

# HPE Edgeline Converged Edge Systems

Converged OT and enterprise IT in a single rugged system for the edge





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A new product category that converges operational technology with enterprise IT in a single ruggedized system for the edge—part of an edge-to-cloud environment

## Unleash the pent-up potential of the edge

### The big picture: Extending the enterprise from the cloud to the edge

#### What is the edge?

##### And how can your business benefit from it?

Simply put, the “edge” is everywhere that is not the data center or the cloud—such as a factory floor, an oil rig at sea, an airport, or a remote office. The “things” residing at the edge are rapidly growing sources of data—cars, drills, pumps, cameras, and practically all other devices.

The ability to rapidly and efficiently capture, analyze, and act on this data enables organizations to optimize operations, redefine employee experiences, improve customer satisfaction, and differentiate business models.

Today, successful organizations must consider a digital foundation that extends to the edge and can connect across the enterprise—back to the data center and the cloud.

Three main types of insight can be gained from data collected at the edge. These can greatly enhance the operations of the enterprise.

- **Business insight**—such as, “Where is my inventory?”
- **Engineering insight**—such as, “When does a robotic arm in my manufacturing facility need maintenance?”
- **Scientific insight**—such as, “Is that a potential disease cure?”

To gain this insight, and manage and control the enterprise, the edge becomes smarter via the three Cs of the Edge:

- **Connect**—The environment must connect to things at the edge to afford a pathway to data capture, control, and actuation. Connectivity is done in many ways, such as Wi-Fi, Ethernet, industrial networks and protocols, and direct-wired I/O and sensors.
- **Compute**—Analyzing data from the edge, using cutting-edge IT capabilities like accelerators, reveals new business, engineering, or scientific insights. Compute becomes pervasive right where it is most needed, not just in the data center or cloud.
- **Control**—Configuring, actuating, or orchestrating equipment at the edge is the ultimate reason for an edge deployment. The end goals and mission of the enterprise are accomplished via action and control.

In addition, all three Cs must be undergirded with:

- **Security** built into the connectivity networks, compute systems, and control systems from the beginning
- **Services**, expertise, and proven methodologies to enable every stage of digital transformation from concept to ongoing operations





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According to Gartner, by 2022, as a result of digital business projects, 75% of enterprise-generated data will be created and processed outside the traditional, centralized data center or cloud, up from less than 10% in 2018.<sup>1</sup>

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## What is operational technology?

Operational technology (OT) is a category of hardware and software that monitors and controls how physical devices perform. OT includes industrial networks, data acquisition, and control systems.

## A new product category is needed for the edge

Unleashing the edge's full potential requires running existing and new enterprise-class business applications unmodified at the edge—not just pared-down “edge versions.” Workloads running in the data center or cloud must all run identically at the edge—whether containers, virtual machines, databases, software-defined storage, or something else.

Running the same software stacks both in the cloud and at the edge affords cost savings, ease of management, and use of existing IT and operational technology (OT) skills. To achieve these benefits, edge systems are engineered with enterprise-class compute, storage, management, and security delivered in a rugged form factor to withstand harsh edge environments. In addition, converging OT with IT requires novel approaches.

There are three main categories of OT-IT convergence value.

- **Process convergence**—IT and OT teams agree to collaborate on end-to-end workflows and dataflows.
- **Software and data convergence**—Enterprise IT applications collaborating with OT applications are applied to both traditional enterprise data and data derived at the edge.
- **Physical systems convergence**—IT systems (compute, storage, management, and security) integrate in the same system chassis with OT systems (data acquisition systems, control systems, and industrial networks).

<sup>1</sup> Gartner, “Top 10 Strategic Technology Trends for 2018: Cloud to the Edge,” March 2018.



# HPE Edgeline Converged Edge Systems

## The new product category for the edge

HPE Edgeline Converged Edge Systems deliver on two fundamental promises of value:

1. HPE Edgeline integrates and converges OT systems (control systems, data capture systems, industrial networks), in the same system chassis as IT systems.
2. HPE Edgeline shifts uncompromised enterprise-class IT systems, from the data center out to the edge.

Let's examine both promises closer.

## OT-IT convergence, only from HPE

### **Not only a pioneer in the unique space of OT-IT convergence, HPE is also considered the industry leader**

OT consists of systems such as control systems, data acquisition systems, and industrial networks. These systems perform operations that actuate and control "things" at the edge. OT also connects things and systems over interfaces such as direct-wired I/O and industrial protocols that don't exist in the traditional Ethernet-based IT environment.

