[MS-QoE]:
Quality of Experience Monitoring Server Protocol Specification

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Revision Summary

Date	Revision History	Revision Class	Comments
04/04/2008	0.1		Initial version
04/25/2008	0.2		Updated based on feedback
06/27/2008	1.0		Updated and revised the technical content.
08/15/2008	1.01		Revised and edited the technical content.
12/12/2008	2.0		Updated and revised the technical content.
02/13/2009	2.01		Revised and edited the technical content.
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07/13/2009	2.03	Major	Revised and edited the technical content
08/28/2009	2.04	Editorial	Revised and edited the technical content
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02/19/2010	2.06	Editorial	Revised and edited the technical content
03/31/2010	2.07	Major	Updated and revised the technical content
04/30/2010	2.08	Editorial	Revised and edited the technical content
06/07/2010	2.09	Minor	Updated the technical content
06/29/2010	2.10	Editorial	Changed language and formatting in the technical content.
07/23/2010	2.10	No change	No changes to the meaning, language, or formatting of the technical content.
09/27/2010	3.0	Major	Significantly changed the technical content.
11/15/2010	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
12/17/2010	3.0	No change	No changes to the meaning, language, or formatting of the technical content.

Date	Revision History	Revision Class	Comments
03/18/2011	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
06/10/2011	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
01/20/2012	4.0	Major	Significantly changed the technical content.

Table of Contents

1 Introduction

This document specifies the Quality of Experience Monitoring Server Protocol. It is a proprietary protocol used for publishing Quality of Experience (QoE) metrics. A client calculates QoE metrics and then sends them to a server for monitoring and diagnostics purposes.

Sections 1.8, 2, and 3 of this specification are normative and contain RFC 2119 language. Sections 1.5 and 1.9 are also normative but cannot contain RFC 2119 language. All other sections and examples in this specification are informative.

1.1 Glossary

The following terms are defined in [MS-GLOS]:

Coordinated Universal Time (UTC)
fully qualified domain name (FQDN)
Internet Protocol version 4 (IPv4)
network address translation (NAT)
Transmission Control Protocol (TCP)
User Datagram Protocol (UDP)

The following terms are defined in [MS-OFCGLOS]:

202 Accepted
Audio/Video Edge Server (A/V Edge Server)
B-frame
call
candidate
codec
Common Intermediate Format (CIF)
conference
connectivity check
dialog
endpoint
forward error correction (FEC)
I-frame
Interactive Connectivity Establishment (ICE)
jitter
Multipurpose Internet Mail Extensions (MIME)
P-frame
proxy
public switched telephone network (PSTN)
QoE Monitoring Server
Quality of Experience (QoE)
Real-Time Transport Protocol (RTP)
remote endpoint
RTP packet
RTVideo
SERVICE
session
Session Description Protocol (SDP)
Session Initiation Protocol (SIP)
SIP message
SIP transaction
stream

Super P-frame (SP-frame)
Synchronization Source (SSRC)
TURN server
Uniform Resource Identifier (URI)
user agent client (UAC)
user agent server (UAS)
XML schema
XML schema definition (XSD)

The following terms are specific to this document:

mean opinion score (MOS): A numerical indication of the perceived quality of media. It is expressed as a single number in the range of 1 to 5, where 1 is the lowest perceived quality and 5 is the highest perceived quality.

QoE Monitoring Agent: A service running on a front-end server that collects and processes Quality of Experience (QoE) reports from clients in the form of a SIP message, sends a 202 Accepted or an error response to the client, and sends the QoE metrics to the QoE Monitoring Server.

reporting endpoint: A protocol client that sends Quality of Experience (QoE) metrics to a QoE Monitoring Server.

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as described in [RFC2119]. All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

References to Microsoft Open Specification documents do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information. Please check the archive site, http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624, as an additional source.

[IETFDRAFT-SIPSOAP-00] Deason, N., "SIP and SOAP", draft-deason-sip-soap-00, June 30 2000, http://www.softarmor.com/wgdb/docs/draft-deason-sip-soap-00.txt

[MS-RTP] Microsoft Corporation, "Real-time Transport Protocol (RTP) Extensions".

[MS-SDPEXT] Microsoft Corporation, "Session Description Protocol (SDP) Version 2.0 Extensions".

[MS-TURN] Microsoft Corporation, "Traversal Using Relay NAT (TURN) Extensions".

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, http://www.rfc-editor.org/rfc/rfc2119.txt

[RFC3550] Schulzrinne, H., Casner, S., Frederick, R., and Jacobson, V., "RTP: A Transport Protocol for Real-Time Applications", STD 64, RFC 3550, July 2003, http://www.ietf.org/rfc/rfc3550.txt

[RFC3551] Schulzrinne, H., and Casner, S., "RTP Profile for Audio and Video Conferences with Minimal Control", STD 65, RFC 3551, July 2003, http://www.ietf.org/rfc/rfc3551.txt

[RFC3611] Friedman, T., Ed., Caceres, R., Ed and Clark, A., Ed., "RTP Control Protocol Extended Reports (RTCP XR)", RFC 3611, November 2003, http://www.ietf.org/rfc/rfc3611.txt

1.2.2 Informative References

[ITUP.562] ITU-T, "P.562 : Analysis and interpretation of INMD voice-service measurements", Recommendation P.562, May 2004, http://www.itu.int/rec/T-REC-P.562-200405-I/en

[ITUP.800.1] ITU-T, "P.800.1 : Mean Opinion Score (MOS) terminology", Recommendation P.800.1, July 2006, http://www.itu.int/rec/T-REC-P.800.1-200607-I/en

[MS-GLOS] Microsoft Corporation, "Windows Protocols Master Glossary".

[MS-OFCGLOS] Microsoft Corporation, "Microsoft Office Master Glossary".

[MS-RTVPF] Microsoft Corporation, "RTP Payload Format for RT Video Streams Extensions".

[MS-SIPRE] Microsoft Corporation, "Session Initiation Protocol (SIP) Routing Extensions".

1.3 Protocol Overview (Synopsis)

This protocol is a proprietary protocol for publishing QoE metrics from a protocol client to a **QoE Monitoring Agent**.

A protocol client publishes QoE metrics at the end of each **Session Initiation Protocol (SIP) session (3)** after a SIP BYE transaction. It encodes QoE metrics to conform to the **XML schema** that is specified in section 2, and then publishes the metrics in the form of a SIP **SERVICE** message that the protocol client sends to the QoE Monitoring Agent through a SIP **proxy**. QoE Monitoring Agent then converts the messages into an internal format and sends them to QoE Monitoring Server and/or a registered 3rd consumer.

Note: The routing behavior of the SIP proxy is based on the SIP routing rules that are described in [MS-SIPRE] section 3.

The QoE Monitoring Agent runs along with SIP proxy and it validates the SIP SERVICE message and returns a final SIP SERVICE response. The response is based on standard SIP rules and is either response code **202 Accepted**, or an error code.

Note: A SIP 202 response indicates that the QoE Monitoring Agent accepted the report, but not that it processed the report.

This sequence of events is illustrated in the following figure in which, at the end of a session between two protocol clients, each protocol client publishes QoE metrics to the QoE Monitoring Agent through the SIP Proxy that mediated the session, and the QoE Monitoring Agent returns a SIP 202 response to each protocol client.

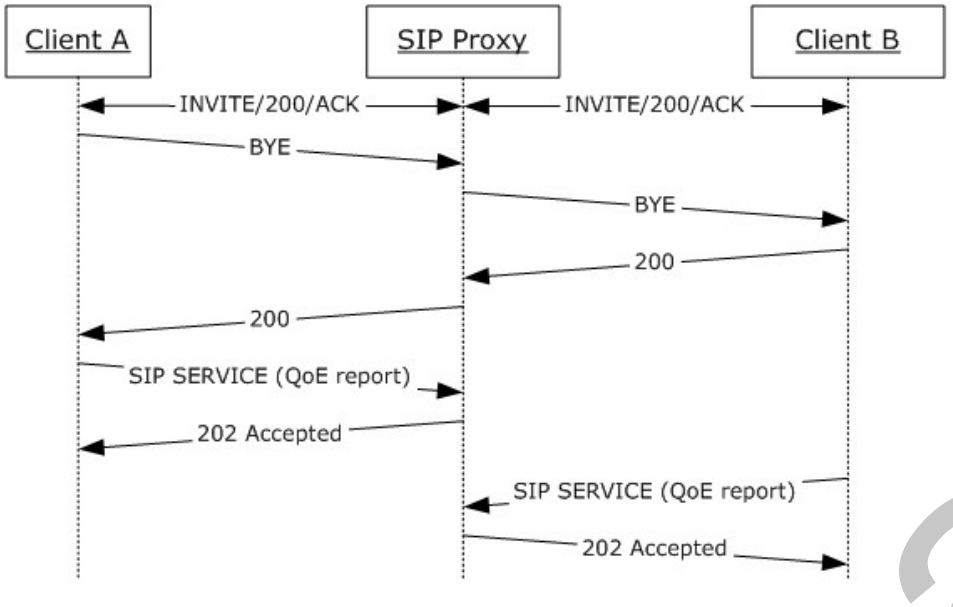

Figure 1: SIP message sequence from protocol client session end through QoE reporting

The QoE Monitoring Server can use QoE metrics for:

- Generating alerts regarding abnormal media quality conditions.
- Generating media quality and resource utilization reports.
- Building a history database for advanced diagnostics and analytic applications.

1.4 Relationship to Other Protocols

This protocol depends on SIP. More specifically, this protocol depends on the SIP SERVICE method.

1.5 Prerequisites/Preconditions

A **QoE Monitoring Server** is required to collect and aggregate QoE metrics and QoE is enabled.

1.6 Applicability Statement

Use this protocol in scenarios that require monitoring quality of SIP sessions (3).

1.7 Versioning and Capability Negotiation

None.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

2 Messages

2.1 Transport

This protocol relies on SIP transport.

2.2 Message Syntax

The SIP SERVICE message and response message syntax are specified in [IETFDRAFT-SIPSOAP-00] section 4.0. The SIP SERVICE message that is used for this protocol MUST include an **application/vq-rtcpxr+xml Content-Type** header. The content is formatted as a Multipurpose Internet Mail Extensions (MIME) type SIP SERVICE message.

QoE Monitoring Agent will process the request only when the request URI is one of the following.

- SIP URI of QoE. Each pool has a SIP URI for QoE (a.k.a. QoE GRUU).
- SIP URI of the pool in which QoE Monitoring Agent is hosted
- Request URI is same to TO header. In this case, the request will be sent to home pool of the target user, and the QoE Monitoring Agent hosted on the home pool will process it.

2.2.1 application/vq-rtcpxr+xml

This section follows the product behavior specified in footnote <1>.

This section contains a detailed specification of the XML schema to which QoE payloads MUST conform. Each element is described in a subsection, along with the child elements and attributes for that element. For each element, the following information is listed:

- **Element information**: Element type and a description of the element.
- **Child elements**: Name, type, availability, and description. If a child element is marked as not available, it is shown in the XML schema, but not populated by the protocol client. This protocol only includes descriptions for elements that are published by protocol clients. If a child element is marked as not supported for a specific product version, the QoE Monitoring Agent will return an error code as described in section 3.2.
- **Attributes (if any)**: Element ID, type, required, availability, description, and unit. If an attribute is marked as required, it MUST be present in the XML document. If an attribute is marked as not available, it is shown in the XML schema, but not populated by the protocol client. This protocol only includes descriptions for attributes that are published by protocol clients.

All string types defined within this section are encoded in Unicode. Unless otherwise stated, if the string exceeds the number of characters specified within [], the value will be truncated. All values should be formatted as invariant culture.

The XML schema in this section uses three namespaces:

- ms-rtcp-metrics
- ms-rtcp-metrics.v2
- ms-rtcp-metrics.v3 <2>

Elements defined in the **ms-rtcp-metrics.v2** namespace are named with a "v2" prefix. Similarly, elements defined in the **ms-rtcp-metrics.v3** namespace are named with a "v3" prefix. Elements that are not named with a "v2" or a "v3" prefix are defined in the **ms-rtcp-metrics** namespace.

2.2.1.1 VQReportEvent Element

A **VQReportEvent** element is a quality report envelope. The type of this element is **VQReportEventType**.

The following example is a **VQReportEvent** element.<3>

```
<xs:element name="VQReportEvent" type="tns:VQReportEventType"/>
<xs:complexType name="VQReportEventType">
  <xs:choice>
    <xs:element name="VQSessionReport" type="tns:SessionReportType"
     maxOccurs="unbounded"/>
    <xs:element name="VQSessionIntervalReport"
     type="tns:SessionReportType" maxOccurs="unbounded"/>
    <xs:any namespace="##other" processContents="lax"
     maxOccurs="unbounded"/>
  </xs:choice>
  <xs:attribute name="Version" type="xs:string" use="optional" />
  <xs:attribute ref="v2:SchemaVersion" use="optional"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>

<xs:attribute name="SchemaVersion" type="xs:string"/>
```

2.2.1.1.1 Child Elements

The following table lists the child elements of the **VQReportEvent** element.

Element	Type	Available	Description
VQSessionReport	**SessionReportType**	Yes	Quality report for a session (3) (SIP **dialog**).
VQSessionIntervalReport	**SessionReportType**	No	

2.2.1.1.2 Attributes

The following table lists the attributes of the **VQReportEvent** element.

Attribute	Type	Available	Description
Version<4>	**xs:string**	Yes	Describes version number of the reporting schema.
v2:SchemaVersion<5>	**xs:string**	Yes	Describes version number of the reporting schema and replaces the **Version** element.

2.2.1.2 VQSessionReport Element

A **VQSessionReport** element is a quality report for a session (3), or SIP dialog. The type of this element is **SessionReportType**.

The following table lists the attributes of the **VQSessionReport** element.

Element	Type	Required	Available	Description
SessionId	**xs:string [755]**	Yes	Yes	SIP dialog ID of the reported session. If maximum string length is exceeded, the report is rejected.

The following example is a **VQSessionReport** element.<6>

```
<xs:complexType name="SessionReportType">
  <xs:sequence>
    <xs:element name="LocationProfile" type="xs:string"
     minOccurs="0"/>
    <xs:element name="Pool" type="xs:string" minOccurs="0"/>
    <xs:element name="Endpoint" type="tns:EndpointType"/>
    <xs:element name="DialogInfo" type="tns:DialogInfoType"/>
    <xs:element name="MediaLine" type="tns:MediaLineType"
     maxOccurs="unbounded"/>
    <xs:element ref="v2:OpaqueClientPlatformData" minOccurs="0" />
    <xs:element ref="v2:OpaqueServerPlatformData" minOccurs="0" />
    <xs:element ref="v2:OpaqueConferenceData" minOccurs="0" />
    <xs:sequence minOccurs="0">
      <xs:element ref="v2:Separator" />
      <xs:any namespace="##other" processContents="lax"
        minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:attribute name="SessionId" type="xs:string" use="required"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/> </xs:complexType>

<xs:complexType name="OpaqueClientPlatformDataType">
  <xs:sequence>
    <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax" />
</xs:complexType>
<xs:complexType name="OpaqueServerPlatformDataType">
  <xs:sequence>
    <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax" />
</xs:complexType>
<xs:complexType name="OpaqueConferenceDataType">
  <xs:sequence>
    <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax" />
</xs:complexType>

<xs:element name="Separator">
  <xs:complexType></xs:complexType>
</xs:element>
```

2.2.1.2.1 Child Elements

The following table lists the child elements of the **VQSessionReport** element.

Element	Type	Available	Description
LocationProfile	**xs:string**	No	
Pool	**xs:string**	No	
Endpoint	**EndpointType**	Yes	Information about the **endpoint (5)** that created the report.
DialogInfo	**DialogInfoType**	Yes	Information regarding the SIP dialog.
MediaLine	**MediaLineType**	Yes	A media line is the logical equivalent to an m-line in **Session Description Protocol (SDP)**.
v2:OpaqueClientPlatformData<7>	**OpaqueClientPlatformDataType**	No	
v2:OpaqueServerPlatformData<8>	**OpaqueServerPlatformDataType**	No	
v2:OpaqueConferenceData<9>	**OpaqueConferenceDataType**	No	
v2:Separator<10>	default	No	Separator element used for future schema extensions.

2.2.1.3 Endpoint Element

An **Endpoint** element contains information about the endpoint (5) that created the report. The type of this element is **EndpointType**.

The following table lists the attributes of the **Endpoint** element.

Element	Type	Required	Available	Description
Name	**xs:string [256]**	Yes	Yes	Computer name of the device that created the report. If the maximum string length is exceeded, the report is rejected.
ProfileID	**xs:string**	No	No	
v2:OS<11>	**xs:string [128]**	No	Yes	The operating system used for the **reporting endpoint**.

Element	Type	Required	Available	Description
v2:CPUName<12>	**xs:string [128]**	No	Yes	The name of the central processing unit (CPU) used for the reporting endpoint.
v2:CPUNumberOfCores<13>	**xs:short**	No	Yes	The number of processor CPU cores used for the reporting endpoint.
v2:CPUProcessorSpeed<14>	**xs:int**	No	Yes	The speed in megahertz of the CPU used for the reporting endpoint.
v2:VirtualizationFlag<15>	**xs:byte**	No	Yes	Flag indicating the type of virtualization environment: "0x00" - None "0x01" - HyperV "0x02" - VMWare "0x04" - Virtual PC "0x08" - Xen PC

The following example is an **Endpoint** element.<16>

```
<xs:complexType name="EndpointType">
  <xs:sequence>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="Name" type="xs:string" use="required"/>
  <xs:attribute name="ProfileId" type="xs:string"/>
  <xs:attribute ref="v2:OS" use="optional"/>
  <xs:attribute ref="v2:CPUName" use="optional"/>
  <xs:attribute ref="v2:CPUNumberOfCores" use="optional"/>
  <xs:attribute ref="v2:CPUProcessorSpeed" use="optional"/>
  <xs:attribute ref="v2:VirtualizationFlag" use="optional"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.3.1 Child Elements

None.

2.2.1.4 DialogInfo Element

A **DialogInfo** element contains information regarding the SIP dialog. The type of this element is **DialogInfoType**.

The following table lists the attributes of the **DialogInfo** element.

Element	Type	Required	Available	Description	Units
CallId	**xs:string [**755]	Yes	Yes	SIP If the maximum string length is exceeded, the report is rejected.	Not applicable

Element	Type	Required	Available	Description	Units
FromTag	**xs:string** [256]	No	Yes	SIP **From** tag of the dialog.	Not applicable
ToTag	**xs:string** [256]	No	Yes	SIP **To** tag of the dialog.	Not applicable
Start	**xs:dateTime**	Yes	Yes	Start time of the dialog.	**Coordinated Universal Time (UTC)**
End	**xs:dateTime**	Yes	Yes	End time of the dialog.	**UTC**

The following example is a **DialogInfo** element.<17>

```
<xs:complexType name="DialogInfoType">
  <xs:sequence>
    <xs:element name="DialogCategory" type="tns:DialogCategoryType"
     minOccurs="0"/>
    <xs:element name="CorrelationID" type="xs:string" minOccurs="0"/>
    <xs:element name="FromURI" type="xs:anyURI"/>
    <xs:element name="ToURI" type="xs:anyURI"/>
    <xs:element name="Caller" type="xs:boolean"/>
    <xs:element name="LocalContactURI" type="xs:anyURI"/>
    <xs:element name="RemoteContactURI" type="xs:anyURI"/>
    <xs:element name="LocalUserAgent" type="xs:string"/>
    <xs:element name="RemoteUserAgent" type="xs:string"/>
    <xs:element name="LocalPAI" type="xs:anyURI"minOccurs="0"/>
    <xs:element name="RemotePAI"type="xs:anyURI"minOccurs="0"/>
<xs:element name="ConfURI" type="xs:anyURI" minOccurs="0"/>
    <xs:element ref="v2:CallPriority" minOccurs="0"/>
    <xs:element ref="v2:MediationServerBypassFlag" minOccurs="0"/>
    <xs:element ref="v2:TrunkingPeer" minOccurs="0"/>
    <xs:element ref="v2:MediaBypassWarningFlag" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:element ref="v2:RegisteredInside" minOccurs="0"/>
        <xs:sequence minOccurs="0">
          <xs:element ref="v2:Separator" />
          <xs:any namespace="##other" processContents="lax"
            minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:sequence>
    </xs:sequence>
  </xs:sequence>
  <xs:attribute name="CallId" type="xs:string" use="required"/>
  <xs:attribute name="FromTag" type="xs:string"/>
  <xs:attribute name="ToTag" type="xs:string"/>
  <xs:attribute name="Start" type="xs:dateTime" use="required"/>
  <xs:attribute name="End" type="xs:dateTime" use="required"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>

<xs:simpleType name="DialogCategoryType">
  <xs:restriction base="xs:string">
      <xs:enumeration value="OCS" />
      <xs:enumeration value="TRUNK" />
```

```
  </xs:restriction>
</xs:simpleType>
<xs:element name="CallPriority" type="xs:short"/>
<xs:element name="MediationServerBypassFlag" type="xs:boolean"/>
<xs:element name="TrunkingPeer" type="xs:string"/>
<xs:element name="BSSID" type="xs:string"/>
<xs:element name="MediaBypassWarningFlag" type="xs:int"/>
<xs:element name="RegisteredInside" type="xs:boolean"/>
```

2.2.1.4.1 Child Elements

The following table lists the child elements of the **DialogInfo** element.

Element	Type	Available	Description
DialogCategory<18>	**DialogCategoryType**	Yes	Information about the QoE Report leg type, which is either a UC or Mediation Server-GW trunk. For more information, see the enumeration types in section 2.2.1.4.
CorrelationID<19>	**xs:string [775]**	Yes	A unique alphanumeric key that is included by reporting endpoints for **calls** that involve multiple SIP legs.
FromURI	**xs:anyURI**	Yes	SIP **URI** in the SIP **From** header that the reporting endpoint uses if it makes a **SIP transaction** using the reported SIP dialog.
ToURI	**xs:anyURI**	Yes	SIP URI in the SIP **To** header that the reporting endpoint uses if it makes a SIP transaction using the reported SIP dialog.
Caller	**xs:boolean**	Yes	"True" if the reporter was the caller of the SIP dialog. "False" if the reporter was not the caller of the SIP dialog.
LocalContactURI	**xs:anyURI**	Yes	SIP URI in the SIP **Contact** header of the reported SIP dialog that was sent from the reporting endpoint.
RemoteContactURI	**xs:anyURI**	Yes	SIP URI in the **Contact** header of the reported SIP dialog that was sent

Element	Type	Available	Description
			from the **remote endpoint**.
LocalUserAgent	**xs:string [450]**	Yes	SIP **User-Agent** or **Server** header content of the reported SIP dialog that was sent from the reporting endpoint.
RemoteUserAgent	**xs:string [450]**	Yes	SIP **User-Agent** or **Server** header content of the reported SIP dialog that was sent from the remote endpoint.
LocalPAI	**xs:anyURI**	Yes	SIP URI in the SIP **p-asserted-identity** (PAI) header of the reported dialog that was sent from the reporting endpoint.
RemotePAI	**xs:anyURI**	Yes	The SIP URI in the SIP **p-asserted-identity** (PAI) header of the reported dialog that was sent from the remote endpoint.
ConfURI	**xs:anyURI**	Yes	The SIP URI of a **conference** bridge that hosted a conference and terminated this dialog. This URI is unique to each conference and common to all the dialogs that participated in the same conference. **ConfURI** is available for conferences only.
v2:CallPriority<20>	**xs:short**	Yes	The SIP **Priority** header that indicates the priority selected for the call.
v2:MediationServerBypassFlag<21>	**xs:boolean**	Yes	"True" if the reporting endpoint selected the bypass SDP.
v2:TrunkingPeer<22>	**xs:string [256]**	Yes	The SIP **ms-trunking-peer** header that reports the **fully qualified domain name (FQDN)** of the **public switched telephone network**

Element	Type	Available	Description
			(PSTN) gateway.
v2:MediaBypassWarningFlag<23>	**xs:int**	Yes	Warning flags to indicate failures that prevent bypass of the mediation server in a PSTN call. The following values are defined: "0x0000" – No error "0x0001" – Unable to determine bypass identifier for the network interface used for the call
v2:RegisteredInside<24>	xs:boolean	Yes	"True" if the listening address is registered within the enterprise. This replaces the **Inside** element in **AddrType**.
v2:Separator<25>	default	No	Separator element used for future schema extensions.

2.2.1.5 MediaLine Element

A **MediaLine** element is the logical equivalent to an **m-line** in SDP. The type of this element is **MediaLineType**.

The following table lists the attributes of the **MediaLine** element.

Element	Type	Required	Available	Description
Label	**xs:string**	Yes	Yes	Identifies the Media Line. Currently supported values: ▪ "main-audio" ▪ "main-video" ▪ "panoramic-video" ▪ "data"<26> If the value does not match one of these listed strings, the report is rejected.

The following example is a **MediaLine** element.<27>

```
<xs:complexType name="MediaLineType">
  <xs:sequence>
    <xs:element name="Description"
     type="tns:MediaLineDescriptionType"/>
    <xs:element name="InboundStream" type="tns:StreamType"
     minOccurs="0"/>
```

```
      <xs:element name="OutboundStream" type="tns:StreamType"
       minOccurs="0"/>
      <xs:element name="LocalConversationalMOS" type="xs:float"
       minOccurs="0"/>
      <xs:element name="RemoteConversationalMOS" type="xs:float"
       minOccurs="0"/>
      <xs:element name="LocalConversationalMOSAlg" type="xs:string"
       minOccurs="0"/>
      <xs:element name="RemoteConversationalMOSAlg" type="xs:string"
       minOccurs="0"/>
      <xs:element ref="v2:AppliedBandwidthLimit" minOccurs="0" />
      <xs:element ref="v2:AppliedBandwidthSource" minOccurs="0" />
      <xs:element ref="v2:LocalClientEvent" minOccurs="0"/>
      <xs:element ref="v2:RemoteClientEvent" minOccurs="0"/>
      <xs:element ref="v2:OpaqueCoreEndpointData" minOccurs="0" />
      <xs:element ref="v2:OpaqueChannelData" minOccurs="0" />
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax"
         minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:attribute name="Label" type="xs:string" use="required"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>

  <xs:element name="AppliedBandwidthLimit" type="xs:int"/>
  <xs:element name="AppliedBandwidthSource" type="xs:string"/>

  <xs:complexType name="OpaqueChannelDataType" >
    <xs:sequence>
      <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
    </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>
  <xs:complexType name="OpaqueCoreEndpointDataType">
    <xs:sequence>
      <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>

  <xs:element name="Separator">
    <xs:complexType></xs:complexType>
  </xs:element
```

2.2.1.5.1 Child Elements

The following table lists the child elements of the **MediaLine** element.

Element	Type	Available	Description	Units
Description	**MediaLineDescriptionType**	Yes	Media Line context information.	Not applicable

Element	Type	Available	Description	Units
InboundStream	**StreamType**	Yes	Information regarding the inbound media **stream (2)**.	Not applicable
OutboundStream	**StreamType**	Yes	Information regarding the outbound media stream (2).	Not applicable
LocalConversationalMOS	**xs:float**	Yes	Conversational clarity index for remote party, as described in [ITUP.562] section 6.3.	**mean opinion score (MOS)**
RemoteConversationalMOS	**xs:float**	No		
LocalConversationalMOSAlg	**xs:string**	No		
RemoteConversationalMOSAlg	**xs:string**	No		
v2:AppliedBandwidthLimit<28>	**xs:int**	Yes	The bandwidth limit applied for sending media.	bits per second
v2:AppliedBandwidthSource<29>	**xs:string [256]**	Yes	The source of the bandwidth limit policy that was applied for the sending of media.	Not applicable
v2:LocalClientEvent<30>	**ClientEventType**	Yes	Information about quality events detected by the reporting endpoint.	Not applicable
v2:RemoteClientEvent<31>	**ClientEventType**	Yes	Information about quality events detected by the remote endpoint.	Not applicable
v2:OpaqueCoreEndpointData<	**OpaqueCoreEndpointDataT**	No		

Element	Type	Availabl e	Description	Units
32>	ype			
v2:OpaqueChannelData<33>	**v2:OpaqueChannelData**	No		
v2:Separator<34>	default	No	Separator element used for future schema extensions.	Not applicabl e

2.2.1.6 MediaLineDescription Element

A **MediaLineDescription** element contains **MediaLine** context information. The type of this element is **MediaLineDescriptionType**.

The following example is a **MediaLineDescription** element.<35>

```
<xs:complexType name="MediaLineDescriptionType">
  <xs:sequence>
    <xs:element name="Connectivity" type="tns:ConnectivityType"
     minOccurs="0"/>
    <xs:element name="Security" type="xs:string" minOccurs="0"/>
    <xs:element name="Offerer" type="xs:boolean" minOccurs="0"/>
    <xs:element name="Transport" type="tns:TransportType"
     minOccurs="0"/>
    <xs:element name="NetworkConnectivityInfo"
     type="tns:NetworkConnectivityInfoType" minOccurs="0" />
    <xs:element name="LocalAddr" type="tns:AddrType"/>
    <xs:element name="RemoteAddr" type="tns:AddrType"/>
    <xs:element name="CaptureDev" type="tns:DeviceType" minOccurs="0"/>
    <xs:element name="RenderDev" type="tns:DeviceType" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<xs:simpleType name="TransportType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="UDP"/>
    <xs:enumeration value="TCP"/>
  </xs:restriction>
</xs:simpleType>
```

2.2.1.6.1 Child Elements

The following table lists the child elements of the **MediaLineDescription** element.

Element	Type	Available	Description
Connectivity	**ConnectivityType**	Yes	**Interactive Connectivity Establishment (ICE)** connectivity

Element	Type	Available	Description
			information.
Security	**xs:string [128]**	Yes	The security profile in use. Supported values are "SRTP" and "None".
Offerer	**xs:boolean**	Yes<36>	"True" if the reporting endpoint offered the Media Line; otherwise, "False".
Transport	**TransportType**	Yes	The type of transport in use. Supported values are "TCP" and "UDP".
NetworkConnectivityInfo<37>	**NetworkConnectivityInfoType**	Yes	Information about network connectivity of the endpoint (5).
LocalAddr	**AddrType**	Yes	**Internet Protocol version 4 (IPv4)** address related information for the reporting endpoint.
RemoteAddr	**AddrType**	Yes	IPv4 address related information for the remote endpoint.
CaptureDev	**DeviceType**	Yes	A device that is used to capture audio and video media, such as a microphone, a USB phone or a camera.
RenderDev	**DeviceType**	Yes	A device that is used to render audio and video media, such as speakers, a headset, or a USB phone.

2.2.1.7 Connectivity Element

A **Connectivity** element contains ICE connectivity information. The type of this element is **ConnectivityType**.

The following example is a **Connectivity** element.

