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Oracle CGBU

User's Guide

HLR Router 4.1 Disaster Recovery Guide for T1200

E76021-02

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These procedures should only be executed by highly skilled personnel who are very familiar with HLR Router Administration and Maintenance.

!!! WARNING !!! Do not attempt to run Disaster Recovery procedures on HLRR servers which are in the Post Upgrade "Accept/Reject" state!

It is also recommended that My Oracle Support (MOS) be notified in advance of executing these procedures on a Production network. Refer to Appendix G: Accessing My Oracle Support (MOS), for more information on contacting MOS.

Oracle® Communications Tekelec HLR Router 4.1, Disaster Recovery User's Guide for T1200

CAUTION: Before installing any system, please access My Oracle Support (MOS) and review any Technical Service Bulletins (TSBs) that relate to these procedures.

My Oracle Support (MOS) 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.

Refer to, Appendix G. Accessing My Oracle Support (MOS) for more information on contacting Oracle Customer Service.

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1.0 INTRODUCTION

1.1 Purpose and Scope

This document describes Disaster Recovery procedures to be used during disaster scenarios for the HLR Router product on T1200.

The disaster scenarios covered in this document are:

1. Failover to DR NOAM (due to network isolation of the Primary NOAM NE)
2. MP server replacement
3. SOAM server replacement
4. NOAM server Replacement
5. Query Server replacement
6. SOAM NE Replacement (loss of both SOAM servers and associated MPs)
7. Primary NOAM NE Replacement
8. DR NOAM NE Replacement
9. Telco switch replacement
10. Restoring the NOAM Provisioning Database from backup file

This document is intended for execution by Oracle Customer Service personnel on fielded HLR Router 4.1 systems.

1.2 References

[1] HLR Router 4.1 Initial Installation and Configuration Guide for T1200, E76020-01
[2] Platform 7.0 Configuration Guide, E53486
[3] T1200 Platform_OAMP System Configuration 821-0034-08
[4] T1200 Platform_EXHR Signaling System Configuration 821-0034-09
[5] Eagle XG HLR Router Network Implementation Guide, 910-5858-001
[6] T1200 Quad-Serial Card Installation, 909-1636-001
[7] Eagle STP Commands Manual, 910-5544-001
[8] TPD Initial Product Manufacture, Release 5.0+, E54521
[9] T1200 Solutions Firmware Upgrade Pack, 909-1618-001
[10] 3-Tier NOAM Failover, E74587-01 (cgbu_018889)

1.3 Acronyms

Table 1: Acronyms

Acronym	Meaning
CLI	Command Line Interface (terminal window)
IMI	Internal Management Interface
ISL	Inter-Switch-Link
MP	Message Processor
NE	Network Element
NOAM	Network Operations, Administration, Maintenance & Provisioning
RMM	Remote Management Module

Acronym	Meaning
SOAM	Systems Operations, Administration & Maintenance
TPD	Tekelec Platform Distribution (Linux OS)
VIP	Virtual IP
XMI	External Management Interface

1.4 Assumptions

This procedure assumes the following:

- The user conceptually understands HLR Router topology and network configuration as described in the HLR Router Network Implementation Guide [5].
- The user has at least an intermediate skill set with command prompt activities on an open systems computing environment such as Linux or TPD.

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 or NOTES.

***Note*:** If a procedural step fails to execute successfully, then **STOP** and contact **My Oracle Support (MOS)** for assistance before attempting to continue. Refer to Appendix G. Accessing My Oracle Support (MOS) for more information on contacting Oracle Customer Service.

1.6 Connections (T1200 Rear Panel)

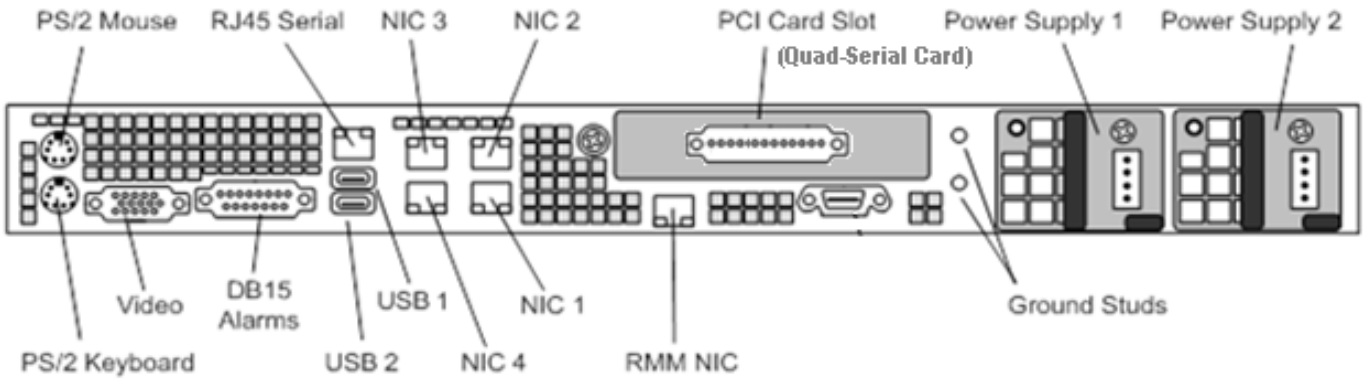


Figure 1: T1200: Rear Panel

2.0 DISASTER RECOVERY SCENARIOS

2.1 Failover to DR NOAM (due to Network Isolation of the Primary NOAM NE)

2.1.1 Pre-Condition

- Primary NOAM servers are not network isolated.
- DR NOAM GUI is accessible.
- Provisioning clients are disconnected from the Primary NOAM.
- SOAM sites/servers cannot connect to the Primary NOAM servers.

2.1.2 Recovery Steps

- In the event that the **Primary NOAM site (site_1)** becomes unreachable due to network isolation, this procedure promotes the **DR NOAM (site_2)** to a "Primary" state.
- This promotion of the DR NOAM site to Primary allows for the reconnection of Provisioning clients to the newly promoted Primary NOAM (site_2) and re-establishes replication of provisioning updates to all SOAM sites in the topology.
- This procedure only addresses **Failover** to the **DR NOAM** in the case of a network isolated **Primary NOAM**.
- To perform a **Failover** when both **NOAM** sites (Primary/DR) are available on network refer to the **3-Tier NOAM Failover** procedure **[10]**.

Procedure 1: Failover to DR NOAM

Step	Instruction	Procedure

1. ☐	**DR NOAM VIP (CLI):** Use an **SSH terminal** program acess the to the **Active DR NOAM CLI.**	1. **SSH** to the **DR NOAM CLI** via the **VIP** address.
		2. Login as the **"admusr"** user.
		3. Change to the **"root"** user.
		`$ sudo su -`
		`#`

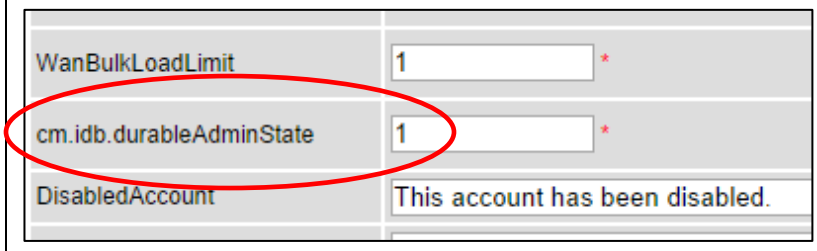
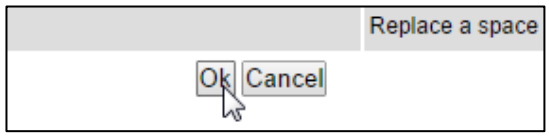
2. ☐	**DR NOAM VIP (CLI):** Verify that the current value for **"myClusterRole"** is **"Secondary"**.	`[root@exhrNO-rlghnc-a ~]# top.myrole`
		`myNodeId=A2857.049`
		`myMasterCapable=true`
		`myMateNodeId=A2857.048`
		`myParentCluster=00000`
		`myClusterRole=Secondary`
		`myClusterTimestamp=01/01/70 00:00:00.000`
		`[root@exhrNO-rlghnc-a ~]#`

3. ☐	**DR NOAM VIP (CLI):** Set the value for **"myClusterRole"** to **"Primary".**	`[root@exhrNO-rlghnc-a ~]# top.setPrimary`
		`- Using my cluster: A2857`
		`- New Primary Timestamp: 03/12/14 18:44:03.255`
		`- Updating A2857.048: sds-rlghnc-a`
		`- Updating A2857.049: exhrNO-rlghnc-a`
		`[root@exhrNO-rlghnc-a ~]#`

Procedure 1: Failover to DR NOAM

Step	Instruction	Procedure

4. ☐	**DR NOAM VIP (CLI):**
	Verify that the value for **"myClusterRole"** is now **"Primary"**.
		`[root@exhrNO-rlghnc-a ~]# top.myrole`
		`myNodeId=A2857.049`
		`myMasterCapable=true`
		`myMateNodeId=A2857.048`
		`myParentCluster=00000`
		`myClusterRole=Primary`
		`myClusterTimestamp=03/12/14 18:44:03.255`
		`[root@exhrNO-rlghnc-a ~]#`

5. ☐	**Newly promoted Primary NOAM VIP *(previous DR)*:** Login to the newly promoted Primary NOAM GUI. **NOTE:** *In an outage scenario (e.g. Primary NO site down or network isolated), login to the GUI of the newly promoted NOAM can take a prolonged period of time.* *Please be patient and allow several minutes for the GUI login to complete.*	**1.** Login to the newly promoted **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Verify that the GUI banner shows that the user is logged into the **"ACTIVE NETWORK OAM&P".** **3.** Navigate to the **NOAM** GUI **[Main Menu: Administration → General Options]** screen.
6. ☐	**Newly promoted Primary NOAM VIP *(previous DR)*:** **1)** Verify that the value for the **"cm.idb. durableAdminState"** is set to **"1"**. **2)** If necessary, modify the **"cm.idb. durableAdminState"** to a value of **"1"** and click the **"OK"** dialogue button.	 
7. ☐	Inform the group responsible for Provisioning subscriber updates that **PDBI Provisioning clients** may connect to the newly promoted **Primary NOAM VIP** at this time amd begin sending new updates to the Provisioning database.	• Repoint PDBI Provisioning clients to the newly promoted NOAM VIP.

Procedure 1: Failover to DR NOAM

Step	Instruction	Procedure
8. ☐	Monitor the status of the network isolated NOAM site.	• Monitor the network isolated NOAM site until network access is restored. • DO NOT PROCEED TO THE NEXT STEP UNTIL NETWORK ACCESS IS RESTORED TO THE ORIGINAL PRIMARY NOAM SITE.

9. ☐	**Original Primary NOAM VIP:**
	Use an **SSH terminal** program acess the to the **Original Primary NOAM CLI.**
		1. **SSH** to the **Original Primary NOAM CLI** via the **VIP** address.
		2. Login as the **"admusr"** user.
		3. Change to the **"root"** user.
		`$ sudo su -`
		`#`

10. ☐	**Original Primary NOAM VIP:**
	Confirm that you are connected to the **Active NOAM** server which will indicated by an entry showing **"VIP Active"**.
		`[root@sds-mrsvnc-a ~]# ha.states -i -w |grep VIP`
		`VIP Obsrvr qs-mrsvnc 0 0220:180815.358`
		`VIP Stby sds-mrsvnc-b 0 0220:182018.444`
		`VIP Active` `sds-mrsvnc-a 0 0220:180815.306`
		`[root@sds-mrsvnc-a ~]#`

11. ☐	**Original Primary NOAM VIP:**
	Verify that the current value for **"myClusterRole"** is **"Primary"**.
		`[root@sds-mrsvnc-a ~]# top.myrole`
		`myNodeId=A0200.195`
		`myMasterCapable=true`
		`myMateNodeId=A0200.212`
		`myParentCluster=00000`
		`myClusterRole=Primary`
		`myClusterTimestamp=01/23/14 21:42:33.235`
		`[root@sds-mrsvnc-a ~]#`

12. ☐	**Original Primary NOAM VIP:**
	Set the value for **"myClusterRole"** to **"Secondary".**
		`[root@sds-mrsvnc-a ~]# top.setSecondary`
		`-bash: top.secondary: command not found`
		`[root@sds-mrsvnc-a ~]# top.setSecondary`
		`- Using my cluster: A0200`
		`- New Secondary Timestamp: 03/12/14 14:47:07.497`
		`- Updating A0200.195: sds-mrsvnc-a`
		`- Updating A0200.212: sds-mrsvnc-b`
		`[root@sds-mrsvnc-a ~]#`

13. ☐	**Original Primary NOAM VIP:**
	Verify that the value for **"myClusterRole"** is now **"Secondary"**.
		`[root@sds-mrsvnc-a ~]# top.myrole`
		`myNodeId=A0200.195`
		`myMasterCapable=true`
		`myMateNodeId=A0200.212`
		`myParentCluster=00000`
		`myClusterRole=Secondary`
		`myClusterTimestamp=03/12/14 14:47:07.497`
		`[root@sds-mrsvnc-a ~]#`

14. ☐	**Original Primary NOAM VIP:**
	Verify the current **PID** for the **"apwSoapServer"** process.
		`[root@sds-mrsvnc-a ~]# pl |grep apwSoapServer`
		`A 678 apwSoapServer Up 03/25 16:10:50 3 apwSoapServer`
		`[root@sds-mrsvnc-a ~]#`

Procedure 1: Failover to DR NOAM

Step	Instruction	Procedure
15. ☐	**Original Primary NOAM VIP:** Restart the **"apwSoapServer"** process.	`[root@sds-mrsvnc-a ~]# pm.kill apwSoapServer` `[root@sds-mrsvnc-a ~]#`

16. ☐	**Original Primary NOAM VIP:** Verify that the **PID** for the **"apwSoapServer"** process has changed from the previous value shown in **Step 14** of this procedure.	`[root@sds-mrsvnc-a ~]# pl |grep apwSoapServer`
		`A 26826 apwSoapServer Up 03/25 19:05:51 4 apwSoapServer`
		`[root@sds-mrsvnc-a ~]#`

17. ☐	**Original Primary NOAM VIP:** Verify the current **PID** for the **"inetmerge"** process.	`[root@sds-mrsvnc-a ~]# pl |grep inetmerge`
		`A 31958 inetmerge Up 03/25 16:07:51 1 inetmerge`
		`[root@sds-mrsvnc-a ~]#`

18. ☐	**Original Primary NOAM VIP:** Restart the **"inetmerge"** process.	`[root@sds-mrsvnc-a ~]# pm.kill inetmerge` `[root@sds-mrsvnc-a ~]#`

19. ☐	**Original Primary NOAM VIP:** Verify that the **PID** for the **"inetmerge"** process has changed from the previous value shown in **Step 17** of this procedure.	`[root@sds-mrsvnc-a ~]# pl |grep inetmerge`
		`A 27175 inetmerge Up 03/25 19:06:47 2 inetmerge`
		`[root@sds-mrsvnc-a ~]#`

20. ☐	**Newly promoted Primary NOAM VIP *(previous DR)*:** Login to the newly promoted **Primary NOAM** GUI and monitor Active alarms until clear.	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Navigate to the **NOAM** GUI **[Main Menu: Alarms & Events → View Active]** screen. **3.** Monitor the current list of Active alarms until all alarms associated with the Failover have cleared. **NOTE_1:** *Alarms visible at this time may include but are not limited to **Event ID(s): 10075, 31102, 31102, 31106** & **31107**.* **NOTE_2:** *The User should allow at least **15 minutes** for resulting alarms to clear before attempting any troubleshooting activities.*
21. ☐	**Newly promoted Primary NOAM VIP *(previous DR)*:** Contact **My Oracle Support (MOS)** for assistance if needed.	• Contact **My Oracle Support (MOS)** for assistance with any reoccurring alarms or alarms which fail to clear within a 15 minute timeframe. Refer to**,** Appendix G. Accessing My Oracle Support (MOS) for more information on contacting Oracle Customer Service. **NOTE:** *If alarms fail to clear that are related to features that use **SSH key exchange** based **file transfer** and the user wishes to re-enable them prior to performing a Failover back to the original Primary/DR states, then the features may be reconfigured using the product feature's initial configuration procedures.* *A partial list of **HLRR** features that use **SSH key exchange** based **file transfer**:* • PDE • APDE

Procedure 1: Failover to DR NOAM

Step	Instruction	Procedure
22. ☐	If the customer wishes to perform a **Failover** back to the original Primary/DR states, refer to Reference [10].	• This procedure only addresses Failover to the DR NOAM in the case of a network isolated Primary NOAM. • To perform a Failover when both NOAM sites (Primary/DR) are available on network refer to the 3-Tier NOAM Failover procedure [10].
THIS PROCEDURE HAS BEEN COMPLETED		

2.1.3 Post Condition

- The new Primary NOAM (previous DR) GUI is accessible.
- Provisioning clients are connected to the new NOAM.
- PDB database provisioning resumes.
- The New DR NOAM GUI (previous Primary) GUI is accessible.
- Replication and collection alarms have cleared.

