



Persistent Data Network Powered by Belden Horizon

Improve Your Process Application's Data Flow
with Next-Generation Solution

 APPLICATION NOTE

Next-Generation Data Networking Solution for Today's Process Automation Applications

Automation across process manufacturing is evolving at a rapid pace. Businesses are increasingly relying on automated systems and workflows to improve quality and productivity, and to reduce risk. Reliable communications and data integrity are keys to this. ProSoft Technology has developed a dedicated networking solution to meet and exceed the data connectivity needs of the most critical automation data networks.

When it comes to process automation, like what we might see in an Oil and Gas application, or a Water and Wastewater application, the customer requires network connectivity to all remote assets, no matter where they are geographically located. This network is the operational technology (OT) network and is recommended to be separated by a DMZ from other operational and IT networks. This OT network is the control level of the automation application, which leverages industrial protocols like EtherNet/IP™ or Modbus



Note: The principles in this document can be applied to applications across several industries, including Chemical, Oil and Gas, Food and Beverage, and even OEMs/ Machine Builders who require access to all of their machines globally.

Next-Generation Data Networking Solution

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TCP/IP for mission-critical communications. As such, this OT network has a unique set of requirements with a focus on reliability, data integrity, and cybersecurity, while also providing the ability for additional improvements in workflows. The Persistent Data Network, powered by Belden Horizon™, was purpose-built for applications just like this.

Next-Generation Data Networking Solution

Network Data Flow

Persistent Data Network - Powered by BH

Creating a PDN Network in BH

Summary of PDN Benefits

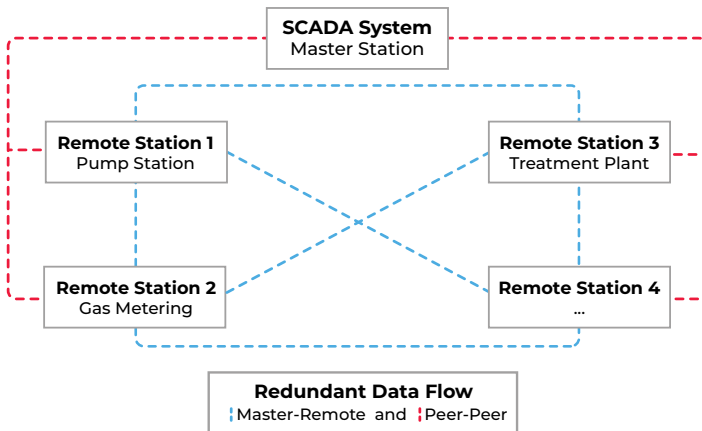
Security

Network Data Flow

The OT network facilitates the data flow in both the modern SCADA (Supervisory Control and Data Acquisition) systems and Distributed Control Systems. These systems allow users to monitor and control various remote functions in the process.

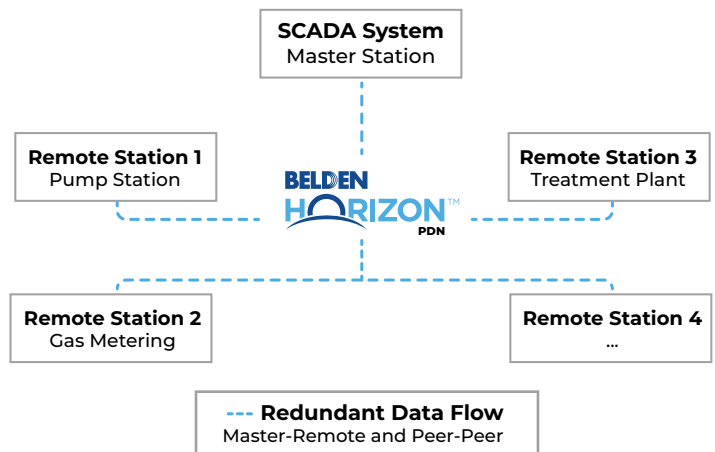
In the past, networking technologies have forced engineers to define a geometric arrangement of nodes and links to establish the OT network. For example, engineers would have to choose between point-to-point, point-to-multipoint, or multipoint-to-multipoint topologies based on the requirements of each individual site. Each of these topologies come with a unique set of considerations that creates challenges during the design, implementation, and even the lifecycle of network.

