Implementation Agreement for Passing RTP Media and SIP Session Metrics from Control Plane to Management Plane, over FTP/SFTP

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MultiService Forum
Implementation Agreement

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Abstract:

The MultiService Forum (MSF) is responsible for developing Implementation Agreements or Architectural Frameworks which can be used by developers and network operators to ensure interoperability between components from different vendors. MSF Implementation Agreements are formally ratified via a Straw Ballot and then a Principal Member Ballot.

Draft MSF Implementation Agreements or Architectural Framework may be published before formal ratification via Straw or Principal Member Ballot. In order for this to take place, the MSF Technical Committee must formally agree that a draft Implementation Agreement or Architectural Framework should be progressed through the balloting process. A Draft MSF Implementation Agreement or Architectural Framework is given a document number in the same manner as an Implementation Agreement.

Draft Implementation Agreements may be revised before or during the full balloting process. The revised document is allocated a new major or minor number and is published. The original Draft Implementation Agreement or Architectural Framework remains published until the Technical Committee votes to withdraw it.

After being ratified by a Principal Member Ballot, the Draft Implementation Agreement or Architectural Framework becomes final. Earlier Draft Implementation Agreements or Architectural Frameworks remain published until the Technical Committee votes to withdraw them.

The use of capitalization of the key words “MUST”, “SHALL”, “REQUIRED”, “MUST NOT”, “SHOULD NOT”, “SHOULD”, “RECOMMENDED”, “NOT RECOMMENDED”, “MAY” or “OPTIONAL” is as described in section V-B of the MSF Technical Committee Operating Procedures.

The goal of the MSF is to promote multi-vendor interoperability as part of a drive to accelerate the deployment of next generation networks. To this end the MSF looks to adopt pragmatic solutions in order to maximize the chances for early deployment in real world networks.

To date the MSF has defined a number of detailed Implementation Agreements and detailed Test Plans for the signaling protocols between network components and is developing additional Implementation Agreements and Test Plans addressing some of the other technical issues such as QoS and Security to assist vendors and operators in deploying interoperable solutions.

The MSF welcomes feedback and comment and would encourage interested parties to get involved in this work program. Information about the MSF and membership options can be found on the MSF website http://www.msforum.org/

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I. The MultiService Forum

The MultiService Forum (MSF) is a global association of service providers, system suppliers and other organizations committed to developing and promoting open-architecture, multiservice communication systems. Founded in 1998, the MSF is an open-membership organization comprised of the world's leading telecommunications companies.

The MSF's activities include developing implementation agreements, promoting worldwide compatibility and interoperability, and encouraging input to appropriate national and international standards bodies.

As part of MSF's effort to drive and promote interoperability, the MSF has created a number of programs geared toward accelerating real world network deployments:

1. Global MSF Interoperability (GMI) events. GMI events provide a real-world setting for vendors to test their solutions and provide evidence that vendor products meet the interoperability standards set forth by MSF Implementation Agreements. Each MSF GMI event is built around a set of capabilities defined for a given release of the MSF Architecture.

2. Next Generation Network (NGN) Test Bed. The NGN test bed provides a facility to enable carriers and vendors to perform in-depth testing of a specific interface as defined in a given release of the MSF architecture.

3. Certification Programs. For more mature technologies the MSF can provide Certification of compliance to a given Implementation Agreement where MSF members believe that it is of value to the industry to do so.

II. An introduction to MSF documentation and GMI 2008

This document is part of the MSF Release 4 set of architectural, protocol and test documentation.

The MSF Release 4 Architecture is a physical implementation of the functional architectures that have been proposed by the key Standards Development Organizations. As such the MSF Release 4 Architecture represents the current state of the industry and it identifies current open interfaces between physically separate network elements.

MSF Implementation Agreements define the protocols to be used over specific open interfaces. Where possible MSF Implementation Agreements are based on industry standard protocols augmented with additional information so as to ensure interoperability between communicating network elements. This level of interoperability is achieved by closing any gaps and tightening any optional capabilities in those industry standards to remove the danger of mutually incompatible selections by vendors. An MSF Implementation Agreement is targeted at a given release of the MSF architecture but can be used in any circumstance where an operator wishes to deploy the open interface and its functionality within their own network.