```
<xs:complexType name="ConnectivityType">
```

```
    <xs:sequence>
      <xs:element name="Ice" type="tns:IceStatusType" minOccurs="0"/>
      <xs:element name="IceWarningFlags" type="xs:unsignedInt"
       minOccurs="0"/>
      <xs:element name="RelayAddress" type="tns:AddrType" minOccurs="0"
       maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0"
       maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>

  <xs:simpleType name="IceStatusType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="FAILED"/>
      <xs:enumeration value="DIRECT"/>
      <xs:enumeration value="RELAY"/>
      <xs:enumeration value="HTTP-PROXY"/>
    </xs:restriction>
  </xs:simpleType>
```

2.2.1.7.1 Child Elements

The following table lists the child elements of the **Connectivity** element.

Element	Type	Available	Description
Ice	**tns:iceStatusType**	Yes	Information about the media path, such as direct or relayed. For more information, see the enumeration types in section 2.2.1.7.
IceWarningFlags	**xs:unsignedInt**	Yes	Information about ICE process described in bits flags. For more information, see the following table.
RelayAddress	**tns:AddrType**	Yes	IPv4 address related information of the **Audio/Video Edge Server (A/V Edge Server)**.

The following table shows the possible values and descriptions for the **IceWarningFlags** applicable to footnote<38>.

Value	Description
"0x000"	There were no failures or ICE was not used.
"0x0010"	**TURN server** is unreachable.
"0x0020"	Shared secret with TURN server failed.
"0x0040"	An attempt to allocate a **User Datagram Protocol (UDP)** port on the TURN server failed.
"0x0200"	An attempt to allocate a **Transmission Control Protocol (TCP)** port on the TURN server failed.
"0x4000"	UDP local connectivity failed.

Value	Description
"0x8000"	UDP **network address translation (NAT)** connectivity failed.
"0x10000"	UDP TURN server connectivity failed.
"0x40000"	TCP NAT connectivity failed.
"0x80000"	TCP TURN server connectivity failed.
"0x100000"	Message Integrity failed in **connectivity check** request.
"0x200000"	Message Integrity failed in connectivity check response.
"0x400000"	**Candidate** lookup failed upon receiving the connectivity check request.
"0x800000"	Candidate lookup failed upon receiving the connectivity check response.
"0x1000000"	Connectivity check request failed because of memory problem or other reasons that prevent sending packets.
"0x2000000"	Connectivity check response failed because of memory problem or other reasons that prevent sending packets.
"0x4000000"	TURN server FQDN was not resolved.
"0x8000000"	TURN server credentials are unknown.

The following table shows the possible values and descriptions for the **IceWarningFlags** applicable to footnote <39>.

Value	Description
"0x0000000"	There were no failures or ICE was not used.
"0x0000001"	TURN server is unreachable.
"0x0000002"	An attempt to allocate a UDP port on the TURN server failed.
"0x0000004"	An attempt to send UDP on the TURN server failed.
"0x0000008"	An attempt to allocate a TCP port on the TURN server failed.
"0x0000010"	An attempt to send TCP on the TURN server failed.
"0x0000020"	UDP local connectivity failed.
"0x0000040"	UDP NAT connectivity failed.
"0x0000080"	UDP TURN server connectivity failed.
"0x0000100"	TCP NAT connectivity failed.
"0x0000200"	TCP TURN server connectivity failed.
"0x0000400"	Message integrity failed in connectivity check request.
"0x0000800"	The message integrity on the response message was incorrect.
"0x0001000"	A bandwidth policy server is configured.

Value	Description
"0x0002000"	Connectivity check request failed because of memory problem or other reasons that prevent sending packets.
"0x0004000"	TURN server credentials expired or are unknown.
"0x0008000"	Bandwidth policy restrictions removed candidates.
"0x0010000"	Bandwidth policy restrictions reduced bandwidth for some candidates.
"0x0020000"	Bandwidth policy keepalive failed.
"0x0040000"	Bandwidth policy allocation failure.
"0x0080000"	No TURN server configured.
"0x0100000"	Multiple TURN servers were attempted for the allocation.
"0x0200000"	Port range exhausted.
"0x0400000"	Received alternate TURN server.
"0x0800000"	Pseudo-TLS failure. See [MS-TURN] section 2.1.1.
"0x1000000"	HTTP proxy is configured.
"0x2000000"	HTTP proxy authentication failed.
"0x4000000"	TCP-TCP connectivity checks failed over TURN server.
"0x8000000"	Use candidates check failed.

2.2.1.8 NetworkConnectivityInfo Element

A **NetworkConnectivityInfo** element contains information specific to the network connection. The type of this element is **NetworkConnectivityInfoType**.

The following example is a **NetworkConnectivityInfo** element.<40>

```
<xs:complexType name="NetworkConnectivityInfoType">
  <xs:sequence>
    <xs:element name="NetworkConnection"
     type="tns:NetworkConnectionType" minOccurs="0"/>
    <xs:element name="VPN" type="xs:boolean" minOccurs="0"/>
    <xs:element name="LinkSpeed" type="xs:float" minOccurs="0"/>
    <xs:element ref="v2:BSSID" minOccurs="0"/>
    <xs:sequence minOccurs="0">
      <xs:element ref="v2:Separator" />
      <xs:any namespace="##other" processContents="lax"
       minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>

<xs:simpleType name="NetworkConnectionType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="wired" />
```

```
      <xs:enumeration value="wifi" />
    </xs:restriction>
  </xs:simpleType>
  <xs:element name="BSSID" type="xs:string"/>
  <xs:element name="Separator">
    <xs:complexType></xs:complexType>
  </xs:element />
```

2.2.1.8.1 Child Elements

This section follows the product behavior described in footnote<41>.

The following table lists the child elements of the **NetworkConnectivityInfo** element.

Element	Type	Available	Description	Units
NetworkConnection	**NetworkConnectionType**	Yes	Information about the **NetworkConnection** type. See ENUM types in section 2.2.1.8.	Not applicable
VPN	**xs:boolean**	Yes	"True" if user is on VPN, "False" if not.	True/False
LinkSpeed	**xs:float**	Yes	The link speed of the network interface of the endpoint (5).	bits per second
v2:BSSID<42>	**xs:string [32]**	Yes	Wireless LAN basic service set identifier.	Not applicable
v2:Separator<43>	default	No	Separator element used for future schema extensions.	Not applicable

2.2.1.9 LocalAddr, RemoteAddr, and RelayAddr Elements

LocalAddr, **RemoteAddr**, and **RelayAddr** elements contain IP address-related information for an endpoint (5) in the dialog. The type for these elements is **AddrType**.

The following example is an **AddrType** element.<44>

```
<xs:complexType name="AddrType">
  <xs:sequence>
    <xs:element name="IPAddr" type="xs:string"/>
    <xs:element name="Port" type="xs:unsignedShort" minOccurs="0"/>
    <xs:element name="Inside" type="xs:boolean" minOccurs="0"/>
    <xs:element name="SubnetMask" type="xs:string" minOccurs="0"/>
    <xs:element ref="v2:MACAddr" minOccurs="0" />
    <xs:sequence minOccurs="0">
      <xs:element ref="v2:Separator"></xs:element>
      <xs:any namespace="##other" processContents="lax"
       minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

```
<xs:element name="MACAddr" type="xs:string"/>
<xs:element name="Separator">
  <xs:complexType></xs:complexType>
</xs:element />
```

2.2.1.9.1 Child Elements

The following table lists the child elements of **LocalAddr**, **RemoteAddr**, and **RelayAddr** elements.

Element	Type	Available	Description	Units
IPAddr	**xs:string**	Yes	The IPv4 listening address for the stream (2) in dotted notation.	IPv4
Port	**xs:unsignedShort**	Yes*	The listening port for the stream (2).	Not applicable
Inside<45>	**xs:boolean**	Yes**	"True" if the listening address is inside the OCS Enterprise, otherwise "False".	Not applicable
SubnetMask	**xs:string**	Yes**	The subnet masks of the listing address for the stream (2), in dotted notation.	IPv4
v2:MACAddr<46>	**xs:string [32]**	Yes**	The media access control address of the network interface adapter associated with the **IPAddr.**	Hexadecimal string
v2:Separator<47>	default	No	Separator element used for future schema extensions.	Not applicable

* Only available for the **LocalAddr** and **RemoteAddr** elements.

** Only available for **LocalAddr**.

2.2.1.10 CaptureDev and RenderDev Elements

CaptureDev and **RenderDev** elements contain microphone, USB phone, or camera device type information. The type for these elements is **DeviceType**.

The following example is a **DeviceType** element.

```
<xs:complexType name="DeviceType">
  <xs:sequence>
    <xs:element name="Name" type="xs:string" minOccurs="0"/>
    <xs:element name="Driver" type="xs:string" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.10.1 Child Elements

The following table lists the child elements of **CaptureDev** and **RenderDev** elements.

Element	Type	Available	Description
Name	**xs:string [256]**	Yes	Media capture or render device name. For more information, see section 6.
Driver<48>	**xs:string [256]**	Yes	Manufacturer and version information about the device driver used for the device.

2.2.1.11 InboundStream and OutboundStream Elements

InboundStream and **OutboundStream** elements contain information regarding a media stream. The type for these elements is **StreamType**.

The following table lists the attributes of **InboundStream** and **OutboundStream** elements.

Element	Type	Required	Available	Description
Id	**xs:unsignedInt**	Yes	Yes	**Synchronization Source (SSRC)** identifier, as specified in [RFC3550] section 8.
Start	**xs:dateTime**	No	No	
End	**xs:dateTime**	No	No	

The following example is a **StreamType** element.

```
<xs:complexType name="StreamType">
  <xs:sequence>
    <xs:element name="Network" type="tns:NetworkMetricsType"
     minOccurs="0"/>
    <xs:element name="Payload" type="tns:PayloadMetricsType"/>
    <xs:element name="QualityEstimates" type="tns:QualityEstimatesType"
     minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="Id" type="xs:unsignedInt" use="required"/>
  <xs:attribute name="Start" type="xs:dateTime"/>
  <xs:attribute name="End" type="xs:dateTime"/>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.11.1 Child Elements

The following table lists the child elements of **InboundStream** and **OutboundStream** elements.

Element	Type	Available	Description
Network	**NetworkMetricsType**	Yes	Network-based metrics.
Payload	**PayloadMetricsType**	Yes	Payload-based metrics.

Element	Type	Available	Description
QualityEstimates	**QualityEstimatesType**	Yes	Metrics estimating the quality of the media.

2.2.1.12 Network Element

A **Network** element contains network-based metrics. The type of this element is **NetworkMetricsType**.

The following example is a **Network** element.<49>

```
<xs:complexType name="NetworkMetricsType">
  <xs:sequence>
    <xs:element name="DSCP" type="xs:byte" minOccurs="0"/>
    <xs:element name="VLAN" type="xs:int" minOccurs="0"/>
    <xs:element name="Jitter" type="tns:JitterType" minOccurs="0"/>
    <xs:element name="PacketLoss" type="tns:PacketLossType"
     minOccurs="0"/>
    <xs:element name="BurstGapLoss" type="tns:BurstGapLossType"
     minOccurs="0"/>
    <xs:element name="Delay" type="tns:DelayType" minOccurs="0"/>
    <xs:element name="Utilization" type="tns:NetworkUtilizationType"
     minOccurs="0"/>
    <xs:element ref="v2:RatioConcealedSamplesAvg" minOccurs="0"/>
    <xs:element ref="v2:RatioStretchedSamplesAvg" minOccurs="0"/>
    <xs:element ref="v2:RatioCompressedSamplesAvg" minOccurs="0"/>
    <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:element ref="v3:ConcealRatioMax" minOccurs="0"/>
        <xs:element ref="v3:ConcealRatioSd" minOccurs="0"/>
        <xs:sequence minOccurs="0">
        <xs:element ref="v3:Separator3" />
        <xs:any namespace="##other" processContents="lax"
         minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>

<xs:element name="RatioConcealedSamplesAvg" type="xs:float"/>
<xs:element name="RatioStretchedSamplesAvg" type="xs:float"/>
<xs:element name="RatioCompressedSamplesAvg" type="xs:float"/>

<xs:element name="Separator">
  <xs:complexType></xs:complexType>
</xs:element />
```

2.2.1.12.1 Child Elements

The following table lists the child elements of the **Network** element.

Element	Type	Available	Description
DSCP	**xs:byte**	No	

Element	Type	Available	Description
VLAN	**xs:byte**	No	
Jitter	**JitterType**	Yes	**Jitter** related metrics.
PacketLoss	**PacketLossType**	Yes	Packet loss related metrics.
BurstGapLoss	**BurstGapLossType**	Yes**	Burst related metrics.
Delay	**DelayType**	Yes<50>	Delay related metrics.
Utilization	**NetworkUtilizationType**	Yes	Utilization related metrics.
v2:RatioConcealedSamplesAvg	**xs:float**	Yes**	Ratio of the number of audio frames with samples generated by packet loss concealment to the total number of audio frames.
v2:RatioStretchedSamplesAvg<51>	**xs:float**	Yes**	Ratio of the number of audio frames with samples that have been stretched to compensate for jitter or loss to the total number of audio frames.
v2:RatioCompressedSamplesAvg<52>	**xs:float**	Yes**	Ratio of the number of audio frames with samples that have been compressed to compensate for jitter or loss to the total number of audio frames.
v2:Separator<53>	default	Yes	Separator element used for future schema extensions.
v3:ConcealRatioMax <54>	**xs:float**	Yes	Maximum value of the short term concealment ratio, which is the ratio of the number of audio frames (10 seconds) with

Element	Type	Available	Description
			samples that are compensated for jitter or loss to the total number of audio frames.
v3:ConcealRatioSD <55>	**xs:float**	Yes	Standard deviation of the short term concealment ratio, which is the ratio of the number of audio frames (10 seconds) with samples that are compensated for jitter or loss to the total number of audio frames.
v3:Separator<56>	default	Yes	Separator element used for future schema extensions.

** Available for **InboundStream** only

2.2.1.13 Payload Element

A **Payload** element contains payload-based metrics. The type of this element is **PayloadMetricsType**.

The following example is a **Payload** element.

```
<xs:complexType name="PayloadMetricsType">
  <xs:choice>
    <xs:element name="Audio" type="tns:AudioPayloadMetricsType"/>
    <xs:element name="Video" type="tns:VideoPayloadMetricsType"/>
    <xs:element name="ApplicationSharing" type="v3:ApplicationSharingPayloadMetricsType" />
    <xs:any namespace="##other" processContents="lax"
     maxOccurs="unbounded"/>
  </xs:choice>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.13.1 Child Elements

The following table lists the child elements of the **Payload** element.

Element	Type	Available	Description
Audio	**AudioPayloadMetricsType**	Yes	Audio-based payload metrics.

Element	Type	Available	Description
Video	**VideoPayloadMetricsType**	Yes	Video-based payload metrics.
ApplicationSharing<57>	**v3:ApplicationSharingPayloadMetricsType**	Yes	ApplicationSharing payload metrics.

2.2.1.14 Payload.Audio Element

A **Payload.Audio** element contains audio-based payload metrics. The type of this element is **AudioPayloadMetricsType**.

The following example is a **Payload.Audio** element.<58>

```
<xs:complexType name="AudioPayloadMetricsType">
  <xs:sequence>
    <xs:element name="PayloadType" type="xs:int" minOccurs="0"/>
    <xs:element name="PayloadDescription" type="xs:string"
     minOccurs="0"/>
    <xs:element name="SampleRate" type="xs:int" minOccurs="0"/>
    <xs:element name="FrameDuration" type="xs:int" minOccurs="0"/>
    <xs:element name="FrameOctets" type="xs:int" minOccurs="0"/>
    <xs:element name="FramesPerPacket" type="xs:int" minOccurs="0"/>
    <xs:element name="PacketsPerSecond" type="xs:int" minOccurs="0"/>
    <xs:element name="FMTP" type="xs:string" minOccurs="0"/>
    <xs:element name="Signal" type="tns:SignalType" minOccurs="0"/>
    <xs:element name="JitterBuffer" type="tns:JitterBufferType"
     minOccurs="0"/>
    <xs:element name="SilenceSupress"
     type="tns:SilenceSuppressionStateType" minOccurs="0"/>
    <xs:element ref="v2:AudioFECUsed" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v3:AudioPostFECPLR" minOccurs="0"/>
        <xs:sequence minOccurs="0">
          <xs:element ref="v2:Separator" />
          <xs:element ref="v3:DecodeStereoPercent" minOccurs="0"/>
          <xs:element ref="v3:AecRenderStereoPercent" minOccurs="0"/>
          <xs:element ref="v3:EncodeStereoPercent" minOccurs="0"/>
          <xs:element ref="v3:AecCaptureStereoPercent" minOccurs="0"/>
          <xs:sequence minOccurs="0">
          <xs:element ref="v3:Separator" />
          <xs:any namespace="##other" processContents="lax"
       minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:sequence>
  </xs:sequence>
</xs:complexType>

<xs:element name="AudioFECUsed" type="xs:boolean"/>

<xs:element name="Separator">
  <xs:complexType></xs:complexType>
</xs:element />
<xs:simpleType name="SilenceSuppressionStateType">
  <xs:restriction base="xs:string">
```

```
    <xs:enumeration value="ON" />
    <xs:enumeration value="OFF" />
  </xs:restriction>
</xs:simpleType>

<xs:complexType name="JitterBufferType">
  <xs:sequence>
    <xs:element name="Type" type="tns:JitterBufferAdaptiveType"
      minOccurs="0" />
    <xs:element name="Rate" type="xs:int" minOccurs="0" />
    <xs:element name="Nominal" type="xs:int" minOccurs="0" />
    <xs:element name="Max" type="xs:int" minOccurs="0" />
    <xs:element name="AbsMax" type="xs:int" minOccurs="0" />
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>

<xs:simpleType name="JitterBufferAdaptiveType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="UNKNOWN" />
    <xs:enumeration value="RESERVED" />
    <xs:enumeration value="NON-ADAPTIVE" />
    <xs:enumeration value="ADAPTIVE" />
    </xs:restriction>
</xs:simpleType>
```

2.2.1.14.1 Child Elements

The following table lists the child elements of the **Payload.Audio** element.

Element	Type	Available	Description	Units
PayloadType<59>	**xs:int**	Yes	Payload number used for the **codec**, as specified in [MS-RTP] section 2.2.1.	Integer
PayloadDescription	**xs:string [256]**	Yes	Codec name, as specified in [MS-SDPEXT] section 3.1.5.3 or [RFC3551] section 6.	Not applicable
SampleRate	**xs:int**	Yes	Audio sample rate.	Samples per second

Element	Type	Available	Description	Units
FrameDuration	**xs:int**	No		
FrameOctets	**xs:int**	No		
FramesPerSecond	**xs:int**	No		
PacketsPerSecond	**xs:int**	No		
FMTP	**xs:string**	No		
Signal	**SignalType**	Yes	Metrics regarding signal level and noise.	Not applicable
JitterBuffer	**JitterBufferType**	No		
SilenceSupress	**SilenceSuppressionStateType**	No		
v2:AudioFECUsed<60>	**xs:boolean**	Yes	"True" means that audio **forward error correction (FEC)** was used at some point during the call. "False" means that no audio FEC was used during the call.	Not applicable
v2:Separator<61>	default	No	Separator element used for future schema extensions.	Not applicable
v3:AudioPostFECPLR	Xs:float	No	Reports packet loss rate after FEC has been applied for audio. Value between 0.00 – 1.00	Percentage
v3:DecodeStereoPercent<62>	Xs:float	Yes	Percentage of audio decoded as	Percentage

Element	Type	Available	Description	Units
			stereo	
v3:AecRenderStereoPercent <63>	Xs:float	Yes	Percentage of call processed by AEC as stereo render	Percentage
v3:EncodeStereoPercent <64>	Xs:float	Yes	Percentage of audio encoded as stereo	Percentage
v3:AecCaptureStereoPercent <65>	Xs:float	Yes	Percentage of call processed by AEC as stereo capture	Percentage
v3:Separator3<66>	default	No	Separator element used for future schema extensions.	Not applicable

2.2.1.15 Payload.Video Element

A **Payload.Video** element contains video-based payload metrics. The type of this element is **VideoPayloadMetricsType**.

The following example is a **Payload.Video** element.<67>

```
<xs:complexType name="VideoPayloadMetricsType">
  <xs:sequence>
    <xs:element name="PayloadType" type="xs:int" minOccurs="0"/>
    <xs:element name="PayloadDescription" type="xs:string"
     minOccurs="0"/>
    <xs:element name="Resolution" type="xs:string" minOccurs="0"/>
    <xs:element name="VideoBitRateAvg" type="xs:int" minOccurs="0"/>
    <xs:element name="VideoBitRateMax" type="xs:int" minOccurs="0"/>
    <xs:element name="VideoFrameRateAvg" type="xs:float" minOccurs="0"/>
    <xs:element name="VideoPacketLossRate" type="xs:float"
     minOccurs="0"/>
    <xs:element name="VideoFrameLossRate" type="xs:float"
     minOccurs="0"/>
    <xs:element name="VideoFrameEncodingTime" type="xs:float"
     minOccurs="0"/>
    <xs:element name="VideoFrameDecodingTime" type="xs:float"
     minOccurs="0"/>
    <xs:element name="VideoFEC" type="xs:boolean" minOccurs="0"/>
```

```
    <xs:element name="FrozenVideoFreq" type="xs:float" minOccurs="0"/>
    <xs:element name="FrozenPeriodPercentAvg" type="xs:float" minOccurs="0"/>
    <xs:element name="ConsecutivePacketLossAvg" type="xs:float"
     minOccurs="0"/>
    <xs:element name="RateMatchLevel" type="xs:float" minOccurs="0"/>
    <xs:element ref="v2:VideoAllocateBWAvg" minOccurs="0"/>
    <xs:element ref="v2:VideoLocalFrameLossPercentageAvg" minOccurs="0"/>
    <xs:element ref="v2:VideoLocalFrameLossPercentageAvg" minOccurs="0"/>

      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:element ref="v2:VideoResolutionDistribution" minOccurs="0" />
        <xs:element ref="v2:VideoRateMatchingLevelDistribution" minOccurs="0" />
        <xs:sequence minOccurs="0">
          <xs:element ref="v2:Separator" />
              <xs:element ref="v3:SendCodecTypes" minOccurs="0"/>
              <xs:element ref="v3:SendFrameRateAverage" minOccurs="0"/>
              <xs:element ref="v3:SendBitRateMaximum" minOccurs="0"/>
              <xs:element ref="v3:SendBitRateAverage" minOccurs="0"/>
              <xs:element ref="v3:SendVideoStreamsMax" minOccurs="0"/>
              <xs:element ref="v3:SendResolutionWidth" minOccurs="0"/>
              <xs:element ref="v3:SendResolutionHeight" minOccurs="0"/>

              <xs:element ref="v3:RecvCodecTypes" minOccurs="0"/>
              <xs:element ref="v3:RecvResolutionWidth" minOccurs="0"/>
              <xs:element ref="v3:RecvResolutionHeight" minOccurs="0"/>
              <xs:element ref="v3:RecvFrameRateAverage" minOccurs="0"/>
              <xs:element ref="v3:RecvBitRateMaximum" minOccurs="0"/>
              <xs:element ref="v3:RecvBitRateAverage" minOccurs="0"/>
              <xs:element ref="v3:RecvVideoStreamsMax" minOccurs="0"/>
              <xs:element ref="v3:RecvVideoStreamsMin" minOccurs="0"/>
              <xs:element ref="v3:RecvVideoStreamsMode" minOccurs="0"/>
              <xs:element ref="v3:VideoPostFECPLR" minOccurs="0"/>
              <xs:sequence minOccurs="0">
                  <xs:element ref="v3:Separator3" />
                  <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
              </xs:sequence>