Delivering capabilities above and beyond traditional gateway devices, HPE Edgeline Converged Edge Systems are first-of-a-kind offerings that physically converge OT capabilities with traditional data center IT systems—enabling customers to deploy a single integrated platform that contains both physical and virtual OT systems along with enterprise-class IT. Integrating IT with OT already at the edge enables enterprises to take action prompted by the vast amount of data gathered at the edge.

Data from OT systems can be ingested, actuated, and controlled by HPE Edgeline systems through standards-based embedded OT systems such as PXI modules from partners like National Instruments and Keysight.

To simplify and accelerate setup and deployment of converged OT and IT systems, HPE created HPE Edgeline OTLink—an innovative hardware-software combination that reduces time to deployment from days or hours to minutes or seconds.

By converging OT and IT in a single system chassis, HPE Edgeline systems deliver seven customer benefits:

1. Less space required
2. Less energy consumed
3. Fewer cables needed
4. Easy deployment and management
5. Lower acquisition and OPEX costs
6. Higher performance
7. Opportunity for first-of-a-kind converged applications



“We are enthused about the value of HPE Edgeline edge-to-cloud solutions, as we strive to significantly expand our analytics capabilities at the edge to reach our goal of creating smarter and more efficient energy delivery for our customers.”

– Dr. Steve Pratt, CTO, CenterPoint Energy

### Enterprise IT, available at the edge

With HPE Edgeline Converged Edge Systems, customers gain uncompromised and identical enterprise-class compute, storage, and management at the edge. The benefits of enterprise compute at the edge include improved system reliability, improved overall security at the edge, and a significantly reduced learning curve by using similar systems-management tools. At the same time, HPE Edgeline delivers enterprise IT capabilities in a ruggedized system designed for the harsh operating environments found at the edge. HPE Edgeline delivers enterprise-class IT through:

- Enterprise-class compute using industry-standard Intel® Xeon® processors
- Robust and high-performance software-defined storage, with up to 108 TB capacity
- Up to 40 Gb Ethernet connectivity for boosting performance
- Edge-optimized systems management with HPE Integrated Lights Out (iLO) and HPE Edgeline Integrated System Manager (iSM)

By keeping data at the edge, rather than sending it back and forth between the edge and the data center or cloud, customers achieve seven benefits:

1. Faster response times
2. Lower bandwidth utilization
3. Lower cloud and connectivity costs
4. Improved security
5. Less IT skill and storage duplication
6. Improved solution reliability
7. Greater data policy and geo-fencing compliance

