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Information technology — Relayed Multicast Control Protocol (RMCP) — Framework

Technologies de l'information -- Protocole de multidiffusion relayé (RMCP) — Cadre général

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

This second edition cancels and replaces firs edition of ISO/IEC 16512-1:2005 which has been technically revised.

ISO/IEC 16512-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in collaboration with ITU-T. The identical text is published as ITU-T X.603 (03/2012).

ISO/IEC 16512 consists of the following parts, under the general title *Information technology — Relayed multicast protocol*:

— *Part 1: Framework*

— *Part 2: Specification for simplex group applications*

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Introduction

This Recommendation | International Standard specifies the relayed multicast protocol (RMCP) used for realizing relayed multicast. Relayed multicast, also known as an overlay multicast or an application-layer multicast, is a data-delivery scheme for group communications applications over an IP-based network environment. RMCP employs intermediate multicast agents for relaying application data from one or more senders to many receivers.

The design of RMCP has been motivated from the following observations:

In the marketplace, diverse group applications and services have been provisioned commercially all over the world. Some of the examples include Internet TV, remote education, real-time media streaming applications, live broadcasting of special events such as the Victoria's Secret Fashion Show, stock-tickers, etc.

At present, most of the group applications mentioned above use a replicated IP unicast method to realize group services. As a result, those applications have scalability problems due to the limitation in supporting a number of simultaneous users. In terms of a business model, it would mean less revenue or profit.

IP multicast has been known as an effective transport technology for providing group communication services. Nevertheless, the IP multicast has not been deployed widely over the Internet due to several reasons, including the following:

- high deployment cost along with an uncertainty of return-on-investment (ROI)
- IP multicast alone cannot support all kinds of group applications.

Network services such as group file transfer or network games, need a reliable multicast transport mechanism. However, even current reliable multicast transport mechanisms still have unresolved problems including scalability, flow control, congestion control, etc. Until an appropriate multicast transport mechanism is laid down, group communication applications requiring reliable data transfer will continue to depend on the server-based replicated unicast method.

Although IP multicast is not deployed globally, various local networks have already been equipped with IP multicast capability. For example, Ethernet-based LANs and private networks, such as corporate and campus networks, substantially provide the multicast transport capability within their local subnet or administrative domains.

Recognizing these observations, there is a crucial need to develop an alternative group delivery scheme. RMCP is one such scheme to realize group delivery over the IP-based network. RMCP utilizes existing unicast, multicast, and/or multicast tunnelling schemes. In addition, RMCP is designed in separate forms to support any kind of group service type. RMCP is expected to provide a substantial solution for group services over the IP-based network.

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ITU-T RECOMMENDATION

Information technology – Relayed multicast protocol: Framework

1 Scope

Relayed multicast protocol (RMCP) is a protocol which is used to realize a relayed multicast data transport scheme. Different from the conventional IP multicast, RMCP can configure a relayed multicast path that multicast traffic flows by using intermediate end-hosts. RMCP can be applied to the current unicast based IP network where IP multicast is not fully deployed.

This Recommendation | International Standard addresses the basic concepts needed to specify RMCP for relayed multicast. It defines the related terminology and proposes a framework for the future development of subsequent protocols. The framework covers network topology including network entities and the relationship among them, service scenarios, basic operations, and message format.

2 Normative references

None.

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation | International Standard

For the purpose of this Recommendation | International Standard the following definitions apply:

3.2.1 child multicast agent (CMA): A next downstream multicast agent (MA) in the relayed multicast protocol (RMCP) data delivery path.

3.2.2 IP multicast: Realizes a multicast scheme in the IP network with the help of multicast-enabled IP routers.

3.2.3 multicast: A data delivery scheme where the same data unit is transmitted from a single source to multiple destinations in a single invocation of service.

3.2.4 multicast agent (MA): An intermediate node which relays group application data.

3.2.5 N-plex: Wherein anyone can send something, and, if someone does so, all others may receive it.

3.2.6 parent multicast agent (PMA): A next upstream multicast agent (MA) in the relayed multicast protocol (RMCP) data delivery path.

3.2.7 relayed multicast: A multicast data delivery scheme that can be used in unicast environments.

3.2.8 receiver multicast agent (RMA): A multicast agent (MA) other than sender multicast agent (SMA).

3.2.9 relayed multicast protocol (RMCP): A protocol to realize the relayed multicast scheme using end hosts.

3.2.10 relayed multicast protocol (RMCP) session: A set of multicast agents (MAs) which configures the data delivery path using RMCP.

3.2.11 session identification (SID): Corresponds to group name and identifies relayed multicast protocol (RMCP) session uniquely.

3.2.12 session manager (SM): A relayed multicast protocol **(**RMCP) entity that is responsible for the overall RMCP operations.

3.2.13 sender multicast agent (SMA): A multicast agent (MA) attached to a sender in the same system or local network.

3.2.14 simplex: Wherein only one sender is send-only and all others are receive-only.