        </xs:sequence>
      </xs:sequence>

   </xs:sequence>
</xs:complexType>

<xs:element name="VideoAllocateBWAvg" type="xs:int"/>

<xs:element name="VideoLocalFrameLossPercentageAvg" type="xs:float"/>
<xs:element name="Separator">
  <xs:complexType></xs:complexType>
</xs:element />
```

2.2.1.15.1 Child Elements

The following table lists the child elements of the **Payload.Video** element.

Element	Type	Available	Description	Units
PayloadType<68>	**xs:int**	Yes	Payload number used for the codec, as specified in [MS-RTP] section 2.2.1.	Integer
PayloadDescription	**xs:string [256]**	Yes	Codec name, as specified in [MS-SDPEXT] section 3.1.5.3 or [RFC3551] section 6.	Not applicable
Resolution	**xs:string [9]**	Yes	Report video resolution in pixels, in the string format of Width x Height without spaces, for example "640x480".	Pixels
VideoBitRateAvg	**xs:int**	Yes	Average bit rate, or bits per second, sent or received for a video stream (2), computed over the duration of the session	Bits per second

Element	Type	Available	Description	Units
			(3). This includes raw video and transport bits.	
VideoBitRateMax	**xs:int**	Yes	Maximum bit rate, or bits per second, sent or received for a video stream (2), computed over the duration of the session (3).	Bits per second
VideoFrameRateAvg	**xs:float**	Yes	Average frames per second sent or received for a video stream (2), computed over the duration of the session (3).	Frames per second
VideoPacketLossRate	**xs:float**	Outbound	The average fraction lost, as specified in [RFC3550] section 6.4.1, computed over the	Fraction

Element	Type	Available	Description	Units
			duration of the session (3).	
VideoFrameLossRate	**xs:float**	Inbound	The average fraction of frames lost on the video receiver side, computed over the duration of the session (3).	Fraction
VideoFrameEncodingTime	**xs:float**	Outbound	Average frame encoding time. This is the time difference between encoding start and encoding finish, computed over the duration of the session (3).	Milliseconds
VideoFrameDecodingTime	**xs:float**	Inbound	Average frame decoding time. This is the time difference between decoding start and decoding finish, computed over	Milliseconds

Element	Type	Available	Description	Units
			the duration of the session (3).	
VideoFEC	**xs:boolean**	No		
FrozenVideoFreq	**xs:float**	Inbound	Frequency of occurrence of long duration frozen video, where long duration is defined as no video frames displayed for more than 1 second. Equal to the ratio of total occurrence over session (3) duration.	Fraction
FrozenPeriodPercentAvg<69>	**xs:float**	Inbound	Percentage of total call duration for which frozen video was observed.	Percentage
ConsecutivePacketLossAvg<70>	**xs:float**	Inbound	Average number of consecutive packets lost during a video session	Packets

Element	Type	Available	Description	Units
			(3).	
RateMatchLevel<71>	**xs:float**	Outbound	Describes the level of frame rate matching in video sessions (3). This is the average of the level values encountered in the **RTVideo** bit stream (2). Zero ("0") corresponds to the case where all frame types (**I-frames**, **Super P-frames (SP-frames)**, **P-frames**, and **B-frames**) are transmitted. "1" corresponds to the case where I-frames, SP-frames, and P-frames are transmitted. "2" corresponds to the case	Not applicable

Element	Type	Available	Description	Units
			where I-frames and SP-frames are transmitted. "3" corresponds to the case where only I-frames are transmitted.	
v2:VideoAllocateBWAvg<72>	**xs:int**	Outbound	The bandwidth allocated for sending video.	Bits per second
v2:VideoLocalFrameLossPercentageAvg<73>	**xs:float**	Inbound	The average percentage of video frames lost as displayed to the user. This includes frames recovered from network losses.	Percentage
v2:Separator<74>	default	No	Separator element used for future schema extensions.	Not applicable
v2:VideoResolutionDistribution<75>	**VideoResolutionDistributionType**	Inbound/Outbound	The distribution of received or sent video	Not applicable

Element	Type	Available	Description	Units
			resolution.	
v2: VideoRateMatchingLevelDistribution<76>	**VideoRateMatchingLevelDistributionType**	Inbound	The distribution of received video rate matching level.	Not applicable
v2:Separator<77>	default	No	Separator element used for future schema extensions.	Not applicable
v3:SendCodecTypes	**xs:string [256]**	Outbound	Concatenated sequence of Codec names, as specified in [MS-SDPEXT] section 3.1.5.3 or [RFC3551] section 6, using the semicolon ";" as the separator.	Not applicable
v3:SendResolutionWidth	**xs:int**	Outbound	The maximum video image width sent for all video streams (2), computed over the duration of the	Pixels

Element	Type	Available	Description	Units
			session (3).	
v3:SendResolutionHeight	**xs:int**	Outbound	The maximum video image height sent for all video streams (2), computed over the duration of the session (3).	Pixels
v3:SendFrameRateAverage	**xs:float**	Outbound	Average frames per second sent for all video streams (2), computed over the duration of the session (3).	Frames per second
v3:SendBitRateMaximum	**xs:int**	Outbound	The maximum bandwidth actually sent for all video streams (2), computed over the duration of the session (3).	Bits per second
v3:SendBitRateAverage	**xs:int**	Outbound	The average bandwidth	Bits per second

Element	Type	Available	Description	Units
			actually sent for all video streams (2), computed over the duration of the session (3).	
v3:SendVideoStreamsMax	**xs:int**	Outbound	The maximum number of video streams (2), active during any one second interval, computed over the duration of the session (3).	Streams
v3:RecvCodecTypes	**xs:string [256]**	Inbound	Concatenated sequence of Codec names, as specified in [MS-SDPEXT] section 3.1.5.3 or [RFC3551] section 6. Using the semicolon ";" as the separator.	Not applicable
v3:RecvResolutionWidth	**xs:int**	Inbound	The maximu	Pixels

Element	Type	Available	Description	Units
			m video image width received for all video streams (2), computed over the duration of the session (3).	
v3:RecvResolutionHeight	**xs:int**	Inbound	The maximum video image height received for all video streams (2), computed over the duration of the session (3).	Pixels
v3:RecvFrameRateAverage	**xs:float**	Inbound	Average frames per second received for all video streams (2), computed over the duration of the session (3).	Frames per second
v3:RecvBitRateMaximum	**xs:int**	Inbound	The maximum bandwidth received for all	Bits per second

Element	Type	Available	Description	Units
			video streams (2), computed over the duration of the session (3).	
v3:RecvBitRateAverage	**xs:int**	Inbound	The average bandwidth received for all video streams (2), computed over the duration of the session (3).	Bits per second
v3:RecvVideoStreamsMax	**xs:int**	Inbound	The maximum number of video streams (2), received during any one second interval, computed over the duration of the session (3).	Streams
v3:RecvVideoStreamsMin	**xs:int**	Inbound	The minimum number of video streams (2), received during any one second	Streams

Element	Type	Available	Description	Units
			interval, computed over the duration of the session (3).	
v3:RecvVideoStreamsMode	**xs:int**	Inbound	The most common number ("mode") of video streams (2), received during any one second interval, computed over the duration of the session (3).	Streams
v3:VideoPostFECPLR	**xs:float**	Inbound	Reports packet loss rate after FEC has been applied for video. Aggregated across all video streams and codecs. Value between 0.00 – 1.00	Percentage
v3:Separator3	default	No	Separator element used for future schema extensions.	Not applicable

2.2.1.16 VideoResolutionDistribution Element

A **VideoResolutionDistribution** element contains metrics representing a distribution of video resolutions. The type of this element is **VideoResolutionDistributionType**.<78>

The following example is a **VideoResolutionDistribution** element.

```
<xs:complexType name="VideoResolutionDistributionType">
  <xs:sequence>
    <xs:element name="CIFQuality" type="xs:unsignedByte" />
    <xs:element name="VGAQuality" type="xs:unsignedByte" />
    <xs:element name="HD720Quality" type="xs:unsignedByte" />
    <xs:sequence minOccurs="0">
      <xs:element ref="tns:Separator"/>
      <xs:any namespace="##any" processContents="lax"
       minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax"/>
</xs:complexType>
```

2.2.1.16.1 Child Elements

The following table lists the child elements of the **VideoResolutionDistribution** element.<79>

Element	Type	Available	Description	Units
v2:CIFQuality<80>	**xs:unsigned byte**	Yes	The percentage of the duration of a call that is using the **CIF** resolution defined in the following table.	Percentage (0-100)
v2:VGAQuality<81>	**xs:unsigned byte**	Yes	The percentage of the duration of a call that is using the VGA resolution defined in the following table.	Percentage (0-100)
v2:HD720Quality<82>	**xs:unsigned byte**	Yes	The percentage of the duration of a call that is using the HD720 resolution defined in the following table.	Percentage (0-100)
v2:Separator<83>	default	no	Separator element used for future schema extensions.	Not applicable

The following table lists the values of height and width in pixels of the resolution used by elements within the **VideoResolutionDistribution** element.

Resolution	Width	Height
CIF	240 ≤ width < 480	height ≥ 180
CIF	width ≥ 240	180 ≤ height < 360
VGA	480 ≤ width < 960	height ≥ 360
VGA	width ≥ 480	360 ≤ height < 600

Resolution	Width	Height
HD720	width ≥ 960	height ≥ 600

2.2.1.17 VideoRateMatchingLevelDistribution Element

A **VideoRateMatchingLevelDistribution** element contains metrics describing the portion of the call where video frames are discarded to reduce bandwidth. The type of this element is **VideoRateMatchingLevelDistribution**.<84>

The following example is a **VideoRateMatchingLevelDistribution** element.

```
<xs:complexType name="VideoRateMatchingLevelDistributionType">
  <xs:sequence>
    <xs:element name="None_Drop" type="xs:unsignedByte" />
    <xs:element name="B_Drop" type="xs:unsignedByte" />
    <xs:element name="BP_Drop" type="xs:unsignedByte" />
    <xs:element name="BPSP_Drop" type="xs:unsignedByte" />
    <xs:element name="BPSPI_Drop" type="xs:unsignedByte" />
    <xs:sequence minOccurs="0">
      <xs:element ref="tns:Separator"/>
      <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax"/>
</xs:complexType>
```

2.2.1.17.1 Child Elements

The following table lists the child elements of the **VideoRateMatchingLevelDistribution** element.<85>

Element	Type	Available	Description	Units
v2: None_Drop<86>	**xs:unsigned byte**	Yes	The percentage of the duration of a call where no frame types were dropped to reduce bandwidth.	Percentage (0-100)
v2:B_Drop<87>	**xs:unsigned byte**	Yes	The percentage of the duration of a call where only B-frames were dropped to reduce bandwidth. Refer to [MS-RTVPF] section 1.1 for details about frame types.	Percentage (0-100)
v2:BP_Drop<88>	**xs:unsigned byte**	Yes	The percentage of the duration of a call where B-frames and P-frames were dropped to reduce bandwidth. Refer to [MS-RTVPF] section 1.1 for details about frame types.	Percentage (0-100)
v2:BPSP_Drop<89>	**xs:unsigned byte**	Yes	The percentage of the duration of a call where B-frames, P-frames, and SP-frames were dropped to reduce bandwidth. Refer to [MS-RTVPF] section 1.1 for details about frame types.	Percentage (0-100)

Element	Type	Available	Description	Units
v2:BPSPI_Drop	**xs:unsigned byte**	Yes	The percentage of the duration of a call where B-frames, P-frames, SP-frames, and I-frames were dropped to reduce bandwidth.<90> Refer to [MS-RTVPF] section 1.1 for details about frame types.	Percentage (0-100)
v2:Separator<91>	default	no	Separator element used for future schema extensions.	Not applicable

2.2.1.18 Payload.ApplicationSharing Element

A **Payload.ApplicationSharing** element contains ApplicationSharing-based payload metrics. The type of this element is **v3:ApplicationSharingPayloadMetricsType**.

The following example is a **Payload.ApplicationSharing** element.<92>

```
  <xs:complexType name="ApplicationSharingPayloadMetricsType">
    <xs:sequence>
      <xs:element name="PayloadDescription" type="xs:string" minOccurs="0"/>
      <xs:element name="AverageRectangleHeight" type="xs:int" minOccurs="0"/>
      <xs:element name="AverageRectangleWidth" type="xs:int" minOccurs="0"/>
      <xs:element name="ApplicationShared" type="xs:string" minOccurs="0"/>
      <xs:element name="RDPTileProcessingLatency" type="v3:MetricAggregationType"
minOccurs="0"/>
      <xs:element name="ScrapingFrameRate" type="v3:MetricAggregationType" minOccurs="0"/>
      <xs:element name="IncomingTileRate" type="v3:MetricAggregationType" minOccurs="0"/>
      <xs:element name="IncomingFrameRate" type="v3:MetricAggregationType" minOccurs="0"/>
      <xs:element name="OutgoingTileRate" type="v3:MetricAggregationType" minOccurs="0"/>
      <xs:element name="OutgoingFrameRate" type="v3:MetricAggregationType" minOccurs="0"/>
      <xs:element name="OpaqueAppSharingData" type="v2:OpaqueChannelDataType" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v3:Separator3"/>
        <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>
```

2.2.1.18.1 Child Elements

The following table lists the child elements of the **Payload.ApplicationSharing** element.

Element	Type	Available	Description	Units
v3:PayloadDescription	**xs:string**	Yes	ApplicationSharing payload name	Not applicable
v3:AverageRectangleHeight	**xs:int**	Yes	Average height of the region being shared or viewed in the ApplicationShari	Pixels

Element	Type	Available	Description	Units
			ng session	
v3:AverageRectangleWidth	**xs:int**	Yes	Average width of the region being shared or viewed in the ApplicationSharing session	Pixels
v3:ApplicationShared	**xs:string**	Yes	Desktop or Application being shared in the ApplicationSharing session	Not applicable
v3:RDPTileProcessingLatency	**v3:MetricAggregationType**	Yes	Latency of processing tiles on the RDP Stack at the MCU	Milliseconds
v3:ScrapingFrameRate	**v3:MetricAggregationType**	Yes	Raw scraping rate from the graphics capture source	Frames per second
v3:IncomingTileRate	**v3:MetricAggregationType**	Yes	Rate of tile received	Tiles per second
v3:IncomingFrameRate	**v3:MetricAggregationType**	Yes	Rate of frame received	Frames per second
v3:OutgoingTileRate	**v3:MetricAggregationType**	Yes	Rate of tile sent	Tiles per second
v3:OutgoingFrameRate	**v3:MetricAggregationType**	Yes	Rate of frame sent	Frames per second
v3:OpaqueAppSharingData	**v2:OpaqueChannelDataType**	No		
v3:Separator3	default	No	Separator element used for future schema extensions	Not applicable

2.2.1.18.1.1 MetricAggregationType

The following example is a **MetricAggregationType**.

```
<xs:complexType name="MetricAggregationType">
  <xs:sequence>
    <xs:element name="Total" type="xs:float" minOccurs="0"/>
    <xs:element name="Average" type="xs:float" minOccurs="0"/>
    <xs:element name="Max" type="xs:float" minOccurs="0"/>
    <xs:element name="Burst" type="v3:MetricBurstGapType" minOccurs="0"/>
    <xs:element name="Gap" type="v3:MetricBurstGapType" minOccurs="0"/>
```

```
    <xs:sequence minOccurs="0">
      <xs:element ref="v3:Separator3"/>
      <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax"/>
</xs:complexType>
```

2.2.1.18.1.1.1 Child Elements

The following table lists the child element of the **MetricAggregationType**. For units and data it represents see section 2.2.1.18.1.

Element	Type	Available	Description
v3:Total	**xs:float**	Yes	Total aggregated value
v3:Average	**xs:float**	Yes	Average aggregated value
v3:Max	**xs:float**	Yes	Maximum aggregated value
v3:Burst	**v3:MetricBurstGapType**	Yes	Computed burst metrics
v3:Gap	**v3:MetricBurstGapType**	Yes	Computed gap metrics
v3:Separator3	default	No	Separator element used for future schema extensions

2.2.1.18.1.2 MetricBurstGapType

The following example is a **MetricBurstGapType**.

```
<xs:complexType name="MetricBurstGapType">
  <xs:sequence>
    <xs:element name="Occurrences" type="xs:int" minOccurs="0"/>
    <xs:element name="Density" type="xs:float" minOccurs="0"/>
    <xs:element name="Duration" type="xs:float" minOccurs="0"/>
    <xs:sequence minOccurs="0">
      <xs:element ref="v3:Separator3"/>
      <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax"/>
</xs:complexType>
```

2.2.1.18.1.2.1 Child Elements

The following table lists the child elements of the **MetricBurstGapType**. For units and data it represents see section 2.2.1.18.1. Each element of **MetricBurstGapType** represents either the computed Burst metrics or the computed Gap metrics.

Element	Type	Available	Description
v3:Occurrences	**xs:int**	Yes	Number of instances of Burst/Gap

Element	Type	Available	Description
v3:Density	**xs:float**	Yes	Average density of Burst/Gap
v3:Duration	**xs:float**	Yes	Average duration of Burst/Gap
v3:Separator3	default	No	Separator element used for future schema extensions

2.2.1.19 QualityEstimates Element

A **QualityEstimates** element contains metrics estimating the quality of the media. The type of this element is **QualityEstimatesType**.

The following example is a **QualityEstimates** element.

```
<xs:complexType name="QualityEstimatesType">
  <xs:choice>
    <xs:element name="Audio" type="tns:AudioQualityEstimatesType"/>
    <xs:element name="Video" type="tns:VideoQualityEstimatesType"/>
    <xs:element name="ApplicationSharing" type="v3:ApplicationSharingQualityEstimatesType"/>
    <xs:any namespace="##other" processContents="lax"
     maxOccurs="unbounded"/>
  </xs:choice>
</xs:complexType>
```

2.2.1.19.1 Child Elements

The following table lists the child elements of the **QualityEstimates** element.

Element	Type	Available	Description
Audio	**AudioQualityEstimatesType**	Yes	Audio metrics estimating quality of the media.
Video	**VideoQualityEstimatesType**	No	
ApplicationSharing<93>	**v3:ApplicationSharingQualityEstimatesType**	No	

2.2.1.20 QualityEstimates.Audio Element

A **QualityEstimates.Audio** element contains audio metrics estimating the quality of the media. The type of this element is **AudioQualityEstimatesType**.

The following example is a **QualityEstimates.Audio** element.

```
<xs:complexType name="AudioQualityEstimatesType">
  <xs:sequence>
    <xs:element name="RecvListenMOS" type="xs:float" minOccurs="0"/>
    <xs:element name="RecvListenMOSMin" type="xs:float" minOccurs="0"/>
    <xs:element name="RecvListenMOSAlg" type="xs:string" minOccurs="0"/>
    <xs:element name="SendListenMOS" type="xs:float" minOccurs="0"/>
    <xs:element name="SendListenMOSMin" type="xs:float" minOccurs="0"/>
```

```
    <xs:element name="SendListenMOSAlg" type="xs:string" minOccurs="0"/>
    <xs:element name="NetworkMOS" type="tns:NetworkAudioMOSType"
     minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.20.1 Child Elements

The following table lists the child elements of the **QualityEstimates.Audio** element.

Element	Type	Available	Description	Units
RecvListenMOS	**xs: float**	Inbound	The MOS-LQO wideband, as specified by [ITUP.800.1] section 2.1.2, for decoded audio received by the reporting entity during the session (3).	MOS
RecvListenMOSMin	**xs: float**	Inbound	Minimum of the **RecvListenMOS** for the stream (2) during the session (3).	MOS
RecvListenMOSAlg	**xs: float**	No		
SendListenMOS	**xs: float**	Outbound	The MOS-LQO wideband, as specified by [ITUP.800.1] section 2.1.2 for pre-encoded audio sent by the reporting entity during the session (3).	MOS
SendListenMOSMin	**xs: float**	Outbound	Minimum of the **SendListenMOS** for the stream (2) over the duration of the session (3).	MOS
SendListenMOSAlg	**xs: float**	No		
NetworkMOS	**NetworkAudioMOSType**	Inbound	Predictive metrics based on network factors alone.	MOS

2.2.1.21 NetworkAudioMOS Element

A **NetworkAudioMOS** element contains predictive metrics based on network factors alone. The type of this element is **NetworkAudioMOSType**.

The following example is a **NetworkAudioMOS** element.<94>

```
<xs:complexType name="NetworkAudioMOSType">
  <xs:sequence>
    <xs:element name="OverallAvg" type="xs:float" minOccurs="0"/>
    <xs:element name="OverallMin" type="xs:float" minOccurs="0"/>
    <xs:element name="DegradationAvg" type="xs:float" minOccurs="0"/>
```

```
      <xs:element name="DegradationMax" type="xs:float" minOccurs="0"/>
      <xs:element name="DegradationJitterAvg" type="xs:float"
       minOccurs="0"/>
      <xs:element name="DegradationPacketLossAvg" type="xs:float"
       minOccurs="0"/>
      <xs:element ref="v2:NetworkMOSAlg" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax"
          minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/></xs:complexType>

  <xs:element name="NetworkMOSAlg" type="xs:string"/>

  <xs:element name="Separator">
    <xs:complexType></xs:complexType>
  </xs:element />
```

2.2.1.21.1 Child Elements

The following table lists the child elements of the **NetworkAudioMOS** element.

Element	Type	Available	Description	Units
OverallAvg	**xs:float**	Inbound	The average of MOS-LQO wideband, as specified by [ITUP.800.1] section 2.1.2, based on the audio codec used and the observed packet loss and inter-arrival packet jitter.	MOS
OverallMin	**xs:float**	Inbound	The minimum of MOS-LQO wideband, as specified by [ITUP.800.1] section 2.1.2, based on the audio codec used and the observed packet loss and inter-arrival packet jitter.	MOS
DegradationAvg	**xs:float**	Inbound	The difference between the **OverallAvg** and the maximum possible MOS-LQO for the audio codec used in the session (3).	MOS
DegradationMax	**xs:float**	Inbound	The difference between the **OverallMin** and the maximum possible MOS-LQO for the audio codec used in the session (3).	MOS
DegradationJitterAvg	**xs: float**	Inbound	The average fraction of the **DegradationAvg** that was caused by inter-arrival packet jitter.	Fraction
DegradationPacketLossAvg	**xs:float**	Inbound	The average fraction of the **DegradationAvg** that was caused by packet loss.	Fraction

Element	Type	Available	Description	Units
v2:NetworkMOSAlg<95>	**xs:string**	No	The algorithm used for computing the **OverallAvg**, **OverallMin, DegradationAvg**, **DegradationMax**, **DegradationJitterAvg** and **DegradationPacketLossAvg** values.	Not applicable
v2:Separator<96>	default	No	Separator element used for future schema extensions.	Not applicable

2.2.1.22 Utilization Element

A **Utilization** element contains metrics related to network utilization. The type of this element is **NetworkUtilizationType**.

The following example is a **Utilization** element.

```
<xs:complexType name="NetworkUtilizationType">
  <xs:sequence>
    <xs:element name="Packets" type="xs:int" minOccurs="0"/>
    <xs:element name="BandwidthEst" type="xs:int" minOccurs="0"/>
    <xs:element name="BandwidthAlloc" type="xs:int" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.22.1 Child Elements

The following table lists the child elements of the **Utilization** element.

Element	Type	Available	Description	Units
Packets	**xs:int**	Yes	Number of **Real-Time Transport Protocol (RTP)** packets sent in the session (3).	Packets
BandwidthEst	**xs:int**	Outbound	Estimated one way available bandwidth of the stream (2) at the end of the session (3).	Bits per second
BandwidthAlloc	**xs:int**	No		

2.2.1.23 PacketLoss Element

A **PacketLoss** element contains metrics related to packet loss. The type of this element is **PacketLossType**.

The following example is a **PacketLoss** element.

```
<xs:complexType name="PacketLossType">
  <xs:sequence>
    <xs:element name="LossRate" type="xs:float" minOccurs="0"/>
```

```
    <xs:element name="LossRateMax" type="xs:float" minOccurs="0"/>
    <xs:element name="DiscardRate" type="xs:float" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.23.1 Child Elements

The following table lists the child elements of the **PacketLoss** element.

Element	Type	Available	Description	Units
LossRate	**xs:float**	Yes	The average fraction lost, as specified in [RFC3550] section 6.4.1, computed over the duration of the session (3).	Fraction
LossRateMax	**xs:float**	Yes	The maximum fraction lost, as specified in [RFC3550] section 6.4.1, computed over the duration of the session (3).	Fraction
DiscardRate	**xs:float**	No		

2.2.1.24 BurstGapLoss Element

A **BurstGapLoss** element contains metrics related to **Burst** and **Gap**. The type of this element is **BurstGapLossType**.

The following example is a **BurstGapLoss** element.

```
<xs:complexType name="BurstGapLossType">
  <xs:sequence>
    <xs:element name="BurstDensity" type="xs:float" minOccurs="0"/>
    <xs:element name="BurstDuration" type="xs:int" minOccurs="0"/>
    <xs:element name="GapDensity" type="xs:float" minOccurs="0"/>
    <xs:element name="GapDuration" type="xs:int" minOccurs="0"/>
    <xs:element name="MinGapThreshold" type="xs:int" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.24.1 Child Elements

The following table lists the child elements of the **BurstGapLoss** element.

Element	Type	Available	Description	Units
BurstDensity	**xs:float**	Inbound	The average burst density, as specified in [RFC3611] section 4.7.2, computed with a Gmin=16 for the **RTP packets** received.	Percentage * 100

Element	Type	Available	Description	Units
BurstDuration	**xs:int**	Inbound	The average burst duration, as specified in [RFC3611] section 4.7.2, computed with a Gmin=16 for the RTP packets received.	Milliseconds
GapDensity	**xs:float**	Inbound	The average gap density, as specified in [RFC3611] section 4.7.2, computed with a Gmin=16 for the RTP packets received.	Percentage * 100
GapDuration	**xs:int**	Inbound	The average gap duration, as specified in [RFC3611] section 4.7.2, computed with a Gmin=16 for the RTP packets received.	Milliseconds
MinGapThreshold	**xs:int**	No		

2.2.1.25 Delay Element

A **Delay** element contains metrics related to delays. The type of this element is **DelayType**.

The following example is a **Delay** element.

```
<xs:complexType name="DelayType">
  <xs:sequence>
    <xs:element name="RoundTrip" type="xs:int" minOccurs="0"/>
    <xs:element name="RoundTripMax" type="xs:int" minOccurs="0"/>
    <xs:element name="EndSystem" type="xs:int" minOccurs="0"/>
    <xs:element name="OneWay" type="xs:int" minOccurs="0"/>
      <xs:element ref="v3:RelativeOneWay" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v3:Separator3" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
```

</xs:sequence>

```
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.25.1 Child Elements

The following table lists the child elements of the **Delay** element.

Element	Type	Available	Description	Units
RoundTrip	**xs:int**	Outbound	The average network propagation round-trip time computed as specified in [RFC3550] section 6.4.1.	Milliseconds

Element	Type	Available	Description	Units
RoundTripMax	**xs:int**	Outbound	The maximum network propagation round-trip time computed as specified in [RFC3550] section 6.4.1.	Milliseconds
EndSystem	**xs:int**	No		
OneWay	**xs:int**	No		
v3:RelativeOneWay<97>	**v3:MetricAggregationType**	Yes	The computed relative one way delay of the peer. MetricAggregationType is described in section 2.2.1.18.1.1.	
v3:Separator	default	No	Separator element used for future schema extensions.	Not applicable

2.2.1.26 Jitter Element

A **Jitter** element contains metrics related to jitter. The type of this element is **JitterType**.

The following example is a **Jitter** element.

```
<xs:complexType name="JitterType">
  <xs:sequence>
    <xs:element name="InterArrival" type="xs:int" minOccurs="0"/>
    <xs:element name="InterArrivalMax" type="xs:int" minOccurs="0"/>
    <xs:element name="MeanAbs" type="xs:int" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
     maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
```

2.2.1.26.1 Child Elements

The following table lists the child elements of the **Jitter** element.

Element	Type	Available	Description	Units
InterArrival	**xs:int**	Yes	The average inter-arrival jitter, as specified in [RFC3550] section 6.4.1.	Milliseconds
InterArrivalMax	**xs:int**	Yes	The maximum inter-arrival jitter, as specified in [RFC3550] section 6.4.1.	Milliseconds
MeanAbs	**xs:int**	No		

2.2.1.27 Signal Element

A **Signal** element contains metrics related to the signal. The type of this element is **SignalType**.

The following example is a **Signal** element.<98>

```
<xs:complexType name="SignalType">
  <xs:sequence>
    <xs:element name="SignalLevel" type="xs:int" minOccurs="0" />
    <xs:element name="NoiseLevel" type="xs:int" minOccurs="0" />
    <xs:element name="EchoReturn" type="xs:int" minOccurs="0" />
    <xs:element name="SpeakerFeedbackMicIn" type="xs:int" minOccurs="0"/>
    <xs:element name="SpeechLevelMicIn" type="xs:int" minOccurs="0"/>
    <xs:element name="SpeechLevelPostProcess" type="xs:int" minOccurs="0"/>
    <xs:element name="SignalLevelLoudSpeaker" type="xs:int" minOccurs="0"/>
    <xs:element name="BackGroundNoiseMicIn" type="xs:int" minOccurs="0"/>
    <xs:element name="BackGroundNoiseSent" type="xs:int" minOccurs="0" />
    <xs:element name="LocalSpeechToEcho" type="xs:int" minOccurs="0" />
    <xs:element name="SpeakerGlitchRate" type="xs:int" minOccurs="0" />
    <xs:element name="MicGlitchRate" type="xs:int" minOccurs="0" />
    <xs:element name="SpeakerClipRate" type="xs:int" minOccurs="0" />
    <xs:element name="MicClipRate" type="xs:int" minOccurs="0" />
    <xs:element name="RxAGCSignalLevel" type="xs:int" minOccurs="0" />
    <xs:element name="RxAGCNoiseLevel" type="xs:int" minOccurs="0" />
    <xs:element ref="v2:InitialSignalLevelRMS" minOccurs="0"/>
    <xs:element ref="v2:AudioTimestampDriftRateMic" minOccurs="0"/>
    <xs:element ref="v2:AudioTimestampDriftRateSpk" minOccurs="0"/>
    <xs:element ref="v2:AudioTimestampErrorMicMs" minOccurs="0"/>
    <xs:element ref="v2:AudioTimestampErrorSpkMs" minOccurs="0"/>
    <xs:element ref="v2:VsEntryCauses" minOccurs="0"/>
    <xs:element ref="v2:EchoEventCauses" minOccurs="0"/>
    <xs:element ref="v2:EchoPercentMicIn" minOccurs="0"/>
    <xs:element ref="v2:EchoPercentSend" minOccurs="0"/>
    <xs:element ref="v2:RxAvgAGCGain" minOccurs="0"/>
    <xs:sequence minOccurs="0">
      <xs:element ref="v2:Separator" />
      <xs:element ref="v3:RecvSignalLevelCh1" minOccurs="0"/>
       <xs:element ref="v3:RecvSignalLevelCh2" minOccurs="0"/>
       <xs:element ref="v3:RecvNoiseLevelCh1" minOccurs="0"/>
       <xs:element ref="v3:RecvNoiseLevelCh2" minOccurs="0"/>
       <xs:element ref="v3:SendSignalLevelCh1" minOccurs="0"/>
       <xs:element ref="v3:SendSignalLevelCh2" minOccurs="0"/>
       <xs:element ref="v3:SendNoiseLevelCh1" minOccurs="0"/>
       <xs:element ref="v3:SendNoiseLevelCh2" minOccurs="0"/>
       <xs:sequence minOccurs="0">
       <xs:element ref="v3:Separator3"/>
        <xs:any namespace="##other" processContents="lax"
         minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
       </xs:sequence>
      </xs:sequence>
      <xs:anyAttribute namespace="##other" processContents="lax" />
     </xs:complexType>
```

2.2.1.27.1 Child Elements

The following table lists the child elements of the **Signal** element.

