

vMRF Network Impact Report

Virtual Multimedia Resource Function

NETWORK IMPACT REPORT

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1 Introduction

The Network Impact Report (NIR) describes how the current release of Virtual Multimedia Resource Function (vMRF) with new and changed features affects the previous release of vMRF and the operator's overall network, including all affected products and functions.

The purpose of this document is to provide sufficient information at an early stage to Ericsson system operators to help them plan the introduction of new products and upgrades to their networks.

This document is a living document and is subject to change during the development of the new release. Therefore, part of the information may be incomplete or unavailable until General Availability (GA) of the new vMRF release.



2 General Impact

This section describes the general impact for the various vMRF releases.

2.1 General Impact for vMRF 1.3

This section describes the general impact for the release.

2.1.1 **Backward Compatibility**

The enhanced functionality is backward compatible.

2.1.2 **Capacity and Performance**

No impact.

2.1.3 **Operation**

The following new features are introduced:

- Support for the Enhanced Voice Services (EVS) codec

The following enhanced features are introduced:

- VNF Life Cycle Management enhancement: Upgrade workflow

2.2 General Impact for vMRF 1.4

This section describes the general impact for the release.

The following new features are introduced:

- Platform Automatic IP Address Configuration
- Tone Sender Service Configuration

2.2.1 **Backward Compatibility**

The enhanced functionality is backward compatible.

2.2.2 **Capacity and Performance**

No impact.



2.2.3 Operation

A separate batch of HOT and example environment yaml files are included in the software delivery package for deployment with or without DHCP server configuration on OpenStack.

2.3 General Impact for vMRF 1.5.0

This section describes the general impact for the release.

2.3.1 Backward Compatibility

The enhanced functionality is backward compatible.

2.3.2 Capacity and Performance

The minimum VM storage disk space is increased to 6 GB.

2.3.3 Operation

Deployment on VMware vSphere is supported.

2.4 General Impact for vMRF 1.6.0

This section describes the general impact for the release.

2.4.1 Backward Compatibility

The enhanced functionality is backward compatible.

2.4.2 Capacity and Performance

Maximum number of PM files has been increased from 250 to 500.

2.4.3 Operation

The following changes are introduced:

- Deployment on VMware vCloud Director is supported.
- Role-Based Access Control (RBAC) in vMRF has been enhanced so that there is no need to define POSIX groups in the LDAP server anymore. This is a



backward-compatible enhancement, that is, old LDAP server configurations can still be used.

- Watchdog feature to supervise VM instances and restart them automatically if needed.
- Open VM Tools are supported for VMware.

2.5 General Impact for vMRF 1.7.0

This section describes the general impact for the release.

The following new features are introduced:

- Watchdog feature enhancement: configurable parameters
- VNF LCM workflow enhancement: support for workflow triggering from an NFV Orchestrator through the Or-Vnfm interface
- Recommended performance tuning parameter values added as default in OVF files for VMware deployments

The following features are discontinued in vMRF 1.7.0:

- Automatic IP address allocation using DHCP

2.5.1 Backward Compatibility

The vMRF 1.7.0 does not have full upgrade compatibility from previous releases.

Due to discontinued support for DHCP-based local IP address allocation (VMware, OpenStack), deployments using DHCP for IP address allocation must be configured using a different IP address allocation method.

2.5.2 Capacity and Performance

No impact.

2.5.3 Operation

The handling of the deployment parameter controlling the total number of VMs (`payload_instance_count`) is changed. In the current version, `payload_instance_count=1` means 1 VM, as opposed to the previous handling where `payload_instance_count=0` meant 1 VM.

A new default user role, `MrfApplicationMomAccess`, has been introduced. This role can be used in combination with custom roles to gain access to the MOM without adding any further MOM permissions to custom roles.



File synchronization between VMs is handled by a proprietary Network File System (NFS) solution.

UDP ports for SNMP are not configurable.

SNMP over DTLS is not supported.

2.6 General Impact for vMRF 1.8.0

This section describes the general impact for the release.

The following new features are introduced:

- The Auto-Healing feature. If Auto-Healing is configured in VNF-LCM, a faulty VM in the cluster and its resources are recreated automatically, based on alarm notifications sent to ENM.
- Support for VM Snapshots in VMware deployments

IP address allocation using MO-based IP pools replaces IP address allocation using cloud platform IP pools for media and signaling interfaces. Manual IP address allocation is only supported in VMware deployments.

2.6.1 Backward Compatibility

The vMRF 1.8.0 does not have full upgrade compatibility from previous releases.

