

IT Infrastructure Tips for Ensuring High-Performance Cloud Connectivity



At a Glance

- The Plex Manufacturing Cloud delivers state-of-the-art connectivity and data security
- Plex connects your Industrial Internet of Things even connecting to plant floor machines
- Plex provides multiple open standards to integrate the way you want to

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THE MANUFACTURING CLOUD

Introduction

What does it take to successfully run my business in the cloud? What happens if my Internet goes down? What does my IT department need to know? What hardware will I need in my plant? These are very common questions customers of mission-critical cloud applications often ask. In this document we will shed some light on the answers to these questions and offer some strategies and tactics to minimize risk and maximize performance.

As a 100 percent cloud software provider, Plex has been helping customers improve their business processes for the past 20 years. During this time we have worked with hundreds of our customers to identify best practices to ensure they are successful at reaching their goals. While cloud delivery was new for many of our customers in the early years, cloud and SaaS have become the preferred delivery model for enterprise software. While Plex offers industry-leading uptime and availability from within our own data center, there are things our customers typically do within their own organizations to ensure they maintain connectivity to the Plex Manufacturing Cloud.

To ensure the high performance and availability of any cloud solution, several key areas should be addressed internally:

- Internet Connectivity & Redundancy
- Application and Data Security
- Mobility & Wireless Network Requirements
- Plant Floor Equipment Needs
- Integrations to other Systems

Internet Connectivity & Redundancy

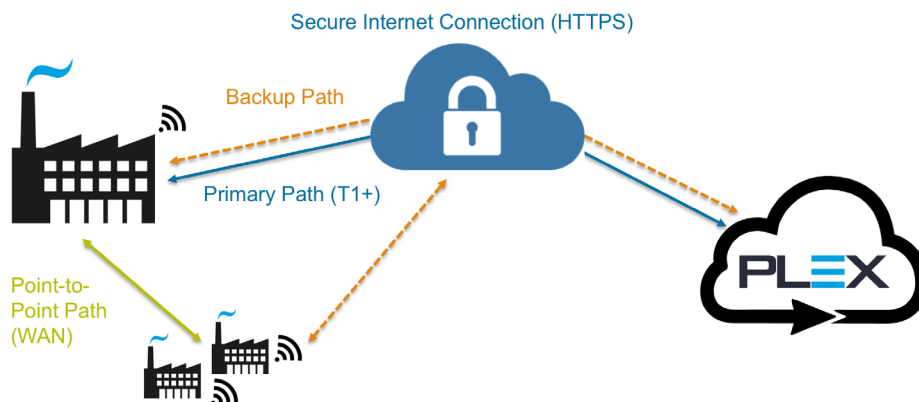
While cloud software delivery has been mainstream for years in many software categories, it remains relatively new to the manufacturing world. Many manufacturers built existing Internet connections to fill basic needs for things like Internet browsing or e-mail delivery. Some larger organizations are

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also sharing information between locations through an established Wide Area Network (WAN) as well. Now with the shift toward cloud delivery for enterprise applications, connectivity strategies need to be revisited and updated to fulfill the current needs. The two main areas that need to be considered are reliability and performance.

With the advent of cloud software, the location of your data shifts from your internal facility to the cloud data center, so access to that data is critical. So now instead of treating your local data center and servers as the hub for your data repository and fortifying the network connectivity to that data center, you now must treat your Internet connection with that same level of importance by ensuring a solid path to your data. At Plex, we recommend our customers establish a separate secondary Internet connection to provide a failover in the event the primary path fails. Further, we recommend the paths use two different mediums as well, so the last mile the data travels to your facility is a completely different path. For example, the primary path may be on a telco carrier T1 type circuit while the secondary path is through a cable modem provider. These two connections would take different methods to reach your building based on their own delivery methods.

Plex recommends secure, redundant connectivity options



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For more remote locations lacking dedicated lines, various cellular, wireless, and satellite options may be available as an alternative. Plex regularly consults with our customers to help recommend the most affordable and relevant options for the size and location of the organization. Once the primary and secondary connections are identified, they can then be coupled using an automatic failover method so that if either connection were to drop, the other connection would continue to run seamlessly without any interruption to end users.

The Plex Manufacturing Cloud Internet traffic is much like web browsing traffic. It is very light weight but will vary from user to user depending upon what functions they are performing in the system. There is no standard formula for how much bandwidth is needed per user because it will depend upon how they use the system.

