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

Cloud Computing

Requirements for desktop as a service

Recommendation ITU-T Y.3503

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Recommendation ITU-T Y.3503

Requirements for desktop as a service

Summary

As one of cloud computing service categories, desktop as a service (DaaS) provides cloud service customers with desktop functions remotely delivered by cloud service providers. Recommendation ITU-T Y.3503 introduces the concept of DaaS, and describes general and functional requirements. To derive those requirements relevant use cases are also presented.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T Y.3503	2014-05-22	13	11.1002/1000/12167

Keywords

Desktop as a service, DaaS, virtual desktop, virtual desktop infrastructure.

* 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>.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

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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In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation ITU-T Y.3503

Requirements for desktop as a service

1 Scope

This Recommendation provides use cases, general requirements and functional requirements for desktop as a service (DaaS).

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 X.1601] Recommendation ITU-T X.1601 (2014), *Security framework for cloud computing*.
- [ITU-T Y.3501] Recommendation ITU-T Y.3501 (2013), *Cloud computing framework and high-level requirements*.
- [ITU-T Y.3510] Recommendation ITU-T Y.3510 (2013), *Cloud computing infrastructure requirements*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

- 3.1.1 cloud service customer** [ITU-T Y.3501]: A person or organization that consumes delivered cloud services within a contract with a cloud service provider.
- 3.1.2 cloud service provider** [ITU-T Y.3501]: An organization that provides and maintains delivered cloud services.
- 3.1.3 hypervisor** [ITU-T Y.3510]: A type of system software that allows multiple operating systems to share a single hardware host.
- 3.1.4 virtual machine** [b-DMTF OVF]: The complete environment that supports the execution of guest software.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

- 3.2.1 DaaS client**: A physical device and associated software running on the device that collectively enables a cloud service user to access desktop as a service (DaaS).
- 3.2.2 desktop as a service (DaaS)**: A cloud service category in which the capabilities provided to the cloud service customer are the ability to build, configure, manage, store, execute and deliver users' desktop functions remotely.
- 3.2.3 virtual desktop**: An environment for accessing end user's desktop functions remotely.

NOTE – Examples of end user's desktop functions can include desktop interface functions for applications, data access functions for multimedia data, and control functions for input/output (I/O) devices.

3.2.4 virtual desktop infrastructure (VDI): A desktop as a service (DaaS) solution enabling the hosting of a desktop operating system within a virtual machine.

NOTE – In this Recommendation, VDI means that the virtual machine hosting the desktop operation system is running in a cloud computing environment.

3.2.5 virtual desktop template: A representation of a set of system configuration and application parameters with an option of including customer personalization, and other desired attributes.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

3D	Three Dimensional
3G	Third Generation
CPU	Central Processing Unit
CSC	Cloud Service Customer
CSP	Cloud Service Provider
CRM	Customer Relationship Management
DaaS	Desktop as a Service
DCN	Data Communication Network
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DTLS	Datagram Transport Layer Security
ERP	Enterprise Resource Planning
FEC	Forward Error Correction
GPS	Global Positioning System
HD	High Definition
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IaaS	Infrastructure as a Service
I/O	Input/Output
IT	Information Technology
LAN	Local Area Network
OS	Operating System
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
QoE	Quality of Experience
RAM	Random Access Memory
SLA	Service Level Agreement

SSL	Secure Socket Layer
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
VDI	Virtual Desktop Infrastructure
VM	Virtual Machine
VPN	Virtual Private Network

5 Convention

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.

