



NEARBY
COMPUTING

NearbyOne Edge Orchestrator



Product
description

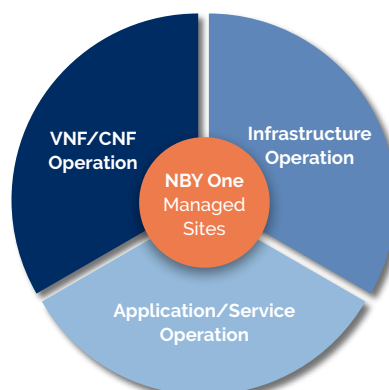
Single pane of Glass for a unified Edge

Telco Edge | Enterprise Edge | IoT Edge

NearbyOne is an end-to-end cross-domain orchestration platform that is built for speed, performance and availability for your latency-sensitive, data-intensive and mission critical applications. It solves the challenges faced by Telcos and Enterprises that require deployment of workloads at the Edge of the network. It covers the full lifecycle management of distributed systems, networks and applications encompassing all layers, from the Edge to the Cloud. NearbyOne adheres to the industry standards as established by CERA (Converged Edge Reference Architecture).

Nearby One is an edge orchestrator that can operate in all tiers of global service deployment, from the edge up until the corporate data centers and even up to the public cloud. The single pane of glass feature allows customers to rapidly provision, allocate resources, and fully manage the lifecycle of their edge nodes as a service.

NearbyOne is pioneering the market in providing a unique tool that addresses all the areas of operations that take part in edge deployments: the infrastructure, the network, and the applications, working on top function-specific components. By creating an internal link between these usually separated areas, NearbyOne can perform sophisticated orchestration functions enabling a higher degree of performance and efficiency, integrating each component's capabilities to deliver innovative services.



NearbyOne enables full multi-tenancy at the Edge, allowing service providers to optimize their investments. Accordingly, Service Providers and different business units can monitor, manage, and deploy their applications, while the vendor agnostic nature of the solution on both the hardware and software levels enables flexible deployments and eliminates vendor locking.

NearbyOne works on top of best-in-class solutions and has been tested with the leading vendors of all the layers that are present in the Edge stack.

These characteristics ensure that the solution provides an unparalleled comprehensive approach in performing edge orchestration across all customers' needs in both Telco and Enterprise markets: from IoT to Fog Computing, MEC, SD-WAN and even deployment of private 4G and 5G networks.

NearbyOne sectors of operation

Public Networks	Telco Edge Cloud UPF and 5GC Integration	uCPE Provisioning and SD-WAN	Smart Cities IoT Applications and Services
	Enterprise 5G Edge Rapid Deployment of Fully Private Network	Managed Services Flexible Networks Infrastructure and Applications Management	Industry Utilities Low Footprint at the Ultra-far Edge

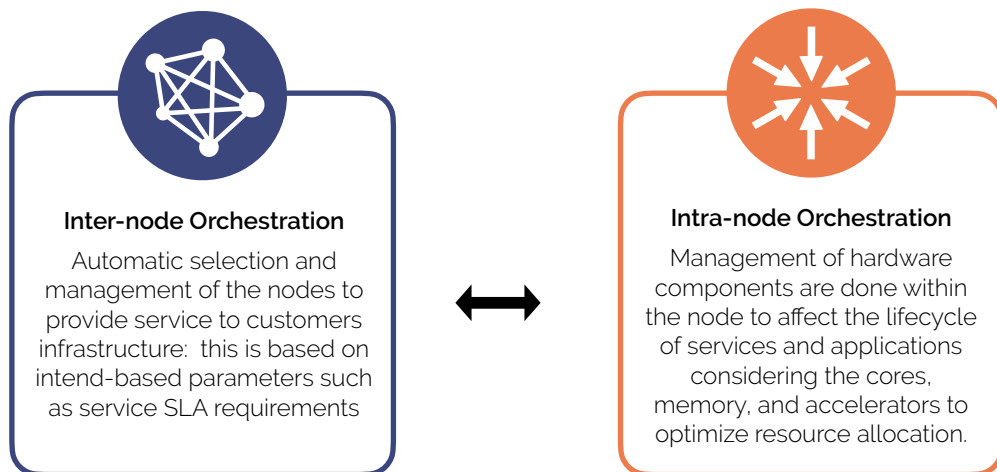


Features and Capabilities

Nearby Computing goes beyond the usual orchestration concept to respond to the complex challenges presented by Edge Computing demands in real scenarios. While traditional orchestration tools are normally limited to assign deployments to nodes in a static mode, NearbyOne makes a smart selection of the existing network resources to dynamically associate those resources to workloads, both on a macro and micro-orchestration perspective. The solution also monitors their status to meet the SLA requirements as defined by the customer, using the most advanced techniques in HW virtualization and policies enforcement.

