Enabling the Hyper-Connected World

Orchestration & ANALYTICS

DZS Cloud

Award-Winning Orchestration and Automation Software

DZS Cloud enables analytics and access orchestration via SDN controls

Benefits

- **Eliminate Vendor Lock-in**
  Aligned with multiple standards, supports any use case built with components from any supplier
- **End-to-End Automation**
  Policy-based automation from Day 2 operations to cloud infrastructure allocation
- **Build Hybrid Services**
  Build, deploy, and manage Network Services using legacy devices and new virtual functions that span clouds and datacenters
- **5G Ready**
  Orchestrate and automate container-based 5G slices across clouds; network slices subnets into end-to-end slices
- **Endorsed by**
  Tier-1 Operator TELUS

Network Functions Virtualization (NFV) is fundamentally changing how network services are deployed and managed. However, one of the obstacles to broader adoption is the lack of an open platform for deploying and managing Network Functions (NF) and end-to-end services. In particular, there is a lack of consistency and openness in management and orchestration tools. Many specifications were broadly defined and lacked cohesion between standards bodies, allowing vendors a “get out of jail free” card to present proprietary, locked-in solutions to customers.

As a result, SDN/NFV deployments stall as network operators lack a standard, vendor-neutral way to deploy virtualized services and network function builders lack a standard platform for delivering them. DZS Cloud aligns with multiple standards to enable a different experience by delivering orchestration and automated operation of multi-vendor virtual network functions and services.

The promise of cloud, SDN and NFV can only be achieved if Network Functions and End-to-end Services feature the elasticity, horizontal scalability, and automation typical of cloud services and modern data centers. DZS Cloud is a model-driven, multi-standard compliant NFV solution that simplifies deployment the onboarding of third-party VM-based and Containerized NFs and the design, deployment, and management of Service Provider use cases from 5G to SDWAN.

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Openness Enabling Freedom of Choice

From the inception of the ETSI Open Source MANO (OSM) effort, DZS Cloud was proven at Plugtest events, earning multiple awards for demonstrating advanced use cases over open ecosystems in TM Forum and MEF. DZS Cloud was the first commercial orchestration solution to support a community-developed, open information model and continues this practice today. It features a modular, programmable, and model-driven platform to prevent vendor lock-in and facilitate interoperability with any NF and cloud platform.

Increased Service Velocity

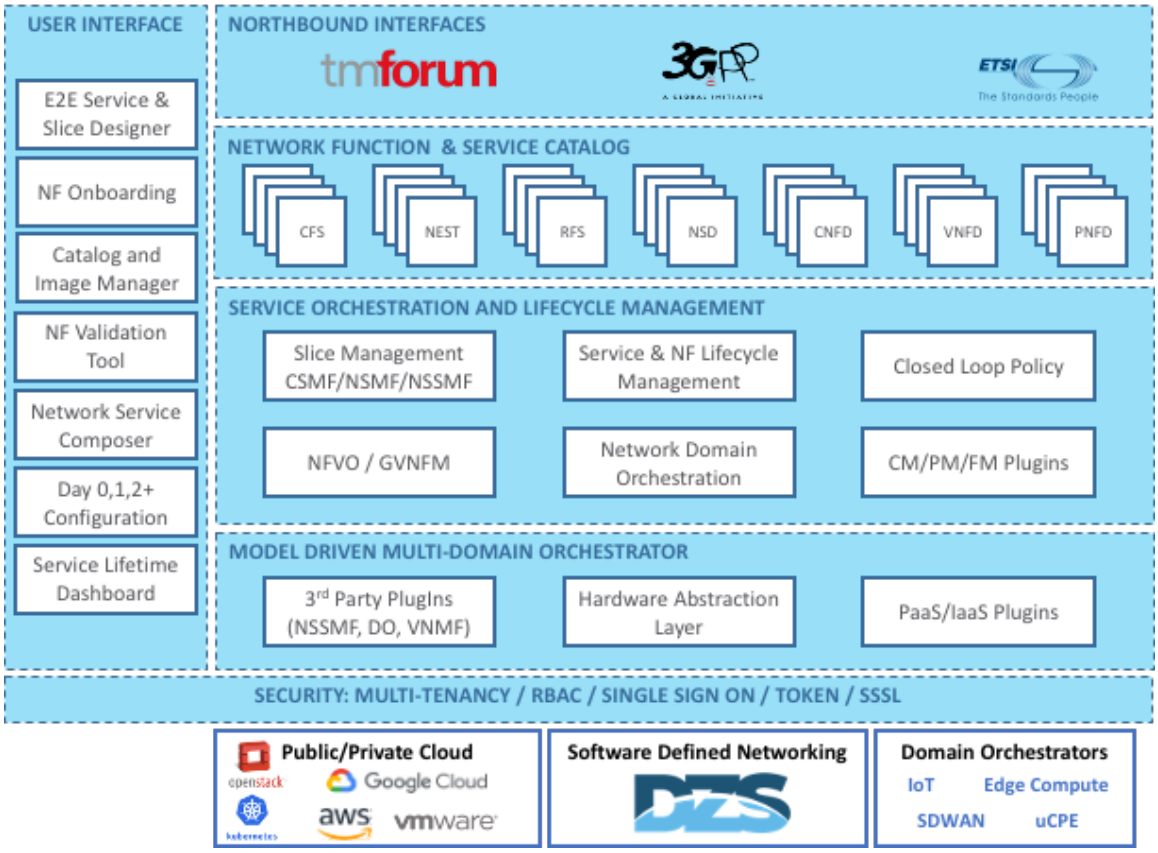
DZS Cloud automates the elastic allocation of resources and the operation of virtualized network functions and services according to policies. It supports dynamic, optimized service instantiation via intelligent workload placement and intelligent Day 2 operations via Closed Loop Automation.

