

**Oracle® Communications
EAGLE Element Management System**

Install/Upgrade Guide

Release 46.6

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ORACLE®

Oracle Communications EAGLE Element Management System Install/Upgrade Guide, Release 46.6

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Before beginning this procedure, contact My Oracle Support and inform them of your upgrade plans. Refer to Appendix T for instructions on accessing My Oracle Support.

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1.0 INTRODUCTION

Release 46.6 of Oracle® Communications EAGLE Element Management System (hereafter referred to as “OCEEMS”) is a major release of OCEEMS product after the release 46.5. Existing customers, who are at release 46.3 or 46.5 can upgrade to release 46.6. Additionally, customers can also directly install release 46.6 on their systems.

Release 46.6 of OCEEMS has fixes for many must-fix bugs and implemented enhancements like various enhancements in Security Administration and adding the feature of LDAP based authentication on OCEEMS and also the EAGLE OCEEMS decoupling feature which will now make OCEEMS releases independent of EAGLE release and now OCEEMS can be made compatible with any EAGLE release. The support for EAGLE SLICv2 card has also been added.

1.1 PURPOSE AND SCOPE

This document is a reference for the installation and upgrade procedure of release 46.6 of OCEEMS. The target audience are those Oracle employees and agents involved with the installation and upgrade of OCEEMS product along with the customers who will use OCEEMS to manage EAGLE(s), EPAP and LSMS in their network.

1.2 References

1.2.1 External

- [1] <http://dev.mysql.com/doc/refman/5.6/en/upgrading.html>
- [2] <http://dev.mysql.com/doc/refman/5.6/en/replication-compatibility.html>

1.2.2 Internal

- [3] OCEEMS Reporting Studio 46.6 Install/Upgrade Guide
- [4] OCEEMS 46.5 Install/Upgrade Guide

1.3 Acronyms

Acronym	Description
EPAP	EAGLE Provisioning Application Processor
LSMS	Local Service Management System
OCEEMS	Oracle® Communications EAGLE Element Management System
RPM	Red Hat Package Manager. OCEEMS software shall be delivered in form of RPM packages.

Table 1: Acronyms

Term	Definition
Backup	Generation of a copy of the existing configuration files, database tables and other data which can be used later to bring the OCEEMS system to the previous configured state
Primary server	In a failover setup, the OCEEMS server which has the OCEEMS processes up and to which a user can connect through a client
Restore	Using a previously generated copy of backup, to bring the OCEEMS system back to a state when the backup was generated
Standalone server	A single OCEEMS server with no support for failover
Standby server	In a failover setup, an OCEEMS server that monitors the state of primary server and has no OCEEMS processes up. It becomes the primary server on detecting a shutdown of primary server.

Table 2: Definition of terms

1.4 OCEEMS Server Requirements

Before moving ahead with the installation/upgrade, make sure all the pre-requisite mentioned in this section are met. Specially make sure the following items are incorporated in the server before you move ahead with the installation/upgrade.

- All rpm packages mentioned in this section are installed
- JAVA_HOME is set as is mentioned in [Java Runtime](#) below
- A compatible browser is available with java enabled as mentioned in [OCEEMS Client Requirements](#) (Browser requirement)

These are some of the common mistakes people make during upgrade in a hurry. Go through the complete procedure mentioned in this section to minimize chances of failure/rework.

1.4.1 Hardware and Operating System

Note: OCEEMS is not an engineered system and ORACLE does not provide the Hardware or Operating System as a bundled package with OCEEMS. Both Hardware and Operating System (Oracle Linux) are owned and maintained by the customer. The customer installs and maintains the operating system. And the customer needs to download Oracle Linux OS from OSDC as explained in Appendix AC. Also, the customer should apply security patches time to time when the Operating System vendor comes with security updates.

Customers are responsible for installing/maintaining/upgrading Hardware and Operating System (Oracle Linux 7). They need to download the Oracle Linux OS from OSDC as explained in Appendix AC: Download Oracle linux from OSDC. Also, they should make sure to use the latest updates of Oracle Linux 7. The operating system updates need to be applied frequently.

Note: For any support on the Oracle Linux installation/upgrade/security patch updates, customers should contact Oracle Linux Support.

Release 46.6.4 of OCEEMS is tested on the following platforms and OS –

Virtual Machine (VM):

Following is the **minimum** configuration on which different types of OCEEMS have been successfully tested.

OCEEMS Configuration	Number of Element (Eagle/LSMS/EPAP) Managed	Logical Host CPUs	Memory (RAM)	Hard Disk
Small	4	2	8 GB	500GB
Medium	20	4	16 GB	500GB
Large	50	4	16 GB	500GB

Note: Different customers will have different loads from their managed System (Eagles). The above table is for reference only. VMs with the above resources have been tested with typical load explained below.

Following is the typical load and CPU usage observed in the lab:

OCEEMS Configuration	Number of Element (Eagle/LSMS/EPAP) managed	Measurement File Load	Alarm Load	CPU Usage	Memory Usage
Small	4	26 measurement files/hour	3600 Alarms/hour	<10%	5.4 GB used/ 2.6 GB free
Medium	20	26 measurement files/hour	10800 Alarms/hour	<10%	11 GB used/ 5 GB free
Large	50	26 measurement files/hour	10800 Alarms/hour	<10%	12 GB/ 4 GB free

Note:

Looking at the fact that the CPU usage is less than 10%, the increase of the measurement file load should be handled by the above configuration easily. As a thumb rule, if customers see the CPU usage shooting to 60% in their environment in a day to day operation, they should consider adding more CPUs to the VM as a precaution.

If customers are using Reporting Studio, it is advised to increase the CPU and memory as per their report size and database size, typically, double the resources if they are using Reporting Studio.

The following table lists the Oracle Linux and Java versions tested with the EMS releases:

EMS Release	Oracle Linux Version	Java Version
46.6.2	7.2	1.8.0-161 (64 bit)
46.6.4	7.8	1.8.0-261 (64 bit)

1.4.2 Disk Space and Open File Limit

The hard disk partition where OCEEMS is to be installed should have at least 500GB of space. In addition, limit for the no. of open files (ulimit -n) on the system should be configured to 65536. **All the harddisk space should be under one partition.**

Following is a typical disk space allocation on a Lab Server, which has 1200GB Hard disk space available. Note that 1.1 TB out of 1.2 TB is allocated to “/” partition.

```
[root@pc9091801 ~]# df -h
```

```
Filesystem    Size Used Avail Use% Mounted on
```

```

devtmpfs    126G  0 126G  0% /dev
tmpfs       126G  0 126G  0% /dev/shm
tmpfs       126G 2.1G 124G  2% /run
tmpfs       126G  0 126G  0% /sys/fs/cgroup
/dev/sda2   1.1T 127G 974G 12% /
tmpfs       26G  0 26G  0% /run/user/1007
/tmpfs      26G  0 26G  0% /run/user/1005
tmpfs       26G  0 26G  0% /run/user/0

```

Following is a typical disk space allocation on a Lab Machine, which has 500GB Hard disk space available. Note that 450GB out of 500GB is allocated to “/” partition.

```

[root@EMS ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        3.7G  0 3.7G  0% /dev
tmpfs           3.8G  0 3.8G  0% /dev/shm
tmpfs           3.8G 407M 3.4G 11% /run
tmpfs           3.8G  0 3.8G  0% /sys/fs/cgroup
/dev/mapper/ol-root 450G  35G 416G  8% /
/dev/mapper/ol-home 4.0G 726M 3.3G 18% /home
/dev/sda1       1014M 280M 735M 28% /boot
tmpfs           762M 1.2M 761M  1% /run/user/42

```

Note: If /tmp is mounted as separate partition make sure enough space is available in /tmp partition/directory.

1.4.3 Software Package Requirements

1.4.3.1 Pre-requisite packages

Following are some of the rpms/packages missing under Oracle Linux 7.8 and are required to be present in the server. Install these rpms before moving ahead with the installation of OCEEMS 46.6.

‘bc’ command is required while installation/upgrade of OCEEMS RPM. It might not be available on the system by default. Therefore, users are advised to verify its availability and install it (if not available) before proceeding with installation/upgrade of OCEEMS. This command can be installed by installing ‘bc’ package on the system (version of the package should be compatible with OS version).

‘lsof’ command is required by the OCEEMS Measurement module and should be installed on the system before OCEEMS is started. Therefore, users are advised to verify its availability and install it (if not available) before starting OCEEMS server.

‘libaio’ package is required under Oracle Linux 7.8. This package is required during OCEEMS installation.

‘unzip’ command must be installed as it is required during installation of i-net Clear Reports.

‘PHP’ package should be install on the system to use the EAGLE OCEEMS decoupling feature.

For LDAP authentication, a suitable LDAP client should be installed on the OCEEMS machine. A TLS connection should be tested with the LDAP server before enabling LDAP authentication from OCEEMS. As mentioned in FRS, for our

testing purpose we have used OpenLDAP server and client. For any other LDAP server, LDAP client should be configured on OCEEMS server and tested from command line before using LDAP Authentication on OCEEMS.

sssd package should also be installed on the OCEEMS server where the LDAP client must be configured. Steps to configure LDAP client are present in APPENDIX Z, APPENDIX Z.2 and APPENDIX Z.3.

Note: Without all these rpms in place, installation will fail. Make sure to install 64 bit version of the rpms as the Oracle Linux 7.8 is 64 bit.

1.4.3.2 Java Runtime

Note: The Java version in this section corresponds to EMS 46.6.4. For EMS 46.6.2, use Java version 1.8.0-161 (64 bit).

Oracle JRE 1.8.0_261 (64-bit) should be available on the system and JAVA_HOME should be set properly for running OCEEMS server. Please execute through Appendix R irrespective of JRE 1.8.0_261 is installed in the system or not.

Note: OCEEMS 46.6.4 is tested with JRE 1.8.0_261. It may not work properly with other Java versions (major or minor).

Note: OCEEMS 46.6.2 is tested with JRE 1.8.0_161. It may not work properly with other Java versions (major or minor).

1.4.3.3 TELNET/SSH

For connecting to network elements like EAGLE(s), EPAP(s) and LSMS(s), the SSH service should be running on the OCEEMS machine. SSH is required for securely connecting to EAGLE(s), EPAP(s) and LSMS(s). **For security reasons, it is recommended that all the network elements should communicate with OCEEMS over secure connections to enhance the security of the connection and to provide a level of protection for the transported data. Optional features for secure communication are available and highly recommended for interfacing to the EAGLE(s).**

The TELNET application client is required and utilized as part of the connection to both secure and non-secure EAGLEs, so it needs to be installed on the OCEEMS server along with the SSH service and SSH client before installation of OCEEMS. If the target OS is Oracle Linux then it by default has SSH service enabled, so only the TELNET application package installation should be required on the server.

1.4.3.4 FTP/SFTP

For receiving measurement data (CSV files) from EAGLEs, FTP/SFTP service should be running on the server. FTP is required for receiving measurement files from EAGLEs over non-secure connection and SFTP is required for receiving measurement files from EAGLE(s) over secure connection. **It is recommended that all the network elements should communicate with OCEEMS over secure connection, so use of FTP should be avoided as much as possible.** If the target OS is Oracle Linux then it by default supports SFTP, so only FTP package installation should be required on it (if required). In addition, in case the machine supports SFTP, then while configuring EAGLE for sending measurement data to OCEEMS using ent-ftp-serv command, the 'security' parameter must be turned 'on'.

1.4.3.5 Required Packages/Libraries

Package	EMS 46.6.3 is tested with the following versions	Comments
bc	1.06.95-13	
lsf	4.87-6	
libaio	0.3.109-13	
unzip	6.0-21	
php	5.4.16-48	Only required if we want to use the 'Decoupling EMS from Eagle' feature

php-xml	5.4.16-48	Only required if we want to use the 'Decoupling EMS from Eagle' feature
wget	1.14-18	Only required if we want to use the 'Decoupling EMS from Eagle' feature
php-posix (php-process)	5.4.16-48	Only required if we want to use the 'Decoupling EMS from Eagle' feature
libssh2 (extn for php)	1.6.0	Only required if we want to use the 'Decoupling EMS from Eagle' feature in SSH mode
ssh2 (extn for php)	0.12	Only required if we want to use the 'Decoupling EMS from Eagle' feature in SSH mode
openldap openldap-client	2.4.44-22	Only required if we want to use LDAP Authentication in OCEEMS
sssd sssd-ldap sssd-krb5-common sssd-nfs-idmap sssd-common sssd-ipa sssd-client sssd-ad sssd-proxy sssd-kcm sssd-common-pac sssd-krb5 python3-sssdconfig	1.16.5-10.0.1	Only required if we want to use LDAP Authentication in OCEEMS
Jdk (java) 1.8.161 only	1.8.161 (EMS 46.6.2)	
Jdk (java) 1.8.261 only	1.8.261 (EMS 46.6.4)	
openssh openssh-server openssh-clients	7.4p1-21.0.1	
telnet telnet-server	0.17-65	
vsftpd	3.0.2-27	
iptables iptables-services iptables-utils iptables-devel	1.4.21-35	

1.4.3.6 Download and installation of software packages

Note that the customer might not have the OCEEMS machine on a network that can access the Yum server to download the packages (and their dependencies) directly on the machine, so **it is advised that packages must be downloaded and installed manually.**

1.4.4 OCEEMS Licensing Requirements

A new OCEEMS license shall be required in the following cases –

1.4.4.1 Fresh Installation

A new OCEEMS license file shall be needed when the customer installs OCEEMS for the first time.

1.4.4.2 Feature Upgrade

A new OCEEMS license file shall be needed when a customer purchases some additional features for the currently installed release of OCEEMS. In this case, the license shall be of the same OCEEMS release that is currently installed on customer's system with the additionally purchased features enabled.

1.4.4.3 Software Release Upgrade

A new OCEEMS license file shall be needed when a customer upgrades OCEEMS to a new release of OCEEMS. In this case, the license required shall be of the OCEEMS release that customer wishes to upgrade to.

1.4.5 Directories created by OCEEMS

OCEEMS creates following directory structure on the system –

- /Tekelec/WebNMS – This is OCEEMS software installation directory.
- /var/E5-MS – This is the directory where OCEEMS application logs are created.
- /opt/E5-MS - This directory contains CMI and LUI modules script and result directories.
- FTP input directory for EAGLE's measurement files - In 46.3 and later releases, OCEEMS' dependence on 'root' user has been removed and now OCEEMS shall be run using a non-root user only (in case of fresh installation) or by a non-root/root user (in case of upgrade). Before 46.3, the ftp input path for measurement files from EAGLE was "/root/E5-MS/measurement/csvinput". In 46.3, the ftp input path for measurement files on OCEEMS machine, in case of OCEEMS being run by a non-root user, is "/opt/E5-MS/measurement/csvinput". Therefore, customers are advised the following –
 - In case of fresh installation of OCEEMS, customer shall configure ftp path "/opt/E5-MS/measurement/csvinput" on EAGLE.
 - In case of upgrade of OCEEMS –
 - When customer wishes to run OCEEMS with root user, no change is needed in the ftp path ("/root/E5-MS/measurement/csvinput") already configured on EAGLE.
 - When customer wishes to run OCEEMS with a non-root user, customer shall update the ftp path on EAGLE from its current value "/root/E5-MS/measurement/csvinput" to "/opt/E5-MS/measurement/csvinput".
- /var/upgrade - This is the backup directory used during OCEEMS upgrade.
- /var/backup - This directory contains OCEEMS manual and scheduled backups.

1.4.6 OCEEMS Password Requirements

1.4.6.1 System User for OCEEMS

OCEEMS stores the login credentials of the system user used for starting/stopping/configuration of OCEEMS in an encrypted format on disk. These credentials are needed for port forwarding mechanism while connecting to EAGLEs on SSH. Before release 46.3, OCEEMS used system user 'root' for this. In 46.3 and later releases, the dependence on 'root' user has been removed and OCEEMS can also be operated by a non-root system user. For installation/upgrade to 46.6, the login credentials of the non-root user used by the customer for OCEEMS operation must be updated for OCEEMS using the procedure given in section **APPENDIX G. PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS**

1.4.6.2 MySQL Root User Credentials

When OCEEMS is installed for the first time on a system, it is installed with a default password for MySQL's root user. Customers are advised to update the password as per their own choice. The procedure to update the password has been described in section **APPENDIX G. PROCEDURE TO UPDATE MYSQL ROOT USER'S PASSWORD**.

Note: OCEEMS users can change the MySQL Temporary directory from /tmp to user-defined directory by executing steps in **Appendix W. Change Temp Directory for Mysql**

1.4.7 Entries in Server's /etc/hosts File

OCEEMS system's hosts file (which is usually available in /etc directory) should have the entry for system's IP address and hostname. This is required for name resolution in DNS system. In case of failover-based setup, both primary and standby machines should have entries for both the systems' IP addresses and hostnames. For example, for a setup where primary server's IP and hostname are '10.248.10.21' and 'oceemspri' and standby server's IP and hostname are '10.248.10.22' and 'oceemssec', the entries in /etc/hosts file on both the machines should look like -

```
10.248.10.21 oceemspri
10.248.10.22 oceemssec
```

1.4.8 OCEEMS Machine to be Dual Stack for IPv6 Support

From OCEEMS R46.3 can support EPAP version 16.1 that comes with IPv6 support. A precondition for OCEEMS to support IPv6 enabled EPAP devices is that the machine on which OCEEMS is installed should be dual stack (that is should be able to communicate with other devices over both IPv4 and IPv6). For a failover based OCEEMS setup, both primary and standby servers must be dual stack.

1.4.9 OCEEMS Operations by non-root user

Before R46.3, only super user 'root' could perform OCEEMS operations like start/stop/restart of OCEEMS server and update of OCEEMS configuration files. R46.3 has added a feature wherein, in case of fresh installation, OCEEMS operations (start/stop/restart/configurational changes in files) shall be done by a non-root user and in case of upgrade, it shall be customer's choice to use root/non-root user for OCEEMS operations.

After fresh installation or upgrade (if the customer wants to use a non-root user for OCEEMS operations), the super user 'root' shall need to execute the 'updatePrivilegesForUser.sh' script. This script shall configure a non-root user, associate it to a group and provide required privileges to this user for OCEEMS operations. In addition, it shall also set the SNMP trap receiving port for OCEEMS in a way so that OCEEMS started by a non-root user can listen to it. Reading of Appendix I is suggested to understand this change in detail. The installation/upgrade procedures in this document have been updated to take care of this change. Two points that need more explanations have been discussed below in detail –

1.4.9.1 OCEEMS SNMP port for incoming device traps

The standard SNMP port 162 used by OCEEMS for receiving the traps coming from network devices is a reserved port that can only be used by processes started by 'root' user. A process started by a non-root user can only bind to an unreserved port in the range 1024-65535. In 46.3, OCEEMS, when started by a non-root user, shall not be able to bind to port 162 for receiving the incoming traps. To address this limitation, following options shall be available –

- **Updating device SNMP port to use an unreserved port value** – In this option, user shall need to change the SNMP port on all managed network devices (EAGLE, EPAP, LSMS) from standard value of 162 to a port in the range 1024-65535. User shall be required to change the trap port on all managed network devices before proceeding with OCEEMS installation/upgrade procedure. Then, while executing ‘updatePrivilegesForUser.sh’ script, user shall have the option to provide the SNMP port (in range 1024-65535) configured on network devices and the script shall store the port in ‘/Tekelec/WebNMS/conf/trapport.conf’ file for use in OCEEMS. OCEEMS shall then directly listen to the traps coming on the unreserved port value defined in trapport.conf file.
- **Use trap-forwarding mechanism on OCEEMS machine** – Alternatively, if a change in standard port value 162 is not desired at managed network devices, OCEEMS shall use a trap forwarding mechanism to forward all traps coming on port 162 on OCEEMS machine to a port in the range 1024-65535. For this, user shall be needed to provide an unreserved port value in the range 1024-65535 while executing ‘updatePrivilegesForUser.sh’ script. The default value for this shall be 64000 and user shall have the ability to provide any other unused port value from the unreserved port range. The script shall then store this port value in ‘/Tekelec/WebNMS/conf/trapport.conf’ file and create the trap forwarding mechanism on OCEEMS machine to forward all traps coming on reserved port 162 to the unreserved port entered by user and available in trapport.conf file. In this case, network devices shall continue sending traps to OCEEMS on port 162, which shall be forwarded by OS to an unreserved port defined in trapport.conf file, and OCEEMS shall listen to them on that unreserved port.

Note: For network devices added to OCEEMS over IPv4, iptables functionality provided by OS shall be used for forwarding traps coming on port 162 to an unreserved port. For network devices added to OCEEMS over IPv6 (EPAP version 16.1), ip6tables functionality provided by OS shall be used. Ip6tables can work only with kernel version 3.10. Therefore, in case user needs traps from IPv6 enabled EPAP (16.1) to come on port 162 and then used the trap forwarding mechanism, s/he must use kernel 3.10 or higher on the OS. If user cannot use the kernel version 3.10 or higher required for trap forwarding, then s/he shall be needed to use an unreserved SNMP port on IPv6 enabled EPAP so that OCEEMS can directly listen to traps coming on that port and trap forwarding is not required.

1.4.9.2 Changes needed in EAGLE configuration for FTP path and user

Before R46.3, OCEEMS expected the incoming measurement CSV files from EAGLE to arrive in directory ‘/root/E5-MS/measurement/csvinput’. However, in R46.3, when started with a non-root user, OCEEMS cannot make file operations in the above directory because it is owned by the ‘root’ user. To address this, the expected path of measurement files has been changed ‘/opt/E5-MS/measurement/csvinput’ in OCEEMS.

The same change shall be required at all the managed EAGLEs so that they start sending measurement files at the new path using the non-root user configured for OCEEMS. For this, the following command needs to be run on all the managed EAGLEs –

```
chg-ftp-serv:ipaddr=<IP address of OCEEMS machine>:app=meas:path="/opt/E5-MS/measurement/csvinput":login=<non-root user configured for OCEEMS>
```

When the above command asks for the password, provide the non-root user’s password. Sample output of the command is shown below -

```
> chg-ftp-serv:ipaddr=10.248.10.21:app=meas:path="/opt/E5-MS/measurement/csvinput":login=ems1

tekelecstp 16-05-05 17:13:31 MST EAGLE5 46.3.0.0.0-68.18.0
chg-ftp-serv:ipaddr=10.248.10.21:app=meas:path="/opt/E5-MS/measurement/csvinput":login=emsuser
Command entered at terminal #19.
```

;

Enter Password :

```
tekelecstp 16-05-05 17:19:30 MST EAGLE5 46.3.0.0.0-68.18.0
```

```
CHG-FTP-SERV: MASP B - Cannot access standby fixed disk.
```

```
CHG-FTP-SERV: MASP B - Simplex database update.
```

Command Accepted - Processing

```
CHG-FTP-SERV: MASP B - COMPLTD
```

;

Command Executed

1.4.10 Requirements for connection between Active and Standby systems

The connectivity speed between the Active and Standby server should not be less than 100 Mb/s. This is required to ensure that all the database and file sync between the server is properly done.

1.5 OCEEMS Client Requirements

OCEEMS client is a java based application client that is launched when a user clicks on the ‘Launch OCEEMS Client’ button on the OCEEMS login page opened in a web browser. Following are the requirements for launching OCEEMS client.

1.5.1 Web Browser Requirements

OCEEMS login page can be viewed using either of the following web browsers:

- Microsoft® Internet Explorer version 11.0 or later
- Mozilla Firefox® version 39.0 or later

Note: The web browser of choice should have pop-ups enabled.

1.5.2 Java Runtime Environment (JRE)

The machine where OCEEMS client is to be used should be having Java Runtime 1.8.0_261 (64 bit) installed and the browser of choice should have Java enabled.

Note: The Java version in this section corresponds to EMS 46.6.4. For EMS 46.6.2, use Java version 1.8.0-161 (64 bit).

1.5.3 Entries in Client Machine’s hosts File

For client machines to render EAGLE card graphics successfully in OCEEMS client and to be able to switchover from primary to standby server in case of failover, client machine's 'hosts' file should have the hostname and IP address entries of OCEEMS server(s). On Windows based client machine, the hosts file is present at 'C:\Windows\System32\drivers\etc' folder. The following entries should be done in client machine's hosts file -

- In case of standalone setup -

```
<OCEEMS SERVER IP>          <OCEEMS SERVER HOSTNAME>
```

e.g. In case the hostname of OCEEMS server is ‘oceans’ and IP address is ‘10.248.10.25’, then the following entry should be added in hosts file -

```
10.248.10.25          oceans
```

- In case of failover based setup -

```
<PRIMARY SERVER IP>        <PRIMARY SERVER HOSTNAME>
<STANDBY SERVER IP>       <STANDBY SERVER HOSTNAME>
```


e.g. In case the hostname of primary OCEEMS server is 'oceempri' and IP address is '10.248.10.25' and hostname of standby OCEEMS server is 'oceemssec' and IP address is '10.248.10.21', then the following entries should be added in hosts file -

```
10.248.10.25    oceempri
10.248.10.21    ceemssec
```

1.6 Reporting Studio Feature

Reporting Studio is an optional feature of OCEEMS that is provided as a separate ISO to customers and must be installed on the same machine where OCEEMS is installed. Installation/upgrade of Reporting Studio 46.6 should be done using document [3] after OCEEMS R46.6 has been installed/upgraded.

1.7 OCEEMS Installation/Upgrade Overview

1.7.1 Installation Phases for StandAlone OCEEMS Server

Note: This case is for first time installation of OCEEMS 46.6

Phase	Elapsed Time (Minutes)		Activity	Procedure
	This Step	Cummulative		
Pre-Requsite	30	30	Complete all the Pre-requisite mentioned in the section 1.4 - OCEEMS Server requirements and section 1.5 OCEEMS Client Requirements.	OCEEMS Server Requirements OCEEMS Client Requirements
Installation	60	90	Installation of OCEEMS and required configuration	Installation Procedure (Standalone Server)
Check OCEEMS Client GUI	5	95	Check OCEEMS Client GUI opens in a compatible browser.	Appendix Y

Table 3: Installation Phases for a StandAlone OCEEMS Servers

1.7.2 Installation Phases for FailOver Setup of OCEEMS Servers

Note: This case is for first time installation of OCEEMS 46.6 where there is Active-Standby Failover setup

Phase	Elapsed Time (Minutes)		Activity	Procedure
	This Step	Cummulative		
Pre-Requsite	30	30	Complete all the Pre-requisite mentioned in the section 1.4 - OCEEMS Server requirements and section 1.5 OCEEMS Client Requirements.	OCEEMS Server Requirements OCEEMS Client Requirements
Installation	120	150	Installation of failover setup and required configuration	Installation Procedure (Failover Setup)
Check OCEEMS Client GUI	5	155	Check OCEEMS Client GUI opens in a compatible browser.	Appendix Y

Table 4: Installation Phases for Failover setup of OCEEMS Servers

1.7.3 Upgrade Procedure (StandAlone Server - When OS Upgrade is required)

Note: In OCEEMS release 46.6, OS upgrade is required.

Phase	Elapsed Time (Minutes)		Activity	Procedure
	This Step	Cummulative		
Upgrade	240	240	OS Upgrade OCEEMS application Upgrade	Upgrade Procedure (Standalone Server-when OS upgrade is required)
Check OCEEMS Client GUI	5	245	Check OCEEMS Client GUI opens in a compatible browser.	Appendix Y

Table 5: Installation Phases for a StandAlone OCEEMS Server with OS Upgrade

1.7.4 Upgrade Procedure (StandAlone Server- When OS Upgrade is NOT required)

Note: This case is for upgrade from OCEEMS 46.3 and 46.5 to 46.6 and for intra release upgrade (46.6.x to 46.6.y)

Phase	Elapsed Time (Minutes)		Activity	Procedure
	This Step	Cummulative		
Upgrade	180	180	OCEEMS application Upgrade	Upgrade Procedure (Standalone Server-when OS upgrade not required)
Check OCEEMS Client GUI	5	185	Check OCEEMS Client GUI opens in a compatible browser.	Appendix Y

Table 6: Installation Phases for a StandAlone OCEEMS Server without OS Upgrade

1.7.5 Upgrade Procedure (Failover Setup - When OS Upgrade is required)

Note: In OCEEMS release 46.6, OS upgrade is not required. But the section is kept as placeholder so that in a future release where OS upgrade is required, the section can be used.

Phase	Elapsed Time (Minutes)		Activity	Procedure
	This Step	Cummulative		
Upgrade	300	300	OS Upgrade – Both Servers OCEEMS application Upgrade – Both Servers	Upgrade Procedure (Failover Server- when OS upgrade is required)
Check OCEEMS Client GUI	5	305	Check OCEEMS Client GUI opens in a compatible browser.	Appendix Y

Table 7: Installation Phases for a StandAlone OCEEMS Server without OS Upgrade

1.7.6 Upgrade Procedure (Failover Setup - When OS Upgrade is not required)

Note: This case is for upgrade from OCEEMS 46.3 and 46.5 to 46.6 and for intra release upgrade (46.6.x to 46.6.y) in a failover setup

Phase	Elapsed Time (Minutes)		Activity	Procedure
	This Step	Cummulative		
Upgrade	210	210	OCEEMS application Upgrade – Both Servers	Upgrade Procedure (Failover Setup- when OS upgrade is not required)
Check OCEEMS Client GUI	5	215	Check OCEEMS Client GUI opens in a compatible browser.	Appendix Y

Table 8: Installation Phases for a StandAlone OCEEMS Server without OS Upgrade

2.0 INSTALLATION PROCEDURE (STANDALONE SERVER)

Purpose	Requirements	Time Required
Installation of OCEEMS	<ol style="list-style-type: none"> Admin (root) login of target OCEEMS server OCEEMS 46.6 RPM copied onto the target OCEEMS server. If OCEEMS iso is on an external media, then it should be mounted to the target OCEEMS server. Refer Appendix V for details. Login credentials of the non-root user created for OCEEMS Password of MySQL root user. 	1 Hour

Note: On Both servers, verify the permission of the directory set in the variable outputDirectory in the /Tekelec/WebNMS/conf/tekelec/common.config file. The directory should be owned by the Non-root admin user and the permission should be 775.

Before installing OCEEMS, using the information given in section 1.2, verify that the system meets all the requirements. If the system meets all the requirements, then proceed with the following procedure to install OCEEMS –

S. No.	Step	Expected Output/Commands
1	Login to target machine using administrator (root) login.	Successful Login
2	Verify if user 'mysql' exists on the system.	# egrep -i "^mysql" /etc/passwd
3	User 'mysql' exists on the system if the command gives output similar to that given here.	mysql:x:518:518::/home/mysql:/bin/bash
4	If 'mysql' user exists on system, delete the user by issuing the given command.	# userdel mysql
5	Verify if group 'mysql' exists on the system.	# egrep -i "^mysql" /etc/group
6	Group 'mysql' exists on the system if the command gives output similar to that given here.	# mysql:x:518:
7	If 'mysql' group exists on system, delete the group by issuing the given command.	# groupdel mysql
8	Install OCEEMS RPM by issuing the given command. The installation process will install OCEEMS RPM as well as execute mysql_upgrade utility to fix any any tablespace related errors.	<pre># rpm -ivh <Path to OCEEMS 46.6 RPM> # rpm -ivh E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm Preparing... ##### [100%] Updating / installing... 1:E5-MS ##### [100%] Starting MySQL...</pre>

		<pre> bin/mysqld_safe: line 489: my_print_defaults: command not found bin/mysqld_safe: line 495: my_print_defaults: command not found 150418 08:12:16 mysqld_safe Logging to '/Tekelec/WebNMS/mysql/data/e5ms8.err'. 150418 08:12:16 mysqld_safe Starting mysqld daemon with databases from /Tekelec/WebNMS/mysql/data MySQL daemon started. Performing MySQL upgrade to fix any tablespace issue. Warning: Using a password on the command line interface can be insecure. Looking for 'mysql' as: bin/mysql Looking for 'mysqlcheck' as: bin/mysqlcheck Running 'mysqlcheck with default connection arguments Warning: Using a password on the command line interface can be insecure. Running 'mysqlcheck with default connection arguments Warning: Using a password on the command line interface can be insecure. mysql.columns_priv OK mysql.db OK mysql.event OK mysql.func OK mysql.general_log OK mysql.help_category OK mysql.help_keyword OK mysql.help_relation OK mysql.help_topic OK mysql.ndb_binlog_index OK mysql.plugin OK mysql.proc OK mysql.procs_priv OK mysql.proxies_priv OK mysql.servers OK mysql.slow_log OK mysql.tables_priv OK mysql.time_zone OK mysql.time_zone_leap_second OK mysql.time_zone_name OK mysql.time_zone_transition OK mysql.time_zone_transition_type OK mysql.user OK Running 'mysql_fix_privilege_tables'... Warning: Using a password on the command line interface can be insecure. </pre>
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		<pre>Running 'mysqlcheck with default connection arguments Warning: Using a password on the command line interface can be insecure. Running 'mysqlcheck with default connection arguments Warning: Using a password on the command line interface can be insecure. OK Shutting down MySQL... Warning: Using a password on the command line interface can be insecure. 150418 08:12:29 mysqld_safe mysqld from pid file /Tekelec/WebNMS/mysql/data/e5ms8.pid ended OCEEMS installation completed.</pre>
9	Move to “/Tekelec/WebNMS/bin” directory by issuing the given command.	<pre># cd /Tekelec/WebNMS/bin/</pre>
10	Execute the UniqueIDLinux.sh script to generate a Unique Machine ID for the system using the MAC ID of the system. Note down the Unique Machine ID generated by the script.	<pre># sh UniqueIDLinux.sh Your Unique Machine ID is 2abVDag3S3 Note: Please use the Unique Machine ID shown above to get Your License Key. Unique Machine ID is encoded version of the MAC address. This Unique Machine ID will be used only for key Generation. This information will not be disclosed to any other sources. Press any key to exit.....</pre>
11	Send the Unique Machine ID to the Oracle sales representative. The Oracle sales representative shall then send the Unique Machine ID to the Oracle PS/TAC/SWOPS team.	Successfully send the Unique Machine ID.
12	Oracle PS/TAC/SWOPS team shall use the Unique Machine ID provided to generate an OCEEMS license file using the LAT tool. The license thus generated shall be applicable to the specific machine where OCEEMS has been installed.	Receive the License file.
13	Login using the ‘root’ user.	Sucessful Login.

