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**FG-NET2030 – Focus Group on Technologies for
Network 2030**

**Network 2030 - Terms and Definitions for
Network 2030**

ITU-T



Keywords: Network 2030, terms, definitions

Abstract: This document represents a glossary of terms helping to understand the Network 2030 use cases, requirements, challenges, and potential operation.

Summary

This document describes discussion results on terms and definitions for Network 2030, which discussed at ITU-T FG NET2030 meeting during 15 – 19 June 2020.

Even if the meeting reached consensus on several important terms and definitions, still much work needs to continue to harmonize and further development of terms and definitions.

FG agreed to provide this document to ITU-T SG13 for consideration and further work on terms and definitions for Network 2030. FG Members are invited to follow these studies in ITU-T SG13.

FG NET2030 Technical Specification

Network 2030 - Terms and Definitions for Network 2030

Summary

This document describes essential terms and their definitions for NET2030 to provide a general common understanding for NET2030 related documents.

Keywords

Network 2030, terms, definitions

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FG NET2030 Technical Specification

Network 2030 - Terms and Definitions for Network 2030

1 Scope

This technical specification represents a glossary of terms helping to understand the Network 2030 use cases, requirements, challenges, and potential operation. Document lists in particular the terms and definitions for Network 2030 used across the approved FG NET2030 Deliverables.

During the review of the Sub-Group contributions and documents, potential issues related to terminology and definitions have been identified and documented in Section 9 *For further study* of this document.

2 Acknowledgments

The document has been prepared with contributions from Daniel King, Mehdi Bezahaf, David Hutchison, Alex Galis, Chen Zhe, and Yingzhen Qu.

3 Reference

The following FG NET2030 deliverables were reviewed and terminology sections referenced in this document:

- 1) White Paper “[Network 2030 - A Blueprint of Technology, Applications and Market Drivers Towards the Year 2030 and Beyond](#)” (May 2019)
- 2) Deliverable “[New Services and Capabilities for Network 2030: Description, Technical Gap and Performance Target Analysis](#)” (October 2019)
- 3) Representative Use Case Deliverable “[Representative use cases and key network requirements for Network 2030](#)” (January 2020)
- 4) Technical Report “Additional representative use cases and network requirements for Network 2030” (June 2020), NET2030-O-040;
- 5) Technical Report “Gap Analysis of Network 2030 New Services, Capabilities and Use Cases” (June 2020), NET2030-O-039;
- 6) Technical Specification “Network 2030 Architecture Framework” (June 2020), NET2030-O-038-R1.

4 Introduction to Network 2030

This document has a section with the terms already in business, derived from the different FG Deliverables, and proposed for elaboration in the future.

Furthermore, the term “Network 2030” itself is defined as in “Network 2030 Architecture Framework”:

*“**Network 2030:** System, system components and associated aspects that relate to an integrated, highly automated, intelligent partitions of the infrastructures (including heterogeneous communication, compute, storage and network services/applications resources), which contain several operator operational domains in all network segments (wired/wireless access, core, edge, space or mixture of segments), that may be accessed by a user from one or more locations.”*

5 Conventions

None

6 Terms defined elsewhere

This clause lists the terms and definitions applicable to the Network 2030 architecture and infrastructure that were defined already in the source publications.

