

Analytics Platform 3.1

Installation and Configuration Guide

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1 Overview

This document provides information regarding the installation and configuration of the Analytics Platform' (referred to as CEA for AMF install) application.

1.1 Intended Audience

Professional Services teams working on customer sites.

1.2 Document History

Date	Author	Version	Notes
20/05/2016	Owen Lynch	0.1	Initial Version

1.3 Document Approval

Role	Name	Approval Date
Document Owner		

1.4 Related Documents

1.4.1 IBM Now Factory Documents

Document	Description
CNA 9.0 Mediation Operations Guide	Guide to installing and configuring Streams mediation software
CNA 9.0 Provisioning Guide	Guide to provisioning dimensions and subscriber.

1.4.2 Other Documents

- IBM Open Platform (IOP) Installation documentation: http://www-01.ibm.com/support/knowledgecenter/SSPT3X_4.1.0/com.ibm.swg.im.infosphere.biginsights.install.doc/doc/inst_container.html

1.5 Glossary

Acronyms and abbreviations that are used in this document are described in the following table.

Abbreviation	Description
AP	Analytics Platform
AMF	Application Management Framework
RPM	Red Hat Package Manager file
CEA	Customer Experience Analytics – This is the application referred to in this document to install Analytics Platform

2 Installation Prerequisites

This chapter describes prerequisites and preparation steps which must be completed before installing IBM Now Factory Analytics Platform software.

1.1 General

The following steps must be completed on all application, platform and streams servers:

1. Vantage 9 kick script has been run. This script is automatically executed on servers shipped from Guadalajara. The kick script ensures the following
 - Red Hat 6.7 is installed.
 - All blades have been configured with a 'boss' unix user account.
 - Creates the /opt/tnf/ on all blades writable by the *boss* user
 - The *boss* user has sudo permission without prompting for a password (is a 'suoer').

- a. The following line has been added to the '/etc/sudoers' by running the *visduo* command as root (on all servers):

```
boss ALL=(ALL) NOPASSWD: ALL
Defaults:boss !requiretty
```

- The *rpm-build* RPM package is installed.
2. If re-purposing servers (i.e. servers not shipped from the factory), the kick script must be executed prior to performing any installation activities
 3. The ssh key has been generated on the application master server and copied to all other servers in the cluster:

```
ssh-keygen -t rsa
ssh-copy-id boss@<remote-server>
```

2.1 Streams Servers

Please refer to the Streams Operations Guide for all streams related information. See:

http://www-01.ibm.com/support/knowledgecenter/SSCRJU_4.1.1/com.ibm.streams.install.doc/doc/ibminfospherestreams-plan.html

In particular check with the dependency checker that all installation requirements are met.

1. Download the installation archive for Streams Release 4.1.1
2. Login as 'boss' user
3. Untar the streams installation archive
4. Change into the directory 'StreamsInstallFiles'
5. Execute the dependency checker 'dependency_checker.sh'
6. Make sure that all prerequisites are met. See:

http://www-01.ibm.com/support/knowledgecenter/SSCRJU_4.1.1/com.ibm.streams.install.doc/doc/ibminfospherestreams-install-prerequisites-dependency-checker.html

2.2 Analytics Platform Servers

The following must be in place to enable successful installation of Analytics Platform components:

1. IBM Open Platform for Hadoop and Big Data (IOP) version 4.1.0 must be installed on the platform cluster.
2. The line *defaults requiretty* is commented out in the */etc/sudoers* file on all Hadoop nodes.

```
#Defaults requiretty
```

Note: IF you are installing the Analytics Platform only, then apply the Application Server prerequisites from section 2.3, to the Analytics platform master server / IOP Master.

2.3 Analytics Platform Master Server

The following steps must be completed on the master server:

1. PostgreSQL Database installed and running:
 - a. PostgreSQL 9.4.5 (latest available fix pack) database has been installed and is accessible.

```
➤ yum install postgresql94-server
```
2. The IBM Java runtime environment version 8 must be installed in */opt/tnf/java* (i.e. the java binary is available at */opt/tnf/java/bin/java*) and is executable by the *boss* user. The appropriate IBM JRE installation file is included in the CEA distribution file in the *CEA/dist/thirdparty/jre* directory.
3. The *JAVA_HOME* environment variable is set for *boss* user and refers to JRE installed above.

3 Installation

3.1 Installation Overview

There are two major components to the installation of AP 3.1:

1. Analytics Platform Installation.
2. Streams mediation installation (covered in a separate install guide to this)

3.1.1 Analytics Platform Installation

All Analytics platform components are installed using the IBM Now Factory Application Management Framework (AMF).

- All application and platform configuration settings are managed by AMF in a set of central configuration files.
- AMF stores the central configuration files in a PostgreSQL AMF database. Configuration settings that don't change during software upgrades are maintained independently of application components. A history of previous configuration settings is kept in the AMF database.
- An operations engineer interacts with AMF using a set of command line tools. The main commands are:
 - *amfConfig*:
 - Generate default configuration files.
 - Upload customized configuration files to AMF.
 - Export previously customized configuration files from AMF back to disk.
 - *amfInstall*:
 - Execute an installation by installing rpm packages on all relevant servers and applying configuration settings as specified in central AMF configuration files uploaded by *amfConfig*.
 - Update component configurations. When new configuration settings are uploaded using *amfConfig*, these configuration changes can be applied the existing installation using *amfInstall*.

A detailed description of AMF commands is available in section Installation of Analytics Platform.

3.1.2 Streams Mediation Installation

Refer to the Streams Mediation Operations Guide for Streams installation and configuration instructions. See:

http://www-01.ibm.com/support/knowledgecenter/SSCRJU_4.1.1/com.ibm.streams.install.doc/doc/ibminfospherestreams-install.html

The streams installation is done in the following steps:

1. Stop all streams jobs instances and domains of the previous version if any.
2. Remove all shared memory segments created by the Lookup manager: Remove all files in '/dev/shm' belonging to the previous streams owner except 'pulse-shm...'
3. Login as user 'boss',
4. Remove old streams installation with
sudo rm -rf /opt/ibm/InfoSphere_Streams
5. Make sure that the owner and group of directory /opt and /opt/ibm is root,
6. Go to your directory that contains the install files and untar the installation archive,
7. Change into directory 'StreamsInstallFiles',
8. Execute the installation as root user
sudo ./InfoSphereStreamsSetup.bin
9. Follow instructions on the screen carefully:
 - select language
 - select license (Developer Edition)
 - accept license
 - specify file owner 'boss'
 - specify file owner 'boss'
 - choose install directory /opt/ibm/InfoSphere_Streams and version directory 4.1.1.0
 - check all and accept
10. Check the log file locations and exit install procedure.
11. Setup environment for user boss – Add the following lines to file **.bashrc**:

```
export STREAMS_INSTALL=/opt/ibm/InfoSphere_Streams/4.1.1.0  
export JAVA_HOME=$STREAMS_INSTALL/java  
export PATH=$STREAMS_INSTALL/java/bin:$PATH  
alias st=streamtool  
source $STREAMS_INSTALL/bin/streamsprofile.sh  
export STREAMS_DOMAIN_ID=cna_domain
```

3.2 Installation of Analytics Platform

The following steps should be followed when installing Analytics Platform, these steps will be described in detail in subsequent sections. All AMF command line tools are available in */opt/tnf/amf/amf-core/bin*.

1. Unpack the distribution and execute the *initialise.sh* script to install and initialise AMF.
2. Use the *amfConfig* command to generate configuration files for AMF.
 - Generates global, server and per dataset AMF configuration files in XML format.
3. Configure configuration files
 - Installation engineer specifies configuration options in AMF XML files.
4. Use the *amfConfig* command to upload configured configuration files to AMF database.

- Configuration files are validated and uploaded to the AMF database if valid.
 - Any validation errors should be resolved before attempting to repeat a file upload.
5. Use the `amfInstall` command to execute install and configure individual software components.

AMF configurations and tools are installed on the application master server and all AMF commands should be executed on this server. Software packages which should be installed on the application master server will be installed locally by AMF. Software which should be installed on other servers will be installed remotely on the correct server by AMF, using server configurations provided in *cea-cfg-servers.xml* as described in the following sections.

3.2.1 Unpacking and Initialisation

Obtain the CEA.tar package and Unpack and initialise AMF, perform the following in `/opt/tnf/install`:

```
tar -xvf CEA.tar
cd CEA
./initailise.sh
```

To verify:

- Check that the AMF tools have been installed in */opt/tnf/amf/amf-core*
- Check that the AMF database schema exists in the postgresSQL database by executing the following command and checking that a database called *AMF* exists.

```
psql amf -c 'select schema_name from information_schema.schemata'
```
- Check that the AMF repository has been initialized and contains AMF configurations in */opt/tnf/amf/amf-repo/CEA/amf-config* and RPM files in */opt/tnf/amf/amf-repo/CEA/rpm*

3.2.2 Configuration Generation

Use *amfConfig* to generate default configuration files:

```
amfConfig -g <output directory> -n
<output_directory> can be any directory, suggest /opt/tnf/amf/amf-cea-config
```

This generates new configuration files for the application with:

- System default settings where applicable.
- Empty configuration values for settings which must be specified by the installation engineer.

The following files should be generated in the specified output directory:

File	Description
cea-cfg-global.xml	Global configuration settings. Also configures what interfaces are to be installed. Required.
cea-cfg-servers.xml	Configures hostnames / IP of Hadoop master server.
cea-sub-cfg- <i><interface></i> .xml	Optional configuration file for each available interface dataset.

Help for the amfConfig command is available by executing

```
amfConfig -h
```

or by referring to section .

3.2.3 Customising Configuration Files

The generated configuration files should be customised as described in the following subsections.

3.2.3.1 *cea-cfg-global.xml*

This is the master configuration file for all installations. It has two types of entry:

1. Enable configuration. This is used to specify which of the optional datasets are required. There is a single sub configuration file per data interface available in CEA.

e.g:

```
<enable-config name="fixedline">false</enable-config>
```

Will prevent the installation of the fixed line interface and

```
<enable-config name="mobileup">true</enable-config>
```

Will enable the installation of the mobile userplane interface.

2. Simple Properties. Global system properties i.e. Properties not related to individual interfaces.

See section cea-cfg-global.xml for the complete list of configuration properties in *cea-cfg-global.xml*.

3.2.3.2 *cea-cfg-servers.xml*

This file lists the hostname or IP of all IBM Now Factory software components that are to be installed on servers other than the application master server. For AP 3.1 the only entry required is the Analytics Platform IP address.

In *cea-cfg-servers.xml*, set the IP address or hostname in the `<server>` tag. The specified server must be your IOP / Hadoop master node.

3.2.3.3 *cea-sub-cfg-<interface>.xml*

The sub-configuration files specify configuration settings for each network interface to be installed. Only the sub-configuration files for the network interfaces that are required need be configured and uploaded.

Sub application configuration have multiple property groups with each group containing configuration settings for a specific functional area.

Each sub-configuration file contains property groups for some or all of:

1. Show/hide metrics
2. Show/hide metric groups
3. Show/Hide dimensions
4. Data Aging
5. Metric label threshold values

Chapter

Appendix 3 – AMF Configurations describes the configuration properties for each sub-configuration file.

3.2.4 Configuration Upload

Use *amfConfig* to upload the customised configuration files to the AMF database:

```
./amfConfig --application CEA -upload <target file(s)>
```

where *<target file(s)>* refers to files to be uploaded to the AMF database. The * wildcard operator may be used to specify multiple files.

Only the *cea-cfg-global*, *cea-cfg-server* and *cea-sub-cfg-** files related to network interfaces that are required need be uploaded.

3.3 The configuration files are validated during the upload process. Any upload from completing and errors must be corrected before proceeding. Refer to section Error Codes

The following table describes the error codes which may be seen when using the application management framework along with suggested steps to rectify the issue.

Error Code	Error message
AMF001	amf-master.xml file not found for application {0}
AMF002	Expression {0} does not evaluate as a boolean. Returned type is: {1} Value is: {2}
AMF003	Expression {0} does not evaluate as an integer. Returned type is: {1} Value is: {2}
AMF004	The specified rpm file does not exist: {0}
AMF005	Error validating configuration rules for configuration definition: {0}
AMF006	The configuration definition does not exist
AMF007	The configuration definition does not have a name
AMF008	The configuration definition does not have a version
AMF009	The configuration definition has no properties
AMF010	The configuration definition property does not exist
AMF011	The configuration definition property does not have a name
AMF012	The configuration definition property does not have a type
AMF013	Error validating configuration rules for configuration definition property: {0}
AMF014	Error {0} while trying to parse the master file

AMF015	Error {0} while trying to parse the configuration definition in: {1}
AMF016	Error {0} while trying to parse the software component in: {1}
AMF017	Error {0} while trying to parse the installation task in: {1}
AMF018	Error while marshalling the master
AMF019	Error validating configuration rules for application: {0}
AMF020	application.cfg.properties file not found for application {0}
AMF100	Error validating configuration rules for configuration type {0}
AMF101	The 'global' application configuration has not been uploaded
AMF102	The "{0}" application has been flagged as enabled in the 'global' configuration but a {0} application configuration has not been uploaded
AMF103	Error while reading the {0} file
AMF104	Error while transforming the xml value to the {0} file
AMF105	Error while processing the {0} sub-application configuration to a xml value
AMF106	Error while processing the {0} applications server configuration to a xml value
AMF107	The application configuration does not exist
AMF108	The application configuration does not have a name
AMF109	The application configuration does not have a version
AMF110	The application configuration has no properties
AMF111	Error validating the configuration rules for the application configuration: {0}
AMF112	Error "{0}" while trying to parse the application configuration
AMF113	Error "{0}" while trying to parse the server configuration for the application
AMF114	The application configuration property does not exist
AMF115	The application configuration property does not have a name
AMF116	The application configuration property does not have a type
AMF117	The "{0}" application configuration property does not exist
AMF118	Error validating configuration rules for application property: "{0}"
AMF119	Error validating configuration rules for application: {0}

AMF120	A value for the "{0}" application configuration property is required
AMF121	The "{0}" application configuration property type does not evaluate as a {1}. Value is: {2}
AMF122	The "{0}" application configuration property type is not a valid one
AMF200	Error executing flyway migration scripts
AMF201	Error executing system command "{0}"
AMF202	Error installing component {0} on master server
AMF203	The installation of task {0} was not successful.
AMF300	Error resolving command line values ({0}) for option {1} in {2}
AMF301	Error resolving the path ({0}) from the command line for option {1} in {2}
AMF302	No application was specified for option --{0} (Required if more than one application installed)
AMF303	Error uploading the file {0} because it's not a valid configuration file
AMF304	The server {0} was not reached successfully (command ping)
AMF305	The 'sudo rpm' command doesn't work correctly on the server {0}
AMF306	The '/opt/tnf/amf/tmp' directory doesn't exist on server {0}
AMF400	Error exporting report to {0}
AMF401	Error loading the configuration definitions for the report

4 Appendix 2 - Application Management Framework

4.1 Troubleshooting Installation of Application Management Framework

This section describes cases where issues occur during the AMF installation and proposes steps to address these problems. Note this is not an exhaustive list of all problems.

4.1.1 Problem “Error: JAVA_HOME variable is undefined”

Problem:

Error message: **Error: JAVA_HOME variable is undefined** is shown when executing *initialise.sh*

Reason:

JAVA_HOME environment variable is not defined, but this is required by *initialise.sh*.

Solution:

First set up the JAVA_HOME environment variable for the *boss* user. This must refer to an accessible Oracle Java 8 Runtime Environment or Oracle Java 8 Standard Edition installation.

For example:

```
export JAVA_HOME=/opt/tnf/jre1.8.0
```

```
export JAVA_HOME=/opt/tnf/jdk1.8.0
```

Next, re-execute the *initialise.sh* installation script.

4.1.2 Problem “Error: Wrong Java version installed...”

Problem:

Error message: **Error: Wrong Java version installed. Required: 1.8, Installed: x.x** is shown when executing *initialise.sh*

Reason:

JAVA_HOME refers to an incompatible version of Oracle Java. Oracle Java 8 is required.

Solution:

Change the JAVA_HOME environment variable for the *boss* user. This must refer to an accessible Oracle Java 8 Runtime Environment or Oracle Java 8 Standard Edition installation.

For example:

```
export JAVA_HOME=/opt/tnf/jre1.8.0
```

```
export JAVA_HOME=/opt/tnf/jdk1.8.0
```

Next, re-execute the *initialise.sh* installation script.

4.1.3 Problem “Exception in thread "main" com.googlecode.flyway.core.exception.FlywayException...”

Problem:

Error message: **Exception in thread "main"**
com.googlecode.flyway.core.exception.FlywayException: Unable to obtain Jdbc connection from DataSource and an accompanying Java stack trace is shown when executing *initialise.sh*

Reason:

The local postgresSQL database is inaccessible or offline and needs to be started.

Solution:

Investigate why the postgresSQL database on the master server is not available and fix the underlying issue there.

Next, re-execute the *initialise.sh* installation script.

for a description of validation error codes.

4.1.4 Verify Server Connectivity

Use *amfServerCheck* to verify that AMF can connect via ssh to all servers where software is to be installed:

```
amfServerCheck -a CEA -r
```

e.g.

4.1.5 Execute Installation

Use *amfInstall* to execute the installation process (once you have uploaded configured files):

```
./amfInstall --application CEA -install
```

- AMF determines which software packages (RPM packages) are to be installed based on configuration settings uploaded.
- Any RPM packages required on the application master server are installed locally by AMF.
- Any RPM packages required other servers server are installed remotely via ssh by AMF.
- Any application configuration files that require custom settings are customized by AMF using settings in the AMF configuration database.

4.1.6 Checking the Installation status

Use *amfStatus* to check the status of an installation:

```
amfStatus -a CEA -p <output directory> -r
```

A HTML report, *cea-status-report.html*, will be generated in the specified output directory.

4.1.7 Updating an Existing Configuration

To modify configuration settings for an existing installation the AMF steps described above can be repeated with some minor changes:

1. Use *amfConfig -e* to export the existing configuration files from the AMF database to local disk.
2. Modify the required configuration settings in the exported configuration files.
3. Upload the modified configuration files using *amfConfig -u*. Only the modified files need be uploaded.
4. Repeat the installation using *amfInstall*.
 - AMF will install any new RPM's that need to be installed based on modified configuration settings.
 - Previously installed RPM's will remain unchanged.
 - Any application configuration files that require custom settings based on the new configuration settings are modified.

5 Administration

This chapter describes how to perform administration tasks such as starting and stopping applications and any administration functions that may need to be performed from time to time. All administration tasks should be executed using the *boss* user.

This document covers administration tasks for the CEA application and the Analytics Platform. Refer to the Streams Operations Guide for details on Streams. Refer to the *Provisioning Guide* for details on dimension and subscriber provisioning.

5.1 Analytics Platform Administration

All Analytics platform operation need to be executed as the *boss* user account on the master node.

5.1.1 Controlling the Analytics platform

Once installation has been completed, you need to confirm the platform is running. The main script to control the Analytics platform is located on the Hadoop / IOP master node in the directory */opt/tnf/apps/bis-main*:

```
usage: ./bis-main.sh (start|stop|restart|status|help)
       ./bis-main.sh (start|stop|restart|status|help) postgresql
       ./bis-main.sh (start|stop|restart|status|help) presto
       ./bis-main.sh (start|stop|restart|status|help) bis-demon

help      - this screen
start     - start the service(s)
stop      - stop the service(s)
restart   - restart or start the service(s)
status    - show the status of the service(s)
```

Ensure the bis-main (Analytics Platform) demon server is running. It is responsible for:

- Data Access
- Schema Creation
- Table Partitioning
- Data Aging
- Dimension and Subscriber Provisioning.

You can check */opt/tnf/apps/bis-main/bis-demon/log/demon.log* for any possible issues.

6 Appendix 1 - AMF tools

All tools provided by the AMF are located in `/opt/tnf/amf/amf-core/bin`.

6.1.1 `amfConfig`

`amfConfig` is responsible for:

- Generating default configuration files.
- Uploading customized configuration files to the AMF database.
- Exporting configuration files from the AMF database to the file system for update.

6.1.2 `amfServerCheck`

`amfServerCheck` performs some basic checks on servers AMF needs to connect to:

- Check if the AMF server (application master server) can connect to other servers to install software.
- Pings each server
- Check if AMF can remotely execute the `rpm` command on each server.
- Checks that the `/opt/tnf/` directory exists on each server.

6.1.3 `amfInstall`

`amfInstall` installs RPM packages and customizes configuration files, either

- Install all components on all servers.
- Install all components for a single specified server (using the `-server` option).
- Install specified components on all servers or on a single specified server (using the `-component` option).

6.1.4 `amfCommandHistory`

`amfCommandHistory` generates a html report with a history of previously executed AMF commands.

6.1.5 `amfComponentVersions`

`amfComponentVersions` generates a report listing the version of all components installed on each server.

6.1.6 `amfStatus`

`amfStatus` generates a html report describing the status of each component in the system.

6.2 Error Codes

The following table describes the error codes which may be seen when using the application management framework along with suggested steps to rectify the issue.

Error Code	Error message
AMF001	amf-master.xml file not found for application {0}
AMF002	Expression {0} does not evaluate as a boolean. Returned type is: {1} Value is: {2}
AMF003	Expression {0} does not evaluate as an integer. Returned type is: {1} Value is: {2}
AMF004	The specified rpm file does not exist: {0}
AMF005	Error validating configuration rules for configuration definition: {0}
AMF006	The configuration definition does not exist
AMF007	The configuration definition does not have a name
AMF008	The configuration definition does not have a version
AMF009	The configuration definition has no properties
AMF010	The configuration definition property does not exist
AMF011	The configuration definition property does not have a name
AMF012	The configuration definition property does not have a type
AMF013	Error validating configuration rules for configuration definition property: {0}
AMF014	Error {0} while trying to parse the master file
AMF015	Error {0} while trying to parse the configuration definition in: {1}
AMF016	Error {0} while trying to parse the software component in: {1}
AMF017	Error {0} while trying to parse the installation task in: {1}
AMF018	Error while marshalling the master
AMF019	Error validating configuration rules for application: {0}

AMF020	application.cfg.properties file not found for application {0}
AMF100	Error validating configuration rules for configuration type {0}
AMF101	The 'global' application configuration has not been uploaded
AMF102	The "{0}" application has been flagged as enabled in the 'global' configuration but a {0} application configuration has not been uploaded
AMF103	Error while reading the {0} file
AMF104	Error while transforming the xml value to the {0} file
AMF105	Error while processing the {0} sub-application configuration to a xml value
AMF106	Error while processing the {0} applications server configuration to a xml value
AMF107	The application configuration does not exist
AMF108	The application configuration does not have a name
AMF109	The application configuration does not have a version
AMF110	The application configuration has no properties
AMF111	Error validating the configuration rules for the application configuration: {0}
AMF112	Error "{0}" while trying to parse the application configuration
AMF113	Error "{0}" while trying to parse the server configuration for the application
AMF114	The application configuration property does not exist
AMF115	The application configuration property does not have a name
AMF116	The application configuration property does not have a type
AMF117	The "{0}" application configuration property does not exist
AMF118	Error validating configuration rules for application property: "{0}"
AMF119	Error validating configuration rules for application: {0}
AMF120	A value for the "{0}" application configuration property is required
AMF121	The "{0}" application configuration property type does not evaluate as a {1}. Value is: {2}
AMF122	The "{0}" application configuration property type is not a valid one
AMF200	Error executing flyway migration scripts

AMF201	Error executing system command "{0}"
AMF202	Error installing component {0} on master server
AMF203	The installation of task {0} was not successful.
AMF300	Error resolving command line values ({0}) for option {1} in {2}
AMF301	Error resolving the path ({0}) from the command line for option {1} in {2}
AMF302	No application was specified for option --{0} (Required if more than one application installed)
AMF303	Error uploading the file {0} because it's not a valid configuration file
AMF304	The server {0} was not reached successfully (command ping)
AMF305	The 'sudo rpm' command doesn't work correctly on the server {0}
AMF306	The '/opt/tnf/amf/tmp' directory doesn't exist on server {0}
AMF400	Error exporting report to {0}
AMF401	Error loading the configuration definitions for the report

7 Appendix 2 - Application Management Framework

7.1 Troubleshooting Installation of Application Management Framework

This section describes cases where issues occur during the AMF installation and proposes steps to address these problems. Note this is not an exhaustive list of all problems.

7.1.1 Problem “Error: JAVA_HOME variable is undefined”

Problem:

Error message: **Error: JAVA_HOME variable is undefined** is shown when executing *initialise.sh*

Reason:

JAVA_HOME environment variable is not defined, but this is required by *initialise.sh*.

Solution:

First set up the JAVA_HOME environment variable for the *boss* user. This must refer to an accessible Oracle Java 8 Runtime Environment or Oracle Java 8 Standard Edition installation.

For example:

```
export JAVA_HOME=/opt/tnf/jre1.8.0
```

```
export JAVA_HOME=/opt/tnf/jdk1.8.0
```

Next, re-execute the *initialise.sh* installation script.

7.1.2 Problem “Error: Wrong Java version installed...”

Problem:

Error message: **Error: Wrong Java version installed. Required: 1.8, Installed: x.x** is shown when executing *initialise.sh*

Reason:

JAVA_HOME refers to an incompatible version of Oracle Java. Oracle Java 8 is required.

Solution:

Change the JAVA_HOME environment variable for the *boss* user. This must refer to an accessible Oracle Java 8 Runtime Environment or Oracle Java 8 Standard Edition installation.

For example:

```
export JAVA_HOME=/opt/tnf/jre1.8.0
```

```
export JAVA_HOME=/opt/tnf/jdk1.8.0
```

Next, re-execute the *initialise.sh* installation script.

7.1.3 Problem “Exception in thread "main" com.googlecode.flyway.core.exception.FlywayException...”

Problem:

Error message: **Exception in thread "main"**
com.googlecode.flyway.core.exception.FlywayException: Unable to obtain Jdbc connection from DataSource and an accompanying Java stack trace is shown when executing *initialise.sh*

Reason:

The local postgresSQL database is inaccessible or offline and needs to be started.

Solution:

Investigate why the postgresSQL database on the master server is not available and fix the underlying issue there.

Next, re-execute the *initialise.sh* installation script.

7.1.4 Problem “boss is not in the sudoers file. ...”

Problem:

Error message: **boss is not in the sudoers file. This incident will be reported. sh: /opt/tnf/amf/amf-core/bin/initDB: No such file or directory** is shown when executing *initialise.sh*

Reason:

The *boss* user is not correctly configured as a ‘sudoer’ with permission to install RPM packages.

Solution:

Add the *boss* user to the */etc/sudoers* file with permissions for executing the */bin/rpm* command. For example:

As *root* run the *visudo* command. Simply add the following lines to enable sudo for *boss* on the *rpm* command:

```
boss ALL=NOPASSWD : /bin/rpm
Defaults:boss !requiretty
```

Save and close the sudoers file.

Next, re-execute the *initialise.sh* installation script.

7.1.5 Problem “/opt/tnf/amf/amf-core/bin/initDB...”

Problem:

Error message: **/opt/tnf/amf/amf-core/bin/initDB: postgresql 9.4 not found** is shown when executing *initialise.sh*

Reason:

The postgresQL database is not installed, **Solution:**

- Ensure *PostgreSQL* is installed

Next, re-execute the *initialise.sh* installation script.

8 Appendix 3 – AMF Configurations

8.1 cea-cfg-global.xml

The following configuration properties are available in the cea-cfg-global.xml file.

Property Name	Description	Default value
Mobile	Enable the cea-sub-cfg-mobile.xml and installation of the GN network interface	false
cnalInstall	Set to 'true' to install Analytics Platform (CEA)	true
bisCountSegmentsByImsi	Analytics Framework - Count of segments by imsi	10
bisCountDaysForAuditHistory	Analytics Framework - Count of days for audit history	365
bisTimezone	Analytics Platform Timezone, used for hourly and Daily UTC time conversions.	Europe/Dublin
bisLocale	Analytics Platform Locale, used for Daily UTC time conversions and start of week calculations in LTT. Format of property is <language>_<country>. See Java documentation for java.util.Locale class.	en_IE

8.1.1 cea-cfg-servers.xml

The cea-cfg-servers.xml file lists the CEA application components and the servers where each component shall be installed. This list of components only consists of application components that can be installed on remote servers. i.e. components that do not have to be installed on the AMF master server.

8.2 cea-sub-cfg-mobileup.xml

8.2.1 Aging Property Group

Property Name	Description	Default value
userPlaneMin5	Aging setting for Mobile Userplane 5 minute Network aggregation tables	15
userPlaneHourly	Aging setting for Mobile Userplane hourly Network aggregation tables	64
userPlaneAppMin5	Aging setting for Mobile Userplane 5 minute aggregation tables Application level	15

userPlaneAppHourly	Aging setting for Mobile Userplane hourly aggregation tables Application level	15
userPlaneCLMin5	Aging setting for Mobile Userplane Cell-location 5 minute aggregation tables	15
userPlaneCLHourly	Aging setting for Mobile Userplane Cell-location hourly aggregation tables	7
userPlaneSubMin5	Aging setting for Mobile Userplane Subscriber 5 min aggregation tables	15
userPlaneSubHourly	Aging setting for Mobile Userplane Subscriber hourly aggregation tables	15
userPlaneStatusCodesMin5	Aging setting for Mobile Userplane Statuses 5 minute Network aggregation tables	15
userPlaneStatusCodesHourly	Aging setting for Mobile Userplane Statuses hourly Network aggregation tables	7
userPlaneStatusCodesSubMin5	Aging setting for Mobile Userplane Statuses Subscriber 5 minute aggregation tables	15
userPlaneStatusCodesSubHourly	Aging setting for Mobile Userplane Statuses Subscriber hourly aggregation tables	15
userPlaneTdrTmp	Aging setting for Mobile Userplane Tdr Tmp tables	1
userPlaneTdr	Aging setting for Mobile Userplane Tdr tables	40

8.3 cea-sub-cfg-gncp.xml

8.3.1 Aging Property Group

Property Name	Description	Default value
controlPlaneMin5	Aging setting for GN Control Plane 5 minute Network aggregation tables	15
controlPlaneHourly	Aging setting for GN Control Plane hourly Network level aggregation tables	64
controlPlaneSubMin5	Aging setting for GN Control Plane Subscriber 5 minute aggregation tables	15
controlPlaneSubHourly	Aging setting for GN Control Plane Subscriber hourly aggregation tables	64

controlPlaneCLMin5	Aging setting for GN Control Plane Cell-location 5 minute aggregation tables	15
controlPlaneCLHourly	Aging setting for GN Control Plane Cell-location hourly aggregation tables	64
controlPlaneStatusCodesMin5	Aging setting for GN Control Plane Status 5 minute Network aggregation tables	15
controlPlaneStatusCodesHourly	Aging setting for GN Control Plane Status hourly Network aggregation tables	64
controlPlaneCLStatusCodesMin5	Aging setting for GN Control Plane Status Cell-location 5 minute aggregation tables	15
controlPlaneCLStatusCodesHourly	Aging setting for GN Control Plane Status Cell-location hourly aggregation tables	64
controlPlaneSubStatusCodesMin5	Aging setting for GN Control Plane Status Subscriber 5 minute aggregation tables	15
controlPlaneSubStatusCodesHourly	Aging setting for GN Control Plane Status Subscriber hourly aggregation tables	64
controlPlaneTdrTmp	Aging setting for GN Control Plane Tdr Tmp tables	1
controlPlaneTdr	Aging setting for GN Control Plane Tdr tables	40

8.4 cea-sub-cfg-lteS11.xml

8.4.1 Aging Property Group

Property Name	Description	Default value
S11Min5	Aging setting for LTE Control Plane 5 minute Network aggregation tables. Network Level	15
S11Hourly	Aging setting for LTE Control Plane hourly Network aggregation tables. Network Level	64
S11CLMin5	Aging setting for LTE Control Plane 5 minute aggregation tables. Cell Location Level	64
S11CLHourly	Aging setting for LTE Control Plane hourly aggregation tables. Cell Location Level	64
S11SubMin5	Aging setting for LTE Control Plane 5 minute	15

	aggregation tables. Subscriber Level	
S11SubHourly	Aging setting for LTE Control Plane Hourly aggregation tables. Subscriber Level	64
S11StatusMin5	Aging setting for LTE Control Plane Status 5 minute aggregation tables. Network Level	15
S11StatusHourly	Aging setting for LTE Control Plane Status hourly aggregation tables. Network Level	64
S11StatusCLMin5	Aging setting for LTE Control Plane Status 5 minute aggregation tables. Cell Location Level	64
S11StatusCLHourly	Aging setting for LTE Control Plane Status hourly aggregation tables. Cell Location Level	64
S11StatusSubMin5	Aging setting for LTE Control Plane Status 5 minute aggregation tables. Subscriber Level	15
S11StatusSubHourly	Aging setting for LTE Control Plane Status Hourly aggregation tables. Subscriber Level	64

8.5 cea-sub-cfg-VoiceSMS.xml

8.5.1 Aging Property Group

Property Name	Description	Default value
controlPlaneMin5	Aging setting for Voice/SMS Control Plane 5 minute aggregation tables	15
controlPlaneHourly	Aging setting for Voice/SMS Control Plane hourly aggregation tables	64
controlPlaneDaily	Aging setting for Voice/SMS Control Plane daily aggregation tables	90
controlPlaneTdrTmp	Aging setting for Voice/SMS Control Plane Tdr Tmp tables	1
controlPlaneTdr	Aging setting for Voice/SMS Control Plane Tdr tables	40
controlPlaneCLMin5	Aging setting for Voice/SMS Control Plane Cell-location 5 minute aggregation tables	15
controlPlaneCLHourly	Aging setting for Voice/SMS Control Plane Cell-location hourly aggregation tables	64

controlPlaneSubMin5	Aging setting for Voice/SMS Control Plane Subscriber 5 minute aggregation tables	15
controlPlaneSubHourly	Aging setting for Voice/SMS Control Plane Subscriber hourly aggregation tables	64
controlPlaneStatusCodesMin5	Aging setting for Voice/SMS Control Plane Status 5 minute aggregation tables	15
controlPlaneStatusCodesHourly	Aging setting for Voice/SMS Control Plane Status hourly aggregation tables	64
controlPlaneStatusCodesCLMin5	Aging setting for Voice/SMS Control Plane Cell-location 5 minute aggregation tables	15
controlPlaneStatusCodesCLHourly	Aging setting for Voice/SMS Control Plane Status Cell-location hourly aggregation tables	64
controlPlaneStatusCodesSubMin5	Aging setting for Voice/SMS Control Plane Subscriber 5 minute aggregation tables	15
controlPlaneStatusCodesSubHourly	Aging setting for Voice/SMS Control Plane Status Subscriber hourly aggregation tables	64

8.6 cea-sub-VOLTE.xml

8.6.1 Aging Property Group

Property Name	Description	Default value
SIPMin5	Aging setting for SIP VOLTE 5 minute aggregation tables	15
SIPHourly	Aging setting for SIP VOLTE hourly aggregation tables	64
SIPCLMin5	Aging setting for SIP VOLTE 5 minute cell aggregation tables	15
SIPCLHourly	Aging setting for SIP VOLTE hourly cell aggregation tables	64
SIPSubMin5	Aging setting for SIP VOLTE 5 minute Subscriber aggregation tables	15

