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Diameter Signaling Router

Software Upgrade Guide

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CAUTION: Use only the Upgrade procedure included in the Upgrade Kit.

Before upgrading any system, please access My Oracle Support (MOS) (https://support.oracle.com) and review any Technical Service Bulletins (TSBs) that relate to this upgrade.

My Oracle Support (MOS) (https://support.oracle.com) is your initial point of contact for all product support and training needs. A representative at Customer Access Support (CAS) can assist you with MOS registration.

Call the CAS main number at 1-800-223-1711 (toll-free in the US), or call the Oracle Support hotline for your local country from the list at http://www.oracle.com/us/support/contact/index.html.

See more information on My Oracle Support (MOS).

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1. Introduction

1.1 Purpose and Scope

This document describes methods utilized and procedures executed to perform a major upgrade from DSR 8.0.x, 8.1.x, 8.2.x, 8.3.x, to release 8.4, or an incremental upgrade from an earlier DSR 8.4 release. The upgrade of HP C-Class blades, RMS HP servers, and VE-DSR servers is covered by this document. The audience for this document includes Oracle customers and the following internal groups: Software Development, Quality Assurance, Information Development, and Consulting Services including NPx. This document provides instructions to execute any incremental or major software upgrade.

Note: This document does not cover cloud DSR. Refer to [13] for cloud upgrades.

The DSR software release includes all Oracle CGBU Platform Distribution (TPD) software. Any upgrade of TPD required to bring the DSR to release 8.4 occurs automatically as part of the DSR 8.4 software upgrade. The execution of this procedure assumes the DSR 8.4 software load (ISO file, CD-ROM or other form of media) has already been delivered to the customer's premises. This includes delivery of the software load to the local workstation being used to perform this upgrade.

1.1.1 What is Not Covered by this Document

The following items are beyond the scope of this document. Refer to the specified reference for additional information.

- Distribution of DSR software loads. It is recommended to contact MOS for the software loads as described in My Oracle Support (MOS).
- Initial installation of DSR software.
- Firmware upgrade. Refer to [1] (HP) or [3] (Netra).
- PMAC upgrade. Refer to [5].
- SDS upgrade. Refer to [7].
- DSA with USBR is not supported in DSR 8.4.0.5.0 release. See Diameter Security Application User's Guide for migration of DSA configuration data.

1.2 References

[1] DSR 8.4 Cloud Installation Guide

[2] HP Solutions Firmware Upgrade Pack Release Notes

[3] Oracle Firmware Upgrade Pack Upgrade Guide

[4] TVOE 3.5 Upgrade Document

[5] PMAC 6.6 Incremental Upgrade Guide

[6] DSR 8.4 Software Installation Part 2/2

[7] SDS 8.4 Software Upgrade Guide

[8] Maintenance Window Analysis Tool

[9] Fast Deployment and Configuration Tool

[10] DSR 8.4 Disaster Recovery Guide

[11] DSR 8.4 Rack Mount Server Disaster Recovery Guide

[12] Oracle Communications DSR Introducing SCTP Datagram Transport Layer Security (DTLS) In DSR 8.0 By Enabling SCTP AUTH Extensions By Default

[13] DSR 8.4 Cloud Software Upgrade Guide
[14] DSR Alarms and KPIs Reference
[15] Oracle Communications Tekelec Platform 7.5.x Configuration Guide
[16] DSR 8.4 C-Class Software Installation and Configuration Procedure 2/2
[17] DSR 8.4 Benchamarking Guide
[18] Diameter Security Application User's Guide

1.3 Acronyms

An alphabetized list of acronyms used in the document.

Table 1. Acronyms

Acronym	Meaning
ASG	Automated Server Group upgrade
CD-ROM	Compact Disc Read-only Media
CPA	Charging Proxy Agent
CSV	Comma-separated Values
cSBR	Charging Session Binding Repository
DA	Diameter Agent
DA MP	Diameter Agent Message Processor
DB	Database
DP	Data Processor
DR	Disaster Recovery
DSR	Diameter Signaling Router
DSR DR NOAM	Disaster Recovery DSR NOAM
FABR	Full Address Based Resolution
FOA	First Office Application
GA	General Availability
GPS	Global Product Solutions
GUI	Graphical User Interface
HA	High Availability
IDIH	Integrated Diameter Intelligence Hub
iLO	Integrated Lights Out (HP)
IMI	Internal Management Interface
IP	Internet Protocol
IPM	Initial Product Manufacture
IPFE	IP Front End
ISO	ISO 9660 file system (when used in the context of this document)

Acronym	Meaning
LA	Limited Availability
LOM	Lights Out Manager (Netra)
MOP	Method of Procedure
MP	Message Processing or Message Processor
MW	Maintenance Window
NE	Network Element
NOAM	Network OAM
OA	HP Onboard Administrator
OAM	Operations, Administration and Maintenance
OFCS	Offline Charging Solution
PCA	Policy and Charging Agent (formerly known as PDRA)
PDRA	Policy Diameter Routing Agent
PM&C/PMAC	Platform Management and Configuration
RMS	Rack Mount Server
SBR	Session Binding Repository
SDS	Subscriber Database Server
SOAM	System OAM
TPD	Tekelec Platform Distribution
TVOE	Tekelec Virtualized Operating Environment
UI	User Interface
VIP	Virtual IP
VPN	Virtual Private Network
XMI	External Management Interface
XSI	External Signaling Interface

1.4 Terminology

This section describes terminology as it is used within this document.

Table 2. Terminology

Term	Definition
Upgrade	The process of converting an application from its current release on a system to a newer release.
Major Upgrade	An upgrade from one DSR release to another DSR release, for example, DSR 8.0 to DSR 8.4.
Incremental Upgrade	An upgrade within a given DSR release, for example, 8.4.x to 8.4.y.
Release	Release is any particular distribution of software that is different from any other distribution.

Term	Definition
Source release	Software release to upgrade from.
Target release	Software release to upgrade to.
Single Server Upgrade	The process of converting a DSR 8.0/8.1/8.2 server from its current release to a newer release.
Blade (or Managed Blade) Upgrade	Single Server upgrade performed on a blade. This upgrade requires the use of the PMAC GUI.
Backout	The process of converting a single DSR 8.4 server to a prior version. This could be performed due to failure in Single Server Upgrade or the upgrade cannot be accepted for some other reason. Backout is a user initiated process.
Rollback	Automatic recovery procedure that puts a server into its pre-upgrade status. This procedure occurs automatically during upgrade if there is a failure.
Primary NOAM Network Element	The network element containing the active and standby NOAM servers in a DSR. If the NOAMs are deployed on a rack-mount server (and often not co-located with any other site), that RMS is considered the primary NOAM network element. If the NOAMs are virtualized on a C-class blade that is part of one of the sites, then the primary NOAM network element and the signaling network element hosting the NOAMs are one and the same.
Signaling Network Element	Any network element that contains DA-MPs (and possibly other C-level servers), thus carrying out Diameter signaling functions. Each SOAM pair and its associated C-level servers are considered a single signaling network element. And if a signaling network element includes a server that hosts the NOAMs, that signaling network element is also considered to be the primary NOAM network element.
Geographic Site	A Geographic Site is defined as the physical location of a SOAM and its co-located children, as well as its non-preferred spare SOAM(s). In this document, a Geographic Site is designated as **GSite**.
Topological Site	A Topological Site is defined as a SOAM Server Group and all C-level Server Groups that are children of the SOAM. All servers within a server group belong to the server group's site, regardless of the physical location of the server. Thus, for upgrade, a Topological Site does not correlate to a 'network element' or a 'place'. In this document, a Topological Site is designated as **TSite**.
Health Check	Procedure used to determine the health and status of the DSR's internal network. This includes status displayed from the DSR GUI and PMAC GUI. This can be observed pre-server upgrade, in-progress server upgrade, and post-server upgrade.
Upgrade Ready	State that allows for graceful upgrade of a server without degradation of service. It is a state that a server is required to be in before upgrading. The state is defined by the following attributes: • A backup file is present in **/var/TKLC/db/filemgmt**. • Not in **Accept** or **Reject** state.
UI	User Interface. Platcfg UI refers specifically to the Platform Configuration Utility User Interface, which is a text-based user interface.
Management server	Server deployed with HP c-class or RMS used to host PMAC application, to configure Cisco 4948 switches, and to serve other configuration purposes.

Term	Definition
PMAC application	PMAC is an application that provides platform-level management functionality for HPC/RMS system, such as the capability to manage and provision platform components of the system so it can host applications.
N+0	Set up with N active DA-MP(s), but no standby DA-MP.
NOAM	Network OAM for DSR.
SOAM	System OAM for DSR.
Migration	Changing policy and resources after upgrade (if required). For example, changing N+ 0 (multiple active) policies.
RMS geographic site	Two rack-mount servers that together host 1) a NOAM HA pair; 2) a SOAM HA pair; 3) two DA-MPs N+0 configuration; 4) optional IPFE(s); 5) optional IDIH.
RMS Diameter site	One RMS geographic site implemented as a single Diameter network element.
Software Centric	The business practice of delivering an Oracle software product, while relying upon the customer to procure the requisite hardware components. Oracle provides the hardware specifications, but does not provide the hardware, and is not responsible for hardware installation, configuration, or maintenance.
Enablement	The business practice of providing support services (hardware, software, documentation, etc) that enable a 3rd party entity to install, configuration, and maintain Oracle products for Oracle customers.

1.5 How to Use this Document

When executing the procedures in this document, there are a few key points that help ensure the user understands procedure convention. These points are:

1. Before beginning a procedure, completely read the instructional text (it displays immediately after the Section heading for each procedure) and all associated procedural WARNINGS or NOTES.
2. Before execution of a STEP within a procedure, completely read the left and right columns including any STEP specific WARNINGS or NOTES.
3. If a procedural STEP fails to execute successfully or fails to receive the desired output, STOP the procedure. It is recommended to contact My Oracle Support (MOS) for assistance, as described in Appendix CC before attempting to continue.

Figure 1 shows an example of a procedural step used in this document.

- Any sub-steps within a step are referred to as step X.Y. The example in Figure 1 shows steps 1 and step 2 and substep 2.1.
- GUI menu items, action links, and buttons to be clicked on are in bold Arial font.
- GUI fields and values to take note of during a step are in bold Arial font.

Each step has a checkbox the user should check to keep track of the progress of the procedure.

The Title column describes the operations to perform during that step.

Each command the user enters, and any response output, is formatted in 10-point `Courier` font.

	Title/Instructions	Directive/Result Steps
1. ☐	Change directory	Change to the backout directory. `$ cd /var/TKLC/backout`
2. ☐	Verify Network Element data	View the Network Elements configuration data; verify the data; save and print report. 1. Select **Configuration > Network Elements** to view Network Elements Configuration screen.

Figure 1. Example Procedure Steps Used in This Document

1.6 Recommendations

This section provides some recommendations to consider when preparing to execute the procedures in this document.

1.6.1 Frequency of Health Checks

The user may execute the **Perform Health Check** or **View Logs** steps repetitively between procedures during the upgrade process. It is not recommended to do this between steps in a procedure, unless there is a failure to troubleshoot.

1.6.2 Large Installation Support

For large systems containing multiple Signaling Network Elements, it is impossible to upgrade multi-site systems in a single maintenance window. However, primary and DR NOAM (if equipped) Network Element servers should be upgraded within the same maintenance window.

1.6.3 Logging of Upgrade Activities

It is a best practice to use a terminal session with logging enabled to capture user command activities and output during the upgrade procedures. These can be used for analysis in the event of issues encountered during the activity. These logs should be saved off line at the completion of the activity.

1.7 Warnings, Cautions, and Notes

This section presents notices of warnings and cautions that directly relate to the success of the upgrade. It is imperative that each of these notices be read and understood before continuing with the upgrade. If there are any conflicts, issues, or questions related to these notices, it is recommended to contact My Oracle Support (MOS) as directed in Appendix CC before starting the upgrade.

1.7.1 Obsolete Hardware Check

Due to the enhanced processing capabilities and requirements of DSR release 8.4, HP Gen6 and Gen7 hardware are NOT supported. All Gen6 and Gen7 blades must be replaced with supported hardware before upgrading to release 8.4.

!!WARNING!!

HP GEN6 AND GEN7 HARDWARE ARE NOT SUPPORTED IN DSR 8.4. ALL GEN6 AND GEN7 BLADES MUST BE REPLACED WITH SUPPORTED HARDWARE BEFORE UPGRADING TO 8.4.

1.7.2 Network IDIH Compatibility

Upgrading an IDIH site to release 8.4 makes it incompatible for viewing network trace data contained in remote IDIH sites that are running a prior release. The incompatibility is removed once all Network IDIH systems have been upgraded to release 8.4.

To view network traces for a network of IDIH systems where there is a mix of systems running release 8.4 and systems running a prior release, Procedure 65 in Appendix N must be executed to prepare the systems running IDIH release 8.4 to support IDIH systems running the prior release. After executing Procedure 65, network traces should be viewed only from an IDIH system running the prior IDIH release. Viewing a network trace from an IDIH 8.4 results in a visualization that is incomplete because the IDIH 8.4 system fails to retrieve Trace Transaction Records (TTRs) from IDIH systems running the prior IDIH release.

When all IDIH systems have been upgraded to release 8.4, Procedure 66 should be executed on each IDIH system where Procedure 65 was previously executed to ensure that no errors occur when viewing network traces.

1.7.3 Review Release Notes

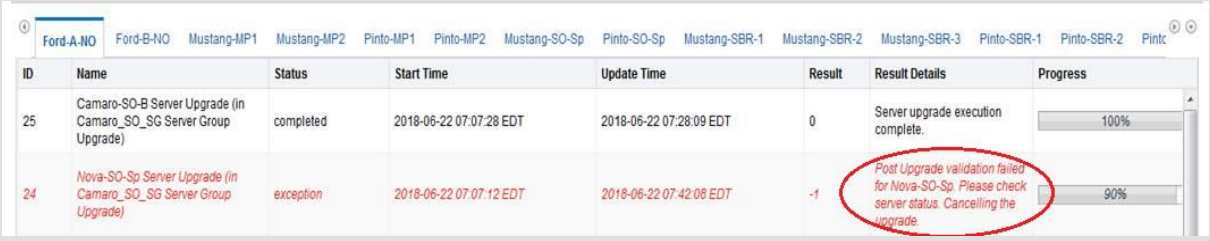
Before starting the upgrade, it is recommended to review the Release Notes for the DSR 8.4 release to understand the functional differences and possible traffic impacts of the upgrade.

1.7.4 Upgrade Check

WARNING

If this error displays, contact My Oracle Support (MOS).

"Post Upgrade validation failed for <server_name>. Please check server status. Cancelling the upgrade."



Caution

SDS Upgrade

If the customer deployment has both the FABR and PCA features enabled, then upgrade the DSR nodes first before upgrading the SDS nodes.

2. General Description

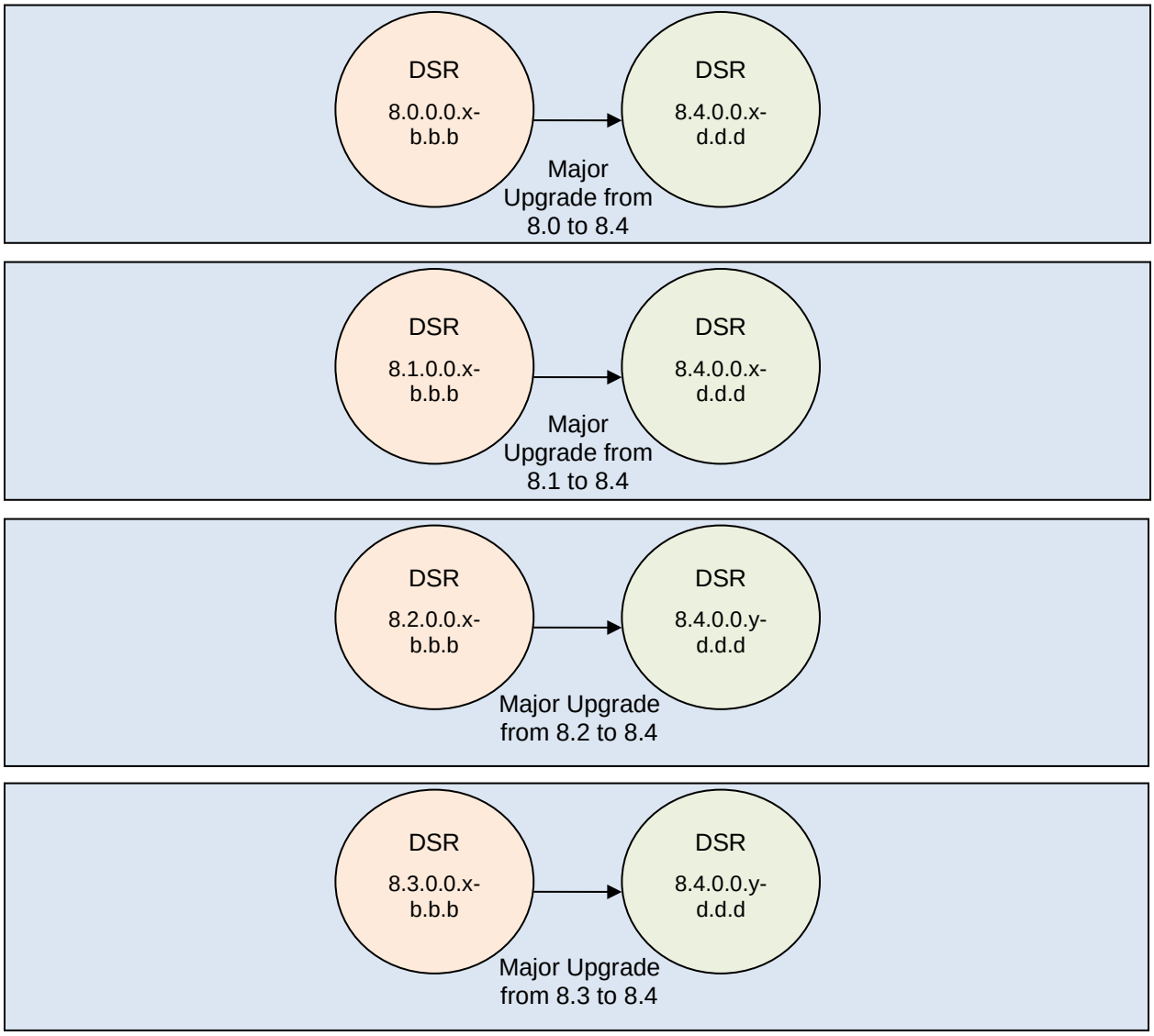
This document defines the procedures needed to upgrade an in-service DSR from the source release to the target release. A major upgrade advances the DSR from the source release to the target release. An incremental upgrade advances the DSR from an earlier DSR 8.4 source release to later version of the same target release.

Note: With any incremental upgrade, the source and target releases must have the same value of **x**. For example, advancing a DSR from 8.4.0.0.0_84.x.y to 8.4.0.0.0_84.z.k is an incremental upgrade. But, advancing a DSR running a 8.0 release to an 8.4 target release constitutes a major upgrade.

2.1 Supported Upgrade Paths

The supported upgrade paths to a DSR 8.4 target release are shown in Figure 2.

Note: DSR upgrade procedures assume the source and target releases are the GA or LA builds in the upgrade path.



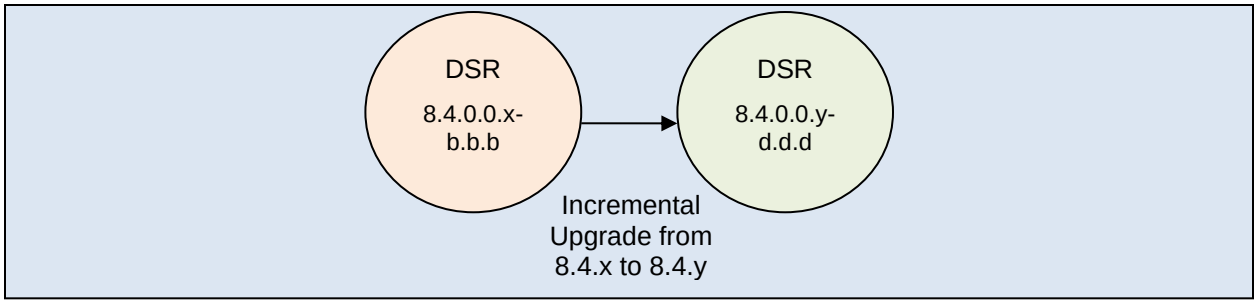


Figure 2. DSR 8.4 Supported Upgrade Paths

2.2 Supported Hardware

If hardware is not provided by Oracle, then all Gen6 and Gen7 blades must be replaced with supported hardware before upgrading to release 8.4.

Due to the enhanced processing capabilities and requirements of DSR release 8.4, HP Gen6 and Gen7 hardware are NOT supported. All Gen6 and Gen7 blades must be replaced with supported hardware before upgrading to release 8.4.

!!WARNING!! HP GEN6 and GEN7 hardware are not supported in DSR 8.4. All GEN6 and GEN7 blades must be replaced with supported hardware before upgrading to 8.4.

2.3 Geo-Diverse Site (Active/Standby/Spare PCA Configuration)

With a geo-diverse site, the upgrade of the SOAM active/standby servers must also include an upgrade of the spare SOAM at the geo-redundant site, in the same maintenance window.

2.4 Firmware Updates

This section is not applicable to Software Centric upgrades.

Firmware upgrades are not in the scope of this document but may be required before upgrading DSR. It is assumed that these are completed when needed by the hardware, and there is typically not a dependency between a firmware version and the DSR release. See the DSR Release Notes for any dependencies.

2.5 TVOE Upgrade

TVOE (Virtual Operating Environment) is a hypervisor, which hosts multiple virtual servers on the same hardware. It is typically used to make more efficient use of a hardware server (Rack Mount or Blade), while maintaining application independence, for DSR applications that do not require the full resources of a modern hardware server.

In DSR architecture, TVOE hosts are typically used to host several functions, including:

- PMAC
- DSR NOAM and SOAM Applications
- SDS SOAM Applications
- IDIH

TVOE host servers may also be used to host other DSR functions, including DA-MPs and IPFEs in a small deployment.

TVOE host servers (that is, servers running TVOE + one or more DSR applications) must be upgraded before upgrading the guest applications, to assure compatibility. However, TVOE is backward compatible with older application versions, so the TVOE host and the applications do not have to be upgraded in the same maintenance window.

The TVOE server hosting PMAC, as well as the PMAC application, must be upgraded before other TVOE host upgrades, since PMAC is used to perform the TVOE upgrades.

There are three supported strategies for site TVOE upgrades (Options A, B and C):

- Option A: Upgrade TVOE environments as a separate activity that is planned and executed days or weeks before the application upgrades (perhaps site-at-a-time)
- Options to Upgrade TVOE and applications in the same maintenance window:
  - Option B: Upgrade a TVOE and application, followed by another TVOE and application. For example: for standby SOAM upgrade – stop the application, upgrade TVOE, upgrade the application, start the application; then repeat for the active SOAM. (preferred)
  - Option C: Upgrade multiple TVOE hosts at a site, and then start upgrading the applications (same maintenance window)

Note: TVOE upgrades require a brief shutdown of the guest application(s) on the server.

Note: The TVOE virtual hosts may be hosting NOAM or SOAM applications. These applications are also affected, including a forced switchover if the active NOAM/SOAM is shut down.

Note: Database (DB) replication failure alarms may display during an Automated and Manual Site Upgrade or during an event that resets multiple servers in parallel. The DB on the child servers is not updated until resolved. Refer to Appendix Z to resolve this issue.

The procedure for upgrading TVOE environments in advance of the application upgrades (Option A) is documented in Section 3.4.6.

2.6 PMAC (Management Server) Upgrades

Each site may have a PMAC (Management Server) that provides support for maintenance activities at the site. The upgrade of the PMAC (and the associated TVOE) is documented in a separate procedure (see Ref [5]). PMAC must be upgraded before the other servers at the site are upgraded.

If a PMAC upgrade is required, this activity is directed in Section 3.3.1 of this document.

2.7 SDS Upgrade

It is recommended to upgrade the SDS topology (NOAMs, SOAMs, DPs) before the DSR topology. See [7] for SDS upgrade documentation.

Caution

SDS Upgrade

If the customer deployment has both the FABR and PCA features enabled, then upgrade the DSR nodes first before upgrading the SDS nodes.

2.8 Traffic Management during Upgrade

The upgrade of the NOAM and SOAM servers is not expected to affect traffic processing at the DA-MPs and other traffic-handling servers.

For the upgrade of the DA-MPs and IPFEs, traffic connections are disabled only for the servers being upgraded. The remaining servers continue to service traffic.

!!WARNING!! SCTP Datagram Transport Layer Security Change

Oracle introduced SCTP Datagram Transport Layer Security (DTLS) in DSR 7.1 by enabling SCTP AUTH extensions by default. SCTP AUTH extensions are required for SCTP DTLS. However, there are known impacts with SCTP AUTH extensions as covered by the CVEs referenced in [12]. It is highly recommended that customers upgrading to release 8.4 should prepare clients before the DSR is upgraded. This ensures the DSR-to-Client SCTP connection establish with DTLS with SCTP AUTH extensions enabled.

If customers DO NOT prepare clients to accommodate the DTLS changes, then the SCTP connections to client devices do NOT restore after the DSR is upgraded to DSR 8.4. In the event that the SCTP connections do not re-establish after the upgrade, follow the Disable/Enable DTLS procedure in [6].

2.9 RMS Deployments

All RMS deployments are 3-Tier. In these smaller deployments, the Message Processing (DA-MP and IPFE) servers are also virtualized (deployed on a Hypervisor Host) to reduce the number of servers required.

When an RMS-based DSR has no geographic redundancy, there is just a single RMS geographic site, functioning as a single RMS Diameter site. The upgrade of this DSR deployment should be done in two maintenance windows: one for the NOAMs, and the second for all remaining servers.

When an RMS-based DSR includes geographic redundancy, there are two RMS geographic sites (but still functioning as a single RMS Diameter site). The primary RMS site contains the NOAM active/standby pair that manages the network element, while the geo-redundant RMS site contains a disaster recovery NOAM pair. Each RMS geographic site includes its own SOAM pair, but only the SOAMs at the primary RMS site are used to manage the signaling network element. The SOAMs at the geo-redundant site are for backup purposes only.

The upgrade of an RMS DSR deployment should be done in three maintenance windows: one for the NOAMs; a second for the SOAMs and MPs (DA-MP and IPFE) at the geo-redundant backup RMS site; and a third for the SOAMs and MPs (DA-MP and IPFE) at the primary RMS site.

2.10 Automated Site Upgrade

In DSR 8.4, there are multiple methods available for upgrading a site. The newest and most efficient way to upgrade a site is the Automated Site Upgrade feature. As the name implies, this feature upgrades an entire site (SOAMs and all C-level servers) with a minimum of user interaction. Once the upgrade is initiated, the upgrade automatically prepares the server(s), performs the upgrade, and sequences to the next server or group of servers until all servers in the site are upgraded. The server upgrades are sequenced in a manner that preserves data integrity and processing capacity.

Automated Site Upgrade can be used to upgrade the DSR servers. However, Automated Site Upgrade cannot be used to upgrade PMAC, TVOE, or IDIH servers at a site.

An important definition with regard to a site upgrade is the **site**. For the purposes of DSR site upgrade, a **site** is defined as a SOAM server group plus all subtending servers of that server group, **regardless of physical location**. To demonstrate this definition, Figure 3 shows three physical locations, labeled **TSite 1**, **TSite 2**, and **TSite 3**. Each site contains a SOAM server group and an MP server group. Each SOAM server group has a spare SOAM that, although physically located at another site, is a member of the site that “owns” the server group. With site upgrade, SOA-Sp is upgraded with the Site 1 SOA server group, and SOB-sp is upgraded with the Site 2 SOB server group. The MP server groups are upgraded

in the same maintenance window as their respective site SOAMs. These sites conform to the **Topological Site** definition of Table 2. Terminology.

With this feature, a site upgrade can be initiated on SO-A SG and all of its children (in this example, MP1 SG) using a minimum of GUI selections. The upgrade performs the following actions:

1. Upgrades SOA-1, SOA-2, and SOA-sp
2. Upgrades the servers in MP1 SG based on an availability setting and HA roles
3. Immediately begins the upgrade of any other server groups which are also children of SO-A SG (not shown). These upgrades begin in parallel with step 2.

Server groups that span sites (for example, SOAMs and SBRs) are upgraded with the server group to which the server belongs. This results in upgrading spare servers that physically reside at another site, but belong to a server group in the SOAM that is targeted for site upgrade.

Note: Automated Site Upgrade does not automatically initiate the upgrade of TSite 2 in parallel with TSite 1. However, the feature does allow the user to initiate Automated Site Upgrade of multiple sites in parallel **manually**.

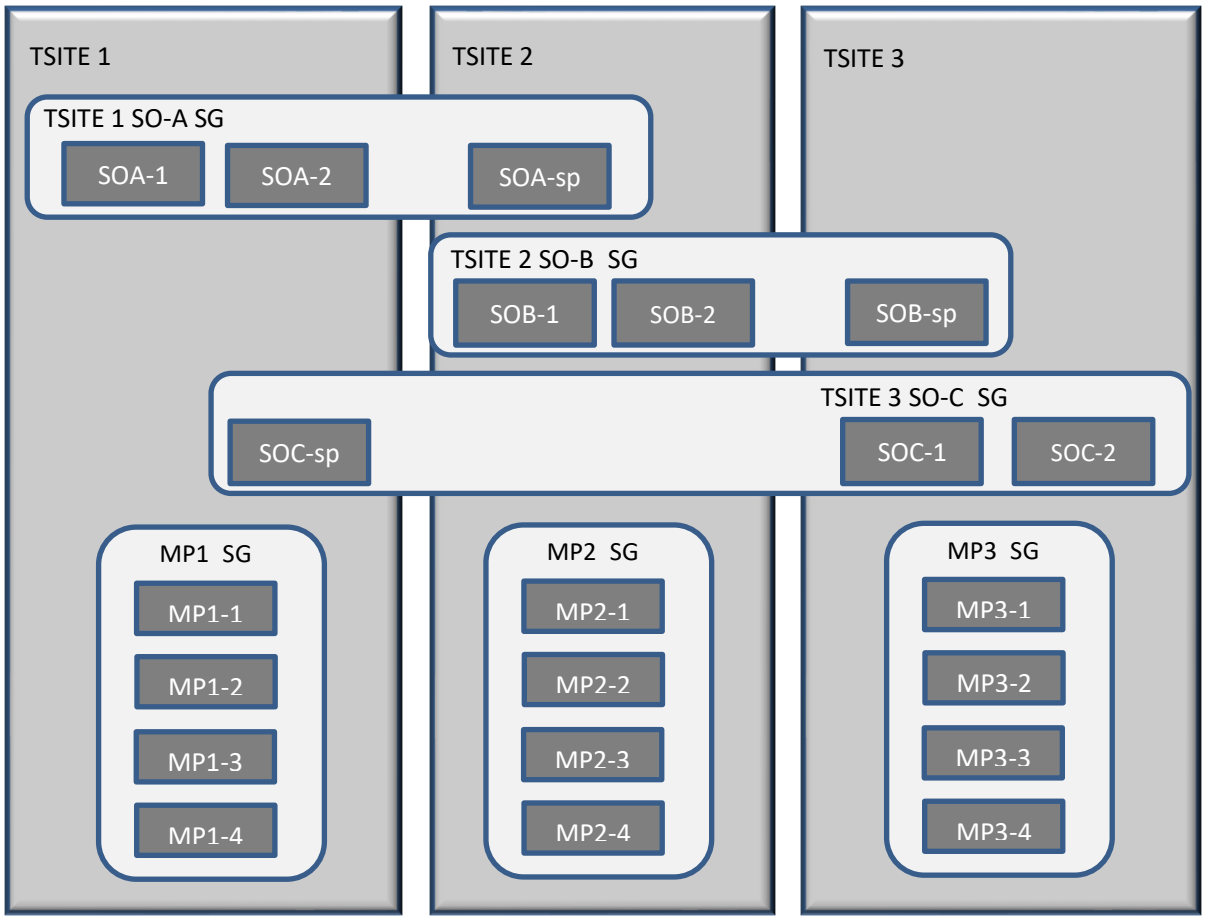


Figure 3. Upgrade Perspective of DSR Site Topology

Caution

Limitations of Automated Site Upgrade and Options

Limitations of automated server upgrade, detailed in Appendix X, also apply for an automated site upgrade, but can be solved by

	rearranging/adding the upgrade cycles. If you do not want to create a custom upgrade plan by rearranging/adding cycles, then manually upgrade using the method described in section 4.3.

2.10.1 Pre-Check

Before continuing with upgrade, check the HA state of the servers.

Execute this command to find the HA state of the servers:

```
$ ha.mystate
```

```
[admusr@E1B581DAMP1 ~]$ ha.mystate
        resourceId      role       node  DC   subResources          lastUpdate
--------------------------------------------------------------------------------
     DbReplication   Stb/Stb  C2016.086   *              0     170915:023010.572
               VIP   Stb/Stb  C2016.086   *              0     170915:023010.530
    CacdProcessRes   Stb/OOS  C2016.086   *              0     170915:023010.530
      DA_MP_Leader   Act/OOS  C2016.086   *              0     170915:023010.932
          DSR_SLDB   OOS/OOS  C2016.086   *           1-63     170913:121610.839
          DSR_SLDB   Act/OOS  C2016.086   *              0     170915:023010.934
         VIP_DA_MP   OOS/OOS  C2016.086   *           1-63     170913:121610.840
         VIP_DA_MP   Act/OOS  C2016.086   *              0     170915:023010.933
  EXGSTACK_Process   OOS/OOS  C2016.086   *           1-63     170913:121610.841
  EXGSTACK_Process   Act/OOS  C2016.086   *              0     170915:023010.933
       DSR_Process   OOS/OOS  C2016.086   *           1-63     170913:121610.841
       DSR_Process   Act/OOS  C2016.086   *              0     170915:023010.932
    CAPM_HELP_Proc   Stb/OOS  C2016.086   *              0     170915:023010.530
       DSROAM_Proc   Stb/OOS  C2016.086   *              0     170915:023010.530
    CAPM_PSFS_Proc   Stb/Stb  C2016.086   *              0     170915:023010.530
```

Note: In case there are more than one server in the same HA state (active), then manually switchover the server HA state using HA management screen before continuing the upgrade procedure.

To check the status of CPU/RAM on NOAM/SOAM servers, execute the following commands:

- `cat /proc/meminfo |grep MemTotal`
- `cat /proc/cpuinfo |grep processor`

2.10.2 Site Upgrade Execution

With Automated Site Upgrade, the upgrade is initiated from the **Administration > Software Management > Upgrade** GUI. Upon initial entry to this screen, the user is presented with a tabbed display of the NOAM server group and SOAM sites (Figure 4). When the NOAM server group tab is selected (as shown in Figure 4), this screen is largely unchanged from the upgrade screen of previous releases. The NOAM server group servers are displayed with the usual assortment of buttons. On this screen, **Auto Upgrade** refers to Automated Server Group upgrade, not Automated Site Upgrade. The site upgrade feature becomes available once a SOAM server group tab is selected. The SOAM server group tabs correspond to the topological sites (TSites).

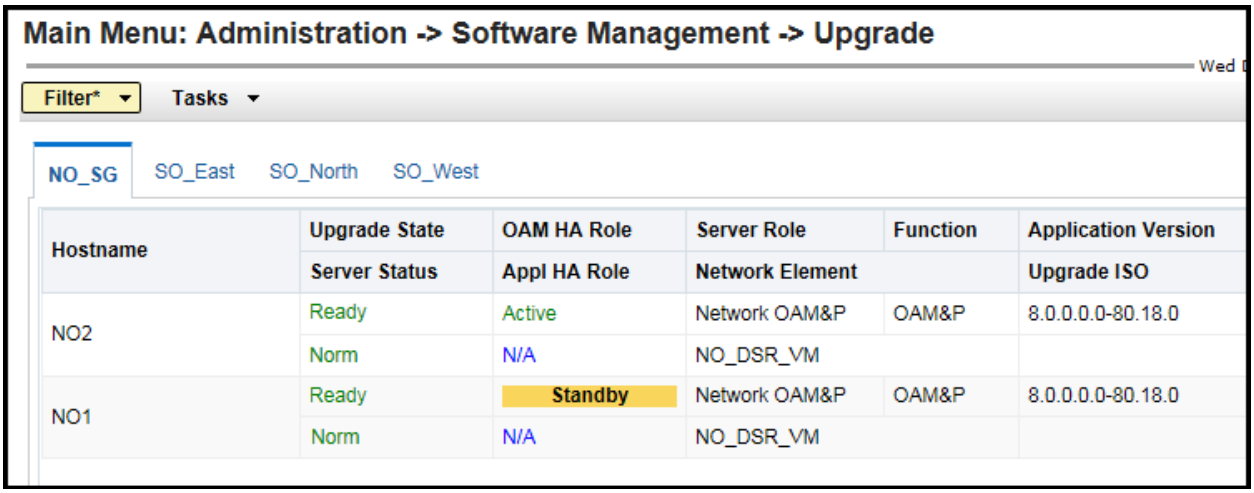


Figure 4. Site Upgrade – NOAM View

After selecting a SOAM site tab on the Upgrade Administration screen, the site summary screen displays (Figure 5). Just below the row of NOAM and SOAM tabs is a row of links related to the selected SOAM site. The first link on the site summary screen displays the **Entire Site** view. In the entire site view, all of the server groups for the site are displayed in table form, with each server group populating one row. An upgrade summary of the server groups is provided in the table columns:

- The **Upgrade Method** column shows how the server group is upgraded. The upgrade method is derived from the server group function and the bulk availability option (see Section 2.10.4 for additional details on bulk availability).
- The **Server Upgrade States** column groups the servers by state, indicating the number of servers in the server group that are in each state.
- The **Server Application Versions** column indicates the current application version, indicating the number of servers in the server group that are at each version.

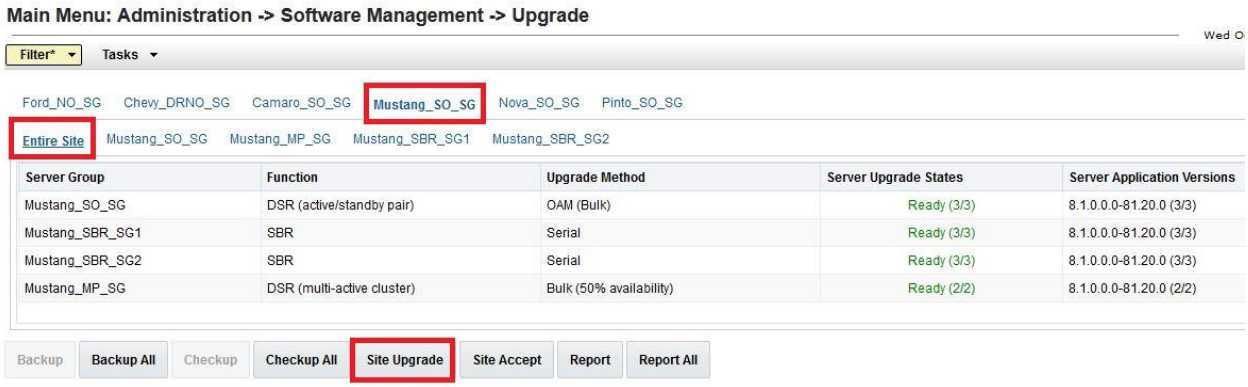


Figure 5. Site Upgrade – Entire Site View

For a server to be considered **Ready** for upgrade, the following conditions must hold true:

- Server has not been upgraded yet
- The FullDBParts and FullRunEnv backup files exist in the filemgmt area

A site is eligible for Automated Site Upgrade when at least one server in the site is upgrade-ready.

Click **Site Upgrade** from the **Entire Site** screen to display the Upgrade Site Initiate screen (Figure 6). The Site Initiate screen presents the site upgrade as a series of upgrade cycles. For the upgrade shown in Figure 6, Cycle 1 upgrades the spare and standby SOAMs in parallel.

Note: This scenario assumes default settings for the site upgrade options. These options are described in Section 2.10.4. The specific servers to be upgraded in each cycle are identified in the **Servers** column of the **Site Initiate** display. Cycle 1 is an atomic operation, meaning Cycle 2 cannot begin until Cycle 1 is complete. Once the spare and standby SOAMs are in **Accept or Reject** state, the upgrade sequences to Cycle 2 to upgrade the active SOAM. Cycle 2 is also atomic – Cycle 3 does not begin until Cycle 2 is complete.

Note: IPFE servers require special handling for upgrade, because IPFE servers are clustered into Target Sets and assigned an IP address, it is called Target Set Assignment (TSA). While upgrading IPFE servers, Automated Site Upgrade makes sure there is no service outage for IPFE while upgrade is in progress (that is, IPFE servers in same TSA are not upgraded in same cycle). If IPFE server address is not configured on screen (**IPFE -> Configuration -> Options**) on active SOAM GUI, that IPFE servers are not included in Upgrade Cycle; therefore, are not considered for upgrade using Automated Site Upgrade.

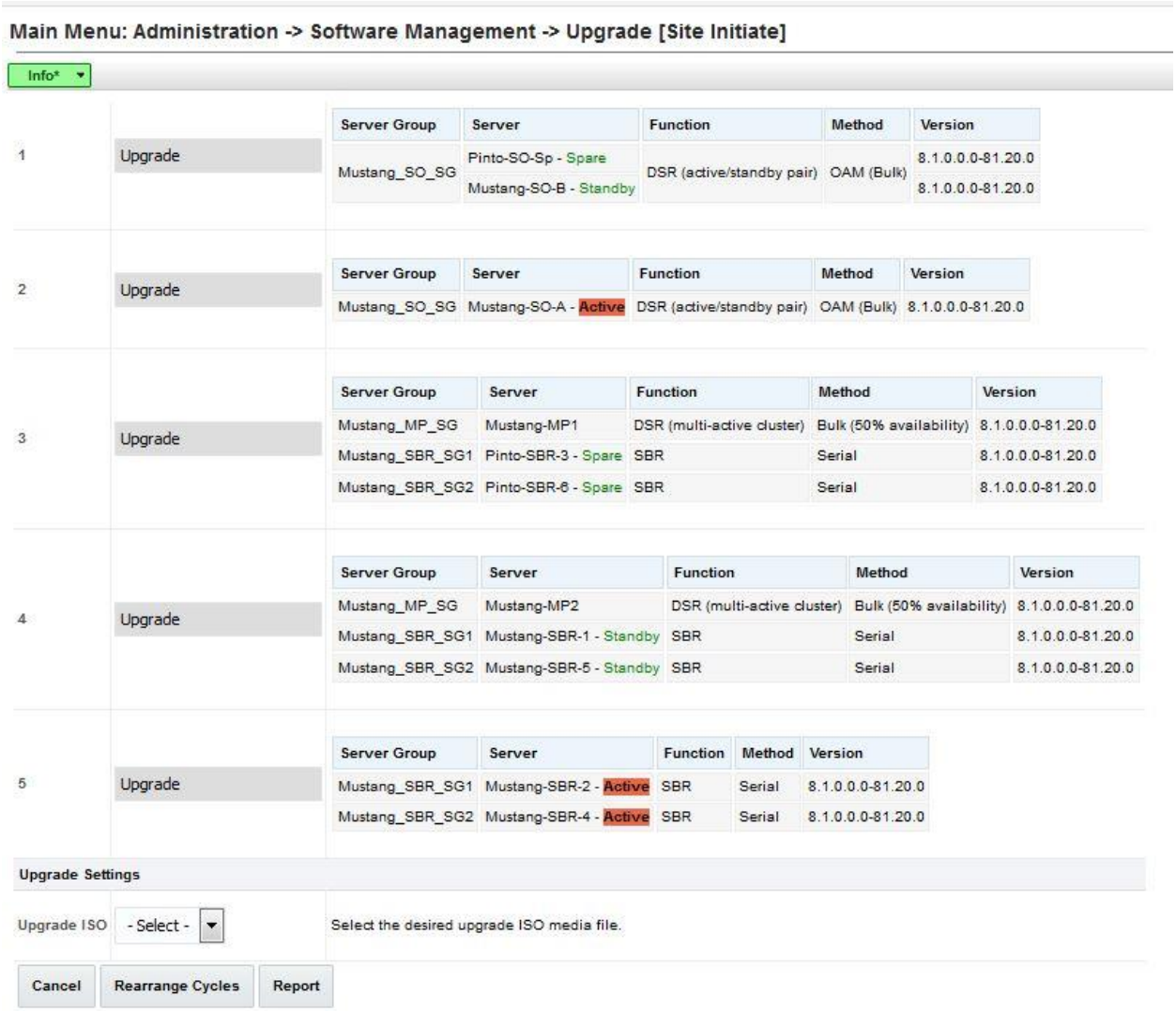


Figure 6. Site Upgrade – Site Initiate Screen

Cycles 3 through 5 upgrade all of the C-level servers for the site. These cycles are **not** atomic.

In Figure 6, Cycle 3 consists of IPFE1, IPFE3, MP1, MP4, and SBR3. Because some servers can take longer to upgrade than others, there may be some overlap in Cycle 3 and Cycle 4. For example, if IPFEs 1 and 3 complete the upgrade before SBR3 is finished (all are in Cycle 3), the upgrade allows IPFEs 2 and 4 to begin, even though they are part of Cycle 4. This is to maximize Maintenance Window efficiency. The primary factor for upgrading the C-level servers is the upgrade method for the server group function (that is, bulk by HA, serial, etc.).

The site upgrade is complete when every server in the site is in the **Accept or Reject** state.

In selecting the servers that are included with each upgrade cycle, particularly the C-level, consideration is given to the server group function, the upgrade availability option, and the HA designation. Table 3 describes the server selection considerations for each server group function.

Note: The minimum availability option is a central component of the server selections for site upgrade. The effect of this option on server availability is described in detail in Section 2.10.3.

Table 3. Server Selection vs Server Group Function

SG Function	Selection Considerations
DSR (multi-active cluster) (for example, DA-MP)	The selection of servers is based primarily on the minimum server availability option. Servers are divided equally (to the extent possible) among the number of cycles required to enforce minimum availability. For DA-MPs, an additional consideration is given to the MP Leader. The MP with the Leader designation is the last DA-MP to be upgraded to minimize leader changes[1].
DSR (for example, DA-MP)	The DA-MP pair configuration is supported for Automated Site Upgrade starting with release 8.4.
DSR (active/standby pair) (for example, SOAM)	The SOAM upgrade method is dependent on the Site SOAM Upgrade option on the General Options page. See section 2.10.4.
SBR	SBRs are always upgraded serially, thus the primary consideration for selection is the HA designation. The upgrade order is spare – spare – standby – active.
IP Front End	IPFEs require special treatment during upgrade. The primary consideration is traffic continuity. Regardless of minimum availability, IPFE A1 is never upgraded at the same time as IPFE A2. They are always upgraded serially. The same restriction applies to IPFE B1 and B2.

[1] In the event of a leader change while upgrades are in progress, the MP leader may not be the last MP to be upgraded.

To initiate the site upgrade, a target ISO is selected from the **ISO** options in the Upgrade Settings section of the Site Initiate screen (Figure 6). Once **OK** is clicked, the upgrade starts, and control returns to the Upgrade Administration screen (Figure 7). With the **Entire Site** link selected, a summary of the upgrade status for the selected site displays. This summary identifies the server group(s) currently upgrading, the number of servers within each server group that are upgrading, and the number of servers that are pending upgrade. This view can be used to monitor the upgrade status of the overall site. More detailed status is available by selecting the individual server group links. The server group view shows the status of each individual server within the selected server group.

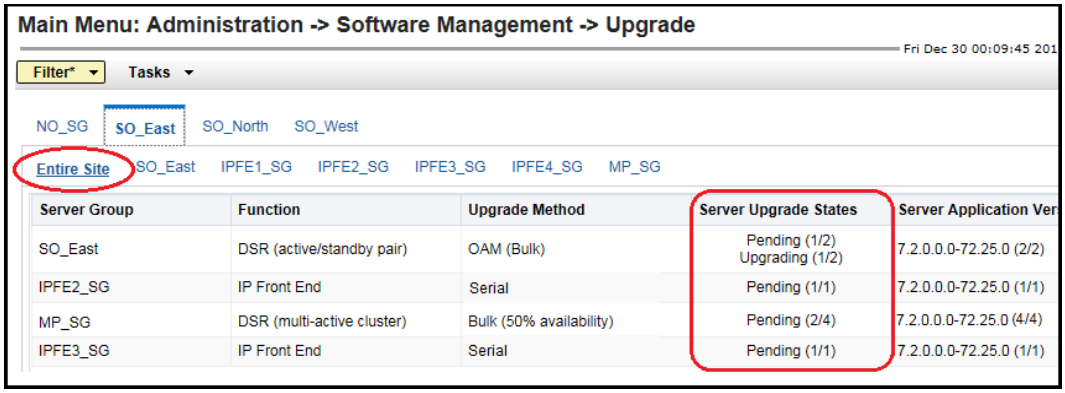


Figure 7. Site Upgrade Monitoring

When a server group link is selected on the upgrade administration screen, the table rows are populated with the upgrade details of the individual servers within that server group (Figure 8).

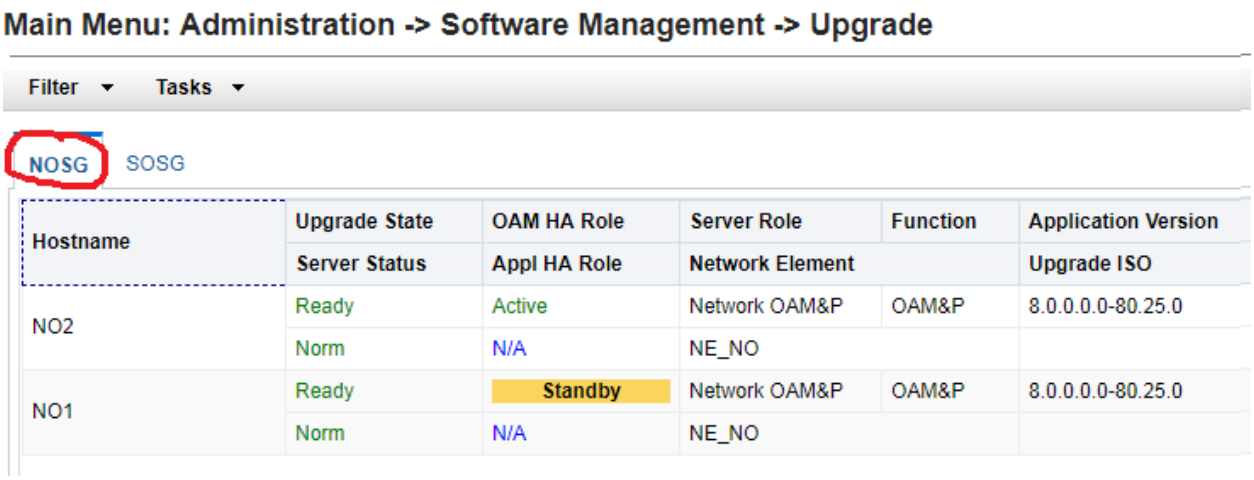


Figure 8. Server Group Upgrade Monitoring

Upon completion of a successful upgrade, every server in the site is in the **Accept or Reject** state. See Section 2.10.5 for a description of cancelling and restarting the Automated Site Upgrade.

2.10.3 Minimum Server Availability

The concept of Minimum Server Availability plays a key role during an upgrade using Automated Site Upgrade. The goal of server availability is to ensure that **at least** a specified percentage of servers (of any given type) remain in service to process traffic and handle administrative functions while other servers are upgrading.

For example, if the specified minimum availability is 50% and there are eight servers of type X, then four servers remain in service while four servers are upgrades. However, if there are nine server of type X, then the minimum availability requires that five servers remain in service while four servers are upgraded. The minimum availability calculation automatically rounds up in the event of a non-zero fractional remainder.

To meet the needs of a wide-ranging customer base, the minimum availability percentage is a user-configurable option. The option allows for settings of 50%, 66%, and 75% minimum availability. There is also a setting of 0% for lab upgrade support. This option is described in detail in Section 3.2.

The application of minimum server availability differs for the various server group functions. For some function types, it is a straight calculation of a percentage. However, for others, minimum availability does not apply due to overriding operational considerations. Table 4 describes the application of availability for the various server group functions.

Table 4. Site Upgrade Availability vs Server Group Function

Server Group Function	Server Availability
DSR (multi-active cluster)	In a multi-active cluster, the availability percentage applies to all of the servers in the server group. The number of servers required to achieve minimum availability are calculated from the pool of in-service servers.
SBR	Availability percentage does not apply to SBR server groups. SBRs are upgraded in a very specific order: spare – spare – standby – active
IP Front End	IPFEs require special treatment during upgrade. The primary consideration is traffic continuity. Regardless of minimum availability, IPFE A1 is never upgraded at the same time as IPFE A2. They are always upgraded serially. The same restriction applies to IPFE B1 and B2.

When calculating the number of servers required to satisfy the minimum server availability, all servers in the server group (or server group cluster) are considered. Servers that are OOS or otherwise unable to perform their intended function, are included, as are servers that have already been upgraded. For example, consider a DA-MP server group with 10 servers; four have already been upgraded, one is OOS, and five are ready for upgrade. With a 50% minimum availability, only four of the servers that are ready for upgrade, can be upgraded in parallel. The four servers that have already been upgraded count toward the five that are needed to satisfy minimum availability. The OOS server cannot be used to satisfy minimum availability, so one of the upgrade-ready servers must remain in-service for minimum availability, thus leaving four servers to be upgraded together. Upgrading the last server would require an additional upgrade cycle.

2.10.4 Site Upgrade Options

To minimize user interactions, the automated site upgrade makes use of a pair of pre-set options to control certain aspects of the sequence. These options control how many servers remain in service while others are upgrading and are located on the **Administration > General Options** screen (Figure 9). The default settings for these options maximize the maintenance window usage by upgrading servers in parallel as much as possible.

Site Upgrade Bulk Availability *	1	Site based upgrade availability for bulk upgrade of MP groups. (0 = none, 1 = 50%, 2 = 66%, 3 = 75%). **** Cannot be changed while any site upgrade is running. **** [Default = 1; Range = 0-3] [A value is required.]
Site Upgrade SOAM Method *	1	Site based upgrade SOAM method. (0 = serial, 1 = bulk). *Note: Bulk upgrade will upgrade all non-active SOAM servers together.* **** Cannot be changed while any site upgrade is running. **** [Default = 1; Range = 0-1] [A value is required.]

Figure 9. Automated Site Upgrade General Options

The first option that affects the upgrade sequence is the **Site Upgrade SOAM Method**. This option determines the sequence in which the SOAMs are upgraded. The default value of 1 considers the OAM HA role of the SOAMs to determine the upgrade order. In this mode, all non-active SOAM servers are upgraded first (in parallel), followed by the active SOAM. This upgrade method requires at most two upgrade cycles to upgrade all of the SOAMs, regardless of how many are present. If there are no spare SOAMs, then this setting has no effect on the SOAM upgrade.

Regardless of the SOAM upgrade method, the active SOAM is always upgraded after the standby and spare SOAMs.

The second option that affects the upgrade sequence is the **Site Upgrade Bulk Availability** setting. This setting determines the number of C-level servers that remain in service during the upgrade. The default setting of **1** equates to 50% availability, meaning that a minimum of one-half of the servers stay in service during the upgrade. The default setting is the most aggressive setting for upgrading the site, requiring the minimum number of cycles, thus the least amount of time. The settings of 66% and 75% increase the number of servers that remain in service during the upgrade.

Note: Increasing the availability percentage may increase the overall length of the upgrade.

The application of minimum server availability varies for the different types of C-level servers. For example, for a multi-active DA-MP server group, the minimum availability applies to all of the DA-MPs within the server group. This same setup applies to IPFEs as well. Table 4 defines how the Site Upgrade Bulk Availability setting on the General Options page affects the various server group function types.

The Site Upgrade General Options cannot be changed while a site upgrade is in progress. Attempting to change either option while a site upgrade is in progress results in:

```
[Error Code xxx] - Option cannot be changed because one or more automated
site upgrades are in progress
```

2.10.5 Cancel and Restart Automated Site Upgrade

When an Automated Site Upgrade is initiated, several tasks are created to manage the upgrade of the individual server groups as well as the servers within the server groups. These tasks can be monitored and managed using the Active Task screen (**Status & Manage > Tasks > Active Tasks**).

The main site upgrade controller task is identified by the naming convention **<site_name> Site Upgrade**. In Figure 10, the main task is task ID 22. This task is controlling the server group upgrade task (task ID 23), which in turn is controlling the server upgrade task (task ID 24).

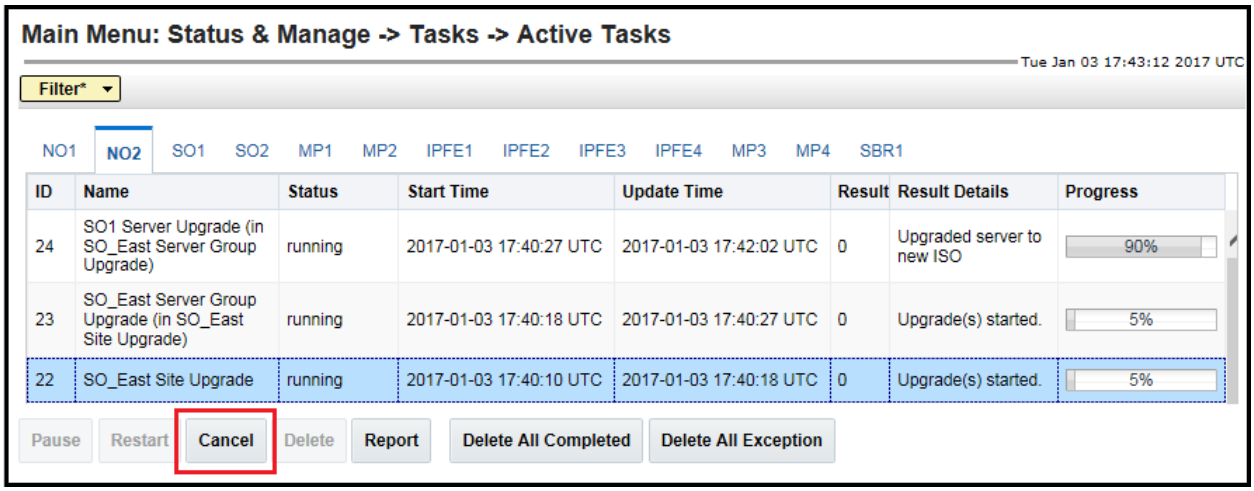


Figure 10. Site Upgrade Active Tasks

To cancel the site upgrade, select the site upgrade task and click **Cancel**. A screen requests confirmation of the cancel operation. The status changes from **running** to **completed**. The Results Details column updates to display **Site upgrade task cancelled by user**. All server group upgrade tasks that are under the control of the main site upgrade task immediately transition to **completed** state. However, the site upgrade cancellation has no effect on the individual server upgrade tasks that are in progress. These tasks continue until completion. Figure 11 shows the Active Task screen after a site upgrade has been cancelled.

Once the site upgrade task is cancelled, it cannot be restarted. However, a new site upgrade can be started using the Upgrade Administration screen.

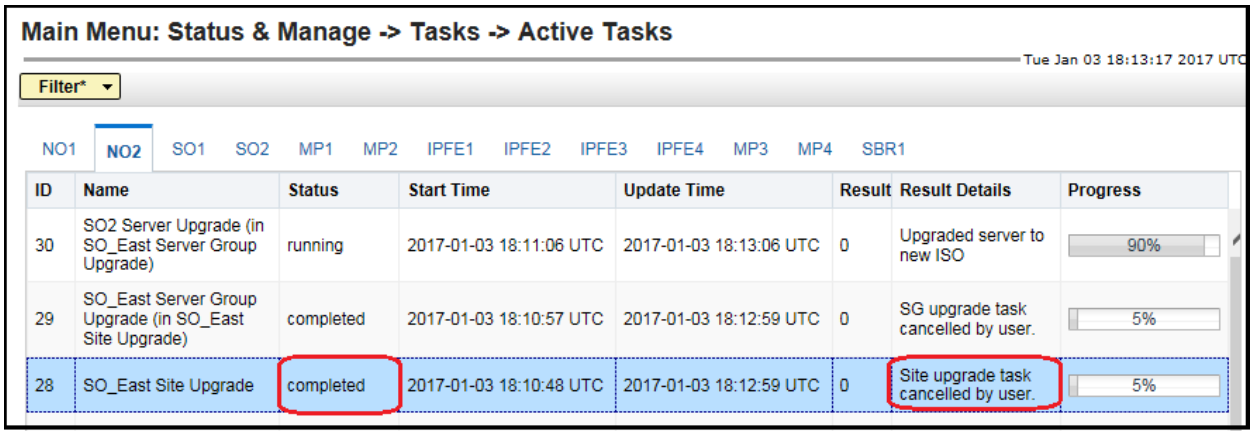


Figure 11. Cancelled Site Upgrade Tasks

Figure 12 is representative of a site upgrade that was cancelled before the site was completely upgraded. The servers that were in progress when the upgrade was cancelled continued to upgrade to the target release. These servers are now in the Accept or Reject state. The servers that were pending when the upgrade was cancelled are now in the Ready state, ready to be upgraded.

To restart the upgrade, verify the **Entire Site** link is selected and click **Site Upgrade**. The Upgrade Site Initiate screen displays.

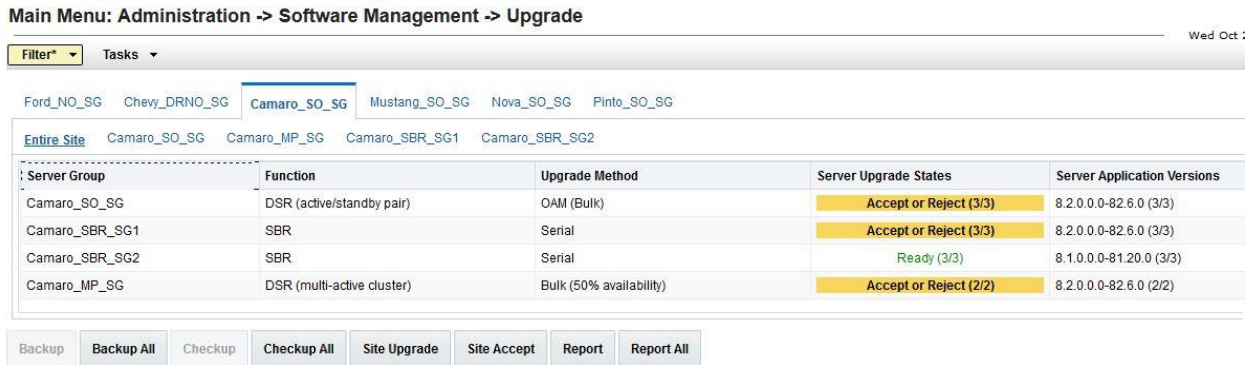


Figure 12. Partially Upgraded Site

On the Upgrade Site Initiate screen, the servers that have not yet been upgraded are grouped into the number of cycles that are required to complete the site upgrade. For the upgrade that was cancelled in Figure 11, only a single cycle is needed since the availability requirements can be met by the servers that have already been upgraded. Once an ISO is selected and **OK** is clicked, the site upgrade continues normally.

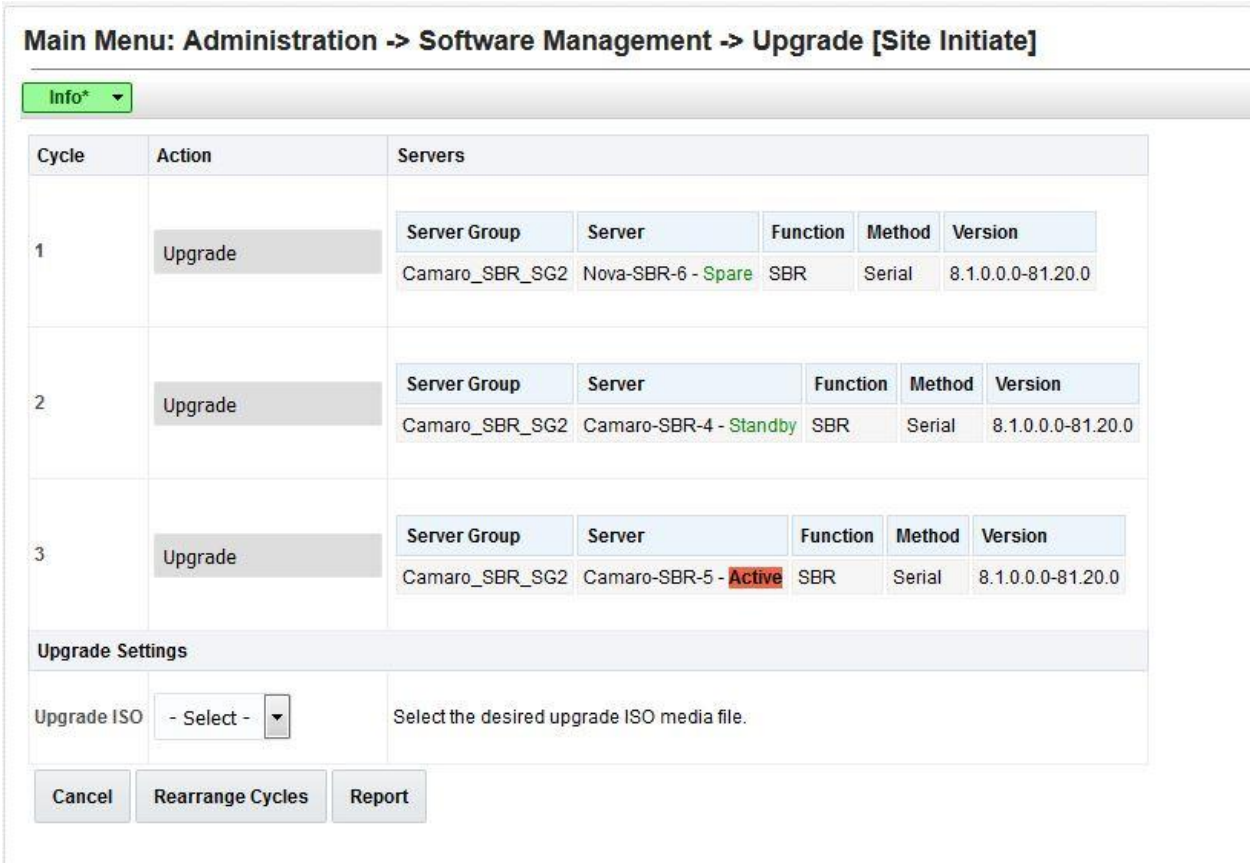


Figure 13. Restarting Site Upgrade

2.11 Automated Server Group Upgrade

The Automated Server Group (ASG) upgrade feature allows the user to upgrade all of the servers in a server group automatically by specifying a set of controlling parameters.

The purpose of ASG is to simplify and automate segments of the DSR upgrade. The DSR has long supported the ability to select multiple servers for upgrade. In doing so however, it was incumbent on the user to determine ahead of time which servers could be upgraded in parallel, considering traffic impact. If the servers were not carefully chosen, the upgrade could adversely impact system operations.

When a server group is selected for upgrade, ASG upgrades each of the servers serially, or in parallel, or a combination of both, while enforcing minimum service availability. The number of servers in the server group that are upgraded in parallel is user selectable. The procedures in this document provide the detailed steps specifying when to use ASG, as well as the appropriate parameters that should be selected for each server group type.

ASG is the default upgrade method for most server group types associated with the DSR. However, there are some instances in which the manual upgrade method is utilized. In all cases where ASG is used, procedures for a manual upgrade are also provided.

Note: To use ASG on a server group, no servers in that server group can be already upgraded – either by ASG or manually.

DSR continues to support the parallel upgrade of server groups, including any combination of automated and manual upgrade methods.

STOP

Limitations of Automated Server Group Upgrade

The limitations of automated site upgrade are detailed inAppendix X.

The Oracle recommendation for any customer whose network aligns with any of the scenarios in Appendix X is that Automated Server Group Upgrade should NOT be used. Use of Auto Server Group Upgrade risks a potential network outage.

2.11.1 Pre-Check

Before continuing with upgrade, check the HA state of the servers.

Execute this command to find the HA state of the servers:

```
$ ha.mystate
```

```
[admusr@E1B581DAMP1 ~]$ ha.mystate
        resourceId      role       node  DC   subResources          lastUpdate
--------------------------------------------------------------------------------
     DbReplication   Stb/Stb  C2016.086   *              0     170915:023010.572
               VIP   Stb/Stb  C2016.086   *              0     170915:023010.530
    CacdProcessRes   Stb/OOS  C2016.086   *              0     170915:023010.530
      DA_MP_Leader   Act/OOS  C2016.086   *              0     170915:023010.932
          DSR_SLDB   OOS/OOS  C2016.086   *           1-63     170913:121610.839
          DSR_SLDB   Act/OOS  C2016.086   *              0     170915:023010.934
         VIP_DA_MP   OOS/OOS  C2016.086   *           1-63     170913:121610.840
         VIP_DA_MP   Act/OOS  C2016.086   *              0     170915:023010.933
  EXGSTACK_Process   OOS/OOS  C2016.086   *           1-63     170913:121610.841
  EXGSTACK_Process   Act/OOS  C2016.086   *              0     170915:023010.933
       DSR_Process   OOS/OOS  C2016.086   *           1-63     170913:121610.841
       DSR_Process   Act/OOS  C2016.086   *              0     170915:023010.932
    CAPM_HELP_Proc   Stb/OOS  C2016.086   *              0     170915:023010.530
       DSROAM_Proc   Stb/OOS  C2016.086   *              0     170915:023010.530
    CAPM_PSFS_Proc   Stb/Stb  C2016.086   *              0     170915:023010.530
```

Note: In case there are more than one server in the same HA state (active), then manually switchover the server HA state using HA management screen before continuing the upgrade procedure.

2.11.2 Cancel and Restart the Automated Server Group Upgrade

When a server group is upgraded using ASG, each server within that server group is automatically prepared for upgrade, upgraded to the target release, and returned to service on the target release. Once an ASG upgrade is initiated, the task responsible for controlling the sequencing of servers entering upgrade can be manually cancelled from the **Status & Manage > Active Tasks** screen (Figure 14) if necessary. Once the task is cancelled, it cannot be restarted. However, a new ASG task can be started using the Upgrade Administration screen.

For example, in Figure 14, task ID #1 (SO_SG Server Group Upgrade) is an ASG task, while task ID #2 is the corresponding individual server upgrade task. When the ASG task is selected (highlighted in green), **Cancel** is enabled. Cancelling the ASG task affects only the ASG task. It has no effect on the individual server upgrade tasks that were started by the ASG task (that is, task ID #2 in Figure 14). Because the ASG task is cancelled, no new server upgrades are initiated by the task.

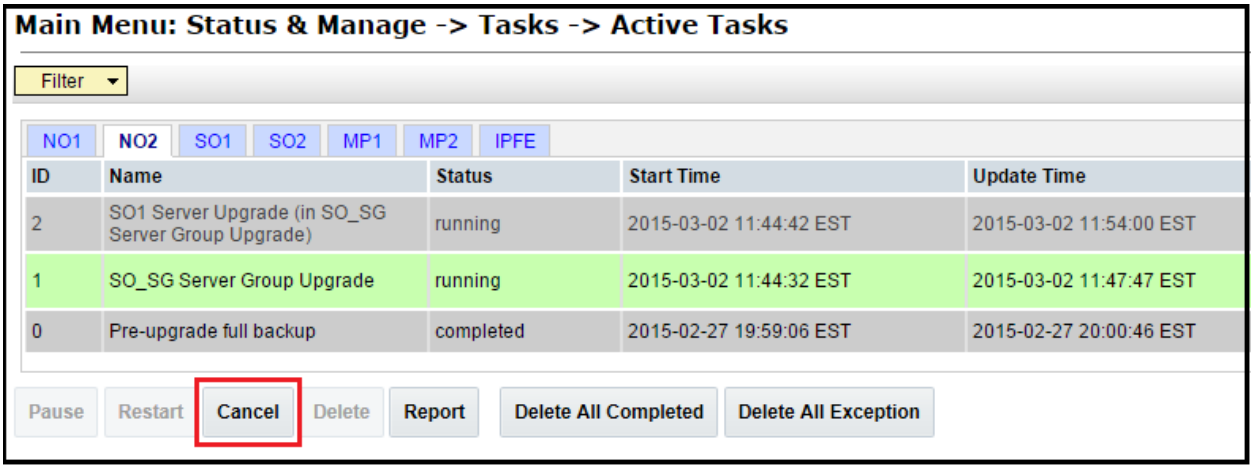


Figure 14. Server Group Upgrade Active Tasks

In the event that a server fails upgrade, that server automatically rolls back to the previous release in preparation for backout_restore and fault isolation. Any other servers in that server group that are in the process of upgrading continue to upgrade to completion. However, the ASG task itself is automatically cancelled and no other servers in that server group are upgraded. Cancelling the ASG task provides an opportunity for troubleshooting to correct the problem. Once the problem is corrected, the server group upgrade can be restarted by initiating a new server group upgrade on the upgrade screen.

2.11.3 Site Accept

Before DSR 8.0, the customer was required to 'Accept' the upgrade of individual servers in each server group of a site. While the Accept is a relatively quick operation, it could nonetheless be a tedious task for larger sites with numerous servers. Starting in DSR 8.0, a new feature has been added to make the upgrade Accept much easier for all customers, large and small.

The **Site Accept** button on the upgrade GUI (Figure 15) provides the capability to simultaneously accept the upgrade of some or all servers for a given site. When the button is clicked, a subsequent screen (Figure 16) displays the servers that are ready for the Accept action.

Figure 15. Site Accept Button

A checkbox on the Upgrade Site Accept screen allows for the selective application of the Accept action. However, normal procedure calls for the Accept to be applied to all of the servers at a site only after the upgrade to the new release is stable and the back out option is no longer needed. After verifying that the information presented is accurate, clicking **OK** results in a screen that requires confirmation of the intended action. Confirming the action causes the server upgrades to be accepted.

The Accept command is issued to the site servers at a rate of approximately one server every second. The command takes approximately 10 seconds per server to complete. As the commands are completed, the server status on the Upgrade Administration screen transitions to **Backup Needed**.

