

MX-ONE System Description

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Abstract

Contents

1	<u>Introduction</u>
1.1	<u>Scope</u>
1.2	<u>Glossary</u>
2	<u>System Overview</u>
2.1	<u>General</u>
2.2	<u>MX-ONE™ Telephony System</u>
2.3	<u>Netwise CMG Application Suite</u>
2.4	<u>D.N.A</u>
2.5	<u>MX-ONE™ Messaging</u>
2.6	<u>MX-ONE™ Manager</u>
3	<u>Key Features</u>
4	<u>Architecture</u>
4.1	<u>MX-ONE™ Telephony System</u>
4.2	<u>Netwise CMG Application Suite</u>
4.3	<u>D.N.A</u>
4.4	<u>MX-ONE™ Messaging</u>
4.5	<u>MX-ONE™ Manager</u>
4.6	<u>Terminals and User Applications</u>
4.7	<u>High Availability</u>
4.8	<u>Scalability</u>
4.9	<u>Networking Capabilities</u>
5	<u>Interfaces and Protocols</u>
6	<u>Migration</u>

7	<u>Operation and Maintenance</u>
7.1	<u>General</u>
7.2	<u>Fault Management</u>
7.3	<u>Configuration Management</u>
7.4	<u>Accounting Management</u>
7.5	<u>Quality of Service</u>
7.6	<u>Performance Management</u>
7.7	<u>Security Management</u>
8	<u>Security</u>
9	<u>Capacity</u>
9.1	<u>MX-ONE™ Telephony System</u>
9.2	<u>MX-ONE™ Messaging</u>
9.3	<u>D.N.A.</u>
10	<u>Environmental Conditions</u>
10.1	<u>General</u>
10.2	<u>Climatic Environment</u>
10.3	<u>Electromagnetic Compatibility, Safety and Telecom</u>

1 [Introduction](#)

MX-ONE™ is a communication system for enterprises. MX-ONE™ integrates voice and data, fixed and mobile communication, as well as public and private services. It is designed to fit into the existing infrastructure of an enterprise Local Area Network (LAN), thereby saving the cost of operating an additional network for voice.

MX-ONE™ comes with large networking capabilities and an Operation and Maintenance (O&M) function that complies with IS/IT common practices. The distributed architecture of MX-ONE™ makes it a flexible solution, able to scale from 100 to 45,000 users. Using Ericsson's IP networking or ISDN/Q-SIG+ networking (including VAPA services), multiple MX-ONE™ systems can be networked to create solutions for even larger or geographically dispersed customers.

For the user, the MX-ONE™ system offers the same user experience as the classic circuit-switched Private Branch Exchange (PBX). Number dialing and terminal interaction is the same with the same array of services and functions and most well-known features and services are available for the user through wired IP phones and mobile phones.

The MX-ONE™ system provides features for the users' daily communication, including user management of activities and profile settings, as well as features for voice mail and fax mail.

The MX-ONE™ system provides the enterprise with a stepwise migration from a circuit-switched PBX into a converged voice and data network.

This release of MX-ONE™ supports a migration of MX-ONE™ Telephony System - Telephony Switch system to an MX-ONE™ V.3.1 system. For customers migrating from the Telephony Switch to MX-ONE™ V.3.1, the D.N.A. application suite is the recommended option for management and end users applications.

For Voice Over IP (VoIP) communication, MX-ONE™ supports both ITU-T H.323 and IETF Session Initiation Protocol (SIP) open standards. MX-ONE™ provides full H.323 functionality in the Ericsson IP phones and the Personal Assistant PC. Basic H.323 functionality is available for other IP terminals. MX-ONE™ supports SIP signaling on both the extension side and trunk side. The SIP solution in MX-ONE™ offers basic call functionality including caller ID/name DTMF digit signaling. The purpose of the SIP solution is to enable communication with third party products, for example, video conferencing systems.

1.1 [Scope](#)

This document provides a high-level description of the MX-ONE™ system. It includes a brief description of the system components, the network architecture, and external interfaces together with general feature descriptions for the MX-ONE™ system.

In this context, the term user is defined as an end-user within the enterprise that uses the MX-ONE™ system for daily communication. The user can access the MX-ONE™ system through several different terminals or applications. Thus, each user can have several extensions, for example, one extension for fixed telephony and one for mobile telephony.

Throughout this document there will be references to other documents that provide more detailed information about different subjects.

For information about how to implement MX-ONE™ in your IP network, see the description for [MX-ONE SYSTEM PLANNING](#).

For information about telephony features and capacity data, see the description for [FEATURE LIST](#) and see the description for [CAPACITIES](#).

1.2 [Glossary](#)

For a complete list of abbreviations and a glossary, see the description for [ACRONYMS, ABBREVIATIONS AND GLOSSARY](#).

2 [System Overview](#)

2.1 [General](#)

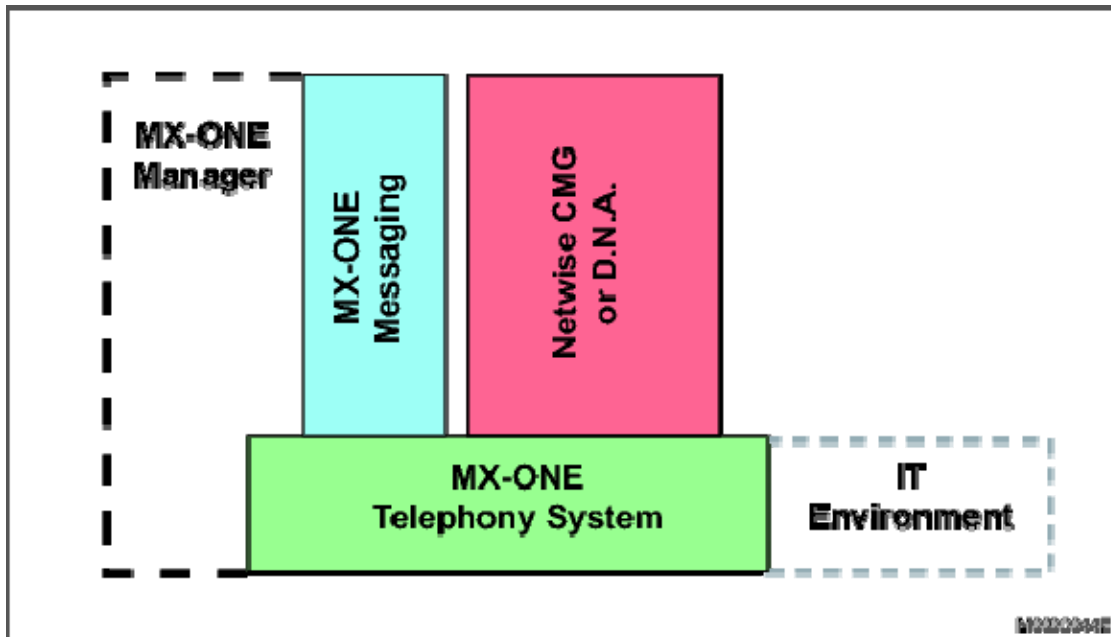


Figure 1 Building blocks of the MX-ONE™ System

The MX-ONE™ system consists of a set of building blocks used to build a communication solution for the enterprise, see [Figure 1](#):

- MX-ONE™ Telephony System is the IP-based and server-based "engine" and the major building block. It supports the Dynamic Network.
- MX-ONE™ Messaging provides features for voice mail and fax mail.
- Netwise Contact Management (CMG) is an advanced contact management system for telephony. It is the recommended user management solution for new customers.
- Dynamic Network Administration (D.N.A.) is an alternative to Netwise CMG. The D.N.A. application suite is the recommended user management solution for customers that are migrating from the Telephony Switch to MX-ONE™ V.3.1.
- MX-ONE™ Manager is used to manage the MX-ONE™ system. MX-ONE™ Manager provides administrators ease of use and integrates with the existing IT environment.

