International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

J.1304

(01/2022)

SERIES J: CABLE NETWORKS AND TRANSMISSION OF TELEVISION, SOUND PROGRAMME AND OTHER MULTIMEDIA SIGNALS

Cloud-based converged media services for IP and broadcast cable television

Functional requirements for service collaboration between cable television operators and OTT service providers

Recommendation ITU-T J.1304

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Functional requirements for service collaboration between cable television operators and OTT service providers

Summary

Recommendation ITU-T J.1304 is intended to define functional requirements for a cable television operator to provide an over-the-top (OTT) service to cable television customers in conjunction with their cable television services, video on demand (VOD) service, high-speed cable internet and so on by collaboration with an OTT service provider. As a reference architecture, the system architecture and interfaces between a cable television operator and one or more OTT service provider(s) are specified. To exemplify the collaboration patterns of a cable television operator with an OTT provider, this Recommendation also describes the configuration patterns of relevant entities including a user, a cable television operator and one or more OTT service provider(s).

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T J.1304	2022-01-13	9	11.1002/1000/14843

Keywords

Billing, ID, OTT, service, subscription.

* 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.

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Introduction

A recent trend among cable television operators is to provide OTT services in conjunction with their own television channels, video on demand (VOD) service, high-speed cable Internet, etc. For the convenience of the users such OTT service is integrated into the set-top box (STB), including quality assurance and billing integration.

This Recommendation defines functional requirements for cable television operators to enable them to provide such integrated OTT services. The system architecture and interfaces between a cable television operator and one or more OTT service provider(s) are also specified to serve as a reference architecture. This Recommendation also describes configuration patterns of the relevant entities, including a user, a cable television operator and one or more OTT service provider(s), to exemplify possible collaboration patterns of the cable television operator with OTT providers.

Recommendation ITU-T J.1304

Functional requirements for service collaboration between cable television operators and OTT service providers

1 Scope

This Recommendation defines functional requirements for a cable television operator to provide an OTT service to cable television customers in conjunction with their cable television services, video on demand (VOD) service, high-speed cable Internet, etc. through collaboration with an OTT service provider. The system architecture and interfaces between a cable television operator and one or more OTT service provider(s) are also specified to serve as a reference architecture. This Recommendation also describes the configuration patterns of relevant entities, including a user, a cable television operator and one or more OTT service provider(s), to exemplify possible collaboration patterns of cable television operators with OTT providers.

This Recommendation focuses on service registration and control flow necessary for a cable television operator to collaborate with an OTT service provider. Configuration of the content distribution platform and the content delivery network are outside the scope of this Recommendation.

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.

None.

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 cable billing: A payment method provided by a cable operator. When cable billing is applied as a payment method for an OTT service, billing for the OTT service is processed through the cable operator.

3.2.2 cable log-in: A logging-in process on a cable service entity with a cable subscriber identifier (ID) for the purpose of the request for cable billing and an OTT service use (if applicable).

3.2.3 cable operator service entity: A service entity that provides interfaces for users such as applications or web pages and those for an OTT service entity in order to process service collaboration.

3.2.4 OTT log-in: A logging-in process on an OTT service entity with an OTT subscriber ID for the purpose of an OTT subscription registration and service use.

3.2.5 OTT service entity: A service entity that provides interfaces for users such as applications or web pages and/or those for a cable service entity in order to process service collaboration.

3.2.6 service entity: An entity that provides interfaces for authorization, authentication, token exchange, etc. In this Recommendation, two types of service entities are defined: cable operator service entity and OTT service entity.

3.2.7 service interface: An interface of cable and OTT service entities referenced during service collaboration processes.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

CPE Customer Premises Equipment

ID Identifier

OTT Over-The-Top

PII Personally Identifiable Information

SAML Security Assertion Markup Language

STB Set-Top-Box

TLS Transport Layer Security

VOD Video on Demand

5 Conventions

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

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

The keywords "**can optionally**" indicate an optional requirement that 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 the specification.

In the body of this document and its annexes, the words shall, shall not, should, and may sometimes appear, in which case they are to be interpreted, respectively, as is required to, is prohibited from, is recommended, and can optionally. The appearance of such phrases or keywords in an appendix or in material explicitly marked as informative are to be interpreted as having no normative intent.