Term	Definition	Reference
Applications and Business Service Viewpoint	It focuses on the explain and justifying the role of applications and services with the user/tenant organization as well with the impact on the infrastructure.	ISO/IEC JTC1/SC21/WG7
Architectural viewpoints	They are a reflection of the viewpoints, initially identified in RM-ODP specification (ISO/IEC JTC1/SC21/WG7, titled "Reference Model of Open Distributed Processing" shorthand RM-ODP, dated 1997 SO-IEC JTC1/SC21/WG7 (www-cs.open.ac.uk/~m_newton/odyssey/RMODP.html))	ISO/IEC JTC1/SC21/WG7
Architecture	It is a plan for implementing non-functional and functional requirements within the system limits/boundaries. It is conceptual model that defines the structure, behavior, and a number of views (i.e. Physical Resources view, Logical & Functional View, Control view, Management View, Information View, Applications & Business View) of a system within the system limits.	ISO/IEC JTC1/SC21/WG7
Control plane	The set of functions that controls the operation of entities in the stratum or layer under consideration, plus the functions required to support this control.	ITU-T Y.2011
Data plane	The set of functions used to transfer data in the stratum or layer under consideration.	ITU-T Y.2011
Domain	An administrative domain is a collection of systems and networks operated by a single organization or administrative authority. Infrastructure domain is an administrative domain that provides virtualized infrastructure resources such as compute, network, and storage or a composition of those resources via a service abstraction to another administrative domain and is responsible for the management and orchestration of these resources.	ETSI NFV MANO
Functional entity	An entity that comprises an indivisible set of specific capabilities. Functional entities are logical concepts, while groupings of functional entities are used to describe practical, physical implementations.	ITU-T Y.2012
IMT-2020 or Network 2030 Planes	A plane is a subdivision of the specification of a complete IMT-2020 or Network 2030 systems, established to bring together those particular pieces of information relevant to some particular area of concern during the analysis or design of the system. Although separately specified, the planes are not completely independent; key items in each are identified as related to items in the other planes. Each plane substantially uses foundational concepts. However, the planes are sufficiently independent to simplify reasoning about the complete system specification. Examples are data plane, control plane, management plane, service plane, intent plane, information and knowledge plane, user plane.	ITU-T IMT 2020, Y.3100
Infrastructure information Viewpoint	It focuses on models and frameworks to present the information requirements and control information of a system. It would show how information is partitioned across logical boundaries and the required quality attributes of information.	ISO/IEC JTC1/SC21/WG7
Key Performance Indicators (KPIs)	Performance indicator is describing the degree of performance of a system according to certain predefined metrics. It defines a set of values against which to measure network functions and/or network operations.	ITU-T Y.4900/L.1600

Term	Definition	Reference
Key Performance Indicators (KPIs)	Performance indicator is describing the degree of performance of a system according to certain predefined metrics. It defines a set of values against which to measure network functions and/or network operations.	ITU-T Y.4900/L.1600s
Logical & Functional Viewpoint	It focuses on the models, mechanisms and frameworks for describing the operations and functions/ virtual functions of a system in an implementation independent way. It includes the operations on information and on the control of information for e2e operations, including information transfer, retrieval, transformation, adaptation and methods necessary to automate the infrastructure processing.	ISO/IEC JTC1/SC21/WG7
Logical resource	An independently manageable partition of a physical resource, which inherits the same characteristics as the physical resource and whose capability is bound to the capability of the physical resource. NOTE – "independently" means mutual exclusiveness among multiple partitions at the same level.	ITU-T Y.3011
Management Functions	The functions or operations related to the management of the network functions and resources. NOTE -Overall coordination and adaptation for configuration and event reporting are achieved between network function infrastructure and network management systems. It includes the collection and forwarding of performance measurements and events. Network function lifecycle management is included with network function instance management. The network management system is authorized to exercise control over and /or collect management information from another system. It is tightly connected with BSS/OSS such that the most efficient and effective way to access, control, deploy, schedule and bind resources is chosen as requested by customers.	ITU-T IMT-0-040, Y.3100
Management plane	The set of functions used to manage entities in the stratum or layer under consideration, plus the functions required to support this management.	ITU-T Y.2011
Network function	A processing function in a network. It includes but is not limited to network nodes functionality, e.g. session management, mobility management, switching, routing functions, which has defined functional behavior and interfaces. Network functions can be implemented as a network node on a dedicated hardware or as a virtualized software function.	ITU-T IMT-0-043, Y.3100
Network function virtualization (NFV)	It is separating network functions from the hardware they run on by using virtual hardware abstraction.	ETSI
Network Management and Operation	Enables the creation, operation, and control of dedicated management functions operating on top of a Network 2030 E2E infrastructure. The collection of resources and their associated KPIs responsible for managing the overall operation of individual network devices.	ITU-T IMT-0-047, Y.3100
Network Orchestration	An automated arrangement, governing, coordination of complex network systems and functions including middleware for both physical and virtual infrastructures. It is often discussed as having an inherent intelligence or even implicitly autonomic control. Orchestration results in automation with control network systems.	ITU-T IMT-0-040, Y.3100
Network slice	A complete end-to-end logically partitioned network providing dedicated telecommunication services and network capabilities. The behavior of the network slice is realized via network slice instance(s).	ITU-T IMT-0-043, Y.3100
Network softwarization	Network softwarization is an overall transformation trend for designing, implementing, deploying, managing and maintaining network equipment and network components by software programming, exploiting characteristics of software such as flexibility and rapidity of design, development and deployment throughout the lifecycle of network equipment and components, for creating conditions that enable the re-design of network and services architectures; allow optimization of costs and processes; and enable self-management.	ITU-T O-016, Y.3111
Network virtualization	A technology that enables the creation of logically isolated network partitions over shared physical networks so that heterogeneous collection of multiple virtual networks can simultaneously coexist over the shared networks. This	ITU-T Y.3011