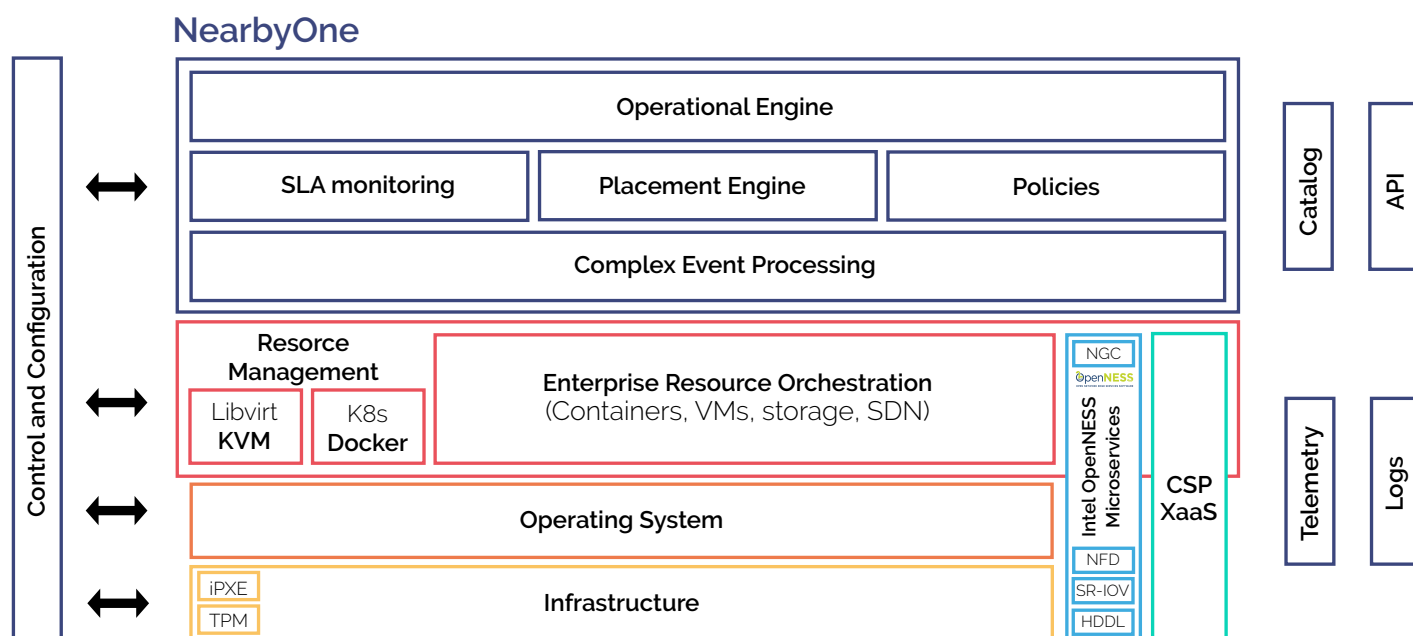
Key capabilities of NearbyOne include:
Inter-node (macro) Orchestration,
Infrastructure Management
Workload Management
Connectivity Management

Intra-node (micro) Orchestration Mapping
workload to resources SLA/QoS



Working on top of existing market tools, NearbyOne delivers a very large set of value-added features to be leveraged according to the actual needs of every use case, avoiding vendor lock-in situations thanks to its extremely flexible and open architecture.

