ipdr.org

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

Service Specification – ASP

Version 2.5-A.0

April 13, 2001

Preface

Contacts

For general questions regarding this document and referrals to technical experts for detailed questions, please contact:

Chief Editor: Steve Cotton
Cotton Management Consulting
scotton@compuserve.com

Architecture Working Group –

Lead: Raghu Dhulipala
Convergys Corporation
raghu.dhulipala@convergys.com

Editor: Aron Heintz
Rate*Integration*, Inc.
aheintz@rateintegration.com

Business Requirements Working Group –

Lead: Kelly Anderson
SCC Communications Corp.
kanderson@sccx.com

Editor: Pat Walls
TSI Telecommunication Services Inc.
pwalls@tsiconnections.com

Protocol Working Group –

Lead: Jeff Meyer
HP
jeffm@cup.hp.com

Editor: Ken Sarno
NARUS, Inc.
kensarno@narus.com

Acknowledgements

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

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

Table of Contents

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. References

[1] NDM-U 2.5, IPDR.org.

[2] XML Schema Part 1: Structures, W3C Working Draft 7 April 2000.

[3] XML Schema Part 2: Data Types, W3C Working Draft 7 April 2000.

1.5. 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.

1.6. Terminology and Glossary

Terminology

Term	Definition
Accounting	The process of collecting and analyzing **service** and **resource usage** metrics for the purposes of capacity and trend analysis, cost allocation, auditing, and billing, etc. Accounting management requires that resource consumption be measured, rated, assigned, and communicated between appropriate business entities.
Mediation	In view of network reference model, Mediation refers to the combination of the logical entities IPDR recorder, IPDR transmitter, and IPDR store.
Resource	A quantifiable asset employed by a **Service Provider**, or on behalf of a **Service Provider** by another Service Provider, to fulfill a request of a **Service Consumer**. (Examples include: files, communications, goods, etc).
Roaming	Service usage initiated by a service consumer and provided by a service provider other than the one with which the service consumer have business relationship.
Service	Network and/or application operation that provides the **Service Consumer** with the requested **resource.**
Service Consumer	The beneficiary (human or system) of a **service**.
Service Element	Any element that is responsible for fulfilling a **Service Consumer** request. (Examples include: network equipment and system processes)
Service Provider	An enterprise that provides communications-based **services**.
Session	A set of related service usages; service usages may or may not be time based in the unit of measurement.
Usage	Consumption of **resources** and **services** by a **Service Consumer**.
Usage Attribute	A parameter whose value indicates some aspect of **usage** of a given **service** and/or **resource.**
Usage Entry[1]	A **Service**-specific trigger resulting in the generation by a **Service Element** of a set of **Usage Attribute** values related to **Usage** specific to a given **Service Consumer**

[1] Because of legacy issues, a Usage Entry from a given Service Element will not initially conform to an IPDR specification or, in some cases, may never conform. To be considered a Usage Entry the information presented or made available by inference from the Service Element must minimally contain attributes from some of the general attribute categories.

Glossary:

ANI - Automatic Number Identification
ASP - Application Service Provider
BSS - Business Support Systems
CRM - Customer Relationship Management
DSS - Decision Support Systems
DTD - Document Type Definition
DSL - Digital Subscriber Line
EP - End Point
ESN - Electronic Serial Number
FoIP - Fax over IP
GK - Gate Keeper
GPRS - General Packet Radio Service
IETF - Internet Engineering Task Force
IMSI - International Mobile Subscriber Identity
IP - Internet Protocol
IS - IPDR Store
ISDN - Integrated Services Digital Network
ISP - Internet Service Provider
IT - IPDR Transmitter
NDM - Network Data Management
NSE - Network Service Element
OSS - Operations Support System
PLMN - Public Land Mobile Network
PSTN - Public Switched Telephone Network
QoS - Quality of Service
RADIUS – Remote Access Dial-In Usage Server
RAS - Remote Access Server
SC - Service Consumer
SE - Service Element
SMS - Short Message Service
SP - Service Provider
TMF - TeleManagement Forum
TOM - Telecommunications Operations Map
UA - Usage Aggregators
UC - Usage Collectors
VoIP - Voice over IP
VPN - Virtual Private Network
WAP - Wireless Application Protocol
xDSL - Digital Subscriber Line of type x
XML - eXtensible Markup Language

2. ASP Specification

2.1. Definition

Application Service is the use of applications supplied by providers outside the service consumers business.