Due to changes introduced with MO-based IP allocation for media and signaling IP interfaces, deployments with cloud based IP pools must be changed to use the new MO-based IP address allocation method. This requires a network-redundant upgrade.

Note: If another VNF is using the same subnets for signaling, media, or both, new subnet must be defined for the affected interface in vMRF.

Configuration exported from a previous version, where MO-based IP pools are not in use, can be imported into version 1.8.0 using MO-based IP pool deployment. As media and signaling IP pools are not defined after import, traffic is not possible before the configuration of MO-based media and signaling IP pools. For configuration instructions, see sections [Configure vMRF User Plane](#) and [Configure vMRF Signaling](#) in the [Initial Configuration Guide](#).

2.6.2 Capacity and Performance

No impact.



2.6.3 Operation

The following changes are introduced in vMRF 1.8.0:

- The following new deployment parameters have been introduced for OpenStack and CEE based deployments:
 - `vnf_name` specifies the name of the VNF instance.
 - `OM_ip_address` specifies a fixed IP address for external O&M.
- The MRF Instance 80% Capacity Limit Exceeded alarm is removed from vMRF 1.8.0.
- The COM SA, Cluster Node Unavailable event is converted into an alarm.
- The maximum number of PM report files is changed to 500.
- The Media Stream Recording Active alarm has been removed.

2.7 Other Network Elements

2.7.1 Other Network Elements in vMRF 1.3

2.7.1.1 General

The lowest interoperable releases are described in Table 1.

Table 1 Lowest Interoperable Releases

MTAS	16A
vMTAS	16A
OSS-RC	17B
ENM	17B
NeLS	1

2.7.1.1.1 Multimedia Telephony Application Server (MTAS)

vMRF 1.3 is compatible with the following MTAS releases: 4.0, 4.1, 4.2, 4.4, 4.5, and 4.6.

2.7.1.1.2 Virtual Multimedia Telephony Application Server (vMTAS)

vMRF 1.3 is compatible with the following vMTAS releases: 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, and 1.6.



2.7.1.1.3 OSS-RC

vMRF 1.3 is compatible with the following OSS-RC releases: 17B, 18A.

Full functionality support for vMRF 1.3 is provided by the following OSS-RC release: 18A

2.7.1.1.4 Ericsson Network Manager (ENM)

vMRF 1.3 is compatible with the following ENM release: 17B

Full functionality support for vMRF 1.3 is provided by the following ENM release: 18A.

2.7.1.1.5 Network License Server (NeLS)

vMRF 1.3 is compatible with the following NeLS release: 1.

2.7.2 Other Network Elements in vMRF 1.4

2.7.2.1 General

The lowest interoperable releases are described in Table 2.

Table 2 Lowest Interoperable Releases

MTAS	16A
vMTAS	16A
OSS-RC	17B
ENM	17B
NeLS	1

2.7.2.1.1 Multimedia Telephony Application Server (MTAS)

vMRF 1.4 is compatible with the following MTAS releases: 4.0, 4.1, 4.2, 4.4, 4.5, 4.6, 4.7, and 4.8.

2.7.2.1.2 Virtual Multimedia Telephony Application Server (vMTAS)

vMRF 1.4 is compatible with the following vMTAS releases: 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, and 1.6.

2.7.2.1.3 OSS-RC

vMRF 1.4 is compatible with the following OSS-RC releases: 17B, 18A.



vMRF 1.4 has only “treat as” support in OSS-RC, meaning OSS-RC treats vMRF 1.4 as vMRF 1.3 with all basic functionality supported (including new alarms), but not the new vMRF 1.4 configuration attributes or PM counters.

2.7.2.1.4 Ericsson Network Manager (ENM)

vMRF 1.4 is compatible with the following ENM release: 17B

Full functionality support for vMRF 1.4 is provided by the following ENM release: 18A.

2.7.2.1.5 Network License Server (NeLS)

vMRF 1.4 is compatible with the following NeLS releases: 1, 2.

2.7.3 Other Network Elements in vMRF 1.5.0

2.7.3.1 General

The lowest interoperable releases are described in Table 3.

Table 3 Lowest Interoperable Releases

MTAS	16A
vMTAS	16A
OSS-RC	17B
ENM	17B
NeLS	1

2.7.3.1.1 Multimedia Telephony Application Server (MTAS)

vMRF 1.5.0 is compatible with the following MTAS releases: 4.0, 4.1, 4.2, 4.4, 4.5, 4.6, 4.7, and 4.8.

2.7.3.1.2 Virtual Multimedia Telephony Application Server (vMTAS)

vMRF 1.5.0 is compatible with the following vMTAS releases: 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, and 1.6.