The MSF Release 4 architecture and its associated implementation agreements are used as the basis for GMI 2008. GMI 2008 is a global test event executed to demonstrate multi-vendor, multi-service interoperability based around IMS and includes IPTV and web based services.

As part of GMI 2008 a number of detailed test scenarios have been developed and a number of test plans defined. Test plans contain the set of test cases required to demonstrate a given MSF Release 4 capability and serve to exercise and validate the set of Implementation Agreements required to realize the capability.

Following the completion of GMI 2008 the MSF Release 4 architecture and individual implementation agreements will be updated if the testing identifies any deficiencies in the documents.

For more information about the scope of GMI2008 please go to http://www.msforum.org

III. Impact on previously published MSF documents

This is a new specification for MSF release 4 and GMI 2008.

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Introduction

1.1 Scope

Within the MSF Release 4 Physical Architecture [4] and GMI 2008 Physical Scenarios [3], a function has been defined for transferring the RTP/RTCP and SIP metrics, collected/calculated at network elements, borders, or endpoints, from the control plane up to the management plane.

This function and associated interfaces would be applied where a network element (e.g. S-SBG-NE/D-SBG-NE, MGC/TGW, UE, RGW) contains the function of collecting and/or calculating media plane and control plane performance metrics, as well as supports the FTP and/or SFTP protocols for communication.

This IA addresses this "FTP-based Metrics Transfer" function as a part of the PM&M architecture [2] within the MSF architecture, which means the MSF reference points MI-6 and MI-9.

1.2 References

[1]	draft-ietf-pmol-sip-perf-metrics-01	SIP End-to-End Performance Metrics
[2]	MSF-2007.130.04	Performance Management and Monitoring Architecture
[3]	MSF-2007.132.07	Physical Scenarios for GMI 2008
[4]	MSF-2008.045.01	MSF Release 4 Architecture
[5]	MSF-2008.112.03	Implementation Agreement for Passing RTP QoS Metrics over H.248 from Media Plain to Control Plane

1.3 Abbreviations

AGW	Access Gateway
AS	Application Server
CPCP	Control Plane Collection Point
CPMP	Control Plane Measurement Point
CPRP	Control Plane Reporting Point
D-SBG-NC	Data Path Session Border Gateway, Network Core
D-SBG-NE	Data Path Session Border Gateway, Network Edge
FTP	File Transfer Protocol
H.248	MeGaCo (Media Gateway Control Protocol)
IP	Internet Protocol
MDR	Metrics Data Record
MGC	Media Gateway Controller
MOP	Media Origination Point
MPCP	Media Plane Collection Point
MPMP	Media Plane Measurement Point
MPRP	Media Plane Reporting Point
OSS	Operations & Support System
P-CSC	Proxy Call Session Controller
PM&M	Performance Monitoring & Management
PMCS	Performance Monitoring & Collection System
POTS	Plain Old Telephone System
RGW	Residential Gateway
RTP	Real-Time Protocol
S-SBG-NC	Signalling Path Session Border Gateway, Network Core
S-SBG-NE	Signalling Path Session Border Gateway, Network Edge
SFTP	Secure FTP
SIP	Session Initiation Protocol
SOP	Session Origination Point
SPDS	Session/Service-based Policy Decision Server
TGW	Trunking Gateway

2. PM&M Architecture

The FTP-based RTP and SIP Metrics transfer function operates over the MI-6 and MI-9 interfaces in the PM&M architecture in Figure 1-1.

