Nearby One
The solution for End-to-end Cross-Platform Edge-Cloud Orchestration

Product description

The Edge effect...
Edge computing architectures have already proven their practical benefits by allowing network managers to:
• deploy and manage computationally intensive and low latency applications, especially voice and video analytics
• perform most operations linked to IoT networks, standardize data, run automation and download from the cloud
• dynamically manage backhaul bandwidth through adaptive deployment of edge resources based on demand (in LTE networks)
• create bridges between tenants in multi-tenant environments, breaking the silos to enable high value cross-applications, such as industrial safety or energy efficiency, which have required huge investment in integration services until now

Edge is exponential
However, as is typically the case in edge computing scenarios, managing the lifecycle of nearly three orders of magnitude more devices than a cloud deployment with a wide range of topologies means increased complexity. In addition, devices are geographically dispersed and are no longer controlled by system administrators because they are located at the site of operation. More devices, more topologies, more locations, more complexity... all imply more cost.

Edge, only economical
Nearby One makes edge easy and efficient which in turn helps you to control your OpEx. Projects that were once considered cost prohibitive are now affordable thanks to our smart orchestration technology.

End-to-end Edge
Users set up end-to-end value-add services (VAS) via a simple and intuitive User Portal. These services are implemented via models in our abstraction layer where they can be deployed on their own or combined into complex service chains.

Moreover, these services may be integrated into an invoicing system like a BSS, for eventual pricing as required.

The Nearby One solution platform provides you with:
• an end-to-end orchestration tool for Edge deployments
• infrastructure, Platform and Software as a service (IaaS/PaaS/SaaS) that is edge-ready or for private or public cloud locations
• an applications deployment environment in virtual containers or VMs
• deployment capacities for Functions as a Service (FaaS).
• an integrated engine for bare-metal system provisioning with over-the-top (OTT) upgrade capacity
• a Simplified Service Builder, i.e. an easy-to-use environment for defining service chains that may be deployed separately or combined for value-added or business services
• a real-time monitoring display service status and use of services in their respective layers
• an SLA and placement manager, able to automatically react to any event and maintain SLA by re-configuring the network architecture as needed.
• a solution ready to be deployed following Platform and Software as a service (PaaS/SaaS) paradigms, that is edge-ready or for private or public cloud locations
• in addition to all of this, the ability to meet the requirements for identity, end-to-end security, licensing control, integrated invoicing and CMMS that you would expect to find in an enterprise solution

Nearby One is the solution for communications network operators and businesses that need to manage networks from remote locations, including mobility systems such as transport or vehicle fleets.
**Architecture Components**

**Architecture on two levels**
The Nearby One solution is composed of two main elements:
- The Nearby Orchestration Platform is the main component of the solution, runs in a central location and is in charge of performing all tasks related to the orchestration of applications and infrastructure.
- The Nearby Blocks are distributed components that encapsulate logic and code for different application-specific functionalities.

*Selection of Nearby Blocks provided only as example – each deployment*

**Multilayer Orchestration Engine**
The power of Nearby One: Instantiating and managing multi-tier services, covering provision, deployment and life cycle management

Nearby One enables an expanded level of orchestration that places elements, which usually fall outside the specifications of the standards covered on the same level of control. The power of Nearby One lies in instantiating and managing multi-tier services covering a range of needs in the provision, deployment and life cycle of a complex service, and in orchestrating the functionalities of the network, as well as the availability of systems and applications. This approach is particularly powerful in hybrid environments and complex configurations with multiple coordinated applications. Thanks to the capabilities of Nearby One solution, customers and users can adapt the technology to the real-world situations faced in everyday operations.
Dashboard
Our portal provides a user-friendly environment for creating E2E services that includes setting parameters and controlling deployment as well as monitoring operational status and operating performance in real time and over a given period of time. Users can transparently and intuitively control execution of process on a set of links to the network, distributed systems and applications. Our environment offers users and groups complete control of access with a high degree of granularity, so that administrators can decide with total flexibility which features each user can access.

