Oracle® Communications
User Data Repository

Disaster Recovery Guide

Release 12.1

E66199-01

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Oracle Communications User Data Repository Disaster Recovery Guide, Release 12.1

E66199-01

CAUTION: Open an Service Request on MOS and confer with Oracle before executing Disaster Recovery Procedure

Before recovering any system, please access My Oracle Support (MOS) (https://support.oracle.com) and review any MOS Alerts that relate to this procedure.

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 MOS in the Appendix C section.

TABLE OF CONTENTS

List of Figures

List of Tables

List of Procedures

1 INTRODUCTION

1.1 Purpose and Scope

This document describes disaster recovery procedures used during disaster scenarios of the UDR 12.1 product.

This document is a guide to describe procedures used to execute disaster recovery for UDR 12.1. This includes recovery of partial or a complete loss of one or more UDR servers (Primary or DR). The audience for this document includes Oracle customers as well as the following internal groups: Software Development, Quality Assurance, Product Verification, Information Development, and Consulting Services including NPx.. This document provides step-by-step instructions to execute disaster recovery for UDR 12.1 Executing this procedure also involves referring to and executing procedures in existing support documents[2].

This document is intended for execution by Customer Service team on the fielded UDR 12.1 systems.

1.2 References

[1] *http://docs.oracle.com/cd/E57832_01/index.htm - TPD Initial Product Manufacture, 909-2130-001*
[2] *UDR 12.1 Installtion and Configuration Guide, E66198-01, latest revision*

1.3 Acronyms

Acronym	Meaning
BIOS	Basic Input Output System
CD	Compact Disk
DR	Disaster Recovery
FRU	Field Replaceable Unit
IMI	Internal Management Interface
ISL	Inter-Switch-Link
NE	Network Element
MP Host Server	Server that contains one SOAM and two MPs
NOAMP	Network Operations, Administration, Maintenance & Provisioning
iLO	HP Integrated Lights-Out
ISO	Constains software images
Management Server	HP ProLiant DL 360 or DL380 server deployed with HP c-class used to host PM&C application in a virtual machine , to configure Cisco 4948E switches and to serve other configuration purpose. This server is deployed with a quad serial card and is connected to both switches.
MOS	My Oracle Support
NAPD	Network Architecture Planning Diagram
PM&C	Platform Management & Configuration
PM&C Application	PM&C is an application that provides platform-level management functionality for HP G6 system, such as the capability to manage and provision platform components of the system so it can host applications.
RMS	Rack Mount Server
SOAM	Systems Operations, Administration & Maintenance
TAC	Technical Assistance Centers
TPD	Tekelec Platform Distribution (Linux OS)
UDR	User Data Repository
TVOE	Tekelec Virtual Operating Environment
VIP	Virtual IP
VM	Virtual Machine
XMI	External Management Interface

VSP	Virtual Serial Port

1.4 Terminology

Table 1. Terminology

Base hardware	Base hardware includes all hardware components (bare metal) and electrical wiring to allow a server to power on.
Base software	Base software includes installing the server's operating system: Tekelec Platform Distribution (TPD) and TVOE for the MP Host Servers only.
Failed server	A failed server in disaster recovery context refers to a server that has suffered partial or complete software and/or hardware failure to the extent that it cannot restart or be returned to normal operation and requires intrusive activities to re-install the software and/or hardware.
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.
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.

1.5 How to Use this Document

When executing this document, understanding the following helps to ensure that the user understands the manual's intent:

- Before beginning a procedure, completely read the instructional text (it appears immediately after the Section heading for each procedure) and all associated procedural WARNINGS or NOTES.
- Before execution of a STEP within a procedure, completely read the left and right columns including any STEP specific WARNINGS and/or NOTES.

If a procedural STEP fails to execute successfully, please STOP and contact My Oracle Support (MOS) by referring to Appendix C.

2 GENERAL DESCRIPTION

2.1 Configurations

2.1.1 Normal Capacity Configurations

Harware Supported (+ D2200sb side car):

- ProLiantBL460Gen8 (G8 Server)
- ProLiantBL460Gen8+ (G8+ Server)
- ProLiantBL460Gen9 with HP Smart Array P246br Controller Firmware (G9 Server)

2.1.1.1 G8 Normal Capacity Configuration

This includes 2 MP Host Servers running on a TVOE virtualization environment in each server. The remaining 2 servers host the NOAMP server and database. The same servers can also be configured in a second site for a geo-redundant configuration.

Hardware Supported: ProLiantBL460Gen8, ProLiantBL460Gen8+

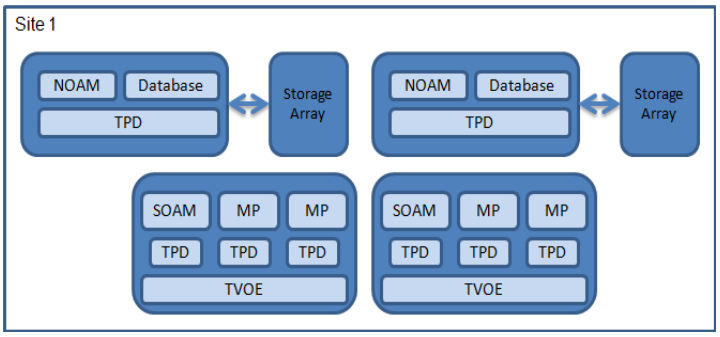


Figure 1: G8 Normal Capacity Single-Site Configuration

2.1.1.2 G9 Normal Capacity Configuration

This includes 2 or 3 MP Host Servers running on a TVOE virtualization environment in each server. The remaining 2 servers host the NOAMP server and database. The same servers can also be configured in a second site for a geo-redundant configuration.

Hardware Supported: ProLiantBL460Gen9. (G9 Server)

Note: For ProLiantBL460Gen9: Any other firmware controller cannot communicate with the side car.

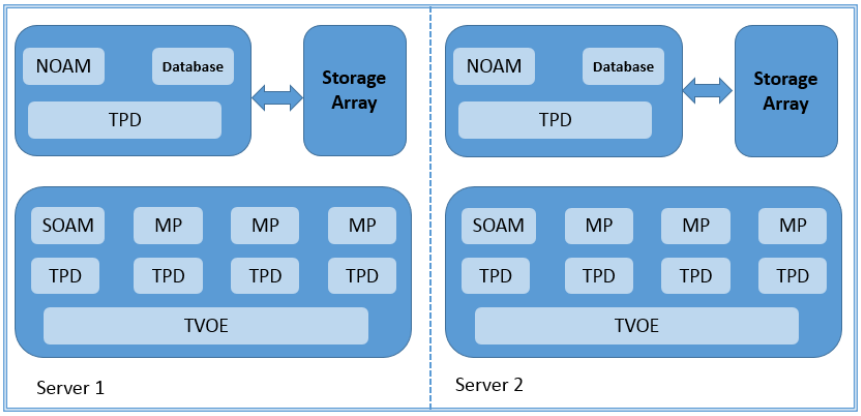


Figure 2: G9 Normal Capacity Single-Site Configuration

2.1.1.3

2.1.2 Low Capacity Configurations

This includes all UDR software running on a TVOE virtualization environment in each server, resulting in a fully-virtualized, fully-redundant HA configuration. This can be deployed either as a single site or as a geo-redundant deployment, with 2 servers at each site. (Each blade/server hosts 1 NOAMP, 1 SOAM and 1 MP instance).

Harware Supported:

1. **Low Capacity C-Class Configuration**
   - ProLiantBL460Gen8, ProLiantBL460Gen8+ or ProLiantBL460Gen9
2. **Low Capacity RMS Configuration**
   - ProLiantDL380Gen8, ProLiantDL380Gen8+ or ProLiantDL380Gen9 (G8, G8+, G9 RMS servers)
3. **Low Capacity RMS Configuration**
   - ORACLESERVERX5-2 (Oracle RMS server)