2.2 MX-ONE™ Telephony System

MX-ONE™ Telephony System provides business class telephony features. It performs call control, call-signaling, and media transcoding and conversion functions.

MX-ONE™ Telephony System can, in various configurations, support IP, mobile, analog, digital, cordless, CAS and ISDN S0 extensions, as well as paging equipment.

MX-ONE™ Telephony System has the following capabilities:

- Provides traditional PBX functionality

- Acts as H.323 gatekeeper and SIP server, and a media gateway
- Acts as a gateway towards private and public telephony networks, both fixed (PSTN) and mobile (PLMN)
- Offers a wide range of telephony features

2.3 Netwise CMG Application Suite

Netwise CMG Application Suite consists of a number of applications for operating and managing an MX-ONE™ Telephony System. It is the recommended solution for MX-ONE™. The CMG suite includes all necessary applications for contact management systems.

The CMG suite comprises the product areas:

- Advanced Operator Console
- Presence and Availability Management
- Call Control and Team Collaboration
- Visitor management

2.4 D.N.A

The D.N.A. application suite is a comprehensive family of graphic, PC-based programs and utilities supporting PBX operation and administration. It is the recommended solution for customers migrating from a Telephony Switch system. D.N.A. provides PBX operational support in the following major areas:

- Operator Call Management
- Extension Management
- Directory Management
- High-level Telecommunications Network Supervision
- Traffic Measurement and Reporting
- Event Management

For detailed information about D.N.A., see the technical guide for [DYNAMIC NETWORK ADMINISTRATION 5.5](#).

2.5 MX-ONE™ Messaging

MX-ONE™ Messaging provides the features and applications used for voice mail and fax mail.

MX-ONE™ Messaging has the following capabilities:

- Offers an efficient and easy-to-use voice mail system that is integrated with MX-ONE™ Telephony System
- Provides a fax server function that interacts with MX-ONE™ Telephony System
- Allows integration of the above-mentioned functions with collaboration services (Unified Messaging)

2.6 **MX-ONE™ Manager**

MX-ONE™ Manager provides the management functions for the MX-ONE™ system in accordance with the Fault, Configuration, Accounting, Performance, and Security Management (FCAPS) paradigm.

MX-ONE™ Manager has the following capabilities:

- Enables configuration and operation of the MX-ONE™ system
- Provides a common, single point of entry for user and extension administration
- Provides advanced fault and performance management that is easy to integrate with existing tools or frameworks
- Provides consistent management user interfaces across the MX-ONE™ components and applications
- Enables automatic software update and distribution within the MX-ONE™ system

3 **Key Features**

- **Scalability** from 100 to up to 45,000 users using a mix of IP, mobile, digital, analog, cordless, CAS and ISDN SO extensions.
- **Mobile extension** - Uses a 2G or 3G phone connected to the PBX just like any other office extension.
- **Simplified network infrastructure** cuts costs by connecting IP extensions with IP phones or IP clients over the LAN, seamlessly extending features to multiple sites through IP connectivity. IP trunking enables a business to optimize network bandwidth and reduce network costs.
- **Open server architecture** - MX-ONE™ runs on off-the-shelf operating systems and commercially available hardware servers.
- **Business class telephony features** with the most complete telephony feature offering for medium and large enterprises. No business has to make compromises on how to process critical customer calls.
- **Full suite of applications**, including Netwise CMG user applications, Netwise Netwise Operator Workstation (NOW), voice messaging, and Unified Messaging, enables businesses to streamline costs, be more productive, and better serve customers.
- **High Availability** - MX-ONE™ offers high availability by supporting both network and server redundancy.

4 **Architecture**

The MX-ONE™ system comprises MX-ONE™ Telephony System that serves the core voice traffic, Netwise CMG Application Suite for personal communication and preference setting, MX-ONE™ Messaging for voice mail and fax mail, and MX-ONE™ Manager for user and system management. As an alternative to the Netwise CMG application suite, the D.N.A. application suite can be used for management and end users applications.

The core of the enterprise network is based on IEEE 802, from now on referred to as Ethernet, preferably in a switched architecture with capabilities for high-grade quality transmission. The Quality of Service (QoS) capability of the Ethernet layer is the foundation for low delay and packet loss, parameters of great importance for voice services running over packet networks.

For an overview of the components that are part of the MX-ONE™ system, see [Figure 2](#).

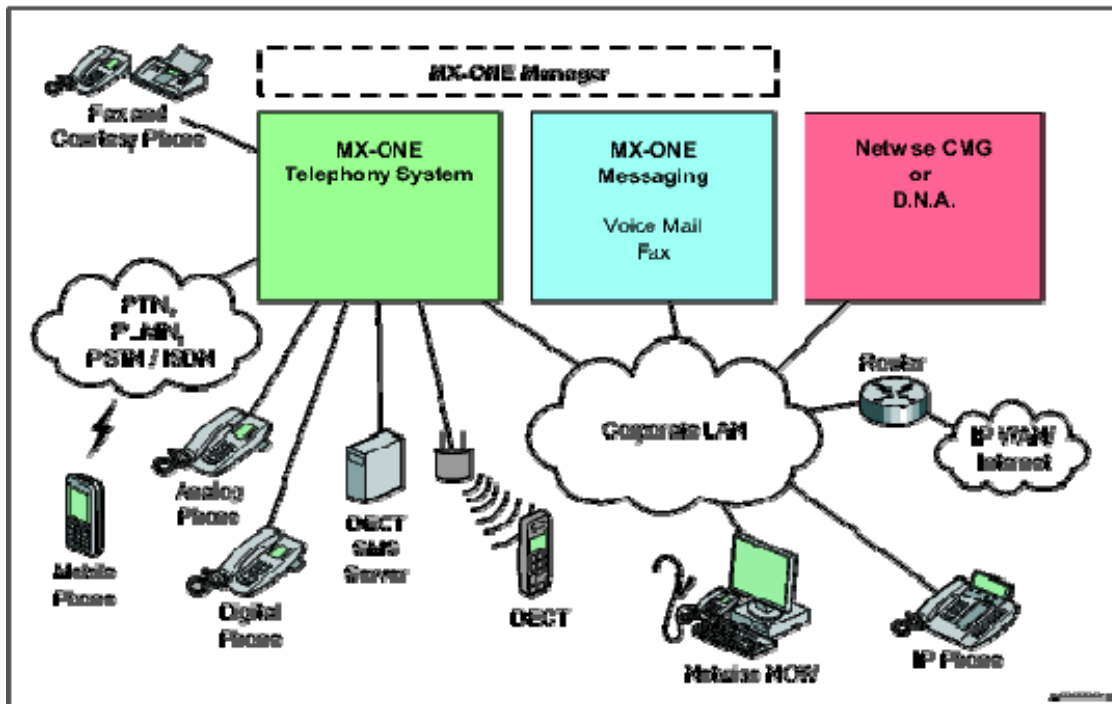


Figure 2 Architectural Overview

The following sections give an overview of the different components and their primary features in the MX-ONE™ system. For detailed information, see the description for each individual component .