Lower Operational Costs

DZS Cloud features a powerful visualization and automation engine that simplifies NF onboarding and network service design and deployment, through a wizard-based UI that breaks reliance on high-code custom development efforts. DZS Cloud simplifies operations, facilitates agile development, and enables operational teams to seamlessly increase their ability to support networks as they grow.

Cloud Scalability and Elasticity

DZS Cloud provides all the tools needed for building and managing distributed virtual network services and communications applications. DZS Cloud is built on a standards-based, model-driven framework that supports multiple formats and scales to support massive numbers of NF and VMs to simplify deployment of any service on any cloud.



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DZS Cloud Cycle Management

DZS Cloud's integrated Service Orchestration and NFV Domain Orchestration functions offer end-to-end service and NF Life Cycle Management (LCM) that forms virtual compute and network resources into a structured topology that can support one to hundreds of Network Functions and Network Services. DZS Cloud is fully compliant with ETSI NFV Management and Orchestration specifications and also complies to end-to-end orchestration architectures published by TM Forum, MEF, and other bodies.

Open Source – DZS Cloud is built with open source components with open, published data models to foster innovation and prevent vendor lock-in.

Model-driven – DZS Cloud is a standards-based, model driven framework that supports multiple model formats such as ETSI NFV-SOL 001 TOSCA, ETSI Open Source MANO, HEAT, Bitnami, 3GPP, and TM Forum.

Intent-based Model Transformation – DZS Cloud's unique intent-based transformation and translation layers allow service providers to seamlessly integrate DZS Cloud with existing OSS/BSS and drive automated, flow-through fulfilment of end-customer services such as "Gold Telemedicine Service" from customer portal to Edge Compute located near the customer.

Designed for Networking – Service provider workloads inherently rely on advanced networking services such as WAN connectivity, load balancing services, and VPN tunnels. DZS Cloud's network modeling capabilities are designed to simplify deployment of complex networked services such as IMS, Network Slices, Multi-access Edge Computing (MEC) and other carrier services which rely on guaranteed connectivity and complex topologies.

Open APIs and Modular Architecture – Multi-language plugin architecture with well-defined industry standard interfaces offers integration with any 3rd party orchestration platform, analytics tool, cloud infrastructure, SDN platform, and Network Function. DZS Cloud provides a fully automated, true, end-to-end multi-vendor environment for any application that can be ready for production in days, not weeks or months.

End-to-End Closed Loop Automation – Enables zero touch Day 0, Day 1, and Day 2 operations from allocation of virtual infrastructure to closed control loop triggers to support full LCM of network services from instantiate to scale, heal, and terminate, with full configuration management of all constituent NFs in the service at each life cycle event.

Multi-cloud – Validates and deploy service chains of Network Functions on any cloud management system and leverage the unique capabilities of the cloud environment.

Intelligent Workload Placement with Enhanced Platform Awareness – Automatically and intelligently take advantage of unique network and cloud infrastructure capabilities to optimize utilization, cost, and performance, using Enhanced Platform Awareness attributes to intelligently map workloads to the best available virtual resource.

