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**SERIES F: NON-TELEPHONE TELECOMMUNICATION
SERVICES**

Audiovisual services

Metadata framework

ITU-T Recommendation F.750

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ITU-T Recommendation F.750

Metadata framework

Summary

A metadata framework architecture with two layers structure is defined. The metadata gateway provides an integrated metadata retrieval capability across various metadata descriptions, and the policy-based service platform provides specific functions common to content delivery. This Recommendation provides a reference architecture of a metadata model for both content description and network control.

Source

ITU-T Recommendation F.750 was approved on 13 February 2005 by ITU-T Study Group 16 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Metadata framework

1 Scope

This Recommendation defines an ITU-T metadata framework architecture for policy-based content delivery over networks. Content includes multimedia Web content and digital broadcast programmes provided by real-time streaming, on-demand streaming, and downloading. In broadband ubiquitous networks, this architecture enables content adaptation to the usage environment and content-aware QoS control, which are provided as network services by the use of policies, rules and network-related metadata. The proposed metadata framework architecture is structured in two layers: a metadata gateway and a policy-based service platform each of which provides open APIs to the next higher layer. The metadata gateway provides an integrated metadata retrieval capability across various metadata descriptions and the policy-based service platform provides specific functions common to content delivery such as compatible content discovery, session control, QoS control, authentication and charging. As implementation examples of the metadata framework architecture, policy-based QoS control and CDN management are addressed.

2 References

2.1 Normative references

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

References: None.

2.2 Non-normative references

- [1] IETF RFC 2327 (1998), *SDP: Session Description Protocol*.
- [2] ETSI TS 102 822-3-1 (2004), *Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime Phase 1"); Part 3: Metadata; Sub-part 1: Metadata schemas*.
- [3] ISO/IEC JTC1/SC29/WG11 2002, *N4980 MPEG-7 Overview (version 8)*.
- [4] W3C Recommendation (2004), *Composite Capabilities/Preference Profiles (CC/PP), Structure and Vocabularies*.
- [5] IETF RFC 2778 (2000), *A Model for Presence and Instant Messaging*.
- [6] IETF RFC 2779 (2000), *Instant Messaging/Presence Protocol Requirements*.
- [7] ISO/IEC 21000-7(2004), *Information technology – Multimedia framework (MPEG-21) – Part 7: Digital Item Adaptation*.
- [8] IETF RFC 1213 (1991), *Management Information Base for Network Management of TCP/IP-based internets: MIB-II*.
- [9] PAM Forum, <http://www.parlay.org/about/pam/index.asp>.

- [10] ITU-T Recommendation H.350 (2003), *Directory services architecture for multimedia conferencing*.
- [11] IETF RFC 3564 (2003), *Requirements for Support of Differentiated Services-aware MPLS Traffic Engineering*.
- [12] IETF RFC 3466 (2003), *A Model for Content Internetworking (CDI)*.
- [13] ETSI TS 102 822-4 (2004), *Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime Phase 1"); Part 4: Content referencing*.

3 Definitions

This Recommendation defines the following terms:

- 3.1 content delivery network (CDN):** A network optimized for delivering digital content.
- 3.2 differentiated service code point (DSCP):** A 6-bit bit-pattern replacing the three IP-Precedence bits and other ToS (Type of Service) bits for differentiated services.
- 3.3 label switch paths (LSP):** Virtual paths between pairs of edges prepared in MPLS.
- 3.4 metadata:** "Metadata" in this Recommendation refers to the attributes of not only the content but also the network.
- 3.5 resource description framework (RDF):** A general framework for describing a Web site's metadata, or the information about the information on the site.

4 Abbreviations

This Recommendation uses the following abbreviations:

3GPP	3rd Generation Partnership Project
API	Application Programming Interface
APL	Application Programming Language
CC	Call Control
CC/PP	Composite Capabilities/Preference Profiles
CDN	Content Delivery Network
CID	Content Identification
DSCP	Differentiated Services Code Point
DSL	Digital Subscriber Line
HTTP	HyperText Transfer Protocol
IMPP	Instant Messaging and Presence Protocol
LSP	Label Switch Paths
MIB	Management Information Base
MPLS	Multi Protocol Label Switching
OWL	Web Ontology Language
PAM	Presence and Availability Management
PBCDNM	Policy-based CDN Management

PC	Personal Computer
PDA	Personal Digital Assistant
QoS	Quality of Service
RDB	Relational Database
RDF	Resource Description Framework
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SLA	Service Level Agreement
SOAP	Simple Object Access Protocol
SQL	Structured Query Language
ToS	Type of Service
UI	User Interaction
UNI	User-Network Interface
W3C	World Wide Web Consortium
WSDL	Web Services Description Language
XML	eXtensible Markup Language
XQL	XML Query Language

5 Advanced content delivery service architecture

5.1 Advanced content delivery

Owing to rapid progress in broadband and wireless Internet access technologies, various kinds of digital content are being delivered to diverse terminal devices (PDAs, PCs, cellular phones, etc.) that are connected by diverse access methods (DSL, wireless, optical-fibre, etc.). Furthermore, digital broadcasting will soon arrive in such an environment. Figure 1 shows content delivery in a ubiquitous environment.

In such a configuration, it is desirable that the network automatically detects the user's usage environment and adapts the content delivery to allow convenient viewing. It is also desirable that the network recognizes the user's preferences for delivery method and quality and adapts to them. To achieve such advanced content delivery, the network requires context understanding and content adaptation. Figure 2 shows a mechanism for advanced content delivery by the network. Conditions on the content side, user side, and network side are described in metadata. When a user requests content, the network gathers relevant metadata to understand the conditions. Then, for those conditions, it optimizes content delivery according to pre-defined policies.

This Recommendation provides a standardized framework for achieving this mechanism.