Term	Definition	Reference
	includes the aggregation of multiple resources in a provider and appearing as a single resource.	
Physical Resource Viewpoint	It focuses on the models, devices, technical artefacts (realized components) and frameworks from which a system is build and as such it is describing the way to support all viewpoints, including the definition of physical distributions to realize different partitions identifies in the logical and functional viewpoint.	ISO/IEC JTC1/SC21/WG7
RCS	Rich Communication Services. A term used by GSMA to define and group advanced communication services including voice/video call, chat & messaging, picture sharing, etc.	GSMA
RCS	Rich Communication Services. A term used by GSMA to define and group advanced communication services including voice/video call, chat & messaging, picture sharing etc	GSMA
Software-defined networking	A set of techniques that enables to directly program, orchestrate, control and manage network resources, which facilitates the design, delivery and operation of network services in a dynamic and scalable manner.	ITU-T Y.3030
Software-defined networking	A set of techniques that enables to directly program, orchestrate, control and manage network resources, which facilitates the design, delivery and operation of network services in a dynamic and scalable manner.	ITU-T Y.3300
System boundaries / limits	They define the constraints and freedoms in controlling the system. Limits can be determined by analyzing how the behavior of the system depends on the parameters that drive the system. Some limits would lead to unexpected and significant behavior changes of the system, for example the unpredictable boundaries or changes in the scale of magnitude. Some other limits are determined by non-common behavior interactions between the components of a system.	ISO/IEC JTC1/SC21/WG7
System Management Viewpoint	It focuses on the models, artefacts and frameworks describing the ways to manage, control and life cycle changes methods of all elements in the other viewpoints at the required management attributes and key performance indicators (KPIs). Note - The description of Network 2030 could be structured as a set of projections of the architecture onto models and specific artefacts representing these 5 viewpoints.	ISO/IEC JTC1/SC21/WG7
User plane	A synonym for the data plane. NOTE – "User plane" is also referred to as the "transport plane" in other ITU-T Recommendations.	ITU-T Y.2011
Virtual resource	An abstraction of physical or logical resource, which may have different characteristics from the physical or logical resource and whose capability may be not bound to the capability of the physical or logical resource.	ITU-T Y.3011
Virtualized Network Function	A network function whose functional software is decoupled from hardware and runs on a virtual machine(s).	ITU-T Y.3321