4.1 [MX-ONE™ Telephony System](#)

The major element of the IP-based voice functionality in the MX-ONE™ system is MX-ONE™ Telephony System. It comprises the following functions:

- Call signaling
- Call control
- Media transcoding and conversion

MX-ONE™ Telephony System consists of logical modules called LIMs. Each LIM is on its own a fully autonomous PBX. Each LIM consists of a server and a media gateway.

Several different types of LIMs are available in MX-ONE™ Telephony System:

- **Media Gateway LIM**

The Media Gateway LIM consists of the Telephony Server and the Media Gateway.

The following functions are offered by a Media Gateway LIM equipped with a standard 19-inch server:

- Digital trunks (ISDN E1/T1, SIP trunk)
- Mobile extensions
- IP extensions, both H.323 and SIP
- Four analog extensions
- IP networking with other PBXs using H.323 signaling
- Netwise NOW for Netwise CMG or Operator Workstation (OWS) for D.N.A. - Only IP operator support

- **Media Gateway Classic LIM**

The Media Gateway Classic LIM consists of the Embedded Server Unit (ESU) and the Media Gateway Classic. The ESU is a standard PC embedded on a board hosted by the Media Gateway Classic.

The Media Gateway Classic is provided as one or two 7U 19-inch subracks with a number of boards for the different functions and interfaces.

Supported functions and interfaces are the following:

- Digital trunks (ISDN over E1/T1, DPNSS over E1/T1, CAS over E1/T1, MFC)
- Analog trunk for loop and ground start
- Digital and analog extensions
- IP extensions
- Mobile extensions
- Cordless extensions (DECT)
- ISDN S0 extensions
- CAS extensions
- Paging equipment
- Netwise NOW with CT-adapter for Netwise CMG or Operator Workstation (OWS) with CT-adapter for D.N.A.
- Old Operator Instruments (OPIs) such as OPI-II

- **MX-ONE™ Compact Server Media Gateway (SM)**

MX-ONE™ Compact SM is functionally equivalent to a Media Gateway LIM but is provided as a 2U unit with an ESU. For a list of functions, see the list for Media Gateway.

- **LIM with Legacy MD110 or MX-ONE™ TSW Hardware**

A LIM with legacy MD110 or MX-ONE™ Telephony Switch (TSW) hardware is any installed MD110 cabinet where the proprietary LIM processor and the LIM switch is replaced by a server and an ethernet-connected LIM switch.

For information about functions and interfaces, see the relevant ASB 501 04 documentation.

LIMs with legacy MD110 or MX-ONE™ TSW hardware can have group switch functionality. For more information, see the operational direction for [GROUP SWITCH, GS](#).

MX-ONE™ Telephony System can be configured with any combination of LIMs. With the exception for Compact SM, any offered server alternative can be combined with any media gateway.

For detailed information about MX-ONE™ Telephony System, see the description for [MX-ONE TELEPHONY SYSTEM](#).

4.1.1 [Telephony Servers](#)

MX-ONE™ offers a number of options for the physical server.

The common denominator for all server options is that the operating system is Novells SUSE® Linux Enterprise Server (SLES) version 10.

4.1.1.1 [Standard Server](#)

The HP Proliant DL 360 rack-mounted server is a standard pre-configured server with the following configuration:

- 3.4 GHz Intel Xeon processor
- 1 GB RAM, 72 GB HDD, and redundant fans
- Redundancy option with support for RAID 1 and duplicated power supply

4.1.1.2 [MX-ONE™ Server](#)

The MX-ONE™ Server consist of an ESU built into a 1U high unit in the 19-inch building practice.

The unit can be used as a stand-alone Telephony Server for media gateways. This server option is the recommended server to use when implementing server redundancy. Being a standard server with proprietary form factor, it can also be used for any application on, for example, Windows.

4.1.1.3 [Server for Media Gateway Classic LIM and LIM with Legacy MD110 or TSW Hardware](#)

For Media Gateway Classic LIMs and all upgraded MD110 cabinets, the server used is a pre-configured ESU. 600 MHz Pentium M for traditional MD110 cabinets and 1.4 GHz for the Media Gateway Classic where higher power dissipation can be tolerated as a fan unit is used.

The ESU is embedded on a single board hosted by the Media Gateway Classic and runs the same version of the Linux operating system as the Telephony Server.

4.1.1.4 [Media Kit](#)

LIMs can also be delivered as software only together with media gateways. For this type of packaging, the functionality of the used server is the responsibility of the distributor. Minimum requirements for the server are the following:

- Processor speed minimum 3 GHz (when using single core)
- RAM memory 1 GB
- Disk 40 GB
- Intel x86 architecture
- Chipset with watchdog implementation
- LAN ports: 2 (100Mb/s)
- USB: 1 (USB 2.0)
- DVD: internal or USB
- Console I/O

4.1.2 [Media Gateways](#)

4.1.2.1 [Media Gateway](#)

The Media Gateway is constituted of a piece of hardware developed by Ericsson. It is a 19-inch rack-mounted 1U unit. The operating system is Linux, installed on the Telephony Server file system and remotely mounted by the Media Gateway.

The Media Gateway supports the following:

- IP and mobile extensions
- Eight E1/T1 ports
- Four analog ports

4.1.2.2 [Media Gateway Classic](#)

The Media Gateway Classic is provided as one or two 7U subracks adapted to the 19-inch building practice, which allows mounting in a standard 19-inch rack. A number of boards provide the necessary functions and interfaces. Some of the boards are necessary for core functionality, while others are optional, depending on the necessary interfaces, number of phones, and traffic requirements.

The Media Gateway Classic supports analog, digital, IP, cordless, and CAS extensions. It also supports other legacy MD110 extensions.

The following boards are included:

- ESU - with the same software as the Telephony Server
- LIM Switch Unit Ethernet (LSU-E) - a common interface between the Telephony Server and the other boards
- Distributed Switch Unit (DSU)- - providing distributed switching functions (two boards per subrack).

In addition, a variable number of boards are included depending on traffic needs, number of extensions, and number of trunks. For detailed information, see the description for [MX-ONE TELEPHONY SYSTEM](#).

4.1.3 [Combined Media Gateway and Server](#)

4.1.3.1 [Compact SM](#)

The Compact SM has the same functionality as the Media Gateway, but is a 19-inch 2U unit that includes an ESU board and a Media Gateway. For functions and interfaces, see [Section 4.1.2.1 Media Gateway](#) .

