

Recommendation

ITU-T Q.4105 (06/2024)

SERIES Q: Switching and signalling, and associated measurements and tests

Protocols and signalling for peer-to-peer communications

Hybrid peer-to-peer (P2P) communications: Signalling requirements for feature-based video services

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Recommendation ITU-T Q.4105

Hybrid peer-to-peer (P2P) communications: Signalling requirements for feature-based video services

Summary

Recommendation ITU-T Q.4105 specifies signalling requirements for feature-based video services. The feature-based video services share features rather than fully encoded video data. The feature is used to recreate images at the remote end points connected to a hybrid overlay network. Since the hybrid overlay network constructs a backbone tree for distributing live data asynchronously, it can be used for video streaming, virtual conference, metaverse, etc. This Recommendation specifies signalling requirements for developing protocol specifications.

History *

Edition	Recommendation	Approval	Study Group	Unique ID
1.0	ITU-T Q.4105	2024-06-29	11	11.1002/1000/15964

Keywords

Feature, hybrid peer-to-peer, requirements, signalling, video.

* To access the Recommendation, type the URL <https://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID.

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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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Recommendation ITU-T Q.4105

Hybrid peer-to-peer (P2P) communications: Signalling requirements for feature-based video services

1 Scope

This Recommendation describes the signalling requirements for feature-based video services using a hybrid peer-to-peer network as follows:

- overview of feature-based video services;
- protocol requirements for controlling feature-based video sessions;
- protocol requirements for transporting video features.

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 Q.4100] | Recommendation ITU-T Q.4100 (2020), <i>Hybrid peer-to-peer communications: Functional architecture</i> . |
| [ITU-T Q.4101] | Recommendation ITU-T Q.4101 (2021), <i>Hybrid peer-to-peer communications: Tree and data recovery procedures</i> . |
| [ITU-T Q.4102] | Recommendation ITU-T Q.4102 (2022), <i>Hybrid peer-to-peer communications: Peer protocol</i> . |
| [ITU-T Q.4102Amd1] | Recommendation ITU-T Q.4102 (2022) Amd.1 (2024), <i>Hybrid peer-to-peer communications: Peer protocol – Amendment 1</i> . |
| [ITU-T Q.4103] | Recommendation ITU-T Q.4103 (2022), <i>Hybrid peer-to-peer communications: Overlay management protocol</i> . |
| [ITU-T Q.4103Amd1] | Recommendation ITU-T Q.4103 (2022) Amd.1 (2024), <i>Hybrid peer-to-peer communications: Overlay management protocol – Amendment 1</i> . |

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 hybrid overlay network [ITU-T Q.4100]: A peer-to-peer overlay network that participating peers use to exchange data applying the pull and push method. The hybrid overlay network also provides a way to organize and maintain a tree-style path for pushing data to all peers without loops, as well as obtaining data from other peers simultaneously.

3.1.2 hybrid peer [ITU-T Q.4100]: A peer capable of exchanging data using the mesh-based and tree-based methods running over a hybrid overlay network.

3.1.3 peer-to-peer (P2P) [b-ITU-T Y.2206]: A system is considered to be P2P if the nodes of the system share their resources in order to provide the service the system supports. The nodes in the system both provide services to other nodes and request services from other nodes.

NOTE – Peer is the node in a P2P system.

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 feature: A measurable and descriptive characteristic of content that represents an interesting part of an image, providing task-relevant information in computer vision and captured in an n-dimensional feature vector for machine learning.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

FVS	Feature-based Video Service
HOMS	Hybrid Overlay Management Server
HP2P	Hybrid Peer-to-Peer
HPEER	Hybrid Peer
KDM	Key points Description Mode
P2P	Peer-to-Peer
SNNM	Shared Neural Network Mode

5 Conventions

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 Recommendation 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 "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/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with this Recommendation.
- The keywords "peer" means a hybrid peer.
- The keywords "HP2P network" means a hybrid overlay network.

6 Feature-based video services

This clause describes the overview of feature-based video services and two types of service modes.

6.1 Overview

The feature-based video communication approach does not strive to restore the original video. Rather, it employs AI technologies to regenerate scene images. This allows for generating lifelike images and character animations from features, which can be tailored to specific service models. The shape of the features is closely associated with the target service. For instance, in a video conferencing service,