HPE Edgeline OT Link
Software-defined intelligence built into HPE Edgeline Converged Edge Systems

Contents

Executive summary .................................................................................................................. 2
Turning IoT ideas into solutions ......................................................................................... 2
Creating the connections ................................................................................................... 3
Standardizing transfer of OT data to the digital domain .................................................. 5
Centralizing systems orchestration and management ....................................................... 6
Extending to cloud and data center IoT and enterprise IT platforms ................................. 6
  API and SDK ...................................................................................................................... 6
Conclusion ......................................................................................................................... 7
Executive summary

HPE created the Edgeline Converged Edge Systems to bring together the best features and practices from the enterprise IT world with the unique requirements of the operational technology (OT) world. To facilitate the convergence of OT and IT, HPE designed the Edgeline products with three foundation principles in mind:

1. Bring high-performance Intel® Xeon®-based compute to the edge, enabling mission-critical applications that traditionally run in the data center or cloud to operate at the edge, near the source of the data.
2. Enable data acquisition and control in the same system that runs mission-critical applications.
3. Provide enterprise-class management for systems at the edge.

This document focuses on HPE Edgeline OT Link—a new addition to the Edgeline Converged Edge Systems portfolio. This new family of hardware and software products provides a fast, simple, and secure way to acquire data, and then use that data as part of an Internet of Things (IoT) solution.

Turning IoT ideas into solutions

While driving an IoT project from idea to production, enterprises face numerous challenges, including:

- Selecting suitable hardware with the appropriate combination of compute resources, industrial I/O for data acquisition, and control and management capabilities
- Identifying, acquiring, and integrating the appropriate software with the required data-ingest, processing, and management capabilities
- Leveraging the operational knowledge of OT personnel to implement a software-intensive IoT project

Starting a new IoT project from scratch is complex. The time, cost, and unforeseen obstacles encountered often lead to false starts and failed efforts. Thus, HPE created HPE Edgeline OT Link—designed to address the requirements and challenges of implementing an IoT project.

HPE Edgeline OT Link is a combination of hardware and software that works together seamlessly to enable simple, fast, and predictable IoT project implementations. HPE Edgeline OT Link is made up of three key elements:

- **HPE Edgeline OT Link certified hardware modules** provide the physical (electrical) means to acquire data from a wide variety of sources. Targeted OT Link hardware modules enable the input and output of data from many industrial devices.
- **Running on top of the HPE Edgeline OT Link hardware is HPE Edgeline OT Link Platform software**, designed to bring data from OT into the digital domain in a standard, normalized manner. Numerous built-in and user-provided mission-critical applications can process, analyze, and act on the data from the edge.
- The **HPE Edgeline Workload Orchestrator** provides the means to orchestrate and manage the activities of multiple HPE Edgeline Converged Edge Systems—including the entry-level Edgeline EL300, the compact Edgeline EL1000, and the high-performance Edgeline EL4000.
Working in concert, the HPE Edgeline OT Link hardware modules, Edgeline OT Link Platform software, and Edgeline Workload Orchestrator provide the tools required to successfully design and implement an IoT solution to solve the most challenging problems. These tools enable OT and IT professionals to work together to deliver an IoT project quickly, securely, and reliably.

The rest of this document provides additional details on the HPE Edgeline OT Link components.

**Creating the connections**

The hardware that supports the HPE Edgeline OT Link system includes multiple options. HPE Edgeline OT Link provides a direct connection between traditional industrial interfaces, such as RS-485, and newer interfaces, such as controller area networks (CANs). HPE Edgeline products—including the EL300, EL1000, and EL4000—can be enabled with HPE Edgeline OT Link support.

HPE Edgeline OT Link supports multiple types of interfaces, all of which are configurable and support various modes of operation. On some Edgeline hardware modules, the type of interface can be selected and configured with the Edgeline OT Link Platform software.

The first HPE Edgeline OT Link interface cards include RS-232, RS-485, Ethernet with TSN support, and CAN. These industrial-grade isolated serial interfaces are included on the HPE Edgeline EL300 and available on all Edgeline systems.
A critical requirement for any true industrial solution is flexible configuration. The RS-485 interface is software-configurable, enabling users to select the termination options and a two- or four-wire transmitter. The RS-485 can also be configured to act as a master or slave device on the bus. These features enable true plug-and-play operation, with HPE Edgeline OT Link Platform software handling the configuration; no hardware jumpers or switches need to be set.

HPE Edgeline OT Link includes an 8-bit DIO (digital in/out) 8-line interface. Each line is configurable as either an input or an output, and each line is 24-volt tolerant—making it the ideal solution for traditional industrial settings, where 24-volt signaling and control is commonplace. In addition, the DIO module is fully isolated, with configuration and operation handled through the OT Link software. As with the RS-485, no jumpers or switches need to be set.

Advantages of having HPE Edgeline OT Link-certified hardware configuration and operation at the application layer include:

- Simplified initial setup
- No maintenance personnel/operators required to set up and configure the hardware prior to use
- True plug-and-play hardware
**Standardizing transfer of OT data to the digital domain**

As the foundation for implementing an IoT project, HPE Edgeline OT Link Platform software enables data acquisition (DAQ) from a wide variety of sources (things), and then turns that data into meaningful, actionable information.

HPE Edgeline OT Link is designed around a framework of connect, collect, analyze, and extend to transfer and make edge data useful.

- **Connect**—Physical and logical connectivity to MODBUS, CANbus, and more. The process starts with data ingested from things typically found in the operational world, such as devices in manufacturing facilities. These devices range from programmable logic controllers (PLCs) to SCADA systems to direct analog and digital data acquisition (DAQ) instruments.