4.2 [Netwise CMG Application Suite](#)

The following CMG applications/products are available for MX-ONE™:

- CMG Server including Directory Manager (web based), Configuration Manager (web based), Phone Book (tool for formatting and printing)
- Netwise NOW is an IP-enabled PC-based operator solution
- Office Web (presence management, directory search) including Quick (taskbar program to quickly access presence information) and Web services (access CMG data using XML).
- Mobile client (java-based mobile phone application)
- Calendar Connection (server-based calendar integration for Exchange, Domino, and Novell's Groupwise)
- Visit (pre-registration, visitor self check-in, advanced booking, group booking, notification of arrival (e-mail or SMS), and badge printing)
- Snapware (3rd party call control, web and PC based solutions. Team collaboration, chat (IM), call screening)

4.3 [D.N.A](#)

The D.N.A. Application Suite provides management applications for the switch and end user applications. It is based on the Microsoft Windows operating system.

Applications can be combined on a single PC or can be distributed over a number of PCs using one or more D.N.A. Servers. Client applications can be connected to any D.N.A. server using TCP/IP.

Examples of the features included in D.N.A are the following:

- Administration of the corporate telecommunications network
- Support through scalable architecture for centralized or distributed environments
- Fault and alarm handling regarding network performance
- Provide user access to corporate directory services using either a PC, Web, WAP, or Smartphone interface
- Provide advanced operator features and directory services
- Provide single point of administration and integration for MX-ONE™ Messaging and D.N.A. users

Also, the support of several open interfaces allows integration with third party applications to meet the specific needs of the business environment.

For detailed information, see the technical guide for [DYNAMIC NETWORK ADMINISTRATION 5.5](#).

4.4 **MX-ONE™ Messaging**

MX-ONE™ Messaging consists of features for voice mail and fax mail. MX-ONE™ Messaging provides capabilities to store and retrieve voice mail, e-mail, and fax.

MX-ONE™ Messaging also supports an interface allowing client applications, such as the Manager Identity, to create voice mailboxes on MX-ONE™ Messaging.

The operating system for MX-ONE™ Messaging is Windows Server 2003.

For detailed information about MX-ONE™ Messaging, see the documents in the ALEX folder MX-ONE MESSAGING.

4.5 **MX-ONE™ Manager**

MX-ONE™ Manager consists of several O&M applications that provide the management functions for the MX-ONE™ system in accordance with the FCAPS paradigm, see [Figure 3](#).

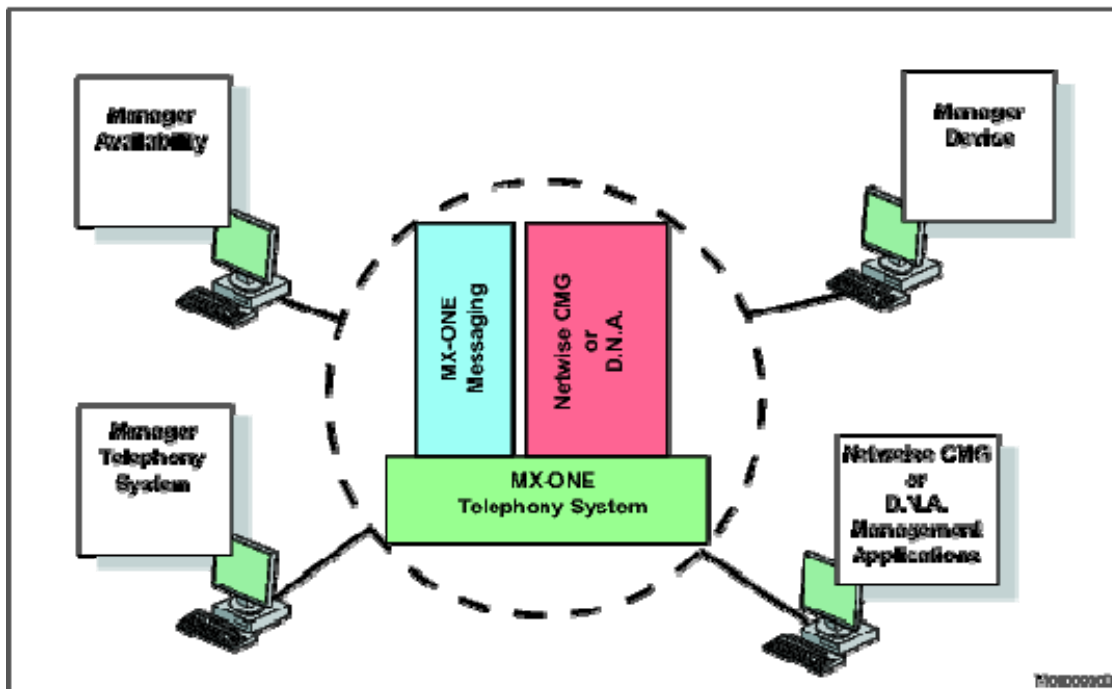


Figure 3 *MX-ONE™ Manager*

The following sections give an overview of the MX-ONE™ Manager applications. For detailed information about the MX-ONE™ Manager applications, see the description for each individual application .

4.5.1 [Manager Availability](#)

Manager Availability is an optional tool that provides the system and network administrators with advanced fault and performance management for computer systems, applications, or databases. Based upon the BMC PATROL® framework, it can be easily integrated into existing management platforms, such as HP OpenView Enterprise Usage Management Solution or IBM® Tivoli®.

Manager Availability consists of a number of agents (software components) that need to be installed on each managed server. Using BMC PATROL it is possible to monitor the status of the MX-ONE™ servers and applications.

Manager Availability can be integrated with an existing Simple Network Management Protocol (SNMP) management framework, using the SNMP bridge. In this configuration, SNMP events are sent from the Manager Availability console to the SNMP Manager.

4.5.2 [Manager Telephony System](#)

The Manager Telephony System is used to:

- Configure the MX-ONE™ Telephony System, for example number plans, routes, branch offices, routing servers, and trunks
- Create or update configuration files for the IP phones
- Monitor the IP phones connected to the system
- Back up and restore data on the Telephony System
- View information about hardware and software revision status for the Telephony Server and Media Gateway components
- View security logs, audit trails, and event logs

A command line interface is also included for entering commands. The interface allows administrators to enter commands and view system responses without having to log out or switch terminals.

Manager Telephony System is Web-based and can be accessed from anywhere using an ordinary Web browser.

For detailed information about the Manager Telephony System, see the user guide for [MX-ONE MANAGER TELEPHONY SYSTEM](#).

4.5.3 [Manager Device](#)

The Manager Device is a tool for remote software maintenance in MX-ONE™. The Manager Device is based on HP Radia, which is a part of the HP OpenView Management Suite. Only a subset of the components in HP Radia will be used in this release of MX-ONE™.

Manager Device handles the following:

- Remote software upgrades of MX-ONE™ applications on the Telephony Server and MX-ONE™ Messaging server
- Remote SLES updates
- Remote IP Phone software updates (updates the boot files and application files on the IP Phone Software server)
- Monitors IP Phones

For detailed information about Manager Device, see the description for [MANAGER DEVICE](#).