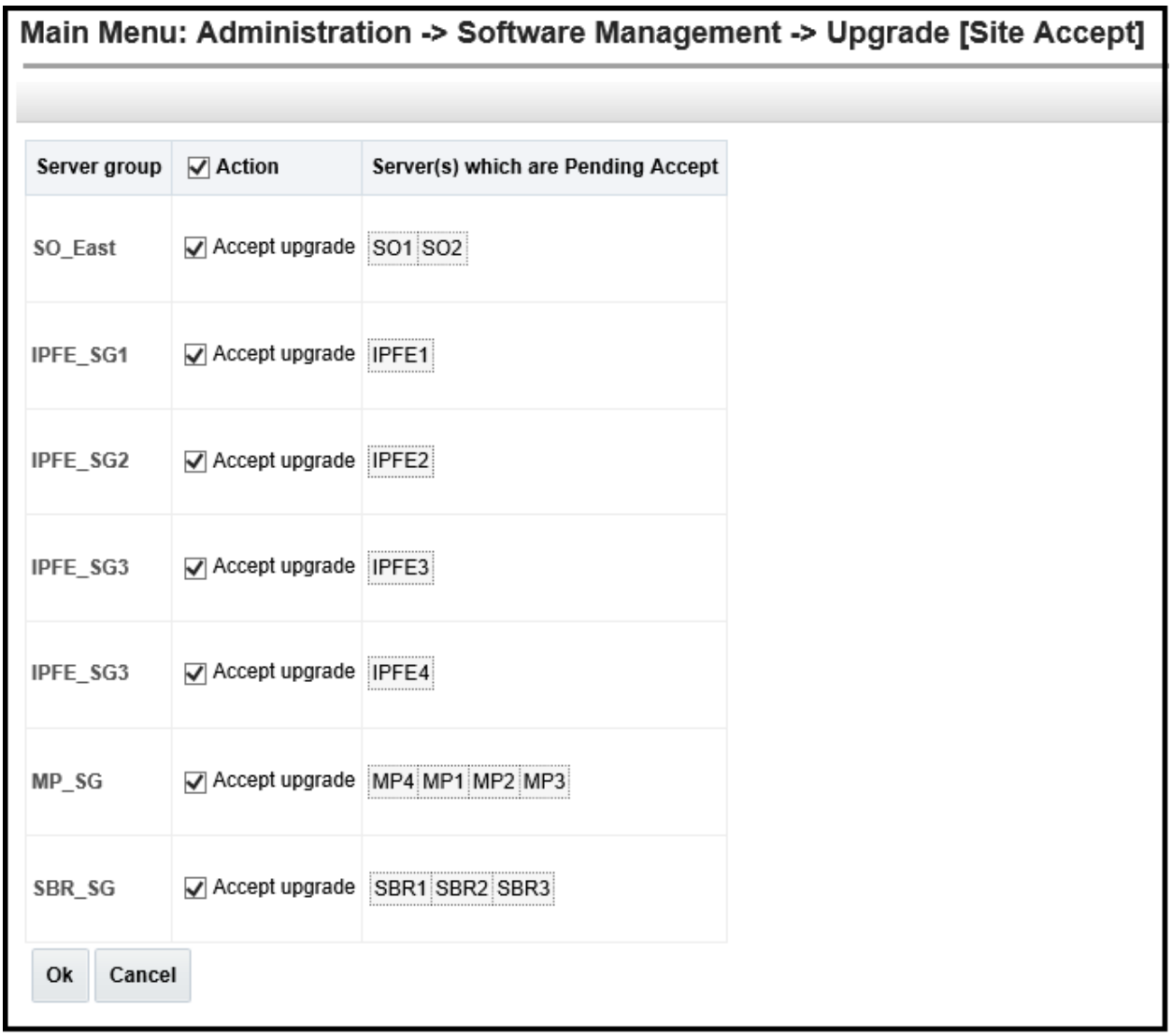


Figure 16. Site Accept Screen

3. Upgrade Planning and Pre-Upgrade Procedures

This section contains all information necessary to prepare for and execute an upgrade. The materials required to perform an upgrade are described, as are pre-upgrade procedures that should be run to ensure the system is fully ready for upgrade. Then, the actual procedures for each supported upgrade path are given.

There are overview tables throughout this document that help plan the upgrade and estimate how long it takes to perform various actions. The stated time durations for each step or group of steps **are estimates only**. Do not use the overview tables to execute any actions on the system. Only the procedures should be used when performing upgrade actions, beginning with Required Materials Check.

Note: While planning for an upgrade, be aware that once an upgrade starts and OAM level servers are on different releases, OAM level provisioning data is not replicated to sites not upgraded yet.

Once servers in the site are upgraded, replication from OAM level serves is restored and upgraded servers start receiving provisioning data.

STOP

Read Section 2.10 Automated Site Upgrade to gather details while planning an upgrade.

Note: If the **31149- DB Late Write Nonactive** alarm displays, ignore it. This alarm does not have any effect on functionality.

3.1 Required Materials and Information

The following materials and information are needed to execute an upgrade:

- Target-release application ISO image file or target-release application media.
- The capability of logging into the DSR 8.x network OAM servers with Administrator privileges.

  Note: All logins into the DSR NOAM servers are made using the External Management VIP unless otherwise stated.
- User logins, passwords, IP addresses and other administration information. See Table 5.
- VPN access to the customer's network is required if that is the only method to log into the OAM servers.
- Direct access to the blades/RMS Integrated Lights Out (iLO)/XMI IP addresses (whichever is applicable) from the workstations directly connected to the DSR servers is required.

3.1.1 Application ISO Image Files/Media

Obtain a copy of the target release ISO image file or media. This file is necessary to perform the DSR application upgrade.

The DSR 8.4 ISO image file name is in the following format:

```
DSR-8.4.0.0.0_83.xx.0-x86_64.iso
```

If TVOE is being upgraded, obtain a copy of the TVOE release ISO image file or media. The TVOE ISO image file name is in the following format:

```
TVOE-7.5.0.0.0_88.xx.0-x86_64.iso
```

Note: Before the execution of this upgrade procedure it is assumed that the ISO image files have already been delivered to the site by the customer. The ISO image files must reside on the local workstation used to perform the upgrade, and any user performing the upgrade must have

access to the ISO image files. If the user performing the upgrade is at a remote location, it is assumed the ISO files are already available before starting the upgrade procedure.

The DSR ISO is deployed as part of the pre-upgrade activities in Section 3.4.

3.1.2 Logins, Passwords and Server IP Addresses

Table 5 identifies the information that is called out in the upgrade procedures, such as server IP addresses and login credentials. For convenience, space is provided in Table 5 for recording the values, or the information can be obtained by other means. This step ensures that the necessary administration information is available before an upgrade.

Consider the sensitivity of the information recorded in this table. While all of the information in the table is required to complete the upgrade, there may be security policies in place that prevent the actual recording of this information in hard-copy form.

Table 5. Logins, Passwords, and Server IP Addresses

Item	Description	Recorded Value
Target Release	Target DSR Upgrade Release	
Credentials	GUI Admin Username[1]	
	GUI Admin Password	
	DSR Root Password[2]	
	DSR admusr Password[2]	
	Blades iLO/LOM Admin Username	
	Blades iLO/LOM Admin Password	
	PMAC GUI Admin Username	
	PMAC GUI Admin Password	
	PMAC root Password	
	PMAC pmacftpusr password	
	OA GUI Username	
	OA GUI Password	
VPN Access Details	Customer VPN information (if needed)	
NOAM	XMI VIP Address[3]	
	NOAM 1 XMI IP Address	
	NOAM 2 XMI IP Address	

[1] The user must have administrator privileges. This means the user belongs to the **admin** group in Group Administration.

[2] This is the password for the server login. This is not the same login as the GUI Administrator. The admusr password is required if recovery procedures are needed. If the admusr password is not the same on all other servers, then all those servers' admusr passwords must also be recorded; use additional space at the bottom of this table.

[3] All logins into the NOAM servers are made using the External Management VIP unless otherwise stated.

Item	Description	Recorded Value
SOAM	XMI VIP address	
	SOAM 1 XMI IP Address (Site 1)	
	SOAM 2 XMI IP Address (Site 1)	
	PCA (DSR) Spare System OAM&P server – Site 1 Spare in Site 2, XMI IP Address	
	SOAM 1 XMI IP Address (Site 2)	
	SOAM 2 XMI IP Address (Site 2)	
	PCA (DSR) Spare System OAM&P server – Site 2 Spare in Site 1, XMI IP Address	
Binding SBR Server Groups	Binding SBR SR1 Server Group Servers (Site 1)	
	Binding SBR SR2 Server Group Servers (Site 1)	
	Binding SBR SR3 Server Group Servers (Site 1)	
	Binding SBR SR4 Server Group Servers (Site 1)	
PCA MP Server Group	PCA MP Server Group Servers (Site 1)	
	PCA MP Server Group Servers (Site 1)	
IPFE Server Groups (For PCA)	PCA IPFE A1 Server Group Server (Site 1)	
	PCA IPFE A 2 Server Group Server (Site 1)	
	PCA IPFE B 1 Server Group Server (Site 1)	
	PCA IPFE B 2 Server Group Server (Site 1)	
Binding SBR Server Groups	Binding SBR SR1 Server Group Servers (Site 2)	
	Binding SBR SR2 Server Group Servers (Site 2)	
	Binding SBR SR3 Server Group Servers (Site 2)	
	Binding SBR SR4 Server Group Servers (Site 2)	
PCA MP Server Group	PCA MP Server Group Servers (Site 2)	
IPFE Server Groups (For PCA)	PCA IPFE A1 Server Group Server (Site 2)	
	PCA IPFE A 2 Server Group Server (Site 2)	
	PCA IPFE B 1 Server Group Server (Site 2)	
	PCA IPFE B 2 Server Group Server (Site 2)	
iLO/LOM	NOAM 1 iLO/LOM IP Address	
	NOAM 2 iLO/LOM IP Address	
	SOAM 1 iLO/LOM IP Address	
	SOAM 2 iLO/LOM IP Address	
	MP 1 iLO/LOM IP Address	
	MP 2 iLO/LOM IP Address	
	MP (n) iLO/LOM IP Address	

Item	Description	Recorded Value
	IPFE MP iLO/LOM IP Address (optional)	
	IPFE MP iLO/LOM IP Address (optional)	
	IPFE MP (n) iLO/LOM IP Address (optional)	
	DA MP iLO/LOM IP Address (optional)	
	DA MP iLO/LOM IP Address (optional)	
	DA MP(n) iLO/LOM IP Address (optional)	
PMAC	PMAC Management IP Address(Site 1)	
PMAC	PMAC Management IP Address(Site 2)	
Software	Target Release Number	
	ISO Image (.iso) file name	
Misc[4]	Miscellaneous additional data	

*[4] As instructed by Oracle CGBU Customer Service.

3.2 Site Upgrade Methodology Selection

There are three primary methods for upgrading a DSR site:

- Automated Site Upgrade
- Auto Server Group Upgrade
- Manual upgrade

The Automated Site Upgrade is the easiest and most efficient site upgrade method. Below mentioned scenarios for Automated Site Upgrade can be solved by rearranging/adding the upgrade cycles. If the user does not want to create a custom upgrade plan by rearranging/adding cycles then in that case manual upgrade method should be used.

The Automated Site Upgrade supports **0**% availability that requires the least amount of time to upgrade the sites. This can be achieved by changing the following parameters:

Site Upgrade SOAM Method setting to **0 -** Changing the Site Upgrade SOAM Method setting to **0** causes the standby SOAM and the spare SOAM(s) to be upgraded serially. With this mode, the SOAM upgrade could take as many as four cycles to complete (that is, spare – spare – standby – active). If there are no spare SOAMs, then this setting has no effect on the SOAM upgrade.

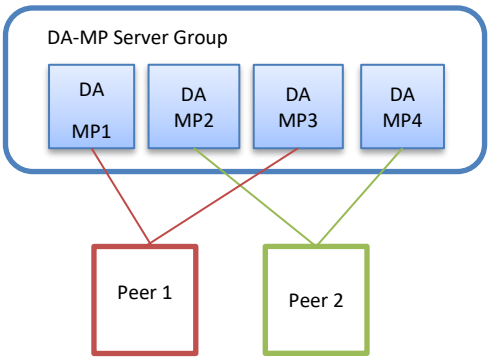
Site Upgrade Bulk Availability setting to **0 -** Changing the **Site Upgrade Bulk Availability** setting to **0** equates to 0% availability that means no servers are required to stay in service during the upgrade. This setting requires the minimum number of cycles, thus the least amount of time. This setting allows all of the DA-MPs to be upgraded at once.

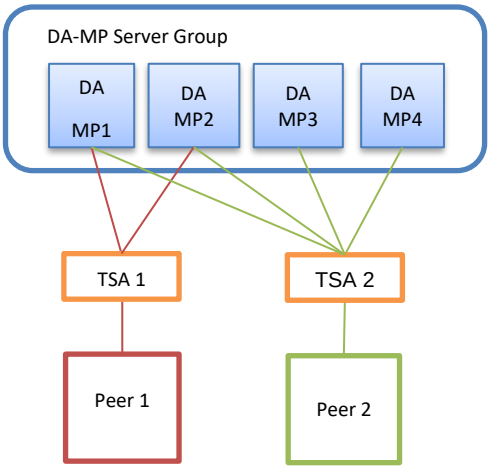
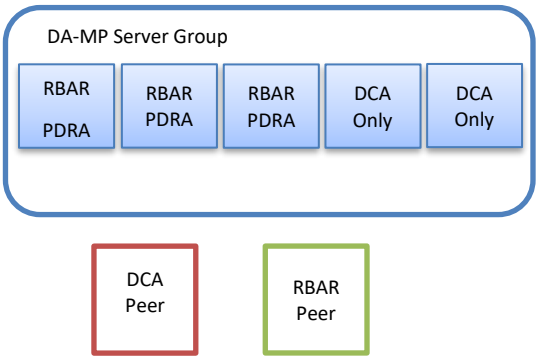
Site Upgrade Bulk Availability *	0	Site based upgrade availability for bulk upgrade of MP groups. (0 = none, 1 = 50%, 2 = 66%, 3 = 75%). **** Cannot be changed while any site upgrade is running. **** [Default = 1; Range = 0-3] [A value is required.]
Site Upgrade SOAM Method *	0	Site based upgrade SOAM method. (0 = serial, 1 = bulk). *Note: Bulk upgrade will upgrade all non-active SOAM servers together.* **** Cannot be changed while any site upgrade is running. **** [Default = 1; Range = 0-1] [A value is required.]

The Auto Server Group upgrade incorporates many of the conveniences of Automated Site Upgrade, but allows for more customer control of the upgrade process. Again, Auto Server Group upgrade is not for all customers or all configurations. The manual upgrade method gives maximum control to the customer and can be used for all configurations. A combination of upgrade methods can be utilized to upgrade a given site to maximize efficiency with customer peace-of-mind.

Table 6 is a worksheet for determining which upgrade method meets the needs of the customer while ensuring compatibility with the DSR configuration. Upon completion of the worksheet, a recommended upgrade method is identified.

Table 6. Traffic Analysis Checklist

	Criteria	Yes	No	Notes
1.	Do any of the site's DA-MPs have fixed diameter connections to any peer node, similar to this depiction?  	☐	☐	Automated Site Upgrade and Automated Server Group upgrade by default do not consider fixed peer connections when selecting servers to upgrade. It is possible that all DA-MPs servicing a given peer (such as DA-MPs 1 and 3) could be upgraded simultaneously using the default plan, thereby isolating the peer. For this reason, the generic upgrade plan generated by Automated Site Upgrade and Auto Server Group Upgrade should be carefully analyzed to ensure all DA-MPs servicing a given peer are not upgraded simultaneously. If the generic plan reports the DA-MPs will be upgraded simultaneously the user must rearrange the upgrade and/or add cycles as necessary to develop a suitable plan. If yes, proceed to section 5.2.4 to Rearrange or add Cycles for ASU or proceed to step 7 for manual Upgrade. If no, continue with step 2.

	Criteria	Yes	No	Notes
2.	If peer nodes are configured using IPFE TSAs, are there any TSAs that are not distributed across all DA-MPs, similar to this depiction?  	☐	☐	Automated Site Upgrade and Automated Server Group upgrade by default do not consider non-uniformly distributed TSAs when selecting servers to upgrade. It is possible that all DA-MPs servicing a given TSA (such as DA-MPs 1 and 2) could be upgraded simultaneously, using the default plan, thereby isolating the peer. For this reason, the generic upgrade plan generated by Automated Site Upgrade and Auto Server Group Upgrade should be carefully analyzed to ensure all DA-MPs servicing a given TSA are not upgraded simultaneously. If the generic plan reports the DA-MPs will be upgraded simultaneously the user must rearrange the upgrade and/or add cycles as necessary to develop a suitable plan. If yes, proceed to section 5.2.4 to Rearrange or add Cycles for ASU or proceed to step 7 for manual Upgrade. If no, continue with step 3.
3.	Do any of the site's DA-MPs have specialized distribution of DSR features, similar to this depiction?  	☐	☐	Automated Site Upgrade and Automated Server Group upgrade by default do not consider non-uniform distribution of features when selecting servers to upgrade. It is possible that all DA-MPs hosting a given feature (such as DCA) could be upgraded simultaneously, using the default plan, thereby eliminating service functionality. For this reason, the generic upgrade plan generated by Automated Site Upgrade and Auto Server Group Upgrade should be carefully analyzed to `ensure all DA-MPs hosting a given feature are not upgraded simultaneously. If the generic plan reports the DA-MPs will be upgraded simultaneously the user must rearrange the upgrade and/or add cycles as necessary to develop a suitable plan. If yes, proceed to section 5.2.4 to Rearrange or add Cycles for ASU or proceed to step 7 for manual Upgrade. If no, continue with step 4.

	Criteria	Yes	No	Notes
4.	Automated Site Upgrade is a candidate for this system. Automated Site Upgrade supports 50% minimum server availability by default. A general option allows availability percentage settings of 66% or 75%. Is 50%, 66%, or 75% server availability during upgrade acceptable to the customer?	☐	☐	In general, a higher minimum availability setting increases the time required to upgrade a site. On the other hand, a lower minimum availability may reduce operational redundancy during the upgrade. If none of the minimum availability options are acceptable, Automated Site Upgrade should not be used to upgrade the site. If yes, continue with step 5. If no, proceed to step 6.
5.	Is the customer comfortable with minimum user intervention (that is, user input) during the upgrade?	☐	☐	Once initiated, Automated Site Upgrade requires no additional user input to complete the upgrade. User control is limited to cancelling the site upgrade task. If yes, Automated Site Upgrade is the recommended upgrade method. If no, proceed to step 6.
6.	Automated Server Group Upgrade is a candidate for this system. Is the customer comfortable with the level of control afforded by the Automated Server Group upgrade?	☐	☐	Auto Server Group upgrade allows the user to initiate the upgrade of each server group, while the individual servers within the server group upgrade automatically. If yes, Auto Server Group upgrade is the recommended upgrade method. If no, proceed to step 8.
7.	A manual upgrade affords the maximum level of control over upgrade sequencing and intermediate observations. With this method, the upgrade of each server is individually initiated, allowing the user to control the level of parallelism and speed of the upgrade. ***Note***: A site upgrade can include a combination of Automated Server Group upgrade and manual upgrades to improve efficiency. For example, SBRs can be upgraded with Automated Server Group or Manual upgrade, while the DA-MPs may be upgraded manually to control the order of upgrade for traffic continuity.	☐	☐	A manual upgrade is the recommended upgrade method.

3.2.1 DA-MP Upgrade Planning

If a manual upgrade is recommended by Table 6 worksheet, additional planning is required to ensure a successful upgrade of the DA-MP server group. A manual upgrade is typically required/recommended when the DA-MPs are configured in a way such that an upgrade could result in a traffic outage. Pre-planning the upgrade of the DA-MPs is key to avoiding an outage.

Note: If complete site upgrade is selected with 0% availability then DA-MP upgrade planning is not required.

Table 7 is an aid to laying out the sequence of the DA-MP upgrades, taking into consideration configuration and traffic continuity. **This worksheet must be completed by the customer and provided to Oracle if Oracle personnel are performing the upgrade.** It is highly recommended that the worksheet be completed for customer-driven upgrades as well.

Customer: perform an analysis of the Diameter application and connection configurations to assess any potential traffic loss due to the DA-MP upgrade. Complete the worksheet, specifying the order in which the DA-MPs will be upgraded, and which MPs, if any, can be upgraded in parallel.

The worksheet is divided into four upgrade **Cycles**. Each cycle represents an upgrade period during which one or more servers are upgraded. Distributing the DA-MPs servers over two or more cycles, takes advantage of parallism, thereby reducing the time required to upgrade the entire server group.

To achieve 50% server availability, half of hostnames would be listed in Cycle 1 while the other half would be listed in Cycle 2, requiring two upgrade cycles. Similarly, 75% availability can be achieved by spreading the hostname over all four cycles.

In all cases, regardless of the number of cycles used to upgrade the DA-MP server group, the DA-MP Leader should be the last server upgraded. Upgrading the DA-MP Leader last minimizes the number of leader changes during the upgrade. The DA-MP Leader is designated on the active SOAM at **Diameter > Maintenance > DA-MPs > Peer DA-MP Status**, where **MP Leader** = **Yes**.

There is some limitation with upgrading DC server in a C-level server group that are upgraded in a group of servers, for example DA-MP. Make sure the DC server is not upgraded in first upgrade cycle of the C-Level servers.

Identify the DC server using Appendix W Identify the DC server.

Note: If desired, the DA-MPs can be upgrade serially, in which case, all hostnames would be listed in cycle 1. List the DA-MPs in the order in which they will be upgraded.

Table 7. DA-MP Upgrade Planning Sheet

	Hostnames			
Upgrade Cycle 1 or Serial Upgrade				
	Hostnames			
Upgrade Cycle 2				
	Hostnames			
Upgrade Cycle 3				
	Hostnames			

Upgrade Cycle 4				
DA-MP Leader:				

3.2.2 Pre-upgrade validation to avoid Comcol inter-connectivity issue between MPs

The HA framework enhancements cause the inter-connectivity issue between the old-DC and non-DC MP nodes during upgrade scenario.

To overcome the inter-connectivity issue:

1. Check the Designated Coordinator (DC) node in the system by using the command:

   ```
   ssh admusr@<MP_server>
   $ ha.info -d
   ```

   Example output:

   ```
   Node ID:     HDBDBGTGCHBDRA54TK
   Report Time: 01/07/2018 03:48:43.299

   ***
   ** Election Mgr: C2939 (4b2799)
   ***

   DC: HDBDBGTGCHBDRA54TK  Generation: 1  State: DC
     Elected: 01/07/2018 02:14:40.822
     Other Non-DC Group Members:
       HDBDBGTGCHBDRA53TK
       HDBDBGTGCHBDRA5BTK
       HDBDBGTGCHBDRA5CTK

   DC Group Candidates: <none>
   ```

2. Before starting the MP server upgrade, disable the DSR application on current DC node, using command:
   1. On Active SOAM - Go to **Server** under **Status & Manage** option.
   2. Disable the DSR application by selecting the MP (DC Node) and click **Stop**.
3. Select an MP to be upgraded:

   Note: The MP Leader Node should be the last server to be upgraded.

   1. If there is an existing IPFE based floating (Diameter) connection, select an MP from TSA with more than two MPs.

      Note: If a TSA has just two MPs, and one has a DC role, avoid using the other MP (non-DC) in this TSA for the upgrade.

   2. If there is an MP based (Diameter) connection, select any MP except the MP having a DC role.
4. After upgrade, one of the upgraded MP with new release takes over the new-DC role.
5. The DSR application remains disabled on the old-DC node, as performed in step 2.
6. The old-DC is upgraded in the next upgrade cycle.
7. Once the upgrade is completed, from Active SOAM - Go to **Server** under **Status & Manage** GUI screen and check if the DSR application is ENABLED on MP node (old-DC). If not then ENABLE it by restart button.

3.3 Plan Upgrade Maintenance Windows

This section provides a high-level checklist to aid in tracking individual server upgrades. The servers are grouped by maintenance window, and it is expected that all servers in a group can be successfully upgraded in a single maintenance window. Use this high-level checklist together with the detailed procedures that appear later in this document.

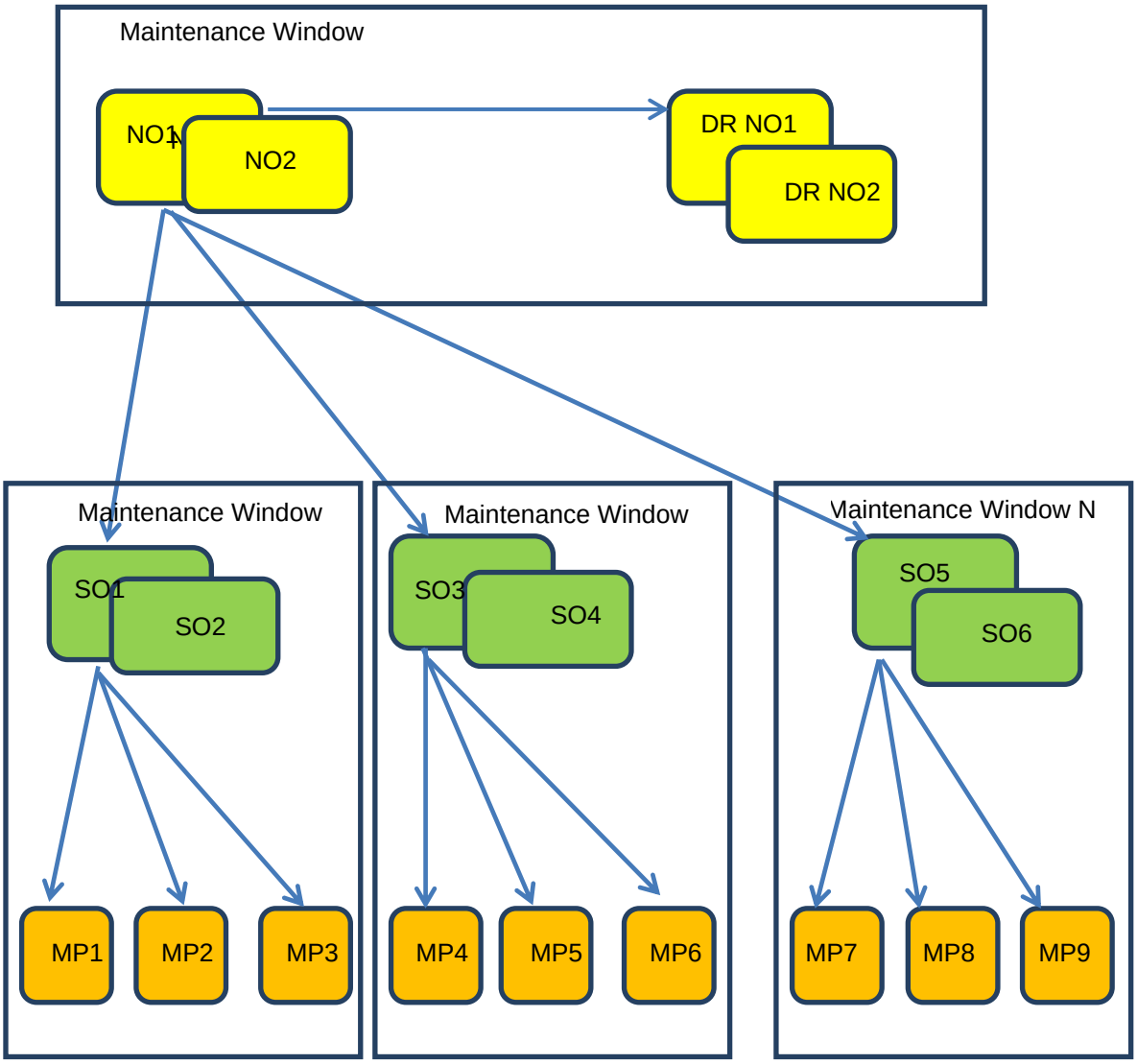


Figure 17. Upgrade Maintenance Windows for 3-Tier Upgrade

!!WARNING!! Mated SOAM sites must be upgraded in separate maintenance windows

3.3.1 Maintenance Window for PMAC and TVOE Upgrades (Optional)

This document includes steps to upgrade TVOE as an integrated activity with the upgrade of the DSR application. However, it is an **option** to upgrade TVOE and PMAC (if necessary) as separately planned and executed activities using the following references:

- PMAC Upgrade procedure is provided in reference [5].
- TVOE host environment upgrade procedures are included in this document and in reference [4].

PMAC and TVOE upgrades are backwards compatible to prior releases of DSR. These upgrades may be done throughout the entire topology, or a site-at-a-time, before upgrading the DSR application.

If PMAC and TVOE are to be upgraded in a separate maintenance window than the DSR application, this activity should be initiated and completed before starting Section 3.6. The procedure for upgrading TVOE is provided in Section 3.4.6. Refer to [5] for PMAC upgrade procedures.

Note: In RMS and VEDSR configurations, the PMAC and DSR servers could be sharing the same TVOE host. Make the customer aware of all servers affected by the TVOE upgrade.

3.3.2 Calculating Maintenance Window Requirements

The number of maintenance windows required for DSR setup and upgrade can be calculated by using the Maintenance Window Analysis Tool (see ref [8]).

This Excel spreadsheet takes setup details as input from the user and accordingly calculates the number of maintenance windows required for upgrade. Complete DSR upgrade maintenance window details and timings can be found in Reference [8]. Please see the instructions tab of the spreadsheet for more information and details.

3.3.3 Maintenance Window 1 (NOAM Site Upgrades)

During the first maintenance window, the NOAM servers are upgraded, and possibly also the PMAC, and the TVOE environments supporting these servers.

Note: PMAC and/or TVOE environments may be upgraded before Maintenance Window 1, as described in Section *2.5*.)

Maintenance Window 1 NOAM Sites **Date**: _____ ***Note***: View the NE Name from the DSR NOAM GUI under Configuration -> Network Elements. ****Note***: To save time, upgrade PMAC servers outside/ahead of the DSR maintenance window since this activity is seen as non-intrusive to DSR operation.	1. Record the site NE name of the PMAC, DSR NOAM, and the DR provisioning site to upgrade during maintenance window 1 in the space provided: 2. Mark the associated checkbox as each server upgrade is completed. ☐ *DR PMAC (Guest): _____ ☐ TVOE for DR NOAM-B: _____ ☐ TVOE for DR NOAM-A: _____ ☐ *Primary PMAC (Guest): _____ ☐ TVOE for Primary NOAM-B: _____ ☐ TVOE for Primary NOAM-A: _____ ☐ DR Standby NOAM (Guest): _____ ☐ DR Active NOAM (Guest): _____ ☐ Primary Standby NOAM (Guest): _____ ☐ Primary Active NOAM (Guest): _____

3.3.4 Maintenance Window 2 and Beyond (SOAM Site Upgrades)

During maintenance window 2, all servers associated with the first SOAM site are upgraded. All servers associated with the second SOAM site are upgraded during maintenance window 3.

For DSRs configured with multiple mated-pair sites, or DSRs having multiple distinct sites (for example, geo-redundant PCA installations), the following form should be copied and used for the subsequent SOAM site upgrades.

!!WARNING!! It is strongly recommended that mated pair SOAM sites are NOT upgraded in the same maintenance window.

Maintenance Window SOAM Sites Date: _____ ****Note***: To save time, upgrade PMAC servers outside/ahead of the DSR maintenance window since this activity is seen as non-intrusive to DSR operation.	1. Record the site NE name of the DSR SOAM and the MP(s) to upgrade during maintenance window 2 in the space provided. 2. Mark the associated checkbox as each server upgrade is completed. SOAM Site: _____ ☐ * PMAC : _____ ☐ * TVOE for PMAC: _____ ☐ TVOE for SOAM-B: _____ ☐ TVOE for SOAM-A: _____ ☐ Spare SOAM1 (Guest): _____ (If equipped) ☐ Spare SOAM2 (Guest): _____ (If equipped) ☐ Standby SOAM (Guest): _____ ☐ Active SOAM (Guest): _____

	☐ DA-MP1: _____ ☐ DA-MP2: _____ ☐ DA-MP3: _____ ☐ DA-MP4: _____ ☐ DA-MP5: _____ ☐ DA-MP6: _____ ☐ DA-MP7: _____ ☐ DA-MP8: _____ ☐ DA-MP9: _____ ☐ DA-MP10: _____ ☐ DA-MP11: _____ ☐ DA-MP12: _____ ☐ DA-MP13: _____ ☐ DA-MP14: _____ ☐ DA-MP15: _____ ☐ DA-MP16: _____
	☐ IPFE1: _____ ☐ IPFE2: _____ ☐ IPFE3: _____ ☐ IPFE4: _____
	Binding Server Group 1 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Binding Server Group 2 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Binding Server Group 3 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ _____ _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Binding Server Group 4 ☐ Standby SBR: _____

	☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Binding Server Group 5 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Binding Server Group 6 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Binding Server Group 7 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Binding Server Group 8 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped)
	Session Server Group 1 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Session Server Group 2 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Session Server Group 3 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped)

	Session Server Group 4 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Session Server Group 5 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Session Server Group 6 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Session Server Group 7 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped) Session Server Group 8 ☐ Standby SBR: _____ ☐ Active SBR: _____ ☐ Spare SBR1 (Mate): _____ ☐ Spare SBR2 (Mate): _____ (If equipped)

3.4 Prerequisite Procedures

The pre-upgrade procedures shown in the following table are executed outside a maintenance window, if desired. These steps have no effect on the live system and can save upon maintenance window time, if executed before the start of the maintenance window.

CAUTION Increase maximum number of open files - Follow Appendix B.

Table 8: Prerequisite Procedures Overview

Procedure	Elapsed Time (hr:min)		Procedure Title
	This Step	Cum.	
Procedure 1	0:10-0:30	0:10-0:30	Required Materials Check
Procedure 2	0:15-0:30	0:25-1:00	DSR ISO Administration

Procedure	Elapsed Time (hr:min)		Procedure Title
	This Step	Cum.	
Procedure 3	0:20-0:30	0:50-1:30	Verification of Configuration Data
Procedure 4	0:15-0:20	1:05-1:50	Data Collection for Source Release 8.0 and Later
Procedure 5	0:15-0:30	1:20-6:35	Back Up TKLCConfigData Files
Procedure 6	0:10-2:00	1:30-8:35	Full Backup of DB Run Environment for Release 8.0 and Later

3.4.1 Required Materials Check

This procedure verifies that all required materials needed to perform an upgrade have been collected and recorded.

Procedure 1. Required Materials Check

Step#	Procedure	Description
This procedure verifies all required materials are present. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Verify all required materials are present	Materials are listed in Section 3.1: Required Materials. Verify required materials are present.
2. ☐	Verify all administration data needed during upgrade	Double-check that all information in Sections 3.2 and 3.2.2 is filled-in and accurate.
3. ☐	Contact My Oracle Support (MOS)	It is recommended to contact My Oracle Support (MOS) and inform them of plans to upgrade this system. See Appendix CC for instructions. ***Note***: Obtaining a new online support account can take up to 48 hours.

3.4.2 DSR ISO Administration

This section provides the steps to upload the new DSR ISO to the NOAMs and then transfer the ISO to all servers to be upgraded.

Note: ISO transfers to the target systems may require a significant amount of time depending on the number of systems and the speed of the network. These factors may significantly affect total time needed and require the scheduling of multiple maintenance windows to complete the entire upgrade procedure. The ISO transfers to the target systems should be performed before, and outside of, the scheduled maintenance window. Schedule the required maintenance windows accordingly before proceeding.

Procedure 2. DSR ISO Administration

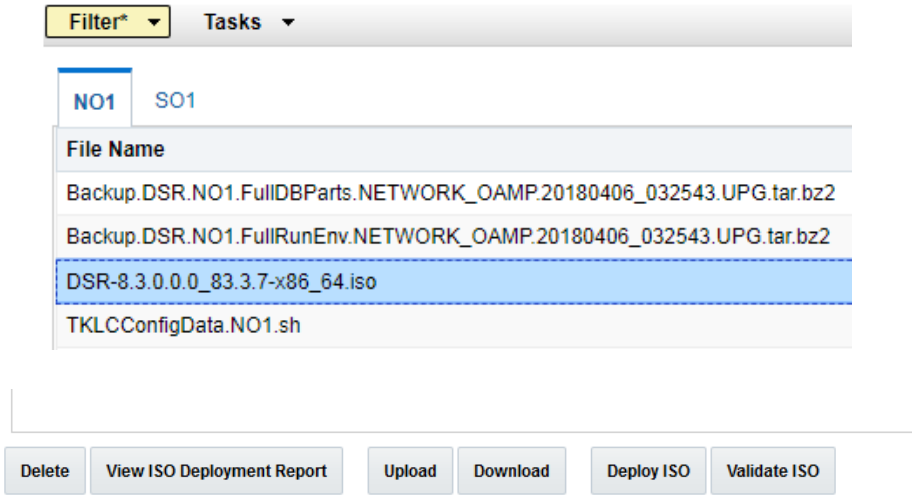
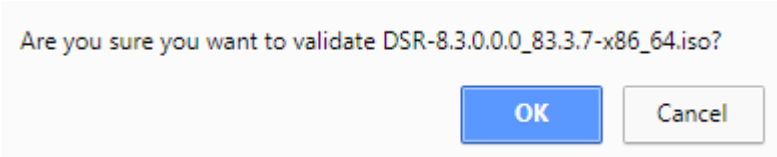
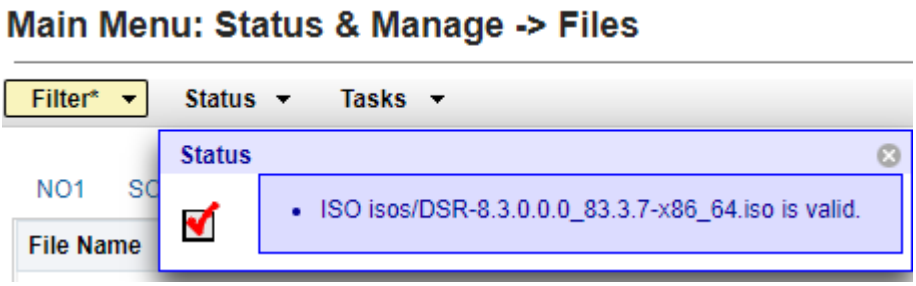
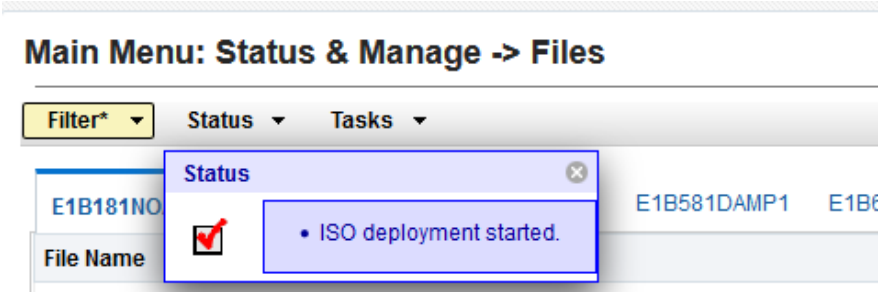
Step#	Procedure	Description
This procedure transfers the target ISO to all servers in the topology. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Upload ISO to active NOAM server	There are two methods to upload the application ISO to the active NOAM based on the type of the media: Execute either: **Option 1** (Use NOAM GUI Upload function for ISO file transfer over the network) – proceed to step 2. OR **Option 2** (Local site media ISO transfer, using PMAC) – proceed to step 5.
2. ☐	**Active NOAM GUI**: Undeploy all **unneeded** ISO images	Remove all unneeded old ISO images from the **/var/TKLC/upgrade** directory. Keep deployed the ISO image file being used for this upgrade. This saves space in the **/var/TKLC/upgrade** directory. 1. Navigate to **Status & Manage > Files**. 2. Select the ISOs to be undeployed and click **Undeploy ISO**. 3. Click **OK** to confirm the ISO undeployment. This launches the ISO un-deployment to the entire topology. This function removes the symlink in **/var/TKLC/upgrade** to the ISO in the isos directory. The ISO Deployment report can be viewed by selecting the ISO and clicking **View ISO Deployment Report**.

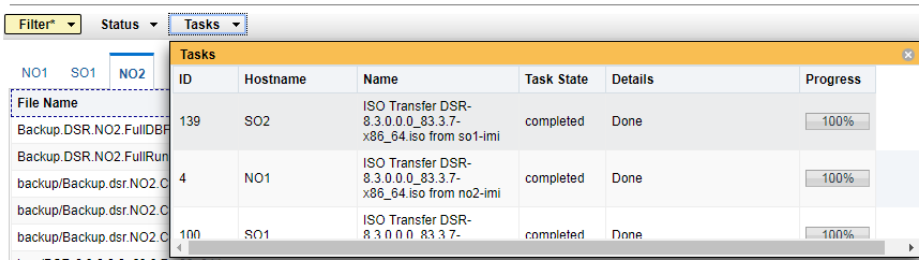
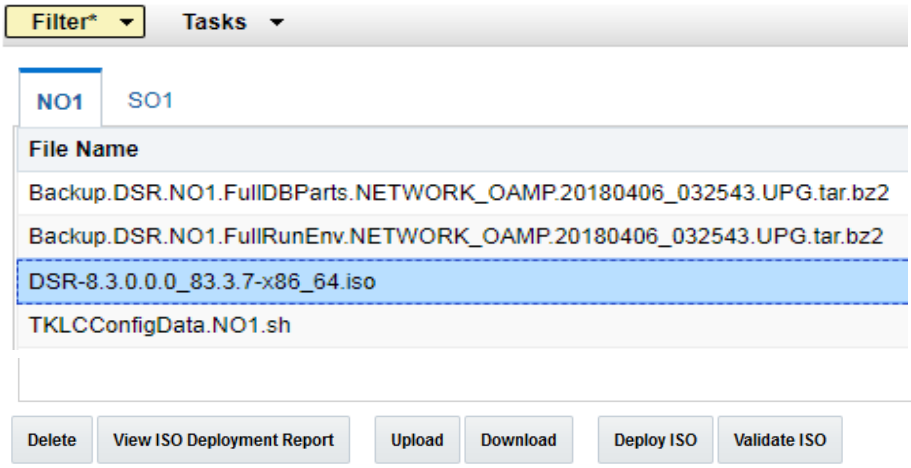
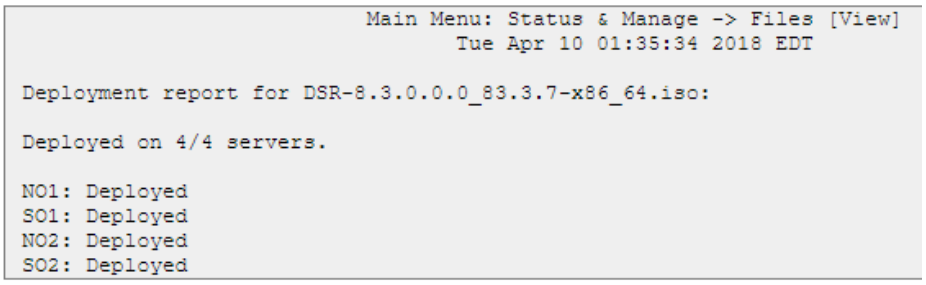
Step#	Procedure	Description
3. ☐	**Active NOAM VIP**: Option 1 – Transfer using NOAM GUI	**Option 1**: Use the NOAM GUI Upload function for ISO file transfer over the network. Upload the target release ISO image file to the File Management Area of the active NOAM server: 1. Log into the active NOAM GUI. 2. Navigate to **Status & Manage > Files**. 3. Click the active NOAM tab to display all files stored in the file management storage area of this server. 4. Ensure this is actually the active NOAM server in the network by comparing the hostname in the screen title vs. the hostname in the session banner in the GUI. Verify they are the same and the status is **Active** in the session banner. 5. Click **Upload**. ***Note***: Actual screens may vary from those shown depending on the browser and browser version used.
4. ☐	**Active NOAM VIP**: Option 1 (continued)	1. Click **Browse** to select the file to upload. 2. Select the target release ISO image file and click **Open**. 3. Click **Upload**. The ISO file begins uploading to the file management storage area. Wait for the screen to refresh and display the uploaded ISO filename in the files list. This usually takes between 2 to 10 minutes, but more if the network upload speed is slow.

Step#	Procedure	Description

5.
☐
	Active NOAM VIP: Option 1 (continued)	1. Wait for the screen to refresh and display the uploaded ISO filename in the files list. This usually takes between 2 to 10 minutes, but more if the network upload speed is slow.
		2. To back up the ISO file to the PMAC, SSH to the active NOAM and execute the following command. Refer to [5] for creating space on PMAC if desired space is not available on the PMAC:
		1. cd to the directory on the active NOAM where the ISO image is located
		`$ cd /var/TKLC/db/filemgmt`
		2. Using sftp, connect to the PMAC management server.
		`$ sftp pmacftpusr@<pmac_management_network_ip>`
		`$ put <image>.iso`
		Note: UserId and password should already be recorded in Table 5.
		3. After the image transfer is 100% complete, close the connection.
		`$ quit`

6. ☐	**PMAC Guest**: Option 2 – Transfer using PMAC	**OPTION 2** (Local site media ISO transfer using PMAC): Using a Media containing the application (recommended for slow network connections between the client computer and the DSR frame. 1. Execute Appendix E to load the ISO onto the PMAC server at the site. 2. SSH into the PMAC server and SCP the ISO to the active NOAM using the following commands: `sudo scp -p /var/TKLC/smac/image/repository/ <DSR_ISO_Filename> admusr@<Active_NOAM_IP>:/var/TKLC/db/filemgmt`
7. ☐	**Active NOAM CLI:** Change Permission of ISO	Log into the active NOAM CLI and execute the following command : `sudo chmod 644 /var/TKLC/db/filemgmt/<DSR_ISO_Filename>`
8. ☐	**Active NOAM VIP**: Using NOAM GUI, deploy ISO to all servers to be upgraded	1. Navigate to **Status & Manage > Files**. 2. Click the active NOAM server tab. All files stored in the file management storage area of this server display on the screen. 3. Select the DSR 8.4 ISO, and click **View ISO Deployment Report**. 4. In the resulting report, determine if the ISO has been deployed to all servers in the system. 5. If the ISO has been deployed to all servers, proceed to the next procedure; otherwise, complete the remaining steps in this procedure. 6. Select the 8.4 DSR ISO in the file list, and click **Validate ISO**.

Step#	Procedure	Description
		 7. Click **OK** on the confirmation screen.  8. Verify the ISO status is valid. The following message displays for status.  9. If the ISO is not valid, repeat this procedure beginning with step 1. If the ISO fails validation more than once, it is recommended to contact My Oracle Support (MOS). 10. If the ISO is valid, select the ISO, and click **Deploy ISO**. 11. Click **OK** on the confirmation screen. The following message displays for status. 

Step#	Procedure	Description
9. ☐	**Active NOAM VIP**: Monitor ISO deployment	1. The deployment progress can be monitored by viewing the **Tasks** dropdown options on the **Status & Manage > Files** screen.  2. Select the target release ISO and click **View ISO Deployment Report**.  3. Monitor deployment progress until the ISO has been deployed to all servers in the system. **Main Menu: Status & Manage -> Files [View]** 

3.4.3 Data Collection – Verification of Global and Site Configuration Data

The procedures in this section are part of Software Upgrade Preparation and are used to collect data required for network analysis, Disaster Recovery, and upgrade verification. Data is collected from both the active NOAM and various other servers at each site (TVOE, PMAC, etc.).

3.4.3.1 Verification of Configuration Data

This procedure checks the configuration data of the system and servers to ensure a successful upgrade.

Procedure 3. Verification of Configuration Data

Step#	Procedure	Description
This procedure checks the configuration data and server status. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Verify application version	1. Navigate to **Administration > Software Management > Upgrade**. 2. Verify the upgrade path to the target release is supported as documented in Section 2.1 (Supported Upgrade Paths). 3. Select the NOAM Server Group and verify the Application Version. **Main Menu: Administration -> Software Management -> Upgrade** Filter Tasks NOSG SOSG Hostname / Upgrade State / Server Status / OAM HA Role / Appl HA Role / Server Role / Network Element / Function / Application Version / Upgrade ISO NO2: Ready, Norm, Active, N/A, Network OAM&P, NE_NO, OAM&P, 8.0.0.0.0-80.25.0 NO1: Ready, Norm, Standby, N/A, Network OAM&P, NE_NO, OAM&P, 8.0.0.0.0-80.25.0

2.
☐
	Active NOAM CLI: Check if the setup has customer supplied Apache certificate installed and protected with a passphrase	1. Use the SSH command (on UNIX systems – or putty if running on windows) to log into the active NOAM
		`ssh admusr@<NOAM_VIP>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		2. cd to **/etc/httpd/conf.d** and open the file named **ssl.conf**.
		3. Locate the line beginning with the phrase **SSLCertificateFile**.
		4. The path that follows **SSLCertificateFile** is the location of the Apache certificate. If the path is **/usr/TKLC/appworks/etc/ssl/server.crt**, then the certificate is supplied by Oracle and no further action is required. Continue with the next step.
		5. If the path is anything other than **/usr/TKLC/appworks/etc/ssl/server.crt**, then a customer-supplied Apache certificate is likely installed. Rename the certificate, but note the original certificate pathname for use in Section 5.7.2.

Step#	Procedure	Description
3. ☐	Check if a new firmware release is required for the system	It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC to determine the minimum supported firmware release required for the target DSR release. ***Note***: New firmware releases for the DSR platform are typically released every 6 months. Target Firmware Rev: _____ Example: FW rev. 2.2.7 1. Acquire the Firmware Release Notes and Firmware Upgrade Pack procedures for the target Firmware Revision. 2. Use the Firmware Upgrade Pack procedures to determine which specific system components (Switches, OAs, Servers, etc.) may require an upgrade. 3. Plan for additional Maintenance Windows if Firmware Upgrade is required. ***Note***: Firmware upgrade activity is typically performed before the DSR upgrade.
4. ☐	Check the existing PMAC version and identify if PMAC upgrade is required	This step applies to all servers that have a PMAC guest (VM) installed. 1. Identify any PMAC servers requiring upgrade. 1. Determine the PMAC version installed by logging into PMAC GUI. 2. Refer to the Release Notes to determine the minimum supported PMAC version required for the target DSR release. 2. If a PMAC upgrade is required, obtain the required PMAC upgrade document [5] and plan for additional Maintenance Windows to execute PMAC upgrades. ***Note***: If required, the PMAC upgrade should be performed as a prerequisite to DSR upgrade.

Step#	Procedure	Description

5. ☐	Check the TVOE host server software version	This step is not applicable to software centric installations/upgrades.
		This step applies to all RMS and Blade servers that have TVOE installed.
		1. Find the target DSR release from Table 5.
		2. Refer to the Release Notes to determine the minimum supported TVOE OS version required for the target DSR release.
		Required TVOE Release: _____
		Example: 872-2525-101-2.5.0_82.22.0-TVOE-x86_64.iso
		3. Verify the current TVOE HOST OS version for each TVOE hosts by comparing the **Product Release** field from the **appRev** command to the **Required TVOE Release** field shown.
		`# appRev`
		`Install Time: Wed Apr 4 05:03:13 2018`
		`Product Name: DSR`
		`Product Release: 8.4.0.0.0_84.5.0`
		`Base Distro Product: TPD`
		`Base Distro Release: 7.5.0.0.0_88.46.0`
		`Base Distro ISO: TPD.install-7.5.0.0.0_88.46.0-OracleLinux6.9-x86_64.iso`
		`ISO name: DSR-8.4.0.0.0_84.5.0-x86_64.iso`
		`OS: OracleLinux 6.9`
		Important: If TVOE hosts are not on the correct release, refer to Section 3.3.1 to plan for TVOE host upgrades.

The following data collection procedures collect similar data; however, the collection method varies depending on the source release. Execute only one of the following procedures for the pre-upgrade data collection. Refer to Table 9 for guidance on which procedure to use.

Table 9. Release Specific Data Collection Procedures

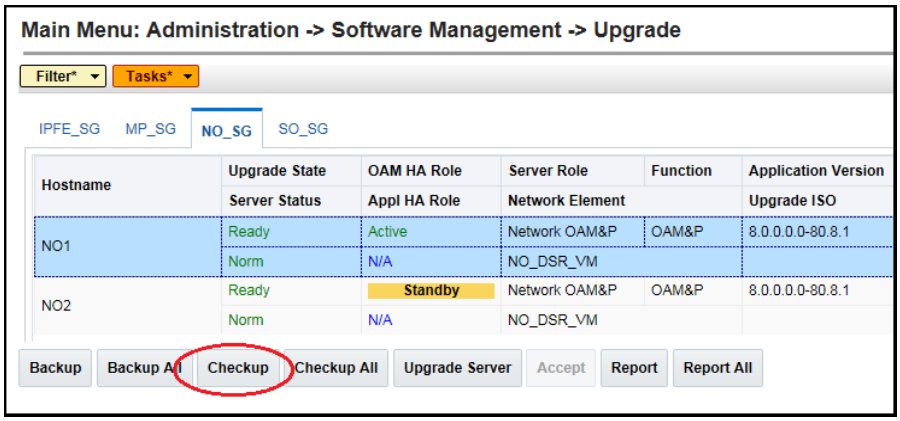
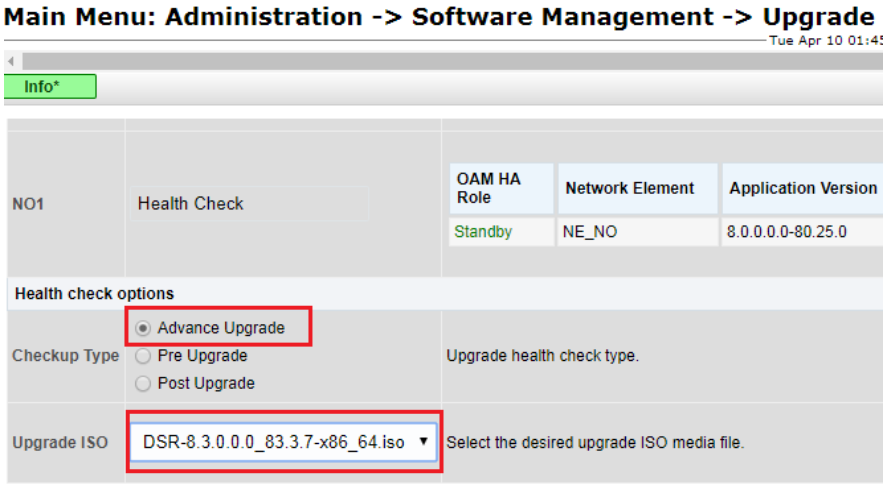
If the Source Release is:	Use This Pre-Upgrade Data Collection Procedure:
8.0 and later	Procedure 4 Data Collection for Source Release 8.0 and Later

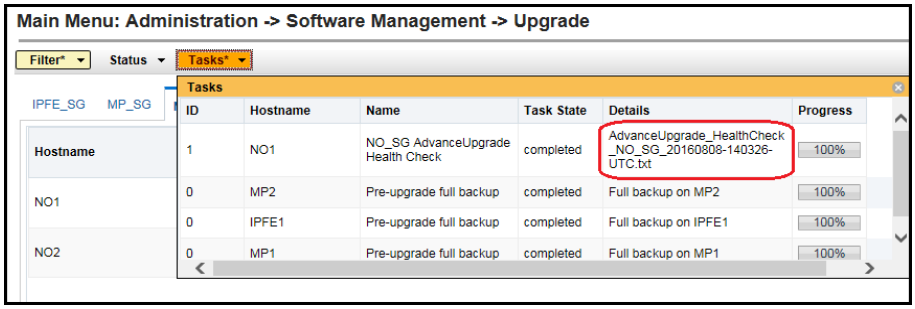
3.4.3.2 Data Collection for Source Release 8.0 and Later

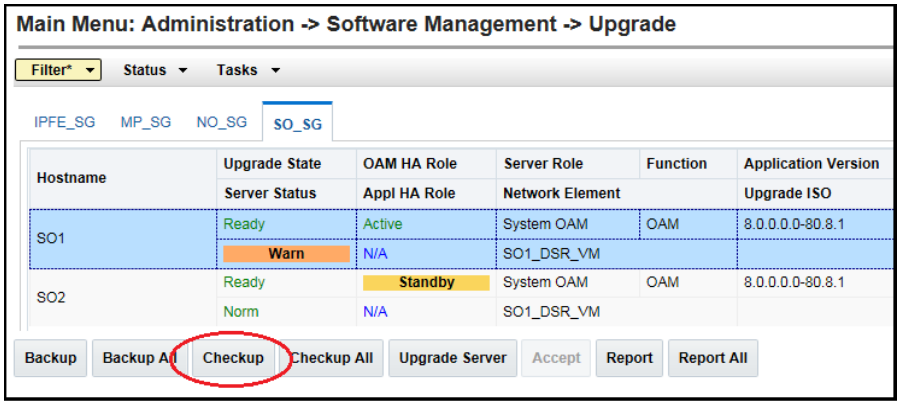
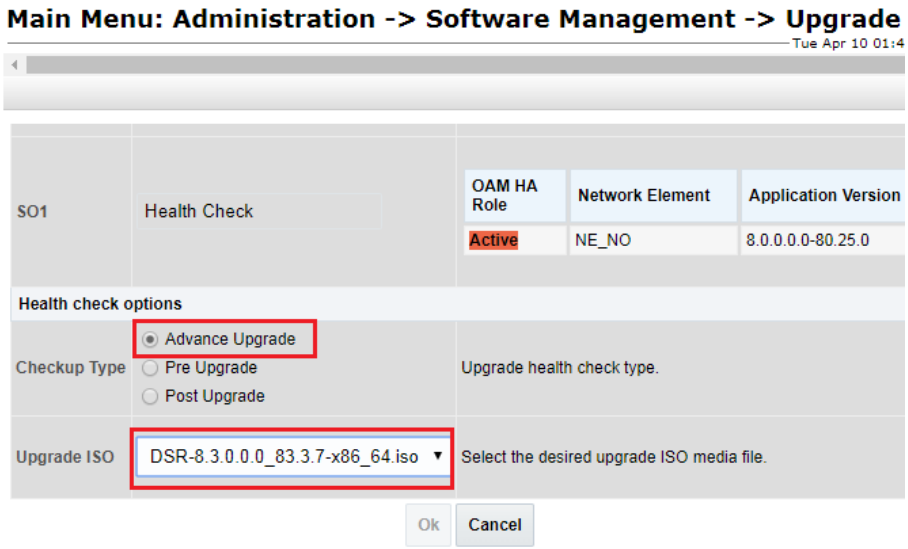
This procedure collects and archives system status data for analysis. Perform this procedure only if the source release is 8.0 and later.

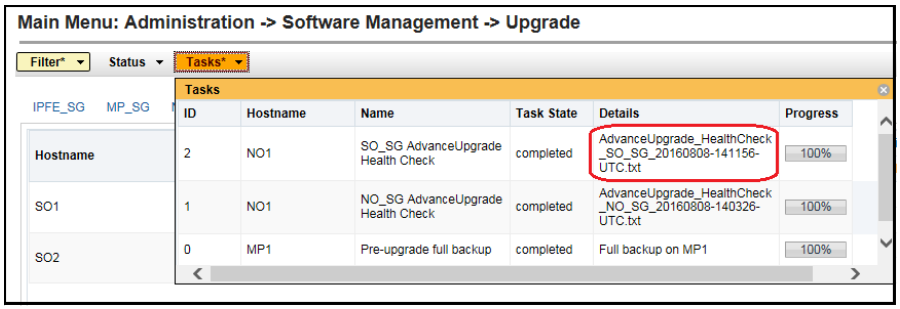
Procedure 4. Data Collection for Source Release 8.0 and Later

Step#	Procedure	Description
This procedure retrieves and retains system status data for analysis and future use. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

Step#	Procedure	Description
1. ☐	**Active NOAM VIP**: Run the automated health checks on the active NOAM	1. Navigate to **Administration > Software Management > Upgrade**. 1. Select the active NOAM.  2. Click **Checkup**. 3. In the Health check options section, select the **Advance Upgrade** option. 4. If the ISO Administration procedure has already been performed for the target ISO, select the **target release ISO** from the Upgrade ISO option. Otherwise, do not select an ISO. 5. Click **OK**. Control returns to the Upgrade screen. 

Step#	Procedure	Description
2. ☐	**Active NOAM VIP**: Monitor health check progress	1. Click the **Tasks** option to display the currently executing tasks. The Health Check task name appears as **AdvanceUpgrade_Health Check**_<NOServerGroup>_TimeStamp.txt. 2. Monitor the Health Check task until the Task State is **completed**. The Details column displays a hyperlink to the Health Check report. 3. Click the hyperlink to download the Health Check report. 4. Open the report and review the results. 
3. ☐	**Active NOAM VIP**: Analyze any health check failure	If the Health Check report status is anything other than **Pass**, the Health Check logs can be analyzed to determine if the upgrade can proceed. 1. Navigate to **Status & Manage > Files**. 2. Click on NOAMP server group tab for which health check was performed. 1. Select the **AdvanceUpgrade_Health Check**_<NOServerGroup>_TimeStamp.txt and click **View**. 2. Locate the log entries for the most recent health check. 3. Review the log for failures. Analyze the failures and determine if it is safe to continue the upgrade. If necessary, it is recommended to contact My Oracle Support (MOS) for guidance as described in Appendix CC.

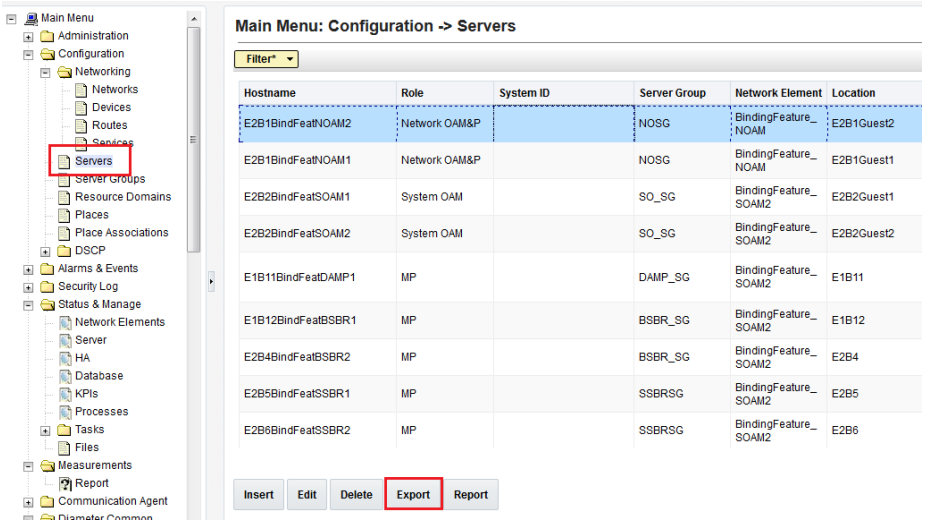
Step#	Procedure	Description
4. ☐	**Active NOAM VIP**: Initiate SOAM health check	This procedure runs the automated health checks on the active SOAM. 1. Navigate to **Administration > Software Management > Upgrade**. 1. Select the SOAM server group tab. 2. Select the active SOAM.  3. Click **Checkup**. 4. In the Health check options section, select the **Advance Upgrade** option. 5. For a major upgrade, select the **target release ISO** from the Upgrade ISO option. Do not select an ISO for an incremental upgrade. 6. Click **OK**. Control returns to the Upgrade screen. 

Step#	Procedure	Description
5. ☐	**Active NOAM VIP**: Monitor health check progress	1. Click the **Tasks** option to display the currently executing tasks. The Health Check task name appears as <SOServerGroup> **AdvanceUpgrade Health Check**. 2. Monitor the Health Check task until the Task State is **completed**. The Details column displays a hyperlink to the Health Check report. 3. Click the hyperlink to download the Health Check report. 4. Open the report and review the results. 
6. ☐	**Active NOAM VIP**: Analyze health check failure	If the Health Check report status is anything other than **Pass**, the Health Check logs can be analyzed to determine if the upgrade can proceed. 1. Navigate to **Status & Manage > Files**. 1. Select the active SOAM tab. 2. Select the **UpgradeHealthCheck.log** file and click **View**. 3. Locate the log entries for the most recent health check. 4. Review the log for failures. Analyze the failures and determine if it is safe to continue the upgrade. If necessary, it is recommended to contact My Oracle Support (MOS) for guidance as described in Appendix CC.
7. ☐	Analyze and plan MP upgrade sequence	From the collected data, analyze system topology and plan for any DA-MP/IPFE/SBR/PCA which are out-of-service during the upgrade sequence. 1. Analyze system topology data gathered in Section 3.4.3.1 and steps 1 through 6 of this procedure. The Health Check reports from steps 3 and 6 can be found in **Status & Manage > Files** on the active SOAM. 2. It is recommended to plan for MP upgrades by consulting My Oracle Support (MOS) to assess the impact of out-of-service MP servers. 3. Determine the manner in which the MP servers are upgraded: Manually or Automated Server Group Upgrade. If the MPs are upgraded manually, determine the exact sequence in which MP servers are upgraded for each site.

3.4.4 Back Up TKLCConfigData Files

This procedure helps to restore networking and server-related information in some cases. For example, disaster recovery when it needs to be performed on servers in case a server is lost during an upgrade.

Procedure 5. Back Up TKLCConfigData

Step#	Procedure	Description
This procedure backs up the **TKLCConfigData** file on all servers. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Active **NOAM GUI**: Login	Use the VIP address to access the primary NOAM GUI
2. ☐	Primary DSR NOAM VIP (GUI): Export configuration data for each server	1. Navigate to **Configuration > Servers**. 2. Select each server in the topology and click **Export**.  3. Repeat this for all servers.

3.
☐
	Primary SDS NOAM Server: Back up TKLCConfig data	1. Access the primary DSR NOAM server command line using ssh or a console.
		`ssh admusr@<NOAM_VIP>`
		2. Transfer the TKLCConfigData files for all servers in the /var/TKLC/db/filemgmt directory to a remote location.
		`$ cd /var/TKLC/db/filemgmt`
		`$ scp TKLCConfigData.<Sever Hostname>.sh <username>@<remote-server>:<directory>`
		Example:
		`scp TKLCConfigData.DSRNO1.sh <username>@<remote-server>:<directory>`
		Remember to back up the TKLCConfig data file for **all** servers.

3.4.5 Full Backup of DB Run Environment at Each Server

The procedures in this section are part of software upgrade preparation and are used to conduct a full backup of the run environment on each server, to be used in the event of a backout of the new software release. The backup procedure to be executed is dependent on the software release that is running on the active NOAM.

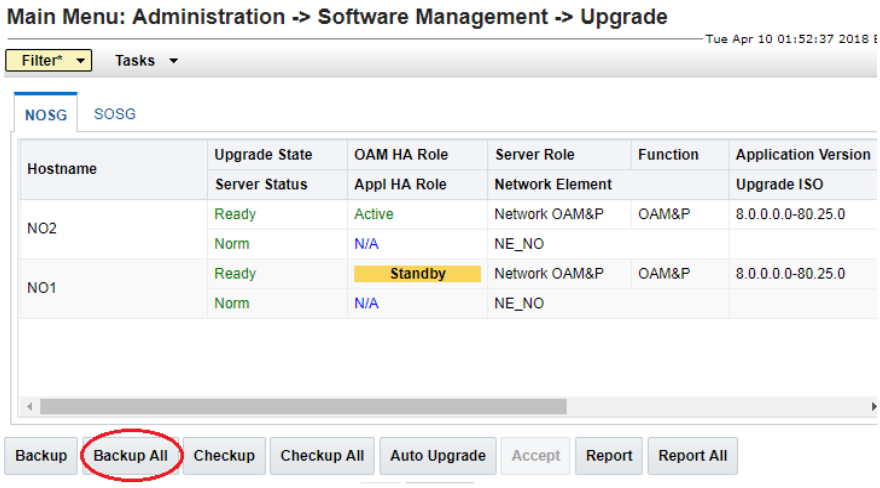
Note: Do not perform this procedure until the ISO deployment is completed for all servers in the topology. Failure to complete the ISO may disrupt ISO deployment/undeployment in the event of a partial backout (for example, backout of one site).

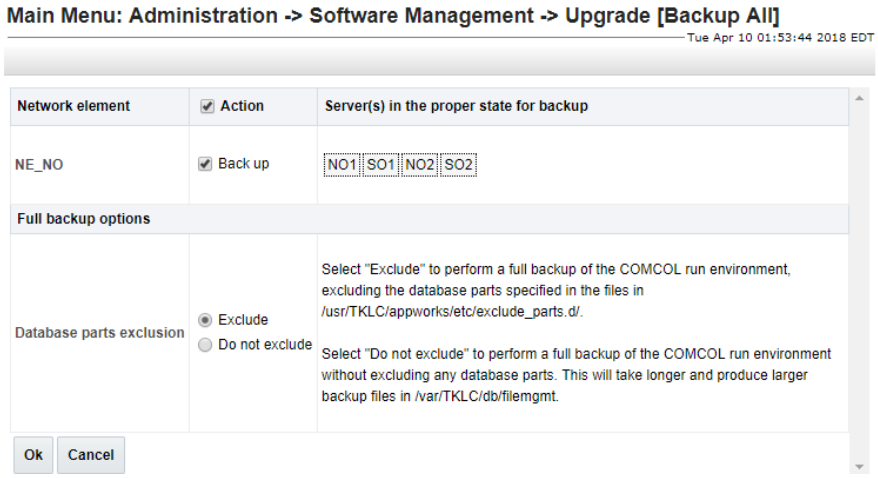
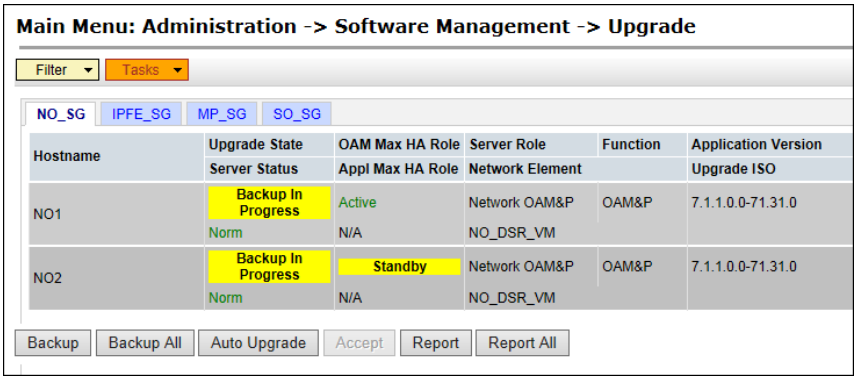
!!WARNING!! If backout is needed, any configuration changes made after the DB is backed up at each server is lost.

3.4.5.1 Full Backup of DB Run Environment for Release 8.0 and Later

This procedure backs up the DB run environment when the active NOAM is on release 8.0 and later.

Procedure 6. Full Backup of DB Run Environment for Release 8.0 and Later

Step#	PROCEDRE	DESCRIPTION
This procedure (executed from the active NOAM server) conducts a full backup of the run environment on each server, so that each server has the required data to perform a back out. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Start backup of all servers	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration > Software Management > Upgrade.** 3. Click **Backup All**. 

Step#	PROCEDRE	DESCRIPTION
2. ☐	**Active NOAM VIP**: Select network elements to backup	The Upgrade Backup All screen displays the various network elements and identifies which servers are ready for backup. 1. In the **Action** column, mark the **Backup** checkbox for each network element. 2. Ensure the **Exclude** option is selected. 3. Click **OK**. This initiates a full backup on each eligible server. 
3. ☐	**Active NOAM VIP**: Monitor backup progress	Select each server group tab and verify each server transitions from **Backup in Progress** to **Ready**. 

Step#	PROCEDRE	DESCRIPTION

4.
☐
	ALTERNATIVE METHOD (Optional)
	Server CLI: If needed, the alternative backup method can be executed on each individual server instead of using the **backupAllHosts** script
		ALTERNATIVE: A manual backup can be executed on each server individually, rather than using the GUI method. To do this, log into each server in the site individually, and execute this command to generate a full backup on that server manually:
		`$ sudo /usr/TKLC/appworks/sbin/full_backup`
		Output similar to the following indicates successful completion:
		`Success: Full backup of COMCOL run env has completed.`
		`Archive file /var/TKLC/db/filemgmt/Backup.dsr.blade01.FullDBParts. SYSTEM_OAM.20140617_021502.UPG.tar.bz2 written in /var/TKLC/db/filemgmt.`
		`Archive file /var/TKLC/db/filemgmt/Backup.dsr.blade01.FullRunEnv. SYSTEM_OAM.20140617_021502.UPG.tar.bz2 written in /var/TKLC/db/filemgmt.`

5.
☐
	Active NOAM VIP: Verify backup files are present on each server	1. Log into the active NOAM.
		2. Navigate to **Status & Manage > Files**.
		3. Click on each server tab.
		4. For each server, verify the following 2 files have been created:
		`Backup.DSR.<server_name>.FullDBParts.NETWORK_OAMP.<time_stamp>.UPG.tar.bz2`
		`Backup.DSR.<server_name>.FullRunEnv.NETWORK_OAMP.<time_stamp>.UPG.tar.bz2`

3.4.6 Upgrade TVOE Hosts at a Site

This procedure applies if the TVOE hosts at a site will be upgraded BEFORE the start of the DSR 8.4 upgrade. Performing the TVOE upgrade BEFORE reduces the time required for DSR and IDIH Application Upgrade procedures during the maintenance window. This procedure should be initiated and completed before starting the DSR upgrade procedures in Section 3.6.

Note: If the TVOE hosts are upgraded in the same maintenance windows as the DSR and IDIH servers, then this procedure does not apply.

Precondition: The PMAC application at each site (and the TVOE host running the PMAC virtual server, must be upgraded before performing TVOE host OS upgrade for servers that are managed by this PMAC. Refer to [5] for PMAC upgrade procedures. If any DSR applications are hosted on the same server as the PMAC application, restart the DSR applications after the PMAC upgrade is complete (see Procedure 51 step 5).

Impact: TVOE host upgrades require that the DSR, SDS, or IDIH applications running on the host be shut down for up to 30 minutes during the upgrade.

Note: In RMS and VEDSR configurations, the PMAC and DSR servers could be sharing the same TVOE host. Make the customer aware of all servers affected by the TVOE upgrade.

Table 10. TVOE Upgrade Execution Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum.		
Procedure 7	60 min per TVOE host*	1:00-16:00	Upgrade TVOE Hosts	DSR and IDIH servers running as virtual guests on the TVOE host are stopped and unable to perform their role while the TVOE host is being upgraded.

***WARNING**: Depending on the risk tolerance of the customer, it is possible to execute multiple TVOE Upgrades in parallel. Detailed steps are shown in the procedure on the next page.

Procedure 7. Upgrade TVOE Hosts

Step#	Procedure	Description
This procedure upgrades the TVOE hosts for a site. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Record site	Record site to be upgraded _____
2. ☐	Select order of TVOE server upgrades	Record the TVOE hosts to be upgraded, in order: It is best to upgrade standby servers before active servers to minimize failovers. Otherwise, any order is OK. _____ _____ _____ _____ _____ ***Note***: The site PMAC, Software Inventory form, typically lists the TVOE hosts at a site and their versions.
3. ☐	Upload TVOE ISO to PMAC	Execute Appendix E to add the TVOE ISO to the PMAC software inventory.

Step#	Procedure	Description

4.
☐
	Determine if there are SDS applications on the TVOE hosts	Log into the TVOE hosts and display the guests.
		1. SSH to the TVOE and log in.
		If the TVOE version is 2.5.2:
		`ssh root@<TVOE_ip>`
		`password: <enter password>`
		If the TVOE version is 2.7 or later:
		`ssh admusr@<TVOE_ip>`
		`password: <enter password>`
		2. Execute this command to display all the VM guests running:
		If the TVOE version is 2.5.2:
		`# virsh list --all`
		If the TVOE version is 2.7 or later:
		`$ sudo virsh list --all`
		3. If the application list includes SDS SOAM applications, then make the team aware of possible failovers and expected alarms due to running in simplex mode during the TVOE upgrade.

5. ☐	Upgrade the TVOE hosting a DSR or IDIH server	Upgrade the TVOE host of the first server. Execute J.2 to shutdown the TVOE host to be upgraded Execute J.1 to upgrade the TVOE host ***Note***: This step may cause a failover of the DSR or other active applications on the TVOE.
6. ☐	Repeat for other TVOE hosts at a site	Repeat step 5 for each TVOE host at the site requiring upgrade.

3.4.7 IDIH Upgrade Preparation

If IDIH is a component of a Network Element, it should be upgraded either before or after the DSR. The order of upgrade does not impact the functionality of either component. However, it should be noted that certain compatibility limitations may exist while the two components are not on the same release.

Note: Verify the TVOE and PMAC version to make sure that TVOE/PMAC are upgraded prior to upgrade of IDIH guests.

CAUTION If the PMAC is 65.x or higher, then TVOE must be upgraded to 3.5.0.0.0_88.45 or higher; otherwise, IDIH guest creation fails.

The IDIH upgrade procedures are provided in Appendix K and may be performed at any time after Procedure 8.

