Solution Brief

Telco

Prodapt Offers "One Stop Shop" for Edge Deployments

Prodapt is working with Intel® and other leading Open Virtual Exchange partners to develop the Network Edge Accelerator Test (NEAT) lab for fast edge compute deployment and orchestration

With the deployment of 5G, an exciting new set of use cases and services are emerging. Some of the use cases centered on the industrial internet of things (IIoT), healthcare, gaming and enterprise applications rely on ultra-low latency networks. Additionally, a large number of employees across the globe are working remotely, driving a significant demand for bandwidth and cloud-based collaboration services. In fact, IDC expects that remote workers will account for a quarter of the global workforce by the end of 2021.[1]

These trends put significant pressure on the telecommunications infrastructure to provide enough low latency access to compute resources to enable a seamless hybrid work environment between the remote office and the physical corporate office.

Communications service providers (CoSPs) are learning that the best way to deliver low latency access to compute services is through building a virtualized or containerized edge compute infrastructure, utilizing a hyperscaler and private approach known as ***multi access edge compute*** (MEC) and ***network edge compute*** (NEC). Industry analyst firm Omdia predicts that by 2024, ***5 million servers will be deployed at the edge***, up from approximately ***2.5 million servers in 2020***.[2]

One of the key benefits of edge computing is that it can move data processing closer to the customer premises, reducing data travel time between the application and the customer premise so that user requests can be processed more quickly. Edge computing supports high bandwidth and low latency and may encompass "far edge computing" or "near edge computing." The far edge refers to edge resources deployed closest to the user, at the bottom of a cell tower or within a manufacturing campus, for example. The near edge refers to data that is processed within the central office (CO), between the far edge and cloud data centers.

Edge computing deployments can be complex, involving a combination of open source and proprietary software. This may require the need for products from multiple vendors, so ensuring interoperability and compatibility among vendors is important.

Finally, edge management requires automation to reduce OPEX so that CoSPs can remain competitive. Servers need regular updating and constant monitoring. In addition, the services that the edge resources support require life cycle features that automate the deployment or decommissioning of services.

CoSPs overcome these complex challenges by partnering with a skilled system integrator who has the skill, partnerships and a deployment lab that is required to address these challenges. The Lab should also be configured to deliver and deploy the tools and platforms required to operate an edge network.

Intel® Network Builders ecosystem partner Prodapt brings deep-level end-to-end (E2E) system integration experience as well as edge-specific management and automation software that utilizes Intel® Smart Edge Open technologies to help CoSPs build and manage edge networks. For an enhanced focus on the edge compute market, ***Prodapt is working with Lanner Electronics on the Network Edge Accelerator Test (NEAT) lab*** with all of the hardware and software resources available to develop the right edge solution for any CoSP application.

The first NEAT lab is located in Bangalore, India, and offers CoSPs an ability to create edge compute solutions that utilize Prodapt system integration, ecosystem technologies and tools all running on Lanner's Intel architecture-based servers.

Prodapt Integration, Innovation, ISV Ecosystem and Tools

Edge deployments require a considerable amount of resources and management skillsets that are new to CoSPs. Prodapt brings end-to-end system integration expertise across the design, development and deployment of edge networks. Prodapt's SI services help CoSPs with strategy assessments, high-level and low-level designs, project execution, ongoing lifecycle management and enhanced monitoring and site reliability engineering and operations (SREOps) as CoSPs begin the journey to evolve their technology and networks to offer new digital services.

The company's areas of practice include cloud and network services, business processes, managed network services for SD-WAN, SASE and MEC deployments and operational / business support systems. Through Prodapt's Next-Gen Labs, CoSPs can work with the Prodapt team to develop new services or capabilities in artificial intelligence (AI), machine learning (ML), DevOps, cloud native microservices, and internet of things (IoT) services.

While leading these works, Prodapt is defining a reference telco architecture where such services and capabilities should be positioned. In a digital age that is disrupting the telco industry, it is key to have a digital services fabric that emphasis automation, supports closed-loop service fulfillment and assurance and foresees a constant optimization of the network. Figure 1 shows Prodapt's vision for a framework that enables the network of the future.

With the constant evolution of the network and the various combinations of connectivity and OTT services offered by the CoSPs, it is crucial to define clear processes and to decouple what is sold and what is delivered to a customer. In addition, defining such an integration strategy improves CoSP IT delivery processes when applying DevOps and agile methodologies.