- **Collect**—Drivers for endpoints, enabling data to be easily collected from various industrial devices. The built-in software drivers in the HPE Edgeline OT Link Platform software speak the language (protocol) of hundreds of physical industrial devices. Data can be seamlessly acquired from these devices, and control commands securely sent to the devices.

- **Analyze**—Manipulating data using built-in functions, Python/JS scripts, or Docker containers. Once data is acquired, it must be pre-processed (normalized), and then published in a defined model. Doing so ensures the data is in the optimal format and available for use by mission-critical applications such as advanced analytics. The OT Link Platform includes the required software pre-processing modules, as well as a data repository that provides ready access to the resulting information.

- **Extend**—Freedom to send the data to the customer’s choice of public cloud, database, or enterprise resource planning/customer relationship management (ERP/CRM) system

To facilitate fast IoT solution implementation, the HPE Edgeline OT Link Platform software follows a drag-and-drop methodology for creating data flows. These flows enable users to quickly and easily define how data acquired from the physical world is analyzed and acted upon. The HPE Edgeline OT Link Platform flow-creation tools include a wide array of prebuilt functions to apply against incoming data from data input connectors, mathematical functions, flow controllers, and output connectors.

Creating a flow is a simple exercise that OT subject matter experts can complete, rather than requiring advanced programming experts. The flow engine is extensible, so a user can simply create a new data processing function if a necessary one is unavailable. With HPE Edgeline OT Link Platform data flows, data from the physical world can be transformed into meaningful and actionable information.

![Figure 3. HPE Edgeline OT Link Platform software user interface](image-url)
HPE Edgeline OT Link Platform software supports deployment and execution of containerized applications. These extend the OT Link Platform by providing highly useful services within OT solutions. These services include advanced data processing, analytics, machine learning, and specialized network services.

In addition, HPE Edgeline OT Link Platform software provides an application store that includes numerous prebuilt containerized applications ready for download and execution. The marketplace is also extensible—enabling users and partners to add their own containerized applications to provide even greater capabilities to the HPE Edgeline OT Link Platform software.

This advanced software platform is delivered preinstalled on HPE Edgeline EL300 Converged Edge Systems, and it is available for download and use on other Edgeline platforms.

**Centralizing systems orchestration and management**

The HPE Edgeline Workload Orchestrator enables users to centrally deploy and manage workloads running on multiple Edgeline systems. Users can deploy workflows and application containers to one or more Edgeline systems located in the same or geographically distributed locations.

For example, a user can create a workflow and application set on HPE Edgeline OT Link, and then deploy it on additional systems with the OT Link Platform software. By centralizing creation and deployment, Workload Orchestrator simplifies the provisioning of multiple systems that perform similar functions.

Using Workload Orchestrator to centralize management of the OT Link Platform on numerous Edgeline Converged Edge Systems cuts the time and effort required to deploy, update, and manage the software stack running on those systems.

HPE Edgeline Workload Orchestrator provides centralized dashboards that depict the operational status across all OT Link systems and consolidates information from those systems. Workload Orchestrator dashboards are user-defined and -created, enabling users to tailor the information displays.

**Extending to cloud and data center IoT and enterprise IT platforms**

A critical attribute of HPE Edgeline OT Link Platform software and Edgeline Workload Orchestrator software is the ability to connect with and extend the capabilities of other popular IoT and enterprise IT platforms widely used to create data center IT, cloud, and IoT solutions—such as Microsoft® Azure®, Amazon Web Services (AWS), SAP®, and Google™. The OT Link Platform provides an interface to these platforms through built-in connectors, enabling seamless data exchange with these external systems.

HPE and Microsoft are working together to deliver Azure IoT Edge software as part of the HPE Edgeline OT Link Platform software environment. In addition, HPE is working with other partners on containerized versions of their edge software—enabling the solutions to be deployed and run natively as part of the OT Link Platform.

Through next-generation data acquisition and flow creation, HPE Edgeline OT Link Platform software simplifies deployment and operation of IoT solutions that leverage cloud-based and data center-based IoT and IT platforms.

**API and SDK**

HPE Edgeline OT Link Platform software and HPE Edgeline Workload Orchestrator software are open and extensible through a set of REST APIs and a published software development kit (SDK). These external interfaces enable user- and partner-created tools to control the operation of OT Link systems and extend OT Link ecosystem capabilities.
Conclusion

As organizations launch IoT projects, they need proven tools that help them remain on schedule and within budget, while also addressing obstacles as they arise. One critical hurdle of any IoT project is converging the OT systems already at the edge with enterprise IT systems.

To meet this priority, HPE created Edgeline OT Link, which leverages built-in software-defined intelligence to dramatically simplify deployment and management of OT–IT convergence at the edge. HPE Edgeline OT Link is:

- **Open and extensible**—Leveraging a set of open REST APIs, OT Link can extend to include industry-specific tools developed by users and HPE partners.

- **Preinstalled**—HPE Edgeline OT Link Platform software is preinstalled on HPE Edgeline EL300 systems, creating a built-in foundation for supporting IoT projects. OT Link Platform is also supported on the EL1000 and EL4000 systems.

- **Fast**—With HPE Edgeline OT Link, users can deploy OT–IT infrastructure with one-touch provisioning.

- **Simple**—HPE Edgeline OT Link orchestrates OT–IT applications on edge-optimized infrastructure in just a few clicks.

- **Secure**—Integrated security and enterprise-class reliability protect converged OT—IT systems.

Learn more at [hpe.com/info/edgeline](http://hpe.com/info/edgeline)