14	In case a firewall is enabled between the OCEEMS server and client machine or OCEEMS server and managed devices (EAGLE, EPAP, LSMS), then all the ports mentioned in OPENING PORTS USED BY OCEEMS IN CASE OF FIREWALL should be opened for proper functioning of OCEEMS.	Successfully open the ports that are required to be opened.
15	On the target machine, move to “/Tekelec/WebNMS/bin” directory by issuing the given command.	# cd /Tekelec/WebNMS/bin/
16	Execute updatePrivilegesForUser.sh script to create a non-root user for OCEEMS.	# sh updatePrivilegesForUser.sh non-root <Messages given in PROCEDURE TO CREATE A NON-ROOT USER FOR OCEEMS are displayed. Provide the inputs as required by the script>
17	Copy the OCEEMS 46.6 license file on the system at a location that can be accessed by the non-root user created for OCEEMS. Note: The user name to whom OCEEMS license has been issued and the path of license file should be noted down. These details are needed during the first OCEEMS server startup after installation.	Copy the license file to the home directory of the non-root user e.g. /home/emsadmuser.
18	Logout from ‘root’ user and login using the non-root user.	This step onwards you will not need the root session. All commands are to be executed from non-root admin user. Ideally close down the session that was opened with root user to avoid the chance of running command from root user by mistake. Open a fresh session (PuTTY or whatever) for the non-root admin user.
19	Move to “/Tekelec/WebNMS/bin” directory by issuing the given command.	\$ cd /Tekelec/WebNMS/bin/
20	Use the procedure given in PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS to update the non-root user and its password in OCEEMS.	Successful execution of the procedure.
21	Use the procedure given in PROCEDURE TO CREATE OCEEMS SSL CERTIFICATE to generate SSL certificate needed for HTTPS based web access for OCEEMS client.	Successful execution of the procedure.
22	Start OCEEMS server by using the given command. When required,	\$ sh startnms.sh

<p>provide appropriate inputs shown as highlighted.</p> <p>Note: For the first time after fresh installation, OCEEMS server must be started using startnms.sh script and not using the e5msService. This is because on first startup, it shows the OCEEMS license agreement and needs manual inputs regarding licensing.</p>	<pre> <Messages given in LOG MESSAGES ON FIRST STARTUP OF OCEEMS SERVER AFTER INSTALLATION are displayed. Keep pressing enter key each time message "Press Enter to continue..." is shown on screen> Do you accept the LICENSE AGREEMENT (y/n) y ***** REGISTRATION ***** HOST NAME IS e5ms9 Press 1 to provide the User Name and License File path 2 to Exit Choose an Option :: 1 Enter User Name : <Provide the user name to whom OCEEMS license has been issued> Enter The License File path : <Path to OCEEMS license file> OS detected : Linux Created table ANNOTATION Created table Alert Created table CORBANode Created table CRITERIAPROPERTIES Created table Event Created table GMapSymbol Created table GroupTable Created table IpAddress Created table MAPPEDPROPERTIES Created table MAPUSERPROPS Created table ManagedGroupObject Created table ManagedObject Created table MapContainer Created table MapDB Created table MapGroup Created table MapLink Created table MapSymbol </pre>
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	Created table Network
	Created table Node
	Created table PolledData
	Created table PortObject
	Created table Printer
	Created table SnmpInterface
	Created table SnmpNode
	Created table SwitchObject
	Created table TL1Interface
	Created table TL1Node
	Created table Tek_Secu_MapUserGrpEagleNode
	Created table Tek_Secu_MapUsergrpCmdClass
	Created table Tek_Secu_PasswordConfig
	Created table Tek_Secu_UserInfo
	Created table Tek_inventory_card
	Created table Tek_inventory_eagleNode
	Created table Tek_inventory_epap
	Created table Tek_inventory_frame
	Created table Tek_inventory_lsmsnode
	Created table Tek_inventory_shelf
	Created table Tek_inventory_slot
	Created table TopoObject
	Created table tek_scheduler_task
	Created table ObjectTypes
	Created table USERTABLE
	Created table HOSTS
	Created table PORTS
	Created table ENGINES
	Created table USERS
	Created table TrapDisabledMO
	Created table CHILDRENSTATUS
	Created table OBJECTSTOLINK
	Created table ObjectSchedulerRUNNABLE
	Created table TaskAudit
	Created table DeviceAudit
	Created table AttributeAudit
	Created table ConfigTasks
	Created table ConfigTaskDetails

		Created table ConfigAttributes
		Created table PendingTasks
		Created table PendingDevices
		Created table DeviceList
		Created table DeviceListDetails
		Created table DeviceUserProps
		Created table TaskToDeviceListMap
		Created table PollingObjects
		Created table ConfigProvider
		Created table PollingAttributes
		Created table Providers
		Created table StatsTables
		Created table ThresholdObjects
		Created table CustomView
		Created table CustomViewProps
		Created table CustomViewColumns
		Created table PanelTree
		Created table Reports
		Created table DataCollectionAttributes
		Created table UserPasswordTable
		Created table UserGroupTable
		Created table ViewPropertiesTable
		Created table ViewsToGroupTable
		Created table ViewToOperationsTable
		Created table OperationsTreeTable
		Created table NamedViewToAuthorizedViewTable
		Created table NotificationLog
		Created table VarBindLog
		Created table PolicyObject
		Created table PolicyActionCondition
		Created table POLICYUSERPROPS
		Created table DBPOLICY
		Created table PolicyScheduleTime
		Created table AlertPolicyObject
		Created table ENGINETABLE
		Created table USMTABLE
		Created table MonitorNmsParameter

	<p>Created table OperationsTable</p> <p>Created table BEFailOver</p> <p>Created table PollIDToKeyMap</p> <p>Created table ProvisioningVariantProps</p> <p>Created table ProvisioningVariant</p> <p>Created table UserConfTable</p> <p>Created table NetworkInventory</p> <p>Created table AuthAudit</p> <p>Created table REPORTS_HOURLY</p> <p>Created table REPORTS_DAILY</p> <p>Created table UIDataIdVsPRId</p> <p>Created table ProvisionResult</p> <p>Created table UserInputData</p> <p>Created table StageIdVsConfigId</p> <p>Created table WIDGETLEVEL</p> <p>Created table WIDGETASSOCIATION</p> <p>Created table WIDGET</p> <p>Created table WIDGETCRITERIA</p> <p>Created table WIDGETDATASOURCE</p> <p>Created table DASHBOARDOLUMNS</p> <p>Created table DASHBOARDPROPS</p> <p>Created table CCTVIEWS</p> <p>Created table CCTV</p> <p>Created table DASHBOARD</p> <p>Created table FAULTREPORTS_HOURLY</p> <p>Created table FAULTREPORTS_DAILY</p> <p>Created table SendEmailEventAction</p> <p>Created table SendEmailAlertAction</p> <p>Created table FilterCommandEventAction</p> <p>Created table FilterCommandAlertAction</p> <p>Created table STATSAGGREGATIONHOURLY</p> <p>Created table STATSAGGREGATIONDAILY</p> <p>Created table smsprofiles</p> <p>Created table smsserver_out</p> <p>Created table tek_cmi_cmdclasses</p> <p>Created table tek_cmi_commands</p> <p>Created table tek_cmi_cmdclass_cmd_map</p> <p>Created table tek_cmi_cmd_params</p>
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		<p>Created table tek_cmi_cmd_param_values</p> <p>Created table tek_cmi_cmd_param_map</p> <p>Created table tek_cmi_cmd_param_validation</p> <p>Created table tek_cmi_cmd_param_lookup</p> <p>Created table tek_cmi_type_cmds_history</p> <p>Created table tek_cmi_script_control_modes</p> <p>Created table tekelec_meas_headers</p> <p>Created table tekelec_meas_reports</p> <p>Created table tek_lui_slk_capacity</p> <p>Created table tek_lui_slk_reptstatcard</p> <p>Created table tek_lui_slk_capacity_arch</p> <p>Created table tek_lui_config_data</p> <p>Created table tek_lui_link_data</p> <p>Created table tek_lui_measurements</p> <p>Created table tek_lui_linkdata_timestamp</p> <p>Created table tek_rprt_rept_stat_card</p> <p>Created table tek_rept_tokens</p> <p>Created table tek_nbi_nms_config</p> <p>Created table tek_snmp_agent_config</p> <p>Created table tek_nbi_ftp_config</p> <p><Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console></p>
23	Launch a new session on the OCEEMS machine and login using the non-root user.	Successful launch of a new session with non-root user.
24	Move to /Tekelec/WebNMS/bin directory by issuing the given command.	\$ cd /Tekelec/WebNMS/bin/
25	<p>Execute installE5MSSchema.sh script to populate CMI, NBI and Measurement module data in OCEEMS database. When prompted by the script, provide the MySQL root user's password.</p> <p>Note: After successful script completion, OCEEMS server restart is needed once for the data to be populated in OCEEMS application.</p>	<p>\$ sh installE5MSSchema.sh</p> <p>Please enter MySql password: <password></p> <p><Messages given in LOG MESSAGES ON INSTALLATION OF OCEEMS SCHEMA are displayed on console></p>
26	Stop the OCEEMS server using the given command.	<p>\$ service e5msService stop</p> <p>Stopping OCEEMS server...</p>

	Note: Restart of the server is required to populate CMI data on OCEEMS GUI.	Warning: Using a password on the command line interface can be insecure. MySQL server to be stopped Done. <Messages given in LOG MESSAGES ON STOPPING OCEEMS SERVER are displayed on console>
27	Start the OCEEMS server using the given command. Output similar to that given here is displayed on console.	\$ service e5msService start Starting OCEEMS server... Starting mysql / bin/mysqld_safe: line 489: my_print_defaults: command not found bin/mysqld_safe: line 495: my_print_defaults: command not found 150418 08:12:50 mysqld_safe Logging to '/Tekelec/WebNMS/mysql/data/e5ms9.err'. 150418 08:12:50 mysqld_safe Starting mysqld daemon with databases from /Tekelec/WebNMS/mysql/data Warning: Using a password on the command line interface can be insecure. 150418 08:12:50 mysqld_safe mysqld from pid file /Tekelec/WebNMS/mysql/data/e5ms9.pid ended / OS detected : Linux <Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console>
28	Procedure Complete	This procedure is complete.

3.0 INSTALLATION PROCEDURE (FAILOVER SETUP)

In a failover setup, there are two OCEEMS servers installed on two machines, both having the same release of software and one working as a primary server and the other working as a standby server.

Primary server is the active server where all the OCEEMS processes are up and the standby server is one where only MySQL process is up and the OCEEMS processes are not up. The standby server keeps monitoring the primary server and in case the primary server shuts down, it takes over the role of primary by starting all the OCEEMS processes. In failover setup, to keep database and configuration of both the servers in sync, database and configuration files are replicated between primary and standby servers.

Purpose	Requirements	Time Required
Installation of OCEEMS on Primary and Standby servers	<ol style="list-style-type: none"> Admin (root) login details of target OCEEMS servers (Primary and Standby). OCEEMS 46.6 RPM copied onto the target OCEEMS servers (Primary and Standby). If RPM file is on an external media, then the media should be mounted to the target OCEEMS server. Login credentials of the non-root users created for OCEEMS on the Primary and Standby servers Password of MySQL root user The server (IP) hostname should be same in '/etc/hostname' and '/etc/hosts', for both Primary and Secondary servers 	2 Hours

Before installing OCEEMS, using the information given in section 1.2, verify that both Primary and Standby systems meet all the requirements. If the systems meet all the requirements, then proceed with the following procedure of OCEEMS installation in a failover setup. For clarity, we shall address the Primary server as 'server 1' and the Standby server as 'server 2'.

S. No.	Step	Expected Output
1	Perform steps 1 to 20 from section 2.0 on both the servers (Server 1 and 2).	-
2	<p>On both the servers, update the system's 'hosts' file to add the DNS entries for both primary and standby servers.</p> <p>On CentOS, the hosts file is placed in '/etc' directory.</p>	<p><PRIMARY SERVER IP> <PRIMARY SERVER HOSTNAME> <STANDBY SERVER IP> <STANDBY SERVER HOSTNAME></p> <p>Sample entries - 10.248.10.25 e5ms1 10.248.10.21 e5ms2</p>
3	Login as non-root user on server 1 and use the procedure given in PROCEDURE TO CREATE OCEEMS SSL CERTIFICATE to generate SSL certificate needed for HTTPS based access for OCEEMS.	Successful execution of the procedure
4	Login as non-root user on server 2 and use the procedure given in PROCEDURE TO CREATE OCEEMS SSL CERTIFICATE to	Successful execution of the procedure

	<p>generate SSL certificate needed for HTTPS based access for OCEEMS.</p> <p>During the certificate creation in server 2, please provide the same keystore password as used in the certificate creation for server 1 in step 3.</p>	
5	<p>Note: Primary and Secondary servers must be behind a single firewall and should not have their individual firewalls turned ON. Client machine used to access OCEEMS client and managed EAGLE(s) could be on other side of the firewall.</p> <p>In case a firewall is enabled between OCEEMS servers and client or OCEEMS servers and managed EAGLE(s), use the procedure given in OPENING PORTS USED BY OCEEMS IN CASE OF FIREWALL to open the ports used by OCEEMS.</p>	Successful open of ports if OCEEMS is behind firewall.
6	Execute the steps in section F.1 to setup replication between the servers.	Successful replication between the servers
7	<p>On server 1, move to “/Tekelec/WebNMS/bin” directory and start OCEEMS server by using the given command. When required, provide appropriate inputs shown as highlighted.</p> <p>Note: For the first time after fresh installation, OCEEMS server must be started using startnms.sh script and not using the e5msService. This is because on first startup, it shows the OCEEMS license agreement and needs manual inputs regarding licensing.</p>	<pre> \$ cd /Tekelec/WebNMS/bin \$ sh startnms.sh <Messages given in LOG MESSAGES ON FIRST STARTUP OF OCEEMS SERVER AFTER INSTALLATION are displayed. Keep pressing enter key each time message “Press Enter to continue...” is shown on screen> Do you accept the LICENSE AGREEMENT (y/n) y ***** REGISTRATION ***** HOST NAME IS e5ms9 Press 1 to provide the User Name and License File path 2 to Exit Choose an Option :: 1 Enter User Name : <Provide the user name to whom OCEEMS license has been issued> Enter The License File path : <Path to OCEEMS license file> </pre>

		<pre>OS detected : Linux Created table ANNOTATION Created table Alert Created table CORBANode Created table CRITERIAPROPERTIES Created table Event Created table GMapSymbol Created table GroupTable Created table IPAddress Created table MAPPEDPROPERTIES Created table MAPUSERPROPS Created table ManagedGroupObject Created table ManagedObject Created table MapContainer Created table MapDB Created table MapGroup Created table MapLink Created table MapSymbol Created table Network Created table Node Created table PolledData Created table PortObject Created table Printer Created table SnmpInterface Created table SnmpNode Created table SwitchObject Created table TL1Interface Created table TL1Node Created table Tek_Secu_MapUserGrpEagleNode Created table Tek_Secu_MapUsergrpCmdClass Created table Tek_Secu_PasswordConfig Created table Tek_Secu_UserInfo Created table Tek_inventory_card Created table Tek_inventory_eagleNode Created table Tek_inventory_epap Created table Tek_inventory_frame</pre>
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	<p>Created table Tek_inventory_lsmsnode</p> <p>Created table Tek_inventory_shelf</p> <p>Created table Tek_inventory_slot</p> <p>Created table TopoObject</p> <p>Created table tek_scheduler_task</p> <p>Created table ObjectTypes</p> <p>Created table USERTABLE</p> <p>Created table HOSTS</p> <p>Created table PORTS</p> <p>Created table ENGINES</p> <p>Created table USERS</p> <p>Created table TrapDisabledMO</p> <p>Created table CHILDRENSTATUS</p> <p>Created table OBJECTSTOLINK</p> <p>Created table ObjectSchedulerRUNNABLE</p> <p>Created table TaskAudit</p> <p>Created table DeviceAudit</p> <p>Created table AttributeAudit</p> <p>Created table ConfigTasks</p> <p>Created table ConfigTaskDetails</p> <p>Created table ConfigAttributes</p> <p>Created table PendingTasks</p> <p>Created table PendingDevices</p> <p>Created table DeviceList</p> <p>Created table DeviceListDetails</p> <p>Created table DeviceUserProps</p> <p>Created table TaskToDeviceListMap</p> <p>Created table PollingObjects</p> <p>Created table ConfigProvider</p> <p>Created table PollingAttributes</p> <p>Created table Providers</p> <p>Created table StatsTables</p> <p>Created table ThresholdObjects</p> <p>Created table CustomView</p> <p>Created table CustomViewProps</p> <p>Created table CustomViewColumns</p> <p>Created table PanelTree</p> <p>Created table Reports</p>
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	<p>Created table DataCollectionAttributes</p> <p>Created table UserPasswordTable</p> <p>Created table UserGroupTable</p> <p>Created table ViewPropertiesTable</p> <p>Created table ViewsToGroupTable</p> <p>Created table ViewToOperationsTable</p> <p>Created table OperationsTreeTable</p> <p>Created table NamedViewToAuthorizedViewTable</p> <p>Created table NotificationLog</p> <p>Created table VarBindLog</p> <p>Created table PolicyObject</p> <p>Created table PolicyActionCondition</p> <p>Created table POLICYUSERPROPS</p> <p>Created table DBPOLICY</p> <p>Created table PolicyScheduleTime</p> <p>Created table AlertPolicyObject</p> <p>Created table ENGINETABLE</p> <p>Created table USMTABLE</p> <p>Created table MonitorNmsParameter</p> <p>Created table OperationsTable</p> <p>Created table BEFailOver</p> <p>Created table PollIDToKeyMap</p> <p>Created table ProvisioningVariantProps</p> <p>Created table ProvisioningVariant</p> <p>Created table UserConfTable</p> <p>Created table NetworkInventory</p> <p>Created table AuthAudit</p> <p>Created table REPORTS_HOURLY</p> <p>Created table REPORTS_DAILY</p> <p>Created table UIDataIdVsPRId</p> <p>Created table ProvisionResult</p> <p>Created table UserInputData</p> <p>Created table StageIdVsConfigId</p> <p>Created table WIDGETLEVEL</p> <p>Created table WIDGETASSOCIATION</p> <p>Created table WIDGET</p> <p>Created table WIDGETCRITERIA</p>
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	Created table WIDGETDATASOURCE
	Created table DASHBOARDOLUMNS
	Created table DASHBOARDPROPS
	Created table CCTVIEWS
	Created table CCTV
	Created table DASHBOARD
	Created table FAULTREPORTS_HOURLY
	Created table FAULTREPORTS_DAILY
	Created table SendEmailEventAction
	Created table SendEmailAlertAction
	Created table FilterCommandEventAction
	Created table FilterCommandAlertAction
	Created table STATSAGGREGATIONHOURLY
	Created table STATSAGGREGATIONDAILY
	Created table smsprofiles
	Created table smsserver_out
	Created table tek_cmi_cmdclasses
	Created table tek_cmi_commands
	Created table tek_cmi_cmdclass_cmd_map
	Created table tek_cmi_cmd_params
	Created table tek_cmi_cmd_param_values
	Created table tek_cmi_cmd_param_map
	Created table tek_cmi_cmd_param_validation
	Created table tek_cmi_cmd_param_lookup
	Created table tek_cmi_type_cmds_history
	Created table tek_cmi_script_control_modes
	Created table tekelec_meas_headers
	Created table tekelec_meas_reports
	Created table tek_lui_slk_capacity
	Created table tek_lui_slk_reptstatcard
	Created table tek_lui_slk_capacity_arch
	Created table tek_lui_config_data
	Created table tek_lui_link_data
	Created table tek_lui_measurements
	Created table tek_lui_linkdata_timestamp
	Created table tek_rprt_rept_stat_card
	Created table tek_rept_tokens
	Created table tek_nbi_nms_config

		<p>Created table tek_snmp_agent_config</p> <p>Created table tek_nbi_ftp_config</p> <p><Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console></p>
8	<p>Open a new session on server 1 using the non-root user and move to /Tekelec/WebNMS/bin directory by issuing the given command.</p>	<pre># cd /Tekelec/WebNMS/bin/</pre>
9	<p>Execute installE5MSSchema.sh script to populate CMI, NBI and Measurement module data in OCEEMS database. When required, provide the MySQL root user's password.</p> <p>Note: Since database replication has already been set up between the two servers, CMI, NBI and Measurement module data shall automatically be replicated from server 1 to server 2 and there shall not be need to execute installE5MSSchema.sh script on server 2.</p>	<pre># sh installE5MSSchema.sh</pre> <p>Please enter MySql password: <password></p> <p><Messages given in LOG MESSAGES ON INSTALLATION OF OCEEMS SCHEMA are displayed on console></p>
10	<p>On server 2, move to "/Tekelec/WebNMS/bin" directory and start OCEEMS server by using the given command. When required, provide appropriate inputs shown as highlighted.</p> <p>Note: For the first time after fresh installation, OCEEMS server must be started using startnms.sh script and not using the e5msService. This is because on first startup, it shows the OCEEMS license agreement and needs manual inputs regarding licensing.</p>	<pre>\$ cd /Tekelec/WebNMS/bin \$ sh startnms.sh</pre> <p><Messages given in LOG MESSAGES ON FIRST STARTUP OF OCEEMS SERVER AFTER INSTALLATION are displayed. Keep pressing enter key each time message "Press Enter to continue..." is shown on screen></p> <p>Do you accept the LICENSE AGREEMENT (y/n)</p> <p>y</p> <p>***** REGISTRATION *****</p> <p>HOST NAME IS e5ms8</p> <p>Press 1 to provide the User Name and License File path</p> <p>2 to Exit</p> <p>Choose an Option :: 1</p> <p>Enter User Name : <Provide the user name to whom OCEEMS license has been issued></p>

		<pre> Enter The License File path : <Path to OCEEMS license file> Oracle Corporation. Checking for the availability of the Primary Server in the Database. Found an entry. Trying to connect to the Primary Server at 10.248.9.5 Please waitConnected Starting OCEEMS Standby Server. The Modules will be started once it takes over as the Primary Server. Monitoring the Primary Server at 10.248.9.5 </pre>
11	<p>On server 1, shutdown OCEEMS server by issuing the command.</p> <p>Note: This is needed for populating OCEEMS CMI data in OCEEMS GUI.</p>	<pre> # service e5msService stop Stopping OCEEMS server... MySQL not stopped for failover Done. </pre>
12	<p>On detecting shutdown of server 1 (primary), server 2 shall assume the responsibility of primary server.</p>	<pre> Starting to do FailOver Tasks. <Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console> The new primary server is 10.248.9.3 </pre>
13	<p>Start OCEEMS server on server 1. It shall now start as standby.</p>	<pre> [root@e5ms9 bin]# service e5msService start Starting OCEEMS server... MySQL already running Warning: Using a password on the command line interface can be insecure. / [root@e5ms9 bin]# OS detected : Linux Oracle Corporation. Checking for the availability of the Primary Server in the Database. Found an entry. Trying to connect to the Primary Server at 10.248.9.3 Please waitConnected </pre>

		<p>Starting Oracle Web NMS Standby Server. The Modules will be started once it takes over as the Primary Server.</p> <p>Monitoring the Primary Server at 10.248.9.3</p>
14	Procedure Complete	This procedure is complete.

4.0 UPGRADE PROCEDURE (STANDALONE SERVER- WHEN OS UPGRADE IS REQUIRED)

Note: In OCEEMS release 46.6.3, OS upgrade is required.

S. No.	Step	Expected Output
1	Login to target machine using administrator (root) login.	Successful Login
2	Take a backup of the system. Save the backup created. This will be used after OS upgrade.	# cd /Tekelec/WebNMS/bin/backup/ # sh BackupDB.sh -d <directory where backup needs to be created>
3	Install Oracle Linux 7.8 on the machine.	Successful installation of Oracle Linux 7.8
4	Install current release of OCEEMS on Oracle Linux 7.8. Note: Here, current release means older release. Release from where the upgrade to 46.6.3 is being attempted, for example, 46.3/46.5/46.6.2. First the Database will be restored in the older release, and then Upgrade will take place for the application. Refer Install/Upgrade Guide of the current release for this.	Successful installation of OCEEMS.
5	Restore the backup taken in Step 2.	# service e5msService stop # cd /Tekelec/WebNMS/bin/backup/ # sh RestoreDB.sh <backup_file path>
6	Start OCEEMS server	# service e5msService start
7	Upgrade the system from current to new release. Refer Section 5.0 to upgrade.	Successful Upgrade
8	Procedure Complete	This procedure is complete.

5.0 UPGRADE PROCEDURE (STANDALONE SERVER- WHEN OS UPGRADE NOT REQUIRED)

Script 'E5MSUpgrade.sh' available in "/Tekelec/WebNMS/bin" directory shall enable a user to upgrade OCEEMS software/license/both. The following sections describe various upgrade procedures.

Note: While upgrading to OCEEMS Release 46.6.3 from Releases 46.6.2, 46.5, or 46.3, the user needs to upgrade OCEEMS software and license and also the OS. Section 5.0 (OCEEMS upgrade without OS Upgrade) does not apply to release 46.6.3. This procedure applies only for incremental upgrade from 46.6.3 version x to 46.6.3 version y.

Note: On Both servers, verify the permission of the directory set in the variable outputDirectory in the /Tekelec/WebNMS/conf/tekelec/common.config file. The directory should be owned by the Non-root admin user and the permission should be 775.

5.1 Upgrade OCEEMS License

OCEEMS license upgrade shall be required in the following cases –

- Inter-release upgrade: In case of OCEEMS upgrade to a new release, before starting OCEEMS server, license upgrade to that release shall be required.

Note: Before upgrading the setup, if the WebNmsDB.TEK_MEAS_COMP_LINK table is empty, the LUI exception is pegged on the screen during the upgrade.

- Intra-release upgrade: In case customer purchases some additional features for the currently installed version of OCEEMS, license upgrade with the additional features enabled shall be required.

In case of 46.6, a license upgrade shall be required only when OCEEMS software has been upgraded to 46.6 and a non-root user has been created for OCEEMS as per procedure 5.2. Therefore, the procedure given below assumes that a non-root user for OCEEMS exists on the system.

Purpose	Requirements	Time Required
Upgrading license of OCEEMS	<ol style="list-style-type: none"> 1. Login credentials of the root user on the target OCEEMS server 2. OCEEMS 46.6 license file on the target OCEEMS server. If license file is on an external media, then the media should be mounted to the target OCEEMS server and the license file should be copied to a location on the server that is accessible to the root user. 	5 Minutes

S. No.	Step	Expected Output
1	Login to target machine using the root user.	Successful Login
2	Check the status of OCEEMS server.	<code>\$ service e5msService status</code>
3	Shutdown OCEEMS server in case it is running. Skip this step is OCEEMS server is not running.	<pre> \$ service e5msService stop Stopping OCEEMS server... Warning: Using a password on the command line interface can be insecure. MySQL server to be stopped Done.</pre>

4	Check the status of OCEEMS server to verify that OCEEMS server has been shut down.	<pre>\$ service e5msService status OCEEMS server is not started!</pre>
5	Change directory to /Tekelec/WebNMS/bin.	<pre>\$ cd /Tekelec/WebNMS/bin</pre>
6	<p>Perform this step in both upgrade i.e Inter-release upgrade and Intra-release upgrade.</p> <p>Note : This will update log4j.xml file with new log4j.xml(As per log4j2)</p>	<pre>\$ cd /Tekelec/WebNMS/bin vi RPMUpgrade.sh</pre> <p>After line: showMessage "OCEEMS configuration files restoration is in progress..."</p> <p>Add Line: sh \$E5MS_HOME/WebNMS/bin/updateConf_46.6.5.sh \$DIRECTORY</p>
7	<p>Execute the E5MSUpgrade.sh script and provide appropriate inputs shown as highlighted.</p> <p>The script shall upgrade the OCEEMS license using the license file provided as input.</p> <p>OCEEMS license upgrade logs will be captured in log file named '/var/upgrade/logs/upgrade_<system date>_<system time stamp>.log'. Please refer to section 9.0 for details of logging feature.</p>	<pre>\$ sh E5MSUpgrade.sh Welcome to OCEEMS Upgrade.</pre> <p>Please select one of the following options:</p> <ol style="list-style-type: none"> 1. OCEEMS License Upgrade 2. OCEEMS Software Upgrade 3. Upgrade Both <p>Press any other key to exit...</p> <p>Your Input: 1</p> <p>Please provide the path of license file (along with the license file name): /opt/Upgrade/Rel46.6/OCEEMSLicense46.6.xml</p> <p>OCEEMS license upgrade is in progress...</p> <p>License upgrade done.</p>
8	<p>Execute this step only if customer needs to run OCEEMS using a non-root user, else move to step 10.</p> <p>Execute updatePrivilegesForUser.sh script to create a non-root user for OCEEMS.</p>	<pre># sh updatePrivilegesForUser.sh non-root</pre> <p><Messages given in PROCEDURE TO CREATE A NON-ROOT USER FOR OCEEMS are displayed. Provide the inputs as required by the script></p>
9	<p>Logout from 'root' user and login using the non-root user.</p> <p>Move to "/Tekelec/WebNMS/bin" directory by issuing the given command.</p>	<pre>\$ cd /Tekelec/WebNMS/bin/</pre>

10	Use the procedure given in PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS to update the non-root user and its password in OCEEMS.	Successful execution of the procedure
11	Start OCEEMS server. Messages similar to the given shall be displayed on console.	<pre> \$ service e5msService start Starting OCEEMS server... Starting mysql / bin/mysqld_safe: line 489: my_print_defaults: command not found bin/mysqld_safe: line 495: my_print_defaults: command not found 140722 07:23:41 mysqld_safe Logging to '/Tekelec/WebNMS/mysql/data/e5ms9.err'. 140722 07:23:41 mysqld_safe Starting mysqld daemon with databases from /Tekelec/WebNMS/mysql/data Warning: Using a password on the command line interface can be insecure. 140722 07:23:47 mysqld_safe mysqld from pid file /Tekelec/WebNMS/mysql/data/e5ms9.pid ended / OS detected : Linux <Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console> </pre>
12	Procedure Complete	This procedure is complete.

5.2 Upgrade OCEEMS Software (RPM)

OCEEMS software upgrade shall be required in the following cases –

- Inter-release upgrade: When a customer wants to upgrade to a new release of OCEEMS. Upgrade to release 46.6 is supported from releases 46.5 and 46.3.
- Intra-release upgrade: When a customer wants to upgrade to a newer RPM version for the currently installed release of OCEEMS.