6 Assumptions on cable and OTT services

This clause describes the sales types and the use of ID assumed in this Recommendation.

6.1 Sales types

There are two sales types of cable television operator's services:

– Sales type A: A cable television operator sells an OTT service which is typically a subscription-based service as a reseller of the OTT service.

– Sales type B: A cable television operator sells a package of services including an OTT service, e.g., a bundling package consisting of multichannel pay-TV service, the cable television operator's VOD service and an OTT service.

6.2 Subscriber ID

There are various roles and purposes of subscriber ID according to different aspects:

6.2.1 Subscriber ID from the management or issuer point of view

There are two kinds of subscriber IDs, i.e., a) subscriber ID managed by an OTT service provider (hereinafter "OTT ID"), b) subscriber ID managed by a cable television operator (hereinafter "cable ID").

6.2.2 Subscriber ID from the purpose point of view

There are also two types of purposes for a subscriber ID, namely, a) subscriber ID for billing, b) subscriber ID for service use.

7 Possible patterns of configurations

Table 1 summarizes combinations of the configurations.

Table 1 – Combinations of the configurations

No.	Sign up to	Subscriber ID for billing	Payment method	Subscriber ID for service use	Sales type	Remarks
0	OTT	OTT ID	Credit card, or other billing methods accepted by OTT provider	OTT ID	A	The most basic case where a cable operator sells an OTT service as a reseller.
1	OTT	Cable ID	Cable billing	OTT ID	A	Typical billing integration by a cable operator.
2	Cable	Cable ID	Cable billing	OTT ID	B	OTT bundling package by a cable operator with billing integration.
3	OTT	Cable ID	Cable billing	Cable ID	A	Billing and service use ID integration.
4	Cable	Cable ID	Cable billing	Cable ID	B	OTT bundling package by a cable operator with billing and service use ID integration.

The following provides an explanatory description the configurations (No. 0 to No. 4) listed in Table 1.

– No. 0: This configuration is the most basic OTT service selling case where a cable operator sells an OTT service to a user as a reseller. The user will sign up to the OTT service with an ID determined by the user for such an OTT service (i.e., OTT ID in this Recommendation) with billing information such as a credit card, and the same OTT ID will be used to enjoy the OTT service. In this configuration, the cable operator plays a role of a reseller and will receive some sale incentives in the most typical case.

– No. 1: A cable operator sells an OTT service to a user similar to No. 0, but billing integration to the cable operator applies in configuration No. 1. When the user signs up for the OTT service, they will sign up with an OTT ID through a special entrance or a URL for billing integration by the cable operator, where the billing will be associated with the user's cable ID. There might also be another sign-up method where the user will directly use a cable ID. In both cases, an OTT ID that is used to enjoy the OTT service needs to be associated with the cable ID through the sign-up process. After the sign-up completion, a similar manner with No. 0 will apply in order to enjoy the OTT service.

– No. 2: A cable operator sells an OTT service to a user with billing integration to the cable operator similar to No. 1, but in this configuration, the OTT service will be sold to the user, not as a single independent service but will be included in some cable television related services as a bundled service. The user will sign up for the OTT service with an OTT ID through a special entrance or a URL for such bundling offer provided by the cable operator. There might also be another sign-up method where the user will use a special ID for the bundling offer (i.e., cable ID in this Recommendation). In the latter case, an OTT ID that is used to enjoy the OTT service needs to be associated with the cable ID through the sign-up process. After the sign-up completion, a similar manner with No. 1 will apply in order to enjoy the OTT service.

– No. 3: Similar to No. 1, but the cable ID is used for the sign-up and service use. In configuration No. 3, the ID linkage mechanism is implemented between an OTT provider's platform and a cable operator's ID platform.

– No. 4: Similar to No. 2, but the cable ID is used for the sign-up and service use. In configuration No. 4, an ID linkage mechanism is implemented between an OTT provider's platform and a cable operator's ID platform.

The illustrative explanations of the patterns from No. 0 to No. 4 are provided as follows to identify the necessary actions, communications and interfaces between the entities.

Figure 1 shows a procedure for pattern No. 0, which does not incorporate any use of the cable ID for billing or service integration. While the patterns from No. 1 to No. 4 illustrate integrated configurations with the cable ID.