Table 11. IDIH Upgrade Preparation Overview

Procedure	Elapsed Time (hr:min)		Procedure Title
	This Step	Cumulative	
Procedure 8	0:15-0:30	0:15-0:30	IDIH Upgrade Preparation

Procedure 8. IDIH Upgrade Preparation

Step#	Procedure	Description
This procedure prepares the FD configuration scripts that are used to create the Mediation and Application guests. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	PMAC CLI: Log into the PMAC server as the admusr user	`ssh <PMAC IP address>`
		`login as: admusr`
		`password: <enter password>`

2.
☐
	PMAC CLI: Copy the ISOs to PMAC	1. Add the Application ISO images (Mediation, Application, and Oracle) and the TPD ISO to the PMAC, this can be done in one of three ways:
		  1. Insert the application CD required by the application into the removable media drive.
		  2. Attach the USB device containing the ISO image to a USB port.
		  3. Copy the Application iso file to the PMAC server into the /var/TKLC/smac/image/isoimages/home/smacftpusr/ directory as pmacftpusr user:
		  4. cd into the directory where your ISO image is located on the TVOE host (not on the PMAC server).
		  5. Using sftp, connect to the PMAC server:
		  `$ sftp pmacftpusr@<pmac_management_network_ip>`
		  `$ put <image>.iso`
		2. Execute Appendix E to add the ISO to the PMAC software inventory.
		3. Repeat the steps for the Application, Mediation, Oracle, and TPD ISOs.
		4. After the all images are transferred, close the connection:
		  `$ quit`
		Note: If there is insufficient disk space in the PMAC pmacftpuser local directory, refer to the “Configure PMAC Application Guest iso Images Virtual Disk” section of [15] to increase the storage allocation.

Step#	Procedure	Description

3.
☐
	IDIH CLI:
	Perform a system health check on the guest
		1. Log into the Oracle guest as the admusr user.
		`ssh <IDIH IP address>`
		`login as: admusr`
		`password: <enter password>`
		2. Execute the analyze_server.sh script.
		`$ sudo /usr/TKLC/xIH/plat/bin/analyze_server.sh -i`
		Sample output:
		`[admusr@cat-ora ~]$ /usr/TKLC/xIH/plat/bin/analyze_server.sh -i`
		`13:24:52: STARTING HEALTHCHECK PROCEDURE`
		`13:24:52: date: 03-17-15, hostname: cat-ora`
		`13:24:52: TPD VERSION: 7.0.0.0.0-86.14.0`
		`13:24:52: ----------`
		`13:24:52: Checking disk free space`
		`13:24:52: No disk space issues found`
		`:`
		`:`
		`13:25:02: All tests passed!`
		`13:25:02: ENDING HEALTHCHECK PROCEDURE WITH CODE 0`
		If the output indicates a status failure, do not proceed with the upgrade. It is recommended to contact My Oracle Support (MOS) for guidance.

3.5 Software Upgrade Execution Overview

It is recommended to contact My Oracle Support (MOS) as described in Appendix CC before executing this upgrade to ensure that the proper media are available for use.

Before upgrade, users must have performed the data collection and system health check instructions in Section 3.4. This check ensures the system to be upgraded is in an upgrade-ready state. Performing the system health check determines which alarms are present in the system and if upgrade can proceed with alarms.

!!WARNING!!

If there are servers in the system which are not in a Normal state, these servers should be brought to the Normal or Application Disabled state before the upgrade process is started. The sequence of upgrade is such that servers providing support services to other servers are upgraded first.

If alarms are present on the server, it is recommended to contact My Oracle Support (MOS) to diagnose those alarms and determine whether they need to be addressed, or if it is safe to proceed with the upgrade.

Read the following notes on upgrade procedures:

- All procedure completion times shown in this document are estimates. Times may vary due to differences in database size, user experience, and user preparation.
- The shaded area within response steps must be verified in order to successfully complete that step.

- Where possible, command response outputs are shown as accurately as possible. EXCEPTIONS are as follows:
  - Session banner information such as **time** and **date**.
  - System-specific configuration information such as **hardware locations**, **IP addresses** and **hostnames.**
  - ANY information marked with **XXXX** or **YYYY** where appropriate, instructions are provided to determine what output should be expected in place of **XXXX** or **YYYY**.
  - Aesthetic differences unrelated to functionality such as **browser attributes: window size**, **colors**, **toolbars,** and **button layouts**.
- After completing each step, and at each point where data is recorded from the screen, the technician performing the upgrade must initial each step. A check box is provided. For procedures which are executed multiple times, the check box can be skipped, but the technician must initial each iteration the step is executed. The space on either side of the step number can be used (margin on left side or column on right side).
- Captured data is required for future support reference if a My Oracle Support (MOS) representative is not present during the upgrade.
- Answer these questions, and record:

  What is the DSR Application version to be upgraded? _____

  What is the DSR Application new version to be applied? _____

  Is this a Major or Incremental Upgrade? _____

  Are there IPFE servers to upgrade? _____

  What DSR applications are running in a TVOE host environment? _____

  Is SDS also deployed (co-located) at the DSR site? _____

  Note: SDS does not need to be upgraded at the same time.

  Is IDIH also deployed (co-located) at the DSR site? _____

3.6 Accepting the Upgrade

After the upgrade of **ALL** servers in the topology has been completed, and following an appropriate soak time, the Post-Upgrade procedures in Section 5.7 are performed in a separate Maintenance Window to finalize the upgrade. Procedure 42 accepts the upgrade and performs a final health check of the system to monitor alarms and server status. Accepting the upgrade is the last step in the upgrade. Once the upgrade is accepted, the upgrade is final and cannot be backed out.

4. NOAM Upgrade Execution

NOAM UPGRADE

The NOAM upgrade section is common to all topologies. This section must be completed before executing the site upgrade procedures.

Procedures for the NOAM upgrade include steps for the upgrade of the Disaster Recovery NOAM (DR NOAM) servers also. If no DR NOAM is present in the customer deployment, then the DR NOAM-related steps can be safely ignored.

Global Provisioning is disabled before upgrading the NOAM servers. Provisioning activities at the NOAM and SOAM servers have certain limitations during the period where the NOAMs are upgraded and the sites are not yet upgraded.

The Elapsed Time mentioned in Table 12 specifies the time with and without TVOE upgrade.

If the TVOE host upgrades are not needed, or were previously performed, then the time estimates without TVOE upgrade apply. All times are estimates.

Note: Refer to Appendix AA for changing the NOAM VM profile to increase MP capacity.

Table 12: NOAM Upgrade Execution Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 9	0:05	0:05	NOAM Pre-Upgrade Health Checks	None
Procedure 10	0:20-0:30	0:25-0:35	NOAM Health Check for Source Release 8.0/8.1	None
Procedure 11	0:05-0:10	0:30-1:15	NOAM Pre-Upgrade Backup	None
Procedure 12	0:01-0:05	0:31-1:20	Disable Global Provisioning	Global Provisioning Disabled
Procedure 13	0:40-1:20	1:11-2:40	NOAM Upgrade	No Traffic Impact
Procedure 14	0:05-0:15	1:17-3:00	Verify NOAM Post Upgrade Status	None
Procedure 15	0:05-0:10	1:22-3:10	Allow Provisioning	Global Provisioning Enabled
Section 4.6	0:05-0:10	1:27-3:20	SNMP Configuration Update	Configuration for SNMP traps

[1]***Note***: It is highly recommended that TVOE hosts at a site be upgraded in a MW before the start of the DSR 8.4 Application upgrade. If TVOE host are to be upgraded during the same MW as the DSR 8.4 Application upgrade, then see Table 10 for additional time estimates associated with TVOE upgrade.

4.1 NOAM Pre-Upgrade Checks and Backup

The procedures in this section perform health checks and backups to prepare the NOAM NE for upgrade. These procedures must be executed on the active NOAM.

Note: If syscheck fails on any server during Pre-Upgrade Checks or in early checks stating that "cpu: FAILURE:: No record in alarm table for FAILURE!", see BB.5 : Resolve syscheck Error for CPU Failure

Note: These procedures may be executed outside of the maintenance window, but should be executed within 6 to 8 hours.

CAUTION

Increase Maximum Number of Open Files

As the number of servers in the topology grows, so does the need for additional files to handle merging data to the NOAM. This procedure checks the number of files currently in use, and, if necessary, increases the maximum number of open files.

See Appendix B to increase the maximum number of open files.

4.1.1 NOAM Pre-Upgrade Health Checks

This procedure performs the pre-upgrade health checks that are common to all source releases.

Procedure 9. NOAM Pre-Upgrade Health Checks

Step#	Procedure	Description
This procedure makes a record of the TVOE software versions and verifies that a recent backup exists for all servers. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Verify NOAM TVOE host upgrades have been completed before starting DSR upgrade	***Important***: Verify the revision level of the TVOE host systems for the NOAM and DR-NOAM servers. If they are not on the required release, then the optional steps in this procedure to upgrade the TVOE hosts are required. See Appendix J for the steps to verify the TVOE host revision level. This can also be done from the PMAC Software Inventory screen. Complete this information: NOAM-A TVOE Host Rev _____ NOAM-B TVOE Host Rev _____ DR-NOAM-A TVOE Host Rev _____ DR-NOAM-B TVOE Host Rev _____ Will TVOE Upgrades be performed during the DSR Application Upgrades? _____

2.
☐
	Active NOAM VIP: Verify backups are created for all servers	Verify a recent COMCOL environment backup has been performed.
		1. Navigate to **Status and Manage > Files**.
		2. Select each server tab, in turn.
		3. Verify the following two files have been created and have a current timestamp:
		`Backup.DSR.<hostname>.FullRunEnv.NETWORK_OAMP.<timestamp>.UPG.tar.bz2`
		`Backup.DSR.<hostname>.FullDBParts.NETWORK_OAMP.<timestamp>.UPG.tar.bz2`
		See Section 3.4.4 to perform (or repeat) a full backup, if needed.
		4. Repeat sub-steps 1 through 3 for each site.

4.1.2 NOAM Health Check for Source Release 8.0/8.1 and Later

This procedure determines the health and status of the network and servers when the NOAM is on source release 8.0 or later. This procedure must be executed on the active NOAM.

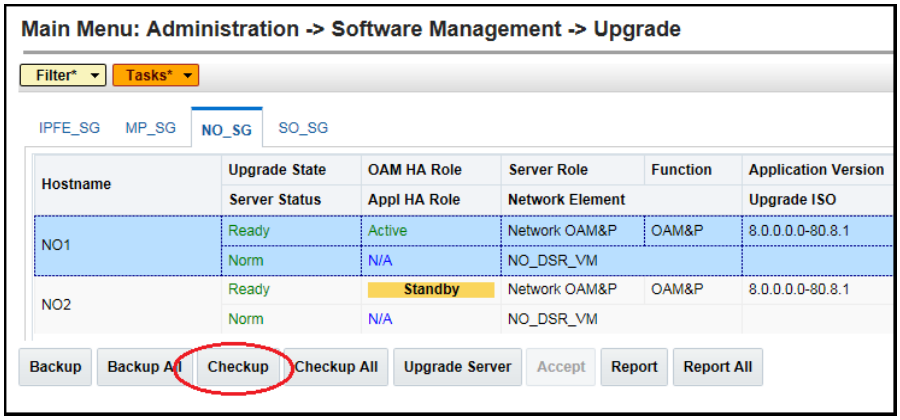
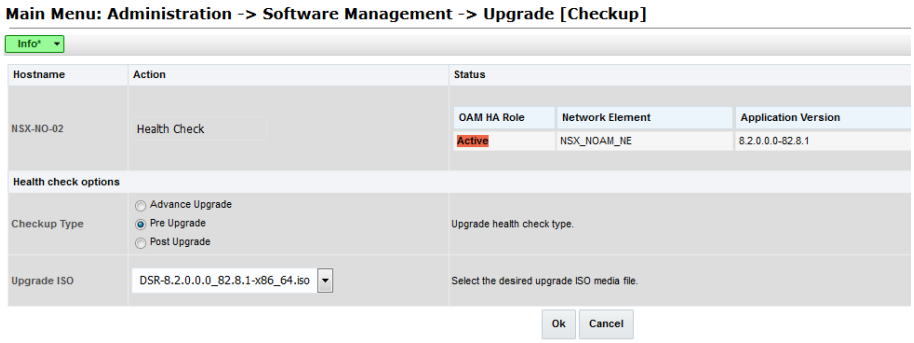
Procedure 10. NOAM Health Check for Source Release 8.0/8.1 and Later

Step#	Procedure	Description
This procedure performs a health check of the system before upgrading the NOAMs. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

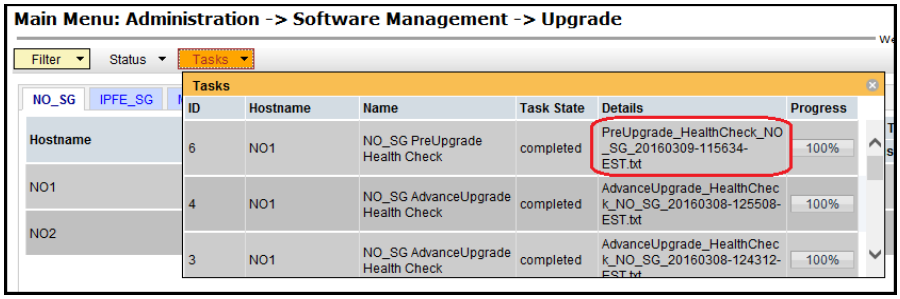
1.
☐
	Active NOAM VIP: Verify upgrade DSR ISO has been transferred to all servers	1. Navigate to **Status & Manage > Files**.
		2. Select the target release DSR ISO and click **View ISO Deployment Report**.
		3. Review the report to ensure the ISO is deployed to all servers in the topology.
		Sample report:
		`Deployment report for DSR-8.4.0.0.0_84.5.0-x86_64.iso:`
		`Deployed on 7/7 servers.`
		`NO1: Deployed`
		`NO2: Deployed`
		`SO1: Deployed`
		`SO2: Deployed`
		`MP1: Deployed`
		`MP2: Deployed`
		`IPFE: Deployed`

2. ☐	**Active NOAM VIP**: Export and archive the Diameter configuration data	1. Navigate to **Diameter Common > Export**. 2. Capture and archive the Diameter data by selecting the **ALL** option for the Export Application. 3. Verify the requested data is exported by clicking **Tasks** at the top of the screen. 4. Navigate to **Status & Manage > Files** and download all the exported files to the client machine, or use the SCP utility to download the files from the active NOAM to the client machine.

Procedure 10. NOAM Health Check for Source Release 8.0/8.1 and Later

Step#	Procedure	Description
3. ☐	**Active NOAM VIP**: Initiate NOAM health checks	This procedure runs the automated pre-upgrade health checks. 1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the active NOAM.  1. Click **Checkup**. 2. Under Health Check options, select the **Pre Upgrade** option. 3. From the Upgrade ISO option, select the target release ISO. 4. Click **OK**. Control returns to the Upgrade screen. 

Procedure 10. NOAM Health Check for Source Release 8.0/8.1 and Later

Step#	Procedure	Description
4. ☐	**Active NOAM VIP**: Monitor health check progress for completion	1. Click the **Tasks** option to display the currently executing tasks. The Health Check task name appears as <NOServerGroup> PreUpgrade Health Check. 2. Monitor the Health Check task until the **Task State** is completed. The Details column displays a hyperlink to the Health Check report. 3. Click the hyperlink to download the Health Check report. 4. Open the report and review the results. 
5. ☐	**Active NOAM VIP**: Analyze health check results	Analyze health check report for failures. If the Health Check report status is anything other than **Pass**, analyze the Health Check logs to determine if the upgrade can proceed. 1. Navigate to **Status & Manage > Files**. 2. Select the file named **PreUpgrade_HealthCheck_NO_SG_<date_timestamp>.txt** and click **View**. 3. Locate the log entries for the most recent health check. 4. Review the log for failures. 5. Analyze the failures and determine if it is safe to continue the upgrade. If necessary, it is recommended to contact My Oracle Support (MOS) for guidance as described in Appendix CC.

4.1.3 NOAM Pre-Upgrade Backup

Procedure 11. NOAM Pre-Upgrade Backup

Step#	Procedure	Description
This procedure backs up the NOAM servers just before the upgrade. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Backup all global configuration databases for NOAM ***Important***: Required for disaster recovery	1. Navigate to **Status & Manage > Database** to return to the Database Status screen. 2. Click to highlight the active NOAM server and click **Backup**. ***Note***: **Backup** is only enabled when the active server is selected. 3. Mark the **Configuration** checkbox. 4. Select the desired compression type. Retain the default selection unless there is a specific reason or direction to change it. 5. Enter **Comments** (optional). 6. Click **OK**. ***Note***: On the **Status & Manage >Database** screen, the active NOAM server displays the word **Active** in the OAM Max HA Role column.
2. ☐	**Active NOAM VIP**: Download/Save database files backups for NOAM ***Important***: Required for disaster recovery	1. Navigate to **Status & Manage > Files**. 2. Click on the active NOAM server tab. 3. Select the configuration database backup file and click **Download**. 4. If a confirmation window displays, click **Save**. 5. If the Choose File screen displays, select a destination folder on the local workstation to store the backup file. Click **Save**. 6. If a Download Complete confirmation displays, click **Close**.

4.2 Disable Global Provisioning

The following procedure disables provisioning on the NOAM. This step ensures no changes are made to the database while the NOAMs are upgraded. Provisioning is re-enabled once the NOAM upgrade is complete.

Procedure 12. Disable Global Provisioning

Step#	Procedure	Description
This procedure disables provisioning for the NOAM (and DR-NOAM) servers before upgrade. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Disable global provisioning and configuration updates on the entire network	1. Log into the active NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Database**. 3. Click **Disable Provisioning**. 4. Confirm the operation by clicking **OK** on the screen. 5. Verify the button text changes to **Enable Provisioning**; a yellow information box should also display at the top of the view screen that states: **[Warning Code 002] – Global provisioning has been manually disabled**. The active NOAM server has the following expected alarm: **Alarm ID = 10008 (Provisioning Manually Disabled)**

4.3 NOAM Upgrade

This procedure is used to upgrade the NOAM and DR NOAM servers, including the TVOE host if TVOE was not upgraded previously, as recommended in Section 3.4.6 – Upgrade TVOE Hosts at a Site.

Procedure 13. NOAM Upgrade

Step#	Procedure	Description
This procedure upgrades the TVOE host of the NOAM servers (optional) and upgrades NOAM servers. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	RMS check	If the active DSR NOAM or standby DSR NOAM is a guest on RMS servers, perform Appendix C to update the NOAM guest VM configuration. ***Note***: This step is not applicable to VE-DSR systems. **WARNING**: Appendix C is mandatory and also depends on the amount of physical RAM deployed on the server. The appendix can be run on any server type if the physical RAM is available. If the physical RAM is not available, then contact My Oracle Support (MOS) and ask for assistance.

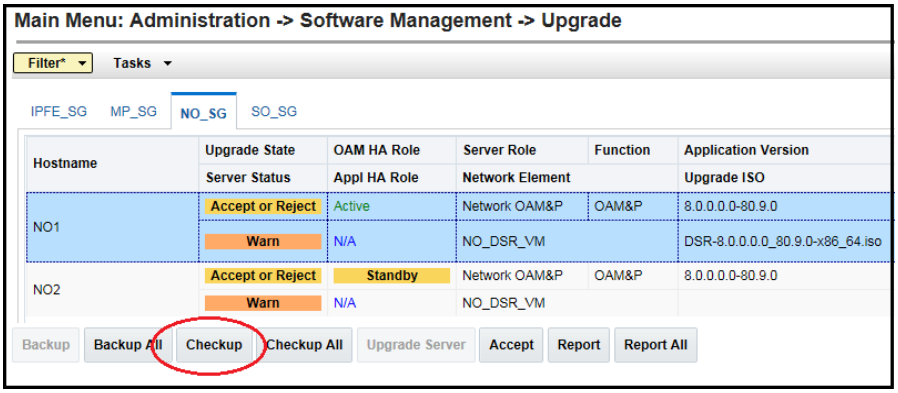
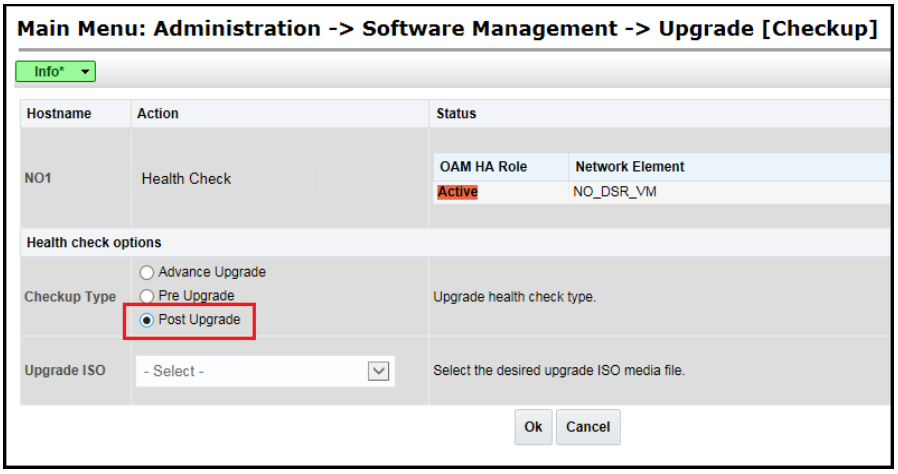
Step#	Procedure	Description
2. ☐	TVOE upgrade (if applicable)	Before proceeding with the primary DSR standby NOAM upgrade, execute Appendix J to upgrade the TVOE host if the standby NOAM is a TVOE guest.
3. ☐	Upgrade primary DSR standby NOAM	1. Upgrade the primary DSR standby NOAM server using the Upgrade Single Server procedure: **If the active NOAM is on DSR 8.0/8.1:** Execute Appendix F -- Single Server Upgrade Procedure – DSR 8.x. **Otherwise:** Execute Appendix G -- Single Server Upgrade Procedure – pre DSR 8.x. 2. After successfully completing the single server upgrade procedure, return to this point and continue with the next step. The active NOAM server may have some or all of the following expected alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 31101 (DB Replication to slave DB has failed)** **Alarm ID = 31106 (DB Merge to Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31226 (HA Availability Status Degraded)** **Alarm ID = 31233 (HA Path Down)** **Alarm ID = 32532 (Server Upgrade Pending Accept/Reject)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** After being upgraded, the standby DR NOAM displays the following expected alarm: **Alarm ID = 31225 (HA Service Start Failure)** **Alarm ID = 31149 (DB Late Write Nonactive)** If the active NOAM is on release 8.0 or later, proceed to step 5.
4. ☐	TVOE upgrade (if applicable)	Before proceeding with the primary DSR active NOAM upgrade, execute Appendix J to upgrade the TVOE host if the active NOAM is a TVOE guest.
5. ☐	Upgrade second primary NOAM	Upgrade the second primary NOAM server using the Upgrade Single Server procedure: **If the active NOAM is on DSR 8.0/8.1**: Execute Appendix F -- Single Server Upgrade Procedure – DSR 8.x **Otherwise**: Execute Appendix G -- Single Server Upgrade Procedure – pre DSR 8.x After successfully completing the single server upgrade procedure, return to this point and continue with the next step.

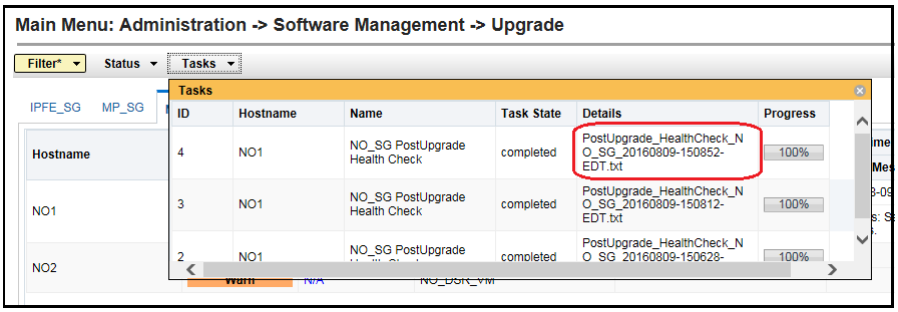
Step#	Procedure	Description
6. ☐	RMS check	If the active DSR NOAM or standby DSR NOAM is a guest on RMS servers, perform Appendix C to update the NOAM guest VM configuration. ***Note***: This step is not applicable to VE-DSR systems. **WARNING**: Appendix C is mandatory and also depends on the amount of physical RAM deployed on the server. The appendix can be run on any server type if the physical RAM is available.
7. ☐	TVOE upgrade (if applicable)	Before proceeding with the primary DSR standby NOAM upgrade, execute Appendix J to upgrade the TVOE host if the standby NOAM is a TVOE guest.
8. ☐	Upgrade standby DR NOAM	Upgrade the standby DR NOAM server using the Upgrade Single Server procedure: Execute Appendix F -- Single Server Upgrade Procedure – DSR 8.x After successfully completing the procedure in Appendix F, return to this point and continue with the next step.
9. ☐	TVOE upgrade (if applicable)	Before proceeding with the active DR NOAM upgrade, execute Appendix J to upgrade the TVOE host if the active DR NOAM is a TVOE guest.
10. ☐	Upgrade the active DR NOAM server using the Upgrade Single Server procedure	Execute **Appendix F** -- Single Server Upgrade Procedure – DSR 8.x After successfully completing the procedure in Appendix F, return to this point and continue with the next procedure per Table 12.

4.4 Verify NOAM Post Upgrade Status

This procedure determines the validity of the upgrade, as well as the health and status of the network and servers.

Procedure 14. Verify NOAM Post Upgrade Status

Step#	Procedure	Description
This procedure verifies post upgrade status for NOAM upgrade. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Post-upgrade health checks	This procedure runs the automated post-upgrade health checks. 1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the active NOAM.  3. Click **Checkup**. 4. Under Health check options, select the **Post Upgrade** option. 5. Click **OK**. Control returns to the Upgrade screen.  	

Step#	Procedure	Description
2. ☐	**Active NOAM VIP**: Monitor health check progress	1. Click the **Tasks** option to display the currently executing tasks. The Health Check task name appears as <NOServerGroup> **PostUpgrade Health Check**. 2. Monitor the health check task until the Task State is **completed**. The Details column displays a hyperlink to the Health Check report. 3. Click the hyperlink to download the Health Check report. 4. Open the report and review the results. 
3. ☐	**Active NOAM VIP**: Analyze health check failures	If the Health Check report status is anything other than **Pass**, the Health Check logs can be analyzed to determine if the upgrade can proceed. 1. Navigate to **Status & Manage > Files**. 2. Select the file named **UpgradeHealthCheck.log** and click **View**. 3. Locate the log entries for the most recent health check. 4. Review the log for failures. Analyze the failures and determine if it is safe to continue the upgrade. If necessary, it is recommended to contact My Oracle Support (MOS) for guidance as described in Appendix CC.

4.5 Allow Provisioning (Post NOAM Upgrade)

The following procedure enables global provisioning for all network elements.

CAUTION Any network-wide provisioning changes made at the NOAM before the upgrade is accepted are lost if the upgrade is backed out.

Procedure 15. Allow Provisioning

Step#	Procedure	Description
This procedure enables provisioning for the NOAM (and DR-NOAM) servers Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Enable global provisioning and configuration updates on the entire network	1. Log into the active NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Database**. 3. Click **Enable Provisioning**. 4. Confirm the operation by clicking **OK** on the screen. 5. Verify the button text changes to **Disable Provisioning.**
Note: After enabling provisioning at the NOAM, the SOAM GUI(s) may display a banner indicating that global provisioning is disabled. This message can be ignored – global provisioning is enabled. This is a display issue only and is corrected when the SOAMs are upgraded.		
2. ☐	**Active NOAM VIP**: Add new network element (if required)	**Perform this step only if the addition of a new network element is required at this time.** If a new network element is to be added, start this procedure now. The addition of the new network element requires a separate maintenance window. The servers in the new network element must be installed with the same DSR release as that of the upgraded NOAM(s). Follow the release specific installation procedures from reference [1] to install the software on the new servers and add the new network element under the existing NOAM(s). Skip the sections of the installation procedure related to installing and configuring the NOAM(s). This adds a new DSR SOAM site under the existing NOAM(s).

4.6 SNMP Configuration Update (Post NOAM Upgrade)

Refer Appendix W. SNMP Configuration to apply SNMP workaround in following cases:

- If SNMP is not configured in DSR.
- If SNMP is already configured and SNMPv3 is selected as enabled version.

  This can be checked by navigating to **Administration > Remote Servers >SNMP Trapping** screen using GUI session of NOAM server VIP IP address.

5. Site Upgrade Execution

This section contains the procedures for upgrading an entire site – starting with the pre-upgrade activities, upgrading the SOAMs and C-level servers, and finishing with verifying the upgrade.

To maximize the Maintenance Window usage, the procedures in this section make full use of the parallel upgrade capabilities of the DSR, while ensuring traffic continuity and redundancy to the fullest extent possible. Rearrangement of cycle option is added in Automated Site Upgrade. See 5.2.4 Rearrange Automated Site Upgrade Cycles for more details.

CAUTION Read 2.10 Automated Site Upgrade for details.

The Automated Site Upgrade procedures are in Section 5.2. Use the procedures in this section if Automated Site Upgrade was recommended in Section 3.2 Site Upgrade Methodology Selection.

*[4] As instructed by Oracle CGBU Customer Service.

Site Upgrade Methodology Selection.

The manual site upgrade procedures are in Section 5.2.4. Use the procedures in this section if Automated Server Group Upgrade or manual upgrade was recommended in Section 3.2 Site Upgrade Methodology Selection.

*[4] As instructed by Oracle CGBU Customer Service.

Site Upgrade Methodology Selection.

5.1 Site Pre-Upgrade Activities

SITE UPGRADE: Pre-Upgrade Activities

Use this section to execute pre-upgrade planning, pre-upgrade backups, pre-upgrade health checks, and to disable site provisioning.

This section contains the procedures for site upgrade planning, pre-upgrade backups, health checks, and disabling site provisioning.

Table 13 shows the procedures to be executed for the site upgrade, along with the estimated time to complete each step. Use Table 13 as a guide for determining the order in which the procedures are to be executed.

Table 13. Site Upgrade Execution Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 16	0:10-0:20	0:10-0:20	Site Pre-Upgrade Backups	None
Procedure 17	0:05-0:10	0:15-0:30	Site Pre-Upgrade Health Check for Release 8.0/8.1 and Later	None
Procedure 19	0:01-0:05	0:16-0:45	Disable Site Provisioning	Site Provisioning Disabled, No Traffic Impact

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 20	0:05-0:10	0:21-0:55	Site Upgrade Pre-Checks	
Procedure 21	2:40-4:00	3:01-4:55	Automated Site Upgrade	Traffic is not serviced by servers that are actively upgrading.
Procedure 29	0:02	3:03-4:57	Allow Site Provisioning	Site Provisioning Enabled, No Traffic Impact
Procedure 30	0:10-0:15	3:13-5:12	Site Post-Upgrade Health Check	None

5.1.1 Site Pre-Upgrade Backups

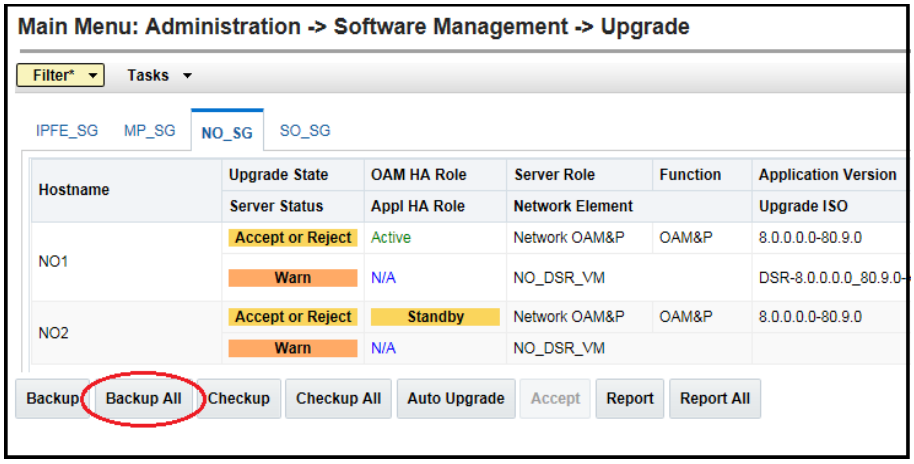
This procedure is non-intrusive and is used to perform a backup of all servers associated with the SOAM site(s) being upgraded. It is recommended that this procedure be executed no earlier than 36 hours before the start of the upgrade.

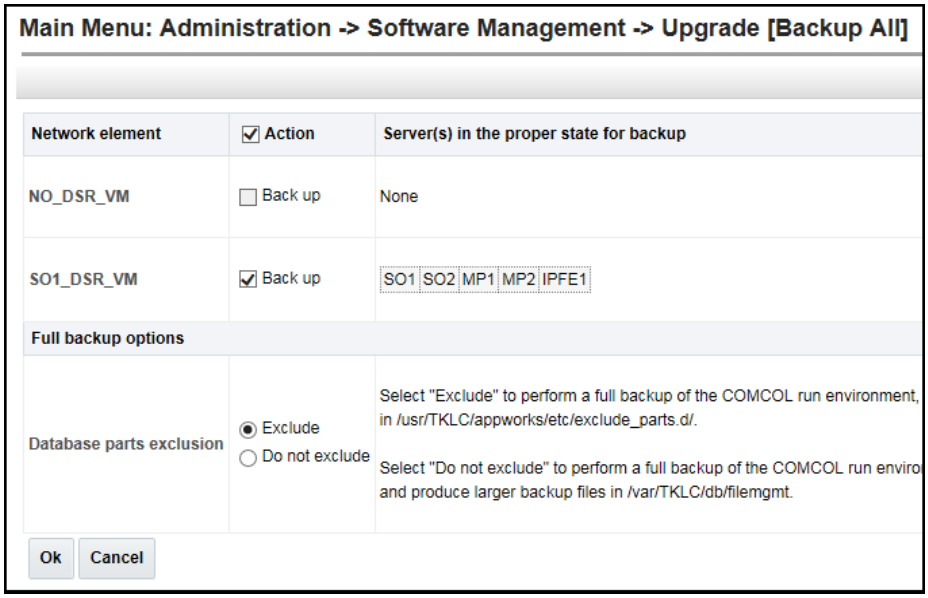
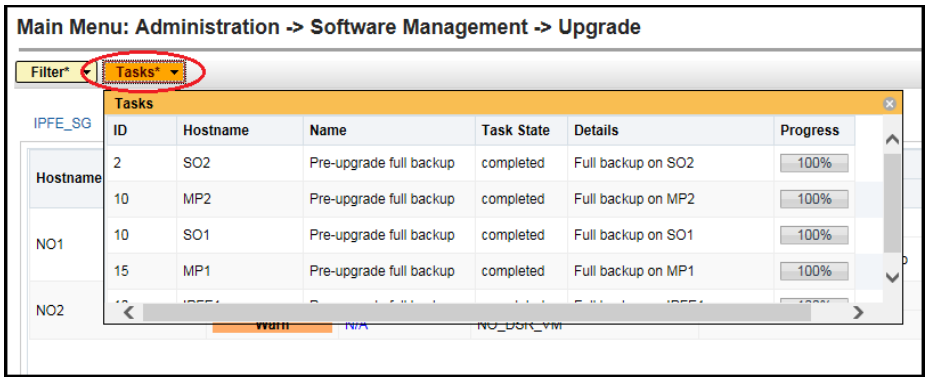
Since this backup is to be used in the event of disaster recovery, any site configuration changes made after this backup should be recorded and re-entered after the disaster recovery.

Procedure 56 is an alternate procedure that can be used to back up a site using the command line. Procedure 56 should only be used by direction of My Oracle Support (MOS).

Procedure 16. Site Pre-Upgrade Backups

Step#	Procedure	Description
This procedure conducts a full backup of the Configuration database and run environment on site being upgraded, so that each server has the latest data to perform a back out, if necessary. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active SOAM VIP**: Back up site configuration data ***Important***: Required for disaster recovery	1. Log into the SOAM GUI using the VIP. 2. Navigate to **Status & Manage > Database** to return to the Database Status screen. 3. Click to highlight the **Active SOAM** server, and click **Backup.** ***Note***: **Backup** is only enabled when the active server is selected. 4. Mark the **Configuration** checkbox. 5. Select the desired compression type. Retain the default selection unless there is a specific reason or direction to change it. 6. Enter **Comments** (optional). 7. Click **OK**. ***Note***: The active SOAM can be determined by navigating to **Status & Manage > HA** and noting which server is currently assigned the VIP in the **Active VIPs** field. The server having VIP assigned is the Active.

Step#	Procedure	Description
2. ☐	**Active SOAM VIP**: Download/Save database backup files ***Important***: Required for disaster recovery	1. Navigate to **Status & Manage > Files**. 2. Click on the active SOAM server tab. 3. Select the configuration database backup file and click **Download**. 4. If a confirmation window displays, click **Save**. 5. If the Choose File window displays, select a destination folder on the local workstation to store the backup file. Click **Save**. 6. If a download complete confirmation displays, click **Close**.
3. ☐	**Active NOAM VIP**: Upgrade/Back up DB run environment for site	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration > Software Management > Upgrade.** 3. Click **Backup All**. 

Step#	Procedure	Description
4. ☐	**Active NOAM VIP**: Set backup parameters	The Upgrade Backup All screen displays the various network elements and identifies which servers are ready for backup. 1. In the Action column, mark the **Back up** checkbox for each network element. 2. Verify the **NOAM server group** checkbox is **NOT** marked. ***Note***: Backing up the NOAM servers at this point overwrites the pre-upgrade backup files needed for backing out the target release. Do NOT back up the NOAM servers. 3. In the Full Backup Options section, verify the **Exclude** option is selected. 4. Click **OK**. This initiates a full backup on each eligible server. 
5. ☐	**Active NOAM VIP**: Monitor tasks for backup completion	1. From the Upgrade screen, click the **Tasks** option. 2. Monitor the progress of the backups until the network element(s) selected in step 4 are complete. 

Step#	Procedure	Description

6. ☐	**Active NOAM VIP**: Verify backup files are present on each server	1. Log into the active NOAM or SOAM GUI.
		2. Navigate to **Status & Manage > Files**.
		3. Click on each server tab.
		4. For each server, verify the following 2 files have been created:
		`Backup.DSR.<server_name>.FullDBParts.NETWORK_OAMP.<time_stamp>.UPG.tar.bz2`
		`Backup.DSR.<server_name>.FullRunEnv.NETWORK_OAMP.<time_stamp>.UPG.tar.bz2`
		5. Repeat sub-steps 1 through 4 for each site being upgraded.

5.1.2 Site Pre-Upgrade Health Checks

This section provides procedures to verify the health of the SOAM site before upgrade. Procedure 17 is the primary procedure to be executed when the active NOAM is on release 8.0/8.1 and later. Alternate release-specific procedures are also provided, to be used as directed.

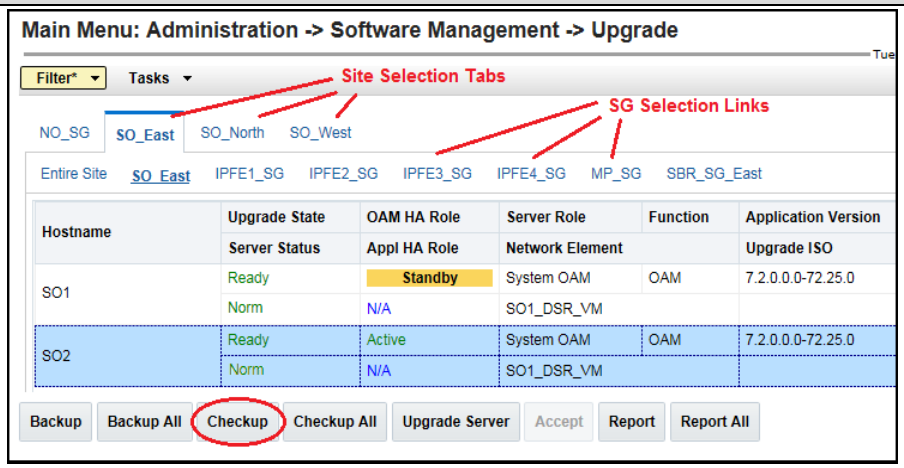
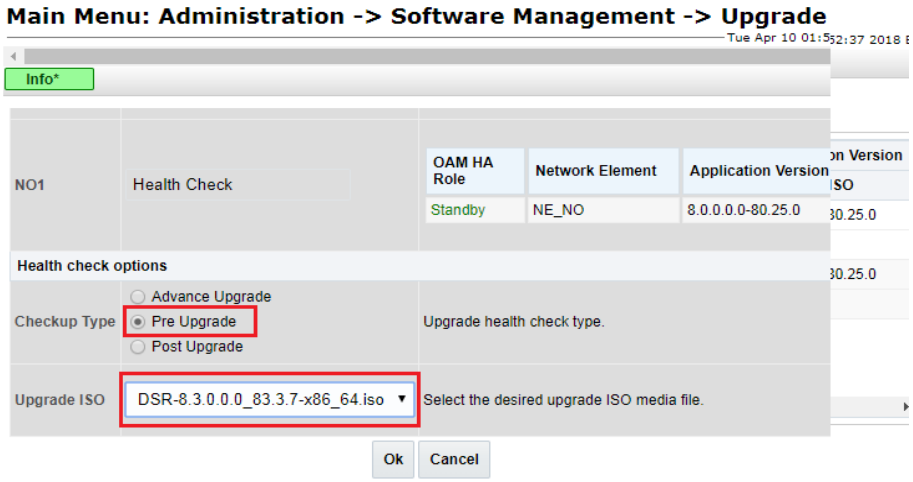
5.1.2.1 Site Pre-Upgrade Health Check for Release 8.0/8.1 and Later

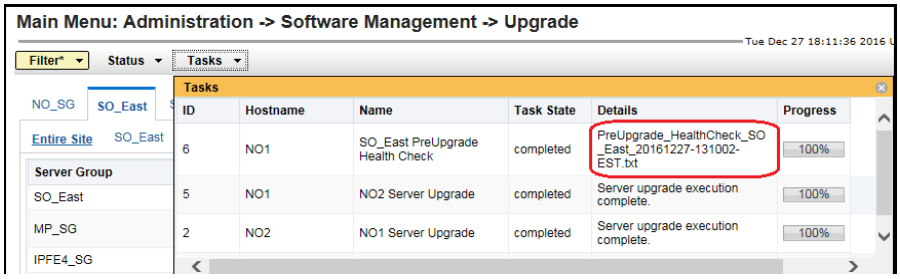
This procedure is used when the NOAMs are on release 8.0/8.1 and later. The procedure is non-intrusive and performs a health check of the site before upgrading.

Note: If syscheck fails on any server during Pre-Upgrade Checks or in early checks stating that "cpu: FAILURE:: No record in alarm table for FAILURE!", see BB.5 : Resolve syscheck Error for CPU Failure.

Procedure 17. Site Pre-Upgrade Health Check for Release 8.0/8.1 and Later

Step#	Procedure	Description
This procedure performs a health check before upgrading the SOAMs. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Run site health checks (part 1)	Select the SOAM on which health checks are run. 1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the tab of the site to be upgraded. 3. Select the SOAM server group link. 4. Select the active SOAM. 5. Click **Checkup**.

Step#	Procedure	Description
		 6. Check for the following alarm that may appear on the Active NOAM: **Alarm ID = 31201 (Process Not Running) for apwSoapServer process** 7. In case the above alarm persist, do not proceed with the upgrade.
2. ☐	**Active NOAM VIP**: Run site health checks (part 2)	Initiate the health checks. 1. Click **Checkup**. 2. In the Health check options section, select the **Pre Upgrade** option. 3. Use the **Upgrade ISO** option to select the target release ISO. 4. Click **OK** to initiate the health check. Control returns to the Upgrade Administration screen. 

Step#	Procedure	Description
3. ☐	**Active NOAM VIP**: Monitor health check progress for completion	1. Click the **Tasks** option to display the currently executing tasks. The Health Check task name appears as **<SOServerGroup> PreUpgrade Health Check**. 2. Monitor the Health Check task until the Task State is **completed**. The Details column displays a hyperlink to the Health Check report. 3. Click the hyperlink to download the Health Check report. 4. Open the report and review the results. 
4. ☐	**Active NOAM VIP**: Analyze any health check failures	If the Health Check report status is anything other than **Pass**, the Health Check logs must be analyzed to determine if the upgrade can proceed. The Health Check log is located in the File Management area of the active SOAM. Select the active SOAM tab to see the Health Check log. 1. Navigate to **Status & Manage > Files**. 2. Select the active SOAM tab. 3. Select the **UpgradeHealthCheck.log** file and click **View**. 4. Locate the log entries for the most recent health check. 5. Review the log for failures. Analyze the failures and determine if it is safe to continue the upgrade. If necessary, it is recommended to contact My Oracle Support (MOS) for guidance as described in Appendix CC.
5. ☐	**ACTIVE SOAM VIP**: Export and archive the Diameter configuration data on active SOAM GUI	1. Navigate to **Diameter Common > Export**. 2. Capture and archive the Diameter data by selecting the **ALL** option for the Export Application. 3. Click **OK**. 4. Verify the requested data is exported by clicking **Tasks** at the top of the screen. 5. Click **File Management** to view the files available for download. Download all of the exported files to the client machine, or use the SCP utility to download the files from the active NOAM to the client machine.
6. ☐	Capture data for each SOAM site	Repeat steps 1. through 5. for each configured SOAM site to be upgraded.

5.1.3 Site Upgrade Options Check

Automated Site Upgrade provides user-configurable options that control certain upgrade behaviors. These options are found on the active NOAM's **Administration > General Options** screen and are described in detail in Section 2.10.4. Before initiating a site upgrade, review these options to verify the current settings are correct, or to modify the settings to meet customer requirements/preferences.

This procedure is applicable only to Automated Site Upgrade. The options have no effect on manual upgrades or Automated Server Group upgrades.

Procedure 18. Site Upgrade Options Check

Step#	Procedure	Description
This procedure is used to review the site upgrade options and make changes as necessary. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: View auto site upgrade options	1. Log into the active NOAM GUI. 2. Navigate to **Administration > General Options**. 3. Scroll down to the **Site Upgrade Bulk Availability** option. 4. Review the existing value of this option and determine if changes are needed. If the option is changed, click **OK** to save the change. 5. Scroll down to the **Site Upgrade SOAM Method** option. 6. Review the existing value of this option and determine if changes are needed. If the option is changed, click **OK** to save the change.

5.1.4 Disable Site Provisioning

This procedure disables site provisioning in preparation for upgrading the site.

!!WARNING!! This procedure may only be performed in the maintenance window immediately before the start of the soam site upgrade.

Procedure 19. Disable Site Provisioning

Step#	Procedure	Description
This procedure disables provisioning for the SOAM. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active SOAM VIP**: Disable site provisioning	1. Log into the SOAM GUI of the site to be upgraded. 2. Navigate to **Status & Manage > Database**. 3. Click **Disable Provisioning**. 4. Confirm the operation by clicking **OK** on the screen. 5. Verify the button text changes to **Enable Provisioning**. A yellow information box also displays at the top of the view screen that states: **[Warning Code 004] – Site provisioning has been manually disabled**. The active SOAM server has the following expected alarm: **Alarm ID = 10008 (Provisioning Manually Disabled)**
2. ☐	Repeat for each SOAM site	Repeat step 1 for each configured SOAM site to be upgraded.

5.2 Automated Site Upgrade

CAUTION

If the following procedures must be completed before the start of automated site upgrade:

Procedure 16; **Error! Reference source not found.**, Procedure 19; REF _Ref488226404 \r \h * MERGEFORMAT Procedure 20

Read section 2.10 for more details about Automated Site Upgrade.

Upgrade cycles are created while using Automated Site Upgrade. Limitations in Appendix X for Automated Site Upgrade can be solved by rearranging/adding the upgrade cycles. If the user does not want to create a custom upgrade plan by rearranging/adding cycles then in that case manual upgrade section 5.3 method should be used.

5.2.1 TVOE Upgrade Check

When using the Automated Site Upgrade feature, it is not possible to upgrade the TVOE hosts with the application, as the application upgrades are performed continuously to completion. Therefore, all TVOE

hosts in the target site must be upgraded, if necessary, before initiating the site upgrade sequence. Refer to Section 3.4.6 for TVOE host upgrade procedures. Once the TVOE hosts upgrades are complete, return to this section to continue the site upgrade.

The TVOE version check is especially applicable to VEDSR systems, wherein all of the DSR applications run as guests of a TVOE host. In particular, consideration must be given to spare SBRs, which may be located at a different physical location, but are upgraded with the server group to which the spare SBR belongs.

5.2.2 Site Upgrade Pre-Checks

This procedure verifies the system is prepared for Automated Site Upgrade.

Procedure 20. Site Upgrade Pre-Checks

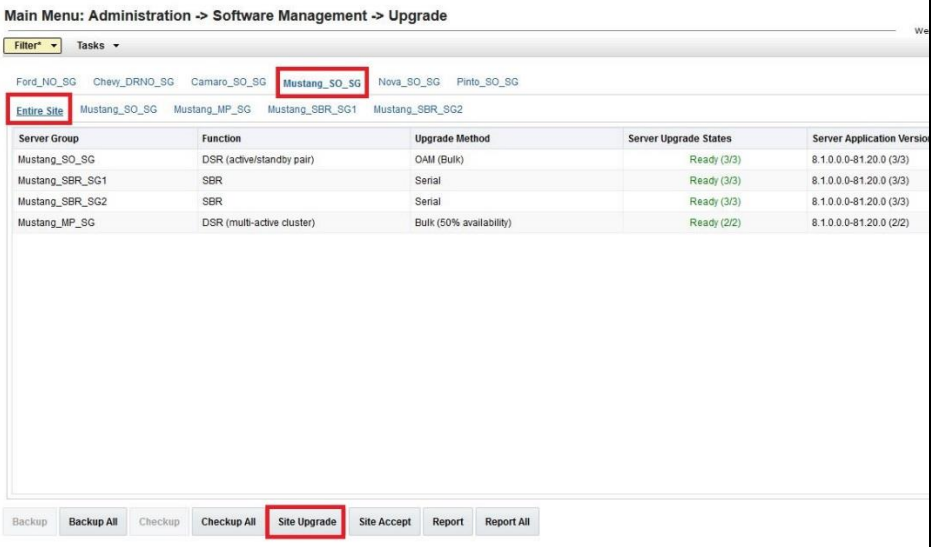
Step#	Procedure	Description
This procedure verifies traffic status, and verifies that site provisioning is disabled, in preparation for upgrading the site. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active SOAM VIP**: View KPIs to verify traffic status	1. Log into the active SOAM GUI using the VIP. 2. Navigate to **Status & Manage > KPIs**. 3. Inspect KPI reports to verify traffic is at the expected condition.
2. ☐	**Active SOAM VIP**: Verify site provisioning is disabled	Verify site provisioning was properly disabled in Procedure 19. In the GUI status bar, where it says **Connected using …**, check for the message **Site Provisioning disabled**. If the message is present, continue with the next procedure per Table 13; otherwise, execute Procedure 19 Disable Site Provisioning

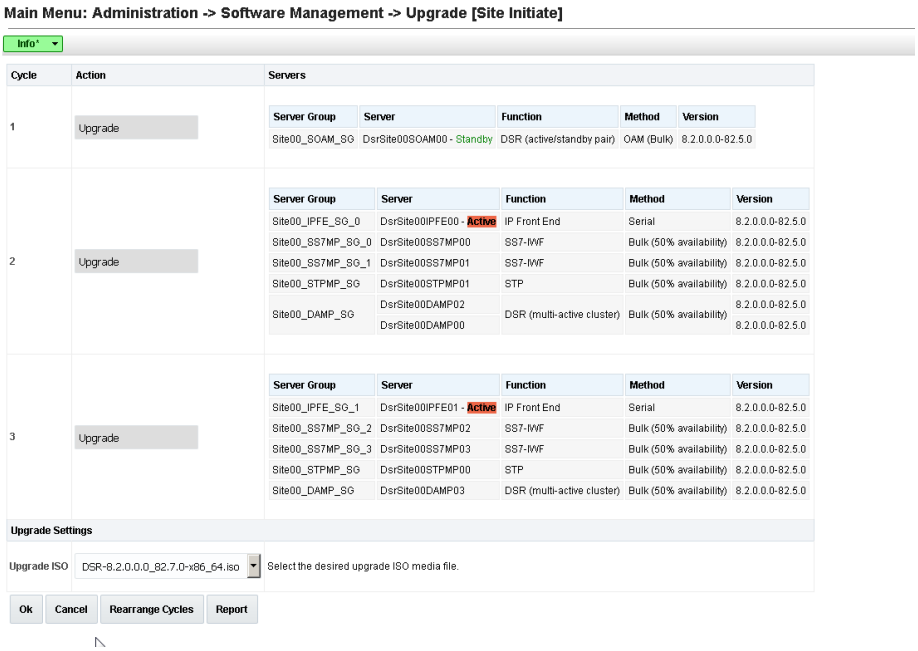
3.
☐
	Active NOAM VIP:
	Verify HA state
		Execute this command to find the state of the servers:
		`$ ha.mystate`
		`[admusr@E1B581DAMP1 ~]$ ha.mystate`
		`resourceId role node DC subResources lastUpdate`
		`DbReplication Stb/Stb C2016.086 * 0 170915:023010.572`
		`VIP Stb/Stb C2016.086 * 0 170915:023010.530`
		`CacdProcessRes Stb/OOS C2016.086 * 0 170915:023010.530`
		`DA_MP_Leader Act/OOS C2016.086 * 0 170915:023010.932`
		`DSR_SLDB OOS/OOS C2016.086 * 1-63 170913:121610.839`
		`DSR_SLDB Act/OOS C2016.086 * 0 170915:023010.934`
		`VIP_DA_MP OOS/OOS C2016.086 * 1-63 170913:121610.840`
		`VIP_DA_MP Act/OOS C2016.086 * 0 170915:023010.933`
		`EXGSTACK_Process OOS/OOS C2016.086 * 1-63 170913:121610.841`
		`EXGSTACK_Process Act/OOS C2016.086 * 0 170915:023010.933`
		`DSR_Process OOS/OOS C2016.086 * 1-63 170913:121610.841`
		`DSR_Process Act/OOS C2016.086 * 0 170915:023010.932`
		`CAPM_HELP_Proc Stb/OOS C2016.086 * 0 170915:023010.530`
		`DSROAM_Proc Stb/OOS C2016.086 * 0 170915:023010.530`
		`CAPM_PSFS_Proc Stb/Stb C2016.086 * 0 170915:023010.530`
		Note: In case there are more than one server in the same HA state (active), then manually switchover the server HA state using HA management screen before continuing the upgrade procedure.

5.2.3 Initiate Automated Site Upgrade

This procedure initiates the Automated Site Upgrade sequence.

Procedure 21. Automated Site Upgrade

Step#	Procedure	Description
This procedure upgrades an entire site using the Automated Site Upgrade option. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Review site upgrade plan and site readiness	Review the site upgrade plan created in Sections 3.2 and 3.2.2. This step verifies the servers and server groups to upgrade are in the proper state. 1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration > Software Management > Upgrade**. 3. Select the SOAM tab of the site to upgrade. 4. Verify the **Entire Site** link is selected. The Entire Site screen provides a summary of the server states and upgrade readiness. More detailed server status is available by selecting a specific server group link.  ***Note***: The Site Upgrade option can be used to upgrade an entire site, or a subset of site elements. The servers within the site may be in various states of readiness, including **Accept or Reject**, **Ready**, **Backup Needed**, **Failed**, or **Not Ready**. Only the servers in the **Ready** or **Failed** state are upgrade eligible.
2. ☐	**Active NOAM VIP**: Initiate site upgrade	1. Verify no server groups are selected on the upgrade administration screen. The Site Upgrade button is not available if a server group is selected. 2. Click **Site Upgrade**. 3. Review the upgrade plan as presented on the Site Initiate screen.

Step#	Procedure	Description
		 **Main Menu: Administration -> Software Management -> Upgrade [Site Initiate]** Info **Cycle** / **Action** / **Servers** 1 — Upgrade Server Group: Site00_SOAM_SG; Server: DsrSite00SOAM00 - Standby; Function: DSR (active/standby pair); Method: OAM (Bulk); Version: 8.2.0.0.0-82.5.0 2 — Upgrade Server Group: Site00_IPFE_SG_0; Server: DsrSite00IPFE00 - Active; Function: IP Front End; Method: Serial; Version: 8.2.0.0.0-82.5.0 Site00_SS7MP_SG_0; DsrSite00SS7MP00; SS7-IWF; Bulk (50% availability); 8.2.0.0.0-82.5.0 Site00_SS7MP_SG_1; DsrSite00SS7MP01; SS7-IWF; Bulk (50% availability); 8.2.0.0.0-82.5.0 Site00_STPMP_SG; DsrSite00STPMP01; STP; Bulk (50% availability); 8.2.0.0.0-82.5.0 Site00_DAMP_SG; DsrSite00DAMP02; DsrSite00DAMP00; DSR (multi-active cluster); Bulk (50% availability); 8.2.0.0.0-82.5.0 3 — Upgrade Server Group: Site00_IPFE_SG_1; Server: DsrSite00IPFE01 - Active; Function: IP Front End; Method: Serial; Version: 8.2.0.0.0-82.5.0 Site00_SS7MP_SG_2; DsrSite00SS7MP02; SS7-IWF; Bulk (50% availability); 8.2.0.0.0-82.5.0 Site00_SS7MP_SG_3; DsrSite00SS7MP03; SS7-IWF; Bulk (50% availability); 8.2.0.0.0-82.5.0 Site00_STPMP_SG; DsrSite00STPMP00; STP; Bulk (50% availability); 8.2.0.0.0-82.5.0 Site00_DAMP_SG; DsrSite00DAMP03; DSR (multi-active cluster); Bulk (50% availability); 8.2.0.0.0-82.5.0 **Upgrade Settings** Upgrade ISO: DSR-8.2.0.0.0_82.7.0-x86_64.iso — Select the desired upgrade ISO media file. Ok / Cancel / Rearrange Cycles / Report ***Note***: Please review the upgrade plan again and ensure all concerns noted in Table 6, have been addressed with the upgrade plan presented on the screen. If you need to rearrange the upgrade cycles, see section 5.2.4 on how to do it; otherwise, continue to the next step. There is some limitation with upgrading the DC server during its server group upgrade, which are upgraded in a group of servers. This is applicable for all of the upgrade options. For example, DA-MPs, make sure that DC server is not getting upgraded in the first upgrade cycle of the C-Level servers and of its server group. To identify the DC server, use Appendix W Identify the DC server. **If the DC server is showing by default in the first upgrade cycle of its server group, then rearrange the upgrade cycles by using section 5.2.4 so that the DC server is not getting upgraded in the first upgrade cycle of its server group.** In all cases, regardless of the number of cycles used to upgrade the DA-MP server group, the DA-MP Leader should be the last server upgraded. Upgrading the DA-MP Leader last minimizes the number of leader changes during the upgrade. The DA-MP Leader is designated on the active SOAM at **Diameter > Maintenance > DA-MPs > Peer DA-MP Status**, where **MP Leader** = **Yes**. 4. In the Upgrade Settings section of the form, use the **Upgrade ISO** options to select the target ISO. 5. Click **OK** to start the upgrade sequence. Control returns to the Upgrade Administration screen.

Step#	Procedure	Description
3. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	See step 4 for instructions if the upgrade fails, or if execution time exceeds 60 minutes. ***Note***: If the upgrade processing encounters a problem, it may attempt to ROLL BACK to the original software release. In this case, the upgrade displays as **FAILED**. The execution time may be shorter or longer, depending on the point in the upgrade where there was a problem. With the **Entire Site** link selected, a summary of the upgrade status for the selected site displays. This summary identifies the server group(s) currently upgrading, the number of servers within each server group that are upgrading, and the number of servers that are pending upgrade. Use this view to monitor the upgrade status of the overall site. More detailed status is available by selecting the individual server group links. The server group view shows the status of each individual server within the selected server group. During the upgrade, the servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 31101 (DB Replication To Slave Failure)** **Alarm ID = 31106 (DB Merge To Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31233 (HA Secondary Path Down)** **Alarm ID = 31283 (Highly available server failed to receive mate heartbeats)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31225 (HA Service Start Failure)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** ***Note***: Do not accept any upgrades at this time. In the unlikely event that after the upgrade, the **Upgrade State** of server will be 'Backout Ready', and the **Status Message** will display: "Server could not restart the application to complete the upgrade." Appendix U to create a link of Comagent. Appendix V to restore the server to full operational status, then return to this procedure to continue the upgrade. **If the upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action.**

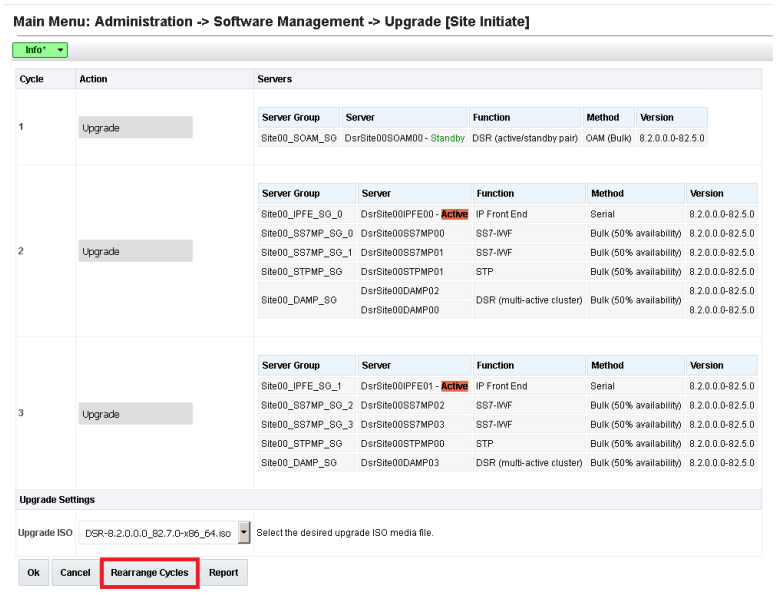
Step#	Procedure	Description
4. ☐	**Server CLI**: If the upgrade of a server fails:	If the upgrade of a server fails, access the server command line (using ssh or a console), and collect the following files: /var/TKLC/log/upgrade/upgrade.log /var/TKLC/log/upgrade/ugwrap.log /var/TKLC/log/upgrade/earlyChecks.log /var/TKLC/log/platcfg/upgrade.log It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document and provide these files. **When upgrade failure issue is identified and resolved, then Auto Site upgrade can be started again without executing any failed server recovery procedure.**
5. ☐	Post upgrade verification	Proceed to Section 5.7 – Site Post-Upgrade Procedures for post upgrade verification procedures.

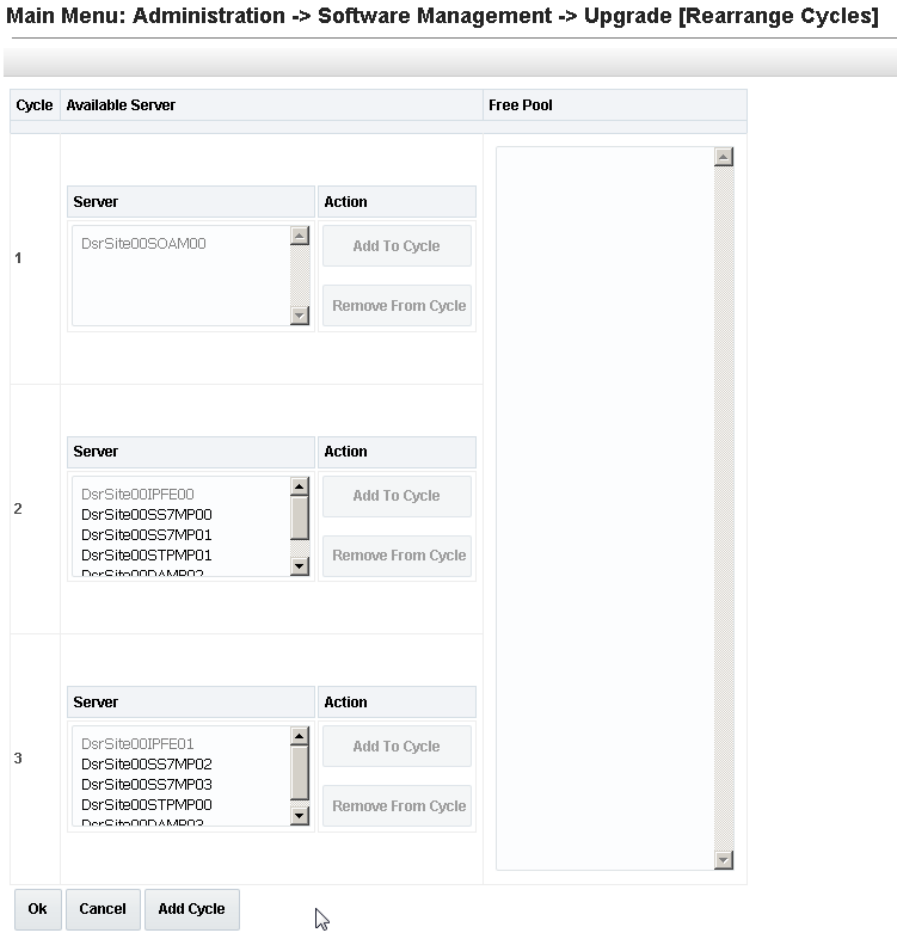
5.2.4 Rearrange Automated Site Upgrade Cycles

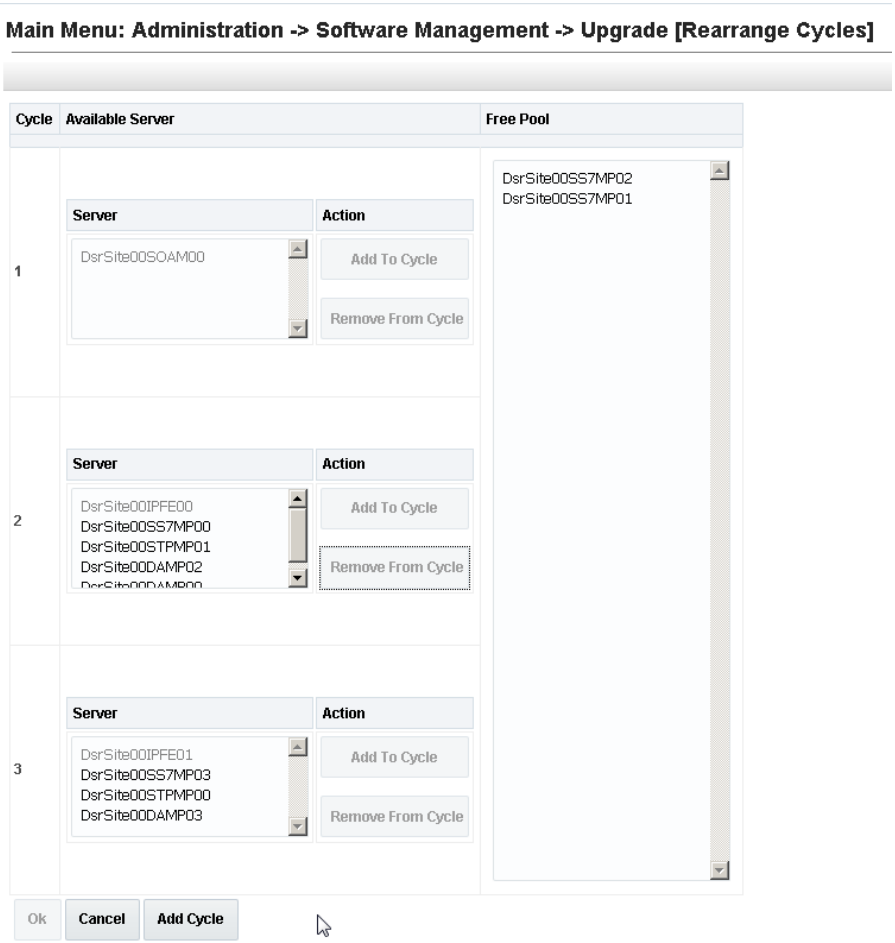
This procedure provides the details to rearrange the Automated Site Upgrade cycles if required.

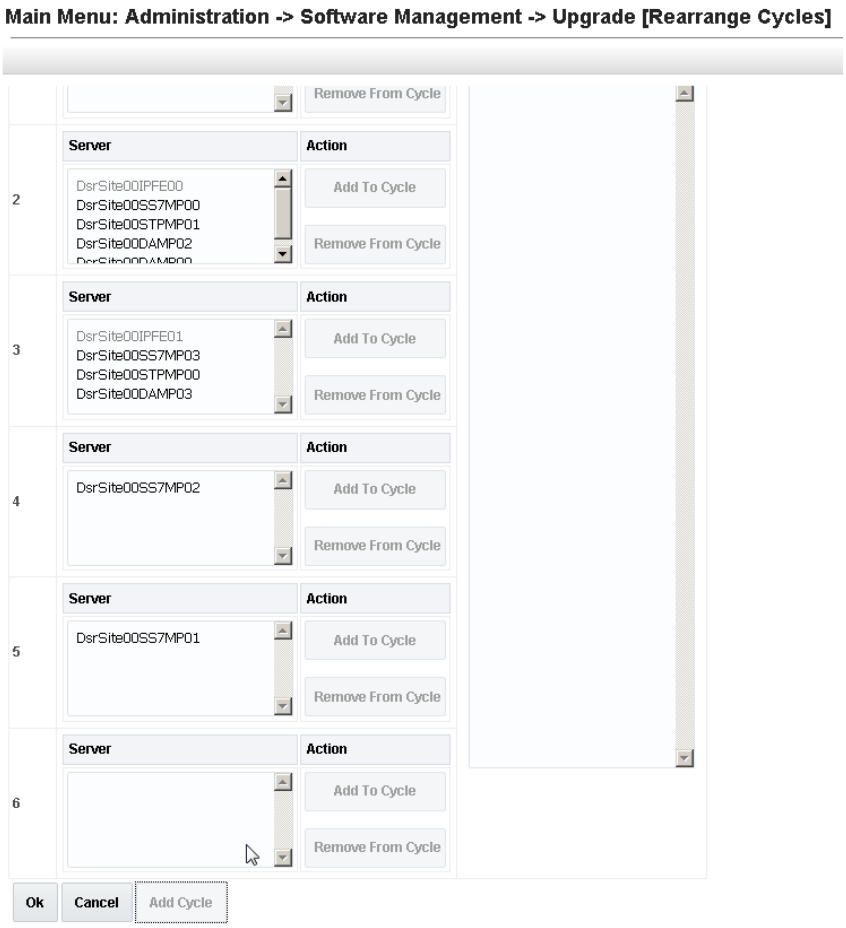
Automated Site Upgrade provides an option to rearrange servers in the cycles thus eliminating the risks of a potential network outage. ASU provides the flexibility to user to order the servers within the cycles without breaking the Minimum Availability and DA-MP Leader criteria.

Procedure 22. Rearrange Automated Site Upgrade Cycles

Step#	Procedure	Description
This procedure provides option to rearrange the upgrade cycles for Automated Site Upgrade. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Rearrange the upgrade cycle as needed	Click **Rearrange Cycles**. 

Step#	Procedure	Description
2. ☐	**Active NOAM VIP**: Rearrange servers in cycles	1. Click **Rearrange Cycles** on the Upgrade screen to rearrange servers. ***Note***: Only DA-MPs can be re-arranged. Re-arranging SBR and IPFE servers is restricted. Servers cannot be left in the free pool (The **OK** button will not be available). The DA-MP leader must remain in the last MP cycle. Even if not done, the DA-MP leader MP is upgraded in last. For the DA-MP group, the DA-MP server record is disabled since these servers are not available to add to cycles.  2. When a server needs to be removed from cycle and needs to be added in an existing cycle or a new cycle, do this: 1. Select the desired server in the list and click **Remove from Cycle**. The server Mmves to the Free Pool on the right side.

Step#	Procedure	Description
		 2. Add the servers in Free Pool to another existing cycle or new cycle. The next step describes how to add a new cycle, if required. If there is no need to add a new cycle, then steps to rearrange the cycle are complete. Return to the section 5.2.3 step that pointed to this procedure.

Step#	Procedure	Description
3. ☐	**Active NOAM VIP**: Add new cycle (If required)	1. Click **Add Cycle**.  After adding new cycle, servers available in free pool can be added in new cycle. 2. Click **OK**.

5.3 Automated Server Group/Manual Upgrade Overview

This section contains alternative site upgrade procedures that can be used when Automated Site Upgrade does not meet the needs or concerns of the customer. These procedures use a combination of Automated Server Group upgrade and manual server upgrades to upgrade a specific site.

Table 14 details the site upgrade plan for a non-PCA/PDRA site, which divides the upgrade into four cycles. A cycle is defined as the complete upgrade of one or more servers, from initiate upgrade to success or failure. The first two cycles consist of upgrading the SOAMs – the first cycle upgrades the standby SOAM, followed by the second cycle, which upgrades the active SOAM. Cycle 3 cannot begin until cycle 2 is complete. This ensures that the OAM controllers are always upgraded before any C-level servers.

The third cycle begins the upgrade of the C-level servers. In cycle 3, one-half of the DA-MPs and IPFEs are upgraded. This leaves the remaining half of these server functions in-service to process traffic.

The fourth cycle upgrades the second half of the DA-MPs and IPFEs to complete the site upgrade.

Table 14. Non-PCA/PDRA Site Upgrade Plan

Cycle 1	Cycle 2	Cycle 3	Cycle 4
Standby SOAM	Active SOAM		
		½ DA-MPs	½ DA-MPs
		½ IPFEs	½ IPFEs

Table 15 details the site upgrade plan for a PCA/PDRA system with two-site redundancy. This upgrade plan is divided into five cycles. The first two cycles consist of upgrading the SOAMs – the first cycle upgrades the standby and spare SOAMs in parallel, followed by the second cycle, which upgrades the Active SOAM. Cycle 3 cannot begin until cycle 2 is complete. This ensures that the OAM controllers are always upgraded before any C-level servers.

The third cycle begins the upgrade of the C-level servers. In cycle 3, one-half of the DA-MPs and IPFEs are upgraded in parallel with all of the spare SBRs. This leaves the remaining server functions in-service to process traffic.

The fourth cycle upgrades the second half of the DA-MPs and IPFEs in parallel with all of the standby SBRs.

The fifth cycle is required to upgrade the active SBR(s), completing the site upgrade.

Table 15. Two-Site Redundancy PCA Site Upgrade Plan

Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
Standby SOAM, Spare SOAM	Active SOAM			
		½ DA-MPs	½ DA-MPs	
		½ IPFEs	½ IPFEs	
		Spare SBR(s)	Standby SBR(s)	Active SBR(s)

Table 16 details the site upgrade plan for a PCA/PDRA system with three-site redundancy. This upgrade plan is divided into six cycles.

Note: It is mandatory to follow the mentioned division and execution order of the cycles. This ensures the OAM controllers are always upgraded before any C-level servers.

For C-level servers the division of servers can be planned in different cycles depending on customer requirements, which means SBR and DA-MPs can be upgraded in different cycles. But, as mentioned, Spare, Standby and Active SBRs should be upgraded in different cycles.

The first two cycles consist of upgrading the SOAMs – the first cycle upgrades the standby and spare SOAMs in parallel, followed by the second cycle, which upgrades the active SOAM. Cycle 3 cannot begin until cycle 2 is complete. **This ensures the OAM controllers are always upgraded before any C-level servers.**

The third cycle begins the upgrade of the C-level servers. In cycle 3, one-half of the DA-MPs and IPFEs are upgraded in parallel with one spare SBR. This leaves the remaining server functions in-service to process traffic.

The fourth cycle upgrades the second half of the DA-MPs and IPFEs in parallel with the second spare SBR

The fifth cycle upgrades the standby SBR(s), and the sixth cycle is required to upgrade the active SBR(s), completing the site upgrade.

Table 16. Three-Site Redundancy PCA Site Upgrade Plan

Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Standby SOAM, Spare SOAM	Active SOAM				
		½ DA-MPs	½ DA-MPs		
		½ IPFEs	½ IPFEs		
		Spare SBR(s)	Spare SBR(s)	Standby SBR(s)	Active SBR(s)

5.3.1 Site Upgrade Planning

The upgrade of the site servers consists of a mixture of automated upgrades using the Automated Server Group upgrade feature, along with manual upgrades that are a little less automated.

There is some limitation with upgrading of DC server in a C-level server group which are upgraded in a group of servers. For example DA-MP. So, please make sure that DC server is not upgraded in first upgrade cycle of such C-Level servers.

Identification of DC server can be done using Appendix W Identify the DC server.

