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PTC Product Focus

Creating a Symbol in RSD from Imported Geometry

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PTC Product Focus

Architectural Improvements in Pro/INTRALINK 8.0

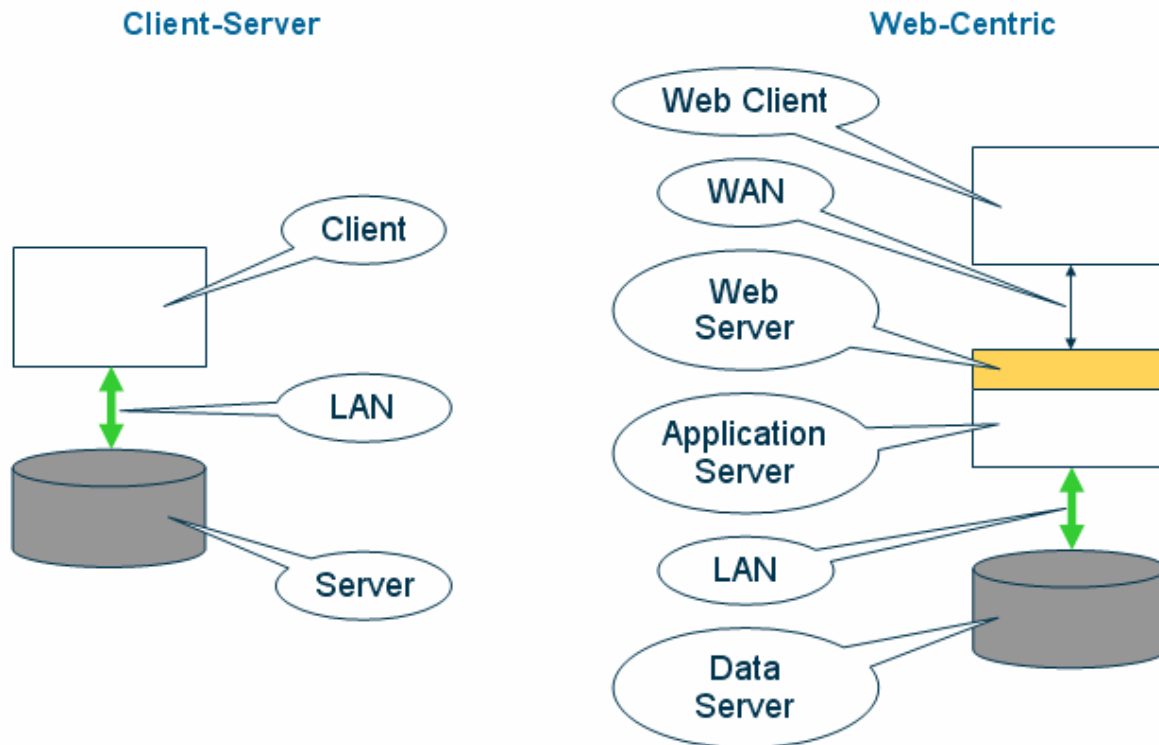
Pro/INTRALINK 8 includes significant architectural improvements over version 3. Pro/INTRALINK 3 was based on client-server technology, but Pro/INTRALINK 8 is based on Windchill's internet architecture. While this change will help to ensure scalability, improve WAN performance, and provide better return on future PLM investments, internet technology is "disruptive" in the sense that it departs from the tried-and-true client-server technology of the '80s and '90s. Therefore, it is worth understanding the differences between these technologies.

So, [why does architecture matter for PLM?](#) The short answer is that an internet architecture provides the lowest possible total cost of ownership (TCO) over the life of the system. TCO goes well beyond just the initial purchase price, and even the deployment costs. TCO adds up over the entire 5-, 10-, 25-year lifespan of the system. It also encompasses not just direct costs, but also missed opportunity costs. For example, how much could be saved by having a more performant system? Or scale to several hundred more users? Securely? World-wide?

Since the Windchill internet architecture is specifically designed for the most scalable and distributed platform on earth, the internet, it has specific capabilities that client-server technology simply cannot match. For example, with client-server technology, if the application is upgraded, both the central server and all client desktop machines must have new software installed. Using Windchill technology, only the server must be explicitly upgraded. The new capabilities are communicated to the client on-demand, without any additional software installation. This also

means that virtually any computer with a network connection to the server, has the ability to access the application.