- During the design phase, complicated and lengthy RF studies are required to determine the best architecture and antenna location based on the location of the remote sites, the environment, and the priority of each individual site.
- Based on information collected during the design phase, the installation phase may require the erection of towers to mount antennas, or they may require a high number of hops between nodes to reach remote sites, or they may require multiple radios at a specific site to establish a multipoint connection.
- During the lifecycle of the application, antennas become misaligned or damaged due to the environment, resulting in lost links and disconnected remote sites.



The Persistent Data Network, powered by Belden Horizon, was engineered to overcome these challenges, and to simplify the network infrastructure while still providing the point-to-point, multipoint, and redundancy requirements of modern process networks. The diagram at the above right illustrates the data flow in a PDN application.

You can see in this diagram that each site is capable of both point-to-point (master-remote) and multipoint (peer-peer) topologies. However, with PDN these topologies are automatically configured, ensuring the SCADA system, or your application server, and all remote sites have connectivity and access to the data they need. The diagram is at right. You can see in this diagram that all of the PDN connections are managed by the Belden Horizon engine.



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Persistent Data Network – Powered by Belden Horizon

The Persistent Data Network (PDN) is a simple, secure, and managed smart remote infrastructure communication network, designed to connect geographically dispersed industrial assets. PDN is a complete networking solution for industrial telemetry networks.

The PDN network is managed and enabled by the Belden Horizon platform. Belden Horizon (PSC) is the engine that we've developed to meet the security, uptime, and ease-of-use requirements for high-reliability industrial data networks.

Since Belden Horizon manages the PDN network, there is no need to work to define a topology for the application. To create a PDN network, simply install a ProSoft cellular gateway (which are packaged with SIM cards and cellular connectivity from the factory) at each of your remote sites, along with a network bridge at your SCADA system, or your application server. Then, connect those gateways to your secure Belden Horizon account.



Next-Generation Data Networking Solution

Network Data Flow

Persistent Data Network - Powered by BH

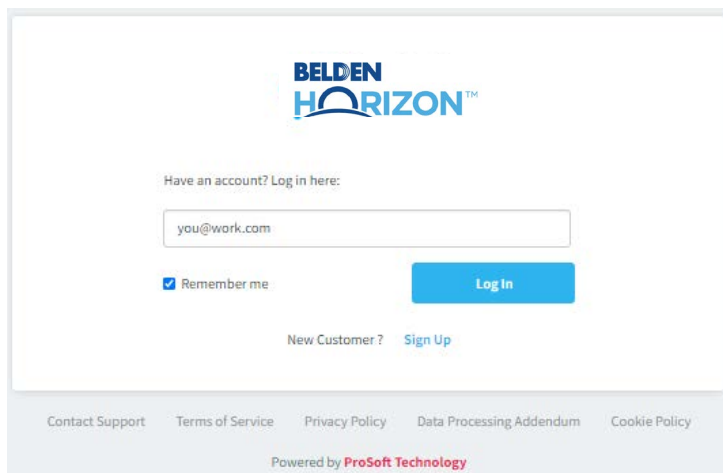
Creating a PDN Network in BH

Summary of PDN Benefits

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Creating a PDN Network in Belden Horizon

Deploying modern telemetry networks with the Persistent Data Network has never been easier. The following section highlights the steps required to get started.



1. Initial Setup

To start, simply connect to belden.io and follow the prompts to create an account. When you create a new account, you create a new “Organization” within Belden Horizon.

It's important to note that there is no software required to deploy, configure, and manage a PDN system with Belden Horizon. All you need is access to the internet and a Belden Horizon account.

Cybersecurity – Zero Trust User: Belden Horizon was engineered with alignment to the toughest security standards in the industry. This system supports single sign-

on so login authentication can be managed by the customer's IT team. The system also allows the user to set their own password policy. In addition, the system supports token-based two-factor authentication.

