

***Project Report on***  
**Installation of Ericsson Mediation 20**



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*In partial fulfillment of requirements for the award of degree in*  
**Bachelor of Technology in Computer Science and Engineering**  
**(2020)**



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## **Project Completion Certificate**

This is to certify that the below mentioned students of Sikkim Manipal Institute of Technology have worked under my supervision and guidance from **3/02/2020** to **3/06/2020** and have successfully completed the project entitled “ **Installation of Ericsson Mediation - 20** ” in partial fulfillment of the requirements for the award of Bachelor of Technology in Computer Science and Engineering.

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## **Project Review Certificate**

This is to certify that the work recorded in this project report entitled “ Installation of Ericsson Mediation - 20 ” has been carried out by Saudamini Ghosh (Reg. No. 201600119) and L. Ajey Koushik (Reg. No. 201600423) of Computer Science & Engineering Department of Sikkim Manipal Institute of Technology in partial fulfillment of the requirements for the award of Bachelor of Technology in Computer Science and Engineering. This report has been duly reviewed by the undersigned and recommended for final submission for Major Project Viva Examination.

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## **Certificate of Acceptance**

This is to certify that the below mentioned students of Computer Science & Engineering Department of Sikkim Manipal Institute of Technology (SMIT) have worked under the supervision of Mr. Mukesh Goel of Ericsson, Gurugram from 3<sup>rd</sup> February 2019 to 3<sup>th</sup> June 2019 on the project entitled “**Installation of Ericsson Mediation 20**”. The project is hereby accepted by the Department of Computer Science & Engineering, SMIT in partial fulfillment of the requirements for the award of Bachelor of Technology in Computer Science and Engineering.

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## **Declaration**

I, the undersigned, hereby declare that the work recorded in this project report entitled “**Installation of Ericsson Mediation 20**” in partial fulfillment for the requirements of award of B.Tech (CSE) from Sikkim Manipal Institute of Technology (A constituent college of Sikkim Manipal University) is a faithful and bonafide project work carried out at “**ERICSSON Gurugram**” under the supervision and guidance of **Mr Mukesh Goel of ERICSSON Gurugram** .

The results of this investigation reported in this project have so far not been reported for any other Degree / Diploma or any other Technical forum.

The assistance and help received during the course of the investigation have been duly acknowledged.

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I would also like to express our humble gratitude to **Prof (DR.) Kalpana Sharma, Head of the Department Computer Science & Engineering Department, Sikkim Manipal Institute of Technology** for allowing us to pursue our major project on **“Installation of Ericsson Mediation 20”**.

I would like to express our humble gratitude to **Mr. Biswaraj Sen, Associate Professor, Computer Science & Engineering Department**, and **Mrs. Saswati Bhattacharya, Asst. Professor II, Computer Science & Engineering Department**, Sikkim Manipal Institute of technology for their support and guidance during the project period.

I would also like to express my sincere thanks to all the faculty members and non-teaching staffs of **Computer Science and Engineering Department** of **Sikkim Manipal Institute of Technology** for their kind support all throughout the project development.

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## **Document Control Sheet**

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## **ABSTRACT**

Mediation is a key telecom node as defined in standards, which is in between the data generators, like network or IT nodes and the data consumers which are the downstream operations and business support systems. Mediation system is responsible to filter out the non-relevant data, aggregate the partial data records and transform the data as per the format required by the data consumers.

The importance of mediation is ever increasing and it simply will not be possible to manage today's complex networks without a fit-for-purpose mediation function. New technologies, new formats, new protocols and new, fast changing business models require a fully convergent mediation platform that can bridge all network elements with your Operations and Business Support Systems (OSS/BSS).

Therefore we will be performing an installation of Ericsson Mediation 20. Today it is the market-leading mediation solution covering all your requirements in telecom and IT mediation. With modern interfaces, it even supports the big data you need to analyze and understand market and consumer behavior, so you can identify trends and act.

With Ericsson Mediation, you have one data mediation environment covering both BSS-related and OSS-related mediation, reducing IT costs and giving you the data you need to provide a consistent, high quality customer experience.

# 1. INTRODUCTION

## 1.1 General Overview of the problem

The importance of mediation is ever increasing, and it simply will not be possible to manage today's complex networks without a fit-for-purpose mediation function. New technologies, new formats, new protocols and new, fast changing business models require a fully convergent mediation platform that can bridge all network elements with your Operations and Business Support Systems (OSS/BSS).

There is a need for a converged mediation which resides at the boundary between the network and the business support systems to improve billing accuracy and granularity, support new competitive services, deliver revenue assurance for BSS systems and prepare data for analytics, IoT or other OSS systems thereby acting as a key data monetization enabler.

Which should also collect, transform and distribute data from your network and IT systems, making it available for a range of purposes such as charging and billing, service assurance, fraud detection and compiling statistics & also provides post-processing systems with one stable, flexible and uniform interface for online and offline charging data collection– even when the network uses a range of technologies and equipment from multiple vendors. It must provide Key features Including:

- Agile Mediation to Handle Service Complexity
- LTE capabilities
- One Mediation for All Business Needs
- Enabler of IT Systems Interworking
- Flexible Deployment
- Handle data

## 1.2 Literature Survey

Sl. No.	Author	Title	Findings	Relevance
1	Ericsson's Propriety User Guide on EM20	Alex, a software that allows users to browse Ericsson Customer Product Information (CPI) libraries in a standard web browser : Technical Product Description , Product Overview, Ericsson Mediation	Ericsson Mediation Product Overview.  Ericsson Mediation Offered Packages.  Mediation Function Overview.	Learnt about the Ericsson mediation Product and the basic functionalities and commands to run it.
2	Zia Ur Rahman (2017)	"GSM Technology: Architecture, Security and Future Challenges"  In International Journal Of Science Engineering and Advance Technology	GSM Overview  GSM Architecture  GSM Security  GSM Call Flow	The basic components of GSM , How does it work and it's application. The call flow of telecommunication to facilitate the use and fuctionality of mediation.
3	Shivinder Devral , Arsh Sharma(2016)	"GSM Architecture & Channels: Review Study" in Second International Conference On Innovative Trends In Electronics Engineering (ICITEE2)	The need of GSM is due to:- Improved spectrum efficiency, International roaming , Low-cost mobile sets and base stations, High-quality speech	Helped in gaining knowledge of the importance of GSM before practicing any work on mediation platform.

### **1.3 Problem Definition:**

Mediation is a key telecom node as defined in standards, which is in between the data generators, like network or IT nodes and the data consumers which are the downstream operations and business support systems. Mediation system is responsible to filter out the non-relevant data, aggregate the partial data records and transform the data as per the requirement of the customer.

The importance of mediation is ever increasing and it simply will not be possible to manage today's complex networks without a fit-for-purpose mediation function. New technologies, new formats, new protocols and new, fast changing business models require a fully convergent mediation platform that can bridge all network elements with your Operations and Business Support Systems (OSS/BSS).

Ericsson as a company has been leading the mediation business since the need was identified in the 1990's. All this knowledge and understanding gained over the years has been gathered into our Ericsson Mediation product. Today it is the market-leading mediation solution covering all your requirements in telecom and IT mediation. With modern interfaces, it even supports the big data you need to analyze and understand market and consumer behavior, so you can identify trends and act.

With Ericsson Mediation, you have one data mediation environment covering both



BSS-related and OSS-related mediation, reducing IT costs and giving you the data you need to provide a consistent, high quality customer experience.

This project will give a solution to the basic understanding of Ericsson Mediation and the procedure of its virtual installation.

## 1.4 Analysis of the problem

The following features must be implemented in the solution in order to satisfy the customer's needs:

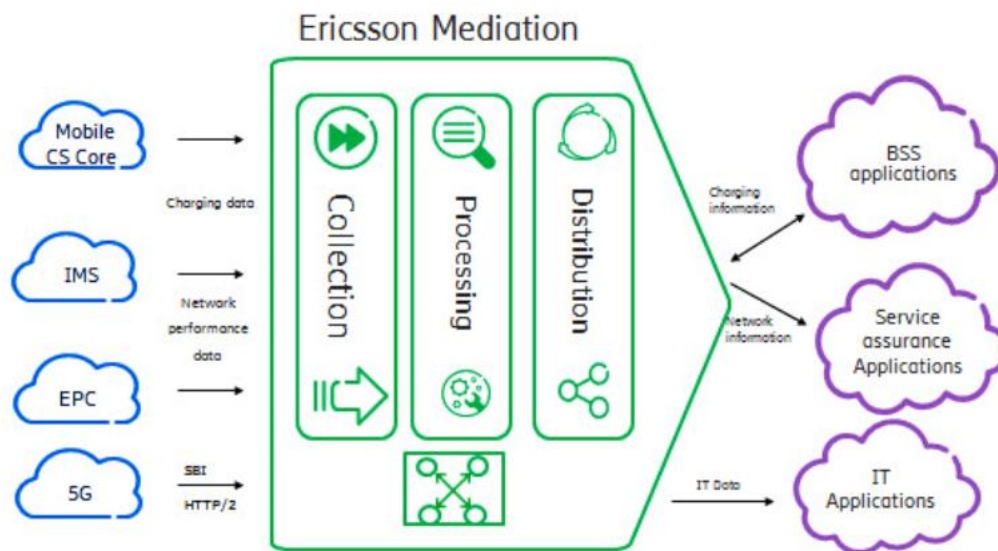
- **Pre-integrated.** The product must be designed, tested and verified for fast deployment with Ericsson equipment, yet also supports equipment from other vendors.
- **Agile Mediation to Handle Service Complexity:** The product must provide several capabilities that redefines the way system is used. Due to the support of a state-of-the-art web based interface, it is possible to access key functionalities remotely from any device. **Ericsson Mediation** therefore is clearly on track to provide the best user experience to the user thus becoming the platform of choice.
- **LTE capabilities.** The product must provide out-of-the-box applications for fast solution deployment in key areas such as charging and billing in a VoLTE. VoWiFi environment. It can be deployed as a VNF node in Cloud NFV environment.
- **One Mediation for All Business Needs:** As a single solution for all mediation needs, vast capabilities enable OSS/BSS transformation and leverage all available data to power more informed business decisions.

- **Enabler of IT Systems Interworking:** The aim of OSS/BSS transformation is to increase flexibility and speed, but during any system evolution, different components will evolve at a different pace. Legacy systems need to coexist and interoperate with modern business support systems in different phases of transformation. The product must play a key role in smoothening this evolution, with inherent capabilities to act as an IT-interoperability and message orchestrator.
- **Flexible Deployment:** The product must have deployment options contribute to this flexibility in two important ways:
  - Providing vendor independence for needed hardware
  - By supporting various deployment modes i.e. native, virtualization and cloud.

### 1.5 Proposed Solution Strategy

Ericsson Mediation is a single solution for all mediation needs. Ericsson Mediation offers one, end-to-end, convergent mediation solution with both real time and filebased mediation capability for all services generated from all networks. Due to its multiple capabilities, we call it Multi-Purpose Mediation. Ericsson Mediation can collect data from multiple sources in multiple formats, process data as per the operator's business needs and distribute the processed data to a desired system in BSS and OSS. Ericsson Mediation is pre-verified with Ericsson network elements and provides support for multivendor network elements.