4.5.4 [D.N.A. Management Applications](#)

The D.N.A. application suite is an integrated set of applications that allows the administrator to operate and manage the PBX communications resources from stand-alone or networked PCs. The application suite includes the following management applications:

- Directory Manager (DMG) - an OWS application that enables the operator to add, modify, and delete D.N.A. Directory entries.
- Extension Manager (EMG) - D.N.A. application for management of PBX telephone data (extensions, extension groups, equipment assignments, and other resources)
- Performance Manager (PMG) - a traffic measurement and reporting application for network performance analysis

PMG allows analysts and administrators to capture traffic data and generate reports. This application consists of Performance Data Manager (PDM), and Performance Presentation Manager (PPM). PDM extracts traffic measurement data from one or more PBX nodes. PPM creates reports from data extracted by PDM.

- PPM Lite - an Internet Server-based version of Performance Presentation Manager

This application is installed as a Web site. The PPM Lite server offers different traffic analysis reports.

For detailed information, see technical guide for [DYNAMIC NETWORK ADMINISTRATION 5.4](#).

4.6 [Terminals and User Applications](#)

MX-ONE™ allows users transparent access to full PBX voice functionality using any of the following supported terminals or applications:

- IP phone (H.323 or SIP)
- Analog phone
- Digital phone

- Mobile phone
- Cordless phone (DECT)
- CAS phone
- ISDN S0 terminal
- Paging equipment
- Personal Assistant PC (Netwise CMG)
- Corporate Telephony applications on Sony Ericsson Smartphone P990i and Sony Ericsson M600i
- Netwise NOW (Netwise CMG)
- Mobile Client (Netwise CMG)
- OWS (D.N.A.)
- Old OPIs, such as OPI-II

For detailed information about the different types of terminals or applications, see the description for [MX-ONE TELEPHONY SYSTEM](#). For information about different features, see the description for [FEATURE LIST](#) and see the description for [FEATURE MATRIX](#).

4.7 [High Availability](#)

MX-ONE™ offers high availability by supporting the following types of redundancy in MX-ONE™ Telephony System:

- Network redundancy

Network redundancy is achieved (provided a redundant network infrastructure is available) by connecting Telephony Servers to two LANs. If one of the LANs fail, the other one will continue to serve the operations and the Telephony Servers will be available on the functioning LAN. If Media Gateways are evenly distributed over the two LANs, approximately half of them will still function. During the downtime, the overall capacity of media processing will be reduced.

In a Media Gateway Classic configuration, the capacity for gateway calls will be reduced. A switch must be used to secure control of the hardware when a LAN fails.

- Server redundancy

Server redundancy is achieved by adding one or more standby servers to the network with the ability to take over any failing Telephony Server. At failover, the standby server will take over the identity of the failing server and control of the Media Gateway or Media Gateway Classic in the failing LIM. For ongoing traffic, all connections will be lost if a server fails. All new traffic will be redirected to the standby server.

In a distributed system connected over limited bandwidth (WAN), each remote domain must have its own standby server.

A prerequisite for server redundancy is that network redundancy is implemented.

4.8 Scalability

The MX-ONE™ system can consist of only one LIM with support for up to 700 extensions. To enhance the number of supported extensions (maximum 45,000), up to 64 LIMs can be combined without the need of trunking or networking. For an example, see [Figure 4](#).

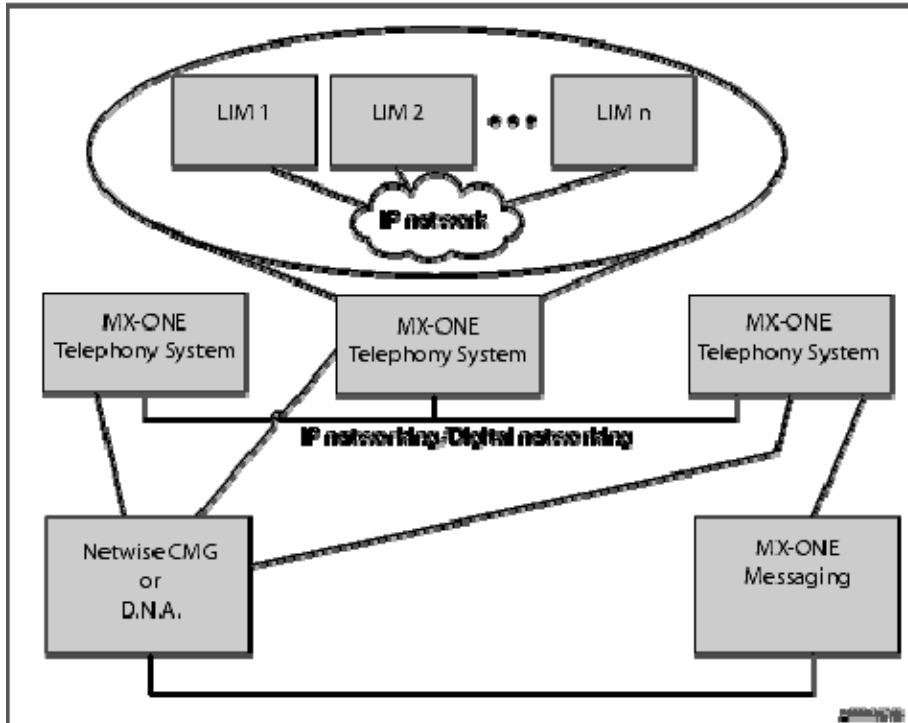


Figure 4 Scalability in MX-ONE™

By using Ericsson's IP networking or ISDN/Q-SIG+ networking (including VAPA services), multiple MX-ONE™ systems can be networked to create solutions for even larger or geographically dispersed customers.

4.9 Networking Capabilities

Networking means to provide all services over network links to other entities of the PTN. This cuts costs compared to the TDM-based leased line. Furthermore, it simplifies Branch Office scenarios to better fit the data network model with IP-connected Branch Offices.

To supply basic and supplementary services transparently, ISDN signaling over the Q-reference point (QSIG) is implemented over H.323 in IP networks. This makes networked PBXs possible over IP intranets and also over the Internet with the appropriate protection. The intraconnectivity over (private) ISDN is in accordance with ITU-T QSIG, or proprietary for US market. MX-ONE™ supports both E1 and T1. The realization of the networking functionality in the MX-ONE™ system is implemented in MX-ONE™ Telephony System.

Third-party products and VoIP service providers can also interoperate with MX-ONE™ using SIP signaling, for basic services such as basic call, caller ID/name, and DTMF digit signaling and supplementary generic services like parking, transfer, and conference. The SIP solution in MX-ONE™ cannot be used for intraconnectivity between MX-ONE™ instances.

APNSS is not supported by MX-ONE™ but the MX-ONE™ can be a part of a network that consists of both APNSS and DPNSS. The APNSS/DPNSS network has the same limitations as in ASB 501 04. For detailed information, see the relevant documentation for ASB 501 04.

For detailed information, see the description for [NETWORKING](#) and see the description for [IP NETWORKING](#).