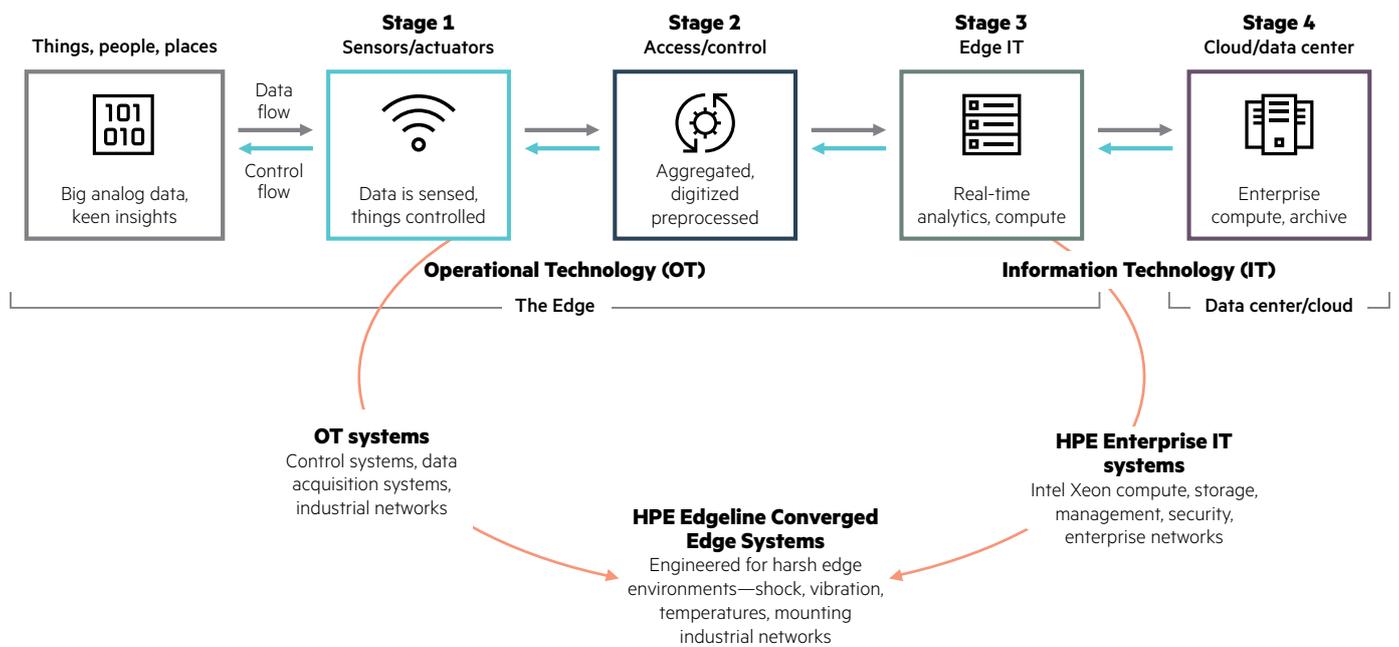


Figure 1. HPE Edgeline Converged Edge Systems—two promises of value



## HPE focus areas

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“PTC’s ThingWorx industrial innovation platform delivers industry-leading functionality that enables businesses to rapidly create, deploy, and maintain industrial IoT (IIoT) and augmented reality apps. When combined with HPE Edgeline, customers and partners have access to a combination of an optimized edge technology that’s capable of fully delivering IIoT and augmented reality apps where the data is created and decisions are made.”

– Iain Michel, General Manager,  
ThingWorx IoT, PTC

**HPE provides Edgeline-based solutions where converged OT and advanced edge computing are required.**

HPE Edgeline supports a variety of customer use cases. Visit [hpe.com/info/edgeline](https://hpe.com/info/edgeline) to learn about our solutions for analytics and artificial intelligence, industrial and manufacturing, telecommunications and media, and remote and mobile workplaces.

### Analytics and artificial intelligence

The edge is an emerging source of “Big Data,” and the oldest, fastest, and biggest “Big Data” comes from the physical world—air pressure, temperature, vibration, light, sound, etc. Businesses need effective solutions to collect, analyze, and act on this Big Analog Data so they can derive timely insights to improve efficiency or create new products.

Artificial intelligence (AI) based on deep neural networks (DNNs) is a key tool used today to analyze massive quantities of data and drive services such as predictive search, image search, and live translation. HPE Edgeline helps customers deploy unmodified AI and deep-learning (DL) software and accelerator hardware at the edge, where they can act in real time, close to the source of the data, such as a video camera or a manufacturing tool.

HPE Edgeline also supports analytics with high-performance databases such as Microsoft® SQL Server and Micro Focus Vertica running on highly-resilient software-defined storage (SDS) such as VMware vSAN™ or Microsoft Storage Spaces.

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### Industrial and manufacturing

Manufacturers and distributors are constantly looking to improve operational efficiency while reducing costs. These organizations also want to innovate and develop products faster. A critical enabler for achieving these objectives is sensor data collected from the edge—be it a factory floor, a warehouse, or an engineering testbed.

This data can be used to maintain “Smart Operations” in a factory, make predictions on product quality, and improve overall production efficiencies and uptime. The data can also be used for “Smart Product Engineering,” where rapid test, modification, and review during development are applied to reach the desired product maturity as quickly as possible.

HPE Edgeline integrates the OT such as industrial networks, data acquisition, and control systems directly into the system—providing enterprise IT analytics that enable manufacturers to reach their goals simply and cost-efficiently. In addition to providing access to all data spread across proprietary siloed OT systems, HPE Edgeline systems also enable customers to act on the analytics they receive, such as turning off a switch, closing a valve, or triggering an alarm. HPE Edgeline wraps all of these capabilities in enterprise-grade security and reliability to reduce the risk of disruption to operations.





## Remote and mobile workspace

“We’ve been very excited about the capability of Edgeline from the perspective of space, size, and redundancy. We can now run applications the way they need to run as close to the (source) that we can get.”

– Mike Orr, Director, IT Digital Transformation, Murphy Oil

Employee trends, such as bring your own device (BYOD) and the expectation of being able to work from any place with network connectivity, are driving organizations to replace stand-alone PCs and laptops with virtual desktop infrastructure (VDI) and hosted desktop infrastructure (HDI). Businesses that fail to deliver this level of mobility in a performant, reliable, and secure fashion will suffer from declining productivity and reduced worker satisfaction.

A primary issue with VDI deployments is delivering predictable performance and a great user experience, due to the hypervisor’s time-sharing of underlying hardware among active users. Furthermore, branch and remote office workers often have difficulty connecting to the core network, making data center VDI impractical for those users.