SIPSubHourly	Aging setting for SIP VOLTE hourly Subscriber aggregation tables	64
SIPStatusMin5	Aging setting for SIP Status VOLTE 5 minute aggregation tables	15
SIPStatusHourly	Aging setting for SIP Status VOLTE hourly aggregation tables	64
SIPStatusCLMin5	Aging setting for SIP Status CellLocation VOLTE 5 minute aggregation tables	15
SIPStatusCLHourly	Aging setting for SIP Status CellLocation VOLTE hourly aggregation tables	64
SIPStatusSubMin5	Aging setting for SIP Status Subscriber VOLTE 5 minute aggregation tables	15
SIPStatusSubHourly	Aging setting for SIP Status Subscriber VOLTE hourly aggregation tables	64
RTPMin5	Aging setting for VOLTE RTP 5 minute aggregation tables	15
RTPHourly	Aging setting for VOLTE RTP hourly aggregation tables	64
RTPCLMin5	Aging setting for VOLTE RTP 5 minute cell aggregation tables	15
RTPCLHourly	Aging setting for VOLTE RTP hourly cell aggregation tables	64
RTPSubMin5	Aging setting for VOLTE RTP 5 minute Subscriber aggregation tables	15
RTPSubHourly	Aging setting for VOLTE RTP hourly Subscriber aggregation tables	64

8.7 cea-sub-cfg-fixedline.xml

8.7.1 Aging Property Group

Property Name	Description	Default
Ageing section	Settings to allow hiding of groups of metrics	
userPlaneMin5	Aging setting for Fixedline User Plane 5 minute aggregation tables	1
userPlaneHourly	Aging setting for Fixedline User Plane hourly aggregation tables	7
userPlaneDeviceApplicationMin5	Aging setting for Fixedline User Plane Device+Application 5 minute aggregation tables	1
userPlaneDeviceApplicationHourly	Aging setting for Fixedline User Plane Device+Application hourly aggregation tables	7

userPlaneSubMin5	Aging setting for Fixedline User Plane Subscriber 5 minute aggregation tables	1
userPlaneSubHourly	Aging setting for Fixedline User Plane Subscriber hourly aggregation tables	7
userPlaneStatusCodesMin5	Aging setting for Fixedline User Plane Statuses 5 minute aggregation tables	1
userPlaneStatusCodesHourly	Aging setting for Fixedline User Plane Statuses hourly aggregation tables	7
userPlaneStatusCodesSubMin5	Aging setting for Fixedline User Plane Statuses Subscriber 5 minute aggregation tables	1
userPlaneStatusCodesSubHourly	Aging setting for Fixedline User Plane Statuses Subscriber hourly aggregation tables	7
controlPlaneMin5	Aging setting for Fixedline Control Plane 5 minute aggregation tables	1
controlPlaneHourly	Aging setting for Fixedline Control Plane hourly aggregation tables	7
controlPlaneDeviceMin5	Aging setting for Fixedline Control Plane Device 5 minute aggregation tables	1
controlPlaneDeviceHourly	Aging setting for Fixedline Control Plane Device hourly aggregation tables	7
controlPlaneSubMin5	Aging setting for Fixedline Control Plane Subscriber 5 minute aggregation tables	1
controlPlaneSubHourly	Aging setting for Fixedline Control Plane Subscriber hourly aggregation tables	7
controlPlaneStatusCodesMin5	Aging setting for Fixedline Control Plane Status 5 minute aggregation tables	1
controlPlaneStatusCodesHourly	Aging setting for Fixedline Control Plane Status hourly aggregation tables	7
controlPlaneStatusCodesSubMin5	Aging setting for Fixedline Control Plane Status Subscriber 5 minute aggregation tables	1
controlPlaneStatusCodesSubHourly	Aging setting for Fixedline Control Plane Status Subscriber hourly aggregation tables	7
fixedLineTdr	Aging setting for Fixedline Tdr tables	int
fixedLineTmp	Aging setting for Fixedline Tdr tmp tables	Int

8.8 cea-sub-cfg-ran.xml

8.8.1 Aging Property Group

Property Name	Description	Default
Ageing section	Settings to allow hiding of groups of metrics	
controlPlaneMin5	Aging setting for RAN Control Plane 5 minute aggregation tables	15
controlPlaneHourly	Aging setting for RAN Control Plane hourly aggregation tables	64
controlPlaneDaily	Aging setting for RAN Control Plane daily aggregation tables	90
controlPlaneCLMin5	Aging setting for RAN Control Plane Cell-location 5 minute aggregation tables	15
controlPlaneCLHourly	Aging setting for RAN Control Plane Cell-location hourly aggregation tables	64

controlPlaneDeviceMin5	Aging setting for RAN Control Plane Device 5 minute aggregation tables	15
controlPlaneDeviceHourly	Aging setting for RAN Control Plane Device hourly aggregation tables	64
controlPlaneSubMin5	Aging setting for RAN Control Plane Subscriber 5 minute aggregation tables	15
controlPlaneSubHourly	Aging setting for RAN Control Plane Subscriber hourly aggregation tables	64
controlPlaneStatusCodesMin5	Aging setting for RAN Control Plane Status 5 minute aggregation tables	15
controlPlaneStatusCodesHourly	Aging setting for RAN Control Plane Status hourly aggregation tables	64
controlPlaneStatusCodesCLMin5	Aging setting for RAN Control Plane Status Cell-location 5 minute aggregation tables	15
controlPlaneStatusCodesCLHourly	Aging setting for RAN Control Plane Status Cell-location hourly aggregation tables	64

8.9 cea-sub-cfg-gb.xml

8.9.1 Aging Property Group

Property Name	Description	Default
Ageing section	Aging settings for Gb aggregation data	
controlPlaneMin5	Aging setting for Gb Control Plane 5 minute aggregation tables	15
controlPlaneHourly	Aging setting for Gb Control Plane hourly aggregation tables	64
controlPlaneCLMin5	Aging setting for Gb Control Plane Cell-location 5 minute aggregation tables	15
controlPlaneCLHourly	Aging setting for Gb Control Plane Cell-location hourly aggregation tables	64
controlPlaneSubMin5	Aging setting for Gb Control Plane Subscriber 5 minute aggregation tables	15
controlPlaneSubHourly	Aging setting for Gb Control Plane Subscriber Hourly aggregation tables	64
controlPlaneDevMin5	Aging setting for Gb Control Plane Device 5 minute aggregation tables	15
controlPlaneDevHourly	Aging setting for Gb Control Plane Decice Hourly aggregation tables	64
controlPlaneStatusCodesMin5	Aging setting for Gb Control Plane Statuses 5 minute aggregation tables	15
controlPlaneStatusCodesHourly	Aging setting for Gb Control Plane Statuses hourly aggregation tables	64
controlPlaneCLStatusCodesMin5	Aging setting for Gb Control Plane Statuses Cell-location 5 minute aggregation tables	15
controlPlanCLStatusCodesHourly	Aging setting for Gb Control Plane Statuses Cell-location hourly aggregation tables	64