5 Interfaces and Protocols

This section lists the external interfaces and protocols used in the MX-ONE™ system. For an overview of some of the interfaces and protocols used in MX-ONE™, see [Figure 5](#).

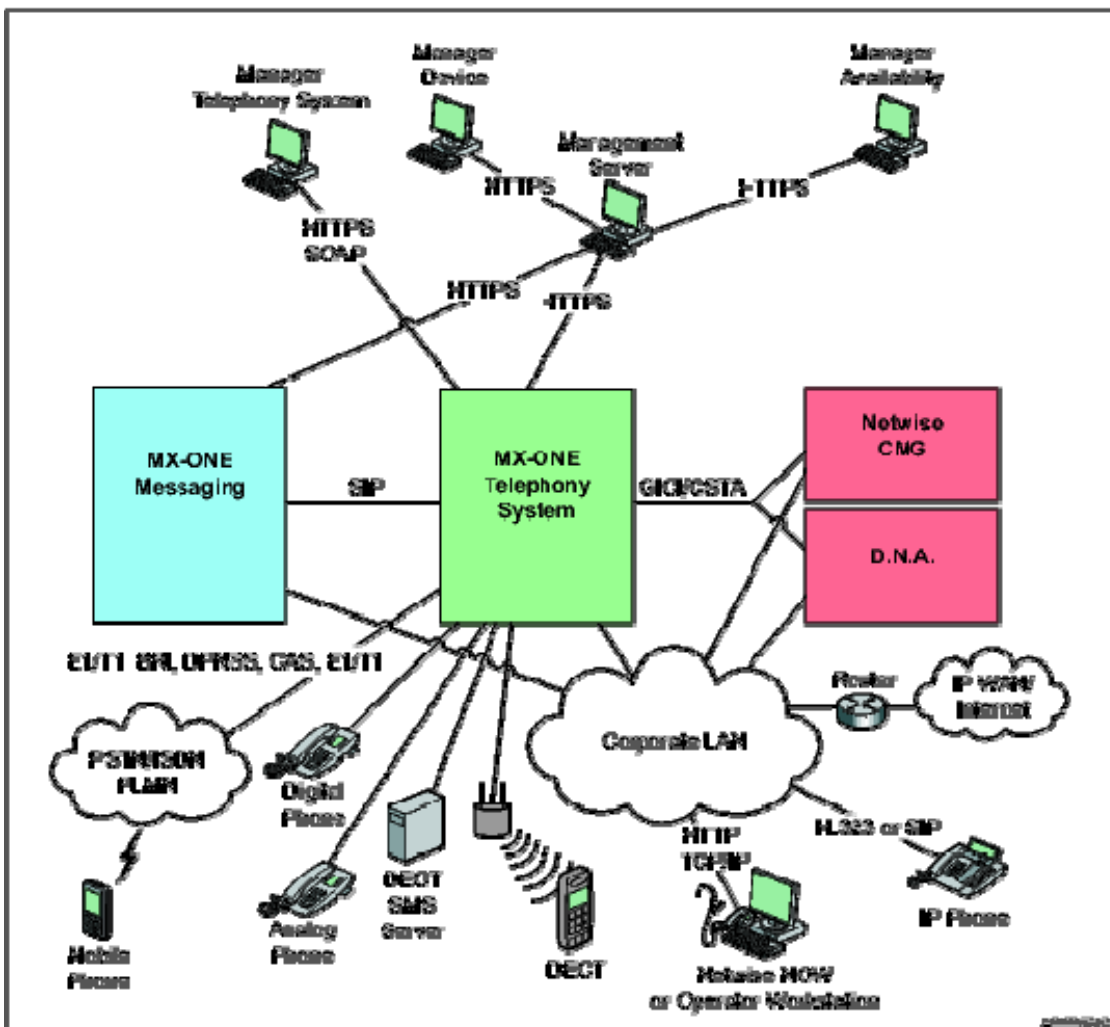


Figure 5 Interfaces and protocols in MX-ONE™

The following interfaces and protocols are available for MX-ONE™ Telephony System:

- Private networking by means of ISDN QSIG over E1 (30B+D)
- Private networking by means of ISDN tie line over E1 (30B+D) and T1 (23B+D) using proprietary signaling
- MFC
- CAS
- Private networking by means of DPNSS and CAS over E1 (30B+D) and T1 (23B+D)
- Public ISDN over E1 (30B+D), T1 (23B+D) and BRI (2B+D)
- H.323
- SIP
- SNMP
- Secure Shell (SSH)
- HTTP(S)
- Interfaces to an accounting system
- DECT
- DASL

The following interfaces and protocols are available for CTI:

- Telephone API (Microsoft)
- TS API (Novell)
- CSTA

The following interfaces and protocols are available for Netwise CMG:

- GICI
- Operator Interface
- LDIF
- Voicemail Systems Interface (VSI)
- HTTP/HTTPS for web applications
- HTTP Calendar Interface
- CWI CMG Web service Interface
- Time-entry System Interface (TSI)

The following interfaces and protocols are available for MX-ONE™ Messaging:

- H.323
- SNMP
- VSI
- Internet Message Access Protocol (IMAP) v4
- Messaging Applications Programming Interface (MAPI)

The following interfaces and protocols are available for Manager Availability:

- SNMP
- HTTPS

The following interfaces and protocols are available for Manager Device:

- SSL used for Radia Configuration Server (RCS)
- SSL used for notifying the Radia Clients
- HTTP used for the Radia Integration Server (RIS) Web server
- HTTPS used for the RIS Web server

The following interfaces and protocols are available for D.N.A.:

- GICI
- CSTA
- Operator Interface (OpenOPI)
- Directory Link (DirLink)
- Extension Link (ExtLink)
- LDAP
- VSI
- Call Accounting Applications Interface (CAAPI)
- Time-entry System Interface (TSI)

For detailed information about the different external interfaces and supported standards, see the description for [MX-ONE SYSTEM PLANNING](#).

6 [Migration](#)

MX-ONE™ supports migration of the Telephony Switch to an MX-ONE™ V.3.1 system. The major steps of the migration procedure includes the following:

- Make a backup copy of all telephony data.
- Replace a limited number of boards.
- Reload and configure the telephony data.

For detailed information, see installation instructions for [MIGRATING MD110 TO MX-ONE VERSION 3.1](#).

7 [Operation and Maintenance](#)

7.1 [General](#)

O&M of the MX-ONE™ system complies with the concept of FCAPS for network management and consists of functions to supervise, administer, and manage the system.

7.2 [Fault Management](#)

The MX-ONE™ system provides two levels of Fault Management:

- Basic Fault Management (always included)
- Advanced Fault Management (using the optional product Manager Availability)

7.2.1 [Basic Fault Management](#)

7.2.1.1 [MX-ONE™ Telephony System](#)

The Telephony Server has an alarm and event handling functionality. An SNMP interface exposes standard Management Information Base (MIB) II information, and alarms generated in the Telephony Server are sent as SNMP traps. When alarms are cleared in the system, alarm cleared-traps are sent to the connected SNMP Managers.