Element	Type	Available	Description	Units
SignalLevel	**xs:int**	Yes	The average energy level of received or sent audio classified as speech.	dB
NoiseLevel	**xs:int**	Yes	The average energy level of received or sent audio classified as noise.	dB
EchoReturn	**xs:int**	No		
SpeakerFeedbackMicIn<99>	**xs:int**	Yes	Signal level of the leakage of Loudspeaker or Headphone output into the microphone input.	dBoV
SpeechLevelMicIn<100>	**xs:int**	Yes	The speech level into the microphone at a given endpoint (5).	dBoV
SpeechLevelPostProcess<101>	**xs:int**	Yes	Overall average speech level sent from an endpoint (5) after all processing.	dBoV
SignalLevelLoudSpeaker<102>	**xs:int**	Yes	Input level to the loudspeaker or headphone input.	dBoV
BackGroundNoiseMicIn<103>	**xs:int**	Yes	Background noise input to the microphone.	dBoV
BackGroundNoiseSent<104>	**xs:int**	Yes	Background noise left over after all processing.	dBoV
LocalSpeechToEcho<105>	**xs:int**	Yes	If less than 10 decibels, speech level is too low compared to echo level, and distorted speech might occur.	dB
SpeakerGlitchRate<106>	**xs:int**	Yes	Average glitches per 5 minutes for the loudspeaker rendering.	Glitch count

Element	Type	Available	Description	Units
MicGlitchRate	**xs:int**	Yes	Average glitches per 5 minutes for the microphone capture.	Glitch count
SpeakerClipRate<107>	**xs:int**	Yes	Average clips per 5 minutes during the call for the loudspeaker rendering.	Glitch count
MicClipRate<108>	**xs:int**	Yes	Average clips per 5 minutes during the call for the microphone capture.	Glitch count
RxAGCSignalLevel<109>	**xs:int**	Yes	Signal level received at the automatic gain control for the inbound audio stream (2).	dBoV
RxAGCNoiseLevel<110>	**xs:int**	Yes	Noise level received at the automatic gain control for the inbound audio stream (2).	dBoV
v2:InitialSignalLevelRMS<111>	**xs:float**	Yes	The root-mean-square of the received signal for the first 30 seconds of the call.	sample level
v2:AudioTimestampDriftRateMic<112>	**xs:float**	Yes	Microphone or capture device clock drift rate.	percent
v2:AudioTimestampDriftRateSpk<113>	**xs:float**	Yes	Speaker or render device clock drift rate.	percent
v2:AudioTimestampErrorMicMs<114>	**xs:float**	Yes	Noise in timestamp information from microphone or capture device.	milliseconds
v2:AudioTimestampErrorSpkMs<115>	**xs:float**	Yes	Noise in timestamp information from speaker or render device.	milliseconds

Element	Type	Available	Description	Units
v2:VsEntryCauses<116>	**xs:unsignedByte**	Yes	The bit flag indicating the reason(s) the AEC entered half-duplex mode: "0x01" – Sample timestamps from capture or render device were poor quality. "0x02" – High level of echo remained after echo cancellation. "0x04" – Policy forced echo canceller into half-duplex mode. "0x10" – Echo canceller placed into half-duplex mode to reduce CPU consumption. "0x20" – Severe quality degradation because of sample timestamp issues from capture or render device.	unsigned byte
v2:EchoEventCauses<117>	**xs:unsignedByte**	Yes	The bit flag indicating the reasons the **DeviceEchoEvent** was detected: "0x01" – Sample timestamps from capture or render device were poor quality. "0x04" – High level of echo remained after echo cancellation. "0x10" – Signal from capture device had significant instances of maximum signal level.	flag

Element	Type	Available	Description	Units
v2:EchoPercentMicIn<118>	**xs:float**	Yes	Percentage of time when echo is detected in the audio from the capture or microphone device prior to echo cancellation.	Percentage
v2:EchoPercentSend<119>	**xs:float**	Yes	Percentage of time when echo is detected in the audio from the capture or microphone device after echo cancellation.	Percentage
v2:RxAvgAGCGain<120>	**xs:float**	Yes	The gain level applied to the received signal.	dB
v2:Separator<121>	default	Yes	Separator element used for future schema extensions.	Not applicable
v3: RecvSignalLevelCh1<122>	**xs:int**	Yes	Average energy level of received for audio classified as mono speech, or left channel of stereo speech.	dB
v3: RecvSignalLevelCh2<123>	**xs:int**	Yes	Average energy level of received for audio classified as right channel of stereo speech.	dB
v3: RecvNoiseLevelCh1<124>	**xs:int**	Yes	Average energy level of received for audio classified as noise, mono signal or the left channel of stereo signal.	dB
v3: RecvNoiseLevelCh2<125>	**xs:int**	Yes	Average energy level of received for audio classified as noise, the right channel of stereo signal.	dB

Element	Type	Available	Description	Units
v3: SendSignalLevelCh1<126>	**xs:int**	Yes	Average energy level of sent for audio classified as mono speech, or left channel of stereo speech.	dB
v3: SendSignalLevelCh2<127>	**xs:int**	Yes	Average energy level of sent for audio classified as right channel of stereo speech.	dB
v3: RecvNoiseLevelCh1<128>	**xs:int**	Yes	Average energy level of sent for audio classified as noise, mono signal or the left channel of stereo signal.	dB
v3: RecvNoiseLevelCh2<129>	**xs:int**	Yes	Average energy level of sent for audio classified as noise, the right channel of stereo signal.	dB
v3:Separator<130>	default	Yes	Separator element used for future schema extensions.	Not applicable

2.2.1.28 ClientEventType Element

A **ClientEventType** element contains information about the quality events detected by the endpoints (5). The type of this element is **ClientEventType**.<131>

The following example is a **ClientEventType** element.

```
<xs:complexType name="ClientEventType">
    <xs:sequence>
      <xs:element name="NetworkSendQualityEventRatio"
       type="xs:float" minOccurs="0"/>
      <xs:element name="NetworkReceiveQualityEventRatio"
       type="xs:float" minOccurs="0"/>
      <xs:element name="NetworkDelayEventRatio"
       type="xs:float" minOccurs="0"/>
      <xs:element name="NetworkBandwidthLowEventRatio"
       type="xs:float" minOccurs="0"/>
      <xs:element name="CPUInsufficientEventRatio"
       type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceHalfDuplexAECEventRatio"
       type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceRenderNotFunctioningEventRatio"
       type="xs:float" minOccurs="0"/>
```

```
        <xs:element name="DeviceCaptureNotFunctioningEventRatio"
         type="xs:float" minOccurs="0"/>
        <xs:element name="DeviceGlitchesEventRatio"
         type="xs:float" minOccurs="0"/>
        <xs:element name="DeviceLowSNREventRatio"
         type="xs:float" minOccurs="0"/>
        <xs:element name="DeviceLowSpeechLevelEventRatio"
         type="xs:float" minOccurs="0"/>
        <xs:element name="DeviceClippingEventRatio"
         type="xs:float" minOccurs="0"/>
        <xs:element name="DeviceEchoEventRatio"
         type="xs:float" minOccurs="0"/>
        <xs:element name="DeviceNearEndToEchoRatioEventRatio"
         type="xs:float" minOccurs="0"/>
        <xs:element name="DeviceMultipleEndpointsEventCount"
         type="xs:short" minOccurs="0"/>
        <xs:element name="DeviceHowlingEventCount"
         type="xs:short" minOccurs="0"/>
        <xs:sequence minOccurs="0">
          <xs:element ref="tns:Separator"/>
          <xs:any namespace="##any" processContents="lax"
           minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:sequence>
      <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>
```

2.2.1.28.1 Child Elements

The following table lists the child elements of the **ClientEventType** element.

Element	Type	Available	Description	Units
v2:NetworkSendQualityEventRatio<132>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected the network was causing poor quality of the audio sent.	Fraction
v2:NetworkReceiveQualityEventRatio<133>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected the network was causing poor quality of the audio received.	Fraction
v2:NetworkDelayEventRatio<134>	**xs:float**	Yes	Fraction of the call that the reporting endpoint	Fraction

Element	Type	Available	Description	Units
			detected the network delay was significant enough to impact the ability to have real-time two-way communication.	
v2:NetworkBandwidthLowEventRatio<135>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected the available bandwidth or bandwidth policy was low enough to cause poor quality of the audio sent.	Fraction
v2:CPUInsufficientEventRatio<136>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected the CPU resources available were insufficient and caused poor quality of the audio sent and received.	Fraction
v2:DeviceHalfDuplexAECEventRatio<137>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected issues and operated the acoustic echo canceller in half-duplex mode, which impacted the ability to have real-time two-way communication.	Fraction
v2:DeviceRenderNotFunctioningEventRatio<138>	**xs:float**	Yes	Fraction of the call that the	Fraction

Element	Type	Available	Description	Units
			reporting endpoint detected the render device was not working properly.	
v2:DeviceCaptureNotFunctioningEventRatio<139>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected the capture device was not working properly.	Fraction
v2:DeviceGlitchesEventRatio<140>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected glitches or gaps in the audio played or captured that caused poor quality of the audio being sent or received.	Fraction
v2:DeviceLowSNREventRatio<141>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected low speech to noise level that caused poor quality of the audio being sent.	Fraction
v2:DeviceLowSpeechLevelEventRatio<142>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected low speech level that caused poor quality of the audio being sent.	Fraction
v2:DeviceClippingEventRatio<143>	**xs:float**	Yes	Fraction of the call that the	Fraction

Element	Type	Available	Description	Units
			reporting endpoint detected clipping in the captured audio that caused poor quality of the audio being sent.	
v2:DeviceEchoEventRatio<144>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected echo that caused poor quality of the audio being sent.	Fraction
v2:DeviceNearEndToEchoRatioEventRatio<145>	**xs:float**	Yes	Fraction of the call that the reporting endpoint detected a ratio of the near end signal level to the echo level that caused poor quality of the audio being sent.	Fraction
v2:DeviceMultipleEndpointsEventCount<146>	**xs:short**	Yes	Number of times during the call that the reporting endpoint detected multiple endpoints (5) in the same room or acoustic environment.	Not applicable
v2:DeviceHowlingEventCount<147>	**xs:short**	Yes	Number of times during the call that the reporting endpoint detected two or more endpoints (5) in the same room or acoustic	Not applicable

Element	Type	Available	Description	Units
			environment that caused poor quality audio in the form of howling or screeching audio.	
v2:Separator<148>	default	Yes	Separator element used for future schema extensions.	Not applicable

3 Protocol Details

3.1 SIP UAC

A protocol client performs the role of a SIP **user agent client (UAC)**. A SIP user agent client initiates a SIP SERVICE transaction by sending a SIP SERVICE message to the SIP URI of a SIP **user agent server (UAS)**. Upon receiving an error, a protocol client can retry to send the report.

3.1.1 Abstract Data Model

None.

3.1.2 Timers

None.

3.1.3 Initialization

None.

3.1.4 Higher-Layer Triggered Events

None.

3.1.5 Message Processing Events and Sequencing Rules

None.

3.1.6 Timer Events

None.

3.1.7 Other Local Events

None.

3.2 SIP UAS

A QoE Monitoring Agent performs the role of a SIP UAS. The SIP UAS accepts the SERVICE message and responds with a SERVICE response code 202 or a SIP SERVICE response error code. The SIP SERVICE response error code that is returned depends on the issue. The following table lists the error codes that are returned depending on the content of the SIP SERVICE request.

Error code	Reason
606	Only VQReportEvent is supported in current version. 606 is returned if received data is not VQReportEvent type.
400	If there is a schema validation failure or one or more metric values in the report contain an invalid value.
401	If the From header in SIP request doesn't match the value of LocalPAI or FromURI (when

Error code	Reason
	LocalPAI is missing) gotten from payload body. If the sender is an anonymous user, 401 could be returned when the focus-uri header in SIP request doesn't match ConfURI gotten from payload body.
415	If the Content-Type header is not "application/vq-rtcpxr+xml"
413	If metric report exceeds the maximum size limit of 300 kilobytes allowed by the QoE Monitoring Agent.

3.2.1 Abstract Data Model

None.

3.2.2 Timers

None.

3.2.3 Initialization

None.

3.2.4 Higher-Layer Triggered Events

None.

3.2.5 Message Processing Events and Sequencing Rules

None.

3.2.6 Timer Events

None.

3.2.7 Other Local Events

None.

3.3 SIP Proxy

A SIP proxy routes the **SIP messages** from the UAC to the UAS and vice versa.

3.3.1 Abstract Data Model

None.

3.3.2 Timers

None.

3.3.3 Initialization

None.

3.3.4 Higher-Layer Triggered Events

None.

3.3.5 Message Processing Events and Sequencing Rules

None.

3.3.6 Timer Events

None.

3.3.7 Other Local Events

None.

4 Protocol Examples

The following example illustrates a **QoE** metrics message payload that adheres to the XML schema described in section 2. In the following example, domain names, server names, e-mail aliases, phone numbers, and IP addresses have been changed to fictitious values.

```
SERVICE sip:server1@contoso.com;gruu;opaque=srvr:QoS:jcH1fn2RSB6uyC59R-IH8QAA SIP/2.0
Via: SIP/2.0/TLS 123.45.67.890:1263
Max-Forwards: 70
From: <sip:alice@contoso.com>;tag=3d26651a97;epid=782abb8f70
To: <sip:server1@contoso.com;gruu;opaque=srvr:QoS:jcH1fn2RSB6uyC59R-IH8QAA>
Call-ID: f86d23b698b34a70a2d23772e7391d94
CSeq: 1 SERVICE
Contact: <sip:alice@contoso.com;opaque=user:epid:reTyjuqAaVmcCIO4qlA4vwAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service", opaque="7B435440",
crand="40171178", cnum="178", targetname="location-server-01.exchange.corp.contoso.com",
response="010000003a516f532e969c311f676e47"
Content-Type: application/vq-rtcpxr+xml
Content-Length: 3283
<?xml version="1.0"?>
<VQReportEvent xmlns="ms-rtcp-metrics">
  <VQSessionReport SessionId="ab323818af644d1eab6bacd6d66d03a7;from-tag=e957a6c0d5;to-
tag=313433a5ba">
    <Endpoint Name="alice.example.corp.contoso.com" />
    <DialogInfo CallId="ab323818af644d1eab6bacd6d66d03a7" FromTag="e957a6c0d5"
ToTag="313433a5ba" Start="2008-01-07T19:47:06.0082Z" End="2008-01-07T19:55:11.0742Z">
      <FromURI>sip:alice@contoso.com</FromURI>
      <ToURI>sip:5550100@contoso.com;user=phone</ToURI>
      <Caller>true</Caller>

      <LocalContactURI>sip:alice@contoso.com;opaque=user:epid:reTyjuqAaVmcCIO4qlA4vwAA;gruu</
LocalContactURI>

      <RemoteContactURI>sip:server1@contoso.com;gruu;opaque=srvr:MediationServer:WftfTuTVQCSA
B0ZJi-j7qAAA;grid=f684305ffb3a4a8184e8cd16846a983c</RemoteContactURI>
      <LocalUserAgent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</LocalUserAgent>
      <RemoteUserAgent>RTCC/3.0.0.0 MediationServer</RemoteUserAgent>
    </DialogInfo>
    <MediaLine Label="main-audio">
      <Description>
        <Connectivity>
          <Ice>DIRECT</Ice>
          <IceWarningFlags>327680</IceWarningFlags>
        </Connectivity>
        <Security>SRTP</Security>
        <Offerer>true</Offerer>
        <Transport>UDP</Transport>
   <NetworkConnectivityInfo>
<VPN>true</VPN>
<LinkSpeed>11000000.000000</LinkSpeed>
</NetworkConnectivityInfo>
 <LocalAddr>
          <IPAddr>123.45.67.890</IPAddr>
          <Port>50004</Port>
          <Inside>true</Inside>
          <SubnetMask>255.255.254.0</SubnetMask>
        </LocalAddr>
```

```
        <RemoteAddr>
          <IPAddr>123.12.34.567</IPAddr>
          <Port>63284</Port>
        </RemoteAddr>
        <CaptureDev>
          <Name>Catalina-V263</Name>
        </CaptureDev>
        <RenderDev>
          <Name>Catalina-V263</Name>
        </RenderDev>
      </Description>
      <InboundStream Id="1536632130">
        <Network>
          <Jitter>
            <InterArrival>2</InterArrival>
            <InterArrivalMax>3</InterArrivalMax>
          </Jitter>
          <PacketLoss>
            <LossRate>0.000000</LossRate>
            <LossRateMax>0.009259</LossRateMax>
          </PacketLoss>
          <BurstGapLoss>
            <BurstDensity>0</BurstDensity>
            <BurstDuration>0</BurstDuration>
            <GapDensity>0</GapDensity>
            <GapDuration>461660</GapDuration>
          </BurstGapLoss>
          <Utilization>
            <Packets>23148</Packets>
          </Utilization>
        </Network>
        <Payload>
          <Audio>
            <Signal>
              <SignalLevel>2434</SignalLevel>
              <NoiseLevel>4861</NoiseLevel>
          <SignalLevelLoudSpeaker>2502</SignalLevelLoudSpeaker>
<SpeakerGlitchRate>7</SpeakerGlitchRate>
<SpeakerClipRate>0</SpeakerClipRate>
            </Signal>
          </Audio>
        </Payload>
        <QualityEstimates>
          <Audio>
            <RecvListenMOS>1.880000</RecvListenMOS>
            <RecvListenMOSMin>1.000000</RecvListenMOSMin>
            <NetworkMOS>
              <OverallAvg>2.950000</OverallAvg>
              <OverallMin>2.940000</OverallMin>
              <DegradationAvg>0.000000</DegradationAvg>
              <DegradationMax>0.010000</DegradationMax>
              <DegradationJitterAvg>0.000000</DegradationJitterAvg>
              <DegradationPacketLossAvg>0.000000</DegradationPacketLossAvg>
            </NetworkMOS>
          </Audio>
        </QualityEstimates>
      </InboundStream>
      <OutboundStream Id="1869098562">
        <Network>
```

```
          <Jitter>
            <InterArrival>2</InterArrival>
            <InterArrivalMax>2</InterArrivalMax>
          </Jitter>
          <PacketLoss>
            <LossRate>0.000000</LossRate>
            <LossRateMax>0.000000</LossRateMax>
          </PacketLoss>
          <Delay>
            <RoundTrip>1</RoundTrip>
            <RoundTripMax>2</RoundTripMax>
          </Delay>
          <Utilization>
            <Packets>7497</Packets>
            <BandwidthEst>23872930</BandwidthEst>
          </Utilization>
        </Network>
        <Payload>
          <Audio>
            <PayloadDescription>x-msrta</PayloadDescription>
            <SampleRate>8000</SampleRate>
            <Signal>
              <SignalLevel>1834</SignalLevel>
              <NoiseLevel>5987</NoiseLevel>
          <SpeakerFeedbackMicIn>5000</SpeakerFeedbackMicIn>
  <SpeechLevelMicIn>2404</SpeechLevelMicIn>
  <SpeechLevelPostProcess>2500</SpeechLevelPostProcess>
  <BackGroundNoiseMicIn>7000</BackGroundNoiseMicIn>
  <BackGroundNoiseSent>8100</BackGroundNoiseSent>
  <LocalSpeechToEcho>-2600</LocalSpeechToEcho>
  <MicGlitchRate>7</MicGlitchRate>
  <MicClipRate>10</MicClipRate>
            </Signal>
          </Audio>
        </Payload>
        <QualityEstimates>
          <Audio>
            <SendListenMOS>3.440000</SendListenMOS>
            <SendListenMOSMin>1.100000</SendListenMOSMin>
          </Audio>
        </QualityEstimates>
      </OutboundStream>
      <LocalConversationalMOS>3.010000</LocalConversationalMOS>
    </MediaLine>
  </VQSessionReport>
</VQReportEvent>
```

5 Security

5.1 Security Considerations for Implementers

This protocol has no additional security considerations beyond those described in [MS-SIPRE] section 5.

5.2 Index of Security Parameters

None.

6 Appendix A: ms-rtcp-metrics

This section provides the detailed **XML schema definition (XSD)** schema specification of the XML schema used for constructing the QoE metrics payload.