2.2 Replacement of a MP Server

2.2.1 Pre Condition

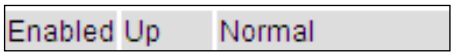
- The MP server has been deemed defective.
- It has been determined that an MP server replacement is required.
- A replacement T1200 server (R03) is available.
- The Primary NOAM & SOAM GUIs are accessible.

2.2.2 Recovery Steps

Procedure 2: Replacement of a MP Server

Step	Instruction	Procedure
1. ☐	Prepare for **MP** server replacement.	Identify the defective **MP** server that needs replacement. **Hostname :**_____
2. ☐	Divert Signaling traffic away from the MP that is being replaced ***(Optional)***. **NOTE:** *Since MP servers are deployed in a mated configuration, the customer may opt to allow the remote mate MP to handle all Signalling traffic during the replacement of the local defective MP.*	Follow steps in **0** *(Appendix C. Diverting Signaling Traffic away* from the MP*)* to divert Signaling traffic away from the defective MP to avoid any message loss during the Maintenance Window activity.
3. ☐	Verify that no signaling traffic is processed at the defective **MP** server.	**1.** Login to **SOAM** GUI (as an **admin** user) for the site where defective **MP** server is located. **2.** Navigate to the **SOAM** GUI **[Main Menu: Status & Manage → KPIs]** screen. **3.** Select the **'EXHR'** tab. **4.** Verify that the following **KPIs** are now showing **'0'** for the **MP** server: a) **ExhrGttPerformed** b) **ExhrGttExceptionRouting** c) **ExhrMlrPerformed**
4. ☐	**Stop** the Application software on **MP** server.	**1.** Navigate to **SOAM** GUI **[Main Menu: Status & Manage → Server]** screen. **2.** Select the defective **MP** server by its hostname. **3.** Click **'Stop'** button. **4.** Click **"Ok"** button on the confirmation pop-up window.
5. ☐	**Power down** and **replace** the defective **MP** server	**1.** **Power down** the defective **MP** server. **2.** Label all cables connected to the defective **MP** server. **3.** Physically remove the defective **MP** server from the frame. **4.** Physically install the replacement **MP** server and reconnect all cables as labeled (refer to Reference **[4]** if any issues are encountered during server re-installation). **5.** **Power up** the replacement **MP** server.

Procedure **2**: Replacement of a MP Server

Step	Instruction	Procedure
6. ☐	Install and configure the replacement **MP** server.	**1.** Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference **[1]**. **2.** Execute **Procedure 9.2** *(Applying the Server Configuration file to the MP)* as detailed in Reference **[1]**. **3.** Execute **Procedure 9.5** *(Restarting the Application SW on the MP)* as detailed in Reference **[1]**.
7. ☐	**Enable SS7 SCTP** associations on the replacement MP server.	**1.** Login to **SOAM** GUI (as an **admin** user). **2.** Navigate to **SOAM** GUI **[Main Menu: Transport Manager → Maintenance → Transport]** screen. **3.** **Enable SCTP** associations for the **MP** server.
8. ☐	Verify **SS7 Link** status and **Enable** links.	**1.** Navigate to the **SOAM** GUI **[Main Menu: SS7 / Sigtran → Maintenance → Links]** screen. **2.** Verify that **links** are all **Enabled** on the **MP** server.  **3.** If necessary, **Enable** links for the replacement **MP** server.
9. ☐	Restore Signaling traffic back to the MP.	If traffic was diverted from the MP in Step 2 of this procedure, follow Appendix D. Restoring Signaling Traffic to the MP and restore traffic to the replacement MP.
10. ☐	Verify **SS7 link** status and traffic.	**1.** Navigate to the **SOAM** GUI **[Main menu: SS7/Sigtran → Maintenance → Links]** screen. **2.** Verify that all links are **Enabled** and **Normal** on the MP.  **3.** Navigate to the **SOAM** GUI **[Main Menu: Status & Manage → KPIs]** screen. **4.** Select the **'EXHR'** tab. **5.** Verify that the **'ExhrGttPerformed' KPI** displays a **non-zero value** for the replacement **MP**.
THIS PROCEDURE HAS BEEN COMPLETED		

2.2.3 Post Condition

- The MP server is processing signaling traffic.

2.3 Replacement of a SOAM Server

2.3.1 Pre Condition

- The SOAM server has been deemed defective.
- It has been determined that a SOAM server replacement is required.
- A replacement T1200 server (R03) is available.
- The Primary NOAM GUI is accessible.

2.3.2 Recovery Steps

Procedure 3: Replacement of a SOAM Server

Step	Instruction	Procedure
1. ☐	Prepare for **SOAM** server replacement.	Identify the defective **SOAM** server that needs replacement. **Hostname: _____**
2. ☐	Place the defective **SOAM** server in ***"Forced Standby"*** so it cannot become the Active.	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → HA]** screen. **3.** Click **"Edit"** button. **4.** Change **"Max Allowed HA Role"** of **SOAM** server to **"Standby".** **5.** Click **"Ok"** button.
3. ☐	Remove the defective **SOAM** server from the Server Group.	**1.** Select the **[Main Menu: Configuration → Server Groups]** screen. **2.** Select the **SOAM Server Group** containing the defective **SOAM** server. **3.** Click **"Edit"** button. **4.** Under the **'SG Inclusion'** field, **UnCheck** the **Checkbox** to the left of the defective **SOAM** server. **5.** Click **"Ok"** button.
4. ☐	**Power down** and replace the defective **SOAM** server.	**1.** **Power down** the defective **SOAM** server. **2.** Label all cables connected to the defective **SOAM** server. **3.** Physically remove the defective **SOAM** server from the frame. **4.** If the replacement **SOAM** contains a Quad-Serial card in the PCI Card slot (refer to Figure 1: T1200: Rear Panel for location), then proceed to **Step 4, sub-step 7** of this procedure. **5.** If the replacement **SOAM** does not contain a Quad-Serial card in the PCI Card slot, remove the card from the defective SOAM server. **6.** Follow procedures in Reference [6] to install and configure Quad-Serial card on the replacement **SOAM** server. **7.** Physically install the replacement **SOAM** server and reconnect all cables as labeled (refer to Reference [4] if any issues are encountered during server re-installation). **8.** **Power up** the replacement **SOAM** server.
5. ☐	Install and configure the replacement **SOAM** server.	**1.** Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference **[1]**. **2.** Execute **Procedure 8.2** *(Applying the Server Configuration file to the OAM server)* as detailed in Reference **[1]**. **3.** Execute **Procedure 7.2** *(Adding the OAM server to the OAM Server Group)* as detailed in Reference **[1]**. **4.** Execute **Procedure 7.4** *(Restarting the Application SW on the OAM server)* as detailed in Reference **[1]**.

Procedure 3: Replacement of a SOAM Server

Step	Instruction	Procedure
6. ☐	Re-exchange SSH keys for PDE feature	**1.** Login to **Primary NOAM** GUI (as an **admin** user). **2.** Perform **SSH key exchange** for **PDE** using the **[Main Menu: EAGLE XG HLR Router → PDE → Options]** screen.
THIS PROCEDURE HAS BEEN COMPLETED		

2.3.3 Post Condition

- The SOAM server has been returned to service.

2.4 Replacement of a NOAM Server

2.4.1 Pre Condition

- The HLRR NOAM server has been deemed defective.
- It has been determined that a NOAM server replacement is required.
- A replacement T1200 server (R07) is available.
- The Primary NOAM GUI is accessible.

2.4.2 Recovery Steps

Procedure 4: Replacement of a NOAM Server

Step	Instruction	Procedure
1. ☐	Prepare for **NOAM** server replacement.	Identify the defective **NOAM** server that needs replacement. **Hostname:** _____
2. ☐	Place the defective **NOAM** server in ***"Forced Standby"*** so it cannot become the Active.	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → HA]** screen. **3.** Click **"Edit"** button. **4.** Change the **"Max Allowed HA Role"** of the defective **NOAM** to **"Standby".** **5.** Click **"Ok"** button.
3. ☐	If the **NOAM** server set to ***"Forced Standby"*** in the previous step was the **Primary "Active" NOAM** server, an **HA Switchover** will occur and the user's **GUI** session will end. Otherwise, **SKIP** to the next step.	**1.** The user's **GUI** session will end as the **"Active" Primary NOAM** server goes through **HA Switchover** and becomes the **"Standby"** server. **2.** If not automatically **logged out** of the **GUI**, use the **[Logout]** link in the top right of the browser to logout of the **NOAM GUI**. **3.** Log back into the **NOAM** GUI via the **VIP** address (as an **admin** user).
4. ☐	Remove the defective **NOAM** server from the Server Group.	**1.** Select the **[Main Menu: Configuration → Server Groups]** screen. **2.** Select the **NOAM Server Group** containing the defective **NOAM** server. **3.** Click **"Edit"** button. **4.** Under the **'SG Inclusion'** field, **UnCheck** the **Checkbox** to the left of the defective **NOAM** server. **5.** Click **"Ok"** button.

Procedure 4: Replacement of a NOAM Server

Step	Instruction	Procedure
5. ☐	**Power down** and replace the defective **NOAM** server.	**1.** **Power down** the defective **NOAM** server. **2.** Label all cables connected to the defective **NOAM** server. **3.** Physically remove the defective **NOAM** server from the frame. **4.** If the replacement **NOAM** contains a Quad-Serial card in the PCI Card slot (refer to **Error! Reference source not found.** for location), then proceed to **Step 5, sub-step 7** of this procedure. **5.** If the replacement **NOAM** does not contain a Quad-Serial card in the PCI Card slot, remove the card from the defective SOAM server. **6.** Follow procedures in Reference **[6]** to install and configure Quad-Serial card on the replacement **NOAM** server. **7.** Physically install the replacement **NOAM** server and reconnect all cables as labeled (refer to Reference **[3]** if any issues are encountered during server re-installation). **8.** **Power up** the replacement **NOAM** server.
6. ☐	Install and configure the replacement **NOAM** server.	**1.** Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference **[1]**. **2.** Execute **Procedure 6.2** *(Applying the Server Configuration file to the OAM / Query Server)* as detailed in Reference **[1]**. **3.** Execute **Procedure 7.2** *(Adding the OAM server to the OAM Server Group)* as detailed in Reference **[1]**. **4.** Execute **Procedure 7.4** *(Restarting the Application SW on the OAM server)* as detailed in Reference **[1]**.
7. ☐	Re-exchange **SSH keys** for the **PDB Import, PDB Export, PDE**, and **Data Export** (APDE) features. **NOTE:** *Refer to product online help if detailed information is needed to complete the specified configuration or refer to,* Appendix G. Accessing My Oracle Support (MOS) *for more information on contacting Oracle Customer Service.*	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Perform **SSH key exchange** for **PDB Export** using this screen **[Main Menu: EAGLE XG Database → Configuration → PDBI → Options]**. **3.** Perform **SSH key exchange** for **PDB Import** using this screen **[Main Menu: EAGLE XG Database → Configuration → PDBI → Options]**. **4.** Perform **SSH key exchange** for **PDE** using this screen **[Main Menu: EAGLE XG HLR Router → PDE → Options]**. **5.** Perform **SSH key exchange** for **Data Export (APDE)** using this screen **[Main Menu: Administration → Remote Servers → Data Export]**.
THIS PROCEDURE HAS BEEN COMPLETED		

2.4.3 Post Condition

- The NOAM server has been returned to service.

2.5 Replacement of a Query Server

2.5.1 Pre Condition

- The Query Server has been deemed defective.
- It has been determined that a Query Server replacement is required.
- A replacement T1200 server (R07) is available.
- The Primary NOAM GUI is accessible.

2.5.2 Recovery Steps

Procedure 5: Replacement of a Query Server

Step	Instruction	Procedure
1. ☐	Prepare for **Query Server** replacement.	Identify the defective **Query Server** server that needs replacement. **Hostname:** _____
2. ☐	Remove the defective **Query Server** from the Server Group.	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Select the **[Main Menu: Configuration → Server Groups]** screen. **3.** Select the **NOAM Server Group** containing the defective **Query Server**. **4.** Click **"Edit"** button. **5.** Under the **'SG Inclusion'** field, **UnCheck** the **Checkbox** to the left of the defective **Query Server**. **6.** Click **"Ok"** button.
3. ☐	**Power down** and replace the defective **Query Server**.	**1.** **Power down** the defective **Query Server**. **2.** Label all cables connected to the defective **Query Server**. **3.** Physically remove the defective **Query Server** from the frame. **4.** Physically install the replacement **Query Server** and reconnect all cables as labeled (refer to Reference **[3]** if any issues are encountered during server re-installation). **5.** **Power up** the replacement **Query Server**.
4. ☐	Install and configure the replacement **Query Server**.	**1.** Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference **[1]**. **2.** Execute **Procedure 6.2** *(Applying the Server Configuration file to the OAM / Query Server)* as detailed in Reference **[1]**. **3.** Execute **Procedure 7.2** *(Adding the OAM server to the OAM Server Group)* as detailed in Reference **[1]**. **4.** Execute **Procedure 7.4** *(Restarting the Application SW on the OAM server)* as detailed in Reference **[1]**.
THIS PROCEDURE HAS BEEN COMPLETED		

2.5.3 Post Condition

- The Query Server has been returned to service.

2.6 Replacement of a SOAM NE *(SOAM Server Pair)*

2.6.1 Pre Condition

- The SOAM NE servers (SOAM-A and SOAM-B) have been deemed unrecoverable.
- It has been determined that replacement of both NOAM servers is required.
- Replacement T1200 servers (R03) are available.
- The Primary NOAM GUI is accessible.
- MPs are not receiving provisioning database updates.

2.6.2 Recovery Steps

Procedure 6: Replacement of a SOAM NE (SOAM Server Pair)

Step	Instruction	Procedure
1. ☐	**Divert Signaling traffic** away from all **MP** servers associated with the **SOAM NE *(Optional)***. **NOTE:** *This procedure takes all anticipated precautions to avoid traffic loss.* *However, if traffic loss is experienced, all traffic should be automatically handled by the mate MP.*	• Execute **0** (Appendix C. Diverting Signaling Traffic away from the MP) if desired.
2. ☐	Locate and retrieve the **SOAM site Configuration Backup** file. **NOTE:** *The backup file should be provided in uncompressed format.*	Make sure that you have access to the SOAM Configuration Backup file. **SOAM Configuration Backup file:** _____
3. ☐	Prepare for **SOAM** server replacements.	Identify the **SOAM** servers that needs replacement. **SOAM-A Hostname:** _____ **SOAM-B Hostname:** _____
4. ☐	Place the defective **SOAM-A** server in ***"Forced Standby"*** so it cannot become the Active.	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → HA]** screen. **3.** Click **"Edit"** button. **4.** Change **"Max Allowed HA Role"** of **SOAM-A** server to **"Standby".** **5.** Click **"Ok"** button.
5. ☐	Remove the defective **SOAM-A** server from the Server Group.	**1.** Select the **[Main Menu: Configuration → Server Groups]** screen. **2.** Select the **SOAM Server Group** containing the defective **SOAM-A** server. **3.** Click **"Edit"** button. **4.** Under the **'SG Inclusion'** field, **UnCheck** the **Checkbox** to the left of the defective **SOAM-A** server. **5.** Click **"Ok"** button.

Procedure 6: Replacement of a SOAM NE (SOAM Server Pair)

Step	Instruction	Procedure
6. ☐	Place the defective **SOAM-B** server in the ***"OOS"*** state so it cannot become the Active.	**1.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → HA]** screen. **2.** Click **"Edit"** button. **3.** Change **"Max Allowed HA Role"** of **SOAM-B** server to **"OOS".** **4.** Click **"Ok"** button.
7. ☐	Remove the defective **SOAM-B** server from the Server Group.	**1.** Select the **[Main Menu: Configuration → Server Groups]** screen. **2.** Select the **SOAM Server Group** containing the defective **SOAM-B** server. **3.** Click **"Edit"** button. **4.** Under the **'SG Inclusion'** field, **UnCheck** the **Checkbox** to the left of the defective **SOAM-B** server. **5.** Click **"Ok"** button.
8. ☐	**Power down** and replace the defective **SOAM-A** server.	**1.** **Power down** the defective **SOAM** server. **2.** Label all cables connected to the defective **SOAM** server. **3.** Physically remove the defective **SOAM** server from the frame. **4.** If the replacement **SOAM** contains a Quad-Serial card in the PCI Card slot (refer Figure 1: T1200: Rear Panel for location), then proceed to **Step 8, sub-step 7** of this procedure. **5.** If the replacement **SOAM** does not contain a Quad-Serial card in the PCI Card slot, remove the card from the defective SOAM server. **6.** Follow procedures in Reference [6] to install and configure Quad-Serial card on the replacement **SOAM** server. **7.** Physically install the replacement **SOAM** server and reconnect all cables as labeled (refer to Reference [4] if any issues are encountered during server re-installation). **8.** **Power up** the replacement **SOAM** server.
9. ☐	**Power down** and replace the defective **SOAM-B** server.	**1.** Repeat **Step 8** of this procedure for the **SOAM-B** server.
10. ☐	Install and configure the replacement **SOAM-A** server.	**1.** Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference [1]. **2.** Execute **Procedure 8.2** *(Applying the Server Configuration file to the OAM server)* as detailed in Reference [1].
11. ☐	Install and configure the replacement **SOAM-B** server.	**1.** Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference [1]. **2.** Execute **Procedure 8.2** *(Applying the Server Configuration file to the OAM server)* as detailed in Reference [1].
12. ☐	Recover any **Telco Switches** that require Disaster Recovery *(if required)*. **NOTE:** *If the **Telco Switch** configurations remain intact from a previous installation, then **SKIP** to the next step.*	If this procedure is being executed due to the **loss of the entire SOAM frame** *(including the Telco Switches)*, then execute the following procedures at this time: **1.** Execute **Procedure 9** *(Replacement of a Telco switch1A)*. **2.** Execute **Procedure 10** *(Replacement of a Telco switch1B)*.