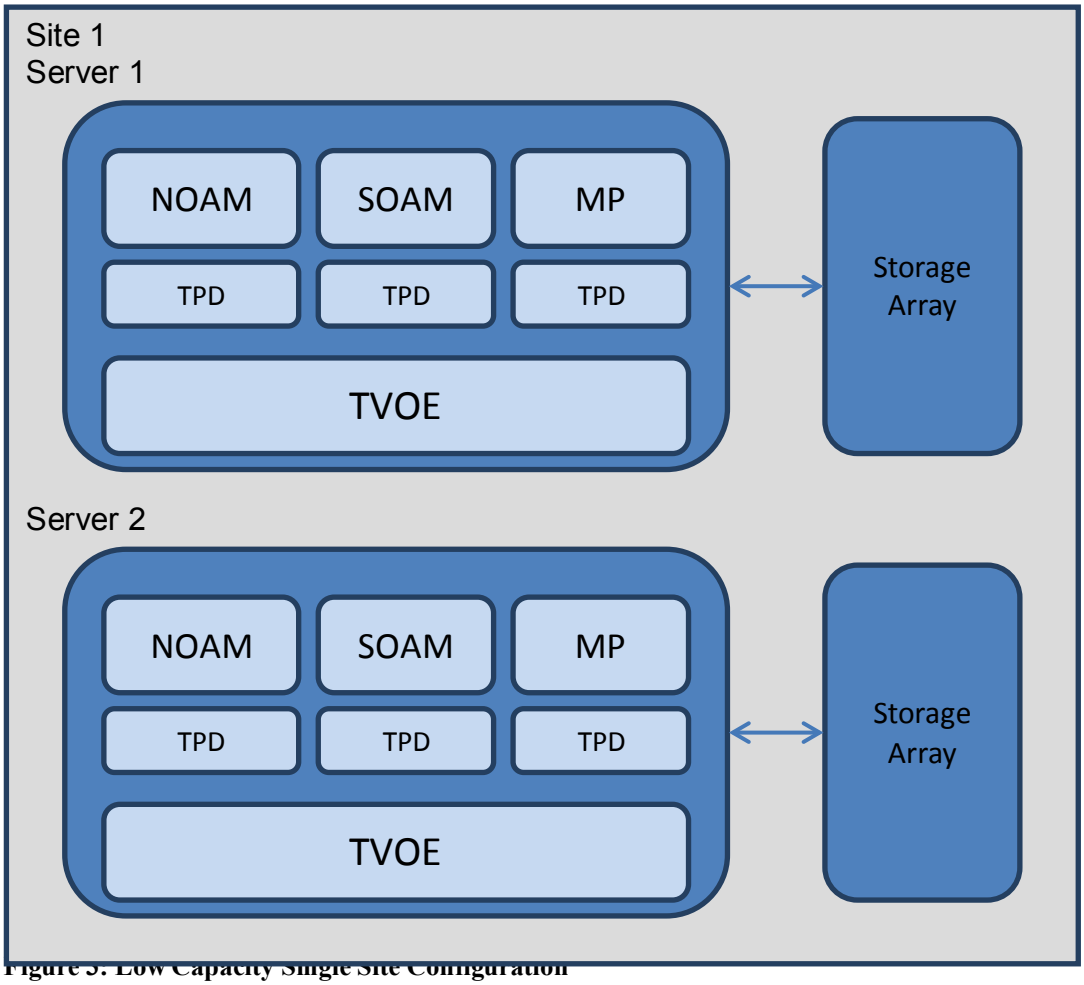


Figure 3: Low Capacity Single Site Configuration

2.2 Recovery Procedure Use Cases

The UDR disaster recovery procedure falls into seven basic cases:

1) Primary or DR NOAMP server has failed and needs replacement:

- Either the active,standby or one of the spare NOAMP servers has failed and needs to be replaced. If the active fails, the standby server will become active and start to receive provisioning data.
- NOAMP server is recovered using base recovery of hardware and/or software.
- Database replication from the active NOAMP server will recover the database to the replaced NOAMP server.

2) MP Host server (contains 1 SOAM and 2 MPs) has failed and needs replacement:

- Either the active or standby MP Host server has failed and needs to be replaced. If the active MP Host server fails, the standby MP Host server will become active.

- MP Host server is recovered using base recovery of hardware and/or software.
- Database replication from the active server will recover the database to the MP Host server.

3) Primary or DR NOAMP server pair has failed and needs replacement:

- Both NOAMP servers at a site failed (Primary or DR).
- NOAMP servers are recovered using base recovery of hardware and/or software.

Three scenarios are possible here:

- If the primary active and standby NOAMP servers failed, the DR NOAMP servers will automatically be activated. This allows provisioning to continue at the DR NOAMP until the primary site is recovered. Control will resume back to primary site once the first NOAMP is back in service. Replication from the DR site will restore the Database on the first NOAMP.
- If no DR site is available, the user will need access to the most recent NOAMP backup archive file that contains both Provisioning and Configuration data. This backup archive file should be in uncompressed format. These should be taken from Customer offsite backup storage locations (assuming these were performed and stored offsite prior to the outage). The servers are then restored using these database backups to the active NOAMP and SOAM servers. If no backup files are available, the only option is to rebuild the entire network from scratch. The network data must be reconstructed from whatever sources are available, including entering all data manually.
- The DR NOAMPs needs to be replaced. Replication from primary site will restore the DB.

4) MP Host server pair (contains 2 SOAMs and 4 MPs) has failed and needs replacement:

- Both MP Host servers at a site failed.
- MP Host servers are recovered using base recovery of hardware and/or software.
- SOAM backup archive is needed for Diameter Configuration. These should be taken from Customer offsite backup storage locations (assuming these were performed and stored offsite prior to the outage).

5) A fully virtualized Primary or DR has failed and needs replacement (one server consists of 1 NOAMP, 1 SOAM and 1 MP):

- Either the active or standby "server hosting UDR in a box" has failed and needs to be replaced. If the active fails, the standby server will become active and start to receive provisioning data.
- A "Server hosting UDR in a box" is recovered using base recovery of hardware and/or software.
- Database replication from the active NOAMP will recover the database to the replaced NOAMP.

6) Fully Virtualized Primary or DR pair has failed and needs replacement (one server consists of 1 NOAMP, 1 SOAM and 1 MP):

- Both servers at a site failed (Primary or DR).
- Servers are recovered using base recovery of hardware and/or software.
- SOAM backup archive is needed for Diameter Configuration. These should be taken from Customer offsite backup storage locations (assuming these were performed and stored offsite prior to the outage).

Three scenarios are possible here:

- If the primary active and standby servers failed, the DR servers will automatically be activated. This allows provisioning to continue at the DR NOAMP temporarily until the primary site is recovered. Control will resume back to primary site once the first NOAMP is back in service. Contact My Oracle Support (MOS) by referring to Appendix C for details of automatic transfer to DR NO for more details. Replication from the DR site will restore the Database on the active Server's NOAMP.
- If no DR site is available, the user will need access to the most recent NOAMP backup archive file that contains both Provisioning and Configuration data. This backup archive file should be in uncompressed format. These should be taken from Customer offsite backup storage locations (assuming these were performed and stored offsite prior to the outage). The servers are then restored using these database backups to the active NOAMP and SOAM servers. If no backup files are available, the only option is to rebuild the entire network from scratch. The network data must be reconstructed from whatever sources are available, including entering all data manually.
- The DR Host Server pair needs to be replaced. Replication from primary site will restore the DB.

7) Whole site failure (Primary or DR Site has suffered complete software and/or hardware failure):

- For Normal Capacity C-Class Configuration:
  - Both NOAMP servers failed at a Primary or DR site (see #3 in this section for details) and
  - Both MP Host servers have failed at a site (Each host contains 1 SOAM and 2 MPs) (see #4 in this section for details)
- For Low Capacity Configuration:
  - Both "Servers hosting UDR in a box" failed at a Primary or DR site (see #6 in this section for details)

3 PROCEDURE OVERVIEW

This section lists the materials required to perform disaster recovery procedures and a general overview (disaster recovery strategy) of the procedure executed.

3.1 Required Materials

The following items are needed for disaster recovery:

1. A hardcopy of this document (E66199-01) and hardcopies or electronic file of all documents, software in the reference list: [1] through [2]
2. Hardcopy of all site surveys performed at the initial installation and network configuration of this customer's site. If the site surveys cannot be found, escalate this issue within My Oracle Support (MOS) [refer to Appendix C] until the site survey documents can be located.
3. UDR 12.1 backup files: electronic backup file (preferred). [refer to Appendix A]
4. Latest Network Element report: electronic file or hardcopy of Network Element report.
5. Access https:edelivery.oracle.com Oracle Software Delivery Cloud (OSDC) page, to download installation softaware for TPD, TVOE, UDR.

For all Disaster Recovery scenarios, we assume that the NOAMP Database backup and the SOAM Database backup were performed around the same time, and that no synchronization issues exist among them.

4 DISASTER RECOVERY PROCEDURE

Disaster recovery requires configuring the system as it was before the disaster and restoration of operational information. There are seven distinct procedures to choose from depending on the type of recovery needed. Only one of these should be followed (not all seven).

Before disaster recovery, users must properly evaluate the outage scenario. This check ensures that the correct procedures are executed for the recovery.

****** WARNING *******

****** WARNING *******

NOTE: **DISASTER Recovery is an exercise that requires collaboration of multiple groups and is expected to be coordinated by the TAC prime. Based on TAC's assessment of Disaster, it may be necessary to deviate from the documented process.**

Recovering Base Hardware

1. Base Hardware Replacement must be controlled by engineer familiar with UDR 12.1 Application.

4.1 Replacement of a Single NOAMP Server (Active, Standby or Spare)

A Primary or DR NOAMP server has stopped functioning (one of the four NOAMP servers). For a partial outage with an active NOAMP server and a SOAM server intact and available, only base recovery of hardware and software is needed. The intact active NOAMP server is capable of restoring the database via replication to the replaced NOAMP server (does not require manual restoration at the standby/spare NOAMP server). The recovery steps are detailed in Procedure 1 below.

