

Vorne XL - IT Brief

Overview

Vorne XL is a comprehensive production monitoring platform that includes:

- **XL Productivity Appliance™:** IoT devices that each monitor one manufacturing process. XL devices are unique in that they work equally well as networked devices in your internal network or as edge computing devices connected to XL Enterprise.
- **XL Enterprise:** A cloud-based application developed by Vorne that provides services that extend the XL platform. These services include alerts (real-time email alerts), reports (automatically delivered end-of-shift reports) and updates (software updates delivered to XL devices).

Architecture

XL devices are highly integrated embedded systems with a TI Sitara™ ARM processor and 4 GB of eMMC Flash (storing approximately one year's worth of historical production data). The OS is a Yocto-based Linux distribution designed for embedded and IoT devices. The application software includes an integrated database and web server. No software needs to be installed in your existing infrastructure. Every XL device uses the same data model and software, and from an IT perspective is managed the same way.

XL Enterprise is a cloud-based application hosted on Amazon Web Services using data centers located in the USA. XL Enterprise temporarily stores production data – no historical production data is stored.

XL supports Edge, Chrome, and Firefox browsers. Chrome is recommended for best performance.

Software Updates

Software updates are regularly released for XL devices. Each update includes one or more of the following:

Software Update	Purpose
Features	Provides new functionality. We regularly add new features and functionality to the XL platform.
Defect Fixes	Provides fixes as well as usability and performance improvements.
Security Patches	Provides updates to the operating system and other software packages. Security updates are based on the National Vulnerability Database (NVD), which is maintained by the United States National Institute of Standards and Technology. Vorne has a formal process and automated tools for reviewing the NVD to identify security patches that may be relevant to XL devices.

Software updates for XL devices are digitally signed and hosted on XL Enterprise (they are also available from our technical support team). If enabled, XL devices automatically check for updates once per day. When a new update is available, the XL device automatically downloads it – ready for the administrator to install at a time of their choosing.

You can review what is new in each software version at www.vorne.com/new, and you can also sign up for our email list to receive notifications of new versions.

XL Enterprise software updates are managed by Vorne and are transparent to users.

Network Considerations

XL Productivity Appliance

XL devices are designed and intended for use solely in a secure, private network environment. If access to the XL device is required from outside the LAN, we recommend using your corporate VPN.

Protocols: XL devices utilize the following protocols: DHCP, DNS, ICMP Echo, and SNTP.

Network Settings: XL devices are shipped with DHCP enabled. We recommend providing either a reserved DHCP address or a static IP address. Additional network settings include the subnet mask, default gateway, preferred DNS server, and an optional alternate DNS server. Network settings can be easily configured at www.vorne.com/set-ip.

Network Traffic: The following are examples of typical network traffic loads for an XL device:

Scenario	Network Traffic
Browser Application	XL has a sophisticated single-page browser application that is cached by the browser. When the application is first opened, approximately 2 MB is cached in the browser. Subsequent opens of the interface update the cache, with 120 KB being a typical update size.
Browser Data	XL has many dynamic and self-updating report pages: <ul style="list-style-type: none">▪ When viewing data for 1 asset, typical network traffic is 20 KB to 200 KB per minute.▪ When viewing data for 15 assets, typical network traffic is 60 KB to 600 KB per minute.
XL Enterprise	XL devices can optionally communicate with XL Enterprise. This typically creates network traffic of approximately 4 KB per minute.

XL Enterprise

XL devices use token authentication for initial connection to XL Enterprise. All communication with XL Enterprise is via HTTPS (this includes XL device and browser-based communication).

Ports and Permissions

Opening the following ports and whitelisting the following domains will enable you to take advantage of services that extend XL. None of these services are required (i.e., XL devices can function without them).

Port	Feature
Port 53	If an internal DNS server is not available, enables XL devices to access external DNS to resolve addresses.
Port 123	If an internal NTP or SNTP server is not available, enables XL devices to set their time with an external time authority.
Port 443	If you are using any XL Enterprise services, required to enable XL devices to communicate via HTTPS.

Domain	Feature
updates.xl-enterprise.com	Enable XL devices to communicate with XL Enterprise to download software updates.
xl.vorne.com	Enable XL devices to communicate with XL Enterprise to provide data for alerts and reports.
*.vornexl.pool.ntp.org	Enable XL devices to set their time from a Vorne NTP server pool.

Using a Proxy Server

Your corporate network or corporate policies may not allow for **Ports and Permissions** to be configured as described above to access services outside your corporate network. An alternate option is to use a proxy server on your network as an intermediary between XL devices and those services.

XL devices support communication to proxy servers using HTTP (with CONNECT tunneling), HTTPS, or SOCKS (socks4, socks4a, socks5, socks5h).

XL Integration Tools

XL can operate as a standalone system or it can be integrated with your other systems and applications using integration tools. We recommend an incremental approach to integration as it ensures that your integrations are soundly based on real-world experience. There are three types of integrations:

Integration	Explanation
Built-In	Built-in integrations enable XL to use information from your existing systems with minimal investment of time or money. For example, XL can be configured to respond to your existing part and job barcodes, and you can import parts and jobs using simple spreadsheets. Built-in integrations are particularly useful for smaller companies with limited IT resources.
XL API	The XL API is a REST-based interface that enables you to directly integrate XL devices with other systems and applications (e.g., ERP applications). Refer to the XL API guide for detailed information. The XL API is particularly useful for larger companies with well-staffed IT departments that have the resources to create and maintain custom integrations.
Third-Party	Third-party tools are products and services offered by partner companies. Examples include PLC integration, ERP integration, and local SQL databases to integrate to your enterprise reporting platform. This is a great choice for any company that wants to leverage standard products to accelerate progress and avoid custom IT projects. Learn more about third-party tools at www.vorne.com/tools .

Data Access

Each XL device stores the production data it collects in its own embedded database. There is no requirement for you to install a dedicated server or SQL database. One of the paramount XL design goals is to make the underlying data easily accessible. Here are five ways that you can access XL data:

Access Method	Description
Reports	XL includes a sophisticated reporting engine, which runs in the browser and aggregates data across multiple devices.
Dashboards	It is easy to create custom reports using point-and-click tools included in every XL device.
Export Templates	Create an unlimited number of Excel export file templates in XL. Each export template includes metrics and dimensions organized as tabular data – ready to export as an Excel file.
XL API	Use the REST API to programmatically access information from XL devices. You can access raw “table” data as well as business-ready “channel” data. Please note that the XL API is subject to change as we continue to add to and improve the XL platform.
Backup	Instantly create a backup of your production data with a single click from the XL browser interface (Settings > Backup and Restore).

If you would like to create a centralized database that contains production data from all your XL devices you can accomplish this using the XL API (free) or third-party integration tools (fast and easy).