Procedure 6: Replacement of a SOAM NE (SOAM Server Pair)

Step	Instruction	Procedure
13. ☐	**Inhibit Replication** for all **MP** servers associated with the **SOAM NE**.	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **3.** **Filter** on the **SOAM NE**. a. **Scope** = <*SOAM_Network_Element_Name*> b. **Role** = MP **4.** **Hold down** the **[CTRL]** key and use the cursor to **multi-select** each row containing an **MP** server *(each selected row will be highlighted in **GREEN**).* **5.** **Release** the **[CTRL]** key and **Click** the **"Inhibit Replication"** dialogue button in the bottom of the right panel. **6.** Click **"Ok"** button on the confirmation pop-up window. **7.** Verify that all **MP** servers associated with the **SOAM NE** now show **"Inhibited"** under the **"Repl Status"** column on the **[Main Menu: Status & Manage → Database]** screen.
14. ☐	**1)** Place both **SOAM-A** and **SOAM-B** in the **SOAM Server Group simultaneously.** **2) Restart** the **HLRR Application** on each server.	**1.** Execute **Procedure 7.2** *(Adding the OAM server to the OAM Server Group)* as detailed in Reference [1] for both **SOAM-A** and **SOAM-B**. **2.** Execute **Procedure 7.4** *(Restarting the Application SW on the OAM server)* as detailed in Reference [1] for both **SOAM-A** and **SOAM-B**.
15. ☐	**Restore** the **SOAM Configuration** database.	**1.** Execute **0** *[Appendix A. Restoring SOAM Configuration Data (SS7 Config)* from Backup File*]* to restore the SOAM NE SS7 Configuration data.
16. ☐	Recover any **MP** servers that require Disaster Recovery *(if required)*. **NOTE:** *If the **MP** server configurations remain intact from a previous installation, then **SKIP** to the next step.*	**1.** If this procedure is being executed due to the **loss of the entire SOAM frame** *(including all MP servers)*, execute **Procedure 2** *(Replacement of a MP Server)* for each **MP** servers that require Disaster Recovery at this time.
17. ☐	**Allow Replication** for all **MP** servers associated with the **SOAM NE**.	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **3.** **Filter** on the **SOAM NE**. a. **Scope** = <*SOAM_Network_Element_Name*> b. **Role** = MP **4.** **Hold down** the **[CTRL]** key and use the cursor to **multi-select** each row containing an **MP** server *(each selected row will be highlighted in **GREEN**).* **5.** **Release** the **[CTRL]** key and **Click** the **"Allow Replication"** dialogue button in the bottom of the right panel. **6.** Click **"Ok"** button on the confirmation pop-up window. **7.** Verify that all **MP** servers associated with the **SOAM NE** now show **"Allowed"** under the **"Repl Status"** column on the **[Main Menu: Status & Manage → Database]** screen.

Procedure 6: Replacement of a SOAM NE (SOAM Server Pair)

Step	Instruction	Procedure
18. ☐	**NOTE:** *Execute this step* ***only if Signaling traffic*** *was* ***diverted*** *in* ***Step 1*** *of this procedure.* **Restore** traffic to the **MP** servers at this time.	**1.** Execute Appendix D. Restoring Signaling Traffic to the MP.
THIS PROCEDURE HAS BEEN COMPLETED		

2.6.3 Post Condition

- Both SOAM-A and SOAM-B servers have been returned to service.
- SOAM configuration changes can be made from the SOAM GUI.
- MP servers are now receiving provisioning database updates.

2.7 Replacement of the Primary NOAM NE *(Primary NOAM Server Pair)*

2.7.1 Pre Condition

- The Primary NOAM NE servers (NOAM-A and NOAM-B) have been deemed unrecoverable.
- No DR NOAM NE site is available or installed.

!!! WARNING !!!

IF A DR NOAM SITE IS AVAILABLE THEN DO NOT EXECUTE THIS PROCEDURE.

PROCEED TO SECTION 2.1 - Failover to DR NOAM (due to Network Isolation of the Primary NOAM NE.

- It has been determined that replacement of both NOAM servers is required.
- Replacement T1200 servers (R07) are available.
- Recent backup files for both the NOAM Configuration and Provisioning databases are available.

2.7.2 Recovery Steps

Procedure 7: Replacement of the Primary NOAM NE *(Primary NOAM Server Pair)*

Step	Instruction	Procedure
1. ☐	Locate and retrieve the **HLRR NOAM Configuration** & **Provisioning Backup** files. **NOTE:** *The backup files should be provided in uncompressed format.*	Make sure that you have access to both the NOAM Configuration Backup file and the NOAM Provisioning Backup file. **NOAM Configuration Backup file:** _____ **NOAM Provisioning Backup file:** _____
2. ☐	Prepare for **NOAM NE** server replacements.	Identify the **NOAM NE** servers that needs replacement. **NOAM-A Hostname:** _____ **NOAM-B Hostname:** _____
3. ☐	**Power down** and replace the defective **NOAM-A** server.	1. **Power down** the defective **NOAM-A** server. 2. Label all cables connected to the defective **NOAM-A** server. 3. Physically remove the defective **NOAM-A** server from the frame. 4. If the replacement **NOAM-A** contains a Quad-Serial card in the PCI Card slot (refer to Figure 1: T1200: Rear Panel for location), then proceed to **Step 3, sub-step 7** of this procedure. 5. If the replacement **NOAM-A** does not contain a Quad-Serial card in the PCI Card slot, remove the card from the defective SOAM server. 6. Follow procedures in Reference [6] to install and configure Quad-Serial card on the replacement **NOAM-A** server. 7. Physically install the replacement **NOAM-A** server and reconnect all cables as labeled (refer to Reference [3] if any issues are encountered during server re-installation). 8. **Power up** the replacement **NOAM-A** server.

Procedure 7: Replacement of the Primary NOAM NE *(Primary NOAM Server Pair)*

Step	Instruction	Procedure
4. ☐	**Power down** and replace the defective **NOAM-B** server.	1. Repeat **Step 3** of this procedure for the **NOAM-B** server.
5. ☐	Install the HLRR Application on the replacement **NOAM-A** server.	1. Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference **[1]**.
6. ☐	Configure a temporary XMI IP address for remote access to the replacement **NOAM-A** server.	1. Execute Appendix E. Adding A Temporary External IP Address for Remote Server Access.

7. ☐	**1)** Copy the **HLRR NOAM Configuration** & **Provisioning Backup** files to the replacement **NOAM-A** server.
	2) Restore the **Configuration Backup** file.
	3) Restore the **Provisioning Backup** file.
		1. Using the **temporary IP address** configured in **Step 6** of this procedure, **SSH** to the **CLI** of the replacement **NOAM-A** server and login as the **"admusr"** user.
		2. Copy the uncompressed **Configuration** & **Provisioning Backup** files identified in **Step 1** of this procedure to the **"/var/TKLC/db/filemgmt"** directory on the replacement **NOAM-A** server.
		3. Become the **"root"** user.
		`# sudo su -`
		4. **Stop** the **HLRR** Application:
		`# prod.stop --ignore-cap`
		5. **Restore** the **Configuration** database:
		`# idb.restore -n -t /var/TKLC/db/filemgmt -v <full_path_to_Configuration_Backup_file>`
		6. **Restore** the **Provisioning** database:
		`# idb.restore -n -t /var/TKLC/db/filemgmt -v <full_path_to_Provisioning_Backup_file>`
		7. **Restart** the **HLRR** Application:
		`# prod.start`

8. ☐	Export the **NOAM-A** Server Configuration file.	1. Using the **temporary IP address** configured in **Step 6** of this procedure, access the **NOAM GUI**. 2. Select the **[Main Menu: Configuration → Servers]** screen. 3. Using the cursor, **SELECT** the row containing the **NOAM-A Hostname** *(the selected row will be highlighted in **GREEN**).* 4. Click the **"Export"** dialogue button in the bottom of the right panel.
9. ☐	Remove the **temporary IP address** configured in **Step 6** by **deleting** Ethernet Interface **eth04**.	`# netAdm delete --device=eth04` `Interface eth04 removed`
10. ☐	Re-add the the server **eth04** interface without **IP** configuration.	`# netAdm add --device=eth04 --onboot=no` `Interface eth04 updated`
11. ☐	Access the Server **console** via the **RMM**.	1. Execute **Appendix B** *(Accessing the RMM VGA Redirection Window)* as detailed in Reference **[1]**.

Procedure 7: Replacement of the Primary NOAM NE *(Primary NOAM Server Pair)*

Step	Instruction	Procedure
12. ☐	Copy the **NOAM-A** Server Configuration file to the **"/var/tmp/"** directory. **NOTE:** *The server will poll the **"/var/tmp/"** directory for the presence of the configuration file and automatically execute it when found.*	**1.** Login to the console of the replacement **NOAM-A** server as the **"admusr"** user. **2.** Copy the `$ cp –p /var/TKLC/db/filemgmt/TKLCConfigData.<NOAM_A_hostname>.sh /var/tmp/TKLCConfigData.sh`

13. ☐	After the script completes, a broadcast message will appear
	Press the **<ENTER>** key to return to the command prompt.
		`*** NO OUTPUT FOR ≈ 3-5 MINUTES ***`
		`Broadcast message from root@tks5031301 (Thu Apr 10 15:13:15 2014):`
		`Server configuration completed successfully!`
		`See /var/TKLC/appw/logs/Process/install.log for details.`
		`Please remove the USB flash drive if connected and reboot the server. <ENTER>`

14. ☐	Initiate a reboot of the **NOAM-A** server.
	Wait until the reboot completes before continuing to the next step.
		`$ sudo init 6`
		`Broadcast message from root@tks5031301 (/dev/pts/0) at 15:14 ...`
		`The system is going down for reboot NOW!`

15. ☐	Recover **Telco switch1A** *(if required)*. **NOTE:** *If the **Telco switch1A** configuration remains intact from a previous installation, then **SKIP** to the next step.*	• If this procedure is being executed due to the **loss of the entire NOAM frame** *(including the Telco Switches)*, then execute **Procedure 9** *(Replacement of a Telco switch1A)* at this time.

16. ☐	Verify that the **NOAM-A** server has both **XMI** and **IMI** network connectivity.	**1.** Login to the console of the replacement **NOAM-A** server as the **"admusr"** user.
		2. **Ping** the NOAM-A **XMI Gateway** IP address to ensure network connectivity.
		`$ ping –c 5 <XMI_Gateway_IP_address>`
		3. **Ping** the NOAM-A **IMI Gateway** IP address to ensure network connectivity.
		`$ ping –c 5 <IMI_Gateway_IP_address>`

17. ☐	Verify that the **NOAM-A** server is actively syncing to at least one of the assigned **NTP** servers.
	NOTE: *This is indicated by the presence of an asterisk (*****) shown to the imediate left of one of the "remote" IP addresses shown* in the output.
		`$ ntpq -pn`
		`remote refid st t when poll reach delay offset jitter`
		`==============================================================================`
		`*10.250.78.247 192.5.41.209 2 u 425 512 377 0.205 0.879 0.048`
		`+10.250.32.10 192.5.41.40 2 u 430 512 377 0.236 0.137 0.158`
		`+10.250.32.51 192.5.41.40 2 u 282 512 377 0.226 0.009 0.174`

Procedure 7: Replacement of the Primary NOAM NE *(Primary NOAM Server Pair)*

Step	Instruction	Procedure
18. ☐	Install and configure the replacement **NOAM-B** server.	Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference [1] for the **NOAM-B** server. Execute **Procedure 6.2** *(Applying the Server Configuration file to the OAM / Query Server)* as detailed in Reference [1] for the **NOAM-B** server.
19. ☐	Recover **Telco switch1B** *(if required)*. **NOTE:** *If the **Telco switch1B** configuration remains intact from a previous installation, then **SKIP** to the next step.*	• If this procedure is being executed due to the **loss of the entire NOAM frame** *(including the Telco Switches)*, then execute **Procedure 10** *(Replacement of a Telco switch1B)* at this time.
20. ☐	**1)** Place **NOAM-B** in the **Primary NOAM Server Group.** **2) Restart** the **HLRR Application.**	Execute **Procedure 7.2** *(Adding the OAM server to the OAM Server Group)* as detailed in Reference [1] for the **NOAM-B** server. Execute **Procedure 7.4** *(Restarting the Application SW on the OAM server)* as detailed in Reference [1] for the **NOAM-B** server.
21. ☐	Re-exchange **SSH keys** for the **PDB Import, PDB Export, PDE**, and **Data Export** (APDE) features. **NOTE:** *Refer to product online help if detailed information is needed to complete the specified configuration or refer to* Appendix G. Accessing My Oracle Support (MOS) *for more information on contacting Oracle Customer Service.*	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Perform **SSH key exchange** for **PDB Export** using this screen **[Main Menu: EAGLE XG Database → Configuration → PDBI → Options]**. **3.** Perform **SSH key exchange** for **PDB Import** using this screen **[Main Menu: EAGLE XG Database → Configuration → PDBI → Options]**. **4.** Perform **SSH key exchange** for **PDE** using this screen **[Main Menu: EAGLE XG HLR Router → PDE → Options]**. **5.** Perform **SSH key exchange** for **Data Export (APDE)** using this screen **[Main Menu: Administration → Remote Servers → Data Export]**.
22. ☐	Recover the **Query Server** *(if required)*. **NOTE:** *If the **Query Server** configuration remains intact from a previous installation, then **SKIP** this step.*	• If this procedure is being executed due to the **loss of the entire NOAM frame** *(including the Query Server)*, execute **Procedure 5** *(Replacement of a Query Server)* at this time.
THIS PROCEDURE HAS BEEN COMPLETED		

2.7.3 Post Condition

- The Primary NOAM-A, NOAM-B, and the Query Server *(if equipped)* have been returned to service.
- Provisioning clients are allowed to reconnect and send updates to the NOAM VIP address.
- Subscriber data is replicated throughout the topology.

2.8 Replacement of the DR NOAM NE *(DR NOAM Server Pair)*

2.8.1 Pre Condition

- The DR NOAM NE servers (DR NOAM-A and DR NOAM-B) have been deemed unrecoverable.
- It has been determined that replacement of both DR NOAM servers is required.
- Replacement T1200 servers (R07) are available.
- The Primary NOAM GUI is accessible.

2.8.2 Recovery Steps

Procedure 8: Replacement of the DR NOAM NE *(DR NOAM Server Pair)*

Step	Instruction	Procedure
1. ☐	Prepare for **DR NOAM NE** server replacements.	Identify the **DR NOAM NE** servers that needs replacement. **DR NOAM-A Hostname:** _____ **DR NOAM-B Hostname:** _____
2. ☐	Place the defective **DR NOAM-A** server in ***"Forced Standby"*** so it cannot become the Active.	**1.** Login to the **Primary NOAM** GUI via the **VIP** address (as an **admin** user). **2.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → HA]** screen. **3.** Click **"Edit"** button. **4.** Change **"Max Allowed HA Role"** of **DR NOAM-A** server to **"Standby".** **5.** Click **"Ok"** button.
3. ☐	Remove the defective **DR NOAM-A** server from the Server Group.	**1.** Select the **[Main Menu: Configuration → Server Groups]** screen. **2.** Select the **DR NOAM Server Group** containing the defective **DR NOAM-A** server. **3.** Click **"Edit"** button. **4.** Under the **'SG Inclusion'** field, **UnCheck** the **Checkbox** to the left of the defective **DR NOAM-A** server. **5.** Click **"Ok"** button.
4. ☐	Place the defective **DR NOAM-B** server in the ***"OOS"*** state so it cannot become the Active.	**1.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → HA]** screen. **2.** Click **"Edit"** button. **3.** Change **"Max Allowed HA Role"** of **DR NOAM-B** server to **"OOS".** **4.** Click **"Ok"** button.
5. ☐	Remove the defective **DR NOAM-B** server from the Server Group.	**1.** Select the **[Main Menu: Configuration → Server Groups]** screen. **2.** Select the **DR NOAM Server Group** containing the defective **DR NOAM-B** server. **3.** Click **"Edit"** button. **4.** Under the **'SG Inclusion'** field, **UnCheck** the **Checkbox** to the left of the defective **DR NOAM-B** server. **5.** Click **"Ok"** button.

