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SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS
AND NEXT-GENERATION NETWORKS

ITU-T Y.2200-series – Functional model of a service overlay network framework which uses the next generation network

ITU-T Y-series Recommendations – Supplement 17

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Supplement 17 to ITU-T Y-series Recommendations

ITU-T Y.2200-series – Functional model of a service overlay network framework which uses the next generation network

Summary

Supplement 17 to ITU-T Y.2200-series Recommendations provides a functional model of a service overlay network (SON) which uses NGNs. It identifies SON service capability functions and also provides a number of operating scenarios which may be used to provide enhanced NGN applications.

History

Edition	Recommendation	Approval	Study Group
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NGN, service overlay network, SON.

FOREWORD

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Introduction

A service overlay network (SON) is a virtual or logical service network which possesses a number of specific functions, lies on top of and utilizes existing transport networks and provides support for various types of services beyond those normally offered by the transport network.

SONs are designed to provide and dynamically utilize application features in accordance with users' demands. The application features are provided via the use of a composition function, which can be used to develop user service capabilities in SONs in response to user's needs.

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Supplement 17 to ITU-T Y-series Recommendations

ITU-T Y.2200-series – Functional model of a service overlay network framework which uses the next generation network

1 Scope

This Supplement defines a functional framework and service features for service overlay networks (SONs) which use the next generation network (NGN). It also provides a number of SON service scenarios.

2 References

[ITU-T Y.2012] Recommendation ITU-T Y.2012 (2010), *Functional requirements and architecture of next generation networks*.

3 Definitions

3.1 Terms defined elsewhere

This Supplement uses the following terms defined elsewhere:

3.1.1 application [b-ITU-T Y.2261]: A structured set of capabilities, which provide value-added functionality supported by one or more services, which may be supported by an API interface.

3.1.2 application network interface (ANI) [ITU-T Y.2012]: Interface which provides a channel for interactions and exchanges between applications and NGN elements. The ANI offers capabilities and resources needed for realization of applications.

3.1.3 functional architecture [ITU-T Y.2012]: A set of functional entities and the reference points between them used to describe the structure of an NGN. These functional entities are separated by reference points, and thus, they define the distribution of functions.

3.1.4 mobility [b-ITU-T Q.1706]: The ability for the user or other mobile entities to communicate and access services irrespective of changes of the location or technical environment.

3.1.5 multicast [b-ITU-T X.603]: A data delivery scheme where the same data unit is transmitted from a single source to multiple destinations in a single invocation of service.

3.1.6 next generation network (NGN) [b-ITU-T Y.2001]: A packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.

3.1.7 NGN service stratum [b-ITU-T Y.2011]: That part of the NGN which provides the user functions that transfer service-related data and the functions that control and manage service resources and network services to enable user services and applications.

3.1.8 NGN transport stratum [b-ITU-T Y.2011]: That part of the NGN which provides the user functions that transfer data and the functions that control and manage transport resources to carry such data between terminating entities.

3.1.9 nomadism [b-ITU-T Q.1706]: The ability of the users to change their network access point on moving. When changing the network access point, the user's service session is completely stopped and then started again, i.e., there is no service continuity or hand-over used. It is assumed that normal usage pattern is that users shut down their service session before attaching to a different access point.

3.1.10 overlay network [b-ITU-T Y-Sup.10]: A network of nodes and logical links that is built on top of the underlying, e.g., transport, network with the purpose of providing a network service that is not available in the underlying network.

3.1.11 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.

3.1.12 quality of experience (QoE) [b-ITU-T P.10 Amd.2]: The overall acceptability of an application or service, as perceived subjectively by the end-user. Quality of experience includes the complete end-to-end system effects (client, terminal, network, services infrastructure, etc.). Overall acceptability may be influenced by user expectations and context.

3.1.13 service composition [b-ITU-T Y.2234]: Service composition is the capability of creating new services from other existing services.