2.1.1. Requirements

1. IPDR must provide unique and clear identification of parties participating in the activity.
2. IPDR must provide information about the amount and type of resources used.

2.1.2 Usage Attribute List

Category	**Usage Attribute Name**	**Data Type**	**Presence**	**Possible Values**	**Remarks**
What	Feature	String	Conditional	"Sort" as a feature of a "spreadsheet" app, etc.	Specific feature of service
What	Type	String	Conditional	"Front office service", "front office/word processor service", "front office/spreadsheet service", etc.	Type of application that is invoked.
When	AppRequestTime	Datetime	Required	ISO 8601 time	May be different from AppStartTime. This will allow measuring response time.
When	AppStartTime	Datetime	Required	ISO 8601 time	Time when application starts
Where	LoginLocation	String	Required		
Where	ProviderLocation	String	Required		Will support providers that host applications at different locations
Who	ProviderName	String	Required		Actual provider of the service
Who	UserLoginName	String	Required		Identifies a unique user in the system. Real time mapping of dynamically allocated IP addresses might be necessary

2.2 Use Case – Front Office

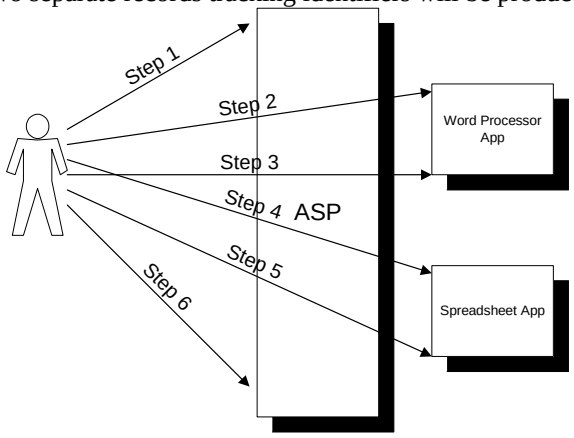
2.2.1 Basic Flow

1. User logs into an Application Service Provider (ASP).
2. After authentication, the user invokes a word processor application (front office service).
3. In the middle of using the word processor, the user invokes a spreadsheet application.
4. While still using the spreadsheet, application the user closes the word processor application.
5. The user closes the spreadsheet application.
6. The user logs out.

This could be considered as a single session with multiple events. Events are:

Start of session (at login)
Start of word processor
Start of Spreadsheet
End of word processor
End of spreadsheet
End of session

Another alternative is considering the word processor and the spreadsheet to be different services. As such, two separate records tracking identifiers will be produced one for each service.



2.2.1.1 Basic Flow Requirements

These are the basic flow requirements for the front office use case:

1. IPDR must provide information about the time that the event occurred.
2. IPDR must provide a correlation between the start and end events for the application.

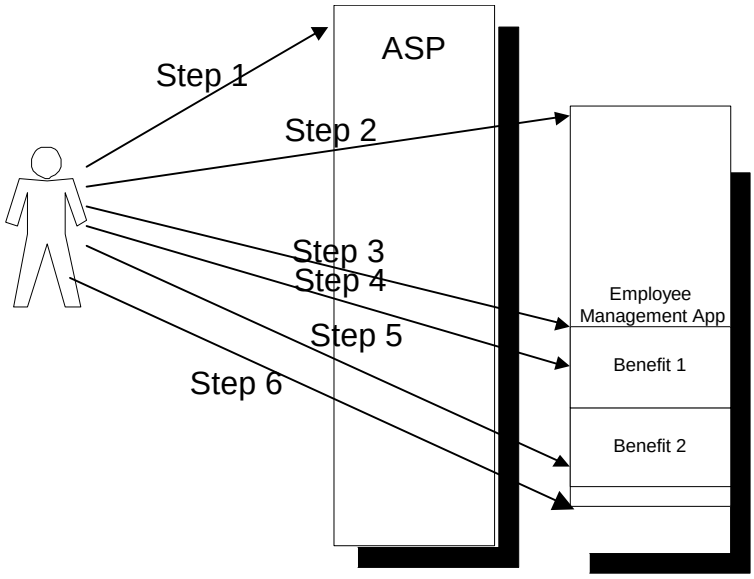
2.2.1.2 Basic Flow Usage Attribute List

Category	Usage Attribute Name	Data Type	Presence	Possible Values	Remarks
What	AppActiveTime	Integer	Conditional	Milliseconds	Total elapsed active time for each process in the session. Active time is a measure of time when the CPU usage exceeds a certain percentage. At least one of the conditional usage attributes must be present.
What	AppLoadedTime	Integer	Conditional	Milliseconds	Total elapsed loaded time for each process in the session
What	NumberOfApps	Integer	Conditional		Number of apps invoked during the session time.
What	SessionDuration	Integer	Conditional	Seconds	Duration of the session.