“Samsung and HPE combine their strengths in radio networks, edge systems, and telecommunications infrastructure to drive the change towards a standard-IT based and software-defined network edge. The HPE Edgeline EL8000 Converged Edge System will play a key role in Samsung’s challenge to evolve our customers’ networks with 5G vRAN demanding intense low-latency.”

– Wonil Roh, Vice President, Head of Technology Strategy at Samsung Network Business

For engineers or graphics designers who need the best performance to run CAD application HPE Edgeline Engineering Workstation solution coupled with AMD WX 4100 graphics, accelerators provide those type of users the performance they need with dedicated desktop resources.

HPE Edgeline aims to solve these issues by delivering performant and cost-effective application and desktop publishing—without virtualization—at the edge, close to the actual user.

## Telecommunications and media

Some of the biggest sources and consumers of edge data are the growing number of mobile devices, IP TVs, connected objects, and machinery. Estimates show that up to 82% of internet traffic will be streaming video by 2020, and 5G will offer data rates of several Gbps in metro areas. This volume of traffic places enormous pressure on content service providers and telecom operators to prepare their infrastructure for the fifth-generation network. These service providers must be able to deliver reliable connectivity, low latency, and high bandwidth, while also differentiating service levels and costs depending on the expected subscriber use cases.

HPE Edgeline is designed to help at every step of the journey toward supporting 5G networks and services.





**HPE Edgeline EL300 Converged Edge System**

Ultra-compact and ruggedized converged OT and IT system with edge-optimized remote management and wireless connectivity.



**HPE Edgeline EL1000 Converged Edge System**

Compact, ruggedized form factor with converged OT and IT; designed to meet customer requirements for wireless and wired connectivity and high-performance analytics.



**HPE Edgeline EL4000 Converged Edge system**

Featuring converged OT and IT, this 1U rack, ruggedized form factor is designed for highly available (multinode) and high-performance.



**HPE Edgeline EL8000 Converged Edge System**

Modular blade and chassis options in a ruggedized form factor for high-performance compute and secure management.

**Advanced features in HPE Edgeline Converged Edge Systems**

- Scalable and modular design that enables easy subsystem replacements and upgrades
- Legacy manufacturing integration for predictive maintenance
- Real-time analysis and condition monitoring
- Real-time monitoring and control
- Data management and video analytics at the edge
- Aided asset monitoring and management

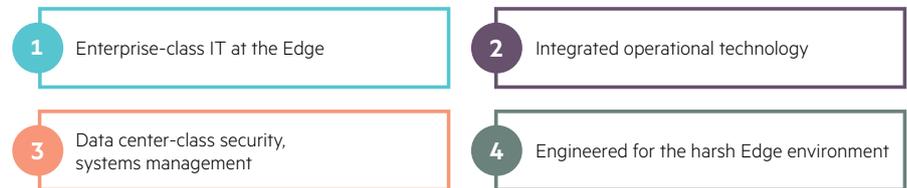
# HPE Edgeline Converged Edge Systems family

## Providing data center-level computing at the edges of the enterprise where “things” exist

To support the demanding workloads moving increasingly to the edge, HPE designed the Edgeline Converged Edge System family. These high-performance, high-precision data acquisition and control machines are able to operate in extreme conditions—bringing robust computing power, high-capacity storage, and integrated networking in an edge-optimized form factor to remote locations.

**HPE Edgeline Converged Edge Systems**

Four points of convergence in one box: Enterprise-class IT, operational technology, systems management, ruggedized form factor



Regardless of which HPE Edgeline Converged Edge System you choose—HPE EL300, HPE EL1000, HPE EL4000, or HPE EL8000—you receive a system that offers unique value.

## Enterprise-class IT at the Edge

Historically, edge-to-cloud solutions have required data to be transferred from the edge to the cloud, exposing it to potential issues of latency, bandwidth, security, compliance, and more. HPE Edgeline Converged Edge Systems eliminate those risks by collecting and processing data on Intel®’s flagship Xeon compute capabilities to provide high-performance analytics at the edge. Edgeline then pairs the data with large amounts of memory and storage to host big data sets, interconnected with robust 40GbE and OT networks for fast data pipelines. Furthermore, HPE’s iLO and HPE Edgeline iSM enable IT-grade security and remote administration to simplify and automate deployment and operation of the Edgeline systems.

This “no compromise” converged OT and IT edge system enables HPE’s IT partners (Microsoft, SAP, Citrix®, VMware®, and others) to redeploy their existing enterprise IT data center or cloud capabilities to solve OT problems at the edge. For example, Microsoft Azure® cloud technologies are now being expanded to run at the edge, forming a true edge-to-cloud architectural solution. This way, users benefit from no transfer issues, less middleware, faster insights, and lower costs.