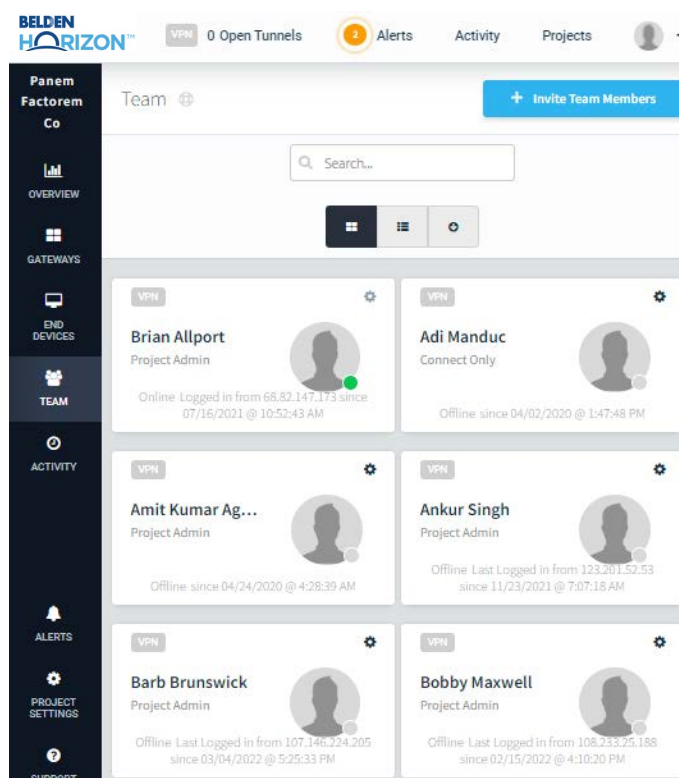
2. Invite Team Members to the Organization

After initial account creation, the Organization Owner can invite additional members to each Project in the Organization.

Users often elect to use a group engineering email box as the Organization Owner, to ensure that individual role and company changes do not render the account inaccessible.

Organization ownership can also be transferred from user to user if necessary.

Cybersecurity – Zero Trust User: Belden Horizon maintains Zero Trust for members beyond the strong log-in authentication referenced in the previous section, but also through the definition of the Role of the member. The Role allows the member's access rights to be controlled by the system administrator. In addition, for enhanced visibility all activity of the members is logged with a time stamp, in the Activity tab.



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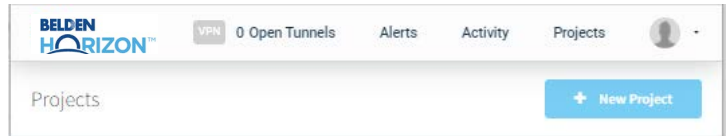
Creating a PDN Network in BH

Summary of PDN Benefits

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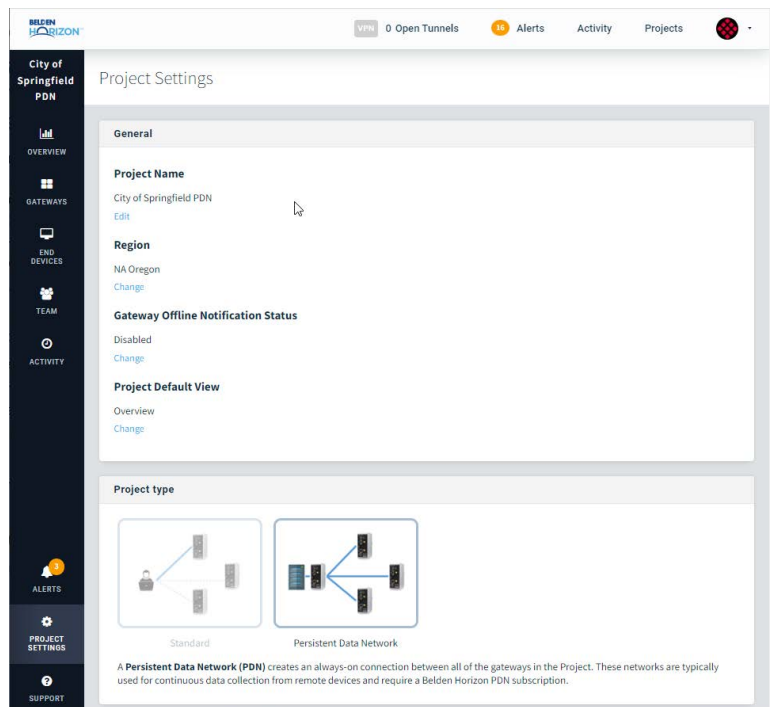
3. Create a Project for the PDN Network

Next, you create a project for each individual PDN network you are deploying by clicking the New Project button and following the prompts.