In addition to alarms, events are stored in the Linux SysLog. These events might provide useful information about the behavior of the software or when debugging.

7.2.1.2 [Netwise CMG](#)

The Netwise CMG Server hosts a number of different applications that send events to the Windows Event Log.

7.2.1.3 [MX-ONE™ Messaging](#)

The Messaging Server hosts a number of different applications that send events to the Windows Event Log.

The Windows SNMP Agent allows external SNMP Managers access to standard MIB II information.

7.2.2 [Advanced Fault Management Using Manager Availability](#)

Manager Availability offers monitoring of the servers in MX-ONE™. A Web-based console displays the status of all servers and applications in MX-ONE™, including objects and parameters.

Manager Availability is based on BMC PATROL and includes collection and display of the following:

- Telephony Server alarms
- Application Events from Netwise CMG and MX-ONE™ Messaging
- Threshold violation events for system resources (CPU, disk usage)

The PATROL Web-based console interacts with the PATROL Agent on each remote server through an event-driven dialog. Messages are sent to the console when a specific event causes a state change on the monitored server. The PATROL Agent stores events in an event repository on the PATROL Agent host server.

If a problem requires the network administrators' attention, the PATROL Web-based console displays the affected resources in a warning or alarm state.

Manager Availability can be integrated into the alarm console of Management Frameworks through the SNMP Bridge.

With the SNMP Bridge facility, SNMPv1 traps will be generated and sent to external SNMP Managers.

7.3 [Configuration Management](#)

User- and extension- related data in all MX-ONE™ applications is configurable from a single user interface. In different Manager user interfaces, system-related data for all MX-ONE™ applications can also be configured.

7.3.1 [MX-ONE™ Telephony System](#)

Most of the configuration, except user and extension management, for MX-ONE™ Telephony System can be performed using the web-based MX-ONE™ Manager Telephony System.

In addition, configuration can be made using a command line interface, mdshell. A number of commands with a common syntax have been defined to provide full control.

Initial configuration of MX-ONE™ Telephony System, including tasks like setting IP addresses of the interfaces, is made during the software installation.

For detailed information, see the user guide for [MX-ONE MANAGER TELEPHONY SYSTEM](#).

7.3.2 [Netwise CMG Server](#)

The following are configurable:

- User administration
- Field name settings (all languages)
- Search layout settings for Netwise NOW
- Search layout settings for Netwise Office Web
- Settings of Activity codes
- Settings for system Contact Profiles incl. forwarding number
- Telephony connection settings
- Message Delivery Systems settings
- Settings of other system parameters
- Personal log-in
- Language settings
- Settings of other system parameters

7.3.3 [MX-ONE™ Messaging](#)

The following are some examples of data that is configurable for MX-ONE™ Messaging Fax Mail:

- Settings for fax support on the Telephony Server
- Global fax settings

- Inbound fax routing
- Notifications about document processing and server status

For detailed information, see the getting started guide for [Captaris RightFax](#) and administrators guide for [Captaris RightFax](#).

The following are some examples of data that is configurable for MX-ONE™ Messaging Voice Mail:

- Unified messaging settings
- SMS message notification settings
- Settings for networking Messaging Voice Mail Servers
- Settings for connecting the voice mail system to the telephony system

For detailed information, see the administrator guide for [ADMINISTERING ERICSSON MX-ONE MESSAGING VOICE MAIL VERSION 4.10](#).

7.3.4 [Extension Manager \(D.N.A.\)](#)

The following data is configurable:

- Extensions and extension groups
- Equipment
- Resources

For detailed information, see the technical guide for [DYNAMIC NETWORK ADMINISTRATION 5.4](#).

7.4 [Accounting Management](#)

Accounting Management comprises the services provided by MX-ONE™ that can be used for billing purposes.

MX-ONE™ Telephony System generates customizable Call Information Logging (CIL) records. Each record contains data for one call.

The CIL records can be configured to have several output formats, such as comma separated, Structured Query Language (SQL), or Extensible Markup Language (XML). Each Telephony Server generates its own CIL records that can be sent to up to 10 target locations. It is also possible to configure a single location and format for all CIL records.

The information provided by the CILs can be matched with user-specific information to get a complete picture of how each user uses the system.

For detailed information, see the description for [CALL INFORMATION LOGGING, QUALITY OF SERVICE LOGGING](#).

7.5 [Quality of Service](#)

VoIP quality of service information can be logged per call. Delay, jitter, used codecs and packet loss rate can be logged. The data can be presented via Manager Telephony System or via Call Information Logging output.

7.6 Performance Management

The MX-ONE™ system provides the following levels of Performance Management:

- Basic Performance Management (always included)
- Advanced Performance Management (using the optional product Manager Availability)

When using D.N.A, the application for performance management is called Performance Manager. For detailed information about this application, see [Section 7.6.3 Performance Manager \(D.N.A.\)](#) .

7.6.1 Basic Performance Management

The MX-ONE™ applications include SNMP agents as well as extensive embedded Performance Management functionality. Some of these functions rely on standard operating system components such as the Windows SNMP Agent, while other functions are embedded in the MX-ONE™ applications.

For a short summary of the basic monitoring and performance management capabilities of the MX-ONE™ servers and applications, see [Section 7.6.1.1 MX-ONE™ Telephony System](#) and [Section 7.6.1.2 MX-ONE™ Messaging](#) .

7.6.1.1 MX-ONE™ Telephony System

MX-ONE™ Telephony System provides the following monitoring and performance management functions:

- Congestion on routes

The rate of congestion on routes is a critical resource in the Telephony Server and is continuously monitored. When the congestion rate reaches a certain threshold, alarms are generated.

- Traffic Measurements

Traffic measurements provide statistical information about the telephony traffic in the Telephony Server. Examples of such measurements are:

- Outgoing calls on a certain route
- Total number of incoming calls

Traffic measurements need to be configured and started manually and data will be collected based on a number of different criteria (configurable).

7.6.1.2 [MX-ONE™ Messaging](#)

The following three different tools are available for configuration in MX-ONE™ Messaging:

- Support Messaging System Management (a suite of Windows-based tools)
- Telephony Server Diagnostics
- Line Status & Reports

Note:

The Telephony Server Diagnostics tool does not specifically refer to the component Telephony Server in MX-ONE™ and the tool is not part of the MX-ONE™ system.

7.6.2 [Advanced Performance Management Using Manager Availability](#)

Manager Availability offers advanced monitoring of all managed servers in MX-ONE™. A Web-based console displays the status of all MX-ONE™ servers and applications, including objects and parameters.

The following performance management features are included in Manager Availability:

- A large number of parameters describes the performance of the system.
- Threshold values of some parameters provide alerts in case of problems.
- History data is collected and may be displayed for a large number of parameters.

7.6.3 [Performance Manager \(D.N.A.\)](#)

The following performance management features are included in the Performance Manager:

- Measuring PBX performance (Operators, Trunks, Base Stations)
- Sizing and configuring trunks and leased lines
- Monitoring Service Level Agreements

For detailed information, see the technical guide for [DYNAMIC NETWORK ADMINISTRATION 5.4](#).