This is what makes Ericsson Mediation a true multi-vendor, multi-access and multiservice solution. Ericsson Mediation is also future proof as it provides support for LTE and IMS network element. 5G SBI interface: Enables gateway like behavior to allow 5G SMF communicate with legacy (non-5G) charging (Incase customer does not have 5G Compliant Ericsson Charging system) during the digital transformation process



*Figure 1 Ericsson Mediation*

As depicted in Figure 1, Ericsson Mediation Toolbox supports collection of data from all GSM, IMS, Wire line (fixed network), CDMA2000, GPRS, WCDMA, EPC, LTE and 5G nodes included in the core network. All Ericsson core network nodes as well as many service nodes and applications are supported. Toolbox

All Ericsson core network nodes as well as many service nodes and applications are supported. Toolbox also provides support for many pre-verified multi-vendor nodes. In addition to this, Toolbox also makes it possible to realize the different use cases in both Business Support Systems (BSS), Service Assurance, IT and IOT domains.

Communication Content Inspection (CCI) is any inspection of the contents of communication. Any feature analyzing the content of communication can be qualified CCI capable feature. Some examples of sensitive information that can be collected with CCI of incoming data from supported interfaces of Ericsson Mediation are

- The usage of various network resources
- Position of a user

- Calling parties involved in a communication
- Habits of user, by understanding better the details of behavior

Almost all the processing activities in Ericsson Mediation are having capabilities to inspect, modify, log incoming data which can be used of CCI capabilities. Multi Mediation offers role-based user management. The access and misuse of these activities should be restricted with the help of User management.

Traditionally, a mediation system was used to collect data from the network, enrich that data via processing and then distribute the enriched data to the desired system. In turn mediation was more of a format and a protocol translator.

However, in recent times, the increase in number of connected devices and mobile broadband usage has led to an explosion of traffic in operator's network. Consumers have become accustomed to multimedia applications and are using more of these services. Also, in the current times and in future, data is perceived to be the new raw material that could be appropriately harnessed for many purposes including analytics. With all these changes, operator's network has become more complex than ever before. The complexity of network and the huge amount of data has increased the demands on the mediation system. Today a mediation system is required to integrate the complex network with IT, and business and operations layer within operator's environment.

Ericsson's Ericsson Mediation fulfills these needs and provides one mediation system for different business needs. Ericsson Mediation is a multipurpose mediation as it performs the multiple roles in operator's environment. Ericsson Mediation acts as a bridge between the Network and the Business and Operations Support Systems. It also acts as a solution enabler, i.e. it helps in quick introduction of new services.

Ericsson Mediation decreases network complexity and reduces both OPEX and CAPEX by providing back-end systems with one single stable, flexible and uniform interface for data collection and distribution, also when the network consists of several different systems and network technologies and of equipment from different vendors.

The flexibility is further increased through the advanced and easy-to-use tools for business logic configuration, operation and maintenance.

Ericsson Mediation 20 provides multiple features to cater to all the different business needs in BSS and OSS domains. The Ericsson Mediation features can be broadly categorized into two concepts, Toolbox and Applications.

### **Toolbox**

Ericsson Mediation provides a flexible toolbox with tools to create mediation flows capable of collecting, processing and distributing data records/events for all services generated from all networks. With such a toolbox operator can make mediation flows containing business logic (configuration) for all their mediation needs in the BSS and OSS domains.

Using Ericsson Mediation Toolbox, both file processing use cases and events or transactions processing use cases can be realized. Also, it provides flexibility to combine both file processing and event processing flows, i.e. both flows can be combined to achieve all different types of use cases.

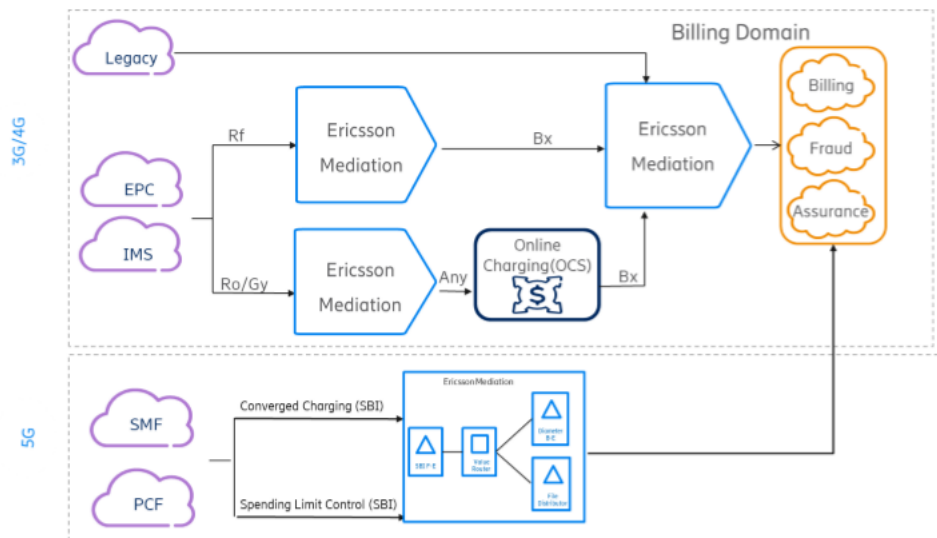


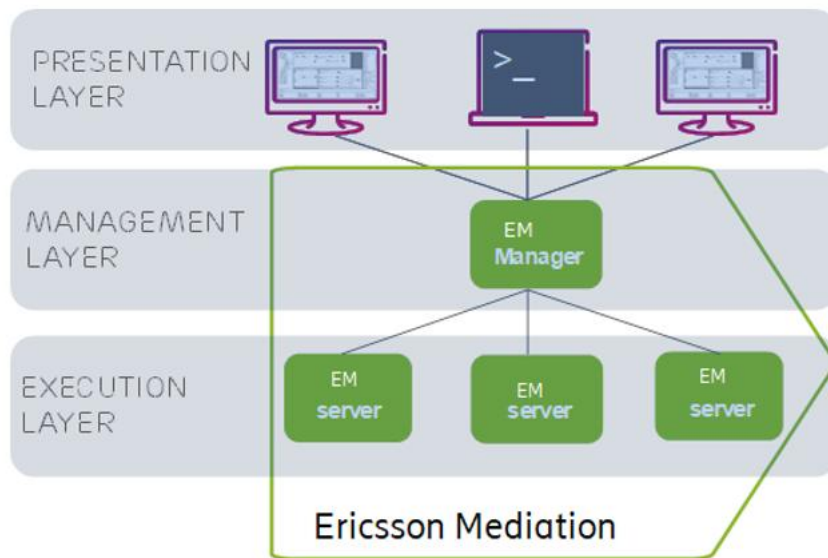
Figure 2 : Ericsson Mediation as a Toolbox network (IMS Enabler and core enabler)

## Applications

Ericsson Mediation provides many use cases in a specific domain, known as Applications. Applications are pre-packaged and pre-verified turn-key features developed for a use case. These plug n play features are available off the shelf and only site-specific parameters needs to be configured for their deployment. This reduces the integration time and time to market for new services. The mediation Applications are updated in every release to cater for any interfaces update in the network.

## Ericsson Mediation Architecture

The Ericsson Mediation architecture provides a scalable and flexible system. Ericsson Mediation's architecture can control distributed systems over several hardware together with centralized Operations & Maintenance (O&M). The scalable architecture enables the operator to expand Ericsson Mediation system when more complex and huge data processing needs arise with network growth.



*Figure 3 Ericsson Mediation Architecture*

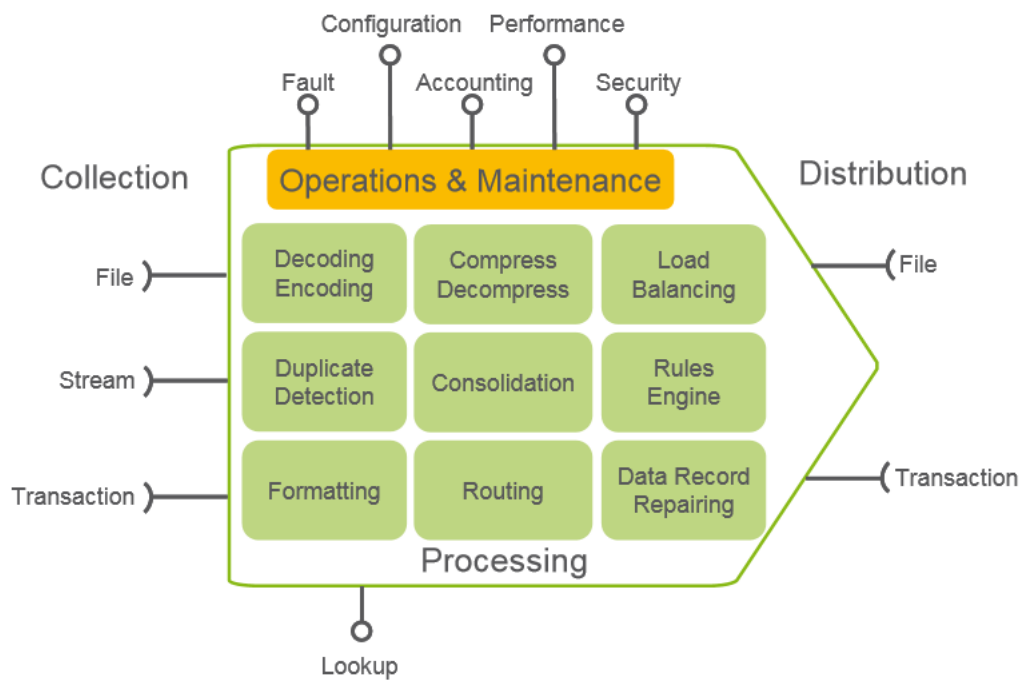
Ericsson Mediation has a three-tiered architecture as depicted in the above Figure . The three layers of Ericsson Mediation architecture are described below:

- o User Interface: Ericsson Mediation user interfaces are the presentation layer in the three-tiered architecture. It also enables the user to efficiently perform all O&M activities for the complete system.

- o Manager: The manager is the central component of the system architecture. It is a controller function which controls the complete O&M of Ericsson Mediation. The responsibilities of the mediation manager are administrative. It consolidates all O&M functions like Fault Management, Configuration Management, Accounting, Performance Management and Security Management. It serves as a layer between the GUI and the Ericsson Mediation servers. It allows several users to log in from different locations to manage several Ericsson Mediation servers running on different hardware.

o Server: Server is Ericsson Mediation component on which the business logic is realized. In Ericsson Mediation system there can be multiple servers on which multiple business logics can be realized to achieve a certain business requirement.

Ericsson Mediation provides several tools to operators to define their own configuration as per their specific needs. These tools can be broadly divided into four broad categories, Collection, Processing, Distribution and Operations & Maintenance.



*Figure 4 Functional View of Mediation*

- **Collection** – This category defines the Ericsson Mediation’s capability to collect data from the network. Ericsson Mediation provides the support for multiple interfaces for data collection. The Collection interfaces can be further subdivided into three categories, File, Stream and Transaction.



- **Processing** – This category describes the Ericsson Mediation’s capabilities to process the collected data. Ericsson Mediation provides the support to decode/encode the collected data, to check the duplicate, to format the data as required, to compress/decompress the data, to consolidate the data, to route the data to the desired system, to integrate with rules engine, to repair the erroneous data, to balance load on the system and to perform external lookup for data enrichment. An operator can use these capabilities while creating a configuration and in turn can enrich, filter or translate the collected data.