7 Terms defined by FG NET2030 technical specifications

Term	Definition	Source reference
Access Network	Access network is last mile connectivity to the consumer device. Access network may be Mobile Radio, copper, fibre, satellite or terrestrial floating network	Generic Term used in the FG NET2030 deliverables
Accessibility	It represents the degree to which a system, device, service, or environment is available to as many people as possible. Accessibility can be viewed as the "ability to access" and benefit from some system or entity.	Network 2030 Architecture Framework
Architecture Principle	A principle is a rule that governs how something is to be done; in the case of network infrastructure architecture, principles are used as a basis for the design and operation of the system. Each principle will apply to a particular set of viewpoints on the architecture. It is an instruction that has to be followed or is an inevitable consequence the way that a system is constructed. From the user point of view the principles of a system are understood as the essential characteristics of the system, and/or reflecting system's purpose, and/or the effective operation, and /or use of which would be impossible if any one of the principles was to be ignored. Examples of use of principles are a) a system may be explicitly based on and implemented from principles; b) systems can be measured /compared / evaluated based on a set of principles; c) systems values that are underling behavior & operations.	Network 2030 Architecture Framework
Availability	It represents the degree to which a system is in a specified operable and committable state at the start of a task. It is the proportion of time a system is ready for use.	Network 2030 Architecture Framework
Backhaul	Backhaul may be considered has hand off layer between access and transport/core network. Specific properties associated with access layer and Edge network of FG NET2030 is studied in this section.	Network 2030 Architecture Framework
Burst Forwarding	The burst forwarding is an application-aware data forwarding technology. A burst is the basic data unit that can be processed by the application. The content of the burst is application dependent. For example, a burst can be a photo in the image processing system, or it can be a video clip in the video streaming service. The burst forwarding network uses burst as the basic transmission unit. The data source sends the entire burst using the line rate of the network interface card.	Network 2030 Architecture Framework
Cell site management & operations	Cell sites are integral part of network access layer. These may fall under edge design or next to edge design under various relevant use case designs. Considerations related to cell site design and applicable Management & operations functions is considered here.	Network 2030 Architecture Framework
Cell site management & operations	Cell sites are integral part of network access layer. These may fall under edge design or next to edge design under various relevant use case designs. Considerations related to cell site design and applicable Management & operations functions is considered here.	Network 2030 Architecture Framework
Certification	It refers to the confirmation of certain characteristics of an object, element of system. This confirmation is often, but not always, provided by some form of external review, assessment, or audit.	Network 2030 Architecture Framework
Cloud Operator	An entity that is responsible for making applications available to users. It can be public or private.	Network 2030 Architecture Framework
Compliance	It represents the conformance to a rule, such as a specification, policy, standard or regulation.	Network 2030 Architecture Framework

Term	Definition	Source reference
Configuration	It is a function establishing and maintaining consistency of a system and/or its performance. It is changing system's functional and physical attributes with its non-functional requirements, design, and operational information throughout its life.	Network 2030 Architecture Framework
Connectivity Operator	An intermediary that provides connectivity between Cloud Operators, Connectivity Operators, and users. In case of Internet, the Connectivity Operator is a public network provider.	Network 2030 Architecture Framework
Consumer Device	Consumer Device is a generic term used in Network 2030 Architecture Framework that implies any device that consumes service offered by communication network either in autonomous fashion or as a human operated/controlled function. Examples include 3GPP Mobile Terminals (MT), IoT/MTC device, Autonomous Sensors/Controllers, Space communication terminals, Broadband Forum Network Terminators (NT) or Home gateway, Customer Edge router, Cable STB, CPE, Satellite phones or any such future emerging device	Network 2030 Architecture Framework
Consumer Device Interworking	Consumer device inter-working refers to peer to peer communication as direct communication channel or through access/edge network segment of communication network	Network 2030 Architecture Framework
Controller (SDN architecture-based)	The satellite network system may also employ hierarchical architecture. So, some of the satellite not only play the role of router but also controller. Refer to SDN, the MEO and GEO may stand higher layer and control the low layer devices (LEO) which are expected to take the role of data forwarding in the data plane.	Network 2030 Architecture Framework
Controller Layer	Controller layer hosts all controller applicable at Access and Edge layer to provide unified controller capability to underlying network. Controller can be network domain specific (e.g. SDN Controller, RAN Controller), network infrastructure specific (e.g. Slice Controller) or service specific (e.g. service quality controller).	Network 2030 Architecture Framework
Data Network	Data Network that is used in generic form to connect two networks or a network with some application function	Network 2030 Architecture Framework
Data Privacy	Restricting the distribution of data to only authorized parties.	Network 2030 Architecture Framework
DN	Data Network that is used in generic form to connect two networks or a network with some application function	Network 2030 Architecture Framework
Edge Computing	Various form of data and network layer analytics will be required to support use-cases requiring real-time decision making and management of data flow in intelligent fashion. This study may help in envisioning the requirements in the area of edge computing and analytics. Edge Computing may be at Mobile edge in the form of Mobile Edge Computing either at RAN or Fronthaul or mid-haul or backhaul or at the edge of enterprise/customer network. Edge computing nodes come with its own capabilities required to store processing data, compute or execute some algorithm and communication setup to interact with rest of the network.	Network 2030 Architecture Framework
Edge Interworking	Edge interworking refers to Edge to Edge communication between communication service provider networks or between Industry vertical solution and communication service provider networks	Network 2030 Architecture Framework
Edge Network	Edge network is typically considered segment of the network after access network and before aggregation point in core network. But it is not strictly fixed. A SP or E/AO can shift the edge contour to very close to customer device e.g. collocated with gNodeB or can have at some distance. Sometime it depends upon the type of network operator or industry vertical solution provider as well. Another view is the point of demarcation between one operator or SP to another operator or SP or enterprise.	Generic Term used in FG NET2030 deliverables