Model-driven Visualization and Automation Tools – The Visualization and Automation tools provide a simple and intuitive way to interact with the DZS Cloud platform. Composing a network service from selected NF and instantiating network services from the dashboard is as easy as browsing the catalog in an online app store, customizing its parameters for personalized service, and launching the service. Visualization and Automation also provides real time statistics for Network Functions, Network Services, and a detailed view of compute and network topologies.

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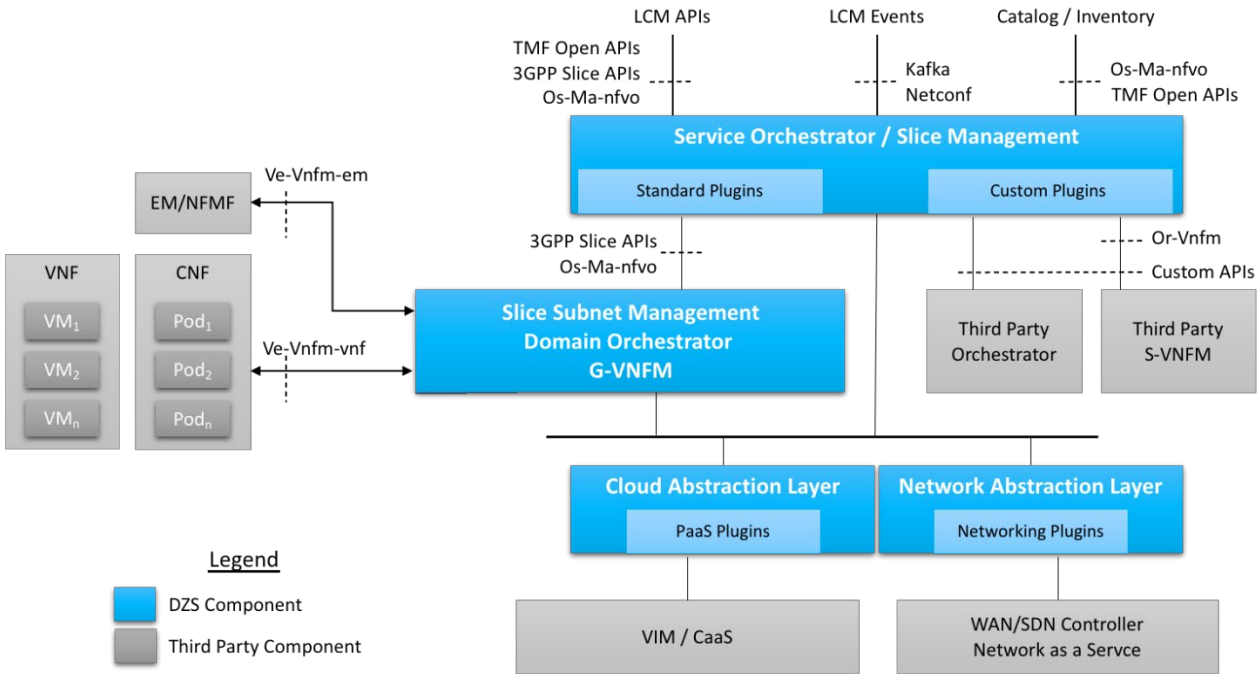
DZS Cloud Architecture

DZS Cloud is composed of a set of modular applications spanning multiple layers and functions such as Network Service, Network Function, Infrastructure, Networking, and platform. This modularity enables DZS Cloud to adapt to any orchestration architecture both standard and proprietary, and also allows DZS Cloud to integrate with third-party components such as OSS, Domain Orchestrators, S-VNFMs, SDN Controllers, VIMs, and Kubernetes clusters.