The Windchill architecture also offers significant improvements when deployed across a WAN. To understand the primary benefits, it is necessary to have a good understanding of client-server and web architectures. The diagrams below illustrate the differences. On the left, is a schematic of a client-server application. It consists of a client program (installed and running on the user's workstation), and a database server, with a high-bandwidth LAN between them. The client program implements business logic as well as display logic, and is also responsible for all aspects of security. This is essentially the picture for Pro/INTRALINK 3.



The diagram on the right, while obviously more complex, has additional features which are required by PLM applications. Starting from the bottom, the data server is essentially the same in each figure. The high-bandwidth LAN is also the same. But, that's where the similarities stop. The web architecture includes an application server, which drives all business logic. The gold box represents the web server, which receives client requests, forwards them to the application server, and then relays the response back to the client, all using standard stateless web protocols. The web server is also responsible for authenticating the user, that is, making sure the user is who s/he says s/he is. Authentication relies on a number of standard technologies including, passwords, dual-factor authenticators, and even biometrics. The next architectural component is the WAN – explicitly assumed to be much lower-bandwidth and higher-latency than the network segment(s) that connects the application to its data. The last component is the universal web client (i.e., your favorite web browser). Because all communication between the client and server is performed using web protocols, it is also possible to ensure privacy by using secure, commercial technology to encrypt data that is transmitted across the WAN. Windchill utilizes the same encryption standards as virtually every e-commerce site on the web. (Refer to the article entitled "Configuring Windchill 7 & 8 Servers for HTTPS" for more details.)

With these architectural models in mind, it is easy to understand why client-server cannot efficiently address modern highly-collaborative PLM business requirements. Let's take, for example, a most fundamental use case – checking out an assembly for modification. Conceptually, the business logic is to loop through all components in the assembly, check them out, and download the CAD data to the client workstation. So, if there were 100 components, there would be 100 check-out and 100 download operations. This approach results in a large number of small, low-level transactions between the data server and the business logic, and is only efficient across a high-bandwidth LAN.

So far, the LAN traffic is the same for each architecture. The difference comes when the end-user is not connected by a LAN to the data server. If the end-user must traverse a WAN with those many small network transactions, performance will suffer. This is because the underlying network protocol being used (TCP/IP), awaits an acknowledgement for every network packet sent. Many small packet scenarios, commonly called “chat”, should be minimized over WANs.

Windchill's web architecture minimizes chat by allowing the application server to aggregate low-level transactions into larger atomic business transactions. Consequently, the end-user need only send one “checkout the whole assembly” request to the server, and can receive back an optimized stream of data, with larger packets than may be possible in the client-server case. This aggregation significantly improves performance as seen across a WAN.

Another significant difference between the two architectures is the network application protocol in use between the end-user and the server. In the client-server days, applications did not typically cross corporate firewalls. They were protected by IT infrastructures and could only be accessed by internal users. However, in the past 15 years, there has been a tidal shift toward outsourcing and external collaboration with partners of all types. Consequently the web protocols, specifically HTTP, came to prominence because they were stateless, application independent (carried no knowledge of the application's business logic), and typically fixed to known network ports. These features gave IT shops flexibility and security to deploy such applications through the corporate firewall. In contrast, client-server applications are not web-friendly and require non-standard ports and protocols, which can be targeted by hackers.

Deploying Pro/INTRALINK 8 requires new understanding of the underlying network technologies to unlock the significant potential of Windchill's internet architecture for Pro/ENGINEER work group management.

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Tips of the Week

6 Tips You Can Use Everyday

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Tips of the Week

Configuring Windchill 7.0 & 8.0 Servers for HTTPS

Note: This tutorial is not intended for production servers – some security features are left disabled. However, it does describe how to configure a basic Windchill server for HTTPS, for development or evaluation purposes. Contact your PTC account manager to discuss the services necessary to deploy HTTPS on a production server.

Have you ever entered your credit card number to purchase an item from a web site? Or balanced your bank account on-line? Have you ever wondered whether a snoop could intercept your transaction, invade your privacy, and steal your identity? Do you have similar concerns about your valuable design data?

Chances are, you have noticed that some web addresses start with “http://...” while others start with “https://...” Or, you may have noticed a lock icon (🔒) in the lower right corner of your browser when you visit some sites but not others. The web is built on the HTTP (hyper text transport) protocol. An “https” at the front of a web address, or the lock in the corner, indicate that the site you are visiting has deployed a more secure variant of HTTP. When HTTPS (HTTP-Secure) is deployed on a web server, and you request a page, its data is first encrypted by the server, then sent across the web, then decrypted in your client. This means that even if a snoop could intercept your network packets, they would not have access to meaningful information - only an encrypted jumble of bits.