In all cases, regardless of the number of cycles used to upgrade the DA-MP server group, the DA-MP Leader should be the last server upgraded. Upgrading the DA-MP Leader last minimizes the number of leader changes during the upgrade. The DA-MP Leader is designated on the active SOAM at **Diameter > Maintenance > DA-MPs > Peer DA-MP Status**, where **MP Leader** = **Yes**.

ASG STEPS (Auto Upgrade button) does not provide any liberty to the operator to verify any observations manually during upgrade but in cases, there is need to verify the data replication status between upgrade cycles, plan to use Manual Upgrade to achieve this.

While choosing ASG and Manual upgrade for multi-active MP servers, please see the limitations detailed in Appendix X for Automated Server Group upgrade option.

The Oracle recommendation for any customer whose network aligns with any of the scenarios mentioned inAppendix X**,** then Automated Server Group should NOT be used. Use of Automated Server Group risks a potential network outage.

Note: Database (DB) replication failure alarms may display during an Automated and Manual Site Upgrade or during an event that resets multiple servers in parallel. The DB on the child servers is not updated until resolved. Refer to Appendix Z to resolve this issue.Table 17 should be used to plan the upgrade of each site. For the server groups that are upgraded using ASG, the only planning necessary is to record the server group name. ASG automatically selects the individual servers to upgrade. The IPFE server groups must be upgraded manually since there is only one server per server group. Planning is necessary for these server groups to ensure traffic continuity. Record the hostname of the servers to upgrade in each iteration.

Table 17. Site Upgrade Planning Sheet

Iteration 1		Notes
Standby SOAM Hostname Spare SOAM Hostname		If a spare SOAM exists, the spare and standby SOAMs are upgraded manually. Otherwise, the SOAMs are upgraded with ASG.
Iteration 2		**Notes**

Active SOAM		The active SOAM is upgraded in iteration 2, either manually or by ASG.
Iteration 3		**Notes**
DA-MP Group 1		Manual Upgrade/ASG automatically selects DA-MPs for upgrade
IPFE 1 Hostname		Manual upgrade
IPFE 3 Hostname		Manual upgrade
Spare SBR(s)		Manual Upgrade/ASG automatically selects the spare SBR(s) for upgrade
Iteration 4		**Notes**
DA-MP Group 2		Manual Upgrade/ASG automatically selects DA-MPs for upgrade
IPFE 2 Hostname		Manual upgrade
IPFE 4 Hostname		Manual upgrade
Standby SBR(s)		Manual Upgrade/ASG automatically selects the standby SBR(s) for upgrade
Iteration 5		**Notes**
Active SBR(s)		Manual Upgrade/ASG automatically selects the active SBR(s) for upgrade

Table 18 shows the procedures to be executed for the site upgrade, along with the estimated time to complete each step. Use Table 18 as a guide for determining the order in which the procedures are to be executed.

Note:

If the TVOE hosts are upgraded during the same Maintenance Window as the application upgrade, refer to Table 10 (Section 3.4.6) for additional time estimates associated with the TVOE upgrade.

Table 18. Site Upgrade Execution Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 16	0:10-0:20	0:10-0:20	Site Pre-Upgrade Backups	None
Procedure 17	0:05-0:10	0:15-0:30	Site Pre-Upgrade Health Check for Release 8.0/8.1 and Later	None
Procedure 19	0:01-0:05	0:16-0:45	Disable Site Provisioning	Site Provisioning Disabled, No Traffic Impact
Procedure 23	0:01-0:05	0:17-0:50	SOAM Upgrade Pre-Checks	No Traffic Impact
Iteration 1	0:40-1:00	0:57-1:50	Standby SOAM, Spare SOAM (if equipped)	Refer to Section 5.2.4 for details

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Iteration 2	0:40-1:00	1:37-2:50	Active SOAM	Refer to Section 5.2.4 for details
Iteration 3	0:40-1:00	2:17-3:50	½ DA-MPs, ½ IPFEs, Spare SBR(s)	Refer to Section 5.4 for details
Iteration 4	0:40-1:00	2:57-4:50	½ DA-MPs, ½ IPFEs, Standby SBR(s)	Refer to Section 5.5 for details
Iteration 5	0:00-1:00	2:57-5:50	Active SBR(s)	Refer to Section 5.6 for details
Procedure 29	0:02	2:59-5:52	Allow Site Provisioning	Site Provisioning Enabled, No Traffic Impact
Procedure 30	0:10-0:15	3:09-6:07	Site Post-Upgrade Health Check	None

5.3.1.1 RMS Notes

RMS-based DSRs are deployed in one of two supported configurations: without geographic redundancy, or with geographic redundancy. In both cases, the RMS-based DSR implements just a single Diameter network element.

When an RMS-based DSR has no geographic redundancy, there is just a single RMS geographic site, functioning as a single RMS Diameter site. The upgrade of this DSR deployment should be done in two maintenance windows: one for the NOAMs, and the second for all remaining servers.

When an RMS-based DSR includes geographic redundancy, there are two RMS geographic sites (but still functioning as a single RMS Diameter site). The primary RMS site contains the NOAM active/standby pair that manages the network element, while the geo-redundant RMS site contains a Disaster Recovery NOAM pair. Each RMS geographic site includes its own SOAM pair, but only the SOAMs at the primary RMS site are used to manage the signaling network element. The SOAMs at the geo-redundant site are for backup purposes only. The upgrade of this DSR deployment should be done in three maintenance windows: one for all NOAMs; a second for the SOAMs and DA-MPs at the geo-redundant backup RMS site; and a third for the SOAMs and DA-MPs at the primary RMS site.

5.3.1.2 TVOE Upgrade Check

When using the Automated Server Group Upgrade feature, it is not possible to upgrade the TVOE hosts with the application, as the application upgrades are performed continuously to completion. Therefore, all TVOE hosts associated with the server group must be upgraded, if necessary, before initiating the server group upgrade sequence. Refer to Section 3.4.6 for TVOE host upgrade procedures. Once the TVOE hosts upgrades are complete, return to this section to continue the site upgrade.

Note: For RMS and VEDSR configurations, the TVOE for the server hosting the PMAC may have already been upgraded.

The TVOE version check is especially applicable to VEDSR systems, wherein all of the DSR applications run as guests of a TVOE host. In particular, consideration must be given to spare SOAMs and spare SBRs, which may be located at a different physical location, but is upgraded with the server group to which the spare server belongs.

5.3.2 SOAM Upgrade Overview

This section contains the steps required to perform a major or incremental upgrade of the SOAMs for a DSR site.

TVOE hosts may be upgraded during this procedure, if the TVOE needs to be upgraded. It assumes each of the SOAM servers is running on a TVOE host (that is, it assumes that there are 2 or 3 TVOE hosts to be upgraded at the site.)

It is highly recommended that TVOE hosts at a site be upgraded in a Maintenance Window before the start of the DSR 8.4 Application upgrade. If the TVOE hosts are upgraded with the Application, consideration must be given to the risks and consequences of exceeding the Maintenance Window.

During the site upgrade (SOAMs plus all C-level servers), site provisioning is disabled. Provisioning is re-enabled at the completion of the site upgrade.

For each site in the DSR, the SOAM(s) and associated MPs and IPFEs should be upgraded within a single maintenance window.

Table 19 shows the estimated execution times for the SOAM upgrade. Procedure 24 Automated SOAM Upgrade (Active/Standby) is the recommended procedure for upgrading the SOAMs when there is **no spare SOAM**. ASG automatically upgrades the standby SOAM, followed by the active SOAM.

If the site does have a spare SOAM, Procedure 25 Manual SOAM Upgrade (Active/Standby/Spare) is the recommended procedure. The manual upgrade procedure upgrades the standby and spare SOAMs in parallel, followed by the active SOAM.

Note: Refer to Appendix Z for changing the SOAM VM profile to increase MP capacity.

Table 19. SOAM Upgrade Execution Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Iteration 1 & 2 Procedure 24 or Procedure 25	1:20-2:40	1:20-2:40	Automated SOAM Upgrade (Active/Standby) Manual SOAM Upgrade (Active/Standby/Spare)	No traffic impact

5.3.3 Upgrade SOAMs

!!WARNING!!

The following procedures must be completed before the start of soam upgrade:

Procedure 16; **Error! Reference source not found.**, REF _Ref445806626 \r \h Procedure 19

This section provides the procedures to upgrade the SOAMs. The SOAMs can be upgraded manually under user control, or automatically using the Automated Server Group Upgrade option. The recommended method for SOAM upgrade depends on the existence of a spare SOAM. If the site includes a spare SOAM, then the SOAMs are upgraded manually so that the spare and standby can be upgraded concurrently. This reduces the time required to upgrade the SOAMs.

Regardless of which SOAM upgrade option is used, Procedure 23 is required to ensure site provisioning is disabled.

If the site does **not** include a spare SOAM, use the automated SOAM upgrade in Procedure 24.

If the site does include a spare SOAM, use the manual SOAM upgrade in Procedure 25.

Procedure 23. SOAM Upgrade Pre-Checks

Step#	Procedure	Description
This procedure verifies traffic status, and verifies that site provisioning is disabled, in preparation for upgrading the SOAMs. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1.	**NOAM health check**	1. Perform the NOAM health check before upgrading SOAM. 2. Check wthether the apwSoapServer process is restarting on active NOAM.
2. ☐	**Active SOAM VIP**: View KPIs to verify traffic status	3. Log into the active SOAM GUI using the VIP. 4. Navigate to **Status & Manage > KPIs**. 5. Inspect KPI reports to verify traffic is at the expected condition.
3. ☐	**Active SOAM VIP**: Verify site provisioning is disabled	Verify site provisioning was properly disabled in Procedure 19. In the GUI status bar, where it says **Connected using …**, check for the message **Site Provisioning disabled**. If the message is present, continue with the next procedure per Table 13; otherwise, execute Procedure 19 Disable Site Provisioning.

4.
☐
	Active NOAM VIP: Verify HA state	Execute this command to find the state of the servers:
		`$ ha.mystate`
		`[admusr@E1B581DAMP1 ~]$ ha.mystate`
		`resourceId role node DC subResources lastUpdate`
		`DbReplication Stb/Stb C2016.086 * 0 170915:023010.572`
		`VIP Stb/Stb C2016.086 * 0 170915:023010.530`
		`CacdProcessRes Stb/OOS C2016.086 * 0 170915:023010.530`
		`DA_MP_Leader Act/OOS C2016.086 * 0 170915:023010.932`
		`DSR_SLDB OOS/OOS C2016.086 * 1-63 170913:121610.839`
		`DSR_SLDB Act/OOS C2016.086 * 0 170915:023010.934`
		`VIP_DA_MP OOS/OOS C2016.086 * 1-63 170913:121610.840`
		`VIP_DA_MP Act/OOS C2016.086 * 0 170915:023010.933`
		`EXGSTACK_Process OOS/OOS C2016.086 * 1-63 170913:121610.841`
		`EXGSTACK_Process Act/OOS C2016.086 * 0 170915:023010.933`
		`DSR_Process OOS/OOS C2016.086 * 1-63 170913:121610.841`
		`DSR_Process Act/OOS C2016.086 * 0 170915:023010.932`
		`CAPM_HELP_Proc Stb/OOS C2016.086 * 0 170915:023010.530`
		`DSROAM_Proc Stb/OOS C2016.086 * 0 170915:023010.530`
		`CAPM_PSFS_Proc Stb/Stb C2016.086 * 0 170915:023010.530`
		Note: In case there are more than one server in the same HA state (active), then manually switchover the server HA state using HA management screen before continuing the upgrade procedure.

5.3.3.1 Automated SOAM Upgrade (Active/Standby)

Procedure 24 is the recommended method for upgrading the SOAMs **if the site does not include a spare SOAM**. If the site has a spare SOAM, upgrade using Procedure 25. Upon completion of this procedure, proceed to Section 5.4 Upgrade Iteration 3.

Procedure 24. Automated SOAM Upgrade (Active/Standby)

Step#	Procedure	Description
This procedure upgrades the SOAM(s) using the Automated Server Group Upgrade option. If necessary, the TVOE on each server that hosts an SOAM guest is also upgraded. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Upgrade TVOE host for active and/or standby SOAM servers	If the TVOE host for the active or standby SOAM needs to be upgraded, execute Appendix J to upgrade the TVOE host for the active and/or standby SOAM, as necessary. ***Note***: In an RMS-based DSR, the SOAM is a guest on a TVOE host that has already been upgraded as part of the NOAM upgrade.
2. ☐	Upgrade SOAM server group	Upgrade the SOAM server group using the Upgrade Multiple Servers procedure with the following options: • Use the Automated Server Group Upgrade option • Select the **Serial** upgrade mode Execute Appendix H Upgrade Multiple Servers – Upgrade Administration. After successfully completing the procedure in Appendix H, return to this point and proceed to Section 5.4 Upgrade Iteration 3.

Note: Once the network element SOAMs are upgraded, if any C-level server is removed from a Server Group and re-added, the server must be restored by way of disaster recovery procedures. The normal replication channel to the C-level server is inhibited due to the difference in release versions.

5.3.3.2 Manual SOAM Upgrade (Active/Standby/Spare)

Procedure 25 is used to upgrade the SOAM server group if the site includes a spare SOAM. If the SOAM server group was upgraded using Procedure 24, do not execute this procedure; proceed to Section 5.4 Upgrade Iteration 3.

Procedure 25. Manual SOAM Upgrade (Active/Standby/Spare)

Step#	Procedure	Description
This procedure upgrades the SOAM(s) in a DSR, including, if necessary, TVOE on each server that hosts an SOAM guest. This procedure upgrades the SOAMs manually. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Upgrade TVOE host for active, standby, and/or spare SOAM servers	If the TVOE host for the active, standby, or spare SOAM needs to be upgraded, execute Appendix J to upgrade the TVOE host for the active, standby, and/or spare SOAM, as necessary. ***Note***: In an RMS-based DSR, the SOAM is a guest on a TVOE host that has already been upgraded as part of the NOAM upgrade.
2. ☐	Upgrade standby and spare SOAMs in parallel using the Upgrade Multiple Servers procedure	Execute Appendix H Upgrade Multiple Servers – Upgrade Administration. After successfully completing the procedure in Appendix H, return to this point and continue with the next step.
3. ☐	Upgrade active SOAM using Upgrade Single Server procedure	Execute Appendix F Upgrade Single Server – DSR 8.x. After successfully completing the procedure in Appendix F, return to this point and proceed to Section 5.4 Upgrade Iteration 3.

Note: Once the network element SOAMs are upgraded, if any C-level server is removed from a server group and re-added, the server must be restored by way of disaster recovery procedures. The normal replication channel to the C-level server is inhibited due to the difference in release versions.

5.4 Upgrade Iteration 3

Upgrade iteration 3 begins the upgrade of the site C-level servers. As shown in Table 17, iteration 3 consists of upgrading the DA-MPs, IPFEs, and spare SBR(s), if equipped. The C-level components are upgraded in parallel to maximize Maintenance Window usage.

Table 20 shows the estimated time required to upgrade the C-level servers for iteration 3.

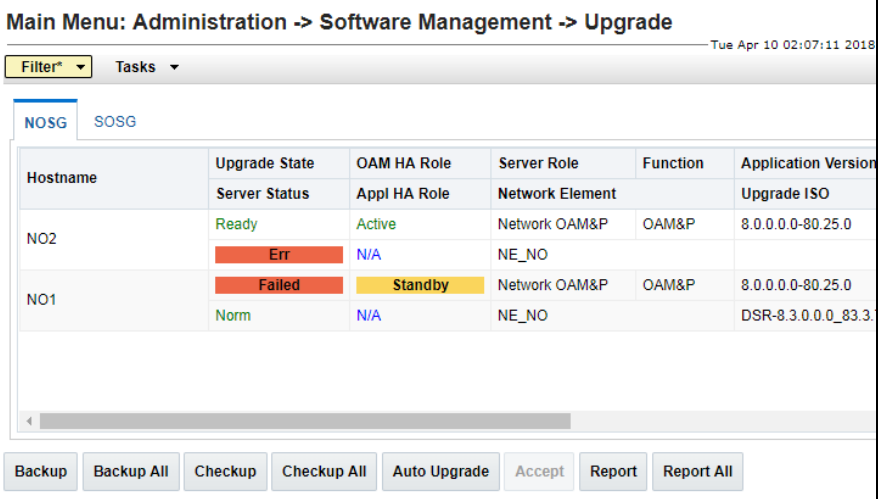
Table 20. Iteration 3 Upgrade Execution Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 26	0:40-1:00	0:40-1:00	Upgrade Iteration 3	½ DA-MPs, ½ IPFEs, spare SBR(s) will be offline

CAUTION

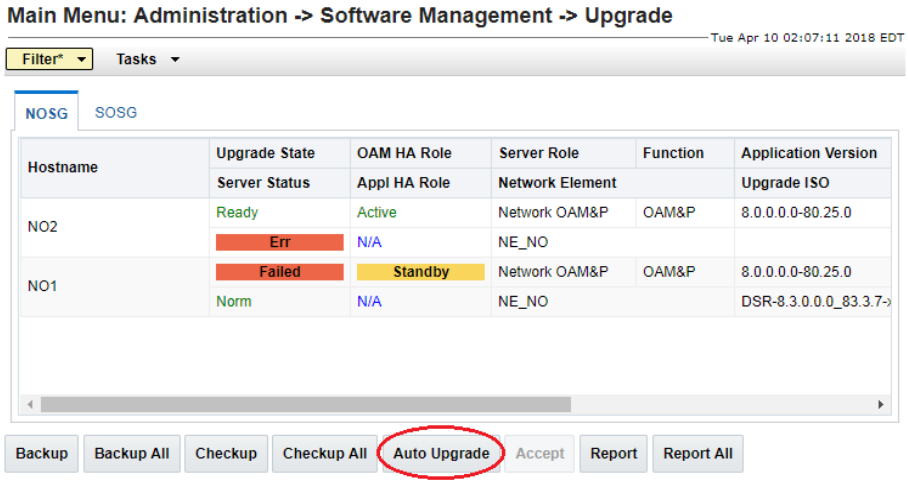
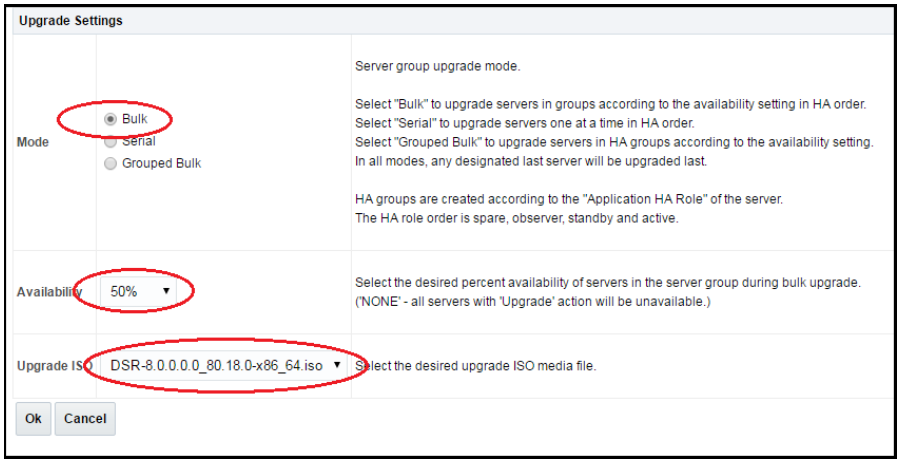
ASG does not allow the operator to specify the upgrade order of the DA-MP servers. If a manual upgrade was recommended in section 0, do not use ASG to upgrade the DA-MPs in this iteration. Alternate upgrade procedures are provided in L.4.

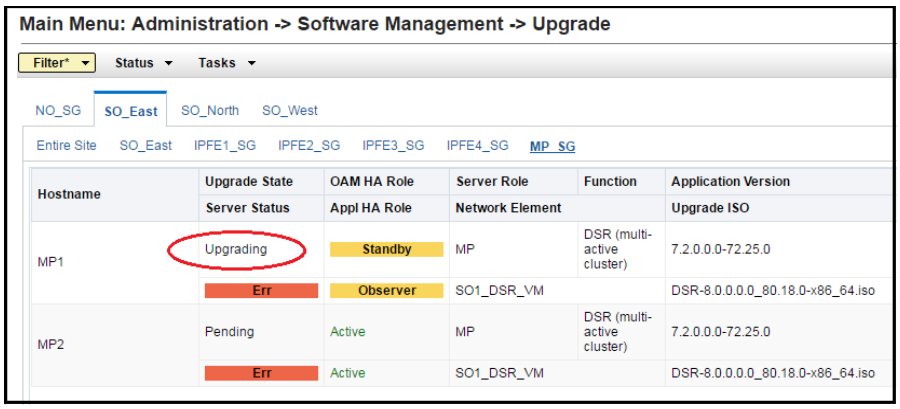
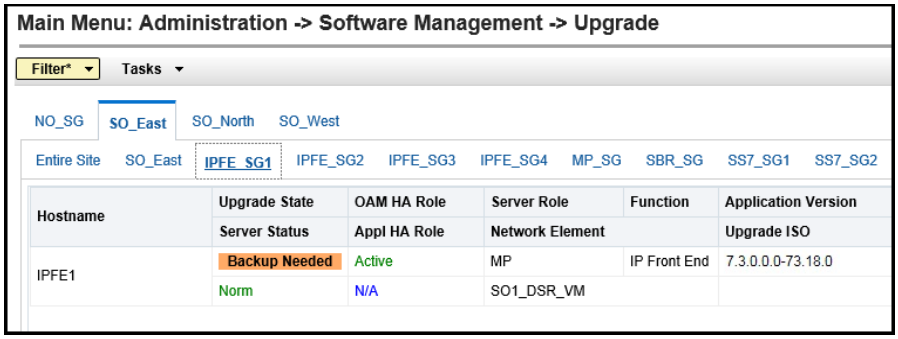
Procedure 26. Upgrade Iteration 3

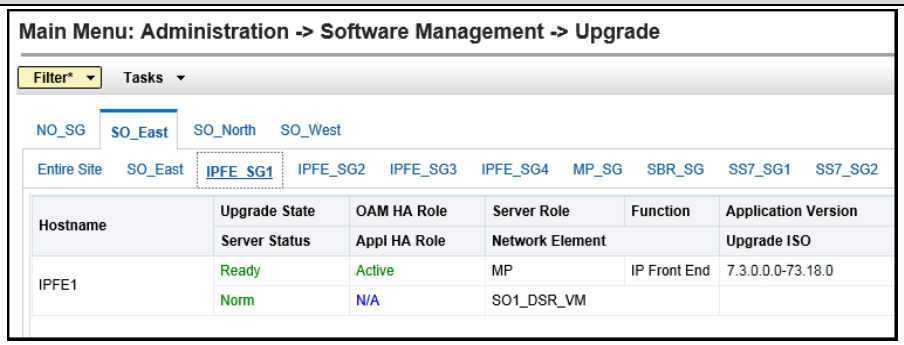
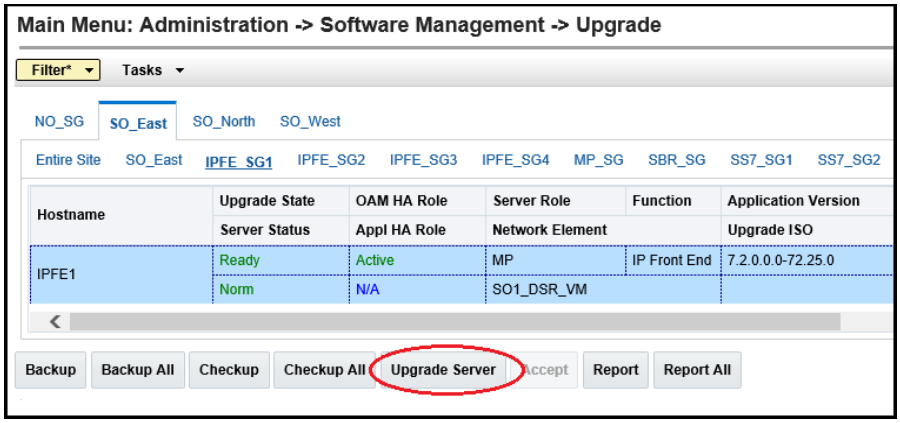
Step#	Procedure	Description
This procedure upgrades a portion of the C-level servers for iteration 3. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1.	**NOAM health check**	1. Perform the NOAM health check before upgrading C-Level servers. 2. Check wthether the apwSoapServer process is restarting on active NOAM.
2. ☐	**Active NOAM VIP**: Select the DA-MP server group to view pre-upgrade status of DA-MPs	3. Log into the NOAM GUI using the VIP. 4. Navigate to **Administration > Software Management > Upgrade** 5. Select the SOAM tab of the site being upgraded. 6. Select the DA-MP Server Group link. 7. For the DA-MP servers to be upgraded in iteration 3, verify the application version value is the expected source software release version.
3. ☐	**Active NOAM VIP**: View pre-upgrade status of DA-MP servers	1. If the servers are in **Backup Needed** state, select the servers and click **Backup**. The Upgrade State changes to **Backup in Progress**. When the backup is complete, the Upgrade State changes to **Ready**. 2. Verify the **OAM Max HA Role** is in the expected condition (either standby or active). This depends on the server being upgraded. 

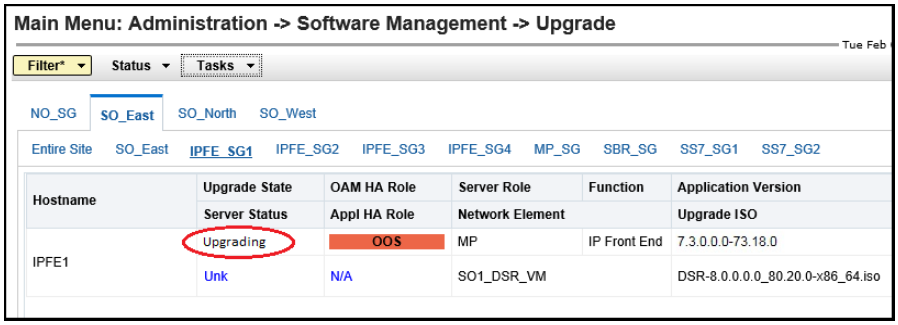
Step#	Procedure	Description
4. ☐	**Active NOAM VIP**: Verify upgrade status is **Ready** for the server to be upgraded	This may take a minute if a backup is in progress. Depending on the server being upgraded, new alarms may occur. The Upgrade Administration screen displays. Navigate to the DA-MP server group of the site being upgraded. **Main Menu: Administration -> Software Management -> Upgrade** Filter* Tasks NO_SG SO_East SO_North SO_West Entire Site SO_East IPFE1_SG IPFE2_SG IPFE3_SG IPFE4_SG MP_SG Servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31101 (DB Replication to slave DB has failed)** **Alarm ID = 31106 (DB Merge to Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31225 (HA Service Start Failure)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)**

Hostname	Upgrade State / Server Status	OAM HA Role / Appl HA Role	Server Role / Network Element	Function	Application Version / Upgrade ISO
MP3	Ready	Active	MP	DSR (multi-active cluster)	7.2.0.0.0-72.25.0
	Norm	Active	SO1_DSR_VM		
MP4	Ready	Standby	MP	DSR (multi-active cluster)	7.2.0.0.0-72.25.0
	Norm	Active	SO1_DSR_VM		
MP1	Ready	Standby	MP	DSR (multi-active cluster)	7.2.0.0.0-72.25.0
	Norm	Active	SO1_DSR_VM		
MP2	Ready	Standby	MP	DSR (multi-active cluster)	7.2.0.0.0-72.25.0
	Norm	Active	SO1_DSR_VM		

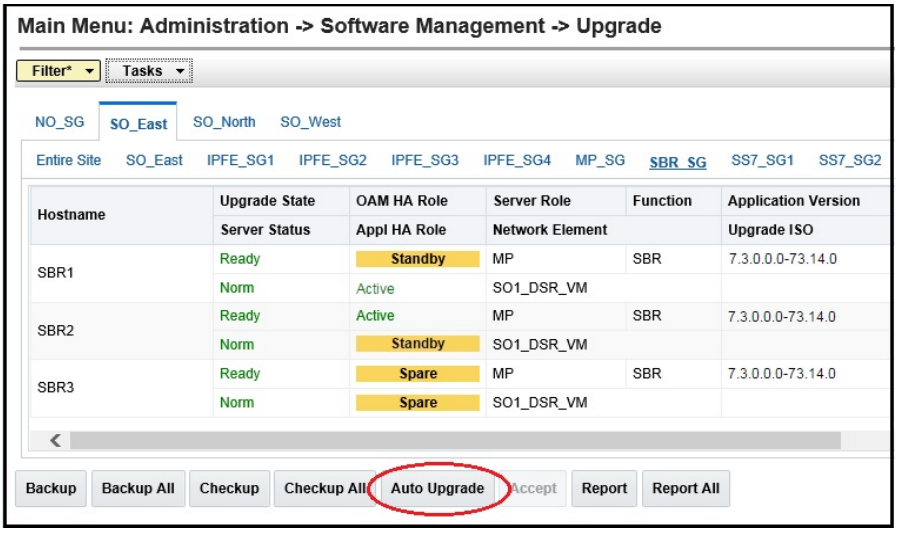
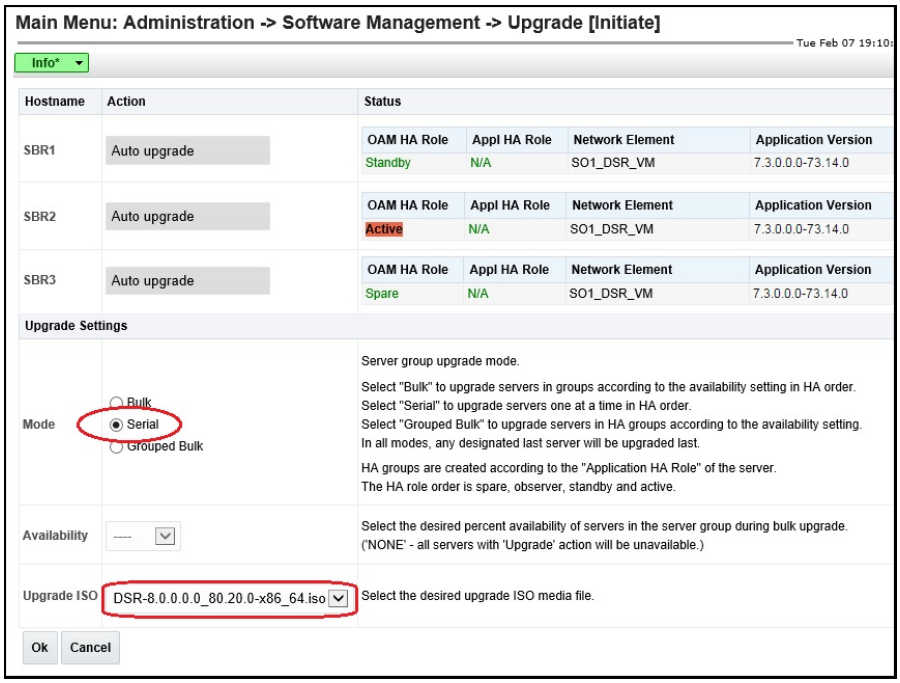
Step#	Procedure	Description
5. ☐	**Active NOAM VIP**: Initiate the Automated Server Group upgrade of the DA-MP servers (part 1)	1. To use the Automated Server Group upgrade option, verify no servers in the server group are selected. 2. Click **Auto Upgrade**. 
6. ☐	**Active NOAM VIP**: Initiate the Automated Server Group upgrade of the DA-MP server (part 2)	1. The **Upgrade Settings** section of the Initiate screen controls the behavior of the server group upgrade. Select **Bulk** Mode. 2. Select **50%** for the **Availability** setting. 3. Select the appropriate ISO from the **Upgrade ISO** options. 4. Click **OK** to start the upgrade. 

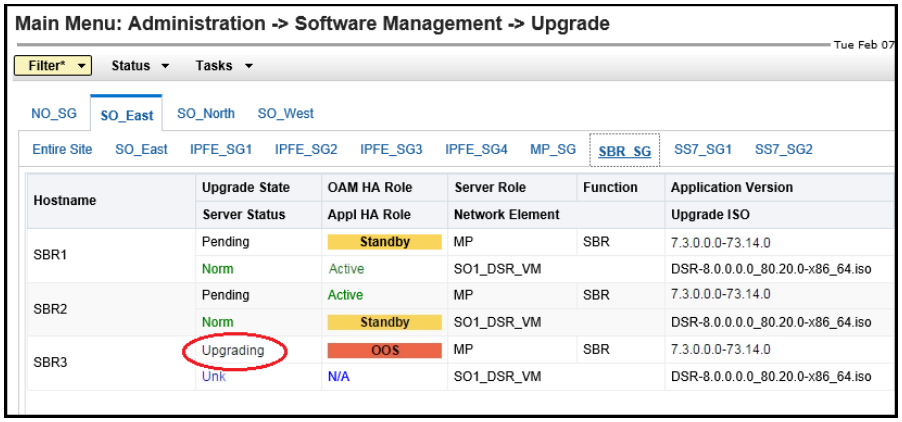
Step#	Procedure	Description
7. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	Observe the upgrade state of the DA-MP servers. Upgrade status displays under the Status Message column.  While the DA-MP servers are upgrading, continue with the next step to upgrade additional C-level components in parallel.
8. ☐	Identify the IPFE server group(s) to upgrade	From the data captured in Table 17, identify the IPFE server group(s) to upgrade in iteration 3.
9. ☐	**Active NOAM VIP**: View pre-upgrade status of IPFEs	1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM tab of the site being upgraded. 3. Select the link for each IPFE server group to upgrade. 4. For the IPFE servers to be upgraded in iteration 3, verify the application version value is the expected source software release version. 5. If a server is in **Backup Needed** state, select the servers and click **Backup**. The Upgrade State changes to **Backup in Progress**. When the backup is complete, the Upgrade State changes to **Ready**. 6. Verify the **OAM Max HA Role** is in the expected condition (either standby or active). This depends on the server being upgraded. 
10. ☐	**Active NOAM VIP**: Verify upgrade status is **Ready** for the server to be upgraded	This may take a minute if a backup is in progress. Depending on the server being upgraded, new alarms may occur. The Upgrade Administration screen displays. Navigate to the IPFE server group being upgraded.

Step#	Procedure	Description
		 Servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31101 (DB Replication to slave DB has failed)** **Alarm ID = 31106 (DB Merge to Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)**
11. ☐	**Active NOAM VIP**: Initiate IPFE upgrade (part 1)	Select the Upgrade Server method. 1. From the Upgrade Administration screen, select the server to upgrade. 2. Click **Upgrade Server**. 

Step#	Procedure	Description
12. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	Observe the upgrade state of the IPFE server. Upgrade status displays under the Status Message column. 
13. ☐	Repeat for each IPFE	Repeat steps 15 through 20 for the next IPFE to upgrade in this iteration per Table 17.
14. ☐	Identify the SBR server group(s) to upgrade	From the data captured in Table 17, identify the SBR server group(s) to upgrade in iteration 3. ASG (Auto Upgrade), mentioned in next steps, do not allow you to verify any observations during upgrade. If a manual upgrade was recommended in section 0, Table 6, step 7. , do not use ASG to upgrade all the SBR servers from same server group in a single iteration. Alternate upgrade procedures are provided in L.6, Manual SBR Upgrade Procedure. Spare SBR server(s) need to be upgraded in this iteration. In the case of Manual Upgrade, ASG steps 15. to 19. need to be skipped.
15. ☐	**Active NOAM VIP**: View pre-upgrade status of SBRs to upgrade	1. Navigate to **Administration > Software Management > Upgrade**. 1. Select the SOAM tab of the site being upgraded. 2. Select the link for each SBR server group to upgrade. 3. For the SBR servers to be upgraded in iteration 3, verify the application version value is the expected source software release version. 4. If the server is in **Backup needed** state, select the servers and click **Backup**. The Upgrade State changes to **Backup in Progress**. When the backup is complete, the Upgrade State changes to **Ready**. 5. Verify the **OAM Max HA Role** is in the expected condition (either standby or active). This depends on the server being upgraded.

Step#	Procedure	Description
		Main Menu: Administration -> Software Management -> Upgrade Filter* Tasks NO_SG SO_East SO_North SO_West Entire Site SO_East IPFE_SG1 IPFE_SG2 IPFE_SG3 IPFE_SG4 MP_SG SBR_SG SS7_SG1 SS7_SG2 Hostname / Upgrade State / OAM HA Role / Server Role / Function / Application Version Server Status / Appl HA Role / Network Element / Upgrade ISO SBR2: Backup Needed, Active, MP, SBR, 7.3.0.0.0-73.18.0 Norm, Spare, SO1_DSR_VM SBR3: Backup Needed, Standby, MP, SBR, 7.3.0.0.0-73.18.0 Norm, Active, SO1_DSR_VM SBR1: Backup Needed, Spare, MP, SBR, 7.3.0.0.0-73.18.0 Norm, Spare, SO1_DSR_VM
16. ☐	**Active NOAM VIP**: Verify upgrade status is **Ready** for the server to be upgraded	This may take a minute if a backup is in progress. Depending on the server being upgraded, new alarms may occur. The Upgrade Administration screen displays. Navigate to the SBR server group being upgraded. **Main Menu: Administration -> Software Management -> Upgrade** Filter* Tasks NO_SG SO_East SO_North SO_West Entire Site SO_East IPFE_SG1 IPFE_SG2 IPFE_SG3 IPFE_SG4 MP_SG SBR_SG SS7_SG1 SS7_SG2 Hostname / Upgrade State / OAM HA Role / Server Role / Function / Application Version Server Status / Appl HA Role / Network Element / Upgrade ISO SBR2: Ready, Active, MP, SBR, 7.3.0.0.0-73.18.0 Norm, Spare, SO1_DSR_VM SBR3: Ready, Standby, MP, SBR, 7.3.0.0.0-73.18.0 Norm, Active, SO1_DSR_VM SBR1: Ready, Spare, MP, SBR, 7.3.0.0.0-73.18.0 Norm, Spare, SO1_DSR_VM Servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31101 (DB Replication to slave DB has failed)** **Alarm ID = 31106 (DB Merge to Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)**

Step#	Procedure	Description
17. ☐	**Active NOAM VIP**: Initiate SBR upgrade (part 1)	Select the Auto Upgrade method. 1. To use the Automated Server Group upgrade option, select the SBR server group to upgrade. 2. Verify no servers in the server group are selected. 3. Click Auto Upgrade. 
18. ☐	**Active NOAM VIP**: Initiate SBR upgrade (part 2)	Set upgrade options and start the Automated Server Group Upgrade. 1. The Upgrade Settings section of the Initiate screen controls the behavior of the automated upgrade. Select **Serial** mode. 2. Select the appropriate ISO from the **Upgrade ISO** options. 3. Click **OK** to start the upgrade. 

Step#	Procedure	Description
19. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	Observe the **Upgrade State** of the SBR server group. Upgrade status displays under the Status Message column (not shown). 
20. ☐	Repeat for each SBR server group	Repeat steps 22 through 27 for the next SBR server group to be upgraded per Table 17.
21. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	See step 30 for instructions if the upgrade fails, or if execution time exceeds 60 minutes. ***Note***: If the upgrade processing encounters a problem, it may attempt to ROLL BACK to the original software release. In this case, the Upgrade displays as **FAILED**. The execution time may be shorter or longer, depending on the point in the upgrade where there was a problem. 4. Navigate to **Administration > Software Management > Upgrade**. 5. Select the SOAM tab of the site being upgraded. 6. Sequence through the server group links for the server groups being upgraded. Observe the Upgrade State of the servers of interest. Upgrade status displays under the Status Message column. During the upgrade, the servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 31101 (DB Replication To Slave Failure)** **Alarm ID = 31106 (DB Merge To Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31233 (HA Secondary Path Down)** **Alarm ID = 31283 (Highly available server failed to receive mate heartbeats)**

Step#	Procedure	Description
		Alarm ID = 32515 (Server HA Failover Inhibited) **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** Database (DB) replication failure alarms may display during an Automated Site Upgrade or during an event that resets multiple servers in parallel. The DB on the child servers is not updated until resolved. Refer to Appendix Z resolve this issue. 7. Half of the DA-MP and SBR server groups are upgraded in iteration 3. ASG automatically sequences to iteration 4 to upgrade the remaining servers. Periodically monitor these servers for failures. 8. For the IPFE servers being upgraded, wait for the upgrades to complete. The Status Message column displays **Success** after approximately 20 to 50 minutes. Do not proceed to iteration 4 until the IPFE servers have completed upgrade. ***Note***: Do not accept any upgrades at this time. **If any upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures.**
22. ☐	**Server CLI**: If the upgrade of a server fails	If the upgrade of a server fails, access the server command line (using ssh or a console), and collect the following files: /var/TKLC/log/upgrade/upgrade.log /var/TKLC/log/upgrade/ugwrap.log /var/TKLC/log/upgrade/earlyChecks.log /var/TKLC/log/platcfg/upgrade.log It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document and provide these files. Refer to Appendix O for failed server recovery procedures.

5.5 Upgrade Iteration 4

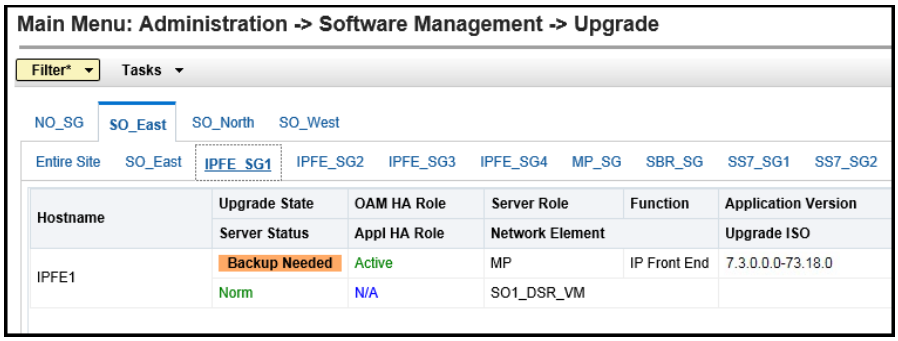
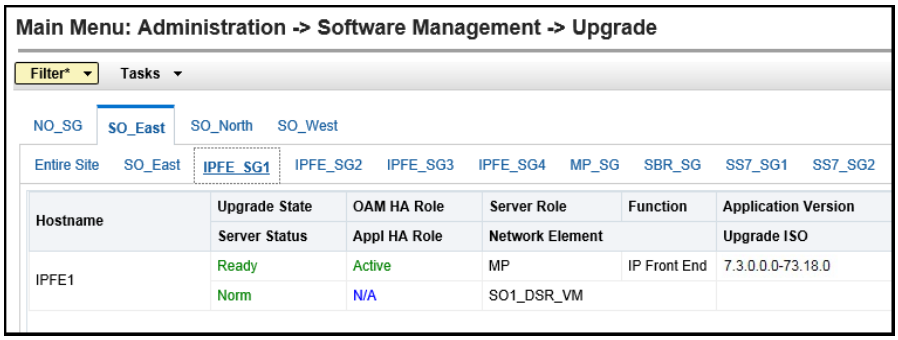
Upgrade iteration 4 continues the upgrade of the site C-level servers. As shown in Table 17, iteration 4 consists of upgrading the second half of the DA-MPs, and IPFEs, as well as the standby SBR(s), if equipped.

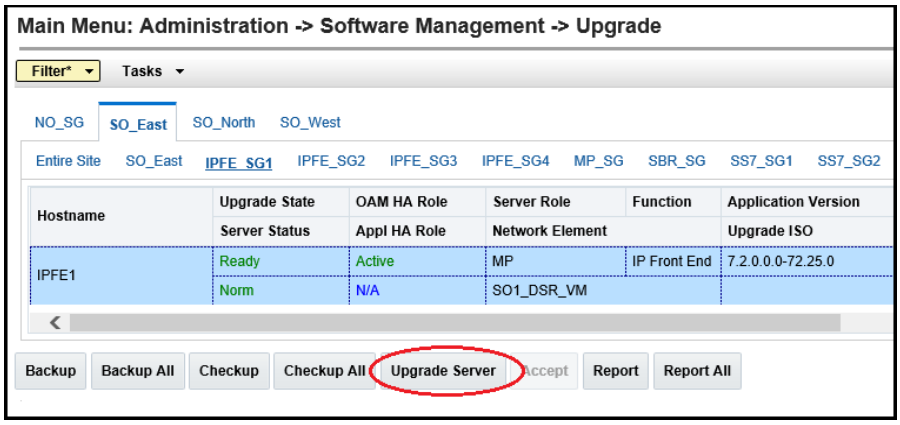
Table 21 shows the estimated time required to upgrade the C-level servers for iteration 4.

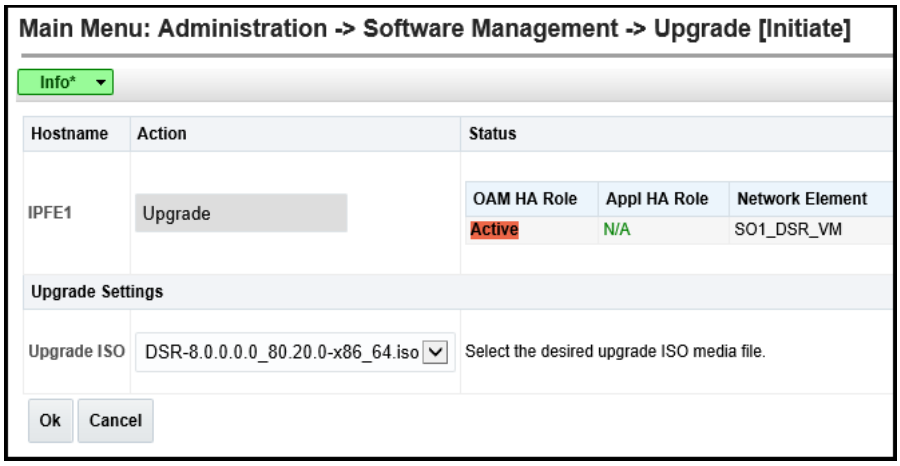
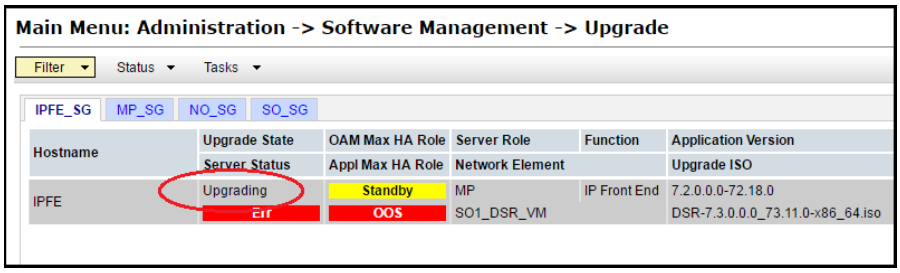
Table 21. Iteration 4 Upgrade Execution Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 27	0:40-1:00		Upgrade Iteration 4	½ DA-MPs, ½ IPFEs, Standby SBR(s) will be offline

Procedure 27. Upgrade Iteration 4

Step#	Procedure	Description
This procedure upgrades a portion of the C-level servers for iteration 4. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1.	**NOAM health check**	1. Perform the NOAM health check before upgrading C-Level servers. 2. Check wthether the apwSoapServer process is restarting on active NOAM.
2. ☐	**Active NOAM VIP**: View pre-upgrade status of IPFEs	3. Navigate to **Administration > Software Management > Upgrade**. 4. Select the SOAM tab of the site being upgraded. 5. Select the link of each IPFE server group to be upgraded. 6. For the IPFE servers to be upgraded in iteration 4, verify the application version value is the expected source software release version. 7. If a server is in **Backup Needed** state, select the servers and click **Backup**. The Upgrade State changes to **Backup in Progress**. When the backup is complete, the Upgrade State changes to **Ready**. 8. Verify the **OAM Max HA Role** is in the expected condition (either standby or active). This depends on the server being upgraded. 
3. ☐	**Active NOAM VIP**: Verify upgrade status is **Ready** for the server to be upgraded	This may take a minute if a backup is in progress. Depending on the server being upgraded, new alarms may occur. The Upgrade Administration screen displays. Navigate to the IPFE server group being upgraded.  Servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms:

Step#	Procedure	Description
		Alarm ID = 10008 (Provisioning Manually Disabled) **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31101 (DB Replication to slave DB has failed)** **Alarm ID = 31106 (DB Merge to Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)**
4. ☐	**Active NOAM VIP**: Initiate IPFE upgrade (part 1)	Select the Upgrade Server method. 1. From the Upgrade Administration screen, select the server to be upgraded. 2. Click **Upgrade Server**. 

Step#	Procedure	Description
5. ☐	**Active NOAM VIP**: Initiate IPFE upgrade (part 2)	Select target ISO. 1. On the **Upgrade Initiate** screen, select the target ISO from the Upgrade ISO options. 2. Click **OK** to initiate the upgrade. 
6. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	Observe the Upgrade State of the IPFE server. Upgrade status displays under the Status Message column. 
7. ☐	Repeat for each IPFE	Repeat steps above steps for the next IPFE to be upgraded per Table 17.
8. ☐	Identify the Standby SBR server(s) to upgrade	From the data captured in Table 17, identify the SBR server (s) to upgrade in iteration 4. If ASG was used for SBR servers in Upgrade Iteration 3, then standby SBR server(s) are already upgraded and the SBR upgrade iteration steps are not required. If manual upgrade was recommended in section 0, Table 6, step 7. , use alternate upgrade procedures provided in L.6, Manual SBR Upgrade Procedure for standby SBR server (s) upgrade.
9. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	See step 10. for instructions if the upgrade fails, or if execution time exceeds 60 minutes. ***Note***: If the upgrade processing encounters a problem, it may attempt to ROLL BACK to the original software release. In this case, the Upgrade displays as **FAILED**. The execution time may be shorter or longer, depending on the point in the upgrade where there was a problem.

Step#	Procedure	Description
		1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM tab of the site being upgraded. 3. Sequence through the server group links for the server groups being upgraded. Observe the upgrade state of the servers of interest. Upgrade status displays under the Status Message column. During the upgrade, the servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 31101 (DB Replication To Slave Failure)** **Alarm ID = 31106 (DB Merge To Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31233 (HA Secondary Path Down)** **Alarm ID = 31283 (Highly available server failed to receive mate heartbeats)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** Database (DB) replication failure alarms may display during an Automated Site Upgrade or during an event that resets multiple servers in parallel. The DB on the child servers is not updated until resolved. Refer to Appendix Z to resolve this issue. 4. The SBR server groups being upgraded with ASG upgrade the standby SBR in iteration 4, and automatically sequence to iteration 5. Periodically monitor these servers for failures, if equipped. 5. For the DA-MP and IPFE servers being upgraded, wait for the upgrades to complete. The Status Message column displays **Success** after approximately 20 to 50 minutes. Do not proceed to iteration 5 until the DA-MP and IPFE servers have completed upgrade. **If the system does not have SBRs, the server upgrades are complete. Proceed to Section 5.6 Upgrade Iteration 5.**
10. ☐	**Server CLI**: If the upgrade of a server fails:	If the upgrade of a server fails, access the server command line (using ssh or a console), and collect the following files: /var/TKLC/log/upgrade/upgrade.log /var/TKLC/log/upgrade/ugwrap.log /var/TKLC/log/upgrade/earlyChecks.log /var/TKLC/log/platcfg/upgrade.log If any upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures.

5.6 Upgrade Iteration 5

Upgrade iteration 5 continues the upgrade of the site C-level servers. As shown in Table 17, iteration 5 consists of upgrading the active SBR(s) if ASG was not used during Upgrade Iteration 3.

Table 22 shows the estimated time required to upgrade the remaining C-level servers for iteration 5.

Table 22. Iteration 5 Upgrade Execution Overview

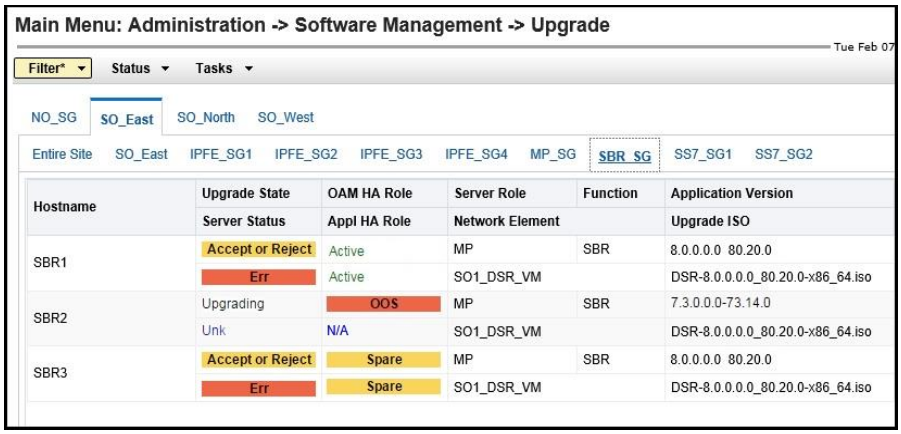
Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 28	0:40-1:00		Upgrade Iteration 5	Standby SBR becomes active; previously active SBR will be offline for upgrade

CAUTION

IF ASG was used for SBR servers in Upgrade Iteration 3, then Active SBR server(s) are already upgraded and Procedure 35 is not required.

If manual upgrade was recommended in section 3.2, Table 6, step 8., use alternate upgrade procedures provided in L.7, Manual SBR Upgrade Procedure for active SBR server(s) upgrade.

Procedure 28. Upgrade Iteration 5

Step#	Procedure	Description
This procedure upgrades the active SBRs. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1.	**NOAM health check**	1. Perform the NOAM health check before upgrading C-Level servers. 2. Check wthether the apwSoapServer process is restarting on active NOAM.
2. ☐	**Active NOAM VIP**: Iteration 5	At iteration 5, the active SBR is upgraded, causing the standby to become active. 

Step#	Procedure	Description
3. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	See step 3 for instructions if the upgrade fails, or if execution time exceeds 60 minutes. ***Note***: If the upgrade processing encounters a problem, it may attempt to ROLL BACK to the original software release. In this case, the Upgrade displays as **FAILED**. The execution time may be shorter or longer, depending on the point in the upgrade where there was a problem. 1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM tab of the site being upgraded. 3. Sequence through the server group links for the server groups being upgraded. Observe the upgrade state of the servers of interest. Upgrade status displays under the Status Message column. During the upgrade, the servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 31101 (DB Replication To Slave Failure)** **Alarm ID = 31106 (DB Merge To Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31233 (HA Secondary Path Down)** **Alarm ID = 31283 (Highly available server failed to receive mate heartbeats)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** Database (DB) replication failure alarms may display during an Automated Site Upgrade or during an event that resets multiple servers in parallel. The DB on the child servers is not updated until resolved. Refer to Appendix Z to resolve this issue. Wait for the SBR upgrades to complete. The Status Message column displays **Success**. This step takes approximately 20 to 50 minutes.

Step#	Procedure	Description
4. ☐	**Server CLI**: If the upgrade of a server fails	If any upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures. If the upgrade of a server fails, access the server command line (using ssh or a console), and collect the following files: /var/TKLC/log/upgrade/upgrade.log /var/TKLC/log/upgrade/ugwrap.log /var/TKLC/log/upgrade/earlyChecks.log /var/TKLC/log/platcfg/upgrade.log

5.7 Site Post-Upgrade Procedures

THE FOLLOWING PROCEDURES MUST BE EXECUTED AT THE COMPLETION OF EACH SOAM SITE UPGRADE:

- Procedure 29 Allow Site Provisioning
- Procedure 30 Site Post-Upgrade Health Check

AFTER ALL SOAM SITES IN THE TOPOLOGY HAVE COMPLETED UPGRADE, THE UPGRADE MAY BE ACCEPTED USING THE FOLLOWING PROCEDURE:

- Procedure 42 Accept the Upgrade

The post-upgrade procedures consist of procedures that are performed after each site upgrades is complete. The final Health Check of the system collects alarm and status information to verify the upgrade did not degrade system operation. After an appropriate soak time, the upgrade is accepted.

5.7.1 Allow Site Provisioning

This procedure enables site provisioning for the site just upgraded.

CAUTION Any provisioning changes made to this site before the upgrade is accepted are lost if the upgrade is backed out.

Procedure 29. Allow Site Provisioning

Step#	Procedure	Description
This procedure allows provisioning for SOAM and MP servers. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active SOAM VIP**: Enable site provisioning	1. Log into the SOAM GUI of the site just upgraded using the VIP. 2. Navigate to **Status & Manage > Database**. 3. Click **Enable Site Provisioning**. 4. Confirm the operation by clicking **OK** on the screen. 5. Verify the button text changes to **Disable Site Provisioning**.

5.7.2 Site Post-Upgrade Health Checks

This section provides procedures to verify the validity and health of the site upgrade.

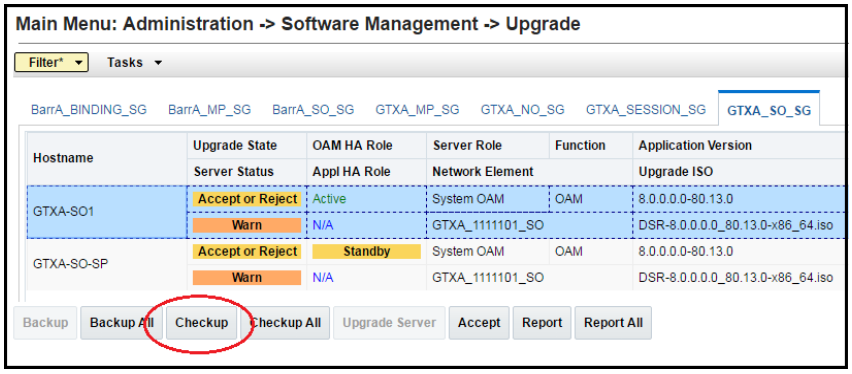
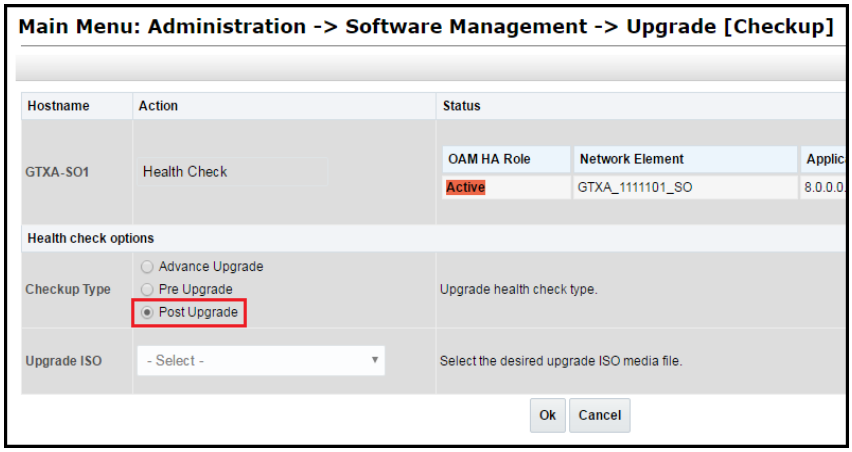
5.7.2.1 Site Post-Upgrade Health Check

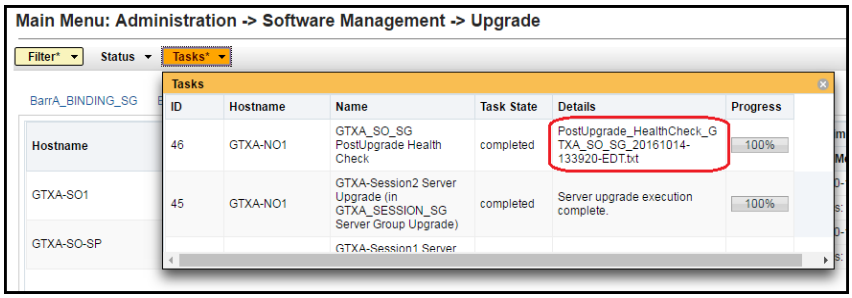
This procedure determines the validity of the upgrade, as well as the health and status of the network and servers.

If the **10054 - Device Deployment Failed** alarm is raised after upgrade for any server, see BB.4 Resolve Device Deployment Failed Alarm for corrective steps.

If syscheck fails stating that **cpu: FAILURE:: No record in alarm table for FAILURE!**, see BB.5 Resolve syscheck Error for CPU Failure.

Procedure 30. Site Post-Upgrade Health Check

Step#	Procedure	Description
This procedure verifies post-upgrade site status. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Run automated post-upgrade health checks	1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM tab of the site being upgraded. 3. Select the SOAM server group link for the site being upgraded. 4. Select the active SOAM.  5. Click **Checkup**. 6. Under Health check options, select **Post Upgrade**. 7. Click **OK**. **Control returns to the Upgrade screen.** 

Step#	Procedure	Description
2. ☐	**Active NOAM VIP**: Monitor health check progress for completion	1. Click the **Tasks** option to display the currently executing tasks. The Health Check task name appears as **<SOServerGroup> PostUpgrade Health Check**. 2. Monitor the Health Check task until the Task State is completed. The Details column displays a hyperlink to the Health Check report. 3. Click the hyperlink to download the Health Check report. 4. Open the report and review the results. 
3. ☐	**Active NOAM VIP**: Analyze health check results	Analyze health check report for failures. If the Health Check report status is anything other than **Pass**, the Health Check logs can be analyzed to determine if the upgrade can proceed. 1. Navigate to **Status & Manage > Files**. 2. Select the active SOAM tab. 3. Select the **UpgradeHealthCheck.log** file and click **View**. 4. Locate the log entries for the most recent health check. 5. Review the log for failures. Analyze the failures and determine if it is safe to continue the upgrade. If necessary, it is recommended to contact My Oracle Support (MOS) for guidance as described in Appendix CC. If the health check log contains the **Unable to execute Health Check on <Active NOAM hostname>** message, perform health checks in accordance with Procedure 31 Alternate Site Post-Upgrade Health Check. **Note**: The following alarm is expected post upgrade only if MP is configured as active-standby pair: **Alarm ID = 31225 (HA Service Start Failure)**

Step#	Procedure	Description
4. ☐	**Active SOAM VIP**: Export and archive the Diameter configuration data	1. Navigate to **Diameter Common > Export**. 2. Capture and archive the Diameter data by selecting the **ALL** option for the Export Application. 3. Verify the requested data is exported by clicking **Tasks** at the top of the screen. 4. Navigate to **Status & Manage > Files** and download all the exported files to the client machine, or use the SCP utility to download the files from the active NOAM to the client machine. 5. Navigate to **Diameter > Maintenance > Applications**. 6. Verify Operational Status is **Available** for all applications.
5. ☐	**Active SOAM Server**: Check if the setup previously has a customer supplied Apache certificate installed and protected with a passphrase, which was renamed before starting with upgrade.	If the setup had a customer-supplied Apache certificate installed and protected with passphrase before the start of the upgrade (refer to Procedure 3 and rename the certificate back to the original name.
6. ☐	Compare data to the Pre-Upgrade health check to verify if the system has degraded after the second maintenance window.	Verify the health check status of the upgraded site as collected from steps 1 through 4 is the same as the pre-upgrade health checks taken in Section 3.4.2. If system operation is degraded, it is recommended to contact My Oracle Support (MOS).

5.7.2.2 Alternate Site Post-Upgrade Health Check

This procedure determines the validity of the upgrade, as well as the health and status of the network and servers. This procedure is an alternative to the normal post upgrade health check in Procedure 30.

Procedure 31. Alternate Site Post-Upgrade Health Check

Step#	Procedure	Description
This procedure verifies post-upgrade site status. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	ACTIVE SOAM CLI: Run/verify SOAM post-upgrade health check status	1. Use an SSH client to connect to the active SOAM:
		`ssh admusr@<SOAM XMI IP address>`
		`password: <enter password>`
		Note: The static XMI IP address for each server should be available in Table 5.
		2. Enter the command:
		`$ upgradeHealthCheck postUpgradeHealthCheckOnSoam`
		This command creates two files in **/var/TKLC/db/filemgmt/UpgradeHealthCheck/** with the filename format:
		`<SOserver_name>_ServerStatusReport_<date-time>.xml`
		`<SOserver_name>_ComAgentConnStatusReport_<date-time>.xml`
		If any alarms are present in the system:
		`<SOserver_name>_AlarmStatusReport_<date-time>.xml`
		If the system is PDRA, one additional file is generated:
		`<SOserver_name>_SBRStatusReport_<date-time>.xml`
		Note: The **FIPS integrity verification test failed** message may display when the upgradeHealthCheck command runs. This message can be ignored.
		3. If the **Server <hostname> needs operator attention before upgrade** message displays, inspect the Server Status Report to determine the reason for the message. If the **Server <hostname> has no alarm with DB State as Normal and Process state as Kill** message displays in the Server Status Report, the alert can be ignored.
		Note: If any server status is not as expected, do not proceed with the upgrade. It is recommended to contact My Oracle Support (MOS) for guidance.
		4. Keep these reports for future reference. These reports are compared to alarm and status reports after the upgrade is complete.

Step#	Procedure	Description
2. ☐	**ACTIVE SOAM CLI**: Capture Diameter maintenance status	Enter the command: `$ upgradeHealthCheck diameterMaintStatus` This command displays a series of messages providing Diameter Maintenance status. Capture this output and save for later use. ***Note***: The output is also captured in **/var/TKLC/db/filemgmt/UpgradeHealthCheck.log**. ***Note***: The **FIPS integrity verification test failed** message may display when the upgradeHealthCheck command runs. This message can be ignored.
3. ☐	**ACTIVE SOAM CLI**: View DA-MP status	1. Enter the command: `$ upgradeHealthCheck daMpStatus` This command outputs status to the screen for review. ***Note***: The **FIPS integrity verification test failed** message may display when the upgradeHealthCheck command runs. This message can be ignored. 2. Verify all peer MPs are available. 3. Note the number of Total Connections Established _____
4. ☐	Compare data to the pre-upgrade health check to verify if the system has degraded after the second maintenance window	Verify the health check status of the upgraded site as collected in this procedure is the same as the pre-upgrade health checks taken in section 5.1.2. If system operation is degraded, it is recommended to report it to My Oracle Support (MOS).

5.7.3 Post-Upgrade Procedures

The procedures in this section are executed after the site upgrade is verified to be valid and healthy. These procedures should be executed in the maintenance window.

Procedure 32. Post-Upgrade Procedures

Step#	Procedure	Description
This procedure performs additional actions required after the upgrade is successfully completed. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active SOAM VIP**: Enable the signaling firewall for the upgraded site	The firewall enables the DSR to dynamically determine and customize the Linux firewall on each DA-MP server in the DSR signaling node to allow only the essential network traffic pertaining to the active signaling configuration. 1. Navigate to **Diameter > Maintenance > Signaling Firewall**. 2. Select the Signaling Node that was just upgraded. 3. Click **Enable**. 4. Click **OK** to confirm the action. 5. Verify the Admin State changes to **Enabled**. ***Note***: There may be a short delay while the firewall is enabled on the site.

6. Backout Procedure Overview

The procedures provided in this section return the individual servers and the overall DSR system to the source release after an upgrade is aborted. The backout procedures support two options for restoring the source release:

- Emergency backout
- Normal backout

CAUTION

DSR Backout

If the customer deployment has both the FABR and PCA features enabled, then first Backout the SDS nodes before the DSR nodes.

The emergency backout overview is provided in Table 23. These procedures back out the target release software in the fastest possible manner, without regard to traffic impact.

The normal backout overview is provided in Table 24. These procedures back out the target release software in a more controlled manner, sustaining traffic to the extent possible.

All backout procedures are executed inside a maintenance window.

The backout procedure times provided in Table 23 and Table 24 are only estimates as the reason to execute a backout has a direct impact on any additional backout preparation that must be done.

Note: While not specifically covered by this procedure, it may be necessary to re-apply patches to the source release after the backout. If patches are applicable to the source release, verify all patches are on-hand before completing the backout procedures.

Table 23. Emergency Backout Procedure Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 33	0:10-0:30	0:10-0:30	Backout Health Check The reason to execute a backout has a direct impact on any additional backout preparation that must be done. Since all possible reasons cannot be predicted ahead of time, only estimates are given here. Execution time varies.	None
Procedure 34	0:01	0:11-0:31	Disable Global Provisioning	Disables global provisioning
Procedure 35	See Note	See Note	Emergency Site Backout ***Note***: Execution time of downgrading entire network is approximately equivalent to execution time taken during upgrade. 0:05 (5 minutes) can be subtracted from total time because ISO Administration is not executed during Backout procedures.	All impacts as applicable in upgrade apply in this procedure. Also, backout procedures cause traffic loss.
Procedure 40	See Note	See Note	Backout Multiple Servers ***Note***: Execution time of downgrading a single server is approximately equivalent to execution time to upgrade the server.	All impacts as applicable in upgrade apply in this procedure. Also, backout procedures cause traffic loss.
Procedure 36	See Note	See Note	Emergency NOAM Backout ***Note***: Execution time of downgrading a single server is approximately equivalent to execution time to upgrade the server.	All impacts as applicable in upgrade apply in this procedure. Also backout procedures cause traffic loss.
Procedure 41	0:01-0:05	Varies	Post-Backout Health Check	None

Table 24. Normal Backout Procedure Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 33	0:10-0:30	0:10-0:30	Backout Health Check The reason to execute a backout has a direct impact on any additional backout preparation that must be done. Since all possible reasons cannot be predicted ahead of time, only estimates are given here. Execution time varies.	None
Procedure 34	0:01	0:11-0:31	Disable Global Provisioning	Disables global provisioning
Procedure 37	See Note	See Note	Normal Site Backout ***Note***: Execution time of downgrading entire network is approximately equivalent to execution time taken during upgrade. 0:05 (5 minutes) can be subtracted from total time because ISO Administration is not executed during Backout procedures.	All impacts as applicable in upgrade apply in this procedure. Also, backout procedures cause traffic loss.
Procedure 40	See Note	See Note	Backout Multiple Servers ***Note***: Execution time of downgrading a single server is approximately equivalent to execution time to upgrade the server.	All impacts as applicable in upgrade apply in this procedure. Also, backout procedures cause traffic loss.
Procedure 38	See Note	See Note	Normal NOAM Backout ***Note***: Execution time of downgrading a single server is approximately equivalent to execution time to upgrade the server.	All impacts as applicable in upgrade apply in this procedure. Also, backout procedures cause traffic loss.
Procedure 41	0:01-0:05	Varies	Post-Backout Health Check	None

6.1 Recovery Procedures

It is recommended to direct upgrade procedure recovery issues to My Oracle Support (MOS) by referring to Appendix CC of this document. Before executing any of these procedures, it is recommended to contact My Oracle Support (MOS).

Execute this section only if there is a problem and it is desired to revert back to the pre-upgrade version of the software.

!!WARNING!!

Before attempting to perform these backout procedures, it is recommended to contact My Oracle Support (MOS) as described in Appendix CC.

Backout procedures cause traffic loss.

Note: These recovery procedures are provided for the back out of an upgrade ONLY (for example, from a failed 82.y.z release to the previously installed 8.0/8.1.x/8.2.x release). Back out of an initial installation is not supported.

During the backout, the servers may have the following expected alarms until the server is completely backout. The servers may have some or all of the following expected alarms but are not limited to Event IDs:

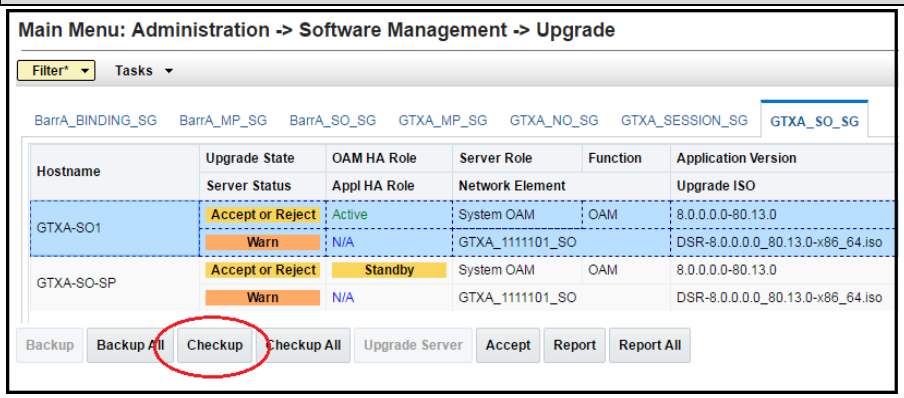
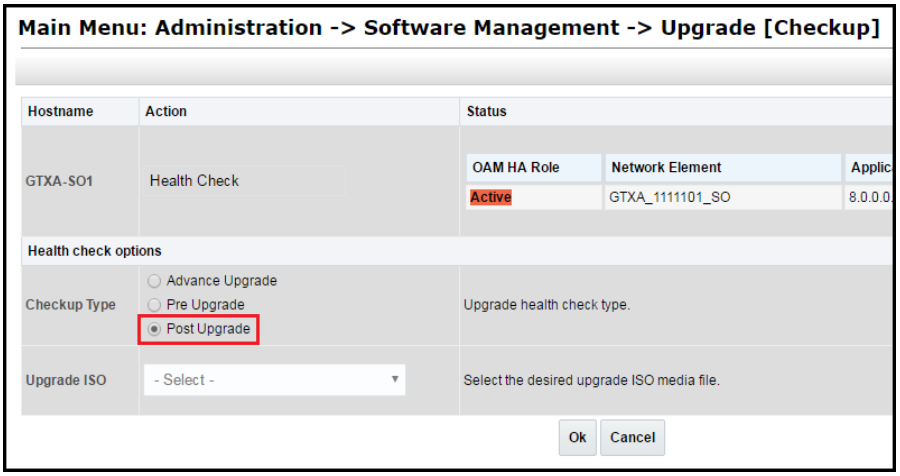
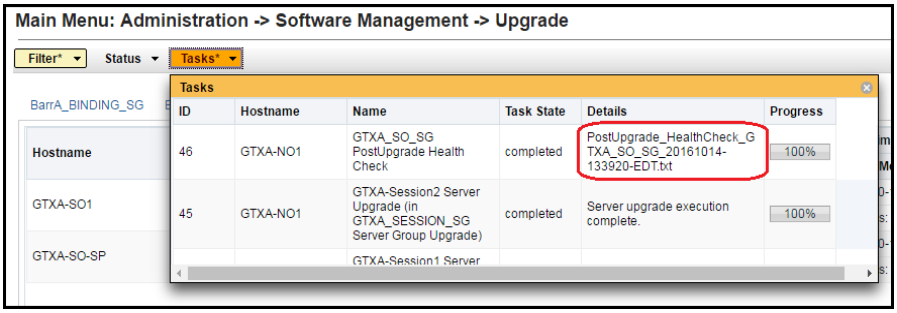
- Alarm ID = 31283 (Highly available server failed to receive mate heartbeats)
- Alarm ID = 31109 (Topology config error)
- Alarm ID = 31114 (DB Replication over SOAP has failed)
- Alarm ID = 31106 (DB Merge To Parent Failure)
- Alarm ID = 31134 (DB replication to slave failure)
- Alarm ID = 31102 (DB replication from master failure)
- Alarm ID = 31282 (HA management fault)

6.2 Backout Health Check

This section provides the procedure to verify the DSR is ready for backout. The site post-upgrade Health Check is used to perform the backout health check.

Procedure 33. Backout Health Check

Step#	Procedure	Description
This procedure performs a health check on the site before backing out the upgrade. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Run the automated post-upgrade health checks for backout	1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM tab of the site being backed out. 3. Select the SOAM server group link for the site being backed out. 4. Select the active SOAM.

Step#	Procedure	Description
		 5. Click **Checkup**. 6. Under Health check options, click **Post Upgrade**. 7. Click **OK**. Control returns to the Upgrade screen. 
2. ☐	**Active NOAM VIP**: Monitor health check progress for completion	1. Click the **Tasks** option to display the currently executing tasks. The Health Check task name appears as **<SOServerGroup> PostUpgrade Health Check**. 2. Monitor the Health Check task until the Task State is completed. The Details column displays a hyperlink to the Health Check report. 3. Click the hyperlink to download the Health Check report. 4. Open the report and review the results. 