Purpose	Requirements	Time Required
Upgrading OCEEMS software (RPM)	<ol style="list-style-type: none"> 1. Admin (root) login details of target OCEEMS server 2. OCEEMS 46.6 RPM copied onto the target OCEEMS server. If RPM file is on an external media, then the media should be mounted to the target OCEEMS server. 3. Password of MySQL 'root' user for the target OCEEMS server 	60 to 180 Minutes (Depends upon the size of data in OCEEMS database)

Note: Before upgrading OCEEMS, verify that the system meets all the requirements for OCEEMS given in section 1.4. If the system meets all the requirements, then proceed with the following procedure to upgrade OCEEMS –

S. No.	Step	Expected Output
1	Login to target machine using administrator (root) login.	Successful Login
2	Run the procedure given in UPDATING DATABASE CHANGES IN XML FILES PRIOR TO UPGRADE TO PRESERVE CUSTOM ALARM/EVENT VIEWS to preserve the custom alarm/event views.	Successful execution of the procedure
3	Change directory to /Tekelec/WebNMS/bin/backup.	# cd /Tekelec/WebNMS/bin/backup
4	Execute the BackupDB.sh script to take backup of OCEEMS database. After the -d option, provide a location (absolute path) on server with sufficient space for the backup file. On completion, the script will create a backup file named E5MS_Database_BackUp.sql in the user provided directory. Note: This backup is needed in case upgrade fails and system needs to be restored to its pre-upgrade state.	# sh BackupDB.sh -d <Path where backup file needs to be created> e.g. # sh BackupDB.sh -d /tmp Please wait! Backup of E5-MS is in progress...- E5-MS database backup file "E5MS_Database_BackUp.sql" successfully created. \n Backup of directories successfully created. E5-MS Backup is completed.
5	Copy the 'BackUp.conf' file available in OCEEMS ISO to "/Tekelec/WebNMS/conf" directory. Note that 'BackUp.conf' already exists in "/Tekelec/WebNMS/conf" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.	# cp <Absolute path of OCEEMS ISO>/BackUp.conf /Tekelec/WebNMS/conf # cp: overwrite `/Tekelec/WebNMS/conf/BackUp.conf'? y
6	If upgrading from version 46.5, then rename the 'RPMUpgrade_46.5.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory.	# cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.5.sh /Tekelec/WebNMS/bin/RPMUpgrade.sh # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y

	<p>If upgrading from version 46.3, then rename the 'RPMUpgrade_46.3.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory.</p> <p>If it is an intra release upgrade i.e. upgrade from 46.6.x to 46.6.y, skip this step.</p> <p>Note that 'RPMUpgrade.sh' already exists in "/Tekelec/WebNMS/bin" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.</p>	<pre># cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.3.sh /Tekelec/WebNMS/bin/ RPMUpgrade.sh # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y</pre>
7	Check the status of OCEEMS server.	<pre># service e5msService status E5-MS server is running.</pre>
8	Shutdown OCEEMS server in case it is running.	<pre># service e5msService stop Stopping E5-MS server... Done.</pre>
9	Check the status of OCEEMS server to verify that OCEEMS server has been shut down.	<pre># service e5msService status E5-MS server is not started!</pre>
10	Check the status of MySQL to verify that it has been shut down. There should not be any entry in the given command output related to OCEEMS. To stop MySQL, move to directory "/Tekelec/WebNMS/bin/" and execute "stopMySQL.sh" script if it is running.	<pre># ps -ef grep mysql root 59320 59299 0 21:06 pts/0 00:00:00 grep mysql</pre>
11	<p>Change directory to /Tekelec/WebNMS/bin.</p> <p>Note: If upgrading from version 46.3 or above and OCEEMS server was running using a non-root user, execute updatePrivilegesForUser.sh script to give back the privileges to root user for upgrade.</p>	<pre># cd /Tekelec/WebNMS/bin # sh updatePrivilegesForUser.sh root</pre>
12	Perform this step only in the case of intra upgrade, that is, 46.6.x to 46.6y. Do the changes in /Tekelec/WebNMS/bin/RPMUpgrade.sh, as mentioned.	<pre>Inside /Tekelec/WebNMS/bin/RPMUpgrade.sh, Replace the line: \$JAVA_HOME/bin/java - DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server. jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File with the line: \$JAVA_HOME/bin/java -DseparateJVM=true</pre>

		<pre>-cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server. jar:\$E5MS_HOME/WebNMS/classes/NmsServerClasses. jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File</pre>
13	<p>Perform this step in both upgrade i.e Inter-release upgrade and Intra-release upgrade.</p> <p>Note : This will update log4j.xml file with new log4j.xml(As per log4j2)</p>	<pre>\$ cd /Tekelec/WebNMS/bin vi RPMUpgrade.sh After line: showMessage "OCEEMS configuration files restoration is in progress..." Add Line: sh \$E5MS_HOME/WebNMS/bin/ updateConf_46.6.5.sh \$DIRECTORY</pre>
14	<p>Execute the E5MSUpgrade.sh script and provide appropriate inputs shown as highlighted. The script shall upgrade the OCEEMS software using the RPM file provided as input.</p> <p>Note:</p> <ol style="list-style-type: none"> 1) Installer should take care while providing the path of OCEEMS Database dump file when prompted by upgrade script. The file provided should be /var/upgrade/Backup_465.14.0/E5MS_Database_BackUp.sql or /var/upgrade/Backup_463.15.0/E5MS_Database_BackUp.sql depending on whether the currently installed release was 46.5 or 46.3 respectively. For intra release upgrade case (upgrade from 46.6.x to 46.6.y), the path of the file provided should be /var/upgrade/Backup_466.x.0/E5MS_Database_BackUp.sql 2) OCEEMS upgrade logs will be captured in a log file named '/var/upgrade/logs/upgrade_<system date>_<system time stamp>.log'. Please refer to section 9.0 for details of logging feature. 	<pre># sh E5MSUpgrade.sh Welcome to OCEEMS Upgrade. Please select one of the following options: 1. OCEEMS License Upgrade 2. OCEEMS Software Upgrade 3. Upgrade Both Press any other key to exit... Your Input: 2 Please provide the path of OCEEMS RPM file (including the RPM file name): /root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm OCEEMS RPM provided by you is: /root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm Are you sure you want to upgrade OCEEMS using the above RPM file (Y/N)? y <Messages given in LOG MESSAGES DURING OCEEMS UPGRADE are displayed on console></pre>
15	Verify that the RPM has been upgraded to the intended version.	<pre># rpm -qa E5-MS E5-MS-46.6.0.0.0_466.1.0.x86_64</pre>

16	<p>In case a firewall is enabled between OCEEMS server and client or OCEEMS server and managed EAGLE(s), use the procedure given in OPENING PORTS USED BY OCEEMS IN CASE OF FIREWALL to open the ports used by OCEEMS.</p> <p>If it is intra release upgrade (upgrade from 46.6.x to 46.6.y), Skip step14 to step 20)</p>	Successful opening of ports if OCEEMS is behind firewall.
17	<p>Execute this step only if customer needs to run OCEEMS using a non-root user, else move to step 19.</p> <p>Note: If the release prior upgrade was 46.3 and a non-root user was used for OCEEMS operations then it is compulsory to create a non-root user after upgrade.</p> <p>Execute updatePrivilegesForUser.sh script to create a non-root user for OCEEMS.</p>	<pre># sh updatePrivilegesForUser.sh non-root <Messages given in PROCEDURE TO CREATE A NON-ROOT USER FOR OCEEMS are displayed. Provide the inputs as required by the script></pre>
18	Logout from 'root' user and login using the non-root user.	<p>If customer is to use non-root user to run OCEEMS, this step onwards he will not need the root session. All commands are to be executed from non-root admin user. Ideally close down the session that was opened with root user to avoid the chance of running command from root user by mistake. Open a fresh session (PuTTY or whatever) for the non-root admin user.</p>
19	Move to "/Tekelec/WebNMS/bin" directory by issuing the given command.	\$ cd /Tekelec/WebNMS/bin/
20	Use the procedure given in PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS to update the non-root user and its password in OCEEMS.	Successful execution of the procedure
21	Use the procedure given in PROCEDURE TO CREATE OCEEMS SSL CERTIFICATE to generate SSL certificate needed for HTTPS based web access for OCEEMS client.	Successful execution of the procedure
22	Start MySQL by executing script 'startMySQL.sh'.	<pre>\$ sh startMySQL.sh \$ bin/safe_mysql: line 199: my_print_defaults: command not found bin/safe_mysql: line 204: my_print_defaults: command not found</pre>

		nohup: redirecting stderr to stdout Starting mysqld daemon with databases from /Tekelec/WebNMS/mysql/data
23	Use the procedure given in UPDATING XML CHANGES IN OCEEMS DATABASE to update OCEEMS database.	Successful execution of the procedure
24	Procedure Complete	This procedure is complete.

Note:

1. In case of upgrade of OCEEMS software from any previous releases (46.3/46.5) to 46.6, before starting server, license upgrade to 46.6 shall be required. Therefore, after the above procedure is done, installer shall need to upgrade OCEEMS license using procedure 5.1 before starting server using the non-root user for OCEEMS.
2. In case of intra upgrade, wherein OCEEMS software is upgraded from a previous version of 46.6 to a newer version of 46.6, it is assumed that steps 14 to 20 of the above procedure and license upgrade are already done during installation/previous upgrade of 46.6 and shall not be required this time. Therefore, OCEEMS server can be started after step 13.
3. In case of inter-release upgrade, OCEEMS cannot be started without the license upgrade. But if this procedure is used for intra-upgrade, then the server can be started using command “**service e5msService start**”.

5.3 Upgrade OCEEMS Software (RPM) and License

Upgrading both OCEEMS software (RPM) and license shall be required in following cases –

- Inter release upgrade: When a customer wants to upgrade to a new release of OCEEMS. Upgrade to release 46.6 is supported from releases 46.3 and 46.5.
- Intra-release upgrade: When a customer wants to upgrade to a newer RPM version for the currently installed release of OCEEMS.

Purpose	Requirements	Time Required
Upgrading software (RPM) and license of OCEEMS	<ol style="list-style-type: none"> 1. Admin (root) login details of target OCEEMS server 2. OCEEMS 46.6 RPM copied onto the target OCEEMS server. If RPM file is on an external media, then it should be mounted to the target OCEEMS server. 3. OCEEMS 46.6 license file on the target OCEEMS server. If license file is on an external media, then the media should be mounted to the target OCEEMS server. 	60 to 180 Minutes (Depends upon the size of data in OCEEMS database)

Note: Before upgrading OCEEMS, verify that the system meets all the requirements given in section 1.4. If the system meets all the requirements, then proceed with the following procedure for upgrading OCEEMS software (RPM) and license –

S. No.	Step	Expected Output
1	Login to target machine using administrator (root) login.	Successful Login
2	Run the procedure given in UPDATING DATABASE CHANGES IN XML FILES PRIOR TO UPGRADE TO PRESERVE CUSTOM	Successful execution of the procedure

	ALARM/EVENT VIEWS to preserve the custom alarm/event views.	
3	Change directory to /Tekelec/WebNMS/bin/backup.	# cd /Tekelec/WebNMS/bin/backup
4	Execute the BackupDB.sh script to take backup of OCEEMS database. After the -d option, provide a location (absolute path) on server with sufficient space for the backup file. On completion, the script will create a backup file named E5MS_Database_BackUp.sql in the user provided directory. Note: This backup is needed in case upgrade fails and system needs to be restored to its pre-upgrade state.	# sh BackupDB.sh -d <Path where backup file needs to be created> e.g. # sh BackupDB.sh -d /tmp Please wait! Backup of E5-MS is in progress..- E5-MS database backup file "E5MS_Database_BackUp.sql" successfully created. \ Backup of directories successfully created. E5-MS Backup is completed.
5	Copy the 'BackUp.conf' file available in OCEEMS ISO to "/Tekelec/WebNMS/conf" directory. Note that 'BackUp.conf' already exists in "/Tekelec/WebNMS/conf" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.	# cp <Absolute path of OCEEMS ISO>/BackUp.conf /Tekelec/WebNMS/conf # cp: overwrite `/Tekelec/WebNMS/conf/BackUp.conf'? y
6	If existing installed version is 46.5, then rename the 'RPMUpgrade_46.5.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory. If existing installed version is 46.3, then rename the 'RPMUpgrade_46.3.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory. Note that 'RPMUpgrade.sh' already exists in "/Tekelec/WebNMS/bin" directory, so when the copy command asks for overwriting the	# cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.5.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y # cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.3.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y

	existing file, provide a response in affirmative as shown highlighted.	
7	Check the status of OCEEMS server.	# service e5msService status E5-MS server is running.
8	Shutdown OCEEMS server in case it is running.	# service e5msService stop Stopping E5-MS server... Done.
9	Check the status of OCEEMS server to verify that OCEEMS server has been shut down.	# service e5msService status E5-MS server is not started!
10	Check the status of MySQL to verify that it has been shut down. There should not be any entry in the given command output related to OCEEMS. To stop MySQL, move to directory “/Tekelec/WebNMS/bin/” and execute “stopMySQL.sh” script if it is running.	# ps -ef grep mysql root 59320 59299 0 21:06 pts/0 00:00:00 grep mysql
11	Change directory to /Tekelec/WebNMS/bin. Note: If upgrading from version 46.3 or above and OCEEMS server was running using a non-root user, execute updatePrivilegesForUser.sh script to give back the privileges to root user for upgrade. Else, there is no need to execute this script.	# cd /Tekelec/WebNMS/bin # sh updatePrivilegesForUser.sh root
12	Perform this step in both upgrade i.e Inter-release upgrade and Intra-release upgrade. Note : This will update log4j.xml file with new log4j.xml(As per log4j2)	\$ cd /Tekelec/WebNMS/bin vi RPMUpgrade.sh After line: showMessage "OCEEMS configuration files restoration is in progress..." Add Line: sh \$E5MS_HOME/WebNMS/bin/updateConf_46.6.5.sh \$DIRECTORY
13	Perform this step only in the case of intra upgrade, that is, 46.6.x to 46.6.y. Do the changes in /Tekelec/WebNMS/bin/RPMUpgrade.sh, as mentioned.	Inside /Tekelec/WebNMS/bin/RPMUpgrade.sh, Replace the line: \$JAVA_HOME/bin/java -DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File with the line: \$JAVA_HOME/bin/java -DseparateJVM=true -cp

		<pre>\$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar:\$E5MS_HOME/WebNMS/classes/NmsServerClasses.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File</pre>
14	<p>Execute the E5MSUpgrade.sh script and provide appropriate inputs shown as highlighted. The script shall upgrade the OCEEMS software and license using the RPM and license file provided as inputs.</p> <p>Note:</p> <ol style="list-style-type: none"> 1) Installer should take care while providing the path of OCEEMS Database dump file when prompted by upgrade script. The file provided should be /var/upgrade/Backup_465.14.0/E5MS_Database_BackUp.sql or /var/upgrade/Backup_463.15.0/E5MS_Database_BackUp.sql depending on whether the currently installed release was 46.5 or 46.3 respectively. 2) OCEEMS software and license upgrade logs shall be captured in a log file named '/var/upgrade/logs/upgrade_<system date>_<system time stamp>.log'. Please refer to section 9.0 for details of logging feature. 	<pre># sh E5MSUpgrade.sh Welcome to OCEEMS Upgrade. Please select one of the following options: 1. OCEEMS License Upgrade 2. OCEEMS Software Upgrade 3. Upgrade Both Press any other key to exit... Your Input: 3 Please provide the path of OCEEMS RPM file (including the RPM file name): /root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm OCEEMS RPM provided by you is: /root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm Are you sure you want to upgrade OCEEMS using the above RPM file (Y/N)? y <Messages given in LOG MESSAGES DURING OCEEMS UPGRADE are displayed on console> Please provide the path of license file (along with the license file name): /var/Upgrade/Rel46.6/E5MSLicense46.6.xml OCEEMS license upgrade is in progress... License upgrade done.</pre>
15	Verify that the RPM has been upgraded to the intended version.	<pre># rpm -qa E5-MS E5-MS-46.6.0.0.0_466.1.0.x86_64</pre>
16	In case a firewall is enabled between OCEEMS server and client or OCEEMS server and managed EAGLE(s), use the procedure given in OPENING PORTS USED BY OCEEMS IN CASE OF	<pre>Successful opening of ports if OCEEMS is behind firewall.</pre>

	FIREWALL to open the ports used by OCEEMS.	
17	Execute this step only if customer needs to run OCEEMS using a non-root user, else move to step 19. Execute updatePrivilegesForUser.sh script to create a non-root user for OCEEMS.	# sh updatePrivilegesForUser.sh non-root <Messages given in PROCEDURE TO CREATE A NON-ROOT USER FOR OCEEMS are displayed. Provide the inputs as required by the script>
18	Logout from 'root' user and login using the non-root user.	If customer is to use non-root user to run OCEEMS, this step onwards s/he will not need the root session. All commands are to be executed from non-root admin user. Ideally close down the session that was opened with root user to avoid the chance of running command from root user by mistake. Open a fresh session (PuTTY or whatever) for the non-root admin user.
19	Move to "/Tekelec/WebNMS/bin" directory by issuing the given command.	\$ cd /Tekelec/WebNMS/bin/
20	Use the procedure given in PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS to update the non-root user and its password in OCEEMS.	Successful execution of the procedure
21	Use the procedure given in PROCEDURE TO CREATE OCEEMS SSL CERTIFICATE to generate SSL certificate needed for HTTPS based web access for OCEEMS client.	Successful execution of the procedure
22	Start OCEEMS server. Messages similar to the given shall be displayed on console.	\$ service e5msService start Starting OCEEMS server... Starting mysql / 140722 07:23:41 mysqld_safe Logging to '/Tekelec/WebNMS/mysql/data/e5ms9.err'. 140722 07:23:41 mysqld_safe Starting mysqld daemon with databases from /Tekelec/WebNMS/mysql/data Warning: Using a password on the command line interface can be insecure. 140722 07:23:47 mysqld_safe mysqld from pid file /Tekelec/WebNMS/mysql/data/e5ms9.pid ended / Created table tek_cmi_type_cmds_history

		<Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console>
23	Use the procedure given in UPDATING XML CHANGES IN OCEEMS DATABASE to update OCEEMS database.	Successful execution of the procedure
24	Procedure Complete	This procedure is complete.

6.0 UPGRADE PROCEDURE (FAILOVER SERVER- WHEN OS UPGRADE IS REQUIRED)

Note: In OCEEMS release 46.6.3, OS upgrade is required.

S. No.	Step	Expected Output
1	Login to primary server using administrator (root) login.	Successful Login
2	Take a backup of the system. Save the backup created. This will be used after OS upgrade.	# cd /Tekelec/WebNMS/bin/backup/ # sh BackupDB.sh -d <directory where backup needs to be created>
3	Install Oracle Linux 7.8 on both primary and standby server.	Successful installation of Oracle Linux 7.8.
4	Create OCEEMS failover setup on Oracle Linux 7.8 on the current release. Note: Here, current release means older release. Release from where the upgrade to 46.6.3 is being attempted, for example, 46.3/46.5/46.6.2. First, the Database will be restored in the older release, and then Upgrade will take place for the application. Refer Install/Upgrade Guide of the current release for this.	Successful creation of failover setup
5	Restore the backup taken in Step 2.	Successful restore
6	Start OCEEMS server. The servers will start as primary and standby servers.	# service e5msService start
7	When the setup is up and running on new Linux version, upgrade OCEEMS to new version. Refer Section 7.0 to upgrade.	Successful upgrade from current to new release.
8	Procedure Complete	This procedure is complete.

7.0 UPGRADE PROCEDURE (FAILOVER SETUP- WHEN OS UPGRADE IS NOT REQUIRED)

In a failover setup, there are two OCEEMS servers installed on two machines, both having the same release of software and one working as a primary server and the other working as a standby server.

Primary server is the active server where all the OCEEMS processes are up and the standby server is one where only MySQL is up and the OCEEMS processes are not up. The standby server keeps monitoring the primary server and in case of primary server shutdown, it takes over the role of primary by starting all the OCEEMS processes. In failover setup, to keep database and configuration of both the servers in sync, database and configuration files are replicated between primary and standby servers.

Note: While upgrading to OCEEMS Release 46.6 from releases 46.3/46.5, the user shall have to upgrade OCEEMS software as well as license.

7.1 Upgrade OCEEMS License

OCEEMS license upgrade shall be required as explained in section 5.1. Upgrading OCEEMS license in a primary-standby setup is equivalent to upgrading license on both the servers one by one. The license shall be upgraded when the server is not running. To make sure that there is no downtime of OCEEMS, it is recommended to first upgrade license on the standby server and then on primary.

Note: In case of 46.6, a license upgrade shall be required only when OCEEMS software has been upgraded to 46.6 and a non-root user has been created for OCEEMS as per procedure 7.2. Therefore, the procedure given below assumes that non-root users for OCEEMS exist on both the primary and standby.

Purpose	Requirements	Time Required
Upgrading OCEEMS license on Primary and Standby servers	<ol style="list-style-type: none"> Login credentials of the root users on the target OCEEMS servers OCEEMS 46.6 license file on the target OCEEMS servers (Primary and Standby). If license file is on an external media, then the media should be mounted onto the target OCEEMS server and the license file should be copied to a location that is accessible to the non-root user for OCEEMS. The server (IP) hostname should be same in '/etc/hostname' and '/etc/hosts', for both Primary and Secondary servers 	10 Minutes

Following is the procedure. For clarity, we shall address the Primary server as 'server 1' and the Standby server as 'server 2'.

S. No.	Step	Expected Output
1	Execute steps 1 to 9 in procedure 5.1 to upgrade OCEEMS license on server 2 (standby).	Successful execution of the procedure
2	Start server 2. It shall come up as standby and start monitoring server 1 (primary server) and OCEEMS processes shall not start.	<pre>\$ service e5msService start Checking for the availability of the Primary Server in the Database. Found an entry. Trying to connect to the Primary Server at 10.248.9.3 Please waitConnected</pre>

		<p>Starting OCEEMS Standby Server. The Modules will be started once it takes over as the Primary Server.</p> <p>Monitoring the Primary Server at 10.248.9.3</p>
3	Login to server 1 (primary) using the non-root user (if OCEEMS is configured to be operated by non-root user) or the root user for OCEEMS.	Successful Login
4	Shutdown server 1 (primary).	<pre># service e5msService stop</pre> <p>Stopping OCEEMS server...</p> <p>Done.</p>
5	On detecting the shutdown of server 1 (primary), server 2 (standby) shall start the OCEEMS processes and take over the role of primary.	<p>Starting to do FailOver Tasks.</p> <p><Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console></p> <p>The new primary server is 10.248.21.70</p>
6	Execute steps 1 to 9 in procedure 5.1 to upgrade OCEEMS license on server 1.	Successful execution of the procedure
7	Start server 1. It shall start as standby server and start monitoring server 2 (primary) and OCEEMS processes shall not start.	<pre># service e5msService start</pre> <p>Checking for the availability of the Primary Server in the Database. Found an entry.</p> <p>Trying to connect to the Primary Server at 10.248.21.70</p> <p>Please waitConnected</p> <p>Starting OCEEMS Standby Server. The Modules will be started once it takes over as the Primary Server.</p> <p>Monitoring the Primary Server at 10.248.21.70</p>
8	Procedure Complete	This procedure is complete.

7.2 Upgrade OCEEMS Software (RPM)

OCEEMS software upgrade shall be required as explained in section 5.2. For software upgrade in a primary-standby setup, one needs to upgrade both the servers separately, one after another.

Purpose	Requirements	Time Required
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Upgrading OCEEMS software (RPM) on Primary and Standby servers	<ol style="list-style-type: none"> 1. Admin (root) login details of target OCEEMS servers (Primary and Standby) 2. OCEEMS 46.6 RPM copied onto the target OCEEMS servers (Primary and Standby). If RPM file is on an external media, then the media should be mounted to the target OCEEMS server. 3. Passwords of MySQL 'root' user for target OCEEMS servers (Primary and Standby) 	60 to 180 Minutes (Depends upon the size of data in OCEEMS database)
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Note: Before upgrading OCEEMS, verify that both primary and standby systems meets all the requirements for OCEEMS given in section 1.4. If the systems meets all the requirements, then proceed with the following procedure to upgrade OCEEMS. For clarity, we shall address the Primary server as 'server 1' and the Standby server as 'server 2'.

S. No.	Step	Expected Output
1	Login to server 2 (standby) using administrator (root) login.	Successful Login
2	Run the procedure given in UPDATING DATABASE CHANGES IN XML FILES PRIOR TO UPGRADE TO PRESERVE CUSTOM ALARM/EVENT VIEWS to preserve the custom alarm/event views.	Successful execution of the procedure
3	Change directory to /Tekelec/WebNMS/bin/backup.	# cd /Tekelec/WebNMS/bin/backup
4	<p>Execute the BackupDB.sh script to take backup of OCEEMS database. After the -d option, provide a location (absolute path) on server with sufficient space for the backup file. On completion, the script will create a backup file named E5MS_Database_BackUp.sql in the user provided directory.</p> <p>Note: This backup is needed in case upgrade fails and system needs to be restored to its pre-upgrade state.</p>	<pre># sh BackupDB.sh -d <Path where backup file needs to be created> e.g. # sh BackupDB.sh -d /tmp Please wait! Backup of E5-MS is in progress..- E5-MS database backup file "E5MS_Database_BackUp.sql" successfully created. \ Backup of directories successfully created. E5-MS Backup is completed.</pre>
5	Copy the 'BackUp.conf' file available in OCEEMS ISO to "/Tekelec/WebNMS/conf" directory.	<pre># cp <Absolute path of OCEEMS ISO>/BackUp.conf /Tekelec/WebNMS/conf # cp: overwrite `/Tekelec/WebNMS/conf/BackUp.conf'? y</pre>

	Note that 'BackUp.conf' already exists in "/Tekelec/WebNMS/conf" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.	
6	<p>If existing installed version is 46.5, then rename the 'RPMUpgrade_46.5.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory.</p> <p>If existing installed version is 46.3, then rename the 'RPMUpgrade_46.3.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory.</p> <p>Note that 'RPMUpgrade.sh' already exists in "/Tekelec/WebNMS/bin" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.</p> <p>If it is an intra release upgrade, that is, upgrade from 46.6.x to 46.6.y, skip this step.</p>	<pre># cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.5.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y # cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.3.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y</pre>
7	Shutdown the OCEEMS server on server 2.	<pre># service e5msService stop Stopping E5-MS server... MySQL not stopped for failover Done.</pre>
8	Check the status of OCEEMS server to verify that server has been shut down.	<pre># service e5msService status E5-MS server is not started!</pre>
9	Change directory to /Tekelec/WebNMS/bin.	<pre># cd /Tekelec/WebNMS/bin</pre>
10	<p>Stop MySQL by running the script.</p> <p>Note: If upgrading from version 46.3 or above and OCEEMS server was running using a non-root user, execute updatePrivilegesForUser.sh script to give back the privileges to root user for upgrade. Else, there is no need to execute this script.</p>	<pre># sh stopMySQL.sh Enter password: <> # sh updatePrivilegesForUser.sh root</pre>
11	Login to server 1 (primary) using administrator (root) login.	Successful Login

12	Run the procedure given in UPDATING DATABASE CHANGES IN XML FILES PRIOR TO UPGRADE TO PRESERVE CUSTOM ALARM/EVENT VIEWS to preserve the custom alarm/event views.	Successful execution of the procedure
13	Change directory to /Tekelec/WebNMS/bin/backup.	# cd /Tekelec/WebNMS/bin/backup
14	Execute the BackupDB.sh script to take backup of OCEEMS database. After the -d option, provide a location (absolute path) on server with sufficient space for the backup file. On completion, the script will create a backup file named E5MS_Database_BackUp.sql in the user provided directory. Note: This backup is needed in case upgrade fails and system needs to be restored to its pre-upgrade state.	# sh BackupDB.sh -d <Path where backup file needs to be created> e.g. # sh BackupDB.sh -d /tmp Please wait! Backup of E5-MS is in progress..- E5-MS database backup file "E5MS_Database_BackUp.sql" successfully created. \n Backup of directories successfully created. \n E5-MS Backup is completed.
15	Copy the 'BackUp.conf' file available in OCEEMS ISO to "/Tekelec/WebNMS/conf" directory. Note that 'BackUp.conf' already exists in "/Tekelec/WebNMS/conf" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.	# cp <Absolute path of OCEEMS ISO>/BackUp.conf /Tekelec/WebNMS/conf # cp: overwrite `/Tekelec/WebNMS/conf/BackUp.conf'? y
16	If existing installed version is 46.5, then rename the 'RPMUpgrade_46.5.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory. If existing installed version is 46.3, then rename the 'RPMUpgrade_46.3.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory.	# cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.5.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y # cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.3.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y

	<p>Note that 'RPMUpgrade.sh' already exists in "/> </p>	
17	<p>Shutdown the OCEEMS server on server 1.</p>	<pre># service e5msService stop Stopping E5-MS server... MySql not stopped for failover Done.</pre>
18	<p>Check the status of OCEEMS server to verify that server has been shut down.</p>	<pre># service e5msService status E5-MS server is not started!</pre>
19	<p>Change directory to /Tekelec/WebNMS/bin.</p>	<pre># cd /Tekelec/WebNMS/bin</pre>
20	<p>Stop MySQL by running the script.</p> <p>Note: If upgrading from version 46.3 or above and OCEEMS server was running using a non-root user, execute updatePrivilegesForUser.sh script to give back the privileges to root user for upgrade. Else, there is no need to execute this script.</p>	<pre># sh stopMySQL.sh Enter password: <> # sh updatePrivilegesForUser.sh root</pre>
21	<p>Perform this step only in case of intra upgrade i.e 46.6.x to 46.6.y. Do the changes in /Tekelec/WebNMS/bin/RPMUpgrade.sh, as mentioned.</p>	<p>Inside /Tekelec/WebNMS/bin/RPMUpgrade.sh,</p> <p>Replace the line: \$JAVA_HOME/bin/java -DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File</p> <p>with the line: \$JAVA_HOME/bin/java -DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar:\$E5MS_HOME/WebNMS/classes/NmsServerClasses.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File</p>
22	<p>On server 1, execute the E5MSUpgrade.sh script and provide appropriate inputs shown as highlighted.</p>	<pre># sh E5MSUpgrade.sh Welcome to OCEEMS Upgrade.</pre>

	<p>Note:</p> <p>1) Installer should take care while providing the path of OCEEMS Database dump file when prompted by upgrade script. The file provided should be /var/upgrade/Backup_465.14.0/E5MS_Database_BackUp.sql or /var/upgrade/Backup_463.15.0/E5MS_Database_BackUp.sql depending on whether the currently installed release was 46.5 or 46.3 respectively.</p> <p>2) OCEEMS upgrade logs will be captured in a log file named '/var/upgrade/logs/upgrade_<system date>_<system time stamp>.log'. Please refer to section 9.0 for details of logging feature.</p>	<p>Please select one of the following options:</p> <ol style="list-style-type: none"> 1. OCEEMS License Upgrade 2. OCEEMS Software Upgrade 3. Upgrade Both <p>Press any other key to exit...</p> <p>Your Input: 2</p> <p>Please provide the path of OCEEMS RPM file (including the RPM file name):</p> <p>/root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm</p> <p>OCEEMS RPM provided by you is:</p> <p>/root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm</p> <p>Are you sure you want to upgrade OCEEMS using the above RPM file (Y/N)? y</p> <p><Messages given in LOG MESSAGES DURING OCEEMS UPGRADE are displayed on console></p>
23	Verify that the RPM has been upgraded to the intended version.	<pre># rpm -qa E5-MS E5-MS-46.6.0.0.0_466.1.0.x86_64</pre>
24	Copy the OCEEMS database backup file generated during server 1 upgrade (var/upgrade/Backup_<Current_Installed_Version>/E5MS_Database_BackUp.sql) to server 2 at any temporary location (e.g. /tmp). The file copied should be /var/upgrade/Backup_465.14.0/E5MS_Database_BackUp.sql or /var/upgrade/Backup_463.13.0/E5MS_Database_BackUp.sql depending on whether the currently installed release was 46.5 or 46.3 respectively.	Successful execution of the procedure
25	Execute this step only if customer needs to run OCEEMS using non-root user, else move to step 29. Execute updatePrivilegesForUser.sh script to create a non-root user for OCEEMS.	<pre># sh updatePrivilegesForUser.sh non-root</pre> <p><Messages given in PROCEDURE TO CREATE A NON-ROOT USER FOR OCEEMS are displayed. Provide the inputs as required by the script></p>
26	Logout from 'root' user and login using the non-root user.	If customer is to use non-root user to run OCEEMS, this step onwards s/he will not need the root session. All commands are to be executed from non-root admin user. Ideally close down the session that was opened with root user to avoid the chance of running

		command from root user by mistake. Open a fresh session (PuTTY or whatever) for the non-root admin user.
27	Move to “/Tekelec/WebNMS/bin” directory by issuing the given command.	\$ cd /Tekelec/WebNMS/bin/
28	Use the procedure given in PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS to update the non-root user and its password in OCEEMS.	Successful execution of the procedure
29	Login to server 2 (standby) using admin (root) login.	Successful Login
30	Update the /Tekelec/WebNMS/classes/hbplib/hibernate.cfg.xml file to point the JDBC connection to the hostname of the standby server.	Update the following statement in /Tekelec/WebNMS/classes/hbplib/hibernate.cfg.xml – <pre><property name="connection.url">jdbc:mysql://<hostname of standby server>/WebNmsDB?dumpQueriesOnException=true&am p;jdbcCompliantTruncation=false</property></pre>
31	On server 2, change directory to /Tekelec/WebNMS/bin.	# cd /Tekelec/WebNMS/bin
32	Perform this step only in the case of intra upgrade, that is, 46.6.x to 46.6y. Do the changes in /Tekelec/WebNMS/bin/RPMUpgrade.sh, as mentioned.	Inside /Tekelec/WebNMS/bin/RPMUpgrade.sh, Replace this line: \$JAVA_HOME/bin/java -DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File with this line: \$JAVA_HOME/bin/java -DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar:\$E5MS_HOME/WebNMS/classes/NmsServerClasses.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File
33	Execute the E5MSUpgrade.sh script and provide appropriate inputs shown as highlighted. Note: 1) User should take care while providing the path of OCEEMS Database dump file when prompted by upgrade script. The file provided should be the one	# sh E5MSUpgrade.sh Welcome to OCEEMS Upgrade. Please select one of the following options: 1. OCEEMS License Upgrade 2. OCEEMS Software Upgrade 3. Upgrade Both

	<p>that was copied from server 1 in step 24 above and not the one generated by upgrade script on server 2.</p> <p>2) OCEEMS upgrade logs shall be captured in log file named <code>‘/var/upgrade/logs/upgrade_<system date>_<system time stamp>.log’</code>. Please refer to section 9.0 for details of logging feature.</p>	<p>Press any other key to exit...</p> <p>Your Input: 2</p> <p>Please provide the path of OCEEMS RPM file (including the RPM file name): <code>/root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm</code></p> <p>OCEEMS RPM provided by you is: <code>/root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm</code></p> <p>Are you sure you want to upgrade OCEEMS using the above RPM file (Y/N)? y</p> <p><Messages given in LOG MESSAGES DURING OCEEMS UPGRADE are displayed on console></p>
34	Verify that the RPM has been upgraded to the intended version.	<pre># rpm -qa E5-MS E5-MS-46.6.0.0.0_466.1.0.x86_64</pre>
35	<p>Execute this step only if customer needs to run OCEEMS using non-root user, else move to step 39.</p> <p>Note: If the release prior upgrade was 46.3 and a non-root user was used for OCEEMS operations then it is compulsory to create a non-root user after upgrade.</p> <p>Execute <code>updatePrivilegesForUser.sh</code> script to create a non-root user for OCEEMS.</p>	<pre># sh updatePrivilegesForUser.sh non-root</pre> <p><Messages given in PROCEDURE TO CREATE A NON-ROOT USER FOR OCEEMS are displayed. Provide the inputs as required by the script></p>
36	Logout from ‘root’ user and login using the non-root user.	<p>If customer is to use non-root user to run OCEEMS, this step onwards s/he will not need the root session. All commands are to be executed from non-root admin user. Ideally close down the session that was opened with root user to avoid the chance of running command from root user by mistake. Open a fresh session (PuTTY or whatever) for the non-root admin user.</p>
37	Move to “/Tekelec/WebNMS/bin” directory by issuing the given command.	<pre>\$ cd /Tekelec/WebNMS/bin/</pre>
38	Use the procedure given in PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS to	Successful execution of the procedure

	update the non-root user and its password in OCEEMS.	
39	Execute Steps 3 and 4 from Section 3.0 to create new certificate. This is required because of Tomcat upgrade to version 8.	Successful execution of the procedure
40	Login as either non-root users on both the servers (if OCEEMS is configured to be operated by non-root user) or the root user and execute the steps in section F.2 in to setup database replication between the primary and standby servers.	Successful execution of the procedure
41	On server 1, use the procedure given in UPDATING XML CHANGES IN OCEEMS DATABASE to update OCEEMS database.	Successful execution of the procedure
42	On server 2, use the procedure given in UPDATING XML CHANGES IN OCEEMS DATABASE to update OCEEMS database.	Successful execution of the procedure
43	In case of upgrade from any previous releases (46.3/46.5) to 46.6, license upgrade to 46.6 shall be required. Therefore, installer shall need to upgrade OCEEMS license using procedure 7.1 before starting server using the non-root user for OCEEMS. In that case, skip the next two steps.	Successful execution of the procedure
44	In case of upgrade from any previous version of 46.6 to a newer version of 46.6 (intra-release upgrade), login as either non-root user (if OCEEMS is configured to be operated by non-root user) or the root user on server 1 and start OCEEMS server. It shall start as primary server.	<pre>\$ service e5msService start Starting OCEEMS server... MySQL already running OS detected : Linux Created table tek_cmi_type_cmds_history <Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console></pre>
45	Login as either non-root user (if OCEEMS is configured to be operated by non-root user) or the root user on server 2 and start OCEEMS server. It shall start as standby server and start monitoring server 1 (primary) and OCEEMS processes shall not start.	<pre>\$ service e5msService start Starting OCEEMS server... MySQL already running Warning: Using a password on the command line interface can be insecure. / [root@e5ms9 bin]# OS detected : Linux Oracle Corporation.</pre>

		<p>Checking for the availability of the Primary Server in the Database. Found an entry.</p> <p>Trying to connect to the Primary Server at 10.248.9.5</p> <p>Please waitConnected</p> <p>Starting OCEEMS Standby Server. The Modules will be started once it takes over as the Primary Server.</p> <p>Monitoring the Primary Server at 10.248.9.5</p>
46	Procedure Complete	This procedure is complete.