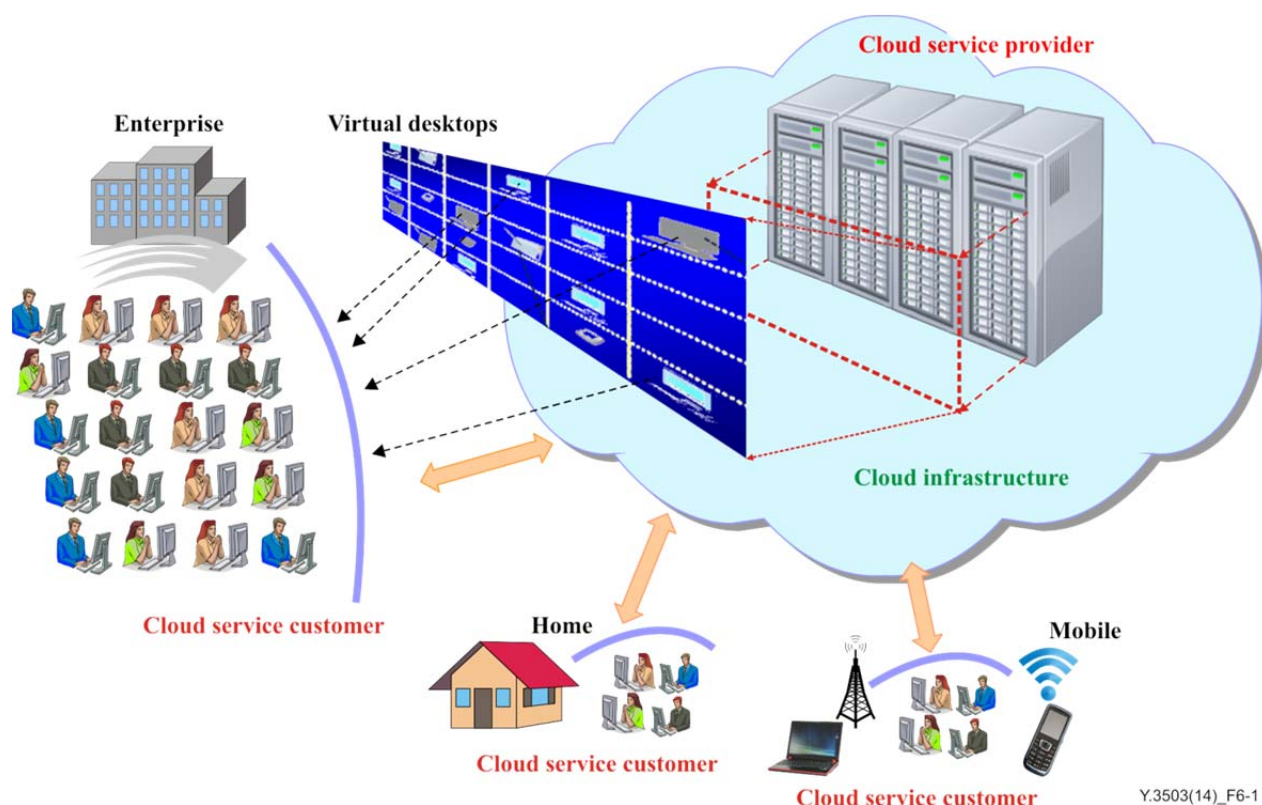
The keywords "**is recommended**" indicate a requirement which is recommended but which is not absolutely required. Thus this requirement need not be present to claim conformance.

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 the specification.

In the body of this Recommendation 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 Introduction to desktop as a service (DaaS)

DaaS is defined as a cloud service category in which the capabilities provided to the cloud service customer (CSC) are the ability to build, configure, manage, store, execute and deliver users' desktop functions remotely. With DaaS, the user experience is achieved through a user interface, which is presented on a DaaS client over the network. Figure 6-1 shows the conceptual view of DaaS.



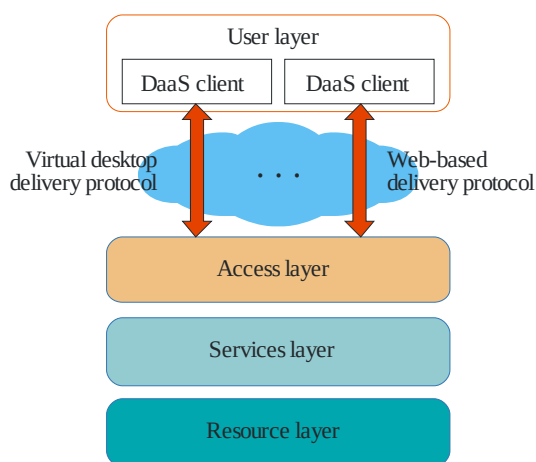
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Figure 6-1 – Conceptual view of DaaS

Instead of maintaining and running a desktop operating system and applications on CSC devices, servers of a cloud service provider (CSP) located in the cloud are used to execute the instances of users' virtual desktops. This allows a party (e.g., an organization) to run end user's operating systems and applications, and keep their data in the cloud computing environment.