Operational Control
All managed nodes and services are continuously monitored to assess the platform and the software performance of all components. Nearby One solution collects key performance metrics of the hardware components and aggregates them into a time series database where they can be processed and analyzed. Service KPIs are also collected at all times, and aggregated into the same time series database. Therefore, platform telemetry and service KPIs can be correlated to continuously understand the performance of the solution components and dynamically adjust resource allocation and service placement decisions. Customizable dashboards can be built on top of the operational data using Grafana, which is natively deployed as part of the Nearby Orchestration Platform.

Service-to-Devices Registry and Database
One of the keys to orchestration in large-scale environments is in the permanent mapping between the state of the (abstract) services and the reality of configuring all devices involved in order to run these services. This component in Nearby One has been specifically designed to ensure scalability, as well as to provide a simplified and transparent provisioning and onboarding of users in extraordinarily broad conditions.

Nearby One combines relational and non-relational database technology to ensure speed, scalability and future adaptability to challenges. It continuously expands the scope of orchestration.

API Engine
Creating high-level E2E services requires the generation of a service-level API that can be individually activated in each instantiation. These individual services are generated in each layer in a secure environment depending on the parameters that have been set by the administrator.

The API engine is based on GraphQL technology which provides decisive power and versatility when generating an abstraction layer. It also decouples the formulation of high level business services from the control of low-level processes.

Security management
Nearby One offers solutions at the various levels of security related to identity, integrity and / or availability. It is a product that enables you to secure your service deployments as well as your equipment provision. This is achieved using the company’s own integrated tools along with another layer of security services that are deployed in parallel to business services. They are mana-
ged using monitoring and tracking tools for security events and can perform such specific and useful functions as block access to USB ports on machines in uncontrolled environments.

Deployment Models

Nearby One deployment options
The Nearby One solution can be deployed as a pure cloud-managed service, where all components sit in a public or private cloud location; 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; or as a fully on-premise deployment completely managed by the customer. With these approaches, Nearby One fits the needs of all types and sizes of customers.

Key Components

E2E Service Orchestrator
End-to-end orchestration is a quantum leap forward for conventional NFV or SD-WAN orchestration. Nearby One pushes the boundaries of orchestration to automate comprehensive service provision procedures. Our reactive orchestration engine supports advanced and abstract rules that will allow you to dynamically deploy your resources where and when they are needed.

Service Creator&Manager. High availability
A graphic management interface allows you to register instances of services on the selected nodes. The operator need only provide configuration parameters to deploy the service components. The system can monitor node status; if a node is unavailable, the system can automatically restore the service to other active nodes with available resources.

Complex Service Processing
A service is an entity with a logical sense, whatever it may be, in the field of network or systems management. Services increase efficiency in human and computing resource management in order to achieve scale and to secure procedures at controlled costs. Nearby One incorporates tools that allow the user to define complex services that can link an indeterminate or adaptive number of actions according to multivariate algorithms rules.

Multi-tenant Access
One key of the key design goals of Nearby One is to achieve a complete multi-tenant environment. Our technology guarantees being able to transparently use all the physical resources among different corporate users. Each one of the tenants can perform their deployments in a secure environment with the guarantee of auditing. In addition, the system provides gateways to exchange data and events to be able to generate concerted actions between tenants in cases that are defined as part of the orchestration of services.

Monitoring Center
Nearby One incorporates a monitoring console to show the status of systems and links for the entire managed network. The operator can build custom dashboards using different graphic solutions (e.g. map, network diagram, etc), prioritizing the aspects that are most relevant to their use case. At the same time, the operator can create alarm and notification systems, access logs to retrieve system event information and generally supervise each node or device in the entire network with a great deal of granularity.