Term	Definition	Source reference
Fault Tolerance	It is the property that enables a system to continue operating properly in the event of the failure of (or one or more faults within) some of its components.	Network 2030 Architecture Framework
Fixed Access Network	Fixed access network enabling use cases for future society through fixed wireless or fixed copper/fiber are considered over here	Network 2030 Architecture Framework
Fixed Access Network	Fixed access network enabling use cases for future society through fixed wireless or fixed copper/fiber are considered over here	Network 2030 Architecture Framework
Fronthaul	Fronthaul may have multiple design options based on operating scenario, use case and network properties. Fronthaul design requires due consideration for access network enablement in Future network.	Network 2030 Architecture Framework
Fronthaul	Fronthaul may have multiple design options based on operating scenario, use case and network properties. Fronthaul design requires due consideration for access network enablement in Future network.	Network 2030 Architecture Framework
Functional Requirement	It is a description of what a system/infrastructure is supposed to do and it defines a function, or a feature of a system, or its components, capable of solving a certain problem or replying to a certain need/request. The set of functional requirements present a complete description of how a specific system will function, capturing every aspect of how it should work before it is built, including information handling, computation handling, storage handling and connectivity handling. The use of Functional and Non-functional Requirements include a) explanation on what has to be done by identifying the necessary integration of systems structure and systems behavior; b) Verification as implementation of the requirements can be determined through basic possible methods: inspection, demonstration, test or analysis.	Network 2030 Architecture Framework
Ground Station and Terminal	Ground station and terminals are a type of physical terrestrial devices that act as gateway or interfaces between terrestrial and space networks through radio communications. At present, the networking mechanisms and protocols used in space networks are different from that in the traditional IP framework in the terrestrial infrastructures, and hence ground stations and terminals have been responsible for protocol translations and creation/maintenance of tunnels in order for data packets to traverse different network environments.	Network 2030 Architecture Framework
High-Precision Network Services	Network services that support stringent service level objectives at very high precision that is explicitly specified, such as in-time and on-time latency guarantees.	ITU-T FG NET-2030 SubG2 Deliverable on Services
Integrability	It represents the process of bringing together the component sub-systems into one system (an aggregation of subsystems cooperating so that the system is able to deliver the overarching functionality) and ensuring that the subsystems function together as a system. Integrability is based on a dynamic interaction between groups subsystems and in all parts of the system.	Network 2030 Architecture Framework
Interoperability	It represents the ability of diverse systems and subsystems to work together (inter-operate). It is also a characteristic of a system, whose interfaces are completely understood, to work with other systems, present or future, without any restricted access or implementation.	Network 2030 Architecture Framework
In-Time Service	In-time Services are services where packets need to be delivered within maximum latency allowed for packet delivery. Packets may be delivered at any time before or until the maximum latency. Multimedia applications supporting buffering capabilities are typical applications that use in-time services.	IMT2030 Sub Group 2 document on Services
Network 2030	System, system components and associated aspects that relate to an integrated, highly automated, intelligent partitions of the infrastructures (including heterogeneous communication, compute, storage and network services/applications resources), which contain a number of operator operational domains in all network segments (wired/wireless access, core, edge,	Network 2030 Architecture Framework.