The architecture shown in Figure 1 defines the key capabilities to support fulfillment and assurance activities all the way from the customer orders down to the network activation. Zooming in, a customer journey gets started with identity management and the product order capture. As soon as the customer order is validated, the purchased offers and products are realized by services that define the solution know-how, always abstracting network complexity and vendor specifications. These services, depending on their defined characteristics, can then be supported by one or multiple resources that comply with vendor-specific *network functions*.

This reference architecture is being driven by the well-known CoSP requirements to simplify and digitize their customer journeys. The end goal should always be to improve customer engagement processes so that a better experience can be delivered to the buyer.

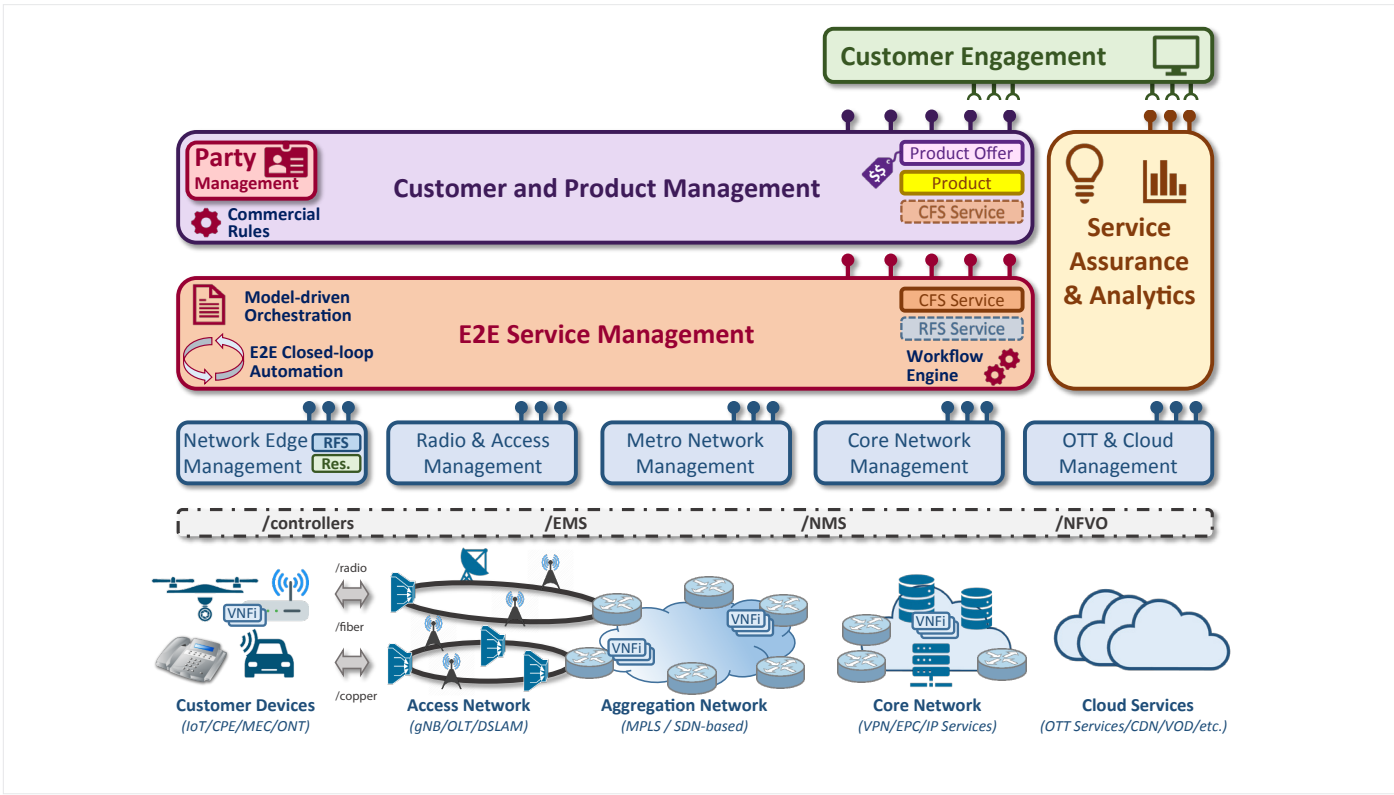

Figure 1. Prodapt's telco architecture framework.