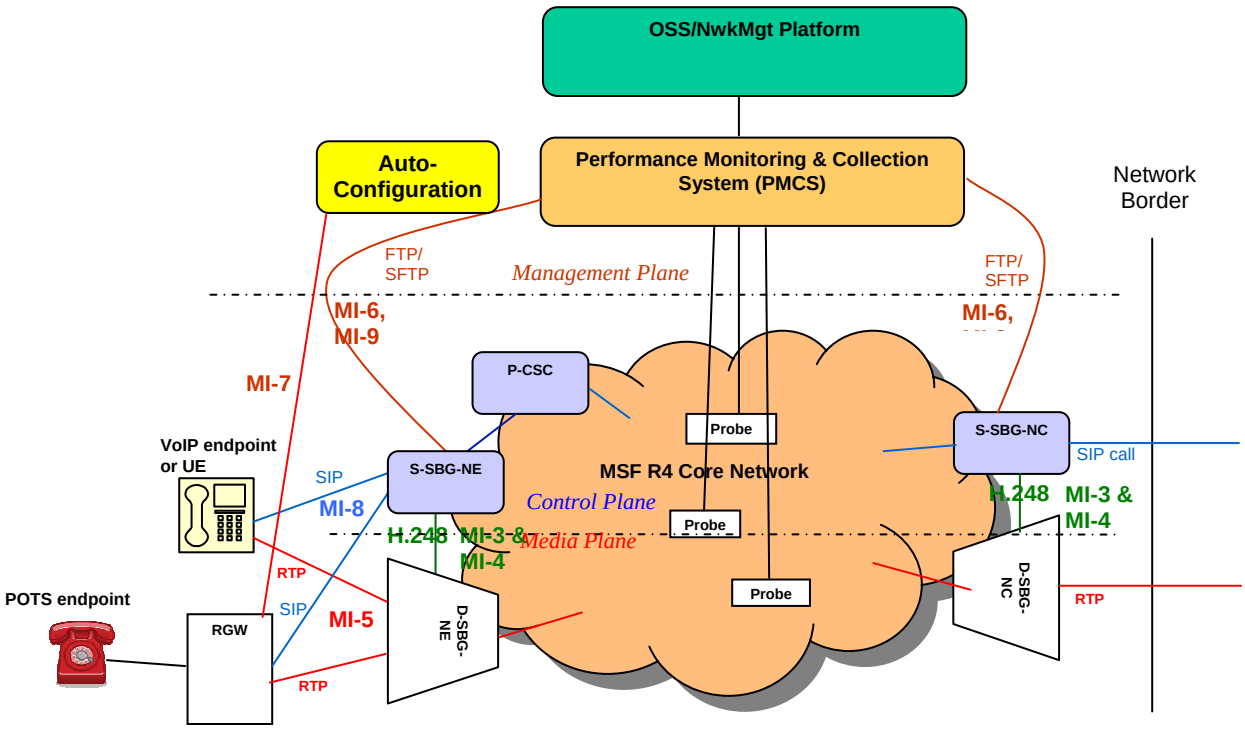

Figure 1-1: PM&M Architecture

2.1 Media Plane Reporting

In the media plane, there exist three logical functions:

1. Media Origination Point (MOP), which is the point from where the RTP and associated RTCP streams are sent from. The element with this function will also be a MPMP for bi-directional media to be able to generate the RTCP metrics for received streams
2. Media Plane Measurement Point (MPMP), which is the point where the RTP streams are analysed and near-end metrics measured, including retrieving the edge or far-end metrics from RTCP
3. Media Plane Reporting Point (MPRP), which is the point that transmits the metrics from an element in the media plane up to an element in the control plane that contains a MPCP function

This IA does not cover these three functions, which are covered by reference [5] for the MI-3 interface.

2.2 Control Plane Reporting

In the control plane, there exist four logical functions:

1. Session Origination Point (SOP), which is the point from where the SIP signaling messages are sent from – usually an edge device. The element with this function will also be a CPMP for generating the SIP metrics for sessions
2. Control Plane Measurement Point (CPMP), which is the point where the SIP sessions are analysed and near-end metrics measured, including retrieving the edge or far-end metrics from SIP
3. Media Plane Collection Point (MPCP), which is the point where the RTP metrics are received and collected from a MPRP function in the media plane
4. Control Plan Reporting Point (CPRP), which is the point that transmits the RTP and SIP metrics from an element in the control plane up to an element in the management plane that contains a CPCP function

This IA describes the MI-6 for media metrics reporting, and the MI-9 interface for signaling session metrics reporting.

2.3 MI-6 Interface

The MI-6 interface is the FTP-based RTP Metrics transfer function, which performs the following:

- Collects the RTP and RTCP metrics that have been received from the media plane by the control plane element
- Transmits the metrics up to the management plane element

The session metrics may either be a summary of the network metrics or on a per call basis.