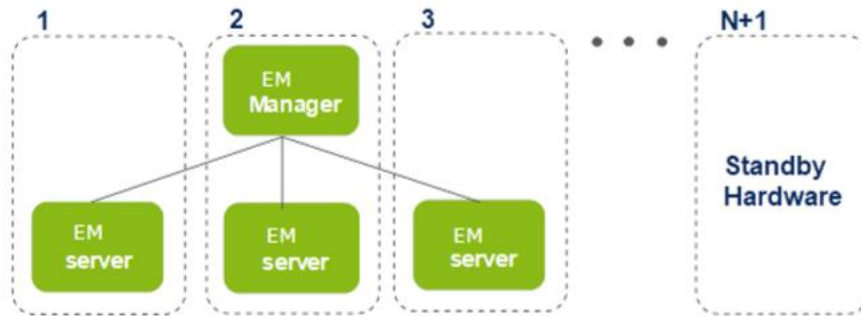
- **Distribution** – This category describes the Ericsson Mediation’s capabilities to distribute the processed data to BSS and/or OSS domain. Toolbox supports file and transaction-based interfaces for distribution of the processed data.

- **Operations & Maintenance** – This category describes the Operations and Maintenance of Ericsson Mediation. The O&M of Ericsson Mediation is divided into five parts, Fault Management, Configuration Management, Accounting.

## **Cluster**

High Availability (HA) solutions are of great importance for the operators as downtime in the system in many situations means lost revenue. In Ericsson Mediation high availability is achieved via the cluster set-up. MM cluster, as depicted in Figure 1, is a so-called  $n+1$  solution, that is, “ $n$ ” numbers of nodes collecting, processing and distributing information in a cluster and one standby ready to take over processing from any of the other. The cluster is very flexible, and it is possible to add hardware nodes to the cluster without affecting the processing on the nodes that are already in operation. When any of the cluster nodes for File and event needs to be taken down, for maintenance reasons, upgrades, or normal updates of business logic, all processing can be switched over to one of the nodes in the cluster, while the other one is updated. Support for NFS storage for cluster deployment on native hardware. Currently, in Native deployment, shared file system requirement is fulfilled with the help of Cluster File System which uses external shared storage. As an alternative to that, now it is possible to support NFS capable storage to share data among all EM nodes. EM Nodes

shall act as NFS Clients and mount the file system shared by NFS capable storage.



*Figure 5 : Ericsson Mediation cluster*

## 2 DESIGN STRATEGY

### 2.1 Ericsson Mediation in Virtualized Environment

Ericsson Mediation is supported on virtualized platform. It provides all the general benefits of virtualization-based deployments. Virtualization is supported over x86 physical hardware and Linux (RHEL 7.6 OS) as guest OS. In Virtualization, Ericsson Mediation supports all the kinds of deployments (Standalone, HA deployment) which are supported on native hardware. It will also be supported to migrate from physical to virtual environment. For standalone deployments multiple VMs can be deployed on single physical machine to utilize the available underlying hardware resources. Support for NFS storage is available for cluster deployment on Virtualized mode to provide additional option for sharing data among EMM nodes. For HA deployments, Ericsson Mediation supports virtual-to-virtual (in-guests) cluster for application failover, which means cluster will run across virtual machines created on different physical machines as shown in the figure below.

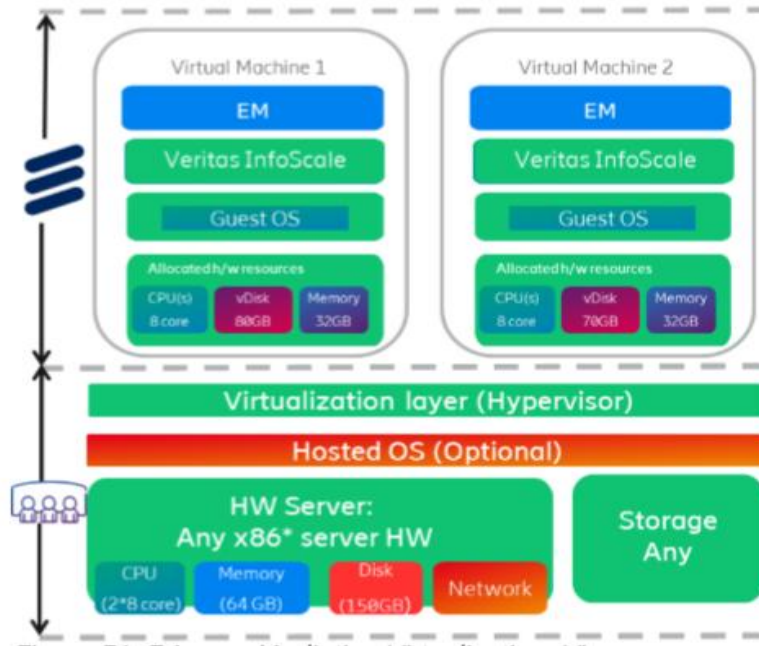


Figure 6 : Ericsson Mediation Virtualization View

A hypervisor, also called a virtual machine manager, is a computer program that creates and runs virtual machines. Classification of hypervisors is as follows: -

Ericsson Mediation supports both Bare Metal and Host OS based virtualized deployments and is verified and dimensioned with the following hypervisors

- VMWare ESXi -for Bare Metal deployment
- KVM - for Host OS based deployment

Usage of any other hypervisor than mentioned above is not supported.

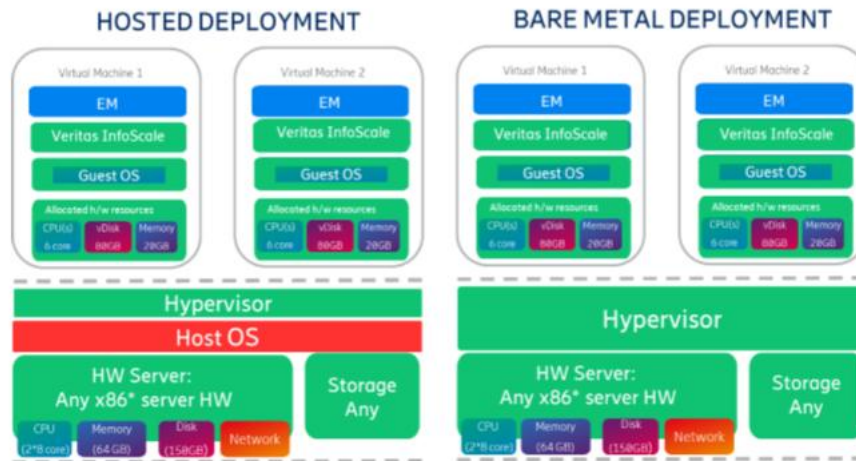


Figure 7 Ericsson Mediation Virtualization View

The selected host OS should meet the following requirements: -

- KVM hypervisor is supported on the host OS.
- Combination of Host OS, KVM and RHEL 7.6 as guest OS should be supported by Host OS vendor and Red Hat

## 2.2 OVF Support

Ericsson Mediation supports OVF (Open Virtualization Format) which helps in reducing installation time over virtualization. OVF delivered would contain pre-installed OS, 3pp and application.

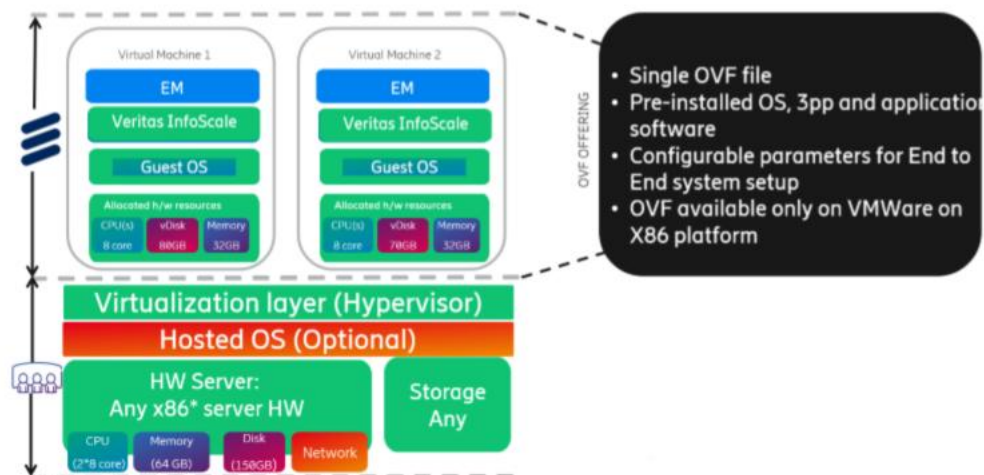


Figure 8 Ericsson Mediation Virtualization OVF support

### 3 IMPLEMENTATION DETAILS

#### 3.1 EM 20 INSTALLATION (on VM ) STEPS:

1. OS Installation
2. OS Patches
3. Platform Installation
4. 3PP Installation
5. EM 20 Application Installation
  1. MGR
  2. FEM
  3. OLM

Ericsson Mediation is a combination of File mediation and Online mediation which provides flexible and secure mediation solution. The overall aim of this product is to

support quick and smooth introduction of services into the communication network by providing a single point and flexible interface for charging related information.

Ericsson Mediation supports deployment on virtualized environment, which means Ericsson Mediation can be deployed inside the virtual machines. It provides all the applicable general benefits of virtualization-based deployments. Virtualization is supported over x86\_64 physical hardware and RedHat Enterprise Linux as guest OS. In virtualized environment, Ericsson Mediation can be deployed in Standalone and Cluster (High Availability [HA]) mode.

For Standalone deployment multiple Virtual Machines (VM) can be deployed on a single physical machine to utilize the available underlying hardware resources. However for Cluster deployment VMs should be deployed in different physical machines. Ericsson Mediation can be deployed in standalone or cluster mode.

Following figure shows the deployment mode for Ericsson Mediation:

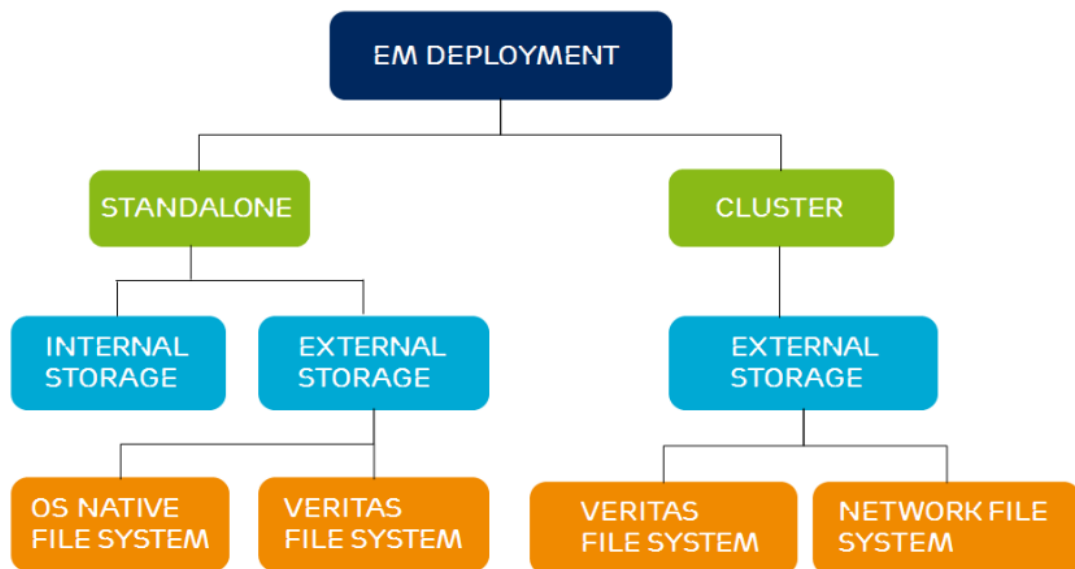


Figure 9 Ericsson Mediation Deployment Mode

### 3.2 Standalone Deployment Mode

In standalone deployment mode, there can be a single or multiple virtualized servers running Ericsson Mediation application in isolation without failover dependency. With this mode of deployment, there is no redundancy ensured for all the VM components, which may bring down the application in the event of critical hardware failure.

