



Infor LN Sizing and Deployment Guide for Infor Workspace and Infor ES Web UI

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Contents

About this guide	7
Intended audience.....	7
Related documents	7
Abbreviations and terminology.....	8
Contacting Infor.....	9
Chapter 1 Architecture.....	11
Infor Workspace	11
Infor ES Web UI	11
Infor Workspace architecture	12
Microsoft SharePoint.....	12
SharePoint server farm	12
SharePoint web application	13
SharePoint site collection.....	13
SharePoint site	13
Infor Workspace.....	13
Authentication	14
Infor ES Web UI performance	14
Chapter 2 Deployment scenarios	15
Typical deployment	15
Separate Infor Workspace server	16
Location of the SharePoint configuration database	16
Large deployment	17
Separate reporting server	17
Separate HTTP server for Infor ES Web UI	18
Chapter 3 Client requirements	21
Software requirements	21

Hardware requirements.....	21
CPU	21
Memory	22
Screen resolution	22
Caching.....	22
Antivirus setting.....	23
Chapter 4 Server requirements	25
Software requirements	25
Java Runtime Environment (JRE)	25
Multiple JVMs	26
Hardware requirements.....	26
CPU requirements	26
Example	26
Memory requirements	27
Disk requirements	27
Typical deployment	27
Large deployment	28
Workspace server	28
Web UI server	28
IFS server	28
Virtualization	29
More information	29
Chapter 5 Network requirements	31
Network requirements between the client and Web server	31
LAN connection.....	31
WAN connection	31
Example	32
Login performance	32
Compression.....	32
System message	33
VPN connection	33
Network requirements between Web server and Infor LN server.....	33
Chapter 6 Security	35
VPN.....	35
Firewall.....	35

Secure Sockets Layers (SSL)	36
Single Sign On (SSO)	36
Citrix XenDesktop	37
Dedicated server for Web server software	37
Separate HTTP server for Infor ES Web UI	37
Chapter 7 Sizing example	39
Scenario	39
Sizing	39
Client configuration	39
WAN requirement between the client and Web server	40
Workspace and Web UI web server requirements	40
Recommended hardware configuration	40
Appendix A Tuning Microsoft SharePoint 2010 and Infor Workspace	43
Microsoft SharePoint 2010	43
SQL Server options	43
Database configuration	43
Infor Workspace	44
Browser performance	44
Appendix B Tuning Infor ES Web UI	45
Tomcat	45
Maximum number of threads	45
JVM memory settings	45
Windows	45
Linux	46
Verifying the installation	47
WebSphere	47
JVM memory settings	47
Server mode JVM	48

About this guide

This document provides performance guidelines and sizing information to implement Infor Workspace with Infor ES Web UI and Infor LN. The information provided in this document is based on Infor Workspace 10.3 and Infor ES Web UI 10.6. However, the sizing and deployment recommendations are also valid for earlier versions of Infor ES Web UI.

Throughout all stages of a software implementation process, you must consider sizing. To perform final sizing, you must consider information for all aspects of the implementation. To choose the appropriate hardware for Infor Workspace and/or Infor ES Web UI, use this sizing guide as a guideline.

You can run Infor ES Web UI in standalone mode or within the Infor Workspace framework, which runs on Microsoft SharePoint. This document describes the sizing and deployment of both of these modes.

For the latest information about Infor ES Web UI, see the Infor ES Web UI release notes in Infor Xtreme solution 22881482.

Intended audience

This sizing guide is intended for Infor consultants, partners and customers who are responsible for implementing Infor Workspace and/or Infor ES Web UI. This document contains information that can help system administrators to optimize the performance of their Infor Workspace environment.

Related documents

Certain sections in this document are described in more detail in other documents. The following documents help to extend the knowledge in particular areas.