NearbyOne in the Edge Ecosystem



Summary

Global Orchestration Capabilities	Model driven	Single Pane of Glass	OSS Integration	Multi-tenant Architecture	Micro and Macro Orchestration
	OTT Orchestration	Cross domain and Heterogeneous environment	Hierarchical deployments	Service Chaining and data bus coordination	Enhanced Security using OAuth2, RBAC
Infrastructure management	Unattended LCM (nZTP & Cloudlets)	Multi-site management (Multi on-premise and multi-cloud)	Resource manager agnostic (Virtual + Physical)	PXE and Extended IPXE over LAN	Card computers and white boxes
Telco Functions	Vendor-agnostic LCM of V/CNFs	Automated Policy management	Telco Function Interplay	5G-in-a-box	MEC/UPF Deployment
Application & Service Management	Automated LCM (Health monitoring & bootstrapping)	Platform awareness (SR-IOV + Acceleration technologies enabled)	Placement advisor (Resource driven + Location driven)	Automation Control loops (KPIs + Performance models)	SDK (available 2022Q1)

NearbyOne supports end-to-end deployment from design to operations.

The solution provides mechanisms to Automate and Orchestrate the infrastructure and the deployment of components, both nodes and applications.

The operations team can leverage NearbyOne's single pane of glass for managing the provisioned services.

Global Orchestration Capabilities

Model Driven: Service creation is based on business rules that are specific to the application or the use case. The orchestrator dynamically reacts to the needs of services, according to pre-defined QoS goals.

Single pane of glass: NearbyOne not only provides mechanisms to automate and orchestrate provisioning of services through a drag and drop approach but also gives access to the catalog of ISV edge solutions and pre-defined bundles allowing rapid deployment of services.

OSS/BSS Integration: The solution has the capability to expose its North Bound Interface to connect to the OSS/BSS network of the customers through REST/NETCONF/GraphQL.

Multi-Tenant Architecture: For mass deployments of computers in large-scale environments, Nearby One enables self-registration of equipment without having to install the operating system as the orchestrator fully configures the equipment automatically. This is a particularly useful function for shipped units which can renew their Over-The-Air (OTA) systems architecture without the need to return to the workshop.

Name	Status	Service	Instance	Actions
Audio/Video Conferencing (service chain)	OK		08/07/2021, 15:08:40	c359a6a5-bc8b-4935-9c87-07e0c7b7d73
Casa-5GCore5G-in-a-box (service chain)	OK		30/06/2021, 00:06:54	4073b3ec-68b3-4935-97c1-d0416c886713
Edge Cloud GaaS (service chain)	OK		12/07/2021, 10:49:08	c359a6a5-bc8b-4935-9c87-07e0c7b7d73
EdgeCDN-WD (service chain)	OK		07/07/2021, 14:56:04	4073b3ec-68b3-4935-97c1-d0416c886713
HorizontalMassDetection (service chain)	OK		08/07/2021, 13:12:26	c359a6a5-bc8b-4935-9c87-07e0c7b7d73
SelfAnalytics (service chain)	OK		07/07/2021, 08:29:25	4073b3ec-68b3-4935-97c1-d0416c886713

Micro and Macro Orchestration: The solution observes two complementary orchestration approaches in terms of management. Micro orchestration comes into play to provide fine-grained resource allocation per service, for instance to enable co-location of mission-critical system applications with low priority workloads. On the other hand, macro-orchestration controls high-level visibility and management of all the points of presence (POP) in the field from a global point of view.

Differentiated Roles and Access: Each tenant has dedicated resource slices, VNF and applications based on the agreed setup. The service provider can assign the tenants to perform node onboarding, network provisioning and application deployment based on demand or just perform fully managed services depending on their agreement.

OTT and non-OTT Orchestration: The solution allows users to create services that work Over- The-Top (OTT), at the highest layer of network configuration without being limited by network characteristics. Depending on the deployment environment, users can also include the orchestration of network devices. This can be done through services that configure the OSI Layers 2, 3 and 4, and even operate SDN drivers.

Cross-domain and heterogeneous environment: Created services can be deployed to different architecture environments without the need to distinguish between public cloud, datacenter, network edge, on-premise edge or IoT driver. They are all defined and managed the same way.

Hierarchical Deployment: The hierarchical deployment functionality increases the scalability by allowing users to tailor the deployment to the exact topology of the use case. This also ensures greater security in terms of effective implementation of deployments because the operations do not depend on a single Master node.