3.1.14 service node interface (SNI) [ITU-T Y.2012]: Interface which provides a channel for interactions and exchanges between a NGN and other service providers.

3.1.15 session [b-ITU-T Y.2091]: A temporary telecommunications relationship among a group of objects in the service stratum that is assigned to collectively fulfil a task for a period of time. A session has a state that may change during its lifetime.

3.1.16 third-party service provider [ITU-T M.3050.1]: The third-party service provider provides services to the enterprise for integration or bundling as an offer from the enterprise to the customer. Third-party service providers are part of an enterprise's seamless offer. In contrast, a complementary service provider is visible in the offer to the enterprise's customer, including having customer interaction.

3.1.17 topology [ITU-T Y.2012]: Information that indicates the structure of a network. It contains the network address and routing information.

3.1.18 user network interface (UNI) [b-ITU-T G.8012]: An interface that is used for the interconnection of customer equipment with a network element of the transport network.

3.2 Terms defined in this Supplement

This Supplement defines the following terms:

3.2.1 service overlay network (SON): A virtual or logical service network deployed to facilitate the creation and deployment of enhanced service-specific functions with applications.

3.2.2 session mobility: The capability that allows a user to transfer an ongoing communication session from one device to another device.

Note that session mobility includes the process of transferring an active session to another terminal or another interface.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

AIPF Application Interface Provisioning Function

AKA Authentication and Key Agreement

ANI Application Network Interface

API Application Programming Interface

AV Authentication Vector

CPN Customer Premises Network

DHT Distributed Hash Table

IaaS Infrastructure as a Service

ID Identification

IdM Identity Management

IPTV Internet Protocol Television

NGN Next Generation Network

P2P Peer-to-Peer

PaaS Platform as a Service

QoE Quality of Experience

QoS Quality of Service

SaaS Software as a Service

SNI Service Node Interface

SON Service Overlay Network

UNI User Network Interface

XaaS Everything as a Service

5 Conventions

None.

6 Overview of service overlay networks (SONs)

6.1 Introduction to SON

A service overlay network (SON) uses a logical service networking structure to support diverse application features. SONs can be thought of as being connected logically, regardless of the underlying networks. Additionally, SONs, which use the NGN, support composition functions that are used to provide customer-oriented service features and their associated applications.

With the rapid advancement of computing technology, it is possible to aggregate information and computing resources which are available from clients or peers and utilize these to provide services more effectively. Figure 6-1 shows the general model of a SON that uses the NGN. In this diagram, SON comprises SON functional elements.

