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SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS,
NEXT-GENERATION NETWORKS, INTERNET OF
THINGS AND SMART CITIES

Next Generation Networks – Enhancements to NGN

Unified management of content delivery networks

Recommendation ITU-T Y.2305

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Recommendation ITU-T Y.2305

Unified management of content delivery networks

Summary

Recommendation ITU-T Y.2305 specifies requirements, mechanisms and security considerations for unified management of multiple content delivery networks (CDNs), in order to support simple and optimized interconnection between different CDNs.

This Recommendation provides a technical solution of a CDN manager with capabilities of content synchronization, user's request routing and other related unified management functionalities, to build up a global CDN.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T Y.2305	2018-05-29	13	11.1002/1000/13615

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Content delivery network, management.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

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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In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation ITU-T Y.2305

Unified management of content delivery networks

1 Scope

This Recommendation specifies unified management of content delivery networks (CDNs), with the following aspects:

- scenarios for unified management of CDNs;
- requirements including request routing-related, CDN content, status, network-related, and charging-related descriptions;
- mechanisms including the framework, procedures and other related functions for unified management of CDNs;
- security considerations for unified management of CDNs.

2 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.

[ITU-T Y.2019] ITU-T Recommendation Y.2019 (2010), *Content delivery functional architecture in NGN*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 charging [b-ITU-T Q.825]: The set of functions needed to determine the price assigned to the service utilization.

3.1.2 content [b-ITU-T H.780]: A combination of audio, still image, graphic, video, or data.

NOTE – A variety of formats is classified as the "data" (e.g., text, encoded values, multimedia description language introduced by [b-ITU-T H.760]).

3.1.3 content provider [b-ITU-T Y.1910]: The entity that owns or is licensed to sell content or content assets.

3.1.4 end user [b-ITU-T Y.1910]: The actual user of the products or services.

3.1.5 service [b-ITU-T Y.2091]: A set of functions and facilities offered to a user by a provider.

3.1.6 service provider [b-ITU-T M.1400]: A general reference to an operator that provides telecommunication services to customers and other users, either on a tariff or contract basis. A service provider may or may not operate a network. A service provider may or may not be a customer of another service provider.

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 content storage metadata: The descriptive information of what the name of the content is and which content delivery network (CDN) it is stored in.

NOTE – Often this metadata takes the form of an identifier and location (CDN name) that the content illustrates.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ACL	Access Control List
AS	Application Server
CDN	Content Delivery Network
CNAME	Canonical Name
CP	Content Provider
DNS	Domain Name System
EPC	Evolved Packet Core
FCDN	Fixed Content Delivery Network
IP	Internet Protocol
KPI	Key Performance Indicator
MCDN	Mobile Content Delivery Network
NGN	Next Generation Network
QoS	Quality of Service
RAN	Radio Access Network
SLA	Service Level Agreement
URL	Uniform Resource Locator

5 Convention

In this Recommendation:

The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

The keywords "is prohibited from" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus this requirement need not be present to claim conformance.

The keywords "is not recommended" indicate a requirement which is not recommended but which is not specifically prohibited. Thus, conformance with this specification can still be claimed even if this requirement is present.

The keywords "can optionally" indicate an optional requirement which is permissible, without implying any sense of being recommended. This term is not intended to imply that the vendor's implementation must provide the option and the feature can be optionally enabled by the network

operator or service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with the specification.

6 Introduction

6.1 Motivation for unified management of CDNs

Nowadays there are many kinds of CDN operator in the network, including specific service providers who provide CDN rental service for Internet content, and traditional telecom operators with self-built CDN for their self-own services or third parties' services. There are also some operators who build and operate CDNs in different regions of the network independently.

Different CDNs (owned by one or multiple operators) provide content services for users in their own independent domains, and the drawbacks of lacking interconnection between them are as follows:

- the content inside a CDN is only enjoyed by users in CDN's own domain, and such content cannot be shared by other users by cross-domain mechanisms, which leads to insufficient resource utilization;
- in an overloading or bandwidth-constrained scenario, one independent CDN cannot realize the best load balance without dispatching users' requests across domains;
- for an operator who is short of content inside his own CDN, it takes time and endeavour to introduce Internet content one content provider (CP) by CP, so that the operator cannot maximize the benefits of the investment in a short time.

This Recommendation discusses unified management of multiple CDNs, which aims to provide a technical solution of a CDN manager above CDNs and interconnections among CDNs, by introducing capabilities of content synchronization, user request routing, and other related unified management functionalities, to build up a global CDN.

The CDN described in this Recommendation follows the capabilities of content delivery identified in [ITU-T Y.2019].

Figure 1 illustrates the basic scheme of unified management of CDNs.

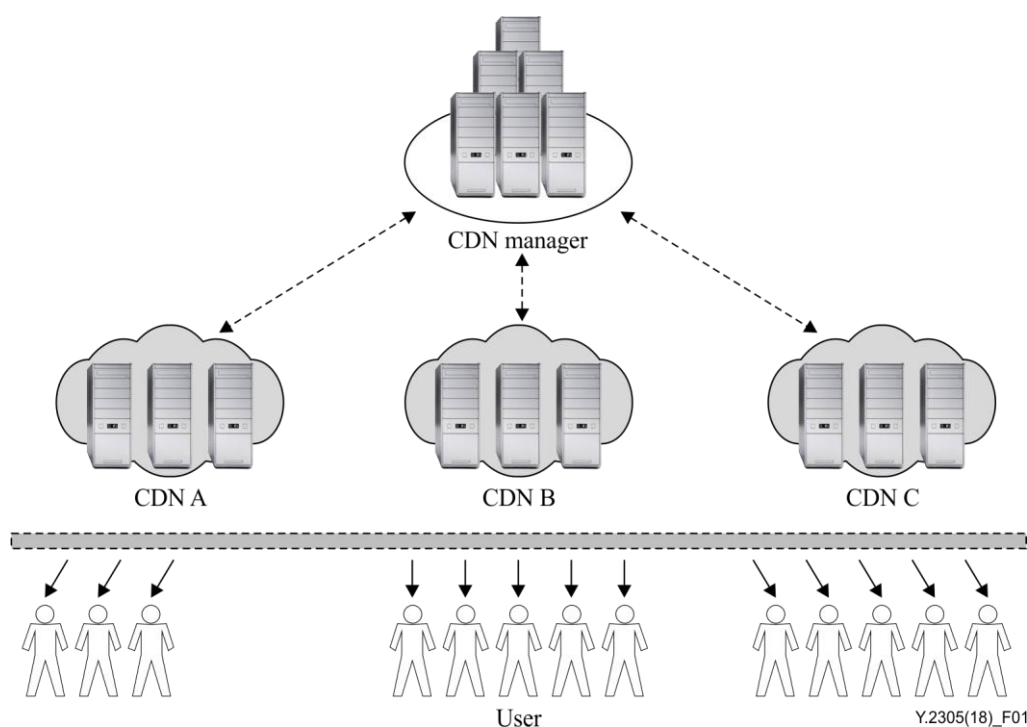


Figure 1 – Basic scheme of unified management of CDNs