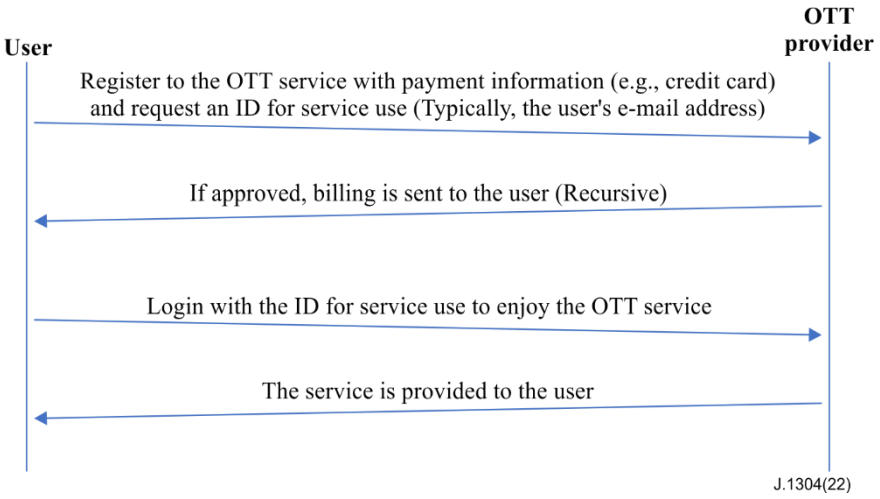

Figure 1 – No. 0 – Normal OTT use without any relationship with the cable ID

7.1 No. 1: Billing integration

Figure 2 shows a procedure for an OTT service subscription which incorporates the cable television billing. In this flow, a user registers a subscription to the OTT service to obtain their OTT ID for service use, and then the OTT provider requests billing for their subscription from the cable television operator. Once the cable television operator approves the billing, the user can enjoy the OTT service by logging in with their OTT ID.

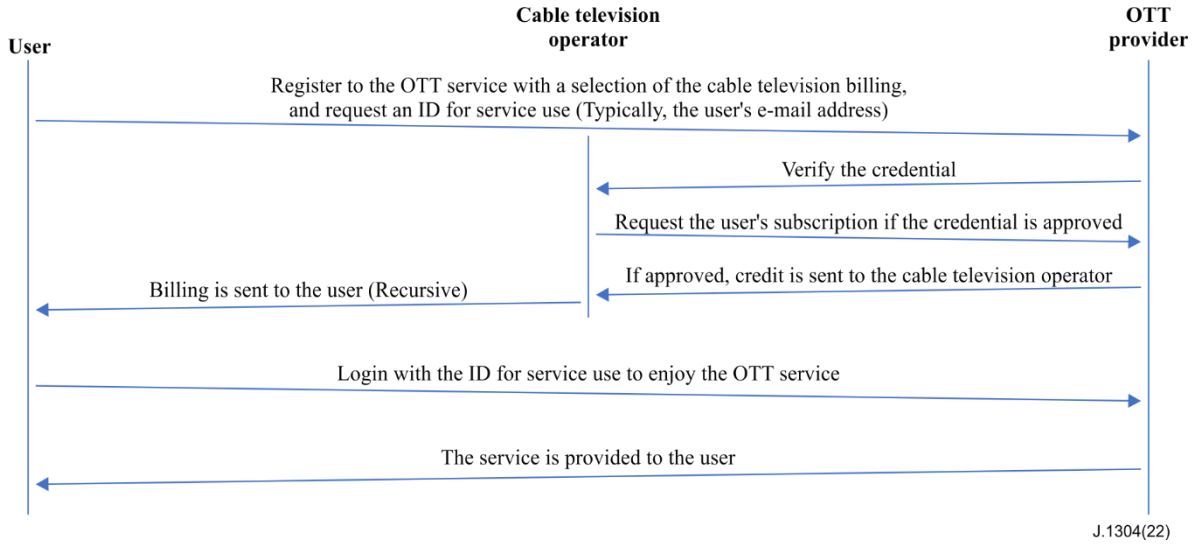

Figure 2 – No. 1 – Typical billing integration

7.2 No. 2: OTT bundling package by cable operator with billing integration

Figure 3 shows a procedure for the cable television billing for OTT service subscriptions provided as a bundling package (sales type B). In this flow, a user who already has their own OTT ID registers a subscription to the cable service, and then the subscription request is forwarded to the OTT provider. If the OTT provider approves the subscription request, billing for the subscribed service is sent to the user. Then, the user can enjoy the OTT service by logging in with their OTT ID.