7.3 Upgrade OCEEMS Software (RPM) and License

OCEEMS software and license upgrade shall be required as explained in section 5.3. The procedure to upgrade OCEEMS software (RPM) and license shall also be similar to procedure 5.3.

For software and license upgrade in a failover setup, one needs to upgrade both the servers separately, one after another.

Purpose	Requirements	Time Required
Upgrading OCEEMS software (RPM) and license on Primary and Standby servers	<ol style="list-style-type: none"> Admin (root) login details of target OCEEMS servers (Primary and Standby). OCEEMS 46.6 license file copied onto the target OCEEMS servers (Primary and Standby). If license file is on an external media, then the media should be mounted to the target OCEEMS server. OCEEMS 46.6 RPM copied onto the target OCEEMS servers (Primary and Standby). If RPM file is on an external media, then the media should be mounted to the target OCEEMS server. Passwords of MySQL 'root' user for target OCEEMS servers (Primary and Standby). 	60 to 180 Minutes (Depends upon the size of data in OCEEMS database)

Note:

- There shall be downtime of OCEEMS services during the upgrade procedure.
- Before upgrading OCEEMS, verify that both primary and standby systems meets all the requirements for OCEEMS given in section 1.4. If the systems meet all the requirements, then proceed with the following procedure to upgrade OCEEMS. For clarity, we shall address the Primary server as 'server 1' and the Standby server as 'server 2'.

S. No.	Step	Expected Output
1	Login to server 2 (standby) using administrator (root) login.	Successful Login

2	Run the procedure given in UPDATING DATABASE CHANGES IN XML FILES PRIOR TO UPGRADE TO PRESERVE CUSTOM ALARM/EVENT VIEWS to preserve the custom alarm/event views.	Successful execution of the procedure
3	Change directory to /Tekelec/WebNMS/bin/backup.	# cd /Tekelec/WebNMS/bin/backup
4	Execute the BackupDB.sh script to take backup of OCEEMS database. After the -d option, provide a location (absolute path) on server with sufficient space for the backup file. On completion, the script will create a backup file named E5MS_Database_BackUp.sql in the user provided directory. Note: This backup is needed in case upgrade fails and system needs to be restored to its pre-upgrade state.	# sh BackupDB.sh -d <Path where backup file needs to be created> e.g. # sh BackupDB.sh -d /tmp Please wait! Backup of E5-MS is in progress..- E5-MS database backup file "E5MS_Database_BackUp.sql" successfully created. \n Backup of directories successfully created. \n E5-MS Backup is completed.
5	Copy the 'BackUp.conf' file available in OCEEMS ISO to "/Tekelec/WebNMS/conf" directory. Note that 'BackUp.conf' already exists in "/Tekelec/WebNMS/conf" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.	# cp <Absolute path of OCEEMS ISO>/BackUp.conf /Tekelec/WebNMS/conf # cp: overwrite `/Tekelec/WebNMS/conf/BackUp.conf'? y
6	If existing installed version is 46.5, then rename the 'RPMUpgrade_46.5.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory. If existing installed version is 46.3, then rename the 'RPMUpgrade_46.3.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory.	# cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.5.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y # cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.3.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y

	<p>Note that 'RPMUpgrade.sh' already exists in "/Tekelec/WebNMS/bin" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.</p> <p>If it is an intra release upgrade, that is, upgrade from 46.6.x to 46.6.y, skip this step.</p>	
7	Shutdown the OCEEMS server on server 2.	<pre># service e5msService stop Stopping E5-MS server... MySQL not stopped for failover Done.</pre>
8	Check the status of OCEEMS server to verify that server has been shut down.	<pre># service e5msService status E5-MS server is not started!</pre>
9	Login to server 1 (primary) using administrator (root) login.	Successful Login
10	Run the procedure given in UPDATING DATABASE CHANGES IN XML FILES PRIOR TO UPGRADE TO PRESERVE CUSTOM ALARM/EVENT VIEWS to preserve the custom alarm/event views.	Successful execution of the procedure
11	Change directory to /Tekelec/WebNMS/bin/backup.	<pre># cd /Tekelec/WebNMS/bin/backup</pre>
12	<p>Execute the BackupDB.sh script to take backup of OCEEMS database. After the -d option, provide a location (absolute path) on server with sufficient space for the backup file. On completion, the script will create a backup file named E5MS_Database_BackUp.sql in the user provided directory.</p> <p>Note: This backup is needed in case upgrade fails and system needs to be restored to its pre-upgrade state.</p>	<pre># sh BackupDB.sh -d <Path where backup file needs to be created> e.g. # sh BackupDB.sh -d /tmp Please wait! Backup of E5-MS is in progress..- E5-MS database backup file "E5MS_Database_BackUp.sql" successfully created. \ Backup of directories successfully created. E5-MS Backup is completed.</pre>

13	<p>Copy the 'BackUp.conf' file available in OCEEMS ISO to "/Tekelec/WebNMS/conf" directory.</p> <p>Note that 'BackUp.conf' already exists in "/Tekelec/WebNMS/conf" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.</p>	<pre># cp <Absolute path of OCEEMS ISO>/BackUp.conf /Tekelec/WebNMS/conf # cp: overwrite `/Tekelec/WebNMS/conf/BackUp.conf'? y</pre>
14	<p>If existing installed version is 46.5, then rename the 'RPMUpgrade_46.5.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory.</p> <p>If existing installed version is 46.3, then rename the 'RPMUpgrade_46.3.sh' file available in OCEEMS ISO to 'RPMUpgrade.sh' and copy it to "/Tekelec/WebNMS/bin" directory.</p> <p>Note that 'RPMUpgrade.sh' already exists in "/Tekelec/WebNMS/bin" directory, so when the copy command asks for overwriting the existing file, provide a response in affirmative as shown highlighted.</p> <p>If it is an intra release upgrade, that is, upgrade from 46.6.x to 46.6.y, skip this step.</p>	<pre># cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.5.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y # cp <Absolute path of OCEEMS ISO>/RPMUpgrade_46.3.sh /tmp/RPMUpgrade.sh # cp /tmp/RPMUpgrade.sh /Tekelec/WebNMS/bin # cp: overwrite `/Tekelec/WebNMS/bin/RPMUpgrade.sh'? y</pre>
15	<p>Shutdown the OCEEMS server on server 1.</p>	<pre># service e5msService stop Stopping E5-MS server... MySQL not stopped for failover Done.</pre>
16	<p>Check the status of OCEEMS server to verify that server has been shut down.</p>	<pre># service e5msService status E5-MS server is not started!</pre>
17	<p>On server 2, stop MySQL process. For this, change directory to /Tekelec/WebNMS/bin and stop MySQL by running the given script.</p>	<pre># sh stopMySQL.sh Enter password: <></pre>
18	<p>On server 1, Change directory to /Tekelec/WebNMS/bin. Stop MySQL by running the script.</p> <p>Note: If upgrading from version 46.3 or above and OCEEMS server was</p>	<pre># cd /Tekelec/WebNMS/bin # sh stopMySQL.sh Enter password: <></pre>

	running using a non-root user, execute updatePrivilegesForUser.sh script to give back the privileges to root user for upgrade. Else, there is no need to execute this script.	# sh updatePrivilegesForUser.sh root
19	Perform this step only in the case of intra upgrade, that is, 46.6.x to 46.6.y. Do the changes in /Tekelec/WebNMS/bin/RPMUpgrade.sh, as mentioned.	<p>Inside /Tekelec/WebNMS/bin/RPMUpgrade.sh,</p> <p>Replace the line: \$JAVA_HOME/bin/java -DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File</p> <p>with the line: \$JAVA_HOME/bin/java -DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar:\$E5MS_HOME/WebNMS/classes/NmsServerClasses.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File</p>
20	<p>Execute the E5MSUpgrade.sh script and provide appropriate inputs shown as highlighted.</p> <p>Note:</p> <ol style="list-style-type: none"> 1) Installer should take care while providing the path of OCEEMS Database dump file when prompted by upgrade script. The file provided should be /var/upgrade/Backup_465.14.0/E5MS_Database_BackUp.sql or /var/upgrade/Backup_463.15.0/E5MS_Database_BackUp.sql depending on whether the currently installed release was 46.5 or 46.3 respectively. 2) OCEEMS upgrade and license upgrade logs will be captured in log file named '/var/upgrade/logs/upgrade_<system date>_<system time stamp>.log'. Please refer to section 9.0 for details of logging feature. 	<pre># sh E5MSUpgrade.sh Welcome to OCEEMS Upgrade. Please select one of the following options: 1. OCEEMS License Upgrade 2. OCEEMS Software Upgrade 3. Upgrade Both Press any other key to exit... Your Input: 3 Please provide the path of OCEEMS RPM file (including the RPM file name): /root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm OCEEMS RPM provided by you is: /root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm Are you sure you want to upgrade OCEEMS using the above RPM file (Y/N)? y <Messages given in LOG MESSAGES DURING OCEEMS UPGRADE are displayed on console></pre>

		<p>Please provide the path of license file (along with the license file name):</p> <p>/var/Upgrade/Rel46.6/OCEEMSLicense46.6.xml</p> <p>OCEEMS license upgrade is in progress...</p> <p>License upgrade done.</p>
21	Verify that the RPM has been upgraded to the intended version.	<pre># rpm -qa E5-MS E5-MS-46.6.0.0.0_466.1.0.x86_64</pre>
22	<p>Copy the OCEEMS database backup file generated during server 1 upgrade (var/upgrade/Backup_<Current_Installed_Version>/E5MS_Database_BackUp.sql) to server 2 at any temporary location (e.g. /tmp). The file copied should be</p> <p>/var/upgrade/Backup_465.14.0/E5MS_Database_BackUp.sql or /var/upgrade/Backup_463.13.0/E5MS_Database_BackUp.sql depending on whether the currently installed release was 46.5 or 46.3 respectively.</p>	<pre>scp <username of server 1>@<IP of server 1>:/var/upgrade/Backup_<Current_Installed_Version>/E5MS_Database_BackUp.sql <username of server 2>@<IP of server 2>:/tmp</pre>
23	<p>Execute this step only if customer needs to run OCEEMS using non-root user, else move to step 27.</p> <p>Execute updatePrivilegesForUser.sh script to create a non-root user for OCEEMS.</p>	<pre># sh updatePrivilegesForUser.sh non-root</pre> <p><Messages given in PROCEDURE TO CREATE A NON-ROOT USER FOR OCEEMS are displayed. Provide the inputs as required by the script></p>
24	Logout from 'root' user and login using the non-root user.	<p>If customer is to use non-root user to run OCEEMS, this step onwards s/he will not need the root session. All commands are to be executed from non-root admin user. Ideally close down the session that was opened with root user to avoid the chance of running command from root user by mistake. Open a fresh session (PuTTY or whatever) for the non-root admin user.</p>
25	Move to "/Tekelec/WebNMS/bin" directory by issuing the given command.	<pre>\$ cd /Tekelec/WebNMS/bin/</pre>
26	Use the procedure given in PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS to update the non-root user and its password in OCEEMS.	Successful execution of the procedure
27	Login to server 2 (standby) using admin (root) login.	Successful Login

28	<p>On server 2, verify that the JDBC connection in <code>/Tekelec/WebNMS/classes/hbplib/hibernate.cfg.xml</code> file is pointing to the hostname of the standby server. If not, then update the value to point to the hostname of standby server.</p>	<p>Update the following statement in <code>/Tekelec/WebNMS/classes/hbplib/hibernate.cfg.xml</code> –</p> <pre><property name="connection.url">jdbc:mysql://<hostname of standby server>/WebNmsDB?dumpQueriesOnException=true&am p;jdbcCompliantTruncation=false</property></pre>
29	<p>Change directory to <code>/Tekelec/WebNMS/bin</code>.</p> <p>Note: If upgrading from version 46.3 or above and OCEEMS server was running using a non-root user, execute <code>updatePrivilegesForUser.sh</code> script to give back the privileges to root user for upgrade. Else, there is no need to execute this script.</p>	<pre># cd /Tekelec/WebNMS/bin # sh updatePrivilegesForUser.sh root</pre>
30	<p>Perform this step only in the case of intra upgrade, that is, 46.6.x to 46.6.y. Do the changes in <code>/Tekelec/WebNMS/bin/RPMUpgrade.sh</code>, as mentioned.</p>	<p>Inside <code>/Tekelec/WebNMS/bin/RPMUpgrade.sh</code>,</p> <p>Replace the line: <code>\$JAVA_HOME/bin/java -DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File</code></p> <p>with the line: <code>\$JAVA_HOME/bin/java -DseparateJVM=true -cp \$E5MS_HOME/WebNMS/NetMonitor/build/E5MS_Server.jar:\$E5MS_HOME/WebNMS/classes/NmsServerClasses.jar com/tekelec/ems/util/UpdateRevisionChanges \$RELEASE \$RELEASE_NEW tee -a \$upgrade_Log_File</code></p>
31	<p>Execute the <code>E5MSUpgrade.sh</code> script and provide appropriate inputs shown as highlighted.</p> <p>Note:</p> <ol style="list-style-type: none"> 1) Installer should take care while providing the path of OCEEMS Database dump file when prompted by upgrade script. The file provided should be the one that was copied from server 1 in step 22 above and not the one generated by upgrade script on server 2. 2) OCEEMS software and license upgrade logs will be captured in log file named <code>'/var/upgrade/logs/upgrade_<sys</code> 	<pre># sh E5MSUpgrade.sh Welcome to OCEEMS Upgrade. Please select one of the following options: 1. OCEEMS License Upgrade 2. OCEEMS Software Upgrade 3. Upgrade Both Press any other key to exit... Your Input: 3 Please provide the path of OCEEMS RPM file (including the RPM file name):</pre>

	<p>tem date>_<system time stamp>.log'. Please refer to section 9.0 for details of logging feature.</p>	<pre>/root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm</pre> <p>OCEEMS RPM provided by you is: /root/Documents/E5-MS-46.6.0.0.0_466.1.0.x86_64.rpm</p> <p>Are you sure you want to upgrade OCEEMS using the above RPM file (Y/N)? y</p> <p><Messages given in LOG MESSAGES DURING OCEEMS UPGRADE are displayed on console></p> <p>Please provide the path of license file (along with the license file name): /var/Upgrade/Rel46.6/E5MSLicense46.6.xml</p> <p>OCEEMS license upgrade is in progress... License upgrade done.</p>
32	Verify that the RPM has been upgraded to the intended version.	<pre># rpm -qa E5-MS E5-MS-46.6.0.0.0_466.1.0.x86_64</pre>
33	<p>Execute this step only if customer needs to run OCEEMS using non-root user, else move to step 37.</p> <p>Move to “/Tekelec/WebNMS/bin” directory and execute updatePrivilegesForUser.sh script to create a non-root user for OCEEMS.</p>	<pre># cd /Tekelec/WebNMS/bin/ # sh updatePrivilegesForUser.sh non-root</pre> <p><Messages given in PROCEDURE TO CREATE A NON-ROOT USER FOR OCEEMS are displayed. Provide the inputs as required by the script></p>
34	Logout from ‘root’ user and login using the non-root user.	<p>If customer is to use non-root user to run OCEEMS, this step onwards s/he will not need the root session. All commands are to be executed from non-root admin user. Ideally close down the session that was opened with root user to avoid the chance of running command from root user by mistake. Open a fresh session (PuTTY or whatever) for the non-root admin user.</p>
35	Move to “/Tekelec/WebNMS/bin” directory by issuing the given command.	<pre>\$ cd /Tekelec/WebNMS/bin/</pre>
36	Use the procedure given in PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS to update the non-root user and its password in OCEEMS.	Successful execution of the procedure

37	Execute Steps 3 and 4 from Section 3.0 to create new certificate. This is required because of Tomcat upgrade to version 8.	Successful execution of the procedure
38	Login as either non-root users (if OCEEMS is configured to be operated by non-root user) or the root users on both the servers and execute the steps in section F.2 in to setup replication between the servers.	Successful Login
39	As either non-root user (if OCEEMS is configured to be operated by non-root user) or the root user on server 1, use the procedure given in UPDATING XML CHANGES IN OCEEMS DATABASE to update OCEEMS database.	Successful execution of the procedure
40	As either non-root user (if OCEEMS is configured to be operated by non-root user) or the root user on server 2, use the procedure given in UPDATING XML CHANGES IN OCEEMS DATABASE to update OCEEMS database.	Successful execution of the procedure
41	Start OCEEMS server on server 1 by either non-root user (if OCEEMS is configured to be operated by non-root user) or the root user. It shall start as primary server.	<pre>\$ service e5msService start Starting OCEEMS server... MySQL already running OS detected : Linux Created table tek_cmi_type_cmds_history <Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console></pre>
42	Start OCEEMS server on server 2 as either non-root user (if OCEEMS is configured to be operated by non-root user) or the root user. It shall start as standby server and start monitoring server 1 (primary) and OCEEMS processes shall not start.	<pre>\$ service e5msService start Starting OCEEMS server... MySQL already running Warning: Using a password on the command line interface can be insecure. / [root@e5ms9 bin]# OS detected : Linux Oracle Corporation. Checking for the availability of the Primary Server in the Database. Found an entry.</pre>

		<p>Trying to connect to the Primary Server at 10.248.9.5</p> <p>Please waitConnected</p> <p>Starting OCEEMS Standby Server. The Modules will be started once it takes over as the Primary Server.</p> <p>Monitoring the Primary Server at 10.248.9.5</p>
43	Procedure Complete	This procedure is complete.

8.0 RESTORATION OF OCEEMS IN CASE OF SOFTWARE UPGRADE FAILURE

If software upgrade of OCEEMS fails due to any reason, following steps are recommended to restore OCEEMS to its previous state –

- 1) Find the OCEEMS RPM installed on the system prior to failed attempt of upgrade. Also, get the OCEEMS installation document applicable to that OCEEMS RPM.
- 2) Do a fresh installation of OCEEMS as mentioned in OCEEMS installation document.
- 3) During the failed attempt to upgrade software, a backup of OCEEMS database and configuration files is taken and placed at location “/var/upgrade/Backup_<Current_Installed_Version>” on the system. After installing OCEEMS afresh, the support engineer shall need to restore OCEEMS state using the backup mentioned in previous statement. For restoring data, section 8.1 should be followed.
- 4) In case of upgrade failure of a primary-standby setup, the server on which upgrade failed shall be restored using the above steps and then failover should be created again on the setup.

8.1 Restoring OCEEMS from an existing backup file

A system user with privileges to execute `/Tekelec/WebNMS/bin/backup/RestoreDB.sh` script will have the ability to restore OCEEMS system to a previous state by using a database backup file generated earlier. Before restoring the contents (data and configuration), OCEEMS server must be shut down. This is because the restore script deletes the existing database tables in database and re-creates them using the database backup file provided by user during the restoration of OCEEMS.

8.1.1 Restoring from the default/any other backup location

Restore script can be executed using the command given below -

```
# sh /Tekelec/WebNMS/bin/backup/RestoreDB.sh <absolute path of database backup file>
```

Note that the path of database backup file provided while running the restore script must also have the other configuration files backed up by OCEEMS. The default location of backup automatically has all the content backed up by OCEEMS as shown below.

- /var/backup/Classes
- /var/backup/commandManagerScripts
- /var/backup/conf
- /var/backup/defaultconf
- /var/backup/html
- /var/backup/linkUtilizationScripts
- /var/backup/reportingStudio
- /var/backup/users
- /var/backup/E5MS_Database_BackUp.sql

In case, user wishes to provide a location of the backup file that is different from the default location, s/he must first verify that the location has all the contents mentioned above. In case the non-default location does not have all the contents, then the user should first copy the contents from the default location to the non-default location and then proceed with restoration.

For example, for restoring from the default OCEEMS backup location, following command can be issued -

```
# sh /Tekelec/WebNMS/bin/backup/RestoreDB.sh /var/backup/E5MS_Database_BackUp.sql
```

Sample output of restore script execution is shown in **LOG MESSAGES WHILE RESTORING OCEEMS**.

8.1.2 Default restore contents

The restore script uses the entries in `/Tekelec/WebNMS/bin/backup/TablesToRestore.conf` file to know what to restore (data and configuration). This has been explained below -

- Database tables

```
<RESTORE TABLES="ALL"  
    DYNAMIC_TABLES="true"  
    SKIP_INDEX="TRUE">  
</RESTORE>
```

The above statement means restoring all the database tables present in the database backup file.

- Configuration

```
<FILES_TO_RESTORE  
DIR_NAMES="conf/tekelec,users,commandManagerScripts,linkUtilizationScripts,reporti  
ngStudio"  
FILE_NAMES="defaultconf/usernamePassword.conf,conf/securitydbData.xml,conf/clientp  
arameters.conf,classes/hbplib/hibernate.cfg.xml,classes/hbplib/secondary/hibernate  
.cfg.xml,conf/transportProvider.conf,conf/trapport.conf,conf/NmsProcessesBE.conf,c  
onf/serverparameters.conf,conf/SmartUpdateManager.xml,html/NMSSocketPort.html">  
</FILES_TO_RESTORE>
```

The above statement means restoring all the files listed in 'FILE_NAMES' tag and all the directories listed in 'DIR_NAMES' tag respectively.

8.1.3 Time taken in restore

The time taken by restore process shall depend upon the size of OCEEMS backup. The size of backup will in turn depend upon the size of OCEEMS database backup file. Restoration will approximately take few minutes (for e.g. 10 to 15 minutes for small database) or more depending upon the size of backup.

8.1.4 Status of restore

The status of restore shall be shown through relevant log messages on console as shown in **LOG MESSAGES WHILE RESTORING OCEEMS**.

9.0 LOGGING DURING UPGRADE

Release 46.2 of OCEEMS has implemented a new feature of logging for the upgrade procedure. In earlier releases, logs during upgrade were only available on the console where upgrade was being done and not available after the console was closed.

In Release 46.2, all the logs appearing on console during upgrade shall automatically be saved in a file named 'upgrade_<date>_<time_stamp>.log' located in "/var/upgrade/logs" directory. The date and timestamp used in the file name will signify the system date and time when upgrade was started by the user. A temporary file named 'upgrade.temp' will also be created during upgrade in the same directory and will have some intermediate upgrade related log messages. On completion of upgrade, the log messages in this file shall be copied to 'upgrade_<date>_<time_stamp>.log' file and this temporary file will be deleted from the system. This file will also be created on fresh installation of R46.2 and will not be deleted in that case because the code for deletion of this file is available in upgrade workflow only.

Note: The script responsible for OCEEMS upgrade is picked from the existing (installed) RPM and not from the new RPM that is being upgraded to. This is why the upgrade log will not be available on upgrade to release 46.2 in spite of the supporting code being there in the new RPM. However, once release 46.2 is installed, then on any subsequent upgrade to a newer release, upgrade logs will be available as per the details given in the above paragraph.

APPENDIX A. LOG MESSAGES ON FIRST STARTUP OF OCEEMS SERVER AFTER INSTALLATION

Headless Exception detected. Continuing in the command line mode...

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APPENDIX B. LOG MESSAGES ON STARTING OCEEMS SERVER

Oracle Corporation.

Starting Oracle Communications EAGLE Element Management System "Primary" Server Modules, please wait

This edition of Oracle Communications EAGLE Element Management System with release 46.6.0.0.0 is a registered version in name of EMS in company Aricent.

```

Process : NmsAuthenticationManager          [ Started ]
Process : ParseMeasReports                  [ Started ]
Process : CheckReplication                  [ Started ]
Process : MeasurementScheduler              [ Started ]
Process : TL1CustomViewsMgr                [ Started ]
Process : NmsConfigurationServer           [ Started ]
Process : CommunicationBEProcess            [ Started ]
Process : WebNMSAgentApp                    [ Started ]
Process : StartProvModule                   [ Started ]
Process : SnmpAgentProcess                  [ Started ]
Process : NmsTftpServer                     [ Started ]
Process : WebNMSMgmtBEProcess               [ Started ]
Process : UtilizationScheduler              [ Started ]
Process : TL1DiscProcess                    [ Started ]
Process : NMSTAServer                       [ Started ]
Process : StorageServer                     [ Started ]
Process : EMSInitializationProcess          [ Started ]
Process : UserConfigProcess                 [ Started ]
Process : E5msSchedulerProcess              [ Started ]
Process : WebNMSBackUp                      [ Started ]
Process : RunJSPModule                       [ Started ]
Process : MapServerBE                       [ Started ]
Process : ProcessTest                       [ Started ]
Process : CLIFactoryBinder                  [ Started ]
Process : RunRmiRegistry                     [ Started ]
Process : EventMgr                           [ Started ]
Process : DBServer                           [ Started ]
Process : StartTelnetClient                  [ Started ]
Process : NmsPolicyMgr                       [ Started ]
Process : NMSMServer                         [ Started ]
Process : NbiProcess                         [ Started ]
Process : TL1EventProcess                    [ Started ]
Process : Collector                          [ Started ]
Process : TL1GatewayProcess                  [ Started ]
Process : CMISchedulerInitiator              [ Started ]
Process : ParsingScheduler                   [ Started ]
Process : AdminModuleInit                    [ Started ]
Process : DataMgmtRPI                        [ Started ]
Process : NMSSAServer                        [ Started ]
Process : NmsAuthManager                     [ Started ]
Process : NmsMainFE                          [ Started ]
Process : TAServerFE                          [ Started ]
Process : SAServerFE                          [ Started ]
Process : AuthenticationManagerFE            [ Started ]
Process : NmsSAServerFE                      [ Started ]
Process : EventFE                            [ Started ]
Process : MapFE                              [ Started ]
Process : PolicyFE                           [ Started ]
Process : AlertFE                            [ Started ]
Process : UserConfigProcessFE                [ Started ]
Process : ConfigFE                           [ Started ]
Process : StorageServerFE                    [ Started ]
Process : AuthorizationManagerFE             [ Started ]
Process : StartTelnetClientFE                [ Started ]

```

```
Process : PollFE [ Started ]
Process : ExampleFE [ Started ]
Process : TopoFE [ Started ]
Process : MServerFE [ Started ]
Process : ProvisioningFE [ Started ]
Process : CommunicationFEProcess [ Started ]
Process : WebNMSMgmtFEProcess [ Started ]
```

Verifying connection with web server ... verified

OCEEMS Server modules started successfully at Jun 16,2016 10:33:26 PM

Please connect your client to the web server on port: 8443

APPENDIX C. LOG MESSAGES ON STOPPING OCEEMS SERVER

Interrupt signal received Shutting down OCEEMS Server

Trying to Shutdown OCEEMS Server

Schedulers Stopped successfully

All Shut Down Observers Notified

```
Process : CommunicationFEProcess      [ Stopped ]
Process : WebNMSMgmtFEProcess         [ Stopped ]
Process : NmsSAServerFE               [ Stopped ]
Process : StorageServerFE             [ Stopped ]
Process : TAServerFE                  [ Stopped ]
Process : ExampleFE                   [ Stopped ]
Process : UserConfigProcessFE         [ Stopped ]
Process : ProvisioningFE              [ Stopped ]
Process : StartTelnetClientFE         [ Stopped ]
Process : PolicyFE                    [ Stopped ]
Process : ConfigFE                    [ Stopped ]
Process : TopoFE                      [ Stopped ]
Process : PollFE                      [ Stopped ]
Process : AlertFE                     [ Stopped ]
Process : EventFE                     [ Stopped ]
Process : MapFE                       [ Stopped ]
Process : AuthorizationManagerFE      [ Stopped ]
Process : AuthenticationManagerFE     [ Stopped ]
Process : MServerFE                   [ Stopped ]
Process : SAServerFE                  [ Stopped ]
Process : CheckReplication             [ Stopped ]
Process : MeasurementScheduler         [ Stopped ]
Process : SnmpAgentProcess            [ Stopped ]
Process : NbiProcess                  [ Stopped ]
Process : E5msSchedulerProcess        [ Stopped ]
Process : UtilizationScheduler        [ Stopped ]
Process : ParsingScheduler            [ Stopped ]
Process : ParseMeasReports            [ Stopped ]
Process : CMISchedulerInitiator       [ Stopped ]
Process : EMSInitializationProcess    [ Stopped ]
Process : CommunicationBEProcess      [ Stopped ]
```



```
Process : WebNMSMgmtBEProcess      [ Stopped ]
Process : DataMgmtRPI              [ Stopped ]
Process : AdminModuleInit          [ Stopped ]
Process : TL1GatewayProcess        [ Stopped ]
Process : TL1CustomViewsMgr        [ Stopped ]
Process : TL1EventProcess          [ Stopped ]
Process : TL1DiscProcess           [ Stopped ]
Process : UserConfigProcess        [ Stopped ]
Process : StorageServer            [ Stopped ]
Process : StartTelnetClient        [ Stopped ]
Process : CLIFactoryBinder         [ Stopped ]
Process : StartProvModule          [ Stopped ]
Process : NmsConfigurationServer   [ Stopped ]
Process : ProcessTest             [ Stopped ]
Process : WebNMSAgentApp           [ Stopped ]
Process : WebNMSBackUp            [ Stopped ]
Process : NmsMainFE               [ Stopped ]
Process : NmsPolicyMgr            [ Stopped ]
Process : EventMgr                [ Stopped ]
Process : Collector               [ Stopped ]
Process : MapServerBE             [ Stopped ]
Process : NmsAuthenticationManager [ Stopped ]
Process : NmsAuthManager          [ Stopped ]
Process : NmsTftpServer           [ Stopped ]
Process : NMSTAServer             [ Stopped ]
Process : NMSMServer              [ Stopped ]
Process : NMSSAServer             [ Stopped ]
Process : DBServer                [ Stopped ]
Process : RunJSPModule            [ Stopped ]
Process : RunRmiRegistry          [ Stopped ]
```

All Database connections disconnected

OCEEMS Server Successfully Shut Down

APPENDIX D. LOG MESSAGES ON INSTALLATION OF OCEEMS SCHEMA

The CMI Schema will be installed as per the Eagle Release entered.