In addition, the HPE Edgeline EL1000, EL4000, and EL8000 can be configured with one or more HPE server blades that deliver various levels of Intel Xeon-class performance for a wide variety of application workloads.





## OT-IT integration

### HPE Edgeline Extended Storage Adapter

The HPE Edgeline Extended Storage Adapter option kit adds up to 48 TB per adapter of SDS to HPE Edgeline Converged Edge Systems. This system enhancement enables storage-intensive use cases such as AI, video analytics, or databases at the edge, while also leveraging industry-standard storage management tools such as Microsoft Storage Spaces Direct, HPE StoreVirtual VSA, and VMware vSAN.

To learn more about the latest addition to the HPE Edgeline product portfolio, please visit [hpe.com/info/edgeline](https://hpe.com/info/edgeline).



HPE Edgeline OTLink Certified modules

Conventional enterprise IT systems are designed to interoperate with devices and networks found in IT environments, such as switches, routers, and storage arrays. At the edge, however, lies an abundance of industry-specific OT physical connections and logical protocols such as Modbus, BACnet, and PROFINET. Furthermore, the OT equipment speaking these protocols is frequently built on proprietary and siloed architectures. Therefore, the “last foot” challenge for any edge system is interoperating with OT protocols and equipment to gain access to data gathered from the “things” at the edge to ultimately enable analytics to gain insight from that data.

Insights derived from analytics are valuable only if the business can take action on them to improve expected outcomes—such as preventing a pump failure before production is impacted. Just as with data acquisition, the edge system must “talk OT” using the appropriate physical connections and logical protocols before it can command such actions.

HPE Edgeline systems integrate key open standards-based OT data acquisition and control technologies directly into the enterprise IT system responsible for running the analytics. Through HPE’s partnership with top OT equipment and software providers, HPE Edgeline delivers fast, simple, and secure convergence between the necessary OT hardware and software components. This convergence of OT and IT capabilities into a single HPE Edgeline system greatly reduces the latency between acquiring data, analyzing it, and acting on it while saving space, weight, and power.

Implementing a converged OT and IT solution from scratch can be difficult—often impacted by false starts, unexpected barriers, and failed efforts that result in projects never successfully reaching production. To streamline OT and IT implementation, HPE created HPE Edgeline OTLink—an innovative hardware-software combination.

- **HPE Edgeline OTLink Certified hardware modules** facilitate data acquisition from a variety of different industrial devices found in many operations environments (factories, refineries, oil rigs, and others).
- **HPE Edgeline OTLink Platform software** provides a software layer that simplifies data movement from the physical world into the digital domain via an easy-to-use drag-and-drop workload flow designer.
- All activities are centrally managed and orchestrated using the **HPE Edgeline Workload Orchestrator software**.





## System operation and automation

### HPE Edgeline Converged Edge Systems help:

- Reduce network traffic and prioritize data sent to the cloud. Analyze and process data at the edge, instead of sending it back and forth to a central data center or to the cloud.
- Accelerate time to action and control. Collect, manage, and analyze data at the edge to quickly gain insight and react to changes and opportunities.
- Boost cost efficiency. Putting compute power closer to things reduces network infrastructure and management costs, as well as removes unnecessary spending for storage capacity in data center or cloud environments, because it sends only useful data.

The management engine built into each HPE Edgeline EL1000, EL4000, and EL8000 system begins with the core capabilities of HPE iLO. Management is extended with edge-specific capabilities enabled by the HPE Edgeline iSM—embedded in the new HPE Edgeline EL300. Both HPE iLO and iSM provide local management of HPE Edgeline systems, supporting simple deployment and reliable operations. These management tools enable users to directly manage individual systems, as well as consolidate management of multiple systems.

To successfully manage individual Edgeline systems, HPE iLO and iSM provide the following key capabilities:

- System configuration
- Health monitoring
- Event logging and alerting
- Graphical user interface (GUI) and command line interface (CLI) for user access
- Remote virtual presence
- Redfish (REST) interface for programmatic access
- Security
- Wireless manageability

The HPE Edgeline Infrastructure Manager (EIM) enables administrators to manage multiple HPE Edgeline systems from a single pane of glass. With EIM, users no longer need to bounce from system to system when checking for issues or performing updates.