6.1 Office Communications Server 2007 Schema

This section follows the product behavior described in footnote <149>.

```
<?xml version="1.0" encoding="UTF-8" ?>
<xs:schema xmlns:tns="ms-rtcp-metrics" xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="ms-rtcp-metrics" elementFormDefault="qualified"
attributeFormDefault="unqualified">
<!--

     RTCP METRICS STATEMENT

  -->
  <xs:element name="VQReportEvent" type="tns:VQReportEventType" />
<!--
     RTCP REPORT TYPE

  -->
<xs:complexType name="VQReportEventType">
<xs:choice>
  <xs:element name="VQSessionReport" type="tns:SessionReportType" maxOccurs="unbounded" />
  <xs:element name="VQSessionIntervalReport" type="tns:SessionReportType"
maxOccurs="unbounded" />
  <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded" />
  </xs:choice>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     VQ SESSION REPORT TYPE

  -->
<xs:complexType name="SessionReportType">
<xs:sequence>
  <xs:element name="LocationProfile" type="xs:string" minOccurs="0" />
  <xs:element name="Pool" type="xs:string" minOccurs="0" />
  <xs:element name="Endpoint" type="tns:EndpointType" />
  <xs:element name="DialogInfo" type="tns:DialogInfoType" />
  <xs:element name="MediaLine" type="tns:MediaLineType" maxOccurs="unbounded" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="SessionId" type="xs:string" use="required" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
<!--
   SessionId = DialogID
  -->
  </xs:complexType>
<!--
     DIALOG INFO TYPE

  -->
<xs:complexType name="DialogInfoType">
<xs:sequence>
  <xs:element name="FromURI" type="xs:anyURI" />
```

```
  <xs:element name="ToURI" type="xs:anyURI" />
  <xs:element name="Caller" type="xs:boolean" />
  <xs:element name="LocalContactURI" type="xs:anyURI" />
  <xs:element name="RemoteContactURI" type="xs:anyURI" />
  <xs:element name="LocalUserAgent" type="xs:string" />
  <xs:element name="RemoteUserAgent" type="xs:string" />
<!--
   PAI = P-Asserted-Identity
  -->
  <xs:element name="LocalPAI" type="xs:anyURI" minOccurs="0" />
  <xs:element name="RemotePAI" type="xs:anyURI" minOccurs="0" />
  <xs:element name="ConfURI" type="xs:anyURI" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="CallId" type="xs:string" use="required" />
  <xs:attribute name="FromTag" type="xs:string" />
  <xs:attribute name="ToTag" type="xs:string" />
  <xs:attribute name="Start" type="xs:dateTime" use="required" />
  <xs:attribute name="End" type="xs:dateTime" use="required" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     ENDPOINT TYPE

  -->
<xs:complexType name="EndpointType">
<xs:sequence>
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="Name" type="xs:string" use="required" />
  <xs:attribute name="ProfileId" type="xs:string" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
<!--
 Name = Computer Name
  -->
<!--
 ProfileId = Endpoint Report GUID  - Note: this attribute is optional
  -->
  </xs:complexType>
<!--
     MEDIA LINE REPORT TYPE

  -->
<xs:complexType name="MediaLineType">
<xs:sequence>
  <xs:element name="Description" type="tns:MediaLineDescriptionType" />
  <xs:element name="InboundStream" type="tns:StreamType" minOccurs="0" />
  <xs:element name="OutboundStream" type="tns:StreamType" minOccurs="0" />
  <xs:element name="LocalConversationalMOS" type="xs:float" minOccurs="0" />
  <xs:element name="RemoteConversationalMOS" type="xs:float" minOccurs="0" />
  <xs:element name="LocalConversationalMOSAlg" type="xs:string" minOccurs="0" />
  <xs:element name="RemoteConversationalMOSAlg" type="xs:string" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
<!--
 Label values : "main-audio", "main-video","panoramic-video"
  -->
  <xs:attribute name="Label" type="xs:string" use="required" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
```

```
  </xs:complexType>
<!--
     MEDIA LINE TYPE

  -->
<xs:complexType name="MediaLineDescriptionType">
<xs:sequence>
  <xs:element name="Connectivity" type="tns:ConnectivityType" minOccurs="0" />
<!--
 Security values : "None", "SRTP","V1"
  -->
  <xs:element name="Security" type="xs:string" minOccurs="0" />
  <xs:element name="Offerer" type="xs:boolean" minOccurs="0" />
  <xs:element name="Transport" type="tns:TransportType" minOccurs="0" />
  <xs:element name="LocalAddr" type="tns:AddrType" />
  <xs:element name="RemoteAddr" type="tns:AddrType" />
<!--
 Microphone or USB Phone or Camera device name
  -->
  <xs:element name="CaptureDev" type="tns:DeviceType" minOccurs="0" />
<!--
 Speakers or USB Phone device name
  -->
  <xs:element name="RenderDev" type="tns:DeviceType" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     Device TYPE

  -->
<xs:complexType name="DeviceType">
<xs:sequence>
  <xs:element name="Name" type="xs:string" minOccurs="0" />
  <xs:element name="Driver" type="xs:string" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     STREAM DIRECTIONAL METRICS TYPE

  -->
<xs:complexType name="StreamType">
<xs:sequence>
  <xs:element name="Network" type="tns:NetworkMetricsType" minOccurs="0" />
  <xs:element name="Payload" type="tns:PayloadMetricsType" />
  <xs:element name="QualityEstimates" type="tns:QualityEstimatesType" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="Id" type="xs:unsignedInt" use="required" />
  <xs:attribute name="Start" type="xs:dateTime" />
  <xs:attribute name="End" type="xs:dateTime" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
<!--
   Id = SSRC
  -->
  </xs:complexType>
```

```
<!--
     NETWORK METRICS

  -->
<xs:complexType name="NetworkMetricsType">
<xs:sequence>
<!--
 DiffServ CodePoint
  -->
  <xs:element name="DSCP" type="xs:byte" minOccurs="0" />
<!--
 VLAN is described via 12 bits
  -->
  <xs:element name="VLAN" type="xs:int" minOccurs="0" />
  <xs:element name="Jitter" type="tns:JitterType" minOccurs="0" />
  <xs:element name="PacketLoss" type="tns:PacketLossType" minOccurs="0" />
  <xs:element name="BurstGapLoss" type="tns:BurstGapLossType" minOccurs="0" />
  <xs:element name="Delay" type="tns:DelayType" minOccurs="0" />
  <xs:element name="Utilization" type="tns:NetworkUtilizationType" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
      ICE  TYPE

  -->
<xs:complexType name="ConnectivityType">
<xs:sequence>
  <xs:element name="Ice" type="tns:IceStatusType" minOccurs="0" />
  <xs:element name="IceWarningFlags" type="xs:unsignedInt" minOccurs="0" />
  <xs:element name="RelayAddress" type="tns:AddrType" minOccurs="0" maxOccurs="unbounded" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     ICE CONECTIVITY TYPE

  -->
<xs:simpleType name="IceStatusType">
<xs:restriction base="xs:string">
  <xs:enumeration value="FAILED" />
  <xs:enumeration value="DIRECT" />
  <xs:enumeration value="RELAY" />
  <xs:enumeration value="HTTP-PROXY" />
  </xs:restriction>
  </xs:simpleType>
<!--
     NETWORK UTILIZATION TYPE

  -->
<xs:complexType name="NetworkUtilizationType">
<xs:sequence>
  <xs:element name="Packets" type="xs:int" minOccurs="0" />
  <xs:element name="BandwidthEst" type="xs:int" minOccurs="0" />
  <xs:element name="BandwidthAlloc" type="xs:int" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
```

```
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     PAYLOAD METRICS TYPE

  -->
<xs:complexType name="PayloadMetricsType">
<xs:choice>
  <xs:element name="Audio" type="tns:AudioPayloadMetricsType" />
  <xs:element name="Video" type="tns:VideoPayloadMetricsType" />
  <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded" />
  </xs:choice>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     AUDIO METRICS TYPE

  -->
<xs:complexType name="AudioPayloadMetricsType">
<xs:sequence>
  <xs:element name="PayloadType" type="xs:int" minOccurs="0" />
  <xs:element name="PayloadDescription" type="xs:string" minOccurs="0" />
  <xs:element name="SampleRate" type="xs:int" minOccurs="0" />
  <xs:element name="FrameDuration" type="xs:int" minOccurs="0" />
  <xs:element name="FrameOctets" type="xs:int" minOccurs="0" />
  <xs:element name="FramesPerPacket" type="xs:int" minOccurs="0" />
  <xs:element name="PacketsPerSecond" type="xs:int" minOccurs="0" />
  <xs:element name="FMTP" type="xs:string" minOccurs="0" />
  <xs:element name="Signal" type="tns:SignalType" minOccurs="0" />
  <xs:element name="JitterBuffer" type="tns:JitterBufferType" minOccurs="0" />
  <xs:element name="SilenceSupress" type="tns:ratioConcealSuppressionStateType" minOccurs="0"
/>
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  </xs:complexType>
<!--
     VIDEO METRICS TYPE

  -->
<xs:complexType name="VideoPayloadMetricsType">
<xs:sequence>
  <xs:element name="PayloadType" type="xs:int" minOccurs="0" />
  <xs:element name="PayloadDescription" type="xs:string" minOccurs="0" />
  <xs:element name="Resolution" type="xs:string" minOccurs="0" />
  <xs:element name="VideoBitRateAvg" type="xs:int" minOccurs="0" />
  <xs:element name="VideoBitRateMax" type="xs:int" minOccurs="0" />
  <xs:element name="VideoFrameRateAvg" type="xs:float" minOccurs="0" />
  <xs:element name="VideoPacketLossRate" type="xs:float" minOccurs="0" />
  <xs:element name="VideoFrameLossRate" type="xs:float" minOccurs="0" />
  <xs:element name="VideoFrameEncodingTime" type="xs:float" minOccurs="0" />
  <xs:element name="VideoFrameDecodingTime" type="xs:float" minOccurs="0" />
  <xs:element name="VideoFEC" type="xs:boolean" minOccurs="0" />
  <xs:element name="FrozenVideoFreq" type="xs:float" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  </xs:complexType>
<!--
     PACKET LOSS CONCEALMENT TYPE
```

```
  -->
<xs:simpleType name="PacketLossConcealmentType">
<xs:restriction base="xs:string">
  <xs:enumeration value="UNSPECIFIED" />
  <xs:enumeration value="DISABLED" />
  <xs:enumeration value="ENHANCED" />
  <xs:enumeration value="STANDARD" />
  </xs:restriction>
  </xs:simpleType>
<!--
     SILENCE SUPPRESSION STATE TYPE

  -->
<xs:simpleType name="SilenceSuppressionStateType">
<xs:restriction base="xs:string">
  <xs:enumeration value="ON" />
  <xs:enumeration value="OFF" />
  </xs:restriction>
  </xs:simpleType>
<!--
     ADDR TYPE

  -->
<xs:complexType name="AddrType">
<xs:sequence>
  <xs:element name="IPAddr" type="xs:string" />
  <xs:element name="Port" type="xs:unsignedShort" minOccurs="0" />
  <xs:element name="Inside" type="xs:boolean" minOccurs="0" />
  <xs:element name="SubnetMask" type="xs:string" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     JITTER BUFFER TYPE

  -->
<xs:complexType name="JitterBufferType">
<xs:sequence>
  <xs:element name="Type" type="tns:JitterBufferAdaptiveType" minOccurs="0" />
  <xs:element name="Rate" type="xs:int" minOccurs="0" />
  <xs:element name="Nominal" type="xs:int" minOccurs="0" />
  <xs:element name="Max" type="xs:int" minOccurs="0" />
  <xs:element name="AbsMax" type="xs:int" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     JITTER BUFFER ADAPTIVE TYPE

  -->
<xs:simpleType name="JitterBufferAdaptiveType">
<xs:restriction base="xs:string">
  <xs:enumeration value="UNKNOWN" />
  <xs:enumeration value="RESERVED" />
  <xs:enumeration value="NON-ADAPTIVE" />
  <xs:enumeration value="ADAPTIVE" />
  </xs:restriction>
```

```
  </xs:simpleType>
<!--
     PACKET LOSS TYPE

  -->
<xs:complexType name="PacketLossType">
<xs:sequence>
  <xs:element name="LossRate" type="xs:float" minOccurs="0" />
  <xs:element name="LossRateMax" type="xs:float" minOccurs="0" />
  <xs:element name="DiscardRate" type="xs:float" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     BURST GAP LOSS TYPE

  -->
<xs:complexType name="BurstGapLossType">
<xs:sequence>
  <xs:element name="BurstDensity" type="xs:float" minOccurs="0" />
  <xs:element name="BurstDuration" type="xs:int" minOccurs="0" />
  <xs:element name="GapDensity" type="xs:float" minOccurs="0" />
  <xs:element name="GapDuration" type="xs:int" minOccurs="0" />
  <xs:element name="MinGapThreshold" type="xs:int" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     DELAY TYPE

  -->
<xs:complexType name="DelayType">
<xs:sequence>
  <xs:element name="RoundTrip" type="xs:int" minOccurs="0" />
  <xs:element name="RoundTripMax" type="xs:int" minOccurs="0" />
  <xs:element name="EndSystem" type="xs:int" minOccurs="0" />
  <xs:element name="OneWay" type="xs:int" minOccurs="0" />
  <xs:element ref="v3:RelativeOneWay" minOccurs="0"/>
  <xs:sequence minOccurs="0">
    <xs:element ref="v3:Separator3" />  <xs:any namespace="##other" processContents="lax"
minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence></xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     JITTER TYPE

  -->
<xs:complexType name="JitterType">
<xs:sequence>
  <xs:element name="InterArrival" type="xs:int" minOccurs="0" />
  <xs:element name="InterArrivalMax" type="xs:int" minOccurs="0" />
  <xs:element name="MeanAbs" type="xs:int" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
```

```
<!--
     SIGNAL TYPE

  -->
<xs:complexType name="SignalType">
<xs:sequence>
  <xs:element name="SignalLevel" type="xs:int" minOccurs="0" />
  <xs:element name="NoiseLevel" type="xs:int" minOccurs="0" />
  <xs:element name="EchoReturn" type="xs:int" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     QUALITY ESTIMATES TYPE

  -->
<xs:complexType name="QualityEstimatesType">
<xs:choice>
  <xs:element name="Audio" type="tns:AudioQualityEstimatesType" />
  <xs:element name="Video" type="tns:VideoQualityEstimatesType" />
  <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded" />
  </xs:choice>
  </xs:complexType>
<!--
     AUDIO QUALITY ESTIMATES TYPE


  -->
<xs:complexType name="AudioQualityEstimatesType">
<xs:sequence>
  <xs:element name="RecvListenMOS" type="xs:float" minOccurs="0" />
  <xs:element name="RecvListenMOSMin" type="xs:float" minOccurs="0" />
  <xs:element name="RecvListenMOSAlg" type="xs:string" minOccurs="0" />
  <xs:element name="SendListenMOS" type="xs:float" minOccurs="0" />
  <xs:element name="SendListenMOSMin" type="xs:float" minOccurs="0" />
  <xs:element name="SendListenMOSAlg" type="xs:string" minOccurs="0" />
  <xs:element name="NetworkMOS" type="tns:NetworkAudioMOSType" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     NETWORK AUDIO MOS FACTOR TYPE

  -->
<xs:complexType name="NetworkAudioMOSType">
<xs:sequence>
  <xs:element name="OverallAvg" type="xs:float" minOccurs="0" />
  <xs:element name="OverallMin" type="xs:float" minOccurs="0" />
  <xs:element name="DegradationAvg" type="xs:float" minOccurs="0" />
  <xs:element name="DegradationMax" type="xs:float" minOccurs="0" />
  <xs:element name="DegradationJitterAvg" type="xs:float" minOccurs="0" />
  <xs:element name="DegradationPacketLossAvg" type="xs:float" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
```

```
      VIDEO QUALITY ESTIMATES TYPE

    -->
  <xs:complexType name="VideoQualityEstimatesType">
  <xs:sequence>
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
  <!--
      TRANSPORT TYPE

    -->
  <xs:simpleType name="TransportType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="UDP" />
    <xs:enumeration value="TCP" />
    </xs:restriction>
    </xs:simpleType>
    </xs:schema>
```

6.2 Office Communications Server 2007 R2 Schema

This section follows the product behavior described in footnote <150>.

```
<?xml version="1.0" encoding="UTF-8" ?>
<xs:schema xmlns:tns="ms-rtcp-metrics" xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="ms-rtcp-metrics" elementFormDefault="qualified"
attributeFormDefault="unqualified" version="2.0">
<!--

      RTCP METRICS STATEMENT

    -->
    <xs:element name="VQReportEvent" type="tns:VQReportEventType" />
  <!--
      RTCP REPORT TYPE

    -->
  <xs:complexType name="VQReportEventType">
  <xs:choice>
    <xs:element name="VQSessionReport" type="tns:SessionReportType" maxOccurs="unbounded" />
    <xs:element name="VQSessionIntervalReport" type="tns:SessionReportType"
  maxOccurs="unbounded" />
    <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded" />
    </xs:choice>
    <xs:attribute name="Version" type="xs:string" use="optional" />
    <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
  <!--
      VQ SESSION REPORT TYPE

    -->
  <xs:complexType name="SessionReportType">
  <xs:sequence>
    <xs:element name="LocationProfile" type="xs:string" minOccurs="0" />
```

```
  <xs:element name="Pool" type="xs:string" minOccurs="0" />
  <xs:element name="Endpoint" type="tns:EndpointType" />
  <xs:element name="DialogInfo" type="tns:DialogInfoType" />
  <xs:element name="MediaLine" type="tns:MediaLineType" maxOccurs="unbounded" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="SessionId" type="xs:string" use="required" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
<!--
   SessionId = DialogID
  -->
  </xs:complexType>
<!--
     DIALOG INFO TYPE

  -->
<xs:complexType name="DialogInfoType">
<xs:sequence>
  <xs:element name="DialogCategory" type="tns:DialogCategoryType" minOccurs="0" />
  <xs:element name="CorrelationID" type="xs:string" minOccurs="0" />
  <xs:element name="FromURI" type="xs:anyURI" />
  <xs:element name="ToURI" type="xs:anyURI" />
  <xs:element name="Caller" type="xs:boolean" />
  <xs:element name="LocalContactURI" type="xs:anyURI" />
  <xs:element name="RemoteContactURI" type="xs:anyURI" />
  <xs:element name="LocalUserAgent" type="xs:string" />
  <xs:element name="RemoteUserAgent" type="xs:string" />
<!--
PAI = P-Asserted-Identity
  -->
  <xs:element name="LocalPAI" type="xs:anyURI" minOccurs="0" />
  <xs:element name="RemotePAI" type="xs:anyURI" minOccurs="0" />
  <xs:element name="ConfURI" type="xs:anyURI" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="CallId" type="xs:string" use="required" />
  <xs:attribute name="FromTag" type="xs:string" />
  <xs:attribute name="ToTag" type="xs:string" />
  <xs:attribute name="Start" type="xs:dateTime" use="required" />
  <xs:attribute name="End" type="xs:dateTime" use="required" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     ENDPOINT TYPE

  -->
<xs:complexType name="EndpointType">
<xs:sequence>
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="Name" type="xs:string" use="required" />
  <xs:attribute name="ProfileId" type="xs:string" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
<!--
 Name = Computer Name
  -->
<!--
 ProfileId = Endpoint Report GUID  - Note: this attribute is optional
  -->
```

```
  </xs:complexType>
<!--
     MEDIA LINE REPORT TYPE

  -->
<xs:complexType name="MediaLineType">
<xs:sequence>
  <xs:element name="Description" type="tns:MediaLineDescriptionType" />
  <xs:element name="InboundStream" type="tns:StreamType" minOccurs="0" />
  <xs:element name="OutboundStream" type="tns:StreamType" minOccurs="0" />
  <xs:element name="LocalConversationalMOS" type="xs:float" minOccurs="0" />
  <xs:element name="RemoteConversationalMOS" type="xs:float" minOccurs="0" />
  <xs:element name="LocalConversationalMOSAlg" type="xs:string" minOccurs="0" />
  <xs:element name="RemoteConversationalMOSAlg" type="xs:string" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
<!--
 Label values : "main-audio", "main-video","panoramic-video"
  -->
  <xs:attribute name="Label" type="xs:string" use="required" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     MEDIA LINE TYPE

  -->
<xs:complexType name="MediaLineDescriptionType">
<xs:sequence>
  <xs:element name="Connectivity" type="tns:ConnectivityType" minOccurs="0" />
<!--
 Security values : "None", "SRTP","V1"
  -->
  <xs:element name="Security" type="xs:string" minOccurs="0" />
  <xs:element name="Offerer" type="xs:boolean" minOccurs="0" />
  <xs:element name="Transport" type="tns:TransportType" minOccurs="0" />
  <xs:element name="NetworkConnectivityInfo" type="tns:NetworkConnectivityInfoType"
minOccurs="0" />
  <xs:element name="LocalAddr" type="tns:AddrType" />
  <xs:element name="RemoteAddr" type="tns:AddrType" />
<!--
 Microphone or USB Phone or Camera device name
  -->
  <xs:element name="CaptureDev" type="tns:DeviceType" minOccurs="0" />
<!--
 Speakers or USB Phone device name
  -->
  <xs:element name="RenderDev" type="tns:DeviceType" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     Device TYPE

  -->
<xs:complexType name="DeviceType">
<xs:sequence>
  <xs:element name="Name" type="xs:string" minOccurs="0" />
  <xs:element name="Driver" type="xs:string" minOccurs="0" />
```

```
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     STREAM DIRECTIONAL METRICS TYPE

  -->
<xs:complexType name="StreamType">
<xs:sequence>
  <xs:element name="Network" type="tns:NetworkMetricsType" minOccurs="0" />
  <xs:element name="Payload" type="tns:PayloadMetricsType" />
  <xs:element name="QualityEstimates" type="tns:QualityEstimatesType" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="Id" type="xs:unsignedInt" use="required" />
  <xs:attribute name="Start" type="xs:dateTime" />
  <xs:attribute name="End" type="xs:dateTime" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
<!--
   Id = SSRC
  -->
  </xs:complexType>
<!--
     NETWORK METRICS

  -->
<xs:complexType name="NetworkMetricsType">
<xs:sequence>
<!--
 DiffServ CodePoint
  -->
  <xs:element name="DSCP" type="xs:byte" minOccurs="0" />
<!--
 VLAN is described via 12 bits
  -->
  <xs:element name="VLAN" type="xs:int" minOccurs="0" />
  <xs:element name="Jitter" type="tns:JitterType" minOccurs="0" />
  <xs:element name="PacketLoss" type="tns:PacketLossType" minOccurs="0" />
  <xs:element name="BurstGapLoss" type="tns:BurstGapLossType" minOccurs="0" />
  <xs:element name="Delay" type="tns:DelayType" minOccurs="0" />
  <xs:element name="Utilization" type="tns:NetworkUtilizationType" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
      ICE  TYPE

  -->
<xs:complexType name="ConnectivityType">
<xs:sequence>
  <xs:element name="Ice" type="tns:IceStatusType" minOccurs="0" />
  <xs:element name="IceWarningFlags" type="xs:unsignedInt" minOccurs="0" />
  <xs:element name="RelayAddress" type="tns:AddrType" minOccurs="0" maxOccurs="unbounded" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
```

```
<!--
     ICE CONECTIVITY TYPE

  -->
<xs:simpleType name="IceStatusType">
<xs:restriction base="xs:string">
  <xs:enumeration value="FAILED" />
  <xs:enumeration value="DIRECT" />
  <xs:enumeration value="RELAY" />
  <xs:enumeration value="HTTP-PROXY" />
  </xs:restriction>
  </xs:simpleType>
<!--
     NETWORK UTILIZATION TYPE

  -->
<xs:complexType name="NetworkUtilizationType">
<xs:sequence>
  <xs:element name="Packets" type="xs:int" minOccurs="0" />
  <xs:element name="BandwidthEst" type="xs:int" minOccurs="0" />
  <xs:element name="BandwidthAlloc" type="xs:int" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     PAYLOAD METRICS TYPE

  -->
<xs:complexType name="PayloadMetricsType">
<xs:choice>
  <xs:element name="Audio" type="tns:AudioPayloadMetricsType" />
  <xs:element name="Video" type="tns:VideoPayloadMetricsType" />
  <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded" />
  </xs:choice>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     AUDIO METRICS TYPE

  -->
<xs:complexType name="AudioPayloadMetricsType">
<xs:sequence>
  <xs:element name="PayloadType" type="xs:int" minOccurs="0" />
  <xs:element name="PayloadDescription" type="xs:string" minOccurs="0" />
  <xs:element name="SampleRate" type="xs:int" minOccurs="0" />
  <xs:element name="FrameDuration" type="xs:int" minOccurs="0" />
  <xs:element name="FrameOctets" type="xs:int" minOccurs="0" />
  <xs:element name="FramesPerPacket" type="xs:int" minOccurs="0" />
  <xs:element name="PacketsPerSecond" type="xs:int" minOccurs="0" />
  <xs:element name="FMTP" type="xs:string" minOccurs="0" />
  <xs:element name="Signal" type="tns:SignalType" minOccurs="0" />
  <xs:element name="JitterBuffer" type="tns:JitterBufferType" minOccurs="0" />
  <xs:element name="SilenceSupress" type="tns:SilenceSuppressionStateType" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  </xs:complexType>
<!--
     VIDEO METRICS TYPE
```

```
  -->
<xs:complexType name="VideoPayloadMetricsType">
<xs:sequence>
  <xs:element name="PayloadType" type="xs:int" minOccurs="0" />
  <xs:element name="PayloadDescription" type="xs:string" minOccurs="0" />
  <xs:element name="Resolution" type="xs:string" minOccurs="0" />
  <xs:element name="VideoBitRateAvg" type="xs:int" minOccurs="0" />
  <xs:element name="VideoBitRateMax" type="xs:int" minOccurs="0" />
  <xs:element name="VideoFrameRateAvg" type="xs:float" minOccurs="0" />
  <xs:element name="VideoPacketLossRate" type="xs:float" minOccurs="0" />
  <xs:element name="VideoFrameLossRate" type="xs:float" minOccurs="0" />
  <xs:element name="VideoFrameEncodingTime" type="xs:float" minOccurs="0" />
  <xs:element name="VideoFrameDecodingTime" type="xs:float" minOccurs="0" />
  <xs:element name="VideoFEC" type="xs:boolean" minOccurs="0" />
  <xs:element name="FrozenVideoFreq" type="xs:float" minOccurs="0" />
  <xs:element name="FrozenPeriodPercentAvg" type="xs:float" minOccurs="0" />
  <xs:element name="ConsecutivePacketLossAvg" type="xs:float" minOccurs="0" />
  <xs:element name="RateMatchLevel" type="xs:float" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  </xs:complexType>
<!--
     PACKET LOSS CONCEALMENT TYPE

  -->
<xs:simpleType name="PacketLossConcealmentType">
<xs:restriction base="xs:string">
  <xs:enumeration value="UNSPECIFIED" />
  <xs:enumeration value="DISABLED" />
  <xs:enumeration value="ENHANCED" />
  <xs:enumeration value="STANDARD" />
  </xs:restriction>
  </xs:simpleType>
<!--
     SILENCE SUPPRESSION STATE TYPE

  -->
<xs:simpleType name="SilenceSuppressionStateType">
<xs:restriction base="xs:string">
  <xs:enumeration value="ON" />
  <xs:enumeration value="OFF" />
  </xs:restriction>
  </xs:simpleType>
<!--
     ADDR TYPE

  -->
<xs:complexType name="AddrType">
<xs:sequence>
  <xs:element name="IPAddr" type="xs:string" />
  <xs:element name="Port" type="xs:unsignedShort" minOccurs="0" />
  <xs:element name="Inside" type="xs:boolean" minOccurs="0" />
  <xs:element name="SubnetMask" type="xs:string" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
```

```
      JITTER BUFFER TYPE

    -->
  <xs:complexType name="JitterBufferType">
  <xs:sequence>
    <xs:element name="Type" type="tns:JitterBufferAdaptiveType" minOccurs="0" />
    <xs:element name="Rate" type="xs:int" minOccurs="0" />
    <xs:element name="Nominal" type="xs:int" minOccurs="0" />
    <xs:element name="Max" type="xs:int" minOccurs="0" />
    <xs:element name="AbsMax" type="xs:int" minOccurs="0" />
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
  <!--
      JITTER BUFFER ADAPTIVE TYPE

    -->
  <xs:simpleType name="JitterBufferAdaptiveType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="UNKNOWN" />
    <xs:enumeration value="RESERVED" />
    <xs:enumeration value="NON-ADAPTIVE" />
    <xs:enumeration value="ADAPTIVE" />
    </xs:restriction>
    </xs:simpleType>
  <!--
      PACKET LOSS TYPE

    -->
  <xs:complexType name="PacketLossType">
  <xs:sequence>
    <xs:element name="LossRate" type="xs:float" minOccurs="0" />
    <xs:element name="LossRateMax" type="xs:float" minOccurs="0" />
    <xs:element name="DiscardRate" type="xs:float" minOccurs="0" />
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
  <!--
      BURST GAP LOSS TYPE

    -->
  <xs:complexType name="BurstGapLossType">
  <xs:sequence>
    <xs:element name="BurstDensity" type="xs:float" minOccurs="0" />
    <xs:element name="BurstDuration" type="xs:int" minOccurs="0" />
    <xs:element name="GapDensity" type="xs:float" minOccurs="0" />
    <xs:element name="GapDuration" type="xs:int" minOccurs="0" />
    <xs:element name="MinGapThreshold" type="xs:int" minOccurs="0" />
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
  <!--
      DELAY TYPE

    -->
  <xs:complexType name="DelayType">
```

```
  <xs:sequence>
    <xs:element name="RoundTrip" type="xs:int" minOccurs="0" />
    <xs:element name="RoundTripMax" type="xs:int" minOccurs="0" />
    <xs:element name="EndSystem" type="xs:int" minOccurs="0" />
    <xs:element name="OneWay" type="xs:int" minOccurs="0" />
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
  <!--
       JITTER TYPE

    -->
  <xs:complexType name="JitterType">
  <xs:sequence>
    <xs:element name="InterArrival" type="xs:int" minOccurs="0" />
    <xs:element name="InterArrivalMax" type="xs:int" minOccurs="0" />
    <xs:element name="MeanAbs" type="xs:int" minOccurs="0" />
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
  <!--
       SIGNAL TYPE

    -->
  <xs:complexType name="SignalType">
  <xs:sequence>
    <xs:element name="SignalLevel" type="xs:int" minOccurs="0" />
    <xs:element name="NoiseLevel" type="xs:int" minOccurs="0" />
    <xs:element name="EchoReturn" type="xs:int" minOccurs="0" />
    <xs:element name="SpeakerFeedbackMicIn" type="xs:int" minOccurs="0" />
    <xs:element name="SpeechLevelMicIn" type="xs:int" minOccurs="0" />
    <xs:element name="SpeechLevelPostProcess" type="xs:int" minOccurs="0" />
    <xs:element name="SignalLevelLoudSpeaker" type="xs:int" minOccurs="0" />
    <xs:element name="BackGroundNoiseMicIn" type="xs:int" minOccurs="0" />
    <xs:element name="BackGroundNoiseSent" type="xs:int" minOccurs="0" />
    <xs:element name="LocalSpeechToEcho" type="xs:int" minOccurs="0" />
    <xs:element name="SpeakerGlitchRate" type="xs:int" minOccurs="0" />
    <xs:element name="MicGlitchRate" type="xs:int" minOccurs="0" />
    <xs:element name="SpeakerClipRate" type="xs:int" minOccurs="0" />
    <xs:element name="MicClipRate" type="xs:int" minOccurs="0" />
    <xs:element name="RxAGCSignalLevel" type="xs:int" minOccurs="0" />
    <xs:element name="RxAGCNoiseLevel" type="xs:int" minOccurs="0" />
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
    </xs:complexType>
  <!--
       QUALITY ESTIMATES TYPE

    -->
  <xs:complexType name="QualityEstimatesType">
  <xs:choice>
    <xs:element name="Audio" type="tns:AudioQualityEstimatesType" />
    <xs:element name="Video" type="tns:VideoQualityEstimatesType" />
    <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded" />
    </xs:choice>
    </xs:complexType>
```

```
<!--
     AUDIO QUALITY ESTIMATES TYPE

  -->
<xs:complexType name="AudioQualityEstimatesType">
<xs:sequence>
  <xs:element name="RecvListenMOS" type="xs:float" minOccurs="0" />
  <xs:element name="RecvListenMOSMin" type="xs:float" minOccurs="0" />
  <xs:element name="RecvListenMOSAlg" type="xs:string" minOccurs="0" />
  <xs:element name="SendListenMOS" type="xs:float" minOccurs="0" />
  <xs:element name="SendListenMOSMin" type="xs:float" minOccurs="0" />
  <xs:element name="SendListenMOSAlg" type="xs:string" minOccurs="0" />
  <xs:element name="NetworkMOS" type="tns:NetworkAudioMOSType" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     NETWORK AUDIO MOS FACTOR TYPE

  -->
<xs:complexType name="NetworkAudioMOSType">
<xs:sequence>
  <xs:element name="OverallAvg" type="xs:float" minOccurs="0" />
  <xs:element name="OverallMin" type="xs:float" minOccurs="0" />
  <xs:element name="DegradationAvg" type="xs:float" minOccurs="0" />
  <xs:element name="DegradationMax" type="xs:float" minOccurs="0" />
  <xs:element name="DegradationJitterAvg" type="xs:float" minOccurs="0" />
  <xs:element name="DegradationPacketLossAvg" type="xs:float" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     VIDEO QUALITY ESTIMATES TYPE

  -->
<xs:complexType name="VideoQualityEstimatesType">
<xs:sequence>
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     TRANSPORT TYPE

  -->
<xs:simpleType name="TransportType">
<xs:restriction base="xs:string">
  <xs:enumeration value="UDP" />
  <xs:enumeration value="TCP" />
  </xs:restriction>
  </xs:simpleType>
<!--
  NETWORK CONNECTIVITY TYPE

  -->
<xs:complexType name="NetworkConnectivityInfoType">
<xs:sequence>
```

```
  <xs:element name="NetworkConnection" type="tns:NetworkConnectionType" minOccurs="0" />
  <xs:element name="VPN" type="xs:boolean" minOccurs="0" />
  <xs:element name="LinkSpeed" type="xs:float" minOccurs="0" />
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
<!--
     ETHERNET CONNECTION TYPE

  -->
<xs:simpleType name="NetworkConnectionType">
<xs:restriction base="xs:string">
  <xs:enumeration value="wired" />
  <xs:enumeration value="wifi" />
  </xs:restriction>
  </xs:simpleType>
<!--
      DIALOG CATEGORY

  -->
<xs:simpleType name="DialogCategoryType">
<xs:restriction base="xs:string">
  <xs:enumeration value="OCS" />
  <xs:enumeration value="TRUNK" />
  </xs:restriction>
  </xs:simpleType>
  </xs:schema>
```

6.3 Microsoft Lync Server 2010 Schema

This section follows the product behavior described in footnote <151>. The schema has been split into three related schema definition files:

- ms-rtcp-metrics.xsd
- ms-rtcp-metrics.medialine.xsd
- ms-rtcp-metrics.v2.xsd

The schema for **ms-rtcp-metrics.xsd** is as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:tns="ms-rtcp-metrics" xmlns:v2="ms-rtcp-metrics.v2"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="ms-rtcp-metrics"
elementFormDefault="qualified" version="1.2" attributeFormDefault="unqualified">
  <xs:import namespace="ms-rtcp-metrics.v2"></xs:import>
  <xs:include schemaLocation="ms-rtcp-metrics.medialine.xsd"></xs:include>
  <!--
    RTCP METRICS STATEMENT
   -->
  <xs:element name="VQReportEvent" type="tns:VQReportEventType"/>
  <!--
    RTCP REPORT TYPE
   -->
  <xs:complexType name="VQReportEventType">
    <xs:choice>
```