Press 'Enter' if you want to proceed with the Default Eagle Release(46.6.0) or
Enter the Eagle Release from the below available Eagle CMI Schemas in OCEEMS:

46.3.0

46.5.0

46.6.0

46.6.0

Eagle CMI Path is: /Tekelec/WebNMS/bin/schema/cmi/eagle46.6.0

Data insertion for CMI module: Start

Table tek_cmi_cmdclasses: Start

Table tek_cmi_cmdclasses: Done!

Table tek_cmi_commands: Start

Table tek_cmi_commands: Done!

Table tek_cmi_cmdclass_cmd_map: Start

Table tek_cmi_cmdclass_cmd_map: Done!

Table tek_cmi_cmd_params: Start

Table tek_cmi_cmd_params: Done!

Table tek_cmi_cmd_param_values: Start

Table tek_cmi_cmd_param_values: Done!

Table tek_cmi_cmd_param_map: Start

Table tek_cmi_cmd_param_map: Done!

Table tek_cmi_cmd_param_validation: Start

Table tek_cmi_cmd_param_validation: Done!

Table tek_cmi_cmd_param_lookup: Start

Table tek_cmi_cmd_param_lookup: Done!

Data insertion for CMI module: Done!

Data insertion for Measurement module: Start

Table tekelec_meas_reports: Start

Table tekelec_meas_reports: Done!

Data insertion for Measurement module: Done!

Data insertion for NBI module: Start

Data insertion for NBI module: Done!

APPENDIX E. LOG MESSAGES DURING OCEEMS UPGRADE

Note: Database dump file needed for restoring old data (see highlighted below) shall be required only in case OCEEMS is being upgraded from R46.0/46.0.1/46.2. Release 46.2 onwards, these upgrade logs will also be captured in log file 'upgrade_<date>_<time stamp>.log' located in "/var/upgrade/logs" directory.

OCEEMS software upgrade is in progress!

Please do not close the command terminal or interrupt the script execution.....

Please wait! OCEEMS Backup is in progress...

OCEEMS database backup file "E5MS_Database_BackUp.sql" successfully created.

Backup of directories successfully created.

OCEEMS Backup is completed.

OCEEMS RPM upgrade is in progress...

Current RPM version: 463.15.0

Installed OCEEMS rpm version: 463

Current OCEEMS rpm version is lower than the version supporting MySQL 5.6.38.

MySQL version in use is lower than 5.6.38, OCEEMS data needs to be backed up for upgrade.

MySQL already running.

Warning: Using a password on the command line interface can be insecure.

MySQL data successfully backed up at /var/upgrade/Backup_463.15.0/MySQL_Backup.sql

Invoking MySQL backup, OCEEMS data needs to be backed up for compatibility changes.

Shutting down MySQL, this will break MySQL replication in OCEEMS failover setup! Please re-setup MySQL replication for OCEEMS failover post upgrade.

Warning: Using a password on the command line interface can be insecure.

MySQL release change detected, backing up MySQL directory to /var/upgrade/Backup_463.15.0/mysql

No MySQL backup directory found.

MySQL backup completed.

MySQL not running.

Starting mysqld ...

... mysqld started.

Performing MySQL upgrade to repair any tablespace.

Warning: Using a password on the command line interface can be insecure.

Looking for 'mysql' as: bin/mysql

Looking for 'mysqlcheck' as: bin/mysqlcheck

Running 'mysqlcheck with default connection arguments

Warning: Using a password on the command line interface can be insecure.

Running 'mysqlcheck with default connection arguments

Warning: Using a password on the command line interface can be insecure.

mysql.columns_priv

OK

```
mysql.db OK
mysql.event OK
mysql.func OK
mysql.general_log OK
mysql.help_category OK
mysql.help_keyword OK
mysql.help_relation OK
mysql.help_topic OK
mysql.ndb_binlog_index OK
mysql.plugin OK
mysql.proc OK
mysql.procs_priv OK
mysql.proxies_priv OK
mysql.servers OK
mysql.slow_log OK
mysql.tables_priv OK
mysql.time_zone OK
mysql.time_zone_leap_second OK
mysql.time_zone_name OK
mysql.time_zone_transition OK
mysql.time_zone_transition_type OK
mysql.user OK
```

Running 'mysql_fix_privilege_tables'...

Warning: Using a password on the command line interface can be insecure.

Running 'mysqlcheck with default connection arguments

Warning: Using a password on the command line interface can be insecure.

Running 'mysqlcheck with default connection arguments

Warning: Using a password on the command line interface can be insecure.

OK

Warning: Using a password on the command line interface can be insecure.

Restoring mysql database.

Warning: Using a password on the command line interface can be insecure.

Please provide the path of OCEEMS Database dump file (including the dump file name):

`/var/upgrade/Backup_463.15.0/E5MS_Database_BackUp.sql`

OCEEMS dump file provided by you is:

`/var/upgrade/Backup_463.15.0/E5MS_Database_BackUp.sql`

Restoring OCEEMS database. Please do not close the console window, it may take several minutes depending upon OCEEMS data size and system performance.....

Warning: Using a password on the command line interface can be insecure.

OCEEMS data restoration: start

OCEEMS data restoration: done

OCEEMS data migration completed on new MySQL version, please re setup mysql replication for OCEEMS failover.

Performing mysql upgrade on restored data.

Warning: Using a password on the command line interface can be insecure.

Looking for 'mysql' as: bin/mysql

Looking for 'mysqlcheck' as: bin/mysqlcheck

Running 'mysqlcheck with default connection arguments

Warning: Using a password on the command line interface can be insecure.

Running 'mysqlcheck with default connection arguments

Warning: Using a password on the command line interface can be insecure.

mysql.columns_priv	OK
mysql.db	OK
mysql.event	OK
mysql.func	OK
mysql.general_log	OK
mysql.help_category	OK
mysql.help_keyword	OK
mysql.help_relation	OK
mysql.help_topic	OK
mysql.innodb_index_stats	OK
mysql.innodb_table_stats	OK
mysql.ndb_binlog_index	OK
mysql.plugin	OK
mysql.proc	OK
mysql.procs_priv	OK
mysql.proxies_priv	OK
mysql.servers	OK
mysql.slave_master_info	OK
mysql.slave_relay_log_info	OK
mysql.slave_worker_info	OK
mysql.slow_log	OK
mysql.tables_priv	OK
mysql.time_zone	OK
mysql.time_zone_leap_second	OK
mysql.time_zone_name	OK

```
mysql.time_zone_transition          OK
mysql.time_zone_transition_type     OK
mysql.user                          OK
Running 'mysql_fix_privilege_tables'...
Warning: Using a password on the command line interface can be insecure.
Running 'mysqlcheck with default connection arguments
Warning: Using a password on the command line interface can be insecure.
Running 'mysqlcheck with default connection arguments
Warning: Using a password on the command line interface can be insecure.
WebNmsDB.ANNOTATION                 OK
WebNmsDB.Alert                     OK
WebNmsDB.AlertPolicyObject         OK
WebNmsDB.AttributeAudit            OK
WebNmsDB.AuthAudit                 OK
WebNmsDB.BEFailOver               OK
WebNmsDB.CCTV                     OK
WebNmsDB.CCTVIEWS                 OK
WebNmsDB.CHILDRENSTATUS            OK
WebNmsDB.CORBANode                 OK
WebNmsDB.CRITERIAPROPERTIES        OK
WebNmsDB.ConfigAttributes           OK
WebNmsDB.ConfigProvider            OK
WebNmsDB.ConfigTaskDetails         OK
WebNmsDB.ConfigTasks              OK
WebNmsDB.CustomView                OK
WebNmsDB.CustomViewColumns         OK
WebNmsDB.CustomViewProps           OK
WebNmsDB.DASHBOARD                 OK
WebNmsDB.DASHBOARDCOLUMNS         OK
WebNmsDB.DBPOLICY                  OK
WebNmsDB.DataCollectionAttributes   OK
WebNmsDB.DeviceAudit               OK
WebNmsDB.DeviceList                OK
WebNmsDB.DeviceListDetails         OK
WebNmsDB.DeviceUserProps           OK
WebNmsDB.ENGINES                   OK
WebNmsDB.ENGINETABLE               OK
WebNmsDB.Event                     OK
WebNmsDB.FAULTREPORTS_DAILY        OK
WebNmsDB.FAULTREPORTS_HOURLY       OK
WebNmsDB.FilterCommandAlertAction  OK
```

WebNmsDB.FilterCommandEventAction	OK
WebNmsDB.GMapSymbol	OK
WebNmsDB.GroupTable	OK
WebNmsDB.HOSTS	OK
WebNmsDB.IpAddress	OK
WebNmsDB.MAPPEDPROPERTIES	OK
WebNmsDB.MAPUSERPROPS	OK
WebNmsDB.ManagedGroupObject	OK
WebNmsDB.ManagedObject	OK
WebNmsDB.MapContainer	OK
WebNmsDB.MapDB	OK
WebNmsDB.MapGroup	OK
WebNmsDB.MapLink	OK
WebNmsDB.MapSymbol	OK
WebNmsDB.MonitorNmsParameter	OK
WebNmsDB.NMS_STATUS_MONITOR7_17_2014	OK
WebNmsDB.NamedViewToAuthorizedViewTable	OK
WebNmsDB.Network	OK
WebNmsDB.NetworkInventory	OK
WebNmsDB.Node	OK
WebNmsDB.NotificationLog	OK
WebNmsDB.OBJECTSTOLINK	OK
WebNmsDB.ObjectSchedulerRUNNABLE	OK
WebNmsDB.ObjectTypes	OK
WebNmsDB.OperationsTable	OK
WebNmsDB.OperationsTreeTable	OK
WebNmsDB.POLICYUSERPROPS	OK
WebNmsDB.PORTS	OK
WebNmsDB.PanelTree	OK
WebNmsDB.PendingDevices	OK
WebNmsDB.PendingTasks	OK
WebNmsDB.PolicyActionCondition	OK
WebNmsDB.PolicyObject	OK
WebNmsDB.PolicyScheduleTime	OK
WebNmsDB.PollIDToKeyMap	OK
WebNmsDB.PolledData	OK
WebNmsDB.PollingAttributes	OK
WebNmsDB.PollingObjects	OK
WebNmsDB.PortObject	OK
WebNmsDB.Printer	OK

WebNmsDB.Providers	OK
WebNmsDB.ProvisionResult	OK
WebNmsDB.ProvisioningVariant	OK
WebNmsDB.ProvisioningVariantProps	OK
WebNmsDB.REPORTS_DAILY	OK
WebNmsDB.REPORTS_HOURLY	OK
WebNmsDB.Reports	OK
WebNmsDB.STATSAGGREGATIONDAILY	OK
WebNmsDB.STATSAGGREGATIONHOURLY	OK
WebNmsDB.STATSDATA6_3_2016	OK
WebNmsDB.STRINGDATA6_3_2016	
WebNmsDB.SendEmailAlertAction	OK
WebNmsDB.SendEmailEventAction	OK
WebNmsDB.SnmpInterface	OK
WebNmsDB.SnmpNode	OK
WebNmsDB.StageIdVsConfigId	OK
WebNmsDB.StatsTables	OK
WebNmsDB.SwitchObject	OK
WebNmsDB.TL1Interface	OK
WebNmsDB.TL1Node	OK
WebNmsDB.TaskAudit	OK
WebNmsDB.TaskToDeviceListMap	OK
WebNmsDB.Tek_Secu_MapUserGrpEagleNode	OK
WebNmsDB.Tek_Secu_MapUsergrpCmdClass	OK
WebNmsDB.Tek_Secu_PasswordConfig	OK
WebNmsDB.Tek_Secu_UserInfo	OK
WebNmsDB.Tek_inventory_card	OK
WebNmsDB.Tek_inventory_eagleNode	OK
WebNmsDB.Tek_inventory_epap	OK
WebNmsDB.Tek_inventory_frame	OK
WebNmsDB.Tek_inventory_lsmsnode	OK
WebNmsDB.Tek_inventory_shelf	OK
WebNmsDB.Tek_inventory_slot	OK
WebNmsDB.ThresholdObjects	OK
WebNmsDB.TopoObject	OK
WebNmsDB.TrapDisabledMO	OK
WebNmsDB.UIDataIdVsPRId	OK
WebNmsDB.USERS	OK
WebNmsDB.USERTABLE	OK
WebNmsDB.USMTABLE	OK
WebNmsDB.UserConfTable	OK

WebNmsDB.UserGroupTable	OK
WebNmsDB.UserInputData	OK
WebNmsDB.UserPasswordTable	OK
WebNmsDB.VACMACCESSTABLE	OK
WebNmsDB.VACMCONTEXTTABLE	OK
WebNmsDB.VACMSECURITYTOGROUPTABLE	OK
WebNmsDB.VACMVIEWTREEFAMILYTABLE	OK
WebNmsDB.VarBindLog	OK
WebNmsDB.ViewPropertiesTable	OK
WebNmsDB.ViewToOperationsTable	OK
WebNmsDB.ViewsToGroupTable	OK
WebNmsDB.WIDGET	OK
WebNmsDB.WIDGETASSOCIATION	OK
WebNmsDB.WIDGETCRITERIA	OK
WebNmsDB.WIDGETDATASOURCE	OK
WebNmsDB.WIDGETLEVEL	OK
WebNmsDB.smsprofiles	OK
WebNmsDB.smserver_out	OK
WebNmsDB.tek_cmi_cmd_param_lookup	OK
WebNmsDB.tek_cmi_cmd_param_map	OK
WebNmsDB.tek_cmi_cmd_param_validation	OK
WebNmsDB.tek_cmi_cmd_param_values	OK
WebNmsDB.tek_cmi_cmd_params	OK
WebNmsDB.tek_cmi_cmdclass_cmd_map	OK
WebNmsDB.tek_cmi_cmdclasses	OK
WebNmsDB.tek_cmi_commands	OK
WebNmsDB.tek_lui_config_data	OK
WebNmsDB.tek_lui_link_data	OK
WebNmsDB.tek_lui_linkdata_timestamp	OK
WebNmsDB.tek_lui_measurements	OK
WebNmsDB.tek_lui_slk_capacity	OK
WebNmsDB.tek_lui_slk_capacity_arch	OK
WebNmsDB.tek_lui_slk_reptstatcard	OK
WebNmsDB.tek_nbi_ftp_config	OK
WebNmsDB.tek_nbi_nms_config	OK
WebNmsDB.tek_rept_tokens	OK
WebNmsDB.tek_rprt_rept_stat_card	OK
WebNmsDB.tek_scheduler_task	OK
WebNmsDB.tek_snmp_agent_config	OK
WebNmsDB.tekelec_meas_headers	OK

```
WebNmsDB.tekelec_meas_reports          OK
OK
Shutting down MySQL...
Warning: Using a password on the command line interface can be insecure.
Removing temp files.
OCEEMS upgrade completed.
RPM upgrade done.

OCEEMS configuration files restoration is in progress...
Restore process done.

Adding OCEEMS release 466.5.0 changes...
Starting mysql for upgrading CMI and Measurement module databases.
160603 17:24:06 mysqld_safe Logging to '/Tekelec/WebNMS/mysql/data/e5ms12.err'.
160603 17:24:06 mysqld_safe Starting mysqld daemon with databases from
/Tekelec/WebNMS/mysql/data
File changes complete.

CMI table 'tek_cmi_script_control_modes' does not exists! Creating table.
Upgrading CMI script files for setting default script execution control mode to
'Coninue'...
Done!

Restoring 'server.keystore' file from '/Tekelec/WebNMS/conf' into
'/Tekelec/WebNMS/apache/tomcat/conf' directory...
Done!

OCEEMS R46.6 CMI and Measurement Schema changes are applicable.....

OCEEMS CMI custom command classes backup: Start
Custom command Classes:: []
OCEEMS CMI custom command classes backup: Done!

Deleting existing OCEEMS schema.....
140717 16:27:57 mysqld_safe Logging to '/Tekelec/WebNMS/mysql/data/e5ms8.err'.
140717 16:27:57 mysqld_safe Starting mysqld daemon with databases from
/Tekelec/WebNMS/mysql/data
Data deletion for Measurement module: Start
  Table tekelec_meas_reports: Start
  Table tekelec_meas_reports: Done!
Data deletion for Measurement module: Done!
Data deletion for CMI module: Start
```

```
Table tek_cmi_cmd_param_lookup: Start
Table tek_cmi_cmd_param_lookup: Done!
Table tek_cmi_cmd_param_validation: Start
Table tek_cmi_cmd_param_validation: Done!
Table tek_cmi_cmd_param_map: Start
Table tek_cmi_cmd_param_map: Done!
Table tek_cmi_cmd_param_values: Start
Table tek_cmi_cmd_param_values: Done!
Table tek_cmi_cmd_params: Start
Table tek_cmi_cmd_params: Done!
Table tek_cmi_cmdclass_cmd_map: Start
Table tek_cmi_cmdclass_cmd_map: Done!
Table tek_cmi_commands: Start
Table tek_cmi_commands: Done!
Table tek_cmi_cmdclasses: Start
Table tek_cmi_cmdclasses: Done!
Data deletion for CMI module: Done!

Adding new OCEEMS schema.....
Starting mysql
140717 16:28:15 mysqld_safe Logging to '/Tekelec/WebNMS/mysql/data/e5ms8.err'.
140717 16:28:15 mysqld_safe Starting mysqld daemon with databases from
/Tekelec/WebNMS/mysql/data
Data insertion for Measurement module: Start
  Table tekelec_meas_reports: Start
  Table tekelec_meas_reports: Done!
Data insertion for Measurement module: Done!
Data insertion for NBI module: Start
Data insertion for NBI module: Done!
Data insertion for CMI module: Start
  Table tek_cmi_cmdclasses: Start
  Table tek_cmi_cmdclasses: Done!
  Table tek_cmi_commands: Start
  Table tek_cmi_commands: Done!
  Table tek_cmi_cmdclass_cmd_map: Start
  Table tek_cmi_cmdclass_cmd_map: Done!
  Table tek_cmi_cmd_params: Start
  Table tek_cmi_cmd_params: Done!
  Table tek_cmi_cmd_param_values: Start
  Table tek_cmi_cmd_param_values: Done!
```

```
Table tek_cmi_cmd_param_map: Start
Table tek_cmi_cmd_param_map: Done!
Table tek_cmi_cmd_param_validation: Start
Table tek_cmi_cmd_param_validation: Done!
Table tek_cmi_cmd_param_lookup: Start
Table tek_cmi_cmd_param_lookup: Done!
Data insertion for CMI module: Done!
OCEEMS Schema updated successfully.

OCEEMS CMI custom command classes backup restoration: Start
OCEEMS CMI custom command classes backup restoration: Done!

OCEEMS R46.3 CMI and Measurement Schema changes end.
Stopping mysql
160603 17:25:02 mysqld_safe mysqld from pid file /Tekelec/WebNMS/mysql/data/e5ms12.pid
ended

Release changes added.

Software upgrade is completed.
```

APPENDIX F. PROCEDURE TO SETUP FAILOVER

To setup failover, DB replication is necessary. To enable DB replication, one needs to set up various GLOBAL PARAMETERS. In addition, changes need to be done in OCEEMS for establishing failover between the primary and standby servers.

F.1 In case of Fresh Installation

In case of fresh installation, one of the servers can be assumed as ‘Primary’ and the other as ‘Standby’ server.

Before proceeding with setting up of failover in case of OCEEMS R46.6 installation, the following details should be known -

- The login credentials of the non-root users created for OCEEMS on both primary and standby servers.
- MySQL root user’s password for both primary and standby servers.
- Hostnames for both primary and standby servers: In the procedure given below, these values shall be called ‘primary server hostname’ and ‘standby server hostname’ respectively.

S. No.	Step	Expected Output
1	Login in to primary OCEEMS server using non-root user for OCEEMS.	-
2	Update the hibernate.cfg.xml file placed in “/Tekelec/WebNMS/classes/hbplib” directory to replace the ‘localhost’ value in the given statement with the hostname of the primary server.	<p>Replace the ‘localhost’ value in the given statement in /Tekelec/WebNMS/classes/hbplib/hibernate.cfg.xml file with the hostname of the primary server as shown below -</p> <pre><property name="connection.url">jdbc:mysql://localhost/WebNmsDB?dumpQueriesOnException=true&jdbcCompliantTruncation=false</property></pre> <p>As –</p> <pre><property name="connection.url">jdbc:mysql://<hostname of primary server>/WebNmsDB?dumpQueriesOnException=true&jdbcCompliantTruncation=false</property></pre> <p>e.g.</p> <pre><property name="connection.url">jdbc:mysql://e5ms1/WebNmsDB?dumpQueriesOnException=true&jdbcCompliantTruncation=false</property></pre>
3	Move to directory /Tekelec/WebNMS/bin.	\$ cd /Tekelec/WebNMS/bin
4	On the PRIMARY system, take a backup of the OCEEMS database	<pre>\$ cd backup \$./BackupDB.sh</pre> <p>Checking whether enough space is present on server for upgrade Please wait! OCEEMS Backup is in progress... ...</p>

		OCEEMS Backup is completed.
5	<p>On the PRIMARY system, add the following parameters to the /Tekelec/WebNMS/bin/startMySQL.sh script on the mysqld_safe line:</p> <pre>--auto-increment-increment=2 --auto-increment-offset=1 --replicate-same-server-id=0</pre> <p>Also, add in 1051 to the --slave-skip-errors line</p>	<pre>bin/mysqld_safe --defaults-file=\$MYSQL_HOME/e5ms_defaults.cnf --auto-increment-increment=2 --auto-increment-offset=1 --replicate-same-server-id=0 --innodb_file_per_table=1 --server-id=1 --binlog-do-db=WebNmsDB --binlog-format=MIXED --binlog-ignore-db=mysql --log-slave-updates --log-bin=/Tekelec/WebNMS/mysql/data/log-bin --relay-log=/Tekelec/WebNMS/mysql/data/relay-bin --slave-skip-errors=1032,1050,1051,1054,1060,1061,1062,1065,1146,1396&</pre>
6	Start MySQL server by invoking startMySQL.sh script.	<pre>\$ sh startMySQL.sh</pre> <pre>\$ bin/safe_mysqld: line 199: my_print_defaults: command not found bin/safe_mysqld: line 204: my_print_defaults: command not found nohup: redirecting stderr to stdout</pre> <p>Starting mysqld daemon with databases from /Tekelec/WebNMS/mysql/data</p>
7	Move to 'Tekelec/WebNMS/mysql/bin' directory.	<pre>\$ cd /Tekelec/WebNMS/mysql/bin</pre>
8	<p>Connect to the MySQL client by executing MySQL in 'Tekelec/WebNMS/mysql/bin' directory.</p> <p>Provide the password for MySQL 'root' user when prompted.</p>	<pre>\$./mysql -uroot -p<password></pre> <pre>Warning: Using a password on the command line interface can be insecure. Welcome to the MySQL monitor. Commands end with ; or \g. Your MySQL connection id is 125 Server version: 5.6.31-enterprise-commercial-advanced-log MySQL Enterprise Server - Advanced Edition (Commercial)</pre> <p>Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved.</p> <p>Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.</p> <pre>mysql></pre>
9	<p>Execute the following commands in mysql:</p> <pre>stop slave; reset master;</pre>	Successful Execution of step
10	Login in to the standby OCEEMS server using the non-root user configured for OCEEMS.	-

11	Update the hibernate.cfg.xml file placed in “/Tekelec/WebNMS/classes/hbnlib” directory to replace the ‘localhost’ value in the given statement with the hostname of the standby server.	<p>Replace the ‘localhost’ value in the given statement in /Tekelec/WebNMS/classes/hbnlib/hibernate.cfg.xml file with the hostname of the standby server as shown below -</p> <pre><property name="connection.url">jdbc:mysql://localhost/WebNmsDB?dumpQueriesOnException=true&jdbcCompliantTruncation=false</property></pre> <p>As -</p> <pre><property name="connection.url">jdbc:mysql://<hostname of standby server>/WebNmsDB?dumpQueriesOnException=true&jdbcCompliantTruncation=false</property></pre> <p>e.g.</p> <pre><property name="connection.url">jdbc:mysql://e5ms2/WebNmsDB?dumpQueriesOnException=true&jdbcCompliantTruncation=false</property></pre>
12	Move to directory /Tekelec/WebNMS/bin.	\$ cd /Tekelec/WebNMS/bin
13	<p>On the STANDBY system, add the following parameters to the /Tekelec/WebNMS/bin/startMySQL.sh script on the mysqld_safe line:</p> <pre>--auto-increment-increment=2 --auto-increment-offset=2 --replicate-same-server-id=0</pre> <p>Also, add in 1051 to the --slave-skip-errors line</p>	<pre>bin/mysqld_safe --defaults-file=\$MYSQL_HOME/e5ms_defaults.cnf --auto-increment-increment=2 --auto-increment-offset=2 --replicate-same-server-id=0 --innodb_file_per_table=1 --server-id=2 --binlog-do-db=WebNmsDB --binlog-format=MIXED --binlog-ignore-db=mysql --log-slave-updates --log-bin=/Tekelec/WebNMS/mysql/data/log-bin --relay-log=/Tekelec/WebNMS/mysql/data/relay-bin --slave-skip-errors=1032,1050,1051,1054,1060,1061,1062,1065,1146,1396&</pre>
14	<p>On the STANDBY SYSTEM, remove the auto.cnf file.</p> <pre>rm /Tekelec/WebNMS/mysql/data/auto.cnf file</pre>	Successful Execution of step
15	Start MySQL server by invoking startMySQL.sh script.	<pre>\$ sh startMySQL.sh</pre> <pre># bin/safe_mysqld: line 199: my_print_defaults: command not found bin/safe_mysqld: line 204: my_print_defaults: command not found nohup: redirecting stderr to stdout</pre> <p>Starting mysqld daemon with databases from /Tekelec/WebNMS/mysql/data</p>

16	Move to '/Tekelec/WebNMS/mysql/bin' directory.	\$ cd /Tekelec/WebNMS/mysql/bin
17	Connect to the MySQL client by executing MySQL in '/Tekelec/WebNMS/mysql/bin' directory. Provide the password for MySQL root user when prompted.	<pre>\$./mysql -uroot -p<password></pre> <p>Warning: Using a password on the command line interface can be insecure. Welcome to the MySQL monitor. Commands end with ; or \g. Your MySQL connection id is 125 Server version: 5.6.31-enterprise-commercial-advanced-log MySQL Enterprise Server - Advanced Edition (Commercial)</p> <p>Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved.</p> <p>Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.</p> <pre>mysql></pre>
18	Execute the following commands in mysql: stop slave; reset master;	Successful execution of step
19	On the MySQL session opened in step 7 on the primary server, execute the given five MySQL commands. Replace the values given in <> by actual values. Note: In the <code>CREATE USER</code> command, the values for 'primary replication user' and 'primary replication user password' can be provided as intended by the user. However, both these values should be noted down to be used later in the <code>GRANT REPLICATION SLAVE</code> command.	<pre>GRANT ALL PRIVILEGES ON *.* TO root@'<primary server hostname>' IDENTIFIED BY '<primary server's mysql root user password>';</pre> <pre>GRANT ALL PRIVILEGES ON *.* TO root@'<standby server hostname>' IDENTIFIED BY '<standby server's mysql root user password>';</pre> <pre>CREATE USER '<primary replication user>'@'localhost' IDENTIFIED BY '<primary replication user password>';</pre> <pre>GRANT REPLICATION SLAVE ON *.* TO '<primary replication user>'@'<standby server hostname>' IDENTIFIED BY '<primary replication user password>';</pre> <pre>FLUSH PRIVILEGES;</pre>
20	On the MySQL session opened in step 14 on the standby server, execute the given five MySQL commands. Replace the values given in <> by actual values. Note: In the <code>CREATE USER</code> command, the values for 'primary replication user' and 'primary replication user password' can be provided as intended by the user. However, both these values should	<pre>GRANT ALL PRIVILEGES ON *.* TO root@'<primary server hostname>' IDENTIFIED BY '<primary server's mysql root user password>';</pre> <pre>GRANT ALL PRIVILEGES ON *.* TO root@'<standby server hostname>' IDENTIFIED BY '<standby server's mysql root user password>';</pre> <pre>CREATE USER '<standby replication user>'@'localhost' IDENTIFIED BY '<standby replication user password>';</pre>

	<p>be noted down to be used later in the GRANT REPLICATION SLAVE command.</p>	<pre>GRANT REPLICATION SLAVE ON *.* TO '<standby replication user>'@'<primary server hostname>' IDENTIFIED BY '<standby replication user password>'; FLUSH PRIVILEGES;</pre>
21	<p>Run SHOW MASTER STATUS command on the MySQL prompt on primary server.</p> <p>Note the values for columns 'File' and 'Position'. Let us call them PrimaryLogFile and PrimaryLogPosition to be used later in the procedure.</p>	<pre>mysql> SHOW MASTER STATUS; +-----+-----+-----+-----+ File Position Binlog_Do_DB Binlog_Ignore_DB Executed_Gtid_Set +-----+-----+-----+-----+ log-bin.000002 973 WebNmsDB mysql +-----+-----+-----+-----+ 1 row in set (0.00 sec)</pre>
22	<p>Run SHOW MASTER STATUS command on the MySQL prompt on standby server.</p> <p>Note the values for columns 'File' and 'Position'. Let us call them StandbyLogFile and StandbyLogPosition to be used later in the procedure.</p>	<pre>mysql> SHOW MASTER STATUS; +-----+-----+-----+-----+ File Position Binlog_Do_DB Binlog_Ignore_DB Executed_Gtid_Set +-----+-----+-----+-----+ log-bin.000004 545 WebNmsDB mysql +-----+-----+-----+-----+ 1 row in set (0.00 sec)</pre>
23	<p>Execute the given two MySQL commands on the primary server. In the command, use the values for <StandbyLogPosition> and <StandbyLogFile> noted earlier in this procedure.</p>	<pre>CHANGE MASTER TO MASTER_HOST='<standby server hostname>', MASTER_PORT=3306, MASTER_USER='<standby replication user>', MASTER_PASSWORD='<standby replication user password>', MASTER_LOG_POS=<StandbyLogPosition>, MASTER_LOG_FILE='<StandbyLogFile>'; START SLAVE;</pre>
24	<p>Execute the two MySQL commands on the standby server. In the command, replace the values for <PrimaryLogPosition> and <PrimaryLogFile> noted earlier in this procedure.</p>	<pre>CHANGE MASTER TO MASTER_HOST='<primary server hostname>', MASTER_PORT=3306, MASTER_USER='<primary replication user>', MASTER_PASSWORD='<primary replication user password>', MASTER_LOG_POS=<PrimaryLogPosition>, MASTER_LOG_FILE='<PrimaryLogFile>'; START SLAVE;</pre>
25	<p>Verify that replication has been setup correctly by executing the given command at the MySQL client on the standby server.</p>	<pre>SHOW SLAVE STATUS\G; Output similar to the following is displayed - ***** 1. row ***** Slave_IO_State: Waiting for master to send event</pre>