Each standalone virtual machine is installed with its own virtualized hardware and software components such as guest OS, Volume Managers, File Systems, 3PPs, and Ericsson Mediation application.

External storage usage is optional in Standalone deployment mode. The external storage array may be shared with multiple physical servers.

Following options are available for File System creation in storage partition if an external storage is used with the standalone deployment:

- Veritas File System: It is an extent-based file system developed by Veritas. Veritas InfoScale License is required if Veritas File System is used.
- Guest OS Native File System: EXT4 or XFS File System. Saves cost of the Veritas InfoScale Licensing.

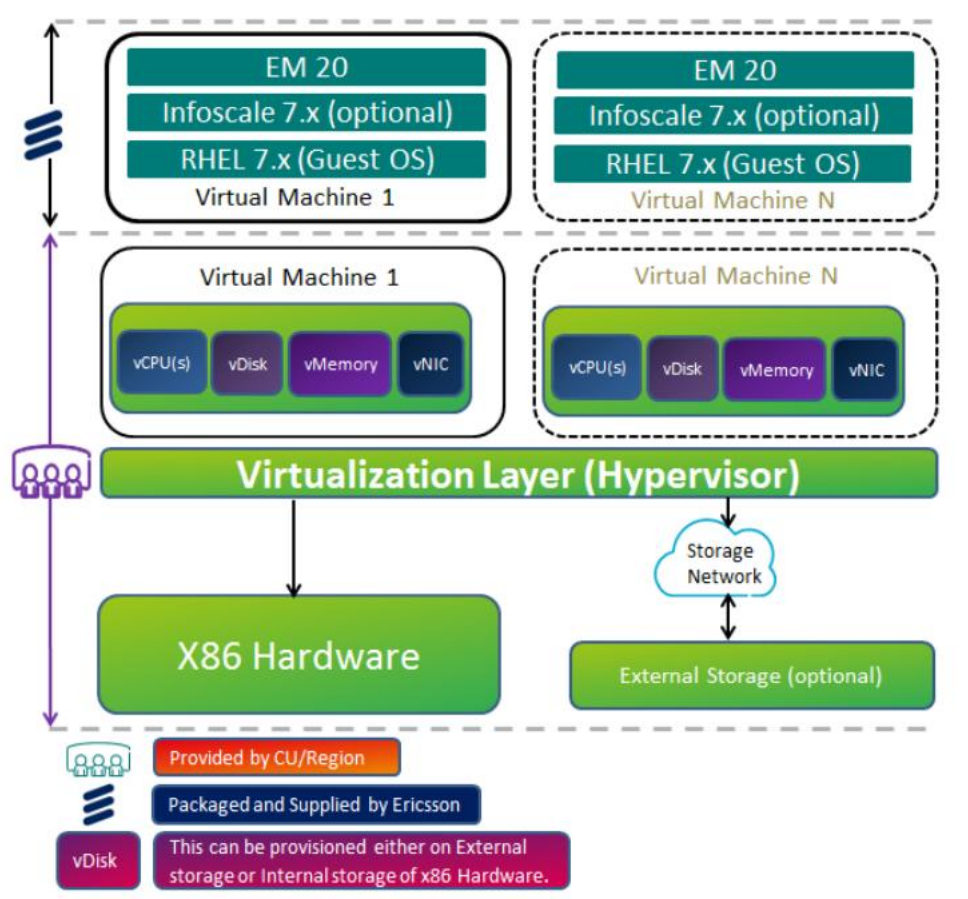


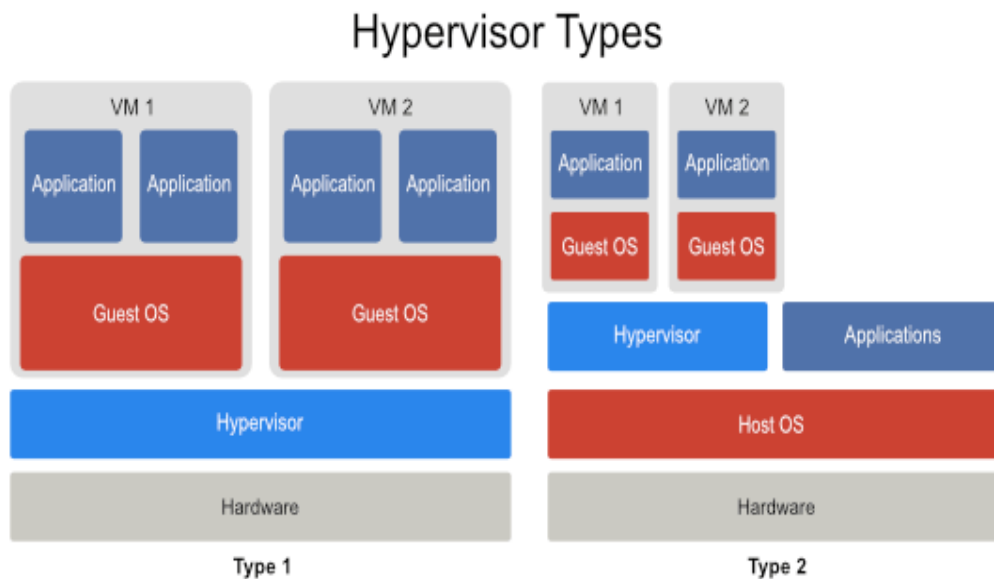
Figure 10 Standalone Deployment logical view

### 3.3 Supported Hypervisor

A hypervisor, also called a virtual machine manager, is a computer program that creates and runs virtual machines. The hypervisor has following two types:

1. **Type 1 or Native or Bare Metal Hypervisors:** Run directly on the host's hardware to control the hardware and to manage guest operating systems. A guest operating system runs on another level above the hypervisor.
2. **Type 2 or Hosted Hypervisors:** Run within a conventional operating system environment, which means Type-2 hypervisors run alongside of operating system. Physical Host is installed with Host OS with hypervisor software.





*Figure 11 Types of Hypervisor in Ericsson Mediation*

Ericsson Mediation is currently supported with the following hypervisors:

Supported Hypervisors	Supports
<ul style="list-style-type: none"> <li>VMWare ESXi (Bare Metal)</li> <li>KVM - Kernel Virtual Machine (Hosted) with RHEL as Host OS</li> </ul>	<ul style="list-style-type: none"> <li>RHEL 7.6 as Guest OS</li> <li>Veritas InfoScale 7.4.1</li> </ul>

*Table 1: Hypervisor Requirements*

### 3.4 Supported Host OS

A host operating system is the primary operating system (OS) installed on a computer system's hard drive. Host OS is only required when KVM hypervisor is used in the hosted mode.

Host OS	Version
Red Hat Enterprise Linux (RHEL)	RHEL 7.6 or higher minor version

*Table 2: OS Requirments*

### 3.5 Platform Deployment Flow

The Ericsson Mediation platform deployment process consists of the following:

- Operating System (Guest OS) setup
- File System setup
- Storage setup

### 3.6 Operating System Setup

The two modes to install and configure Red Hat Enterprise Linux operating system are:

- **Media-based Installation:** The media-based installation is preferred when there are less number of virtual machines on which the product is to be installed. In this mode, installation is performed using DVD-ROM or by mounting ISO file as virtual media in virtual machine console. This mode of installation is interactive and prompts for system information. This mode is not an efficient method when guest OS installation needs to be performed on multiple systems.
- **Network-based Installation:** The network-based installation is performed over the network. It requires an Installation server (Kickstart) configured and accessible over the network. The advantage of network-based installation is that it allows multiple installations simultaneously at the same time. Network-based installation is preferred when there are large number of virtual machines on which the product is to be installed. In this kind of installation, network client sends boot and installation requests to the Installation server.

### 3.7 Storage Setup

Ericsson Mediation deployment is supported with the following storages:

- **Internal Storage:** Internal storage is referred as internal hard disk of the virtual machine. Internal storage usage is applicable only in Standalone deployment mode.
- **External Storage:** External storage is referred to the storage, which is located outside the virtual machine and connected to physical machine. External storage usage is optional in standalone setup and mandatory in cluster setup. External storage is required for performance needs and storing high volume of data. Ericsson Mediation expects block-based storage device access from the external storage that allows the guest host system to identify the devices as native devices.

Ericsson Mediation also supports file-based storage that allows host system to mount NFS share.

### 3.8 Hardware Requirement

The virtual machine and other additional components like NIC cards, Host Bus adapters (HBA) should be certified for the RHEL 7.6 (64-bit).

While configuring the Virtual Machine the installation personnel should analyze the resource requirement based on the traffic computation to be performed on the System. The following are the minimal hardware resource requirement while configuring the Virtual Machine for Ericsson Mediation 20 deployment.

1. **DISK SIZE:** At least 60 GB.
2. **RAM SIZE:** 32 GB RAM is recommended.
3. **CPU CORE:** 8 CPU is recommended.
4. **Network Adapter:** Network adapter connected with O&M and Traffic (if configured) network.

## Prerequisites and Preparation

This section describes the prerequisites and preparations required for guest OS installation on the respective VM.

1. Following **information** is required before starting the guest OS installation:
  - Virtual Machine Console
  - Login credential for Virtual Machine Console
  - bootprotol to be selected (Static or DHCP)
  - IP Address of the virtual machine
  - Hostname of the virtual machine
  - Gateway IP Address
  - Subnet for Network Interface
  - Ethernet device name or MAC Address of the virtual machine
  - Virtual disk for guest OS installation
2. Following Installation media are required for RHEL OS installation on the respective VM:
  - EM20 Platform Linux x86 SW 1: CXP9036931/1: For OS Installation
  - EM20 Platform Linux x86 SW 3: CXP9036931/3: For OS Patch Installation. Also required for Network Based Installation.

## 4 INSTALLATION

### 4.1 Media-based Installation

The media-based Installation is done using physical DVD or ISO media. Before starting the guest OS installation, ensure that all the installation related media and network information is available as described in Prerequisites and Preparation section.

The installation personnel, installing RHEL operating system on the respective virtual machine should have the RHEL installation media available. If Ericsson provided media is being used, then EM20 Platform Linux x86 SW 1, CXP 903 6931/1 is required.

The following steps needs to be performed to install the guest OS on virtualized hardware:

1. Connect to the virtual machine console of the virtual machine.
2. If Virtual Machine console supports virtual media usage, then mount the ISO file according to the vendor documentation.

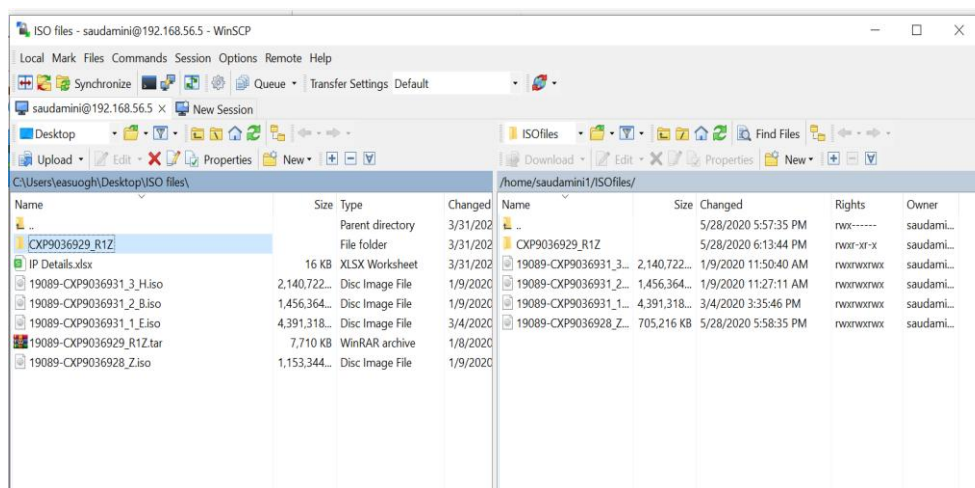


Figure 12 : Media transfer

3. Power on or reset the virtual machine. A splash screen may appear on the virtual machine console.

4. Press a specific key or combination of keys to boot from the media. On mount servers, a message appears briefly on the screen soon after you turn on the machine. Refer to vendor-specific documentation for more details.
5. If the virtual machine does not allow selecting a boot device at system start up, then configure boot priority in system's Basic Input/Output System (BIOS) to boot from the DVD ROM or Virtual media. If installing the guest OS using Virtual media then make sure that no CD or DVD ROM is inserted in the DVD drive of the virtual machine.
6. After system boots up using RHEL 7.x OS media, the welcome screen (containing menu) is displayed. If Ericsson provided installation media is used, then Install Ericsson Mediation Base option will be seen in the Menu.
7. Select Install Ericsson Mediation Base using up-down arrow and press **Enter**.

If RHEL installation media is procured from other sources, then follow the RHEL 7.6 installation guide for guest OS installation using kickstart file.

8. Select the correct virtual machine console using up-down arrow keys, select **OK** and press **Enter** on the Serial Console Settings screen.
9. Select installation drive for guest OS installation and press **Enter**.
10. Fill the correct values for the following fields on the Network Information screen:
  - ip
  - netmask
  - gateway
  - hostname
11. Select the correct network interface and press **Enter**.

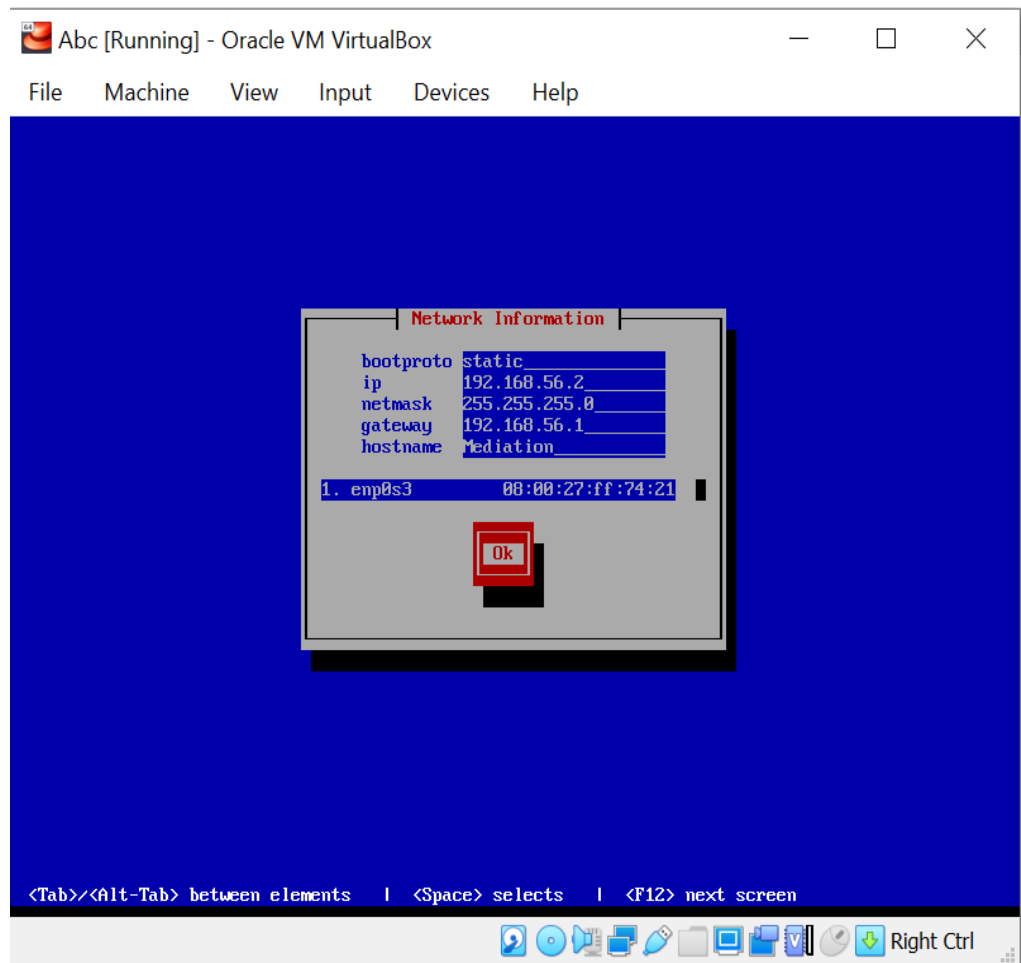


Figure 13 : OS configuration

12. Fill the correct values for the following fields on the SUDO USER DETAILS screen and press **OK**:
  - User Name
  - Group Name
  - Password
  - Confirm Password
13. Select an appropriate time zone using up-down arrow key at Time Zone Selection screen and press **OK** or press **Cancel** to accept the defaults.

OS Installation process starts. About 15-20 minutes are required to complete the installation process.

After OS installation the VM reboots automatically.

14. Change the boot priority in BIOS by setting first boot device as **Hard Disk** during system startup.
15. After system startup the **RHEL Login** page appears. Login with user name and password specified at SUDO USER DETAILS screen.
16. If guest OS installation was done using mounting the ISO, then open the guest OS console and unmount the mount point by executing the following command:

```
$ sudo umount <Mount_Point Name>
```

In case the DVD does not come out automatically then eject the DVD ROM manually.

## 4.2 Installing Required Packages

Installation server setup is a one time activity. The installation personnel need to update the configuration if there is change in network information or OS version. The procedure to setup Installation server is designed using ISO media only. If using DVD media, then the installation personnel has to ensure that correct DVD ROM is inserted in the DVD drive of the system during system setup.

Perform the following steps to install the required packages:

1. Login to the Installation Server with user having ALL **root** privileges using ssh protocol.
2. Transfer the required ISO media files to internal HDD of the server. If the ISO files are available in NFS share, then mount NFS share locally. Mount the following ISO media file in the server:

```
$ sudo mkdir -p /cdrom/rhel_os
```



```

Last login: Thu May 28 11:20:09 2020
#####
# Warning! You have entered into a secured area!
# Your IP, Login Time, Username have been noted for auditing purposes.
# This service is restricted to authorized users only.
# All activities on this system are logged. Unauthorized access will be fully
# investigated and action would be taken appropriately.
#
# LOG OFF IMMEDIATELY IF YOU ARE NOT AN AUTHORIZED USER
#####
[saudaminil@emm20 ~]$ ls
19089-CXP9036928_Z.iso  19089-CXP9036931_2_B.iso  CXP9036929_R1Z
19089-CXP9036931_1_E.iso  19089-CXP9036931_3_H.iso
[saudaminil@emm20 ~]$ cd CXP9036929_R1Z
[saudaminil@emm20 CXP9036929_R1Z]$ CXP9036929_R1Z
-bash: CXP9036929_R1Z: command not found
[saudaminil@emm20 CXP9036929_R1Z]$ sudo mkdir -p /cdrom/rhel_os
[saudaminil@emm20 CXP9036929_R1Z]$

```

sw\_3pp

Figure 14 : Mounting path

**\$ sudo mount -o loop,ro <absolute\_path\_of\_1st\_ISO\_file> /cdrom/rhel\_os**

3. Execute the following commands to install the RPM package for Installation Server along with all its dependencies.

**\$ sudo cp -f /cdrom/sw\_3pp/OS\_PATCH/RHEL7/rhel7\_errata.repo  
/etc/yum.repos.d/.**

**\$ sudo cat <<-EOF > /var/tmp/mminstall\_rhel7.repo**

**[mminstall\_rhel7]**

**name=MM Installation RHEL 7**

**baseurl=file:///cdrom/rhel\_os**

**enabled=1**

**gpgcheck=0**

**EOF**

**\$ sudo mv /var/tmp/mminstall\_rhel7.repo**

**/etc/yum.repos.d/mminstall\_rhel7.repo**

**\$ sudo yum install -y /cdrom/sw\_3pp/NETWORKINSTALL/networkinstall.rpm**

```

Installed size: 6.2 M
Downloading packages:
-----
Total
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : apr-1.4.8-3.el7 4.1.x86_64 1/10
Installing : apr-util-1.5.2-6.el7.x86_64 2/10
Installing : httpd-tools-2.4.6-89.el7 6.1.x86_64 3/10
Installing : libdhcp-4.2.5-68.el7 5.1.x86_64 4/10
Installing : tftp-server-5.2-22.el7.x86_64 5/10
Installing : tftp-5.2-22.el7.x86_64 6/10
Installing : mailcap-2.1.41-2.el7.noarch 7/10
Installing : httpd-2.4.6-89.el7 6.1.x86_64 8/10
Installing : xinetd-2.3.15-13.el7.x86_64 9/10
Installing : MMInstallationServer-20.0.0-0.el7.x86_64 10/10

--> Copying OS media contents to Installation server

--> Finishing configuration on Installation server
mminstall.rhel7/productid 1.6 KB 00:00:00
Verifying : xinetd-2.3.15-13.el7.x86_64 1/10
Verifying : mailcap-2.1.41-2.el7.noarch 2/10
Verifying : tftp-5.2-22.el7.x86_64 3/10
Verifying : apr-util-1.5.2-6.el7.x86_64 4/10
Verifying : httpd-2.4.6-89.el7 6.1.x86_64 5/10
Verifying : httpd-tools-2.4.6-89.el7 6.1.x86_64 6/10
Verifying : tftp-server-5.2-22.el7.x86_64 7/10
Verifying : MMInstallationServer-20.0.0-0.el7.x86_64 8/10
Verifying : apr-1.4.8-3.el7 4.1.x86_64 9/10
Verifying : libdhcp-4.2.5-68.el7 5.1.x86_64 10/10

Installed:
MMInstallationServer.x86_64 0:20.0.0-0.el7

Dependency Installed:
apr.x86_64 0:1.4.8-3.el7 4.1 apr-util.x86_64 0:1.5.2-6.el7 dhcp.x86_64 12:4.2.5-68.el7 5.1 httpd.x86_64 0:2.4.6-89.el7 6.1
httpd-tools.x86_64 0:2.4.6-89.el7 6.1 mailcap.noarch 0:2.1.41-2.el7 tftp.x86_64 0:5.2-22.el7 tftp-server.x86_64 0:5.2-22.el7
xinetd.x86_64 2:2.3.15-13.el7

Complete!