HPE EIM provides key capabilities that can be applied to multiple systems:

- Manual and automated device discovery
- Health monitoring
- Firmware updates completed individually or concurrently, with one operation for multiple systems
- Aggregated health logs for managed systems
- Dashboard with an at-a-glance summary view of all managed systems

EIM supports management of HPE Edgeline EL1000, EL4000, and EL300 Converged Edge Systems. EIM interfaces with individual HPE Edgeline systems via the Redfish REST API provided by iLO and iSM. Through this interface, EIM monitors the health of each system, manages the system configuration, and updates system firmware. The REST API can also be used to script actions against multiple systems or to interface with a third-party management tool.

For more information, please refer to the HPE Edgeline systems management white paper at [hpe.com/info/edgeline](https://hpe.com/info/edgeline).

## Rugged form factor

Designed to reside in environmentally harsh, space-constrained, and/or dusty environments, compact and ruggedized HPE Edgeline Converged Edge Systems are designed to withstand increased shock and vibration. They can also tolerate very high operating temperatures ranging for -30°C to 70°C, depending on the model and options selected.

When floor space is limited, a wide range of wall-, rack-, or shelf-mounting options opens up a variety of placement possibilities. In addition, you can easily connect HPE Edgeline systems to your electrical infrastructure by selecting AC or -48 VDC hot-pluggable power supplies.

HPE's Edgeline EL300, EL1000, EL4000, and EL8000 are also certified for a variety of industry standards including NEBS, MIL-STD-810G, and IP50, depending on the model and options selected.



## HPE Edgeline Converged Edge Systems

### Which platform is right for me?

**Product class**

**HPE Edgeline Converged Edge Systems**

Edge-optimized rugged systems converging OT data acquisition, control systems, and industrial networks with enterprise-class IT performance and remote systems management.

System name	HPE Edgeline EL300	HPE Edgeline EL1000	HPE Edgeline EL4000	HPE Edgeline EL8000
<b>Primary customer needs</b>	<ul style="list-style-type: none"> <li>• Converged OT in an ultra-compact, ruggedized form-factor ideal for embedded environments</li> <li>• Modular converged OT in a compact</li> <li>• Robust IT analytics performance and capabilities, including wired and wireless connectivity</li> <li>• Data center-class security and management</li> </ul>	<ul style="list-style-type: none"> <li>• Modular converged OT in a compact and industrial-tier ruggedized system</li> <li>• Enterprise-class IT performance and capabilities, including wired and wireless connectivity</li> <li>• Data center-class security and management</li> </ul>	<ul style="list-style-type: none"> <li>• Converged OT with industry-standard PXle slots in a 1U rackable industrial-tier ruggedized system</li> <li>• Enterprise-class IT performance and capabilities, including wired connectivity and high availability</li> <li>• Data center-class security and management</li> </ul>	<ul style="list-style-type: none"> <li>• Innovative 5U, half-width and 17-inch deep modular and ruggedized system</li> <li>• Enterprise-class IT performance and capabilities, including wired and wireless connectivity</li> <li>• Data center-class security and management</li> </ul>
<b>Core features</b>	<ul style="list-style-type: none"> <li>• Converged OT via daughter card modules such as CAN bus, GPIO/DAC, GbE TSN, Modbus, RS232, and RS485</li> <li>• Intel® Core™ i5 CPU, with up to 32 GB RAM and 3 TB SSD storage</li> <li>• HPE iSM for edge-optimized remote systems management</li> <li>• Wi-Fi, Bluetooth®, and LTE wireless connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• OTLink Platform tested via two industry-standard PXI/PXle modules with over 1500 market options for data acquisition, control systems and industrial networks</li> <li>• Intel Xeon 16-core CPU, with up to 128 GB RAM and 16 TB SSD storage; supports 2 add-in accelerators</li> <li>• HPE iLO remote systems management</li> <li>• Wi-Fi, Bluetooth, and LTE wireless connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• OTLink Platform tested via four industry-standard PXle modules and OTLink with over 1500 market options for data acquisition, control systems, and industrial networks</li> <li>• Intel Xeon CPUs with up to 64 cores in 512 GB RAM and 48 TB SSD storage in 1U; supports four add-in accelerators</li> <li>• HPE iLO remote systems management</li> </ul>	<ul style="list-style-type: none"> <li>• High performance edge compute with up to four HPE compute blades with Intel Xeon SP, and 10GbE</li> <li>• Each system supports up to 112 cores, 6 TB of memory and 96 TB of SSD storage</li> <li>• NEBS and ASHRAE compliant</li> <li>• HPE iLO 5 remote systems management and security</li> </ul>
<b>Example use cases</b>	<ul style="list-style-type: none"> <li>• Analytics and AI</li> <li>• Industrial and Manufacturing</li> </ul>	<ul style="list-style-type: none"> <li>• Analytics and AI</li> <li>• Industrial and Manufacturing</li> </ul>	<ul style="list-style-type: none"> <li>• Analytics and AI</li> <li>• Industrial and Manufacturing</li> <li>• Remote and mobile workspace</li> <li>• Telecommunications and media</li> </ul>	<ul style="list-style-type: none"> <li>• Analytics and AI</li> <li>• Industrial and manufacturing</li> <li>• Remote and mobile workspace</li> <li>• Telecommunications and media</li> <li>• Military and Defense</li> </ul>



