Network Data Management – Usage
(NDM-U)
For
IP-Based Services

Service Specification – Streaming Media (SM)

Version 3.5-A.0.1

November, 2004

Preface

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Acknowledgements

The following member companies contributed materially to the creation of this release of the document:

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Convergys Corporation
Daleen Technologies
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Lucent Technologies
Narus, Inc.
Sprint PCS
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Abstract

This document is a companion to NDM-U, which specifies the overall business requirements and protocol generic to all services. The content herein is compliant to those requirements and specifications and is particular to the service specified.

Change History

3.0-A.0 Review Draft 1 Correct terminationStatus restriction in schema
3.0-A.0 Production Release 2/14/2002
3.0-A.0.1 Editorial Correction 2/20/2002 Add chargeCurrency entry in attribute table.
3.0-A.0.2 Editorial Corrections 4/30/2002 Align Table and Schema
3.0-A.0.3 Editorial Corrections 5/20/2002 Correct errors in sample instance document.
3.1-A.0.4 Editorial Corrections 7/5/2002 Correct errors in sample instance document, rename to point to NDM-U 3.1
3.1-A.0.5 Editorial Corrections 8/21/2002 Correct XML Schema inconsistencies

3.5-A.0 April 26, 2004—Production Release

3.5-A.0.1 November, 2004—"Cosmetic" Cleanup

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1. Introduction

1.1. Purpose

This document is intended to specify the business use case and formal XML Schema for the IP-based service.

1.2. Scope

This document is limited to the discussion of issues as defined by the mission statement of IPDR.org, namely:

> *The IPDR Organization (the "Organization") is organized and operates as a non-stock not for profit organization for the following purposes:*
>
> *(a) To develop, agree upon and publish a non-proprietary, open specification for the representation and encapsulation of Internet Protocol (IP)-based events for use by business, operations and decision support systems. Such events include, but are not limited to, IP-based network services, application services and e-commerce transactions;*
> *(b) To develop, agree upon and publish a non-proprietary, open specification for the representation and encapsulation of IP-based network and service elements provisioning events;*
> *(c) To promote work accomplished and uniform specifications to the industry and submit approved published specifications to the appropriate standards bodies for acceptance in the public domain; and*

To have and exercise all powers necessary or convenient to affect any or all of the purposes for which the Organization is organized.

1.3. Compatibility

Future revisions are expected to make every attempt to preserve investments made by service providers and solution vendors by considering backward and forward compatibility whenever it is practical.

1.4. Overview

This specification is divided into two major chapters:

- Service Specification – description of the specific requirements and business use case for the service in question.
- Formal Specification – XML Schema description of the IPDR Record for this service.

2. Streaming Media (SM) Specification

2.1. Definition

Streaming Media (SM) is a service where a consumer can request and view content using the Internet. The content can be a cinematic movie, a news report, TV programming or other content.

2.1.1. Requirements

- The SM IPDR must identify the SM service provider and consumer.
- The SM IPDR must contain information about the content provided.
- The SM IPDR must contain the time that the video stream was initiated and completed.

If available, the SM IPDR should contain information about quality and streaming attributes such as used bandwidth, codec used and transferred data volume.

2.1.2 Usage Attribute List

Table 1 – SM Service Attributes List

Category	Usage Attribute Name	Data Type	Presence	Possible Values	Remarks
Who	serviceProviderID	String	Required		Service provider of streaming service.
Who	sourceAddress	IPv4addr	Required		IP address of streaming server
Who	subscriberID	String	Required	Ip address, account number etc	Identifies a unique subscriber in the system.
Who	destAddress	IPv4addr	Required		IP address of streaming destination.
When	startTime	Datetime	Required	ISO 8601 time	Time instant the stream starts playing.
When	endTime	Datetime	Required	ISO 8601 time	Time instant the stream stops playing.
What	timeZoneOffset	Int	Required	-300	Time offset, in minutes, of local time zone referenced to GMT. Local time zone should reflect service consumer time zone for correct billing (as opposed to SE time zone if the two are different).
What	terminationStatus	Enum	Required	Normal, Server Failure, Client Failure, Connection Failure	Describes how the session ended.
What	streamName	String	Required	Rocky IV	Descriptive name of

Category	Usage Attribute Name	Data Type	Presence	Possible Values	Remarks
					stream
What	streamID	String	Required	000-111-1234, "Rock IV, widescreen, English"	Unique id of stream. This id is used to uniquely identify the stream where the name does not provide a unique value.
What	streamClass	String	Optional	Premium, Normal, etc	Attribute can be used to classify the content.
What	rating	String	Optional	R, PG13, etc	Rating of the content.
What	charge	Float	Optional	5.50, 15, etc	Monetary amount to be charged.
What	chargeCurrency	String	Optional	USD, YEN	Currency unit of charge amount. Encoded using ISO 4217:2001.
What	codec		Optional	DivX, MPEG4, etc	Codec used for video stream.
What	numVideoStreams	Number	Optional		Count of video streams.
What	numAudioStreams	Number	Optional		Count of audio streams.
What	averageBandwidth	Long	Optional	56000	Average bandwidth used for stream, in bits per second.
What	totalVolume	Long	Optional	5000000	Total volume used for stream, in bytes.
What	qosRequested	Number	Optional	0..255	Requested QoS corresponding to the SLA or dynamic QoS request
What	qosDelivered	Number	Optional	0..255	Pre-calculated indicator representing the delivered / negotiated QoS. Physical attributes such as latency or error rates are weighted and combined into one value.
What	qosMeasurement	String	Optional	Delay, Frames dropped, Jitter	QoS measurement such as delay, jitter or other parameter.