Service Chaining: The services consist of low-level service templates that can be combined to form higher level use cases that can be further combined and adapt to fit business operations rules.

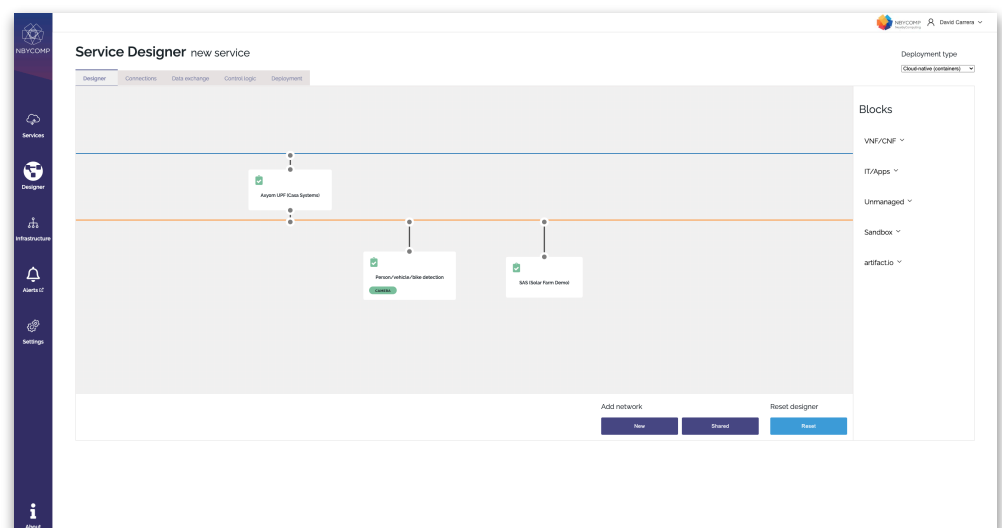
Data bus Coordination: While each tenant application is in its own secure environment with a service guarantee, the system has a bus or queue to generate interactions between these applications. With this, the usual limitations caused by the vertical silos are resolved and the implementation of 100% edge computing solutions is achieved.

RBAC: Role-Based Access Control allows you to specify permissions for individuals and groups.

AAA: All user actions are secure and follow OAuth2 approval processes, identifying and authenticating the user and ensuring that the user has sufficient authorization level. These processes are subject to strict traceability and accountability rules for adhering to invoicing service rules and Quality of Service (QoS) policies.

Interoperable and agnostic

We support all kinds of infrastructure providers including Hyperscalers, Public, Private and Hybrid clouds.



Infrastructure Management

Automated Onboarding of newly Registered Devices: Automatic device provisioning and configuration at the OS applications level are performed for each tenant. This enables users to operate at data level without the need for an on-site technician.

Near Zero Touch Provisioning: Nearby One enables self-registration of equipment without having to install the operating system as the orchestrator fully configures the equipment automatically. This is a particularly useful function for shipped units which can renew their Over-The-Air (OTA) systems architecture without the need to return to the workshop.

Cloudlets: The solution on can manage small-scale cloud datacenters located at the Edge.

Multi-Site Management: The Nearby Controller has the capability to manage and orchestrate multiple edge sites located anywhere, be it on customer premise or even in a cloud environment. The extended orchestration system covers flat networks where all nodes are on the same plane.