## Technical specifications

### HPE Edgeline EL300, EL1000, EL4000, and EL8000 Converged Edge Systems<sup>2</sup>



HPE Edgeline EL300



HPE Edgeline EL1000



HPE Edgeline EL4000



HPE Edgeline EL8000

	HPE Edgeline EL300	HPE Edgeline EL1000	HPE Edgeline EL4000	HPE Edgeline EL8000
<b>Environmental</b>	<ul style="list-style-type: none"> <li>Operating temp: -30 to 70°C</li> <li>Shock and Vibration tested</li> <li>Passively cooled; IP50 rated</li> <li>MIL-STD-810G</li> </ul>	<ul style="list-style-type: none"> <li>Operating temp: 0 to 55°C</li> <li>Shock and Vibration tested</li> <li>NEBS Level 3</li> </ul>	<ul style="list-style-type: none"> <li>Operating temp: 0 to 55°C</li> <li>Shock and Vibration tested</li> <li>MIL-STD-810G</li> <li>NEBS Level 3</li> </ul>	<ul style="list-style-type: none"> <li>Operating temp: 0 to 55°C</li> <li>Shock and Vibration tested</li> <li>NEBS Level 3</li> </ul>
<b>Compute</b>	<ul style="list-style-type: none"> <li>One Intel Core i5</li> <li>Up to 4 x86 cores per system</li> <li>VPU Option for vision processing</li> </ul>	<ul style="list-style-type: none"> <li>One HPE ProLiant m510 (Intel Xeon D 8C/16C) or ProLiant m710x (Intel Xeon E3 4C + workstation GPU) compute blade</li> <li>Up to 16 Xeon cores per system</li> <li>Hot-swappable</li> <li>VPU Option for vision processing</li> <li>HPE NVIDIA® GPU option</li> </ul>	<ul style="list-style-type: none"> <li>Four HPE ProLiant m510 (Intel Xeon D 8C/16C) or ProLiant m710x (Intel Xeon E3 4C + workstation GPU) compute blades</li> <li>Up to 64 Xeon cores per system</li> <li>Mix-and-match, hot-swappable</li> <li>VPU Option for vision processing</li> <li>HPE NVIDIA GPU option</li> </ul>	<ul style="list-style-type: none"> <li>Four HPE ProLiant e910 (Intel Xeon SP) compute blades</li> <li>Up to 112 Xeon cores per system</li> <li>Up to 6 TB of memory per system</li> <li>Mix-and-match, hot-swappable</li> <li>VPU Option for vision processing</li> <li>HPE NVIDIA GPU options</li> </ul>
<b>Memory</b>	<ul style="list-style-type: none"> <li>Up to 32 GB per system</li> </ul>	<ul style="list-style-type: none"> <li>Up to 128 GB per system</li> </ul>	<ul style="list-style-type: none"> <li>Up to 512 GB per system (across four compute blades)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 512 GB per system (across four compute blades)</li> </ul>
<b>Storage</b>	<ul style="list-style-type: none"> <li>Up to 3 TB using M.2 SSDs</li> </ul>	<ul style="list-style-type: none"> <li>Up to 16 TB on compute blades and extended storage adapters</li> <li>Up to 22 TB using two SFF drivers</li> </ul>	<ul style="list-style-type: none"> <li>Up to 48 TB on four compute blades and four extended storage adapters</li> </ul>	<ul style="list-style-type: none"> <li>Up to 96 TB on four compute blades</li> <li>Up to 122 TB if SFF storage array option installed</li> </ul>
<b>Networking</b>	<ul style="list-style-type: none"> <li>Up to six 1GbE ports, with Time Sensitive Network (TSN)</li> </ul>	<ul style="list-style-type: none"> <li>Up to two 10GbE ports with RDMA over Converged Ethernet (RoCE)</li> </ul>	<ul style="list-style-type: none"> <li>Up to eight 10GbE ports with RoCE, and optional 25 Gb, 100 Gb Ethernet NICs</li> </ul>	<ul style="list-style-type: none"> <li>On-blade quad 10GbE (QSFP) or dual 10GbE (SFP+) or dual 1GbE (RJ45)</li> <li>Chassis option for up to two 10GbE unmanaged switches, each with SFP uplink</li> <li>Chassis aggregation for 1GbE management (iLO) network</li> <li>Chassis aggregation for 1GbE maintenance (x86 blade) network</li> <li>Wireless support option for management and maintenance networks</li> </ul>
<b>Converged OT and other I/O interfaces</b>	<ul style="list-style-type: none"> <li>HPE Edgeline OTLink compatible</li> <li>One daughter card option supporting CAN bus, GbE TSN, GPIO or Modbus for Converged OT</li> <li>Two M.2 slots, each with a SIM slot for Wi-Fi, Bluetooth, and LTE connectivity</li> </ul>	<ul style="list-style-type: none"> <li>HPE Edgeline OTLink compatible</li> <li>Two full-height half-length (FHHL) PCIe cards or PXI/PXle modules for Converged OT</li> <li>Two mini-PCIe slots, each with a SIM slot for Wi-Fi, Bluetooth, and LTE connectivity</li> </ul>	<ul style="list-style-type: none"> <li>HPE Edgeline OTLink compatible</li> <li>Four FHHL PCIe cards or PXle modules for Converged OT</li> </ul>	<ul style="list-style-type: none"> <li>HPE Edgeline OTLink compatible</li> <li>Single half-height half-length (HHHL) PCIe card for 1U ProLiant e910 blade</li> <li>Two FHFL and two HHFL PCIe cards for 2U ProLiant e910 blade</li> </ul>
<b>Security</b>	<ul style="list-style-type: none"> <li>Silicon root of trust</li> <li>Trusted Platform Module (TPM)</li> </ul>	<ul style="list-style-type: none"> <li>TPM</li> </ul>	<ul style="list-style-type: none"> <li>TPM</li> </ul>	<ul style="list-style-type: none"> <li>Silicon root of trust for Chassis Controller</li> <li>Silicon root of trust for iLO 5 on each blade</li> <li>TPM 2.0 for BIOS and OS boot on each blade</li> </ul>
<b>Systems management</b>	<ul style="list-style-type: none"> <li>HPE Edgeline iSM, EIM</li> <li>Redfish, CLI, WebGUI</li> </ul>	<ul style="list-style-type: none"> <li>HPE iLO 4, EIM</li> <li>Redfish, CLI, WebGUI</li> </ul>	<ul style="list-style-type: none"> <li>HPE iLO 4, EIM</li> <li>Redfish, CLI, WebGUI</li> </ul>	<ul style="list-style-type: none"> <li>HPE iLO 5 and Edgeline iSM, EIM, Redfish, CLI, WebGUI, Edgeline Chassis Manager</li> </ul>
<b>Power</b>	<p><b>Typical:</b> 30W, AC (with external AC power supply) and DC input options</p>	<p><b>Typical:</b> 100–150W, AC and DC input options</p>	<p><b>Typical:</b> 400–600W, AC and DC input options; redundant power</p>	<p><b>Typical:</b> 400–1200W, AC and DC input options; redundant power</p>