```

**Figure 15 : 3 PP Installation**

### 4.3 Installing Operating System Patch

Now , we install the required patches released by RedHat for bug fixes and to fixes for security vulnerabilities.

Transfer following installation media to the VM. If media is stored in an NFS location, then mount the NFS partition into the VM.

EM20 Platform Linux x86 SW 3, CXP 903 6931/3

19089-CXP9036931\_3\_<version>.iso

Perform the following steps to install all the applicable patches on top of RHEL 7.6 Operating System release using yum repository.

1. Login to the VM with user having ALL **sudo** privileges using ssh protocol.
2. Execute the following command to create directory to mount the required ISO media file:

```
$ sudo mkdir -p /cdrom/sw_3pp
```

3. Execute the following command to mount the 19089-CXP9036931\_3\_<version>.iso file:

```
$ sudo mount -o loop,ro <absolute_path_of_ISO_media>/19089-  
CXP9036931_3_<version>.iso /cdrom/sw_3pp
```

4. Replace the <absolute\_path\_of\_ISO\_media> with the absolute directory path of 19089-CXP9036931\_3\_<version>.iso file.
5. Create a link of the yum configuration file for RHEL 7.6 patch to the respective location and load the yum configuration:

```
$ sudo ln -s /cdrom/sw_3pp/OS_PATCH/RHEL7/rhel7_errata.repo  
/etc/yum.repos.d/.
```

```
$ sudo yum clean all
```

```
$ sudo yum repolist
```

6. Execute the following command to apply all the respective (applicable) patches to the VM:

```
$ sudo yum update -y
```

```
---> Package rsyslog-relp.x86_64 0:8.24.0-34.el7_6.3 will be an update  
---> Package selinux-policy.noarch 0:3.13.1-229.el7 will be updated  
---> Package selinux-policy.noarch 0:3.13.1-229.el7_6.15 will be an update  
---> Package selinux-policy-targeted.noarch 0:3.13.1-229.el7 will be updated  
---> Package selinux-policy-targeted.noarch 0:3.13.1-229.el7_6.15 will be an update  
---> Package sg3_utils.x86_64 0:1.37-17.el7 will be updated  
---> Package sg3_utils.x86_64 0:1.37-17.el7_6.1 will be an update  
---> Package sg3_utils-libs.x86_64 0:1.37-17.el7 will be updated  
---> Package sg3_utils-libs.x86_64 0:1.37-17.el7_6.1 will be an update  
---> Package shadow-utils.x86_64 2:4.1.5.1-25.el7 will be updated  
---> Package shadow-utils.x86_64 2:4.1.5.1-25.el7_6.1 will be an update  
---> Package sos.noarch 0:3.6-9.el7 will be updated  
---> Package sos.noarch 0:3.6-19.el7_6 will be an update  
---> Package subscription-manager.x86_64 0:1.21.10-2.el7 will be updated  
---> Package subscription-manager.x86_64 0:1.21.10-3.el7_6 will be an update  
---> Package subscription-manager-rhsm.x86_64 0:1.21.10-2.el7 will be updated  
---> Package subscription-manager-rhsm.x86_64 0:1.21.10-3.el7_6 will be an update  
---> Package subscription-manager-rhsm-certificates.x86_64 0:1.21.10-2.el7 will be updated  
---> Package subscription-manager-rhsm-certificates.x86_64 0:1.21.10-3.el7_6 will be an update  
---> Package sysstat.x86_64 0:10.1.5-17.el7 will be updated  
---> Package sysstat.x86_64 0:10.1.5-17.el7_6.1 will be an update  
---> Package systemd.x86_64 0:219-62.el7 will be updated  
---> Package systemd.x86_64 0:219-62.el7_6.9 will be an update  
---> Package systemd-libs.i686 0:219-62.el7 will be updated  
---> Package systemd-libs.x86_64 0:219-62.el7 will be updated  
---> Package systemd-libs.i686 0:219-62.el7_6.9 will be an update  
---> Package systemd-libs.x86_64 0:219-62.el7_6.9 will be an update  
---> Package systemd-sysv.x86_64 0:219-62.el7 will be updated  
---> Package systemd-sysv.x86_64 0:219-62.el7_6.9 will be an update  
---> Package teamd.x86_64 0:1.27-5.el7 will be updated  
---> Package teamd.x86_64 0:1.27-6.el7_6.1 will be an update  
---> Package tuned.noarch 0:2.10.0-6.el7 will be updated  
---> Package tuned.noarch 0:2.10.0-6.el7_6.4 will be an update  
---> Package tuned-utils.noarch 0:2.10.0-6.el7 will be updated  
---> Package tuned-utils.noarch 0:2.10.0-6.el7_6.4 will be an update  
---> Package tzdata.noarch 0:2018e-3.el7 will be updated  
---> Package tzdata.noarch 0:2019c-1.el7 will be an update  
---> Package util-linux.x86_64 0:2.23.2-59.el7 will be updated  
---> Package util-linux.x86_64 0:2.23.2-59.el7_6.1 will be an update  
---> Package vim-minimal.x86_64 2:7.4.160-5.el7 will be updated  
---> Package vim-minimal.x86_64 2:7.4.160-6.el7_6 will be an update  
---> Package xfsprogs.x86_64 0:4.5.0-18.el7 will be updated  
---> Package xfsprogs.x86_64 0:4.5.0-19.el7_6 will be an update
```

#### Figure 16 : Repolist Update

Post installation the complete execution summary will be displayed. Any Warning messages seen during patch installation can be ignored.

7. Execute the following command to remove the yum configuration file and restart the VM:

```
$ sudo rm -f /etc/yum.repos.d/rhel7_errata.repo
```

```
$ sudo shutdown -r now
```

8. After system startup, the **RHEL Login** prompt appears. Login with user having ALL **sudo** privileges.
9. Execute the following command to remove the older kernel version:

```
$ sudo rpm -e kernel-<old_version>.el7.x86_64
```

#### 4.4 Ericsson Mediation Installation Tool

Ericsson Mediation Installation Tool is used for performing the installation and configuration of platform, 3PP, and Application layer for Ericsson Mediation deployment.

This tool provides the possibility of deploying platform layer either on the standalone or cluster mode. This tool contains multiple scripts to perform multiple tasks for Platform Layer deployment.

During installation the installation personnel has to provide all the mandatory arguments with parameters. The inputs will vary depending on the deployment mode.

Perform the following steps to extract the downloaded EM20 Installation Tool:

1. Login to the system with user having ALL **sudo** privileges using ssh protocol.

2. Transfer the downloaded EM20 Installation Tool to the system in a temporary location.
3. Execute the following command for extracting the Installation tool from tar archive:

```
$ cd /home/<USERNAME>/
```

```
$ tar -xvf <path_of_source_directory>/19089-CXP9036929_<version>.tar
```

In the above command:

- <path\_of\_source\_directory> is the directory of the EM20 Installation Tool tar archive.
- <version> is the product version of Installation Tool.

#### 4.5 Installation and Configuration Templates

Depending upon the deployment mode the respective configuration template will be opened. All the inputs provided in the templates will be validated by the tool. After validation the tool will install and configure Ericsson Mediation platform automatically.

During the installation phase, when the installation wizard is started, the installation personnel is prompted to enter parameter values through template(s). However, these templates can be edited before starting the installation.

```
$ cd /home/<USERNAME>/CXP9036929_<version>/templates/Linux
```

```
$ sudo cp <template_name>.ini.eric <template_name>.ini
```

Use the <template\_name>.ini file for modification.

Update the required template(s) with the respective parameter value and save it.

```

Network Interface Details
#
Specify the connected network interfaces to be configured. Default primary interface is populated.
Modify the default values for interface name if different interface to be used
#
If multiple network interfaces of same NW are available for Bonding then un-comment and enter the
the standby entry. All network interfaces should have unique mac addresses
#
Primary and Standby network interface for the respective bond should be connected to same IP subnet
#
Standby network interface is not applicable for Cloud Instance
#
Creation of O&M bond is mandatory
#
-----
ONM Bond]
bonding_interface_primary_ONM=enp0s3
bonding_interface_standby_ONM=enp0s3
#
If separate (dedicated) Network for Traffic exist then Traffic bond configuration is required.
To create separate bond for Traffic network uncomment the parameters for Traffic Bond and provide
network interface details
#
-----
Traffic Bond]
bonding_interface_primary_Traffic=<primary_interface>
bonding_interface_standby_Traffic=<secondary_interface>
#
Interface IP]
#
Only IPv4 Address format is allowed for O&M Network
#
bonding_interface_ip_ONM=192.168.56.5
netmask_ONM=255.255.255.0
default_gateway_ip_ONM=192.168.56.1
#
The IP Address for Traffic bond can be either of IPv4 or IPv6 format. Provide the netmask/prefix
#

```

Figure 17 : Updating Network Interface

If the template(s) were updated offline (that is before starting installation), then the updated template(s) will be opened during Ericsson Mediation Platform Deployment. The installation personnel can update/modify the updated template(s) during the platform installation as well.

## 4.6 Deployment Procedures

Perform the following steps to deploy the Ericsson Mediation Deployment Procedure platform:

1. Login to the system with user having ALL **sudo** privileges using ssh protocol.
2. Executing following command to go to the target directory:

```
$ cd /home/<USERNAME>/CXP9036929_<version>
```

3. Execute the following command to view the usage for Platform installation script:

```
$ sudo ./Install_Platform.sh -h
```

Execute the following command to view the detailed usage for Platform installation script:

```
$ sudo ./Install_Platform.sh -H
```

The output of above command displays all possible combination of arguments and parameters to support different deployment modes for platform layer.

Depending on deployment mode, select the appropriate combination of arguments and parameters as described below:

a. For **Standalone Deployment**

- For deployment on internal storage:

```
$ sudo ./Install_Platform.sh -C STDALONE -E internal [-I  
DEFAULT]
```

```
--> Configuring bash_logout to capture User activity and events
--> Checking SELinux configuration
--> SELinux is disabled, enabling it in permissive mode
--> Operating System Hardening Completed

=====
Creating Directory Structure   Date: Thu May 28 17:01:27 IST 2020   ** Step : 3 of 4 **
=====
--> Directory Structure created successfully.

=====
Configuring Linux Bond         Date: Thu May 28 17:01:27 IST 2020   ** Step : 4 of 4 **
=====
--> Bonding Module Loaded in system.
--> Bonding is made persistent for next reboot.
--> Creating bond0 for ONM Network
--> Created bond0 using enp0s3 and lo
--> IP Address for bond0 would be 192.168.56.5
--> Restarting Network Service

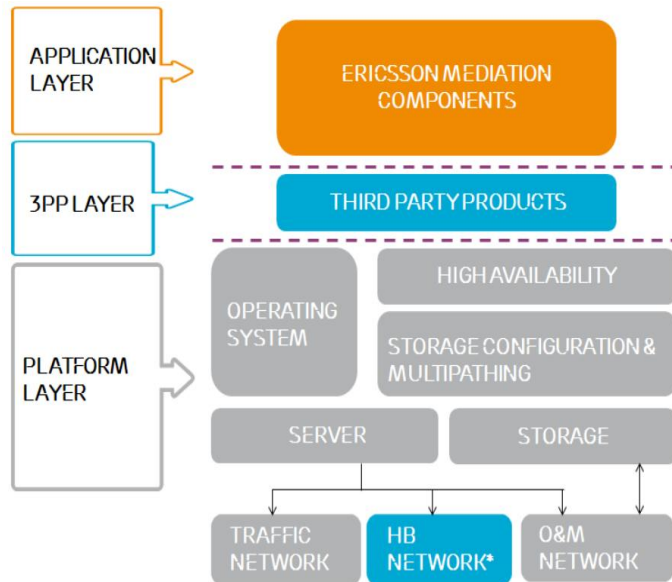
*** VIEW LOG FILE : sudo view /var/adm/MM_LOGS/Platform/MM_Platform.log.28052020-17:00
[INFO] : Removing Platform Install Status File
*** Congrats! Platform Installation and Configuration on Standalone server emm20 has been Completed Successfully.
--> A Graceful System Restart is Required for Applying the Configuration Changes
Restart System Now ? (y/n) : y
*** REBOOTING THE SYSTEM ***
```

*Figure 18 : Platform installation*

Ericsson Mediation is a combination of File mediation and Online mediation which provides flexible and powerful mediation solution. The overall aim of this product is to

support quick and smooth introduction of services into the communication network by providing a single point and flexible interface for charging related information.