2.7.3.1.3 OSS-RC

vMRF 1.5.0 is compatible with the following OSS-RC releases: 17B, 18A.



vMRF 1.5.0 has only “treat as” support in OSS-RC, meaning OSS-RC treats vMRF 1.5.0 as vMRF 1.3 with all basic functionality supported (including new alarms), but not the new vMRF 1.5.0 configuration attributes or PM counters.

2.7.3.1.4 Ericsson Network Manager (ENM)

vMRF 1.5.0 is compatible with the following ENM release: 17B

Full functionality support for vMRF 1.5.0 is provided by the following ENM release: 18A.

2.7.3.1.5 Network License Server (NeLS)

vMRF 1.5.0 is compatible with the following NeLS releases: 1, 2.

2.7.4 Other Network Elements in vMRF 1.6.0

2.7.4.1 General

The lowest interoperable releases are described in Table 4.

Table 4 Lowest Interoperable Releases

MTAS	16A
vMTAS	16A
OSS-RC	17B
ENM	17B
NeLS	1

2.7.4.1.1 Multimedia Telephony Application Server (MTAS)

vMRF 1.6.0 is compatible with the following MTAS releases: 4.4, 4.6, 4.7, 4.8, 4.9, 4.10, and 4.11.

2.7.4.1.2 Virtual Multimedia Telephony Application Server (vMTAS)

vMRF 1.6.0 is compatible with the following vMTAS releases: 1.6, 1.7, 1.8, 1.9, 1.10, and 1.11.

2.7.4.1.3 OSS-RC

vMRF 1.6.0 is compatible with the following OSS-RC releases: 17B, 18A, and 18B.



vMRF 1.6.0 has only “treat as” support in OSS-RC, meaning OSS-RC treats vMRF 1.6.0 as vMRF 1.3 with all basic functionality supported (including new alarms), but not the new vMRF 1.6.0 configuration attributes or PM counters.

2.7.4.1.4 Ericsson Network Manager (ENM)

vMRF 1.6.0 is compatible with the following ENM release: 17B

Full functionality support for vMRF 1.6.0 is provided by the following ENM release: 18A.

2.7.4.1.5 Network License Server (NeLS)

vMRF 1.6.0 is compatible with the following NeLS release: 2.

2.7.5 Other Network Elements in vMRF 1.7.0

2.7.5.1 General

The lowest interoperable releases are described in Table 5.

Table 5 Lowest Interoperable Releases

MTAS	16A
vMTAS	16A
OSS-RC	18A
ENM	18A
NeLS	2.4

2.7.5.1.1 Multimedia Telephony Application Server (MTAS)

vMRF 1.7.0 is compatible with the following MTAS releases: 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, and 4.12.

2.7.5.1.2 Virtual Multimedia Telephony Application Server (vMTAS)

vMRF 1.7.0 is compatible with the following vMTAS releases: 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, and 1.12.

2.7.5.1.3 OSS-RC

vMRF 1.7.0 is compatible with the following OSS-RC releases: 18A and 18B.



vMRF 1.7.0 has only “treat as” support in OSS-RC, meaning OSS-RC treats vMRF 1.7.0 as vMRF 1.3 with all basic functionality supported (including new alarms), but not the new vMRF 1.7.0 configuration attributes or PM counters.

2.7.5.1.4 Ericsson Network Manager (ENM)

vMRF 1.7.0 is compatible with the following ENM releases: 18A, 18.1, 18.2, 18.3, and 18.4.

Full functionality support for vMRF 1.7.0 is provided by the following ENM release: 18A.

2.7.5.1.5 Network License Server (NeLS)

vMRF 1.7.0 is compatible with the following NeLS release: 2.4.

2.7.6 Other Network Elements in vMRF 1.8.0

2.7.6.1 General

The lowest interoperable releases are described in Table 6.

Table 6 Lowest Interoperable Releases

MTAS	16A
vMTAS	16A
OSS-RC	18A
ENM	18A
NeLS	2.4

2.7.6.1.1 Multimedia Telephony Application Server (MTAS)

vMRF 1.8.0 is compatible with the following MTAS releases: 4.8 or later.

2.7.6.1.2 Virtual Multimedia Telephony Application Server (vMTAS)

vMRF 1.8.0 is compatible with the following vMTAS releases: 1.9 or later.

2.7.6.1.3 OSS-RC

vMRF 1.8.0 is compatible with the following OSS-RC releases: 18A and 18B.

vMRF 1.8.0 has only “treat as” support in OSS-RC, meaning OSS-RC treats vMRF 1.8.0 as vMRF 1.3 with all basic functionality supported (including new alarms), but not the new vMRF 1.8.0 configuration attributes or PM counters.