Administration Manager
Nearby Computing is for organizations of any size that have a vast number of users with a wide range of roles and functions. It can be configured with complete granularity. The management environment enables the user to manage every aspect of the active license from billing scheme to accounting services, historical access and use notifications, API activations or connectors for third-party applications.
## Features and Benefits

### Orchestration by abstract service models

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<th>Feature</th>
<th>Description</th>
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<td><strong>Model-driven</strong></td>
<td>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 the data plane.</td>
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<td><strong>Service chains</strong></td>
<td>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.</td>
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<td><strong>Data bus for coordination between tenants.</strong></td>
<td>While each “tenant” application is located in its own secure environment with a service guarantee, the system has a bus or queue data to generate interactions between these applications. This way the usual limitations caused by the vertical silos are resolved and the implementation of 100% edge computing solutions is facilitated.</td>
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### Multi-tenant environment

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<td><strong>Differentiated roles</strong></td>
<td>Each tenant has its architecture of customized roles, and a single user may have different roles in each tenant environment.</td>
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<td><strong>RBAC</strong></td>
<td>Role-Based Access Control allows you to specify permissions for individuals and groups.</td>
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<td><strong>AAA</strong></td>
<td>All user actions are secure and follow OAuth2 approval processes, identifying and authenticating the user and ensuring that the he/she 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.</td>
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### Multivendor CPE

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<td><strong>White Boxes</strong></td>
<td>In IoT, it is common to install industrial rugged PCs for aggressive environments. NearbyComputing treats these PCs transparently and like any other node.</td>
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<td><strong>Vendor Agnostic</strong></td>
<td>There is no dependency between the solution and the hardware that you want to integrate either at the system or the network level.</td>
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<td><strong>Cross-Platform</strong></td>
<td>Services created using NearbyComputing 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 in the same way.</td>
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<td><strong>Ready for novel Intel acceleration technologies</strong></td>
<td>Nearby One also covers Intel Edge architectures based on hardware accelerators allowing for versatile and compact solutions for hardware available in relation to its power. It is particularly able in environments with variable demand for resources, such as video analytics at the end (edge) of the network.</td>
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<td><strong>OTT and non-OTT orchestration</strong></td>
<td>Nearby One allows you to create services that work Over-The-Top, at the highest layer of network configuration without being limited by network characteristics. At the same time, depending on the deployment environment, you 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.</td>
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<td><strong>IT asset management</strong></td>
<td>Nearby One enables a search for, location and continuous follow-up of the configuration data for all computers and nodes that make up the orchestrated network. It also provides an API interface for automated data insertion in third-party asset management systems.</td>
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### nZTP and automated device onboarding

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<td><strong>near Zero-Touch Provisioning</strong></td>
<td>For mass deployments of computers in large-scale environments, Nearby One enables self-registration of equipment without having an installed operating system. The orchestrator fully configures this 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.</td>
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Support and Other Add-on Services

NearbyComputing provides the professional services required to implement an orchestration solution that is tailored to fit your needs. We will evaluate your current infrastructure in order to define, develop, test and deploy automated processes and services to fully satisfy your requirements. Additionally, our trainers will provide a solid foundation for users and managers so that your company can get the most out of your solution. Finally, NearbyComputing offers support and maintenance throughout the product lifecycle.

Orders and Request for Information

NearbyComputing offers a variety of software product licenses and solutions that allow you flexibility in selecting the products that make the most business sense for your company.

For on-prem products, customers may choose between installing Nearby One on available hardware or purchase products that have been pre-installed and pre-configured on top tier qualified hardware that is delivered with support and maintenance.

For more information, visit our website: www.nearbycomputing.com.

About NearbyComputing

NearbyComputing SL is a spin-off of the Barcelona Supercomputing Center - National Center for Supercomputing, and the Universitat Politècnica de Catalunya. We are focused on the development and implementation of advanced management solutions for computing systems in complex environments.

NearbyComputing, S.L.
Trav. de Gracia, 18 3º 3ª 08021 Barcelona   T +34 93 655 00 50   info@nearbycomputing.com   www.nearbycomputing.com