Prodapt augments its SI services with technology and testing expertise and the partnerships with major technology providers as part of its ***Open Virtual Exchange (OVX)*** program, its ***Lite Edge Orchestrator (LEO)*** for orchestration and its NetBots.AI for network automation and management. Here are short summaries of these innovative frameworks:

Prodapt's Open Virtual Exchange (OVX) is a global, virtual network services marketplace and ecosystem of leading providers of SD-WAN, uCPE, secure access service edge (SASE) services, AI operations, and end-to-end service orchestration technology.

Through OVX, Prodapt can deliver virtual network services and the test and integration capabilities to accelerate the launch of new digital services. OVX empowers CoSPs and virtual edge vendors with 360-degree partnership offerings across engineering, technology, lab-as-a-service, and development services.

Prodapt's Lite Edge Orchestrator (LEO) is an edge domain service orchestrator that is specifically designed to provide edge compute-specific orchestration, particularly for the vRAN and ORAN environment. Built using the Topology and Orchestration Specification for Cloud Applications (TOSCA), LEO describes the edge compute environment and uses open APIs to connect and exchange data with the orchestration system.

LEO enables composite services that seamlessly bundle and operate innovative edge applications along with a CoSP's multi-access 5G network services, to satisfy the growing number of monetizable edge use cases.

LEO is fully integrated with Intel® Smart Edge Open software to help orchestrate edge compute hardware. The company chose Intel Smart Edge Open because it is a royalty-free edge computing software toolkit with a growing ecosystem that enables highly optimized and performant edge platforms to onboard and manage applications and network functions with cloud-like agility across any type of network. The LEO edge MANO solution builds upon Intel Smart Edge Open edge control stack by turning it into a service through the use of its intent-driven domain orchestration and OpenAPI exposure which enables integration with other applications in the operator's wider operational landscape.

Prodapt optimizes its software for servers based on 3rd generation Intel® Xeon® Scalable processors. The 3rd generation Intel Xeon Scalable processors are engineered for modern network workloads, targeting low latency, high throughput, deterministic performance, and high-performance with enhanced hardware-based security and exceptional processing performance, the processors are built with the performance needed to deliver flexible and scalable edge computing solutions.