4.1.1 Pre-Conditions

- Primary or DR NOAMP server has failed and needs replacement. (Active, Standby or Spare)
- If the active NOAMP server stopped functioning, the standby NOAMP server has become active.
- Primary NOAMP GUI is accessible.
- It has been determined to replace defective NOAMP server.
- The new NOAMP server replacement is available.
- For Normal Capacity Configurations only.

4.1.2 Alarms During Replacement of NOAMP Servers

The following alarms may appear during the NOAMP replacement and can be ignored:

- 10009 Config and Prov DB not yet synchronized
- 19800 Communication Agent Connection Down
- 19820 Communiation Agent Routed Service Unavailable
- 13071 No northbound Provisioning Connections

4.1.3 Recovery Steps

Procedure 1. Replacement of the failed NOAMP Server (Primary or DR)

S T E P #	This procedure performs recovery if one NOAMP server has failed. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1 ☐	Identify the server to be replaced	Identify the defective NOAMP server that needs to be replaced Hostname _____

2 ☐	Force defective NOAMP server to be "Standby" or "Spare" so it cannot become active.	1. Login to the NOAMP GUI as admin user using VIP address. 2. Select [Main Menu: Status & Manage → HA] screen 3. Click 'Edit' button 4. Change "Max Allowed HA Role" of NOAMP server that needs to be replaced to 'Standby' if primary server or to 'Spare' if DR server. 5. Click OK button
3 ☐	Remove the defective NOAMP from the server group at active NOAMP.	1. Select [Main Menu: Configuration → Server Groups] screen. 2. Select NOAMP's server group. 3. Click "Edit" button. 4. Under 'SG Inclusion', uncheck the defective NOAMP server 5. Click "Ok" button
4 ☐	Power down and replace NOAMP server.	1. Power down the defective NOAMP server 2. Physically remove the blade for replacement. 3. Ensure that the new blade is compatible. 4. A Gen8 blade can be replaced with a Gen9 blade if the Gen 9 blade is equipped with equivalent or greater RAM and equivalent networking connections. Note: Any other firmware controller cannot communicate with the side car. Refer to section 2.1.1 for hardware details. 5. G9 blade needs to be replaced with a G9 blade equipped with equivalent or greater RAM. G9 cards cannot be replaced with G8 cards. 6. Wire in the new NOAMP server according to the cables you labeled and removed from the old NOAMP server OR insert new server blade, if the hardware type is different. 7. Power up the new NOAMP server
5 ☐	Prepare/Install the new NOAMP server	1. Execute Procedures "Install NOAMP Servers(NO and DR Network Elements)" in reference[2]. Important Note: Some of the steps in this procedure are for the Primary Active NOAMP only, these are noted in the procedure.
6 ☐	Configuration of NOAMP Server On Primary NOAMP	1. Go to [Main Menu: Configuration → Servers] 2. Select the replaced standby/spare NOAMP 3. Select the Export dialogue button 4. The configuration file will be created and stored in the /var/TKLC/db/filemgmt directory on the active NOAMP. The configuration file will have a file name like TKLCConfigData.<***hostname***>.sh. 5. Execute one of the "Applying Server Configuration" procedures in Appendix in reference [2].

7 ☐	On Primary NOAMP Add new NOAMP server to the NOAMP server group	1. Select [Main Menu: Configuration → Server Groups] screen. 2. Select NOAMP's server group. 3. Click "Edit" button. 4. Under 'SG Inclusion', check the new NOAMP server 5. Click "Ok" button Note: If the NOAMP server being added to the server group is a DR NOAMP, then the preferred spare option needs to be selected.
8 ☐	On Primary NOAMP Make new NOAMP server Active (remove forced standby or Spare)	1. Select [Main Menu: Status & Manage → HA] screen 2. Click 'Edit' button 3. Change "Max Allowed HA Role" of the new NOAMP server to 'Active' if it's a primary server or a DR server. 4. Click OK button
9 ☐	Restart the application on NOAMP server	1. Select [Main Menu: Status & Manage → Server] screen. 2. Verify the "DB" status displays "Norm" and the "Proc" status shows "Man" for the new NOAMP server before preceding to the next step. 3. Select the new server and then select "Restart" from the bottom left corner of the screen. 4. Click OK button 5. The Info tab should display a confirmation message for the NOAMP Server stating: "[server name]:Successfully restarted application". 6. Verify that the "Appl State" now shows "Enabled" and the "Proc" status column show "Norm" for the new NOAMP Server. 7. Database replication from the active NOAMP server will recover the database on this server after it's restarted.
10 ☐	**(OPTIONAL) ACTIVE NOAM:** Re-Sync NTP if Necessary	Navigate to **Status & Manage -> Server**, then select **each** server that has been recovered and click **NTP Sync**. NOTE: This action can cause the server to be restarted.
11 ☐	Re-exchange SSH keys for Prov Import/Export Features	1. Login to Primary NOAMP GUI as admin user. 2. [Main Menu: UDR → Configuration → Provisioning Options] 3. Perform SSH key exchange for **Prov Import/Export** using this screen after filling in the Remote Import/Export Host details
12 ☐	Verify the Database state of the newly restored server	1. Click on Main Menu->Status and Manage->Database 2. Verify that the OAM Max HA Role is either "Active" or "Standby" or "Spare" and that the status is "Normal".
13 ☐	Verify the HA Status	1. Click on Main Menu->Status and Manage->HA 2. Check the row for the newNOAMP Server. 3. Verify that the Max Allowed HA role is Active.

14 ☐	Examine All Alarms	1. Click on Main Menu->Alarms & Events->View Active 2. Examine all active alarms and refer to the on-line help on how to address them.
15 ☐	Verify new NOAMP server was synched	Examine Main Menu-> Status & Manage->*Database* 1) Repl Status should be "allowed" 2) The DB Levels should be the same or close in numbers. Note: The Database sync time can take up to 90 minutes to complete.
16 ☐	Backup and archive all the databases from the recovered system	Execute Appendix A:UDR 12.1 Database Backup "Replacement of a NOAMP Server" is Complete.

End of Procedure

4.1.4 Post Condition

- Recovered NOAMP (Primary or DR site) server is back in service.

4.2 Replacement of a MP Host Server

For a partial outage with an active NOAMP server and an active MP Host server intact and available, only base recovery of hardware and software is needed. The intact active NOAMP and active MP Host server are capable of restoring the database via replication to the replaced MP Host server (does not require manual restoration at the standby MP Host server). The recovery steps are detailed in Procedure 2 below.

4.2.1 Pre-Conditions

- An Active or Standby MP Host server has failed and needs replacement (An MP Host Server consists of 1 SOAM and 2 or 3 MPs).
- If the active MP Host server stopped functioning, the standby MP Host server has become active.
- Primary NOAMP and SOAM GUI is accessible.
- It has been determined to replace defective MP Host server.
- The new MP Host server replacement is available.
- For Normal Capacity Configurations only.

4.2.2 Recovery Steps

Procedure 2. Replacement of a MP Host Server

1 ☐	Identify the server to be replaced.	Identify the defective MP Host server (Consists of 1 SOAM and 2 MPs) that needs to be replaced: Hostname _____
2 ☐	Force defective MP Host server to be "Standby" so it does not become active.	1. Login to the NOAMP GUI as admin user using VIP address. 2. Select [Main Menu: Status & Manage → HA] screen 3. Click 'Edit' button 4. Change MP Host Server's NOAMP/SOAM to"Max Allowed HA Role" of'Standby' (This includes 1 SOAM and 2/3 MPs) 5. Click OK button
3 ☐	Remove MP Host server from the server group at active NOAMP.	1. Select [Main Menu: Configuration → Server Groups] screen. 2. Select SOAM server group. 3. Click "Edit" button. 4. Under 'SG Inclusion', uncheck the defective SOAM server 5. Click "Ok" button 6. Select MP server group. 7. Click "Edit" button. 8. Under 'SG Inclusion', uncheck the defective MP servers 9. Click "Ok" button
4 ☐	Power down and replace MP Host server.	1. Power down the defective MP Host server 2. Physically remove the blade for replacement. 3. Ensure that the hardware is compatible. 4. A Gen8 blade can be replaced with a Gen9 blade if the Gen 9 blade is equipped with equivalent or greater RAM and equivalent networking connections. 5. Wire in the new MP Host server according to the cables you labeled and removed from the old MP Host server. 6. Power up the new MP Host server
5 ☐	Prepare/Install the new MP Host server	1. Execute Procedure 2 "Install NOAMP/SOAM/MP Host Servers" in reference[2]. 2. Execute Procedure 3 "Create, IPM and Install Application on Virtual Machines in reference [2].
6 ☐	Configure MP Host Server	1. On Primary NOAMP, Select… Main Menu->Configuration->Servers 2. Select the new SOAM Server (part of MP Host Server) 3. Select the Export dialogue button 4. The configuration file will be created and stored in the /var/TKLC/db/filemgmt directory. The configuration file will have a file name like TKLCConfigData.<***hostname***>.sh. 5. Execute one of the procedures in Appendix K. Applying Server Configuration in reference [2] for new SOAM server. 6. Repeat for the two or three MPs that are part of the MP Host Server.