The following figure shows the deployment of the Ericsson Mediation in three layers:



*Figure 19 : Ericsson Mediation Deployment Layers*

## 4.7 Ericsson Mediation Deployment Layers

### 4.7.1 Platform Layer

Platform layer is used for setting up hardware, Operating System (OS), storage, and deployment mode (cluster or standalone) without Ericsson Mediation application. Cluster setup formed at this layer only provides basic cluster functionality such as I/O Fencing and cluster file system. Platform layer setup is a prerequisite for 3PP and Application layer deployment

### 4.7.2 Third Party Product (3PP) Layer

3PP layer is used for setting up all the mandatory and optional 3PPs for Ericsson Mediation deployment. The mandatory 3PPs are required for the deployment of Ericsson Mediation. The optional 3PPs can be installed as per customer's requirement. The optional 3PP can be selected for installation



during third party product deployment. The optional 3PPs are not installed by default.

During installation, all third party product binaries are extracted on the internal storage (HDD) of the server.

#### **4.7.3 Application Layer**

Application layer is used for installing and configuring the Ericsson Mediation components. The Ericsson Mediation components are:

- Manager
- GUI
- File mediation
- Online mediation

The Installation and configuration of these Ericsson Mediation components can be performed in any order. During installation, these components are installed on every server. However, the usage of Ericsson Mediation components depends on the Product licenses purchased/to be procured by the Customer.

During installation, Ericsson Mediation component's binaries are extracted on internal storage (HDD) of the server. However, component-specific data can either reside on internal or external storage depending on the mode of deployment.

The process of installation and configuration is automated. There are separate shell scripts created to handle 3PP and Application layer deployment. These scripts accept input in the form of templates, which are opened during application component installation for editing. All inputs provided in the templates are validated before proceeding with the installation. During execution of these scripts, all the generated outputs and errors are logged for later reference. For troubleshooting purpose, these scripts can be executed with debug option, which enhances the logging level during execution of the script.

#### **Standalone Deployment Setup**

Following figure shows logical representation of standalone deployment setup:



*Figure 20 Layers of deployment*

#### **4.8 Ericsson Mediation Installation Tool**

Ericsson Mediation Installation Tool is used to install 3PPs and Ericsson Mediation Application. The tool provides the possibility of deploying 3PPs and application layer either on standalone or cluster setups. Depending on the required deployment type, the arguments passed to the tool may vary. The deployment type for 3PP and Application Layer depends on the Platform deployment type (standalone or cluster).

Basic cluster should be operational at platform layer for 3PP layer and Application layer deployment in cluster setup. During execution of the EM20 Installation Tool, the selected deployment type is internally matched to the

platform deployment type.

During installation, the installation personnel have to provide all the mandatory arguments with parameters.

Perform the following steps to extract the EM20 Installation Tool before starting the installation of 3PP layer:

1. Login to the system with user having ALL **sudo** privileges using ssh protocol.
2. Transfer the downloaded EM20 Installation Tool to the server in a temporary location.
3. Execute the following command for extracting the Installation Tool from tar archive:

```
$ cd /home/<USERNAME>/
```

```
$ tar -xvf <path_of_source_directory>/19089-CXP9036929_<R-state>.tar
```

In the above command:

- *<path\_of\_source\_directory>* is the directory of the EM20 Installation Tool tar archive.
- *<R-state>* is the product version of Installation Tool.

## 4.9 Installing Third Party Products

Installation of 3PPs is done by executing the `Install_3pp.sh` script. The script is delivered as part of the EM20 Installation Tool. Every listed 3PP is associated with a post script which is executed after the installation of respective 3PP.

List of the 3PPs are mentioned below:

- Sentinel
- Tomcat
- JAVA JRE
- JAVA JDK
- PostgreSQL
- Unison
- ERE
- Custom Report (Jasper)

Following Installation media is required for 3PP installation. Ensure that the required media file is downloaded and is accessible from the system.

EM20 Platform Linux x86 SW 3, CXP 903 6931/3

Perform the following steps to install the 3PPs on the system:

1. Login with user having ALL **sudo** privileges to the system using ssh protocol.
2. If 3PP installation is done using physical DVD R
3. OM, then ensure that the DVD ROM is inserted and mounted on the server.

- The installation personnel have to issue the mount command for mounting the DVD ROM:

```
$ sudo mkdir -p /cdrom/sw_3pp
```

```
$ sudo mount -t iso9660 /dev/cdrom /cdrom/sw_3pp
```

- Ensure that the DVD ROM is mounted by executing the following command:

```
$ sudo df -k
```

4. For 3PP installation the tool can be started by executing Install\_3pp.sh with the valid arguments.

```
$ cd /home/<USERNAME>/CXP9036929_<R-state>
```

- Execute the following command to view the usage for EM20

Installation Tool:

```
$ sudo ./Install_3pp.sh -h
```

To view the detailed usage of 3PP installation script, execute the following command:

```
$ sudo ./Install_3pp.sh -H
```

The output of above command displays all possible combination of arguments and parameters to support different Ericsson Mediation deployment modes.

Depending on Ericsson Mediation deployment mode, select the appropriate combination of arguments and parameters.

- Execute the following command for Standalone deployment:

```
$ sudo ./Install_3pp.sh -C STDALONE [-M <USB|LOCAL|NFS>]
```

```
*** VIEW LOG FILE : sudo view /var/adm/MM_LOGS/3pp/MM_3pp.log.10062020-17:22
[em20@em20 CXP9036929_R1Z]$ cd /opt/mediation/3pp
[em20@em20 3pp]$ ls -l
total 0
drwxr-xr-x. 9 mmsuper med 151 Jun 10 17:22 apache-tomcat-8.5.46
lrwxrwxrwx. 1 mmsuper med 35 Jun 10 17:24 customreport -> /opt/mediation/3pp
/customreport-7.2
drwxr-xr-x. 4 mmsuper med 55 Jun 10 17:23 customreport-7.2
lrwxrwxrwx. 1 mmsuper med 28 Jun 10 17:23 ere -> /opt/mediation/3pp/ere-8.4.
1
drwxr-xr-x. 4 mmsuper med 32 Jun 10 17:23 ere-8.4.1
lrwxrwxrwx. 1 mmsuper med 31 Jun 10 17:23 jdk -> /opt/mediation/3pp/jdk1.8.0
_221
drwxr-xr-x. 7 root med 65 Jun 10 17:23 jdk1.8.0_221
lrwxrwxrwx. 1 mmsuper med 31 Jun 10 17:23 jre -> /opt/mediation/3pp/jre1.8.0
_221
drwxr-xr-x. 6 root med 53 Jun 10 17:23 jre1.8.0_221
lrwxrwxrwx. 1 mmsuper med 13 Jun 10 17:23 postgres -> /usr/pgsql-11
lrwxrwxrwx. 1 mmsuper med 33 Jun 10 17:23 sentinel -> /opt/mediation/3pp/sen
tinel-8.6.2
drwxr-xr-x. 9 mmsuper med 150 Jun 10 17:23 sentinel-8.6.2
lrwxrwxrwx. 1 mmsuper med 39 Jun 10 17:22 Tomcat -> /opt/mediation/3pp/apach
e-tomcat-8.5.46
lrwxrwxrwx. 1 mmsuper med 39 Jun 10 17:23 unison -> /opt/mediation/3pp/uniso
n-2.48.4/unison
drwxr-xr-x. 2 mmsuper med 49 Jun 10 17:23 unison-2.48.4
```

Figure 21 3PP Installation

## **4.10 Ericsson Mediation Application Deployment**

Installation and configuration of Ericsson Mediation components is done through Install\_App.sh shell script. It is delivered as part of EM20 Installation Tool. For Ericsson Mediation components deployment, Install\_App.sh script needs to be executed with the correct arguments. On execution of script, it first performs certain checks for OS and 3PPs installation before proceeding. The checks performed during execution may vary depending on the mode of deployment (standalone or cluster setup).

For cluster deployment, the Install\_App.sh script always installs all the four Ericsson Mediation components on the physical server. However, configuration is only performed for the selected component (given as argument to the script) only. For collocation requirement, the configuration of other Ericsson Mediation component can also be achieved on the same server by changing the applicable argument.

Each Ericsson Mediation component can be deployed independently. There is no particular order to set up these components, however, it is recommended that Manager (with GUI) should be deployed first as other two components require IP address of Manager during configuration.

### **Installation and Configuration Templates**

Depending on the deployment mode the respective configuration template is opened during installation. All the inputs provided in the templates are validated by the EM20 Installation Tool. After validation the tool installs and configures the respective Ericsson Mediation component automatically.

During the installation, when the installation wizard is started, the installation personnel is prompted to enter parameter values through template(s). Installation personnel can modify this template as per requirement. It is not recommended to change the default values of the template until it is required. However, these templates can be edited before starting the installation.

If the template(s) are already updated offline before starting installation, the

updated template(s) are opened during Ericsson Mediation component(s) deployment. The installation personnel can update/modify the updated template(s) during the platform installation as well.

Detail of the templates is given below:

- The templates are available in the following directory:

`/home/<USERNAME>/CXP9036929_<R-state>/templates/Linux`

- The list of templates used by the EM20 Installation Tool is given below:

- `config_template_FEM.eric`: This template is used for configuring File mediation Server.
- `config_template_OLM.eric`: This template is used for configuring Online mediation Server.
- `config_template_MGR.eric`: This template is used for configuring Ericsson Mediation Manager.

- For updating the template(s) offline before starting installation, create a copy of template and perform the required modification.

Login with user having ALL **sudo** privileges to the system using ssh protocol.

```
$ cd /home/<USERNAME>/CXP9036929_<R-  
state>/templates/Linux
```

```
$ sudo cp <template_name>.eric <template_name>.ini
```

Use the `<template_name>.ini` file for modification.

- Update the required template(s) with the respective parameter value and save it. Do not modify or delete any *parameter name* as these are internally used by the installation wizard. Deleting any parameter from the templates may lead to installation failure.

The template *<template name>* lists all the variables for which input is required. All the inputs provided in this template are used during the installation and configuration of Ericsson Mediation components.

## Manager Deployment Procedure

Perform the following steps to install and configure Ericsson Mediation Manager component:

Login with user having ALL **sudo** privileges to the system using ssh protocol.