4. Configure the PDN Network

Within the project, establishing the network as a PDN network is as easy as selecting the project type in the Project Settings.

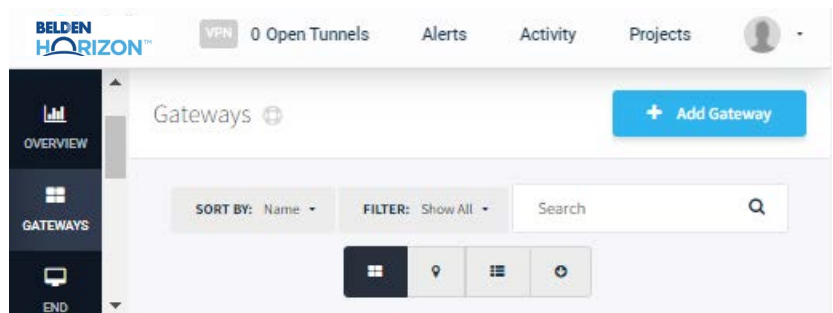


5. Connect Remote Sites to the PDN Network

To connect the remote sites in the application, simply click the Add Gateway button in your project, and enter the activation key provided in the UI of the gateway.

Cybersecurity – Zero Trust Infrastructure: With a focus on a Zero Trust Infrastructure, the gateway connections to Belden Horizon are all outbound during the initiation of the PDN network.

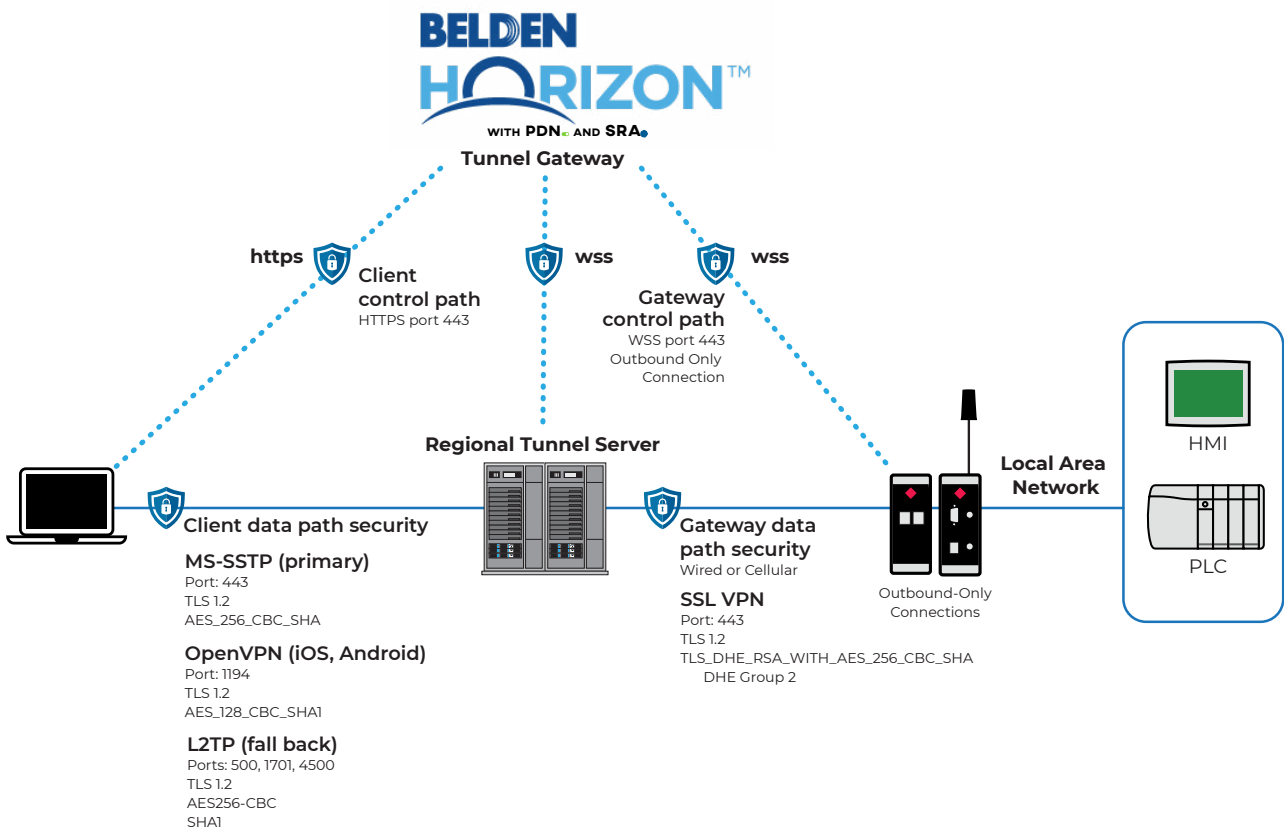
This outbound connection is through port 443 of the customer's firewall. In addition, the ProSoft-provided SIM cards for the cellular gateways include a dynamic WAN IP address, preventing DDoS attacks from the cellular provider.