The Windchill web architecture provides a high degree of privacy by utilizing exactly the same commercial encryption technology employed by most e-commerce sites.

HTTPS uses secure socket layer (SSL) infrastructure to encrypt the HTTP packets across the public internet. SSL ensures privacy since only the sender and intended recipient can decrypt a message. It also authenticates the server by providing an encrypted certificate to the user’s browser.

Certificates can either be certified by a trusted certification authority (CA), such as VeriSign or Entrust, or they can be self-signed. The CA takes responsibility for ensuring that the certificate is valid and fairly represents the issuer. By convention, a certificate from a trusted CA can be automatically imported into the browser, so the end-user may never know that a certificate has been sent and installed. With a self-signed certificate, there is no external organization vouching

that you are actually the issuer of the certificate. When the browser encounters a system, which is offering a self-signed certificate, the user is prompted to accept the certificate manually in order to continue. Once, accepted, a self-signed certificate works exactly the same way as one issued by a trusted CA.

So, if you want to make your Windchill server more secure, but don't want to incur the expense of purchasing a certificate from a trusted CA, or if you need a temporary certificate while one is procured, the following procedure can be used to create and install a self-signed certificate. The following commands prompt for information such as passwords, and identifying information, which appears in the user's browser when they are asked to accept the certificate in order to load the page.

1. Create a private key. Run the following command from the <apache>\conf directory. (Note: You may need to add <apache>\bin to your PATH.)

```
openssl genrsa -out ssl.key\server.key 2048
```

2. Create a self-signed authentication certificate. The command uses the private key and creates a certificate, which will be valid for 10 years.

```
openssl req -config openssl.cnf -new -x509 -days 3650 -out ssl.crt\server.crt -key \ssl.key\server.key
```

The command (single line) will prompt you for identifying information. Most are self-explanatory, but when prompted for the "Common Name", enter the logical Windchill server name. This can be the name of your reverse proxy, or Windchill cluster.

3. By default Windchill's Apache is configured for HTTPS (see ssl.conf, which points to the key and certificate just created), but it must be restarted in SSL mode. This can be done from a command line:

```
apache -D SSL
```

Or on Windows, it can be done by specifying "-D SSL" in the service properties dialog's "Start parameters:" field and pressing the start button. Note that parameters will not be saved for next startup.

4. Configure Windchill. Use "xconfmanager -p" and/or site.xconf to modify the following URL properties in wt.property to use the HTTPS protocol rather than HTTP. Just replace "http" in the following property values with "https".

```
wt.server.codebase  
wt.httpgw.mapCodebase (if using a reverse proxy)
```

5. Purge the Tomcat cache and restart all servers.

At this point Windchill should be accessible via HTTPS. However, most sites will also want to block (via a firewall) all network traffic through any port other than 443 (the default for HTTPS).

Server-to-applet RMI communications which are, by default, configured over ports 5000 through 5009 can be tunneled over HTTP/S. Refer to the Windchill Administrator's Guide for instructions on how to tunnel RMI over HTTP/S. There are also several articles in the technical support knowledge base on ptc.com.

One other warning... Since the server must now decrypt every transaction request and encrypt every response, HTTPS can impose as much as a 20-30% overhead on server processing resources. Take care to account for the additional resource demand or your server may become sluggish. Another option is to deploy special network hardware devices that perform all encryption and decryption, and leave the load on the server essentially unchanged (vs. using HTTP).

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Announcements

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If you have any questions about these sessions or would like to see getting other courses, not on this list, on the schedule please feel free to contact me for more details. They are a great way to bring training to you without you having to worry about location or being out from work for long stretches.

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1. calling order admin at <http://www.ptc.com/services/edserv/training/registra.htm> or

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<http://www.ptc.com/go/engineering/index.htm>

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Upcoming, 2005 Your local Pro/Engineer User Groups
<http://www.ptcuser.org/rugs/>

Upcoming, 2006 TBD
PTC/USER International Conference
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- 1) Inform you on events related to PTC products (user groups, conferences, training schedules, etc.)
- 2) Educate you on solutions that are available at PTC
- 3) Tips & Techniques using PTC Products

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