As such, Plex regularly consults with customers to offer recommendations on the ideal connection types given the available options in their area along with the details of each particular use case. Generally, for customers with 100 to 150 users, a single T1 (1.5MB) connection is usually sufficient.

However, Plex is actually more concerned with the latency (response speed) than the bandwidth. Think of this like a highway; you can have an eight lane freeway between two points but the speed limit is really what determines how fast you will get to your destination. For optimal performance Plex requires less than 150ms of latency from our customer sites to our data center.

The good news is that it's typically very easy to achieve latency below 150ms in most places around the world. However, if in some problem areas latency becomes challenging, there are also other solutions available to accelerate the traffic or priority route the path the traffic takes to lower the latency. Plex can assist customers with recommendations for solutions should issues arise.

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Application and Data Security

With seemingly endless stories about data theft and corporate hacking, application and data security is always top of mind for any customer of a cloud solution. However, security for cloud applications can generally be broken down into three key zones:

1. The security of the network environment in the customer's facility
2. Data security between the customer site and the cloud provider
3. Security within the cloud provider's data center

As a mission-critical provider of cloud manufacturing software, Plex treats security as a top priority at all three zones.

First, Plex highly recommends that customers should consider Internet web traffic filtering to prevent employees from accessing inappropriate sites or services. This can be achieved through a filtering appliance or some models and brands of firewalls. This not only increases security protection, but minimizes the amount of unnecessary traffic that could affect the company's Internet performance.

Second, all Plex customer sessions are forced to go over an HTTPS SSL encrypted path to Plex. This is the same secure method that is used for online banking. This encryption ensures that nobody can monitor or read any data traffic while in transit.

Lastly, once the data reaches Plex, it is stored and secured in our state-of-the-art Data Center. Features of this data center include:

- A bank-vault design constructed with advanced design principles and techniques to withstand natural disasters and other physical attacks
- Advance fire suppression systems
- Multiple layers of physical security, including advanced biometric security clearance to access the data center
- Camera monitoring systems

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- Multiple layers of highly secure, hardened Palo Alto Firewall clusters with hot standby redundancy
- External monitoring and tracking systems utilizing Nessus, VisualPulse, Snort and other security threat detection techniques
- Robust multi-layered anti-virus system featuring application aware in-stream packet level scanning
- Isolated network barrier to protect critical subsystems
- Third-party application vulnerability testing on a weekly basis
- Comprehensive quarterly automated vulnerability testing
- Annual third party manual network penetration testing

These types of devices can also be tied into your local security domain and enforced with active-directory policies for your users. Plex has partnered with solution providers to help customers with these types of security measures if help is needed.

Mobility & Wireless Network Requirements

One of the greatest benefits to the Plex Manufacturing Cloud is that it captures all your manufacturing events and data in real time, when and where they happen. The benefit to this granular data at the “manufacturing moment” is that it can be accessed and analyzed whenever and wherever you need it. This isn’t limited to computers and workstations, but extends to smartphones and tablets to enable mobile employees.

Mobility begins within the company with a sound wireless network. With Plex, the most common uses of wireless on the plant floor include Shipping, Receiving, Material Movement, Cycle Counting, Physical Inventory, and Quality Inspection. So anywhere inventory is processed, inspected, moved, or stored a strong wireless network may be a core requirement. For many manufacturers, that reach may include the entire plant floor. Therefore, it is key to ensure your wireless network eliminates or avoids dead spots and is designed for proper roaming capabilities.

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In some cases, Plex customers may even store inventory outside the four walls of their facilities. In some instances, cellular enabled devices can eliminate the need for wireless coverage in these extended areas. Because Plex traffic is very minimal, cellular networks can be a good alternative for these use cases. In the event of extremely remote areas or unusual obstacles, Plex can assist with selecting a solution partner to perform a survey of your location and provide an estimate on the costs of installing your additional wireless coverage.

Plant Floor Equipment Needs

The core of the Plex Manufacturing Cloud is built around product traceability. To achieve the high levels of traceability, Plex makes a unique use of barcode or RFID equipment. Therefore, most Plex customers deploy a combination of barcode printers, production workstations, mobile scanners and tablets at strategic locations throughout their production floor.

A typical production workstation consists of a PC or thin client device, a touchscreen monitor, keyboard, mouse, barcode scanner, label printer and some type of mobile cart or enclosure. Depending upon the environment or production processes conducted in a given facility, the specific models and types of these devices will change.