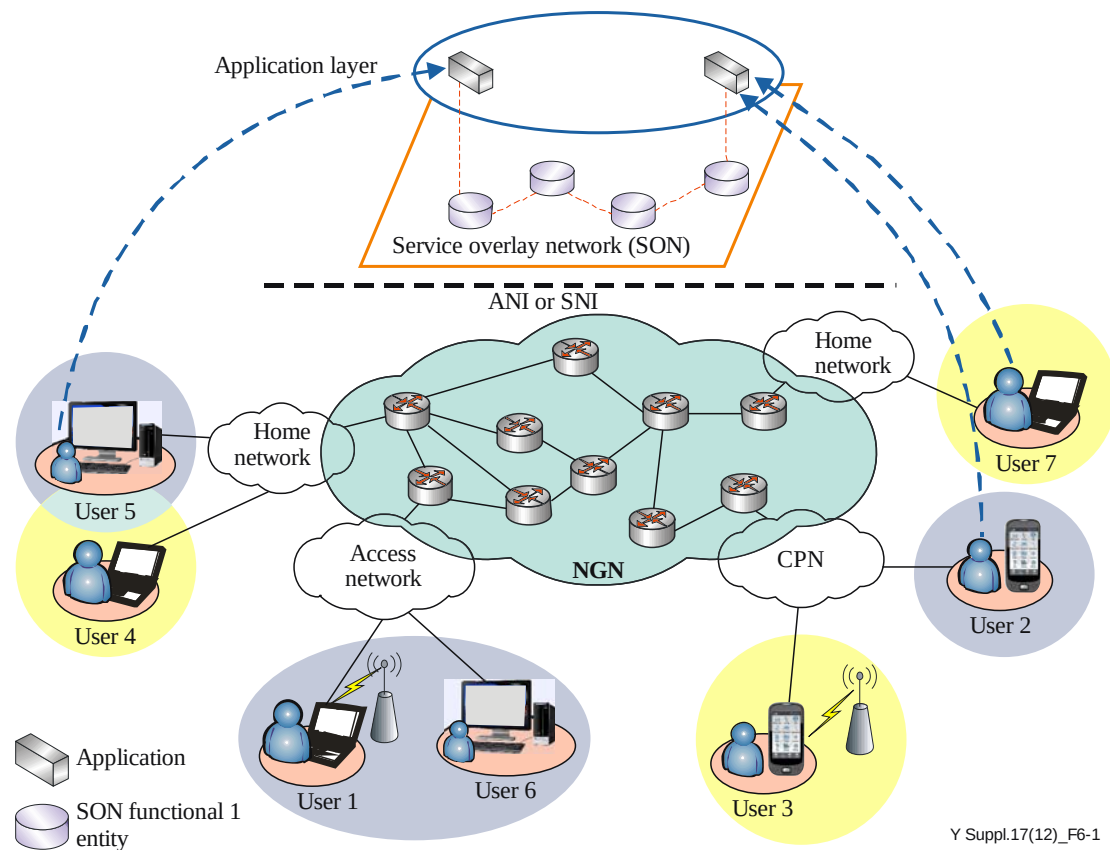


Figure 6-1 – General model of a SON using the NGN

6.1.1 SON relationship with NGN

SON aims to provide easy and quick deployment of service-specific logical networking functions, which can be used to complement the services that can be provided by transport networks. SON need not be constrained by the same technical and political hurdles that may have to be addressed by service providers. SON will also provide active service capabilities that can be used to establish services, modify established services easily, and provide improved and new emerging services.

SONs are expected to support control and management functions that can be used to deliver diverse application features in accordance with a user's request. SONs will also incorporate and support service-processing functions to harmonize and integrate application-related entities. The processing functions will allow enhancement of application service features, e.g., allowing creation and use of application-aware functions.

SON will provide the following:

- user-driven service networking: SON will accept and act upon user requests to create a specific logical service-oriented networking function to deliver user-driven service capabilities for a particular customer, a particular customer group or members of a group.
- context-aware service: SON will allow the provisioning of context-aware services by responding and adapting to the changes in the computing environment. For example, SON-supported context-aware services may react when the location of the user, or the capabilities of the device used, changes.
- service composition: SON will allow two or more service entities to compose and create new application features through the overlay networked service components.
- service personalization: SON will provide the means for retrieving the optimal variant of content (as a response to content requests) based primarily on (i) subscriber profiles including service preferences and end-device capabilities; (ii) content profiles; and (iii)

content provider policies. Examples of personalized services include virus scanning, content adaptation based on subscriber bandwidth and device capability, request and content filtering and localization services.

6.2 SON functional positioning

Service will be provided by SONs using one of the two functional positions of SON shown in Figure 6-2. Each SON deployment model uses the NGN and will have an interface as discussed below.

- SON associated with an application network interface (ANI): This deployment model will be used when SON interfaces with the NGN using the ANI.
- SON associated with a service node interface (SNI): This deployment model (used to interface the NGN using the SNI) will be used when SON relies on a service provider to provide certain functions and access the NGN via the SNI. In this deployment model, SON features will be provided via the SNI to users. This deployment configuration may include use of the existing Internet.

As shown in Figure 6-2, SON function is positioned at the application level, and it is associated with the service stratum of the NGN via the ANI interface or, when third party service providers are utilized, via the SNI.