Step#	Procedure	Description
3. ☐	**Active NOAM VIP**: Analyze health check results	Analyze health check report for failures. If the Health Check report status is anything other than **Pass**, the Health Check logs can be analyzed to determine if the upgrade can proceed. 1. Navigate to **Status & Manage > Files**. 2. Select the active SOAM tab. 3. Select the **PostUpgrade_HealthCheck<SO server Group>-datetime.txt**" file and click **View**. 4. Locate the log entries for the most recent health check. 5. Review the log for failures. Analyze the failures and determine if it is safe to continue the upgrade. If necessary, it is recommended to contact My Oracle Support (MOS) for guidance as described in Appendix CC.
4. ☐	**Active NOAM VIP**: Identify IP addresses of servers to be backed out	1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM tab of the site being backed out. 3. Select each server group link, making note of the application version of each server. 4. Based on the Application Version column, identify all the hostnames that need to be backed out. 5. Navigate to **Configuration > Servers**. 6. Using the data recorded in Table 5, note the XMI/iLO/LOM IP addresses of all the hostnames to be backed out. These are required to access the server when performing the backout. The reason to execute a backout has a direct impact on any additional backout preparation that must be done. The backout procedures cause traffic loss. Since all possible reasons cannot be predicted ahead of time, it is recommended to contact My Oracle Support (MOS) as stated in the **Warning** box.

5. ☐	**Active NOAM VIP**: Verify backup archive files	1. Navigate to **Status & Manage > Files**.
		2. For each server to be backed out, select the server tab on the Files screen. Verify the two backup archive files, created in section 3.4.4, are present on every server that is to be backed out. These archive files have the format:
		`Backup.<application>.<server>.FullDBParts.<role>.<date_time>.UPG.tar.bz2`
		`Backup.<application>.<server>.FullRunEnv.<role>.<date_time>.UPG.tar.bz2`

6. ☐	**Active NOAM CLI**: Verify disk usage	Starting with the active SOAM, log into each server to be backed out to verify the disk usage is within acceptable limits.
		1. Use the SSH command (on UNIX systems – or putty if running on windows) to log into the active SOAM.
		`ssh admusr@<server IP>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		2. Enter the command:

Step#	Procedure	Description
		[admusr@EVO-NO-1 ~]$ df Sample output (abridged): Filesystem 1K-blocks Used Available Use% Mounted on /dev/mapper/vgroot-plat_root 999320 294772 652120 32% / tmpfs 12303460 0 12303460 0% /dev/shm /dev/vda1 245679 41967 190605 19% /boot /dev/mapper/vgroot-plat_tmp 999320 1548 945344 1% /tmp /dev/mapper/vgroot-plat_usr 5029504 2962552 1804824 63% /usr /dev/mapper/vgroot-plat_var 999320 558260 388632 59% /var /dev/mapper/vgroot-plat_var_tklc 3997376 2917284 870380 78% /var/TKLC 3. Observe the line for the **/var and /usr** partition. If the Use% column is 70% or less, this procedure is complete. Continue with the back out per 4. Table 23. Emergency Backout Procedure Overview 5. (Emergency) or 6. Table 24 (Normal). If the Use% of the /var and /usr partition is at 70% or greater, search the partition for files that can be safely deleted. **Use extreme caution in selecting files to be deleted. The deletion of critical system files could severely impair the DSR functionality.** 7. Repeat sub-steps 1 through 3 for all servers to be backed out.

6.3 Disable Global Provisioning

The following procedure disables provisioning on the NOAM. This step ensures no changes are made to the database while the NOAMs and sites are backed out. Provisioning is re-enabled once the NOAM upgrade is complete.

Procedure 34. Disable Global Provisioning

Step#	Procedure	Description
This procedure disables provisioning for the NOAM servers, before upgrade. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Disable global provisioning and configuration updates on the entire network	1. Log into the active NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Database**. 3. Click **Disable Provisioning**. 4. Confirm the operation by clicking **OK** on the screen. 5. Verify the button text changes to **Enable Provisioning**. A yellow information box should also be displayed at the top of the view screen which states: **[Warning Code 002] – Global provisioning has been manually disabled**. The active NOAM server has the following expected alarm: **Alarm ID = 10008 (Provisioning Manually Disabled)**

6.4 Perform Emergency Backout

EMERGENCY SITE BACKOUT

Use this section to perform an emergency backout of a DSR upgrade.

The procedures in this section perform a backout of all servers to restore the source release. An emergency backout can only be executed once all necessary corrective setup steps have been taken to prepare for the backout. It is recommended to contact My Oracle Support (MOS), as stated in the warning box in Section 6.1, to verify all corrective setup steps have been taken.

6.4.1 Emergency Site Backout

The procedures in this section back out all servers at a specific site without regard to traffic impact.

!!WARNING!! Executing this procedure results in a total loss of all traffic processed by this DSR. Traffic processed by the mate DSR is not affected.

Note: If another site is to be backed out, follow all procedures in another maintenance window.

Procedure 35. Emergency Site Backout

Step#	Procedure	Description
This procedure backs out the DSR application software from multiple B- and C-level servers for a specific site. Any server requiring backout can be included: SOAMs, DA-MPs, IPFEs, SBRs, and even TVOE hosts. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Identify all servers that require backout (within a site)	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration >Software Management >Upgrade.** 3. Select the SOAM tab of the site being backed out. 4. Select each server group link, making note of the application version of the servers. 5. Identify the servers in the respective server groups with the target release **Application Version** value. These servers were previously upgraded but now require backout. 6. Make note of these servers. They have been identified for backout. 7. Before initiating the backout procedure, remove all new blades and/or sites configured after upgrade was started.
2. ☐	**Active SOAM VIP**: Disable site provisioning for the site to be backed out	1. Log into the SOAM GUI using the VIP. 2. Navigate to **Status & Manage > Database**. 3. Click **Disable Provisioning**. 4. Confirm the operation by clicking **OK** on the screen. 5. Verify the button text changes to **Enable Provisioning**. A yellow information box displays at the top of the view screen which states: **[Warning Code 004] – Site provisioning has been manually disabled**. The active SOAM server has the following expected alarm: **Alarm ID = 10008 (Provisioning Manually Disabled)**

!!WARNING!! STEP 4 RESULTS IN A TOTAL LOSS OF ALL TRAFFIC BEING PROCESSED BY THIS DSR

Step#	Procedure	Description
3. ☐	Backout all C-level servers, as applicable	**For all configurations**: Backout all C-level servers (IPFEs, SBRs, SBRs, DA-MPs) identified in step 1: Execute Section 6.7, Backout Multiple Servers.
4. ☐	Additional post backout steps (SBR servers)	If all of the servers in a particular server group are backed out then Backout procedure is not completed yet. Some more steps need to be executed for SBR server(s) to revert back the changes done in Appendix Q (Additional Backout Steps) during Backout Single Server procedure. Execute Appendix R Additional Post-Backout Steps in such case. Refer to Appendix U to create softlink of Comagent. ***Note***: This procedure is required only for 8.1/8.0 backout.
5. ☐	Backout the standby and spare SOAM servers, as applicable	Backout the standby and spare DSR SOAM servers: **If standby and spare SOAM servers are present:** Execute Section 6.7, Backout Multiple Servers. **If only a spare SOAM server is present:** Execute Section 6.6. Backout Single Server.
6. ☐	Backout the active DSR SOAM server	Execute Section 6.6, Backout Single Server.
7. ☐	Additional Post Backout steps (SOAM servers)	If all of the servers in a particular server group are backed out then Backout procedure is not completed yet. Some more steps need to be executed for SOAM server(s) to revert back the changes done in Appendix Q (Additional Backout Steps) during Backout Single Server procedure. Execute Appendix R Additional Post-Backout Steps in such case. ***Note***: This procedure is required only for 8.1/8.0 backout.

Step#	Procedure	Description
8. ☐	**Active NOAM VIP**: Prepare for TVOE backout TVOE, if upgraded previously	**If the SOAM is a guest under the same host as a NOAM, do not backout the TVOE at this time. Proceed to step 10.** Otherwise, if the SOAM is a guest of the TVOE software, determine if TVOE backout is required. Unless a TVOE issue is the cause of the backout, it is an option to leave the TVOE upgrade in place to save time. TVOE is backward compatible with all source releases and may remain upgraded. This is a customer decision. **If backout is not required, proceed to step 10.** Execute the following steps to backout the SOAM TVOE server upgraded previously. Disable all applications running on the TVOE server. 1. Log into the NOAM GUI using VIP. 2. Navigate to **Status & Manage > Server**. 3. Select all applications running on the current TVOE server. 4. Click **Stop**. 5. Confirm the operation by clicking **OK** on the screen. 6. Verify the Appl State for all selected servers changes to **Disabled**.

9.
☐
	TVOE CLI: Back out the TVOE upgrade	1. Log into the TVOE host
		`ssh admusr@<TVOE IP>`
		`password: <enter password>`
		2. List the guests running on the current TVOE host:
		`$ sudo virsh list`
		Note: The output lists all guests running on the TVOE host.
		3. Execute the following command for each guest listed:
		`$ sudo virsh shutdown <guestname>`
		Note: Shutting down applications may lead to lost VIP. Wait until all TVOE servers on which SOAM(s) are hosted are successfully backed out.
		4. Periodically execute the following command until the command displays no entries. This means that all VMs have been properly shut down:
		`$ sudo virsh list`
		5. Backout TVOE on the blade according to reference [4].

10.
☐
	TVOE CLI: Start the TVOE guests	1. Log into the TVOE host:
		`ssh admusr@<TVOE IP>`
		`password: <enter password>`
		2. Execute the following command to start the TVOE guest shutdown in step 7 (if not already started).
		`$ sudo virsh start <guestname>`
		3. Periodically execute the following command until the command displays all the VM guests running.
		`$ sudo virsh list`

Step#	Procedure	Description
11. ☐	**Active NOAM VIP**: Enable all applications running on the backed out TVOE server	1. Log into the NOAM VIP GUI 2. Navigate to Status & Manage > Server. 3. Select all applications running on the current TVOE server. 4. Click Restart. 5. Confirm the operation by clicking OK on the screen. 6. Verify the Appl State for all selected servers is changed to Enabled. 7. Repeat steps 6 through 8 for another TVOE server hosting a SOAM (as applicable).
12. ☐	**Active SOAM VIP**: Enable site provisioning	1. Log into the SOAM GUI using the VIP. 2. Navigate to Status & Manage > Database. 3. Click Enable Site Provisioning. 4. Confirm the operation by clicking OK on the screen. 5. Verify the button text changes to Disable Site Provisioning.

6.4.2 Emergency NOAM Backout

The procedures in this section backout the NOAM servers.

Procedure 36. Emergency NOAM Backout

Step#	Procedure	Description
This procedure is used to perform an emergency backout of the DSR application software from the NOAM servers. This includes the DSR NOAMs, DR NOAMs, and TVOE hosts. This procedure backs out the application software as quickly as possible, without regard to operational impact. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Back out the standby DR NOAM server (if equipped)	Execute Section 6.6 Backout Single Server.
2. ☐	Back out the active DR NOAM server (now the standby) (if equipped)	Execute Section 6.6 Backout Single Server.
3. ☐	Back out the standby DSR NOAM server (as applicable)	Execute Section 6.6 Backout Single Server.

Step#	Procedure	Description
4. ☐	Back out the active DSR NOAM server (now the standby)	Execute Section 6.6 Backout Single Server.
5. ☐	Additional Post Backout steps	If all of the servers in a particular server group are backed out then Backout procedure is not completed yet. Some more steps need to be executed for NOAM server(s) to revert back the changes done in Appendix Q (Additional Backout Steps) during Backout Single Server procedure. Execute Appendix R Additional Post-Backout Steps in such case. **Note**: This procedure is required only for 8.1/8.0 backout.
6. ☐	**Active NOAM VIP**: Disable applications	**If the NOAM is a guest of the TVOE software, determine if TVOE backout is required. Unless a TVOE issue is the cause of the backout, it is an option to leave the TVOE upgrade in place to save time. TVOE is backward compatible with all source releases and may remain upgraded. This is a customer decision.** **If a TVOE backout is not required, proceed to step 9.** Execute these steps for each TVOE server upgraded previously. 1. Disable all applications running on the TVOE server. 2. Log into the NOAM GUI using the VIP. 3. Navigate to **Status & Manage > Server**. 4. Select all applications running on the current TVOE server. 5. Click **Stop**. 6. Confirm the operation by clicking **OK** on the screen. 7. Verify the Appl State for all selected servers changes to **Disabled**.

7.
☐
	TVOE CLI: Back out TVOE, if upgraded previously as part of the DSR upgrade	1. Log into the TVOE host:
		`ssh admusr@<TVOE IP>`
		`password: <enter password>`
		2. List the guests running on the current TVOE host:
		`$ sudo virsh list`
		The output of this command lists all guests running on the TVOE host.
		3. Execute this command for each guest listed :
		`$ sudo virsh shutdown <guestname>`
		Note: Shutting down applications may lead to lost VIP. Wait until all TVOE servers on which NOAM(s) are hosted are successfully backed out.
		4. Periodically execute the following command until the command displays no entries. This means that all VMs have been properly shut down:
		`$ sudo virsh list`
		5. Backout TVOE on the blade according to reference [4].

Step#	Procedure	Description

8.
☐
	TVOE CLI: Start TVOE guests	1. Log into the TVOE host:
		`$ ssh admusr@<TVOE IP>`
		`password:  <enter password>`
		2. Execute the following command to start the TVOE guests shutdown in step 6 (if not already started).
		`$ sudo virsh start <guestname>`
		3. Periodically execute the following command until the command displays all the VM guests running.
		`$ sudo virsh list`

9. ☐	**Active NOAM VIP**: Enable all applications running on the backed out TVOE server	1. Log into the NOAM VIP GUI 2. Navigate to **Status & Manage > Server**. 3. Select all applications running on the current TVOE server. 4. Click **Restart**. 5. Confirm the operation by clicking **OK** on the screen. 6. Verify the Appl State for all selected servers is changed to **Enabled**. 7. Repeat steps 5 through 8 for another TVOE server hosting a SOAM (as applicable).
10. ☐	**Active NOAM VIP**: Enable global provisioning and configuration updates on the entire network	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Database**. 3. Click **Enable Provisioning**. 4. Verify the button text changes to **Disable Provisioning**.

Step#	Procedure	Description
11. ☐	**Active NOAM VIP**: Remove **Ready** state for any backed out server	1. Navigate to **Status & Manage > Servers**. 2. If any backed-out server Application Status is **Disabled**, then navigate to the server row and click **Restart**. 3. Navigate to **Administration >Software Management >Upgrade**. 4. If any backed-out server shows an Upgrade State of **Ready** or **Success**, then select that server and click **Complete Upgrade**. Otherwise, skip this step. 5. Click **OK**. This removes the **Forced Standby** designation for the backed-out server. ***Note***: Due to backout being initiated from the command line instead of through the GUI, the following SOAP error may appear in the GUI banner. `SOAP error while clearing upgrade status of hostname=[frame10311b6] ip=[172.16.1.28]` It is safe to ignore this error message. 6. Verify the Application Version value for servers has been downgraded to the original release version.

6.5 Perform Normal Backout

NORMAL SITE BACKOUT

Use this section to perform a normal backout of a DSR upgrade

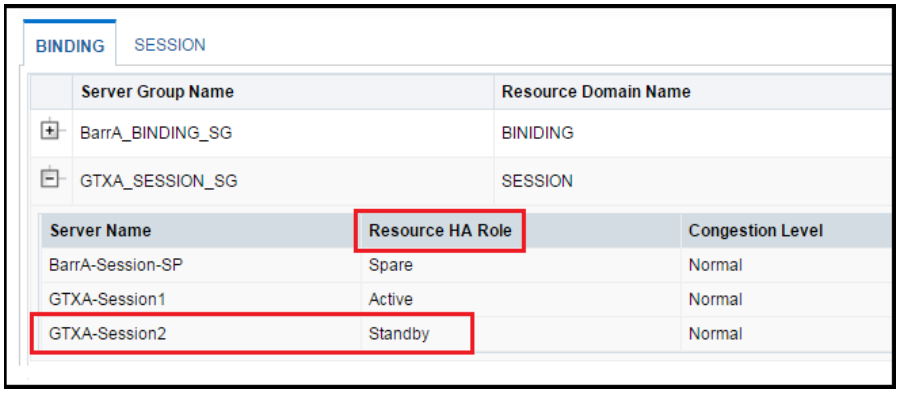
The following procedures to perform a normal backout can only be executed once all necessary corrective setup steps have been taken to prepare for the backout. It is recommended to contact My Oracle Support (MOS), as stated in the Warning box in Section 6.1, to verify all corrective setup steps have been taken.

6.5.1 Normal Site Backout

The procedures in this section backout all servers at a specific site.

Procedure 37. Normal Site Backout

Step#	Procedure	Description
This procedure is used to backout an upgrade of the DSR application software from multiple servers in the network. Any server requiring backout can be included: SOAMs, DA-MPs, IPFEs, SBRs, and even TVOE hosts. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Identify all servers that require backout (within a site)	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration >Software Management > Upgrade**. 3. Select the SOAM tab of the site being backed out. 4. Select each server group link, making note of the application version of each server. 5. Identify the servers in the respective Server Groups with the target release **Application Version** value. These servers were previously upgraded but now require Backout. 6. Make note of these servers. They have been identified for backout. 7. Before initiating the backout procedure, remove all new blades and/or sites configured after upgrade was started.
2. ☐	**Active SOAM VIP**: Disable site provisioning for the site to be backed out	1. Log into the SOAM GUI using the VIP. 1. Navigate to **Status & Manage > Database**. 2. Click **Disable Provisioning**. 3. Confirm the operation by clicking **OK** on the screen. 4. Verify the button text changes to **Enable Provisioning**. A yellow information box displays at the top of the view screen which states: **[Warning Code 004] – Site provisioning has been manually disabled**. The active SOAM server has the following expected alarm: **Alarm ID = 10008 (Provisioning Manually Disabled)**
3. ☐	Back out the first set of C-level servers, as applicable	***Note***: In a PCA System, the spare SBR server is located at the mated site of the site being backed out. These servers can be backed out in parallel (as applicable): • ½ of all DA-MPs for N+0 (multi-active) configuration • Standby SBR(s) • Spare SBR(s) • ½ of all IPFEs Execute 6.6, Backout Single Server for each standby/spare C-level server identified.

Step#	Procedure	Description
	!!WARNING!!	Failure to comply with step 5 and step 6 may result in the loss of PCA traffic, resulting in service impact.
4. ☐	**Active NOAM VIP**: Verify standby SBR server status	If the server being backed out is the standby SBR, execute this step. Otherwise, continue with step 6. 1. Navigate to **SBR > Maintenance > SBR Status.** Open the tab of the server group being upgraded. 2. Do not proceed to step 6 until the **Resource HA Role** for the standby server has a status of **Standby**. 
5. ☐	**Active NOAM VIP**: Verify bulk download is complete between the active SBR in the server group to the standby and spare SBRs	1. Navigate to **Alarm & Event > View History**. 2. Export the Event log using the following filter: **Server Group**: Choose the SBR group that is in upgrade **Display Filter**: Event ID = 31127 – DB Replication Audit Complete **Collection Interval**: X hours ending in current time, where X is the time from upgrade completion of the standby and spare servers to the current time. 3. Wait for the following instances of Event 31127: • 1 for the Standby Binding SBR server • 1 for the Standby Session SBR server • 1 for the Spare Binding SBR server • 1 for the Spare Session SBR server • 1 for the 2nd Spare Binding SBR server, if equipped • 1 for the 2nd Spare Session SBR server, if equipped ***Note***: There is an expected loss of traffic depending on size of the bulk download. This must be noted along with events captured.

Step#	Procedure	Description
6. ☐	Back out remaining C-level servers, as applicable	These servers can be backed out in parallel (as applicable) • ½ of all DA-MPs for N+0 (multi-active) configuration • Active SBR(s) • ½ of all IPFEs Execute 6.6, Backout Single Server for each C-level server identified.
7. ☐	Additional Post Backout steps (For SBR Servers)	If all of the servers in a particular server group are backed out then see below. Backout procedure is not completed yet. Some more steps need to be executed for SBR server(s) to revert back the changes done in Appendix Q (Additional Backout Steps) during Backout Single Server procedure. Execute Appendix R Additional Post-Backout Steps in such case. Refer to Appendix U to create softlink of Comagent. **Note**: This procedure is required only for 8.1/8.0 backout.
8. ☐	Back out the standby DSR SOAM server	Execute Section 6.6 Backout Single Server.
9. ☐	Back out active DSR SOAM server	Execute Section 6.6 Backout Single Server.
10. ☐	Back out spare SOAM server (if applicable)	***Note***: The spare server is located at the mated site of the site being backed out. Execute Section 6.6 Backout Single Server.
11. ☐	Additional Post Backout steps (SOAM servers)	If all of the servers in a particular server group are backed out then see below. Backout procedure is not completed yet. Some more steps need to be executed for SOAM server(s) to revert back the changes done in Appendix Q (Additional Backout Steps) during Backout Single Server procedure. Execute Appendix R Additional Post-Backout Steps in such case. **Note**: This procedure is required only for 8.1/8.0 backout.

Step#	Procedure	Description
12. ☐	**Active NOAM VIP**: Disable applications	**If the SOAM is a guest under the same host as a NOAM, do not backout the TVOE at this time. Proceed to step 14.** Otherwise, if the SOAM is a guest of the TVOE software, determine if TVOE backout is required. Unless a TVOE issue is the cause of the backout, it is an option to leave the TVOE upgrade in place to save time. TVOE is backward compatible with all source releases and may remain upgraded. This is a customer decision. **If a TVOE backout is not required, proceed to step 14.** Execute these steps for a TVOE server previously upgraded. 1. Disable all applications running on the TVOE server. 2. Log into the NOAM GUI using the VIP. 3. Navigate to **Status & Manage > Server**. 4. Select all applications running on the current TVOE server. 5. Click **Stop**. 6. Confirm the operation by clicking **OK** on the screen. 7. Verify the Appl State for all selected servers changes to **Disabled**.

13.
☐
	TVOE CLI: Back out TVOE, if upgraded previously as part of the DSR upgrade	1. Log into the TVOE host:
		`ssh admusr@<TVOE IP>`
		`password: <enter password>`
		2. List the guests running on the current TVOE host:
		`$ sudo virsh list`
		The output of this command lists all guests running on the TVOE host.
		3. Execute the following command for each guest listed :
		`$ sudo virsh shutdown <guestname>`
		Note: Shutting down applications may lead to lost VIP. Wait until all TVOE servers on which NOAM(s) are hosted are successfully backed out.
		4. Periodically execute the following command until the command displays no entries. This means that all VMs have been properly shut down :
		`$ sudo virsh list`
		Backout TVOE on the blade according to reference [4].

14.
☐
	TVOE CLI: Start TVOE guests	1. Log into the TVOE host:
		`$ ssh admusr@<TVOE IP>`
		`password: <enter password>`
		2. Execute the following command to start the TVOE guests shutdown in step 11 (if not already started).
		`$ sudo virsh start <guestname>`
		3. Periodically execute the following command until the command displays all the VM guests running.
		`$ sudo virsh list`

Step#	Procedure	Description
15. ☐	**Active NOAM VIP**: Enable all applications running on the backed out TVOE server	1. Log into the NOAM VIP GUI 2. Navigate to **Status & Manage > Server**. 3. Select all applications running on the current TVOE server. 4. Click **Restart**. 5. Confirm the operation by clicking **OK** on the screen. 6. Verify the Appl State for all selected servers is changed to **Enabled**. 7. Repeat steps 10 through 12 for another TVOE server hosting a SOAM (as applicable).
16. ☐	**Active SOAM VIP**: Enable site provisioning	1. Log into the SOAM GUI using the VIP. 2. Navigate to **Status & Manage > Database**. 3. Click **Enable Site Provisioning**. 4. Confirm the operation by clicking **OK** on the screen. 5. Verify the button text changes to **Disable Site Provisioning**.

Note: If another site is to be backed out, follow all procedures in Table 24 in another maintenance window.

6.5.2 Normal NOAM Backout

The procedures in this section backout the NOAM servers.

Procedure 38. Normal NOAM Backout

Step#	Procedure	Description
This procedure is used to perform a normal backout of the DSR application software from the NOAM servers. This includes the DSR NOAMs, DR NOAMs, and TVOE hosts. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Back out the standby DR NOAM server (if equipped)	Execute Section 6.6 Backout Single Server.
2. ☐	Back out the active DR NOAM server (now the standby) (if equipped)	Execute Section 6.6 Backout Single Server.
3. ☐	Back out the standby DSR NOAM server (as applicable)	Execute Section 6.6 Backout Single Server.

Step#	Procedure	Description
4. ☐	Back out the active DSR NOAM server (now the standby)	Execute Section 6.6 Backout Single Server.
5. ☐	Additional post backout steps	If all of the servers in a particular server group are backed out then see below. Backout procedure is not completed yet. Some more steps need to be executed for NOAM server(s) to revert back the changes done in Appendix Q (Additional Backout Steps) during Backout Single Server procedure. Execute Appendix R Additional Post-Backout Steps in such case. **Note**: This procedure is required only for 8.1/8.0 backout.
6. ☐	**Active NOAM VIP**: Disable applications	**If the NOAM is a guest of the TVOE software, determine if TVOE backout is required. Unless a TVOE issue is the cause of the backout, it is an option to leave the TVOE upgrade in place to save time. TVOE is backward compatible with all source releases and may remain upgraded. This is a customer decision.** **If a TVOE backout is not required, proceed to step 9.** Execute the following steps for a TVOE server upgraded previously. 1. Disable all applications running on the TVOE server. 2. Log into the NOAM GUI using the VIP. 3. Navigate to **Status & Manage > Server**. 4. Select all applications running on the current TVOE server. 5. Click **Stop**. 6. Confirm the operation by clicking **OK** on the screen. 7. Verify the Appl State for all selected servers changes to **Disabled**.

7.
☐
	TVOE CLI: Back out TVOE, if upgraded previously as part of the DSR upgrade	1. Log into the TVOE host:
		`ssh admusr@<TVOE IP>`
		`password: <enter password>`
		2. List the guests running on the current TVOE host:
		`$ sudo virsh list`
		The output of this command lists all guests running on the TVOE host.
		3. Execute this command for each guest listed :
		`$ sudo virsh shutdown <guestname>`
		Note: Shutting down applications may lead to lost VIP. Wait until all TVOE servers on which NOAM(s) are hosted are successfully backed out.
		4. Periodically execute the following command until the command displays no entries. This means that all VMs have been properly shut down :
		`$ sudo virsh list`
		5. Backout TVOE on the blade according to reference [4].

Step#	Procedure	Description

8.
☐
	TVOE CLI: Start TVOE guests	1. Log into the TVOE host:
		`$ ssh admusr@<TVOE IP>`
		`password:  <enter password>`
		2. Execute the following command to start the TVOE guests shutdown in step 6 (if not already started).
		`$ sudo virsh start <guestname>`
		3. Periodically execute the following command until the command displays all the VM guests running.
		`$ sudo virsh list`

9. ☐	**Active NOAM VIP**: Enable all applications running on the backed out TVOE server	1. Log into the NOAM VIP GUI 2. Navigate to **Status & Manage > Server**. 3. Select all applications running on the current TVOE server. 4. Click **Restart**. 5. Confirm the operation by clicking **OK** on the screen. 6. Verify the Appl State for all selected servers is changed to **Enabled**. 7. Repeat steps 5 through 8 for another TVOE server hosting a SOAM (as applicable).
10. ☐	**Active NOAM VIP**: Enable global provisioning and configuration updates on the entire network	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Database**. 3. Click **Enable Provisioning**. 4. Verify the button text changes to **Disable Provisioning**.

6.6 Backout Single Server

This section provides the procedures to backout the application software on a single server.

CAUTION This procedure is executed as a component of the Emergency Backout Procedure (Section 6.4) or the Normal Backout Procedure (Section 6.5). This procedure should never be executed as a standalone procedure.

Procedure 39. Backout Single Server

Step#	Procedure	Description
This procedure backs out the upgrade of DSR 8.4 application software. Any server requiring back out can be included: NOAMs, SOAMs, DA-MPs, IPFEs, SBRs, and even TVOE hosts. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Prepare the server for backout.	1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM tab of the site being backed out. 3. Select the server group link containing the server to be backed out. 4. Verify the Upgrade State is **Accept or Reject**. Make the server **Backout Ready** as follows: 5. Navigate to **Status & Manage > HA**. 6. Click **Edit**. 7. Select the server to be backed out and choose a **Max Allowed HA Role** value of **Standby** (unless it is a Query server, in which case the value should remain set to **Observer**). ***Note***: When the active NOAM is the server being backed out, click **OK** to initiate an HA switchover and cause the GUI session to log out. 8. Click **OK**. ***Note***: If the server being backed out is active NOAM and HA switchover doesn't happen after above step and OAM HA Role of the NOAMP server to be backed out on the HA status screen is still Active. It means you have hit a known issue. Please apply workaround using BB.2 to have the NOAMP HA switchover.*** Critical *** Do NOT omit this step 9. If the server being backed out is active NOAM then log out of the GUI, clear the browser cache, and log back into the active NOAM using the VIP before continuing. Some GUI forms may exhibit incorrect behaviors if the browser cache is not cleared. 10. Verify the Max Allowed HA Role is set to the desired value for the server on the HA Status screen. 11. Navigate to **Status & Manage > Server**. 12. Select the server to back out and click **Stop**.

Step#	Procedure	Description
		13. Click **OK** to confirm the operation and verify the Appl State changes to **Disabled**. 14. Navigate to **Administration > Software Management > Upgrade**. 15. Select the SOAM tab of the site being backed out. 16. Select the link of the server group containing the server to be backed out. Verify the Upgrade State is now **Backout Ready**. ***Note***: It may take a couple of minutes for the status to update.

2.
☐
	Server CLI: SSH to server	Use an SSH client to connect to the server (for example, ssh, putty):
		`ssh admusr@<server address>`
		`password: <enter password>`
		Note: If direct access to the IMI is not available, or if TVOE is installed on a blade, then access the target server using a connection through the active NOAM. SSH to the active NOAM XMI first. From there, SSH to the target server's IMI address.

3.
☐
	Server CLI: Execute the backout	Execute this command to find the state of the server to be backed out:
		`$ ha.mystate`
		In this example output, the HA state is **Standby**.
		`[admusr@E1B581DAMP1 ~]$ ha.mystate`
		`resourceId role node DC subResources lastUpdate`
		`DbReplication Stb/Stb C2016.086 * 0 170915:023010.572`
		`VIP Stb/Stb C2016.086 * 0 170915:023010.530`
		`CacdProcessRes Stb/OOS C2016.086 * 0 170915:023010.530`
		`DA_MP_Leader Act/OOS C2016.086 * 0 170915:023010.932`
		`DSR_SLDB OOS/OOS C2016.086 * 1-63 170913:121610.839`
		`DSR_SLDB Act/OOS C2016.086 * 0 170915:023010.934`
		`VIP_DA_MP OOS/OOS C2016.086 * 1-63 170913:121610.840`
		`VIP_DA_MP Act/OOS C2016.086 * 0 170915:023010.933`
		`EXGSTACK_Process OOS/OOS C2016.086 * 1-63 170913:121610.841`
		`EXGSTACK_Process Act/OOS C2016.086 * 0 170915:023010.933`
		`DSR_Process OOS/OOS C2016.086 * 1-63 170913:121610.841`
		`DSR_Process Act/OOS C2016.086 * 0 170915:023010.932`
		`CAPM_HELP_Proc Stb/OOS C2016.086 * 0 170915:023010.530`
		`DSROAM_Proc Stb/OOS C2016.086 * 0 170915:023010.530`
		`CAPM_PSFS_Proc Stb/Stb C2016.086 * 0 170915:023010.530`
		If the state of the server is **Act**, then return to step 1.
		Execute the **reject** command to initiate the backout:
		`$ sudo /var/TKLC/backout/reject`
		Note: If back out asks to continue, answer **y**.
		The reject command creates a no-hang-up shell session, so the command continues to execute if the user session is lost.
		Sample output of the reject script:

Step#	Procedure	Description

		`Applications Enabled.`
		`Running /usr/TKLC/plat/bin/service_conf reconfig`
		`Remove isometadata (appRev) file from upgrade`
		`Reverting platform revision file`
		`RCS_VERSION=1.4`
		`Creating boot script: /etc/rc3.d/S89backout`
		`Rebuilding RPM database. This may take a moment...`
		`rpmdb_load: /var/lib/rpm/Packages: unexpected file type or format`
		`Cleaning up chroot environment...`
		
		`A reboot of the server is required.`
		`The server will be rebooted in 10 seconds`

4. ☐	Backout proceeds	Many informational messages display to the terminal screen as the backout proceeds. After backout is complete, the server automatically reboots.

5.
☐
	Server CLI: SSH to server	Use an SSH client to connect to the server (for example, ssh, putty):
		`ssh admusr@<server address>`
		`password:  <enter password>`
		Refer to Appendix U to create softlink of Comagent.

6.
☐
	Server CLI: Restore the full DB run environment	Execute the backout_restore utility to restore the full database run environment:
		`$ sudo /var/tmp/backout_restore`
		If asked to proceed, answer **y**.
		Note: In some incremental upgrade scenarios, the backout_restore file is not found in the **/var/tmp** directory, resulting in the following error message:
		`/var/tmp/backout_restore: No such file or directory`
		If this message occurs, copy the file from **/usr/TKLC/appworks/sbin to /var/tmp** and repeat sub-step 1.
		The backout_restore command creates a no-hang-up shell session, so the command continues to execute if the user session is lost.
		If the restore was successful, the following displays:
		`Success: Full restore of COMCOL run env has completed.`
		`Return to the backout procedure document for further instruction.`
		If an error is encountered and reported by the utility, it is recommended to consult with My Oracle Support (MOS) by referring to Appendix CC of this document for further instructions.

7.
☐
	Server CLI: Verify the backout	1. Examine the output of the following commands to determine if any errors were reported:
		`$ sudo verifyUpgrade`
		Note: The verifyUpgrade command detected errors that occurred in the initial upgrade and during the backout. Disregard the initial upgrade errors.
		Note: Disregard the **TKLCplat.sh** error:
		`[root@NO1 ~]# verifyUpgrade`

Step#	Procedure	Description

		ERROR: TKLCplat.sh is required by upgrade.sh!
		ERROR: Could not load shell library!
		ERROR: LIB: /var/TKLC/log/upgrade/verifyUpgrade/upgrade.sh
		ERROR: RC: 1
		Also, Disregard following error and the missing file error
		ERROR: Upgrade log (/var/TKLC/log/upgrade/upgrade.log) reports errors!
		ERROR: 1513202476::zip error: Nothing to do!
		(/usr/share/tomcat6/webapps/ohw.war)
		ERROR: Missing files found during the RPM verification!
		ERROR: Missing Files:
		0:TKLCcapm-plugin-perlscript-8.x.x-8.x.x.x.x_88.x.x: /usr/TKLC/capm/prod/plugins/lib/perl/UserDefined
		This command displays the current sw rev on the server:
		$ appRev
		Install Time: Wed Apr 4 05:03:13 2018
		Product Name: DSR
		Product Release: 8.4.0.0.0_84.5.0
		Base Distro Product: TPD
		Base Distro Release: 7.5.0.0.0_88.46.0
		Base Distro ISO: TPD.install-7.5.0.0.0_88.46.0-OracleLinux6.9-x86_64.iso
		ISO name: DSR-8.4.0.0.0_84.5.0-x86_64.iso
		OS: OracleLinux 6.9
		2. Enter this command
		$ sudo verifyBackout
		The verifyBackout command searches the upgrade log and report all errors found.
		3. If the backout was successful (no errors or failures reported), then proceed to step 8.
		4. If the backout failed with the following error, this error can be ignored and the backout may continue.
		ERROR: Upgrade log (/var/TKLC/log/upgrade/upgrade.log) reports errors!
		ERROR: 1485165801::ERROR: <rpm name>-7.2.14-7.2.0.0.0_72.23.0: Failure running
		command '/usr/TKLC/appworks/bin/eclipseHelp reconfig'
		Also, Disregard following error and the missing file error
		ERROR: Upgrade log (/var/TKLC/log/upgrade/upgrade.log) reports errors!
		ERROR: 1513202476::zip error: Nothing to do!
		(/usr/share/tomcat6/webapps/ohw.war)
		ERROR: Missing files found during the RPM verification!

Step#	Procedure	Description
		ERROR: Missing Files: 0:TKLCcapm-plugin-perlscript-8.x.x-8.x.x.x.x_88.x.x: /usr/TKLC/capm/prod/plugins/lib/perl/UserDefined 5. If the backout failed with the following error, refer to BB.7 for the workaround: Running /usr/TKLC/plat/bin/service_conf reconfig ERROR: Partially installed package was found: ERROR: TKLCdsr.x86_64 ERROR: Partial packages exist! ERROR: Partial packages must be fixed before re-trying an upgrade! Remove isometadata (appRev) file from upgrade Restore original initrd images Reverting platform revision file RCS_VERSION=1.12 ERROR: Backing out changes from BACKOUT_SERVER on backwards... ERROR: Backout was unsuccessful!!! ERROR: Trouble when running backout command! ERROR: CMD: /var/TKLC/backout/ugwrap --backout ERROR: Failed to reject upgrade. Rebuilding RPM database. This may take a moment... rpmdb_load: /var/lib/rpm/Packages: unexpected file type or format Cleaning up chroot environment... Stopping remoteExec background process Shutting down /var/TKLC/backout/remoteExec... /usr/TKLC/plat/sbin/savelogs_plat logs: 1530516317::ERROR: TKLCdpi-8.0.33-8.0.1.0.0_80.28.0: Adding the DSR helpset failed! 1530516320::error: %post(TKLCdpi-0:8.0.33-8.0.1.0.0_80.28.0.x86_64) scriptlet failed, exit status 1 6. If the backout failed with the following error:

Step#	Procedure	Description
		`ERROR: The upgrade log does not exist!` Examine the upgrade log at **/var/TKLC/log/upgrade/upgrade.log** for errors that occurred during the backout. 7. If the backout failed due to errors found in the upgrade log, it is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document for further instructions.
8. ☐	**Server CLI**: Reboot the server	Enter this command to reboot the server: `$ sudo init 6` This step can take several minutes.

9.
☐
	Server CLI: Verify OAM services restart (NOAM/SOAM only)	**If the server being backed out is a NOAM or SOAM, perform this step; otherwise proceed to step 10.**
		1. Wait several (approximately 6 minutes) minutes for a reboot to complete before attempting to log back into the server.
		2. SSH to the server and log in.
		`login as: admusr`
		`password: <enter password>`
		3. Execute the following command to verify the httpd service is running.
		`$ sudo service httpd status`
		The expected output displays httpd is running (the process IDs are variable so the list of numbers can be ignored):
		`httpd <process IDs will be listed here> is running...`
		If httpd is not running, repeat sub-steps 3 for a few minutes. If httpd is still not running after 3 minutes, then services have failed to restart. It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document for further instructions.

10.
☐
	Server CLI: Change the ownership of the **id_dsa** file	Verify if the **id_dsa** file has the required ownership:
		1. Check the ownership of the file:
		`ls -ltr /home/awadmin/.ssh/`
		The file permission should be defined as below:
		`[admusr@HPC-NO1 ~]$ sudo ls -lrt /home/awadmin/.ssh/`
		`total 20`
		`-rw------- 1 awadmin awadm 1281 Sep 27 16:19 config`
		`-rw-r----- 1 awadmin awadm 605 Nov 18 13:20 id_dsa.pub`
		`-rw------- 1 awadmin awadm 668 Nov 18 13:20 id_dsa`
		`-rw------- 1 awadmin awadm 7275 Nov 18 18:09 authorized_keys`
		If the file ownership is set as awadmin awadm, skip step 2 and 3.
		2. If the file ownership is not set as **awadmin awadm**, then change the permission:
		`sudo chown awadmin:awadm /home/awadmin/.ssh/id_dsa`
		3. Repeat step 1 to verify.

Step#	Procedure	Description
11. ☐	**Active NOAM VIP**: Verify server state is correct after back out	1. Navigate to **Administration > Software Management > Upgrade** to observe the server status. 2. Select the SOAM Server Group tab of the site being backed out. 3. Select the link of the server group containing the server being backed out. If the server status is **Not Ready**, proceed to step 12. ; otherwise, proceed to step 13.
12. ☐	**Active NOAM VIP**: Change/Correct the Upgrade State on backed out server to **Ready**	1. Navigate to **Status & Manage > HA**. 2. Click **Edit**. 3. Select the backed out server and choose a Max Allowed HA Role value of **Active** (unless it is a Query server, in which case the value should remain set to **Observer**). 4. Click **OK**. 5. Verify the Max Allowed HA Role is set to the desired value for the server on the HA Status screen. 6. Navigate to **Status & Manage > Server.** 7. Select the server being backed out and click **Restart**. 8. Click **OK** to confirm the operation. 9. Verify the Appl State updates to **Enabled**. 10. Navigate to **Administration > Software Management > Upgrade**. 11. Select the tab of the server group containing the server to be backed out. 12. Verify the Upgrade State is now **Ready**. It may take a couple minutes for the grid to update.
13. ☐	**Active NOAM VIP**: Verify application version is correct for the backed out server	1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM tab of the site being backed out. 3. Select the link of the server group containing the server that was backed out. 4. Verify the **Application Version** value for this server has been downgraded to the original release version.
14. ☐	Additional Backout steps	Backout procedure is not completed yet. Some more steps need to be executed for NOAM, SOAM and SBR server(s) to support backout for major upgrade paths. Following are the details of additional procedures: • Execute Appendix Q Additional Backout Steps for OAM servers only when the target backout release is 8.1 or lower. • Execute Appendix S for SBR servers only when the target backout release is 8.1 or lower. • Refer to Appendix U to create Comagent link. The single server backout is now complete. Return to the overall DSR backout procedure step that directed the execution of this procedure.

6.7 Backout Multiple Servers

This section provides the procedures to backout the application software on multiple servers.

CAUTION

This procedure is executed as a component of the Emergency Backout Procedure (Section 6.4) or the Normal Backout Procedure (Section 6.5). This procedure should never be executed as a standalone procedure.

Procedure 40. Backout Multiple Servers

Step#	Procedure	Description
This procedure backs out the upgrade of DSR 8.4 application software for multiple servers. Any server requiring backout can be included: DA-MPs, IPFEs, and SBRs. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Prepare the server for backout	1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM Server group tab of the site being backed out. 3. Select the server group link containing the server to be backed out. 4. Verify the Upgrade State is **Accept or Reject**. Make the server **Backout Ready** as follows: 5. Navigate to **Status & Manage > HA**. 6. Click **Edit**. 7. Select the server to be backed out and choose a Max Allowed HA Role value as Standby (unless it is a Query server, in which case the value should remain set to Observer). ***Note***: When the active NOAM is the server being backed out, click **OK** to initiate an HA switchover and cause the GUI session to log out. 8. Click **OK**. 9. Verify the Max Allowed HA Role is set to the desired value for the server on the HA Status screen. 10. Navigate to **Status & Manage > Server**. 11. Select the server to back out and click Stop. 12. Click **OK** to confirm the operation and verify the Appl State changes to **Disabled**. 13. Navigate to **Administration > Software Management > Upgrade**. 14. Select the SOAM Server Group tab of the site being backed out. 15. Select the link of the server group containing the server to be backed out. Verify the Upgrade State is now **Backout Ready**. ***Note***: It may take a couple of minutes for the status to update.

Step#	Procedure	Description

2.
☐
	Server CLI:
	Log into the server(s)
		Use an SSH client to connect to the server under backout (for example, ssh, putty):
		`ssh admusr@<server address>`
		`password:  <enter password>`
		Note: If direct access to the IMI is not available, then access the target server using a connection through the active NOAM. SSH to the active NOAM XMI first. From there, SSH to the target server's IMI address.

3.
☐
	Server CLI:
	Execute the backout
		Determine the state of the server to be backed out. The server role must be either **Standby** or **Spare**.
		Execute following command to find the server role :
		`$ ha.mystate`
		In this example output, the HA state is **Standby**.
		`[admusr@E1B581DAMP1 ~]$ ha.mystate`
		`resourceId role node DC subResources lastUpdate`
		`DbReplication Stb/Stb C2016.086 * 0 170915:023010.572`
		`VIP Stb/Stb C2016.086 * 0 170915:023010.530`
		`CacdProcessRes Stb/OOS C2016.086 * 0 170915:023010.530`
		`DA_MP_Leader Act/OOS C2016.086 * 0 170915:023010.932`
		`DSR_SLDB OOS/OOS C2016.086 * 1-63 170913:121610.839`
		`DSR_SLDB Act/OOS C2016.086 * 0 170915:023010.934`
		`VIP_DA_MP OOS/OOS C2016.086 * 1-63 170913:121610.840`
		`VIP_DA_MP Act/OOS C2016.086 * 0 170915:023010.933`
		`EXGSTACK_Process OOS/OOS C2016.086 * 1-63 170913:121610.841`
		`EXGSTACK_Process Act/OOS C2016.086 * 0 170915:023010.933`
		`DSR_Process OOS/OOS C2016.086 * 1-63 170913:121610.841`
		`DSR_Process Act/OOS C2016.086 * 0 170915:023010.932`
		`CAPM_HELP_Proc Stb/OOS C2016.086 * 0 170915:023010.530`
		`DSROAM_Proc Stb/OOS C2016.086 * 0 170915:023010.530`
		`CAPM_PSFS_Proc Stb/Stb C2016.086 * 0 170915:023010.530`
		If the state of the server is **Act**, then return to step 1.
		Execute the **reject** command to initiate the backout:
		`$ sudo /var/TKLC/backout/reject`
		Note: If back out asks to continue, answer y.
		The reject command creates a no-hang-up shell session, so the command continues to execute if the user session is lost.
		Sample output of the reject script:
		`Applications Enabled.`
		`Running /usr/TKLC/plat/bin/service_conf reconfig`
		`Remove isometadata (appRev) file from upgrade`
		`Reverting platform revision file`
		`RCS_VERSION=1.4`
		`Creating boot script: /etc/rc3.d/S89backout`
		`Rebuilding RPM database. This may take a moment...`
		`rpmdb_load: /var/lib/rpm/Packages: unexpected file type or format`
		`Cleaning up chroot environment...`
		`A reboot of the server is required.`
		`The server will be rebooted in 10 seconds`

4. ☐	**Server CLI**: Backout proceeds	Many informational messages display to the terminal screen as the backout proceeds. After backout is complete, the server automatically reboots.

Step#	Procedure	Description
5. ☐	Repeat for each server to be backed out	Repeat steps 1 through 4 for each server to be backed out.

6.
☐
	Server CLI: Log into the server	Use an SSH client to connect to the server under backout (for example, ssh, putty):
		`ssh admusr@<server address>`
		`password:  <enter password>`

7.
☐
	Server CLI: Restore the full DB run environment	Execute the backout_restore utility to restore the full database run environment:
		`$ sudo /var/tmp/backout_restore`
		If asked to proceed, answer **y**.
		Note: In some incremental upgrade scenarios, the backout_restore file is not found in the **/var/tmp** directory, resulting in the following error message:
		`/var/tmp/backout_restore: No such file or directory`
		If this message occurs, copy the file from **/usr/TKLC/appworks/**sbin to **/var/tmp** and repeat sub-step `backout_restore` again.
		The backout_restore command creates a no-hang-up shell session, so the command continues to execute if the user session is lost.
		If the restore was successful, the following displays:
		`Success: Full restore of COMCOL run env has completed.`
		`Return to the backout procedure document for further instruction.`
		If an error is encountered and reported by the utility, it is recommended to consult with My Oracle Support (MOS) by referring to Appendix CC of this document for further instructions.

8.
☐
	Server CLI: Verify the backout	1. Examine the output of the following commands to determine if any errors were reported:
		`$ sudo verifyUpgrade`
		Note: The verifyUpgrade command detected errors that occurred in the initial upgrade and during the backout. Disregard the initial upgrade errors.
		Note: Disregard the **TKLCplat.sh** error:
		`[root@NO1 ~]# verifyUpgrade`
		`ERROR: TKLCplat.sh is required by upgrade.sh!`
		`ERROR: Could not load shell library!`
		`ERROR: LIB: /var/TKLC/log/upgrade/verifyUpgrade/upgrade.sh`
		`ERROR:  RC: 1`
		`Also, Disregard following error and the missing file error`
		`ERROR: Upgrade log (/var/TKLC/log/upgrade/upgrade.log) reports errors!`

Step#	Procedure	Description

		`ERROR: 1513202476::zip error: Nothing to do!`
		`(/usr/share/tomcat6/webapps/ohw.war)`
		`ERROR: Missing files found during the RPM verification!`
		`ERROR: Missing Files:`
		`0:TKLCcapm-plugin-perlscript-8.x.x-8.x.x.x.x_88.x.x: /usr/TKLC/capm/prod/plugins/lib/perl/UserDefined`
		This command displays the current sw rev on the server:
		`$ appRev`
		`[admusr@E1B581DAMP1 ~]$ appRev`
		
		`Install Time: Wed Apr  4 05:03:13 2018`
		`Product Name: DSR`
		`Product Release: 8.4.0.0.0_84.5.0`
		`Base Distro Product: TPD`
		`Base Distro Release: 7.5.0.0.0_88.46.0`
		`Base Distro ISO: TPD.install-7.5.0.0.0_88.46.0-OracleLinux6.9-x86_64.iso`
		`ISO name: DSR-8.4.0.0.0_84.5.0-x86_64.iso`
		`OS: OracleLinux 6.9`
		2. Enter this command:
		`$ sudo verifyBackout`
		The verifyBackout command searches the upgrade log and reports all errors found.
		3. If the backout was successful (no errors or failures reported), then proceed to step 9.
		4. If the backout failed with the following error, this error can be ignored and the backout may continue.
		`ERROR: Upgrade log (/var/TKLC/log/upgrade/upgrade.log) reports errors!`
		`ERROR: 1485165801::ERROR: <rpm name>-7.2.14-7.2.0.0.0_72.23.0: Failure running`
		`command '/usr/TKLC/appworks/bin/eclipseHelp reconfig'`
		`Also, Disregard following error and the missing file error`
		`ERROR: Upgrade log (/var/TKLC/log/upgrade/upgrade.log) reports errors!`
		`ERROR: 1513202476::zip error: Nothing to do!`
		`ERROR: Missing files found during the RPM verification!`
		`ERROR: Missing Files:`
		`0:TKLCcapm-plugin-perlscript-8.x.x-8.x.x.x.x_88.x.x: /usr/TKLC/capm/prod/plugins/lib/perl/UserDefined`

Step#	Procedure	Description
		5. `(/usr/share/tomcat6/webapps/ohw.war)` If the backout failed with the following error: `ERROR: The upgrade log does not exist!` Examine the upgrade log at **/var/TKLC/log/upgrade/upgrade.log** for errors that occurred during the backout. 6. If the backout failed due to errors found in the upgrade log, it is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document for further instructions.
9. ☐	**Server CLI**: Reboot the server	Enter the following command to reboot the server: `$ sudo init 6` This step can take several minutes.

10.
☐
	Server CLI: Verify OAM services restart (NOAM/SOAM only)	**If the server being backed out is a NOAM or SOAM, perform this step; otherwise proceed to step 11.**
		Refer to Appendix U to create softlink of Comagent.
		1. Wait several (approximately 6 minutes) minutes for a reboot to complete before attempting to log back into the server.
		2. SSH to the server and log in.
		`login as: admusr`
		`password: <enter password>`
		3. Execute the following command to verify the httpd service is running.
		`$ sudo service httpd status`
		The expected output displays httpd is running (the process IDs are variable so the list of numbers can be ignored):
		`httpd <process IDs will be listed here> is running...`
		If httpd is not running, repeat sub-steps 3 and 4 for a few minutes. If httpd is still not running after 3 minutes, then services have failed to restart. It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document for further instructions.

11.
☐
	Server CLI: Change the ownership of the **id_dsa** file	Verify if the**id_dsa** file has the required ownership:
		1. Check the ownership of the file:
		`ls -ltr /home/awadmin/.ssh/`
		The file permission should be defined as below:
		`[admusr@HPC-NO1 ~]$ sudo ls -lrt /home/awadmin/.ssh/`
		`total 20`
		`-rw------- 1 awadmin awadm 1281 Sep 27 16:19 config`
		`-rw-r----- 1 awadmin awadm 605 Nov 18 13:20 id_dsa.pub`
		`-rw------- 1 awadmin awadm 668 Nov 18 13:20 id_dsa`
		`-rw------- 1 awadmin awadm 7275 Nov 18 18:09 authorized_keys`
		If the file ownership is set as awadmin awadm, skip step 2 and 3.
		2. If the file ownership is not set as **awadmin awadm**, then change the permission:
		`sudo chown awadmin:awadm /home/awadmin/.ssh/id_dsa`
		3. Repeat step 1 to verify.

Step#	Procedure	Description
12. ☐	Additional backout steps	Backout procedure is not completed yet. Execute Appendix Q Additional Backout Steps to back out major upgrade paths. ***Note***: This procedure is required only for 8.1/8.0 backout.
13. ☐	Repeat for each server backed out	Repeat steps 6. through 12. for each server to be backed out.
14. ☐	**Active NOAM VIP**: Verify server state is correct after back out	1. Navigate to **Administration > Software Management > Upgrade** to observe the server upgrade status. 2. If the server status is **Not Ready**, continue to step 15. ; otherwise, proceed to step 16.
15. ☐	**Active NOAM VIP**: Change/Correct the Upgrade State on backed out server to **Ready**	1. Navigate to **Status & Manage > HA**. 2. Click **Edit**. 3. Select the backed out server and choose a Max Allowed HA Role value of **Active** (unless it is a Query server, in which case the value should remain set to **Observer**). 4. Click **OK**. 5. Verify the Max Allowed HA Role is set to the desired value for the server on the HA Status screen. 6. Navigate to **Status & Manage > Server.** 7. Select the server being backed out and click **Restart**. 8. Click **OK** to confirm the operation. 9. Verify the Appl State updates to **Enabled**. 10. Navigate to **Administration > Software Management > Upgrade**. 11. Select the tab of the server group containing the server to be backed out. 12. Verify the Upgrade State is now **Ready**. It may take a couple minutes for the grid to update.
16. ☐	**Active NOAM VIP**: Verify application version is correct for the backed out server	1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the SOAM server group tab of the site being backed out. 3. Select the link of the server group containing the server that was backed out. 4. Verify the **Application Version** value for this server has been downgraded to the original release version. The multiple server backout is now complete.

6.8 Post-Backout Health Check

This procedure is used to determine the health and status of the DSR network and servers following the backout of the entire system.

Procedure 41. Post-Backout Health Check

Step#	Procedure	Description
This procedure performs a basic Health Check of the DSR to verify the health of the system following a backout. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Verify server status is normal	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Server**. 3. Verify Server Status is Normal (Norm) for Alarm (Alm), Database (DB) and Processes (Proc). 4. Do not proceed with the upgrade if any server status is not **Norm**. 5. Do not proceed with the upgrade if there are any Major or Critical alarms. Refer to Appendix P for details. ***Note***: It is recommended to troubleshoot if any server status is not Norm. A backout should return the servers to their pre-upgrade status.
2. ☐	**Active NOAM VIP**: Log all current alarms in the system	1. Navigate to **Alarms & Events > View Active**. 2. Click **Report** to generate an Alarms report. 3. Save the report and print the report. Keep these copies for future reference.

6.9 IDIH Backout

The procedures in this section back out the Oracle, Application, and Mediation servers to the previous release.

6.9.1 Oracle Server Backout

Backout of Oracle Server is not supported after release 7.1.

The Oracle server is backed out using the disaster recovery procedure documented in [10].

6.9.2 Mediation and Application Server Backout

The Mediation and Application servers are backed out using the disaster recovery procedure documented in [10].

Appendix A. Post Upgrade Procedures

Execute the procedures in this section only **AFTER** the upgrade of **ALL** servers in the topology is completed.

A.1. Accept the Upgrade

Detailed steps for accepting the upgrade are provided in the procedure. TPD requires that upgrades be accepted or rejected before any subsequent upgrades may be performed. **Alarm 32532 Server Upgrade Pending Accept/Reject** displays for each server until one of these two actions is performed.

An upgrade should be accepted only after it is determined to be successful as the Accept is final. This frees up file storage but prevents a backout from the previous upgrade.

Note: Once the upgrade is accepted for a server, that server is not allowed to backout to a previous release.

Note: This procedure must be performed in a Maintenance Window.

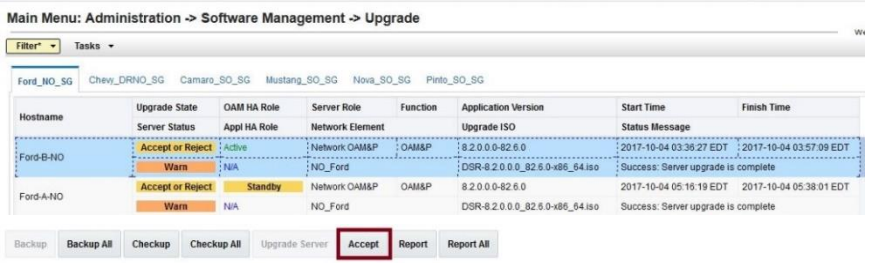
!!WARNING!!

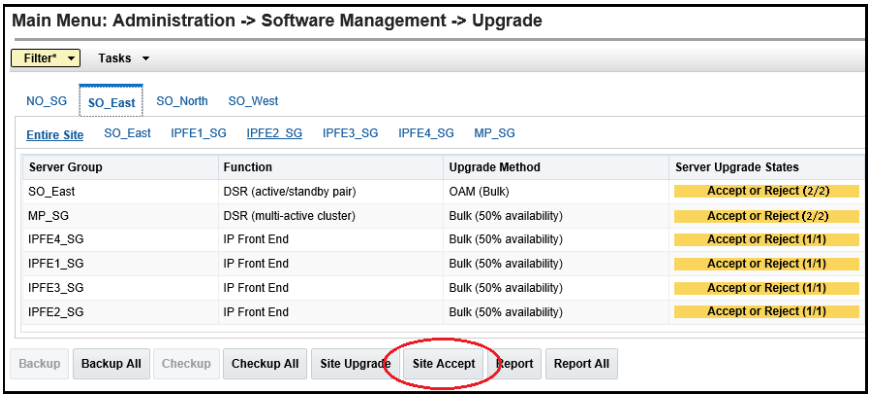
Upgrade acceptance may only be executed with authorization from the customer.

Be advised that once an upgrade has been accepted, it is not possible to back out to the previous release.

Procedure 42. Accept the Upgrade

Step#	Procedure	Description
This procedure accepts a successful upgrade. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	It is recommended that this procedure be performed two weeks after the upgrade	Verify the upgraded system has been stable for two weeks or more. ***Note***: It is not possible to back out after this is procedure is executed.
2. ☐	**Active NOAM VIP**: Execute this step if accepting a NOAM server. Log all current alarms present at the NOAM.	Log all alarms before accepting the NOAM upgrade. 1. Log into the NOAM GUI. 2. Navigate to **Alarms & Events > View Active**. 3. Click **Report** to generate an Alarms report. 4. Save the report and/or print the report. Keep these copies for future reference. All other upgraded servers have the following expected alarm: **Alarm ID = 32532 (Server Upgrade Pending Accept/Reject)**
3. ☐	**Active SOAM VIP**: Execute this step if accepting a SOAM server. Log all current alarms present at the SOAM.	Log all alarms before accepting the SOAM upgrade. 1. Log into the SOAM GUI. 2. Navigate to **Alarms & Events > View Active**. 3. Click **Report** to generate an Alarms report. 4. Save the report and/or print the report. Keep these copies for future reference. All other upgraded servers have the following expected alarm: **Alarm ID = 32532 (Server Upgrade Pending Accept/Reject)**

Step#	Procedure	Description
4. ☐	**Active NOAM VIP**: Accept upgrade on NOAM servers	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration > Software Management > Upgrade**. 3. Select the NOAM server group tab. 4. Select the NOAM server and click **Accept**.  **WARNING**: Accepting the upgrade may take several minutes depending on the servers in the network. Be patient and DO NOT TRY to accept the site again since this results in different accept states on the Server Upgrade States column on the Upgrade Administration screen. Repeat this step on all NOAM servers one by one.

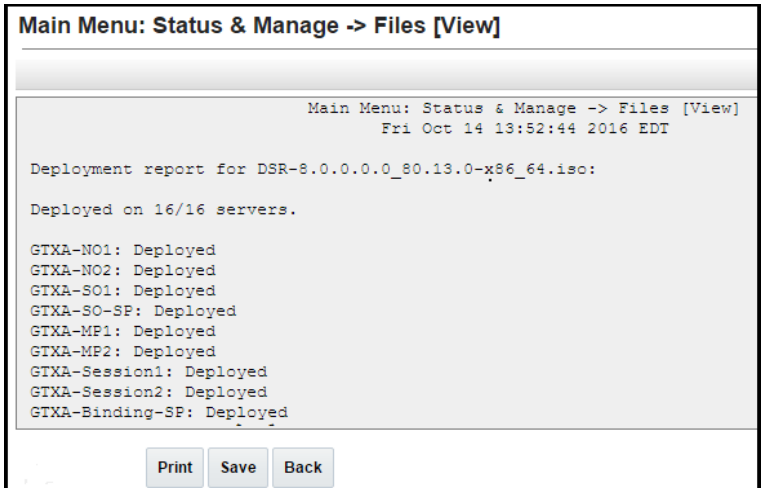
Step#	Procedure	Description
5. ☐	**Active NOAM VIP**: Accept upgrade for multiple servers	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration > Software Management > Upgrade**. 3. Select the SOAM tab of the site being upgraded. ***Note***: The **Site Accept** button accepts the upgrade for every upgraded server at the selected site. This is the most efficient way to accept an upgrade. A manual alternative to this is to select the link of each server group in the site and use the **Accept** button to accept the upgrade of only the servers in the selected server group. 4. Click **Site Accept**.  A confirmation screen warns that once the server is accepted it is not able to revert back to the previous image state. 5. Click **OK**. **WARNING**: Accepting the upgrade may take several minutes depending on the servers in the network. Be patient and DO NOT TRY to accept the site again since this results in different accept states on the Server Upgrade States column on the Upgrade Administration screen. 6. Navigate to **Alarms & Events > View Active**. As upgrade is accepted on each server, the corresponding **Alarm ID – 32532 (Server Upgrade Pending Accept/Reject)** should automatically clear and server status transitions to **Backup Needed**.

A.2. Undeploy ISO

This procedure is run after the upgrade has been accepted to undeploy all deployed ISOs. When an ISO is undeployed, the ISO is deleted from all servers in the topology except for the active NOAM. On the active NOAM, the ISO remains in the File Management Area.

This procedure can be run at any time after the upgrade has been accepted.

Procedure 43. Undeploy ISO

Step#	Procedure	Description
This procedure undeploy an ISO from the DSR servers. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: View the files in the file management area	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Files**.
2. ☐	**Active NOAM VIP**: Start ISO undeploy sequence	1. Select an ISO stored in the isos directory of the File Management Area. The ISO filename has the format: `isos/DSR-8.0.0.0.0_80.12.0-x86_64.iso` 2. Click **Undeploy ISO**. 3. Click **OK** on the confirmation screen to start the undeploy sequence.
3. ☐	**Active NOAM VIP**: Monitor the ISO undeploy progress	1. Select the ISO being undeployed in step 2. 2. Click **View ISO Deployment Report**. 3. If some servers show the ISO as **Deployed**, click **Back** on the Files View screen. 4. Periodically repeat sub-steps 1 through 3 until all servers indicate **Not Deployed**. 

Step#	Procedure	Description
4. ☐	**Active NOAM VIP**: Repeat as necessary	If there are additional ISOs in the File Management Area that need to be undeployed, repeat steps 2 and 3 as necessary.

A.3. Post Upgrade Procedures

The procedures in this section are executed after the upgrade has been accepted.

Procedure 44. PCA Post Upgrade Procedure

Step#	Procedure	Description
This procedure performs miscellaneous actions that are required to be executed after the upgrade is accepted. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1. ☐	**Active NOAM CLI**: Reset COMCOL compatibility flag	**This step is required only if the source release is pre-8.0.**
		1. Use an SSH client to connect to the active NOAM:
		`ssh <NOAM XMI IP address>`
		`login as: admusr`
		`password: <enter password>`
		Note: The static XMI IP address for each server should be available in Table 5.
		2. Enter this command to reset the COMCOL backward compatibility flag. Backward compatibility is no longer required when all of the servers in the topology have been upgraded to release 8.0 or later.
		`$ iset -fvalue=0 LongParam where "name='cm.cm6compat'"`
		Sample output:
		`=== changed 1 records ===`
		3. Verify the changed value:
		`$ iqt -zp -fvalue LongParam where "name='cm.cm6compat'"`
		`value`
		`0`

Appendix B. Increase Maximum Number of Open Files

This procedure increases the maximum number of files that can be opened for reading and writing. As the number of servers in the topology grows, so does the need for additional files to handle merging data to the NOAM. This procedure checks the number of files currently in use, and, if necessary, increases the maximum number of open files.

Note: This procedure is for one NOAM server. Repeat this procedure for other NOAM servers.

Procedure 45. Increase Maximum Number of Open Files

Step#	Procedure	Description
This procedure checks the number of files currently in use, and, if necessary, increases the maximum number of open files. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Active NOAM CLI:
	Determine the number of files currently open
		1. Use an SSH client to connect to the active NOAM.
		`ssh <NOAM XMI IP address>`
		`login as: admusr`
		`password: <enter password>`
		Note: The static XMI IP address for each server should be available in Table 5.
		2. Enter the following command to retrieve the pid of idbsvc. The pid is highlighted in this sample output:
		`$ ps -ef | grep -i idbsvc`
		`root 4369 idbsvc Up 03/01 13:03:28 1 idbsvc -M10 -ME204 -D40 -DE820 -W1 -S2`
		3. The number of open files is output with the 'lsof' command. Use the highlighted value from sub-step 2 in place of XXXX in the lsof command.
		`$ sudo lsof -p XXXX | wc -l`
		`1278`
		4. Record the number of files currently open (the output of sub-step 3):
		_____
		5. Enter the following command to retrieve the pid of tpdProvd. The pid is highlighted in this sample output:
		`$ ps -ef | grep -i tpdProvd`
		`tpdProvd 347635 1 0 06:09 ? 00:00:11 /usr/TKLC/plat/bin/tpdProvd`
		6. The number of open files is output with the 'lsof' command. Use the highlighted value from sub-step 4 in place of XXXX in the lsof command.
		`$ sudo lsof -p XXXX | wc -l`
		`1280`
		7. Record the number of files currently open (the output of sub-step 5):
		_____

Step#	Procedure	Description

2.
☐
	Active NOAM CLI:
	Maximum number of open files
		Display the maximum number of open files for idbsvc.
		1. Use the highlighted value from step 1, sub-step 2 in place of XXXX in the cat command.
		`$ sudo cat /proc/XXXX/limits | grep -i open`
		`Max open files  32768  32768  files`
		The output of the cat command displays the maximum number of files that can be open by the idbsvc process. Record both values here:
		Soft Limit (1st value): _____ Hard Limit (2nd value): _____
		Display the maximum number of open files for tpdProvd.
		2. Use the highlighted value from step 1, sub-step 4 for tpdProvd in place of XXXX in the cat command.
		`$ sudo cat /proc/XXXX/limits | grep -i open`
		`Max open files  1024  4096  files`
		The output of the cat command displays the maximum number of files that can be open by the tpdProvd process. Record both values here:
		Soft Limit (1st value): _____ Hard Limit (2nd value): _____

3. ☐	Make sure the current number of open files used by idbsvc in in the safe limit	If the number of currently open files (step 1, sub-step 3) of idbsvc is less than the maximum allowed (step 2, sub-step 2 Soft Limit for tpdProvd), this procedure is complete, for example, number of currently open files (used by idbsvc) is less than 1024. Further steps are not required to be executed on this NOAM server. If the number of currently open files is more than the maximum allowed (step 2, sub-step 2 Soft Limit for tpdProvd), for example, 1024, go to step 5. Repeat this procedure (if required) for other NOAM server.
4. ☐	Make sure the current number of open files used by tpdProvd in in the safe limit	If the maximum number of open files value (step 2, sub-step 2 - Soft Limit) for tpdProvd is already set to 32768, this procedure is complete. Further steps are not required to be executed on this NOAM server. If maximum value is not already set, then go to step 5. Repeat this procedure (if required) for other NOAM server.

Step#	Procedure	Description

5.
☐
	Active NOAM CLI: Increase max number of open files	1. Using a text editor with sudo, edit the file **/etc/init/tpdProvd.conf** to add these two lines just before the comment line in the file **/etc/init/tpdProvd.conf** that reads **Start the daemon**:
		`# increase open file limit`
		`limit nofile 32768 32768`
		Insight of file as example:
		`#`
		`# restart tpdProvd up to 10 times within a 100 second period.`
		`# If tpdProvd fails to start 10 times within a 100 second period then`
		`# it most likely has a deeper problem that restarting will not overcome.`
		`respawn limit 10 100`
		`# increase open file limit`
		`limit nofile 32768 32768`
		`#`
		`# Start the daemon`
		`script`
		2. Save the file and close the editor.
		Caution: Do not edit any other line in this file. You can back up the file, if required.

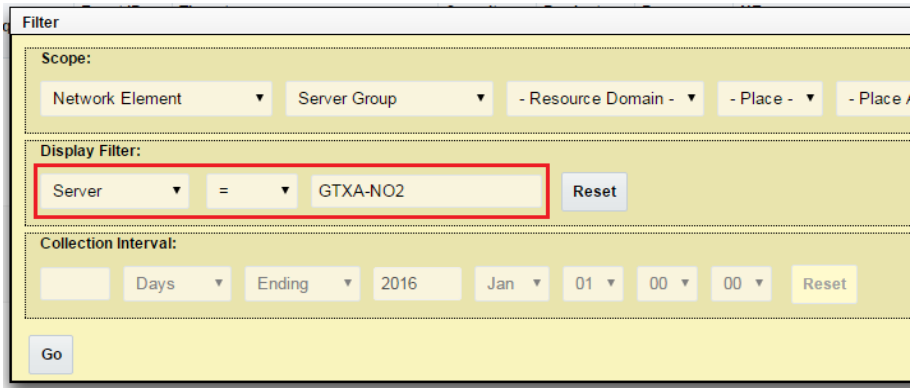
6.
☐
	Active NOAM CLI: Restart tpdProvd service	1. Enter this command to stop tpdProvd:
		`$ sudo initctl stop tpdProvd`
		2. Enter this command to restart tpdProvd:
		`$ sudo initctl start tpdProvd`
		Sample output:
		`tpdProvd start/running, procedd 186743`

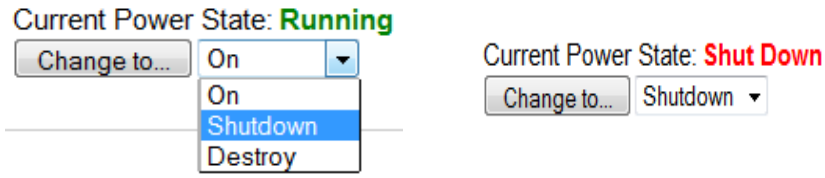
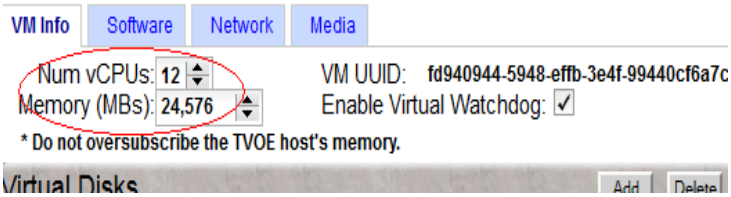
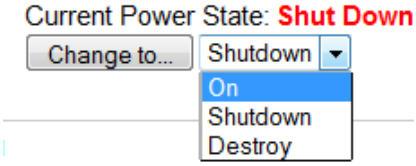
7.
☐
	Active NOAM CLI: Recheck open file maximum limit	1. Enter the following command to retrieve the pid of idbsvc. The pid is highlighted in this sample output:
		`$ ps -ef | grep -i idbsvc`
		`root 8670 idbsvc Up 03/01 13:03:28 1 idbsvc -M10 -ME204 -D40 -DE820 -W1 -S2`
		2. Use the highlighted value from sub-step 1in place of XXXX in the cat command.
		`$ sudo cat /proc/XXXX/limits | grep -i open`
		`Max open files 32768 32768 files`
		3. Verify the output of sub-step 2 indicates that the max number of open files is 32768. If the value is NOT 32768, it is recommended to contact My Oracle Support (MOS) per Appendix CC.

Appendix C. Update NOAM Guest VM Configuration

This procedure updates the VM configuration for NOAM guests hosted on an RMS. The new configuration increases the number of virtual CPUs and RAM available to the NOAMs to improve performance in high load conditions. This procedure should be executed only when the NOAM is virtualized on an RMS with no B-level or C-level servers.

Procedure 46. Update NOAM Guest VM Configuration

Step#	Procedure	Description
This procedure modifies the VM configuration for the NOAM guest. This procedure applies only to NOAMs hosted on an RMS. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**PMAC GUI**: Verify the VM configuration	1. Log into the PMAC GUI by navigating to http://<pmac_management_ip> 2. Navigate to **Main Menu > VM Management**. 3. Select the TVOE host that is hosting the NOAM VM to be upgraded. 4. Select the NOAM VM, which needs to be verified. 5. Make sure NOAM VM already has these values: Num vCPUs: **12** Memory (MBs): **24,576** If the values are correct, then this procedure is complete. 6. If the values are not correct, then proceed to the next step.
2. ☐	**Active NOAM VIP**: Log all current alarms for the standby NOAM	When the NOAM guest VM is shut down before updating the configuration, a number of alarms are generated by the event. Thus it is necessary to note any existing alarms for the server before the shutdown. 1. Navigate to **Alarms & Events > View Active**. 2. Select the **Filter** option. Select **Server = <StbyNOAM>** for the Display Filter, where <StbyNOAM> is the hostname of the standby NOAM. 3. Click **Go** to filter the alarms on the specified criteria. 4. Make note of all alarms that are displayed as a result of the applied filter. These should be the only alarms displayed once the VM is restarted. 

Step#	Procedure	Description
3. ☐	**PMAC GUI**: Edit the NOAM guest VM configuration	1. Log into the PMAC GUI by navigating to http ://<pmac_management_ip>. 2. Navigate to **Main Menu > VM Management.** 3. Select the TVOE host that is hosting the NOAM VM to be upgraded. 4. Select the NOAM VM to edit. 5. Change the power state of the guest VM from **Running** to **Shutdown** and click **Change to**. Confirm the pop-up and wait for the power state to change to Shutdown. This may take a few moments as this executes a graceful shutdown of the NOAM guest.  6. Click **Edit** near the bottom of the window. 7. Change the following guest configuration values from the current value to the values presented in bold: Num vCPUs: **12** Memory (MBs): **24,576**  **No other configuration values should be changed.** 8. Click **Save**. The GUI may gray out for a moment while the changes are committed.
4. ☐	**PMAC GUI**: Change/Modify the guest power state	Change the guest VM power state from **Shutdown** to **On** and click **Change to**. This restarts the VM. 

Step#	Procedure	Description
5. ☐	**Active NOAM VIP**: Monitor current alarms for the standby NOAM	Monitor the alarms for the standby NOAM until the alarm count is down to those that existed before the VM shutdown, as recorded in step 1. 1. Navigate to **Alarms & Events > View Active**. 2. From the **Filter** option, select **Server = <StbyNOAM>** for the **Display Filter**, where <StbyNOAM> is the hostname of the standby NOAM. 3. Click **Go** to filter the alarms on the specified criteria. 4. Monitor standby NOAM alarms.

Appendix D. Determine if TVOE Upgrade is Required

When upgrading a server that exists as a virtual guest on a TVOE host, it is first necessary to determine whether the TVOE host (that is, the bare-metal) server must be upgraded to a newer release of TVOE.

NOAM and SOAM servers are often implemented as TVOE guests in C-class deployments, so the TVOE upgrade check is necessary. DA-MPs are not implemented as TVOE guests in C-class deployments, so the TVOE upgrade check is not necessary when upgrading C-class DA-MPs.