2.2 Use Case

2.2.1 Basic Flow

1. A consumer visits the site of a content provider.
2. The consumer selects content to watch. At this point the consumer might be provided with the option to select a QoS.
3. The content is streamed to the consumer's stream client device.

Upon completion of the stream, the mediation system provides the information collected about the transaction to the BSS system.

3.0 Formal Specification

3.1 Schema

```
<?xml version = "1.0" encoding = "UTF-8"?>
<schema xmlns = "http://www.w3.org/2001/XMLSchema"
        targetNamespace = "http://www.ipdr.org/namespaces/SM"
        xmlns:ipdr = "http://www.ipdr.org/namespaces/IPDR"
        xmlns:SM = "http://www.ipdr.org/namespaces/SM"
        version = "3.5-A.0"
        elementFormDefault = "qualified"
        attributeFormDefault = "unqualified">
        <import namespace = "http://www.ipdr.org/namespaces/IPDR"
              schemaLocation = "http://www.ipdr.org/public/IPDRDoc3.5.xsd"/>
       <include schemaLocation = "http://www.ipdr.org/public/IPDRTypes.xsd"/>
       <element name = "subscriberID" type = "string">
              <annotation>
                     <documentation>

                           Identifies a unique subscriber in the system.
                           Ip address, account number etc
                      </documentation>
              </annotation>
       </element>
       <element name = "destAddress" type = "ipdr:ipV4Addr">
              <annotation>
                     <documentation>

                            IP address of streaming destination.

                      </documentation>
              </annotation>
       </element>
       <element name = "serviceProviderID" type = "string">
              <annotation>
                     <documentation>
                            Service provider of streaming service.
                     </documentation>
              </annotation>
       </element>
       <element name = "sourceAddress" type = "ipdr:ipV4Addr">
              <annotation>
                     <documentation>
                            IP address of streaming server
                     </documentation>
              </annotation>
       </element>
       <element name = "startTime" type = "ipdr:dateTimeMsec">
              <annotation>
                     <documentation>
                            Time instant the stream starts playing.
                     </documentation>
              </annotation>
       </element>
       <element name = "endTime" type = "ipdr:dateTimeMsec">
              <annotation>
                     <documentation>
                            Time instant the stream stops playing.
                     </documentation>
              </annotation>
       </element>
       <element name = "timeZoneOffset" type = "int">
              <annotation>
                     <appinfo>
                            <ipdr:units>minutes</ipdr:units>
                     </appinfo>
                     <documentation>
```

```
                              Number of minutes ahead (+) or behind (-) UMT of the local time
zone in which the service is consumed.

                        </documentation>
                </annotation>
        </element>
        <element name = "terminationStatus">
                <annotation>
                        <documentation>
                                Indication of the nature of termination of the session.
                                </documentation>
                </annotation>
                <simpleType>
                        <restriction base = "integer">
                                <enumeration value = "1">
                                        <annotation>
                                                <documentation>
                                                        <ipdr:enumMeaning>Normal</ipdr:enumMeaning>
                                                </documentation>
                                        </annotation>
                                </enumeration>
                                <enumeration value = "2">
                                        <annotation>
                                                <documentation>
                                                        <ipdr:enumMeaning>Client
Failure</ipdr:enumMeaning>
                                                </documentation>
                                        </annotation>
                                </enumeration>
                                <enumeration value = "3">
                                        <annotation>
                                                <documentation>
                                                        <ipdr:enumMeaning>Server
Failure</ipdr:enumMeaning>
                                                </documentation>
                                        </annotation>
                                </enumeration>
                                <enumeration value = "4">
                                        <annotation>

                                                <documentation>
                                                        <ipdr:enumMeaning>Connection
Failure</ipdr:enumMeaning>
                                                </documentation>
                                        </annotation>
                                </enumeration>
                        </restriction>
                </simpleType>
        </element>
        <element name = "streamName" type = "string">
                <annotation>
                        <documentation>
                                Descriptive name of stream
                        </documentation>
                </annotation>
        </element>
        <element name = "streamID" type = "string">
                <annotation>
                        <documentation>
                                Unique id of stream. This id is used to uniquely identify the
stream where the name does not provide a unique value.
                        </documentation>
                </annotation>
        </element>
        <element name = "charge" type = "float">
                <annotation>
                        <documentation>
                                Monetary amount to be charged.
                        </documentation>
                </annotation>
        </element>
```

```
        <element name = "chargeCurrency" type = "string">
                <annotation>
                        <appinfo>
                                <ipdr:reference>http://www.iso.ch</ipdr:reference>
                        </appinfo>
                        <documentation>
                                Currency unit of charge amount.
                                Encoded using ISO 4217:2001.
                        </documentation>
                </annotation>
        </element>
        <element name = "codec" type = "string">
                <annotation>
                        <documentation>
                                Codec used for video stream.
                        </documentation>
                </annotation>
        </element>
        <element name = "numAudioStreams" type = "int">
                <annotation>
                        <documentation>
                                Count of audio streams.
                        </documentation>
                </annotation>
        </element>
        <element name = "numVideoStreams" type = "int">
                <annotation>
                        <documentation>
                                Count of video streams.
                        </documentation>
                </annotation>
        </element>
        <element name = "averageBandwidth" type = "long">
                <annotation>
                        <appinfo>
                                <ipdr:units>bps</ipdr:units>
                        </appinfo>
                        <documentation>
                                Average bandwidth used for stream.
                        </documentation>
                </annotation>
        </element>
        <element name = "totalVolume" type = "long">
                <annotation>
                        <appinfo>
                                <ipdr:units>bytes</ipdr:units>
                        </appinfo>
                        <documentation>
                                Total volume used for stream.
                        </documentation>
                </annotation>
        </element>
        <element name = "qosRequested" type = "int">
                <annotation>
                        <documentation>
                                Requested QoS corresponding to the SLA or dynamic QoS request
                                0..255
                        </documentation>
                </annotation>
        </element>
        <element name = "qosDelivered" type = "int">
                <annotation>
                        <documentation>
                                Pre-calculated indicator representing the delivered / negotiated
QoS. Physical attributes such as latency or error rates are weighted and combined into one value.
                                0..255
                        </documentation>
                </annotation>
        </element>
        <element name = "qosMeasurement" type = "string">
                <annotation>
```

```
                        <documentation>
                                QoS measurement such as delay, jitter or other parameter.
                        </documentation>
                </annotation>
        </element>
        <complexType name = "IPDR-SM-Type">
                <complexContent>
                        <extension base = "ipdr:IPDRType">
                                <sequence>
                                        <element ref = "SM:subscriberID"/>
                                        <element ref = "SM:destAddress"/>
                                        <element ref = "SM:serviceProviderID"/>
                                        <element ref = "SM:sourceAddress"/>
                                        <element ref = "SM:startTime"/>
                                        <element ref = "SM:endTime"/>
                                        <element ref = "SM:timeZoneOffset"/>
                                        <element ref = "SM:terminationStatus"/>
                                        <element ref = "SM:streamName"/>
                                        <element ref = "SM:streamID"/>
                                        <element ref = "SM:charge" minOccurs = "0"/>
                                        <element ref = "SM:chargeCurrency" minOccurs = "0"/>
                                        <element ref = "SM:codec" minOccurs = "0"/>
                                        <element ref = "SM:numAudioStreams" minOccurs = "0"/>
                                        <element ref = "SM:numVideoStreams" minOccurs = "0"/>
                                        <element ref = "SM:averageBandwidth" minOccurs = "0"/>
                                        <element ref = "SM:totalVolume" minOccurs = "0"/>
                                        <element ref = "SM:qosRequested" minOccurs = "0"/>
                                        <element ref = "SM:qosDelivered" minOccurs = "0"/>
                                        <element ref = "SM:qosMeasurement" minOccurs = "0"/>
                                </sequence>
                        </extension>
                </complexContent>
        </complexType>
</schema>
```

3.2 Sample Instance Document

```
<?xml version="1.0" ?>
<IPDRDoc xmlns="http://www.ipdr.org/namespaces/ipdr"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:schemaLocation="http://www.ipdr.org/public/SM3.5-A.0.xsd"
  docId="f9c0ca84-1111-11b2-a222-90ef-fd735469"
 creationTime="2001-01-24T16:17:33Z"
 IPDRRecorderInfo="CGI" version="3.1">
 <IPDR xsi:type="IPDR-SM-Type">
  <IPDRCreationTime>2001-01-24T22:39:38Z</IPDRCreationTime>
  <seqNum>2437</seqNum>
  <subscriberID>001-797-55</subscriberID>
  <destAddress>12.250.155.205</destAddress>
  <serviceProviderID>eBroadcasting</serviceProviderID>
  <sourceAddress>26.122.50.243</sourceAddress>
  <startTime>2000-10-22T17:21:17Z</startTime>
  <endTime>2000-11-12T19:36:40Z</endTime>
  <timeZoneOffset>-480</timeZoneOffset>
  <terminationStatus>1</terminationStatus>
  <streamName>Cast Away</streamName>
  <streamID>0013-2001-323-57</streamID>
  <charge>240.81</charge>
  <chargeCurrency>BRL</chargeCurrency>
  <codec>rm 3.9</codec>
  <totalVolume>9725</totalVolume>
 </IPDR>
</IPDRDoc>
```