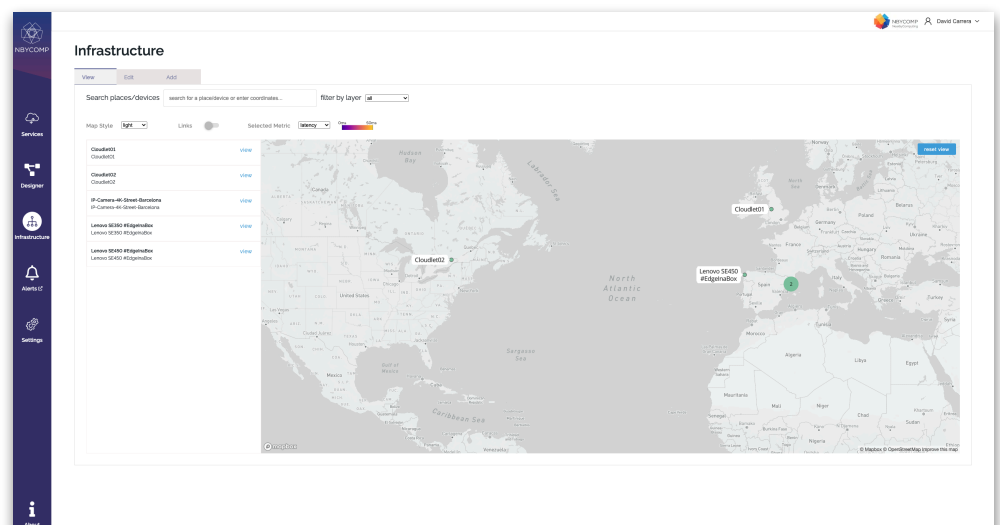
Support for PXE over LAN: Nearby One includes a PXE (Pre-boot Execution Environment) redirection service over LAN, over which PXE clients can directly obtain a system image and run it.

Extended IPXE over HTTPS: Nearby One also offers a pre-boot iPXE HTTPS server for greater security. NearbyComputing presents this extended functionality which automates remote system provisioning and application deployment into a single procedure.

Card Computer and White Boxes: NearbyComputing manages the spectrum of low-end IoT computing platforms and industrial rugged PCs to powerful data-center servers in a uniform way.

Client/Server Managed VPN and S2S VPN: Nearby One can access managed nodes via a Virtual Private Network (VPN) connection. Moreover, the orchestrator can configure the parameters of the connection, allowing users to overcome intermediate barriers such as firewalls, proxies, etc. The orchestrator also allows users to connect to remote nodes via site-to-site VPN.

Complete Integration with Runtimes (Kubernetes, Openstack, Cloud, Platforms): Nearby One offers full integration with the most common application deployment environments. Any decision on which among them will be used will depend on the high-level services description and parameterization. In that way, the systems administrator benefits from an orchestration stack that entirely decouples the data plane from the control plane.



NearbyOne supports provisioning and management of all virtual functions as well as fully containerized solutions.

This enables the solution to run stand alone or connect seamlessly to the existing infrastructure.

VNF/CNF Operations

Vendor Agnostic: There is no dependency between the solution and the hardware that will be integrated either at the system or network level.

Automated Policy Management: The solution can perform traffic steering to the correct applications and the QoS of the traffic is monitored and maintained.

Telco Function Interplay: The solution can leverage SD-WAN capabilities regardless of the access technology such as MPLS, LTE or even fixed access technologies.

5G-in-a-Box Solution: The solution can provide a fully private 5G network at the edge covering both the RAN and 5G Core elements that can be leveraged by Enterprise clients.

MEC/UPF Deployment: NearbyOne can deploy the Telco Edge which allows the user plane function (UPF) to sit at the Edge excluding the RAN and the 5GC control plane, with the latter sitting at the Core Data Center.

Application and Service Operations

Automation Control Loops: Dynamic scaling and management of resources are available through the deployment of probes in the devices collecting telemetry and status allowing policy enforcement.

Automated Lifecycle Management: The solution is capable of continuously monitoring the current configuration of all the nodes that make up the network being orchestrated. It also provides an API interface for automated data insertion in third-party asset management systems. Telemetry and KPIs are continuously monitored at the infrastructure level (i.e. platform, chassis and network) for real-time analysis of the current workloads.

Acceleration Technologies Supported: The solution covers Edge architectures based on hardware accelerators allowing versatile and compact solutions providing the appropriate hardware in relation to its power. It adapts to different environments with variable demands of resources such as video analytics at the end (edge) of the network. **Placement Advisor:** Ability to advise on resources for deployment, such as where specific accelerators are required. This allows for optimum resource usage.

SDK: The solution through the Block Builder function provides support for an interface that will allow customers to integrate specific Edge services into a managed block that in turn provides access to Life Cycle management, KPI monitoring and automation functions.

Monitoring and event signaling: rich platform and application telemetry, logs and alerts, that can be integrated with the NOC central repository and display systems.