```
      <xs:element name="VQSessionReport" type="tns:SessionReportType" maxOccurs="unbounded"/>
      <xs:element name="VQSessionIntervalReport" type="tns:SessionReportType"
maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded"/>
    </xs:choice>
    <xs:attribute name="Version" type="xs:string" use="optional"/>
    <xs:attribute ref="v2:SchemaVersion" use="optional"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     VQ SESSION REPORT TYPE
   -->
  <xs:complexType name="SessionReportType">
    <xs:sequence>
      <xs:element name="LocationProfile" type="xs:string" minOccurs="0"/>
      <xs:element name="Pool" type="xs:string" minOccurs="0"/>
      <xs:element name="Endpoint" type="tns:EndpointType"/>
      <xs:element name="DialogInfo" type="tns:DialogInfoType"/>
      <xs:element name="MediaLine" type="tns:MediaLineType" maxOccurs="unbounded"/>
      <xs:element ref="v2:OpaqueClientPlatformData" minOccurs="0" />
      <xs:element ref="v2:OpaqueServerPlatformData" minOccurs="0" />
      <xs:element ref="v2:OpaqueConferenceData" minOccurs="0" />
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:attribute name="SessionId" type="xs:string" use="required"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
    <!---SessionId = DialogID  -->
  </xs:complexType>
  <!--
     DIALOG INFO TYPE
   -->
  <xs:complexType name="DialogInfoType">
    <xs:sequence>
      <xs:element name="DialogCategory" type="tns:DialogCategoryType" minOccurs="0"/>
      <xs:element name="CorrelationID" type="xs:string" minOccurs="0"/>
      <xs:element name="FromURI" type="xs:anyURI"/>
      <xs:element name="ToURI" type="xs:anyURI"/>
      <xs:element name="Caller" type="xs:boolean"/>
      <xs:element name="LocalContactURI" type="xs:anyURI"/>
      <xs:element name="RemoteContactURI" type="xs:anyURI"/>
      <xs:element name="LocalUserAgent" type="xs:string"/>
      <xs:element name="RemoteUserAgent" type="xs:string"/>
      <!--   PAI = P-Asserted-Identity  -->
      <xs:element name="LocalPAI" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="RemotePAI" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="ConfURI" type="xs:anyURI" minOccurs="0"/>
      <xs:element ref="v2:CallPriority" minOccurs="0"/>
      <xs:element ref="v2:MediationServerBypassFlag" minOccurs="0"/>
      <xs:element ref="v2:TrunkingPeer" minOccurs="0"/>
      <xs:element ref="v2:MediaBypassWarningFlag" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:element ref="v2:RegisteredInside" minOccurs="0"/>
        <xs:sequence minOccurs="0">
          <xs:element ref="v2:Separator" />
```

```
            <xs:any namespace="##other" processContents="lax"
              minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
        </xs:sequence>
      </xs:sequence>
      <xs:attribute name="CallId" type="xs:string" use="required"/>
      <xs:attribute name="FromTag" type="xs:string" use="required"/>
      <xs:attribute name="ToTag" type="xs:string" use="required"/>
      <xs:attribute name="Start" type="xs:dateTime" use="required"/>
      <xs:attribute name="End" type="xs:dateTime" use="required"/>
      <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>

  <!--
        DIALOG CATEGORY
    -->
    <xs:simpleType name ="DialogCategoryType">
     <xs:restriction base="xs:string">
       <xs:enumeration value="OCS"/>
       <xs:enumeration value="TRUNK"/>
     </xs:restriction>
    </xs:simpleType>
  </xs:schema>
```

The schema for **ms-rtcp-metrics.medialine.xsd** is as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:tns="ms-rtcp-metrics" xmlns:v2="ms-rtcp-metrics.v2"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="ms-rtcp-metrics"
elementFormDefault="qualified" version="2.0" attributeFormDefault="unqualified">
  <xs:import namespace="ms-rtcp-metrics.v2"></xs:import>
  <!--
     MEDIA LINE REPORT TYPE
   -->
  <xs:complexType name="MediaLineType">
    <xs:sequence>
      <xs:element name="Description" type="tns:MediaLineDescriptionType"/>
      <xs:element name="InboundStream" type="tns:StreamType" minOccurs="0"/>
      <xs:element name="OutboundStream" type="tns:StreamType" minOccurs="0"/>
      <xs:element name="LocalConversationalMOS" type="xs:float" minOccurs="0"/>
      <xs:element name="RemoteConversationalMOS" type="xs:float" minOccurs="0"/>
      <xs:element name="LocalConversationalMOSAlg" type="xs:string" minOccurs="0"/>
      <xs:element name="RemoteConversationalMOSAlg" type="xs:string" minOccurs="0"/>
      <xs:element ref="v2:AppliedBandwidthLimit" minOccurs="0" />
      <xs:element ref="v2:AppliedBandwidthSource" minOccurs="0" />
      <xs:element ref="v2:LocalClientEvent" minOccurs="0"/>
      <xs:element ref="v2:RemoteClientEvent" minOccurs="0"/>
      <xs:element ref="v2:OpaqueCoreEndpointData" minOccurs="0" />
      <xs:element ref="v2:OpaqueChannelData" minOccurs="0" />
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <!-- Label values : "main-audio", "main-video","panoramic-video" -->
    <xs:attribute name="Label" type="xs:string" use="required"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
```

```
  </xs:complexType>
  <!--
     MEDIA LINE TYPE
   -->
  <xs:complexType name="MediaLineDescriptionType">
    <xs:sequence>
      <xs:element name="Connectivity" type="tns:ConnectivityType" minOccurs="0"/>
      <!-- Security values : "None", "SRTP","V1"  -->
      <xs:element name="Security" type="xs:string" minOccurs="0"/>
      <xs:element name="Offerer" type="xs:boolean" minOccurs="0"/>
      <xs:element name="Transport" type="tns:TransportType" minOccurs="0"/>
      <xs:element name="NetworkConnectivityInfo" type ="tns:NetworkConnectivityInfoType"
minOccurs="0"/>
      <xs:element name="LocalAddr" type="tns:AddrType"/>
      <xs:element name="RemoteAddr" type="tns:AddrType"/>
      <!-- Microphone or USB Phone or Camera device name   -->
      <xs:element name="CaptureDev" type="tns:DeviceType" minOccurs="0"/>
      <!-- Speakers or USB Phone device name    -->
      <xs:element name="RenderDev" type="tns:DeviceType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
    Device TYPE
   -->
  <xs:complexType name="DeviceType">
    <xs:sequence>
      <xs:element name="Name" type="xs:string" minOccurs="0"/>
      <xs:element name="Driver" type="xs:string" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     STREAM DIRECTIONAL METRICS TYPE
   -->
  <xs:complexType name="StreamType">
    <xs:sequence>
      <xs:element name="Network" type="tns:NetworkMetricsType" minOccurs="0"/>
      <xs:element name="Payload" type="tns:PayloadMetricsType"/>
      <xs:element name="QualityEstimates" type="tns:QualityEstimatesType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="Id" type="xs:unsignedInt" use="required"/>
    <xs:attribute name="Start" type="xs:dateTime"/>
    <xs:attribute name="End" type="xs:dateTime"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
    <!---Id = SSRC -->
  </xs:complexType>

  <xs:complexType name="NetworkMetricsType">
    <xs:sequence>
      <!-- DiffServ CodePoint  -->
      <xs:element name="DSCP" type="xs:byte" minOccurs="0"/>
      <!-- VLAN is described via 12 bits -->
      <xs:element name="VLAN" type="xs:int" minOccurs="0"/>
      <xs:element name="Jitter" type="tns:JitterType" minOccurs="0"/>
      <xs:element name="PacketLoss" type="tns:PacketLossType" minOccurs="0"/>
```

```
      <xs:element name="BurstGapLoss" type="tns:BurstGapLossType" minOccurs="0"/>
      <xs:element name="Delay" type="tns:DelayType" minOccurs="0"/>
      <xs:element name="Utilization" type="tns:NetworkUtilizationType" minOccurs="0"/>
      <xs:element ref="v2:RatioConcealedSamplesAvg" minOccurs="0"/>
      <xs:element ref="v2:RatioStretchedSamplesAvg" minOccurs="0"/>
      <xs:element ref="v2:RatioCompressedSamplesAvg" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      ICE  TYPE
    -->
  <xs:complexType name="ConnectivityType">
    <xs:sequence>
      <xs:element name="Ice" type="tns:IceStatusType" minOccurs="0"/>
      <xs:element name="IceWarningFlags" type="xs:unsignedInt" minOccurs="0"/>
      <xs:element name="RelayAddress" type="tns:AddrType" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     ICE CONECTIVITY TYPE
   -->
  <xs:simpleType name="IceStatusType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="FAILED"/>
      <xs:enumeration value="DIRECT"/>
      <xs:enumeration value="RELAY"/>
      <xs:enumeration value="HTTP-PROXY"/>
    </xs:restriction>
  </xs:simpleType>
  <!--
     NETWORK UTILIZATION TYPE
   -->
  <xs:complexType name="NetworkUtilizationType">
    <xs:sequence>
      <xs:element name="Packets" type="xs:int" minOccurs="0"/>
      <xs:element name="BandwidthEst" type="xs:int" minOccurs="0"/>
      <xs:element name="BandwidthAlloc" type="xs:int" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     PAYLOAD METRICS TYPE
   -->
  <xs:complexType name="PayloadMetricsType">
    <xs:choice>
      <xs:element name="Audio" type="tns:AudioPayloadMetricsType"/>
      <xs:element name="Video" type="tns:VideoPayloadMetricsType"/>
      <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded"/>
    </xs:choice>
```

```
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     AUDIO METRICS TYPE
   -->
  <xs:complexType name="AudioPayloadMetricsType">
    <xs:sequence>
      <xs:element name="PayloadType" type="xs:int" minOccurs="0"/>
      <xs:element name="PayloadDescription" type="xs:string" minOccurs="0"/>
      <xs:element name="SampleRate" type="xs:int" minOccurs="0"/>
      <xs:element name="FrameDuration" type="xs:int" minOccurs="0"/>
      <xs:element name="FrameOctets" type="xs:int" minOccurs="0"/>
      <xs:element name="FramesPerPacket" type="xs:int" minOccurs="0"/>
      <xs:element name="PacketsPerSecond" type="xs:int" minOccurs="0"/>
      <xs:element name="FMTP" type="xs:string" minOccurs="0"/>
      <xs:element name="Signal" type="tns:SignalType" minOccurs="0"/>
      <xs:element name="JitterBuffer" type="tns:JitterBufferType" minOccurs="0"/>
      <xs:element name="SilenceSupress" type="tns:SilenceSuppressionStateType"
minOccurs="0"/>
      <xs:element ref="v2:AudioFECUsed" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
  </xs:complexType>
  <!--
     VIDEO METRICS TYPE
   -->
  <xs:complexType name="VideoPayloadMetricsType">
    <xs:sequence>
      <xs:element name="PayloadType" type="xs:int" minOccurs="0"/>
      <xs:element name="PayloadDescription" type="xs:string" minOccurs="0"/>
      <xs:element name="Resolution" type="xs:string" minOccurs="0"/>
      <xs:element name="VideoBitRateAvg" type="xs:int" minOccurs="0"/>
      <xs:element name="VideoBitRateMax" type="xs:int" minOccurs="0"/>
      <xs:element name="VideoFrameRateAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="VideoPacketLossRate" type="xs:float" minOccurs="0"/>
      <xs:element name="VideoFrameLossRate" type="xs:float" minOccurs="0"/>
      <xs:element name="VideoFrameEncodingTime" type="xs:float" minOccurs="0"/>
      <xs:element name="VideoFrameDecodingTime" type="xs:float" minOccurs="0"/>
      <xs:element name="VideoFEC" type="xs:boolean" minOccurs="0"/>
      <xs:element name="FrozenVideoFreq" type="xs:float" minOccurs="0"/>
      <xs:element name="FrozenPeriodPercentAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="ConsecutivePacketLossAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="RateMatchLevel" type="xs:float" minOccurs="0"/>
      <xs:element ref="v2:VideoAllocateBWAvg" minOccurs="0"/>
      <xs:element ref="v2:VideoLocalFrameLossPercentageAvg" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:element ref="v2:VideoResolutionDistribution" minOccurs="0" />
        <xs:element ref="v2:VideoRateMatchingLevelDistribution" minOccurs="0" />
        <xs:sequence minOccurs="0">
          <xs:element ref="v2:Separator" />
          <xs:any namespace="##other" processContents="lax" minOccurs="0"
           maxOccurs="unbounded"/>
```

</xs:sequence>

```
      </xs:sequence>
    </xs:sequence>
  </xs:complexType>
  <!--
     SILENCE SUPPRESSION STATE TYPE
   -->
  <xs:simpleType name="SilenceSuppressionStateType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="ON"/>
      <xs:enumeration value="OFF"/>
    </xs:restriction>
  </xs:simpleType>
  <!--
     ADDR TYPE
   -->
  <xs:complexType name="AddrType">
    <xs:sequence>
      <xs:element name="IPAddr" type="xs:string"/>
      <xs:element name="Port" type="xs:unsignedShort" minOccurs="0"/>
      <xs:element name="Inside" type="xs:boolean" minOccurs="0"/>
      <xs:element name="SubnetMask" type="xs:string" minOccurs="0"/>
      <xs:element ref="v2:MACAddr" minOccurs="0"></xs:element>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator"></xs:element>
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     JITTER BUFFER TYPE
   -->
  <xs:complexType name="JitterBufferType">
    <xs:sequence>
      <xs:element name="Type" type="tns:JitterBufferAdaptiveType" minOccurs="0"/>
      <xs:element name="Rate" type="xs:int" minOccurs="0"/>
      <xs:element name="Nominal" type="xs:int" minOccurs="0"/>
      <xs:element name="Max" type="xs:int" minOccurs="0"/>
      <xs:element name="AbsMax" type="xs:int" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     JITTER BUFFER ADAPTIVE TYPE
   -->
  <xs:simpleType name="JitterBufferAdaptiveType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="UNKNOWN"/>
      <xs:enumeration value="RESERVED"/>
      <xs:enumeration value="NON-ADAPTIVE"/>
      <xs:enumeration value="ADAPTIVE"/>
    </xs:restriction>
  </xs:simpleType>
  <!--
```

```
    PACKET LOSS TYPE
 -->
<xs:complexType name="PacketLossType">
  <xs:sequence>
    <xs:element name="LossRate" type="xs:float" minOccurs="0"/>
    <xs:element name="LossRateMax" type="xs:float" minOccurs="0"/>
    <xs:element name="DiscardRate" type="xs:float" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!--
    BURST GAP LOSS TYPE
 -->
<xs:complexType name="BurstGapLossType">
  <xs:sequence>
    <xs:element name="BurstDensity" type="xs:float" minOccurs="0"/>
    <xs:element name="BurstDuration" type="xs:int" minOccurs="0"/>
    <xs:element name="GapDensity" type="xs:float" minOccurs="0"/>
    <xs:element name="GapDuration" type="xs:int" minOccurs="0"/>
    <xs:element name="MinGapThreshold" type="xs:int" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!--
    DELAY TYPE
 -->
<xs:complexType name="DelayType">
  <xs:sequence>
    <xs:element name="RoundTrip" type="xs:int" minOccurs="0"/>
    <xs:element name="RoundTripMax" type="xs:int" minOccurs="0"/>
    <xs:element name="EndSystem" type="xs:int" minOccurs="0"/>
    <xs:element name="OneWay" type="xs:int" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!--
    JITTER TYPE
 -->
<xs:complexType name="JitterType">
  <xs:sequence>
    <xs:element name="InterArrival" type="xs:int" minOccurs="0"/>
    <xs:element name="InterArrivalMax" type="xs:int" minOccurs="0"/>
    <xs:element name="MeanAbs" type="xs:int" minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax"/>
</xs:complexType>
<!--
    SIGNAL TYPE
 -->
<xs:complexType name="SignalType">
  <xs:sequence>
    <xs:element name="SignalLevel" type="xs:int" minOccurs="0" />
    <xs:element name="NoiseLevel" type="xs:int" minOccurs="0" />
    <xs:element name="EchoReturn" type="xs:int" minOccurs="0" />
    <xs:element name="SpeakerFeedbackMicIn" type="xs:int" minOccurs="0"/>
```

```
      <xs:element name="SpeechLevelMicIn" type="xs:int" minOccurs="0"/>
      <xs:element name="SpeechLevelPostProcess" type="xs:int" minOccurs="0"/>
      <xs:element name="SignalLevelLoudSpeaker" type="xs:int" minOccurs="0"/>
      <xs:element name="BackGroundNoiseMicIn" type="xs:int" minOccurs="0"/>
      <xs:element name="BackGroundNoiseSent" type="xs:int" minOccurs="0"/>
      <xs:element name="LocalSpeechToEcho" type="xs:int" minOccurs="0"/>
      <xs:element name="SpeakerGlitchRate" type="xs:int" minOccurs="0"/>
      <xs:element name="MicGlitchRate" type="xs:int" minOccurs="0"/>
      <xs:element name="SpeakerClipRate" type="xs:int" minOccurs="0"/>
      <xs:element name="MicClipRate" type="xs:int" minOccurs="0"/>
      <xs:element name="RxAGCSignalLevel" type="xs:int" minOccurs="0"/>
      <xs:element name="RxAGCNoiseLevel" type="xs:int" minOccurs="0"/>
      <xs:element ref="v2:InitialSignalLevelRMS" minOccurs="0"/>
      <xs:element ref="v2:AudioTimestampDriftRateMic" minOccurs="0"/>
      <xs:element ref="v2:AudioTimestampDriftRateSpk" minOccurs="0"/>
      <xs:element ref="v2:AudioTimestampErrorMicMs" minOccurs="0"/>
      <xs:element ref="v2:AudioTimestampErrorSpkMs" minOccurs="0"/>
      <xs:element ref="v2:VsEntryCauses" minOccurs="0"/>
      <xs:element ref="v2:EchoEventCauses" minOccurs="0"/>
      <xs:element ref="v2:EchoPercentMicIn" minOccurs="0"/>
      <xs:element ref="v2:EchoPercentSend" minOccurs="0"/>
      <xs:element ref="v2:RxAvgAGCGain" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator"></xs:element>
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     QUALITY ESTIMATES TYPE
   -->
  <xs:complexType name="QualityEstimatesType">
    <xs:choice>
      <xs:element name="Audio" type="tns:AudioQualityEstimatesType"/>
      <xs:element name="Video" type="tns:VideoQualityEstimatesType"/>
      <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded"/>
    </xs:choice>
  </xs:complexType>
  <!--
     AUDIO QUALITY ESTIMATES TYPE
   -->
  <xs:complexType name="AudioQualityEstimatesType">
    <xs:sequence>
      <xs:element name="RecvListenMOS" type="xs:float" minOccurs="0"/>
      <xs:element name="RecvListenMOSMin" type="xs:float" minOccurs="0"/>
      <xs:element name="RecvListenMOSAlg" type="xs:string" minOccurs="0"/>
      <xs:element name="SendListenMOS" type="xs:float" minOccurs="0"/>
      <xs:element name="SendListenMOSMin" type="xs:float" minOccurs="0"/>
      <xs:element name="SendListenMOSAlg" type="xs:string" minOccurs="0"/>
      <xs:element name="NetworkMOS" type="tns:NetworkAudioMOSType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     NETWORK AUDIO MOS FACTOR TYPE
   -->
```

```
  <xs:complexType name="NetworkAudioMOSType">
    <xs:sequence>
      <xs:element name="OverallAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="OverallMin" type="xs:float" minOccurs="0"/>
      <xs:element name="DegradationAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="DegradationMax" type="xs:float" minOccurs="0"/>
      <xs:element name="DegradationJitterAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="DegradationPacketLossAvg" type="xs:float" minOccurs="0"/>
      <xs:element ref="v2:NetworkMOSAlg" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     VIDEO QUALITY ESTIMATES TYPE
   -->
  <xs:complexType name="VideoQualityEstimatesType">
    <xs:sequence>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
     TRANSPORT TYPE
   -->
  <xs:simpleType name="TransportType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="UDP"/>
      <xs:enumeration value="TCP"/>
    </xs:restriction>
  </xs:simpleType>

  <!--
  NETWORK CONNECTIVITY TYPE
  -->
  <xs:complexType name="NetworkConnectivityInfoType">
    <xs:sequence>
      <xs:element name="NetworkConnection" type="tns:NetworkConnectionType" minOccurs="0"/>
      <xs:element name="VPN" type="xs:boolean" minOccurs="0"/>
      <xs:element name="LinkSpeed" type="xs:float" minOccurs="0"/>
      <xs:element ref="v2:BSSID" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator"></xs:element>
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>

  <!--
     ETHERNET CONNECTION TYPE
   -->
  <xs:simpleType name="NetworkConnectionType">
    <xs:restriction base="xs:string">
```

```
      <xs:enumeration value="wired"/>
      <xs:enumeration value="wifi"/>
    </xs:restriction>
  </xs:simpleType>

  <!--
     ENDPOINT TYPE
   -->
  <xs:complexType name="EndpointType">
    <xs:sequence>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="Name" type="xs:string" use="required"/>
    <xs:attribute name="ProfileId" type="xs:string" use="optional"/>
    <xs:attribute ref="v2:OS" use="optional"/>
    <xs:attribute ref="v2:CPUName" use="optional"/>
    <xs:attribute ref="v2:CPUNumberOfCores" use="optional"/>
    <xs:attribute ref="v2:CPUProcessorSpeed" use="optional"/>
    <xs:attribute ref="v2:VirtualizationFlag" use="optional"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
    <!-- Name = Computer Name-->
    <!-- ProfileId = Endpoint Report GUID  - Note: this attribute is optional-->
  </xs:complexType>
</xs:schema>
```

The schema for **ms-rtcp-metrics.v2.xsd** is as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:tns="ms-rtcp-metrics.v2" xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="ms-rtcp-metrics.v2" elementFormDefault="qualified" version="1.2"
attributeFormDefault="unqualified">

  <!--Schema version-->
  <xs:attribute name="SchemaVersion" type="xs:string"/>

  <!--The following are part of dialog info-->

  <xs:element name="CallPriority" type="xs:short"/>
  <xs:element name="MediationServerBypassFlag" type="xs:boolean"/>
  <xs:element name="TrunkingPeer" type="xs:string"/>
  <xs:element name="BSSID" type="xs:string"/>
  <xs:element name="MediaBypassWarningFlag" type="xs:int"/>
  <xs:element name="RegisteredInside" type="xs:boolean"/>

  <!--The following are media metrics-->

  <xs:element name="AppliedBandwidthLimit" type="xs:int"/>
  <xs:element name="AppliedBandwidthSource" type="xs:string"/>
  <xs:element name="InitialSignalLevelRMS" type="xs:float"/>
  <xs:element name="AudioFECUsed" type="xs:boolean"/>
  <xs:element name="VideoAllocateBWAvg" type="xs:int"/>
  <xs:element name="VideoLocalFrameLossPercentageAvg" type="xs:float"/>

  <!--The following are AEC metrics-->
  <xs:element name="AudioTimestampDriftRateMic" type="xs:float"/>
  <xs:element name="AudioTimestampDriftRateSpk" type="xs:float"/>
```

```
<xs:element name="AudioTimestampErrorMicMs" type="xs:float"/>
<xs:element name="AudioTimestampErrorSpkMs" type="xs:float"/>
<xs:element name="VsEntryCauses" type="xs:unsignedByte"/>
<xs:element name="EchoEventCauses" type="xs:unsignedByte"/>
<xs:element name="EchoPercentMicIn" type="xs:float"/>
<xs:element name="EchoPercentSend" type="xs:float"/>
<xs:element name="RxAvgAGCGain" type="xs:int"/>

<!--The following are healer metrics-->
<xs:element name="RatioConcealedSamplesAvg" type="xs:float"/>
<xs:element name="RatioStretchedSamplesAvg" type="xs:float"/>
<xs:element name="RatioCompressedSamplesAvg" type="xs:float"/>

<!--The following are Network MOS related-->
<xs:element name="NetworkMOSAlg" type="xs:string"/>


<!--The following are endpoint information-->
<xs:attribute name="OS" type="xs:string"/>
<!--
Bit flag indicate if the system is running in a virtualized environment:
  0x0000: None
  0x0001: HyperV
  0x0002: VMWare
  0x0004: Virtual PC
  0x0008: Xen PC
-->
<xs:attribute name="VirtualizationFlag" type="xs:byte"/>
<xs:attribute name="CPUNumberOfCores" type="xs:short"/>
<xs:attribute name="CPUProcessorSpeed" type="xs:int"/>
<xs:attribute name="CPUName" type="xs:string"/>
<xs:element name="MACAddr" type="xs:string"/>


<!--The following are client event count-->
<xs:element name="LocalClientEvent" type="tns:ClientEventType"/>
<xs:element name="RemoteClientEvent" type="tns:ClientEventType"/>
<xs:complexType name="ClientEventType">
  <xs:sequence>
    <xs:element name="NetworkSendQualityEventRatio"
     type="xs:float" minOccurs="0"/>
    <xs:element name="NetworkReceiveQualityEventRatio"
     type="xs:float" minOccurs="0"/>
    <xs:element name="NetworkDelayEventRatio" type="xs:float" minOccurs="0"/>
    <xs:element name="NetworkBandwidthLowEventRatio"
     type="xs:float" minOccurs="0"/>
    <xs:element name="CPUInsufficientEventRatio"
     type="xs:float" minOccurs="0"/>
    <xs:element name="DeviceHalfDuplexAECEventRatio"
     type="xs:float" minOccurs="0"/>
    <xs:element name="DeviceRenderNotFunctioningEventRatio"
     type="xs:float" minOccurs="0"/>
    <xs:element name="DeviceCaptureNotFunctioningEventRatio"
     type="xs:float" minOccurs="0"/>
    <xs:element name="DeviceGlitchesEventRatio"
     type="xs:float" minOccurs="0"/>
    <xs:element name="DeviceLowSNREventRatio" type="xs:float" minOccurs="0"/>
    <xs:element name="DeviceLowSpeechLevelEventRatio"
     type="xs:float" minOccurs="0"/>
```

```
      <xs:element name="DeviceClippingEventRatio"
       type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceEchoEventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceNearEndToEchoRatioEventRatio"
       type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceMultipleEndpointsEventCount"
       type="xs:short" minOccurs="0"/>
      <xs:element name="DeviceHowlingEventCount"
       type="xs:short" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="tns:Separator"/>
        <xs:any namespace="##any" processContents="lax" minOccurs="0"
         maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>

  <xs:element name="VideoResolutionDistribution"
   type="tns:VideoResolutionDistributionType"/>

  <xs:complexType name="VideoResolutionDistributionType">
    <xs:sequence>
      <xs:element name="CIFQuality" type="xs:unsignedByte" />
      <xs:element name="VGAQuality" type="xs:unsignedByte" />
      <xs:element name="HD720Quality" type="xs:unsignedByte" />
      <xs:sequence minOccurs="0">
        <xs:element ref="tns:Separator"/>
        <xs:any namespace="##any" processContents="lax" minOccurs="0"
         maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:element name="VideoRateMatchingLevelDistribution"
   type="tns:VideoRateMatchingLevelDistributionType"/>

  <xs:complexType name="VideoRateMatchingLevelDistributionType">
    <xs:sequence>
      <xs:element name="None_Drop" type="xs:unsignedByte" />
      <xs:element name="B_Drop" type="xs:unsignedByte" />
      <xs:element name="BP_Drop" type="xs:unsignedByte" />
      <xs:element name="BPSP_Drop" type="xs:unsignedByte" />
      <xs:element name="BPSPI_Drop" type="xs:unsignedByte" />
      <xs:sequence minOccurs="0">
        <xs:element ref="tns:Separator"/>
        <xs:any namespace="##any" processContents="lax" minOccurs="0"
         maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:element name="OpaqueClientPlatformData"
   type="tns:OpaqueClientPlatformDataType" />
  <xs:element name="OpaqueServerPlatformData"
   type="tns:OpaqueServerPlatformDataType" />
  <xs:element name="OpaqueCoreEndpointData"
```

```
 type="tns:OpaqueCoreEndpointDataType" />
<xs:element name="OpaqueConferenceData"
 type="tns:OpaqueConferenceDataType" />
<xs:element name="OpaqueChannelData" type="tns:OpaqueChannelDataType" />