When DSR is deployed in the VEDSR configuration, or on Rack Mounted Servers (RMSs), all servers are virtual guests, and the TVOE upgrade check is always required. However, DA-MPs are often deployed as guests on the same TVOE host as the OAM server(s), and so by the time the DA-MP servers are being upgraded, TVOE has already been upgraded and there is no need to do so again.

Procedure 47. Determine if TVOE Upgrade is Required

Step#	Procedure	Description
This procedure checks if TVOE upgrade is required. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	TVOE CLI: Determine the version of TVOE already running on the bare-metal server that hosts the virtual guest currently being upgraded	Log into the host server on which TVOE is installed.
		Execute the following command to get the current TVOE installed version :
		`# appRev`
		`Install Time: Wed Apr  4 05:03:13 2018`
		`Product Name: DSR`
		`Product Release: 8.4.0.0.0_84.5.0`
		`Base Distro Product: TPD`
		`Base Distro Release: 7.5.0.0.0_88.46.0`
		`Base Distro ISO: TPD.install-7.5.0.0.0_88.46.0-OracleLinux6.9-x86_64.iso`
		`ISO name: DSR-8.4.0.0.0_84.5.0-x86_64.iso`
		`OS: OracleLinux 6.9`

2. ☐	Check the TVOE release version required for target DSR release	It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document to determine the appropriate release version.

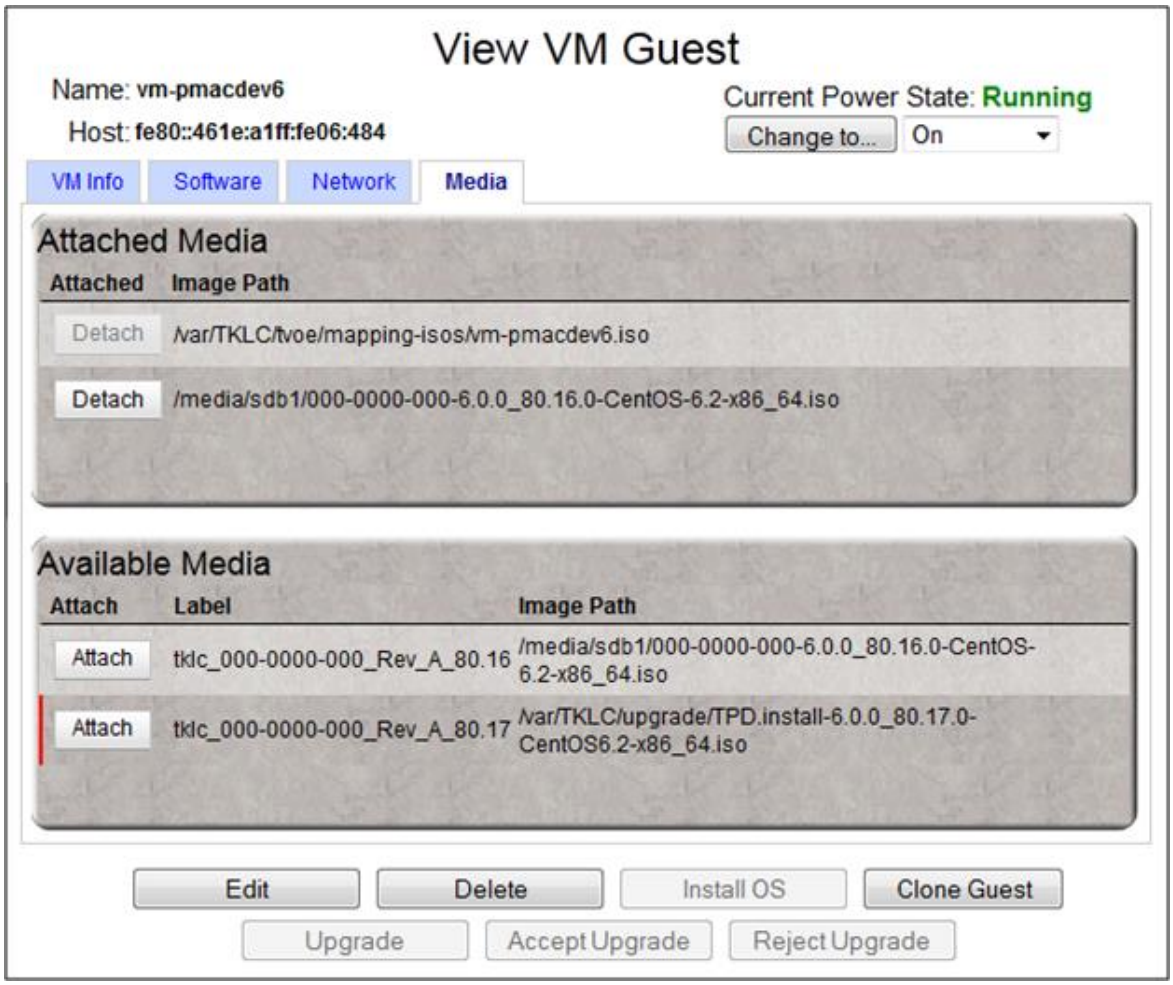
Step#	Procedure	Description
3. ☐	If the release in step 1 is less than what is required in step 2 then upgrade of TVOE is required	The procedure to upgrade TVOE on the host server is in Appendix J.

Appendix E. Add ISO Images to PMAC Image Repository

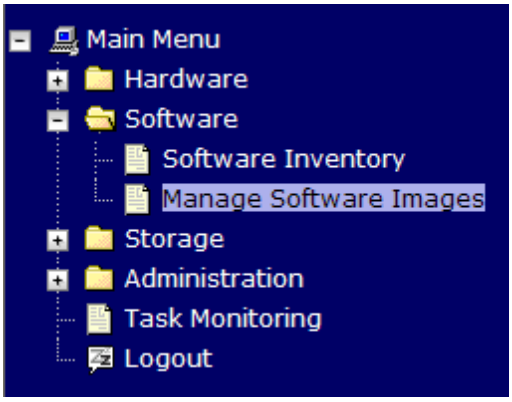
If the ISO image is delivered on optical media, or USB device, continue with step 1 of this Appendix; otherwise, if the ISO image was delivered to the PMAC using sftp, continue with step 5.

1. In the PMAC GUI, navigate to **Main Menu > VM Management.** In the VM Entities list, select the **PMAC Guest**. On the resulting View VM Guest page, select the Media tab.
2. Under the Media tab, find the ISO image in the Available Media list, and click **Attach**.

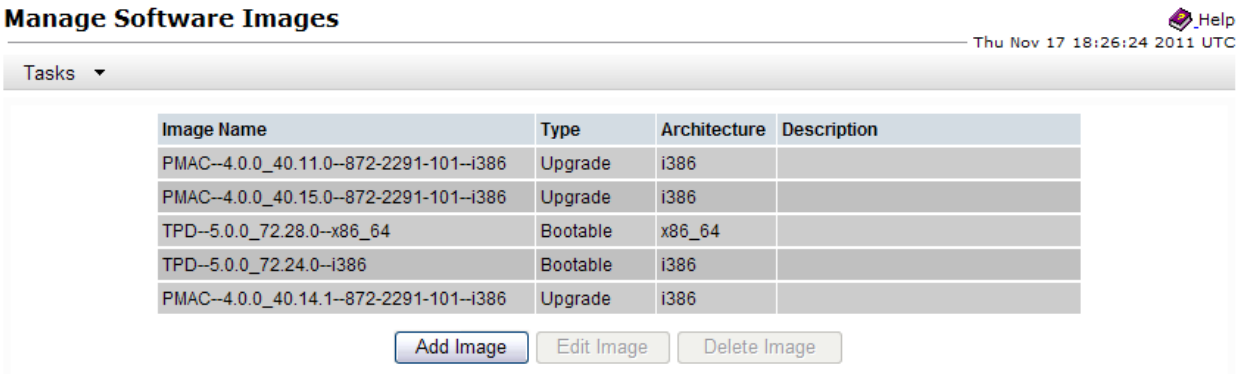
   After a pause, the image displays in the Attached Media list.



3. Navigate to **Software -> Manage Software Images**.

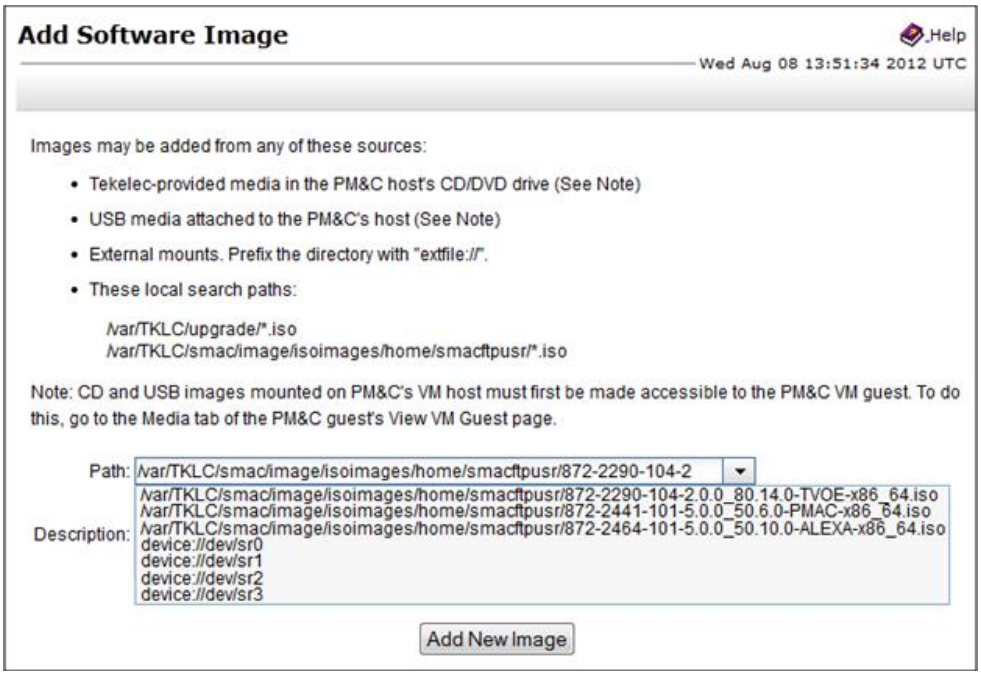


4. Click **Add Image**.

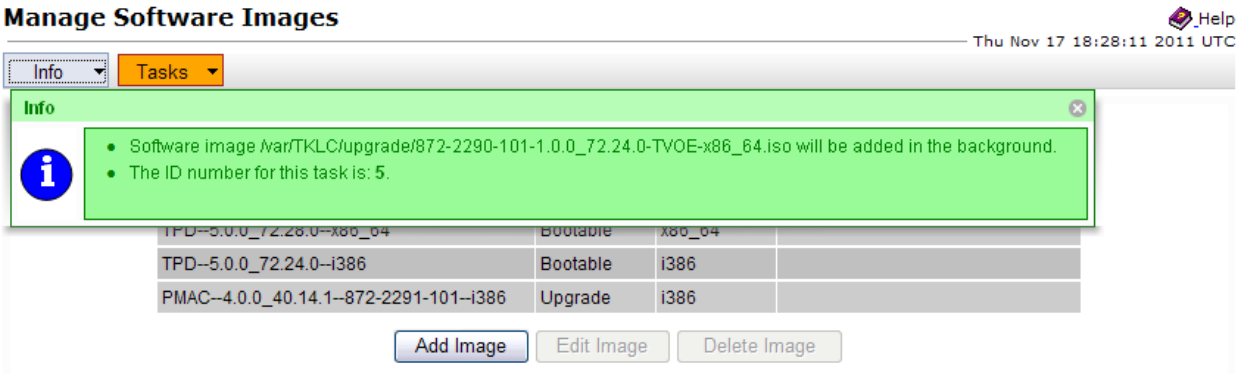


5. Select an image to add.

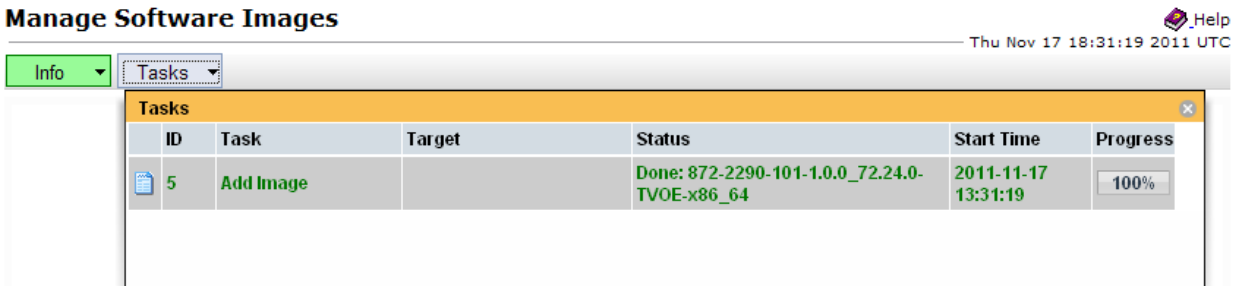
   - If the image was transferred to PMAC using sftp, it displays in the list as a local file **/var/TKLC/....**
   - If the image was supplied on a CD or a USB drive, it displays as a virtual device (**device://...**). These devices are assigned in numerical order as CD and USB images become available on the Management Server. The first virtual device is reserved for internal use by TVOE and PMAC; therefore, the ISO image of interest is normally present on the second device, **device://dev/sr1**. If one or more CD or USB-based images were already present on the Management Server before this procedure was started, choose a correspondingly higher device number. Enter an appropriate image description and click **Add New Image**.



The Manage Software Images page is then redisplayed with a new background task entry in the table at the bottom of the page:



6. Wait until the Add Image task finishes. When the task is complete, its text changes color and its Progress column indicates **100%**. Make sure the correct image name appears in the Status column:



7. Detach the image from the PMAC guest.

   If the image was supplied on CD or USB, return to the PMAC Guest's Media tab used in step 2, locate the image in the Attached Media list, and click **Detach**. After a pause, the image removes from the Attached Media list. This releases the virtual device for future use.

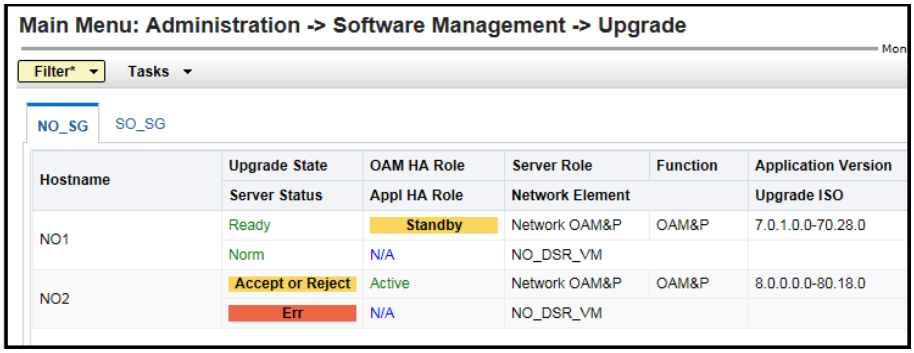
8. Remove the CD or USB device from the Management Server.

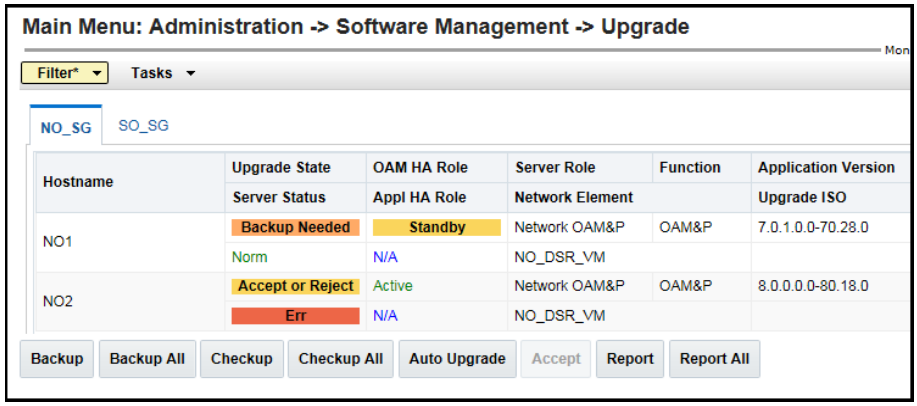
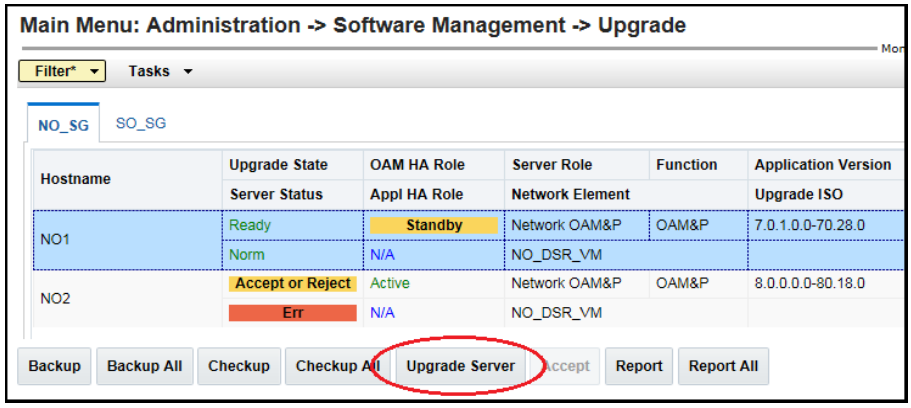
Appendix F. Upgrade Single Server – DSR 8.x

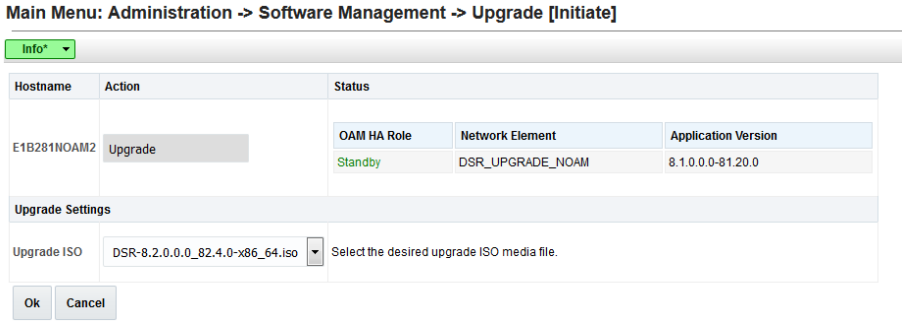
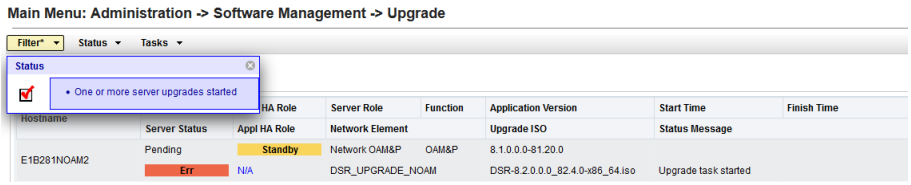
This appendix upgrades a single DSR server of any type (NOAM, SOAM, MP, etc.) when the active NOAM is on DSR 8.x.

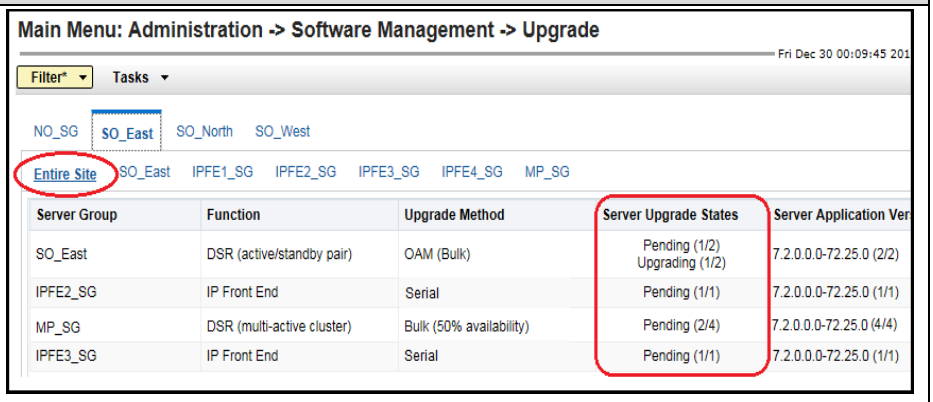
Note: This procedure may be executed multiple times during the overall upgrade, depending on the number of servers in the DSR and the chosen upgrade methodology. Make multiple copies of Appendix F to mark up, or keep another form of written record of the steps performed.

Procedure 48. Upgrade Single Server – Upgrade Administration – DSR 8.x

Step#	Procedure	Description
This procedure executes the Upgrade Single Server – Upgrade Administration steps for an active NOAM on release 8.0/8.1. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: View the pre-upgrade status of servers	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration > Software Management > Upgrade** 3. Select the Network Element of the server to be upgraded (NOAM or site).  Main Menu: Administration -> Software Management -> Upgrade Filter* Tasks NO_SG SO_SG Hostname / Upgrade State / OAM HA Role / Server Role / Function / Application Version Server Status / Appl HA Role / Network Element / Upgrade ISO NO1: Ready, Standby, Network OAM&P, OAM&P, 7.0.1.0.0-70.28.0 Norm, N/A, NO_DSR_VM NO2: Accept or Reject, Active, Network OAM&P, OAM&P, 8.0.0.0.0-80.18.0 Err, N/A, NO_DSR_VM The active NOAM server may have some or all of these expected alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 32532 (Server Upgrade Pending Accept/Reject)** **Alarm ID = 31149 (DB Late Write Nonactive)**

Step#	Procedure	Description
2. ☐	**Active NOAM VIP**: Verify status of server to be upgraded	1. Identify the server to be upgraded (NOAM, SOAM, MP, etc.) _____(record hostname) 2. Verify the Application Version value is the expected source software release version. 3. If the server is in the **Backup Needed** state, select the server and click **Backup**. 4. On the Upgrade Backup screen, click **OK**. The Upgrade State changes to **Backup in Progress**. 5. Verify the **OAM Max HA Role** is the expected condition (either standby or active). This depends on the server being upgraded.  6. When the backup is complete, verify the server state changes to **Ready**.
3. ☐	**Active NOAM VIP**: Initiate the server upgrade	1. From the Upgrade Administration screen, select the server to be upgraded. 2. Click **Upgrade Server**. The Initiate Upgrade form displays. 

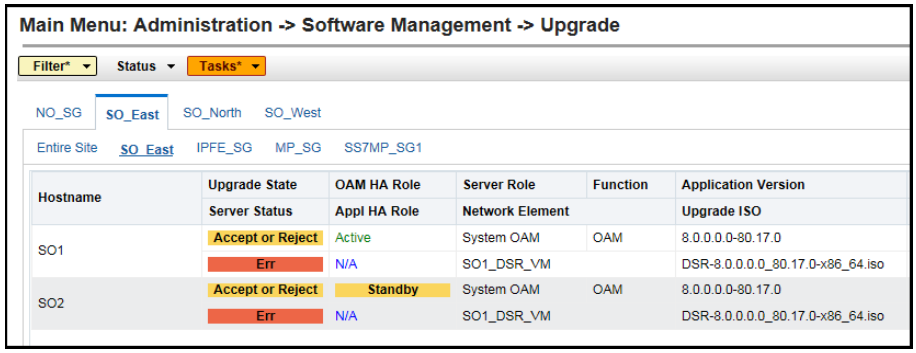
Step#	Procedure	Description
4. ☐	**Active NOAM VIP**: Select upgrade ISO	Initiate the server upgrade. 1. From the **Upgrade Settings** – **Upgrade ISO** options, select the ISO to use in the server upgrade. ***Note***: When the active NOAM is the server being upgraded, click OK to initiate an HA switchover and cause the GUI session to log out. ***Note***: If the selected server is the active server in an active/standby pair, the OAM Max HA Role column displays **Active** with a red background. This is NOT an alarm condition. This indicator is to make the user aware the Make Ready action causes an HA switchover. 2. Click **OK**.  The upgrade begins and control returns to the Upgrade Administration screen.  *** Critical *** Do NOT omit this step 3. Log out of the GUI, clear the browser cache, and log back into the active NOAM using the VIP before continuing. Some GUI forms may exhibit incorrect behaviors if the browser cache is not cleared.
5. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	See step 6 for an optional method of monitoring upgrade progress. See step 7 for instructions if the upgrade fails. ***Note***: If the upgrade processing encounters a problem, it may attempt to ROLL BACK to the original software release. In this case, the Upgrade displays as **FAILED**. The execution time may be shorter or longer, depending on the point in the upgrade where there was a problem. 1. Observe the upgrade status of the site on the Upgrade Administration screen by selecting the **Entire Site** link. An upgrade status summary of each server group in the site displays in the Server Upgrade States column.

Step#	Procedure	Description
		 Servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31283 (Highly available server failed to receive mate heartbeats)** **Alarm ID = 31106 (DB Merge To Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31233 (HA Secondary Path Down)** **Alarm ID = 31101 (DB Replication To Slave Failure)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** **Alarm ID = 31282 (The HA manager (cmha) is impaired by a s/w fault)** **Alarm ID = 31225 (HA Service Start Failure)** **Alarm ID = 31149 (DB Late Write Nonactive)** 2. Wait for the upgrade to complete. The Status Message column displays **Success**. This step takes approximately 20 to 50 minutes. In the unlikely event that after the upgrade, the **Upgrade State** of server will be 'Backout Ready' or 'Failed', and the **Status Message** will display: "Server could not restart the application to complete the upgrade." Perform Appendix U to create a link of Comagent. Appendix V to restore the server to full operational status, then return to this step to continue the upgrade. If the upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures.

Step#	Procedure	Description

6.
☐
	Server CLI: (Optional) View in-progress status from command line of server	An optional method to view Upgrade progress from the command line:
		To view the detailed progress of the upgrade , access the server command line (using SSH or Console), and enter:
		`$ tail -f  /var/TKLC/log/upgrade/upgrade.log`
		This command displays the upgrade log entries as the events occur. Once the upgrade is complete, the server reboots. It takes a couple of minutes for the DSR application processes to start up.
		For example, this command displays the current rev on the server:
		`[admusr@NO2 ~]$ appRev`
		
		`Install Time: Wed Apr  4 05:03:13 2018`
		`Product Name: DSR`
		`Product Release: 8.4.0.0.0_84.5.0`
		`Base Distro Product: TPD`
		`Base Distro Release: 7.5.0.0.0_88.46.0`
		`Base Distro ISO: TPD.install-7.5.0.0.0_88.46.0-OracleLinux6.9-x86_64.iso`
		`ISO name: DSR-8.4.0.0.0_84.5.0-x86_64.iso`
		`OS: OracleLinux 6.9`
		If the upgrade fails – **do not proceed**. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures.

7. ☐	**Server CLI**: If the upgrade fails	If the upgrade of a server fails, access the server command line (using ssh or a console), and collect the following files: /var/TKLC/log/upgrade/upgrade.log /var/TKLC/log/upgrade/ugwrap.log /var/TKLC/log/upgrade/earlyChecks.log /var/TKLC/log/platcfg/upgrade.log It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document and provide these files. Refer to Appendix O for failed server recovery procedures.

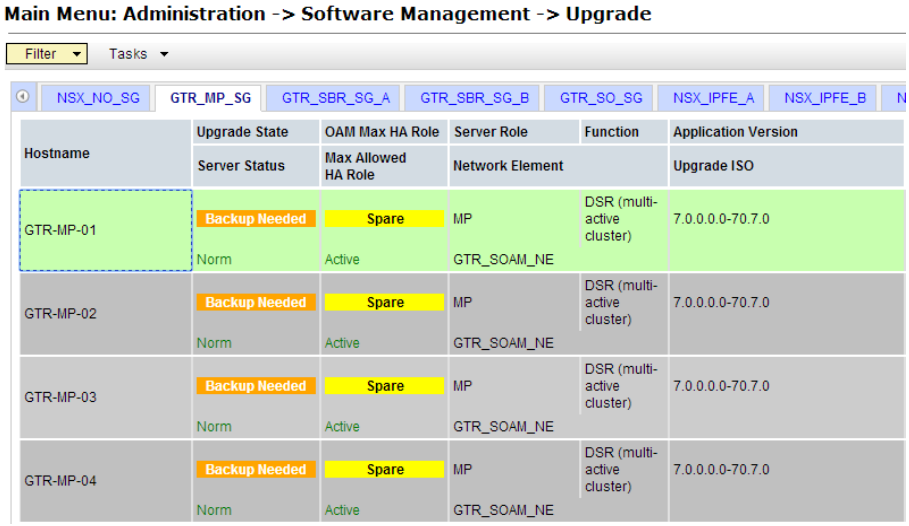
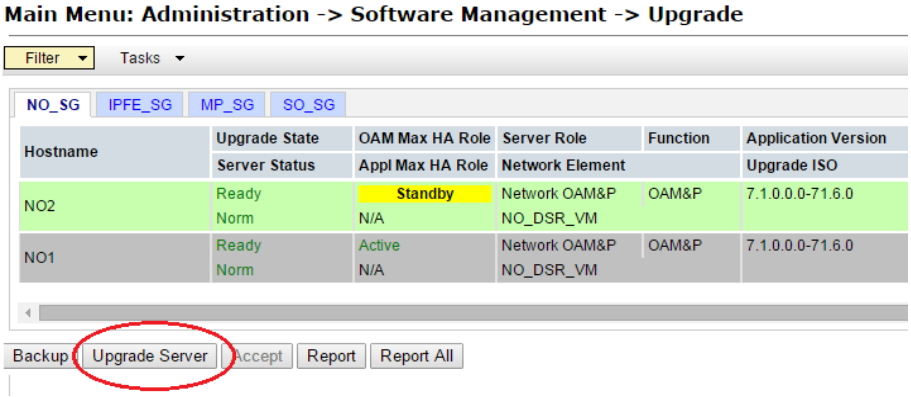
Step#	Procedure	Description
8. ☐	**Active NOAM VIP**: Verify post upgrade status	1. Navigate to **Administration > Software Management > Upgrade**. 2. Select the tab of the NOAM or site being upgraded. 3. Verify the Application Version value for this server has been updated to the target software release version. 4. Verify the Upgrade State of the upgraded server is **Accept or Reject**. 
9. ☐	**Active NOAM/SOAM VIP**: Verify the server was successfully upgraded	View the post-upgrade status of the server: 1. Navigate to **Alarm & Events > View Active**. The active NOAM or SOAM server may have some or all the following expected alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10010 (Stateful database not yet synchronized with mate database)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 31000 (Program impaired by S/W Fault)** **Alarm ID = 31201 (Process Not Running) for eclipseHelp process** **Alarm ID = 31282 (The HA manager (cmha) is impaired by a s/w fault)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** The active NOAM or SOAM has these expected alarms until both NOAMs/SOAMs are upgraded: **Alarm ID = 31233 – HA Secondary Path Down** **Alarm ID = 32532 (Server Upgrade Pending Accept/Reject)** **Alarm ID = 31149 (DB Late Write Nonactive)** ***Note***: Do not accept upgrade at this time. This alarm is OK.

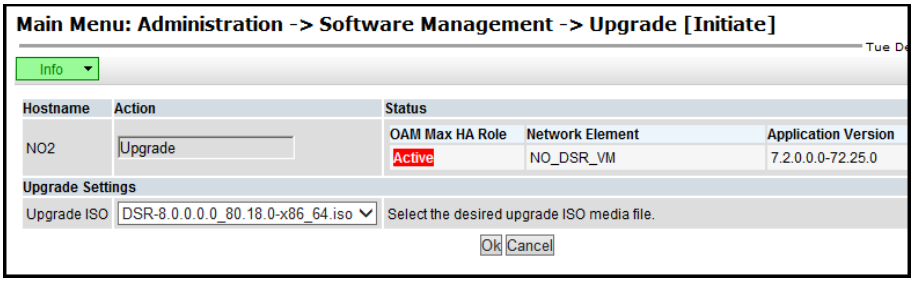
Appendix G. Upgrade Single Server – Pre-DSR 8.x

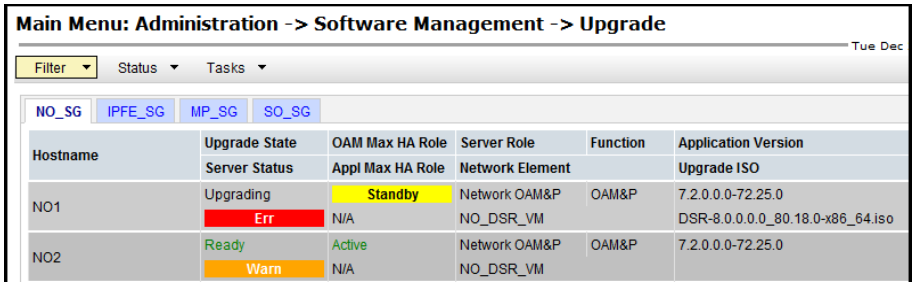
This appendix provides the procedure for upgrading a single DSR server when the active NOAM is on DSR 8.x.y. This procedure is used to upgrade the standby NOAM only. The remaining servers are upgraded using Procedure 48.

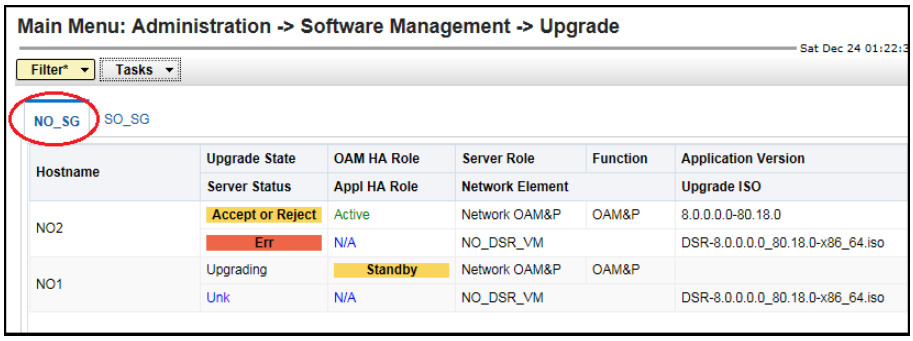
Procedure 49. Upgrade Single Server – Upgrade Administration – pre DSR 8.x

Step#	Procedure	Description
This procedure executes the Upgrade Single Server – Upgrade Administration steps. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: View the pre-upgrade status of servers	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration > Software Management > Upgrade**. The active NOAM server may have some or all of the following expected alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 32532 (Server Upgrade Pending Accept/Reject)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Main Menu: Administration -> Software Management -> Upgrade** Filter Tasks NSX_NO_SG GTR_MP_SG GTR_SBR_SG_A GTR_SBR_SG_B GTR_SO_SG NSX_IPFE_A NSX_IPFE_B Hostname / Upgrade State / Server Status / OAM Max HA Role / Max Allowed HA Role / Server Role / Network Element / Function / Application Version / Upgrade ISO GTR-MP-01: Backup Needed, Norm, Spare, Active, MP, GTR_SOAM_NE, DSR (multi-active cluster), 7.0.0.0.0-70.7.0 GTR-MP-02: Backup Needed, Norm, Spare, Active, MP, GTR_SOAM_NE, DSR (multi-active cluster), 7.0.0.0.0-70.7.0 GTR-MP-03: Backup Needed, Norm, Spare, Active, MP, GTR_SOAM_NE, DSR (multi-active cluster), 7.0.0.0.0-70.7.0 GTR-MP-04: Backup Needed, Norm, Spare, Active, MP, GTR_SOAM_NE, DSR (multi-active cluster), 7.0.0.0.0-70.7.0

Step#	Procedure	Description
2. ☐	**Active NOAM VIP**: Verify status of server to be upgraded	1. Identify the server (NOAM, SOAM, MP, etc.) _____ (record name) 2. Verify the Application Version value is the expected source software release version. 3. Navigate to **Administration > Software Management > Upgrade** and select the Server Group of the server to upgrade.  4. If the server is in the **Backup Needed** state, select the server and click **Backup**. 5. On the Upgrade Backup screen, click **OK**. The Upgrade State changes to **Backup in Progress**. 6. Verify the **OAM Max HA Role** is the expected condition (either standby or active). This depends on the server being upgraded. 7. When the backup is complete, verify the server state changes to **Ready**.
3. ☐	**Active NOAM VIP**: Initiate the server upgrade (part 1)	1. From the Upgrade Administration screen, select the server to upgrade. 2. Click **Upgrade Server**.  The Initiate Upgrade form displays on the **Administration > Software Management > Upgrade Initiate** screen.

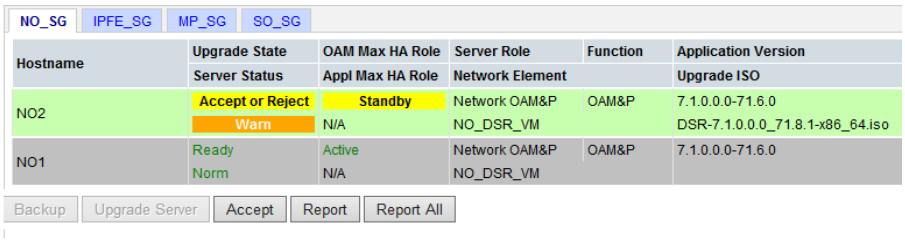
Step#	Procedure	Description
4. ☐	**Active NOAM VIP**: Initiate the server upgrade (part 2) – Select ISO form	1. From the **Upgrade Settings** – **Upgrade ISO** options, select the ISO to use in the server upgrade, ***Note***: When the active NOAM is the server being upgraded, click **OK** to initiate an HA switchover and cause the GUI session to log out. ***Note***: If the selected server is the active server in an active/standby pair, the OAM Max HA Role column displays **Active** with a red background. This is NOT an alarm condition. This indicator is to make the user aware that the action causes an HA switchover. 2. Click **OK**. The upgrade begins and control returns to the Upgrade Administration screen.  *** Critical *** Do NOT omit this step 3. **If the server being upgraded is the active NOAM and clicking OK initiated a role change, log out of the GUI, clear the browser cache**, and log back into the active NOAM using the VIP before continuing. Some GUI forms may exhibit incorrect behaviors if the browser cache is not cleared.

Step#	Procedure	Description
5. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	If the upgrade processing encounters a problem, it may attempt to ROLL BACK to the original software release. In this case, the Upgrade displays as **FAILED**. The execution time may be shorter or longer, depending on the point in the upgrade where there was a problem. 1. Observe the upgrade state of the server of interest. Upgrade status displays under the Status Message column.  Main Menu: Administration -> Software Management -> Upgrade Tue Dec Filter Status Tasks NO_SG IPFE_SG MP_SG SO_SG Hostname / Upgrade State / Server Status / OAM Max HA Role / Appl Max HA Role / Server Role / Network Element / Function / Application Version / Upgrade ISO NO1: Upgrading / Err / Standby / N/A / Network OAM&P / NO_DSR_VM / OAM&P / 7.2.0.0.0-72.25.0 / DSR-8.0.0.0.0_80.18.0-x86_64.iso NO2: Ready / Warn / Active / N/A / Network OAM&P / NO_DSR_VM / OAM&P / 7.2.0.0.0-72.25.0 Servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31283 (Highly available server failed to receive mate heartbeats)** **Alarm ID = 31106 (DB Merge To Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31233 (HA Secondary Path Down)** **Alarm ID = 31101 (DB Replication To Slave Failure)** **Alarm ID = 31104 (DB Replication over SOAP has failed** **Alarm ID = 31225 (HA Service Start Failure)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** 2. Wait for the upgrade to complete. The Status Message column displays **Success**. This step takes approximately 20 to 50 minutes. In the unlikely event that after the upgrade, if the **Upgrade State** of server is **Backout Ready** and the **Status Message** displays **Server could not restart the application to complete the upgrade**, then perform Appendix U to create a link of Comagent. Appendix V to restore the server to full operational status and then return to this step to continue the upgrade. If the upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures.

Step#	Procedure	Description
6. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress **For active NOAM on DSR 8.2 only**	This step is for monitoring upgrade status of the formerly active NOAM after a role change. The NOAM that was active when the upgrade was initiated is now the standby NOAM. Monitoring from this point on is from the new active NOAM on DSR 8.4. See step 7. for an optional method of monitoring upgrade progress. See step 8. for instructions if the upgrade fails. ***Note***: If the upgrade processing encounters a problem, it may attempt to ROLL BACK to the original software release. In this case, the Upgrade displays as **FAILED**. The execution time may be shorter or longer, depending on the point in the upgrade where there was a problem. 1. Observe the upgrade status of the standby NOAM on the Upgrade Administration screen by selecting the NOAM server group tab.  2. Wait for the upgrade to complete. The Status Message column displays **Success**. This step takes approximately 20 to 50 minutes. If the upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures.

Step#	Procedure	Description

7.
☐
	Server CLI: (**Optional**) View in-progress status from command line of server	An optional method to view Upgrade progress from the command line:
		To view the detailed progress of the upgrade , access the server command line (using SSH or Console), and enter:
		`$ tail -f /var/TKLC/log/upgrade/upgrade.log`
		Once the server has upgraded, it reboots, and it takes a couple of minutes for the DSR application processes to start up.
		This command displays the current rev on the server:
		`$ appRev`
		`Install Time: Tue Jun 17 08:20:57 2014`
		`Product Name: DSR`
		`Product Release: 6.0.0_60.14.6`
		`Base Distro Product: TPD`
		`Base Distro Release: 6.7.0.0.1_84.14.0`
		`Base Distro ISO: TPD.install-6.7.0.0.1_84.14.0-OracleLinux6.5-x86_64.iso`
		`OS: OracleLinux 6.5`
		If the upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures.

8. ☐	**Server CLI**: If the upgrade fails	If the upgrade of a server fails, access the server command line (using ssh or a console), and collect the following files: /var/TKLC/log/upgrade/upgrade.log /var/TKLC/log/upgrade/ugwrap.log /var/TKLC/log/upgrade/earlyChecks.log /var/TKLC/log/platcfg/upgrade.log It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document and provide these files. Refer to Appendix O for failed server recovery procedures.
9. ☐	**Active NOAM VIP**: Verify post upgrade status	1. Navigate to **Administration > Software Management > Upgrade**. 2. Verify the Application Version value for this server has been updated to the target software release version. 3. Verify the Upgrade State of the upgraded server is **Accept or Reject**. 

Step#	Procedure	Description
10. ☐	**Active NOAM/SOAM VIP**: Verify the server was successfully upgraded	View the Post-Upgrade Status of the server: Navigate to **Alarm & Events > View Active**. The active NOAM or SOAM server may have some or all the following expected alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10010 (Stateful database not yet synchronized with mate database)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 31000 (Program impaired by S/W Fault)** **Alarm ID = 31201 (Process Not Running) for eclipseHelp process** **Alarm ID = 31282 (The HA manager (cmha) is impaired by a s/w fault)** **Alarm ID = 32532 (Server Upgrade Pending Accept/Reject)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** ***Note***: Do not accept upgrade at this time. This alarm is OK. The active NOAM or SOAM has the following expected alarm until both NOAMs/SOAMs are upgraded: **Alarm ID = 31233 – HA Secondary Path Down** The single server upgrade is now complete. Return to the DSR upgrade procedure step that directed the execution of appendix.

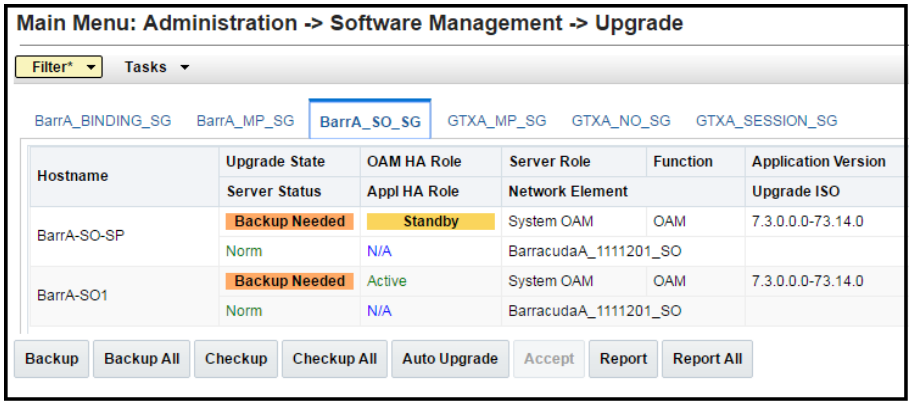
Appendix H. Upgrade Multiple Servers – Upgrade Administration

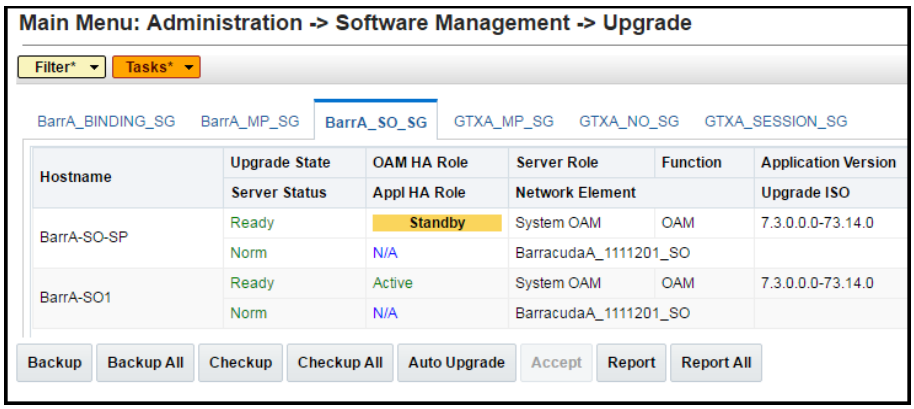
This Appendix provides the procedure for upgrading multiple servers in parallel.

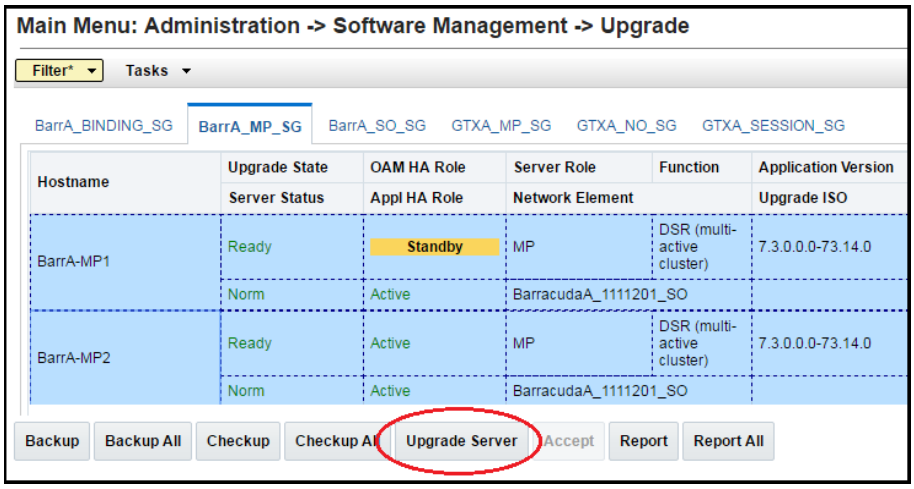
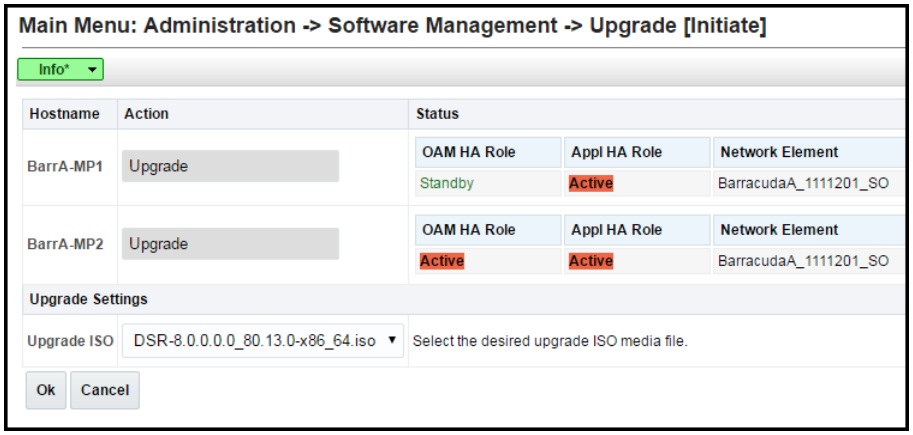
Note: This procedure is executed multiple times during the overall upgrade depending on the number of servers in the DSR. Make multiple copies of Appendix H to mark up or keep another form of written record of the steps performed.

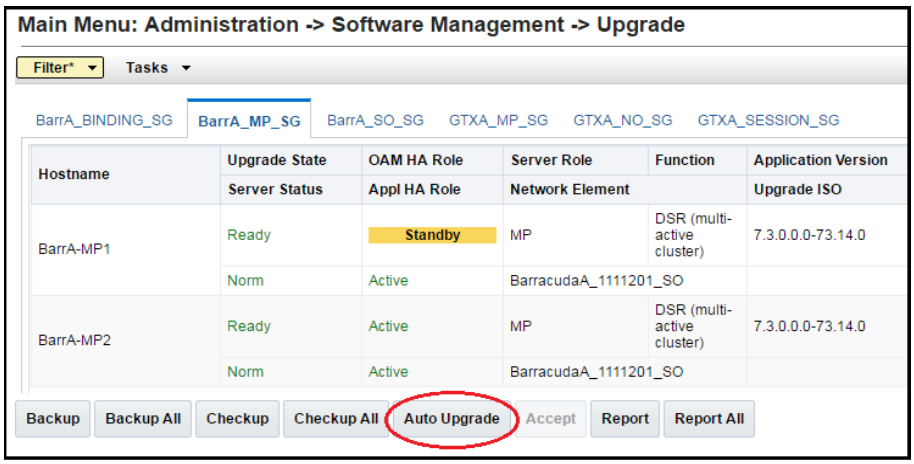
Procedure 50. Upgrade Multiple Servers – Upgrade Administration

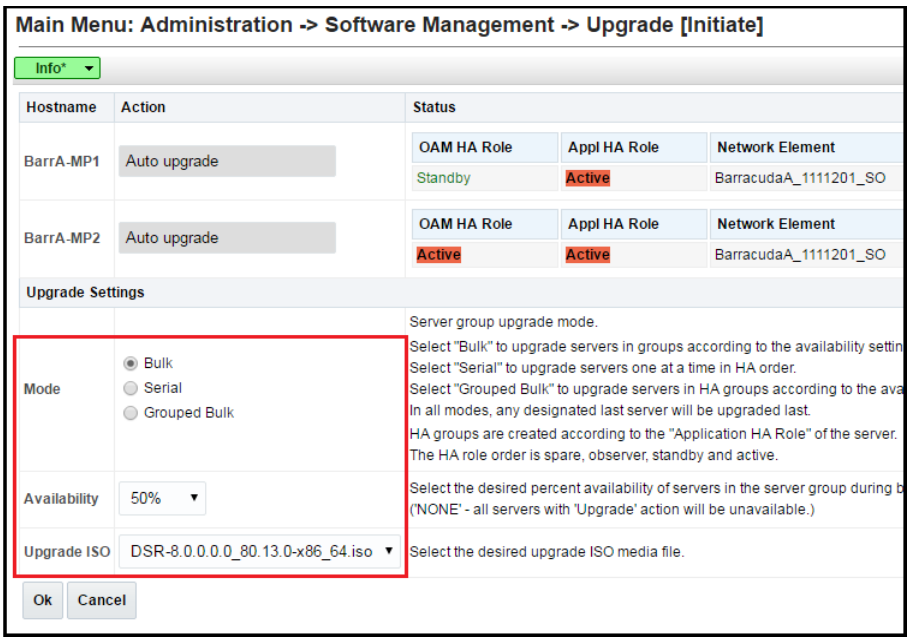
Step#	Procedure	Description
This procedure executes the Upgrade Multiple Servers – Upgrade Administration steps. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: View pre-upgrade status of the servers	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration > Software Management > Upgrade**. The active NOAM server may have some or all of the following expected alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 32532 (Server Upgrade Pending Accept/Reject)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Main Menu: Administration -> Software Management -> Upgrade** Filter Tasks NSX_NO_SG GTR_MP_SG GTR_SBR_SG_A GTR_SBR_SG_B GTR_SO_SG NSX_IPFE_A NSX_IPFE_B Hostname / Upgrade State / OAM Max HA Role / Server Role / Function / Application Version Server Status / Max Allowed HA Role / Network Element / Upgrade ISO GTR-MP-01 / Backup Needed / Spare / MP / DSR (multi-active cluster) / 7.0.0.0.0-70.7.0 Norm / Active / GTR_SOAM_NE GTR-MP-02 / Backup Needed / Spare / MP / DSR (multi-active cluster) / 7.0.0.0.0-70.7.0 Norm / Active / GTR_SOAM_NE GTR-MP-03 / Backup Needed / Spare / MP / DSR (multi-active cluster) / 7.0.0.0.0-70.7.0 Norm / Active / GTR_SOAM_NE GTR-MP-04 / Backup Needed / Spare / MP / DSR (multi-active cluster) / 7.0.0.0.0-70.7.0 Norm / Active / GTR_SOAM_NE

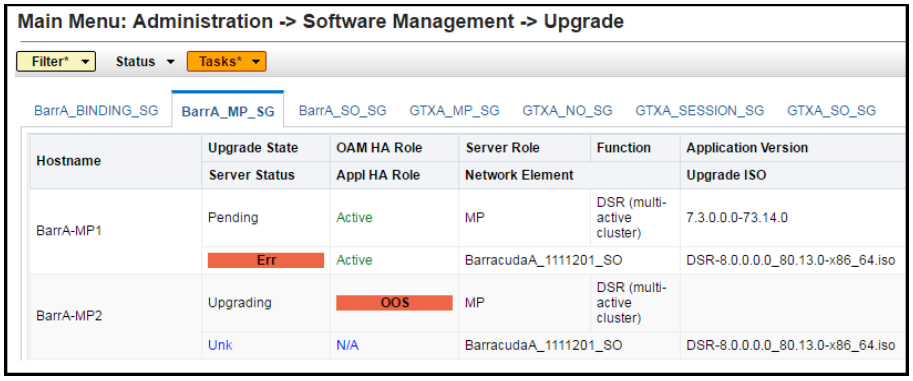
Step#	Procedure	Description
2. ☐	**Active NOAM VIP**: Verify status of servers to be upgraded	1. Identify the MP servers to be upgraded in parallel _____ (record names) 2. Verify the Application Version value is the expected source software release version for each MP server to be upgraded. 3. Navigate to **Administration > Software Management > Upgrade** and select the Server Group of the server to upgrade.  4. If the server is in **Backup Needed** state, select the servers and click **Backup**. The Upgrade State changes to **Backup in Progress**. When the backup is complete, the Upgrade State changes to **Ready**. 5. Verify the **OAM Max HA Role** is in the expected condition (either standby or active). This depends on the server being upgraded.

Step#	Procedure	Description
3. ☐	**Active NOAM VIP**: Verify upgrade status is **Ready**	The Upgrade Administration form refreshes and the server to upgrade displays Upgrade Status = **Ready**. This may take a minute.  Depending on the server being upgraded, new alarms may occur. Servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31101 (DB Replication to slave DB has failed)** **Alarm ID = 31106 (DB Merge to Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)**
4. ☐	Determine upgrade method – manual or automatic	To upgrade multiple servers in parallel using the manual option, execute steps 5. and 6. To upgrade a server group using the Automated Server Group Upgrade option, proceed to step 7.

Step#	Procedure	Description
5. ☐	**Active NOAM VIP**: Initiate upgrade (part 1)	1. From the Upgrade Administration screen, select the servers to upgrade. 2. Click **Upgrade Server**.  The Initiate Upgrade form displays on the **Administration > Software Management > Upgrade Initiate** screen.
6. ☐	**Active NOAM VIP**: Initiate upgrade (part 2) – Select ISO form	1. From the **Upgrade Settings** – **Upgrade ISO** options, select the ISO to use in the server upgrade. 2. Click **OK**. The upgrade begins and control returns to the Upgrade Administration screen.  3. Proceed to step 8. to complete this procedure.

Step#	Procedure	Description
7. ☐	**Active NOAM VIP**: Initiate (part 1) – Automated Server Group Upgrade option	1. To utilize the Automated Server Group upgrade option, verify no servers in the server group are selected.  2. Click **Auto Upgrade**.

Step#	Procedure	Description
8. ☐	**Active NOAM VIP**: Initiate (part 2) – Automated Server Group Upgrade	***Note***: The settings to be used in this step are specified in the calling procedure. 1. The **Upgrade Settings** section of the Initiate screen controls the behavior of the automated upgrade. Select the settings that apply to the server type being upgraded. **Bulk**: Select this option for active/standby and multi-active server groups. For servers in an active/standby configuration, the standby server is upgraded first, followed by the active. Servers in a multi-active configuration are upgraded in parallel to the extent allowed by the Availability setting. **Serial**: Select this option to upgrade multiple servers one at a time. **Grouped Bulk**: Select this option for SBR server groups. Grouped bulk always upgrades the spare(s), followed by the standby, followed by the active. **Availability**: This setting determines how many servers remain in service while servers in the server group are upgraded. For example, a setting of 50% ensures at least half of the servers in the server group remain in service. ***Note***: The Serial upgrade mode is available as an alternative to Bulk and Grouped Bulk for a more conservative upgrade scenario. Serial mode upgrades each server in the server group one at a time, and can be used on any server group type. 2. Select the appropriate ISO from the **Upgrade ISO** options. 3. Click **OK** to start the upgrade. 

9. ☐	**Active NOAM VIP**: View the upgrade administration form to monitor upgrade progress	See step 10. for an optional method of monitoring upgrade progress. See step 11. for instructions if the Upgrade fails, or if execution time exceeds 60 minutes. ***Note***: If the upgrade processing encounters a problem, it may attempt to ROLL BACK to the original software release. In this case, the Upgrade displays as **FAILED**. The execution time may be shorter or longer, depending on the point in the upgrade where there was a problem. 1. Observe the upgrade status of the servers of interest. Upgrade status displays under the Status Message column.  Main Menu: Administration -> Software Management -> Upgrade Filter* Status Tasks* BarrA_BINDING_SG BarrA_MP_SG BarrA_SO_SG GTXA_MP_SG GTXA_NO_SG GTXA_SESSION_SG GTXA_SO_SG Hostname / Upgrade State / OAM HA Role / Server Role / Function / Application Version Server Status / Appl HA Role / Network Element / Upgrade ISO BarrA-MP1: Pending, Active, MP, DSR (multi-active cluster), 7.3.0.0.0-73.14.0 Err, Active, BarracudaA_1111201_SO, DSR-8.0.0.0.0_80.13.0-x86_64.iso BarrA-MP2: Upgrading, OOS, MP, DSR (multi-active cluster) Unk, N/A, BarracudaA_1111201_SO, DSR-8.0.0.0.0_80.13.0-x86_64.iso During the upgrade, the servers may have a combination of the following expected alarms. ***Note***: Not all servers have all alarms: **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10073 (Server Group Max Allowed HA Role Warning)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 31101 (DB Replication To Slave Failure)** **Alarm ID = 31106 (DB Merge To Parent Failure)** **Alarm ID = 31107 (DB Merge From Child Failure)** **Alarm ID = 31228 (HA Highly available server failed to receive mate heartbeats) or (Lost Communication with Mate Server)** **Alarm ID = 31233 (HA Secondary Path Down)** **Alarm ID = 31283 (Highly available server failed to receive mate heartbeats)** **Alarm ID = 32515 (Server HA Failover Inhibited)** **Alarm ID = 31149 (DB Late Write Nonactive)** **Alarm ID = 31114 (DB Replication over SOAP has failed)** 2. Wait for the upgrade to complete. The Status Message column displays **Success**. This step takes approximately 20 to 50 minutes. When an upgraded SOAM becomes active on release 8.x, **Alarm 25607** displays to alert the operator to enable the new Signaling Firewall feature. This alarm is active until the firewall is enabled in Procedure 29. **Alarm ID = 25607 (DSR Signaling Firewall is administratively Disabled)**

Step#	Procedure	Description
		If the upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures.

10.
☐
	Server CLI: (Optional) View in-progress status from command line	Optional method to view upgrade progress from a command line:
		To view the detailed progress of the upgrade –
		Access the server command line (using ssh or Console), and:
		`$ tail -f /var/TKLC/log/upgrade/upgrade.log`
		Once a server is upgraded, it reboots, and it takes a couple of minutes for the DSR application processes to start up.
		This command displays the current rev on the upgraded servers:
		`[admusr@NO1 ~]$ appRev`
		`Install Time: Wed Apr 4 05:03:13 2018`
		`Product Name: DSR`
		`Product Release: 8.4.0.0.0_84.5.0`
		`Base Distro Product: TPD`
		`Base Distro Release: 7.5.0.0.0_88.46.0`
		`Base Distro ISO: TPD.install-7.5.0.0.0_88.46.0-OracleLinux6.9-x86_64.iso`
		`ISO name: DSR-8.4.0.0.0_84.5.0-x86_64.iso`
		`OS: OracleLinux 6.9`
		If the upgrade fails – do not proceed. It is recommended to consult with My Oracle Support (MOS) on the best course of action. Refer to Appendix O for failed server recovery procedures.

11. ☐	**Server CLI**: If upgrade fails	If a server upgrade fails, access the server command line (using ssh or Console), and collect the following files: /var/TKLC/log/upgrade/upgrade.log /var/TKLC/log/upgrade/ugwrap.log /var/TKLC/log/upgrade/earlyChecks.log /var/TKLC/log/platcfg/upgrade.log **It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document and provide these files. Refer to Appendix O for failed server recovery procedures.**
12. ☐	**Active NOAM VIP**: Verify post upgrade status	1. Navigate to **Administration > Software Management > Upgrade**. 2. Verify the Application Version value for the servers has been updated to the target software release version. 3. Verify the Status Message indicates success. 4. Verify the Upgrade State of the upgraded servers is **Accept or Reject**.

Step#	Procedure	Description
13. ☐	Verify the servers were successfully upgraded	View Post-Upgrade Status of the server: The active SOAM server may have some or all the following expected alarm(s): **Alarm ID = 10008 (Provisioning Manually Disabled)** **Alarm ID = 10010 (Stateful database not yet synchronized with mate database)** **Alarm ID = 10075 (The server is no longer providing services because application processes have been manually stopped)** **Alarm ID = 31000 (Program impaired by S/W Fault)** **Alarm ID = 32532 (Server Upgrade Pending Accept/Reject)** ***Note***: Do Not Accept upgrade at this time. This alarm is OK. The multiple servers upgrade is now complete.

Appendix I. Upgrade Firmware

This section is not applicable to Software Centric installations/upgrades.

Firmware upgrade procedures are not included in this document. It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document for the latest information on firmware upgrades.

Appendix J. TVOE Platform

This Appendix provides procedures for gracefully shutting down TVOE guests and for upgrading TVOE on a host server that supports one or more DSR virtual guests.

If upgrading a DSR server that is deployed as a virtual guest of the TVOE host software, then TVOE itself may have to be upgraded first. Refer to Appendix D to determine if a TVOE upgrade is required.

If the server being upgraded is not virtualized, then this Appendix does not apply.

J.1. TVOE Upgrade

This procedure is used to upgrade the TVOE host of DSR VM guests. The guests of the host must be shutdown before executing this procedure.

CAUTION

Upgrading the TVOE host creates a snapshot of the Logical Volumes (LV) present on the disk. This snapshot is required in case of **backout** to the previous release.

Upgrading the TVOE shuts down all guests operating in the TVOE environment. Advance planning is required to ensure traffic processing is not adversely affected.

Be aware that snapshot corruption can occur if large-scale changes (such as the deletion or addition of an ISO image) are made on the TVOE host before the Upgrade Accept.

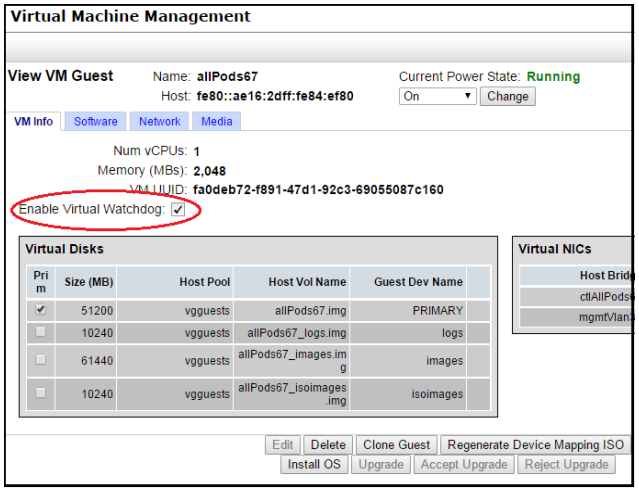
Procedure 51. Upgrade TVOE Platform

Step#	Procedure	Description
This procedure upgrades TVOE. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Upgrade TVOE	Upgrade TVOE using the **PMAC Aided TVOE Upgrade Procedure** from Reference [4]. If the **PMAC Aided TVOE Upgrade Procedure** is not possible, it is also possible to upgrade TVOE using the alternate procedure provided in Reference [4]. ***Note***: When Reference [4] directs the shut down of the guest VMs, return to this document, execute Appendix J.2, and return to Reference [4]. ***Note***: If the active NOAM is hosted on the TVOE server which is being upgraded, VIP may be lost until TVOE is successfully upgraded.

Step#	Procedure	Description

2.
☐
	TVOE Host CLI: Set the tuned profile
	
	For VEDSR only
		This step is applicable to the VEDSR configuration only. For all other configurations, continue to step 3.
		If the TVOE being upgraded hosts a VEDSR component, set the tuned profile on the upgraded TVOE host.
		1. Use the SSH command (on UNIX systems – or putty if running on windows) to log into the TVOE host
		`ssh admusr@<TVOE host>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		2. Check the currently active tuned profile with the `tuned-adm` command. If the active profile is **tvoe_profile**, proceed to the next step. Otherwise, continue with this step to set the tuned profile.
		`$ sudo tuned-adm active`
		`Current active profile: tvoe_profile`
		`Service tuned: enabled, running`
		`Service ktune: enabled, running`
		3. Enter this command to set the tuned profile:
		`$ sudo tuned-adm profile tvoe_profile`
		Sample output:
		`Calling '/etc/ktune.d/tunedadm.sh stop': [ OK ]`
		`Reverting to cfq elevator: dm-0 dm-1 dm-10 dm-11 dm-12 dm-1[ OK ]dm-15 dm-16 dm-17 dm-18 dm-19 dm-2 dm-20 dm-21 dm-22 dm-23 dm-24 dm-25 dm-26 dm-27 dm-28 dm-29 dm-3 dm-30 dm-4 dm-5 dm-6 dm-7 dm-8 dm-9 sda sdb`
		`Stopping tuned: [ OK ]`
		`Switching to profile 'tvoe_profile'`
		`Applying deadline elevator: dm-0 dm-1 dm-10 dm-11 dm-12 dm-[ OK ] dm-15 dm-16 dm-17 dm-18 dm-19 dm-2 dm-20 dm-21 dm-22 dm-23 dm-24 dm-25 dm-26 dm-27 dm-28 dm-29 dm-3 dm-30 dm-4 dm-5 dm-6 dm-7 dm-8 dm-9 sda sdb`
		`Applying ktune sysctl settings:`
		`/etc/ktune.d/tunedadm.conf: [ OK ]`
		`Calling '/etc/ktune.d/tunedadm.sh start': [ OK ]`
		`Applying sysctl settings from /etc/sysctl.conf`
		`Starting tuned: [ OK ]`
		4. Verify the **tvoe_profile** is active.
		`$ sudo tuned-adm active`
		`Current active profile: tvoe_profile`
		`Service tuned: enabled, running`
		`Service ktune: enabled, running`

3. ☐	After completed	After the TVOE upgrade is completed on the host server, the application(s) may not start automatically. Proceed with the next step to restore service.

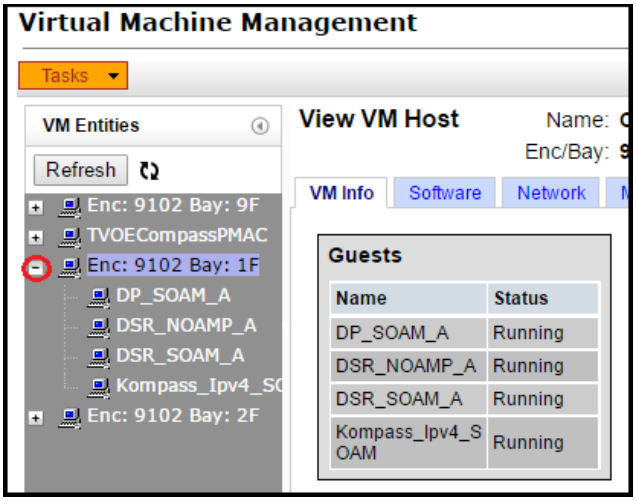
Step#	Procedure	Description
4. ☐	**PMAC GUI**: Restart guest VMs following the TVOE upgrade	1. Log into the PMAC GUI by navigating to http ://<pmac_management_ip>. 2. Navigate to **Main Menu > VM Management**. 3. Display the TVOE guest VMs by expanding the TVOE host that is to be upgraded. 4. Select a guest VM of the TVOE to be upgraded. 5. If the **Enable Virtual Watchdog** checkbox is not marked: 1. Click **Edit**. 2. Mark the **Enable Virtual Watchdog** checkbox. 3. Click **Save**.  6. Change the power state of the guest VM from **Shutdown** to **On** and click **Change**. Confirm the pop-up and wait for the power state to change to **Running**. This may take a few moments as guest VM reboots.
5. ☐	**Active DSR NOAM VIP**: Enable DSR applications running on upgraded TVOE	1. Log into the DSR NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Server**. 3. Select all the applications running on upgraded TVOE, excluding the server which is in upgrade **Ready** state. Verify the Upgrade State from the **Administration > Upgrade** screen. 4. Click **Restart**. 5. Confirm the operation by clicking **OK**. 6. Verify the Appl State for all the selected servers is changed to **Enabled**.

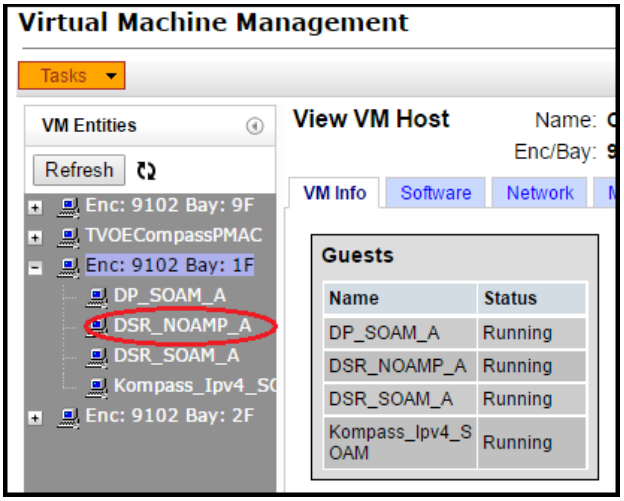
Step#	Procedure	Description
6. ☐	**Active SDS NOAM VIP**: Enable SDS applications running on upgraded TVOE	1. Log into the SDS NOAM GUI using the VIP 2. Navigate to **Status & Manage > Server**. 3. Select all the applications running on upgraded TVOE, excluding the server which is in upgrade **Ready** state. Verify the Upgrade State from the **Administration > Upgrade** screen. 4. Click **Restart**. 5. Confirm the operation by clicking **OK**. Verify the Appl State for all the selected servers is changed to **Enabled**.

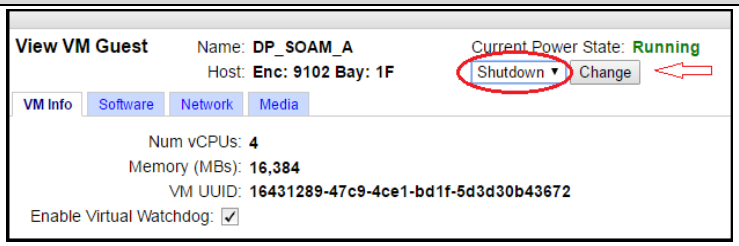
J.2. TVOE Guest Shutdown

This procedure gracefully shuts down the guest VMs of a TVOE host. This procedure is required to be performed before upgrading the host TVOE.

Procedure 52. Shutdown TVOE Guests

Step#	Procedure	Description
This procedure upgrades TVOE. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**PMAC GUI**: Display TVOE guest VMs of the TVOE to upgrade	1. Log into the PMAC GUI by navigating to http://<pmac_management_ip>. 2. Navigate to **Main Menu > VM Management.** 3. Display the TVOE guest VMs by expanding the TVOE host to be upgraded. 

Step#	Procedure	Description
2. ☐	**Active DSR NOAM VIP**: Disable DSR applications	If any DSR applications are guest VMs of the TVOE to be upgraded (as shown in step 1), disable all applications running on the current TVOE. 1. Log into the DSR NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Server**. 3. Select the virtual servers that are running on the TVOE environment to be upgraded, as identified in step 1. 4. Click **Stop**. 5. Confirm the operation by clicking **OK** on the screen. 6. Verify the Appl State for all the selected servers is changed to **Disabled**.
3. ☐	**Active SDS NOAM VIP**: Disable SDS applications **For VEDSR only**	**This step is applicable to the VEDSR configuration only.** If any SDS applications are guest VMs of the TVOE to be upgraded (as shown in step 1, coordinate with the SDS team to shut down the SDS applications. 1. Log into the SDS NOAM GUI using the VIP. 2. Navigate to **Status & Manage > Server**. 3. Select the virtual servers that are running on the TVOE environment to be upgraded, as identified in step 1. 4. Click **Stop**. 5. Confirm the operation by clicking **OK** on the screen. 6. Verify the Appl State for all the selected servers is changed to **Disabled**.
4. ☐	**PMAC GUI**: Shut down TVOE guest VMs	1. On the PMAC Virtual Machine Management screen, select a guest VM of the TVOE to be upgraded.  2. Change the power state of the guest VM from **Running** to **Shutdown** and click **Change**. Confirm the pop-up and wait for the power state to change to Shutdown. This may take a few moments as this executes a graceful shutdown of the guest VM.

Step#	Procedure	Description
		 3. Verify the **Current Power State** changes to **Shut Down**. 4. Repeat sub-steps 1 thru 3 for each guest VM shown in step 1.

Appendix K. IDIH Upgrade at a Site

In IDIH release 7.1 and later, the mediation and application instance data is stored in the Oracle Database. This allows the Application and Mediation servers to be upgraded by performing a fresh installation. Upon completion of the upgrade, the mediation and application guests automatically restore the configuration data from the Oracle database.

Note: Verify the TVOE and PMAC version to make sure the TVOE/PMAC are upgraded before upgrading IDIH guests.

CAUTION If PMAC is version 6.5.x or higher, then TVOE must be upgraded to 3.5.0.0.0_88.45 or higher; otherwise, IDIH guest creation fails.

Table 25 shows the elapsed time estimates for IDIH upgrade.

Table 25. IDIH Upgrade Execution Overview

Procedure	Elapsed Time (hr:min)		Procedure Title	Impact
	This Step	Cum		
Procedure 53	1:15-1:45	1:15-1:45	Upgrade Oracle Guest	None
Procedure 54	0:30-0:45	1:45-2:30	Non-VEDSR Mediation and Application Guest	None
Procedure 55	0:30-0:45	1:45-2:30	VEDSR Mediation and Application Guest Upgrade	None

K.1. Upgrade Oracle Guest

The Oracle Guest is upgraded first.

Note: When attempting to repeat an upgrade following a back out, it is not necessary to upgrade the Oracle Guest if the source release is 7.1 or later.