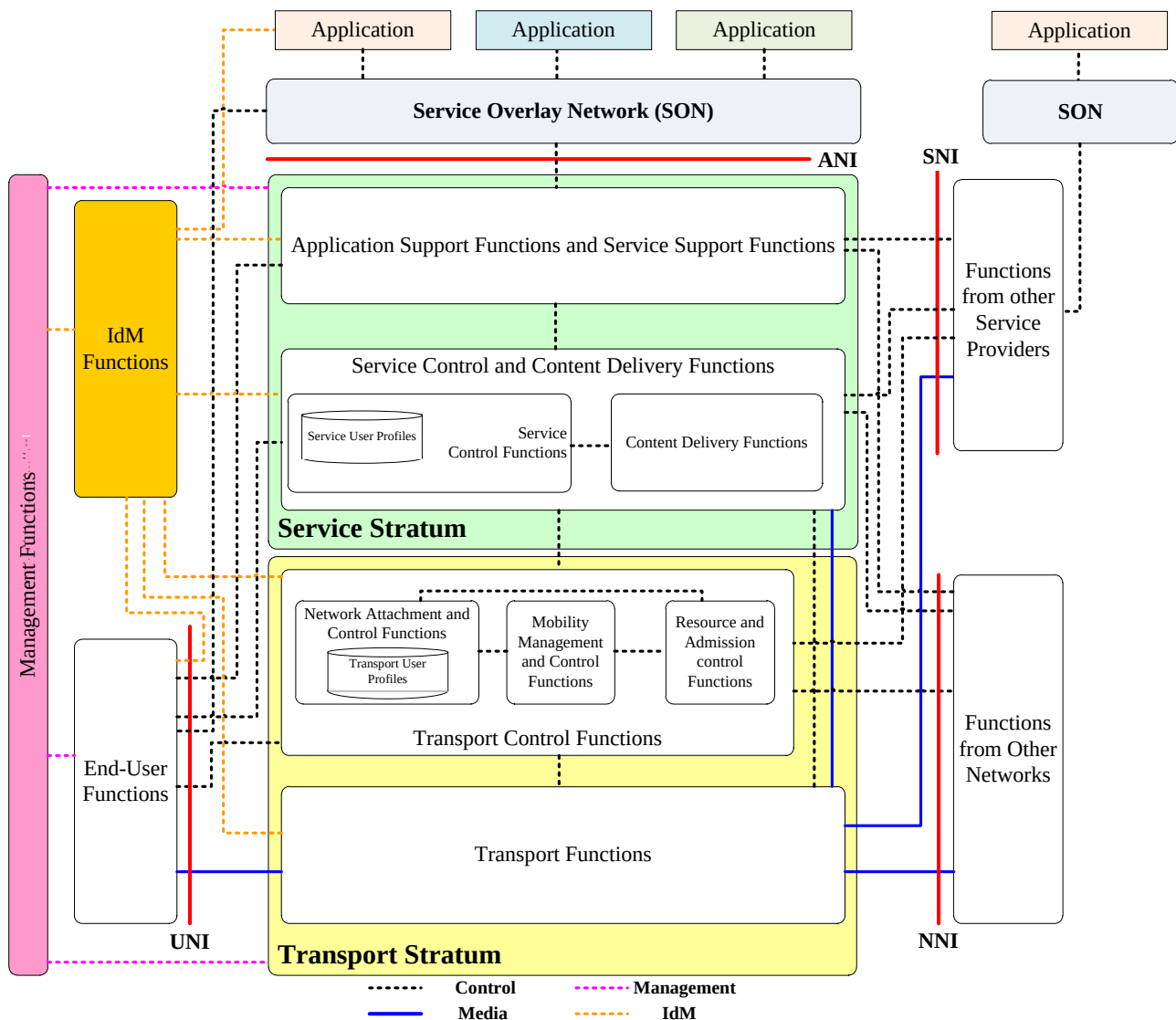


Figure 6-2 – Functional positioning of SON