7.7 [Security Management](#)

For detailed information, see [Section 8 Security](#), the description for [SECURITY](#), or [SECURITY GUIDELINES](#).

7.7.1 [User Management](#)

In MX-ONE™ Telephony System it is possible to define the users that are allowed to use the Command Line Interface and the access privilege for each of them.

7.7.2 [Audit and Security Trail](#)

The different components of the MX-ONE™ system log all activities that are relevant from the security point of view, such as access attempts, O&M operations, and so on.

This information is necessary in case of a security incident to be able to determine what caused the event.

7.7.3 [IPSec](#)

The LIMs composing MX-ONE™ Telephony System communicate using a proprietary inter-LIM signaling protocol, used for management messages, control signals, and call control signals. This communication can be protected by using IPSec.

8 [Security](#)

Attention to the security aspects of an IP telephony infrastructure is increasingly growing by corporate Chief Information Officers (CIOs), IT administrators, and end-users. Voice over IP traffic (both signaling and media) must be protected from a number of attacks, such as media streams eavesdropping, toll-fraud attacks, signaling modification, etc. For this reason, it is necessary to protect both the VoIP signaling messages as well as the media streams.

The following security measures are supported in the MX-ONE™ Telephony System:

- Secure RTP (SRTP) to protect media streams

MX-ONE™ supports the use of SRTP for media encryption in the IP phones and the Media Gateway Classic. SRTP is only supported when using H.323 as signaling protocol. SRTP makes use of the Advanced Encryption Standard (AES) with a 128-bit key to protect the media streams. The Media Gateway does not support SRTP.

To enable or disable SRTP, it is necessary to set the appropriate parameter in the IP phone configuration file, using the IP Phone Configuration File task in Manager Telephony System.

- Transport Layer Security (TLS) to protect signaling messages

TLS guarantees the signaling privacy when the SRTP keys are interchanged between the parties.

- Support for a number of flexible security policies, in order to support environment with different security requirements

The main principle for the security policy is that it directs if an extension is allowed to register to the system or not. Once the extension is registered, the calls to any other party is allowed from a security perspective.

SIP terminals have to authenticate themselves using HTTP digest authentication. Additionally, communication between LIMs can be protected using IPSec.

The servers in MX-ONE™ run on operating systems that have been hardened to resist the most common network attacks. Known vulnerable services are shut down and file integrity is checked periodically. Additionally, customers are recommended to implement security policies that cover patch management and antivirus software updates. It is recommended to use some type of antivirus software and to have automatic updates, of the security patches, activated. Server farms should be protected by firewalls and Intrusion Detection Systems (IDS) that are able to block attacks able to overcome the VLAN separation.

All management interfaces towards MX-ONE™ servers can be run over secure protocols, such as SSH and HTTPS. Management operations and access to such interfaces are logged to have maximum control. Users and administrators always have to authenticate themselves before being able to access the system. Additionally, an access control mechanism is available to assign users and administrators different roles and privileges.

For detailed information about security, see the description for [SECURITY](#).

9 [Capacity](#)

9.1 [MX-ONE™ Telephony System](#)

Table 1 *MX-ONE™ Telephony System*

LIMs	64
Extensions/LIM (with Media Gateway)	700
Extensions/LIM (with Media Gateway Classic)	1000

Extensions/LIM (with legacy MD110 or TSW hardware)	640
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For more information about the capacity of the MX-ONE™ Telephony System configurations, see the description for [CAPACITIES](#).

9.2 MX-ONE™ Messaging

Table 2 MX-ONE™ Messaging Voice Mail

Ports (simultaneous connected users)	Up to 120
Non-UM users (unified messaging)	No limitations specified. A 120-port system can generally handle up to 15,000 users.
UM users	Up to 10,000 users

Table 3 MX-ONE™ Messaging Fax Mail

Ports	Up to 30
Users	No general guidelines as to how many users a 30-port system can handle, as fax usage varies greatly between customers.

If MX-ONE™ Messaging Voice Mail and MX-ONE™ Messaging Fax Mail are installed on the same server, then the capacity is reduced to the following:

- MX-ONE™ Messaging Voice Ports: 16
- MX-ONE™ Messaging Fax Ports: 4

For more information about the capacity of MX-ONE™ Messaging, see the relevant MX-ONE™ Messaging documentation.

9.3 D.N.A.

The following capacity figures (per LIM) are valid for D.N.A. installed on the ESU or MX-ONE™ Server hardware.

Table 4 D.N.A.

Users	500
Extensions	500
PMG extensions	500
Operators	2
ECC users	100 (with 5 monitor licenses)
ECA basic users	100

DME users	100
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For more information about the capacity of D.N.A., see the relevant ASB 501 04 documentation.

10 Environmental Conditions

10.1 General

The MX-ONE™ system consists of different Ericsson™ components as well as commercial server-based products.

MX-ONE™ is designed to operate in and comply with regulations in force for enterprise (light industry) locations. Special measures may be required if MX-ONE™ is installed in other locations or if the environmental parameters deviate from the values described in this document or in other referenced documents.

10.2 Climatic Environment

Table 5 Temperature Range and Humidity

Product		In Operation	Storage
MX-ONE™ Media Gateway MX-ONE™ Media Gateway Classic MX-ONE™ Compact SM MX-ONE™ Server Fan unit	Temperature range	+5° C to + 40° C IEC 60068-2-1, -2, -14 and -56; ETSI EN 300 019-2-3 Class 3.1, Table 1, Normal climatic limits	-5° C to +55° C IEC 60068-2-1, -2 and -56; ETSI EN 300019-2-1 Class 3.1, Table 1
	Relative humidity	+5% to 85% IEC 60068-2-1, -2, -14 and -56; ETSI EN 300 019-2-3 Class 3.1, Normal climatic limits (no condensation)	Maximum +95% ETSI EN 300019-2-1 Class 3.1 (condensation)
AC/DC power unit		As specified by supplier	As specified by supplier
Telephony Server and server for Netwise CMG and MX-ONE™ Messaging		As specified by supplier	As specified by supplier

Table 6 Mechanical Range

Product		Seismic	Transport
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		exposure (product in operation)	
MX-ONE™ Media Gateway MX-ONE™ Media Gateway Classic MX-ONE™ Compact SM MX-ONE™ Server Fan unit		VERTEQ II IEC 60068-2-6, -27, -64 and GR-63- CORE; ETSI EN 300-019-2-3 Class 3.2 Table 5	Random and bump IEC 60068-2-29, -32 and -64; ETSI 300 019-2-2 Class 2.2 Table 4
AC/DC power unit		As specified by supplier	As specified by supplier
Telephony Server MX- ONE™ Netwise CMG and MX-ONE™ Messaging		As specified by supplier	As specified by supplier

10.3 [Electromagnetic Compatibility, Safety and Telecom](#)

For Ericsson products, see the Supplier's Declaration of Conformity, located at www.ericsson.com/sdoc .

For the Telephony Server, see the documentation delivered with the product or contact the supplier for details.

For safety information, see the description for [SAFETY](#).

For the AC/DC unit, see the documentation delivered with the product or contact the supplier for details.