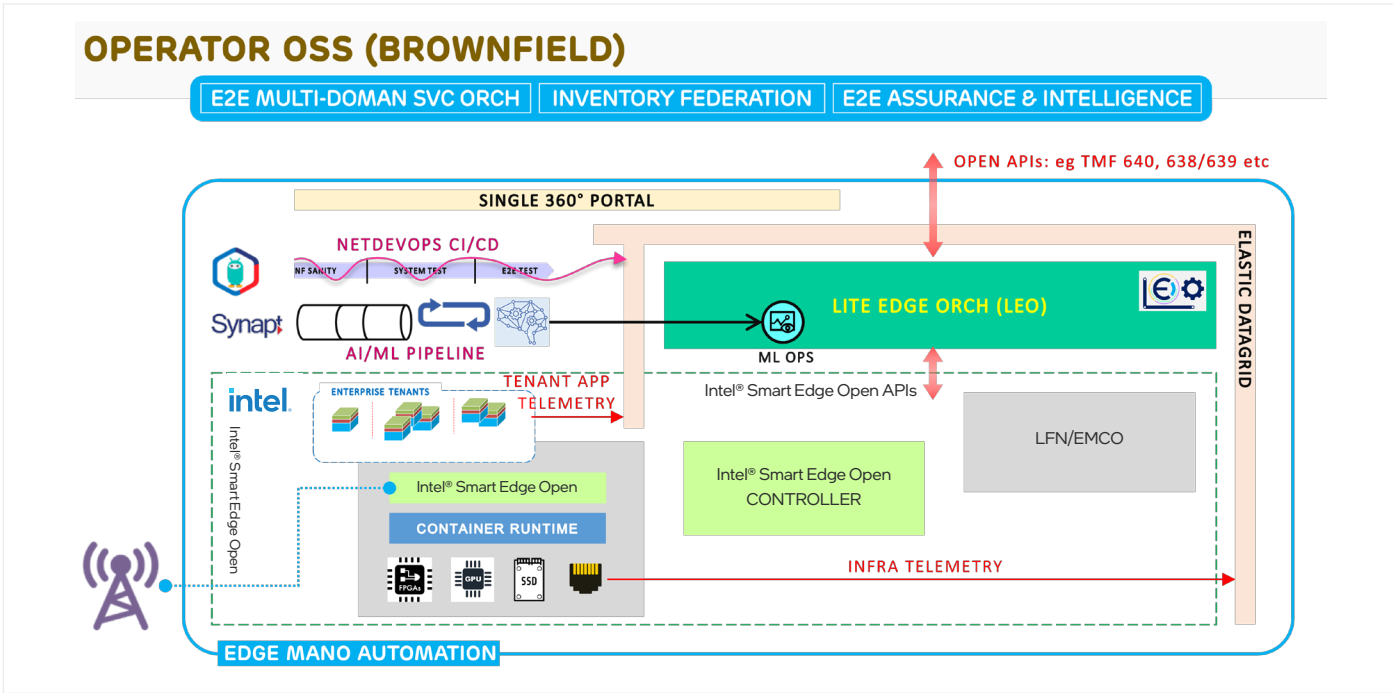

Figure 2. LEO block diagram.

NetBots.AI

Due to the remote nature of the edge compute locations, automation is critical to keeping pace with technology innovation and rapidly accelerating customer demands. **Prodapt's NetBots.AI** is an AI-powered network automation and validation platform designed to address large and distributed edge compute deployments.

With automated configuration and change management, NetBots.AI provides one-click provisioning using off-the-shelf test cases, which tends to create a large number of built-in bots that support multiple southbound interfaces to connect to devices. The NetBots.AI framework is flexible enough to support multiple bots to address the entire workflow. NetBots.AI enables order management, provisioning and service activation, test and acceptance, zero touch provisioning (ZTP) in data centers and central offices, network health checks and system validation.