7 ☐	Add new MP Host server (1 SOAM and 2 MPs) to appropriate server groups	1. Select [Main Menu: Configuration → Server Groups] screen. 2. Select SOAM's server group. 3. Click "Edit" button. 4. Under 'SG Inclusion', check the new SOAM 5. Click "Ok" button 6. Select MP server group. 7. Click "Edit" button. 8. Under 'SG Inclusion', check the new MPs (two or three) 9. Click "Ok" button 10. Wait at least 5 minutes before continuing to the next steps.
8 ☐	Make new MP Host server Active (remove forced standby).	1. Select [Main Menu: Status & Manage → HA] screen 2. Click 'Edit' button 3. Change "Max Allowed HA Role" of the new MP Host server [1 SOAM and all MPs (2 or 3)] to 'Active' if it's on standby. 4. Click OK button
9 ☐	Restart the application on MP Host server	1. Select [Main Menu: Status & Manage → Server] screen. 2. Verify the "DB" status displays "Norm" and the "Proc" status shows "Man" for the new MP Host server [1 SOAM and all MPs (2 or 3)] before preceding to the next step. 3. Select the new SOAM and all MP servers (2 or 3) and then select "Restart" from the bottom left corner of the screen. 4. Click OK button 5. The "Info" tab should contain the confirmation messages stating: "Successfully restarted application" for the SOAM and all MPs(2 or 3). 6. Verify that the "Appl State" now shows "Enabled" and the "Proc" status column show "Norm" for the new MP Host Server [1 SOAM and all MPs (2 or 3)].
10 ☐	**(OPTIONAL) ACTIVE NOAM:** Re-Sync NTP if Necessary	Navigate to **Status & Manage -> Server**, then select **each** server that has been recovered and click **NTP Sync**. NOTE: This action can cause the server to be restarted.
11 ☐	Verify the Database state of the newly restored server	1. Click on Main Menu->Status and Manage->Database 2. Verify that the OAM Max HA Role is either "Active" or "Standby" or "Spare", and that the status is "Normal". 3. Verify data was synched from the active NOAMP (servers, etc).
12 ☐	Configure ComAgent for the Replaced MPs	Execute Procedure 17 in [2]. ("Configure SPR Application on MP")
13 ☐	Verify the HA Status	1. Click on Main Menu->Status and Manage->HA 2. Check the MP Host Server (1 SOAM and 2 MPs) 3. Verify that the "Max Allowed HA Role" status is Active.

14 ☐	Verify the local node info on the Replaced SOAM	1. Click on Main Menu->Diameter->Configuration->Local Node 2. Verify that all the local nodes are listed.
15 ☐	Verify the peer node info on the Replaced SOAM	1. Click on Main Menu->Diameter->Configuration->Peer Node 2. Verify that all the peer nodes are listed.
16 ☐	Verify the Connections info on the Replaced SOAM	1. Click on Main Menu->Diameter->Configuration->Connections 2. Verify that all appropriate connections are listed.
17 ☐	Re-enable connections if needed on Active SOAM	1. Click on Main Menu->Diameter->Maintenance->Connections 2. Select each connection and click on the "Enable" button 3. Verify that the Operational State is Available.
18 ☐	Examine All Alarms	1. Click on Main Menu->Alarms & Events->View Active 2. Examine all active alarms and refer to the on-line help on how to address them.
20 ☐	Backup and archive all the databases from the recovered system	Execute Appendix A: UDR 12.1 Database Backup "Replacement of a MP Host Server" is Complete.

End of Procedure

4.2.3 Post Condition

- MP Host server is back in service

4.3 Replacement of a Primary or DR NOAMP Server Pair

Three scenarios are possible here:

- The primary NOAMP servers both failed and there is a DR site.
- The primary NOAMP servers both failed and there is no DR site.
- The DR NOAMP servers both failed.

4.3.1 Primary NOAMP Server Pair Failure with an operational DR Site

4.3.1.1 Pre-Conditions

- Primary Active and Standby NOAMP servers failed.
- For Normal Capacity Configurations only.
- It has been determined to replace defective NOAMP servers and the new NOAMP servers are available.

- The DR NOAMP site will automatically be activated and become the primary site. This allows provisioning to continue at the DR NOAMP site temporarily until the primary site is recovered. The appropriate flag is set and control will resume back to the primary site once the first NOAMP is back up. Refer to [2] for more details.

4.3.1.2 Recovery Steps

Procedure 3. Replacement of Primary NOAMP Server Pair with an operational DR Site

S T E P #	This procedure performs recovery if both NOAMP servers have failed at a site and there is a DR site. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1 ☐	Recover NOAMP server (1st one)	1. Execute steps 1 - 9 in procedure 1 for the first defective NOAMP.
2 ☐	Control returns back to Primary Site.	1. Control returns back to the NOAMP at the Primary site. 2. Finish steps 10-16 in Procedure 1.
3 ☐	Recover second NOAMP server	Execute Procedure 1.

End of Procedure

4.3.1.3 Post Condition

- Primary NOAMP server pair is back in service

4.3.2 Primary NOAMP Server Pair Failure with no operational DR Site

4.3.2.1 Pre-Conditions

- Primary Active and Standby NOAMP servers failed.
- For Normal Capacity Configurations only.

- It has been determined to replace defective NOAMP servers and the new NOAMP servesr are available.
- The servers are restored using database backups since there is no DR site.

4.3.2.2 Recovery Steps

Procedure 4. Replacement of Primary NOAMP Server Pair with no operational DR Site

S T E P #	This procedure performs recovery if both NOAMP servers have failed at a site and there is no DR site. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1 ☐	Recover first NOAMP server	1. Execute steps 4-5 in procedure 1. 2. Execute section 8.1 "Configuration NOAMP-A Server" in reference [2].
2 ☐	Copy NOAMP backup archive to new NOAMP server, and perform DB restore from backup file.	1. Login via SSH to the console of new NOAMP server. 2. Copy the uncompressed backup archive identified in step 1 to newly installed NOAMP-A server on this location: **/var/TKLC/db/filemgmt** 3. Execute this command to stop running applications and leave database running: **prod.stop** 4. Restore configuration and provisioning database by executing this command: **idb.restore -n –f –t /var/TKLC/db/filemgmt -v <archive file>** 5. NOAMP database is now restored Start the application by executing this command **prod.start**
3 ☐	Recover second NOAMP server	Execute procedure 1.

End of Procedure

4.3.2.3 Post Condition

- Primary NOAMP server pair is back in service

4.3.3 DR NOAMP Server Pair Failure

4.3.3.1 Pre-Conditions

- DR NOAMP servers failed at a site.
- For Normal Capacity Configurations only.
- It has been determined to replace defective NOAMP servers and the new NOAMP servers are available.

4.3.3.2 Recovery Steps

Procedure 5. Replacement of DR NOAMP Server Pair

S T E P #	This procedure performs recovery if both DR NOAMP servers have failed at a site. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1 ☐	Recover first DR NOAMP server	Execute procedure 1.
2 ☐	Recover second DR NOAMP server	Execute procedure 1.

End of Procedure

4.3.3.3 Post Condition

- DR NOAMP server pair is back in service.

4.4 Replacement of a MP Host Server Pair

4.4.1 Pre-Conditions

- Active or Standby MP Host Servers have failed at a site.
- For Normal Capacity Configurations only.
- It has been determined to replace defective MP Host servers and the new MP Host servers are available.
- SOAM backup archive is needed for Diameter Configuration. These should be taken from Customer offsite backup storage locations (assuming these were performed and stored offsite prior to the outage).

4.4.2 Recovery Steps

Procedure 6. Replacement of a MP Host Server Pair

S T E P #	This procedure performs recovery if both MP Host servers have failed at a site. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1 ☐	Recover first MP Host Server	Execute steps 3-12 in procedure 2.
2 ☐	On the new SOAM GUI, perform the actions to upload backup archive file and verify it was uploaded successfully.	1. Select Main Menu->Status & Manage->Files 2. Select the Active SOAM Server 3. Click on "Upload" 4. Select the "SOAM Configuration:" file backed up after configuration. 5. Click on the "Upload " button. The file will take a few seconds to upload depending on the size of the backup data. The file will be visible on the list of entries after the upload is complete. Verify that the SOAM database backup file was uploaded and is located under /var/TKLC/db/filemgmt.
3 ☐	On Active NOAMP Disable Provisioning	1. Click on Main Menu->Status & Manage->Database 2. Disable Provisioning by clicking on "Disable Site Provisioning" button at the bottom of the screen. A confirmation window will appear, press "OK" to disable Provisioning.