Term	Definition	Source reference
	space or mixture of segments), that may be accessed by a user from one or more locations.	
Layer and/or plane	It is an approach of hiding the design and/or implementation details of a particular set of network functions.	Network 2030 Architecture Framework
Maintainability	It is a characteristic of design and installation, expressed as the probability that an element of a system will be retained in or restored to a specified condition within a given period of time, when the maintenance is performed in accordance with prescribed procedures and resources.	Network 2030 Architecture Framework
Midhaul	It is network segment between fronthaul and backhaul.	Network 2030 Architecture Framework Many vendors also refer to this word.
Midhaul	There may be need for deviation in design to put some network function & associated compute capability in the middle of Fronthaul and backhaul. Any such design aspect is provided due consideration over here.	Network 2030 Architecture Framework
Mobile Edge Computing (MEC) server	MEC has been a terminology mainly in the context of 5G where local computing and storage capabilities can be embedded at the mobile network edge in order to provide low latency data/computing services to locally attached end users. It can be envisaged that in future emerging space and terrestrial networks, LEO satellites can also become MEC servers in constellation in the space once equipped with computing and data storage capabilities.	Network 2030 Architecture Framework
Network2030	System, system components and associated aspects that relate to an integrated, highly automated, intelligent partitions of the infrastructures (including heterogeneous communication, compute, storage and network services/applications resources), which contain a number of operator operational domains in all network segments (wired/wireless access, core, edge, space or mixture of segments), that may be accessed by a user from one or more locations.	Network 2030 Architecture Framework
Network Devices	They are network capable endpoints that may include a) core devices - node, gateways, routers, network bridges, modems, wireless access points, networking cables, line drivers, switches, hubs, and repeaters; b) hybrid devices - multilayer switches, protocol converters, bridge routers, proxy servers, firewalls, network address translators, multiplexers, network interface controllers, wireless network interface controllers, ISDN terminal adapters; c) frontier devices - proxy server, firewall, network address translation; d) end devices - network interface controller, modem, wireless network interface controller, ISDN terminal adapter, line driver; e) data center devices - file servers, database servers and storage areas; f) network services (i.e. DNS, DHCP, email, etc.); g) content delivery devices which assure content distribution and h) other related hardware or software devices.	Network 2030 Architecture Framework
Network Function	Network function of a device or of a control system component is a mathematical function or a logical action, which theoretically models the device's output for each possible input. It is a functional block within a network infrastructure or a device that has well-defined external interfaces and well-defined functional behavior.	Network 2030 Architecture Framework
Network Host	It is a computer connected to a network. A host may work as a server offering information resources, services, and applications to users or other nodes on the network. Hosts are assigned at least one network address. A computer participating in networks that use the Internet protocol suite may also be called an IP host.	Network 2030 Architecture Framework
Network Service / Application	It represents a composition of Network Function(s) and/or other Network Service(s), defined by a functional and behavioral specification. Network service behavior refers to any set of network actions performed by a provider (person or system) in fulfilment of a request, which occurs through the network (i.e. by exploiting communication, compute and storage mechanisms) with the	Network 2030 Architecture Framework

Term	Definition	Source reference
	<p>aim of creating and/or providing value or benefits to the requester(s). The Network Service behavior is characterized by at least some of its non-functional requirements (i.e. performance, manageability, dependability and security specifications). The end-to-end network service behavior is the result of the combination of the individual network function behaviors as well as the behaviors of the network infrastructure composition mechanism. Network Service deployment descriptors include service topology, service characteristics such as SLAs and any other artefacts necessary for the Network Service on-boarding and lifecycle management of its instances. Examples of Network 2030 Network services are (a) Precision Services, which are network services with strict guarantee for 1) performance, 2) low-to-medium latency requirements, 3) ultra-reliable QoS set of characteristics and 4) assurance loops; b) Holographic and Holoport Communications, which are network services combining immersive conferencing with on - demand network functions and ultra-reliable communications and high bandwidth characteristics; c) Low Latency Management, Control and Analytics Network Services for robots, cars and large scale multi-access edge cloud environments.</p>	
Network Slice	<p>It can be defined as a set of infrastructures (network, cloud, data center) components/network functions, infrastructure resources (i.e., connectivity, compute, and storage manageable resources) and service functions that have attributes specifically designed to meet the needs of an industry vertical or a service. As such a Network Slice is a managed group of subsets of resources, network functions/network virtual functions at the data, control, management/orchestration, and service planes at any given time. The behavior of the Network Slice is realized via network slice instances (i.e., activated slices, dynamically and non-disruptively re-provisioned). Network Slices considerably transform the networking perspective by abstracting, isolating, orchestrating, softwarizing, and separating logical network components from the underlying physical network resources and as such they are inter-twined to enhance Internet architecture principles.</p>	Network 2030 Architecture Framework
Network Slicing (NS)	<p>It is an end-to-end concept covering all network and cloud network segments (access, core, transport, edge). It enables the concurrent deployment of multiple logical, self-contained and independent shared or partitioned network resources and a group of network and service functions on a common infrastructure platform. Network Slicing is a management mechanism that a resource provider can use to allocate dedicated partition infrastructure resources and service functions to users.</p>	Network 2030 Architecture Framework
Network Orchestration	<p>An automated arrangement, governing, coordination of complex network systems and functions including middleware for both physical and virtual infrastructures. It is often discussed as having an inherent intelligence or even implicitly autonomic control. Orchestration results in automation with control network systems.</p>	
Non-functional Requirement	<p>It is a specification criterion that can be used to judge the operation of a system/infrastructure, rather than specific behaviors; it is a description of how well a system performs its functions; it represents an attribute that a specific system must have. The non-functional requirements are controlled by other aspects of the system. Examples of non-functional requirements are accessibility, availability, certification, consistency, compliance, determinism, extensibility, fault tolerance, integrability, interoperability, maintainability, operability, performance, privacy, resilience, reliability, robustness, scalability, security.</p>	Network 2030 Architecture Framework
On-Time Services	<p>On-time Services are services that ensure the arrival of packets within a specific time window. On-time services need packet delivery within maximum and minimum limit of latency. A packet must be delivered no later than upper bound of the time window, but also no earlier than the lower bound of the time window</p>	NET2030 Sub Group 2 document on Services
Operability	<p>It is the ability to keep a system in a safe and reliable functioning condition, according to pre-defined operational requirements. It is the ability of system components to work together to accomplish a common task such as startup, running, decommission of components part of network life-cycles network stages.</p>	Network 2030 Architecture Framework