NearbyOne Orchestrator

Deployment Options

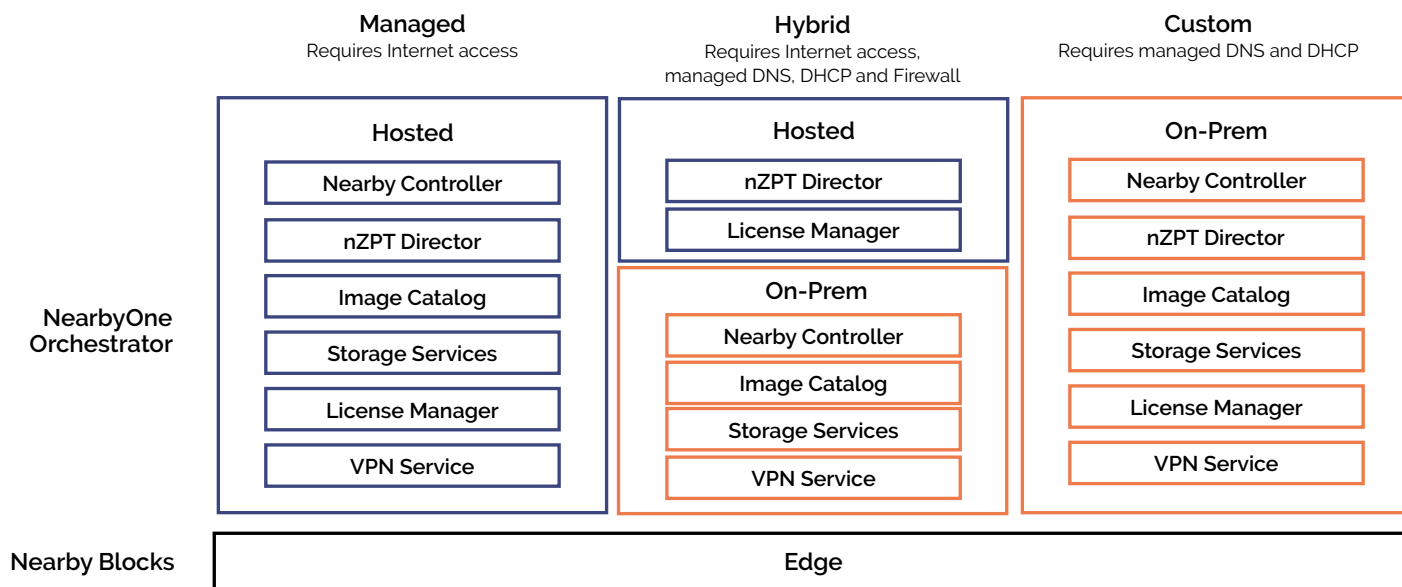
Nearby One can operate in all tiers of global service deployment covering from the Edge to Data Centers up until the public clouds. It can be deployed as a pure cloud-managed service, where all components sit in a public or private cloud location.

Another option is to deploy it as a self-managed service where the customer hosts part of the key components on premise and some node provisioning and service licensing components are hosted in the cloud. And lastly, as a full on-premise deployment completely managed by the customer. With all these approaches, Nearby One fits the needs of all types and sizes of customer.

The deployment scheme to be used will be based on the requirements of the customers to deliver the end-to-end services. Different schemes will require different hardware technologies. These include the following:

- Low power processors for Constrained Power-budget Environments
- Neural processors for efficient Video Analytics
- High-end solutions for Data Centers

NearbyOne Deployment Schemes





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About Nearby Computing

Nearby Computing helps Telcos & Enterprise customers unleash the potential of Edge Computing through Orchestration and Automation of MEC and 5G. The Nearby One is an orchestration platform that goes beyond market standards to manage all tiers of the network, from Cloud and Data Centre to Edge, from a single pane of glass. Using a cross-domain approach that is fully agnostic, it is able to manage hybrid networks at scale through domain-specific orchestration and comprehensive end-to-end orchestration. The solution covers all critical elements of deployment automation-from the initial Edge node provisioning to application on-boarding, to lifecycle management and QoS Assurance to SLA monitoring.

The company was founded in 2018 and operates globally from its headquarters in Barcelona, Spain.

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