4 ☐	Execute a restore of SOAM configuration database.	1. Navigate to GUI page [Main Menu: Status & Manage → Database] 2. Select the active SOAM server. Server is now highlighted. 3. Click 'Restore' button and select the backup archive file. 4. GUI will display compatibility information. If you get an error that the NodeIDs do not match, that is expected. If no other errors beside the NodeIDs are displayed, select the Force checkbox as shown above and Click OK to proceed with the DB restore . 5. If the databases are compatible, then click 'OK' to continue with database restoration. 6. Wait for 5-10 minutes for the system to stabilize. There will be HA switch over for SOAM servers and you will have to log back in the SOAM GUI via VIP address again. Make sure that you are logging in to the same active server identified in Step 1 above.
5 ☐	Re-enable Provisioning	1. Log into the Active NOAMP GUI 2. Click on Main Menu->Status & Manage->Database menu item. 3. Click on the "Enable Provisioning" button. A pop-up window will appear to confirm, press OK.
6 ☐	Finish MP Host verification for the first server.	Execute steps 13 – 20 in procedure 2.
7 ☐	Recover second MP Host Server	Execute procedure 2.

End of Procedure

4.4.3 Post Condition

- MP Host server pair is back in service

4.5 Replacement of a Primary or DR "Server hosting UDR in a box"(fully virtualized)

4.5.1 Pre-Conditions

- A Primary or DR "Server hosting UDR in a box" has failed and needs replacement. (One server consists of 1NOAMP, 1 SOAMP and 1MP).
- Low Capacity Configurations only.
- If the active server stopped functioning, the standby server has become active.
- Primary NOAMP and SOAM GUI is accessible.
- It has been determined to replace defective "Server hosting UDR in a box".
- The new "Server hosting UDR in a box" replacement is available.

4.5.2 Recovery Steps

Procedure 7. Replacement of a Primary or DR "Server hosting UDR in a box"

1 ☐	Identify the server to be replaced	Identify the defective "Server hosting UDR in a box" (Consists of 1 NOAMP, 1 SOAM and 1 MP) that needs to be replaced: Hostname _____
2 ☐	Force defective server to be "Standby" so it does not become active.	1. Login to the NOAMP GUI as admin user using VIP address. 2. Select [Main Menu: Status & Manage → HA] screen 3. Click 'Edit' button 4. Change Server's NOAMP and SOAM to "Max Allowed HA Role" of 'Standby' 5. Click OK button
3 ☐	Remove "Server hosting UDR in a box" from the server groups at active NOAMP.	1. Select [Main Menu: Configuration → Server Groups] screen. 2. Select NOAMP server group 3. Click "Edit" button. 4. Under 'SG Inclusion', uncheck the defective NOAMP server 5. Select SOAM server group. 6. Click "Edit" button. 7. Under 'SG Inclusion', uncheck the defective SOAM server 8. Click "Ok" button 9. Select MP server group. 10. Click "Edit" button. 11. Under 'SG Inclusion', uncheck the defective MP servers 12. Click "Ok" button

4 ☐	Power down and replace server.	1. Power down the defective "Server hosting UDR in a box" 2. **Low Capacity RMS Configuration Only**: Label all cables connected to defective NOAMP server Disconnect all cables if RMS 3. Physically remove the server (RMS or blade) for the replacement. 4. **Blade only**: A Gen8 blade can be replaced with a Gen9 blade if the Gen 9 blade is equipped with equivalent or greater RAM and equivalent networking connections. 5. Connect back the cables you labeled and removed from the old "Server hosting UDR in a box" to the new "Server hosting UDR in a box". 6. Power up the new server.
5 ☐	Prepare/Install the new "Server hosting UDR in a box"	**For Low Capacity C-Class Configuration Only:** 1. Execute Procedure 4 "Install NOAMP/SOAM/MP Host Servers" in reference[2]. 2. Execute Procedure 5 "Create, IPM and Install Application on Virtual Machines in reference[2].
6 ☐	Prepare/Install the new server	**For Low Capacity RMS Configuration Only:** 1. Execute Procedure 6 "Install NOAMP/SOAM/MP Host Servers" in reference[2]. 2. Execute Procedure 7 "Create, IPM and Install Application on Virtual Machines in reference[2].
7 ☐	Prepare/Install the new server	**For Low Capacity Oracle Server Configuration Only:** 1. Execute Procedure 8 "Install NOAMP/SOAM/MP Host Servers" in reference[2]. 2. Execute Procedure 9 "Create, IPM and Install Application on Virtual Machines in reference[2].
8 ☐	Configure "Server hosting UDR in a box" On Primary NOAMP	1. Select [Main Menu: Configuration → Servers] 2. Select the new NOAMP Server (part of "Server hosting UDR in a box") 3. Select the Export dialogue button 4. The configuration file will be created and stored in the /var/TKLC/db/filemgmt directory. The configuration file will have a file name like TKLCConfigData.<***hostname***>.sh. 5. Execute one of the procedures in Appendix K. Applying Server Configuration in reference [2] for new NOAMP. 6. Repeat for the SOAM and two MPs that are part of the "Server hosting UDR in a box".

9 ☐	Add new "Server hosting UDR in a box" (1 NOAMP, 1 SOAM and MPs) to appropriate server groups Low Capacity Oracle Server Configuration supports 2 MPs.	1. Select [Main Menu: Configuration → Server Groups] screen. 2. Select NOAMP's server group. 3. Click "Edit" button. 4. Under 'SG Inclusion', check the new NOAMP 5. Click "Ok" button 6. Select SOAM's server group. 7. Click "Edit" button. 8. Under 'SG Inclusion', check the new SOAM 9. Click "Ok" button 10. Select MP server group. 11. Click "Edit" button. 12. Under 'SG Inclusion', check the new MPs (two or four) 13. Click "Ok" button 14. Wait at least 5 minutes before continuing with the steps.
10 ☐	Make new "Server hosting UDR in a box" Active (remove forced standby).	1. Select [Main Menu: Status & Manage → HA] screen 2. Click 'Edit' button 3. Change "Server hosting UDR in a box's"NOAMP/SOAM to "Max Allowed HA Role" of 'Active' if it's on standby. 4. Click OK button
11 ☐	Restart the application on "Server hosting UDR in a box"	1. Select [Main Menu: Status & Manage → Server] screen. 2. Verify the "DB" status displays "Norm" and the "Proc" status shows "Man" for the new MP Host server (1 NOAMP, 1 SOAM and 1 or 2 MPs) before preceding to the next step. 3. Select the new NOAMP, SOAM and MP servers and then select "Restart" from the bottom left corner of the screen. 4. Click OK button 5. The "Info" tab should contain the confirmation messages stating: "Successfully restarted application" for the NOAMP, SOAM and MP. 6. Verify that the "Appl State" now shows "Enabled" and the "Proc" status column show "Norm" for the components of "Server hosting UDR in a box"
12 ☐	**(OPTIONAL) ACTIVE NOAM:** Re-Sync NTP if Necessary	Navigate to **Status & Manage -> Server**, then select **each** server that has been recovered and click **NTP Sync**.
13 ☐	Verify the Database state of the newly restored server	1. Click on Main Menu->Status and Manage->Database 2. Verify that the OAM Max HA Role is either "Active" or "Standby" or "Spare", and that the status is "Normal". 3. Verify data was synched from the active NOAMP(servers, etc).
14 ☐	Configure ComAgent for the Replaced MPs	Execute Procedure 17 in[2]. ("Configure SPR Application on MP")

15 ☐	Verify the HA Status	1. Click on Main Menu->Status and Manage->HA 2. Check the components of "Server hosting UDR in a box". Verify that the "Max Allowed HA Role" status is Active.
16 ☐	Verify the local node info on the Replaced SOAM	1. Click on Main Menu->Diameter->Configuration->Local Node 2. Verify that all the local nodes are listed.
17 ☐	Verify the peer node info on the Replaced SOAM	1. Click on Main Menu->Diameter->Configuration->Peer Node 2. Verify that all the peer nodes are listed.
18 ☐	Verify the Connections info on the Replaced SOAM	1. Click on Main Menu->Diameter->Configuration->Connections 2. Verify that all appropriate connections are listed.
19 ☐	Re-enable connections if needed on Active SOAM	1. Click on Main Menu->Diameter->Maintenance->Connections 2. Select each connection and click on the "Enable" button 3. Verify that the Operational State is Available.
20 ☐	Examine All Alarms	1. Click on Main Menu->Alarms & Events->View Active 2. Examine all active alarms and refer to the on-line help on how to address them.
21 ☐	Backup and archive all the databases from the recovered system	Execute Appendix A "UDR 10.x Database Backup" "Replacement of a "Server hosting UDR in a box"" is Complete.

End of Procedure

4.5.3 Post Condition

- "Server hosting UDR in a box" is back in service.

4.6 Replacement of Primary or DR "Server hosting UDR in a box"Pair

Three scenarios are possible here:

- The primary "Servers hosting UDR in a box" both failed and there is a DR site.
- The primary "Servers hosting UDR in a box" both failed and there is no DR site.
- The DR "Servers hosting UDR in a box" both failed.