2.7.6.1.4 Ericsson Network Manager (ENM)

vMRF 1.8.0 is compatible with the following ENM releases: 18A, 18.1, 18.2, 18.3, and 18.4.

Full functionality support for vMRF 1.8.0 is provided by the following ENM release: 18A.

2.7.6.1.5 Network License Server (NeLS)

vMRF 1.8.0 is compatible with the following NeLS release: 2.4.



3 Interfaces

This section describes interface changes between the existing and new revisions of the product.

3.1 Interfaces in vMRF 1.3

This section describes the introduced interface changes.

3.1.1 Inter-node Interfaces

3.1.2 Operation and Maintenance

3.1.2.1 Configuration

This section lists changes in attributes. There are no changed, deprecated, or obsolete attributes.

3.1.2.1.1 New Attributes

This section lists changes in attributes. There are no changed or deprecated attributes.

New attributes are listed in Table 7.

Table 7 New Attributes for EVS

MO Class Name	Attribute Name	Description
MrfData	evsConfDataMoRef	Contains a reference to the <i>EvsConfData</i> MO instance associated with this <i>MrfData</i> MO.
EvsConfData	supportedBitRatesRangeBegin	Specifies the beginning of the supported bit rate range of EVS audio codec.
	supportedBitRatesRangeEnd	Specifies the end of the supported bit rate range of EVS audio codec.
	supportedBwRange	Specifies the supported audio bandwidth range of EVS audio codec.
SctpProfile	maxSctpPduSize	The maximum size of the SCTP PDU towards the Multimedia Telephony Application Server (MTAS).



3.1.2.2 Fault Management

This section lists changes in alarms. There are no changed or new alarms.

3.1.2.3 Events and Notifications

This section lists changes in alarms. There are no changed, deleted or new alarms.

3.1.3 Counters

There are no new, changed, deprecated, or obsolete counters.

3.2 Interfaces in vMRF 1.4

This section describes the introduced interface changes.

3.2.1 Inter-node Interfaces

3.2.2 Operation and Maintenance

3.2.2.1 Configuration

This section lists changes in attributes. There are no changed, deprecated, or obsolete attributes.

3.2.2.1.1 New Attributes

This section lists changes in attributes. There are no changed, or deprecated attributes.

New attributes are listed in Table 8.

Table 8 New MO Attributes

MO Class Name	Attribute Name	Description
TsTone	For the list of all the attributes refer to the TsTone MO in the MOM.	Configurable attributes for the Tone Sender service.

3.2.2.2 Fault Management

This section lists changes in alarms. There are no changed or new alarms.



3.2.2.3 Events and Notifications

This section lists changes in alarms. There are no changed, deleted or new alarms.

3.2.3 Counters

There are no new, changed, deprecated, or obsolete counters.

3.3 Interfaces in vMRF 1.5.0

This section describes the introduced interface changes.

3.3.1 Inter-node Interfaces

3.3.2 Operation and Maintenance

3.3.2.1 MOs

This section lists changes in MOs.

New MOs are shown in Table 9.

Table 9 New MOs

MO Class Name	Description
ChainCertificate	Chain certificate belonging to the credential.

Changed MOs are shown in Table 10.

Table 10 Changed MOs

MO Class Name	Description
FmAlarm	An FmAlarm instance represents an active alarm. An alarm is a persistent indication of a fault that clears only when the triggering condition has been resolved.
FmAlarmType	<p>A specific kind of alarm that can be reported, for example "power failure".</p> <p>In an X.733 context it maps to event type, probable cause, and specific problem. The same principle is used for alert types as for alarm types.</p>



3.3.2.2 Configuration

This section lists changes in attributes.

3.3.2.2.1 New Attributes

New attributes are listed in Table 11.

Table 11 New MO Attributes

MO Class Name	Attribute Name	Description
CertMC capabilities	keySupport	List of the key types the ME supports.
EnrollmentAuthority	reservedBy	The MO Distinguished Names using this EnrollmentAuthority.
FmAlarm	originalAdditionalText	The additional text set when the alarm was raised. This attribute is set when the alarm is raised and will not change during the alarm's lifetime.
	originalEventTime	The timestamp when the alarm was raised. This attribute is set when the alarm is raised and will not change during the alarm's lifetime.
	originalSeverity	The perceived severity set when the alarm was raised. It will not change during the alarm's lifetime. Specification: RFC3877