	<p>Verify the highlighted values in the command output. Both should be 'Yes' for correct replication setup.</p>	<pre> Master_Host: e5ms1 Master_User: primary Master_Port: 3306 Connect_Retry: 60 Master_Log_File: log-bin.000002 Read_Master_Log_Pos: 120 Relay_Log_File: relay-bin.000002 Relay_Log_Pos: 149415 Relay_Master_Log_File: log-bin.000001 Slave_IO_Running: Yes Slave_SQL_Running: Yes Replicate_Do_DB: Replicate_Ignore_DB: Replicate_Do_Table: Replicate_Ignore_Table: Replicate_Wild_Do_Table: Replicate_Wild_Ignore_Table: Last_Errno: 0 Last_Error: Skip_Counter: 0 Exec_Master_Log_Pos: 149254 Relay_Log_Space: 229712 Until_Condition: None Until_Log_File: Until_Log_Pos: 0 Master_SSL_Allowed: No Master_SSL_CA_File: Master_SSL_CA_Path: Master_SSL_Cert: Master_SSL_Cipher: Master_SSL_Key: Seconds_Behind_Master: 770 Master_SSL_Verify_Server_Cert: No Last_IO_Errno: 0 Last_IO_Error: Last_SQL_Errno: 0 Last_SQL_Error: Replicate_Ignore_Server_Ids: Master_Server_Id: 1 Master_UUID: 836db629-e017-11e3-b81f-00151a6e0499 Master_Info_File: /Tekelec/WebNMS/mysql/data/master.info SQL_Delay: 0 SQL_Remaining_Delay: NULL Slave_SQL_Running_State: creating table Master_Retry_Count: 86400 Master_Bind: Last_IO_Error_Timestamp: Last_SQL_Error_Timestamp: Master_SSL_Crl: Master_SSL_Crlpath: Retrieved_Gtid_Set: Executed_Gtid_Set: Auto_Position: 0 1 row in set (0.00 sec) </pre>
<p>26</p>	<p>Verify that the replication has been setup correctly by executing the given command at the MySQL client on the primary server.</p>	<pre> SHOW SLAVE STATUS \G; Output similar to the following is displayed - ***** 1. row ***** </pre>

	<p>Verify the highlighted values in the command output. Both should be 'Yes' for correct replication setup.</p>	<pre> Slave_IO_State: Waiting for master to send event Master_Host: e5ms2 Master_User: secondary Master_Port: 3306 Connect_Retry: 60 Master_Log_File: log-bin.000002 Read_Master_Log_Pos: 120 Relay_Log_File: relay-bin.000002 Relay_Log_Pos: 149415 Relay_Master_Log_File: log-bin.000001 Slave_IO_Running: Yes Slave_SQL_Running: Yes Replicate_Do_DB: Replicate_Ignore_DB: Replicate_Do_Table: Replicate_Ignore_Table: Replicate_Wild_Do_Table: Replicate_Wild_Ignore_Table: Last_Errno: 0 Last_Error: Skip_Counter: 0 Exec_Master_Log_Pos: 149254 Relay_Log_Space: 229712 Until_Condition: None Until_Log_File: Until_Log_Pos: 0 Master_SSL_Allowed: No Master_SSL_CA_File: Master_SSL_CA_Path: Master_SSL_Cert: Master_SSL_Cipher: Master_SSL_Key: Seconds_Behind_Master: 770 Master_SSL_Verify_Server_Cert: No Last_IO_Errno: 0 Last_IO_Error: Last_SQL_Errno: 0 Last_SQL_Error: Replicate_Ignore_Server_Ids: Master_Server_Id: 1 Master_UUID: 836db629-e017-11e3-b81f- 00151a6e0499 Master_Info_File: /Tekelec/WebNMS/mysql/data/master.info SQL_Delay: 0 SQL_Remaining_Delay: NULL Slave_SQL_Running_State: creating table Master_Retry_Count: 86400 Master_Bind: Last_IO_Error_Timestamp: Last_SQL_Error_Timestamp: Master_SSL_Crl: Master_SSL_Crlpath: Retrieved_Gtid_Set: Executed_Gtid_Set: Auto_Position: 0 1 row in set (0.00 sec) </pre>
<p>27</p>	<p>On primary server, login to OCEEMS database and create a DUMMY table. After creation,</p>	<pre> ./mysql -uroot -p<password> </pre>

	<p>verify that it has been created successfully by using SHOW TABLES command.</p>	<pre>Warning: Using a password on the command line interface can be insecure. Welcome to the MySQL monitor. Commands end with ; or \g. Your MySQL connection id is 125 Server version: 5.6.31-enterprise-commercial- advanced-log MySQL Enterprise Server - Advanced Edition (Commercial) Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved. Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners. Type 'help;' or '\h' for help. Type '\c' to clear the current input statement. mysql> USE WebNmsDB; Reading table information for completion of table and column names You can turn off this feature to get a quicker startup with -A Database changed mysql> CREATE TABLE DUMMY(dummy_column VARCHAR(100)); Query OK, 0 rows affected (0.21 sec) mysql> SHOW TABLES;</pre>
<p>28</p>	<p>On standby server, login to OCEEMS database and verify that the DUMMY is present by using SHOW TABLES command.</p>	<pre>./mysql -uroot -p<password> Warning: Using a password on the command line interface can be insecure. Welcome to the MySQL monitor. Commands end with ; or \g. Your MySQL connection id is 125 Server version: 5.6.31-enterprise-commercial- advanced-log MySQL Enterprise Server - Advanced Edition (Commercial) Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved. Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners. Type 'help;' or '\h' for help. Type '\c' to clear the current input statement. mysql> USE WebNmsDB;</pre>

		<p>Reading table information for completion of table and column names You can turn off this feature to get a quicker startup with -A</p> <p>Database changed mysql> SHOW TABLES;</p>
29	On standby server, delete the DUMMY table from OCEEMS database by using DROP TABLE command.	<pre>mysql> DROP TABLE DUMMY; Query OK, 0 rows affected (0.05 sec)</pre>
30	On primary server, verify that the DUMMY table no more exists in OCEEMS database using SHOW TABLES command.	<pre>mysql> SHOW TABLES;</pre>
31	On the PRIMARY SERVER, update the /Tekelec/WebNMS/conf/NmsProcessesBE.conf file to set the CLEAN_DATA_INTERVAL to 7	<pre>#java com.adventnet.nms.poll.Collector [CLEAN_DATA_INTERVAL num days] [STATUS_POLL_PING_RE TRIES num] [STATUS_POLL_SNMP_RETRIES num] [DATA_COLLECTION_SNMP_RETRIES num] [MAX_OIDS_IN_O NE_POLL num] [CUSTOMIZED_DATA_COLLECTOR classname] [POLLING_POLICY_CUSTOMIZER classname] [D EBUGGING_MODE true/false] [SEND_MULTIPLE_REQUEST true/false] [STATUS_POLL_QUERY_INTERVAL mi lliseconds] [DATA_COLLECTION_QUERY_INTERVAL milliseconds] [AUTHORIZATION true/false] [PASS_ THRO_ALL_POLLING_OBJECTS true/false] [RECOVER_DELETED_PDATAS true/false] [BULK_INSERT_INTER VAL seconds] [MAX_ALLOWABLE_INSERT num] [STATUS_POLL_DELAY seconds] [DATA_COLLECTION_SNMP_T IMEOUT seconds] [DATA_COLLECTION_STARTUP_DELAY seconds] [STATUS_POLL_TXN_TIMEOUT milliseco nds] PROCESS com.adventnet.nms.poll.Collector ARGS MAX_OIDS_IN_ONE_POLL 15 AUTHORIZATION true CLEAN_DATA_INTERVAL 7 DATA_COLLECTION_QUE RY_INTERVAL 120000 PASS_THRO_ALL_POLLING_OBJECTS true</pre>
32	On the STANDBY SERVER, update the /Tekelec/WebNMS/conf/NmsProcessesBE.conf file to set the CLEAN_DATA_INTERVAL to 9	<pre>#java com.adventnet.nms.poll.Collector [CLEAN_DATA_INTERVAL num days] [STATUS_POLL_PING_RE TRIES num] [STATUS_POLL_SNMP_RETRIES num] [DATA_COLLECTION_SNMP_RETRIES num] [MAX_OIDS_IN_O NE_POLL num] [CUSTOMIZED_DATA_COLLECTOR classname] [POLLING_POLICY_CUSTOMIZER classname] [D EBUGGING_MODE true/false] [SEND_MULTIPLE_REQUEST true/false] [STATUS_POLL_QUERY_INTERVAL mi lliseconds] [DATA_COLLECTION_QUERY_INTERVAL milliseconds] [AUTHORIZATION true/false] [PASS_ THRO_ALL_POLLING_OBJECTS true/false] [RECOVER_DELETED_PDATAS true/false] [BULK_INSERT_INTER VAL seconds] [MAX_ALLOWABLE_INSERT num] [STATUS_POLL_DELAY seconds] [DATA_COLLECTION_SNMP_T IMEOUT seconds] [DATA_COLLECTION_STARTUP_DELAY seconds] [STATUS_POLL_TXN_TIMEOUT milliseco</pre>

		nds] PROCESS com.adventnet.nms.poll.Collector ARGS MAX_OIDS_IN_ONE_POLL 15 AUTHORIZATION true CLEAN_DATA_INTERVAL 9 DATA_COLLECTION_QUE RY_INTERVAL 120000 PASS_THRO_ALL_POLLING_OBJECTS true
33	On Both servers, verify the permission of the directory set in the variable outputDirectory in the /Tekelec/WebNMS/conf/tekelec/common.config file. The directory should be owned by the Non-root admin user and the permission should be 775.	Successful Verification.
34	Procedure Complete	This procedure is complete.

Note: For client switchover to function, the entries for primary and standby servers must be done in the client machines' 'hosts' file. On Windows machine, the hosts file is present at 'C:\Windows\System32\drivers\etc' folder. The following two lines should be added in the 'hosts' file –

```
<PRIMARY SERVER IP> <PRIMARY SERVER HOSTNAME>
<STANDBY SERVER IP> <STANDBY SERVER HOSTNAME>
```

e.g.

```
10.248.10.25 e5ms1
10.248.10.21 e5ms2
```

F.2 In case of Upgrade

Before proceeding with setting up of failover in case of OCEEMS upgrade to R46.6, the following details should be known -

- The login credentials of the non-root users created for OCEEMS on both primary and standby servers
- MySQL 'root' user's password for both primary and standby servers
- Hostnames for both primary and standby servers: In the procedure given below, these values shall be called 'primary server hostname' and 'standby server hostname' respectively
- MySQL replication user name and its password on primary server: In the procedure given below, these values shall be called 'primary replication user' and 'primary replication user password' respectively.
- MySQL replication user name and its password on Standby OCEEMS server: In the procedure given below, these values shall be called 'standby replication user' and 'standby replication user password' respectively.

Note: Before proceeding with setting up of failover give in the table below, e5msService must be stopped on both primary and standby servers.

S. No.	Step	Expected Output
1	Login in to primary OCEEMS server using either the non-root user (if OCEEMS is configured to be operated by non-root user) or the root user for OCEEMS.	-
2	Move to directory /Tekelec/WebNMS/bin.	\$ cd /Tekelec/WebNMS/bin
3	On the PRIMARY system, take a backup of the OCEEMS database	

	emsadmuser@oceems1:[/Tekelec/WebNMS/bin/backup]\$.BackupDB.sh	Checking whether enough space is present on server for upgrade Please wait! OCEEMS Backup is in progress... ... OCEEMS Backup is completed.
4	On the PRIMARY system, add the following parameters to the /Tekelec/WebNMS/bin/startMySQL.sh script on the mysqld_safe line: --auto-increment-increment=2 --auto-increment-offset=1 --replicate-same-server-id=0 Also, add in 1051 to the --slave-skip-errors line	bin/mysqld_safe --defaults-file=\$MYSQL_HOME/e5ms_defaults.cnf --auto-increment-increment=2 --auto-increment-offset=1 --replicate-same-server-id=0 --innodb_file_per_table=1 --server-id=1 --binlog-do-db=WebNmsDB --binlog-format=MIXED --binlog-ignore-db=mysql --log-slave-updates --log-bin=/Tekelec/WebNMS/mysql/data/log-bin --relay-log=/Tekelec/WebNMS/mysql/data/relay-bin --slave-skip-errors=1032,1050,1051,1054,1060,1061,1062,1065,1146,1396&
5	Start MySQL by invoking the startMySQL.sh script.	\$ sh startMySQL.sh
6	Move to 'Tekelec/WebNMS/mysql/bin' directory.	\$ cd /Tekelec/WebNMS/mysql/bin
7	Connect to the MySQL client by executing MySQL in 'Tekelec/WebNMS/mysql/bin' directory. Provide the password for MySQL root user when prompted.	\$./mysql -uroot -p<password> Warning: Using a password on the command line interface can be insecure. Welcome to the MySQL monitor. Commands end with ; or \g. Your MySQL connection id is 125 Server version: 5.6.31-enterprise-commercial-advanced-log MySQL Enterprise Server - Advanced Edition (Commercial) Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved. Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners. mysql>
8	Execute the following commands in mysql: stop slave; reset master;	Successful Execution of step.
9	Login in to standby OCEEMS server using either the non-root user (if OCEEMS is configured to be	-

	operated by non-root user) or the root user for OCEEMS.	
10	Move to directory /Tekelec/WebNMS/bin.	<code>\$ cd /Tekelec/WebNMS/bin</code>
11	On the STANDBY system, add the following parameters to the /Tekelec/WebNMS/bin/startMySQL.sh script on the mysqld_safe line: --auto-increment-increment=2 --auto-increment-offset=2 --replicate-same-server-id=0 Also, add in 1051 to the --slave-skip-errors line	<code>bin/mysqld_safe --defaults-file=\$MYSQL_HOME/e5ms defaults.cnf --auto-increment-increment=2 --auto-increment-offset=2 --replicate-same-server-id=0 --innodb_file_per_table=1 --server-id=2 --binlog-do-db=WebNmsDB --binlog-format=MIXED --binlog-ignore-db=mysql --log-slave-updates --log-bin=/Tekelec/WebNMS/mysql/data/log-bin --relay-log=/Tekelec/WebNMS/mysql/data/relay-bin --slave-skip-errors=1032,1050,1051,1054,1060,1061,1062,1065,1146,1396&</code>
12	On the STANDBY SYSTEM, remove the auto.cnf file. rm /Tekelec/WebNMS/mysql/data/auto.cnf file	Successful Execution of step.
13	Start MySQL server by invoking startMySQL.sh script.	<code>\$ sh startMySQL.sh</code>
14	Move to 'Tekelec/WebNMS/mysql/bin' directory.	<code>\$ cd /Tekelec/WebNMS/mysql/bin</code>
15	Take backup of database and configuration files on the primary server and restore them on the standby server. This is to ensure that both the databases are in-sync before failover setup.	<p>a. On both primary and standby servers, create a temporary backup directory for storing backups. For this, run the following command on both the servers – <code>\$ mkdir /tmp/backup</code></p> <p>Note: If the “/tmp/backup” directory is already present on the system, make sure the non-root user configured for OCEEMS has write permission over it.</p> <p>b. On primary server, run /Tekelec/WebNMS/bin/backup/BackupDB.sh script and take backup in temporary backup location “/tmp/backup”. Run following commands - <code>\$ cd /Tekelec/WebNMS/bin/backup</code> <code>\$ sh BackupDB.sh -d /tmp/backup/</code></p> <p>c. On primary server, run following commands to tar the contents of /tmp/backup directory - <code>\$ cd /tmp/backup</code> <code>\$ tar cvf /tmp/primarybackup.tar *</code></p> <p>d. On primary server, run following commands to transfer the tar file created above to the standby server - <code>\$ scp /tmp/primarybackup.tar <username>@<ip of secondary server>:/tmp</code> Note: Username shall be either non-root user (if OCEEMS is configured to be operated by non-root user) or the root user</p> <p>e. On the standby server, and ONLY ON THE STANDBY SERVER, DO THE FOLLOWING: <code>\$ cd /Tekelec/WebNMS/bin</code> <code>\$./reinitialize_nms.sh MODE ALL</code></p>

		<p>f. On standby server, run following commands to restore the contents of tar file transferred from primary server -</p> <pre>\$ cd /tmp/backup \$ tar xvf /tmp/primarybackup.tar \$ cd /Tekelec/WebNMS/bin/backup/ ./RestoreDB.sh /tmp/backup/E5MS_Database_BackUp.sql</pre>
16	<p>On standby server, update the /Tekelec/WebNMS/classes/hbplib/hibernate.cfg.xml file to point the JDBC connection to the hostname of the standby server. This needs to be done because while restoring database and configurations files in the earlier step, hibernate.cfg.xml file on the standby server gets overwritten by the one from primary and value of hostname needs to be corrected to point to standby server's hostname.</p>	<p>Update the following statement in /Tekelec/WebNMS/classes/hbplib/hibernate.cfg.xml –</p> <pre><property name="connection.url">jdbc:mysql://<hostname of standby server>/WebNmsDB?dumpQueriesOnException=true&jdbc cCompliantTruncation=false</property></pre>
17	<p>Move to 'Tekelec/WebNMS/bin' directory and start MySQL by executing startMySQL.sh script.</p> <p>After MySQL is started, Move to '/Tekelec/WebNMS/mysql/bin' directory and connect to the MySQL client. Provide the password for MySQL 'root' user when prompted.</p>	<pre>\$ cd /Tekelec/WebNMS/bin \$ sh startMySQL.sh \$ cd /Tekelec/WebNMS/mysql/bin \$./mysql -uroot -p<password></pre> <p>Warning: Using a password on the command line interface can be insecure. Welcome to the MySQL monitor. Commands end with ; or \g. Your MySQL connection id is 125 Server version: 5.6.31-enterprise-commercial-advanced-log MySQL Enterprise Server - Advanced Edition (Commercial)</p> <p>Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved.</p> <p>Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.</p> <pre>mysql></pre>
18	<p>Execute the following commands in mysql:</p> <pre>stop slave; reset master;</pre>	<p>Successful Execution of step.</p>
19	<p>On primary server, check if replication slave privilege for</p>	<pre>show grants for '<primary replication user>'@'<standby server hostname>;</pre>

	<p>primary replication user is present for standby host by executing the given query.</p>	
20	<p>If output similar to what is given here is observed, it means replication privileges were provided to a user (primary replication user) logging from standby host. In this case, execute next step.</p> <p>Else, if output is similar to error log as shown, it means that replication privileges were not given to primary replication user from standby host during earlier failover setup. In this case, skip the next step.</p>	<pre>+-----+ Grants for <primary replication user>@<standby server hostname > +-----+ GRANT REPLICATION SLAVE ON *.* TO <primary replication user>@<standby server hostname> IDENTIFIED BY PASSWORD '*3C0FBEB25545FC3BEFC6B26880D8D51D07A4A455' +-----+ 1 row in set (0.00 sec)</pre> <p>ERROR 1141 (42000): There is no such grant defined for user <primary replication user> on host '<standby server hostname>'</p>
21	<p>Remove all the replication users and create a new replication user to establish replication by executing the given MySQL commands.</p>	<pre>select User from mysql.user where User<>"root" and Host="localhost";</pre> <p>This command will give a list of replication users. Delete them one by one using the following command:</p> <pre>drop user <username>@localhost;</pre> <p>Create a new replication user to establish replication:</p> <pre>CREATE USER '<primary replication user>'@'localhost' IDENTIFIED BY '<primary replication user password>';</pre> <p>Eg:</p> <pre>select User from mysql.user where User<>"root" and Host="localhost"; +-----+ User +-----+ secondary stand standby +-----+ 3 rows in set (0.00 sec)</pre> <pre>mysql> drop user secondary@localhost; Query OK, 0 rows affected (0.00 sec)</pre> <pre>mysql> drop user stand@localhost; Query OK, 0 rows affected (0.00 sec)</pre> <pre>mysql> drop user standby@localhost; Query OK, 0 rows affected (0.00 sec)</pre> <pre>CREATE USER 'primary'@'localhost' IDENTIFIED BY '<password>';</pre>

22	Execute the two MySQL commands. Replace the values given in <> by actual values.	<pre>GRANT REPLICATION SLAVE ON *.* TO '<primary replication user>'@'<standby server hostname>' IDENTIFIED BY '<primary replication user password>'; FLUSH PRIVILEGES;</pre>
23	On standby server, check if replication slave privilege for standby replication user is present for primary host by executing the given query.	<pre>show grants for '<standby replication user>'@'<primary server hostname>;</pre>
24	<p>If output similar to what is given here is observed, it means replication privileges were provided to a user (standby replication user) logging from primary host. In this case, execute next step.</p> <p>Else, if output is similar to error log as shown, it means that replication privileges were not given to standby replication user from primary host during earlier failover setup. In this case, skip the next step.</p>	<pre>+-----+ +-----+ Grants for <standby replication user>@<primary server hostname > +-----+ +-----+ GRANT REPLICATION SLAVE ON *.* TO <standby replication user>@<primary server hostname> IDENTIFIED BY PASSWORD '*3C0FBEB25545FC3BEFC6B26880D8D51D07A4A455' +-----+ +-----+ 1 row in set (0.00 sec)</pre> <p>ERROR 1141 (42000): There is no such grant defined for user <standby replication user> on host '<primary server hostname>'</p>
25	Remove all the replication users and create a new replication user to establish replication by executing the given MySQL commands.	<pre>select User from mysql.user where User<>"root" and Host="localhost";</pre> <p>This command will give a list of replication users. Delete them one by one using the following command:</p> <pre>drop user <username>@localhost;</pre> <p>Create a new replication user to establish replication:</p> <pre>CREATE USER '<standby replication user>'@'localhost' IDENTIFIED BY '<standby replication user password>';</pre> <p>Eg:</p> <pre>select User from mysql.user where User<>"root" and Host="localhost"; +-----+ User +-----+ secondary stand standby +-----+ 3 rows in set (0.00 sec)</pre> <pre>mysql> drop user secondary@localhost; Query OK, 0 rows affected (0.00 sec)</pre> <pre>mysql> drop user stand@localhost;</pre>

		<pre>Query OK, 0 rows affected (0.00 sec) mysql> drop user standby@localhost; Query OK, 0 rows affected (0.00 sec) CREATE USER 'standby'@'localhost' IDENTIFIED BY '<password>';</pre>
26	Execute the two MySQL commands. Replace the values given in <> by actual values.	<pre>GRANT REPLICATION SLAVE ON *.* TO '<standby replication user>'@'<primary server hostname>' IDENTIFIED BY '<standby replication user password>'; FLUSH PRIVILEGES;</pre>
27	Run SHOW MASTER STATUS command on the MySQL prompt on primary server. Note the values for columns 'File' and 'Position'. Let us call them PrimaryLogFile and PrimaryLogPosition to be used later in the procedure.	<pre>mysql> SHOW MASTER STATUS; +-----+-----+-----+-----+ File Position Binlog_Do_DB Binlog_Ignore_DB Executed_Gtid_Set +-----+-----+-----+-----+ log-bin.000002 WebNmsDB mysql +-----+-----+-----+-----+ 1 row in set (0.00 sec)</pre>
28	Run SHOW MASTER STATUS command on the MySQL prompt on standby server. Note the values for columns 'File' and 'Position'. Let us call them StandbyLogFile and StandbyLogPosition to be used later in the procedure.	<pre>mysql> SHOW MASTER STATUS; +-----+-----+-----+-----+ File Position Binlog_Do_DB Binlog_Ignore_DB Executed_Gtid_Set +-----+-----+-----+-----+ log-bin.000004 WebNmsDB mysql +-----+-----+-----+-----+ 1 row in set (0.00 sec)</pre>
29	Execute the three MySQL commands on the primary server. In the command, use the values for <StandbyLogPosition> and <StandbyLogFile> noted earlier in this procedure.	<pre>STOP SLAVE; CHANGE MASTER TO MASTER_HOST='<standby server hostname>', MASTER_PORT=3306, MASTER_USER='<standby replication user>', MASTER_PASSWORD='<standby replication user password>', MASTER_LOG_POS=<StandbyLogPosition>, MASTER_LOG_FILE='<StandbyLogFile>'; START SLAVE;</pre>
30	Execute the three MySQL commands on the standby server. In the command, replace the values for <PrimaryLogPosition> and <PrimaryLogFile> noted earlier in this procedure.	<pre>STOP SLAVE; CHANGE MASTER TO MASTER_HOST='<primary server hostname>', MASTER_PORT=3306, MASTER_USER='<primary replication user>', MASTER_PASSWORD='<primary replication user password>', MASTER_LOG_POS=<PrimaryLogPosition>, MASTER_LOG_FILE='<PrimaryLogFile>';</pre>

		START SLAVE;
31	<p>Verify that replication has been setup correctly by executing the given command at the MySQL client on the standby server.</p> <p>Verify the highlighted values in the command output. Both should be 'Yes' for correct replication setup.</p>	<pre>SHOW SLAVE STATUS\G; Output similar to the following is displayed - ***** 1. row ***** Slave_IO_State: Waiting for master to send event Master_Host: e5ms1 Master_User: primary Master_Port: 3306 Connect_Retry: 60 Master_Log_File: log-bin.000002 Read_Master_Log_Pos: 120 Relay_Log_File: relay-bin.000002 Relay_Log_Pos: 149415 Relay_Master_Log_File: log-bin.000001 Slave_IO_Running: Yes Slave_SQL_Running: Yes Replicate_Do_DB: Replicate_Ignore_DB: Replicate_Do_Table: Replicate_Ignore_Table: Replicate_Wild_Do_Table: Replicate_Wild_Ignore_Table: Last_Errno: 0 Last_Error: Skip_Counter: 0 Exec_Master_Log_Pos: 149254 Relay_Log_Space: 229712 Until_Condition: None Until_Log_File: Until_Log_Pos: 0 Master_SSL_Allowed: No Master_SSL_CA_File: Master_SSL_CA_Path: Master_SSL_Cert: Master_SSL_Cipher: Master_SSL_Key: Seconds_Behind_Master: 770 Master_SSL_Verify_Server_Cert: No Last_IO_Errno: 0 Last_IO_Error: Last_SQL_Errno: 0 Last_SQL_Error: Replicate_Ignore_Server_Ids: Master_Server_Id: 1 Master_UUID: 836db629-e017-11e3-b81f- 00151a6e0499 Master_Info_File: /Tekelec/WebNMS/mysql/data/master.info SQL_Delay: 0 SQL_Remaining_Delay: NULL Slave_SQL_Running_State: creating table Master_Retry_Count: 86400 Master_Bind: Last_IO_Error_Timestamp: Last_SQL_Error_Timestamp: Master SSL Crl:</pre>

		<pre> Master_SSL_Crlpath: Retrieved_Gtid_Set: Executed_Gtid_Set: Auto_Position: 0 1 row in set (0.00 sec) </pre>
<p>32</p>	<p>Verify that the replication has been setup correctly by executing the given command at the MySQL client on the primary server.</p> <p>Verify the highlighted values in the command output. Both should be 'Yes' for correct replication setup.</p>	<pre> SHOW SLAVE STATUS \G; Output similar to the following is displayed - ***** 1. row ***** Slave_IO_State: Waiting for master to send event Master_Host: e5ms12 Master_User: secondary Master_Port: 3306 Connect_Retry: 60 Master_Log_File: log-bin.000002 Read_Master_Log_Pos: 120 Relay_Log_File: relay-bin.000002 Relay_Log_Pos: 149415 Relay_Master_Log_File: log-bin.000001 Slave_IO_Running: Yes Slave_SQL_Running: Yes Replicate_Do_DB: Replicate_Ignore_DB: Replicate_Do_Table: Replicate_Ignore_Table: Replicate_Wild_Do_Table: Replicate_Wild_Ignore_Table: Last_Errno: 0 Last_Error: Skip_Counter: 0 Exec_Master_Log_Pos: 149254 Relay_Log_Space: 229712 Until_Condition: None Until_Log_File: Until_Log_Pos: 0 Master_SSL_Allowed: No Master_SSL_CA_File: Master_SSL_CA_Path: Master_SSL_Cert: Master_SSL_Cipher: Master_SSL_Key: Seconds_Behind_Master: 770 Master_SSL_Verify_Server_Cert: No Last_IO_Errno: 0 Last_IO_Error: Last_SQL_Errno: 0 Last_SQL_Error: Replicate_Ignore_Server_Ids: Master_Server_Id: 1 Master_UUID: 836db629-e017-11e3-b81f- 00151a6e0499 Master_Info_File: /Tekelec/WebNMS/mysql/data/master.info SQL_Delay: 0 SQL_Remaining_Delay: NULL Slave_SQL_Running_State: creating table Master_Retry_Count: 86400 Master_Bind: Last_IO_Error_Timestamp: </pre>

		<pre> Last_SQL_Error_Timestamp: Master_SSL_Crl: Master_SSL_Crlpath: Retrieved_Gtid_Set: Executed_Gtid_Set: Auto_Position: 0 1 row in set (0.00 sec) </pre>
33	On primary server, login to OCEEMS database and create a DUMMY table. After creation, verify that it has been created successfully by using SHOW TABLES command.	<pre> ./mysql -uroot -p<password> Warning: Using a password on the command line interface can be insecure. Welcome to the MySQL monitor. Commands end with ; or \g. Your MySQL connection id is 125 Server version: 5.6.31-enterprise-commercial- advanced-log MySQL Enterprise Server - Advanced Edition (Commercial) Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved. Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners. Type 'help;' or '\h' for help. Type '\c' to clear the current input statement. mysql> USE WebNmsDB; Reading table information for completion of table and column names You can turn off this feature to get a quicker startup with -A Database changed mysql> CREATE TABLE DUMMY(dummy_column VARCHAR(100)); Query OK, 0 rows affected (0.21 sec) mysql> SHOW TABLES; </pre>
34	On standby server, login to OCEEMS database and verify that the DUMMY is present by using SHOW TABLES command.	<pre> ./mysql -uroot -p<password> Warning: Using a password on the command line interface can be insecure. Welcome to the MySQL monitor. Commands end with ; or \g. Your MySQL connection id is 125 Server version: 5.6.31-enterprise-commercial- advanced-log MySQL Enterprise Server - Advanced Edition (Commercial) Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved. </pre>

		<p>Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.</p> <p>Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.</p> <pre>mysql> USE WebNmsDB; Reading table information for completion of table and column names You can turn off this feature to get a quicker startup with -A Database changed mysql> SHOW TABLES;</pre>
35	On standby server, delete the DUMMY table from OCEEMS database by using DROP TABLE command.	<pre>mysql> DROP TABLE DUMMY; Query OK, 0 rows affected (0.05 sec)</pre>
36	On primary server, verify that the DUMMY table no more exists in OCEEMS database using SHOW TABLES command.	<pre>mysql> SHOW TABLES;</pre>
37	On the PRIMARY SERVER, update the /Tekelec/WebNMS/conf/NmsProcessesBE.conf file to set the CLEAN_DATA_INTERVAL to 7	<pre>#java com.adventnet.nms.poll.Collector [CLEAN_DATA_INTERVAL num_days] [STATUS_POLL_PING_RETRIES num] [STATUS_POLL_SNMP_RETRIES num] [DATA_COLLECTION_SNMP_RETRIES num] [MAX_OIDS_IN_ONE_POLL num] [CUSTOMIZED_DATA_COLLECTOR classname] [POLLING_POLICY_CUSTOMIZER classname] [DEBUGGING_MODE true/false] [SEND_MULTIPLE_REQUEST true/false] [STATUS_POLL_QUERY_INTERVAL milliseconds] [DATA_COLLECTION_QUERY_INTERVAL milliseconds] [AUTHORIZATION true/false] [PASS_THRO_ALL_POLLING_OBJECTS true/false] [RECOVER_DELETED_PDATAS true/false] [BULK_INSERT_INTERVAL seconds] [MAX_ALLOWABLE_INSERT num] [STATUS_POLL_DELAY seconds] [DATA_COLLECTION_SNMP_TIMEOUT seconds] [DATA_COLLECTION_STARTUP_DELAY seconds] [STATUS_POLL_TXN_TIMEOUT milliseconds] PROCESS com.adventnet.nms.poll.Collector ARGS MAX_OIDS_IN_ONE_POLL 15 AUTHORIZATION true CLEAN_DATA_INTERVAL 7 DATA_COLLECTION_QUERY_INTERVAL 120000 PASS_THRO_ALL_POLLING_OBJECTS true</pre>
38	On the STANDBY SERVER, update the /Tekelec/WebNMS/conf/NmsProcessesBE.conf file to set the CLEAN_DATA_INTERVAL to 9	<pre>#java com.adventnet.nms.poll.Collector [CLEAN_DATA_INTERVAL num_days] [STATUS_POLL_PING_RETRIES num] [STATUS_POLL_SNMP_RETRIES num] [DATA_COLLECTION_SNMP_RETRIES num] [MAX_OIDS_IN_ONE_POLL num] [CUSTOMIZED_DATA_COLLECTOR classname] [POLLING_POLICY_CUSTOMIZER classname] [DEBUGGING_MODE true/false] [SEND_MULTIPLE_REQUEST true/false] [STATUS_POLL_QUERY_INTERVAL mi</pre>

		<pre> lliseconds] [DATA_COLLECTION_QUERY_INTERVAL milliseconds] [AUTHORIZATION true/false] [PASS_ THRO_ALL_POLLING_OBJECTS true/false] [RECOVER_DELETED_PDATAS true/false] [BULK_INSERT_INTER VAL seconds] [MAX_ALLOWABLE_INSERT num] [STATUS_POLL_DELAY seconds] [DATA_COLLECTION_SNMP_T IMEOUT seconds] [DATA_COLLECTION_STARTUP_DELAY seconds] [STATUS_POLL_TXN_TIMEOUT milliseco nds] PROCESS com.adventnet.nms.poll.Collector ARGS MAX_OIDS_IN_ONE_POLL 15 AUTHORIZATION true CLEAN_DATA_INTERVAL 9 DATA_COLLECTION_QUE RY_INTERVAL 120000 PASS_THRO_ALL_POLLING_OBJECTS true </pre>
39	<p>On Both servers, verify the permission of the directory set in the variable outputDirectory in the /Tekelec/WebNMS/conf/tekelec/common.config file.</p> <p>The directory should be owned by the Non-root admin user and the permission should be 775.</p>	Successful Verification.
40	Procedure Complete	This procedure is complete.