4.6.1 Primary "Server hosting UDR in a box" Pair Failure with an operational DR site

4.6.1.1 Pre-Conditions

- Primary Active and Standby servers failed. ("Server hosting UDR in a box" consists of 1 NOAMP, 1 SOAM and 1 MP).
- Low Capacity Configurations only.
- It has been determined to replace defective "Server hosting UDR in a box" pair and the new "Server hosting UDR in a box" pair is available.
- The DR NOAMP site will automatically be activated and become the primary site. This allows provisioning to continue at the DR NOAMP site temporarily until the primary site is recovered. The appropriate flag is set and control will resume back to the primary site once the first NOAMP is back up. Contact My Oracle Support (MOS) by referring to Appendix C for details of automatic transfer to DR NO.
- SOAM backup archive is needed for Diameter Configuration. These should be taken from Customer offsite backup storage locations (assuming these were performed and stored offsite prior to the outage).

4.6.1.2 Recovery Steps

Procedure 8. Replacement of a Primary "Server hosting UDR in a box" Pair with an operational DR site

S T E P #	This procedure performs recovery if both MP Host servers have failed at a site. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1 ☐	Recover first "Server hosting UDR in a box"	Execute steps 1-9 in procedure 7 for the first defective "Server hosting UDR in a box".
2 ☐	Control returns back to Primary Site.	1. Control returns back to the NOAMP at the Primary site. 2. Execute steps 10-13 in procedure 7.
3 ☐	On the new SOAM GUI, perform the actions to upload backup archive file and verify it was uploaded successfully.	1. Select Main Menu->Status & Manage->Files 2. Select the Active SOAM Server 3. Click on "Upload" 4. Select the "SOAM Configuration:" file backed up after configuration. 5. Click on the "Upload " button. The file will take a few seconds to upload depending on the size of the backup data. The file will be visible on the list of entries after the upload is complete. 6. Verify that the SOAM database backup file was uploaded and is located under /var/TKLC/db/filemgmt.
4 ☐	Disable Provisioning	1. Click on Main Menu->Status & Manage->Database 2. Disable Provisioning by clicking on "Disable Site Provisioning" button at the bottom of the screen. 3. A confirmation window will appear, press "OK" to disable Provisioning.
5 ☐	Execute a restore of SOAM configuration database.	1. Navigate to GUI page [Main Menu: Status & Manage → Database] 2. Select the active SOAM server. Server is now highlighted. 3. Click 'Restore' button and select the backup archive file. 4. GUI will display compatibility information. If databases are not compatible, review and record incompatibility information. If 'server id' within topology check are shown to be incompatible, check 'force' option then click 'OK' to continue with DB restoration If 'force' option is used, then configuration data needs manual modifications. 5. If the databases are compatible, then click 'OK' to continue with database restoration. 6. Wait for 5 minutes. There will be HA switch over for SOAM servers and you will have to log back in the SOAM GUI via VIP address again. Make sure that you are logging in to the same active server identified in Step 1 above.

6 ☐	Re-enable Provisioning	1. Log into the Active NOAMP GUI 2. Click on Main Menu->Status & Manage->Database menu item. 3. Click on the "Enable Provisioning" button. A pop-up window will appear to confirm, press OK.
7 ☐	Finish UDR Host verification for the first server.	Finish steps 14-21 in procedure 7.
8 ☐	Recover second "Server hosting UDR in a box"	Execute procedure 7.

End of Procedure

4.6.1.1 Post Condition

- "Server hosting UDR in a box" Pair is back in service.

4.6.2 Primary "Server hosting UDR in a box" Pair Failure without an operational DR site

4.6.2.1 Pre-Conditions

- Primary Active and Standby "Servers hosting UDR in a box"failed.
- Low Capacity Configurations only.
- It has been determined to replace defective "Server hosting UDR in a box" pair and the new servers are available
- The servers are restored using database backups since there is no DR site.

4.6.2.2 Recovery Steps

Procedure 9. Replacement of a Primary "Server hosting UDR in a box" Pair without a DR site

S T E P #	This procedure performs recovery if both MP Host servers have failed at a site. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1 ☐	Recover first "Server hosting UDR in a box"	Execute steps 1-9 in procedure 7 for the first defective "Server hosting UDR in a box".
2 ☐	Copy NOAMP backup archive to new NOAMP server, and perform DB restore from backup file.	1. Login via SSH to the console of new NOAMP server. 2. Copy the uncompressed backup archive identified in step 1 to newly installed NOAMP-A server on this location: **/var/TKLC/db/filemgmt** 3. Execute this command to stop running applications and leave database running: 4. **prod.stop** 5. Restore configuration and provisioning database by executing this command: **idb.restore -n –f –t /var/TKLC/db/filemgmt -v <archive file>** 6. NOAMP database is now restored Start the application by executing this command **prod.start**
3 ☐	**Restore /etc/hosts file of active NOAMP**	From the recovered NOAMP server command line, execute: **# AppWorks AppWorks_AppWorks updateServerAliases <NOAMP Host Name>** Check /etc/hosts and confirm all servers exist in this file.
4 ☐	On the new SOAM GUI, perform the actions to upload backup archive file and verify it was uploaded successfully.	1. Select Main Menu->Status & Manage->Files 2. Select the Active SOAM Server 3. Click on "Upload" 4. Select the "SOAM Configuration:" file backed up after configuration. 5. Click on the "Upload " button. The file will take a few seconds to upload depending on the size of the backup data. The file will be visible on the list of entries after the upload is complete. 6. Verify that the SOAM database backup file was uploaded and is located under /var/TKLC/db/filemgmt.
5 ☐	From Active NOAMP: Disable Provisioning	1. Click on Main Menu->Status & Manage->Database 2. Disable Provisioning by clicking on "Disable Site Provisioning" button at the bottom of the screen. 3. A confirmation window will appear, press "OK" to disable Provisioning.

6 ☐	Execute a restore of SOAM configuration database.	1. Navigate to GUI page [Main Menu: Status & Manage → Database] 2. Select the active SOAM server. Server is now highlighted. 3. Click 'Restore' button and select the backup archive file. 4. GUI will display compatibility information. If databases are not compatible, review and record incompatibility information. If 'server id' within topology check are shown to be incompatible, check 'force' option then click 'OK' to continue with DB restoration. If 'force' option is used, then configuration data needs manual modifications. 5. If the databases are compatible, then click 'OK' to continue with database restoration. 6. Wait for 5 minutes. There will be HA switch over for SOAM servers and you will have to log back in the SOAM GUI via VIP address again. Make sure that you are logging in to the same active server identified in Step 1 above.
7 ☐	Re-enable Provisioning	1. Log into the Active NOAMP GUI 2. Click on Main Menu->Status & Manage->Database menu item. 3. Click on the "Enable Provisioning" button. A pop-up window will appear to confirm, press OK.
8 ☐	Finish UDR Host verification for the first server.	Finish steps 10-21 in procedure 7.
9 ☐	Recover second "Server hosting UDR in a box"	Execute procedure 7.

End of Procedure

4.6.2.1 Post Condition

- "Server hosting UDR in a box" Pair is back in service

4.6.3 DR "Server hosting UDR in a box" Pair Failure

4.6.4 Pre-Conditions

- DR "Server hosting UDR in a box" pairs failed at a site.
- Low Capacity Configurations only.
- It has been determined to replace defective "Server hosting UDR in a box" pair and the new "Server hosting UDR in a box" pair is available.

- SOAM backup archive is needed for Diameter Configuration. These should be taken from Customer offsite backup storage locations (assuming these were performed and stored offsite prior to the outage).

4.6.4.1 Recovery Steps

Procedure 10. Replacement of a DR "Server hosting UDR in a box" Pair

S T E P #	This procedure performs recovery if both DR NOAMP servers have failed at a site. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1 ☐	Recover first DR "Server hosting UDR in a box"	Execute steps 1-13 in procedure 7 for first defective DR "Server hosting UDR in a box".
2 ☐	On the new SOAM GUI, perform the actions to upload backup archive file and verify it was uploaded successfully.	1. Select Main Menu->Status & Manage->Files 2. Select the Active SOAM Server 3. Click on "Upload" 4. Select the "SOAM Configuration:" file backed up after configuration. 5. Click on the "Upload " button. The file will take a few seconds to upload depending on the size of the backup data. The file will be visible on the list of entries after the upload is complete. 6. Verify that the SOAM database backup file was uploaded and is located under /var/TKLC/db/filemgmt.
3 ☐	From Active NOAMP: Disable Provisioning	1. Click on Main Menu->Status & Manage->Database 2. Disable Provisioning by clicking on "Disable Site Provisioning" button at the bottom of the screen. 3. A confirmation window will appear, press "OK" to disable Provisioning.
4 ☐	Execute a restore of SOAM configuration database.	1. Navigate to GUI page [Main Menu: Status & Manage → Database] 2. Select the active SOAM server. Server is now highlighted. 3. Click 'Restore' button and select the backup archive file. 4. GUI will display compatibility information. If databases are not compatible, review and record incompatibility information. If 'server id' within topology check are shown to be incompatible, check 'force' option then click 'OK' to continue with DB restoration. If 'force' option is used, then configuration data needs manual modifications. 5. If the databases are compatible, then click 'OK' to continue with database restoration. 6. Wait for 5 minutes. There will be HA switch over for SOAM servers and you will have to log back in the SOAM GUI via VIP address again. Make sure that you are logging in to the same active server identified in Step 1 above.
5 ☐	Re-enable Provisioning	1. Log into the Active NOAMP GUI 2. Click on Main Menu->Status & Manage->Database menu item. 3. Click on the "Enable Provisioning" button. A pop-up window will appear to confirm, press OK.