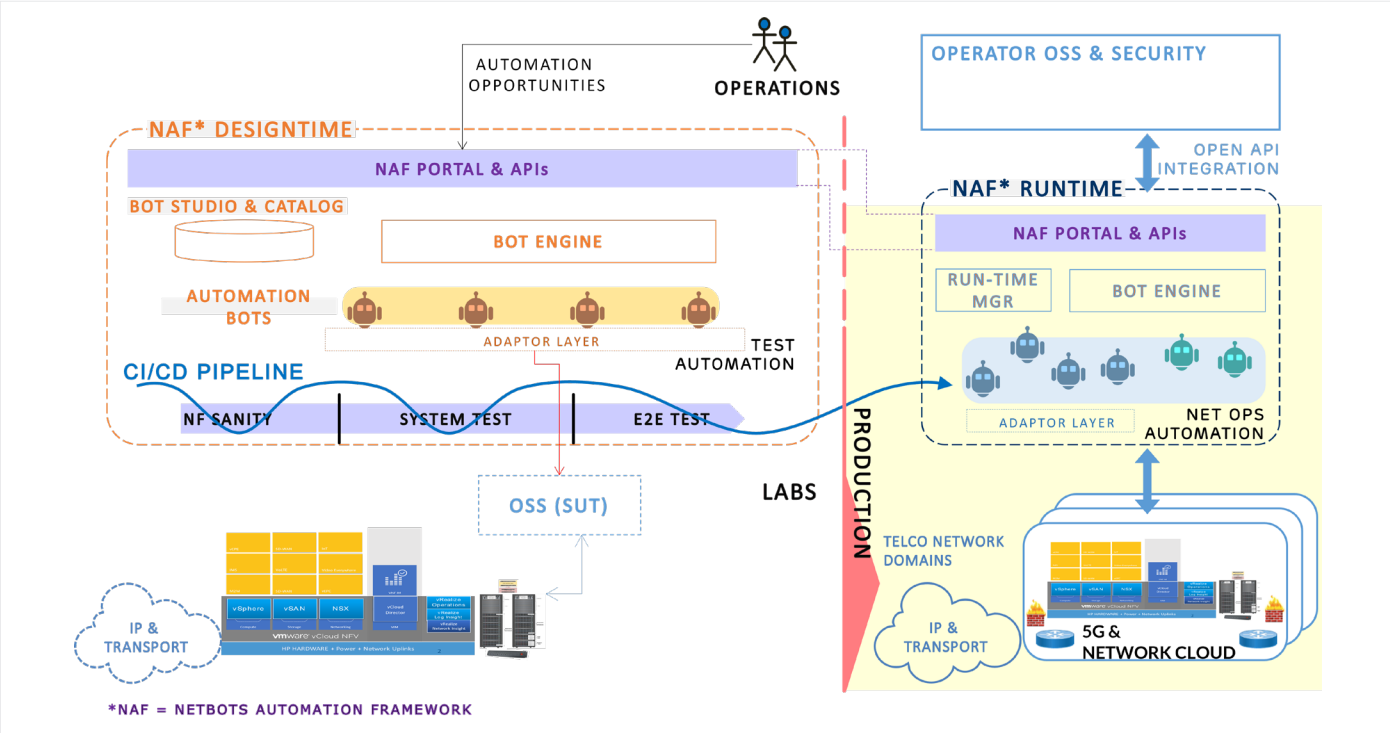

Figure 3. NetBots.AI architecture

NetBots.AI automates intelligent operations such as network operations center repetitive tasks, alarm and fault monitoring and suppression, alarm correlations, security threat management, network turnups / decommission and configuration backups. A vendor-specific adapter supports multiple vendor network devices and bare-metal servers. This extensible architecture helps in quick integration with northbound and southbound applications/devices and helps network operators to simplify operations over the network without worrying about vendor dependencies.

NetBots.AI includes a status and productivity portal with role-based dashboards for different KPIs. Within the portal, users can access network utilization, a KPI calculator, fault diagnosis, root cause analysis, demand management and site engineering and analysis. The bot status summarizes the status of all the triggered automation suites. The dashboard provides a view of the OPEX/CAPEX savings with options to choose multiple input qualifiers. The portal also provides a real-time view of devices in the network.

NEAT Lab Accelerates Edge Server Deployments

Prodapt's NEAT lab leverages the company's system integration services, ecosystem and tools as well as Lanner servers to create a proof of concept (PoC) environment that enables CoSPs to shorten their time to market for edge deployments. The lab also has complete test facilities to enable performance evaluation and benchmarking. The lab also works with service providers and independent software vendors (ISV) to test out new services and capabilities.

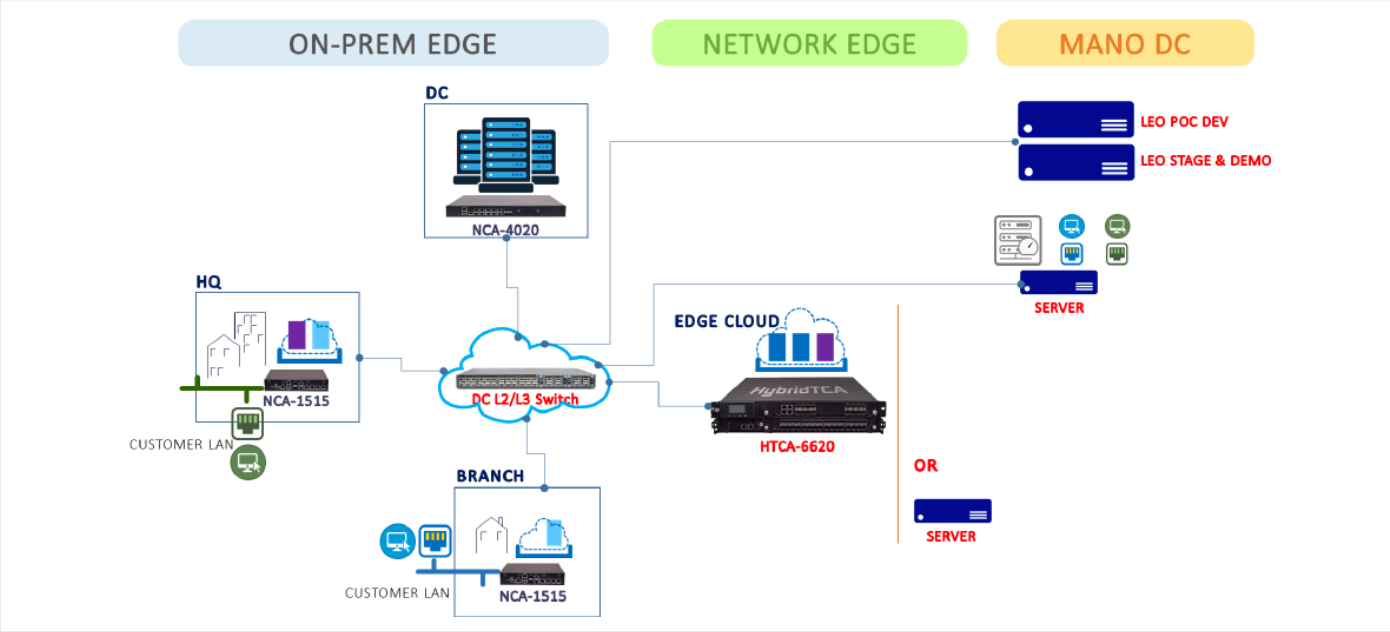

Figure 4. NEAT Lab configuration.