Procedure 8: Replacement of the DR NOAM NE *(DR NOAM Server Pair)*

Step	Instruction	Procedure
6. ☐	**Power down** and replace the defective **NOAM-A** server.	**1.** **Power down** the defective **DR NOAM-A** server. **2.** Label all cables connected to the defective **DR NOAM-A** server. **3.** Physically remove the defective **DR NOAM-A** server from the frame. **4.** If the replacement **DR NOAM-A** contains a Quad-Serial card in the PCI Card slot (refer to Figure 1: T1200: Rear Panel for location), then proceed to **Step 6, sub-step 7** of this procedure. **5.** If the replacement **DR NOAM-A** does not contain a Quad-Serial card in the PCI Card slot, remove the card from the defective SOAM server. **6.** Follow procedures in Reference [6] to install and configure Quad-Serial card on the replacement **DR NOAM-A** server. **7.** Physically install the replacement **DR NOAM-A** server and reconnect all cables as labeled (refer to Reference [3] if any issues are encountered during server re-installation). **8.** **Power up** the replacement **DR NOAM-A** server.
7. ☐	**Power down** and replace the defective **DR NOAM-B** server.	**1.** Repeat **Step 6** of this procedure for the **DR NOAM-B** server.
8. ☐	Install and configure the replacement **DR NOAM-A** server.	**1.** Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference [1]. **2.** Execute **Procedure 8.2** *(Applying the Server Configuration file to the OAM server)* as detailed in Reference [1].
9. ☐	Install and configure the replacement **DR NOAM-B** server.	**1.** Execute **Procedure 1** *(Installing the HLR Router Application)* as detailed in Reference [1]. **2.** Execute **Procedure 8.2** *(Applying the Server Configuration file to the OAM server)* as detailed in Reference [1].
10. ☐	Recover any **Telco Switches** that require Disaster Recovery *(if required)*. **NOTE:** *If the **Telco Switch** configurations remain intact from a previous installation, then **SKIP** to the next step.*	If this procedure is being executed due to the **loss of the entire NOAM frame** *(including the Telco Switches)*, then execute the following procedures at this time: **1.** Execute **Procedure 9** *(Replacement of a Telco switch1A)*. **2.** Execute **Procedure 10** *(Replacement of a Telco switch1B)*.
11. ☐	**1)** Place **Both** servers (**DR NOAM-A** and **DR NOAM-B**) in the **DR NOAM Server Group simultaneously.** **2) Restart** the **HLRR Application** on each server.	**1.** Execute **Procedure 7.2** *(Adding the OAM server to the OAM Server Group)* as detailed in Reference [1] for **DR NOAM-A** and **DR NOAM-B**. **2.** Execute **Procedure 7.4** *(Restarting the Application SW on the OAM server)* as detailed in Reference [1] for **DR NOAM-A** and **DR NOAM-B**.
12. ☐	Recover the **Query Server** *(if required)*. **NOTE:** *If the **Query Server** configuration remains intact from a previous installation, then **SKIP** this step.*	**1.** If this procedure is being executed due to the **loss of the entire NOAM frame** *(including the Query Server)*, execute **Procedure 5** *(Replacement of a Query Server)* at this time.
THIS PROCEDURE HAS BEEN COMPLETED		

2.8.3 Post Condition

- DR NOAM-A, DR NOAM-B and the DR Query Server have been returned to service.

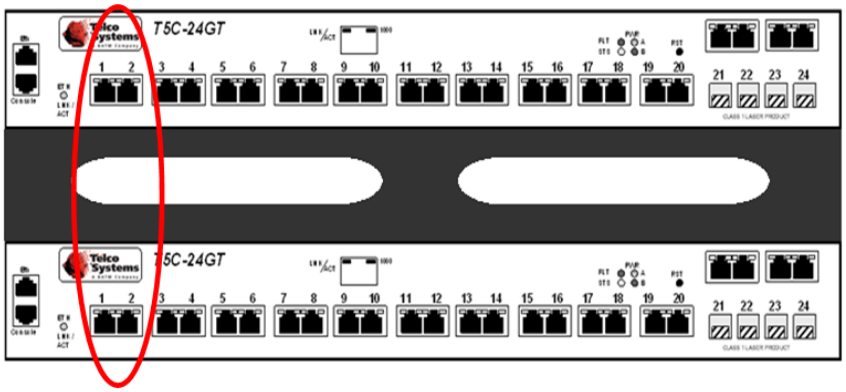
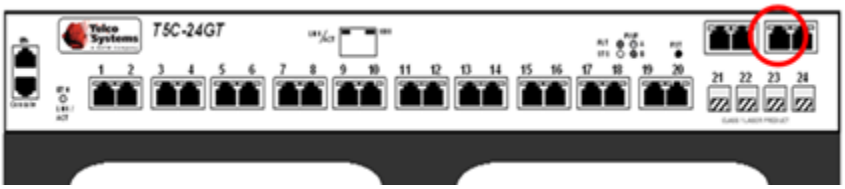
2.9 Replacement of a Telco switch1A

2.9.1 Pre Condition

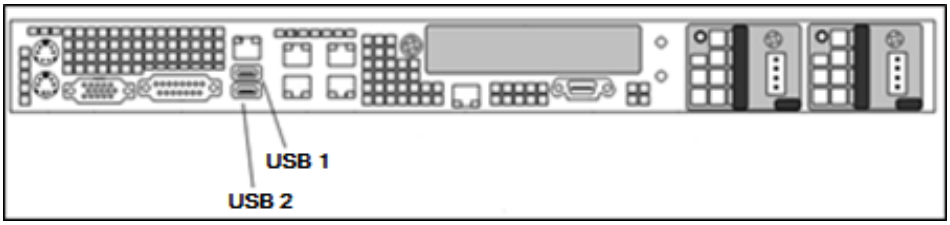
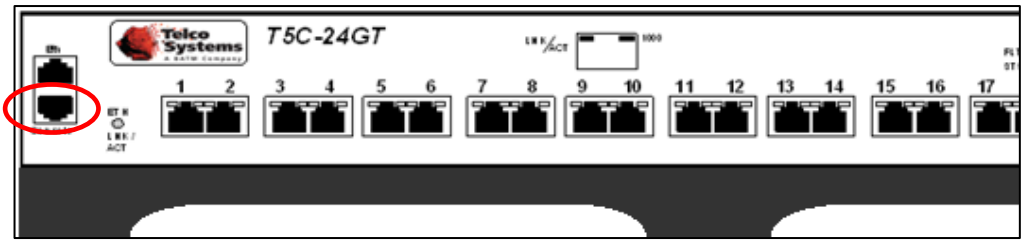
- Telco switch1A has been identified to be defective.
- A replacement Telco Switch (T5C-24GT) is available.
- OAM servers at the site are accessible

2.9.2 Recovery Steps

Procedure 9: Replacement of a Telco switch1A

Step	Instruction	Procedure
1. ☐	**Power down** and replace the defective **Telco switch1A**.	1. **Power down** the defective **Telco switch1A**. 2. Label all cables connected to the defective **Telco switch1A**. 3. Physically remove the defective **Telco switch1A** from the frame. 4. Physically install the replacement **Telco switch1A** and reconnect all cables as labeled (refer to Reference [3] (NOAM NE) or Reference [4] (SOAM NE) if any issues are encountered during server re-installation). 5. **Power up** the replacement **Telco switch1A**.
2. ☐	Set/verify the following cable configuration at the **Telco Switches**: **1)** Verify that the ISL from… **switch1A, Port 1** to **switch1B, Port 1** is **CONNECTED.** **2)** Verify that the ISL from… **switch1A, Port 2** to **switch1B, Port 2** is **DISCONNECTED.**	switch1A (top) switch1B (bottom)  **Figure 2: Telco Switches: ISL Connections**
3. ☐	Set/Verify the following cable configuration at the **Telco Switches**: Verify that **switch1A, Port 23** is **DISCONNECTED.**	switch1A (top)  **Figure 3: Telco Switches: swith1A Uplink**

Procedure 9: Replacement of a Telco switch1A

Step	Instruction	Procedure
4. ☐	**1)** Verify that **OAM Server A** (top-most server in the cabinet) has a **"SEALEVEL" USB-to-DB9M** Serial adaptor (**OEM P/N: 2105R**) connected to the upper **USB Port 1** on the rear panel. **NOTE:** *The **USB-to-DB9M** Serial adaptor referenced above is connected to a **DB9F-to-RJ45** Serial cable (**TKLC P/N: 830-1229-xx**).* **2)** Verify that the **DB9F-to-RJ45** Serial cable is **CONNECTED** to the **RJ45 Console** port of **switch1A**.	 **Figure 4: T1200 Rear Panel: USB Port 1**  **Figure 5: Telco Switch Console Cable: USB-to-DB9M Serial Adapter/DB9F-to-RJ45 Serial Cable**  **Figure 6: Telco Switches: switch1A Console Port**
5. ☐	**OAM Server A:** Log into the OAM Server **RMM**. **NOTE:** *Although **XMI** connectivity to the OAM server should be available thru the mate Telco Switch, **RMM** access is recommended as it bypasses both switch uplinks.*	Execute Appendix B. Restoring NOAM Provisioning Database from Backup as detailed in Reference [1].

Procedure 9: Replacement of a Telco switch1A

Step	Instruction	Procedure
6. ☐	**OAM Server A:** Login and create an independent login shell.	**1.** Login to the console of the replacement **NOAM-A** server as the **"root"** user. **2.** Start a **"screen"** session from the server console. `# screen`

7. ☐	**OAM Server A:**
	Verify that **bond1.1** has been configured with IP address **169.254.1.11**.
		`# ifconfig bond1.1`
		`bond1.1 Link encap:Ethernet HWaddr 00:1E:67:00:AB:74`
		`inet addr:169.254.1.11 Bcast:169.254.1.255 Mask:255.255.255.0`
		`inet6 addr: fe80::21e:67ff:fe00:ab74/64 Scope:Link`
		`UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1`
		`RX packets:0 errors:0 dropped:0 overruns:0 frame:0`
		`TX packets:197 errors:0 dropped:0 overruns:0 carrier:0`
		`collisions:0 txqueuelen:0`
		`RX bytes:0 (0.0 b) TX bytes:14482 (14.1 KiB)`

8. ☐	**OAM Server A:** Verify that **USB1** is the access port which should be configured for access to **switch1A**.	`# ls -la /dev/ttyUSB*` `crw-rw---- 1 root dialout 188, 0 Apr 25 15:39 /dev/ttyUSB1`
9. ☐	**OAM Server A:** Verify that the **vlan.conf** file is located in the **/usr/TKLC/plat/etc/** directory. If the **vlan.conf file** is **PRESENT**, then **SKIP** to **Step 13** of this procedure. If the **vlan.conf file** is **NOT PRESENT**, then continue to the next step.	`# ls /usr/TKLC/plat/etc/vlan.conf` `/usr/TKLC/plat/etc/vlan.conf`
10. ☐	If the **vlan.conf** file is not present, execute one of the options shown to the right. **NOTE:** *The user should be aware that the **vlan.conf** file must be customized with **"site specific"** network subnet information for each **Network Element** site.*	*If the **vlan.conf** file is not present, the user has **(2)** options*: **1)** If the **vlan.conf** file for the given site has been backed up off-site, copy the file to the **"/usr/TKLC/plat/etc/"**directory on **OAM Server A**. If no **vlan.conf** file is available, then execute **Appendix I** *(Creating a vlan.conf file for Telco Switch Configuration)* as detailed in Reference [1] and copy the created file to the **"/usr/TKLC/plat/etc/"**directory on **OAM Server A**.
11. ☐	**OAM Server A:** Change file ownship to the "root" user as shown to the right.	`# chown root:root /usr/TKLC/plat/etc/vlan.conf`
12. ☐	**OAM Server A:** Change file permissions as shown to the right.	`# chmod 755 /usr/TKLC/plat/etc/vlan.conf`

Procedure 9: Replacement of a Telco switch1A

Step	Instruction	Procedure
13. ☐	**OAM Server A:** Verify that the file permissions and ownship have been successfully updated as shown to the right.	`# ls -l /usr/TKLC/plat/etc/vlan.conf` `-rwxr-xr-x 1 root root 10102 Aug 1 2014 usr/TKLC/plat/etc/vlan.conf`

14. ☐	**OAM Server A:**
	Verify that the **vlan.conf** file **accessport** is mapped to device **USB1**.
	NOTE: *If the output doesn't show device **USB1**, then **edit** the file to correct it.*
	Otherwise, continue to the next step.
		`# grep USB /usr/TKLC/plat/etc/vlan.conf`
		`--accessport=/dev/ttyUSB1 \`
		`--accessport=/dev/ttyUSB1 \`

15. ☐	**OAM Server A:** Execute the **dos2unix** command to remove any non-**ASCII** characters from the file.	`# dos2unix /usr/TKLC/plat/etc/vlan.conf`

16. ☐	**OAM Server A:**
	Verify if that the **switch1A minicom** file access port is configured to device **USB1**.
	NOTE: *If the output doesn't show device **USB1**, then modify the value using the provided command.*
	Otherwise, continue to the next step.
		`# grep USB /etc/minirc.switch1A`
		`pr port /dev/ttyUSB1`
		
		Example minicom modification:
		`# /usr/TKLC/plat/bin/remoteConsole --add --name=switch1A --bps=9600 --port=ttyUSB1`

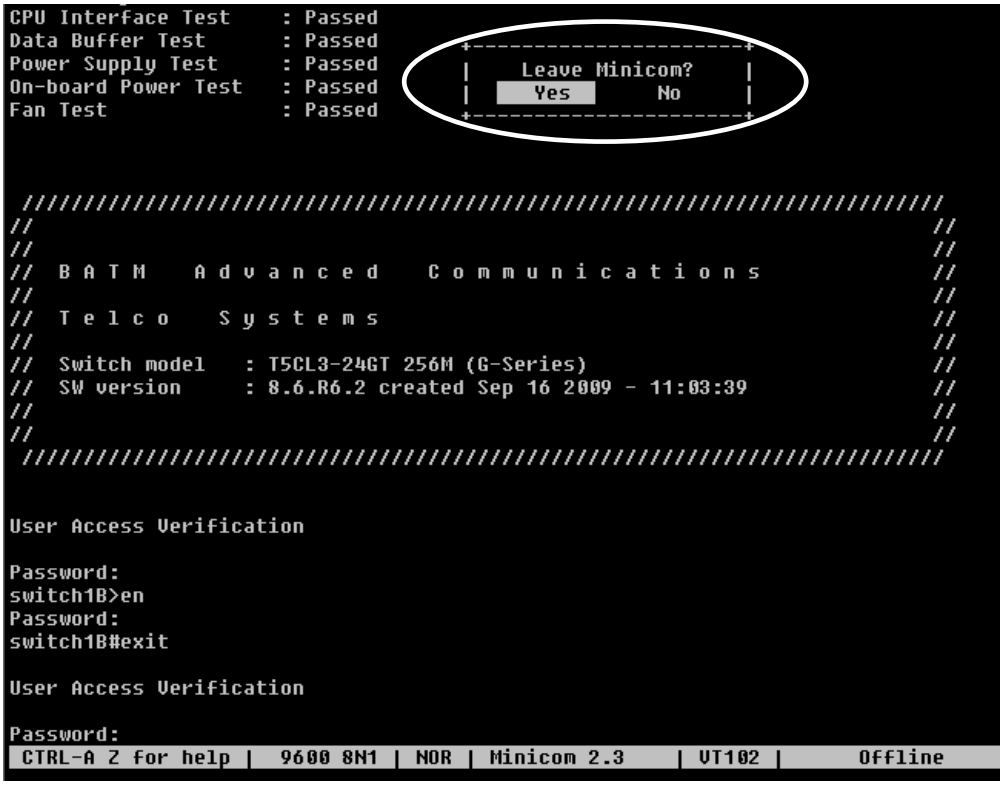
Procedure 9: Replacement of a Telco switch1A

Step	Instruction	Procedure

17. ☐	**OAM Server A:**
	Connect serially to the **switch1A** console by issuing the following command on **server1A**.
	NOTE: *If the Telco Switch does not accept the factory default password, then a previous configuration may be present.*
	*If the switch **console** and switch **enable** passwords are known, then login and continue to the next step.*
	*Otherwise, **STOP** and contact "My Oracle Support" (MOS) for assistance [refer to* Appendix G. Accessing My Oracle Support (MOS) *for more information on contacting Oracle Customer Service.].*
		`# minicom switch1A`
		`Welcome to minicom 2.3`
		`OPTIONS: I18n`
		`Compiled on Aug 19 2010, 05:50:19.`
		`Port /dev/ttyUSB0`
		`Press CTRL-A Z for help on special keys`
		<ENTER>
		`Password: <factory_default_password>`
		`T5C-24GT>`
		`Switch> enable`
		`T5C-24GT#`

18. ☐	**OAM Server A (switch console session):**
	Restore **switch1A** to **factory default** settings.
		`T5C-24GT# reload to-defaults`
		`Restore factory setting and reboot the Switch ? [y/n] : y`
		`Rebooting…`
		[Additional output omitted]
		
		The switch will reboot to a factory default configuration. Once the reboot has completed, the user will be presented with the following prompt:
		`User Access Verification`
		`Password:`

Procedure 9: Replacement of a Telco switch1A

Step	Instruction	Procedure
19. ☐	**OAM Server A (switch console session):** Exit from the **switch1A** console and minicom session At the **"Password:"** prompt, exit the minicom session by pressing the following keyboard sequence: **1) CTRL-a** **2) a** **3) x** **4) <ENTER>** **NOTE:** If you are at the **"T5C-24GT# "** or **"T5C-24GT>"** prompt, log out by typing **"exit"** and pressing the **<ENTER>** key.	
20. ☐	**OAM Server A:** Verify that the Telco Switch firmware binary version present on the server matches the one displayed to the right. **NOTE**: *If the correct binary image file is not displayed, then refer to the **T1200 Solutions Firmware Upgrade Pack** [9], or contact "My Oracle Support" (MOS) for assistance [refer to Appendix G. Accessing My Oracle Support (MOS) for more information on contacting Oracle Customer Service.].*	`# ls /var/TKLC/switchconfig/*.bin` `/var/TKLC/switchconfig/BiNOS-T5CL3_24G-G_v8.6.R6.2.bin`

21. ☐	**OAM Server A:**
	1) Turn on the **tftp** service using the **chkconfig** utility.
	2) Verify that the **tftp** service has been enabled.
		`# chkconfig tftp on`
		`# chkconfig --list tftp`
		`tftp on`

Procedure 9: Replacement of a Telco switch1A

Step	Instruction	Procedure

22. ☐	**OAM Server A:**
	1) Start the **xinetd** service as shown to the right.
	2) Verify that the **xinetd** service is running.
		`# service xinetd start`
		`Starting xinetd: [  OK  ]`
		
		`# service xinetd status`
		`xinetd (pid  24261) is running...`

23. ☐	**OAM Server A:** Verify that **bond1** contains both network interfaces **eth01** and **eth03.**	`# cat /sys/class/net/bond1/bonding/slaves` `eth01 eth03`
24. ☐	**OAM Server A:** Turn down the **eth03** interface. **NOTE:** *This forces the **eth01** interface (connected to **switch1A**) to remain **Active** for the duration of the switch configuration push.*	`# ifdown eth03`
25. ☐	**OAM Server A:** Verify that **bond1** now contains the **eth01** network interface only.	`# cat /sys/class/net/bond1/bonding/slaves` `eth01`
26. ☐	**OAM Server A:** Run the **prepswconf** script to modify server **iptables** *(firewall)* to allow **tftp** between the switch and the server. **NOTE:** *This command will temporarily open up iptables on the server to allow tftp access to the switch for **120 minutes**.* *The following step must be completed within that time frame. If not, the **prepswconf** script must be re-run before any subsequent attempt to complete the remaining steps of this procedure.*	`# /usr/TKLC/plat/sbin/prepswconf --prepare`

Procedure 9: Replacement of a Telco switch1A

Step	Instruction	Procedure

27. ☐	**OAM Server A:**
	Configure **switch1A** using the **switchconfig** utility.
	NOTE: *This step will take approximately 20 minutes to complete.*
	*If the output fails to indicate a successful configuration, **STOP** and contact "My Oracle Support" (MOS) for assistance [refer to Appendix G. Accessing My Oracle Support (MOS), for more information on contacting Oracle Customer Service.].*
		`# /usr/TKLC/plat/sbin/switchconfig --swname=switch1A`
		
		`Successfully enabled on switch switch1A.`
		`Reloading switch switch1A with defaults, please standby…`
		`Switch switch1A successfully set to default configuration.`
		`Successfully started management VLAN on switch1A.`
		`Startup configuration created OK.`
		`Successfully uploaded startup config for switch1A.`
		`Removing config file switch1A.startup-config from /var/lib/tftpboot.`
		`Reloading switch switch1A, please standby…`
		`Reload of switch switch1A complete.`
		`Switch switch1A successfully configured.`
		
		Refer to Appendix F. Handling Errors IN "switchconfig" script
		If the following errors occur:
		`ERROR: IP address lookup for switch1A failed!`
		`ERROR: Could not start management VLAN!`
		`ERROR: Could not configure switch, switch1x! at /usr/TKLC/plat/sbin/switchconfig line 362.`
		
		`ERROR: Error detected in output for tftp of SYS!`
		`ERROR: Could not transfer SYS image!`
		`ERROR: Could not configure switch, switch1x! at /usr/TKLC/plat/sbin/switchconfig line 362.`

28. ☐	**OAM Server A:** Restore the iptables configuration *(firewall)* to its original state.	`# /usr/TKLC/plat/sbin/prepswconf --clean`
29. ☐	**OAM Server A:** Stop the **xinetd** service.	`# service xinetd stop` `Stopping xinetd: [ OK ]`

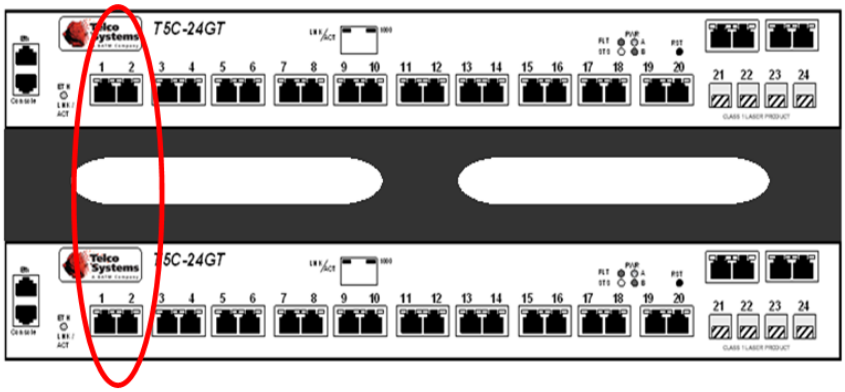
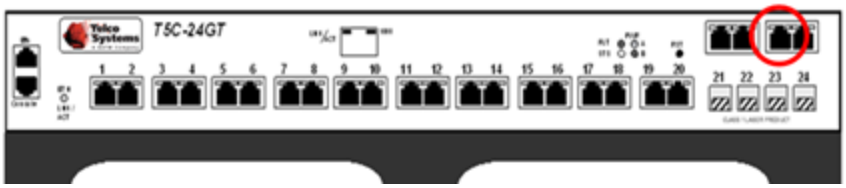
30. ☐	**OAM Server A:**
	1) Turn off the **tftp** service using the **chkconfig** utility.
	2) Verify that the **tftp** service has been disabled.
		`# chkconfig tftp off`
		`# chkconfig --list tftp`
		`tftp off`

31. ☐	**OAM Server A:** Turn up the **eth03** interface.	`# ifup eth03`
32. ☐	**OAM Server A:** Verify that **bond1** once again contains both network interfaces **eth01** and **eth03.**	`# cat /sys/class/net/bond1/bonding/slaves` `eth01 eth03`

Procedure 9: Replacement of a Telco switch1A

Step	Instruction	Procedure

33. ☐	**OAM Server A:**
	Exit the **screen** session and logout of the server.
		`# exit`
		`[screen is terminating]`
		`# exit`
		`logout`

34. ☐	Set/Verify the following cable configuration at the **Telco Switches**: **1)** Verify that the ISL from… **switch1A, Port 1** to **switch1B, Port 1** is **CONNECTED.** **2)** Verify that the ISL from… **switch1A, Port 2** to **switch1B, Port 2** is **CONNECTED.**	switch1A (top) switch1B (bottom)  **Figure 7: Telco Swithes: ISL Connections**
35. ☐	Reconnect the **Telco Switches** to the customer network: Verify that… **switch1A, Port 23** is **CONNECTED.**	switch1A (top)  **Figure 8: Telco Switches: switch1A Uplink**
THIS PROCEDURE HAS BEEN COMPLETED		

2.10

2.10 Replacement of a Telco switch1B

2.10.1 Pre Condition

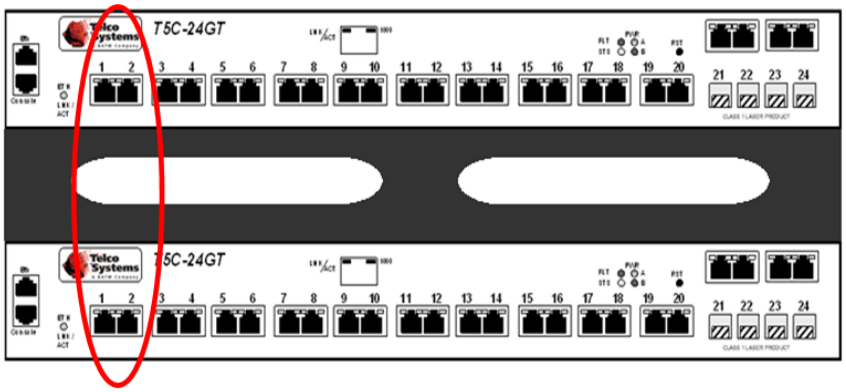
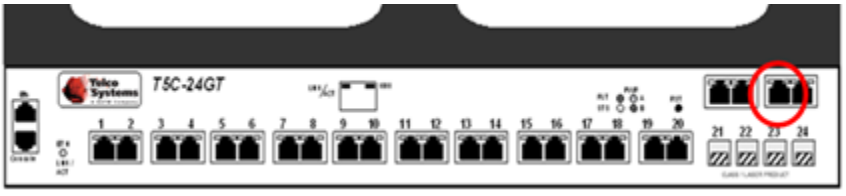
- Telco switch1B has been identified to be defective.
- A replacement Telco Switch (T5C-24GT) is available.
- OAM servers at the site are accessible

2.10.2 Post Condition

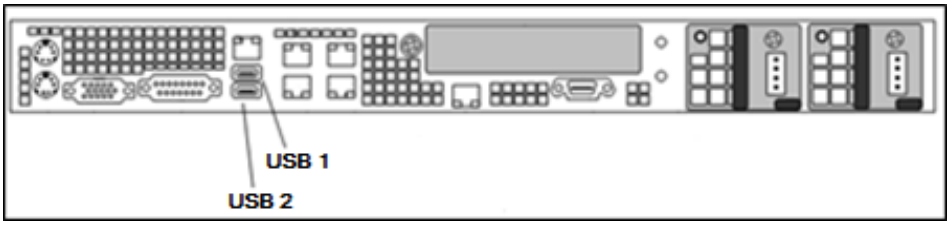
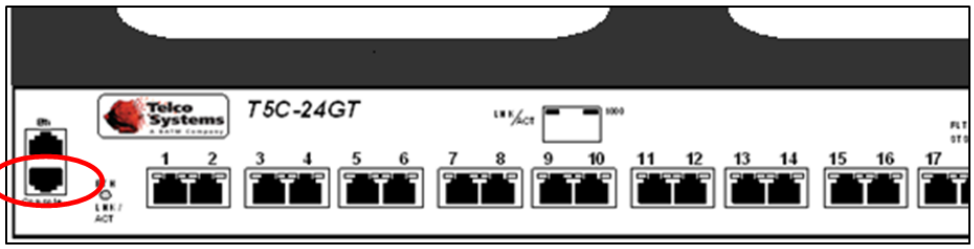
- The replacement Telco switch1A has been placed into service.

2.10.3 Recovery Steps

Procedure 10: Replacement of a Telco switch1B

Step	Instruction	Procedure
1. ☐	**Power down** and replace the defective **Telco switch1B**.	1. **Power down** the defective **Telco switch1B**. 2. Label all cables connected to the defective **Telco switch1B**. 3. Physically remove the defective **Telco switch1B** from the frame. 4. Physically install the replacement **Telco switch1B** and reconnect all cables as labeled (refer to Reference [3] (NOAM NE) or Reference [4] (SOAM NE) if any issues are encountered during server re-installation). 5. **Power up** the replacement **Telco switch1B**.
2. ☐	Set/verify the following cable configuration at the **Telco Switches**: **1)** Verify that the ISL from… **switch1A, Port 1** to **switch1B, Port 1** is **CONNECTED.** **2)** Verify that the ISL from… **switch1A, Port 2** to **switch1B, Port 2** is **DISCONNECTED.**	switch1A (top) switch1B (bottom)  **Figure 9: Telco Switches: ISL Connections**
3. ☐	Set/Verify the following cable configuration at the **Telco Switches**: Verify that **switch1B, Port 23** is **DISCONNECTED.**	switch1B (bottom)  **Figure 10: Telco Switches: swith1B Uplink**

Procedure 10: Replacement of a Telco switch1B

Step	Instruction	Procedure
4. ☐	**1)** Verify that **OAM Server B** (top-most server in the cabinet) has a **"SEALEVEL" USB-to-DB9M** Serial adaptor (**OEM P/N: 2105R**) connected to the upper **USB Port 1** on the rear panel. **NOTE:** ***The USB-to-DB9M*** *Serial adaptor referenced above is connected to a* ***DB9F-to-RJ45*** *Serial cable (****TKLC P/N: 830-1229-xx****).* **2)** Verify that the **DB9F-to-RJ45** Serial cable is **CONNECTED** to the **RJ45 Console** port of **switch1B**.	 **Figure 11: T1200 Rear Panel: USB Port 1**  **Figure 12: Telco Switch Console Cable: USB-to-DB9M Serial Adapter/DB9F-to-RJ45 Serial Cable**  **Figure 13: Telco Switches: switch1B Console Port**

Procedure 10: Replacement of a Telco switch1B

Step	Instruction	Procedure
5. ☐	**OAM Server B:** Login to the OAM Server **RMM**. **NOTE:** *Although **XMI** connectivity to the OAM server should be available thru the mate Telco Switch, **RMM** access is recommended as it bypasses both switch uplinks.* RMM access is recommended If RMM is not available then MINICOM is the alternate. If user starts step 5 using MINICOM, then it is recommended to exit or break that MINICOM session before Step 17 to avoid looping that can cause issues. Otherwise user can execute Steps 1 thru 19 via ssh, then switchover to a serial console (RMM/MINICOM) for the remaining steps (20 thru 35).	Execute **Appendix B** *(Accessing the RMM VGA Redirection Window)* as detailed in Reference [1].
6. ☐	**OAM Server B:** Create an independent login shell.	`# screen`

7. ☐	**OAM Server B:**
	Verify that **bond1.1** has been configured with IP address **169.254.1.11**.
		`# ifconfig bond1.1`
		`bond1.1 Link encap:Ethernet HWaddr 00:1E:67:00:AB:74`
		`inet addr:169.254.1.11 Bcast:169.254.1.255 Mask:255.255.255.0`
		`inet6 addr: fe80::21e:67ff:fe00:ab74/64 Scope:Link`
		`UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1`
		`RX packets:0 errors:0 dropped:0 overruns:0 frame:0`
		`TX packets:197 errors:0 dropped:0 overruns:0 carrier:0`
		`collisions:0 txqueuelen:0`
		`RX bytes:0 (0.0 b) TX bytes:14482 (14.1 KiB)`

8. ☐	**OAM Server B:** Verify that **USB1** is the access port which should be configured for access to **switch1B**.	`# ls -la /dev/ttyUSB*` `crw-rw---- 1 root dialout 188, 0 Apr 25 15:39 /dev/ttyUSB1`

Procedure 10: Replacement of a Telco switch1B

Step	Instruction	Procedure
9. ☐	**OAM Server B:** Verify that the **vlan.conf** file is located in the **/usr/TKLC/plat/etc/** directory. If the **vlan.conf file** is **PRESENT**, then **SKIP** to **Step 13** of this procedure. If the **vlan.conf file** is **NOT PRESENT**, then continue to the next step.	`# ls /usr/TKLC/plat/etc/vlan.conf` `/usr/TKLC/plat/etc/vlan.conf`
10. ☐	If the **vlan.conf** file is not present, execute one of the options shown to the right. **NOTE:** *The user should be aware that the **vlan.conf** file must be customized with **"site specific"** network subnet information for each **Network Element** site.*	*If the **vlan.conf** file is not present, the user has **(2)** options*: **1)** If the **vlan.conf** file for the given site has been backed up off-site, copy the file to the **"/usr/TKLC/plat/etc/"**directory on **OAM Server A**. **2)** If no **vlan.conf** file is available, then execute **Appendix I** *(Creating a vlan.conf file for Telco Switch Configuration)* as detailed in Reference [1] and copy the created file to the **"/usr/TKLC/plat/etc/"**directory on **OAM Server A**.
11. ☐	**OAM Server B:** Change file ownship to the "root" user as shown to the right.	`# chown root:root /usr/TKLC/plat/etc/vlan.conf`
12. ☐	**OAM Server B:** Change file permissions as shown to the right.	`# chmod 755 /usr/TKLC/plat/etc/vlan.conf`
13. ☐	**OAM Server B:** Verify that the file permissions and ownship have been successfully updated as shown to the right.	`# ls -l /usr/TKLC/plat/etc/vlan.conf` `-rwxr-xr-x 1 root root 10102 Aug 1 2014  usr/TKLC/plat/etc/vlan.conf`

14. ☐	**OAM Server B:**
	Verify that the **vlan.conf** file **accessport** is mapped to device **USB1**.
	NOTE: *If the output doesn't show device **USB1**, then **edit** the file to correct it.*
	Otherwise, continue to the next step.
		`# grep USB /usr/TKLC/plat/etc/vlan.conf`
		`--accessport=/dev/ttyUSB1 \`
		`--accessport=/dev/ttyUSB1 \`

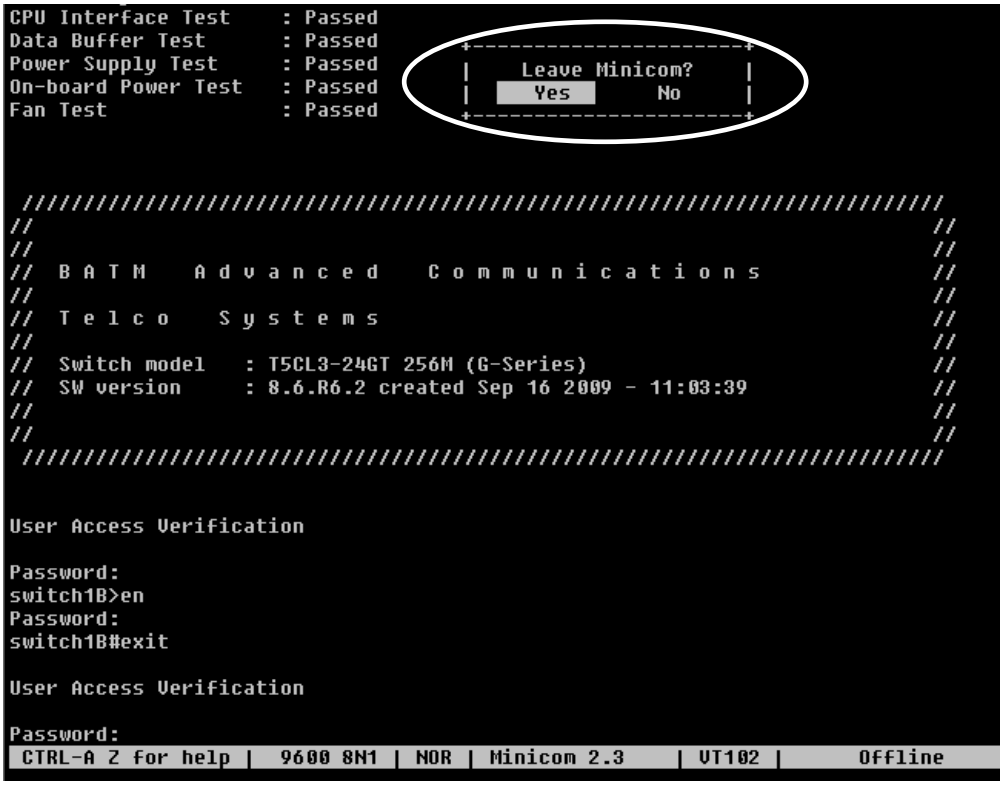
Procedure 10: Replacement of a Telco switch1B

Step	Instruction	Procedure
15. ☐	**OAM Server B:** Execute the **dos2unix** command to remove any non-**ASCII** characters from the file.	`# dos2unix /usr/TKLC/plat/etc/vlan.conf`

16. ☐	**OAM Server B:**
	Verify if that the **switch1B minicom** file access port is configured to device **USB1**.
	NOTE: *If the output doesn't show device **USB1**, then modify the value using the provided command.*
	Otherwise, continue to the next step.
		`# grep USB /etc/minirc.switch1B`
		`pr port /dev/ttyUSB1`
		
		Example minicom modification:
		`# /usr/TKLC/plat/bin/remoteConsole --add --name=switch1B --bps=9600 --port=ttyUSB1`

17. ☐	**OAM Server B:**
	Connect serially to the **switch1B** console by issuing the following command on **server1A**.
	NOTE: *If the Telco Switch does not accept the factory default password, then a previous configuration may be present.*
	*If the switch **console** and switch **enable** passwords are known, then login and continue to the next step.*
	*Otherwise, **STOP** and contact "My Oracle Support" (MOS) for assistance [refer to Appendix G. Accessing My Oracle Support(MOS).* Accessing My Oracle Support (MOS) *for more information on contacting Oracle Customer Service.].*
		`# minicom switch1B`
		`Welcome to minicom 2.3`
		
		`OPTIONS: I18n`
		`Compiled on Aug 19 2010, 05:50:19.`
		`Port /dev/ttyUSB0`
		
		`Press CTRL-A Z for help on special keys`
		<ENTER>
		
		`Password: <factory_default_password>`
		`T5C-24GT>`
		`Switch> enable`
		`T5C-24GT#`

Procedure 10: Replacement of a Telco switch1B

Step	Instruction	Procedure
18. ☐	**OAM Server B (switch console session):** Restore **switch1B** to **factory default** settings.	T5C-24GT# **reload to-defaults** Restore factory setting and reboot the Switch ? [y/n] : **y** Rebooting… [Additional output omitted] The switch will reboot to a factory default configuration. Once the reboot has completed, the user will be presented with the following prompt: User Access Verification Password:
19. ☐	**OAM Server B (switch console session):** Exit from the **switch1B** console and minicom session At the **"Password:"** prompt, exit the minicom session by pressing the following keyboard sequence: **1) CTRL-a** **2) a** **3) x** **4) <ENTER>** **NOTE:** If you are at the **"T5C-24GT# "** or **"T5C-24GT>"** prompt, log out by typing **"exit"** and pressing the **<ENTER>** key.	

Procedure 10: Replacement of a Telco switch1B

Step	Instruction	Procedure
20. ☐	**OAM Server B:** Verify that the Telco Switch firmware binary version present on the server matches the one displayed to the right. **NOTE**: *If the correct binary image file is not displayed, then refer to the **T1200 Solutions Firmware Upgrade Pack** [9], or contact "My Oracle Support" (MOS) for assistance [refer to Appendix G. Accessing My Oracle Support (MOS), for more information on contacting Oracle Customer Service.].*	`# ls /var/TKLC/switchconfig/*.bin` `/var/TKLC/switchconfig/BiNOS-T5CL3_24G-G_v8.6.R6.2.bin`

21. ☐	**OAM Server B:**
	1) Turn on the **tftp** service using the **chkconfig** utility.
	2) Verify that the **tftp** service has been enabled.
		`# chkconfig tftp on`
		`# chkconfig --list tftp`
		`tftp on`

22. ☐	**OAM Server B:**
	1) Start the **xinetd** service as shown to the right.
	2) Verify that the **xinetd** service is running.
		`# service xinetd start`
		`Starting xinetd: [ OK ]`
		`# service xinetd status`
		`xinetd (pid 24261) is running...`

23. ☐	**OAM Server B:** Verify that **bond1** contains both network interfaces **eth01** and **eth03.**	`# cat /sys/class/net/bond1/bonding/slaves` `eth01 eth03`
24. ☐	**OAM Server B:** Turn down the **eth03** interface. **NOTE:** *This forces the **eth01** interface (connected to **switch1B**) to remain **Active** for the duration of the switch configuration push.*	`# ifdown eth03`
25. ☐	**OAM Server B:** Verify that **bond1** now contains the **eth01** network interface only.	`# cat /sys/class/net/bond1/bonding/slaves` `eth03`

Procedure 10: Replacement of a Telco switch1B

Step	Instruction	Procedure
26. ☐	**OAM Server B:** Run the **prepswconf** script to modify server **iptables** *(firewall)* to allow **tftp** between the switch and the server. **NOTE:** *This command will temporarily open up iptables on the server to allow tftp access to the switch for **120 minutes**.* *The following step must be completed within that time frame. If not, the **prepswconf** script must be re-run before any subsequent attempt to complete the remaining steps of this procedure.*	`# /usr/TKLC/plat/sbin/prepswconf --prepare`

27. ☐	**OAM Server B:**
	Configure **switch1B** using the **switchconfig** utility.
	NOTE: *This step will take approximately 20 minutes to complete.*
	*If the output fails to indicate a successful configuration, **STOP** and contact "My Oracle Support" (MOS) for assistance [refer to Appendix G. Accessing My Oracle Support (MOS), for more information on contacting Oracle Customer Service.].*
		`# /usr/TKLC/plat/sbin/switchconfig --swname=switch1B`
		`Successfully enabled on switch switch1B.`
		`Reloading switch switch1B with defaults, please standby…`
		`Switch switch1B successfully set to default configuration.`
		`Successfully started management VLAN on switch1B.`
		`Startup configuration created OK.`
		`Successfully uploaded startup config for switch1B.`
		`Removing config file switch1B.startup-config from /var/lib/tftpboot.`
		`Reloading switch switch1B, please standby…`
		`Reload of switch switch1B complete.`
		`Switch switch1B successfully configured.`
		
		Refer to Appendix F. Handling Errors IN "switchconfig" script
		
		If the following errors occur:
		`ERROR: IP address lookup for switch1A failed!`
		`ERROR: Could not start management VLAN!`
		`ERROR: Could not configure switch, switch1x! at /usr/TKLC/plat/sbin/switchconfig line 362.`
		
		`ERROR: Error detected in output for tftp of SYS!`
		`ERROR: Could not transfer SYS image!`
		`ERROR: Could not configure switch, switch1x! at /usr/TKLC/plat/sbin/switchconfig line 362.`

28. ☐	**OAM Server B:** Restore the iptables configuration *(firewall)* to its original state.	`# /usr/TKLC/plat/sbin/prepswconf --clean`
29. ☐	**OAM Server B:** Stop the **xinetd** service.	`# service xinetd stop` `Stopping xinetd: [ OK ]`

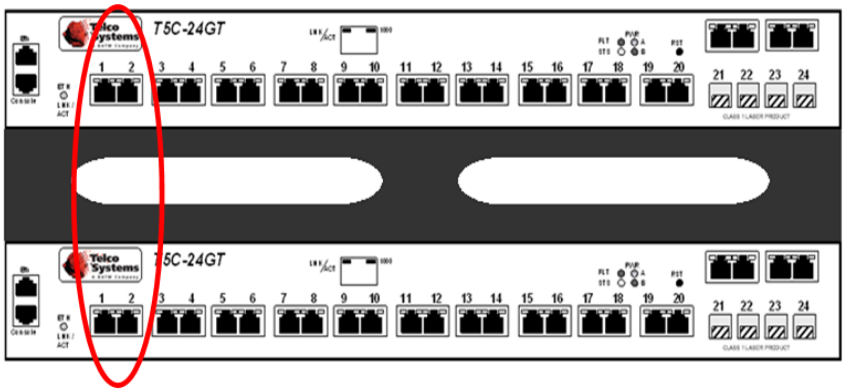
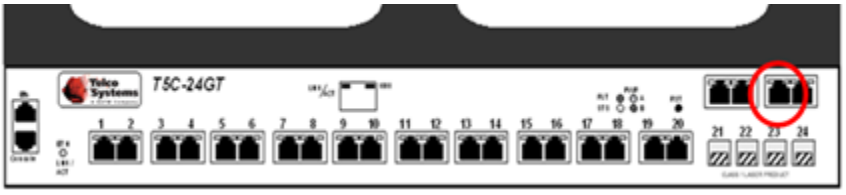
Procedure 10: Replacement of a Telco switch1B

Step	Instruction	Procedure

30. ☐	**OAM Server B:**
	1) Turn off the **tftp** service using the **chkconfig** utility.
	2) Verify that the **tftp** service has been disabled.
		`# chkconfig tftp off`
		`# chkconfig --list tftp`
		`tftp off`

31. ☐	**OAM Server B:** Turn up the **eth03** interface.	`# ifup eth01`
32. ☐	**OAM Server B:** Verify that **bond1** once again contains both network interfaces **eth01** and **eth03.**	`# cat /sys/class/net/bond1/bonding/slaves` `eth01 eth03`

33. ☐	**OAM Server B:**
	Exit the **screen** session and logout of the server.
		`# exit`
		`[screen is terminating]`
		`# exit`
		`logout`

34. ☐	Set/Verify the following cable configuration at the **Telco Switches**: **1)** Verify that the ISL from… **switch1A, Port 1** to **switch1B, Port 1** is **CONNECTED.** **2)** Verify that the ISL from… **switch1A, Port 2** to **switch1B, Port 2** is **CONNECTED.**	switch1A (top) switch1B (bottom)  **Figure 14: Telco Switches: ISL Connections**
35. ☐	Reconnect the **Telco switch1B** to the customer network: Verify that… **switch1B, Port 23** is **CONNECTED.**	switch1B (bottom)  **Figure 15: Telco Switches: switch1B Console Port**
THIS PROCEDURE HAS BEEN COMPLETED		

2.10.4 Post Condition

- The replacement Telco switch1B has been placed into service.

APPENDIX A. RESTORING SOAM CONFIGURATION DATA (SS7 CONFIG) FROM BACKUP FILE

Use these instructions to restore the SOAM Configuration Database (SS7/Transport) at HLRR system. The SS7/Transport Configuration Database consists of Adjacent Nodes, Transports, Adjacent Server Groups, Local Signaling Points, Local SCCP Users, Remote Signaling Points, Remote MTP3 Users, Link Sets, Links, and Routes configured via SOAM GUI and/or command line interface.

It is highly recommended that this procedure only be executed under the supervision of Oracle HLR Router Support personnel. Refer Appendix G. Accessing My Oracle Support (MOS), for more information on contacting Oracle Customer Service.

Appendix A. Restoring SOAM Configuration Data (SS7 Config) from Backup File

Step	Instruction	Procedure
1. ☐	Determine the impact of restored data on **Signaling traffic** running on **MP**	**1.** Evaluate the impact of the restored data on **MP** server(s) on SOAM site. **2.** It is advisable to divert traffic away from MP server(s) using **0** *(Appendix C. Diverting Signaling Traffic away* from the MP*)* when performing the restore of database.
2. ☐	On the **SOAM GUI**, perform the actions to upload **SS7/Transport** *(SOAM configuration)* **backup file** and verify it was uploaded successfully.	**1.** Login to the **SOAM** GUI via **VIP** address. **2.** Identify the **hostname** of the **Active SOAM** server **Active SOAM** *(Hostname)* **=** _____ **3.** Navigate to the **SOAM** GUI **[Main Menu: Status & Manage → Files]** screen. **4.** Select the **Active SOAM** server tab. **5.** Click on the **'Upload'** button. **6.** Use **'Browse'** button to select the **backup file** containing SS7/Transport configuration database for the given **SOAM** site. **7.** Click on the **'Upload'** button to upload the **backup file** to the **Active SOAM** server. **8.** Verify that upload is complete and the **backup file** now shows up in the file list.
3. ☐	Execute a **Restore** of **SOAM configuration** database. **NOTE:** *If the **'Force Restore'** option is used, then the SS7/Transport configuration data will require additional manual modifications.*	**1.** Login to **SOAM** GUI via **VIP** address. **2.** Navigate to the **SOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **3.** Select the **Active SOAM** server *(the selected row will be highlighted in **GREEN**)* and **click** the **'Restore'** button. **4.** Select the **SOAM configuration backup file** and **click** the **'OK'** button. **5.** The GUI will display **compatibility** information. **a)** If the the databases is **compatible**, then click the **'OK'** button to continue with SS7/Transport database restoration. **b)** If databases are **NOT compatible**, then contact **"My Oracle Support" (MOS)** for assistance *(refer to Appendix G. Accessing My Oracle Support (MOS), for more information on contacting Oracle Customer Service.)* **before selecting using the 'Force** Restore' option. **i.** If the determination is made by **"My Oracle Support" (MOS)** to use the **'Force Restore'** option, then review and **record the incompatibility information** using **copy/paste** into a **Notepad** text file. **ii.** **CHECK** the **'Force' CheckBox** and click the **'OK'** button to continue with SS7/Transport database restoration. **c)** **Wait at least 5 minutes for the Restore process to complete.** An **HA switchover** of the SOAM servers will occur and the user will be **logged out** of the SOAM GUI session.

Appendix A. Restoring SOAM Configuration Data (SS7 Config) from Backup File

<table>
<tr><th>Step</th><th>Instruction</th><th>Procedure</th></tr>
<tr><td>4. ☐</td><td>Verify the status of the SOAM configuration database restore.</td><td>
1. Login to SOAM GUI via VIP address.
2. Navigate to SOAM GUI [Main Menu: Status & Manage → Database] screen.
3. Click on the 'Info' tab to verify that database restore has completed successfully.
Restore on tks5031302 status MAINT_CMD_SUCCESS. Success
</td></tr>
<tr><td>5. ☐</td><td>*** IMPORTANT ***
If the "Force Restore" option WAS NOT used in Step 3 of this procedure, then SKIP to Step 15 at this time.
If the "Force Restore" option WAS used in Step 3 of this procedure, then continue forward beginning with this step (Step 5) to correct the SS7 configuration data.</td><td>
1. Identify the hostname of the Active SOAM server
Active SOAM (Hostname) = _____
2. SSH to the CLI of the Active SOAM server via the SOAM VIP address and login as the "admusr" user.
3. Become the "root" user.
$ sudo su –
#
</td></tr>
<tr><td>6. ☐</td><td>Identify the Network Element ID (NE_ID))of the Active SOAM server and record the value.</td><td>
1. Find the Network Element ID of the Active SOAM server:
Syntax:
iqt -z -f_h_NE_ID Server where "Hostname='<<i>SOAM_Hostname</i>>'"
Example:
iqt -z -f_h_NE_ID Server where "Hostname='exhrSO-carync-a'"
_h_NE_ID
4
#
2. Record the Network Element ID (NE_ID) of the Active SOAM server in the space provided.
<table><tr><th>NE_ID (SOAM site)</th></tr><tr><td></td></tr></table>
</td></tr>
</table>

Appendix A. Restoring SOAM Configuration Data (SS7 Config) from Backup File

<table>
<tr><th>Step</th><th>Instruction</th><th>Procedure</th></tr>
<tr><td>7. ☐</td><td>Identify all MP server hostnames and Server IDs (Server_ID) associated to the Network Element and record the values.</td><td>
1. Identify MP servers associated to the Network Element ID:
<u>Syntax:</u>
iqt -z -fHostname -f_h_Server_ID Server where "_h_NE_ID=<<i>NE_ID</i>> and Role='MP'"
<u>Example:</u>
iqt -z -fHostname -f_h_Server_ID Server where "_h_NE_ID=4 and Role='MP'"
Hostname _h_Server_ID
mp1-carync 8
mp2-carync 9
#
2. Complete the “Hostname” and “Server ID” columns for each MP server in Table 2: MP Configuration Data:
Table 2: MP Configuration Data
<table>
<tr><th>Server</th><th>Hostname</th><th>Server_ID</th><th>SG_ID</th><th>LSP_ID</th></tr>
<tr><td>Example</td><td>mp1-carync</td><td>8</td><td>125</td><td>0</td></tr>
<tr><td>MP 1</td><td></td><td></td><td></td><td></td></tr>
<tr><td>MP 2</td><td></td><td></td><td></td><td></td></tr>
<tr><td>MP 3</td><td></td><td></td><td></td><td></td></tr>
<tr><td>MP 4</td><td></td><td></td><td></td><td></td></tr>
<tr><td>MP 5</td><td></td><td></td><td></td><td></td></tr>
<tr><td>MP 6</td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>8. ☐</td><td>Find the Server Group ID (SG_ID) for each MP server and record the values.</td><td>
1. Repeat the command below for each MP “Server ID” recorded in Table 2: MP Configuration Data to identify its MP Server Group ID (SG_ID):
<u>Syntax:</u>
iqt -z -f_h_SG_ID Server2SG where "_h_Server_ID=<<i>MP_Server_ID</i>>"
<u>Example:</u>
iqt -z -f_h_SG_ID Server2SG where "_h_Server_ID=8"
_h_SG_ID
125
#
2. Complete the “SG_ID” column in Table 2: MP Configuration Data for each MP server on the SOAM site.
</td></tr>
<tr><td>9. ☐</td><td>Find the Local Signaling Point ID (LSP_ID) for each configured MP server and record the values.</td><td>
1. Identify the (LSP_ID) each configured MP:
<u>Example:</u>
iqt -z -fLSP_Name -f_h_LSP_ID LocalSP
LSP_Name _h_LSP_ID
so1_mp1 0
#
2. Complete the “LSP_ID” column in Table 2: MP Configuration Data for each configured MP server.
</td></tr>
</table>

Appendix A. Restoring SOAM Configuration Data (SS7 Config) from Backup File

Step	Instruction	Procedure

10. ☐	Identify the current **SG_ID** values associated with each **MP** in the **LSP2SG** table.	**1.** Execute the command below to verify that each **MP LSP_ID** is associated with the correct **MP** Server Group ID **(SG_ID)**:
		Example:
		`# iqt LSP2SG`
		`_h_LSP_ID _h_SG_ID`
		`0 125`
		#

11.	Verify that Local Signaling Point code **(LSP)** assigned to **MP** has the correct **Server ID**. **NOTE:** *The **"ivi"** table editor responds to the same commands as the **"vi"** Editor in Linux.*	• If all **"_h_SG_ID"** values in the **"LSP2SG"** table **MATCH** the values recorded in the **"SG_ID"** column of Table 2: MP Configuration Data, then **SKIP** to the next step. • If any **"_h_SG_ID"** values in the **"LSP2SG"** table **DO NOT MATCH** the values recorded in the **"SG_ID"** column of Table 2: MP Configuration Data, use the **"ivi"** table editor to manually correct the **"_h_SG_ID"** field as shown below. `# ivi LSP2SG`

12. ☐	Identify the current **Server_ID** values associated with each **MP** in the **"Transports"** table.	Execute the command below verify that the value for the **"_h_Server_ID"** field matches the value for the **"Server_ID"** column recorded in Table 2: MP Configuration Data:
		Example:
		`# iqt -z -fTransport_Name -f_h_Server_ID Transports`
		`Transport_Name _h_Server_ID`
		`so1_mp1_eth2_to_top_eagle_1101a 8`
		`so1_mp1_eth4_to_bot_eagle_1102a 8`

13. ☐	Verify that transports hosted on this **MP** server have the correct **Server ID**. **NOTE:** *The **"ivi"** table editor responds to the same commands as the **"vi"** Editor in Linux.*	• If all **"_h_Server_ID"** values in the **"Transports"** table **MATCH** the values recorded in the **"Server_ID"** column of Table 2: MP Configuration Data, then **SKIP** to the next step. • If any **"_h_Server_ID"** values in the **"Transports"** table **DO NOT MATCH** the values recorded in the **"Server_ID"** column of Table 2: MP Configuration Data, use the **"ivi"** table editor to manually correct the **"_h_Server_ID"** field as shown below. `# ivi Transports`

Appendix A. Restoring SOAM Configuration Data (SS7 Config) from Backup File

Step	Instruction	Procedure
14. ☐	Login to **SOAM GUI** and execute the **Backup** of SS7/Transport **Configuration** database.	**1.** Log into **SOAM GUI** via the **VIP** address. **2.** Navigate to **SOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **3.** Select the **Active SOAM** server. **4.** Click on **"Backup…"** button, the **"Database Backup"** screen appears **5.** Verify that only the "Configuration" Checkbox is CHECKED. **6.** For the "Compression" field, select "none". **7.** Enter a comment in the **"Comment"** field to identify the backup file. **8.** Click on **"Ok"** button. **9.** Periodically refresh the screen clicking on the **[Main Menu: Status & Manage → Database]** menu option. **10.** Click on the **"Info"** tab and verify that the **Configuration Backup** completed successfully *(Status: MAINT_CMD_SUCCESS)* **11.** Navigate to **SOAM** GUI **[Main Menu: Status & Manage → Files]** screen. **12.** Under the **Active SOAM** server tab, select the newly created **Configuration Backup** file. **13.** Click **"Download"** button. **14.** Click the **"Save As"** button on the pop-up window to save the **Configuration Backup** file to your local workstation hard disk. **15.** Place the **Configuration Backup** file in a secure location.
15. ☐	**"Allow Replication"** to the **SOAM** servers within the **SOAM site.**	**1.** Login to **NOAM GUI** via the **VIP** address. **2.** Navigate to **NOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **3.** Select the **"Active" SOAM"** server within the **SOAM site** and click the **"Allow Replication"** button. **4.** Select the **"Standby" SOAM"** server within the **SOAM site** and click the **"Allow Replication"** button. **5.** Verify that the **"DB Level"** populates for each SOAM server (**NOTE:** *A refresh of the **Main Menu: Status & Manage → Database]** screen may be required to see the updated status)*.
16. ☐	**"Allow Replication"** to the **MP** servers within the **SOAM site**.	**1.** *Navigate* to **NOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **2.** *Select* the **1st MP** server within the **SOAM site** and click **"Allow replication"** button. **3.** *Verify* the functionality of **1st MP** server and decide whether or not it is safe to roll out the restored data to all MP servers. **4.** If the decision is made to move forward, select the remaining MP servers within the **SOAM site and** click the **"Allow Replication"** button for each.
17. ☐	**"Enable Site Provisioning"** on SOAM site.	**1.** Log in to **SOAM GUI** via the **VIP** address. **2.** *Navigate* to **SOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **3.** *Click* **"Enable Site Provisioning"** button.
18. ☐	Adjust the **"Max Allowed HA Role"** for the **"Standby" SOAM** server within the **SOAM site.**	**1.** *Login* to the **NOAM GUI** via the **VIP** address. **2.** *Navigate* to the **NOAM** GUI **[Main Menu: Status & Manage → HA]** screen. **3.** *Click* **"Edit"** button **4.** *For* the **"Standby" SOAM** server within the **SOAM site**, change the **"Max Allowed HA Role"** from **"Standby"** to **"Active"**. **5.** *Click* the **"OK"** button.

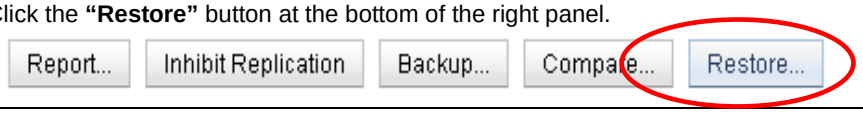
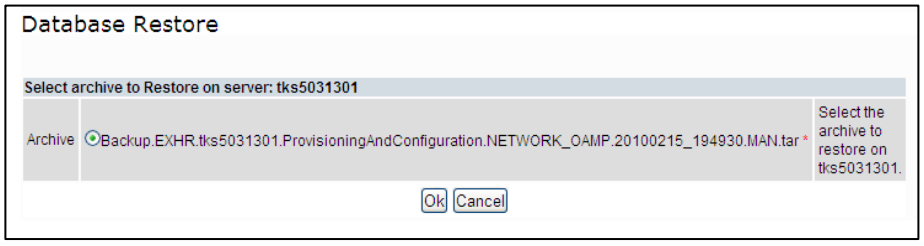
Appendix A. Restoring SOAM Configuration Data (SS7 Config) from Backup File

Step	Instruction	Procedure
19. ☐	If Signaling traffic **WAS** diverted away from the MP servers in **Step 1** of this procedure, then **Restart** each **MP** server at is time. If Signaling traffic **WAS NOT** diverted in **Step 1** of this procedure, then SKIP the remainder of this procedure.	**1.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → Server]** screen. **2.** Select the **1st MP** server. **3.** Click **"Restart"** button. **4.** **Repeat** this step for each remaining **MP server** within the **SOAM site.**
20. ☐	Restore Signaling traffic back to the MP.	If traffic was diverted from the MP servers prior to executing this procedure, follow Appendix D. Restoring Signaling Traffic to the MP and restore traffic to the replacement MP.
THIS PROCEDURE HAS BEEN COMPLETED		

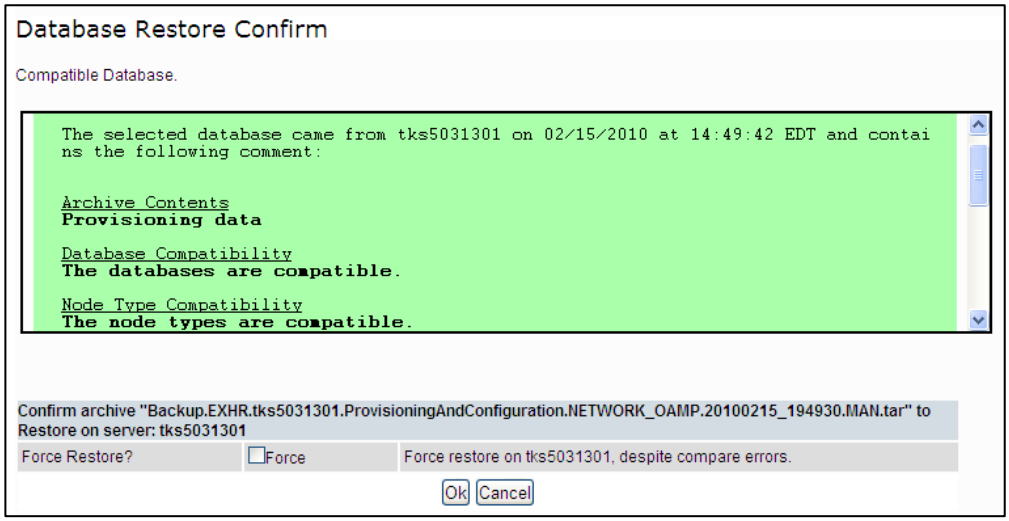
APPENDIX B. RESTORING NOAM PROVISIONING DATABASE FROM BACKUP

Use these instructions to restore NOAM Provisioning Database (PDB) at HLRR system. The Provisioning Database consists of DNs, IMSIs and Network Entities configured via PDBI and/or NOAM GUI.

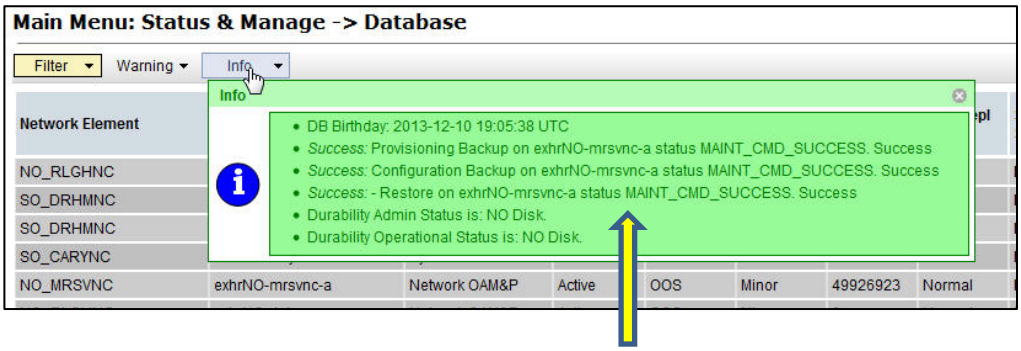
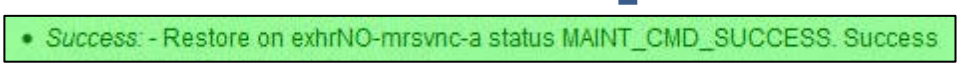
Appendix B. Restoring NOAM Provisioning Database from Backup

Step	Instruction	Procedure
1. ☐	Identify the **hostname** of **Active NOAM** server.	Identify the **Active NOAM** server: **Hostname:** _____
2. ☐	***(OPTIONAL)*** If the **Provisioning Database Backup file** to be restored has been stored in a remote location, **copy** the backup file to the **Active NOAM** server. If a Backup file is already present in the **"/var/TKLC/db/filemgmt/backup/"** directory on **Active NOAM** server, then **SKIP** to the next step.	**1.** Identify the Provisioning Database Backup file to be restored (file should be in uncompressed format). **2.** Use **scp** or **sftp** to copy the **Provisioning Database** Backup file to the **"/var/TKLC/db/filemgmt/backup/"** directory on **Active NOAM** server.
3. ☐	Under the **Status & Manage → Database** screen, select the **Active NOAM** server and click the **"Restore"** button.	**1.** Login to **NOAM GUI** via the **VIP** address. **2.** Using the GUI banner, verify that the **Active NOAM** server: **Hostname:** _____ **3.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **4.** Using the cursor, select the row containing the **Active NOAM** server *(the server should now be highlighted in **GREEN**)*. **5.** Click the **"Restore"** button at the bottom of the right panel. 
4. ☐	Select the **Provisioning Backup** file to be Restored.	Select the desired Provisioning Backup file and click the **"OK"** button. 

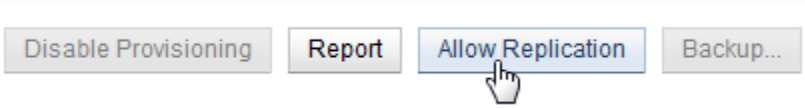
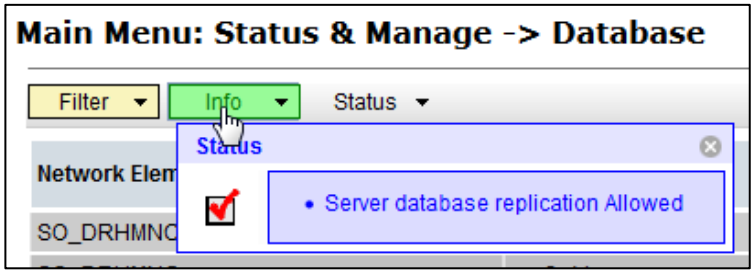
Appendix B. Restoring NOAM Provisioning Database from Backup

Step	Instruction	Procedure
5. ☐	Execute a **Restore** of the **Provisioning Database**.	The GUI will display compatibility information.  • If databases are **NOT COMPATIBLE**, **STOP** and contact "My Oracle Support" (MOS) for assistance **BEFORE** selecting a **"Force"** option. *Refer to* Appendix G. Accessing My Oracle Support (MOS) *for more information on contacting Oracle Customer Service.* • If the databases are **COMPATIBLE**, click **"OK"** button to continue with database restoration.
6. ☐	The **Database Restore** may take several minutes to complete and is marked by several conditions. **!!! IMPORTANT !!!** **WAIT AT LEAST 5 MINUTES BEFORE CONTINUING TO THE NEXT STEP.**	During database restoration, the following conditions will occur: • An **HA Switchover** will occur at the NOAM. • The user will be **logged out** of the NOAM GUI. • External Provisioning clients will be disconnected. • The PDBI Interface will be disabled. • **Replication** will be **disabled** throughout the topology. • (e.g., NOAM ←→ SOAM, SOAM ←→ DP)

Appendix B. Restoring NOAM Provisioning Database from Backup

Step	Instruction	Procedure
7. ☐	Verify that the **Provisioning Database Restore** has completed successfully and restart **PDBI Provisioning**.	**1.** Login to **NOAM GUI** via the **VIP** address. **2.** Using the GUI banner, verify that the **Active NOAM** server is the same as the one recorded in **Step 3** of this procedure. **3.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **4.** Click on the **"Info"** tab in the banner and verify that the **Restore** of the **Provisioning Database** has completed successfully.   **NOTE:** If the status of the **Restore** shows that it is still **"MAINT_IN_PROGRESS"**, periodically repeat **Step 7, sub-steps 2-4** to refresh the status. **!!! WARNING !!!** **DO NOT CONTINUE WITH THE NEXT STEP UNTIL A STATUS OF "MAINT_CMD_SUCCESS" IS RECEIVED.**
8. ☐	Re-enable **Global Provisioning**.	**1.** Click **"Enable Provisioning"** button in the bottom of the right panel to re-enable **Global Provisioning**.  **2.** External Provisioning clients may now reconnect via **PDBI** and start provisioning new updates to the database.

Appendix B. Restoring NOAM Provisioning Database from Backup

Step	Instruction	Procedure
9. ☐	**"Allow Replication"** for the **Primary NOAM** servers and the **Primary Query Server**.	**1.** Click the **"Filter"** tab in the banner. **2.** In the **"Scope:"** field pull-down, select the **Primary NOAM Network Element**. **3.** Click the **"Go"** dialogue button. **4.** Using the cursor, select the row containing the **Active Primary NOAM** server *(the server should now be highlighted in **GREEN**)*. **5.** Click the **"Allow Replication"** button at the bottom of the right panel.  **6.** Verify under the **"Info"** tab in the banner that database replication is **"Allowed"**.  **7.** Click the **"Filter"** tab in the banner. **8.** In the **"Scope:"** field pull-down, select the **Primary NOAM Network Element**. **9.** Click the **"Go"** dialogue button. **10.** Hold down the **[CTRL]** key and use the cursor to **multi-select** the rows containing the **Standby Primary NOAM** and the **Primary Query Server**. *(the servers should now be highlighted in **GREEN**)*. **11.** Click the **"Allow Replication"** button at the bottom of the right panel. **12.** Verify under the **"Info"** tab in the banner that database replication is **"Allowed"**.
10. ☐	Adjust the **"Max Allowed HA Role"** for the **"Standby" Primary NOAM** server.	**1.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → HA]** screen. **2.** Click **"Edit"** button **3.** For the **"Standby" Primary NOAM** server, change the **"Max Allowed HA Role"** from **"Standby"** to **"Active"**. **4.** Click the **"OK"** button
11. ☐	**"Allow Replication"** for the **DR NOAM** servers and the **DR Query Server**.	**1.** Navigate to the **NOAM** GUI **[Main Menu: Status & Manage → Database]** screen. **2.** Click the **"Filter"** tab in the banner. **3.** In the **"Scope:"** field pull-down, select the **DR NOAM Network Element**. **4.** Click the **"Go"** dialogue button. **5.** Using the cursor, select the row containing the **Active DR NOAM** server *(the server should now be highlighted in **GREEN**)*. **6.** Click the **"Allow Replication"** button at the bottom of the right panel. **7.** Verify under the **"Info"** tab in the banner that database replication is **"Allowed"**. **8.** Click the **"Filter"** tab in the banner. **9.** In the **"Scope:"** field pull-down, select the **DR NOAM Network Element**. **10.** Click the **"Go"** dialogue button. **11.** Hold down the **[CTRL]** key and use the cursor to **multi-select** the rows containing the **Standby DR NOAM** and the **DR Query Server**. *(the servers should now be highlighted in **GREEN**)*. **12.** Click the **"Allow Replication"** button at the bottom of the right panel. **13.** Verify under the **"Info"** tab in the banner that database replication is **"Allowed"**.

Appendix B. Restoring NOAM Provisioning Database from Backup

Step	Instruction	Procedure
12. ☐	**"Allow Replication"** for the 1st **SOAM** site.	**1.** Click the **"Filter"** tab in the banner. **2.** In the **"Scope:"** field pull-down, select the **SOAM Network Element**. **3.** Click the **"Go"** dialogue button. **4.** Using the cursor, select the row containing the **Active SOAM** server *(the server should now be highlighted in **GREEN**)*. **5.** Click the **"Allow Replication"** button at the bottom of the right panel. **6.** Verify under the **"Info"** tab in the banner that database replication is **"Allowed"**. **7.** Click the **"Filter"** tab in the banner. **8.** In the **"Scope:"** field pull-down, select the **SOAM Network Element**. **9.** Click the **"Go"** dialogue button. **10.** Hold down the **[CTRL]** key and use the cursor to **multi-select** the rows containing the **Standby SOAM** and all **MP** servers associated with the SOAM site *(the servers should now be highlighted in **GREEN**)*. **11.** Click the **"Allow Replication"** button at the bottom of the right panel. **12.** Verify under the **"Info"** tab in the banner that database replication is **"Allowed"**.
13. ☐	**"Allow Replication"** for the remaining **SOAM** sites.	• **Repeat** the previous step for each remaining **SOAM** site.
THIS PROCEDURE HAS BEEN COMPLETED		

APPENDIX C. DIVERTING SIGNALING TRAFFIC AWAY FROM THE MP

When doing maintenance activity on affected MP server, it is recommended to divert the signaling traffic away from the affected MP server until the maintenance activity is complete. This is to eliminate traffic loss at the affected MP server.

Appendix C. Diverting Signaling Traffic away from the MP

Step	Instruction	Procedure
1. ☐	Identify the **hostname** of the affected **MP server(s)**.	Identify the hostname of the affected **MP** server(s): **MP Hostname:**_____
2. ☐	Determine **True Point Code (TPC)** and **Capability Point Code (CPC)** of the affected **MP server.**	1. Login to the **SOAM GUI** via the **VIP** address for the **SOAM site**. 2. Navigate to the **SOAM** GUI page **[Main Menu: Configuration → Server Groups]** screen and determine the **MP Server Group** name. 3. Navigate to the **SOAM** GUI **[Main Menu: SS7/Sigtran → Configuration → Local Signaling Points]** screen and determine the **True Point Code (TPC)** and **Capability Point Code (CPC)** for the **MP Server Group**: **MP Server Group TPC:** _____ **MP Server Group CPC:** _____
3. ☐	Identify **Eagle STPs** that are connected to the affected **MP server**, and determine their **Point Codes**.	1. Navigate to the **SOAM** GUI **[Main Menu: Transport Manager → Configuration → Transport]** screen. 2. Set the **Filter** to the **MP hostname**, and determine **"Adjacent Node"** names of the **Eagle STPs**. 3. Cross reference the **"Adjacent Node"** names of Eagle STPs with the **[Main Menu: SS7/Sigtran → Configuration → Adjacent Server Groups]** screen and determine the **"Adjacent Server Group"** names of Eagle STP. 4. Cross reference the **"Adjacent Server Group"** name with the **[Main Menu: SS7/Sigtran → Configuration → Remote Signaling Points]** screen and determine the **MTP Point Codes** of the **Eagle STPs** connected to the **MP server**: **Eagle STP-1 MTP Point Code:** _____ **Eagle STP-2 MTP Point Code :** _____
4. ☐	Divert **Signaling traffic** away from the affected **MP server** at the **Eagle STP**. **NOTE:** *For more info on Eagle commands, please refer to the* ***"Eagle STP Commands Manual"*** **[7].**	The signaling traffic to the affected MP server can be restored in 2 steps: 1. Connect to the **terminal** of the **"local" Eagle STP** connected to the affected **MP server.** 2. Increase the **"relative cost"** (to the pre-maintenance value) for the **linkset** to the MP server **True Point Code (TPC)** for routing to the MP server **Capability Point Code (CPC)** by issuing this command on Eagle STP terminal: **chg-rte** 3. **Wait for ~30 seconds** and then **Disable** the link going to MP server **True Point Code (TPC)** by issuing this command on Eagle STP terminal: **act-slk** 4. Repeat **Step 4** of this procedure for the **"remote" Eagle STP** connected to the affected **MP server.**
THIS PROCEDURE HAS BEEN COMPLETED		

APPENDIX D. RESTORING SIGNALING TRAFFIC TO THE MP

After the maintenance activity on the affected MP server is completed, the signaling traffic can be brought back to the affected MP server by using the following steps.

Appendix D. Restoring Signaling Traffic to the MP

Step	Instruction	Procedure
1. ☐	Identify the **hostname** of the affected **MP server(s)**.	Identify the hostname of the affected **MP** server(s): **MP Hostname :**_____
2. ☐	Determine **True Point Code (TPC)** and **Capability Point Code (CPC)** of the affected **MP server.**	1. Login to the **SOAM GUI** via the **VIP** address for the **SOAM site**. 2. Navigate to the **SOAM** GUI page **[Main Menu: Configuration → Server Groups]** screen and determine the **MP Server Group** name. 3. Navigate to the **SOAM** GUI **[Main Menu: SS7/Sigtran → Configuration → Local Signaling Points]** screen and determine the **True Point Code (TPC)** and **Capability Point Code (CPC)** for the **MP Server Group**: **MP Server Group TPC:** _____ **MP Server Group CPC:** _____
3. ☐	Identify **Eagle STPs** that are connected to the affected **MP server**, and determine their **Point Codes**.	1. Navigate to the **SOAM** GUI **[Main Menu: Transport Manager → Configuration → Transport]** screen. 2. Set the **Filter** to the **MP hostname**, and determine **"Adjacent Node"** names of the **Eagle STPs**. 3. Cross reference the **"Adjacent Node"** names of Eagle STPs with the **[Main Menu: SS7/Sigtran → Configuration → Adjacent Server Groups]** screen and determine the **"Adjacent Server Group"** names of Eagle STP. 4. Cross reference the **"Adjacent Server Group"** name with the **[Main Menu: SS7/Sigtran → Configuration → Remote Signaling Points]** screen and determine the **MTP Point Codes** of the **Eagle STPs** connected to the **MP server**: **Eagle STP-1 MTP Point Code:** _____ **Eagle STP-2 MTP Point Code :** _____
4. ☐	Bring **Signaling traffic** back to the affected **MP server** at the **Eagle STP**. **NOTE:** *For more info on Eagle commands, please refer to the **"Eagle STP Commands Manual"*** **[7].**	The signaling traffic to the affected MP server can be restored in 2 steps: 1. Connect to the **terminal** of the **"local" Eagle STP** connected to the affected **MP server.** 2. Reduce the **"relative cost"** (to the pre-maintenance value) for the **linkset** to the MP server **True Point Code (TPC)** for routing to the MP server **Capability Point Code (CPC)** by issuing this command on Eagle STP terminal: **chg-rte** 3. **Wait for ~30 seconds** and then **Enable** the link going to MP server **True Point Code (TPC)** by issuing this command on Eagle STP terminal: **act-slk** 4. Repeat **Step 4** of this procedure for the **"remote" Eagle STP** connected to the affected **MP server.**
THIS PROCEDURE HAS BEEN COMPLETED		

APPENDIX E. ADDING A TEMPORARY EXTERNAL IP ADDRESS FOR REMOTE SERVER ACCESS

This procedure creates a temporary external IP address that will be used for remote OAM server access during Disaster Recovery.

This procedure assumes that the user has access to the OAM Server RMM and can access an external (XMI) network at the

customer site.

Appendix E. Adding A Temporary External IP Address for Remote Server Access

Step	Instruction	Procedure
1. ☐	Log into the OAM Server **RMM**.	Execute **Appendix B** *(Accessing the RMM VGA Redirection Window)* as detailed in Reference **[1]**.

2. ☐	Through the **RMM VGA window**, log into the Server as the **"root"** user.	`CentOS release 5.6 (Final)`
		`Kernel 2.6.18-238.19.1.el5prerel5.0.0_72.22.0 on an x86_64`
		
		`hostname1260476221 login: root`
		`Password: <root_password>`

3. ☐	**Delete** Ethernet Interface **eth04**.	`# netAdm delete --device=eth04` `Interface eth04 removed`
4. ☐	Add the **XMI IP address** to the server **eth04** interface.	`# netAdm add --device=eth04 --onboot=yes --netmask=<XMI_netmask> --address=<XMI_IP_address>` `Interface eth04 updated`
5. ☐	Add a **default route** for the **eth04** interface.	`# netAdm add --device=eth04 --route=default --gateway=<XMI_Gateway>` `Route to eth04 added`
6. ☐	**"ping"** the **default gateway** to ensure connectivity.	`# ping –c 10 <XMI_Gateway>`
7. ☐	Log out of the **RMM**.	`# exit`
THIS PROCEDURE HAS BEEN COMPLETED		

APPENDIX F. HANDLING ERRORS IN "SWITCHCONFIG" SCRIPT

Follow these instructions if errors are encountered with the *switchconfig* script excuted in Step 27 of Procedure 9 or Procedure 10 of the Disaster Recovery procedure.

The possible reasons for the errors are:

- Missing */etc/hosts* entries for the Telco switches.
- Difference in the software version of the Telco switch (#show ver) and the image being uploaded (# ls/var/TKLC/switchconfig/*.bin)

Perform the following procedure to handle the errors:

Appendix F. Handling Errors in switchconfig Script

Step	Instruction	Procedure
1. ☐	Restore the iptables configuration *(firewall)* to its original state.	`/usr/TKLC/plat/sbin/prepswconf --clean`
2. ☐	Verify that **bond1** now contains the **eth01** network interface only.	`cat /sys/class/net/bond1/bonding/slaves`

3. ☐	Login as root user for switch1A and 1B and execute these commands.	**For Switch 1A:**
		`# delHost --alias=switch1A`
		`# addHost --force --alias=switch1A --ip=169.254.1.1`
		For Switch 1B:
		`# delHost --alias=switch1B`
		`# addHost --force --alias=switch1B --ip=169.254.1.2`

4.	Import new switchconfig file to '/tmp/'.
	New 'switchconfig' file will be provided by Oracle TAC. Contact **"My Oracle Support" (MOS)** for assistance (Refer Appendix G. Accessing My Oracle Support (MOS))
		`# mv usr/TKLC/plat/sbin/switchconfig usr/TKLC/plat/sbin/switchconfig_orig`
		`# mv /tmp/switchconfig /usr/TKLC/plat/sbin/`
		`# chown root:root /usr/TKLC/plat/sbin/switchconfig`
		`# chmod 740 /usr/TKLC/plat/sbin/switchconfig`
		`# dos2unix /usr/TKLC/plat/sbin/switchconfig`
		`# ls -lh /usr/TKLC/plat/sbin/switchconfig`
		`-rwxr----- 1 root root 137K Aug 15 10:50 /usr/TKLC/plat/sbin/switchconfig`
		`# cat /usr/TKLC/plat/sbin/switchconfig |wc -l`
		`3533`
		`# cat /usr/TKLC/plat/sbin/switchconfig_orig |wc -l`
		`3526`
		`# md5sum /usr/TKLC/plat/sbin/switchconfig`
		`7df282c4957254cf547fca516084a682 /usr/TKLC/plat/sbin/switchconfig`

5. ☐	Continue with step 26 of Procedure 9 and Procedure 10 for switch 1A and 1B respectively.	`# /usr/TKLC/plat/sbin/prepswconf --prepare`

Appendix F. Handling Errors in switchconfig Script

THIS PROCEDURE HAS BEEN COMPLETED

APPENDIX G. ACCESSING MY ORACLE SUPPORT (MOS)

My Oracle Support

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*. When calling, there are multiple layers of menus selections. Make the selections in the sequence shown below on the Support telephone menu:

1. For the first set of menu options, select 2, "New Service Request". You will hear another set of menu options.
2. In this set of menu options, select 3, "Hardware, Networking and Solaris Operating System Support". A third set of menu options begins.
3. In the third set of options, select 2, "Non-technical issue". Then you will be connected to a live agent who can assist you with MOS registration and provide Support Identifiers. Simply mention you are a Tekelec Customer new to MOS.

MOS is available 24 hours a day, 7 days a week, 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 Site

Oracle 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 OHC site at http://docs.oracle.com.

2. Click **Industries**.
3. Under the Oracle Communications subheading, click the **Oracle Communications documentation** link.
4. The Communications Documentation page appears. Most products covered by these documentation sets will appear under the headings “Network Session Delivery and Control Infrastructure” or “Platforms.”
5. Click the Product and then the Release Number. A list of the entire documentation set for the selected product and release appears.
6. 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.