6 ☐	Finish UDR Host verification for the first server.	Finish steps 14-21 in procedure 7.
7 ☐	Recover second DR "Server hosting UDR in a box"	Execute procedure 7.

4.6.4.2 Post Condition

- "Server hosting UDR in a box" Pair is back in service.

4.7 Replacement of Primary or DR UDR Site

For a complete site outage, NOAMP and MP Host servers or "Server hosting UDR in a box" are recovered using recovery procedures of base hardware and software. A database restore to the active NOAMP server is necessary if no DR site is available. A database restore is used to quickly recover provisioning and configuration data on the active servers. Database replication from the primary active NOAMP/SOAM servers will recover the database on the standby/spare servers. SOAM backup archive is needed for Diameter Configuration.

4.7.1 Pre-Conditions

- A combined NOAMP + MP Host frame or "Server hosting UDR in a box" frame (consists of 2 sets of 1 NOAMP, 1 SOAM and 1 MP) is destroyed.
- A replacement NOAMP + MP Host frame or "Server hosting UDR in a box" frame is available.
- For Normal or Low Capacity Systems.
- A DR site may or may not be available.
- If a DR site is available, please STOP and contact My Oracle Support (MOS) by referring to Appendix C for details of automatic transfer to DR NO.
- If no DR site is available and for NOAMP/SOAM servers, database backups will be taken from customer offsite backup storage locations (assuming these were performed and stored offsite prior to the outage). The servers are then restored using these database backups to the active NOAMP and SOAM servers.

4.7.2 Recovery Steps

Procedure 11. Replacement of NOAMP + MP Host Frame

S T E P #	This procedure performs recovery if both NOAMP servers and both MP Host servers have failed. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1 ☐	Install new replacement frame	Follow procedures in reference [2] to install the new NOAMP + MP Host frame.
2 ☐	Configure switch 1A	Follow recovery steps in Appendix B for replacement of Cisco aggregation switch. Note: aggregation switches are usually located at the top of the frame for aggregating HP C-Class enclosures. It is only deployed with Topology 1 and 2 deployments.

Procedure 11. Replacement of NOAMP + MP Host Frame

3 ☐	Configure switch 1B	Follow recovery steps in Appendix B for replacement of Cisco aggregation switch. Note: aggregation switches are usually located at the top of the frame for aggregating HP c-Class enclosures. It is only deployed with Topology 1 and 2 deployments.
4 ☐	Configure Enclosure switches	Follow recovery steps in Appendix B to recover Enclosure switches. Note: enclosure switches sit inside the HP c-Class enclosure and 'aggregate' blades but not the enclosures (typically).
5 ☐	For Low Capacity Configurations only: Recover Primary or DR "Server hosting UDR in a box" pair	For replacement of primary or DR Server pair, follow appropriate procedure in section 4.6: • Procedure 8 for Replacement of Primary "Server hosting UDR in a box" Pair with a DR Site or • Procedure 9 for Replacement of Primary "Server hosting UDR in a box"Pair with no DR site or • Procedure 10 for Replacement of DR "Server hosting UDR in a box"Pair
6 ☐	For Normal Capacity C-Class Configuration Only: Recover primary or DR NOAMP pair.	For replacement of primary or DR NOAMP pair, follow appropriate procedure in section 4.3: • Procedure 3 for Replacement of Primary NOAMP Server Pair with a DR Site or • Procedure 4 for Replacement of Primary NOAMP Server Pair with no DR Site or • Procedure 5 for Replacement of DR NOAMP Server Pair
7 ☐	For Normal Capacity C-Class Configuration Only: Recover MP Host Server Pair	For replacement of MP Host Server Pair, execute procedure 6.
8 ☐	Restore GUI Usernames and passwords	If applicable, Execute steps in Section 5 to recover the user and group information restored.

End of Procedure

4.7.3 Post Condition

- Primary or DR NOAMP+MP Host frame is back in service

5 RESOLVING USER CREDENTIAL ISSUES AFTER DATABASE RESTORE

User incompatibilities may introduce security holes or prevent access to the network by administrators. User incompatibilities are not dangerous to the database, however. Review each user difference carefully to ensure that the restoration will not impact security or accessibility.

5.1 Restoring a Deleted User

```
- User 'testuser' exists in the selected backup file but not in the current
database.
```

These users were removed prior to creation of the backup and archive file. They will be reintroduced by system restoration of that file.

5.1.1 To Keep the Restored User

Perform this step to keep users that will be restored by system restoration.

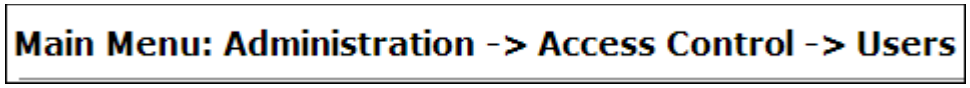
Before restoration,

- Contact each user that is affected and notify them that you will reset their password during this maintenance operation.

After restoration

- Log in and reset the passwords for all users in this category.

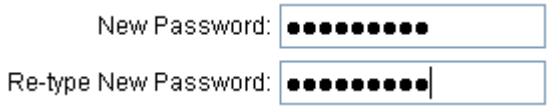
1. Navagate to the user administration screen.



2. Select the user.

3. Click the Change Password button.

4. Enter a new password.



5. Click the Continue button.

5.1.2 To Remove the Restored User

Perform this step to remove users that will be restored by system restoration.

After restoration, delete all users in this category.

1. Navagate to the user administration screen.

   Main Menu: Administration -> Access Control -> Users

2. Select the user.
3. Click the Delete button.
4. Confirm.

5.2 Restoring a Modified User

These users have had a password change prior to creation of the backup and archive file. This will be reverted by system restoration of that file.

```
- The password for user 'testuser' differs between the selected backup file and
the current database.
```

Before restoration,

- Verify that you have access to a user with administrator permissions that is not affected.
- Contact each user that is affected and notify them that you will reset their password during this maintenance operation.

After restoration

- Log in and reset the passwords for all users in this category. See the steps in section 5.1.1 for resetting passwords for a user.

5.3 Restoring an Archive that Does not Contain a Current User

These users have been created after the creation of the backup and archive file. This will be deleted by system restoration of that file.

```
- User 'testuser' exists in current database but not in the selected backup file.
```

If the user is no longer desired, do not perform any additional steps. The user is permanently removed.

To re-create the user, do the following:

Before restoration,

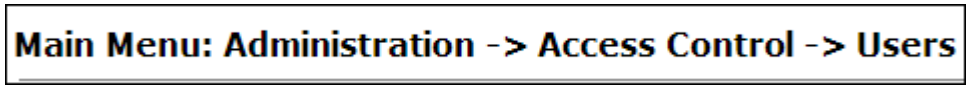
- Verify that you have access to a user with administrator permissions that is not affected.
- Contact each user that is affected and notify them that you will reset their password during this maintenance operation.

- Log in and record the username, group, timezone, comment, and enabled values for each affected user.

After restoration

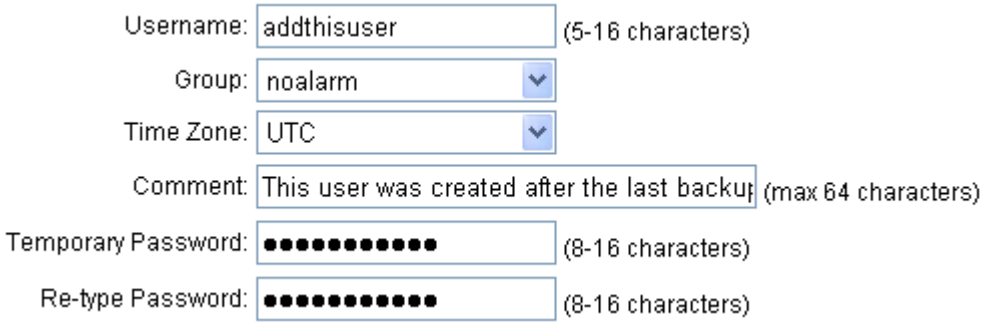
- Log in and re-create each of the affected users using the information recorded above