MO Class Name	Attribute Name	Description
FmAlarmType	configuredSeverity	<p>Gives the possibility to configure the perceived severity for all alarms of this type.</p> <p>If set, this value overrides the perceived severity provided by the alarming object. Setting this attribute has no impact on existing alarms, only new and updated ones.</p> <p>Specification: RFC3877</p>
	defaultSeverity	<p>The default perceived severity for all alarms of this type. Not set means alarms of this type can be assigned different severities.</p> <p>Specification: RFC3877</p>
NodeCredential	subjectAltName	The subjectAltName can be specified either as an IP address or a FQDN.
Snmp	engineId	Unique identifier of the SNMP agent. Only applicable when using SNMPv3.
TrustedCertificate	reservedBy	The Distinguished Names of MOs using this TrustedCertificate.

3.3.2.2.2

Changed Attributes

Changed attributes are listed in Table 12.

Table 12 Changed MO Attributes

MO Class Name	Attribute Name	Description
EnrollmentAuthority	enrollmentCaCertificate	<p>The trusted certificate of the RA or CA used for enrollment authentication. Represents the certificate by the DN of the appropriate TrustedCertificate MO. The RA or CA certificate provided in the PKI response is authenticated by this trusted certificate. If this attribute has any value, the attribute enrollmentCaFingerprint is ignored.</p>



MO Class Name	Attribute Name	Description
EnrollmentServer	uri	<p>The URI of the enrollment server. The URI consists of a protocol, an IP or DNS address and an optional port number. Specify the optional port designation by appending a colon followed by the port number to the host part, for example, 192.168.33.27:8080. If no port number is provided, the default port is used.</p> <p>For SCEP, the URI contains the relative URI of the enrollment CA HTTP Common Gateway interface (CGI) script path, which is the resource identifier of the resource on the server which will process the enrollment request.</p>
	activeSeverity	<p>The perceived severity of the alarm.</p> <p>It may change during the alarm's lifetime.</p> <p>Specification: RFC3877</p>
FmAlarm	additionalInfo	<p>Further information about the problem.</p> <p>The information is represented as a set of data structures with two items of information, an identifier and a value. It may change during the alarm's lifetime.</p>
	eventType	<p>General category for the alarm.</p> <p>Specification: ITU-T X.733 X.736</p>
	probableCause	<p>Qualifies and provides further information on the reason for the event.</p> <p>A standard set of probableCause values is provided in the ERICSSON-ALARM-PC-MIB.</p>
	sequenceNumber	<p>A unique identity for every notification sent.</p> <p>This identity changes at every notification, that is, severity change and information change. It is not the same as the fmAlarmId as multiple notifications may be sent for one alarm instance.</p>
	specificProblem	<p>Provides further refinement to the information given by probableCause.</p> <p>Can be used to find an associated operating instruction (OPI).</p>



MO Class Name	Attribute Name	Description
ManagedElement	dnPrefix	It provides naming context that allows the managed objects to be partitioned into logical domains. A Distinguished Name (DN) is defined by 3GPP TS 32.300, which splits the DN into a DN Prefix and Local DN, for example DN format: dnPrefix=<DN Prefix>, localDn =<Local DN>Fault Management: dnPrefix does not impact Fault Management, since an NMS recognises a Managed Element by IP address Performance Management (PM): The dnPrefix is present in the PM Data file, Result Output Period (ROP) file, if the dnPrefix attribute is specified, that is, not an empty string.
NodeCredential	keyInfo	Specifies the key type and length that is used for the next enrollment. Mandatory for actions startOfflineCsrEnrollment or startOnlineEnrollment. For the supported key types see CertMCapabilities MO keySupport attribute. Deprecated key types are not recommended for new enrollments.

3.3.2.2.3 Deprecated Attributes

Deprecated attributes are listed in Table 13.

Table 13 Deprecated MO Attributes

MO Class Name	Attribute Name
FmAlarmType	moClasses
ManagedElement	dateTimeOffset
	productIdentity
	localDateTime
	timeZone
TrustedCertificate	reservedByCategory

3.3.2.3 Fault Management

This section lists changes in alarms. There are no changed or new alarms.

3.3.2.4 Events and Notifications

This section lists changes in alarms. There are no changed, deleted or new alarms.



3.3.3 Counters

There are no new, changed, deprecated, or obsolete counters.

3.4 Interfaces in vMRF 1.6.0

This section describes the introduced interface changes.

3.4.1 Inter-node Interfaces

3.4.2 Operation and Maintenance

3.4.2.1 MOs

There are no new or deleted MOs.

3.4.2.2 Configuration

There are no new or deprecated attributes.

3.4.2.2.1 Changed Attributes

Changed attributes are listed in Table 14.