Procedure 53. Upgrade Oracle Guest

Step#	Procedure	Description
This procedure performs the IDIH Oracle Guest upgrade. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	IDIH CLI:
	Perform a system health check on the Oracle guest
		1. Log into the Oracle guest as the admusr user.
		`ssh <IDIH IP address>`
		`login as: admusr`
		`password: <enter password>`
		2. Execute the analyze_server.sh script.
		`$ sudo /usr/TKLC/xIH/plat/bin/analyze_server.sh -i`
		Sample output:
		`[admusr@cat-ora ~]$ /usr/TKLC/xIH/plat/bin/analyze_server.sh -i`
		`13:24:52: STARTING HEALTHCHECK PROCEDURE`
		`13:24:52: date: 03-17-15, hostname: cat-ora`
		`13:24:52: TPD VERSION: 7.0.0.0.0-86.14.0`
		`13:24:52: ----------`
		`13:24:52: Checking disk free space`
		`13:24:52: No disk space issues found`
		`:`
		`13:25:02: All tests passed!`
		`13:25:02: ENDING HEALTHCHECK PROCEDURE WITH CODE 0`
		If the output indicates the following error, ignore the error and continue the upgrade. This error indicates the target release and the running release are the same.
		`00:47:29: Checking runlevel`
		`00:47:29: >>> Error: Runlevel value "3 4" is different from "N 4"`
		If the output indicates any other failure, do not proceed with the upgrade. It is recommended to contact My Oracle Support (MOS) for guidance.

Step#	Procedure	Description
2. ☐	**IDIH CLI**: Shut down Mediation and Application guests	1. Shut down the Mediation guest by logging in as admusr and running. `$ sudo init 0` 2. Shut down the Application guest by logging in as admusr and running. `$ sudo init 0` The active SOAM server may have some or all of the following expected alarms: **Alarm ID = 19800 Communication Agent Connection Down** **Alarm ID = 11511 Unable to connect using Comagent to remote DIH server with hostname** **Alarm ID = 31149 (DB Late Write Nonactive)** The active NOAM server may have some or all of the following expected alarms: **Alarm ID = 19800 Communication Agent Connection Down** **Alarm ID = 31149 (DB Late Write Nonactive)**
3. ☐	**PMAC GUI**: Start the upgrade of the Oracle guest using the PMAC GUI	1. Navigate to the PMAC VM Management menu. 2. Select the Oracle guest and click **Upgrade**. 3. On the Select Image screen, select the target image from the list of available images. 4. The Oracle iso for a fresh installation and upgrade is different. When installing IDIH, use the following: • apps iso • mediation iso • oracleGuest iso When upgrading IDIH, use the following: • apps iso • mediation iso • oracle iso 5. Click **Start Software Upgrade** to initiate the upgrade.
4. ☐	**PMAC GUI**: Using the PMAC GUI, monitor the upgrade until it finishes	Navigate to the **Task Monitoring** menu and wait until the upgrade task finishes. When it finishes, the status is either **Success** or **Failed**. If the upgrade fails, do not proceed with the upgrade. It is recommended to contact My Oracle Support (MOS) for guidance.
5. ☐	**IDIH CLI**: Perform a system health check on the Oracle guest	Wait a few minute to allow the Oracle guest to stabilize after the reboot, and repeat step 1 to perform the post-upgrade system health check. ***Note***: The following warnings are expected due to the mediation and app servers being shut down. **Warning: mediation server is not reachable (or ping response exceeds 3 seconds)** **Warning: app server is not reachable (or ping response exceeds 3 seconds)**

K.2. Upgrade the Mediation and Application Guests

The Mediation and Application Guest upgrade is similar to the installation procedure. The procedure varies slightly for VEDSR systems so a separate procedure is provided for that configuration.

For non-VEDSR systems, execute Procedure 54 to upgrade the Mediation and Application guests.

Procedure 55 is used to upgrade the Mediation and Application guests for VEDSR systems.

K.2.1. Non-VEDSR Mediation and Application Guest Upgrade

This procedure updates the Mediation and Application guests in a non-VEDSR system.

Procedure 54. Non-VEDSR Mediation and Application Guest Upgrade

Step#	Procedure	Description
This procedure performs the IDIH Mediation and Application server upgrade for a non-VEDSR system. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

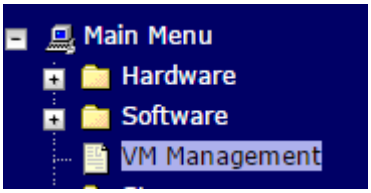
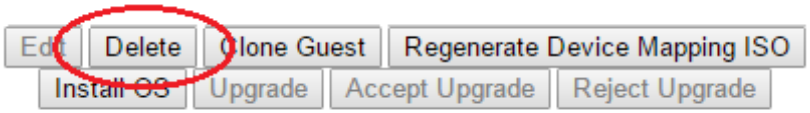
1.
☐
	PMAC CLI:
	Log into the PMAC server
		Log into the PMAC server as the admusr user.
		`ssh <PMAC IP address>`
		`login as: admusr`
		`password: <enter password>`

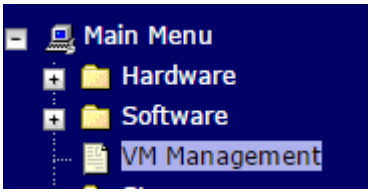
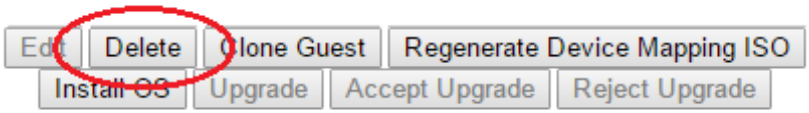
2. ☐	**PMAC CLI**: Save existing fdc.cfg file	If an fdc.cfg file exists in **/var/TKLC/smac/guest-dropin**, rename the file to **fdc.cfg-old**. The contents of the file are referenced in step 4.
3. ☐	**PMAC CLI**: Copy the fdc.cfg file to the guest	Copy the fdc.cfg file to the pmac guest-dropin directory using the command: `sudo cp /usr/TKLC/smac/html/TPD/mediation-*/fdc.cfg /var/TKLC/smac/guest-dropin`
4. ☐	**PMAC CLI**: Configure the fdc.cfg file	Edit the fdc.cfg file for the Mediation and Application guest installation. See Appendix Y for a breakdown of the fdc.cfg file parameters. Update the software versions, hostnames, bond interfaces, network addresses, and network vlan information for the Mediation and Application guests being installed. The old fdc.cfg file saved in step 2 can be used as a reference for obtaining the hostnames, bond interfaces, network addresses, and network vlan information. Do not copy the software versions from the old fdc.cfg file.

5.
☐
	PMAC CLI:
	Run the FDC creation script
		Run the FDC creation script using the config file created in step 4.
		`$ cd /var/TKLC/smac/guest-dropin`
		`$ /usr/TKLC/smac/html/TPD/mediation- x.x.x.x.x_x.x.x -x86_64/fdc.sh fdc.cfg`
		Note: Rename the **fdc.cfg** file as desired. Also, note that two files are generated by the fdc shell script. One is for the installation procedure and the other file is used for the upgrade procedure. The upgrade FDC is named upgrade.

Step#	Procedure	Description

6.
☐
	PMAC CLI:
	Reset the guest creation timeout
		1. Enter the following command to reset the guest creation timeout value.
		`$ sudo sqlite3 /usr/TKLC/plat/etc/TKLCfd-config/db/fdcRepo.fdcdb 'update params set value=3000 where name="DEFAULT_CREATE_GUEST_TIMEOUT"';`
		2. Increase timeout values (workaround to be applied in PMAC before starting the installation):
		`sudo pmacadm setParam --paramName=defaultTpdProvdTimeout --paramValue=120`
		`sudo pmacadm setParam --paramName=guestDiskDeployTimeout --paramValue=50`

7. ☐	**PMAC GUI**: Log into PMAC	1. Using a web browser, navigate to: `<pmac ip address>` 2. Login as **guiadmin** user.
8. ☐	**PMAC GUI**: Remove existing Application Server	1. Navigate to **Main Menu > VM Management**.  2. Select the Application guest. 3. Click **Delete**. 

Step#	Procedure	Description
9. ☐	**PMAC GUI**: Remove existing Mediation Server	1. Navigate to **Main Menu > VM Management**.  2. Select the Mediation guest. 3. Click **Delete**. 

10. ☐	**PMAC CLI**: Establish SSH session and login	Use an SSH client to connect to the PMAC:
		`ssh <PMAC IP address>`
		`login as: admusr`
		`password: <enter password>`

11. ☐	**PMAC CLI**: Reinstall the Mediation and Application servers	The upgrade config file must be used in the following command, or the database is destroyed and all database data is lost. Execute the following command, using the upgrade file: `sudo fdconfig config --file=hostname-upgrade_xx-xx-xx.xml` Starting with release 8.0, the installation is archive-based installation. The basic installation procedure is the same. All the changes happened to the **fdc xml** script file, so make sure you generate the fdc xml script file using the fdc.sh and fdc.cfg. See step 5.
12. ☐	**PMAC GUI**: Monitor installation	From the PMAC GUI, monitor the IDIH installation on the Task Monitoring page until the installation is complete.
13. ☐	Reconfiguration	Reconfigure the system ***Note***: If upgrading from 8.0 and later, all application server and mediation server configuration is lost. Follow the customer specific site configuration steps to re-configure the system.
14. ☐	**NOAM CLI**: Reset SOAP password	In case upgrading to release IDIH 8.2.1, reset the SOAP password to allow self-authentication of DSR with IDIH to send traces. Refer BB.8.

K.2.2. VEDSR Mediation and Application Guest Upgrade

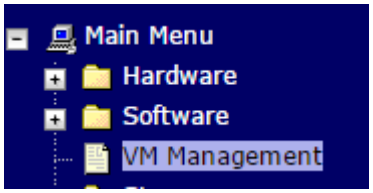
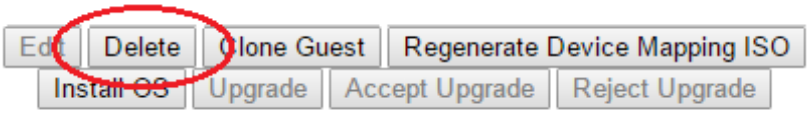
This procedure updates the Mediation and Application guests in a VEDSR system. In order to upgrade the guests, the installation fdconfig file is copied and modified before the fdconfig utility is run to recreate the guests.

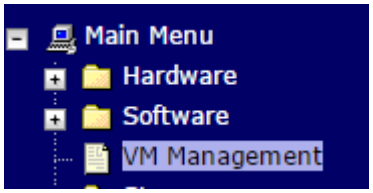
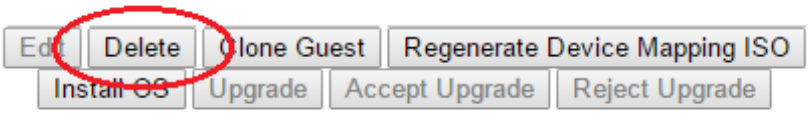
Procedure 55. VEDSR Mediation and Application Guest Upgrade

Step#	Procedure	Description
This procedure performs the IDIH Mediation and Application server upgrade for a VEDSR system. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	TVOE Host CLI: Establish SSH session and login	Use an SSH client to connect to the TVOE host:
		`ssh <TVOE host IP address>`
		`login as: admusr`
		`password: <enter password>`

2.
☐
	TVOE Host: Note the CPU Pinning allocations	Execute the following commands to allocate CPU sets for EACH (including the PMAC(s)) VM configured:
		`$ cd /var/TKLC/upgrade`
		Print the current CPU pinning allocations:
		`$ sudo ./cpuset.py –show`
		Note the mapping of cpuset values to Mediation and Application VMs.
		For example:
		`[admusr@CRV-TVOE-6 upgrade]$ sudo ./cpuset.py --show`
		`VM Domain Name  vcpus  cpuset  numa  state`
		`CRV_EX_Ipfe_B_2  4  30-31,66-67  1  running`
		`CRV_EX_Sbr_S_3  14  8-14,44-50  0  running`
		`CRV_EX_Soam_2  4  18-19,54-55  1  running`
		`CRV_EX_Damp_5  12  24-29,60-65  1  running`
		`CRV_EX_Ipfe_A_2  4  32-33,68-69  1  running`
		`CRV_EX_Dp_1  6  15-17,51-53  0  running`
		`CRV_EX_Sbr_B_3  12  2-7,38-43  0  running`
		`APP  4  20-21,56-57  1  running`
		`NUMA node 0 Free CPUs: count = 0 []`
		`NUMA node 1 Free CPUs: count = 8 [22, 23, 34, 35, 58, 59, 70, 71]`

Step#	Procedure	Description
3. ☐	**PMAC GUI**: Log into PMAC	1. Using a web browser, navigate to: `<pmac ip address>` 2. Login as **guiadmin** user.
4. ☐	**PMAC GUI**: Remove existing Application Server	1. Navigate to **Main Menu > VM Management**.  2. Select the Application guest. 3. Click **Delete**. 

Step#	Procedure	Description
5. ☐	**PMAC GUI**: Remove existing Mediation Server	1. Navigate to **Main Menu > VM Management**  2. Select the Mediation guest. 3. Click **Delete**. 

6.
☐
	PMAC CLI:
	Establish SSH session and login
		Use an SSH client to connect to the PMAC:
		`ssh <PMAC IP address>`
		`login as: admusr`
		`password: <enter password>`

7.
☐
	PMAC CLI: Create upgrade fdconfig file from a template	An upgrade configuration file is created by copying the installation config file, and modifying the copy to support upgrade.
		1. Navigate to **/var/TKLC/smac/guest-dropin**.
		`$ cd /var/TKLC/smac/guest-dropin`
		2. Copy the vedsr upgrade template from the mediation directory using the below command:
		`sudo cp /usr/TKLC/smac/html/TPD/mediation-x.x.x.0.0_x.x.x-x86_64/vedsr_idih_upgrade.xml.template`
		3. Remove the `.template` extension and update the software versions, hostnames, bond interfaces, network addresses, and network VLAN information for the TVOE host and IDIH guests to be upgraded. Refer to Appendix P for a breakdown of the config file.

8. ☐	**PMAC CLI**: Reset the guest creation timeout	Enter the following command to reset the guest creation timeout value. `$ sudo sqlite3 /usr/TKLC/plat/etc/TKLCfd-config/db/fdcRepo.fdcdb 'update params set value=3000 where name="DEFAULT_CREATE_GUEST_TIMEOUT"';`

Step#	Procedure	Description

9.
☐
	PMAC CLI: Modify the upgrade config file	The Oracle guest stanza must be removed from the newly created upgrade config file. Failure to do so causes the Oracle guest server to be re-installed.
		1. Edit the upgrade config file and locate the Oracle guest stanza. The sections to be removed are highlighted in the config file excerpt shown:
		`<!--REMOVE_FOR_DR_START (DO NOT remove this line! )-->`
		`<!--Oracle Guest Configuration-->`
		`<tvoeguest id="ORA">`
		`<infrastructure>PMAC</infrastructure>`
		`<tvoehost>mgmtsrvrtvoe</tvoehost>`
		`<!--Oracle Guest Profile: Update if hardware is Gen6 default is Gen8-->`
		`<!--profile>ORA_GEN6</profile-->`
		`<profile>ORA_GEN8</profile>`
		`<postdeploy>`
		`<scriptfile id="oraHealthcheck">`
		`<filename>/usr/bin/sudo</filename>`
		`<arguments>/usr/TKLC/xIH/plat/bin/ana...`
		`</scriptfile>`
		`</postdeploy>`
		`</scripts>`
		`</tvoeguest>`
		`<!--REMOVE_FOR_DR_END (DO NOT remove this line! )-->`
		2. In the **<infrastructures>** section of the upgrade config file, update the **tpd**, **ora**, **med**, and **app** release numbers to reflect the target release.
		Config file excerpt. Update the highlighted values.
		`<image id="tvoe">`
		`<name>TVOE-3.0.2.0.0_86.28.0-x86_64</name>`
		`</image>`

10. ☐	**PMAC CLI**: Reinstall the Mediation and Application servers	The **upgrade** config file must be used in the following command, or the database is destroyed, and all database data is lost. Execute the following command, using the upgrade file: `sudo fdconfig config --file=hostname-upgrade_xx-xx-xx.xml`
11. ☐	**PMAC GUI**: Monitor installation	From the PMAC GUI, monitor the IDIH installation on the Task Monitoring page until the installation is complete.

Step#	Procedure	Description

12.
☐
	TVOE Host:
	Execute the CPU Pinning script
		Establish an SSH session to the TVOE Host, login as admusr.
		Print the current CPU pinning allocations:
		`$ cd /var/TKLC/upgrade`
		`$ sudo ./cpuset.py --show`
		For Example:-
		`[admusr@CRV-TVOE-6 upgrade]$ sudo ./cpuset.py --show`
		`VM Domain Name  vcpus  cpuset  numa  state`
		`CRV_EX_Ipfe_B_2  4  30-31,66-67  1  running`
		`CRV_EX_Sbr_S_3  14  8-14,44-50  0  running`
		`CRV_EX_Soam_2  4  18-19,54-55  1  running`
		`CRV_EX_Damp_5  12  24-29,60-65  1  running`
		`CRV_EX_Ipfe_A_2  4  32-33,68-69  1  running`
		`CRV_EX_Dp_1  6  15-17,51-53  0  running`
		`CRV_EX_Sbr_B_3  12  2-7,38-43  0  running`
		`APP  4  20-21,56-57  1  running`
		`NUMA node 0 Free CPUs: count = 0 []`
		`NUMA node 1 Free CPUs: count = 8 [22, 23, 34, 35, 58, 59, 70, 71]`
		If we **DO NOT** see **None** for either cpuset or numa (or both), we first clear the pinning for those VMs using following command:
		`[admusr@CRV-TVOE-6 upgrade ~]$ sudo ./cpuset.py --clear=APP`
		`Successful. Domain APP must be restarted for changes to take affect`
		Have the mapping of the VMs to cpuset ready which was determined from step 2.
		Execute the following to allocate CPU pinning on EACH VM according to the mapping:
		`$ sudo ./cpuset.py --set=<VM Name> --cpuset=<cpuset>`
		Example:
		`[admusr@CRV-TVOE-6 upgrade ~]$ sudo ./cpuset.py --set=APP –cpuset=20-21,56-57`
		`Successful. Domain APP must be restarted for changes to take affect`
		Note: Execute the CPU pinning script for both the application and mediation server VMs.

13.
☐
	TVOE Host:
	Restart the VMs or TVOE host
		Restart the VMs for which the pinning has been assigned or modified using below command:
		`[admusr@CRV-TVOE-6 ~]$ sudo virsh shutdown <VM Name>`
		`[admusr@CRV-TVOE-6 ~]$ sudo virsh start <VM Name>`
		Alternately, we can restart the entire TVOE sever using below command:
		`$ sudo init 6`

Step#	Procedure	Description

14. ☐	**TVOE Host**: Verify CPU pinning	Once the TVOE host is restarted, establish an SSH session to the TVOE Host, login as admusr.
		Verify the CPU pinning is allocated as set in step 12. by executing the following commands:
		`$ cd /var/TKLC/upgrade`
		Print the newly allocated CPU pinning allocations and cross check with the mapping:
		For example:
		`[admusr@CRV-TVOE-6 upgrade]$ sudo ./cpuset.py --show`
		`VM Domain Name  vcpus  cpuset  numa  state`
		`CRV_EX_Ipfe_B_2  4  30-31,66-67  1  running`
		`CRV_EX_Sbr_S_3  14  8-14,44-50  0  running`
		`CRV_EX_Soam_2  4  18-19,54-55  1  running`
		`CRV_EX_Damp_5  12  24-29,60-65  1  running`
		`CRV_EX_Ipfe_A_2  4  32-33,68-69  1  running`
		`CRV_EX_Dp_1  6  15-17,51-53  0  running`
		`CRV_EX_Sbr_B_3  12  2-7,38-43  0  running`
		`APP  4  20-21,56-57  1  running`
		`NUMA node 0 Free CPUs: count = 0 []`
		`NUMA node 1 Free CPUs: count = 8 [22, 23, 34, 35, 58, 59, 70, 71]`

15. ☐	Repeat for each TVOE host	Repeat this procedure for each TVOE host.
16. ☐	**NOAM CLI**: Reset SOAP password	In case upgrading to release IDIH 8.2.1, reset the SOAP password to allow self-authentication of DSR with IDIH to send traces. Refer BB.8.

Appendix L. Alternate Server Upgrade Procedures

The procedures in this section provide alternative ways of upgrading various server types, using an array of differing methods. All of the procedures in this section are secondary to the upgrade methods provided in Section 3.6 and Section 4.6. These procedures should be used only when directed by My Oracle Support (MOS) or by other procedures within this document.

L.1. Alternate Pre-Upgrade Backup

This procedure is an alternative to the normal pre-upgrade backup provided in Procedure 16. It is recommended that this procedure be executed only under the direction of My Oracle Support (MOS).

Procedure 56. Alternate Pre-Upgrade Backup

Step#	Procedure	Description
This procedure is a manual alternative backup. The procedure conducts a full backup of the Configuration database and run environment on site being upgraded, so that each server has the latest data to perform a backout, if necessary. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

Step#	Procedure	Description
1. ☐	**Active SOAM CLI**: Log into the active SOAM	Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the active SOAM: `ssh admusr@<SOAM_VIP>`
2. ☐	**Active SOAM CLI**: Start a screen session	Enter the command: `$ screen` The screen tool creates a no-hang-up shell session, so the command continues to execute if the user session is lost.

3. ☐	**Active SOAM CLI**: Execute a backup of all servers managed from the SOAM to be upgraded	Execute the **backupAllHosts** utility on the active SOAM. This utility remotely accesses each specified server, and runs the backup command for that server.
		The **--site** parameter allows the user to backup all servers associated with a given SOAM site to be upgraded:
		WARNING: Failure to include the --site parameter with the backupAllHosts command results in overwriting the NOAM backup file created in Section 3.4.4. Backing out to the previous release is not possible if the file is overwritten.
		`$ /usr/TKLC/dpi/bin/backupAllHosts --site=<NEName>`
		where **<NEName>** is the Network Element Name (**NEName**) as seen using the following command:
		`$ iqt NetworkElement`
		This output displays when executing either of the options:
		`Do you want to remove the old backup files (if exists ) from all the servers (y/[n])?y`
		It may take from 10 to 30 minutes for this command to complete, depending upon the number of servers and the data in the database.
		Do not proceed until the backup on each server is completed.
		Output similar to the following indicates successful completion:
		`Script Completed. Status:`
		`HOSTNAME | STATUS`
		`---`
		`HPC3blade02 | PASS`
		`HPC3blade01 | PASS`
		`HPC3blade03 | PASS`
		`HPC3blade04 | PASS`
		Errors also report to the command line.
		Note: There is no progress indication for this command; only the final report when it completes.

4. ☐	**Active SOAM CLI**: Exit the screen session	`# exit`
		`[screen is terminating]`
		Note: **screen -ls** is used to show active screen sessions on a server, and **screen -dr** is used to re-enter a disconnected screen session.

Step#	Procedure	Description

5.
☐
	ALTERNATIVE METHOD (Optional)
	Server CLI: If needed, the Alternative backup method can be executed on each individual server instead of using the **backupAllHosts** script
		Alternative: A manual back up can be executed on each server individually, rather than using the script. To do this, log into each server in the site individually, and execute the following command to manually generate a full backup on that server:
		`$ sudo /usr/TKLC/appworks/sbin/full_backup`
		Output similar to the following indicates successful completion:
		`Success: Full backup of COMCOL run env has completed.`
		`Archive file /var/TKLC/db/filemgmt/Backup.dsr.blade01.FullDBParts.SYSTEM_OAM.20140617_021502.UPG.tar.bz2 written in /var/TKLC/db/filemgmt.`
		`Archive file /var/TKLC/db/filemgmt/Backup.dsr.blade01.FullRunEnv.SYSTEM_OAM.20140617_021502.UPG.tar.bz2 written in /var/TKLC/db/filemgmt.`

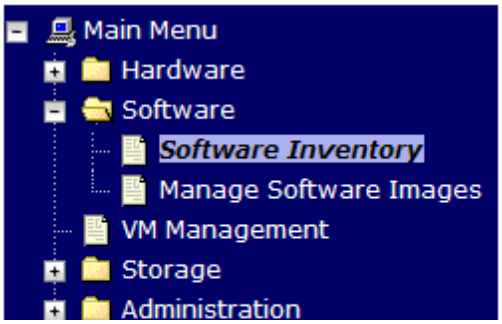
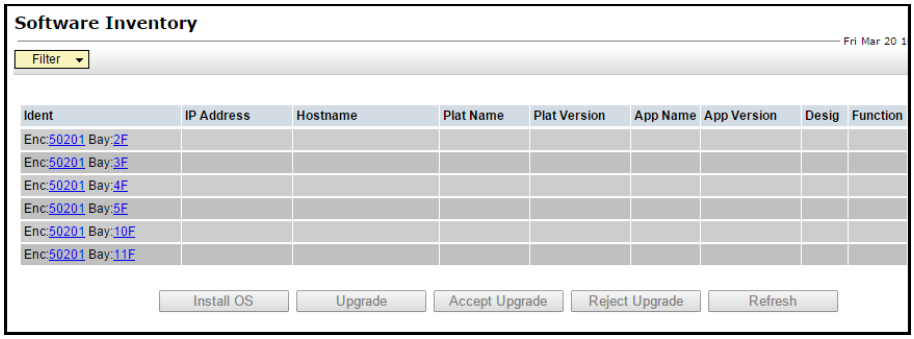
6.
☐
	Active NOAM VIP: Verify backup files are present on each server.	1. Log into the active NOAM GUI using the VIP.
		2. Navigate to **Status & Manage > Files**
		3. Click on each server tab, in turn
		4. For each server, verify the following (2) files have been created:
		`Backup.DSR.<server_name>.FullDBParts.NETWORK_OAMP.<time_stamp>.UPG.tar.bz2`
		`Backup.DSR.<server_name>.FullRunEnv.NETWORK_OAMP.<time_stamp>.UPG.tar.bz2`
		5. Repeat sub-steps 1 through 4 for each site.

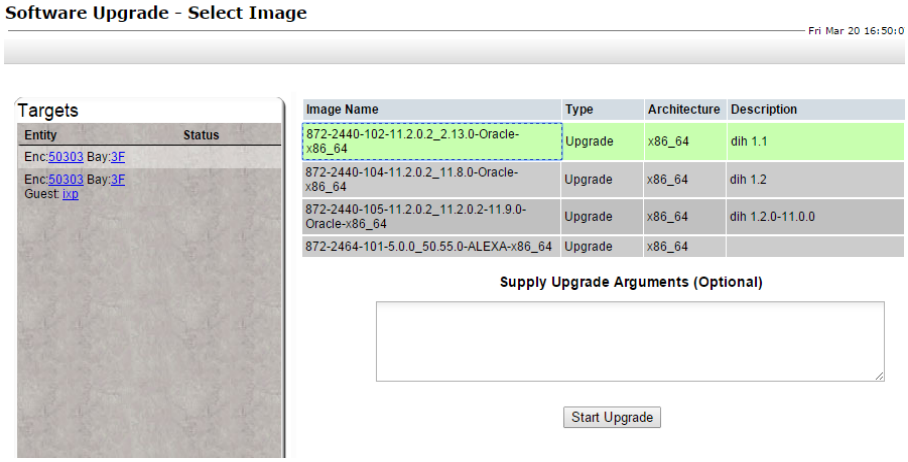
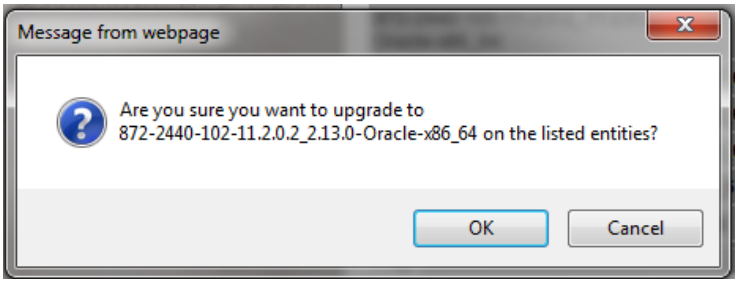
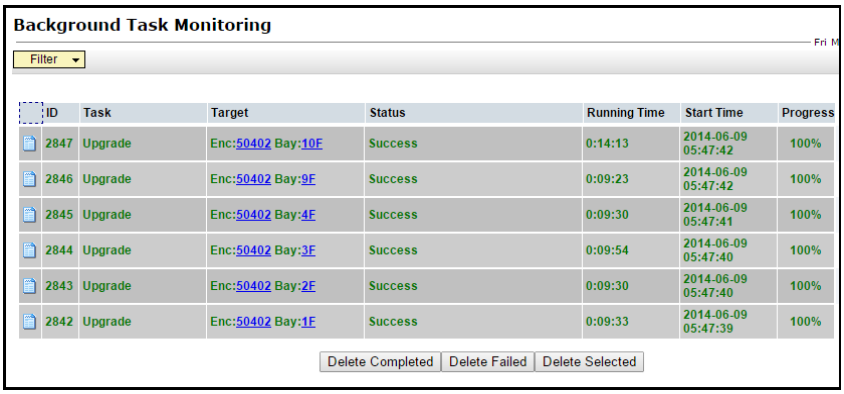
L.2. Server Upgrade Using PMAC

This appendix provides the procedure for upgrading the standby NOAM and DR-NOAM using the PMAC interface. This upgrade method is an alternative to using the NOAM Upgrade GUI, and is used only when the NOAM Upgrade GUI refresh is sluggish due to the large number of C-level servers.

Note: Before executing this procedure, download the target release ISO to the PMAC image repository in accordance with Appendix E.

Procedure 57. Alternate Server Upgrade using PMAC

Step#	Procedure	Description
This procedure performs an upgrade of one or more servers using the PMAC interface instead of the more typical NOAM Upgrade GUI. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**PMAC GUI**: Login	1. If needed, open a web browser and enter: `http://<pmac_management_ip>` 2. Login as the **guiadmin** user.
2. ☐	**PMAC GUI**: Navigate to Software Inventory	Navigate to **Software > Software Inventory**. 
3. ☐	**PMAC GUI**: Select server to be upgraded	1. Select the server(s) to upgrade. If upgrading more than one server at a time, select multiple servers by individually clicking multiple rows. Selected rows are highlighted.  2. Click **Upgrade**. ***Note***: Until the target servers are fully discovered by PMAC, the user is unable to start an upgrade on the servers. A server that has not yet been discovered is represented by an empty row on the Software Inventory page (no IP address, hostname, plat name, plat version, etc., displays).

Step#	Procedure	Description
4. ☐	**PMAC GUI**: Select the target release ISO	1. The left side of the screen displays the servers to upgrade. From the list of upgrade images on the right side of the screen, select the image to install on the selected servers.  2. Click **Start Upgrade**.
5. ☐	**PMAC GUI**: Start the upgrade	Click **OK** to proceed with the upgrade. 
6. ☐	**PMAC GUI**: Monitor the upgrade	Navigate to **Main Menu > Task Monitoring** to monitor the progress of the Upgrade background task. A separate task displays for each server being upgraded.  When the task is complete and successful, the text changes color and the Progress column indicates **100%**. The alternate server upgrade procedure is now complete. Return to the overall DSR upgrade procedure step that directed the execution of Appendix J.2

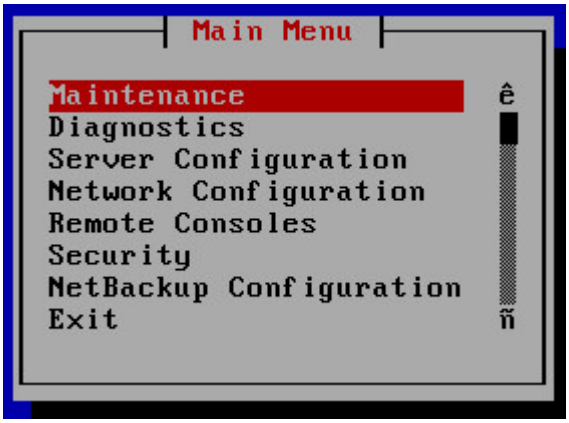
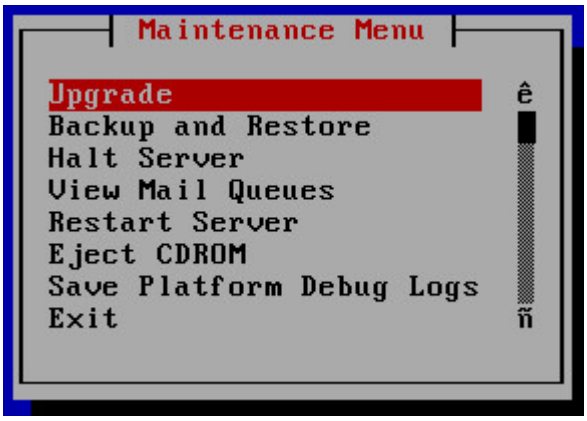
L.3. Server Upgrade Using platcfg

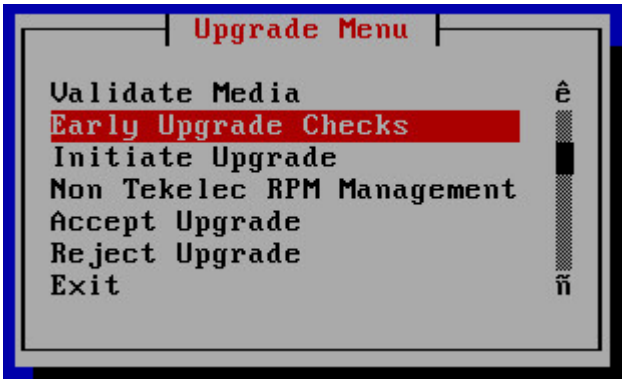
The procedure provided in this appendix enables a server to be upgraded using the Platform Configuration (platcfg) utility. This procedure should be used only under the guidance and direction of My Oracle Support (MOS).

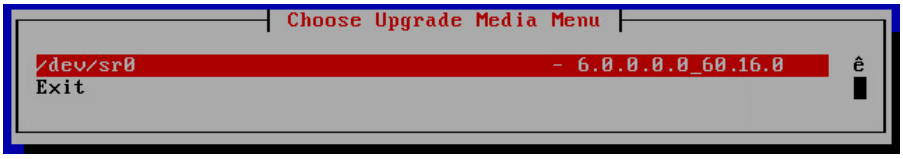
Procedure 58. Server Upgrade Using platcfg

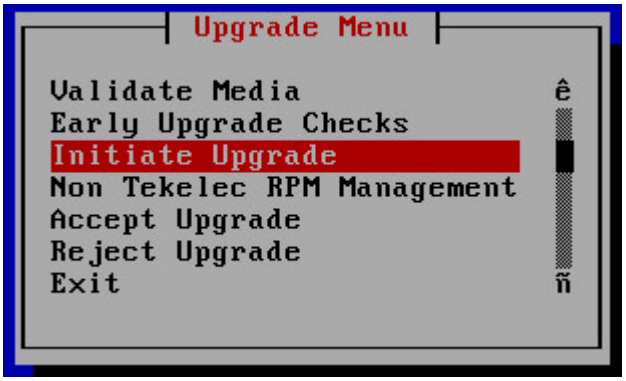
Step#	Procedure	Description
This procedure upgrades a server using the platcfg utility. ***Note***: All UI displays are sample representations of upgrade screens. The actual display may vary slightly for those shown. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Server CLI: Log into the server console to be upgraded	Use the SSH command (on UNIX systems – or putty if running on windows) to log into the server to be upgraded:
		`ssh admusr@<server IP>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.

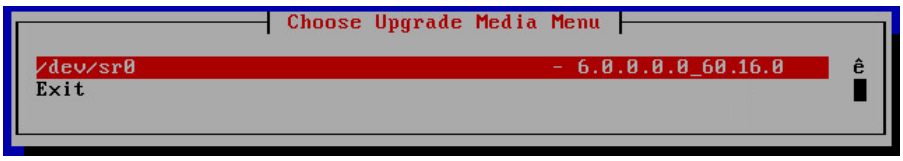
2. ☐	**Server CLI**: Enter the platcfg menu	Switch to the platcfg user to start the configuration menu. `$ sudo su - platcfg` From the Main Menu, select **Maintenance** 
3. ☐	**Server CLI**: Select upgrade	From the Maintenance Menu, select **Upgrade**. 

Step#	Procedure	Description
4. ☐	**Server CLI**: Select early upgrade checks	From the Upgrade Menu, select **Early Upgrade Checks**. 

5. ☐	**Server CLI**: Select the upgrade media	1. From the Choose Upgrade Media Menu, select the desired target media. This begins the early upgrade checks in the console window.
		 
		
		Informational messages display as the checks progress. At the end of a successful test, a message similar to this displays:
		`Running earlyUpgradeChecks() for Upgrade::EarlyPolicy::TPDEarlyChecks upgrade policy...`
		`Verified server is not pending accept of previous upgrade`
		`Hardware architectures match`
		`Install products match.`
		`Verified server is alarm free!`
		`Early Upgrade Checks Have Passed!`
		2. Verify early upgrade checks pass. In case of errors, it is recommended to contact My Oracle Support (MOS).
		3. Press **q** to exit the screen session and return to the platcfg menu.
		4. From the Choose Upgrade Media Menu, select **Exit**.

6. ☐	**Server CLI**: Initiate the upgrade	From the Upgrade Menu, select **Initiate Upgrade**. 

Step#	Procedure	Description

7.
☐
	Server CLI:
	Select the upgrade media
		The screen displays a message that it is searching for upgrade media. Once the upgrade media is found, an Upgrade Media selection menu displayed similar to the example shown.
		From the Choose Upgrade Media Menu, select the desired target media. This begins the server upgrade.
		 
		
		Many informational messages display on the terminal screen as the upgrade proceeds.
		After upgrade is complete, the server reboots.
		`A reboot of the server is required.`
		`The server will be rebooted in 10 seconds`

8.
☐
	Server CLI: Log into the server to be upgraded	Use the SSH command (on UNIX systems – or putty if running on windows) to log into the server to be upgraded:
		`ssh admusr@<server IP>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.

9. ☐	**Server CLI**: Check for upgrade errors	1. Examine the upgrade logs in the directory /var/TKLC/log/upgrade and verify no errors were reported. `grep -i error /var/TKLC/log/upgrade/upgrade.log` 2. Examine the output of the command to determine if any errors were reported. 3. If the upgrade fails, collect the following files: /var/TKLC/log/upgrade/upgrade.log /var/TKLC/log/upgrade/ugwrap.log /var/TKLC/log/upgrade/earlyChecks.log /var/TKLC/log/platcfg/upgrade.log 4. It is recommended to contact My Oracle Support (MOS) by referring to Appendix CC of this document and provide these files.

10.
☐
	Server CLI:
	Verify the upgrade
		1. Check the upgrade log for the upgrade complete message
		`grep "UPGRADE IS COMPLETE" /var/TKLC/log/upgrade/upgrade.log`
		2. Verify the **UPGRADE IS COMPLETE** message displays. If not, it is recommended to contact My Oracle Support (MOS).
		`[admusr@NO2 ~]$ grep "UPGRADE IS COMPLETE" /var/TKLC/log/ upgrade/upgrade.log`
		`1407786220::  UPGRADE IS COMPLETE`

L.4. Manual DA-MP (N+0) Upgrade Procedure

Procedure 59 is used to manually upgrade a multi-active DA-MP Server Group. This procedure is provided as an alternative to the normal DA-MP upgrade procedures in Section 4.6.

Procedure 59 must be executed for all configured DA-MPs of a site, regardless of how the DA-MPs are grouped for upgrade. So if 16 DA-MPs are upgraded four at a time, then Procedure 59 must be executed four distinct times.

Procedure 59. Manual DA-MP (N+0) Upgrade Procedure

Step#	Procedure	Description
This procedure upgrades a multi-active DA-MP servers using the manual upgrade method. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Identify all the DA-MPs to be upgraded together	From the data captured in Table 5, identify the **DSR (multi-active cluster)** server group to be upgraded.
2. ☐	Upgrade DA-MP servers as identified in step 1	Upgrade up to (½) one half (no more than 50%) of the DA-MP servers in parallel using the Upgrade Multiple Servers procedure. ***Note***: When using the manual server upgrade method, it is recommended that the DA-MP leader be upgraded in the last group of servers to minimize DA-MP leader role changes. 1. Execute Appendix H Upgrade Multiple Servers – Upgrade Administration. 2. After successfully completing the procedure in Appendix H, return to this point and continue with the next step.
3. ☐	Repeat for all servers identified in step 1 of this procedure	Repeat step 2 of this procedure for the remaining DA-MP servers.

L.5. ASG SBR Upgrade Procedure

Procedure 60 is used to upgrade the SBR server group using Auto Server Group upgrade. This procedure is provided as an alternative to the normal SBR upgrade procedures in Section 4.6.

Procedure 60. ASG SBR Upgrade

Step#	Procedure	Description
This procedure upgrades the SBR server group using the automated server group upgrade option. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Identify the SBR server group(s) to upgrade	From the data captured in Table 5, identify the SBR server group(s) to upgrade. One server group can be executed at a time or multiple server groups can be executed simultaneously.
2. ☐	Upgrade SBR server group(s) identified in step 1 of this procedure using the upgrade multiple servers procedure	***Note***: The spare SBRs of this server group are located at different sites. 1. Use the Automated Server Group Upgrade option. 2. Select the Serial upgrade mode. 3. Execute Appendix H Upgrade Multiple Servers – Upgrade Administration.
3. ☐	Repeat for all SBR server groups with active, standby in Site 1 and spare in Site 2 (and an optional 2nd spare in Site 3)	Repeat step 2 for all remaining binding and session server groups to be upgraded.

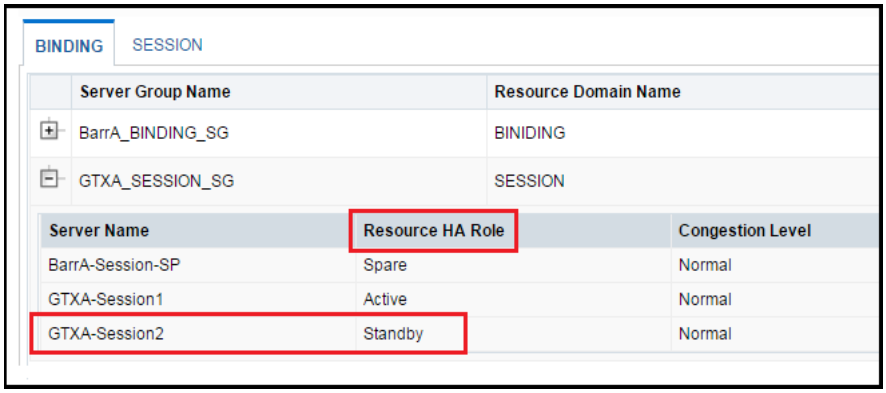
L.6. Manual SBR Upgrade Procedure

Procedure 61 is used to upgrade the SBR Server Group manually. This procedure is provided as an alternative to the normal SBR upgrade procedures in Section 4.6.

Note: Before upgrading the active SBR, it is imperative that the database audit of the spare and standby servers complete successfully. Failure to comply could result in a loss of session/binding data.

Procedure 61. Manual SBR Upgrade Procedure

Step#	Procedure	Description
This procedure upgrades an SBR server group using the manual upgrade option. ***Note***: This procedure upgrades all the servers in the server group; however, if it is recommended to upgrade one by one, such as spare, standby, and active in different upgrade iterations, upgrade those servers manually and then return to this procedure. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

Step#	Procedure	Description
1. ☐	**Active NOAM VIP**: Identify the active, standby, and spare SBR server group(s) to upgrade	1. From the data captured in Table 5, identify the server group(s) to upgrade. One server group can be executed at a time or multiple server groups can be executed simultaneously. 2. Log into the NOAM GUI using the VIP. 3. Navigate to **SBR > Maintenance > SBR Status.** Open each server group chosen in sub-step 1. Note which server is active, standby, and spare (as designated by the Resource HA Role) for each server group chosen for upgrade. The following figure provides an example: • GTXA-Session1 – Active • GTXA-Session2 – Standby • BarrA-Session-SP – Spare  BINDING SESSION Server Group Name / Resource Domain Name BarrA_BINDING_SG / BINIDING GTXA_SESSION_SG / SESSION Server Name / Resource HA Role / Congestion Level BarrA-Session-SP / Spare / Normal GTXA-Session1 / Active / Normal GTXA-Session2 / Standby / Normal ***Note***: SBR servers have two High Availability policies: one for controlling replication of session or binding data, and one for receipt of replicated configuration data from the NOAM and SOAM GUIs. During this upgrade procedure, ONLY the High Availability policy for replication of session or binding data is important. This means that the SBR Status screen MUST be used to determine the High Availability status (active, standby, or spare) of SBR servers. The HA Status screen and the OAM Max HA Role column on the Upgrade screen must NOT be used because they only show the status of the configuration replication policy. Because the two High Availability policies run independently, it is possible that a given server might be standby or spare for the session and binding replication policy, but active for the configuration replication policy. When this happens, it is necessary to ignore warnings on the Upgrade screen about selecting what it views as the active server (for the configuration replication policy).

Step#	Procedure	Description
2. ☐	**Active NOAM VIP**: Upgrade spare SBR server identified in step 1 of this procedure **(If need to be upgraded in this upgrade iteration)**	***Note***: The spare SBRs of this server group are located at different sites. 1. Execute Appendix F Upgrade Single Server – DSR 8.x. 2. After successfully completing the procedure in Appendix F, return to this point to monitor server status. 3. Navigate to **SBR > Maintenance > SBR Status**. Open the tab of the server group being upgraded. ***Note***: After executing Appendix F, the spare SBR temporarily disappears from the SBR Status screen. When the server comes back online, it reappears on the screen with a status of **Out of Service**. 4. Monitor the Resource HA Role status of the spare server. Wait for the status to transition from **Out of Service** to **Spare**. 5. If the system is equipped with a second spare SBR server, repeat sub-steps 1 thru 3 for the other spare. **Caution**: Do not proceed to step 3 until the Resource HA Role of the spare SBR server returns to **Spare**.
3. ☐	Upgrade standby SBR server identified in step 1 of this procedure **(If need to be upgraded in this upgrade iteration)**	1. Execute Appendix F Upgrade Single Server – DSR 8.x. 2. After successfully completing the procedure in Appendix F, return to this point and continue with the next step.
!!WARNING!!		Failure to comply with step 4 and step 5 may result in the loss of PCA traffic, resulting in service impact.
4. ☐	**Active NOAM VIP**: Verify standby SBR server status **(If need to be upgraded in this upgrade iteration)**	1. Navigate to **SBR > Maintenance > SBR Status**. Open the tab of the server group being upgraded. ***Note***: After executing Appendix F, the standby SBR temporarily disappears from the SBR Status screen, and the spare server assumes the standby role. When the upgraded server comes back online, it reappears on the screen with a status of **Out of Service**. 2. Monitor the Resource HA Role status of the upgraded server. Wait for the status to transition from **Out of Service** to **Standby**. **Caution**: Do not proceed to step 5 until the Resource HA Role of the upgraded server transitions to **Standby**.

Step#	Procedure	Description
5. ☐	**Active NOAM VIP:** Verify bulk download from the active SBR to the standby and spare SBRs completes **(If need to be upgraded in this upgrade iteration)**	1. Navigate to **Alarm & Event > View History**. 2. Export the Event log using the following filter: **Server Group**: Choose the SBR group that is in upgrade **Display Filter**: Event ID = 31127 – DB Replication Audit Complete **Collection Interval**: X hours ending in current time, where X is the time from upgrade completion of the standby and spare servers to the current time. 3. Wait for all instances of Event 31127: • 1 for the Standby binding SBR • 1 for the Standby session SBR • 1 for the Spare binding SBR • 1 for the Spare session SBR • 1 for the 3rd site Spare binding SBR (if equipped) • 1 for the 3rd site Spare session SBR (if equipped) ***Note***: There is an expected loss of traffic depending on size of the bulk download. This must be noted along with events captured.

6.
☐
	Active SBR (CLI):
	Verify the replication status for DB Replication and pSbrBindingPolicy (Binding SBR)
	or pSbrSessionPolicy (Session SBR)
		1. Use the SSH command (on UNIX systems – or putty if running on windows) to log into the active SBR of the first non-upgraded site:
		`ssh admusr@<SBR_XMI_IP>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		2. Execute command
		`irepstat -w`
		Verify replication is showing as **Active** for ActStb [DbReplication] policy, pSbrSessionPolicy (for Session SBR), and pSbrBindingPolicy (for Binding SBR).
		Do not proceed if replication is not **Active** for all of the resource.
		Example:
		`[admusr@StThomas-sSBR-A ~]$ irepstat -w`
		`StThomas-sSBR-A  C2706.068  StThomas-sSBR-A  11:19:19  [R]`
		`-- Policy 0 ActStb [DbReplication] ----------`
		`BC From D0 StThomas-SO2 Active 0 0.10 ^0.04%cpu 35.5/s`
		`CC To P0 StThomas-sSBR-B Active 0 0.10 1%S 0.08%cpu 48.3/s`
		`CC To P1 StThomas-sSBR-Sp Active 0 0.11 1%S 0.08%cpu 43.1/s`
		`-- Policy 20 pSbrSessionPolicy [pSbrSBaseRepl] ----------`
		`CC To P0 StThomas-sSBR-B Active 0 0.10 1%S 0.07%cpu 62.5/s`
		`CC To P1 StThomas-sSBR-Sp Active 0 0.10 1%S 0.08%cpu 56.2/s`

Step#	Procedure	Description
7. ☐	Upgrade active SBR server as identified in step 1 of this procedure **(If need to be upgraded in this upgrade iteration)**	1. Execute Appendix F Upgrade Single Server – Upgrade Administration – DSR 8.x. 2. After successfully completing the procedure in Appendix F, return to this point and continue with the next step.
8. ☐	Repeat for all SBR server groups with active, standby in Site 1 and spare in Site 2	Repeat this procedure for all remaining binding and session server groups to be upgraded.

Appendix M. Expired Password Workaround Procedure

This appendix provides the procedures to handle password expiration during upgrade. Procedure 62 is a temporary workaround to allow an expired password to be used on a non-upgrade site. This procedure is provided as a workaround when a password expires after the NOAM has been upgraded and before all sites have been upgraded.

The workaround must be removed using Procedure 63 after the site is upgraded. Failure to remove the workaround inhibits password aging on the server.

M.1. Inhibit Password Aging

This procedure describes a workaround that inhibits password aging on the SOAM. This procedure should be used only when the following conditions apply:

- An upgrade is in progress
- The NOAMs have been upgraded, but one or more sites have not been upgraded
- A login password has expired on a non-upgraded site

Once the workaround is executed, no passwords expire at that site. Remove the workaround once the site is upgraded.

Procedure 62. Expired Password Workaround Procedure

Step#	Procedure	Description
This procedure disables password aging on a server, allowing “expired” credentials to be used for login. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Active SOAM CLI: SSH to active SOAM server. Disable password aging	1. Use the SSH command (on UNIX systems – or putty if running on windows) to log into the active SOAM of the first non-upgraded site:
		`ssh admusr@<SOAM_VIP>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		2. Create a text file with the following content (exactly as formatted):
		`[production]`
		`aw.policy.pwchange.isExpired =`
		`aw.policy.db.checkPw =`
		`[development : production]`
		`[test : development]`
		3. Save the file as:
		`/var/TKLC/appworks/ini/pw.ini`
		4. Change the file permissions:
		`sudo chmod 644 pw.ini`
		5. Execute the following command:
		`clearCache`
		Note: For each server on which this workaround is enacted, the old **expired** password must be used for login. The new password used on the NOAM does not work on these servers.

2. ☐	Repeat for standby SOAM	Repeat step 1 for the standby SOAM
3. ☐	Repeat for all non-upgraded sites	Repeat steps 1 and 2 for all non-upgraded sites.

M.2. Enable Password Aging

This procedure removes the password expiration workaround that is enabled by Procedure 62.

Procedure 63. Expired Password Workaround Removal Procedure

Step#	Procedure	Description
This procedure removes the password aging workaround and re-enables password aging on a server. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Active SOAM CLI: SSH to active SOAM server. Re-enable password aging.	1. Use the SSH command (on UNIX systems – or putty if running on windows) to log into the active SOAM of the first non-upgraded site:
		`ssh admusr@<SOAM_VIP>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		2. Delete the pw.ini file:
		`$ sudo rm /var/TKLC/appworks/ini/pw.ini`
		3. Execute this command:
		`$ sudo clearCache`
		4. Repeat sub-steps 1 through 3 for the standby SOAM

2. ☐	Repeat for all non-upgraded sites	Repeat this procedure for all non-upgraded sites.

M.3. Password Reset

Procedure 64 resets the GUI Admin (guiadmin) password on the NOAM. In a backout scenario where the password expired during the upgrade, it is possible for the customer to get locked out due to global provisioning being disabled. When this happens, this procedure can be used to reset the password to gain access to the GUI.

Procedure 64. Expired Password Reset Procedure

Step#	Procedure	Description
This procedure resets the guiadmin password on the NOAM. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Active NOAM CLI: SSH to active NOAM server. Reset the password	1. Use the SSH command (on UNIX systems – or putty if running on windows) to log into the active NOAM:
		`ssh admusr@<NOAM_VIP>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.

Step#	Procedure	Description
2. ☐	**Active NOAM CLI**: Execute reset	1. Execute the reset command: `$ sudo /usr/TKLC/appworks/sbin/resetPassword guiadmin` 2. At the **Enter new Password for guiadmin** prompt, enter a new password. 3. Attempt to log into the NOAM GUI using the new password. If the login is not successful, it is recommended to contact My Oracle Support (MOS) for guidance.

Appendix N. Network IDIH Compatibility Procedures

The procedures in this appendix are used to provide IDIH compatibility when upgrading to release 8.2. Procedure 65 is performed on a release 8.2 IDIH to make the trace data viewable on prior release IDIH systems, as described in Section 1.7.2. This procedure must be performed on every IDIH 8.2 system from which trace data is expected.

When all IDIH systems have been upgraded to release 8.2, Procedure 66 must be executed on every IDIH on which Procedure 65 was previously performed.

Procedure 65. Enable IDIH 8.4 Compatibility

Step#	Procedure	Description
This procedure upgrades a server using the platcfg utility. ***Note***: All UI displays are sample representations of upgrade screens. The actual display may vary slightly for those shown. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1. ☐	**Appserver CLI**: Log into the appserver	Use the SSH command (on UNIX systems – or putty if running on windows) to log into the appserver:
		`ssh admusr@<server_ip>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.

2. ☐	**Appserver CLI**: Change user	Change to the system user tekelec: `sudo su – tekelecund`
3. ☐	**Appserver CLI**: Execute command	Execute the following command to enable backward compatibility `apps/ndih7-compat.sh enable`
4. ☐	Repeat as needed	Repeat this procedure on each IDIH 8.0/8.1 appserver as needed.

Procedure 66. Disable IDIH 8.2 Compatibility

Step#	Procedure	Description
This procedure upgrades a server using the platcfg utility. ***Note***: All UI displays are sample representations of upgrade screens. The actual display may vary slightly for those shown. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

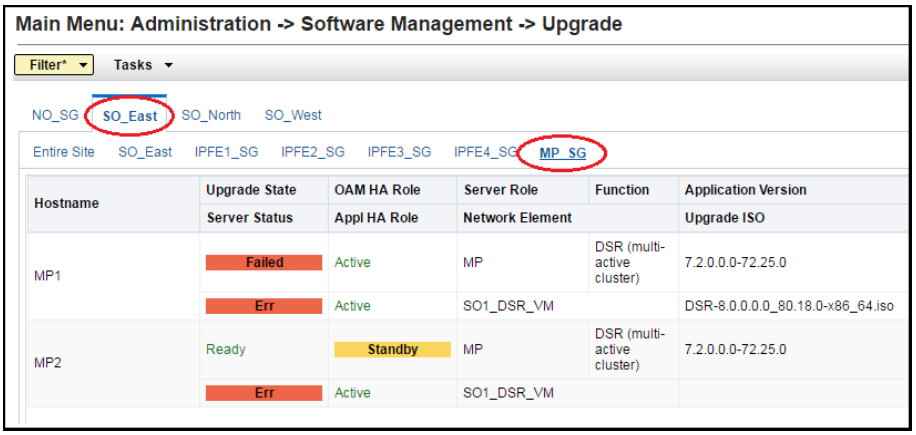
1.
☐
	Appserver CLI: Log into the appserver	Use the SSH command (on UNIX systems – or putty if running on windows) to log into the appserver:
		`ssh admusr@<server_ip>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.

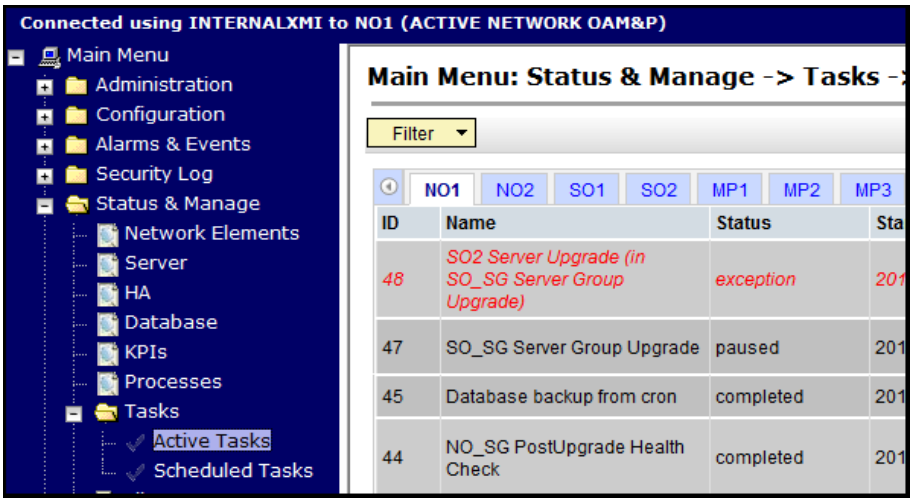
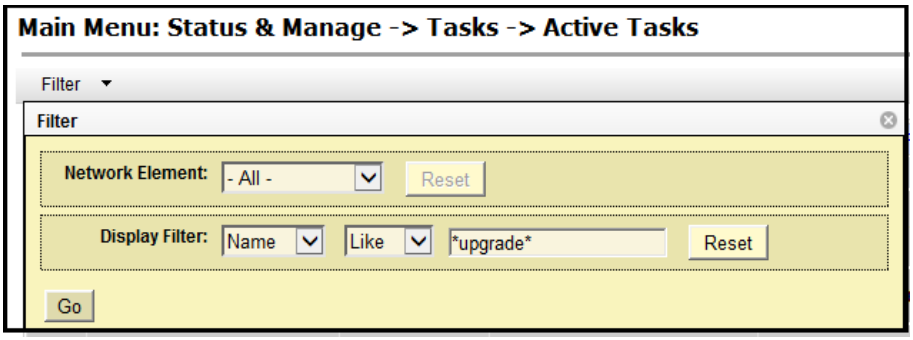
2. ☐	**Appserver CLI**: Change user	Change to the system user tekelec: `sudo su – tekelec`
3. ☐	**Appserver CLI**: Execute command	Execute this command to enable backward compatibility: `apps/ndih7-compat.sh disable`
4. ☐	Repeat as needed	Repeat this procedure on each IDIH 8.2 appserver as needed.

Appendix O. Recover from a Failed Upgrade

This procedure provides the steps required to recover a server after a failed upgrade. Due to the complexity of the DSR system and the nature of troubleshooting, it is recommended to contact My Oracle Support (MOS) for guidance while executing this procedure.

Procedure 67. Recover from a Failed Upgrade

Step#	Procedure	Description
This procedure provides the basic steps for returning a server to a normal state after an upgrade failure. ***Note***: The server is returned to the source release by this procedure. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Select affected server group containing the failed server	1. Log into the NOAM GUI using the VIP. 2. Navigate to **Administration > Software Management > Upgrade**. 3. Select the server group containing the failed server.  • If the failed server was upgraded manually, or by using the Upgrade Server option, then **skip to step 7** of this procedure. • If the failed server was upgraded using the Auto Upgrade option, then **continue with step 2** of this procedure.

Step#	Procedure	Description
2. ☐	**Active NOAM VIP**: Navigate to the Active Tasks screen to view active tasks	Navigate to **Status & Manage > Tasks > Active Tasks**. 
3. ☐	**Active NOAM VIP**: Use the filter to locate the server group upgrade task	1. From the **Filter** option, enter the following filter values: Network Element: **All** Display Filter: **Name Like *Upgrade*** 2. Click **Go**. 
4. ☐	**Active NOAM VIP**: Identify the upgrade task	In the search results list, locate the **Server Group Upgrade** task. 1. If not already selected, select the tab displaying the hostname of the active NOAM server. 2. Locate the task for the **Server Group Upgrade**. It shows a status of **paused**.

Step#	Procedure	Description
		Main Menu: Status & Manage -> Tasks -> Active Tasks (Filtered) Filter NO1 NO2 SO1 SO2 MP1 MP2 MP3 MP4 MP6 MP8 MP9 MP10 MP11 MP12 ID | Name | Status | Start Time | Update Time 48 | *SO2 Server Upgrade (in SO_SG Server Group Upgrade)* | *exception* | *2016-03-23 13:38:36 UTC* | *2016-03-23 13:40:11 UTC* 47 | SO_SG Server Group Upgrade | paused | 2016-03-23 13:38:26 UTC | 2016-03-23 13:40:07 UTC 46 | *SO2 Server Upgrade* | *exception* | *2016-03-23 13:14:10 UTC* | *2016-03-23 13:16:01 UTC* 44 | NO_SG PostUpgrade Health Check | completed | 2016-03-22 17:14:51 UTC | 2016-03-22 17:15:06 UTC 42 | NO_SG PreUpgrade Health Check | completed | 2016-03-21 14:56:08 UTC | 2016-03-21 14:56:19 UTC ***Note***: Consider the case of an upgrade cycle where the upgrade of one or more servers in the server group has a status as exception (for example, failed), while the other servers in that server group have upgraded successfully; however, the server group upgrade task still shows as running. In this case, cancel the running (upgrade) task for the server group before reattempting ASU for the same. **Caution**: Before clicking **Cancel** for the server group upgrade task, ensure the upgrade status of the individual servers in that particular server group should have status as completed or exception (that is, failed for some reason). Make sure you are not cancelling a task with some servers still in running state.
5. ☐	**Active NOAM VIP**: Cancel the Server Group Upgrade task	1. Click the Server Group Upgrade task to select it. 2. Click **Cancel** to cancel the task. 3. Click **OK** on the confirmation screen to confirm the cancellation. **Main Menu: Status & Manage -> Tasks -> Active Tasks (Filtered)** Filter NO1 NO2 SO1 SO2 MP1 MP2 MP3 MP4 MP6 MP8 MP9 MP ID | Name | Status | Start Time | Update T 48 | *SO2 Server Upgrade (in SO_SG Server Group Upgrade)* | *exception* | *2016-03-23 13:38:36 UTC* | *2016-03-* 47 | SO_SG Server Group Upgrade | paused | 2016-03-23 13:38:26 UTC | 2016-03- 46 | *SO2 Server Upgrade* | *exception* | *2016-03-23 13:14:10 UTC* | *2016-03-* Pause Restart Cancel Delete Report Delete All Completed Delete All Exce

Step#	Procedure	Description
6. ☐	**Active NOAM VIP**: Verify the Server Group Upgrade task is cancelled	On the Active Tasks screen, verify the task that was cancelled in step 5 shows a status of **completed**. 47 SO_SG Server Group Upgrade completed 2016-03-23 13:38:26 UTC 2016-03-23 16:24:27 UTC SG upgrade task cancelled by user. 5%

7. ☐	**Failed Server CLI**: Inspect upgrade log	Log into the failed server to inspect the upgrade log for the cause of the failure.
		1. Use an SSH client to connect to the failed server:
		`ssh <XMI IP address>`
		`login as: admusr`
		`password: <enter password>`
		Note: The static XMI IP address for each server should be available in Table 5.
		2. View or edit the upgrade log at **/var/TKLC/log/upgrade/upgrade.log** for clues to the cause of the upgrade failure.
		3. If the upgrade log contains a message similar to the following, inspect the early upgrade log at **/var/TKLC/log/upgrade/earlyChecks.log** for additional clues.
		`1440613685::Early Checks failed for the next upgrade`
		`1440613691::Look at earlyChecks.log for more info`

		• Although outside of the scope of this document, the user is expected to use standard troubleshooting techniques to clear the alarm condition from the failed server. • If troubleshooting assistance is needed, it is recommended to contact My Oracle Support (MOS) as described in Appendix CC. • DO NOT PROCEED TO STEP 2 OF THIS PROCEDURE UNTIL THE ALARM CONDITION HAS BEEN CLEARED!

8. ☐	**Failed Server CLI**: Verify platform alarms are cleared from the failed server	Use the alarmMgr utility to verify all platform alarms have been cleared from the system.
		`$ sudo alarmMgr --alarmstatus`
		Example output:
		`[admusr@SO2 ~]$ sudo alarmMgr --alarmstatus`
		`SEQ: 2 UPTIME: 827913 BIRTH: 1458738821 TYPE: SET ALARM: TKSPLATMI10|tpdNTPDaemonNotSynchronizedWarning|1.3.6.1.4.1.323.5.3.18.4.1.3.10|32509|Communications|Communications Subsystem Failure`
		user troubleshoots alarm and is able to resolve NTP sync issue and clear alarm
		`[admusr@SO2 ~]$ sudo alarmMgr --alarmstatus`
		`[admusr@SO2 ~]$`

Step#	Procedure	Description
9. ☐	**Active NOAM VIP**: Re-execute the server upgrade	Return to the upgrade procedure being executed when the failure occurred. Re-execute the upgrade for the failed server using the Upgrade Server option. ***Note***: Once a server has failed while using the Automated Server Group Upgrade option, the Auto Upgrade option cannot be used again on that server group. The remaining servers in that server group must be upgraded using the Upgrade Server option.

Appendix P. Critical and Major Alarms Analysis

This procedure identifies critical and major alarms that should be resolved before proceeding with an upgrade and backout.

Note: During any time of upgrade if the **31149- DB Late Write Nonactive** alarm displays, ignore it. This alarm does not have any effect on functionality.

Procedure 68. Verify Critical and Major Alarms in the System Before the Upgrade

Step#	Procedure	Description
This procedure identifies the current alarms in the system before an upgrade can start. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Active NOAM VIP**: Log/View all current alarms at the NOAM	1. Navigate to **Alarms & Events > View Active**. 2. Click **Report** to generate an Alarms report. 3. Save the report and/or print the report.

Step#	Procedure	Description
2. ☐	Analyze the active alarms data	Reference Table 26 and Table 27 for the alarms. If any alarms listed in the Table 26 and Table 27 display in the system, resolve the alarms before starting the upgrade. **Refer to Reference [14] DSR Alarms and KPIs Reference for specific alarm in-depth details.** Two categories from the alarm list. **High impact alarms** It's almost certain the presence of this alarm ID in the active alarm list should prevent upgrade from continuing. Alarms of this category should be resolved before upgrading. **Medium impact alarms** It's likely/possible the presence of this alarm ID should prevent upgrade from continuing; concurrence needed. Alarms of this category may/mayn't be resolved before upgrading. Some ideas of inclusion of alarms in the categories include. • Any alarm indicating an actual hardware error, or an impending/potential hardware error, is automatically mentioned in high impact alarm list. Included in this category are all Platform Group alarms (PLAT) of severity Minor, Major, and Critical. • If an alarm ID indicates some sort of (pending) resource exhaustion issue or other threshold crossed condition, it is almost always mentioned in Medium impact alarms. Resource exhaustion states have to be fixed before upgrading.

Table 26. High Impact Alarms

Alarm ID	Name
5010	Unknown Linux iptables command error
5011	System or platform error prohibiting operation
10000	Incompatible database version
10134	Server Upgrade Failed
10200	Remote database initialization in progress
19217	Node isolated - all links down
19805	Communication Agent Failed to Align Connection
19855	Communication Agent Resource Has Multiple Actives
19901	CFG-DB Validation Error
19902	CFG-DB Update Failure
19903	CFG-DB post-update Error
19904	CFG-DB post-update Failure
22223	MpMemCongested
22950	Connection Status Inconsistency Exists

Alarm ID	Name
22961	Insufficient Memory for Feature Set
22733	SBR Failed to Free Binding Memory After PCRF Pooling Binding Migration
22734	Policy and Charging Unexpected Stack Event Version
25500	No DA-MP Leader Detected
25510	Multiple DA-MP Leader Detected
31101	Database replication to slave failure
31116	Excessive shared memory
31117	Low disk free
31125	Database durability degraded
31128	ADIC Found Error
31133	DB Replication Switchover Exceeds Threshold
31215	Process resources exceeded
31288	HA Site Configuration Error
32100	Breaker Panel Feed Unavailable
32101	Breaker Panel Breaker Failure
32102	Breaker Panel Monitoring Failure
32103	Power Feed Unavailable
32104	Power Supply 1 Failure
32105	Power Supply 2 Failure
32106	Power Supply 3 Failure
32107	Raid Feed Unavailable
32108	Raid Power 1 Failure
32109	Raid Power 2 Failure
32110	Raid Power 3 Failure
32111	Device Failure
32112	Device Interface Failure
32113	Uncorrectable ECC memory error
32114	SNMP get failure
32115	TPD NTP Daemon Not Synchronized Failure
32116	TPD Server's Time Has Gone Backwards
32117	TPD NTP Offset Check Failure
32300	Server fan failure
32301	Server internal disk error
32302	Server RAID disk error
32303	Server Platform error

Alarm ID	Name
32304	Server file system error
32305	Server Platform process error
32306	Server RAM shortage error
32307	Server swap space shortage failure
32308	Server provisioning network error
32309	Eagle Network A Error
32310	Eagle Network B Error
32311	Sync Network Error
32312	Server disk space shortage error
32313	Server default route network error
32314	Server temperature error
32315	Server mainboard voltage error
32316	Server power feed error
32317	Server disk health test error
32318	Server disk unavailable error
32319	Device error
32320	Device interface error
32321	Correctable ECC memory error
32322	Power Supply A error
32323	Power Supply B error
32324	Breaker panel feed error
32325	Breaker panel breaker error
32326	Breaker panel monitoring error
32327	Server HA Keepalive error
32328	DRBD is unavailable
32329	DRBD is not replicating
32330	DRBD peer problem
32331	HP disk problem
32332	HP Smart Array controller problem
32333	HP hpacucliStatus utility problem
32334	Multipath device access link problem
32335	Switch link down error
32336	Half Open Socket Limit
32337	Flash Program Failure
32338	Serial Mezzanine Unseated

Alarm ID	Name
32339	TPD Max Number Of Running Processes Error
32340	TPD NTP Daemon Not Synchronized Error
32341	TPD NTP Daemon Not Synchronized Error
32342	NTP Offset Check Error
32343	TPD RAID disk
32344	TPD RAID controller problem
32345	Server Upgrade snapshot(s) invalid
32346	OEM hardware management service reports an error
32347	The hwmgmtcliStatus daemon needs intervention
32348	FIPS subsystem problem
32349	File Tampering
32350	Security Process Terminated
32500	Server disk space shortage warning
32501	Server application process error
32502	Server hardware configuration error
32503	Server RAM shortage warning
32504	Software ConfigurationError
32505	Server swap space shortage warning
32506	Server default router not defined
32507	Server temperature warning
32508	Server core file detected
32509	Server NTP Daemon not synchronized
32510	CMOS battery voltage low
32511	Server disk self test warning
32512	Device warning
32513	Device interface warning
32514	Server reboot watchdog initiated
32515	Server HA failover inhibited
32516	Server HA Active to Standby transition
32517	Server HA Standby to Active transition
32518	Platform Health Check failure
32519	NTP Offset Check failure
32520	NTP Stratum Check failure
32521	SAS Presence Sensor Missing
32522	SAS Drive Missing

Alarm ID	Name
32523	DRBD failover busy
32524	HP disk resync
32525	Telco Fan Warning
32526	Telco Temperature Warning
32527	Telco Power Supply Warning
32528	Invalid BIOS value
32529	Server Kernel Dump File Detected
32530	TPD Upgrade Failed
32531	Half Open Socket Warning Limit
32532	Server Upgrade Pending Accept/Reject
32533	TPD Max Number Of Running Processes Warning
32534	TPD NTP Source Is Bad Warning
32535	TPD RAID disk resync
32536	TPD Server Upgrade snapshot(s) warning
32537	FIPS subsystem warning event
32538	Platform Data Collection Error
32539	Server Patch Pending Accept/Reject
32540	CPU Power limit mismatch

Table 27. Medium Impact Alarms

Alarm ID	Name
5002	IPFE Address configuration error
5003	IPFE state sync run error
5004	IPFE IP tables configuration error
5006	Error reading from Ethernet device
5012	Signaling interface heartbeat timeout
5013	Throttling traffic
5100	Traffic overload
5101	CPU Overload
5102	Disk Becoming Full
5103	Memory Overload
10003	Database backup failed
10006	Database restoration failed
10020	Backup failure
10117	Health Check Failed

Alarm ID	Name
10118	Health Check Not Run
10121	Server Group Upgrade Cancelled - Validation Failed
10123	Server Group Upgrade Failed
10131	Server Upgrade Cancelled (Validation Failed)
10133	Server Upgrade Failed
10141	Site Upgrade Cancelled (Validation Failed)
10143	Site Upgrade Failed
19200	RSP/Destination unavailable
19202	Linkset unavailable
19204	Preferred route unavailable
19246	Local SCCP subsystem prohibited
19251	Ingress message rate
19252	PDU buffer pool utilization
19253	SCCP stack event queue utilization
19254	M3RL stack event queue utilization
19255	M3RL network management event queue utilization
19256	M3UA stack event queue utilization
19258	SCTP Aggregate Egress queue utilization
19251	Ingress message rate
19252	PDU buffer pool utilization
19253	SCCP stack event queue utilization
19254	M3RL stack event queue utilization
19255	M3RL network management event queue utilization
19256	M3UA stack event queue utilization
19258	SCTP Aggregate Egress queue utilization
19272	TCAP active dialogue utilization
19273	TCAP active operation utilization
19274	TCAP stack event queue utilization
19276	SCCP Egress Message Rate
19408	Single Transport Egress-Queue Utilization
19800	Communication Agent Connection Down
19803	Communication Agent stack event queue utilization
19806	Communication Agent CommMessage mempool utilization
19807	Communication Agent User Data FIFO Queue Utilization
19808	Communication Agent Connection FIFO Queue utilization

Alarm ID	Name
19818	Communication Agent DataEvent Mempool utilization
19820	Communication Agent Routed Service Unavailable
19824	Communication Agent Pending Transaction Utilization
19825	Communication Agent Transaction Failure Rate
19827	SMS stack event queue utilization
19846	Communication Agent Resource Degraded
19847	Communication Agent Resource Unavailable
19848	Communication Agent Resource Error
19860	Communication Agent Configuration Daemon Table Monitoring Failure
19861	Communication Agent Configuration Daemon Script Failure
19862	Communication Agent Ingress Stack Event Rate
19900	Process CPU Utilization
19905	Measurement Initialization Failure
19910	Message Discarded at Test Connection
8000-001	MpEvFsmException_SocketFailure
8000-002	MpEvFsmException_BindFailure
8000-003	MpEvFsmException_OptionFailure
8000-101	MpEvFsmException_ListenFailure
8002-003	MpEvRxException_CpuCongested
8002-004	MpEvRxException_SigEvPoolCongested
8002-006	MpEvRxException_DstMpCongested
8002-007	MpEvRxException_DrlReqQueueCongested
8002-008	MpEvRxException_DrlAnsQueueCongested
8002-009	MpEvRxException_ComAgentCongested
8002-203	MpEvRxException_RadiusMsgPoolCongested
8006-101	EvFsmException_SocketFailure
8011	EcRate
8013	MpNgnPsStateMismatch
8200	MpRadiusMsgPoolCongested
8201	RclRxTaskQueueCongested
8202	RclItrPoolCongested
8203	RclTxTaskQueueCongested
8204	RclEtrPoolCongested
22016	Peer Node Alarm Aggregation Threshold
22017	Route List Alarm Aggregation Threshold

Alarm ID	Name
22056	Connection Admin State Inconsistency Exists
22200	MpCpuCongested
22201	MpRxAllRate
22202	MpDiamMsgPoolCongested
22203	PTR Buffer Pool Utilization
22204	Request Message Queue Utilization
22205	Answer Message Queue Utilization
22206	Reroute Queue Utilization
22207	DclTxTaskQueueCongested
22208	DclTxConnQueueCongested
22214	Message Copy Queue Utilization
22221	Routing MPS Rate
22222	Long Timeout PTR Buffer Pool Utilization
22349	IPFE Conneetion Alarm Aggregation Threshold
22350	Fixed Connection Alarm Aggregation Threshold
22407	Routing attempt failed duto internal database incosistency failure
22500	DSR Application Unavailable
22501	DSR Application Degraded
22502	DSR Application Request Message Queue Utilization
22503	DSR Application Answer Message Queue Utilization
22504	DSR Application Ingress Message Rate
22607	Routing attempt failed due to DRL queue exhaustion
22608	Database query could not be sent due to DB congestion
22609	Database connection exhausted
22631	FABR DP Response Task Message Queue Utilization
22632	COM Agent Registration Failure
22703	Diameter Message Routing Failure Due to Full DRL Queue
22710	SBR Sessions Threshold Exceeded
22711	SBR Database Error
22712	SBR Communication Error
22717	SBR Alternate Key Creation Failure Rate
22720	Policy SBR To PCA Response Queue Utilization Threshold Exceeded
22721	Policy and Charging Server In Congestion
22722	Policy Binding Sub-resource Unavailable
22723	Policy and Charging Session Sub-resource Unavailable

Alarm ID	Name
22724	SBR Memory Utilization Threshold Exceeded
22725	SBR Server In Congestion
22726	SBR Queue Utilization Threshold Exceeded
22727	SBR Initialization Failure
22728	SBR Bindings Threshold Exceeded
22729	PCRF Not Configured
22730	Policy and Charging Configuration Error
22731	Policy and Charging Database Inconsistency
22732	SBR Process CPU Utilization Threshold Exceeded
22737	Configuration Database Not Synced
22740	SBR Reconfiguration Plan Completion Failure
31100	Database replication fault
31102	Database replication from master failure
31103	DB Replication update fault
31104	DB Replication latency over threshold
31106	Database merge to parent failure
31107	Database merge from child failure
31108	Database merge latency over threshold
31113	DB replication manually disabled
31114	DB replication over SOAP has failed
31118	Database disk store fault
31121	Low disk free early warning
31122	Excessive shared memory early warning
31124	ADIC error
31126	Audit blocked
31130	Network health warning
31131	DB Ousted Throttle Behind
31134	DB Site Replication To Slave Failure
31135	DB Site Replication to Master Failure
31137	DB Site Replication Latency Over Threshold
31146	DB mastership fault
31147	DB upsynclog overrun
31200	Process management fault
31201	Process not running
31202	Unkillable zombie process

Alarm ID	Name
31209	Hostname lookup failed
31217	Network Health Warning
31220	HA configuration monitor fault
31113	DB replication manually disabled
31114	DB replication over SOAP has failed
31118	Database disk store fault
31121	Low disk free early warning
31122	Excessive shared memory early warning
31124	ADIC error
31126	Audit blocked
31130	Network health warning
31131	DB Ousted Throttle Behind
31134	DB Site Replication To Slave Failure
31135	DB Site Replication to Master Failure
31137	DB Site Replication Latency Over Threshold
31146	DB mastership fault
31147	DB upsynclog overrun
31200	Process management fault
31201	Process not running
31202	Unkillable zombie process
31209	Hostname lookup failed
31217	Network Health Warning
31220	HA configuration monitor fault
31221	HA alarm monitor fault
31222	HA not configured
31233	HA Heartbeat transmit failure
31224	HA configuration error
31225	HA service start failure
31226	HA availability status degraded
31228	HA standby offline
31230	Recent alarm processing fault
31231	Platform alarm agent fault
31233	HA Path Down
31234	Untrusted Time Upon Initialization
31234	Untrusted time After Initialization

Alarm ID	Name
31236	HA Link Down
31282	HA Management Fault
31283	Lost Communication with server
31322	HA Configuration Error
33000	MAP-to-Diameter Service Registration Failure on DA-MP
33001	Diameter-to-MAP Service Registration Failure on DA-MP
33003	Insufficient memory for DM-IWF
33004	DM-IWF Transaction Response Queue Utilization
33005	DM-IWF PTR Pool Utilization
33007	MD-IWF Error
33050	MD-IWF Ingress Message Rate
33051	MD-IWF Application Degraded or Unavailable
33052	MD-IWF Notified that DM-IWF Service Status is Down
33053	MD-IWF DiamTrans Task Queue Utilization
33054	MD-IWF MapTrans Task Queue Utilization
33055	MD-IWF DAMPInterface Task Queue Utilization
33058	MD-IWF DiamToMap PTR Utilization
33059	MD-IWF MapToDiam PTR Utilization
33062	Insufficient Memory for MD-IWF
33076	MD-IWF received Diameter Answer from unexpected DA-MP
33103	GLA Communication Agent Error
33105	Routing Attempt failed due to queue exhaustion
33106	GLA Communication Agent Timeout
33120	Policy SBR Binding Sub-Resource Unavailable
33121	GLA pSBR-B Response Task Message Queue Utilization
33301	Update Config Data Failure
33303	U-SBR Event Queue Utilization
33310	U-SBR Sub-resource Unavailable
33312	DCA Script Generation Error
33301	Update Config Data Failure

Appendix Q. Additional Backout Steps for OAM Servers

Procedure 69. Additional Backout Steps for NOAM, SOAM Server(s)

Step#	Procedure	Description
This procedure provides the details about additional backout steps for NOAM, SOAM server(s) to support backout for major upgrade release paths. **Note**: This procedure is required only when the target backout release is 8.1 or lower. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Server CLI: Log into the server (if not already done)	Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the server under backout:
		`ssh admusr@<server address>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		Please note the hostname of the server on which these steps are executed. Once all the servers in a server group are backed out, additional post-backout steps are executed to revert the changes done in this procedure.