Getting the performance metrics from the media plane to the control plane is out of the scope of this document, and is described by the MI-3 IA [5].

2.4 MI-9 Interface

The MI-9 interface is the FTP-based SIP Metrics transfer function, which performs the following:

- Collates the end-to-end SIP session metrics that have been measured and collected at this network element
- Transmits the metrics up to the management plane element over SFTP (or optionally FTP)

The session metrics are a summary of the network metrics, and are generally not on a per call basis.

It is worth noting here that “end-to-end” metrics measured and collected at an S-SBG will be separate for:

- between the S-SBG and the edge network element (e.g. UE), and
- between the S-SBG and the “end” of the session with the core, which could be an AS, MGC, or even another S-SBG

3. Realization of RTP and SIP Metrics Transfer Function

3.1 Policy

What metrics shall be transmitted shall be based on what metrics have been collected by the MPCP and CPMP functions.

No filtering or descriminatory communication will be conducted between the CPRP and CPCP functions.

3.2 Reporting

Metrics Detail Record (MDR) files, will be transmitted from the CPRP to the CPCP using SFTP (the preferred method or optionally FTP) to transport the file.

The MDR files will be sent to the CPCP at 120 second intervals, i.e once every 2 minutes.

Each MDR file sent will contain only the data reported during the previous 2 minute interval since the last MDR file was sent.

4. Metrics Data

The metrics data will be stored in MDR files, using the Comma Separated Values (CSV) format. The contents of each MDR will only be the values for the time period that the file is recording. Data will be recorded/entered into the MDR as soon as a new set of media and/or session metrics is measured or received.

4.1 Heading

The first line will include the start and stop times, which describe the duration of metrics recorded in each MDR file. These will be labelled as:
Start record:, yyyy:mm:dd:hh:mm:ss, Stop record:, yyyy:mm:dd:hh:mm:ss

The Heading fields, described below, will be included only once in the second line of the file.

4.2 Mandatory Statistics

4.2.1 General Fields

Originator of Metrics (e.g. MOP, SOP)
Heading: Origin
String: Up to 6 alphanumeric characters. If this is not provided then this will be a null entry, followed by a comma

Translator
Heading: Trans
String: Up to 6 alphanumeric characters. If this is not provided then this will be a null entry, followed by a comma

4.2.2 RTP Fields

Refer to [5] for descriptions of each field, applying to MI-6.

If no fresh RTP metrics are available at the time of the record entry, all field entries will be Nulls separated by commas.

4.2.2.1 Media Metric Time Stamp (of the measurement)

Heading: MMTS
Integer: yyyy:mm:dd:hh:mm:ss:aaa (where aaa = 3 digit value in milliseconds)

4.2.2.2 Media Metrics

Packets Sent
Heading: PSent
Integer: Up to 20 numeric characters

Packets Received
Heading: PReceived
Integer: Up to 20 numeric characters

Packet Loss
Heading: PLoss
Floating: Up to 10 numeric characters, a decimal dot (.), and up to 10 numeric characters

Jitter
Heading: Jitter
Integer: Up to 10 numeric characters

Delay or Latency
Heading: Delay
Integer: Up to 10 numeric charaters

4.2.3 SIP Fields

Refer to [1] for descriptions of each field, applying to MI-9.

If no fresh SIP metrics are available at the time of the record entry, all field entries will be Nulls separated by commas.

4.2.3.1 Session Metric Time Stamp (of the measurement)

Heading: SMTS
Integer: yyyy:mm:dd:hh:mm:ss:aaa (where aaa = 3 digit value in milliseconds)

4.2.3.2 Registration Request Delay (RRD)

Successful REGISTER Completion RRD
Heading: Success RRD
Integer: Up to 10 numeric characters

Failed REGISTER Attempt RRD
Heading: Fail RRD
Integer: Up to 10 numeric characters

4.2.3.3 Session Request Delay (SRD)

Successful Session Setup SRD
Heading: Success SRD
Integer: Up to 10 numeric characters