1. Execute the following command to change the directory to access Install\_App.sh file:

```
$ cd /home/<USERNAME>/CXP9036929_<R-state>
```

- **For Standalone Deployment**

```
$ sudo ./Install_App.sh -C STDALONE -P MGR [-M]
```

```
Checking Media ...!!! Wait ...
Found On Media... Continuing ....
Preparing... #####
#
Updating / installing...
CXC1741719-R1Z-EM20 #####
#
Installation of <COMMON BASE> was successful on em20.

=====
Installing Ericsson Mediation GUI      Date: Thu Jun 11 01:38:06 GMT 2020  *
* Step : 5 of 14 **
=====
Checking Media ...!!! Wait ...
Found On Media... Continuing ....
Preparing... #####
#
Updating / installing...
CXC1741715-R1Z-EM20 #####
The new client should appear in the list of installed clients.

Installation of <EM GUI> was successful on em20.

=====
Installing Ericsson Mediation Manager  Date: Thu Jun 11 01:38:21 GMT 2020  ** Step : 6 of 14 **
=====
Checking Media ...!!! Wait ...
Found On Media... Continuing ....
Preparing... #####
Updating / installing...
psa-18.0.0.40-1 #####
```

*Figure 22 MGR Installation*



## File mediation Deployment Procedure

Perform the following steps to install and configure File mediation component:

1. Login with user having ALL **sudo** privileges to the system using ssh protocol.
2. Execute the following command to change the directory to access Install\_App.sh file:

```
$ cd /home/<USERNAME>/CXP9036929_<R-state>
```

### For Standalone Deployment

```
$ sudo ./Install_App.sh -C STDALONE -P FEM [-M  
<USB|LOCAL|NFS>] [-I DEFAULT]
```

```
Executing --> /opt/mediation/appl/SERVER/CXC1741717_R1Z/bin/BGwDBPassword Server1 -p thule
Executing --> 1> /dev/null 2>& 1
Executing --> [ XSTDALONE '=' XSTDALONE ]
Executing --> Enable_MM_Startup
Executing --> grep mmappresource
Executing --> 1> /dev/null 2>& 1
Executing --> chkconfig --list
Executing --> 2> /dev/null
Executing --> [ 0 -ne 0 ]
Executing --> [ ! -f /etc/init.d/lic_sentinel_srv ]
Executing --> /bin/echo -e '\nConfiguration of <FM Server> was successful.\n'

Configuration of <FM Server> was successful.

Executing --> update_status Config_FEM_Server=Y
Executing --> /bin/echo -e Config_FEM_Server=Y
Executing --> awk '-F=' '{ print $1 }'
Executing --> func_name=Config_FEM_Server
Executing --> grep ^Config_FEM_Server /var/adm/MM_INSTALL_STATUS.FEM
Executing --> 1> /dev/null 2>& 1
Executing --> [ 0 -ne 0 ]
Executing --> sed -i -e 's/^Config_FEM_Server.*/Config_FEM_Server=Y/' /var/adm/MM_INSTALL_STATUS.FEM
Executing --> expr 11 + 1
Executing --> instctr=12
Executing --> grep ^Start_FM_Server /var/adm/MM_INSTALL_STATUS.FEM
Executing --> awk '-F=' '{ print $2 }'
Executing --> [ N '=' N ]
Executing --> Start_FM_Server 12 13
Executing --> Func_Header 'Starting FM Server' 12 13
Executing --> [ 3 -eq 1 ]
Executing --> [ 3 -eq 3 ]
Executing --> /bin/echo -e ' '
```

*Figure 23 FEM Installation*

## Online mediation Deployment Procedure

Perform the following steps to install and configure Online mediation Server component:

1. Login with user having ALL **sudo** privileges to the system using ssh protocol.
2. Execute the following command to change the directory to access

Install\_App.sh file:

```
$ cd /home/<USERNAME>/CXP9036929_<R-state>
```

### For Standalone Deployment

```
$ sudo ./Install_App.sh -C STDALONE -P OLM [-M <USB|LOCAL|NFS>] [-I  
DEFAULT]
```

```
Validating Configuration Template !!! Wait ...

=====
Modifying System Files      Date: Thu Jun 11 01:55:46 GMT 2020  ** Step : 1 of 13 **
=====

Modification of <FILES> was successful.

=====
Creating Users and Groups   Date: Thu Jun 11 01:55:46 GMT 2020  ** Step : 2 of 13 **
=====

Required <USER(s)/GROUP(s)> already exist.

=====
Setting Directory Permissions Date: Thu Jun 11 01:55:46 GMT 2020  ** Step : 3 of 13 **
=====

Setting <PERMISSIONS> was successful.

=====
Not Applicable             Date: Thu Jun 11 01:55:46 GMT 2020      ** Skipping Step : 4 of 13 **
=====

--> Installation of Common Base Package was already done or not required

=====
Installing OLM Server       Date: Thu Jun 11 01:55:46 GMT 2020  ** Step : 5 of 13 **
=====

Checking Media ...!!! Wait ...

Found On Media... Continuing ....
Preparing...
Updating / installing...
CXC1741718-R1Z-EM20
Installation of <OLM Server> was successful on em20.

=====
```

*Figure 24 OLM Installation*

## **5 RESULT & CONCLUSION**

### **5.1 Operations & Maintenance**

#### **User Interfaces**

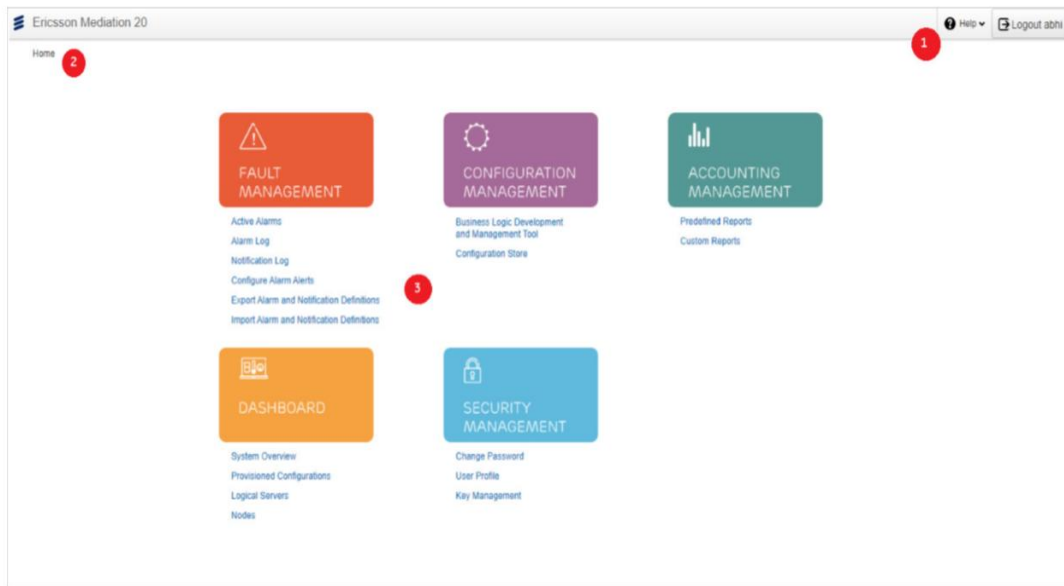
Ericsson Mediation provides two user interfaces, Graphical User Interface (GUI) and Command Line Interface (CLI), to perform the complete O&M operations in Ericsson Mediation. As discussed in the architecture these user interfaces are the presentation layer in the three-tiered architecture.

#### **5.1.1 Graphical User Interface**

The platform independent Ericsson Mediation Graphical User Interface (GUI) enables the users to conduct all the O&M activities in Ericsson Mediation via one GUI. The GUI connects over a secure interface to Ericsson Mediation and allows only authenticated users can access the MM via GUI.

The GUI is extremely flexible and modular with possibilities for the user to customize it by choosing what parts shall be visible, hidden or where they shall be positioned. The first level of GUI is called as Ericsson Mediation home page. The Mediation home page will have five areas i.e. Fault Management, Configuration Management, Accounting Management, Performance Management and Security Management.

The Mediation GUI provides centralized control and management for ease of operations. The GUI has a capability to handle multiple logical servers (more than hundred) using web GUI. This will provide the users an ease to manage large number of logical servers and supervise them with one manager effortlessly. Clicking on each area will open a second level window where related tasks can be performed. The home page is also used to open the main interface for creating a configuration. This interface provides a support for drag and drop of activities while creating a configuration.



*Figure 25: Ericsson - Mediation Home page*

The home page is divided into three main area

1. Page header, from where a user can see help and also perform logout.
2. Is for easy navigation between different levels of the pages
3. Is for going on to the second level detailed view. This can be done by clicking on the hyperlinks.

In Ericsson Mediation 20, user can also view a high level dashboard of the system.

The dashboard can be used to view

- A consolidated view of the system state
- Overall status of executing business logic
- Various statistics on system throughput



Figure 26 Ericsson Mediation System Overview Dashboard

The Ericsson Mediation architecture and the GUI support multiple users to be logged on and administer different parts of the Ericsson Mediation. The GUI can be used with a LAN connection or be accessed through a dial-in connection (minimum connection speed is 256 kbps). The GUI is normally started utilizing Java Web Start, that is, through the web browser, but it can also run as a stand-alone Java application.

### 5.1.2 Command Line Interface

The Command Line Interface (CLI) is a text-based user interface and supports most of the user tasks in Ericsson Mediation. The CLI offers possibilities to perform operations on Ericsson Mediation from a shell or from an external script. This interface can typically be used to perform batch updates or script-controlled updates and can save the operator's time and prevent human errors. Support for basic operation and maintenance operations is available in CLI. Commands to change activity and resource password, validate and export configuration are added and available through CLI.

The same user authentication is used for the CLI as for the GUI, that is, Ericsson Mediation users utilize the same username and password at login from the CLI and from the GUI.

## **6. SUMMARY AND CONCLUSION**

### **6.1 Summary**

In this project, we have performed an installation of Ericsson Mediation 20 in a virtual machine as a standalone product. Firstly, we have installed the OS on top of the VM and we also installed the OS patches on top of it and further implementing platform installation and after that, we also set up all the third party applications (Example: Tomcat, Sentanil, JDK, etc.,) which will be required to successfully run the Ericsson Mediation product.

Finally, we have installed the Manager, File Mediation for collection of data from different Network Elements and processing the obtained information (Example: SDP, AIR, CCN, OCC, etc.,) and distributing to require nodes in their required format (Example: Billing, Data Warehousing, Fraud Management System). We have also installed the Online Mediation System in order to process the Live Data (Example: IMS).

Hence , it allows to Improve the customer experience with data mediation that ensures that correct and complete data is collected from across the mobile, fixed and converged networks with multi-vendor equipment and disparate IT systems and processed quickly and accurately. The operators can use Ericsson Mediation as the common data harvesting platform for all networks and IT system to interface with downstream BSS and OSS systems.

### **6.2 Limitations**

- Even though mediation is present in every other field EM20 can only be used in Telco Domain.
- There is no feature to update configuration on live nodes without any downtime.
- EM20 Cloud deployment can only be done on its own cloud called CEE.
- KVM and VMware Exsi are the only 2 supported hypervisors that EM20 supports.

### **6.3 Future Scope**

- Enabling Deployment on Containers
- Support for Kubernetes as the Container Orchestrator
- Support latest releases of IMS, Packet Core, 5G Ericsson Network Nodes
- Search and Add comments in configuration for operational ease

## 7. GANTT CHART

Activity	Time Frame				
	February 2020	March 2020	April 2020	May 2020	June 2020
Literature Survey					
Requirements gathering & analysis					
Design					
Implementation					
Final Report Writing					

 Proposed Activity

 Activity Achieved



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