The following represent some standard Plex recommendations for equipment requirements:

PC/Thin Client:

Plex recommends Windows OS devices that meet the basic hardware requirements of the version of OS. Plex supports Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari browsers. Browser versions should be kept within two versions of the most current to ensure full compatibility with Plex.

Touch Screen Monitor:

While regular monitors can also be used, many Plex customers prefer touch screen versions. The Plex control panel used on the production floor is designed with large color-coded buttons to make optimal use of touch screens ideal for

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production recording. These can be capacitive or resistive models but should be matched appropriately with your environment.

Label Printer:

Plex comes standard with a barcode label library consisting primarily of ZPL formatted labels. Plex recommends Zebra brand printers, although most of today's major manufacturers do support some form of emulation for ZPL. However, emulation is not always 100 percent accurate so we recommend testing any existing printers to ensure they work properly. If purchasing new printers, it would be ideal to purchase Zebra brands. USB barcode printers are usually sufficient, although networked (IP addressable) printers would be required if connecting via a mobile device.

Barcode Scanners:

The most common barcode format in the Plex library is Code 3 of 9 (or Code 39), although others can be supported to support specific industries. Most barcode scanners currently on the market support Code 3 of 9 (or Code 39), but you should ensure you specify scanners that support your barcode specifications. Plex recommends a keyboard wedge (USB) scanner type. The wired or wireless that is ideal for your situation will depend upon your application and the distance from the workstation where scanning will take place.

Mobile Scanners:

For typical shipping, receiving, or material movement activities a scanner may need to support the use by forklift truck operators. Plex supports the use of truck-mounted terminals or mobile devices. For mobile devices, Plex has a mobile application designed for smaller devices with smaller screens. Plex recommends Windows Mobile OS devices (not CE), or Android devices.

Tablet Computers:

There are many uses for tablets in the Plex application. The most common use would be a worker who is moving around the plant floor, such as a quality or maintenance person. Plex recommends Windows OS-based devices if labels are being printed. Otherwise Android and IOS devices work just as well in these applications. Bluetooth is also required in order to pair a Bluetooth type scanner

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to these devices for scanning barcodes.

Weigh Scales:

If your process dictates weighing of product, this data can be read directly into Plex. This requires a scale with a serial (RS232) COM port type connection. This can be plugged into a local PC or thin client device that also supports a serial (RS232) COM port. This practice helps eliminate operator error from manually entering data.

Quality Gages:

Much like weigh scales, Plex can take data directly from electronically equipped measuring equipment straight into the Plex application. This can be accomplished with a multi-port mux box and USB cable. The size of the mux box would be determined by the number of gages used at a particular inspection station.

Because each customer's configuration will vary and may have unique requirements, Plex regularly assists customers with identifying the types and quantities of hardware that would be ideal for their facilities. During the sales cycle, the Plex Solution Engineering team can even conduct a plant visit and provide budgetary estimates to help identify costs and build appropriate budgets.

Integrations to Other Systems

In today's manufacturing world it is very common to have varying levels of automation and PLC equipment within a facility. Plex realizes that every plant will be different so Plex has been designed with the flexibility to be able to communicate with all of these different devices through an open application interface (API). The Plex API is easy to use and can communicate with a vast majority of hardware and applications within a manufacturing facility. Integration is handled via the Web Services model where virtually every area of the application database can be exposed through Web Service transactions.

If your local IT group is not familiar with creating Web Services transactions, Plex can recommend experienced Solutions Partners to build integrations. Over

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one-third of all data transactions entered into the Plex system today come from machines and not people. This is a growing trend for our customers as they strive to gather more data points and efficiencies from their processes.

In Summary

While every organization is different, some basic best practices and general requirements offer a solid starting point. The Plex Solutions Engineering team can offer early advice on requirements and costs, and additional subject matter experts can be consulted as needed. Plex boasts the happiest customers in the cloud software market, and we want to continue this by making sure new customers are making informed decisions with their business needs.

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About Plex

Plex is the Manufacturing Cloud, delivering industry-leading ERP and manufacturing automation to more than 400 companies across process and discrete industries. Plex pioneered Cloud solutions for the shop floor, connecting suppliers, machines, people, systems and customers with capabilities that are easy to configure, deliver continuous innovation and reduce IT costs. With insight that starts on the production line, Plex helps companies see and understand every aspect of their business ecosystems, enabling them to lead in an ever-changing market.