Failed Session Setup SRD

Heading: Fail SRD
Integer: Up to 10 numeric characters

Instant Messaging SRD
Heading: IM SRD
Integer: Up to 10 numeric characters

4.2.3.4 Session Disconnect Delay (SDD)

Successful session completion SDD
Heading: Success SDD
Integer: Up to 10 numeric characters

Failed session completion SDD
Heading: Fail SDD
Integer: Up to 10 numeric characters

4.2.3.5 Session Duration Time (SDT)

Successful session completion SDT
Heading: Success SDT
Integer: Up to 10 numeric characters

Failed session completion SDT
Heading: Fail SDT
Integer: Up to 10 numeric characters

4.2.3.6 Hops per Request (HpR)

Heading: HPR
Integer: Up to 4 numeric characters

4.2.3.7 Session Establishment Rate (SER)

Inviting SER
Heading: INVITE SER
Floating: Up to 3 numeric characters, a decimal dot (.), and up to 2 numeric characters

Instant Messaging SER
Heading: IM SER
Floating: Up to 3 numeric characters, a decimal dot (.), and up to 2 numeric characters

4.2.3.8 Session Establishment Efficiency Rate (SEER)

Heading: SEER
Floating: Up to 3 numeric characters, a decimal dot (.), and up to 2 numeric characters

4.2.3.9 Session Defects (SD)

Heading: SDefects
Floating: Up to 3 numeric characters, a decimal dot (.), and up to 2 numeric characters

4.2.3.10 Ineffective Session Attempts (ISA)

Heading: ISA
Floating: Up to 3 numeric characters, a decimal dot (.), and up to 2 numeric characters

4.2.3.11 Session Disconnect Failures (SDF)

Heading: SDF

Floating: Up to 3 numeric characters, a decimal dot (.), and up to 2 numeric characters

4.2.3.12 Session Completion Rate (SCR)

Successful Session Completion
Heading: Success SCR
Floating: Up to 3 numeric characters, a decimal dot (.), and up to 2 numeric characters
Failed Session Completion
Heading: Fail SCR
Floating: Up to 3 numeric characters, a decimal dot (.), and up to 2 numeric characters

4.2.3.13 Session Success Rate (SSR)

Heading: SSR
Floating: Up to 3 numeric characters, a decimal dot (.), and up to 2 numeric characters

4.3 Optional Statistics

If no optional metrics are supported by the CPRP, then no headers or fields will be created for these.

4.3.1 RTCP XR Fields

Refer to [5] for descriptions of each field, applying to MI-6.

4.3.1.1 Packet Loss

Packet Loss Concealment Type
Heading: PLCT
Integer: 1 numeric characters

Network Packet Loss Rate
Heading: NPLR
Integer: Up to 3 numeric characters

Jitter Buffer Discard Rate
Heading: JBDR
Integer: Up to 3 numeric characters

4.3.1.2 Delays

RTCP Round-Trip Delay
Heading: RTD
Integer: Up to 10 numeric characters

End System Delay
Heading: ESD
Integer: Up to 10 numeric characters

4.3.1.3 Levels

Signal Level
Heading: SLevel
Integer: Up to 4 numeric characters

Noise Level

Heading: NLevel
Integer: Up to 4 numeric characters

4.3.1.4 Residual Echo Return Loss

Heading: RERL
Integer: Up to 4 numeric characters

4.3.1.5 Quality Scores

R Factor

Heading: RFact
Integer: Up to 3 numeric characters

External R Factor

Heading: ERF
Integer: Up to 3 numeric characters

Estimated MOSLQ

Heading: MOSL
Integer: Up to 2 numeric characters

Estimated MOSCQ

Heading: MOSC
Integer: Up to 2 numeric characters

4.3.2 RTCP XR Burst Metrics

Refer to [5] for descriptions of each field.

4.3.2.1 Minimum Gap Threshold

Heading: MGT
Integer: Up to 4 numeric characters

4.3.2.2 Bursts

Burst Loss Density

Heading: BLD
Integer: Up to 3 numeric characters

Burst Duration

Heading: BurstD
Integer: Up to 10 numeric characters

4.3.2.3 Gaps

Gap Loss Density

Heading: GLD
Integer: Up to 3 numeric characters

Gap Duration

Heading: GapD
Integer: Up to 10 numeric characters