Table 14 Changed MO Attributes

MO Class Name	Attribute Name	Description
Snmp	agentAddress	Listen addresses for the SNMP agent. Attribute defines ports and IP addresses the agent listens to for incoming SNMP requests that use UDP protocol. Typical configurations uses IP address 0.0.0.0 (IPv4) or :: (IPv6) and port 161, which means that the standard SNMP port is used on all interfaces.
	agentAddressDtls	Listen addresses for SNMP agent that uses DTLS. Attribute defines ports and IP addresses the agent listens to for incoming SNMP requests that use DTLS transport protocol. The typical configuration uses IP address 0.0.0.0 (IPv4) or :: (IPv6) and port 10161. This means that the standard port for SNMP over DTLS is used on all interfaces.

3.4.2.3 Fault Management

This section lists changes in alarms. There are no changed or new alarms.



3.4.2.4 Events and Notifications

This section lists changes in alarms. There are no changed, deleted or new alarms.

3.4.3 Counters

There are no new, changed, deprecated, or obsolete counters.

3.5 Interfaces in vMRF 1.7.0

This section describes the introduced interface changes.

3.5.1 Inter-node Interfaces

3.5.2 Operation and Maintenance

3.5.2.1 MOs

There are no new or deleted MOs.

3.5.2.1.1 Changed MOs

Changed MOs are listed in Table 15.

Table 15 Changed MO Attributes

MO Class Name	Description
SctpProfile	The SctpProfile defines the configuration that controls the behaviour of an SCTP Association. In order to reconfigure an attribute of this MO, the associated MOs representing controllers need to be locked (i.e. MrfH248Interface for vMRF).

3.5.2.2 Configuration

There are no changed, or deprecated attributes.

3.5.2.2.1 New Attributes

New attributes are listed in Table 16.



Table 16 New MO Attributes

MO Class Name	Attribute Name	Description
MrfInstance	operationalState	The operational state of this node.
	availabilityStatus	The availability status qualifies the operational state. It indicates why the operational state has changed its value to DISABLED. If the availability status is DEGRADED, the attribute operationalState is ENABLED.

3.5.2.3 Fault Management

This section lists changes in alarms. There are no new, changed, or deleted alarms.

3.5.2.4 Events and Notifications

This section lists changes in events and notifications. There are no new, changed, or deleted events and notifications.

3.5.3 Counters

There are no new, changed, deprecated, or obsolete counters.

3.6 Interfaces in vMRF 1.8.0

This section describes the introduced interface changes.

3.6.1 Inter-node Interfaces

3.6.2 Operation and Maintenance

3.6.2.1 MOs

There are no changed or deleted MOs.

3.6.2.1.1 New MOs

New MOs are listed in Table 17.



Table 17 New MOs

MO Class Name	Description
MrfNetworkIpPool	This MO represents a MrfNetworkIpPool.
SignalingIpPool	This MO represents a SignalingIpPool.

3.6.2.2 Configuration

There are no deprecated attributes.

3.6.2.2.1 New Attributes

New MO attributes are listed Table 18.

Table 18 New MO Attributes

MO Class Name	Attribute Name	Description
Media Resource Function	ipAddressAllocationMethod	The IP address allocation method used in the VNF.
	slaacInUse	This attribute is relevant only when ipAddressAllocationMethod = MO_AUTO_IP_POOL. When set false, MO based pool will be the IPv6 allocation method. When set true, Stateless Address AutoConfiguration (SLAAC) will be the IPv6 allocation method.
MrfNetworkIpPool	mediaVlanId	The VLAN id used for media IP interfaces when the VLAN transparency feature is enabled.
MrfH248Control	signalingVlanId	The VLAN id used for signaling IP interfaces when the VLAN transparency feature is enabled.

3.6.2.2.2 Changed Attributes

Changed MO attributes are listed Table 19.



Table 19 Changed MO Attributes

MO Class Name	Attribute Name	Description
MrfInstance	availabilityStatus	The SctpProfile defines the configuration that controls the behaviour of an SCTP Association. In order to reconfigure an attribute of this MO, the associated MOs representing controllers need to be locked (i.e. Sbg for vBGF and MrfH248Interface for vMRF).
	operationalState	The SctpProfile defines the configuration that controls the behaviour of an SCTP Association. In order to reconfigure an attribute of this MO, the associated MOs representing controllers need to be locked (i.e. Sbg for vBGF and MrfH248Interface for vMRF).

3.6.2.3 Fault Management

This section lists changes in alarms.

3.6.2.3.1 New Alarms

Table 20 shows new alarms.