6. Operation

The PDN solution is now up and running as engineered, and all remote sites are connected to the SCADA system, or the application server in the Distributed Control System.

Cybersecurity – Zero Trust Infrastructure: PDN maintains the Zero Trust Infrastructure through several levels of encryption in the virtual private tunnel. While the peer-to-peer and master-to-peer tunnels are established with Secure WebSockets, all data within the tunnel is encrypted end-to-end with AES 256 and SHA Secure Hashing Algorithms



Summary of PDN Benefits

The Persistent Data Network on Belden Horizon was purpose-engineered to be your Next-Generation Telemetry Solution for the most innovative and critical process networks. [Please contact your local ProSoft representative](#) to learn more about the benefits of the solution.

Ease of Use

- No software to install or maintain – simply connect to the platform at belden.io.
- Remotely access any and all of your sites through PSC, or even through your phone with the Belden Horizon app.
- Remotely see network diagnostics and activity log records of login/logout events and tunneling events.

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Defense in depth – multiple levels of security have been implemented covering the device level, login and access level, and the network connection level.

- Device level
 - » Gateway connections to Belden Horizon are all outbound.
 - » Does not accept inbound connections EXCEPT for HTTP, HTTPS EtherNet/IP, and/or Modbus TCP – all of these can be disabled through the local UI.
- Login and access level for remote access
 - » Can use corporate login credentials (single sign-on) with SAML 2.0 authentication.
 - » Token-based multi-factor authentication.
 - » Tunnel passwords are automatically generated - 32-byte one-time passwords per user and per gateway.
 - » IP Allow List - specify which end devices the user is allowed to access.
 - » Virtual Lockout-Tagout (vLOTO) - when enabled, must give permission for remote user to connect to gateway.
 - » Activity log records login, logout, and tunneling event.
- Network Connection
 - » Belden Horizon leverages computing power from AWS to enhance the security and reliability for a Persistent Data Network (no data is stored in the cloud).
 - » AWS uses Elastic Compute Cloud as virtual servers (aka EC2). Belden Horizon software is hosted on a variety of EC2s. These EC2s are not used for anything other than PSC.

- » All data is encrypted, including data at rest in the cloud, and data between micro-services.
- » Belden Horizon uses SSTP (Secure Socket Tunneling Protocol), which uses Port 443 – only one port to open and manage.
- » Tunneling cipher from gateway is:
 - » TLS_DHE_RSA_WITH_AES_256_CBC_SHA
- » Tunneling cipher to user is:
 - » AES_256_CBC_SHA for MS-SSTP and
 - » AES_256_CBC_SHA1 for L2TP.
- Uptime
 - » High availability and reliability with 99% uptime.
 - » Multiple tunnel servers located strategically around the globe – can connect through any tunnel server (we recommend using the closest tunnel server to make sure there are no latency issues).
 - » Separated data and control plane. The data plane is for communication between devices, and the control plane is for ProSoft device management and Belden Horizon connection.


Learn More

Learn more about the remote connectivity solutions from ProSoft Technology and [contact our experts.](#)



Remote Connectivity Toolkit

PDN Persistent Data Network



Industrial Cellular Gateway

Belden Horizon
[Technical Overview](#)

Datasheets
[Belden Horizon, Wired Network Bridge](#)