The DZS Cloud architecture allows modularization of DZS Cloud into functional components with open APIs providing instrumentation into each component. The key functional components in DZS Cloud include:

- **NS LCM** – The Network Service Life Cycle Management function forms the heart of the DZS Cloud Service Orchestration, Slice Management, Domain Orchestration, and NFVO capabilities
- **NF LCM** – NF Life Cycle Management is the key function of the DZS Cloud Domain Orchestrator and G-VNFM
- **Cloud Abstraction Layer** – The CAL provides cloud-agnostic interface to all manners of virtual infrastructure, from public cloud to private cloud, from data centers to CPE VIMs to containers
- **Network Abstraction Layer** – Similar to the CAL, the Network Abstraction Layer provides an SDN-C interface to all manners of virtual network controllers, to create end-to-end service chains of NFs

All functionality is driven by standard data models and APIs, enabling operators to quickly and easily integrate DZS Cloud orchestration with existing OSS/BSS systems. To enable migration from legacy systems such as VNFs, PNFs, network controllers, and first-generation orchestrators, DZS Cloud is instrumented with a rich set of plugins which allow rapid customization to third-party proprietary APIs, without affecting the northbound data models and APIs, therefore enabling service providers to immediately deploy standards-based NFV while retaining maximum use of existing assets.

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Standards and Specifications

Supported VIMs

+ OpenStack, open source and major commercial distributors
+ Kubernetes, open source and major commercial distributors
+ Amazon EKS and EC2
+ Google GKE
+ VMware vCloud Director

Orchestration Architectures

+ TM Forum Open Digital Architecture (ODA)
+ 3GPP Slice Management (CSMF, NSMF, and NSSMF)
+ MEF 55 Lifecycle Service Orchestration (LSO): Reference Architecture and Framework
+ ETSI NFV Management and Orchestration (MANO)
+ ETSI Open Source MANO (OSM)
+ Open Network Automation Platform (ONAP)
+ 3GPP TR 28.801 “Telecommunication management; Study on management and orchestration of network slicing for next generation network”
+ ETSI GS MEC 003 “Multi-access Edge Computing (MEC); Framework and Reference Architecture”
+ HEAT Orchestration Templates
+ HELM Charts

IETF Specifications

+ RFC 7665 “Service Function Chaining (SFC) Architecture”
+ RFC 8300 “Network Service Header (NSH)”

TM Forum Open API

+ TMF633 Service Catalog API
+ TMF638 Service Inventory Management API
+ TMF641 Service Ordering Management API
+ TMF653 Service Test Management API
+ TMF635 Usage Management API

Select ETSI NFV Specifications

+ State 1 Specifications and Reports
  - ETSI GR NFV 001 “Network Functions Virtualisation (NFV); Use Cases”
  - ETSI GR NFV-EVE 012 " Report on Network Slicing Support with ETSI NFV Architecture Framework”
  - ETSI GS NFV-IFA 004 “Acceleration Technologies; Management Aspects Specification”
+ Stage 2 Specifications
  - ETSI GS NFV-MAN 001 “Management and Orchestration”
  - ETSI GS NFV-IFA 005 “Or-Vi”
  - ETSI GS NFV-IFA 006 “Vi-Vnfm”
  - ETSI GS NFV-IFA 007 “Or-Vnfm”
  - ETSI GS NFV-IFA 008 “Ve-Vnfm”
  - ETSI GS NFV-IFA 010 “Management and Orchestration Functional Requirements”
  - ETSI GS NFV-IFA 011 “VNF Packaging”
  - ETSI GS NFV-IFA 013 “Os-Ma-nfvo”
  - ETSI GS NFV-IFA 014 “Network Service Templates”
  - ETSI GS NFV-IFA 019 “ETSI GS NFV-IFA 014 “Network Service Templates”
  - ETIS GS NFV-IFA 029 “Enhancements of the NFV architecture towards “Cloud-native” and "PaaS"
+ Stage 3 Specifications
  - ETSI GS NFV-SOL 001 “NFV descriptors based on TOSCA”
  - ETSI GS NFV-SOL 002 “Ve-Vnfm”
  - ETSI GS NFV-SOL 003 “Or-Vnfm”
  - ETSI GS NFV-SOL 004 “VNF Package”
  - ETSI GS NFV-SOL 005 “Os-Ma-nfvo”
  - ETSI GS NFV-SOL 006 “NFV descriptors based on YANG Specification” (pre-standards support based on ETSI Open Source MANO format)
  - ETSI GS NFV-SOL 007 “Network Service Descriptor File Structure”

Select 5G Network Slicing

+ 3GPP TS 28.525 “Life Cycle Management (LCM) for mobile networks that include virtualized network functions; Requirements”
+ 3GPP TS 28.526 “Life Cycle Management (LCM) for mobile networks that include virtualized network functions; Procedures”
+ 3GPP TS 28.531 “Management and orchestration; Provisioning”
+ 3GPP TS 28.533 “Management and orchestration; Architecture framework”
+ 3GPP TS 28.541 “Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3”