1. Navagate to the user administration screen.

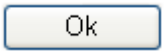


2. Click the Add New User button.

3. Re-populate all the data for this user.



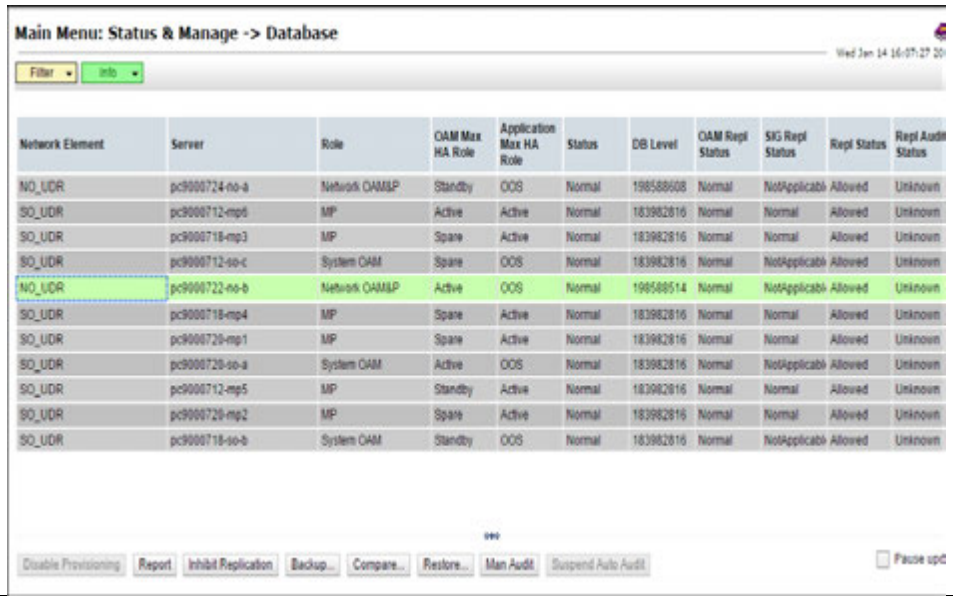
4. Click the OK button.



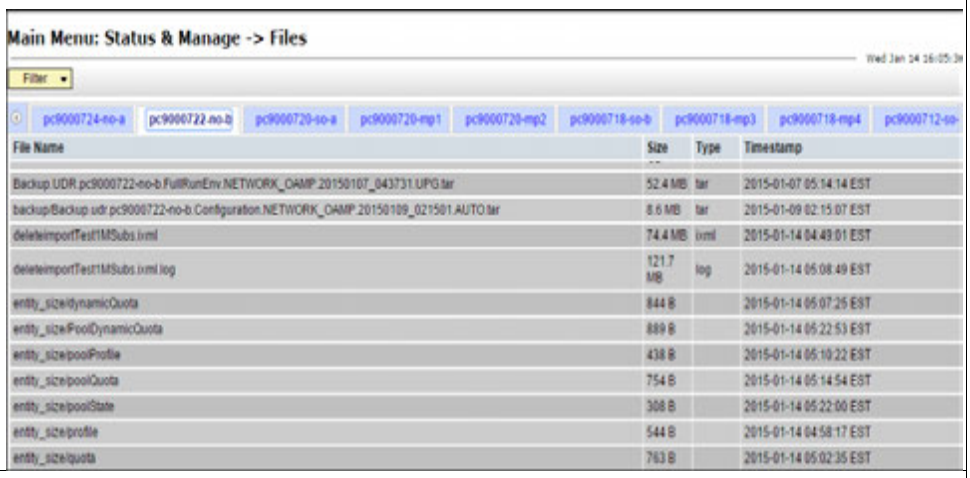
- Reset the passwords for all users in this category. See the steps in section 5.1.1 for resetting passwords for a user.

Appendix A. UDR 12.1 Database Backup

Procedure 12: UDR 12.1 Database Backup

S T E P #		
	The intent of this procedure is to backup the provision and configuration information from an NOAMP or SOAM server after the disaster recovery is complete and transfer it to a secure location accessible to TAC. Prerequisites for this procedure are: ▪ Network connectivity to the NOAMP XMI address via VPN access to the Customer's network. ▪ UDR 12.1 "guiadmin" user password. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1.	Login into NOAMP (or SOAM) XMI VIP IP Address	Login using the "guiadmin" credentials.
2.	Backup Configuration data for the system.	1. Browse to Main Menu->Status & Manage->Database screen 2. Select the Active NOAMP (or SOAM) Server and Click on "Backup" button. 3. Make sure that the checkboxes next to Provisioning and Configuration are checked. Then enter a filename for the backup and press "OK". 4. This may take 5-10 minutes or so to backup. 

Procedure 12: UDR 12.1 Database Backup

3.	Verify the back up file availability.	1. Browse to Main Menu-> Status & Manage->Files 2. Select the Active NOAMP (or SOAM) and click on "File Name" 3. The files on this server file management area will be displayed in the work area. 4. Verify the existence of the backed up configuration back up file. 
4. ☐	Download the file to local machine.	1. Click on the file link and click on the download button **2.** File download dialog box will be displayed, click on the save button and save it to local machine:
5. ☐	Upload the image to secure location for future disaster recovery of entire system.	Transfer the backed up image saved in the previous step to a secure location where the Server Backup files are fetched in case of system disaster recovery.
6.	Backup Active SOAM	Repeat Steps 2 through 5 to backup the Active SOAM. The database backup of the UDR 12.1 is complete.

Appendix B. Recovering/Replacing a Failed 3rd party component (Switches, OAs)

Procedure 13: Recovering a failed PM&C Server

S T E P #	The intent of this procedure is to recover a failed PM&C Server Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1.		Refer to [1] *PM&C Disaster Recovery* on instructions how to recover a PM&C Server.

Procedure 14: Recovering a failed Aggregation Switch (Cisco 4948E / 4948E-F)

S T E P #	The intent of this procedure is to recover a failed Aggregation (4948E / 4948E-F) Switch. Prerequisites for this procedure are: ▪ A copy of the networking xml configuration files ▪ A copy of HP Misc Firmware USB ▪ IP address and hostname of the failed switch ▪ Rack Mount position of the failed switch Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1.		1. Remove the old SSH key of the switch from the PMAC by executing the following command from a PMAC command shell: **sudo ssh-keygen -R <4948_switch_ip>** 2. Refer to [1] , procedure "**Replace a failed 4948/4948E/4948E-F switch (c-Class system) (netConfig)**", to replace a failed Aggregation switch. You will need a copy of the HP Misc Firmware USB, ISO and copy of the original networking xml files custom for this installation. These will either be stored on the PM&C in a designated location, or can be obtained from the NAPD.

Procedure 15: Recovering a failed Enclosure Switch (Cisco 3020)

S T E P #		
	The intent of this procedure is to recover a failed Enclosure (3020) Switch. Prerequisites for this procedure are: ▪ A copy of the networking xml configuration files ▪ A copy of HP Misc USB or ISO ▪ IP address and hostname of the failed switch ▪ Interconnect Bay position of the enclosure switch Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1.		1. Remove the old SSH key of the switch from the PMAC by executing the following command from a PMAC command shell: **sudo ssh-keygen -R <enclosure_switch_ip>** 2. Refer to[1], procedure "**Reconfigure a failed 3020 switch(netConfig)**", to replace a failed Enclosure switch. You will need a copy of the HP Misc Firmware USB or ISO and of the original networking xml files custom for this installation. These will either be stored on the PM&C in a designated location, or can be obtained from the NAPD.

Procedure 16: Recovering a failed Enclosure Switch (HP 6120XG)

S T E P #		
	The intent of this procedure is to recover a failed Enclosure (6120XG) Switch. Prerequisites for this procedure are: ▪ A copy of the networking xml configuration files ▪ IP address and hostname of the failed switch ▪ Interconnect Bay position of the enclosure switch A copy of HP Misc Firmware USB or ISO Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1.		1. Remove the old SSH key of the switch from the PMAC by executing the following command from a PMAC command shell: **sudo ssh-keygen -R <enclosure_switch_ip>** 2. Refer to [1], procedure "**Reconfigure a failed HP 6120XG switch (netConfig)**", to replace a failed Enclosure switch. You will need a copy of the HP Misc Firmware USB or ISO and of the original networking xml files custom for this installation. These will either be stored on the PM&C in a designated location, or can be obtained from the NAPD.

Procedure 17: Recovering a failed Enclosure Switch (HP 6125XG)

S T E P #	The intent of this procedure is to recover a failed Enclosure (6125XG) Switch. Prerequisites for this procedure are: ▪ A copy of the networking xml configuration files A copy of HP Misc Firmware USB or ISO Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1.		1. Remove the old SSH key of the switch from the PMAC by executing the following command from a PMAC command shell: **sudo ssh-keygen -R <enclosure_switch_ip>** 2. Refer to [1], procedure "**Reconfigure a failed HP 6125XG switch (netConfig)**", to replace a failed Enclosure switch. You will need a copy of the HP Misc Firmware USB or ISO and of the original networking xml files custom for this installation. These will either be stored on the PM&C in a designated location, or can be obtained from the NAPD.

Procedure 18: Recovering a failed Enclosure OA

S T E P #	The intent of this procedure is to recover a failed Enclosure Onboard Administrator Switch. Check off (√) each step as it is completed. Boxes have been provided for this purpose under each step number.	
1.		Refer to [1], procedure "**Replacing Onboard Administrator in a system with redundant OA"** to replace a failed Enclosure OA.

Appendix C. Contacting My Oracle Support (MOS)

MOS (https://support.oracle.com) is your initial point of contact for all product support and training needs. MOS is available 24 hours a day, 7 days a week, 365 days a year.