controlPlaneSubStatusCodesMin5	Aging setting for Gb Control Plane Statuses Subscriber 5 minute aggregation tables	15
controlPlaneSubStatusCodesHourly	Aging setting for Gb Control Plane Statuses Subscriber Hourly aggregation tables	64
controlPlaneDevStatusCodesMin5	Aging setting for Gb Control Plane Statuses Device 5 minute aggregation tables	15
controlPlaneDevStatusCodesHourly	Aging setting for Gb Control Plane Statuses Device Hourly aggregation tables	64

7.11 cea-sub-cfg-s1mme-s6a.xml

7.11.1 Aging Property Group

Property Name	Description	Default
<i>Aging section</i>	<i>Aging settings for Mobile aggregation data</i>	-
mobileLteS1mmeMin5	Aging setting for mobile-lte-s1-mme 5 minute aggregation tables	15
mobileLteS1mmeHourly	Aging setting for mobile-lte-s1-mme hourly aggregation tables	64
mobileLteS1mmeDevMin5	Aging setting for mobile-lte-s1-mme Device 5 minute aggregation tables	15
mobileLteS1mmeDevHourly	Aging setting for mobile-lte-s1-mme Device hourly aggregation tables	64
mobileLteS1mmeCLMin5	Aging setting for mobile-lte-s1-mme Cell 5 minute aggregation tables	15
mobileLteS1mmeCLHourly	Aging setting for mobile-lte-s1-mme Cell hourly aggregation tables	64
mobileLteS1mmeSubMin5	Aging setting for mobile-lte-s1-mme Subscriber 5 minute aggregation tables	15
mobileLteS1mmeSubHourly	Aging setting for mobile-lte-s1-mme Subscriber hourly aggregation tables	64
mobileLteS1mmeStatusMin5	Aging setting for mobile-lte-s1-mme status 5 minute aggregation tables	15
mobileLteS1mmeStatusHourly	Aging setting for mobile-lte-s1-mme status hourly aggregation tables	64
mobileLteS1mmeStatusDevMin	Aging setting for mobile-lte-s1-mme status Device	15

5	5 minute aggregation tables	
mobileLteS1mmeStatusDevHourly	Aging setting for mobile-lte-s1-mme status Device hourly aggregation tables	64
mobileLteS1mmeStatusCLMin5	Aging setting for mobile-lte-s1-mme status Cell 5 minute aggregation tables	15
mobileLteS1mmeStatusCLHourly	Aging setting for mobile-lte-s1-mme status Cell hourly aggregation tables	64
mobileLteS1mmeStatusSubMin5	Aging setting for mobile-lte-s1-mme status Subscriber 5 minute aggregation tables	15
mobileLteS1mmeStatusSubHourly	Aging setting for mobile-lte-s1-mme status Subscriber hourly aggregation tables	64
mobileLteS6aMin5	Aging setting for mobile-lte-s6a 5 minute aggregation tables	15
mobileLteS6aHourly	Aging setting for mobile-lte-s6a hourly aggregation tables	64
mobileLteS6aSubMin5	Aging setting for mobile-lte-s6a Subscriber 5 minute aggregation tables	15
mobileLteS6aSubHourly	Aging setting for mobile-lte-s6a Subscriber hourly aggregation tables	64
mobileLteS6aStatusMin5	Aging setting for mobile-lte-s6a status 5 minute aggregation tables	15
mobileLteS6aStatusHourly	Aging setting for mobile-lte-s6a status hourly aggregation tables	64
mobileLteS6aStatusSubMin5	Aging setting for mobile-lte-s6a status Subscriber 5 minute aggregation tables	15
mobileLteS6aStatusSubHourly	Aging setting for mobile-lte-s6a status Subscriber hourly aggregation tables	64

7.12 cea-sub-cfg-iups.xml

7.12.1 Aging Property Group

Property Name	Description	Default
Ageing section	Aging settings for Gb aggregation data	
controlPlaneMin5	Aging setting for Gb Control Plane 5 minute aggregation tables	15
controlPlaneHourly	Aging setting for Gb Control Plane hourly aggregation tables	64

controlPlaneCLMin5	Aging setting for Gb Control Plane Cell-location 5 minute aggregation tables	15
controlPlaneCLHourly	Aging setting for Gb Control Plane Cell-location hourly aggregation tables	64
controlPlaneSubMin5	Aging setting for Gb Control Plane Subscriber 5 minute aggregation tables	15
controlPlaneSubHourly	Aging setting for Gb Control Plane Subscriber Hourly aggregation tables	64
controlPlaneDevMin5	Aging setting for Gb Control Plane Device 5 minute aggregation tables	15
controlPlaneDevHourly	Aging setting for Gb Control Plane Device Hourly aggregation tables	64
controlPlaneStatusCodesMin5	Aging setting for Gb Control Plane Statuses 5 minute aggregation tables	15
controlPlaneStatusCodesHourly	Aging setting for Gb Control Plane Statuses hourly aggregation tables	64
controlPlaneCLStatusCodesMin5	Aging setting for Gb Control Plane Statuses Cell-location 5 minute aggregation tables	15
controlPlanCLStatusCodesHourly	Aging setting for Gb Control Plane Statuses Cell-location hourly aggregation tables	64
controlPlaneSubStatusCodesMin5	Aging setting for Gb Control Plane Statuses Subscriber 5 minute aggregation tables	15
controlPlaneSubStatusCodesHourly	Aging setting for Gb Control Plane Statuses Subscriber Hourly aggregation tables	64
controlPlaneDevStatusCodesMin5	Aging setting for Gb Control Plane Statuses Device 5 minute aggregation tables	15
controlPlaneDevStatusCodesHourly	Aging setting for Gb Control Plane Statuses Device Hourly aggregation tables	64