Table 20 New Alarms

Alarm Name
COM SA, Cluster Node Unavailable
MRF Media IP Interface Configuration Failure
MRF Signaling IP Interface Configuration Failure

3.6.2.3.2 Deleted Alarms

Table 21 shows deleted alarms.

Table 21 Deleted Alarms

Alarm Name
Media Stream Recording Active



3.6.2.4 Events and Notifications

This section lists changes in events and notifications. There are no new or changed events and notifications.

3.6.2.4.1 Deleted

Table 22 shows deleted events.

Table 22 Deleted Events

Event Name
COM SA, Cluster Node Unavailable ⁽¹⁾

(1) This event has been converted into an alarm.

3.6.3 Counters

There are no new, changed, deprecated, or obsolete counters.



4 Summary of Impacts per Feature

This section summarizes the impact per feature when the feature is turned on.

The description of impact is as follows:

- **Major Impact** means that the feature has done an incompatible change so that another node requires an update.
- **Minor Impact** means that the feature has caused changes that affect other nodes, but with extra configuration, the previous behavior can be kept.
- **No Impact** means that the feature has no impact on the system.

A summary of impacts per feature is shown in Table 23.

Table 23 Summary of Impacts per Feature

Feature	Impact	Basic or Optional New or Enhanced	Feature Number	Relation to Other Features or Nodes	Release of Feature Introduction
Enhanced Voice Services	No Impact	New, Optional	FAJ 801 0893	NeLS	vMRF 1.3
Workflow-based VNF operations enhancement: Upgrade workflow	No Impact	Enhanced, Optional	—	None	
Platform automatic IP address configuration	No Impact	New, Optional	—	None	vMRF 1.4
Consumer Communication enhancement: Tone Sender Service Configuration	No Impact	Basic, Enhanced	FAJ 801 0891	None	vMRF 1.4



Table 23 Summary of Impacts per Feature

Feature	Impact	Basic or Optional New or Enhanced	Feature Number	Relation to Other Features or Nodes	Release of Feature Introduction
VMware deployment enhancement: Support for VMware vCloud Director	No Impact	Basic, Enhanced	FAJ 8010891	None	vMRF 1.6.0
VMware deployment enhancement: Open VM Tools	No impact	Basic, Enhanced	FAJ 8010891	None	
RBAC Enhancement	No Impact	Basic, Enhanced	FAJ 8010891	None	
Support for watchdog feature	No impact	Basic, Enhanced	FAJ 8010891	None	
Watchdog Feature Enhancement: Configurable Parameters	No impact	Basic, Enhanced	FAJ 8010891	None	vMRF 1.7.0
VNF LCM workflow improvements: support for workflow triggering from an NFV Orchestrator through the Or-Vnfm interface	No Impact	Basic, Enhanced	–	None	
Recommended Performance Tuning Parameter Values in OVF Files	No Impact	Basic, Enhanced	–	None	



Table 23 Summary of Impacts per Feature

Feature	Impact	Basic or Optional New or Enhanced	Feature Number	Relation to Other Features or Nodes	Release of Feature Introduction
Consumer Communication, IP Interconnect: Changes in Local Media IP Address Allocation Methods	Local media and signaling IP address allocation using MO-based IP pools replaces IP address allocation using cloud platform IP pools.	Basic, Enhanced	FAJ 801 0891, FAJ 801 0880	None	vMRF 1.8.0
VNF LCM workflow improvements: Auto-Healing	No impact	Basic, Enhanced	—	None	
Support for VM snapshots in VMware deployments	No impact	Basic, Enhanced	—	None	



5 Impact on vMRF Features

This section shows the impact on the vMRF features when the feature is turned on.

5.1 Impact on vMRF Features from vMRF 1.2 to vMRF 1.3

5.1.1 Enhanced Voice Services

Transcoding support for the EVS codec is introduced. EVS is a multi-rate audio codec that operates at 8 kHz, 16 kHz, 32 kHz, and 48 kHz sampling rates, and offers full audio bandwidth ranging from 20 Hz up to 20 kHz. EVS supports bit rates from 5.9 kbps to 128 kbps. EVS supports comfort noise generation and error concealment.

The use of EVS requires the Enhanced Voice Services capacity license and connection to a Network License Server (NeLS).

5.1.2 VNF Life Cycle Management Enhancement

The network-redundant upgrade LCM operation has been introduced. This procedure can be used to upgrade the vMRF VNF to a newer version even without traffic loss, if another VNF is in operation during the upgrade.