2.
☐
	Server CLI: Set the resource as optional
	For OAM servers only
		Note: Make sure the resource being set is in system. Some of the resources shown are introduced in different releases.
		If the resource is not in the system, presence check will not result any output records. In this case, skip updating these fields for the resource not in the system.
		1. Check for the resource:
		`iqt -E HaResourceCfg where "name='<resource_name>'"`
		2. Execute this command:
		`iset -W -foptional='Yes' HaResourceCfg where "name='DSROAM_Proc'"`
		These commands change/update the results of some records.

3. ☐	**Server CLI**: Restart the HTTPD service For OAM servers only	Execute this command: `sudo service httpd restart`

4.
☐
	Active NOAM/SOAM Server CLI: Log into the server (if not already done)	Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the Active NOAM/SOAM server in the same server group, in which server is under backout:
		`ssh admusr@<server address>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.

Step#	Procedure	Description

5.
☐
	Server CLI:
	Verify that the replication is working fine.
	For OAM servers only
		1. Execute this command on an active NOAM/SOAM server in the same server group being backed out:
		`irepstat`
		2. Verify the `irepstat` command displays a replication row for the server which is being backed out.
		Note the replication status is **Active** before proceeding, if it is **Audit**, then wait until replication becomes Active.
		If this step is missed, data is lost and is unrecoverable.
		Example:
		Here Ford-B-NO is Active NOAM Server and Ford-A-NO is backed out.
		`Ford-B-NO  A3301.157  Ford-B-NO  09:32:17  [Rw]`
		`Policy 0 ActStb [DbReplication] ----------`
		`AA To  P0 Ford-A-NO  Active  0  0.00 1%R 0.12%cpu 1.88k/s`
		`AA To  P1 Chevy-DRNO-B Active  0  0.00 1%R 0.08%cpu 1.89k/s`
		`AB To  D0 Camaro-SO-B  Active  0  0.00 1%R 0.09%cpu 1.89k/s`
		`AB To  D0 Nova-SO-B  Active  0  0.00 1%R 0.08%cpu 1.90k/s`
		`AB To  D0 Pinto-SO-B  Active  0  0.00 1%R 0.10%cpu 1.89k/s`
		`AB To  D0 Mustang-SO-B Active  0  0.00 1%R 0.10%cpu 2.14k/s`
		3. Press **q** if you want to exit the irepstat command output.
		4. Execute `irepstat` again, if required.

Appendix R. Additional Post-Backout Steps for OAM Server

Procedure 70. Additional Post Backout Steps for NOAM, SOAM Server(s)

Step#	Procedure	Description
This procedure provides the details about additional post backout steps for NOAM, SOAM server(s) to support backout for major upgrade release paths. **Note**: This procedure need to be executed only when all the servers in the same server group are backed out. This procedure is required only when you are performing backout to 8.1 or lower. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Server CLI:
	Log into the server (if not already done)
		Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the server under backout:
		`ssh admusr@<server address>`
		`password:  <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		If the server is an NOAM or SOAM server, execute step 2.
		Note the hostname of the server on which these steps are executed. Once all servers in a server group are backed out, additional post-backout steps are executed to revert the changes done in this procedure.

Step#	Procedure	Description

2.
☐
	Server CLI: Set the resource as optional
	For OAM servers only
		Note: Make sure the resource getting set is in system. Some of resources shown are introduced in different releases.
		If the resource is not in the system, presence check will not result any output records. In this case, skip updating these fields for the resource not in the system.
		1. Check for the resource:
		`iqt -E HaResourceCfg where "name='<resource_name>'"`
		2. Execute this command:
		`iset -W -foptional='Yes' HaResourceCfg where "name='DSROAM_Proc'"`
		These commands change/update the results of some records.

Appendix S. Additional Backout Steps for SBR Server(s)

Procedure 71. Additional Backout Steps for SBR Server(s)

Step#	Procedure	Description
This procedure provides the details about additional backout steps for SBR server(s) to support backout for major upgrade release paths. ***Note***: This procedure is required only when the target backout release is 8.1 or lower. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Server CLI: Log into the server (if not already done)	1. Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the server under backout:
		`ssh admusr@<server address>`
		`password: <enter password>`
		2. Answer **yes** if you are asked to confirm the identity of the server.
		3. Note the hostname of the server on which these steps are executed.

Step#	Procedure	Description

2.
☐
	Server CLI: Setting the resource as optional
	For SBR servers only
		Note: Make sure the resource being set is present in the system. Some of the resources listed below are introduced in different releases. While checking the resource presence in the system in case resource **is not present in the system, the check will not result in any output records. In that case, updation of the field is not required.**
		Resource presence can be checked using:-
		`iqt -E HaResourceCfg where "name='<resource_name>'"`
		For example:-
		`iqt -E HaClusterResourceCfg where "resource='uSbrRes'"`
		Execute this command for Session SBR only:
		`iset -W -foptional='Yes' HaResourceCfg where "name='pSbrSBaseRepl'"`
		`iset -W -foptional='Yes' HaClusterResourceCfg where "resource='uSbrRes'"`
		`iset -W -foptional='Yes' HaClusterResourceCfg where "resource='pSbrSessionRes'"`
		Execute this command for Binding SBR only:
		`iset -W -foptional='Yes' HaResourceCfg where "name='pSbrBBaseRepl'"`
		`iset -W -foptional='Yes' HaClusterResourceCfg where "resource='uSbrRes'"`
		`iset -W -foptional='Yes' HaResourceCfg where " name='pSbrBindingRes'"`
		These commands change/update the results of some records.

Step#	Procedure	Description

3.
☐
	Server CLI:
	Verify that the replication is working fine
	(For SBR servers only)
		1. Execute this command on an active SBR server in the same server groupas the server being backed out:
		`irepstat`
		2. Verify the `irepstat` command displays a replication row for the server which is being backed out.
		Note the replication status is **Active** before proceeding, if it is **Audit**, then wait until replication becomes Active.
		If this step is missed, data is lost and is unrecoverable.
		Example:
		Here Pinto-SBR-2 is Active SBR Server and Pinto-SBR-1 is backed out.
		Also, on Binding SBR, resource will be pSbrBindingPolicy
		And on Session SBR, resource will be pSbrSessionPolicy
		`Pinto-SBR-2  C3783.034  Pinto-SBR-2  13:39:38  [Rw]`
		`Policy 0 ActStb [DbReplication] ----------`
		`BC From  D0 Pinto-SO-B  Active  0  0.10 ^0.10%cpu 67.0/s`
		`CC To  P0 Pinto-SBR-1  Active  0  0.10 1%S 0.31%cpu 30.9/s`
		`CC To  P1 Mustang-SBR-3 Active  0  0.10 1%S 0.28%cpu 39.6/s`
		`Policy 21 pSbrBindingPolicy [pSbrBBaseRepl] ----------`
		`CC To  P0 Pinto-SBR-1  Active  0  0.10 1%S 0.63%cpu 186k/s`
		`CC To  P1 Mustang-SBR-3 Active  2  0.13 1%S 0.55%cpu 189k/s`
		3. Press **q** if you want to exit the irepstat command output.
		4. Execute `irepstat` again, if required.

Appendix T. Additional Post Backout Steps for SBR Server(s)

Procedure 72. Additional Post Backout Steps for SBR Server(s)

Step #	Procedure	Description
This procedure provides the details about additional post backout steps for SBR server(s) to support backout for major upgrade release paths. ***Note***: This procedure need to be executed only when all the servers in the same server group are backed out. This procedure is required only when you are performing backout to 8.1 or lower. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Server CLI:
	Log into the server (if not already done)
		Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the server under backout:
		`ssh admusr@<server address>`
		`password:  <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		Note the hostname of the server on which these steps are executed. Once all servers in a server group are backed out, additional post-backout steps are executed to revert the changes done in this procedure.

Step #	Procedure	Description

2.
☐
	Server CLI:
	Setting the resource as optional
	For SBR servers only
		Note: Make sure the resource being set is present in the system. Some of the resources listed below are introduced in different releases. While checking the resource presence in the system in case resource **is not present in the system, the check will not result in any output records. In that case, updation of the field is not required.**
		Resource presence can be checked using:-
		`iqt -E HaResourceCfg where "name='<resource_name>'"`
		For example:-
		`iqt -E HaClusterResourceCfg where "resource='uSbrRes'"`
		Execute this command for Session SBR only:
		`iset -W -foptional='No' HaResourceCfg where "name='pSbrSBaseRepl'"`
		`iset -W -foptional='No' HaClusterResourceCfg where "resource='uSbrRes'"`
		`iset -W -foptional='No' HaClusterResourceCfg where "resource='pSbrSessionRes'"`
		Execute this command for Binding SBR only:
		`iset -W -foptional='No' HaResourceCfg where "name='pSbrBBaseRepl'"`
		`iset -W -foptional='No' HaClusterResourceCfg where "resource='uSbrRes'"`
		`iset -W -foptional='No' HaResourceCfg where "name='pSbrBindingRes'"`
		These commands change/update the results of some records.
		Repeat this procedure for other servers in the server group being backed out.

Appendix U. Create a link of Comagent

Procedure 73. Create a link of Comagent

Step#	Procedure	Description
This procedure provides the details about creating a symbolic link of Comagent. **Note**: This procedure is executed only after all servers in the same server group are backed out. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Server CLI:
	Log into the server (if not already done)
		Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the server under backout:
		`ssh admusr@<server address>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.

Step#	Procedure	Description

2. ☐	**Server:** Create a link of Comagent	Execute the following commands to create a Comagent link:
		1. Navigate to **/var/TKLC/appworks/library**.
		`$ cd /var/TKLC/appworks/library`
		2. Create a link
		`$ sudo ln -s /usr/TKLC/comagent-gui/gui/ Comagent`
		Verify if the Comagent link has been restored.
		`[admusr@HPC-NO1 library]$ ls -ltr`
		`total 56`
		`drwxr-xr-x  7 awadmin awadm 4096 Aug 25  2017 Diameter`
		`lrwxrwxrwx  1 root  root  47 Dec 15 02:05 Zend -> /usr/TKLC/plat/www/zend-framework/library/Zend/`
		`lrwxrwxrwx  1 root  root  21 Dec 15 02:07 Awpss7 -> /usr/TKLC/awpss7/gui/`
		`lrwxrwxrwx  1 root  root  29 Dec 15 02:07 TransportMgr -> /usr/TKLC/awptransportmgr/gui`
		`lrwxrwxrwx  1 root  root  38 Dec 15 02:07 Exgstack -> /usr/TKLC/awptransportmgr/gui/Exgstack`
		`drwxr-xr-x  3 awadmin awadm 4096 Dec 31 15:58 Rbar`
		`drwxr-xr-x  4 awadmin awadm 4096 May 22 10:42 AWCLI`
		`drwxr-xr-x  3 awadmin awadm 4096 May 22 10:44 Radius`
		`drwxr-xr-x  4 awadmin awadm 4096 May 22 10:44 Dca`
		`drwxr-xr-x  3 awadmin awadm 4096 May 22 10:44 Fabr`
		`drwxr-xr-x  3 awadmin awadm 4096 May 22 10:44 Gla`
		`drwxr-xr-x  2 awadmin awadm 4096 May 22 10:44 Loadgen`
		`drwxr-xr-x  3 awadmin awadm 4096 May 22 10:44 Mapiwf`
		`drwxr-xr-x  6 awadmin awadm 4096 May 22 10:44 Pdra`
		`drwxr-xr-x  3 awadmin awadm 4096 May 22 10:44 Sbr`
		`drwxr-xr-x  3 awadmin awadm 4096 May 22 10:44 Vstp`
		`lrwxrwxrwx  1 root  root  18 May 22 10:44 Ipfe -> /usr/TKLC/ipfe/gui`
		`drwxr-xr-x  3 awadmin awadm 4096 May 22 10:45 Csbr`
		`drwxr-xr-x 17 awadmin awadm 4096 May 22 10:45 AppWorks`
		`lrwxrwxrwx  1 root  root  27 May 22 11:47 Comagent -> /usr/TKLC/comagent-gui/gui/`
		If the output is received as highlighted in red, the softlink for Comagent directory has been restored.

Appendix V. Manual Completion of Server Upgrade

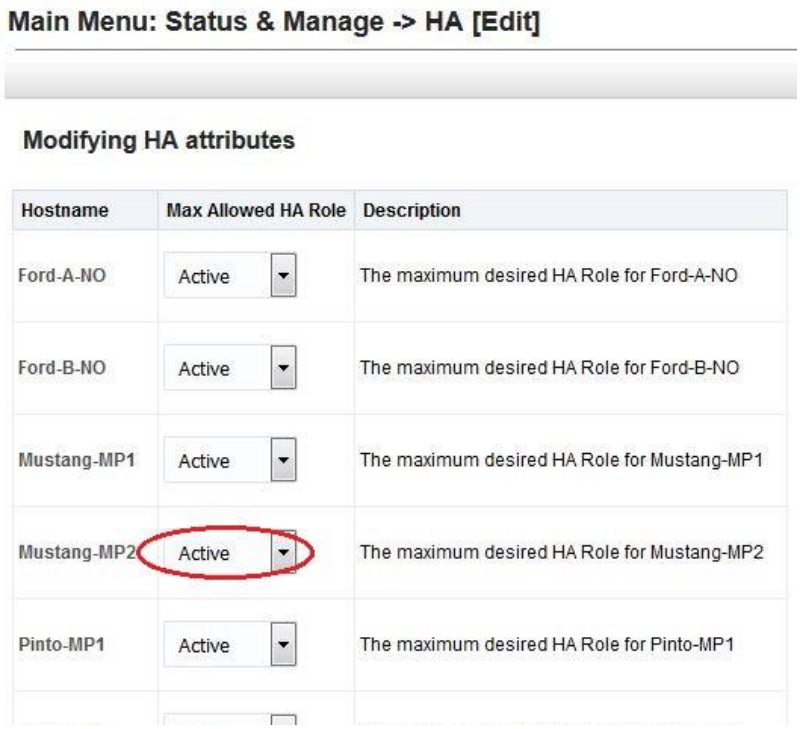
Procedure 74. Manual Completion of Server Upgrade

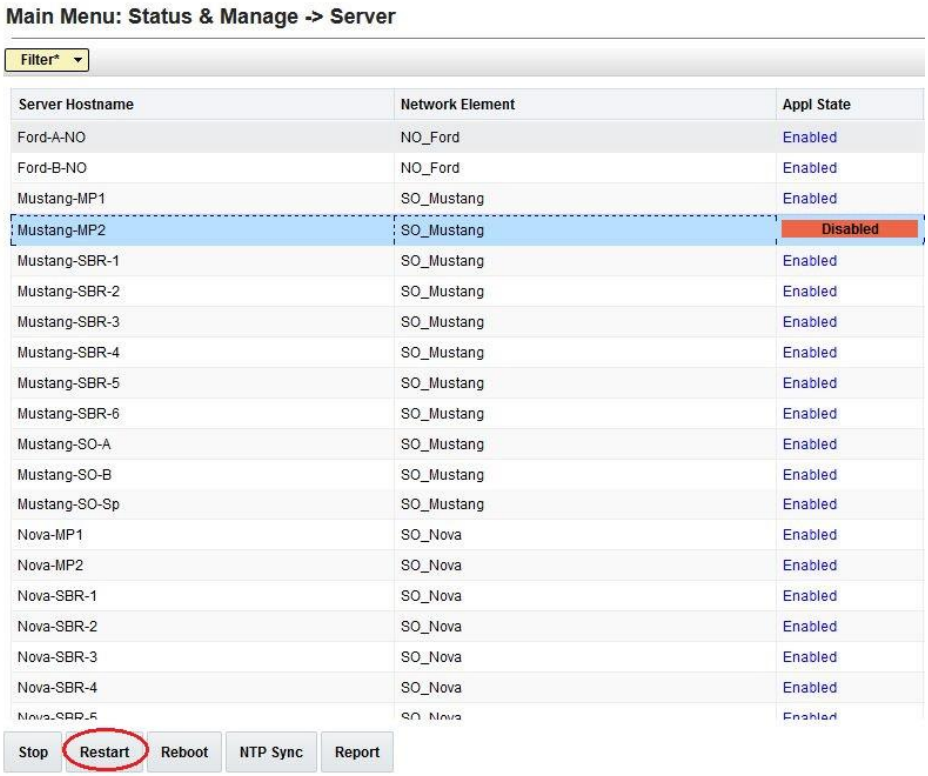
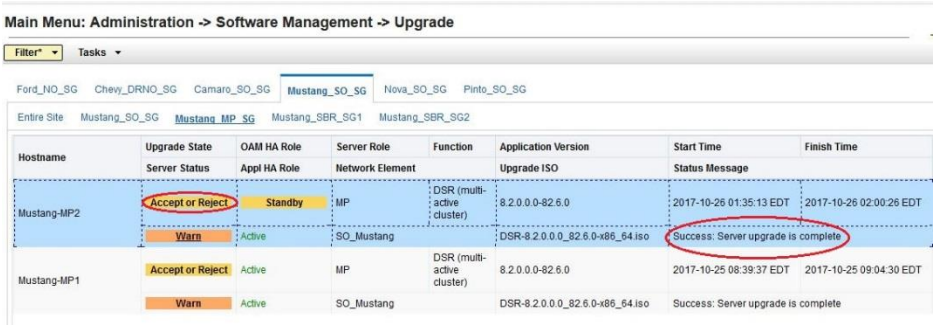
Step#	Procedure	Description
This procedure provides the details about manual completion of server upgrade. ***Note***: In the unlikely event that after the upgrade, if the **Upgrade State** of server is **Backout Ready** and the **Status Message** displays **Server could not restart the application to complete the upgrade**, then perform Appendix U to create a link of Comagent. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**NOAMP VIP GUI**: Login: Log into the server (if not already done)	If not already done, establish a GUI session on the NOAM server the VIP IP address of the NOAM server. Open the web browser and enter a URL of: `http://<Primary_NOAM_VIP_IP_Address>` Log into the NOAM GUI as the **guiadmin** user:

Step#	Procedure	Description
2. ☐	**NOAMP VIP GUI**: Verify server status	1. Navigate to **Status and Manage > HA**. 2. Locate the server you want to upgrade. 3. Verify the **Max Allowed HA Role** is **Standby**. **Main Menu: Status & Manage -> HA** Filter* 4. Click **Edit**.

Hostname	OAM HA Role	Application HA Role	Max Allowed HA Role	Mate Hostname List	Network Element
Ford-A-NO	Standby	N/A	Active	Ford-B-NO	NO_Ford
Ford-B-NO	Active	N/A	Active	Ford-A-NO	NO_Ford
Mustang-MP1	Active	Active	Active	Mustang-MP2	SO_Mustang
Mustang-MP2	Standby	Active	Standby	Mustang-MP1	SO_Mustang
Pinto-MP1	Standby	Active	Active	Pinto-MP2	SO_Pinto
Pinto-MP2	Active	Active	Active	Pinto-MP1	SO_Pinto
Mustang-SO-Sp	Spare	N/A	Active	Pinto-SO-A Pinto-SO-B	SO_Mustang
Pinto-SO-Sp	Spare	N/A	Active	Mustang-SO-A Mustang-SO-B	SO_Pinto
Mustang-SBR-1	Active	Active	Active	Mustang-SBR-2 Pinto-SBR-3	SO_Mustang
Mustang-SBR-2	Standby	Standby	Active	Mustang-SBR-1 Pinto-SBR-3	SO_Mustang
Mustang-SBR-3	Spare	Spare	Active	Pinto-SBR-1 Pinto-SBR-2	SO_Mustang
Pinto-SBR-1	Standby	Standby	Active	Mustang-SBR-3 Pinto-SBR-2	SO_Pinto
Pinto-SBR-2	Active	Active	Active	Mustang-SBR-3 Pinto-SBR-1	SO_Pinto
Pinto-SBR-3	Spare	Spare	Active	Mustang-SBR-1 Mustang-SBR-2	SO_Pinto

Edit

Step#	Procedure	Description
3. ☐	**NOAMP VIP GUI**: Change role	1. Change the **Max Allowed HA Role** to **Active**. 2. Click **OK**. 
4. ☐	**NOAMP VIP GUI**: Verify change	Verify the **Max Allowed HA Role** changes to **Active**. **Main Menu: Status & Manage -> HA** Filter* Hostname | OAM HA Role | Application HA Role | Max Allowed HA Role | Mate Hostname List | Network Element Ford-A-NO | Standby | N/A | Active | Ford-B-NO | NO_Ford Ford-B-NO | Active | N/A | Active | Ford-A-NO | NO_Ford Mustang-MP1 | Active | Active | Active | Mustang-MP2 | SO_Mustang Mustang-MP2 | Standby | Active | Active | Mustang-MP1 | SO_Mustang Pinto-MP1 | Standby | Active | Active | Pinto-MP2 | SO_Pinto Pinto-MP2 | Active | Active | Active | Pinto-MP1 | SO_Pinto Mustang-SO-Sp | Spare | N/A | Active | Pinto-SO-A Pinto-SO-B | SO_Mustang

Step#	Procedure	Description
5. ☐	**NOAMP VIP GUI**: Restart the server	1. Navigate to **Status & Manage > Server**. 2. Select the server to upgrade. 3. Click **Restart**.  After a few minutes, the Appl State change to **Enabled**.
6. ☐	**NOAMP VIP GUI**: Verify status	1. Navigate to **Administration > Software Management > Upgrade**. 2. Verify the **Upgrade State** changes to **Accept or Reject** and the **Status Message** changes to **Success: Server manually completed**. 

Appendix W. Identify the DC server

Procedure 75. Identify the DC Server

Step#	Procedure	Description
This procedure provides the details to identify the DC server. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**NOAMP VIP GUI**: Login	Open the web browser and enter a URL of: `http://<Primary_NOAM_VIP_IP_Address>` Log into the NOAM GUI as the guiadmin user:
2. ☐	**NOAMP VIP GUI**: Select an MP server	1. Navigate to **Configuration > Server Groups**. 2. Select an MP server from the server group that needs to be upgraded.

3.
☐
	Login into MP Server using CLI
	SSH to MP server chosen above
		1. Use the SSH command (on UNIX systems – or putty if running on windows) to log into the MP server identified in Step 1.
		`ssh admusr@<MP_SERVER_XMI>`
		`password: <enter password>`
		2. Answer **yes** if you are asked to confirm the identity of the server

Step#	Procedure	Description

4.
☐
	MP Server CLI:
	Find DC server
		Identify the DC server in the server group with this command:
		`ha.info -d`
		If the server is the DC server, then output is similar to this:
		`[admusr@X6201-MP1 ~]$ ha.info -d`
		
		`Output from`
		`Node ID:  X6201-MP1`
		`Report Time: 12/14/2017 12:05:10.905`
		
		`***`
		`** Election Mgr: C2121 (27a64d)`
		`***`
		
		`DC: X6201-MP1  Generation: 2  State: DC`
		`  Elected: 12/12/2017 09:18:08.905`
		`  Other Non-DC Group Members:`
		`    X6201-MP5`
		`    X6201-MP3`
		`    X6201-MP4`
		`    X6201-MP2`
		`  DC Group Candidates: <none>`
		
		`***`
		`** End of Election Mgr: C2121`
		`***`
		If the server is not the DC server, then output is similar to this:
		`[admusr@X6201-MP3 ~]$ ha.info -d`
		
		`Output from`
		`Node ID:  X6201-MP3`
		`Report Time: 12/14/2017 12:05:38.314`
		
		`***`
		`** Election Mgr: C2121 (27a64d)`
		`***`
		
		`DC: X6201-MP1  Generation: 2  State: NON-DC`
		`ATTN: Reported from Non-DC node. Execute ha.info on DC for full status.`
		`  DC Group Candidates: <none>`
		
		`***`
		`** End of Election Mgr: C2121`
		`***`

Appendix X. Limitations of Auto Server Group Upgrade and Automated Site Upgrade

For multi-active server groups, such as DA-MP, non-deterministic server selection **could possibly** result in a network outage during the upgrade. In certain scenarios, customer preferences or requirements can result in configurations in which it is imperative that DA-MP servers must be, or conversely, cannot be, upgraded together. These scenarios are described in this section with the recommendation that customers NOT use ASG if any of these exists in their network.

CAUTION

Oracle's recommendation for any customer whose network aligns with any of the following scenarios is that the Automated Server Group upgrade should NOT be used on multi-active DA-MP server groups. Use of ASG risks a potential network outage.

For Automated Site Upgrade, following limitations can be solved by rearranging/adding the upgrade cycles. If the user does not want to create a custom upgrade plan by rearranging/adding cycles then in that case manual upgrade section 5.3 method should be used.

Specialized Fixed Diameter Connections

In this scenario, each peer node is configured to connect to two specific DA-MPs for local redundancy (Figure 18). With ASG/ASU setup for 50% minimum availability, three of the DA-MPs in the server group are upgraded in parallel. However, it is not possible to determine in advance which three DA-MPs are selected. Although the DSR has redundant connections to the peer nodes, an unfortunate selection of servers for upgrade could result in an outage. Upgrade cycle 1 takes out both DA-MPs connected to the unhappy peer. This peer is isolated for the duration of the upgrade.

The happy peer is connected to DA-MPs that are selected by ASG/ASU for different upgrade cycles. This peer is never isolated during the upgrade.

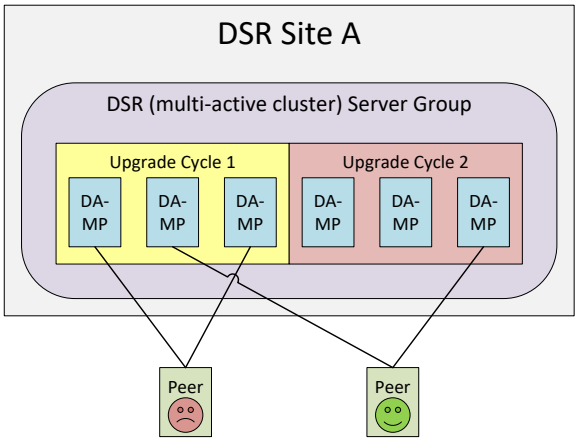


Figure 18. Specialized Fixed Diameter Connections

Specialized Floating Diameter Connections

In this scenario, each peer node is configured to connect to an IPFE TSA address hosted by a set of DA-MPs. When any particular TSA contains only a subset of the server group MPs, and the DSR upgrade logic happens to select that subset of MPs for simultaneous upgrade, then there is a signaling outage for that TSA. This scenario is depicted in Figure 19.

TSA1 is distributed across the first three DA-MPs, whereas TSA2 is distributed across all six DA-MPs. If ASG/ASU is initiated with 50% minimum availability, the DSR could select all three of the DA-MPs hosting TSA1 in the first upgrade cycle. The unhappy peer is isolated for the duration of upgrade cycle 1.

The happy peer is connected to TSA2, which is hosted by the DA-MP servers in such a way that the TSA is evenly hosted in both upgrade cycles. This peer is never isolated during the upgrade.

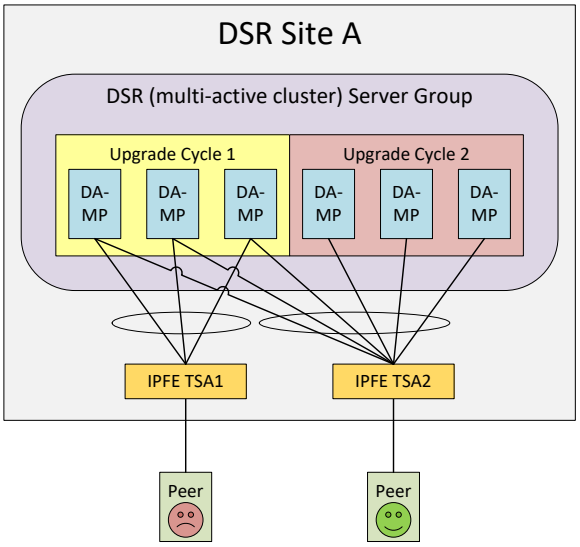


Figure 19. Specialized Floating Diameter Connections

Specialized Distribution of DSR Features

In this scenario, the customer has decided to enable P-DRA and RBAR on four DA-MP servers and DCA on two DA-MP servers, consistent with expected traffic load. With ASG setup for 50% minimum availability, the DA-MP server group is upgraded in two cycles. RBAR and P-DRA happen to be hosted by DA-MP servers selected by ASG/ASU to be in different upgrade cycles, albeit unbalanced. The RBAR peer is only marginally happy because during upgrade cycle 1, only 25% of RBAR and P-DRA capacity is available, even though the customer specified 50% availability.

DCA happens to be hosted by DA-MP servers selected by ASG/ASU to be in upgrade cycle 2. The DCA peer is unhappy because DCA is completely unavailable during upgrade cycle 2.

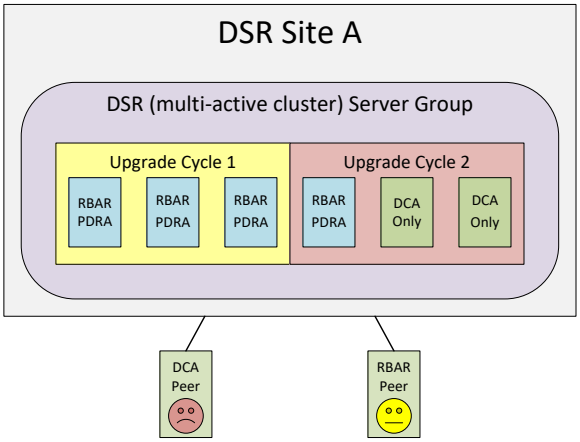


Figure 20. Specialized Distribution of DSR Features

Appendix Y. Fast Deployment Configuration File Description

An XML configuration file is the primary source of automated deployment and configuration information for the feature. The configuration defines one or more infrastructures that represent a set of hardware, software and TVOE hosts associated with a PMAC. The file also defines one or more application servers that are to be deployed to a specified infrastructure.

The sections to be modified are identified with a brief description

Note: Any sub-element that is not described should not be modified.

More information on the FDC Fast deployment configuration file can be found in [9].

Software Element

The optional software element contains one or more image elements representing deployable ISO images. Each image element has a required id attribute used to uniquely reference that image in the configuration file. The only element that should be modified is the name.

Name defines the ISO version of TVOE, Application, Mediation, Oracle or TPD image. Verify the versions match the version of software that to be installed. If they do not match, modify the configuration file as needed.

Enclosure Element

The enclosure element specifies the enclosure for a set of blade servers.

- cabhwid refers to the cabinet identification used at each site.
- encid refers to the enclosure identification used at each site.
- oa1 refers to the IP Address for the first OA within an enclosure.
- oa2 refers to the IP Address for the second OA within an enclosure.

Blade Element

The blade element specifies the blade within an enclosure, on which an IDIH system is installed.

Use the enchwID that has been specified within the PMAC to be IPM'd.

- bay is the bay location of the blade to be IPM'd.
- type is the hardware type, for example, Gen 6 or Gen 8 blade.

RMS Element

The rms element specifies a rack-mount server in the infrastructure, and provisions it in PMAC if not already present. The rmsOOBIP, rmsname, and cabhwid elements should be modified.

The rmsOOBIP sub-element is the only required sub-element, and it specifies the IP address of the RMS iLO.

The rmsname sub-element specifies the name of the RMS when provisioned in PMAC. The cabhwid sub-element specifies the ID of the cabinet.

TVOE Software Element

The TVOE software stanza should not be added to an IDIH system where the IDIH guest is co-located with a PMAC guest.

Note: Do not IPM the TVOE host when the IDIH guest and PMAC guest are on the same TVOE host.

TVOE Server info Element

A server info element specifies configuration information for TVOE hosts, guests, and native application servers. The only sub elements that should be changed are the TVOE hostname and TVOE ntpserver ipaddress.

The hostname sub element sets the hostname for the TVOE host.

The ntpservers sub element sets NTP servers for the system. It may contain up to five ntpserver sub elements. Each ntpserver element contains name and ipaddress sub elements which are the host name and IP address of the NTP servers.

TVOE tpdinterface Sub-Element

The tpdinterface sub element specifies the TVOE interface configuration. The only sub elements that should be modified are the device, type, vlandata and vlandid elements.

- device contains the name of the TVOE interface device.
- type can be either Vlan or Bonding.
- vlandata contains a vlanid sub-element with the ID of the vlan.

TVOE tpdbridge Sub-Element

Each tpdbridge sub element specifies the TVOE bridge configuration. The sub elements that should be modified are interfaces, address, and netmask.

- interfaces defines the interfaces in the TVOE host bridge.
- address defines the IP address of the TVOE host bridge.
- netmask defines the network mask for the TVOE host bridge.

TVOE tpdroute Sub-Element

This tpdroute sub element specifies the TVOE route configuration. The only sub element that should be modified is the gateway.

- gateway specifies the gateway for the XMI route used by the TVOE host.

Oracle Guest Scripts Element Network

The scripts element defines files that are executed as part of the IPM process. Currently, network configuration of the TVOE guest is not directly supported by the Fast Deployment. Instead, the netAdm script is called with arguments. The only arguments that should be modified are the address, netmask, and gateway.

- address defines the IP XMI address of the Oracle guest.
- netmask defines the Oracle guest XMI netmask.
- gateway defines the XMI default route used by the Oracle guest.

Mediation Guest Scripts Element Network

The scripts element defines files that are executed as part of the IPM process. Currently, network configuration of the TVOE guest is not directly supported by the Fast Deployment. Instead, the netAdm script is called with arguments. The only arguments that should be modified are the address, netmask, and gateway.

- address defines the IP XMI and IMI address of the Mediation guest.
- netmask defines the Mediation guest XMI and IMI netmask.
- gateway defines the XMI default route used by the mediation guest.

Application Guest Scripts Element Network

The scripts element defines files that are executed as part of the IPM process. Currently, network configuration of the TVOE guest is not directly supported by the Fast Deployment. Instead, the netAdm script is called with arguments. The only arguments that should be modified are the address, netmask, and gateway.

- address defines the IP XMI address of the Application guest.
- netmask defines the Application guest XMI netmask.
- gateway defines the XMI default route used by the Application guest.

Y.1. Sample FDC Configuration File

```
<fdc>
   <infrastructures>
   <infrastructure name="PMAC">
      <!--Software Elements-->
      <software>
         <image id="tvoe">
            <name>872-2525-101-2.5.0_82.12.1-TVOE-x86_64</name>
         </image>
         <image id="app">
            <name>872-2427-102-7.0.0_7.0.0-apps-x86_64</name>
         </image>
         <image id="med">
            <name>872-2427-101-7.0.0_7.0.0-mediation-x86_64</name>
         </image>
         <image id="ora">
            <name>872-2440-104-7.0.0_7.0.0-oracle-x86_64</name>
         </image>
         <image id="tpd">
            <name>TPD.install-7.5.0_82.15.0-CentOS6.4-x86_64</name>
         </image>
      </software>

      <hardware>
         <cabinet id="cab1">
            <cabid>1</cabid>
         </cabinet>

         <!--Enclosure Element: Update cabhwid, endid and oa ip's-->
         <enclosure id="enc1">
            <cabhwid>cab1</cabhwid>
            <encid>1401</encid>
            <oa1>10.240.71.197</oa1>
            <oa2>10.240.71.198</oa2>
         </enclosure>

         <!--Blade Element: Update enchwid, bay and type-->
         <blade id="blade7">
            <enchwid>enc1</enchwid>
            <bay>7F</bay>
            <type>ProLiant BL460c G6</type>
         </blade>

         <!--Rack Mount Server Element: update rmsOOBIP with ILO IP-->
         <rms id="mgmtsrvr">
            <rmsOOBIP>10.250.36.27</rmsOOBIP>
            <rmsname>d-ray</rmsname>
            <cabhwid>cab1</cabhwid>
            <rmsuser>root</rmsuser>
```

```
      <rmspassword>TklcRoot</rmspassword>
      <type>ProLiant DL380 G8</type>
   </rms>
</hardware>

<tvoehost id="mgmtsrvrtvoe">
   <!--TVOE Hardware Element: Update the name of the tvoe device-->
   <!--In this example we are configuring a rms server-->
   <hardware>
      <rmshwid>mgmtsrvr</rmshwid>
      <!--bladehwid>blade7</bladehwid-->
   </hardware>

   <!--TVOE Software Element-->
   <!--Do Not Use this element when the PM&C host co-exist with IDIH-->
   <software>
      <baseimage>tvoe</baseimage>
   </software-->

   <server info>
      <!--tvoe hostname: Update hostname-->
      <hostname>d-ray</hostname>
      <!--tvoe ntpservers: Update ip address-->
      <ntpservers>
         <ntpserver>
            <name>ntpserver1</name>
            <ipaddress>10.250.32.10</ipaddress>
         </ntpserver>
      </ntpservers>
   </server info>

   <tpdnetworking>
      <tpdinterfaces>
         <!--tvoe xmi interface: Update device and vlanid-->
         <tpdinterface id="xmi">
            <device>bond0.3</device>
            <type>Vlan</type>
            <vlandata>
               <vlanid>3</vlanid>
            </vlandata>
            <onboot>yes</onboot>
            <bootproto>none</bootproto>
         </tpdinterface>

         <!--Tvoe imi interface: Update device and vlanid-->
         <tpdinterface id="imi">
            <device>bond0.4</device>
            <type>Vlan</type>
            <vlandata>
               <vlanid>4</vlanid>
```

```
            </vlandata>
            <onboot>yes</onboot>
            <bootproto>none</bootproto>
         </tpdinterface>
      </tpdinterfaces>

      <tpdbridges>
         <!--Tvoe xmi bridge: Update interfaces, ipaddress and netmask-
         ->
         <tpdbridge id="xmibr">
            <name>xmi</name>
            <!--Make sure this value matches the imi tpdinterface-->
            <interfaces>bond0.3</interfaces>
            <bootproto>none</bootproto>
            <address>10.240.51.39</address>
            <netmask>255.255.255.0</netmask>
            <onboot>yes</onboot>
         </tpdbridge>

         <!--Tvoe imi bridge: Update interfaces, ipaddress and netmask-
         ->
         <tpdbridge id="imibr">
            <name>imi</name>
            <!--Make sure this value matches the imi tpdinterface-->
            <interfaces>bond0.4</interfaces>
            <bootproto>none</bootproto>
            <onboot>yes</onboot>
         </tpdbridge>
         <tpdbridge id="intbr">
            <name>int</name>
            <bootproto>none</bootproto>
            <onboot>yes</onboot>
         </tpdbridge>
      </tpdbridges>

      <tpdroutes>
         <!--Tvoe default gateway address: Update gateway-->
         <tpdroute id="default">
            <type>default</type>
            <device>xmi</device>
            <gateway>10.240.30.3</gateway>
         </tpdroute>
      </tpdroutes>
   </tpdnetworking>

   <scripts>
      <predeploy>
         <!--configExt configures external disk-->
         <scriptfile id="configExt">
            <image>med</image>
```

```
                <imagefile>external.pl</imagefile>
                <filename>/root/external.pl</filename>
             </scriptfile>
          </predeploy>
       </scripts>
    </tvoehost>
 </infrastructure>
 </infrastructures>

 <servers>
    <!--Oracle Guest Configuration-->
    <tvoeguest id="Oracle">
       <infrastructure>PMAC</infrastructure>
       <tvoehost>mgmtsrvrtvoe</tvoehost>

       <!--Oracle Guest Profile: Update if hardware is Gen6 default is
       Gen8-->
       <!--profile>ORA_GEN6</profile-->
       <profile>ORA_GEN8</profile>
       <name>oracle</name>
       <software>
          <baseimage>tpd</baseimage>
          <appimage>ora</appimage>
       </software>
       <server info>

          <!--Oracle guest hostname-->
          <hostname>mamie</hostname>
       </server info>

       <scripts>
          <presrvapp>
             <scriptfile id="oracleInt">
                <filename>/usr/TKLC/plat/bin/netAdm</filename>
                <arguments>set --device=int --address=10.254.254.2 --
                netmask=255.255.255.224
                   --onboot=yes --bootproto=none</arguments>
             </scriptfile>

             <!--Oracle Guest xmi network: Update address and netmask-->
             <scriptfile id="oracleXmi">
                <filename>/usr/TKLC/plat/bin/netAdm</filename>
                <arguments>set --device=xmi --address=10.250.51.184 --
                netmask=255.255.255.0
                   --onboot=yes --bootproto=none</arguments>
             </scriptfile>

             <!--Oracle Guest xmi default route: Update gateway-->
             <scriptfile id="oracleRoute">
                <filename>/usr/TKLC/plat/bin/netAdm</filename>
```

```
            <arguments>add --route=default --device=xmi --
            gateway=10.250.51.1</arguments>
         </scriptfile>
      </presrvapp>
      <postsrvapp>
         <!--Oracle Post Server Application Configuration Script-->
         <scriptfile id="oracleConfig">
            <filename>/opt/xIH/oracle/configureOracle.sh</filename>
            <timeout>2700</timeout>
         </scriptfile>
      </postsrvapp>
   </scripts>
</tvoeguest>

<!--Mediation Guest Configuration-->
<tvoeguest id="Mediation">
   <infrastructure>PMAC</infrastructure>
   <tvoehost>mgmtsrvrtvoe</tvoehost>

   <!--Mediation Guest Profile: Update if hardware is Gen6 default is
   Gen8-->
   <!--profile>MED_GEN6</profile-->
   <profile>MED_GEN8</profile>
   <name>mediation</name>
   <software>
      <baseimage>tpd</baseimage>
      <appimage>med</appimage>
   </software>

   <!--Mediation guest hostname-->
   <server info>
      <hostname>poney</hostname>
   </server info>
   <scripts>
      <presrvapp>
         <scriptfile id="medInt">
            <filename>/usr/TKLC/plat/bin/netAdm</filename>
            <arguments>set --device=int --address=10.254.254.3 --
            netmask=255.255.255.224
               --onboot=yes --bootproto=none</arguments>
         </scriptfile>

         <!--Mediation Guest xmi network: Update address and netmask-->
         <scriptfile id="medXmi">
            <filename>/usr/TKLC/plat/bin/netAdm</filename>
               <arguments>set --device=xmi --address=10.250.51.185 --
               netmask=255.255.255.0
                  --onboot=yes --bootproto=none</arguments>
         </scriptfile>

         <!--Mediation Guest xmi default route: Update gateway-->
```

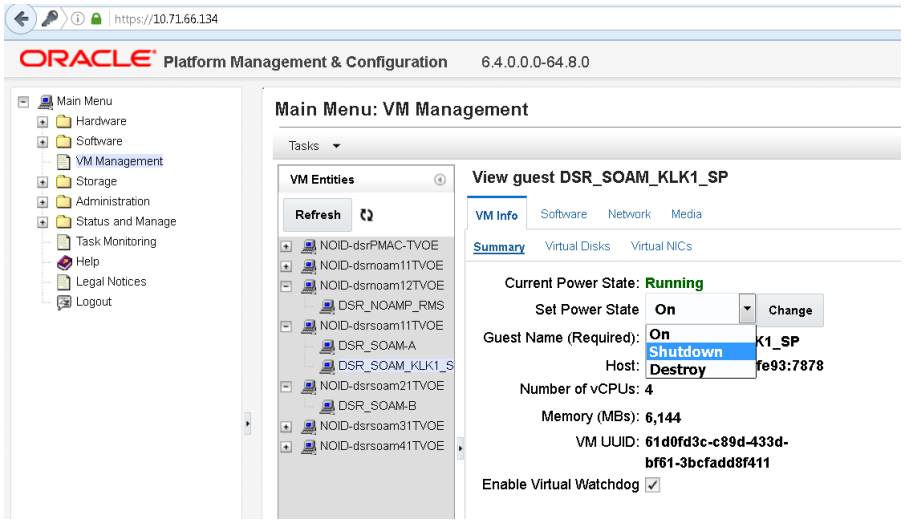
```
            <scriptfile id="medRoute">
               <filename>/usr/TKLC/plat/bin/netAdm</filename>
               <arguments>add --route=default --device=xmi --
               gateway=10.250.51.1</arguments>
            </scriptfile>

            <!--Mediation Guest imi network: Update address and netmask-->
            <scriptfile id="medImi">
               <filename>/usr/TKLC/plat/bin/netAdm</filename>
               <arguments>set --device=imi --address=192.168.10.55 --
               netmask=255.255.255.0
                  --onboot=yes --bootproto=none</arguments>
            </scriptfile>
         </presrvapp>

         <!--Mediation Post Deploy Database Configuration Script-->
         <postdeploy>
            <scriptfile id="medConfig">
               <filename>/opt/xIH/mediation/xdrDbInstall/install.sh</filen
               ame>
            </scriptfile>
         </postdeploy>
      </scripts>
   </tvoeguest>

   <!--Application Guest Configuration-->
   <tvoeguest id="Application">
      <infrastructure>PMAC</infrastructure>
      <tvoehost>mgmtsrvrtvoe</tvoehost>

      <!--Application Guest Profile: Update if hardware is Gen6 default is
      Gen8-->
      <!--profile>APP_GEN6</profile-->
      <profile>APP_GEN8</profile>
      <profile>application</profile>
      <name>application</name>
      <software>
         <baseimage>tpd</baseimage>
         <appimage>app</appimage>
      </software>

      <!--Application guest hostname: Update hostname-->
      <server info>
         <hostname>jesco</hostname>
      </server info>
      <scripts>
         <presrvapp>
            <scriptfile id="appInt">
               <filename>/usr/TKLC/plat/bin/netAdm</filename>
               <arguments>set --device=int --address=10.254.254.4 --
               netmask=255.255.255.224
```

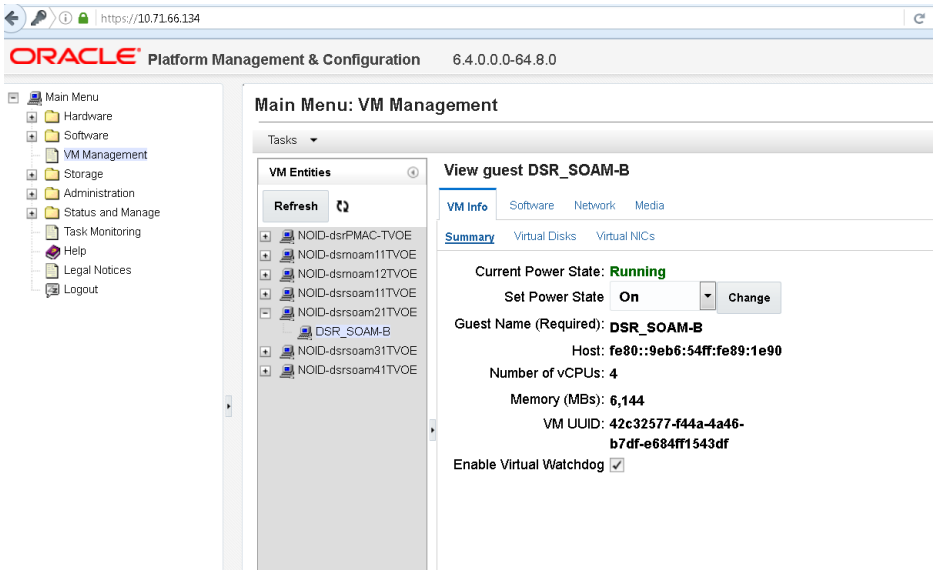
```
                --onboot=yes --bootproto=none</arguments>
            </scriptfile>

            <!--Application Guest xmi network: Update address and netmask-
            ->
            <scriptfile id="appXmi">
               <filename>/usr/TKLC/plat/bin/netAdm</filename>
                  <arguments>set --device=xmi --address=10.250.51.186 --
                  netmask=255.255.255.0
                     --onboot=yes --bootproto=none</arguments>
            </scriptfile>

            <!--Application Guest xmi default route: Update gateway-->
            <scriptfile id="appRoute">
               <filename>/usr/TKLC/plat/bin/netAdm</filename>
               <arguments>add --route=default --device=xmi --
               gateway=10.250.51.1</arguments>
            </scriptfile>
         </presrvapp>
         <postdeploy>

            <!--Sleep allows time for mediation scripts completion-->
            <scriptfile id="appSleep">
               <filename>/bin/sleep</filename>
               <arguments>60</arguments>
            </scriptfile>

            <!--Application Post Deploy Configuration Script-->
            <scriptfile id="appConfig">
               <filename>/opt/xIH/apps/install.sh</filename>
               <timeout>3000</timeout>
            </scriptfile>
         </postdeploy>
      </scripts>
   </tvoeguest>
</servers>
</fdc>
```

Appendix Z. Change SOAM VM Profile for Increased MP Capacity

Procedure 76. Change SOAM VM profile for increased MP Capacity

Step#	Procedure	Description
This procedure describes how to change SOAM VM profile when the MP capacity is increased. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

Step#	Procedure	Description
1. ☐	**Login PMAC**:	1. Log into the PMAC GUI using the VIP. 2. Navigate to Main Menu -> VM Management 3. Select the **Standby SOAM**
2. ☐	**Stop/Shutdown VM**	1. In **Set Power State** field, select **Shutdown** option from the downdown menu. 2. Modify Number of vCPUs to 8 3. Modify Memory to 14GB (1024 X 16) 4. Click **Change**. Confirm the pop-up and wait for the power state to change to **Shutdown**. This may take a few moments as this executes a graceful shutdown of the guest VM. 

Step#	Procedure	Description
3. ☐	**PMAC VIP:** ON VM	1. In **Set Power State** field, select **ON** option from the downdown menu. 2. Click **Change**. Confirm the pop-up and wait for the power state to change to **ON**. This may take a few moments as this executes a graceful shutdown of the guest VM. 

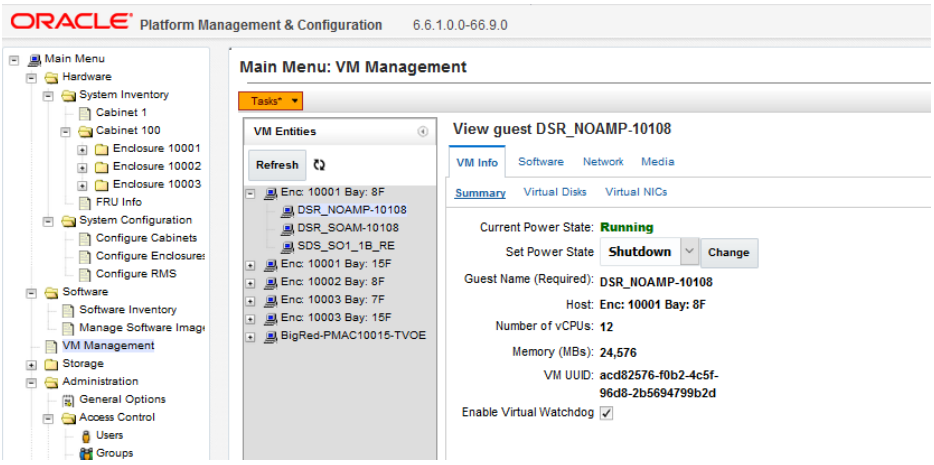
4.
☐
	Login to SOAM using CLI	1. Use the SSH command to log into the respective SOAM identified.
		`ssh admusr@<SERVER_XMI>`
		`password: <enter password>`
		2. Answer **yes** if you are asked to confirm the identity of the server

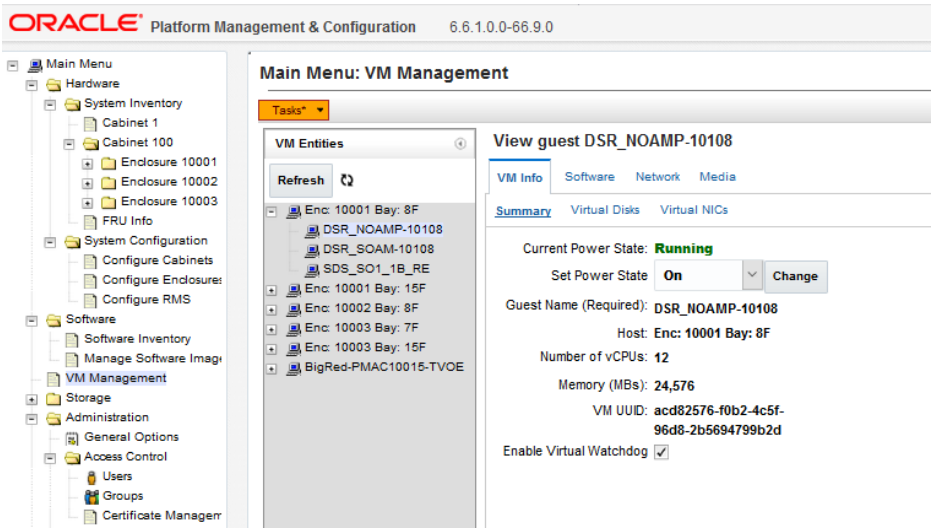
5.
☐
	SOAM CLI:
	Increase measurement memory and queue size
		1. Execute to the below mentioned command:
		`sudo sh /usr/TKLC/dsr/prod/maint/loaders/install/load.AppwMeasMem`
		2. Verify if `MeasMem.ini` file is created for measurement memory size of 3072 MB :
		`cat /var/TKLC/appworks/ini/MeasMem.ini.`
		Note: INI entry should be `aw.measure.maxmem = 3072`
		3. Verify that measurement queue size is set to 2 in `LongParam` table where parameter name "`measurementMaxQueues`" is 2, by executing:
		`iqt -pE LongParam | grep measurementMaxQueues`

6. ☐	**Repeat on Active SOAM**	Repeat the above steps on all active SOAMs.

Appendix AA. Change NOAM VM Profile for Increased MP Capacity

Procedure 77. Change NOAM VM profile for increased MP Capacity

Step#	Procedure	Description
This procedure describes how to change NOAM VM profile when the MP capacity is increased. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**Login NOAM**: login to NOAM GUI	1. Log into the NOAM GUI using the VIP. 2. Navigate to Main Menu -> VM Management 3. Select the **Standby NOAM**
2. ☐	**Stop/Shutdown VM**	1. In **Set Power State** field, select **Shutdown** option from the downdown menu. 2. Modify Number of vCPUs to 8 3. Modify Memory to 14GB (1024 X 16) 4. Click **Change**. Confirm the pop-up and wait for the power state to change to **Shutdown**. This may take a few moments as this executes a graceful shutdown of the guest VM. 

Step#	Procedure	Description
3. ☐	**PMAC VIP:** ON VM	1. In **Set Power State** field, select **ON** option from the downdown menu. 2. Click **Change**. Confirm the pop-up and wait for the power state to change to **ON**. This may take a few moments as this executes a graceful shutdown of the guest VM. 

4.
☐
	Login to NOAM using CLI	Use the SSH command to log into the respective NOAM identified.
		`ssh admusr@<SERVER_XMI>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server

5.
☐
	NOAM CLI:
	Create measurement file
		1. Execute to the below mentioned command:
		`sudo sh /usr/TKLC/dsr/prod/maint/loaders/install/load.AppwMeasMem`
		2. Verify if `MeasMem.ini` file is created for measurement memory size of 3072 MB :
		`cat /var/TKLC/appworks/ini/MeasMem.ini.`
		Note: INI entry should be `aw.measure.maxmem = 3072`
		3. Verify that measurement queue size is set to 2 in `LongParam` table where parameter name "`measurementMaxQueues`" is 2, by executing:
		`iqt -pE LongParam | grep measurementMaxQueues`

6. ☐	**Repeat on Active NOAM**	Repeat the above steps on all active NOAMs.

Appendix BB. Workarounds

BB.1. Resolve DB Site Replication Alarms

This procedure resolves DB site replication alarms if encountered during the upgrade. Database (DB) replication failure alarms may display during an Auto Site Upgrade (ASU) or during an event that resets multiple servers in parallel. The DB on the child servers is not updated until resolved.

Procedure 78. Workaround to Resolve DB Site Replication Alarms

Step#	Procedure	Description
This procedure restarts the `inetrep` process on the server that has a DB replication failure alarm. ***Note***: All UI displays are sample representations of upgrade screens. The actual display may vary slightly. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Server CLI: Log into the server	Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the active NOAM:
		`ssh admusr@<server address>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.

2. ☐	**Server CLI**: Check if the replication links are up	Execute this command: `irepstat` Some of the B-C and C-C replications links may be down.
3. ☐	**Server CLI**: Resolve replication issue(s)	Execute this command: `sudo pm.kill inetrep`
4. ☐	Repeat, if needed	Repeat procedure on each affected server

BB.2. Resolve Server HA Switchover Issue

This procedure resolves the HA switchover issue.

Procedure 79. Workaround Resolve the HA Switchover Issue on Affected Server(s)

Step#	Procedure	Description
This procedure restarts the cmha process on the server that has HA switchover issue. ***Note***: All UI displays are sample representations of upgrade screens. The actual display may vary slightly. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Server CLI: Log into the server	Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the NOAM server which is experiencing the HA switchover issue :
		`ssh admusr@<server address>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.

Step#	Procedure	Description
2. ☐	**Server CLI**: Resolve HA switchover issue(s)	Execute this command: `sudo pm.kill cmha`
3. ☐	Repeat, if needed	Repeat procedure on each affected server.

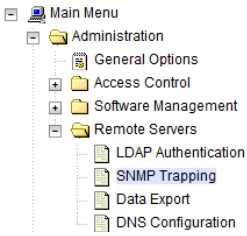
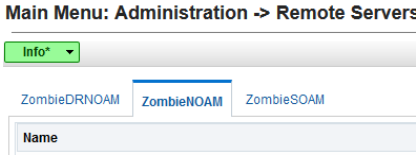
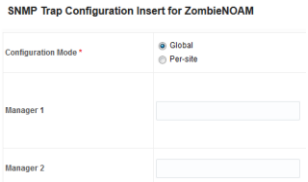
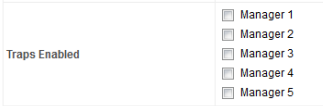
BB.3. SNMP Configuration

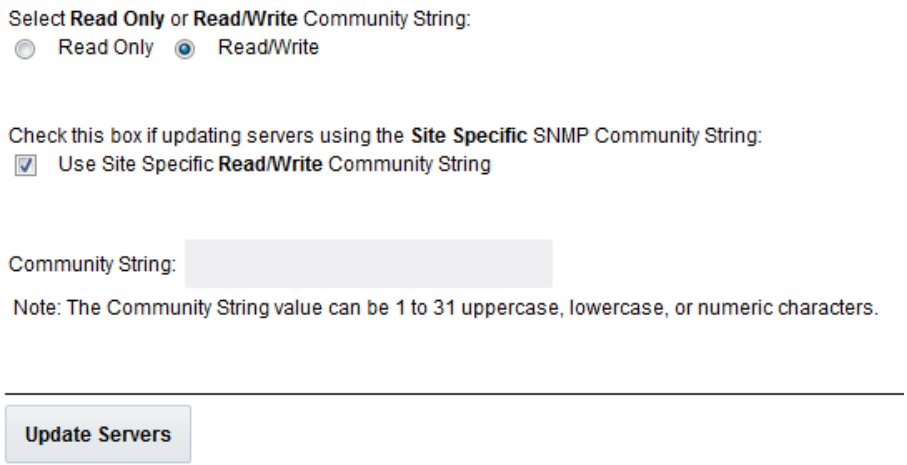
This workaround step should be performed only in the following cases:

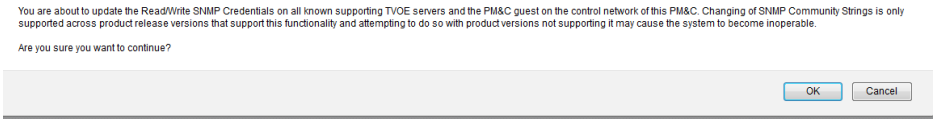
- If SNMP is not configured.
- If SNMP is already configured and SNMPv3 (V3Only) is selected as enabled version.

Procedure 80. Configure or Update SNMP Configuration

Step#	Procedure	Description
This workaround configures or updates the SNMP with **SNMPv2c and SNMPv3** as the enabled versions for SNMP Traps configuration, since PMAC does not support SNMPv3. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**NOAMP VIP GUI**: Login	If not already done, establish a GUI session on the NOAM server the VIP IP address of the NOAM server. Open the web browser and enter a URL of: `http://<Primary_NOAM_VIP_IP_Address>` Log into the NOAM GUI as the **guiadmin** user:

Step#	Procedure	Description
2. ☐	**NOAM VIP GUI**: Configure/Update system-wide SNMP trap receiver(s)	1. Navigate to **Administration > Remote Servers > SNMP Trapping**.  4. Select the Server Group tab for SNMP trap configuration:  5. Type the **IP address** or **hostname** of the Network Management Station (NMS) where you want to forward traps. This IP should be reachable from the NOAMP's XMI network. If already configured SNMP with **SNMPv3** as enabled version, another server needs to be configured here. 6. Continue to fill in additional secondary, tertiary, etc., Manager IPs in the corresponding slots if desired.  7. Set the Enabled Versions as **SNMPv2c and SNMPv3**. ***Note***: In case, enabled versions of already configured SNMP is V3Only, then update the enabled versions as above. 8. Check **Traps Enabled** checkboxes for the Manager servers being configured.  9. Type the SNMP Community Name. 10. Leave all other fields at their default values. 11. Click **OK**.

Step#	Procedure	Description
3. ☐	**PMAC GUI**: Login	Open web browser and enter: `http://<PMAC_Mgmt_Network_IP>` Login as **guiadmin** user:
4. ☐	**PMAC GUI**: Update the TVOE host SNMP community string	1. Navigate to **Administration->Credentials->SNMP Community String Update**. 12. Check the **Use Site Specific Read/Write Community String** checkbox.  13. Click **Update Servers**.

Step#	Procedure	Description
		 14. Click **OK**. 15. Execute following command on PMAC CLI. `$ sudo sentry restart`

BB.4. Resolve Device Deployment Failed Alarm

Procedure 81. Workaround to Resolve Device Deployment Failed Alarm

Step#	Procedure	Description
This procedure resolves the device deployment failed alarm, for example, 10054. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	**NOAMP VIP GUI**: Login	Open the web browser and enter a URL of: `http://<Primary_NOAM_VIP_IP_Address>` Log into the NOAM GUI as the **guiadmin** user:

Step#	Procedure	Description
2. ☐	**NOAMP VIP GUI**: Identify server(s) and interface(s) withalarm	Navigate to current alarm details and identify the server and interface where the **10054 - Device Deployment Failed** alarm is displayed. 1. Navigate to **Alarms & Events -> View Active**. 2. Look for the **10054** alarm make a list of the server(s) and interface(s).
3. ☐	**NOAMP VIP GUI**: Corrective action for alarm 10054	Interfaces like xmi and imi are in locked state and do not allow editing as a corrective action. For xmi and imi interfaces, first unlock the interface and for other interfaces skip steps (a) to (d) below. 1. Navigate to **Configuration -> Networking -> Networks**, select the respective “Network element” tab used for the server configuration 16. Click on the Network Name row. 17. Click **Unlock**. Click on the checkbox to confirm it and click **OK**. 18. To unlock the network for the particular device, navigate to **Configuration > Networking > Devices**. 19. Click on the Server tab from the list in Step 2. 20. Select each interface row one by one for which alarm is showing and click **Edit**. 21. Click **OK**. ***Note***: Give some time to system to auto correct the condition to clear the alarm. 22. Once this step is done, lock the network back again which were unlocked above. **For xmi and imi interfaces, lock the interface back, for other interfaces skip (a) to (d) below.** 1. To lock the network for a specific device, navigate to **Configuration > Networking > Networks**, select the respective Network element tab used for the server configuration. 23. Click the Network Name row. 24. Click **Lock**. Click on the checkbox to confirm it and click **OK**.

BB.5. Resolve syscheck Error for CPU Failure

Procedure 82. Workaround to Resolve syscheck Error for CPU Failure

Step#	Procedure	Description
This procedure is to resolve the syscheck errors for CPU failure. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

4.
☐
	Log into the server using CLI on which syscheck is failing	Use the SSH command (on UNIX systems – or putty if running on windows) to log into the server identified.
		`ssh admusr@<SERVER_XMI>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server

5.
☐
	Server CLI: Execute workaround	1. Edit the cpu config file.
		`$ sudo vim /usr/TKLC/plat/lib/Syscheck/modules/system/cpu/config`
		25. Comment out the all texts that reads: **EXPECTED_CPUS=** by putting # at the beginning of the line, for example:
		`# EXPECTED_CPUS=2`
		26. Save the cpu config file.
		27. Reconfig the syscheck by running these commands:
		`sudo syscheck --unconfig`
		`sudo syscheck --reconfig`
		`sudo syscheck`
		CPU related errors do not display.

BB.6. Resolve PDRA Trap Library Issue

Procedure 83. Workaround to resolve PDRA Trap Library Issue

Step#	Procedure	Description
This workaround is to resolve PDRA Trap library issue. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1.
☐
	Server CLI: Log into the server (if not already done)	Use the SSH command (on UNIX systems – or putty if running on Windows) to log into the server under backout:
		`ssh admusr@<server address>`
		`password: <enter password>`
		Answer **yes** if you are asked to confirm the identity of the server.
		Execute the following commands on servers where the services are in pending state:
		`rm -rf /etc/ld.so.cache`
		`echo "/usr/TKLC/dsr/lib" | sudo tee -a /etc/ld.so.conf.d/dsr.conf`
		`sudo cat /etc/ld.so.conf.d/dsr.conf`
		`sudo ldconfig`
		Check for configured libraries, for example:
		`sudo ldconfig -p | grep -i pdra`
		Output must have the following information:
		`libPdraTraps.so (libc6,x86-64) => /usr/TKLC/dsr/lib/libPdraTraps.so`
		Check whether all the services are Up,
		`sudo pl`

BB.7. Restore the Servers with Backout Errors

Procedure 84. Workaround to Restore the Servers with Backout Errors

Step#	Procedure	Description
This workaround is to resolve the backout failure error. Execute the below mentioned steps on the failed server. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		
1. ☐	Identify the rpm	Recognize the rpm (dsr/dpi) which yielded the scriptlet failure. Examine the upgrade log at **/var/TKLC/log/upgrade/upgrade.log** for errors that occurred during the backout. `$ rpm -qa <rpm_name>` Example: `$ rpm – qa <TKLCdsr.x86_64>` ***Note***: There will be two rpms, identify the newer rpm.
2. ☐	Uninstall the rpm	Uninstall the newer version of the rpm: `rpm -e <rpm_name>`

Step#	Procedure	Description
3. ☐	Identify the rpm	Execute the following command: `$ rpm -qa <rpm_name>` ***Note***: There must be single rpm.
4. ☐	Restore the database	Run the `sudo /var/tmp/backout_restore` command to restore the database and restart the server.

BB.8. Reset SOAP Password

Procedure 85. Reset SOAP Password

Step#	Procedure	Description
This procedure provides the details about resetting the SOAP password. When Oracle is upgraded, the following procedure resets the SOAP password, for the DSR to perform self-authenticate with IDIH. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number. If this procedure fails, it is recommended to contact My Oracle Support (MOS) and ask for assistance.		

1. ☐	**Login to NOAM**: Login on the active NOAM server	1. Login as admusr on the active NOAM server.
		2. Retrieve the TPD web service password in plaintext by executing:
		`$ /usr/TKLC/appworks/bin/aw.wallet credential get cmsoapa password`
		The command will print the current plaintext configuration web service password.
		For example:
		`7w57q9U0OvOtKtgtLVTMajDcXfhCj2F4nyXw45qK6EXNHA9jACyQ`

2. ☐	Login to the IDIH application server	1. Login as admusr on the IDIH application server. 2. Change the user to tekelec by executing: `sudo su - tekelec` 3. Reset/Create the Configuration web service password: a. Go to the directory `/usr/TKLC/xIH/apps/trace-refdata-adapter/` b. run `./resetSoapPassword.sh` c. When prompted for password: <enter the password obtained from Step1.2> **Note**: This script prints the encrypted password. The new encrypted SOAP password is stored into IDIH Oracle database. 4. Verify if the password is stored in IDIH Oracle database by executing: a. `sqlplus /@NSP` b. Select * from `DSR_USER_CREDENTIALS`; Here you should see the same encrypted password as in Step 2.3. c. Type `exit` to exit from database.

Step#	Procedure	Description

		5. After verifying that password is stored in database in Step 2.4, the WebLogic application server must be restarted on IDIH application server.
		a. Become admusr by executing:
		`exit`
		b. Stop the WebLogic application server by executing:
		`sudo service xih-apps stop`
		c. Start the WebLogic application server by executing:
		`sudo service xih-apps start`
		The Weblogic server might take few minutes to resume its service.
		Note: Upon completion of the above steps, in IDIH `/var/TKLC/xIH/log/apps/weblogic/apps/application.log` file you should see NO Error.

Appendix CC. My Oracle Support (MOS)

MOS (https://support.oracle.com) is your initial point of contact for all product support and training needs. A representative at Customer Access Support (CAS) can assist you with MOS registration.

Call the CAS main number at **1-800-223-1711** (toll-free in the US), or call the Oracle Support hotline for your local country from the list at http://www.oracle.com/us/support/contact/index.html. When calling, make the selections in the sequence shown on the Support telephone menu:

1. Select 2 for New Service Request.
2. Select 3 for Hardware, Networking and Solaris Operating System Support.
3. Select one of the following options:
   - For technical issues such as creating a new Service Request (SR), select 1.
   - For non-technical issues such as registration or assistance with MOS, select 2.

You are connected to a live agent who can assist you with MOS registration and opening a support ticket. MOS is available 24 hours a day, 7 days a week, and 365 days a year.

Emergency Response

In the event of a critical service situation, emergency response is offered by the CAS main number at `1-800-223-1711` (toll-free in the US), or by calling the Oracle Support hotline for your local country from the list at http://www.oracle.com/us/support/contact/index.html. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions

- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with Oracle.

Locate Product Documentation on the Oracle Help Center

Oracle Communications customer documentation is available on the web at the Oracle Help Center (OHC) site, http://docs.oracle.com. You do not have to register to access these documents. Viewing these files requires Adobe Acrobat Reader, which can be downloaded at http://www.adobe.com.

1. Access the **Oracle Help Center** site at http://docs.oracle.com.
2. Click **Industries**.
3. Under the **Oracle Communications** subheading, click the **Oracle Communications documentation** link. The Communications Documentation page appears. Most products covered by these documentation sets display under the headings **Network Session Delivery and Control Infrastructure** or "**Platforms**."
4. Click on your Product and then the Release Number. A list of the entire documentation set for the selected product and release displays. To download a file to your location, right-click the PDF link, select `Save target as` (or similar command based on your browser), and save to a local folder.