<!--OPAQUE MEDIALINE DATA TYPE-->
<xs:complexType name="OpaqueCoreEndpointDataType">
  <xs:sequence>
    <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax" />
</xs:complexType>

<!--OPAQUE CHANNEL DATA TYPE-->
<xs:complexType name="OpaqueChannelDataType" >
  <xs:sequence>
    <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax" />
</xs:complexType>

<!--OPAQUE CLIENT PLATFORM DATA TYPE-->
<xs:complexType name="OpaqueClientPlatformDataType">
  <xs:sequence>
    <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax" />
</xs:complexType>

<!--OPAQUE SERVER PLATFORM DATA TYPE-->
<xs:complexType name="OpaqueServerPlatformDataType">
  <xs:sequence>
    <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax" />
</xs:complexType>

<!--OPAQUE CONFERENCE DATA TYPE-->
<xs:complexType name="OpaqueConferenceDataType">
  <xs:sequence>
    <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
  </xs:sequence>
  <xs:anyAttribute namespace="##any" processContents="lax" />
</xs:complexType>

<!--Separator is used for forward/backward compatiblity-->
<xs:element name="Separator">
  <xs:complexType></xs:complexType>
</xs:element>

</xs:schema>
```

6.4 Microsoft Lync Server 2012 Schema

This section follows the product behavior described in footnote<152>.The schema has been split into four related schema definition files:

- ms-rtcp-metrics.xsd
- ms-rtcp-metrics.medialine.xsd
- ms-rtcp-metrics.v2.xsd
- ms-rtcp-metrics.v3.xsd

The schema for **ms-rtcp-metrics.xsd** is as follows

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:tns="ms-rtcp-metrics" xmlns:v2="ms-rtcp-metrics.v2" xmlns:v3="ms-rtcp-
metrics.v3" xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="ms-rtcp-metrics"
elementFormDefault="qualified" version="1.2" attributeFormDefault="unqualified">
  <xs:import namespace="ms-rtcp-metrics.v2"></xs:import>
  <xs:import namespace="ms-rtcp-metrics.v3"></xs:import>
  <xs:include schemaLocation="ms-rtcp-metrics.medialine.xsd"></xs:include>
  <!--
      RTCP METRICS STATEMENT
    -->
  <xs:element name="VQReportEvent" type="tns:VQReportEventType"/>
  <!--
      RTCP REPORT TYPE
    -->
  <xs:complexType name="VQReportEventType">
    <xs:choice>
      <xs:element name="VQEndpointMediaProfileReport"
type="tns:EndpointMediaProfileReportType"/>
      <xs:element name="VQSessionReport" type="tns:SessionReportType" maxOccurs="unbounded"/>
      <xs:element name="VQSessionIntervalReport" type="tns:SessionReportType"
maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded"/>
    </xs:choice>
    <xs:attribute name="Version" type="xs:string" use="optional"/>
    <xs:attribute ref="v2:SchemaVersion" use="optional"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      ENDPOINT REPORT TYPE
    -->
  <xs:complexType name="EndpointMediaProfileReportType">
    <xs:sequence>
      <xs:element name="Name" type="xs:string"/>
      <xs:element name="Platform" type="tns:EndpointPlatformType" minOccurs="0"/>
      <xs:element name="MediaMetrics" type="tns:EndpointMediaMetricsType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="ProfileId" type="xs:string"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
    <!-- Profile ID is GUID - updated whenever there is a change in profile data    -->
  </xs:complexType>
  <!--
      ENDPOINT PLATFORM TYPE
    -->
  <xs:complexType name="EndpointPlatformType">
    <xs:sequence>
      <xs:element name="Hardware" type="tns:HardwareType" minOccurs="0"/>
      <!-- Software = Operating System name and version    -->
      <xs:element name="Software" type="xs:string" minOccurs="0"/>
```

```
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <!--
      ENDPOINT PLATFORM TYPE
    -->
  <xs:complexType name="HardwareType">
    <xs:sequence>
      <xs:element name="Name" type="xs:string" minOccurs="0"/>
      <xs:element name="MACAddr" type="xs:string" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="CPU" type="xs:string" minOccurs="0"/>
      <xs:element name="Memory" type="xs:unsignedLong" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <!--
      ENDPOINT MEEDIA METRICSTYPE
    -->
  <xs:complexType name="EndpointMediaMetricsType">
    <xs:choice>
      <xs:element name="Audio" type="tns:AudioEndpointMetricsType"/>
      <xs:element name="Video" type="tns:VideoEndpointMetricsType"/>
      <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded"/>
    </xs:choice>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      AUDIO ENDPOINT METRICS TYPE
    -->
  <xs:complexType name="AudioEndpointMetricsType">
    <xs:sequence>
      <xs:element name="Microphone" type="xs:string" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="Speaker" type="xs:string" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="LossConcealment" type="tns:PacketLossConcealmentType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      PACKET LOSS CONCEALMENT TYPE
    -->
  <xs:simpleType name="PacketLossConcealmentType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="UNSPECIFIED"/>
      <xs:enumeration value="DISABLED"/>
      <xs:enumeration value="ENHANCED"/>
      <xs:enumeration value="STANDARD"/>
    </xs:restriction>
  </xs:simpleType>
  <!--
      VIDEO ENDPOINT METRICS TYPE
    -->
  <xs:complexType name="VideoEndpointMetricsType">
    <xs:sequence>
      <xs:element name="Camera" type="xs:string" minOccurs="0" maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
```

```
  <!--
      VQ SESSION REPORT TYPE
    -->
  <xs:complexType name="SessionReportType">
    <xs:sequence>
      <xs:element name="LocationProfile" type="xs:string" minOccurs="0"/>
      <xs:element name="Pool" type="xs:string" minOccurs="0"/>
      <xs:element name="Endpoint" type="tns:EndpointType"/>
      <xs:element name="DialogInfo" type="tns:DialogInfoType"/>
      <xs:element name="MediaLine" type="tns:MediaLineType" maxOccurs="unbounded"/>
      <xs:element ref="v2:OpaqueClientPlatformData" minOccurs="0" />
      <xs:element ref="v2:OpaqueServerPlatformData" minOccurs="0" />
      <xs:element ref="v2:OpaqueConferenceData" minOccurs="0" />
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:attribute name="SessionId" type="xs:string" use="required"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
    <!--    SessionId = DialogID  -->
  </xs:complexType>
  <!--
      DIALOG INFO TYPE
    -->
  <xs:complexType name="DialogInfoType">
    <xs:sequence>
      <xs:element name="DialogCategory" type="tns:DialogCategoryType" minOccurs="0"/>
      <xs:element name="CorrelationID" type="xs:string" minOccurs="0"/>
      <xs:element name="FromURI" type="xs:anyURI"/>
      <xs:element name="ToURI" type="xs:anyURI"/>
      <xs:element name="Caller" type="xs:boolean"/>
      <xs:element name="LocalContactURI" type="xs:anyURI"/>
      <xs:element name="RemoteContactURI" type="xs:anyURI"/>
      <xs:element name="LocalUserAgent" type="xs:string"/>
      <xs:element name="RemoteUserAgent" type="xs:string"/>
      <!--    PAI = P-Asserted-Identity  -->
      <xs:element name="LocalPAI" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="RemotePAI" type="xs:anyURI" minOccurs="0"/>
      <xs:element name="ConfURI" type="xs:anyURI" minOccurs="0"/>
      <xs:element ref="v2:CallPriority" minOccurs="0"/>
      <xs:element ref="v2:MediationServerBypassFlag" minOccurs="0"/>
      <xs:element ref="v2:TrunkingPeer" minOccurs="0"/>
      <xs:element ref="v2:MediaBypassWarningFlag" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:element ref="v2:RegisteredInside" minOccurs="0"/>
        <xs:sequence minOccurs="0">
          <xs:element ref="v2:Separator" />
          <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:sequence>
    </xs:sequence>
    <xs:attribute name="CallId" type="xs:string" use="required"/>
    <xs:attribute name="FromTag" type="xs:string" use="required"/>
    <xs:attribute name="ToTag" type="xs:string" use="required"/>
    <xs:attribute name="Start" type="xs:dateTime" use="required"/>
```

```
      <xs:attribute name="End" type="xs:dateTime" use="required"/>
      <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>

  <!--
        DIALOG CATEGORY
    -->
    <xs:simpleType name ="DialogCategoryType">
     <xs:restriction base="xs:string">
       <xs:enumeration value="OCS"/>
       <xs:enumeration value="TRUNK"/>
     </xs:restriction>
    </xs:simpleType>
```

</xs:schema>

The schema for **ms-rtcp-metrics.medialine.xsd** is as follows

```
 <?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:tns="ms-rtcp-metrics" xmlns:v2="ms-rtcp-metrics.v2" xmlns:v3="ms-rtcp-
metrics.v3" xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="ms-rtcp-metrics"
elementFormDefault="qualified" version="2.0" attributeFormDefault="unqualified">
  <xs:import namespace="ms-rtcp-metrics.v2"></xs:import>
  <xs:import namespace="ms-rtcp-metrics.v3"></xs:import>
  <!--
      MEDIA LINE REPORT TYPE
    -->
  <xs:complexType name="MediaLineType">
    <xs:sequence>
      <xs:element name="Description" type="tns:MediaLineDescriptionType"/>
      <xs:element name="InboundStream" type="tns:StreamType" minOccurs="0"/>
      <xs:element name="OutboundStream" type="tns:StreamType" minOccurs="0"/>
      <xs:element name="LocalConversationalMOS" type="xs:float" minOccurs="0"/>
      <xs:element name="RemoteConversationalMOS" type="xs:float" minOccurs="0"/>
      <xs:element name="LocalConversationalMOSAlg" type="xs:string" minOccurs="0"/>
      <xs:element name="RemoteConversationalMOSAlg" type="xs:string" minOccurs="0"/>
      <xs:element ref="v2:AppliedBandwidthLimit" minOccurs="0" />
      <xs:element ref="v2:AppliedBandwidthSource" minOccurs="0" />
      <xs:element ref="v2:LocalClientEvent" minOccurs="0"/>
      <xs:element ref="v2:RemoteClientEvent" minOccurs="0"/>
      <xs:element ref="v2:OpaqueCoreEndpointData" minOccurs="0" />
      <xs:element ref="v2:OpaqueChannelData" minOccurs="0" />
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <!-- Label values : "main-audio", "main-video","panoramic-video", "data" -->
    <xs:attribute name="Label" type="xs:string" use="required"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      MEDIA LINE TYPE
    -->
```

```
  <xs:complexType name="MediaLineDescriptionType">
    <xs:sequence>
      <xs:element name="Connectivity" type="tns:ConnectivityType" minOccurs="0"/>
      <!-- Security values : "None", "SRTP","V1"  -->
      <xs:element name="Security" type="xs:string" minOccurs="0"/>
      <xs:element name="Offerer" type="xs:boolean" minOccurs="0"/>
      <xs:element name="Transport" type="tns:TransportType" minOccurs="0"/>
      <xs:element name="NetworkConnectivityInfo" type ="tns:NetworkConnectivityInfoType"
minOccurs="0"/>
      <xs:element name="LocalAddr" type="tns:AddrType"/>
      <xs:element name="RemoteAddr" type="tns:AddrType"/>
      <!-- Microphone or USB Phone or Camera device name   -->
      <xs:element name="CaptureDev" type="tns:DeviceType" minOccurs="0"/>
      <!-- Speakers or USB Phone device name    -->
      <xs:element name="RenderDev" type="tns:DeviceType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      Device TYPE
    -->
  <xs:complexType name="DeviceType">
    <xs:sequence>
      <xs:element name="Name" type="xs:string" minOccurs="0"/>
      <xs:element name="Driver" type="xs:string" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      STREAM DIRECTIONAL METRICS TYPE
    -->
  <xs:complexType name="StreamType">
    <xs:sequence>
      <xs:element name="Network" type="tns:NetworkMetricsType" minOccurs="0"/>
      <xs:element name="Payload" type="tns:PayloadMetricsType" />
      <xs:element name="QualityEstimates" type="tns:QualityEstimatesType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="Id" type="xs:unsignedInt" use="required"/>
    <xs:attribute name="Start" type="xs:dateTime"/>
    <xs:attribute name="End" type="xs:dateTime"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
    <!--    Id = SSRC -->
  </xs:complexType>

  <xs:complexType name="NetworkMetricsType">
    <xs:sequence>
      <!-- DiffServ CodePoint  -->
      <xs:element name="DSCP" type="xs:byte" minOccurs="0"/>
      <!-- VLAN is described via 12 bits -->
      <xs:element name="VLAN" type="xs:int" minOccurs="0"/>
      <xs:element name="Jitter" type="tns:JitterType" minOccurs="0"/>
      <xs:element name="PacketLoss" type="tns:PacketLossType" minOccurs="0"/>
      <xs:element name="BurstGapLoss" type="tns:BurstGapLossType" minOccurs="0"/>
      <xs:element name="Delay" type="tns:DelayType" minOccurs="0"/>
      <xs:element name="Utilization" type="tns:NetworkUtilizationType" minOccurs="0"/>
      <xs:element ref="v2:RatioConcealedSamplesAvg" minOccurs="0"/>
```

```
      <xs:element ref="v2:RatioStretchedSamplesAvg" minOccurs="0"/>
      <xs:element ref="v2:RatioCompressedSamplesAvg" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:element ref="v3:ConcealRatioMax" minOccurs="0"/>
        <xs:element ref="v3:ConcealRatioSd" minOccurs="0"/>
        <xs:sequence minOccurs="0">
        <xs:element ref="v3:Separator3" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      ICE  TYPE
    -->
  <xs:complexType name="ConnectivityType">
    <xs:sequence>
      <xs:element name="Ice" type="tns:IceStatusType" minOccurs="0"/>
      <xs:element name="IceWarningFlags" type="xs:unsignedInt" minOccurs="0"/>
      <xs:element name="RelayAddress" type="tns:AddrType" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute ref="v2:RtpLatched" use="optional"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      ICE CONECTIVITY TYPE
    -->
  <xs:simpleType name="IceStatusType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="FAILED"/>
      <xs:enumeration value="DIRECT"/>
      <xs:enumeration value="RELAY"/>
      <xs:enumeration value="HTTP-PROXY"/>
    </xs:restriction>
  </xs:simpleType>
  <!--
      NETWORK UTILIZATION TYPE
    -->
  <xs:complexType name="NetworkUtilizationType">
    <xs:sequence>
      <xs:element name="Packets" type="xs:int" minOccurs="0"/>
      <xs:element name="BandwidthEst" type="xs:int" minOccurs="0"/>
      <xs:element name="BandwidthAlloc" type="xs:int" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      PAYLOAD METRICS TYPE
    -->
  <xs:complexType name="PayloadMetricsType">
    <xs:choice>
      <xs:element name="Audio" type="tns:AudioPayloadMetricsType"/>
      <xs:element name="Video" type="tns:VideoPayloadMetricsType"/>
```

```
      <xs:element name="ApplicationSharing" type="v3:ApplicationSharingPayloadMetricsType" />
      <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded"/>
    </xs:choice>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      AUDIO METRICS TYPE
    -->
  <xs:complexType name="AudioPayloadMetricsType">
    <xs:sequence>
      <xs:element name="PayloadType" type="xs:int" minOccurs="0"/>
      <xs:element name="PayloadDescription" type="xs:string" minOccurs="0"/>
      <xs:element name="SampleRate" type="xs:int" minOccurs="0"/>
      <xs:element name="FrameDuration" type="xs:int" minOccurs="0"/>
      <xs:element name="FrameOctets" type="xs:int" minOccurs="0"/>
      <xs:element name="FramesPerPacket" type="xs:int" minOccurs="0"/>
      <xs:element name="PacketsPerSecond" type="xs:int" minOccurs="0"/>
      <!-- <xs:element name="RatioHealedSamplesAvg" type="xs:float" minOccurs="0"/> -->
      <xs:element name="FMTP" type="xs:string" minOccurs="0"/>
      <xs:element name="Signal" type="tns:SignalType" minOccurs="0"/>
      <xs:element name="JitterBuffer" type="tns:JitterBufferType" minOccurs="0"/>
      <xs:element name="SilenceSupress" type="tns:SilenceSuppressionStateType"
minOccurs="0"/>
      <xs:element ref="v2:AudioFECUsed" minOccurs="0"/>
      <!--OpaqueAudioData will be removed once everyone move to OpaqueChannelData-->
      <xs:element ref="v2:OpaqueAudioData" minOccurs="0" />
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:element ref="v3:DecodeStereoPercent" minOccurs="0"/>
        <xs:element ref="v3:AecRenderStereoPercent" minOccurs="0"/>
        <xs:element ref="v3:AudioPostFECPLR" minOccurs="0"/>
        <xs:element ref="v3:EncodeStereoPercent" minOccurs="0"/>
        <xs:element ref="v3:AecCaptureStereoPercent" minOccurs="0"/>
        <xs:sequence minOccurs="0">
          <xs:element ref="v3:Separator3" />
          <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:sequence>
    </xs:sequence>
  </xs:complexType>
  <!--
      VIDEO METRICS TYPE
    -->
  <xs:complexType name="VideoPayloadMetricsType">
    <xs:sequence>
      <xs:element name="PayloadType" type="xs:int" minOccurs="0"/>
      <xs:element name="PayloadDescription" type="xs:string" minOccurs="0"/>
      <xs:element name="Resolution" type="xs:string" minOccurs="0"/>
      <xs:element name="VideoBitRateAvg" type="xs:int" minOccurs="0"/>
      <xs:element name="VideoBitRateMax" type="xs:int" minOccurs="0"/>
      <xs:element name="VideoFrameRateAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="VideoPacketLossRate" type="xs:float" minOccurs="0"/>
      <xs:element name="VideoFrameLossRate" type="xs:float" minOccurs="0"/>
      <!--This is obsolete in w14-->
      <xs:element name="VideoFrameEncodingTime" type="xs:float" minOccurs="0"/>
      <!--This is obsolete in w14-->
      <xs:element name="VideoFrameDecodingTime" type="xs:float" minOccurs="0"/>
      <xs:element name="VideoFEC" type="xs:boolean" minOccurs="0"/>
```

```
        <!--This is obsolete in w14-->
        <xs:element name="FrozenVideoFreq" type="xs:float" minOccurs="0"/>
        <!--This is obsolete in w14-->
        <xs:element name="FrozenPeriodPercentAvg" type="xs:float" minOccurs="0"/>
        <!--This is obsolete in w14-->
        <xs:element name="ConsecutivePacketLossAvg" type="xs:float" minOccurs="0"/>
        <!--This is obsolete in w14-->
        <xs:element name="RateMatchLevel" type="xs:float" minOccurs="0"/>
        <xs:element ref="v2:VideoAllocateBWAvg" minOccurs="0"/>
        <xs:element ref="v2:VideoLocalFrameLossPercentageAvg" minOccurs="0"/>
        <!--OpaqueVideoData will be removed once everyone move to OpaqueChannelData-->
        <xs:element ref="v2:OpaqueVideoData" minOccurs="0" />
        <xs:sequence minOccurs="0">
          <xs:element ref="v2:Separator" />
          <!-- The following two metrics should really be labelled v3 -->
          <xs:element ref="v2:VideoResolutionDistribution" minOccurs="0" />
          <xs:element ref="v2:VideoRateMatchingLevelDistribution" minOccurs="0" />
          <xs:sequence minOccurs="0">
            <!-- New v3 Video Receive Metrics go here -->
            <xs:element ref="v2:Separator" />
            <xs:element ref="v3:SendCodecTypes" minOccurs="0"/>
            <xs:element ref="v3:SendFrameRateAverage" minOccurs="0"/>
            <xs:element ref="v3:SendBitRateMaximum" minOccurs="0"/>
            <xs:element ref="v3:SendBitRateAverage" minOccurs="0"/>
            <xs:element ref="v3:SendVideoStreamsMax" minOccurs="0"/>
            <xs:element ref="v3:SendResolutionWidth" minOccurs="0"/>
            <xs:element ref="v3:SendResolutionHeight" minOccurs="0"/>

            <xs:element ref="v3:RecvCodecTypes" minOccurs="0"/>
            <xs:element ref="v3:RecvResolutionWidth" minOccurs="0"/>
            <xs:element ref="v3:RecvResolutionHeight" minOccurs="0"/>
            <xs:element ref="v3:RecvFrameRateAverage" minOccurs="0"/>
            <xs:element ref="v3:RecvBitRateMaximum" minOccurs="0"/>
            <xs:element ref="v3:RecvBitRateAverage" minOccurs="0"/>
            <xs:element ref="v3:RecvVideoStreamsMax" minOccurs="0"/>
            <xs:element ref="v3:RecvVideoStreamsMin" minOccurs="0"/>
            <xs:element ref="v3:RecvVideoStreamsMode" minOccurs="0"/>
            <xs:element ref="v3:VideoPostFECPLR" minOccurs="0"/>
            <xs:sequence minOccurs="0">
              <xs:element ref="v3:Separator3" />
              <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
          </xs:sequence>
        </xs:sequence>
      </xs:sequence>
    </xs:complexType>
    <!--
        SILENCE SUPPRESSION STATE TYPE
      -->
    <xs:simpleType name="SilenceSuppressionStateType">
      <xs:restriction base="xs:string">
        <xs:enumeration value="ON"/>
        <xs:enumeration value="OFF"/>
      </xs:restriction>
    </xs:simpleType>
    <!--
        ADDR TYPE
      -->
```

```
  <xs:complexType name="AddrType">
    <xs:sequence>
      <xs:element name="IPAddr" type="xs:string"/>
      <xs:element name="Port" type="xs:unsignedShort" minOccurs="0"/>
      <xs:element name="Inside" type="xs:boolean" minOccurs="0"/>
      <xs:element name="SubnetMask" type="xs:string" minOccurs="0"/>
      <xs:element ref="v2:MACAddr" minOccurs="0"></xs:element>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator"></xs:element>
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      JITTER BUFFER TYPE
    -->
  <xs:complexType name="JitterBufferType">
    <xs:sequence>
      <xs:element name="Type" type="tns:JitterBufferAdaptiveType" minOccurs="0"/>
      <xs:element name="Rate" type="xs:int" minOccurs="0"/>
      <xs:element name="Nominal" type="xs:int" minOccurs="0"/>
      <xs:element name="Max" type="xs:int" minOccurs="0"/>
      <xs:element name="AbsMax" type="xs:int" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      JITTER BUFFER ADAPTIVE TYPE
    -->
  <xs:simpleType name="JitterBufferAdaptiveType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="UNKNOWN"/>
      <xs:enumeration value="RESERVED"/>
      <xs:enumeration value="NON-ADAPTIVE"/>
      <xs:enumeration value="ADAPTIVE"/>
    </xs:restriction>
  </xs:simpleType>
  <!--
      PACKET LOSS TYPE
    -->
  <xs:complexType name="PacketLossType">
    <xs:sequence>
      <xs:element name="LossRate" type="xs:float" minOccurs="0"/>
      <xs:element name="LossRateMax" type="xs:float" minOccurs="0"/>
      <xs:element name="DiscardRate" type="xs:float" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      BURST GAP LOSS TYPE
    -->
  <xs:complexType name="BurstGapLossType">
    <xs:sequence>
      <xs:element name="BurstDensity" type="xs:float" minOccurs="0"/>
      <xs:element name="BurstDuration" type="xs:int" minOccurs="0"/>
```

```
      <xs:element name="GapDensity" type="xs:float" minOccurs="0"/>
      <xs:element name="GapDuration" type="xs:int" minOccurs="0"/>
      <xs:element name="MinGapThreshold" type="xs:int" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      DELAY TYPE
    -->
  <xs:complexType name="DelayType">
    <xs:sequence>
      <xs:element name="RoundTrip" type="xs:int" minOccurs="0"/>
      <xs:element name="RoundTripMax" type="xs:int" minOccurs="0"/>
      <xs:element name="EndSystem" type="xs:int" minOccurs="0"/>
      <xs:element name="OneWay" type="xs:int" minOccurs="0"/>
      <xs:element ref="v3:RelativeOneWay" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v3:Separator3" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      JITTER TYPE
    -->
  <xs:complexType name="JitterType">
    <xs:sequence>
      <xs:element name="InterArrival" type="xs:int" minOccurs="0"/>
      <xs:element name="InterArrivalMax" type="xs:int" minOccurs="0"/>
      <xs:element name="MeanAbs" type="xs:int" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      SIGNAL TYPE
    -->
  <xs:complexType name="SignalType">
    <xs:sequence>
      <xs:element name="SignalLevel" type="xs:int" minOccurs="0" />
      <xs:element name="NoiseLevel" type="xs:int" minOccurs="0" />
      <xs:element name="EchoReturn" type="xs:int" minOccurs="0" />
      <!-- <xs:element name="RxAvgGain" type="xs:int" minOccurs="0"/> -->
      <!--This is obsolete in w14-->
      <xs:element name="SpeakerFeedbackMicIn" type="xs:int" minOccurs="0"/>
      <!--This is obsolete in w14-->
      <xs:element name="SpeechLevelMicIn" type="xs:int" minOccurs="0"/>
      <!--This is obsolete in w14-->
      <xs:element name="SpeechLevelPostProcess" type="xs:int" minOccurs="0"/>
      <!--This is obsolete in w14-->
      <xs:element name="SignalLevelLoudSpeaker" type="xs:int" minOccurs="0"/>
      <!--This is obsolete in w14-->
      <xs:element name="BackGroundNoiseMicIn" type="xs:int" minOccurs="0"/>
      <!--This is obsolete in w14-->
      <xs:element name="BackGroundNoiseSent" type="xs:int" minOccurs="0"/>
      <!--This is obsolete in w14-->
```

```
        <xs:element name="LocalSpeechToEcho" type="xs:int" minOccurs="0"/>
        <xs:element name="SpeakerGlitchRate" type="xs:int" minOccurs="0"/>
        <xs:element name="MicGlitchRate" type="xs:int" minOccurs="0"/>
        <!--This is obsolete in w14-->
        <xs:element name="SpeakerClipRate" type="xs:int" minOccurs="0"/>
        <!--This is obsolete in w14-->
        <xs:element name="MicClipRate" type="xs:int" minOccurs="0"/>
        <xs:element name="RxAGCSignalLevel" type="xs:int" minOccurs="0"/>
        <xs:element name="RxAGCNoiseLevel" type="xs:int" minOccurs="0"/>
        <xs:element ref="v2:InitialSignalLevelRMS" minOccurs="0"></xs:element>
        <xs:element ref="v2:AudioTimestampDriftRateMic" minOccurs="0"></xs:element>
        <xs:element ref="v2:AudioTimestampDriftRateSpk" minOccurs="0"></xs:element>
        <xs:element ref="v2:AudioTimestampErrorMicMs" minOccurs="0"></xs:element>
        <xs:element ref="v2:AudioTimestampErrorSpkMs" minOccurs="0"></xs:element>
        <xs:element ref="v2:VsEntryCauses" minOccurs="0"></xs:element>
        <xs:element ref="v2:EchoEventCauses" minOccurs="0"></xs:element>
        <xs:element ref="v2:EchoPercentMicIn" minOccurs="0"></xs:element>
        <xs:element ref="v2:EchoPercentSend" minOccurs="0"></xs:element>
        <xs:element ref="v2:RxAvgAGCGain" minOccurs="0"></xs:element>
        <xs:sequence minOccurs="0">
          <xs:element ref="v2:Separator"/>
           <xs:element ref="v3:RecvSignalLevelCh1" minOccurs="0"/>
           <xs:element ref="v3:RecvSignalLevelCh2" minOccurs="0"/>
           <xs:element ref="v3:RecvNoiseLevelCh1" minOccurs="0"/>
           <xs:element ref="v3:RecvNoiseLevelCh2" minOccurs="0"/>
           <xs:element ref="v3:SendSignalLevelCh1" minOccurs="0"/>
           <xs:element ref="v3:SendSignalLevelCh2" minOccurs="0"/>
           <xs:element ref="v3:SendNoiseLevelCh1" minOccurs="0"/>
           <xs:element ref="v3:SendNoiseLevelCh2" minOccurs="0"/>
          <xs:sequence minOccurs="0">
            <xs:element ref="v3:Separator3"/>
              <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:sequence>
      </xs:sequence>
      <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
    <!--
        QUALITY ESTIMATES TYPE
      -->
    <xs:complexType name="QualityEstimatesType">
      <xs:choice>
        <xs:element name="Audio" type="tns:AudioQualityEstimatesType"/>
        <xs:element name="Video" type="tns:VideoQualityEstimatesType"/>
        <xs:element name="ApplicationSharing"
type="v3:ApplicationSharingQualityEstimatesType"/>
        <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded"/>
      </xs:choice>
    </xs:complexType>
    <!--
        AUDIO QUALITY ESTIMATES TYPE
      -->
    <xs:complexType name="AudioQualityEstimatesType">
      <xs:sequence>
        <xs:element name="RecvListenMOS" type="xs:float" minOccurs="0"/>
        <xs:element name="RecvListenMOSMin" type="xs:float" minOccurs="0"/>
        <xs:element name="RecvListenMOSAlg" type="xs:string" minOccurs="0"/>
        <xs:element name="SendListenMOS" type="xs:float" minOccurs="0"/>
```

```
      <xs:element name="SendListenMOSMin" type="xs:float" minOccurs="0"/>
      <xs:element name="SendListenMOSAlg" type="xs:string" minOccurs="0"/>
      <xs:element name="NetworkMOS" type="tns:NetworkAudioMOSType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      NETWORK AUDIO MOS FACTOR TYPE
    -->
  <xs:complexType name="NetworkAudioMOSType">
    <xs:sequence>
      <xs:element name="OverallAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="OverallMin" type="xs:float" minOccurs="0"/>
      <xs:element name="DegradationAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="DegradationMax" type="xs:float" minOccurs="0"/>
      <xs:element name="DegradationJitterAvg" type="xs:float" minOccurs="0"/>
      <xs:element name="DegradationPacketLossAvg" type="xs:float" minOccurs="0"/>
      <xs:element ref="v2:NetworkMOSAlg" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator" />
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      VIDEO QUALITY ESTIMATES TYPE
    -->
  <xs:complexType name="VideoQualityEstimatesType">
    <xs:sequence>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <!--
      TRANSPORT TYPE
    -->
  <xs:simpleType name="TransportType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="UDP"/>
      <xs:enumeration value="TCP"/>
    </xs:restriction>
  </xs:simpleType>

  <!--
  NETWORK CONNECTIVITY TYPE
  -->
  <xs:complexType name="NetworkConnectivityInfoType">
    <xs:sequence>
      <xs:element name="NetworkConnection" type="tns:NetworkConnectionType" minOccurs="0"/>
      <xs:element name="VPN" type="xs:boolean" minOccurs="0"/>
      <xs:element name="LinkSpeed" type="xs:float" minOccurs="0"/>
      <xs:element ref="v2:BSSID" minOccurs="0"></xs:element>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator"></xs:element>
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
```

```
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>

  <!--
      ETHERNET CONNECTION TYPE
    -->
  <xs:simpleType name="NetworkConnectionType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="wired"/>
      <xs:enumeration value="wifi"/>
    </xs:restriction>
  </xs:simpleType>

  <!--
      ENDPOINT TYPE
    -->
  <xs:complexType name="EndpointType">
    <xs:sequence>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="Name" type="xs:string" use="required"/>
    <xs:attribute name="ProfileId" type="xs:string" use="optional"/>
    <xs:attribute ref="v2:OS" use="optional"/>
    <xs:attribute ref="v2:CPUName" use="optional"/>
    <xs:attribute ref="v2:CPUNumberOfCores" use="optional"/>
    <xs:attribute ref="v2:CPUProcessorSpeed" use="optional"/>
    <xs:attribute ref="v2:VirtualizationFlag" use="optional"/>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
    <!-- Name = Computer Name-->
    <!-- ProfileId = Endpoint Report GUID  - Note: this attribute is optional-->
  </xs:complexType>
</xs:schema>
```