5.2 Impact on vMRF Features from vMRF 1.3 to vMRF 1.4

5.2.1 Platform Automatic IP Address Configuration

Support for deployment without DHCP server on OpenStack has been introduced. Separate batch of HOT and example environment yaml files are included in the software delivery package for deployment with or without DHCP server configuration on OpenStack. With platform automatic IP address configuration, IP addresses are assigned by the virtualization infrastructure.

5.2.2 Tone Sender Service Configuration

The Tone Sender (TS) service can be configured by the attributes of the new `TsTone` MO. The `TsTone` MO represents a tone as used by the Tone Sender service in the vMRF. An instance of this MO exists for each tone type supported by the VNF. The MO instances are created automatically by the system. The parameters, for example, tone type, tone duration, frequencies, levels, play and pause times, can be changed.



5.3 Impact on vMRF Features from vMRF 1.4 to vMRF 1.5.0

No new features are introduced.

5.4 Impact on vMRF Features from vMRF 1.5.0 to vMRF 1.6.0

5.4.1 Support for VMware vCloud Director

Support for deployment using the cloud service VMware vCloud Director is introduced.

5.4.2 POSIX Group Enhancement

Due to RBAC Enhancement, POSIX groups do not need to be defined in the LDAP server anymore. This is a backward-compatible enhancement, that is, old LDAP server configurations can still be used.

5.4.3 Support for Watchdog Feature

Support for the watchdog feature is introduced.

The watchdog feature, when configured, supervises the status of each VM instance and restarts the instance if the watchdog does not get signal from the VM for one minute.

5.4.4 Open VM Tools

Open VM Tools (OVT) is included in the guest OS. OVT is an open source implementation of VMware Tools. It consists of virtualization utilities that improve the functionality and management of VMs within a VMware environment.

5.5 Impact on vMRF Features from vMRF 1.6.0 to vMRF 1.7.0

5.5.1 Watchdog Feature Enhancement: Configurable Parameters

The following configurable watchdog parameters are introduced for the watchdog feature:

watchdog_interval

Watchdog ping interval in seconds. Min.: 1, Max.: 58.
Default: 1.



watchdog_enable Parameter for enabling watchdog. Min.: 0 (Watchdog feature is disabled), Max.: 1 (Watchdog feature is enabled). Default: 0.

Note: Watchdog parameters can be configured only during deployment.

5.5.2 VNF Life Cycle Management Enhancement

In vMRF 1.7.0, support for LCM workflow triggering from an NFV Orchestrator through the Or-Vnfm interface is introduced. In vMRF 1.7.0 the following limitations apply:

- ENM (EO) is the only supported NFVO.
- The only supported workflows are instantiation and termination.
- For triggering workflows, the only supported VIM is OpenStack.

5.5.3 Discontinuation of Support for DHCP

In vMRF 1.7.0, deployments with a DHCP server are no longer supported. DHCP is no longer a supported IP address allocation mechanism.

5.5.4 Recommended Performance Tuning Parameters in OVF Files

The following recommended parameter values are added as default values in OVF files:

- `ethernetX.ctxPerDev=1` for media interfaces
- `sched.mem.pin=true`
- `sched.cpu.latencySensitivity=high`

5.6 Impact on vMRF Features from vMRF 1.7.0 to vMRF 1.8.0

5.6.1 Changes in Local Media and Signaling IP Address Allocation Methods

This feature allocates IP addresses for media and signaling IP interfaces from a separate MO-based IP pool for signaling and media interfaces. IP address pools are configured and maintained on the vMRF application level. vMRF allocates IP addresses instead of the cloud infrastructure, keeping track of free and used IP addresses in each configured IP pool.

In parallel with the introduction of MO-based IP pool for media and signaling interfaces, IP address allocation using cloud platform IP pools is no longer supported, and manual IP address allocation is supported only in VMware deployments..



5.6.2 VNF-LCM Workflow Improvements: Auto-Healing

If Auto-Healing is configured in VNF-LCM, a faulty VM in the cluster and its resources are recreated automatically, based on alarm notifications sent to ENM. If the COM SA, CLM Cluster Node Unavailable alarm sent to ENM matches one of the configured autostart rules, the VNF-LCM starts a healing workflow instance with the specified parameters. The Auto-Healing autostart rule file must be activated in VNF-LCM so that the alarm notifications, initiated by vMRF and forwarded to VNF-LCM through the ENM alarm handler, can be paired to the appropriate workflows.

5.6.3 Support for VM Snapshots

In vMRF 1.8.0, support for VM snapshots is introduced in VMware deployments. Snapshots allow for reverting VMs of the VNF cluster manually to an earlier state, if normal operation cannot be retained using normal O&M procedures.