2.3 Use Case – Back Office

2.3.1 Basic Flow

1. User logs into an Application Service Provider (ASP).
2. After authentication, the user invokes an employee management application.
3. The user checks his benefits info.
4. The user cancels one of the benefits.
5. The user modifies another benefit.
6. The user logs off.



2.3.1.1 Basic Flow Requirements

1. IPDR must provide unique and clear identification of parties participating in the activity.
2. IPDR must provide information about the type of service used and operations performed.

IPDR must provide service consumer activities to including number of requests and amount obtained for each service feature.

2.3.1.2 Basic Flow Usage Attributes

Category	Usage Attribute Name	Data Type	Presence	Possible Values	Remarks
What	BytesTransferred	Integer	Conditional		Number of bytes transferred on request basis. Should not include any inline images or ad view.
What	NumberOfTransactionsRequested	Integer	Conditional		Number of transactions requested by the user during the session.
What	NumberOfTransactionsCompleted	Integer	Conditional		
What	RequestDuration	Integer	Conditional	Seconds	Time between two

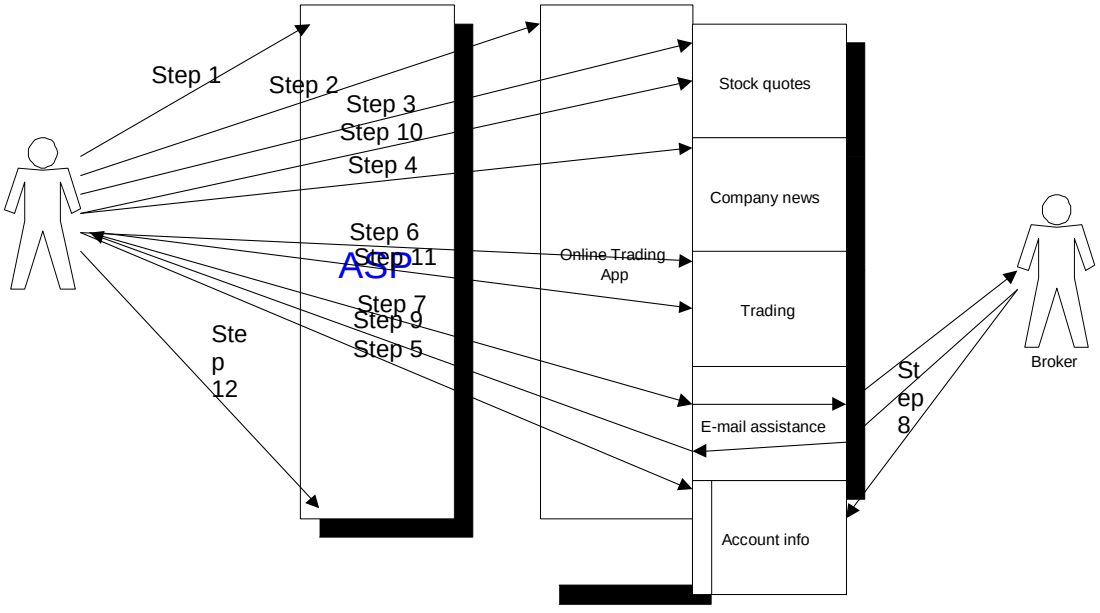
Category	Usage Attribute Name	Data Type	Presence	Possible Values	Remarks
					consecutive requests
What	VisitTime	Integer	Required	Seconds	The duration that covers a series of consecutive requests to the ASP site, bounded by the first and last requests made by user

2.4 Use Case – Online Trading

Online trading service provider provides ASP customer with an opportunity to view the current stock quotes and trade stocks online. It includes access to latest company news, comprehensive account information services, and e-mail assistance from a brokerage firm. It is assumed that the brokerage firm owns the brokerage application.

2.4.1 Basic Flow

1. User logs into an Application Service Provider (ASP).
2. After authentication user invokes online trading application using his account number.
3. The user checks current stock quotes
4. The user browses latest company news.
5. The user checks his account status.
6. The user attempts to place a stock trading request, encounters a problem with his account.
7. The user sends e-mail to his broker through the application, waits for response.
8. Broker modifies a parameter on user's account.
9. The user receives a response from the broker.
10. The user checks stock quotes again.
11. The user places a stock-trading request, this time successfully.
12. The user logs out.



1. Basic Flow Requirements IPDR must provide unique and clear identification of parties participating in the activity, and their locations.
2. IPDR must provide information about the amount and type of resources used.

IPDR must provide a list of trading requests executed during the session.

2.4.1.1 Basic Flow Usage Attribute List

Service Consumer

Category	Usage Attribute Name	Data Type	Presence	Possible Values	Remarks
Who	UserAccountNumber	String	Required		May be derived from the user login

Service Definitions

Category	Usage Attribute Name	Data Type	Presence	Possible Values	Remarks
What	NumberOfEmailAssistanceRequests	Integer	Conditional		Total number of e-mail assistance requests per session
What	NumberOfNewsRequests	Integer	Conditional		Total number of company news requests per session
What	NumberOfQuotes	Integer	Conditional		Total number of stock quotes obtained during the session
What	SessionDuration	Integer	Conditional	Seconds	Duration of the session, including both browsing and trading
What	TradeRequests	String	Conditional	"MSFT, buy, 100", etc.	List of trade requests

3.0 Formal Specification

3.1 Schema

```
<?xml version = "1.0" encoding = "UTF-8"?>
<!--Generated by XML Authority. Conforms to w3c http://www.w3.org/2000/10/XMLSchema-->
<schema xmlns = "http://www.w3.org/2000/10/XMLSchema"
        targetNamespace = "http://www.ipdr.org/namespaces/ipdr"
        xmlns:ipdr = "http://www.ipdr.org/namespaces/ipdr"

        version = "NDM-U-ver-2-5-XXXXX-Cx"
        elementFormDefault = "qualified"
        attributeFormDefault = "unqualified">
        <annotation>
                <documentation>
                        Referring to a local copy will normally yield significantly faster performance.
                        The name of the master IPDR schema file can either be:

    http://www.ipdr.org/public/ipdr2.5.xsd

   Alternatively, it can be a local copy of this file.
                        Please modify the preceding "include schemaLocation" appropriately.
  </documentation>
                <documentation>This is the master IPDR schema file for Application Service Provider</documentation>
                <documentation>The master service description documentation _SHOULD_ be found at:
                        http://www.ipdr.org/public/NDM-U-ver-2-5-XXXXX-Cx.doc</documentation>
        </annotation>
        <include schemaLocation = "ipdr2.5.xsd"/>
        <group name = "onlineTrading">
                <sequence>
                        <element name = "userAccountNumber" type = "string">
                                <annotation>
                                        <documentation> User account number.  May be derived from the user login.
    </documentation>
                                </annotation>
                        </element>
                        <element name = "numberOfEmailAssistanceRequests" type = "nonNegativeInteger" minOccurs =
"0">
                                <annotation>
                                        <documentation> Total number of e-mail assistance requests per session.
    </documentation>
                                </annotation>
                        </element>
                        <element name = "numberOfNewsRequests" type = "nonNegativeInteger" minOccurs = "0">
                                <annotation>
                                        <documentation> Total number of company news requests per session.
    </documentation>
                                </annotation>
                        </element>
                        <element name = "numberOfQuotes" type = "nonNegativeInteger" minOccurs = "0">
                                <annotation>
                                        <documentation> Total number of stock quotes obtained during the session.
    </documentation>
                                </annotation>
                        </element>
                        <element name = "sessionDuration" type = "nonNegativeInteger" minOccurs = "0">
                                <annotation>
                                        <documentation> Duration of the session, measured in seconds, including
both browsing and trading.
    </documentation>
                                </annotation>
                        </element>
                        <element name = "tradeRequests" type = "string" minOccurs = "0">
                                <annotation>
                                        <documentation> List of trade requests.  For example, "MSFT, buy, 100".
    </documentation>
                                </annotation>
```

```
                                </element>
                        </sequence>
                </group>
                <group name = "backOffice">
                        <sequence>
                                <element name = "bytesTransferred" type = "nonNegativeInteger" minOccurs = "0">
                                        <annotation>
                                                <documentation> Number of bytes transferred on request basis.  Should not
include any inline images or ad view.
        </documentation>
                                        </annotation>
                                </element>
                                <element name = "numberOfTransactionsRequested" type = "nonNegativeInteger" minOccurs =
"0">
                                        <annotation>
                                                <documentation> Number of transactions requested by the user during the
session..
        </documentation>
                                        </annotation>
                                </element>
                                <element name = "numberOfTansactionsCompleted" type = "nonNegativeInteger" minOccurs =
"0">
                                        <annotation>
                                                <documentation> Number of transactions completed.
        </documentation>
                                        </annotation>
                                </element>
                                <element name = "requestDuration" type = "nonNegativeInteger" minOccurs = "0">
                                        <annotation>
                                                <documentation> Time between two consecutive requests.
        </documentation>
                                        </annotation>
                                </element>
                                <element name = "visitTime" type = "nonNegativeInteger">
                                        <annotation>
                                                <documentation> The duration that covers a series of consecutive requests to
the ASP site, bounded by the first and last requests made by user.
        </documentation>
                                        </annotation>
                                </element>
                        </sequence>
                </group>
                <group name = "frontOffice">
                        <sequence>
                                <element name = "appActiveTime" type = "nonNegativeInteger" minOccurs = "0">
                                        <annotation>
                                                <documentation> Total elapsed active time for each process in the session.
Active time is a measure of time when the CPU usage exceeds a certain percentage.  At least one of the conditional usage attributes
must be present.  Time is measured in milliseconds
        </documentation>
                                        </annotation>
                                </element>
                                <element name = "appLoadedTime" type = "nonNegativeInteger" minOccurs = "0">
                                        <annotation>
                                                <documentation> Total elapsed loaded time for each process in the session.
Time is measured in milliseconds.
        </documentation>
                                        </annotation>
                                </element>
                                <element name = "numberOfApps" type = "nonNegativeInteger" minOccurs = "0">
                                        <annotation>
                                                <documentation> Number of apps invoked during the session time.
        </documentation>
                                        </annotation>
                                </element>
                                <element name = "sessionDuration" type = "nonNegativeInteger" minOccurs = "0">
                                        <annotation>
                                                <documentation> Duration of the session, measured in seconds.
        </documentation>
```

```
                                        </annotation>
                                </element>
                        </sequence>
                </group>

                <!-- ********************************************************************* -->

                <complexType name = "SC-ASP-Type">
                        <complexContent>
                                <extension base = "ipdr:SCType">
                                        <sequence>
                                                <element name = "userLoginName" type = "string">
                                                        <annotation>
                                                                <documentation>Identifies a unique user in the system.
Real time mapping of dynamically allocated IP addresses might be necessary.
        </documentation>
                                                        </annotation>
                                                </element>
                                        </sequence>
                                </extension>
                        </complexContent>
                </complexType>
                <complexType name = "SE-ASP-Type">
                        <complexContent>
                                <extension base = "ipdr:SEType">
                                        <sequence>
                                                <element name = "providerLocation" type = "string">
                                                        <annotation>
                                                                <documentation>
                   Will support providers that host applications at different locations.
        </documentation>
                                                        </annotation>
                                                </element>
                                                <element name = "providerName" type = "string">
                                                        <annotation>
                                                                <documentation>  Actual provider of the service.
        </documentation>
                                                        </annotation>
                                                </element>
                                        </sequence>
                                </extension>
                        </complexContent>
                </complexType>
                <complexType name = "UE-ASP-Type">
                        <complexContent>
                                <extension base = "ipdr:UEType">
                                        <sequence>
                                                <element name = "feature" type = "string" minOccurs = "0">
                                                        <annotation>
                                                                <documentation> Specific feature of the type of service
provided.
        </documentation>
                                                        </annotation>
                                                </element>
                                                <element name = "type" type = "string" minOccurs = "0">
                                                        <annotation>
                                                                <documentation>  Type of application that is invoked.
        </documentation>
                                                        </annotation>
                                                </element>
                                                <element name = "appRequestTime" type = "timeInstant">
                                                        <annotation>
                                                                <documentation> Time application was requested.
May be different from appStartTime.  This will allow measuring response time.
        </documentation>
                                                        </annotation>
                                                </element>
                                                <element name = "appStartTime" type = "timeInstant">
                                                        <annotation>
```

```
                                                                <documentation>Time when application starts.
        </documentation>
                                                        </annotation>
                                                </element>
                                                <element name = "loginLocation" type = "string">
                                                        <annotation>
                                                                <documentation>


                                                                </documentation>
                                                        </annotation>
                                                </element>
                                                <choice>
                                                        <group ref = "ipdr:frontOffice"/>
                                                        <group ref = "ipdr:backOffice"/>
                                                        <group ref = "ipdr:onlineTrading"/>
                                                </choice>
                                        </sequence>
                                </extension>
                        </complexContent>
                </complexType>
</schema>
```