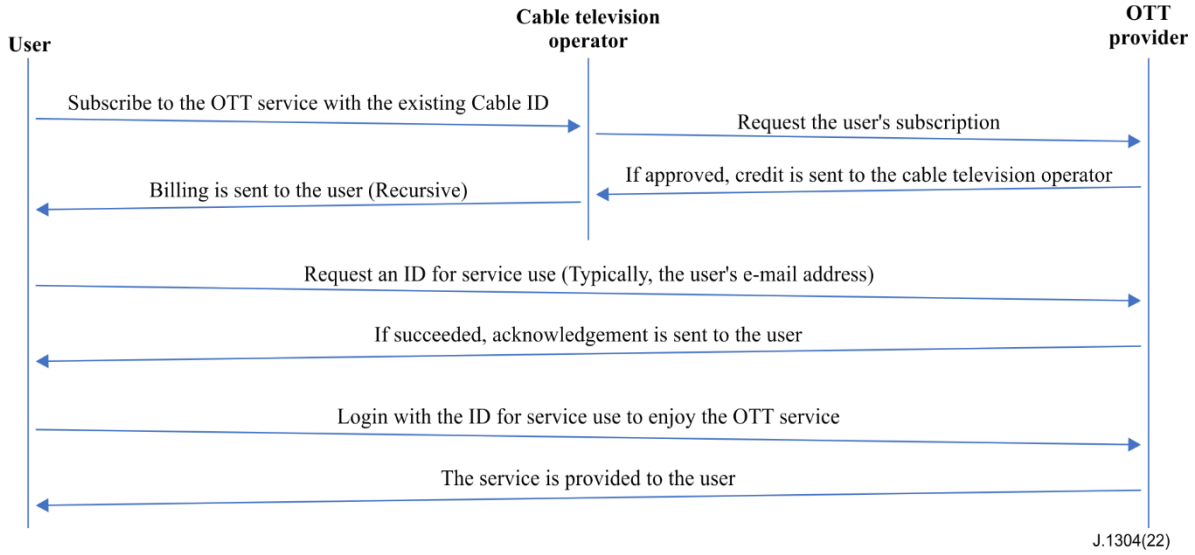

Figure 3 – No. 2 – OTT package by a cable operator with billing integration

7.3 No. 3: Billing and service use ID integration

Figure 4 shows a procedure for an OTT service subscription which incorporates the cable ID for both billing and service use. In this flow, a user who already has their own cable ID registers a subscription to the OTT service, and the OTT provider requests billing for their subscription from the cable television operator. Once the cable television operator approves the billing, the user can enjoy the OTT service by logging in with their cable ID.

