

Recommendation

ITU-T M.3173.1 (01/2024)

SERIES M: Telecommunication management, including
TMN and network maintenance

Telecommunications management network

**Interface for synergy management of cloud and
software-defined networking-based networks –
Protocol neutral requirements**

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Recommendation ITU-T M.3173.1

Interface for synergy management of cloud and software-defined networking-based networks – Protocol neutral requirements

Summary

Recommendation ITU-T M.3173.1 specifies interface requirements for synergy management of cloud and networks based on software-defined networking (SDN). Recommendation ITU-T M.3173.1 describes the interface position for the synergy management system, and synergy management scenarios for cloud and SDN-based networks. Recommendation ITU-T M.3173.1 also specifies the management interface requirements and the related use cases for the synergy management interface at a technology independent level (protocol neutral).

History *

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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 M.3173.1

Interface for synergy management of cloud and software-defined networking-based networks – Protocol neutral requirements

1 Scope

This Recommendation specifies interface requirements for synergy management of cloud and networks based on software-defined networking (SDN). This Recommendation describes the interface position for the synergy management system (SMS), and the synergy management scenarios of cloud and SDN-based networks. The main content in this Recommendation specifies the management interface requirements and the related use cases for the synergy management interface at a technology independent level (protocol neutral).

The management interface requirements provided in this Recommendation follows the ITU-T M.3020 interface specification methodology in the requirements phase, and is developed in a protocol neutral manner.

This Recommendation applies to the design, development and inter-operation of SMSs of cloud and SDN-based networks.

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 M.3020] Recommendation ITU-T M.3020 (2023), *Management interface specification methodology*.
- [ITU-T M.3372] Recommendation ITU-T M.3372 (2018), *Requirements for resource management in cloud-aware telecommunication management systems*.
- [ITU-T M.3373] Recommendation ITU-T M.3373 (2020), *Requirements for synergy management of cloud and SDN-based networks*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 cloud service [b-ITU-T Y.3500]: One or more capabilities offered via cloud computing (see clause 3.2.5 of [b-ITU-T Y.3500]) invoked using a defined interface.

3.1.2 private network [b-ITU-T Q.1290]: A network which provides services to a specific set of users only.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

CMS	Cloud Management System
FM	Fulfilment Management
FS	Function Set
FUN	Function
ID	Identifier
PM	Policy Management
REQ	Requirement
RM	Resource Management
SbNMS	Software-defined networking-based Network Management System
SDN	Software-Defined Networking
SMS	Synergy Management System

5 Conventions

In this Recommendation:

- The phrase "**is required**" indicates a requirement that must be strictly followed and from which no deviation is permitted if conformance to this Recommendation is to be claimed.
- The phrase "**is recommended**" indicates a requirement that is recommended but which is not absolutely required. Thus this requirement needs not be present to claim conformance.
- For the qualifiers of a use case in the specification-level requirements, "**M**" stands for mandatory, and "**O**" stands for optional.

6 Concepts and background

Traditionally, an SDN-based network has its own management system and provides SDN network management functions, while a cloud also has its own management system. Telecommunication operators use the two systems to provide services to their customers. Some improvements have been made to each system, such as functional requirements for resource management proposed in [ITU-T M.3372]. However, when an operator needs to provide a synergy service (containing both a cloud service and the related network service for customer use), it needs to use the two management systems jointly, and coordinate manually, which suffers from low efficiency, high time consumption and proneness to errors. In this context, requirements for synergy management of cloud and SDN-based networks are proposed in [ITU-T M.3373].

Based on the information provided in [ITU-T M.3373], the logical architecture of synergy management of cloud and SDN-based networks can be found in Figure 1, which mainly shows two interfaces between the management systems.

Interface I1 is the interface between the SMS and the software-defined networking-based network management system (SbNMS).

Interface I2 is the interface between the SMS and the cloud management system (CMS).

The purpose of this Recommendation is to provide detailed interface requirements for both interfaces I1 and I2.

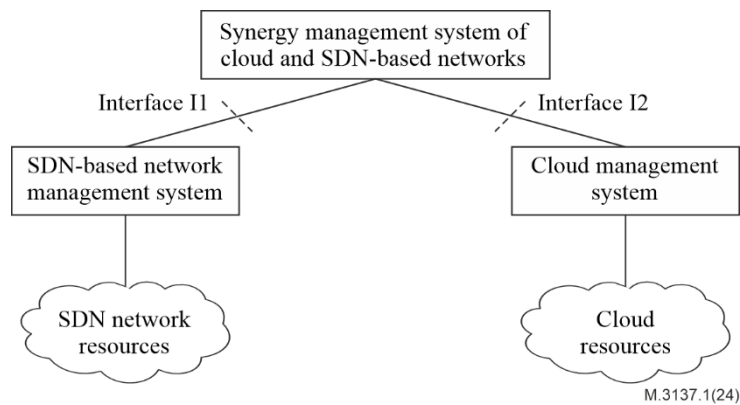


Figure 1 – Interface position among synergy management related systems

The purpose of the synergy management of cloud and SDN-based network is for both SbNMS and CMS to perform functions for SMS to configure the related resources, thereby synergy services of cloud and the corresponding SDN-based networks can be easily fulfilled and managed. Clauses 7 and 8 specify requirements for interfaces I1 and I2 to support such functionalities.

7 Business-level requirements

7.1 Requirements

Synergy management functions of cloud and SDN-based networks are the key emerging features for the network management interfaces between the SMS and the SbNMS or between the SMS and the CMS, as shown in Figure 1, where the SMS takes the manager role, and the SbNMS or the CMS the agent role. The manager should be able to request an agent to perform synergy service management functions, either to configure certain cloud resources or network resources. The synergy management interface requirements (REQs) are a subset of the requirements mentioned in [ITU-T M.3373], those functions that do not involve interaction across interface I1 or I2 are not addressed in this Recommendation (e.g., service order management can be done within the SMS itself). These interface REQs can be grouped into the following aspects.

- Synergy service fulfilment management (FM) of resource reservation for a service; creation, update, suspension, resumption, query and deletion of a service; network bandwidth adjustment; and service status monitoring.
- Synergy service policy management (PM), including: creation; query; deletion; and modification of service policy information for cloud service or private network service.
- Synergy resource management (RM), including: management of end-to-end cloud resources; related network resources; connection management of cloud data centres and private networks; dynamic resource update; and resource query, etc.

7.1.1 Synergy service fulfilment management

The agent is required to provide the following functions (FUNs) across the management interface for the manager to:

- REQ-FM-FUN-01 check for resource reservation of a synergy service;
- REQ-FM-FUN-02 create a synergy service, which will be mapped to a network service across interface I1 or a cloud service across interface I2;
- REQ-FM-FUN-03 query the basic information about a synergy service;
- REQ-FM-FUN-04 suspend a synergy service;
- REQ-FM-FUN-05 resume a synergy service;