<sup>2</sup> For a complete list of technical specifications visit [hpe.com/info/edgeline](https://hpe.com/info/edgeline)



## HPE Edgeline Innovation Network

### A growing partner ecosystem

The HPE Edgeline Innovation Network is an ecosystem of third-party software and hardware vendors committed to developing effective edge solutions for customers worldwide. By adding these partners' unique capabilities to HPE Edgeline Converged Edge Systems, HPE can create and optimize new edge-to-cloud solutions at an accelerated pace.

The HPE Edgeline Innovation Network provides:

- A validated hardware and software stack
- Complimentary HPE engineering assistance to build and test solutions
- Complimentary use of the HPE IoT Global Innovation Lab—both on-premises and remote
- Certified Edgeline-tested solutions
- Solution showcases in media and tradeshow
- Joint go-to-market activities with HPE
- Seamless deployment of solutions

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## HPE Global IoT Innovation Labs

### Partner with HPE edge experts

Designed to accelerate collaboration among customers, partners, and across HPE, HPE Global IoT Innovation Labs provide proof-of-concept design and testing of custom IoT and edge-to-cloud technologies and solutions. HPE Global IoT Innovation Lab personnel have the expertise and technology to assist you with testing on-site or remotely via secure network connections.

HPE Global IoT Innovation Labs are configured to explore and build a wide range of IoT solutions such as smart cities, IIoT manufacturing, smart healthcare, and smart retail, as well as media processing and distribution, telecom, remote virtual desktops, and military applications.

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## Next steps

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