Term	Definition	Source reference
Path-aware networking (PAN)	The sender of a packet obtains information on the network path the packet will follow to reach the destination. The network path information can be at different granularities, for instance at the AS level. The information can be obtained at the moment the packet is sent, for instance by embedding the network path in the packet header.	Network 2030 Architecture Framework
Performance	It describes the degree of execution of a system (according to certain predefined metrics, e.g. convergence time).	Network 2030 Architecture Framework
Privacy	It is the ability of system or actor to seclude itself or information about itself and thereby reveal itself selectively.	Network 2030 Architecture Framework
QoS	Quality of Service is used to describe various functions in different contexts. QoS is used for the functionality that is most often referred to as QoS in the context of transport, networking or data-link layers: switch/router forwarding-plane functions that impact the absolute or differential drop behaviour, throughput and latency of individual packets and packet flows under uncongested or congested traffic load as well as the required control and management plane functions to support these forwarding-plane functions.	Network 2030 Architecture Framework
Radio Access Network	Future network is expected to use heterogeneous wireless link layer to support multiple technologies & use cases. These aspects are considered under this section	Network 2030 Architecture Framework
Radio Access Network	Future network is expected to use heterogeneous wireless link layer to support multiple technologies & use cases. These aspects are considered under this section	Network 2030 Architecture Framework
Reliability	It is the proportion of time a system will continue to function properly while it is being used. Specifications for reliability typically refer to stability, availability, accuracy, and maximum acceptable/tolerable bugs.	Network 2030 Architecture Framework
Resilience	It is the ability to provide and maintain an acceptable level of system operations in the face of faults and challenges to normal operations.	Network 2030 Architecture Framework
Robustness	It is the ability of a system to cope with errors during execution or the ability of a system to continue to operate despite abnormalities in input or in environment context.	Network 2030 Architecture Framework
Satellite Low Earth Orbit (LEO)	Satellite has lower physical orbit which potentially bring the short latency benefit. Medium Earth Orbit (MEO) and Geostationary Orbit (GEO) can provide more physical stability. The current satellite system mostly provides relay function however in the future the satellite system may build up a mesh-like network then provide routing and forwarding function. The LEO should be organized as routing system and work as router. The MEO and GEO may also play the role of router but work as complement and control function further.	Network 2030 Architecture Framework
Scalability	It is the capability of a system, or a process to handle a growing amount of work, or its potential to be enlarged to accommodate that growth.	Network 2030 Architecture Framework
Security	It is freedom from, or resilience against, potential harm (or other unwanted coercive change) caused by other systems. It uses protection mechanisms (e.g. mechanisms for controlling access of programs, processes, or users to resources) to prevent misuse of resources. Misuse defined with respect to policy a) preventing exposure of certain sensitive information, b) preventing unauthorized modification/deletion of data and c) need to consider external operational environment.	Network 2030 Architecture Framework
Service Provider	An entity that is responsible for the creation, delivery and billing of services, and negotiates relationships among Cloud Operators, Connectivity Operators, Space Operators, and Users. It is the single point of contact for the user.	Network 2030 Architecture Framework

Term	Definition	Source reference
Space Operator	An Operator that may provide connectivity as well applications in the space.	Network 2030 Architecture Framework
System Design	It is a plan for implementing functional requirements.	Network 2030 Architecture Framework

8 Abbreviations and Acronyms used in FG NET2030

The following list represents a full list of abbreviations and acronyms used in NET2030 documentation.

Term	Definition	Reference
AAA	Authentication, Authorization, and Accounting	Arch.
ABF	Application-aware data Burst Forwarding	UC & Req.
BSS	Business Support Systems	Arch.
Caps	(Network 2030) Capabilities	Gap, C & UC.
CERN	Conseil Européen pour la Recherche Nucléaire	UC & Req.
CO	Compound Services	Gap, C & UC.
CSAI	Connectivity and Sharing of pervasively distributed AI	UC & Req.
DL	Deep Learning	Gap, C & UC.
DN	Data Network	Arch.
DT	Digital Twin	Gap, C & UC.
EDR	Emergency and Disaster Rescue	UC & Req.
ENNI	External Network Network Interface	Arch.
FAST	Five-hundred-meter Aperture Spherical radio Telescope	UC & Req.
FO	Foundational services	Gap, C & UC.
GTP	GPRS Tunnelling Protocol	Gap, C & UC.
HSD	Huge Scientific Data applications	UC & Req.
HTC	Holographic Type Communications	Gap, C & UC.
HTCS	Holographic Type Communication services	Gap, C & UC.
ICT	Information and Communications Technology	UC & Req.
IIoT	Industrial IoT cloudified	Gap, C & UC.
LHC	Large Hadron Collider	UC & Req.
MEC	Multi-access Edge Computing	Arch.
MSIC	Mass Service of Individualized Control	UC & Req.
MTU	Maximum Transmission Unit	UC & Req.
NIC	Network Interface Card	UC & Req.
OSS	Operations Support Systems	Arch.
PCN	Public Communication Networks	UC & Req.
QoS	Quality of Service	UC & Req.
RCS	Rich Communication Services	Arch.
SC	Service Capabilities	Gap, C & UC.
SIoT	Socialized Internet of Things	UC & Req.
SKA	Square Kilometer Array	UC & Req.
STIN	Space-Terrestrial Integrated Network	UC & Req.

Term	Definition	Reference
TDMA	Time Division Multiple Access	UC & Req.
TIRO	Tactile Internet and Remote Operations	Gap, C & UC.
UAV	Unmanned Aerial Vehicle	UC & Req.
UCC	Use case Clustering	Gap, C & UC.
UNI	User-Network Interface	Arch.
VLBI	Very Long Baseline Interferometry	UC & Req.
WRR	Weighted Round Robin	UC & Req.

9 Items for further study

FG identified the following open items for further discussion and elaboration of definition:

Term/abbreviation	Proposed Definition	Exists as ITU Terms and Definitions
Agile Lifecycle		No
Application Burst Forwarding		No
BDF	Baseband Distribution Frame	Yes
BIER	Bit Indexed Explicit Replication	No
Compound (CO) Services		No
COOR		No
Deterministic Networking		No
Digital Twin		No
Foundational (FO) Services		No
Haptic Communication		
High Precision Services		
High Programmability		
Holographic Type Communication		
Homomorphic Encryption		
HPC		
HSD		
Huge Scientific Data		
Industrial IoT cloudified		

Term/abbreviation	Proposed Definition	Exists as ITU Terms and Definitions
Intelligent Operations of Networks		
Intent		
LLS		
ManyNets		
MGM		
MPTCP		
Network Compute Convergence		
Network Service Interfaces		
NFV		
NSI		
OTT		
PIM		
PRG		
PRIV		
QUAL		
QUIC		
RES		
RTT		
SCTP		
SDN		
SEC		
Service Level Aware		
Social IoT		
STIN	Space-Terrestrial Integrated Network	
TAC		
TIRO	Tactile Internet and Remote Operations	
Telemetry		
Time-Sensitive Networking		
VDS		
VLV		

Bibliography

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