Note: The entry for primary and standby servers must also be done on the client machines' hosts file. On Windows machine, the hosts file is present at 'C:\Windows\System32\drivers\etc' folder. The following two lines should be added in the hosts file –

```

<PRIMARY SERVER IP> <PRIMARY SERVER HOSTNAME>
<STANDBY SERVER IP> <STANDBY SERVER HOSTNAME>

```

e.g.

```

10.248.10.25 e5ms8
10.248.10.21 e5ms9

```

APPENDIX G. PROCEDURE TO UPDATE SYSTEM USER AND PASSWORD IN OCEEMS

Execute /Tekelec/WebNMS/bin/E5MSConfigurationScript.sh script to update the system user and its password for OCEEMS.

```
# sh E5MSConfigurationScript.sh
Please enter OCEEMS home path. (Absolute path till WebNMS directory)
/Tekelec/WebNMS/
Press 1 To update current system username and password in OCEEMS
2 To update current mysql root user's password in OCEEMS
3 To Exit
Your Choice (1, 2 or 3): 1
Enter Username (e.g. root): <non-root system user for OCEEMS>
Enter Password: <above system user's password>
Do you want to proceed with the entered username and password?(y/n): y
Username and Password updated successfully in OCEEMS.
```

Note: If OCEEMS server is already running when this procedure is applied, then a restart of OCEEMS server shall be required to make the above change effective. Use the following command to restart OCEEMS -

```
service e5msService restart
```

Note that if it is first time configuration and e5ms software is not running, do not restart the e5ms service. Go back to the installation step. Please check whether OCEEMS server is running or not by using the following command:

```
service e5msService status
```

APPENDIX H. PROCEDURE TO UPDATE MYSQL ROOT USER'S PASSWORD

H.1 For Standalone Server

1. Shutdown OCEEMS server

```
service e5msService stop
```

2. Start MySQL using /Tekelec/WebNMS/bin/startMySQL.sh

```
sh startMySQL.sh
```

3. Update MySQL root user's password using following steps –

- a. Login to MySQL using root user and its current password –

```
[root@e5ms-12 bin]# ./mysql -uroot -p
```

```
Enter password:
```

```
Warning: Using a password on the command line interface can be insecure.
```

```
Welcome to the MySQL monitor.  Commands end with ; or \g.
```

```
Your MySQL connection id is 125
```

```
Server version: 5.6.31-enterprise-commercial-advanced-log MySQL Enterprise  
Server - Advanced Edition (Commercial)
```

```
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```

```
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```

- b. Set MySQL as database -

```
mysql> use mysql;
```

- c. Set new password for root user and flush –

```
mysql> SET PASSWORD FOR 'root'@'localhost' = PASSWORD('hello');
```

```
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> FLUSH PRIVILEGES;
```

```
Query OK, 0 rows affected (0.00 sec)
```

- d. Commit the change and exit MySQL –

```
mysql> commit;
```

```
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> exit
```

```
Bye
```

4. Stop MySQL using /Tekelec/WebNMS/bin/stopMySQL.sh. When prompted for password, supply the new password set in step 3.

```
[root@e5ms-12 bin]# sh stopMySQL.sh
```

```
Enter password:
```

```
STOPPING server from pid file /Tekelec/WebNMS/mysql/data/e5ms-12.pid
```

```
130910 00:45:26 mysqld ended
```

5. Execute /Tekelec/WebNMS/bin/E5MSConfigurationScript.sh script to update the new MySQL root user's password in OCEEMS.

```
# sh E5MSConfigurationScript.sh
```

```

Please enter OCEEMS home path.(Absolute path till WebNMS directory)
/Tekelec/WebNMS/
Press 1 To update current system username and password in OCEEMS
2 To update current mysql root user's password in OCEEMS
3 To Exit
Your Choice (1, 2 or 3): 2
Enter new password for MySQL root user: hello
Do you want to proceed with the entered password? (y/n) y
MySQL Password updated successfully.

```

6. Start OCEEMS server.

```
service e5msService start
```

H.2 For Failover Setup

To update MySQL user's password for a failover setup, replication needs to be stopped first, MySQL root user's password needs to be updated and then replication setup needs to be re-created between the servers. Following are the steps -

1. Stop database replication between the servers by running following commands on both Primary and Standby servers -

a. Login to MySQL using root user and its current password –

```

[root@e5ms-12 bin]# ./mysql -uroot -p
Enter password:
Warning: Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 125
Server version: 5.6.31-enterprise-commercial-advanced-log MySQL Enterprise
Server - Advanced Edition (Commercial)

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```

b. STOP SLAVE;

c. RESET SLAVE;

d. QUIT

2. Shutdown standby server and then Primary server by using following command –

```

# service e5msService stop
Stopping OCEEMS server...
MySql not stopped for failover
Done.

```

3. Follow steps 3 to 5 in section H.1 to update MySQL root user's password on Primary and Standby servers.
4. Follow steps 18 to 25 in section F.1 to setup replication again between the two servers.
5. Start primary server.
6. Start standby server.

APPENDIX I. PROCEDURE TO CREATE A NON-ROOT USER FOR OCEEMS

Before release 46.3, OCEEMS supported installation/upgrade as well as regular operations (like start/stop/restart of server and updates in configuration files) through super user 'root' only. Starting release 46.3, OCEEMS shall restrict the use of 'root' user to installation/upgrade procedure only. After installation/upgrade of OCEEMS, the 'root' user shall be required to run /Tekelec/WebNMS/bin/updatePrivilegesForUser.sh script. This script shall create a non-root user for OCEEMS operations (start/stop/restart of server and updates in configuration files) as well as do the initial configuration that is required by OCEEMS and can be done only by the system admin account. The tasks performed by the script when run with option 'non-root' are given below -

- Create a non-root system user for OCEEMS operations (script shall provide the option to create a new system user or update an existing system user)
- Create a new group or update an existing group to be associated to the above non-root user
- Assign group ownership of various OCEEMS directories to the above group
- Configure SNMP trap receiving port for OCEEMS for traps coming from IPv4 and IPv6 based network devices

A sample run of the script with 'non-root' option has been provided below (inputs provided by the user have been highlighted) -

```
[root@localhost bin]# sh updatePrivilegesForUser.sh non-root
```

```
The script shall try to create a non-root user on the system with limited
privileges for operation(start/stop/configuration) of OCEEMS...
```

```
This user can be an existing user or a non-existing user...
```

```
In case of a non-existing user, script shall create the user and provide
required privileges for operation of OCEEMS...
```

```
In case of an existing user, the user's privileges shall be updated to
enable operation of OCEEMS...
```

```
The recommended non-root user created will be 'emsadmuser' with group
'emsadm'...
```

```
Do you want to proceed with default non-root user? (y/n)y
```

```
The script will now continue with the default username and group....
```

```
Please provide the password for the user -
```

```
(Non-empty, no spaces, only with permitted characters- alphanumeric, !, @ and
#):
```

```
Please provide the SNMP trap forwarding port configured on devices (EAGLE/EPAP/LSMS)
for OCEEMS (default is 162):
```

```
Are you sure you want to proceed with default port 162 (Y/N)? y
```

```
Proceeding with port 162...
```

```
Since port 162 is a reserved port for root processes, OCEEMS started with
a non-root user can not listen to it...
```

```
Therefore, OCEEMS needs an unreserved port, to which the SNMP traps coming
from devices (EAGLE/EPAP/LSMS) at port 162, shall be forwarded...
```

```
OCEEMS shall then listen to this unreserved port for all the SNMP traps...
```

```
Please provide a port number in range [1024-65535] that OCEEMS shall listen
to for SNMP traps (default is 64000):
```

Proceeding with port 64000...

Are you sure you want to proceed with default port 64000 (Y/N)? **y**

Do you want to support network devices over IPV6?(Y/N) **n**

Adding PREROUTING entry in iptables for forwarding of SNMP traps coming on port 162 to 64000.

Done!

Saving PREROUTING entry to persist on machine restart.

Done!

Updating value of 'trapport' parameter in /Tekelec/WebNMS/conf/trapport.conf to 64000.

Done!

Creating non-root user 'emsuser' with group 'emsgroup'.

Done!

Changing group ownership of OCEEMS directories to group 'emsgroup'.

Done!

Modifying read/write permissions for OCEEMS directories.

Done!

Providing sudo access to user 'emsuser' for system command 'lsof'.

Done!

OCEEMS operations (start/stop/configuration) can now be done using user 'emsuser'.

Close this session and start a new session using user 'emsuser' to proceed with OCEEMS operation with user 'emsuser'.

APPENDIX J. PROCEDURE TO CREATE OCEEMS SSL CERTIFICATE

To create SSL certificate needed for HTTPS based access for OCEEMS, the user needs to execute E5MSCertificateCreationScript.sh script present in /Tekelec/WebNMS/bin directory. During execution of script, it shall ask the user for various inputs. The user should provide appropriate inputs (fitting the constraints) as highlighted in the sample script execution below –

```
[emsadmuser@e5ms8 bin]$ cd /Tekelec/WebNMS/bin
[emsadmuser@e5ms8 bin]$ sh E5MSCertificateCreationScript.sh

Welcome to OCEEMS SSL Certificate creation wizard!!!

Please provide OCEEMS home path (Absolute path till 'WebNMS' directory e.g.
/Tekelec/WebNMS): /Tekelec/WebNMS

Please provide the country name (e.g. US)-
(Must not be empty, permitted characters - alphabets and space): US

Please provide the state name (e.g. North Carolina)-
(Must not be empty, permitted characters - alphabets and space): North Carolina

Please provide the organization name (e.g. Oracle)-
(Must not be empty, permitted characters - alphanumeric, underscore, dot and space):
Oracle

Please provide the organization unit name (e.g. E5MS)-
(Must not be empty, permitted characters - alphanumeric, underscore, dot and space):
OCEEMS

Please provide the keystore password -
(Must not be empty, length at least six, space not allowed, permitted characters-
alphanumeric, !, @ and #):<provide a password fitting the constraints>

Please provide E5MS root user's password (used for E5MS client login):<>

Trying to generate encrypted password for keystore and trust store...

Creating certificates for BE in localhost server.
Certificate stored in file </Tekelec/WebNMS/Certs/server.cer>
Certificate was added to keystore
The Certificates and key files were created in /Tekelec/WebNMS/Certs and copied into the
respective conf directories
Done.

Updating keystore and trust store password in transportProvider.conf file...

Passwords successfully updated.
```

APPENDIX K. OPENING PORTS USED BY OCEEMS IN CASE OF FIREWALL

Primary and Secondary servers need to be behind a single firewall and should not have their individual firewalls turned ON. Client machine used to access OCEEMS client and managed EAGLE(s) could be on other side of the firewall.

In case a firewall is enabled between OCEEMS servers and client or OCEEMS servers and managed EAGLE(s), the ports used by OCEEMS needs to be opened on the firewall for proper functioning of OCEEMS with the firewall.

The ports used by OCEEMS, their types and purpose have been given in the table below. All these must be opened up on the firewall.

Note: Ports for SSH (22), Telnet (23), SNMP (161), SNMP v3 user discovery ports (1234 and 8002) must be opened bi-directionally.

S. No.	Port and Type	Purpose
1	20 (TCP)	Data port for FTP
2	21 (TCP)	Command port for FTP
3	22 (TCP)	Port used for SSH connection
4	23 (TCP)	Port used for TELNET connection
5	69 (UDP)	TFTP service port used by WebNMS
6	161 (UDP)	SNMP port
7	162 (UDP)	SNMP trap port used for receiving traps.
8	1099 (TCP)	RMI Registry port used in Client-Server communication
9	1234 (TCP)	Port for SNMP v3 user discovery by NMS for receiving traps from OCEEMS
10	2000 (TCP)	NMS BE port used for communication between BE and FE servers.
11	2300 (TCP)	Config Server port
12	3306 (TCP)	MySQL
13	4500 (TCP)	SAS (SNMP Applet Server) port In BE - FE combination, all SAS related information is passed through a socket.
14	4567 (TCP)	For Web NMS client server communication
15	8001 (UDP)	Web NMS Agent port
16	8002 (UDP)	Port for SNMP v3 user discovery by NMS and to receive SNMP set request from NMS after user discovery
17	8443 (TCP)	for SSL connection
18	9000 (TCP)	Used by i-net Clear Reports server
19	9999 (TCP)	SUM Port
20	36001 (TCP)	NMS FE Secondary Port
21	36002 (TCP)	Web NMS Client Server communication port
22	36003 (TCP)	RMI Server Socket Port.
23	Port Range (TCP)	For NBI FTP module to transfer measurement files from OCEEMS to NMS using FTP (passive mode), the port range (ports used for ftp) for the FTP server needs to be configured at NMS. The ports specified in port range on NMS need to be opened on OCEEMS server firewall as well.

APPENDIX L. UPDATING DATABASE CHANGES IN XML FILES PRIOR TO UPGRADE TO PRESERVE CUSTOM ALARM/EVENT VIEWS

Before proceeding with upgrade of OCEEMS, DBXML tool needs to be executed so that the custom alarm/event views created by users are preserved after upgrade. For this, follow the steps given below -

- 1) Verify that the CLASSPATH value in '/Tekelec/WebNMS/bin/developertools/DBXmlTool.sh' file includes the entries “./NetMonitor/build/E5MS_Common.jar:./NetMonitor/build/E5MS_Server.jar.” If these entries are not there, add them as shown below -

Update -

```
CLASSPATH=$NMS_CLASSES/AdventNetTtl.jar:$NMS_CLASSES/ManagementServer.jar:$NMS_SERVER_CLASSES:$NMS_CLASSES:$XML_CLASSPATH:$SNMP_CLASSPATH:$DB_CLASSPATH:$TRANSACTION_CLASSPATH:$NMS_CLASSES/ApiUtils.jar:$NMS_CLASSES/JimiProClasses.jar:$NMS_CLASSES/AdventNetNPrevalent.jar:$HBN_CLASSPATH:$HBN_LIB_CLASSPATH:$NMS_CLASSES/Mail.jar:$JSON_CLASSPATH
```

As -

```
CLASSPATH=./NetMonitor/build/E5MS_Common.jar:./NetMonitor/build/E5MS_Server.jar:$NMS_CLASSES/AdventNetTtl.jar:$NMS_CLASSES/ManagementServer.jar:$NMS_SERVER_CLASSES:$NMS_CLASSES:$XML_CLASSPATH:$SNMP_CLASSPATH:$DB_CLASSPATH:$TRANSACTION_CLASSPATH:$NMS_CLASSES/ApiUtils.jar:$NMS_CLASSES/JimiProClasses.jar:$NMS_CLASSES/AdventNetNPrevalent.jar:$HBN_CLASSPATH:$HBN_LIB_CLASSPATH:$NMS_CLASSES/Mail.jar:$JSON_CLASSPATH
```

- 2) Move to /Tekelec/WebNMS/bin/developertools directory.
cd /Tekelec/WebNMS/bin/developertools
- 3) Run the updateUsers.sh script with the 'updateXML' option as shown below -
sh updateUsers.sh <Password of MySQL root user> updateXML

Sample output of the script is given below for reference (Note: failure for user 'guest' can be ignored) -

```
Warning: Using a password on the command line interface can be insecure.
DBXmlTool.sh updateXML guest
TransactionAPI create instance called.
WARNING!! More than one property has the same ALIAS name - USERGRPNAME. This may lead to undesirable results.
WARNING!! More than one property has the same ALIAS name - SNMPPORT. This may lead to undesirable results.

"updateXML" operation Failed for user guest

Reason for Failure : com.adventnet.nms.store.NmsStorageException: Exception There is no data found in Database for userName : guest id : null
DBXmlTool.sh updateXML root
TransactionAPI create instance called.
WARNING!! More than one property has the same ALIAS name - USERGRPNAME. This may lead to undesirable results.
WARNING!! More than one property has the same ALIAS name - SNMPPORT. This may lead to undesirable results.

"updateXML" operation Successful for user root
```

APPENDIX M. UPDATING XML CHANGES IN OCEEMS DATABASE

In R46.0, “Command Class Management” functionality was added to OCEEMS. For this functionality, a new link named ‘Command Class Management’ was added in OCEEMS GUI’s left navigation pane. After upgrade to R46.0, for pre-upgrade OCEEMS users to see the ‘Command Class Management’ link in OCEEMS client, the **updateUsers.sh** script must be run. In R46.2, a number of changes have been done for rebranding purpose i.e. updating old E5MS references to the new name OCEEMS. All such changes are available in XML files. Script **‘/Tekelec/WebNMS/bin/developertools/updateUsers.sh’** should be run to pick the above changes from XML files and update users’ information in OCEEMS database.

Follow the below given steps to execute updateUsers.sh script to update users’ information in OCEEMS database -

- 1) Move to /Tekelec/WebNMS/bin/developertools directory.
- 2) Run updateUsers.sh script for updating database by using the following command -

```
$ cd /Tekelec/WebNMS/bin/developertools
```

```
$ sh updateUsers.sh <Password of MySQL root user> updateDB
```

Sample output of the script is given below for reference –

Warning: Using a password on the command line interface can be insecure.

```
DBXmlTool.sh updateDB guest
TransactionAPI create instance called.
WARNING!! More than one property has the same ALIAS name - USERGRPNAME. This may
lead to undesirable results.
WARNING!! More than one property has the same ALIAS name - SNMPPORT. This may lead
to undesirable results.
"updateDB" operation Successful for user guest
```

```
DBXmlTool.sh updateDB root
TransactionAPI create instance called.
WARNING!! More than one property has the same ALIAS name - USERGRPNAME. This may
lead to undesirable results.
WARNING!! More than one property has the same ALIAS name - SNMPPORT. This may lead
to undesirable results.
```

```
"updateDB" operation Successful for user root
```

```
DBXmlTool.sh updateDB user1
TransactionAPI create instance called.
WARNING!! More than one property has the same ALIAS name - USERGRPNAME. This may
lead to undesirable results.
WARNING!! More than one property has the same ALIAS name - SNMPPORT. This may lead
to undesirable results.
```

```
"updateDB" operation Successful for user user1
```

APPENDIX N. SETTING OCEEMS SYSTEM TIME ZONE

In case, the time zone for OCEEMS system is not set properly, the following procedure should be used to set it -

- 1) Set server to time zone X (e.g. IST).
- 2) Start OCEEMS server using command 'service e5msService start'.
- 3) Launch OCEEMS client and perform resync on a configured EAGLE.
- 4) Validate that OCEEMS Timestamp on OCEEMS Alarms GUI reflects time zone X.
- 5) Use system command 'system-config-date' to change server time zone to Y (e.g. CDT).
- 6) Stop OCEEMS server using command 'service e5msService stop'.
- 7) Start OCEEMS server using command 'service e5msService start'.
- 8) Launch OCEEMS client. Due to OCEEMS server restart, resync will automatically trigger for added EAGLE(s).
- 9) Validate that OCEEMS Timestamp on Alarms GUI now reflects time zone Y.

APPENDIX O. PURPOSE OF OCEEMS LOG FILES

Log files in OCEEMS are placed at two locations - /Tekelec/WebNMS/logs and /var/E5-MS directories.

The log files placed in /Tekelec/WebNMS/logs directory are created by WebNMS framework. The purpose of these log files can be found at the below given link -

http://www.webnms.com/webnms/help/developer_guide/logging_service/web_nms_logfiles.html

The log files placed in /var/E5-MS directory are customized log files that are created by various OCEEMS modules. The purpose of these log files is self-explanatory as per the location and mentioned below -

- 1) /var/E5-MS/measurement/logs – OCEEMS Measurement module logs
- 2) /var/E5-MS/configuration/logs – OCEEMS Configuration (CMI) module logs
- 3) /var/E5-MS/security/logs – OCEEMS Security related logs
- 4) /var/E5-MS/fault/logs – OCEEMS Fault module logs
- 5) /var/E5-MS/discovery/logs/ - Logs related to discovery of devices in OCEEMS
- 6) /var/E5-MS/maps/logs – Map related logs in OCEEMS
- 7) /var/E5-MS/inventory/logs – OCEEMS Inventory module logs
- 8) /var/E5-MS/channel/logs – OCEEMS Client and server communication channel related logs
- 9) /var/E5-MS/userOperations/logs – Logs related to user operations in OCEEMS
- 10) /var/E5-MS/linkUtilization/logs – OCEEMS Link Utilization Interface (LUI) module logs
- 11) /var/E5-MS/scheduler/logs - OCEEMS Scheduler module logs
- 12) /var/E5-MS/license/logs - OCEEMS Licensing related logs
- 13) /var/E5-MS/nbi/logs - OCEEMS Northbound Interface (NBI) module logs
- 14) /var/E5-MS/reporting/logs – OCEEMS Reporting module logs
- 15) /var/upgrade/logs – OCEEMS upgrade logs

APPENDIX P. ADDING A NON ADMIN USER FOR SSH PORT FORWARDING

- 1) Create a new user on the system using `adduser` command.

```
# adduser e5msuser
```

- 2) Provide a password for the newly created user using `passwd` command. Provide the highlighted inputs as required.

```
# passwd e5msuser
Changing password for user e5msuser.
# New password: <provide new password here>
Retype new password: <confirm new password here>
passwd: all authentication tokens updated successfully.
```

- 3) Change directory to `/Tekelec/WebNMS/bin`.

```
# cd /Tekelec/WebNMS/bin
```

- 4) Execute `E5MSConfigurationScript.sh` script to update the newly created user in OCEEMS. Provide the highlighted inputs as required.

```
# sh E5MSConfigurationScript.sh

Please enter OCEEMS home path (Absolute path till 'WebNMS' directory):
/Tekelec/WebNMS/
Press 1 To update current system username and password in OCEEMS
    2 To update current mysql root user's password in OCEEMS
    3 To Exit
Your Choice (1, 2 or 3): 1
Enter Username (e.g. root): e5msuser
Enter Password: <e5msuser's password>
Do you want to proceed with the entered username and password?(y/n): Y
Username and Password updated successfully in OCEEMS.
```

- 5) Change directory to `/Tekelec/WebNMS/conf/tekelec`.

```
# cd /Tekelec/WebNMS/conf/tekelec
```

- 6) Edit `server_conf.properties` file, make the following change and save it.

```
Update entry -
LinuxMachinePrompt=\#

to -
LinuxMachinePrompt=\$
```

- 7) Restart the OCEEMS server for the above change to take effect.

```
# service e5msServcie restart
```

APPENDIX Q. LOG MESSAGES WHILE RESTORING OCEEMS

```
[root@e5ms-12 backup]# sh RestoreDB.sh /var/backup/E5MS_Database_BackUp.sql
restore path :: /var/backup
```

```
WARNING! Attempting to restore the data!!! This will result in losing your current
data!!! Do you want to continue [y/n]?
```

```
y
```

```
Script will attempt to restore OCEEMS database from the dump file:
/var/backup/E5MS_Database_BackUp.sql
```

```
OCEEMS database restoration in progress...
```

```
Successfully restored OCEEMS database.
```

```
The following files will be restored now to OCEEMS:
```

```
/Tekelec/WebNMS//Tekelec/WebNMS/conf/tekelec
/Tekelec/WebNMS/conf/tekelec/lui.properties
/Tekelec/WebNMS/conf/tekelec/InventoryCommands.txt
/Tekelec/WebNMS/conf/tekelec/security.properties
/Tekelec/WebNMS/conf/tekelec/tekmeas.conf
/Tekelec/WebNMS/conf/tekelec/lui_template_script.txt
/Tekelec/WebNMS/conf/tekelec/ContinentZonalMap.xml
/Tekelec/WebNMS/conf/tekelec/CmiParameters.conf
/Tekelec/WebNMS/conf/tekelec/EagleCardNameNumMap.xml
/Tekelec/WebNMS/conf/tekelec/ModulesConf.xml
/Tekelec/WebNMS/conf/tekelec/common.config
/Tekelec/WebNMS/conf/tekelec/fault.properties
/Tekelec/WebNMS/conf/tekelec/NbiParameters.conf
/Tekelec/WebNMS/conf/tekelec/server_conf.properties
/Tekelec/WebNMS/conf/tekelec/reporting.properties
/Tekelec/WebNMS//Tekelec/WebNMS/users
/Tekelec/WebNMS//Tekelec/WebNMS/users/root
/Tekelec/WebNMS/users/root/toolbar.dtd
/Tekelec/WebNMS//Tekelec/WebNMS/users/root/listmenus
/Tekelec/WebNMS/users/root/listmenus/dummy.txt
/Tekelec/WebNMS/users/root/sysadminmenu.xml
/Tekelec/WebNMS//Tekelec/WebNMS/users/root/policymenus
/Tekelec/WebNMS/users/root/policymenus/nonperiodicpolicymenu.xml
/Tekelec/WebNMS/users/root/policymenus/periodicpolicymenu.xml
```

```
/Tekelec/WebNMS/users/root/AudioInfo.xml
/Tekelec/WebNMS/users/root/mibmenu.xml
/Tekelec/WebNMS/users/root/HomePageLayout.xml
/Tekelec/WebNMS/users/root/increments.conf
/Tekelec/WebNMS//Tekelec/WebNMS/users/root/mapmenus
/Tekelec/WebNMS/users/root/mapmenus/dummy.txt
/Tekelec/WebNMS/users/root/panelmenubar.dtd
/Tekelec/WebNMS/users/root/FramesInfo.conf
/Tekelec/WebNMS/users/root/alertsmenu.xml
/Tekelec/WebNMS/users/root/maptoolbar.xml
/Tekelec/WebNMS/users/root/clientparameters.conf
/Tekelec/WebNMS/users/root/framemenu.xml
/Tekelec/WebNMS/users/root/tllbrowsermenu.xml
/Tekelec/WebNMS/users/root/TreeOperations.xml
/Tekelec/WebNMS/users/root/Tree.xml
/Tekelec/WebNMS/users/root/maptoolbar.dtd
/Tekelec/WebNMS/users/root/frameoptions.xml
/Tekelec/WebNMS//Tekelec/WebNMS/users/guest
/Tekelec/WebNMS/users/guest/toolbar.dtd
/Tekelec/WebNMS//Tekelec/WebNMS/users/guest/listmenus
/Tekelec/WebNMS/users/guest/listmenus/dummy.txt
/Tekelec/WebNMS/users/guest/sysadminmenu.xml
/Tekelec/WebNMS//Tekelec/WebNMS/users/guest/policymenus
/Tekelec/WebNMS/users/guest/policymenus/nonperiodicpolicymenu.xml
/Tekelec/WebNMS/users/guest/policymenus/periodicpolicymenu.xml
/Tekelec/WebNMS/users/guest/AudioInfo.xml
/Tekelec/WebNMS/users/guest/mibmenu.xml
/Tekelec/WebNMS/users/guest/HomePageLayout.xml
/Tekelec/WebNMS/users/guest/increments.conf
/Tekelec/WebNMS//Tekelec/WebNMS/users/guest/mapmenus
/Tekelec/WebNMS/users/guest/mapmenus/dummy.txt
/Tekelec/WebNMS/users/guest/panelmenubar.dtd
/Tekelec/WebNMS/users/guest/alertsmenu.xml
/Tekelec/WebNMS/users/guest/maptoolbar.xml
/Tekelec/WebNMS//Tekelec/WebNMS/users/guest/state
/Tekelec/WebNMS/users/guest/state/dummy.txt
/Tekelec/WebNMS/users/guest/clientparameters.conf
/Tekelec/WebNMS/users/guest/framemenu.xml
/Tekelec/WebNMS/users/guest/tllbrowsermenu.xml
/Tekelec/WebNMS/users/guest/TreeOperations.xml
```

```
/Tekelec/WebNMS/users/guest/Tree.xml
/Tekelec/WebNMS/users/guest/maptoolbar.dtd
/Tekelec/WebNMS/users/guest/frameoptions.xml
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/kanav
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/kanav/Kanav
/Tekelec/WebNMS/commandManagerScripts/kanav/Kanav/kan.bsh
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/viv
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/usr4
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/usr4/default
/Tekelec/WebNMS/commandManagerScripts/usr4/default/scr1.bsh
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/usr4/cat1
/Tekelec/WebNMS/commandManagerScripts/usr4/cat1/scr1.bsh
/Tekelec/WebNMS/commandManagerScripts/usr4/cat1/scr4.bsh
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/arjun
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/arjun/default
/Tekelec/WebNMS/commandManagerScripts/arjun/default/hashhhh.bsh
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/k2
/Tekelec/WebNMS//Tekelec/WebNMS/commandManagerScripts/kan
/Tekelec/WebNMS/linkUtilizationScripts/aricentstp_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/tekelecstp_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/eagle9_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/tklc9010801_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/stpd1180801_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/eale5_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/tklc1071501_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/eagle3_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/pveagle03_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/eagle8_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/tklc1180601_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/eagle6_lui_script.bsh
/Tekelec/WebNMS/linkUtilizationScripts/tklc1170501_lui_script.bsh
/Tekelec/WebNMS//Tekelec/WebNMS/reportingStudio
/Tekelec/WebNMS/reportingStudio/Alarms_SpecificDuration_WithSeverity.rpt
/Tekelec/WebNMS/reportingStudio/Resources_Top10_PerCount.rpt
/Tekelec/WebNMS/reportingStudio/Events_SpecificDuration_WithSeverity.rpt
/Tekelec/WebNMS/reportingStudio/LinkReport_withErlang_PercentUtilization.rpt
/Tekelec/WebNMS/reportingStudio/All_Events.rpt
/Tekelec/WebNMS/reportingStudio/Alarms_Top10_PerCount.rpt
/Tekelec/WebNMS/reportingStudio/Alarms_Top10_PerSeverity.rpt
/Tekelec/WebNMS/reportingStudio/Events_SpecificDuration_WithSeverity_UAM_Number.rpt
```



```
/Tekelec/WebNMS/reportingStudio/Alarms_SpecificDuration_WithSeverity_UAM_Number.rpt
/Tekelec/WebNMS/reportingStudio/EventSummary_SpecificDuration.rpt
/Tekelec/WebNMS/reportingStudio/CardReport_withErlang_PercentUtilization.rpt
/Tekelec/WebNMS/reportingStudio/Resources_Top10_PerSeverity.rpt
/Tekelec/WebNMS/reportingStudio/All_Alarms.rpt
/Tekelec/WebNMS/reportingStudio/Events_SpecificDuration.rpt
/Tekelec/WebNMS/reportingStudio/Inventory_OOSCards.rpt
/Tekelec/WebNMS/reportingStudio/LinkSetReport_withErlang_PercentUtilization.rpt
/Tekelec/WebNMS/reportingStudio/Inventory_AllCards.rpt
/Tekelec/WebNMS/reportingStudio/Measurement_Systot_STP.rpt
/Tekelec/WebNMS/reportingStudio/Events_SpecificDate.rpt
/Tekelec/WebNMS/reportingStudio/Alarms_SpecificDate.rpt
/Tekelec/WebNMS/reportingStudio/AlarmSummary_SpecificDuration.rpt
/Tekelec/WebNMS/reportingStudio/Alarms_SpecificDuration.rpt
/Tekelec/WebNMS/defaultconf/usernamePassword.conf
/Tekelec/WebNMS/conf/securitydbData.xml
/Tekelec/WebNMS/classes/hbplib/hibernate.cfg.xml
/Tekelec/WebNMS/classes/hbplib/secondary/hibernate.cfg.xml
```

All the files & directories specified in the FILES_TO_RESTORE tag are successfully restored

OCEEMS successfully restored.

APPENDIX R. INSTALLATION OF JAVA RUNTIME FOR OCEEMS

Note: The Java version in this section corresponds to EMS 46.6.4. For EMS 46.6.2, use Java version 1.8.0-161 (64 bit).

Java Runtime (JRE) package 1.8.0_261 (64-bit) is required to run OCEEMS application.

Note: OCEEMS 46.6.4 is tested with JRE 1.8.0_261. It may not work properly with other Java versions (major or minor).

Note: OCEEMS 46.6.2 is tested with JRE 1.8.0_161. It may not work properly with other Java versions (major or minor)

The following sections describe the steps needed for installation of JRE on the system as required by OCEEMS.

1.1.1 Installation of JRE on system

In case Java is not installed on the machine or a lower version is installed, the user shall be required to download the 64-bit package from the link <http://www.java.com/en/download/> and install/upgrade it. After installation, it is advised to note down the absolute path of 'jre' directory in the Java installation on the system (it shall be needed in the section 1.1.2 while setting JAVA_HOME variable and while running OCEEMS upgrade script for upgrading OCEEMS). After successful installation of Java, JAVA_HOME system variable shall be set using the steps given in the following section. Note that JAVA_HOME should be set properly for running OCEEMS server.

1.1.2 Setting JAVA_HOME system variable

Before proceeding with the installation/upgrade of Release 46.6 of OCEEMS, the user shall be required to create (if it does not already exist) or update (if it exists but points to an older JRE) the system variable JAVA_HOME using the steps given below –

- 1) Login to machine using system user 'root'.
- 2) Check if java is installed. Under Oracle Linux, run the following command.
`# find / -name jre`
If the output is blank that means java is not installed on system. Please install java and then proceed to step-5.
- 3) If Java is installed, Check if JAVA_HOME is already set. Under Oracle Linux, Run the following command.
`# echo $JAVA_HOME`
If output is blank, JAVA_HOME is not set. Go to step 5.
- 4) If JAVA_HOME is set, check if it is set to correct path. Check that the path of jre found in step-2 above and the path of JAVA_HOME found in step-3 above are same or not. If path is same, this procedure is complete.

If JAVA_HOME path is not properly set, Go to step-5
- 5) Move to /etc/profile.d directory.
`# cd /etc/profile.d`
- 6) Create a new file named custom.sh. Skip this step if the file already exists in the directory.
`# touch custom.sh`
- 7) In file 'custom.sh', verify the export statement for the JAVA_HOME variable. Add a new export statement (if not already exists) or update the existing export statement (if points to an older JRE path) to point to the absolute path of the 'jre' folder present in the Java installed on the system in section 1.1.1.
`export JAVA_HOME=<absolute path of the 'jre' folder present in the Java installation>`

e.g. if Java is installed in directory /usr/java/jdk1.8.0_261-amd64, then the statement in 'custom.sh' shall be -
`export JAVA_HOME=/usr/java/jdk1.8.0_261-amd64/jre`

Note: The Java version in this section corresponds to EMS 46.6.4. For EMS 46.6.2, use Java version 1.8.0-161 (64 bit).

- 8) Save the file and exit the command terminal.
- 9) Login again using system user 'root' and verify that the value of JAVA_HOME variable. It should point to the version of java installed in section 1.1.1.

```
# echo $JAVA_HOME
```

```
/usr/java/jdk1.8.0_261-amd64/jre
```

Note: The Java version in this section corresponds to EMS 46.6.4. For EMS 46.6.2, use Java version 1.8.0-161 (64 bit).

1.1.3 Java verification before OCEEMS installation/upgrade

OCEEMS installation/upgrade procedure shall automatically check the correctness of Java on the system before actually proceeding with installation/upgrade of OCEEMS. Installation/upgrade shall proceed only if various checks for Java are successful; else, it shall not proceed and exit providing the cause of failure. The user can then fix the issue using the cause given and try the installation/upgrade again.

The following checks shall be performed before proceeding with OCEEMS installation/upgrade –

- 1) **JAVA_HOME should not point to OCEEMS bundled JRE package** – In case the JAVA_HOME variable set on the system points to the JRE package bundled with OCEEMS, OCEEMS installation/upgrade shall not proceed and exit with the following error message –

JAVA_HOME is set to the OCEEMS embedded version!

Please perform a standalone Java installation, configure JAVA_HOME as recommended in the OCEEMS Installation/Upgrade guide and try again.

- 2) **JAVA_HOME variable should be set correctly** - In case the JAVA_HOME variable is not set correctly (e.g. points to a location where Java is not present), installation/upgrade shall not proceed and exit with the following error message –

JAVA_HOME is not set properly!

Please set JAVA_HOME as recommended in the OCEEMS installation/upgrade guide and try again.

- 3) **Java 1.8.0_261 should be installed** - In case the JAVA_HOME variable set on the system points to a version of Java that is lower than 1.8.0_261, installation/upgrade shall not proceed and exit with the following error message –

Required Java version for OCEEMS is not installed on server!

Please perform a standalone Java installation, configure JAVA_HOME as recommended in the OCEEMS Installation/Upgrade guide and try again.

Note: The Java version in this section corresponds to EMS 46.6.4. For EMS 46.6.2, use Java version 1.8.0-161 (64 bit).

Note: OCEEMS 46.6.4 is tested with JRE 1.8.0_261. It may not work properly with other Java versions (major or minor).

Note: OCEEMS 46.6.2 is tested with JRE 1.8.0_161. It may not work properly with other Java versions (major or minor).

1.1.4 Java verification on OCEEMS server startup

After successful installation/upgrade to OCEEMS release 46.6, correctness of Java shall be checked each time on the OCEEMS server startup. This check shall prevent against any undesirable change in the java installation after OCEEMS has been successfully installed/upgraded and started. The following checks shall be performed each time before OCEEMS server startup –

- 1) **JAVA_HOME variable should be set correctly** - In case, there is any undesirable change in JAVA_HOME variable (e.g. user modifies the name of the variable or deletes it altogether) then the following error message shall be displayed and OCEEMS server shall not start –

JAVA_HOME is not set properly!

Please set JAVA_HOME as recommended in the OCEEMS installation/upgrade guide and try again.

- 2) **Java 1.8.0_261 should be installed** - If the Java version pointed to by the JAVA_HOME variable is not as per OCEEMS recommendation (i.e. 1.8.0_261) then the following error message shall be displayed and OCEEMS server shall not start –

Required Java version for OCEEMS is not installed on server!

Please perform a standalone Java installation, configure JAVA_HOME as recommended in the OCEEMS Installation/Upgrade guide and try again.

Note: The Java version in this section corresponds to EMS 46.6.4. For EMS 46.6.2, use Java version 1.8.0-161 (64 bit).

Note: OCEEMS 46.6.4 is tested with JRE 1.8.0_261. It may not work properly with other Java versions (major or minor).

Note: OCEEMS 46.6.2 is tested with JRE 1.8.0_161. It may not work properly with other Java versions (major or minor).

APPENDIX S. IPV6 SUPPORT ON OCEEMS

OCEEMS R46.3 can support EPAP version 16.1 that comes with IPv6 support. A precondition for OCEEMS to support IPv6 enabled EPAP devices is that the machine on which OCEEMS is installed should be dual stack (that is support IPv4 and IPv6 both).

APPENDIX T. MY ORACLE SUPPORT (MOS)

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

Call the CAS main number at 1-800-223-1711 (toll-free in the US), or call the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. When calling, make the selections in the sequence shown below on the Support telephone menu:

1. Select 2 for New Service Request
2. Select 3 for Hardware, Networking and Solaris Operating System Support
3. Select 2 for Non-technical issue

You will be connected to a live agent who can assist you with MOS registration and provide Support Identifiers. Simply mention you are an Oracle Customer new to MOS.

MOS is available 24 hours a day, 7 days a week, 365 days a year.

APPENDIX U. 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 www.adobe.com.

1. Access the Oracle Help Center site at <http://docs.oracle.com/>.
2. Click Industries.
3. Under the Oracle Communications subheading, click the Oracle Communications documentation link. The Communications Documentation page appears.
4. Under the heading “Network Session Delivery and Control Infrastructure,” click on EAGLE. The EAGLE Documentation page appears.
5. Under the heading “EAGLE Element Management System,” select the Release Number. A list of the entire documentation set for the 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.

APPENDIX V. PROCEDURE TO MOUNT OCEEMS ISO FILE

To proceed with OCEEMS 46.6 installation/upgrade, the OCEEMS iso file should be mounted on the system. To mount the iso file, follow the steps given below:

- 1) Create a directory:

```
mkdir /mnt/oceems
```

- 2) Mount the ISO:

```
mount -o loop <path to OCEEMS ISO file> /mnt/oceems
```

- 3) On running 'ls -ltr' on the '/mnt/oceems' directory, output similar to the following shall appear:

```
-r-xr-xr-x    1 root root      2542 May 30 09:44 BackUp.conf
-r--r--r--    1 root root 511695525 May 30 09:44 E5-MS-
46.6.0.0.0_466.4.0.x86_64.rpm
dr-xr-xr-x    2 root root      2048 May 30 09:42 Packages
-r-xr-xr-x    1 root root      6332 May 30 09:44 RPMUpgrade_45.0.1.sh
-r-xr-xr-x    1 root root      8533 May 30 09:44 RPMUpgrade_46.0.1.sh
-r-xr-xr-x    1 root root      8533 May 30 09:44 RPMUpgrade_46.0.sh
-r-xr-xr-x    1 root root      9863 May 30 09:44 RPMUpgrade_46.2.sh
-r-xr-xr-x    1 root root      9862 May 30 09:44 RPMUpgrade_46.3.sh
-r-xr-xr-x    1 root root      9862 May 30 09:44 RPMUpgrade_46.5.sh
-r--r--r--    1 root root      2937 May 30 09:45 TRANS.TBL
dr-xr-xr-x    4 root root      2048 May 30 09:42 umvt
-r-xr-xr-x    1 root root      1230 May 30 09:44 updateUsers.sh
dr-xr-xr-x    4 root root      2048 May 30 09:42 upgrade
-r--r--r--    1 root root         36 May 30 09:45 uuid
```


APPENDIX W. CHANGE TEMP DIRECTORY FOR MYSQL

OCEEMS users can update the Temporary directory used by MySQL from /tmp to user-defined directory. User needs to execute changeMysqlTmpdir.sh script and restart OCEEMS MySQL process. The changeMysqlTmpdir.sh script is utilized to redefine the MySQL temp directory variable (tmpdir). This setting change is necessary for systems with limited space in the /tmp directory. For large OCEEMS setups, the size of MySQL cache file can be large, so it's recommended that users shall update their MySQL tmpdir path using the following procedure.

Following steps shall be executed, after all the steps for installation/upgrade are executed and the OCEEMS server is up and running. After executing the changeMysqlTmpdir.sh script, restart the OCEEMS server to reload the updated configuration. Execute this script with the same user as the current OCEEMS user (root/nonroot) and new directory path shall have same access rights as OCEEMS user.

To proceed with changing the temporary directory for MySQL, follow the steps given below:

- 1) Go to /Tekelec/WebNMS/bin/ where changeMysqlTmpdir.sh file is present

```
cd /Tekelec/WebNMS/bin/
```

- 2) Execute changeMysqlTmpdir.sh script

```
sh changeMysqlTmpdir.sh
```

```
#####
#####
```

```
This Script will update the directory used by MySQL, for creating
temporary files.
```

```
By Default MySQL uses /tmp directory, In case user wish to change this
directory.
```

```
Please continue executing this script, a new /tmp Directory will be
created as
```

```
/Tekelec/WebNMS/tmp by Default, or user can provide a valid Directory
path as input
```

```
Restart OCEEMS MySQL Process in order to let these changes take place.
```

```
Execute this script with the same user as your OCEEMS user & new directory path
shall have same access rights as OCEEMS user.
```

```
#####
#####
```

```
Do you want to continue, changing the temporary directory for MySQL (Y/N)?
Y
```

```
Enter path for updating MySQL Temp directory (Default is:
/Tekelec/WebNMS/tmp)
```

```
Press Enter for selecting the default Directory or provide you input:
/Tekelec/WebNMS/mysqlTmp
```

```
MySQL temp directory changed to /Tekelec/WebNMS/mysqlTmp
```

- 3) Restart MySQL service in order to let this change take place. Execute OCEEMS service start

```
service e5msService stop
```

User can verify that mysql process is killed, execute

```
ps -ef | grep mysql
```

```
[root@e5ms1 bin]# ps -ef | grep mysql
root      34680 34064  0 01:11 pts/4      00:00:00 grep --color=auto
mysql
```

```
service e5msService start
```

User can verify that MySQL temp directory changed by logging into MySQL, execute following steps:

```
cd /Tekelec/WebNMS/mysql/bin
```

```
sh mysql -uroot -ppublic WebNmsDB
```

```
Warning: Using a password on the command line interface can be
insecure.
```

```
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A
```

```
Welcome to the MySQL monitor.  Commands end with ; or \g.
```

```
Your MySQL connection id is 1
```

```
Server version: 5.6.31-enterprise-commercial-advanced-log MySQL
```

```
Enterprise Server - Advanced Edition (Commercial)
```

```
Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights
reserved.
```

```
Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.
```

```
Type 'help;' or '\h' for help. Type '\c' to clear the current input
statement.
```

```
mysql> show variables like '%tmp%';
```

Variable_name	Value
default_tmp_storage_engine	InnoDB
innodb_tmpdir	
max_tmp_tables	32
slave_load_tmpdir	/Tekelec/WebNMS/mysqlTmp
tmp_table_size	16777216
tmpdir	/Tekelec/WebNMS/mysqlTmp

```
6 rows in set (0.00 sec)
```

APPENDIX X. PROCEDURE TO UNINSTALL OCEEMS

S. No.	Step	Expected Output
1	Login to target machine using administrator (root) login.	-
2	Shutdown the OCEEMS server.	# service e5msService stop
3	Check the status of MySQL to verify that it has been shut down. There should not be any entry in the given command output related to OCEEMS. To stop MySQL, move to directory “/Tekelec/WebNMS/bin/” and execute “stopMySQL.sh” script if it is running.	# ps -ef grep mysql root 59320 59299 0 21:06 pts/0 00:00:00 grep mysql
4	Remove the OCEEMS application	# rpm -ev E5-MS
5	Procedure Complete	This procedure is complete.

APPENDIX Y. PROCEDURE TO OPEN OCEEMS CLIENT GUI

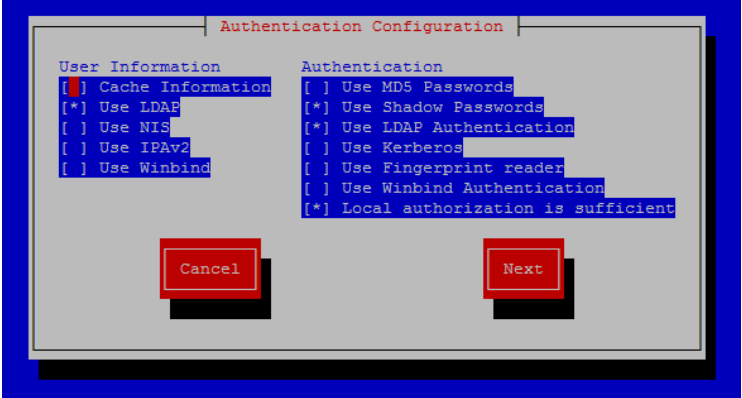
S. No.	Step	Expected Output
1	Open a browser	Open a compatible browser of Microsoft® Internet Explorer version 11.0 (or later) or Mozilla Firefox® version 39.0 (or later).
2	Open the OCEEMS Client GUI	On the browser address bar, input the following URL. https://<OCEEMS server IP>:8443 Press Enter. Input the values as is asked. If more details are required, refer the document “Interface User Guide”, section “OCEEMS Graphical User Interface”.
3	Check GUI is working	Check that OCEEMS client GUI opens properly.

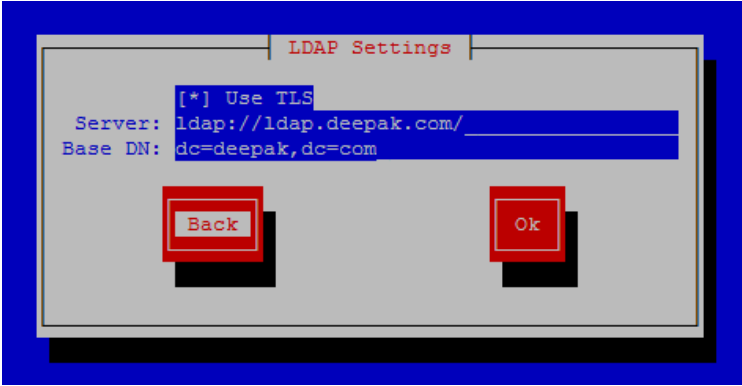

APPENDIX Z. CONFIGURATION OF OPENLDAP CLIENT

OpenLDAP version 2.4.40 client/server configuration is tested and used in this Appendix.

LDAP client and server must have same date and time. Preferably sync'ed via same NTP server.

Users must be configured in LDAP server and the same users need to be created in OCEEMS GUI/Client as well.

S. No.	Step	Expected Output/Commands
1	Update the LDAP server details in “/etc/hosts” on client for name resolution, if server name is used instead of IP address.	<pre># vim /etc/hosts</pre> <p>Add the ldap server details at the end of this file, as shown in the example below:</p> <pre>10.75.137.7 oceems23 ldap.oceems.com</pre> <p>Note: Oceems and com are given as dc on the ldap server during configuration. Here, oceems23 is the hostname of ldapserver. Please note that this is just an example. Replace the dc present in this example by the dc given on the ldap server being used.</p>
2	Login to target machine using administrator (root) login.	Successful Login
3	Install OpenLDAP client using the given command.	<pre># yum install -y openldap-clients nss-pam-ldapd</pre>
4	In case a firewall is enabled between the OCEEMS server and LDAP server, then make sure they are behind the same firewall. Else the firewall can be disabled using the given commands.	<pre># systemctl stop firewalld</pre> <pre># systemctl disable firewalld</pre>
5	Open the LDAP configuration screen	<pre># authconfig-tui</pre>
6	Make the given configurations according to the given screenshots.	 <p>Select "Next" and Enter. Enter the LDAP server URL and domain components(dc) as given.</p>

		 <p>Select "OK" and Enter.</p> <p>Certificates from LDAP server needs to be copied to OCEEMS server. A message for the same will be displayed.</p>  <p>Press OK.</p>
<p>7</p>	<p>To enable TLS connection between LDAP server and OCEEMS, the key and certificate files(eg: ldapkey.pem and ldap.pem) will have to be copied to OCEEMS server.</p> <p>For OpenLDAP the certificates are present at “/etc/pki/tls/certs/” and should be copied to “/etc/openldap/cacerts”</p>	<p>Certificate and key file copied to required location on OCEEMS server.</p>
<p>8</p>	<p>Execute the following commands to enable TLS configuration on LDAP client.</p>	<pre># echo "TLS_REQCERT allow" >> /etc/openldap/ldap.conf # echo "tls_reqcert allow" >> /etc/nslcd.conf</pre>
<p>9</p>	<p>Execute update for the above configuration changes to take effect using the given command.</p>	<pre># authconfig --enableldaptls --update</pre>

10	Add the LDAP certificate to Java Keystore. For this the default java keystore password will be required.	<pre># \$JAVA_HOME/bin/keytool -importcert -file <path of LDAP certificate> -keystore \$JAVA_HOME/lib/security/cacerts -alias "<Alias>"</pre> <p>Eg: # \$JAVA_HOME/bin/keytool -importcert -file /etc/openldap/cacerts/ldap.pem -keystore \$JAVA_HOME/lib/security/cacerts -alias "Tekelec"</p>
11	<p>Add the LDAP certificate to OCEEMS keystore.</p> <p>The password required here would be the one used for creating OCEEMS certificate which is provided during the certificate creation (E5MSCertificateCreationScript.sh) in keystore password field.</p>	<pre>\$JAVA_HOME/bin/keytool -import -keystore /Tekelec/WebNMS/conf/Truststore.truststore -alias Tekelec -file <path of LDAP certificate> -storepass "<password>" -noprompt</pre> <p>Eg: \$JAVA_HOME/bin/keytool -import -keystore /Tekelec/WebNMS/conf/Truststore.truststore -alias Tekelec -file /etc/openldap/cacerts/ldap.pem -storepass "<password>" -noprompt</p>
12	<p>Check and update the “/etc/nssswitch” file, starting at line 33, for the following changes.</p> <p>ldap should be present in the given lines. If it is not present, add "ldap" in all the three lines as given:</p> <p>After that restart the given services:</p> <p>Note: If ldap is already present in the “/etc/nssswitch.conf” file in the given lines, no change is required. Please move to the next step of this procedure.</p>	<pre>passwd: ldap files sss shadow: ldap files sss group: ldap files sss</pre> <p>service nslcd restart service sssd restart</p>
13	To check whether all the configurations are correct and LDAP authentication is working fine, execute the given command.	<pre># getent passwd <ldapuser></pre> <p>Eg: # getent passwd ldapuser1 ldapuser1:*:1001:1001:ldapuser1:/home/ldapuser1:/bin/bash</p>

APPENDIX Z.2. ENABLING/DISABLING LDAP AUTHENTICATION

A.1 Enabling LDAP Authentication

Go to /Tekelec/WebNMS/bin and run the following script:

```
$ sh configureLDAPAuth.sh
```

This script will be used to enable/disable LDAP server authentication on OCEEMS

Do you want to enable(E)/disable(D) LDAP authentication on OCEEMS?(E/D):E

Please enter URL of the LDAP server (eg: ldap://ldap.example.com):
ldap://ldap.deepak.com

Please enter the OU(Organization Unit) that will be used for OCEEMS on the LDAP server (eg: People): People

Base DN is configured while configuring LDAP Client. It can be viewed using 'authconfig-tui' command...

Please enter the Base DN used to configure LDAP (eg: dc=example,dc=com):
dc=deepak,dc=com

Setting up LDAP server, please wait...

LDAP based authentication has been enabled, the OCEEMS service needs to be restarted for changes to take effect.

Do you want to restart OCEEMS service now?(Y/N): Y

A.2 Disabling LDAP Authentication

Go to /Tekelec/WebNMS/bin and run the following script:

```
$ sh configureLDAPAuth.sh
```

This script will be used to enable/disable LDAP server authentication on OCEEMS

Do you want to enable(E)/disable(D) LDAP authentication on OCEEMS?(E/D):D

LDAP based authentication has been disabled, the OCEEMS service needs to be restarted for changes to take effect.

Do you want to restart OCEEMS service now?(Y/N): y

APPENDIX Z.3 CONFIGURATION OF OPENLDAP CLIENT FOR FAILOVER SETUP

A working Failover Setup (with Primary and Standby server) must be available for enabling the LDAP Authentication. Users must be configured in LDAP server and the same users need to be created in OCEEMS GUI/Client as well.

S. No	Steps	Expected Output/Commands
1	<p>Launch OCEEMS Client on the Primary Server and create the same user as that is available on the LDAP server. The User should belong to the Admin Group.</p> <p>For. E.g. If a user named 'ldapuser1' is available on the LDAP server, then create a user 'ldapuser1' in OCEEMS belonging to Admin group.</p>	Successful Creation of User.
2	Login to Primary Server with root user	Successful Login
3	Configure the LDAP Authentication in the Primary Server by following the Steps in APPENDIX Z.	Successful Execution of Steps
4	<p>Enable the LDAP Authentication in the Primary Server by following the section A.1 section in APPENDIX Z.2</p> <p>In A.1, the configureLDAPAuth.sh script will ask for restarting the OCEEMS service, Enter 'n' or 'N'.</p> <p>(Note: If you need to disable LDAP Authentication, follow the section A.2 in APPENDIX Z.2 and when asked for restarting the OCEEMS service, Enter 'n' or 'N')</p>	Successful Execution of Steps
5	Configure the LDAP Authentication in Secondary Server by following the Steps in APPENDIX Z.	Successful Execution of Steps
6	<p>Enable the LDAP Authentication in the Secondary Server by following the section A.1 in APPENDIX Z.2</p> <p>In A.1, the configureLDAPAuth.sh script will ask for restarting the OCEEMS service, Enter 'n' or 'N'.</p> <p>(Note: If you need to disable LDAP Authentication, follow the section A.2 in APPENDIX Z.2 and when asked for restarting the OCEEMS service, Enter 'n' or 'N')</p>	Successful Execution of Steps
7	On Primary Server, shutdown OCEEMS server by issuing the command.	<pre># service e5msService stop Stopping OCEEMS server... MySQL not stopped for failover Done.</pre>
8	On detecting shutdown of Primary Server, Secondary Server shall assume the responsibility of primary server.	<pre>Starting to do FailOver Tasks. <Messages given in LOG MESSAGES ON STARTING OCEEMS SERVER are displayed on console> The new primary server is 10.248.9.3</pre>

9	Start OCEEMS server on Primary Server. It shall now start as standby.	<pre>[root@e5ms9 bin]# service e5msService start Starting OCEEMS server... MySQL already running Warning: Using a password on the command line interface can be insecure. / [root@e5ms9 bin]# OS detected : Linux Oracle Corporation. Checking for the availability of the Primary Server in the Database. Found an entry. Trying to connect to the Primary Server at 10.248.9.3 Please waitConnected Starting Oracle Web NMS Standby Server. The Modules will be started once it takes over as the Primary Server. Monitoring the Primary Server at 10.248.9.3</pre>
10	Now the Primary and Secondary servers have been switched. Repeat the Steps from 7 to 9.	Successful execution of steps
11	Launch OCEEMS client in the Primary Server and login with the LDAP user created in step 1 e.g. 'ldapuser1'. Enter the password that is configured in the LDAP server for the above user.	Successful login through LDAP user
12	Close the OCEEMS client on Primary Server	Successful closure of client
13	Execute the Steps from 7 to 9. The Primary and Secondary servers will be switched.	Successful execution of steps
14	Launch OCEEMS client in the Primary Server (which was Secondary server earlier) and login with the LDAP user created in step 1 e.g. 'ldapuser1'. Enter the password that is configured in the LDAP server for the above user.	Successful login through LDAP user

APPENDIX Z.4 CONFIGURE SENDING DEVICE TIMESTAMP IN NMS TRAPS

OCEEMS users can configure whether to send device timestamp or OCEEMS timestamp in the NMS traps by changing a property value in `server_conf.properties` file at `/Tekelec/WebNMS/conf/tekelec` path.

To proceed with making the above configuration changes, follow the steps given below:

1. Go to `/Tekelec/WebNMS/conf/tekelec/` where `server_conf.properties` file is present

```
cd /Tekelec/WebNMS/conf/tekelec/
```

2. Open `server_conf.properties` file

3. If device timestamp needs to be sent in the traps, then set “`SendDeviceTimeStampWithTraps`” property value as true.

4. If OCEEMS timestamp needs to be sent in the traps, then set “`SendDeviceTimeStampWithTraps`” property value as false.

Default value of the property :

```
SendDeviceTimeStampWithTraps=false
```

New value of the property :

```
SendDeviceTimeStampWithTraps=true
```

Note: Server restart is required for above changes to reflect.

APPENDIX AA. DECOUPLING OF COMMAND MANAGER INTERFACE (CMI) FROM EAGLE

The following packages should be installed on the server for running this feature:

- PHP (php-5.4.16-48) (yum install php)
- DOM extension (PHP-XML) (php-xml-5.4.16-48) (yum install php-xml)
- Wget (wget-1.14-18) (yum install wget)
- PHP-Posix (php-process) (php-process-5.4.16-48) (yum install php-posix)
- PHP SSH2 extension must be installed on the OCEEMS server. The server should have internet access to install the required packages.

Please refer to the following [instructions for installation of PHP extension SSH2](#).

The following packages should be installed on the server for installing PHP SSH2 extension/module:

- Gcc compiler (gcc-4.8.5-39.0.3)
- Openssl-devel (openssl-devel-1.0.2k-19.0.1)
- Make (make-3.82-24)
- Php-devel (php-devel-5.4.16-48)

S. No	Steps	Expected Output/Commands
1	<p>Go to the specified directory "cd /usr/local/src"</p> <p>Download the extension package wget https://www.libssh2.org/download/libssh2-1.6.0.tar.gz</p> <p>Untar / Unzip the extension package and enter the directory</p> <p>Configure with providing path to php-config</p> <p>Run its compilation and installation</p>	<pre>tar -zxvf libssh2-1.6.0.tar.gz cd libssh2-1.6.0 ./configure --with-php-config=/usr/local/bin/php-config make make install</pre>
2	<p>Go to the specified directory "cd /usr/local/src"</p> <p>Download the extension package wget http://pecl.php.net/get/ssh2-0.12.tgz</p> <p>Untar / Unzip the extension package and enter the directory</p> <p>Run phpize</p> <p>Configure with providing path to ssh2</p> <p>Run its compilation and installation</p>	<pre>tar -zxvf ssh2-0.12.tgz cd ssh2-0.12 phpize ./configure --with-ssh2 make make install</pre>
3	<p>Check if SSH2 extension is loaded by executing the given command</p>	<pre>php -m grep ssh2 Expected output : ssh2</pre>

	<p><u>Note</u>: If the output is blank, activate it in your PHP config file (php.ini): extension=ssh2.so</p>	
--	--	--

APPENDIX AB. OCEEMS ON VIRTUAL MACHINE

VM Instance

OCEEMS has been tested on Oracle Linux 7.8 based Virtual machine.

Configuration

Different configurations of OCEEMS have different resource requirement as mentioned in Interface User Guide, Section - Hardware and Software Requirements.

Following is the configuration of the virtual machine test setup:

- vCPU – 4
- RAM – 16 GB
- Disk size – 500 GB

Package Requirement

Following packages are needed to be installed on the OL 7.8 based VM:

Package	Version
bc	1.07.1-5
lsof	4.91-2
libaio	0.3.112-1
unzip	6.0-41
php	7.2.24
php-xml	7.2.24
wget	1.19.5-8.0.1
php-posix	7.2.24
libssh2 (extn for php)	1.9.0-20200603
ssh2 (extn for php)	1.2
openldap	
sssd	2.2.0
Jdk (java)	1.8_161
openssh	8.0p1-3
telnet	0.17-73
vsftpd	3.0.3-31
iptables	1.8.4-10

Procedure to Create Virtual Machine for OCEEMS

- **Virt command to create Virtual Machine on host machine based on Oracle Linux 7.8:**

```
virt-install --virt-type kvm --hvm --connect qemu:///system --network bridge=br0,model=virtio --cdrom
/home/V984216-01.iso --disk path=/home/EMS1.disk,size=500,sparse=no,bus=ide --name EMS1 --autostart --
boot cdrom,hd --ram 8000 --vcpus 2 --graphics vnc --os-variant rhel6.0
```

Note: The following arguments are to be provided to the **virt-install** command:

Virtualization mode:

```
--virt-type kvm --hvm --connect qemu:///system
```

Network interfaces:

```
--network bridge=<bridge_name>,model=virtio
```

CD Drive:`--cdrom <tpd_iso_file>`**Disk:**`--disk path=<disk_file>,size=<disk_size>,sparse=no,bus=ide`**VM NAME:**`--name <vm_name>`**RAM:**`--memory <ram_size>`**CPU:**`--vcpus <cpu_count>,cpuset=<cpu_set>`**Display:**`--graphics vnc`**VM optimization:**`--os-variant rhel6.0`

Category	Mount Point	Device	Size
DATA	/home	ol-home	4 GiB
SYSTEM	/boot	sda1	1024 MiB
	/	ol-root	450 GiB
	swap	ol-swaps	16 GiB

Figure 1: Default directory structure of VM with 500GB Disk:

- **Creating Bridge between Host and Virtual Machine on Host Machine:**

Setting up a Network Bridge Using nmcli Tool:

1. List the active network connections on the test system by running the following nmcli command:

`# nmcli conn show --active`

```
[root@tecmint ~]# nmcli conn show --active
NAME                UUID                                  TYPE      DEVICE
virbr0              385bf8b3-5bdd-4b57-9980-14f0d3bfb983 bridge    virbr0
Wired connection 1  e1ffb0e0-8ebc-49d0-a690-2117ca5e2f42 ethernet  enp2s0
[root@tecmint ~]#
```

2. Create a network bridge interface by using the following nmcli command:

`# nmcli conn add type bridge con-name br0 ifname br0`


```
[root@tecmint ~]# nmcli conn add type bridge con-name br0 ifname br0
Connection 'br0' (2f03943b-6fb5-44b1-b714-a755660bf6eb) successfully added.
[root@tecmint ~]#
```

Create Network Bridge Interface

3. Add the Ethernet interface as a portable device to the bridge (br0) connection by using the following command:

```
# nmcli conn add type Ethernet slave-type bridge con-name bridge-<br0> ifname <Ethernet-name> master br0
```

Where , Ethernet name (Eno1) - Host machine IP is assigned

4. Bring up or activate the bridge connection using the **connection name** by using the following command:

```
# nmcli conn up br0
```

```
# nmcli conn up br0
```

5. Deactivate or bring down the **Ethernet** by using the following command:

```
# nmcli conn down <Ethernet-name>
```

APPENDIX AC: DOWNLOAD ORACLE LINUX FROM OSDC

Perform the following steps to download Oracle Linux from OSDC:

1. Login to OSDC (<https://edelivery.oracle.com/osdc/faces/Home.jsp>).
2. Type Oracle Linux in the search box and click Search.
3. Select the required Oracle Linux version, for example, for OCEEMS 46.6.4, select DLP: Oracle Linux 7.8.0.0.0 (Oracle Linux).
4. Add to the cart and click the Continue button.
5. Select and download the required iso.