The schema for **ms-rtcp-metrics.v2.xsd** is as follows

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:v2="ms-rtcp-metrics.v2" xmlns:v3="ms-rtcp-metrics.v3"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="ms-rtcp-metrics.v2"
elementFormDefault="qualified" version="1.2" attributeFormDefault="unqualified">
<xs:import namespace="ms-rtcp-metrics.v3"></xs:import>

  <!--Schema version-->
  <xs:attribute name="SchemaVersion" type="xs:string"/>

  <!--The following are part of dialog info-->

  <xs:element name="CallPriority" type="xs:short"/>
  <xs:element name="RegisteredInside" type="xs:boolean"/>
  <xs:element name="MediationServerBypassFlag" type="xs:boolean"/>
  <xs:element name="TrunkingPeer" type="xs:string"/>
  <xs:element name="BSSID" type="xs:string"/>
  <xs:element name="MediaBypassWarningFlag" type="xs:int"/>


  <!--The following are ICE metrics-->
  <xs:attribute name="RtpLatched" type="xs:boolean"/>
```

```
<!--The following are media metrics-->

<xs:element name="AppliedBandwidthLimit" type="xs:int"/>
<xs:element name="AppliedBandwidthSource" type="xs:string"/>
<xs:element name="InitialSignalLevelRMS" type="xs:float"/>
<xs:element name="AudioFECUsed" type="xs:boolean"/>
<xs:element name="VideoAllocateBWAvg" type="xs:int"/>
<xs:element name="VideoLocalFrameLossPercentageAvg" type="xs:float"/>

<!--The following are AEC metrics-->
<xs:element name="AudioTimestampDriftRateMic" type="xs:float"/>
<xs:element name="AudioTimestampDriftRateSpk" type="xs:float"/>
<xs:element name="AudioTimestampErrorMicMs" type="xs:float"/>
<xs:element name="AudioTimestampErrorSpkMs" type="xs:float"/>
<xs:element name="VsEntryCauses" type="xs:unsignedByte"/>
<xs:element name="EchoEventCauses" type="xs:unsignedByte"/>
<xs:element name="EchoPercentMicIn" type="xs:float"/>
<xs:element name="EchoPercentSend" type="xs:float"/>
<xs:element name="RxAvgAGCGain" type="xs:int"/>

<!--The following are healer metrics-->
<xs:element name="RatioConcealedSamplesAvg" type="xs:float"/>
<xs:element name="RatioStretchedSamplesAvg" type="xs:float"/>
<xs:element name="RatioCompressedSamplesAvg" type="xs:float"/>

<!--The following are Network MOS related-->
<xs:element name="NetworkMOSAlg" type="xs:string"/>



<!--The following are endpoint information-->

<xs:attribute name="OS" type="xs:string"/>
<!--
Bit flag indicate if the system is running in a virtualized environment:
  0x0000: None
  0x0001: HyperV
  0x0002: VMWare
  0x0004: Virtual PC
  0x0008: Xen PC
-->
<xs:attribute name="VirtualizationFlag" type="xs:byte"/>
<xs:attribute name="CPUNumberOfCores" type="xs:short"/>
<xs:attribute name="CPUProcessorSpeed" type="xs:int"/>
<xs:attribute name="CPUName" type="xs:string"/>
<xs:element name="MACAddr" type="xs:string"/>


<!--The following are client event count-->
<xs:element name="LocalClientEvent" type="v2:ClientEventType"/>
<xs:element name="RemoteClientEvent" type="v2:ClientEventType"/>
<xs:complexType name="ClientEventType">
  <xs:sequence>
    <xs:element name="NetworkSendQualityEventRatio" type="xs:float" minOccurs="0"/>
    <xs:element name="NetworkReceiveQualityEventRatio" type="xs:float" minOccurs="0"/>
    <xs:element name="NetworkDelayEventRatio" type="xs:float" minOccurs="0"/>
    <xs:element name="NetworkBandwidthLowEventRatio" type="xs:float" minOccurs="0"/>
```

```
      <xs:element name="CPUInsufficientEventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceHalfDuplexAECEventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceRenderNotFunctioningEventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceCaptureNotFunctioningEventRatio" type="xs:float"
minOccurs="0"/>
      <xs:element name="DeviceGlitchesEventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceLowSNREventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceLowSpeechLevelEventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceClippingEventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceEchoEventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceNearEndToEchoRatioEventRatio" type="xs:float" minOccurs="0"/>
      <xs:element name="DeviceMultipleEndpointsEventCount" type="xs:short" minOccurs="0"/>
      <xs:element name="DeviceHowlingEventCount" type="xs:short" minOccurs="0"/>
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator"/>
        <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>


  <!--The following are video metrics-->
  <xs:element name="VideoResolutionDistribution" type="v2:VideoResolutionDistributionType"/>

  <xs:complexType name="VideoResolutionDistributionType">
    <xs:sequence>
      <xs:element name="CIFQuality" type="xs:unsignedByte" />
      <xs:element name="VGAQuality" type="xs:unsignedByte" />
      <xs:element name="HD720Quality" type="xs:unsignedByte" />
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator"/>
        <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:element name="VideoRateMatchingLevelDistribution"
type="v2:VideoRateMatchingLevelDistributionType"/>
  <xs:complexType name="VideoRateMatchingLevelDistributionType">
    <xs:sequence>
      <xs:element name="None_Drop" type="xs:unsignedByte" />
      <xs:element name="B_Drop" type="xs:unsignedByte" />
      <xs:element name="BP_Drop" type="xs:unsignedByte" />
      <xs:element name="BPSP_Drop" type="xs:unsignedByte" />
      <xs:element name="BPSPI_Drop" type="xs:unsignedByte" />
      <xs:sequence minOccurs="0">
        <xs:element ref="v2:Separator"/>
        <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>


  <!--The following are debugging blob, it's for internal use only-->

  <xs:element name="OpaqueClientPlatformData" type="v2:OpaqueClientPlatformDataType" />
```

```
  <xs:element name="OpaqueServerPlatformData" type="v2:OpaqueServerPlatformDataType" />
  <xs:element name="OpaqueCoreEndpointData" type="v2:OpaqueCoreEndpointDataType" />
  <xs:element name="OpaqueConferenceData" type="v2:OpaqueConferenceDataType" />
  <xs:element name="OpaqueChannelData" type="v2:OpaqueChannelDataType" />

  <!--These two elements should be removed once nobody refer to it. (Instead, everyone should
use OpaqueChannelData)-->
  <xs:element name="OpaqueAudioData" type="v2:OpaqueAudioDataType" />
  <xs:element name="OpaqueVideoData" type="v2:OpaqueVideoDataType" />


  <!--OPAQUE MEDIALINE DATA TYPE-->
  <xs:complexType name="OpaqueCoreEndpointDataType">
    <xs:sequence>
      <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>
  <!--OPAQUE CHANNEL DATA TYPE-->
  <xs:complexType name="OpaqueChannelDataType" >
    <xs:sequence>
      <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>
  <!--OPAQUE CLIENT PLATFORM DATA TYPE-->
  <xs:complexType name="OpaqueClientPlatformDataType">
    <xs:sequence>
      <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>
  <!--OPAQUE SERVER PLATFORM DATA TYPE-->
  <xs:complexType name="OpaqueServerPlatformDataType">
    <xs:sequence>
      <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>
  <!--OPAQUE CONFERENCE DATA TYPE-->
  <xs:complexType name="OpaqueConferenceDataType">
    <xs:sequence>
      <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>
  <!--OPAQUE VIDEO DATA TYPE (this should be removed once nobody refer to it)-->
  <xs:complexType name="OpaqueVideoDataType">
    <xs:sequence>
      <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>
  <!--OPAQUE AUDIO DATA TYPE (this should be removed once nobody refer to it)-->
  <xs:complexType name="OpaqueAudioDataType">
    <xs:sequence>
      <xs:element name="OpaqueData" type="xs:string" minOccurs="0" />
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax" />
```

```
    </xs:complexType>


    <!--Separator is used for forward/backward compatiblity-->
    <xs:element name="Separator">
      <xs:complexType></xs:complexType>
    </xs:element>

</xs:schema>
```

The schema for **ms-rtcp-metrics.v3.xsd** is as follows

```
  <?xml version="1.0" encoding="UTF-8"?>
  <xs:schema xmlns:tns="ms-rtcp-metrics" xmlns:v2="ms-rtcp-metrics.v2" xmlns:v3="ms-rtcp-
  metrics.v3" xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="ms-rtcp-metrics.v3"
  elementFormDefault="qualified" version="1.2" attributeFormDefault="unqualified">

    <!--Core Metrics-->

    <!--Platform Metrics-->

    <!--Audio Metrics-->
    <xs:element name="DecodeStereoPercent" type="xs:float"/>
    <xs:element name="AecRenderStereoPercent" type="xs:float"/>
    <xs:element name="AudioPostFECPLR" type="xs:float"/>
    <xs:element name="EncodeStereoPercent" type="xs:float"/>
    <xs:element name="AecCaptureStereoPercent" type="xs:float"/>
    <xs:element name="RecvSignalLevelCh1" type="xs:int"/>
    <xs:element name="RecvSignalLevelCh2" type="xs:int"/>
    <xs:element name="RecvNoiseLevelCh1" type="xs:int"/>
    <xs:element name="RecvNoiseLevelCh2" type="xs:int"/>
    <xs:element name="SendSignalLevelCh1" type="xs:int"/>
    <xs:element name="SendSignalLevelCh2" type="xs:int"/>
    <xs:element name="SendNoiseLevelCh1" type="xs:int"/>
    <xs:element name="SendNoiseLevelCh2" type="xs:int"/>
    <xs:element name="ConcealRatioMax" type="xs:float"/>
    <xs:element name="ConcealRatioSd" type="xs:float"/>

    <!--Video Metrics-->
    <xs:element name="SendCodecTypes" type="xs:string"/>
    <xs:element name="SendResolutionWidth" type="xs:int"/>
    <xs:element name="SendResolutionHeight" type="xs:int"/>
    <xs:element name="SendFrameRateAverage" type="xs:float"/>
    <xs:element name="SendBitRateMaximum" type="xs:int"/>
    <xs:element name="SendBitRateAverage" type="xs:int"/>
    <xs:element name="SendVideoStreamsMax" type="xs:int"/>

    <xs:element name="RecvCodecTypes" type="xs:string"/>
    <xs:element name="RecvResolutionWidth" type="xs:int"/>
    <xs:element name="RecvResolutionHeight" type="xs:int"/>
    <xs:element name="RecvFrameRateAverage" type="xs:float"/>
    <xs:element name="RecvBitRateMaximum" type="xs:int"/>
```

```
    <xs:element name="RecvBitRateAverage" type="xs:int"/>
    <xs:element name="RecvVideoStreamsMax" type="xs:int"/>
    <xs:element name="RecvVideoStreamsMin" type="xs:int"/>
    <xs:element name="RecvVideoStreamsMode" type="xs:int"/>
    <xs:element name="VideoPostFECPLR" type="xs:float"/>

    <xs:element name="RelativeOneWay" type="v3:MetricAggregationType"/>

    <xs:complexType name="ApplicationSharingPayloadMetricsType">
      <xs:sequence>
        <xs:element name="PayloadDescription" type="xs:string" minOccurs="0"/>
        <xs:element name="AverageRectangleHeight" type="xs:int" minOccurs="0"/>
        <xs:element name="AverageRectangleWidth" type="xs:int" minOccurs="0"/>
        <xs:element name="ApplicationShared" type="xs:string" minOccurs="0"/>
        <xs:element name="RDPTileProcessingLatency" type="v3:MetricAggregationType"
  minOccurs="0"/>
        <xs:element name="ScrapingFrameRate" type="v3:MetricAggregationType" minOccurs="0"/>
        <xs:element name="IncomingTileRate" type="v3:MetricAggregationType" minOccurs="0"/>
        <xs:element name="IncomingFrameRate" type="v3:MetricAggregationType" minOccurs="0"/>
        <xs:element name="OutgoingTileRate" type="v3:MetricAggregationType" minOccurs="0"/>
        <xs:element name="OutgoingFrameRate" type="v3:MetricAggregationType" minOccurs="0"/>
        <xs:element name="OpaqueAppSharingData" type="v2:OpaqueChannelDataType" minOccurs="0"/>
        <xs:sequence minOccurs="0">
          <xs:element ref="v3:Separator3"/>
          <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:sequence>
      <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>


    <xs:complexType name="MetricAggregationType">
      <xs:sequence>
        <xs:element name="Total" type="xs:float" minOccurs="0"/>
        <xs:element name="Average" type="xs:float" minOccurs="0"/>
        <xs:element name="Max" type="xs:float" minOccurs="0"/>
        <xs:element name="Burst" type="v3:MetricBurstGapType" minOccurs="0"/>
        <xs:element name="Gap" type="v3:MetricBurstGapType" minOccurs="0"/>
        <xs:sequence minOccurs="0">
          <xs:element ref="v3:Separator3"/>
          <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:sequence>
      <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>

    <!--Metrics Burst and Gap Type calculation-->
    <xs:complexType name="MetricBurstGapType">
      <xs:sequence>
        <xs:element name="Occurrences" type="xs:int" minOccurs="0"/>
        <xs:element name="Density" type="xs:float" minOccurs="0"/>
        <xs:element name="Duration" type="xs:float" minOccurs="0"/>
        <xs:sequence minOccurs="0">
          <xs:element ref="v3:Separator3"/>
          <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:sequence>
      <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
```

```
    <xs:complexType name="ApplicationSharingQualityEstimatesType">
      <xs:sequence>
          <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>

    <!--Separator is used for forward/backward compatiblity-->
    <xs:element name="Separator3">
      <xs:complexType></xs:complexType>
    </xs:element>


</xs:schema>
```

7 Appendix B: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Microsoft® Office Communications Server 2007
- Microsoft® Office Communicator 2007
- Microsoft® Office Communications Server 2007 R2
- Microsoft® Office Communicator 2007 R2
- Microsoft® Lync™ Server 2010
- Microsoft® Lync™ 2010
- Microsoft® Lync Server 15 Technical Preview
- Microsoft® Lync 15 Technical Preview

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

<1> Section 2.2.1: Office Communications Server 2007, Office Communicator 2007: This behavior is not supported.

<2> Section 2.2.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2, Lync Server 2010, Lync 2010: This namespace is not supported.

<3> Section 2.2.1.1: Office Communications Server 2007, Office Communicator 2007: The Version attribute and the v2:SchemaVersion attribute are not supported. Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:SchemaVersion attribute is not supported.

<4> Section 2.2.1.1.2: Office Communications Server 2007, Office Communicator 2007: This attribute is not supported.

<5> Section 2.2.1.1.2: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This attribute is not supported.

<6> Section 2.2.1.2: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:OpaqueClientPlatformData, v2:OpaqueServerPlatformData, v2:OpaqueConferenceData, and v2:Separator elements are not supported.

<7> Section 2.2.1.2.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<8> Section 2.2.1.2.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<9> Section 2.2.1.2.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<10> Section 2.2.1.2.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<11> Section 2.2.1.3: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This attribute is not supported.

<12> Section 2.2.1.3: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This attribute is not supported.

<13> Section 2.2.1.3: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This attribute is not supported.

<14> Section 2.2.1.3: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This attribute is not supported.

<15> Section 2.2.1.3: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This attribute is not supported.

<16> Section 2.2.1.3: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:OS, v2:CPUName, v2:CUNumberofCores, v2:CPUProcessorSpeed, v2:VirtualizationFlag, and namespace="##other" attributes are not supported.

<17> Section 2.2.1.4: Office Communications Server 2007, Office Communicator 2007: The DialogCategory, CorrelationID, v2:CallPriority, v2:MediationServerBypassFlag, v2:TrunkingPeer, and v2:MediaBypassWarningFlag elements are not supported. The DialogCategoryType is also not supported. Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:CallPriority, v2:MediationServerBypassFlag, v2:TrunkingPeer, and v2:MediaBypassWarningFlag elements are not supported.

<18> Section 2.2.1.4.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<19> Section 2.2.1.4.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<20> Section 2.2.1.4.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<21> Section 2.2.1.4.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<22> Section 2.2.1.4.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<23> Section 2.2.1.4.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<24> Section 2.2.1.4.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<25> Section 2.2.1.4.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<26> Section 2.2.1.5: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2, Lync Server 2010, Lync 2010: This value is not supported.

<27> Section 2.2.1.5: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:AppliedBandwidthLimit, v2:AppliedBandwidthSource, v2:LocalClientEvent, v2:RemoteClientEvent, v2:OpaqueCoreEndpointData, v2:OpaqueChannelData, and v2:Separator elements are not supported.

<28> Section 2.2.1.5.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<29> Section 2.2.1.5.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<30> Section 2.2.1.5.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<31> Section 2.2.1.5.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<32> Section 2.2.1.5.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<33> Section 2.2.1.5.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<34> Section 2.2.1.5.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<35> Section 2.2.1.6: Office Communications Server 2007, Office Communicator 2007: The NetworkConnectivityInfo element is not supported.

<36> Section 2.2.1.6.1: Supported in Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2 only.

<37> Section 2.2.1.6.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<38> Section 2.2.1.7.1: The values in this table are supported in Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, and Office Communicator 2007 R2 only.

<39> Section 2.2.1.7.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The values in this table are not used.

<40> Section 2.2.1.8: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:BSSID and v2:Separator elements are not supported.

<41> Section 2.2.1.8.1: Office Communications Server 2007, Office Communicator 2007: The NetworkConnectivityInfoType type is not supported.

<42> Section 2.2.1.8.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<43> Section 2.2.1.8.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<44> Section 2.2.1.9: Office Communications Server 2007,Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:MACAddr and v2:Separator elements are not supported.

<45> Section 2.2.1.9.1: Supported in Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2 only, deprecated in later version.

<46> Section 2.2.1.9.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<47> Section 2.2.1.9.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<48> Section 2.2.1.10.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<49> Section 2.2.1.12: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:RatioConcealedSamplesAvg, v2:RatioStretchedSamplesAvg, v2:RatioCompressSamplesAvg, and v2:Separator elements are not supported.

<50> Section 2.2.1.12.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2, Lync Server 2010, Lync 2010: Available for **OutboundStream** only

<51> Section 2.2.1.12.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<52> Section 2.2.1.12.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<53> Section 2.2.1.12.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<54> Section 2.2.1.12.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<55> Section 2.2.1.12.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<56> Section 2.2.1.12.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<57> Section 2.2.1.13.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2, Lync Server 2010, Lync 2010: This element is not supported.

<58> Section 2.2.1.14: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:AudioFECUsed and v2:Separator elements are not supported.

<59> Section 2.2.1.14.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<60> Section 2.2.1.14.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<61> Section 2.2.1.14.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<62> Section 2.2.1.14.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<63> Section 2.2.1.14.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<64> Section 2.2.1.14.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<65> Section 2.2.1.14.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<66> Section 2.2.1.14.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<67> Section 2.2.1.15: Office Communications Server 2007, Office Communicator 2007: The FrozenPeriodPercentAvg, ConsecutivePacketLossAvg, RateMatchLevel, v2:VideoAllocateBWAvg, and v2:VideoLocalFrameLossPercentageAvg elements are not supported. Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2VideoAllocateBWAvg and v2:VideoLocalFrameLossPercentageAvg elements are not supported.

<68> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<69> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<70> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<71> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<72> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<73> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<74> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<75> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<76> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<77> Section 2.2.1.15.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<78> Section 2.2.1.16: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The VideoResolutionDistribution element is not supported.

<79> Section 2.2.1.16.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The VideoResolutionDistribution element is not supported.

<80> Section 2.2.1.16.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<81> Section 2.2.1.16.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<82> Section 2.2.1.16.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<83> Section 2.2.1.16.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<84> Section 2.2.1.17: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The VideoRateMatchingLevelDistribution element is not supported.

<85> Section 2.2.1.17.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The VideoRateMatchingLevelDistribution element is not supported.

<86> Section 2.2.1.17.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<87> Section 2.2.1.17.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<88> Section 2.2.1.17.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<89> Section 2.2.1.17.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<90> Section 2.2.1.17.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<91> Section 2.2.1.17.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<92> Section 2.2.1.18: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2, Lync Server 2010, Lync 2010: This element and all its subelements are not supported.

<93> Section 2.2.1.19.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2, Lync Server 2010, Lync 2010: This element is not supported.

<94> Section 2.2.1.21: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:NetworkMOSA1g and v2:Separator elements are not supported.

<95> Section 2.2.1.21.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<96> Section 2.2.1.21.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<97> Section 2.2.1.25.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2, Lync Server 2010, Lync 2010: This element is not supported.

<98> Section 2.2.1.27: Office Communications Server 2007, Office Communicator 2007: The SpeakerFeedbackMicIn, SpeechLevelMicIn, SpeechLevelPostProcess, SignalLevelLoudSpeaker, BackGroundNoiseMicIn, BackGroundNoiseSent, LocalSpeechToEcho, SpeakerGlitchRate, MicGlitchRate, SpeakerClipRate, MicGlitchRate, SpeakerClipRate, MicClipRate, RxAGCSignalLevel, and RxAGCNoiseLevel elements are not supported.

Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The v2:InitialSignalLevelRMS, v2:AudioTimestampDriftRateMic, v2:AudioTimestampDriftRateSpk, v2:AudioTimestampErrorMicMs, v2:AudioTimestampErrorMicMs, v2:AudioTimestampErrorSpkMs, v2:VsEntryCauses, v2:EchoEventCauses, v2:EchoPercentMicIn, v2:EchoPercentSend, v2:RxAvgAGCGain, and v2:Separator elements are not supported.

<99> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<100> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<101> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<102> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<103> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<104> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<105> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<106> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<107> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<108> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<109> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<110> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<111> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007: This element is not supported.

<112> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<113> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<114> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<115> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<116> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<117> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<118> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<119> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<120> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<121> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<122> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<123> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<124> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<125> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<126> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<127> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<128> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<129> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<130> Section 2.2.1.27.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<131> Section 2.2.1.28: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: The **ClientEventType** element is not supported.

<132> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<133> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<134> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<135> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<136> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<137> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<138> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<139> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<140> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<141> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<142> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<143> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<144> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<145> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<146> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<147> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<148> Section 2.2.1.28.1: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This element is not supported.

<149> Section 6.1: This schema is supported in Office Communications Server 2007 and Office Communicator 2007 only.

<150> Section 6.2: This schema is supported in Office Communications Server 2007 R2 and Office Communicator 2007 R2 only.

<151> Section 6.3: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This schema is not supported.

<152> Section 6.4: Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2, Lync Server 2010, Lync 2010: This schema is not supported.

8 Change Tracking

This section identifies changes that were made to the [MS-QoE] protocol document between the June 2011 and January 2012 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.
- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated.**

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact protocol@microsoft.com.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
1.3 Protocol Overview (Synopsis)	Changed "QoE Monitoring Server" to "QoE Monitoring Agent".	N	Content updated.
1.5 Prerequisites/Preconditions	Removed duplicate routing information that is covered in other sections.	N	Content removed.
2.2 Message Syntax	Described how routesQoE Monitoring Agent will process the request.	N	New content added.
2.2.1.1.1 Child Elements	Removed length limitation for Version and SchemaVersion.	N	Content updated.
2.2.1.4 DialogInfo Element	Adjusted the position for extended elements.	N	Content updated.
2.2.1.4.1 Child Elements	Changed 'Available' from No to Yes for RegisteredInside element.	N	Content updated.
2.2.1.8 NetworkConnectivityInfo Element	Added NetworkConnectionType.	N	New content added.
2.2.1.8 NetworkConnectivityInfo Element	Added enumeration information to example.	N	Content updated.
2.2.1.9.1 Child Elements	Clarify the behavior of Inside element for the version after com2007r2.	N	Product behavior

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
			note updated.
2.2.1.13.1 Child Elements	Added a description and a product behavior note for ApplicationSharing.	N	New content added.
2.2.1.14.1 Child Elements	Added descriptions and a product behavior notes for v3:AudioPostFECPLR, v3:DecodeStereoPercent, v3:AecRenderStereoPercent, v3:EncodeStereoPercent, v3:AecCaptureStereoPercent, and v3:Separator3.	N	New content added.
2.2.1.15.1 Child Elements	Added new child elements.	Y	New content added.
2.2.1.18 Payload.ApplicationSharing Element	Add a section and subsections for ApplicationSharing quality of experience metrics.	N	New protocol syntax added.
2.2.1.18.1 Child Elements	Added a description and a product behavior note for ApplicationSharing.	Y	New content added.
2.2.1.25 Delay Element	Add support for RelativeOneWay delay metrics.	N	New protocol syntax added.
2.2.1.26.1 Child Elements	Added new descriptions and product behavior notes for child elements.	Y	New content added.
3.2 SIP UAS	Updated the 606 response code.	N	Content updated.
3.2 SIP UAS	Added response code 413.	N	Content updated.
3.2 SIP UAS	Updated description of response code 415.	N	Content updated.
3.2 SIP UAS	Updated the 401 response code.	N	Content updated.
4 Protocol Examples	Removed the example about From/To header routing because detailed routing is covered in the Message section.	N	Content removed.
7 Appendix B: Product Behavior	Updated the products list.	N	New content added.

9 Index