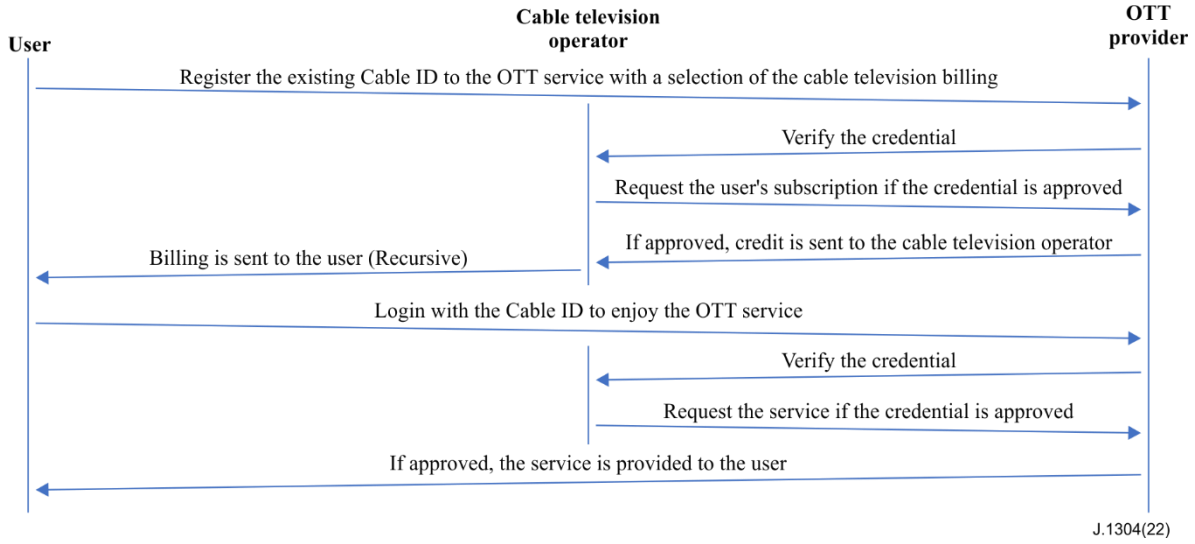

Figure 4 – No. 3 – Billing and service use ID integration

7.4 No. 4: OTT bundling package by cable operator with billing and service use ID integration

Figure 5 shows a procedure for a cable ID integration for both billing and service use for the OTT service subscription as a bundling package (sales type B). In this flow, a user registers a subscription to the cable television operator's package/bundle of the OTT service, and then the subscription request is forwarded to the OTT provider. If the OTT provider approves the subscription request, billing for the subscribed service is sent to the user. Then, the user can enjoy the packaged/bundled OTT service by logging in with their cable ID.

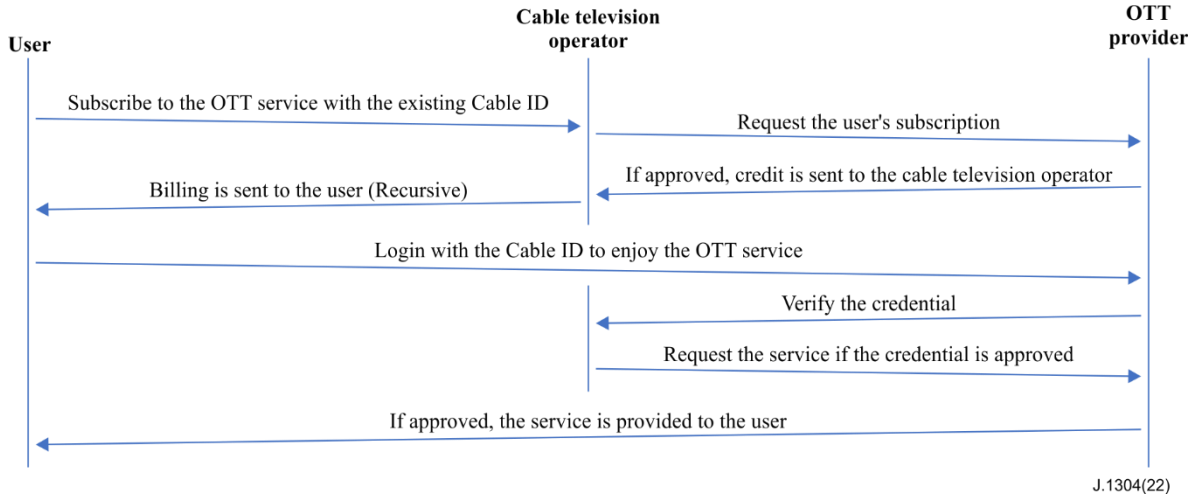

Figure 5 – No. 4 – OTT package by a cable operator with billing and service use ID integration

8 General architecture

This clause illustrates the components for cable and an OTT service collaboration. Figure 6 shows the general architecture, where a customer premises equipment (CPE) is a device managed by the cable operator (e.g., set-top box), connected to a cable broadband network and the user's device is an unmanaged device connected to the Internet through Wi-Fi, cellular network, etc.