Based on application streaming and virtualization technologies, CSCs can access the virtual desktop environment through cloud infrastructure.

A few technologies can be used for providing services of the DaaS like virtual desktop infrastructure (VDI) and web-based solutions with various delivery protocols such as the virtual desktop delivery protocol and the web-based delivery protocol shown in Figure 6-2.



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Figure 6-2 – DaaS delivery solutions

VDI supports the users' virtual desktop and recreates it in an environment hosted on a remote system. A virtual desktop is executed for each user from the server side. Users access this

environment remotely through DaaS clients, with all virtual desktop associated processing. A virtual desktop delivery protocol is used to deliver the virtual desktop.

In the web-based DaaS solution, a web-based server invokes application services from different servers and aggregates them to build a virtual desktop service. The web-based DaaS solution relies on cloud services provided through the use of web oriented technologies, i.e., based on the hypertext transfer protocol (HTTP), hypertext markup language (HTML) and the new features supported by HTML5 [b-W3C-HTML5].

6.1 Main advantages of DaaS

The main advantages of DaaS [b-ITU-T FGCC1] are:

- **Enhanced management and security:** Since all desktop applications actually run in a CSP server, they are more secure than if they were installed on each user's DaaS client since the CSP can focus more on security aspects.
- **Lower total cost of ownership:** By placing emphasis on the data centre rather than on individual user devices, DaaS promotes longer hardware life. Organizations or enterprises seeking to avoid additional costs can switch part of their information and communication technology infrastructure from capital expenditure to operating expenditure, as they now pay for virtual desktops. Also, decoupling the desktop operating system from the hardware permits the use of cost-effective user's devices.
- **Preservation of user experience:** DaaS allows for a rich user experience by enabling the possible choice among multiple operating systems and their customization. Conversely, shared service environments offer a user experience that may compromise between application compatibility and user customization.
- **Separation of CSP and CSC responsibilities:** DaaS allows separation between the responsibilities of the CSP and the CSC. The CSP is responsible for the infrastructure of virtual desktops delivery (i.e., servers, storage, virtualization software, etc.), while the virtual desktops (e.g., operating system (OS), application packaging, user profiles, etc.) is under the CSC responsibility.

6.2 General configuration for DaaS

Figure 6-3 shows the general configuration environment for DaaS logical components. The environment is based on a traditional client-server model and mainly consists of a DaaS client, a connection manager, a resource pool, a virtualization infrastructure and a virtual desktop delivery. Detailed interaction among these DaaS logical components are described in clause 6.3.

NOTE 1 – Relationship between DaaS logical components and the cloud computing reference architecture in [b-ITU-T FGCC2] is described in Appendix I. Further study of the DaaS architecture is needed to map the DaaS logical components to the cloud computing reference architecture.

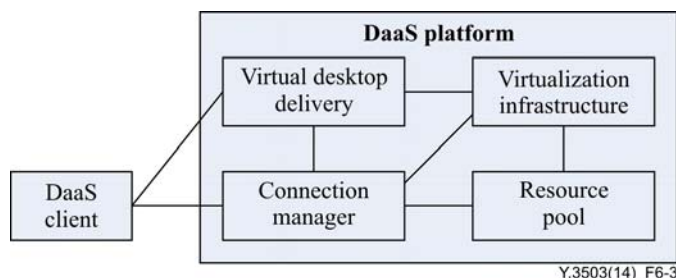


Figure 6-3 – General configuration for DaaS

The main logical DaaS components, shown in Figure 6-3, are as follows: