OAV Terminology

Terminology and Glossary

During our discussions with NRENs and at workshops it became clear that there are OAV terms that are being used in different ways and in some cases with slightly different meaning and understanding. So in order to have a common basis we decided to identify a list of relevant OAV terms and add a short definition with a reference link (source) for each term as well as an acronym table with definitions of abbreviations. We tried to use standard-based definitions whenever we could find them and listed internal definitions in cases where no standard definitions were found.

Internal definitions are based on the consensus of all team members; to come to an agreed definition of all team members a terminology document was created with descriptions of the terms and an internal survey was conducted for final adjustments. Additional comments are welcome!

OAV Common Terms

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Glossary

OAV Terms	Definition and reference
AIOps	*AIOps is (the usage of) Artificial Intelligence for IT Operations. It combines big data and machine learning to automate IT operations processes, including event correlation, anomaly detection and causality determination.* - https://www.gartner.com/en/information-technology/glossary/aiops-artificial-intelligence-operations
AI-powered Virtual Agent (AIVA)	*An AI-powered Virtual Agent is an animated virtual character, more complex than a chatbot, that makes use of technologies like machine learning and natural language processing (NLP). This allows it to actively participate in a conversation, acting more like a human.* - **Reference(s)**: based on https://www.ringcentral.com/virtual-agent.html and TM Forum AI Fundamentals course [TMF_AIF] and TM Forum "AI and its pivotal role in transforming operations" report and webinar [TMF_AI]
API (Application Programming Interface)	*An API is a set of commands, functions, protocols, and objects that programmers can use to create software or interact with an external system. Any data can be shared with an application program interface.* - based on https://techterms.com/definition/api and https://searchapparchitecture.techtarget.com/definition/appli cation-program-interface-API
Architecture component	*An architecture component is a nontrivial, nearly independent, and replaceable part of a system that fulfills a clear function in the context of a well-defined architecture.* - TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019
Architecture principles	*Architecture principles define the underlying general rules and guidelines for the use and deployment of all IT resources and assets across the organisation. They reflect a level of consensus among the various elements of the enterprise, and form the basis for making future IT decisions.* - based on https://pubs.opengroup.org/architecture/togaf8-doc/arch/chap29.html

Artificial intelligence	**Artificial intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. It is the system's ability to correctly interpret external data, to learn from such data, and to use that learning to achieve specific goals and tasks through flexible adaptation.** • based on https://www.britannica.com/technology/artificial-intelligence and Kaplan, A., & Haenlein, M. "Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence". *Business Horizons*. 2019; 62:15–25 (https://www.sciencedirect.com/science/article/abs/pii/S0007681318301393)
Automated service provisioning	**Automated service provisioning is the ability to deploy an information technology or telecommunications service by using pre-dened procedures that are carried out electronically without requiring human intervention.** • multiple sources including US government documents, e.g. Financial Services and General Government Appropriations for 2016 p.201 (https://books.google.de/books?id=h4SVIm3XaUsC&printsec=frontcover&hl=de&source=gbs_ge_summary_r&cad=0#v=onepage&q=201&f=false)
Automation	**Processing tasks in a repeatable manner to yield the same result every time without human intervention.** • internal definition
Big data	**Big data reflects extremely large or complex datasets that may be analysed computationally, rather than by traditional data-processing application software, to reveal patterns, trends and associations, especially relating to human behaviours and interactions.** • based on https://link.springer.com/article/10.1057/s41272-019-00191-9 and https://en.wikipedia.org/wiki/Big_data
Big data-driven networking	**A type of future network framework that collects big data from networks and applications, and generates big data intelligence based on that data; it then provides big data intelligence to facilitate smarter and autonomous network management, operation, control, optimisation and security, etc.** • ITU Recommendation Y.3652 "Big data driven networking – requirements" (06/20) (https://www.itu.int/rec/T-REC-Y.3652-202006-I/en)
Blockchain	**A blockchain is an expanding list of cryptographically signed, irrevocable transactional records shared by all participants in a network.** • reduced; from TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019
Cgroups (control groups)	**Cgroups are linux kernel mechanisms to restrict and measure resource allocations to each process group. Using cgroups, you can allocate resources such as CPU time, network, and memory.** • https://subscription.packtpub.com/book/application_development/9781785883057/1/ch01lvl1sec15/namespaces-and-cgroups
Chatbot /Bot	**A computer program that simulates and processes human conversation (either written or spoken), allowing humans to interact with digital devices, systems and platforms as if they were communicating with a real person.** • https://www.oracle.com/chatbots/what-is-a-chatbot/
Cloud native application	**Cloud Native Application (CNA) refers to a type of computer software that natively utilises services and infrastructure provided by cloud computing providers.** • reduced; from TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019

Component	*A component is a functionally independent part of any system. It performs some function and may require some input or produce some output.* • https://www.techopedia.com/definition/3217/component
Composite service	*A composite service is an assembly of one or more elements into an end to end service. It may be recursive so a composite service may become a component of yet another service.* • based on TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019 and TR274 DSRA Guide R17.5 Reference R02
Control plane	*The control plane is responsible for processing a number of different control protocols that may affect the forwarding table, depending on the configuration and type of network device. These control protocols are jointly responsible for managing the active topology of the network.* • Software Defined Networks, A Comprehensive Approach, Paul Göransson, Chuck Black Morgan Kaufmann, 2014
Cross-domain data services	*Data services that are delivered across multiple administrative, information or technological domains that allow data sharing among authorized consumers in different domains.* • internal definition based on ETSI GS ZSM 007 V1.1.1 (2019-08): Zero-touch network and Service Management (ZSM); Terminology for concepts in ZSM (https://www.etsi.org/deliver/etsi_gs/ZSM/001_099/007/01.01.01_60/gs_ZSM007v010101p.pdf)
Data center interconnect (DCI)	*Data center interconnect (DCI) is a segment of the networking market that focuses on the technology used to link two or more data centers so the facilities can share resources.* • https://searchnetworking.techtarget.com/definition/data-center-interconnect
Data ingestion	*Data ingestion is the process of transporting data from one or more sources to a target site, system or platform for further processing and analysis. This data can originate from a range of sources, including data lakes, IoT devices, on-premises databases, and SaaS apps, and end up in different target environments, such as cloud data warehouses or data marts.* • https://www.striim.com/what-is-data-ingestion-and-why-this-technology-matters/
Data lake	*A storage repository that holds a vast amount of raw data in its native format, primarily in files or objects storage without hierarchical dimensions, until it is needed for analytics applications.* • https://www.techtarget.com/searchdatamanagement/definition/data-lake
Data model	*A data model (or datamodel) is an abstract model that organises elements of data and standardises how they relate to one another.* • https://en.wikipedia.org/wiki/Data_model
Data plane	*The data plane (sometimes known as the user plane, forwarding plane, carrier plane or bearer plane) is the part of a network that carries user traffic from one interface to another.* • based on https://searchnetworking.techtarget.com/definition/data-plane-DP
Decision management engine	*A decision management engine is a customisable solution that represents the logic, often in the form of a rules flow or decision tree, that can be operationalised to automate a decision. […] A decision management engine articulates how smaller decisions branch off to bigger and more complex decisions and ultimately end with a final outcome. This logic can be codified, documented, and often executed in an automated fashion.* • based on https://www.fico.com/en/glossary/decision-engine

Decoupling	*Building approach (in electronics, software, etc.) where the constituent components of a system can be produced, sourced and interchanged independently of the other.* • based on TOGAF 9.2 Reference R16
Deep learning	*Deep learning is an iterative approach to artificial intelligence (AI) that stacks machine learning algorithms in a hierarchy of increasing complexity and abstraction. Each deep learning level is created with knowledge gained from the preceding layer of the hierarchy.* • https://www.techopedia.com/definition/30325/deep-learning
Domain	*A collection of network infrastructure under the administrative control of the same organisation.* • internal definition based on ITU-T Y.110 TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU (06/98); SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE; General Global Information Infrastructure principles and framework architecture (https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.110-199806-I!!PDF-E&type=items)
Extract, Transform, Load (ETL)	*The data processing technique that engineers use to extract data from different sources, transform the data into a usable and trusted resource, and load that data into the systems end users can access and use downstream to solve business problems.* • https://databricks.com/glossary/extract-transform-load
Expert system	*An expert system uses artificial intelligence (AI) technologies to simulate the judgement and behaviour of a human expert based on "knowledge" programmed into it by humans, and only following predetermined rules.* • based on https://www.techtarget.com/searchenterpriseai/definition/expert-system and TM Forum AI Fundamentals course [TMF_AIF]
Federated orchestration	*Service orchestration performed by multiple autonomous management domains, to effectively allow services to span across several providers.* • internal definition based on https://e-archivo.uc3m.es/bitstream/handle/10016/27125/service_WCNCW_2018_ps.pdf?sequence=1, ETSI GS ZSM 007 V1.1.1 (2019-08): Zero-touch network and Service Management (ZSM); Terminology for concepts in ZSM (https://www.etsi.org/deliver/etsi_gs/ZSM/001_099/007/01.01.01_60/gs_ZSM007v010101p.pdf) and https://www.researchgate.net/publication/318473608_Orchestration_of_Network_Services_across_multiple_operators_The_5G_Exchange_prototype
Functional block	*Self contained unit in an overall system that performs a specific function or task.* • based on TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019 and ETSI Network Functions Virtualization (NFV); Infrastructure; Methodology to describe Interfaces and Abstractions Reference R08
Hierarchical orchestration	*Orchestration decomposed into one or more hierarchical interactions where parts of the service are delegated to a subordinate orchestrator.* • ETSI GS ZSM 007 V1.1.1 (2019-08): Zero-touch network and Service Management (ZSM); Terminology for concepts in ZSM (https://www.etsi.org/deliver/etsi_gs/ZSM/001_099/007/01.01.01_60/gs_ZSM007v010101p.pdf)
Intent-based policy / network	*Technology incorporating artificial intelligence (AI) and machine learning to automate administrative tasks across a network.* • based on TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019

Intelligent network	*An architectural concept for the support, maintenance, operation and provision of new services which is characterised by: information processing, efficient management, control and use of network resources and standardised communication between physical resources, network functions and services.* • based on International Telegraph and Telephone Consultative Committee (CCITT) Recommendation I.312 / Q.1201 (10/92) Principles of Intelligent Network Architecture (https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-I.312-199210-I!!PDF-E&type=items)
Internet of Things (IoT)	*The Internet of Things, or IoT, is a system of interrelated networking computing devices, mechanical and digital machines aimed at objects, animals or people and provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.* • based on https://en.wikipedia.org/wiki/Internet_of_things and https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT
Machine learning (ML)	*Processes that enable computational systems to "understand" data and gain "knowledge" from it without necessarily being explicitly programmed. (Supervised machine learning and unsupervised machine learning are two examples of machine learning.)* • based on ETSI GR ENI 004 V2.1.1 (2019-10), Experiential Networked Intelligence (ENI); Terminology for Main Concepts in ENI (https://www.etsi.org/deliver/etsi_gr/ENI/001_099/004/02.01.01_60/gr_eni004v020101p.pdf) and Telecommunication Standardisation Sector of ITU (ITU-T) Recommendation Y.3177 (02/2021) Architectural framework for artificial intelligence-based network automation for resource and fault management in future networks including IMT-2020 (https://www.itu.int/rec/dologin_pub.asp?lang=s&id=T-REC-Y.3177-202102-I!!PDF-E&type=items)
Management	*The processes aiming at fulfilment, assurance, and billing of services, network functions, and resources in both physical and virtual infrastructure including compute, storage, and network resources.* • based on ITU-T Y.3100 TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU (09/2017); SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS, NEXT-GENERATION NETWORKS, INTERNET OF THINGS AND SMART CITIES; Future networks: Terms and definitions for IMT-2020 network (https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.3100-201709-I!!PDF-E&type=items)
Management API	*A Management API allows a service requestor to perform all management operations before, during and after the use of a service.* • based on TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019
Management domain	*A collection of physical or functional elements under the control of an entity, aiming at fulfilment, assurance, and billing of services, network functions, and resources in both physical and virtual infrastructure.* • internal definition based on ITU-T Y.3100 TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU (09/2017); SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS, NEXT-GENERATION NETWORKS, INTERNET OF THINGS AND SMART CITIES; Future networks: Terms and definitions for IMT-2020 network (https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.3100-201709-I!!PDF-E&type=items) and ITU-T Y.110 TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU (06/98); SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE; General Global Information Infrastructure principles and framework architecture (https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.110-199806-I!!PDF-E&type=items)
Maturity level	*A maturity level is a defined evolutionary plateau for organisational process improvement. Each maturity level matures an important subset of the organisation's processes, preparing it to move to the next maturity level. The maturity levels are measured by the achievement of the specific and generic goals associated with each predefined set of process areas.* • https://www.megatronicstech.com/maturity-level-of-technology/

Maturity model	***A maturity model is an instrument that evaluates the current position of certain capabilities of an organisation and provides indications of how it can transform to improve.*** • based on https://www.bmc.com/blogs/maturity-model-itsm/ and the TM Forum AI Fundamentals course [TMF_AIF]
Micros ervices	***Microservices is an approach to software architecture that builds a large, complex application from multiple small components that each perform a single function, such as authentication, notification, or payment processing. Each microservice is a distinct unit within the software development project, with its own code base, infrastructure, and database. The microservices work together, communicating through web APIs or messaging queues to respond to incoming events.*** • https://www.nginx.com/learn/microservices/
Natural languag e process ing (NLP)	*Natural language processing (NLP) refers to the branch of AI concerned with giving computers the ability to understand text and spoken words in much the same way human beings can.* • https://www.ibm.com/cloud/learn/natural-language-processing
Netwo rk autom ation	***Network automation is the process of automating the configuration, management, testing, deployment, and operations of physical and virtual devices within a network.*** • https://www.juniper.net/us/en/products-services/whatis/network-automation/ • https://www.cisco.com/c/en/us/solutions/automation/networkautomation.html • https://www.netsync.com/practices/service-provider/networkautomation/
Netwo rk contro ller	***Functional block that centralizes some or all of the control and management functionality of a network domain and may provide an abstract view of its domain to other functional blocks via well-defined interfaces.*** • ETSI GS NFV 003 V1.4.1 (2018-08), Network Functions Virtualisation (NFV); Terminol ogy for Main Concepts in NFV (https://www.etsi.org/deliver/etsi_gs/NFV/001_099/003 /01.04.01_60/gs_nfv003v010401p.pdf)
Netwo rk functi on	***Network Function (NF) – a functional building block within a network infrastructure, which has well-defined external interfaces and a well-defined functional behaviour.*** • ETSI GS ZSM 007 V1.1.1 (2019-08): Zero-touch network and Service Management (ZSM); Terminology for concepts in ZSM (https://www.etsi.org/deliver/etsi_gs/ZSM /001_099/007/01.01.01_60/gs_ZSM007v010101p.pdf)
Netwo rk functi on disagg regati on (NFD)	***Defines the evolution of switching and routing appliances from proprietary, closed hardware and software sourced from a single vendor, towards totally decoupled, open components which are combined to form a complete switching and routing device.*** • https://www.metaswitch.com/knowledge-center/reference/what-is-network-function-disaggregation-nfd
Network intellige nce level	***A three-level application of automation capabilities (i.e., full automated infrastructure management, data centre infrastructure management and traceable/intelligent patch cords), including those enabled by integrating artificial intelligence techniques in the network.*** • Telecommunication Standardisation Sector of ITU (ITU-T) Recommendation Y.3173 (02/2020) Series Y: Global Information Infrastructure, Internet Protocol Aspects, Next-Generation Networks, Internet of Things and Smart Cities – Future networks: *Framewo rk for evaluating intelligence levels of fufure networks including IMT-2020 network* (http s://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.3173-202002-I!!PDF-E&type=items)

Network namespaces	*Network namespaces is a virtualization mechanism (a virtualised networking stack) which provides abstraction and virtualisation of network protocol services and interfaces. Each network namespace has its own network device instances that can be configured with individual network addresses.* • internal definition based on https://subscription.packtpub.com/book/application_development/9781785883057/1/ch01lvl1sec15/namespaces-and-cgroups
Network orchestration	*Network orchestration is the execution of the operational and functional processes involved in designing, creating, and delivering an end-to-end service. For example, it uses network automation to provide services through the use of applications that drive the network. An orchestrator functions to arrange and organise the various components involved in delivering a network service.* • internal definition based on: Ciena, https://www.ciena.com/insights/what-is/what-is-service-orchestration.html
Network resource	*Physical or logical network component of hardware, software or data in the data, control or management planes within an organization's infrastructure.* • internal definition
Network service	*A collection of network functions with a well specified behavior (i.e. content delivery networks (CDNs) and IP multimedia subsystem (IMS)).* • internal definition based on ITU-T - REC-Y.3515-201707: SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS, NEXT-GENERATION NETWORKS, INTERNET OF THINGS AND SMART CITIES, Cloud Computing – Functional architecture of Network as a Service; (https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.3515-201707-I!!PDF-E&type=items)
Network slicing	*Network slicing is a specific form of virtualisation that allows multiple logical networks to run on top of a shared physical network infrastructure. (..) The intent of network slicing is to be able to partition the physical network at an end-to-end level to allow optimum grouping of traffic, isolation from other tenants, and configuring of resources at a macro level.* • https://www.idginsiderpro.com/article/3231244/what-is-the-difference-between-network-slicing-and-quality-of-service.html
Network slice instance	*A Network slice instance is a set of Network Function instances and the required resources (e.g. compute, storage and networking resources) which form a deployed Network Slice.* • based on TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019 and 3GPP TS 23.501.
NFV	*Network Function Virtualisation (NFV) is a network architecture concept that uses virtualization to classify entire classes of network node functions into building blocks that may connect, or chain together, to create communication services. More specifically, it is the deployment of software implementations of traditional network functions (e.g. load balancers, firewalls, office switches/routers) on virtualized infrastructure rather than on function-specific specialized hardware devices.* • based on Dijiang Huang, Huijun Wu, in Mobile Cloud Computing, 2018, (https://www.sciencedirect.com/topics/computer-science/network-function-virtualization)
NFV-MANO (Network Functions Virtualisation Management and Orchestration)	*Management and orchestration (MANO) is a key element of the ETSI network functions virtualization (NFV) architecture. MANO is an architectural framework that coordinates network resources for cloud-based applications and the lifecycle management of virtual network functions (VNFs) and network services. As such, it is crucial for ensuring rapid, reliable NFV deployments at scale. MANO includes the following components: the NFV orchestrator (NFVO), the VNF manager (VNFM), and the virtual infrastructure manager (VIM).* • https://www.adva.com/en/products/technology/what-is-nfv-mano

NFV-MANO Architectural Framework (Network Functions Virtualisation Management and Orchestration Architectural Framework)	*Collection of all functional blocks (including those in NFV-MANO category as well as others that interwork with NFV-MANO), data repositories used by these functional blocks, and reference points and interfaces through which these functional blocks exchange information for the purpose of managing and orchestrating NFV.* • ETSI GS NFV 003 V1.4.1 (2018-08), Network Functions Virtualisation (NFV); Terminology for Main Concepts in NFV (https://www.etsi.org/deliver/etsi_gs/NFV/001_099/003/01.04.01_60/gs_nfv003v010401p.pdf)
NFVO (Network Functions Virtualisation Orchestrator)	*Functional block that manages the Network Service (NS) lifecycle and coordinates the management of NS lifecycle, VNF lifecycle (supported by the VNFM) and NFVI resources (supported by the VIM) to ensure an optimized allocation of the necessary resources and connectivity.* • ETSI GS NFV 003 V1.4.1 (2018-08), Network Functions Virtualisation (NFV); Terminology for Main Concepts in NFV (https://www.etsi.org/deliver/etsi_gs/NFV/001_099/003/01.04.01_60/gs_nfv003v010401p.pdf)
OpenFlow protocol	*OpenFlow protocol is a protocol defined by the OpenFlow Switch Specification that allows separation of the network control plane by providing access to the forwarding plane.* • internal definition based on: OpenFlow Switch Specification - Open Networking Foundation https://www.opennetworking.org/wp-content/uploads/2014/10/openflow-switch-v1.5.1.pdf and https://www.opennetworking.org/sdn-definition/?nab=1
OpenFlow (standard)	*OpenFlow is an open standard that enables you to control traffic and run experimental protocols in an existing network by using a remote controller. The OpenFlow components consist of a controller, an OpenFlow or OpenFlow-enabled switch, and the OpenFlow protocol.* • https://www.juniper.net/documentation/en_US/junos/topics/concept/junos-sdn-openflow-support-overview.html
OpenStack	*Open source software for creating private and public clouds. OpenStack software controls large pools of compute, storage, and networking resources throughout a data center, managed through a dashboard or via the OpenStack API.* • https://www.openstack.org/
Open virtual network (OVN)	*Open Virtual Network (OVN) is an Open vSwitch-based software-defined networking (SDN) solution for supplying network services to instances.* • https://access.redhat.com/documentation/en-us/red_hat_openstack_platform/13/html/networking_with_open_virtual_network/open_virtual_network_ovn
Open vSwitch (OVS)	*Open source multilayer virtual switch that supports standard interfaces and protocols.* • based on https://www.openvswitch.org/
Operational domain	*Scope of management delineated by an administrative and technological boundary.* • based on TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019

Orchestration (ONAP)	***The arrangement, sequencing and automated implementation of tasks, rules and policies to coordinate logical and physical resources in order to meet a customer or on-demand request to create, modify or remove network or service resources.*** • from: TM Forum Technical Specification, Terminology for Zero-touch Orchestration, Operations and Management, TMF071, Release 17.0.1, November 2017, version 0.4.1, IPR Mode RAND • (synonyms for the system performing the function: manager, coordinator)
Process automation	***Process automation refers to the usage of technology to automate complex processes. It typically has three functions: automating processes, centralising information, and reducing the requirement for input from people. It is designed to remove bottlenecks and reduce errors and data loss, all while increasing transparency, communication across departments, and processing speed.*** • https://www.tibco.com/reference-center/what-is-process-automation
Reinforcement learning	***Reinforcement learning, in the context of machine learning and artificial intelligence (AI), is a type of dynamic programming that trains algorithms using a system of reward and punishment.*** • based on https://www.techopedia.com/definition/32055/reinforcement-learning-rl
Resource slice	***A grouping of physical or virtual (network, compute, storage) resources. A resource slice could be one of the components of Network Slice, however on its own does not represent fully a Network Slice.*** • based on https://tools.ietf.org/id/draft-geng-netslices-architecture-01.html#rfc.section.1.2
Robotic Process Automation (RPA)	***Robotic Process Automation (RPA) is a type of AI; it is a software technology that allows people to configure robots to perform rules-based tasks. It can be particularly useful for processes with predictable and frequent interactions with multiple applications.*** • based on TM Forum AI Fundamentals course [TMF_AIF] and TM Forum "AI and its pivotal role in transforming operations" report and webinar [TMF_AI]
Software-defined networking (SDN)	***A programmable network approach that supports the separation of control and forwarding planes via standardized interfaces.*** • IRTF, RFC 7426: Software-Defined Networking (SDN): Layers and Architecture Terminology, January 2015, https://tools.ietf.org/html/rfc7426
Self-configuration	***A process by which computer systems or networks automatically adapt their own configuration of components without human direct intervention.*** • based on https://www.igi-global.com/dictionary/aspect-oriented-self-configuring-p2p/26200 (retrieved Nov. 11, 2019) and ETSI GS ZSM 007 V1.1.1 (2019-08): Zero-touch network and Service Management (ZSM); Terminology for concepts in ZSM (https://www.etsi.org/deliver/etsi_gs/ZSM/001_099/007/01.01.01_60/gs_ZSM007v010101p.pdf)
Self-organising network (SON)	***The term self-organising network comes from the mobile radio network industry and refers to automated planning, configuration, management, optimisation and healing of a network.*** • based on https://www.celona.io/network-architecture/self-organizing-network
Service access point	***A Service Access Point is a kind of Resource Function (RF) that handles access into and out of another RF, such as an application RF or virtualized appliance RF.*** • TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019

Service chaining (NFV)	***Network service chaining, also known as service function chaining (SFC) is a capability that uses software-defined networking (SDN) capabilities to create a service chain of connected network services (such as L4-7 like firewalls, network address translation [NAT], intrusion protection) and connects them in a virtual chain. This capability can be used by network operators to set up suites or catalogs of connected services that enable the use of a single network connection for many services, with different characteristics.*** • https://www.sdxcentral.com/networking/virtualization/definitions/what-is-network-service-chaining/
Software (Engineering) Governance	***Software Engineering Governance or Software Governance is the set of structures, processes and policies by which the software development and deployment function within an organisation is directed and controlled to yield business values and to mitigate risk.*** • https://www.cs.uoregon.edu/events/icse2009/images/postConf/TB-Governance-ICSE09.pdf
Software defined exchanges (SDX)	***Software Defined IXP (SDX) is an internet exchange that utilizes SDN to do interdomain routing. In addition, SDX design incorporates high levels of programmability, open APIs, shared resources across multiple domains, dynamic provisioning, resource discovery, quick resource integration and configuration, and granulated control of resources.*** • internal definition based on https://sdx.cs.princeton.edu/ and J. Mambretti, J. Chen, F. Yeh, Software-Defined Network Exchanges (SDXs): Architecture, services, capabilities, and foundation technologies, 2014 26th International Teletraffic Congress (ITC), DOI: 10.1109/ITC.2014.6932970.
Supervised learning / Supervised machine learning	***Supervised learning, also known as supervised machine learning, is an approach to creating artificial intelligence (AI), where a computer algorithm is trained on input data that has been labelled for a particular output. The model is trained until it can detect the underlying patterns and relationships between the input and output labels, enabling it to yield accurate labelling results when presented with never-before-seen data.*** Also: "Note 2 – Supervised machine learning and unsupervised machine learning are two examples of machine learning types." From ITU Recommendation Y.3172 (06/19). • based on https://www.techtarget.com/searchenterpriseai/definition/supervised-learning and https://www.ibm.com/cloud/learn/supervised-learning
Switch abstraction interface (SAI)	***Definition of the API to provide a vendor-independent way of controlling forwarding elements, such as a switching ASIC, an NPU or a software switch in a uniform manner.*** • Open Compute Project github page, https://github.com/opencomputeproject/SAI
Technical Reference Model (TRM)	***Architecture of generic services and functions that provides a foundation on which more specific architectures and architectural components can be built.*** • https://pubs.opengroup.org/architecture/togaf8-doc/arch/chap19.html (TOGAF™ stands for The Open Group Architecture Framework)
Unsupervised learning / Unsupervised machine learning	***Unsupervised learning, also known as unsupervised machine learning, uses machine learning algorithms to analyse and cluster unlabelled datasets. These algorithms discover hidden patterns or data groupings without human intervention. Its ability to discover similarities and differences in information makes it the ideal solution for exploratory data analysis, cross-selling strategies for offering different products to customers, customer segmentation, and image recognition.*** • https://www.ibm.com/cloud/learn/unsupervised-learning

User interface orchestration	*User Interface Orchestration defines, formats and structures the sequence of user interfaces (UIs) needed for a process. For example, the orchestration of UI during a service request from customers.* • based on TM Forum Reference, TMF071 ODA Terminology, TMF071, Release 19.0.1, October 2019 and IG1167 R18.0 "ODA Functional Architecture" Reference R21
Virtual content delivery network	*A content delivery network using virtualisation technology that enables the allocation of virtual storage, virtual machines, and network resources according to providers' requirements in a dynamic and scalable manner.* • based on ITU-T F.743.4 TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU (03/2017) SERIES F: NON-TELEPHONE TELECOMMUNICATION SERVICES Multimedia services, Functional requirements for virtual content delivery networks (https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-F.743.4-201703-I!!PDF-E&type=items)
Virtual eXtensible Local Area Network (VXLAN)	*Virtual eXtensible Local Area Network (VXLAN) enables the encapsulation of Ethernet frames inside UDP packets with a designated UDP destination port (4789). VXLAN allows users to overlay L2 networks on top of existing L3 networks. In the data center, it is commonly used to stretch an L2 network across multiple racks.* • https://github.com/Mellanox/mlxsw/wiki/Virtual-eXtensible-Local-Area-Network-(VXLAN) • https://tools.ietf.org/html/rfc7348
Virtual routing and forwarding (VRF)	*Virtual Routing and Forwarding is a layer 3 abstraction, which provides a separate routing table for each instance, usually this is done by adding some sort of VRFID to the routing table lookup.* • internal definition • https://en.wikipedia.org/wiki/Virtual_routing_and_forwarding
Virtualisation	*Abstraction of network or service objects to make them appear generic, i.e. disassociated from the underlying hardware implementation specifics.* • internal definition
Virtualised network function (VNF) - virtual network function	*Virtual Network Function (VNF) is a network task written as software that can be provided in a virtualised manner (i.e. firewall, router, switch).* • internal definition based on https://www.sdxcentral.com/networking/nfv/definitions/virtual-network-function/ • https://www.webopedia.com/TERM/V/virtualized-network-function.html
Workflow	*The sequence of steps through which a piece of work passes from initiation to completion.* • based on https://www.merriam-webster.com/dictionary/workflow

Workflow management	**Workflow management (WFM) is a technology supporting the re-engineering of business and information processes. It involves: Defining workflows, (...) and providing for fast (re)design and (re)implementation of the processes as business needs and information systems change.** • D. Georgakopoulos, M. Hornick, A. Sheth, An Overview of Workflow Management: From Process Modeling to Workflow Automation Infrastructure, Distributed and Parallel Databases, 3, 119-153 (1995), http://www.workflowpatterns.com/documentation/documents/workflow95.pdf.

GLOSSARY

Abbreviation/ Acronym	Description/Definition
ABE	Aggregate Business Entity
ACMM	Analysis Capability Maturity Model
AI	Artificial Intelligence
AIOps	Artificial Intelligence for IT Operations
AMC	Autonomic Management and Control
AMM	Automation Maturity Model
ACMM	Architecture Capability Maturity Model
AWS	Amazon Web Services
BPMM	Business Process Maturity Model
BPMN	Business Process Model and Notation
BSS	Business Support System
CBP	Ciena Blue Planet
CDE	Component DEscription
CDN	Content Delivery Network
CMM	(Service) Capability Maturity Model
CMMI	Capability Maturity Model Integrated
CNA	Cloud Native Application
CNI	Container Network Interface
CSP	Communications Service Provider
D&I	Decoupling & Integration
DC	Data Centre
DCN	Data Communication Network
DE	Decision Element
DPMM	Document Process Maturity Model
DPRA	Digital Platform Reference Architecture
DTN	Data Transfer Node
EACM	Enterprise Architecture Content Metamodel
EGM	Engagement Management
eLMM	e-Learning Maturity Model
ETSI	European Telecommunications Standards Institute
EVPN	Ethernet VPN

FOSS	Free and Open Source Software	
FRR	Free Range Routing	
GANA	Generic Autonomic Networking Architecture	
Geneve	Generic Network Virtualisation Encapsulation	
GRE	Generic Routing Encapsulation	
GS	Group Specification	
GVM	Generalised Virtualisation Model	
IaaS	Infrastructure as a Service	
IaC	Infrastructure as Code	
IDE	Integrated Development Environment	
IDSP	Integrated Digital Service Provider	
IEEE	Institute of Electrical and Electronics Engineers	
IETF	Internet Engineering Task Force	
IM	Intelligence Management	
IMS	IP Multimedia Subsystem	
IRTF	Internet Research Task Force	
IS/ICT CMF	Information Systems and Information Communication Technology Management Capability Maturity Framework	
ISO	International Organisation for Standardisation	
ISO 15504 – SPICE	Software Process Improvement and Capability Determination	
IT-BSC Maturity Model	IT governance tool Balanced Scorecard Maturity Model	
ITPM3	IT Performance Measurement Maturity Model	
ITU	International Telecommunication Union	
K8s	Kubernetes	
LSO	Lifecycle Service Orchestration	
M2M	Machine-to-Machine	
MANO	Management and Orchestration	
MCC	Management-Control Continuum	
MDSO	Multi-Domain Service Orchestration	
MDVPN	Multi-Domain Virtual Private Networks	
ME	Managed Entity	
MEF	Metro Ethernet Forum	
NaaS	Network as a Service	
NaC	Network as Code	
NAO	Network Automation and Orchestration	
NCO	Network Controls and Orchestration	
NE	Network Element	
NEP	Network Equipment Providers	
NETCONF	Network Configuration Protocol	
NF	Network Function	

NFD	Network Function Disaggregation
NFV	Network Function Virtualisation
NFVI	Network Function Virtualisation Infrastructure
NFV-O	Network Function Virtualisation Orchestrator
NGN	Next Generation Network
NMM	Network Maturity Model
NREN	National Research and Education Network
NRO	Network Resource Optimisation
NS	Network Service
NSA	Network Service Agent
NSI	Network Service Interface
NSSAI	Network Slice Selection Assistance Information
NVGRE	Network Virtualisation over GRE (Generic Routing Encapsulation)
OAMP	Operations, Administration, Maintenance and Provisioning
OASIS	Organisation for the Advancement of Structured Information Standards
OAV	Orchestration, Automation and Virtualisation
OCP	Open Compute Project
ODA	Open Digital Architecture
ODL	OpenDaylight
ODM	Operational Domain Management/Manager
OESS	Open Exchange Software Suite
OGF	Open Grid Forum
ONAP	Open Networking Automation Platform
ONOS	Open Network Operating System
OPNFV	Open Platform for NFV Project
OSM	Open Source MANO
OSS	Operations Support System
OVN	Open Virtual Network
OVS	Open vSwitch
PaaS	Platform as a Service
R&D	Research and Development
R&E	Research & Education
REST	Representational State Transfer
RF	Resource Function
SaaS	Software as a Service
SAI	Switch Abstraction Interface
SDDC	Software-Defined Data Center
SDN	Software Defined Network
SDO	Standards Developing Organization
SD-WAN	Software-Defined networking in a Wide Area Network (WAN)
SDX	Software-Defined Exchange

SFC	Service Function Chaining (also known as Network Service Chaining)
S-NSSAI	Single Network Slice Selection Assistance Information
SOA	Service Oriented Architecture
SPA	Service Provider Architecture
STF	Service and Technology Forum
STP	Service Termination Point
STT	Stateless Transport Tunneling
TMF	TM Forum
TOGAF	The Open Group Architecture Framework
TOSCA	Topology and Orchestration Specification for Cloud Applications
VCDN	Virtual Content Delivery Network
VIM	Virtual Infrastructure Management
VM	Virtual Machine
VNF	Virtual Network Function
VNFM	Virtualised Network Function Manager
VNO	Virtual Network Operator
VPN	Virtual Private Network
VPP	Vector Packet Processing
VRF	Virtual Routing Function
VSI	Virtual Switch Instance
VTEP	Virtual Tunnel End Point
VXLAN	Virtual Extensible LAN
WFM	Workflow Management
XaaS	Anything as a Service
XDP	eXpress Data Path
ZOOM	Zero-touch Orchestration, Operations and Management
ZSM	Zero-touch network and Service Management
ZTP	Zero Touch Provisioning