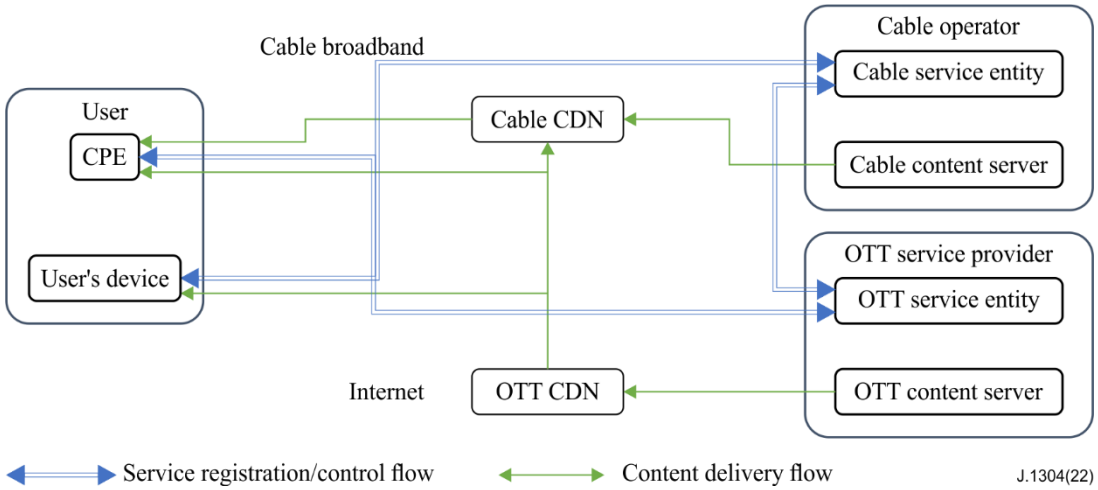

Figure 6 – General architecture of cable and OTT service collaboration

This architecture is intended to enable cable operators to incorporate an OTT provider's service subscription into the cable operator's service, specifically in the form of billing integration and/or packaging/bundling with cable television services.

Cable operators can determine whether collaborated services are provided with their own cable broadband network or not. Also, the type of ID for service use, i.e., cable subscriber ID or OTT subscriber ID, will be chosen by consultation with an OTT provider.

9 Functional requirements

This clause defines the functional requirements for service collaboration between the cable operator and an OTT provider. Requirements for the cable operator's service entity and service flow are defined. Service interfaces of an OTT service provider including user interfaces on applications and/or web pages are outside the scope of this Recommendation.

9.1 Requirements for user identification by cable ID

[LOG-001]: A cable service entity is required to provide a user interface as an application or a web page for log-in with cable ID in order to identify a user.

[LOG-002]: A cable service entity can optionally provide an identity federation scheme (e.g., security assertion markup language (SAML) [b-OASIS SAML], openID connect [b-OIDF OIDC], OAuth 2.0 [b-IETF RFC 6749]), so that OTT service entities can provide a scheme for log-in with a cable ID on their service application or web page in the form of embedding or redirection.

9.2 Requirements for cable service interfaces

[INF-001]: A cable service interface is required to be capable of connection between a cable service entity and an OTT service entity authorized by the cable operator.

[INF-002]: A cable service interface is required to be capable of secure connections (e.g., transport layer security (TLS) 1.2 [b-IETF RFC 5246], TLS 1.3 [b-IETF RFC 8446]) to be connected with OTT service entities.

[INF-003]: A service interface is required to anonymise personally identifiable information (PII) included in every message (e.g., by tokenising the user's cable subscriber ID, etc.).

9.3 Requirements for cable billing integration

[BIL-001]: A cable service entity is required to process cable billing registration (sign-up) requests from the user for an OTT service subscription by communicating with the OTT service provider through the service interface connected to the OTT service entity.

[BIL-002]: A cable service entity is required to validate a cable billing registration request by verifying whether the request is correctly associated with a valid cable subscriber ID (authentication) and can be authorized for the specified OTT service (authorization).

[BIL-003]: A cable service entity can optionally provide some information related to the registered user to the OTT service entity based on a permission given by the user and prior consensus or an agreement with the OTT service provider.

9.4 Requirements for service use integration

[SRV-001]: A cable service entity can optionally provide user authentication and authorization for the collaborated OTT service to the OTT service provider through the service interface connected to the OTT entity. This function may be used for the cases described in clauses 7.3 and 7.4. When the user tries to enjoy their subscribed OTT service with a cable ID already registered, the OTT service provider needs to verify the validity of the user's credentials by communicating with the cable operator through the service interface.

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Printed in Switzerland
Geneva, 2022