Figure 4 depicts the NEAT lab with an emphasis on the Lanner servers that provide the hardware performance for the PoCs.

The Lanner HTCA-6620 has been selected to provide the network edge compute functionality in the NEAT lab. The HTCA-6620 is a high-performance network session border controller (SBC) appliance, featuring a 2U rackmount chassis.

The server features powerful processing, with two CPU blades, each supporting up to two Intel® Xeon® E5-2600 v3/v4 CPUs with 16 DDR4 sockets for memory. For internetworking, the server supports up to a 1280 Gbps fabric capacity leveraging 100GbE Intel® Ethernet Network Adapter E810 through the backplane. This allows the platform to provide line-rate 100GbE connectivity. The HTCA-6620 is certified compliant with the Network Equipment Building System (NEBS) standard. The lab is planning a future upgrade to 3rd generation Intel Xeon Scalable processor-based servers.

For the on-premise edge, NEAT lab participants have a choice of two Lanner servers. The NCA-4020 is a vCPE/uCPE platform that is designed to reduce complexity via extensive hardware and software integration.

The server features four 16-core Intel® Xeon® D-2100 processors, ten GbE RJ45 (8 Port PoE+) and four 10GbE SFPs. With the utilization of the Data Plane Development Kit (DPDK) and Intel QuickAssist Technology (Intel® QAT) for improved network performance, the optimized Lanner NCA-4020 hardware can deliver significant performance enhancements, reduce testing and validation efforts, and accelerate time-to-market deployments.

The NEAT option for the branch office is the Lanner NCA-1515, a desktop network appliance powered by the Intel Atom™ C3000 CPU. The network appliance features robust performance and built in Intel QAT, offering cryptographic acceleration and commercial-grade LAN functions in a small form factor.

The Intel Atom C3000 CPU and Intel QAT work together to boost network responsiveness and security by distributing processing power to more critical applications and by offloading computationally intensive compression and encryption/decryption tasks. The network appliance also features up to 32 GB of DDR4 2400/2133/1866 MHz memory, two mini-PCIe slots and one M.2 2242 slot with dual nano SIM, one RJ45 console, two USB 2.0, one onboard EMMC (8GB) and one optional 2.5" HDD/SSD bay. Wireless connectivity is built in with LTE and Wi-Fi as build options.

Intel Security Features

These servers utilizes a number of Intel platform security technologies to enhance application security, including the following features:

Intel® Software Guard Extensions (Intel® SGX) are a set of instructions that increases the security of application code and data, protecting from disclosure or modification. Intel SGX allows for the partition of sensitive information into enclaves, which are areas of execution in memory with more security protection.

Intel® Security Libraries for Data Centers (Intel® SecL - DC) consists of software components providing end-to-end cloud security solutions with integrated libraries. Intel SecL - DC is designed to leverage the platform hardware security features and provide an easy to use deployment model and pre-validated security usages

Intel® Secure Device Onboard (Intel® SDO) is an onboarding system that is fast, open, and provides additional security. Intel SDO features zero-touch onboarding in less than one minute and supports a wide range of processors.

Conclusion

Customer demand for low latency access to cloud resources is rapidly growing on a global basis and CoSPs are accelerating the build out of an edge compute infrastructure to deliver these low latency services. Edge computing reduces data travel time for faster processing, but deployments can be complex and require significant investment. By partnering with the right system integrator, CoSPs can overcome the complexity and CAPEX of edge deployments, and Prodapt brings the system integration expertise and edge-specific software tools to partner with CoSPs to achieve these ends.

Learn More

Intel® Network Builders

Intel® Smart Edge

Prodapt Open Virtual Exchange (OVX)

Prodapt NetBots.AI

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Notices & Disclaimers

[1] https://digitalworkplaceinsights.unisys.com/home/assets/WP_2021_DigitalWorkplaceInsights.pdf
[2] https://www.section.io/blog/7-edge-computing-predictions-2021/

Intel technologies may require enabled hardware, software or service activation.
No product or component can be absolutely secure.
Your costs and results may vary.

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