- *Infor LN - Performance, Tracing and Tuning Guide* (U9357 US)
- *Infor LN – Deployment in a Virtualized Environment* (B0073 US)
- *Infor LN - Sizing guide* (B0045 US)
- *Infor Enterprise Server Extensions - Installation Guide* (U9484 US)

- *Infor ES Web UI - Installation and Configuration Guide* (U8715 US)
- *Infor ES Web UI - Sizing and Deployment for a Thin Client Solution* (B0067 US)
- *Infor ES Web UI - Deployment in a High-available Environment* (B0072 US)
- *Infor LN - Deployment in a Virtualized Environment* (B0073 US)
- *Infor Federation Services - Installation Guide* (U9661 US)
- *Infor LN - Integration Guide In-Context BI* (U9725 US)
- *Infor LN - Configure Single Sign On* (U9559 US)

Note that the sizing and deployment recommendations provided in these documents are still valid for older versions of Infor ES Web UI.

You can find the documents in the product documentation section of the Infor Xtreme Support portal, as described in “Contacting Infor” on page 9.

Abbreviations and terminology

This table shows the abbreviations and terminology that are used in this document:

Abbreviation	Description
Named or licensed user	A user who can potentially log on to the Infor application
Connected or logged-on user	A user who is logged on to the Infor application
Active or concurrent user	A connected user who is actively using the Infor application
2-Tier Server	System that runs both the applications from both the application server and the database server
3-Tier Application Server	System that runs the bshell (Virtual Machine) and the database driver
3-Tier Database Server	System running the database
DS	DS protocol, used for communication between the Infor ES Web UI server and the Infor LN server
JVM	Java Virtual Machine
PBC	Performance and Benchmark Center. This department is responsible for this sizing guide
ION	Integrated Open Network platform
IFS	Infor Federation Services
ADFS	Active Directory Federation Services
IWA	Integrated Windows Authentication

Abbreviation	Description
STS	Security Token Service
Tomcat	Web server and Java Servlet Engine, delivered together with Infor ES Web UI

Contacting Infor

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If we update this document after the product release, we will post the new version on this Web site. We recommend that you check this Web site periodically for updated documentation.

If you have comments about Infor documentation, contact documentation@infor.com.

This chapter provides an overview of Infor Workspace and Infor ES Web UI. It also explains the Infor Workspace architecture.

Infor Workspace

Infor Workspace is a web application framework that provides a common user interface with Single Sign-On for integrated Infor applications. Infor Workspace resides within the Microsoft SharePoint framework. All of the integrated Infor applications in Infor Workspace use SharePoint functionality, navigational elements, and connectivity to social media outlets.

The Infor Workspace interface includes a header with menu options and icons that activate the display of Infor applications in the area below the header. To the right of the application area is a collapsible panel, which hosts a series of web parts such as Maps, Language Translator, Currency Converter, Documentation and Help, and Shortcuts.

Infor Workspace provides drill-back capability among Infor applications so that users can navigate from one application to another to track transactions, transfer data, and to report updates. Additionally, Infor Workspace, along with Microsoft SharePoint and .NET technologies, provides an infrastructure for sharing content among the different web parts.

Infor ES Web UI

Infor ES Web UI is a browser-based user interface that can be used with these Infor ERP applications:

- Infor ERP Baan IVc4
- Infor ERP Baan 5.0c
- Infor LN

Using a navigational framework, Infor ES Web UI offers global access to ERP systems. This framework is used to start and view web pages, and includes shortcuts and a navigation tree. Infor ES Web UI can be customized to a large extent.

Infor ES Web UI also includes Infor Web Help, which is a tightly integrated browser-based help application.

Infor ES Web UI 10.x can run in standalone mode or within the Infor Workspace framework, which runs on Microsoft SharePoint. The look and feel of Infor ES Web UI running within Workspace differs completely from the standalone mode. This document highlights the differences in performance between the two modes.

For the best performance, run Infor Enterprise Server version 8.7 or later with Infor LN. Infor ES Web UI is also supported on earlier versions of Infor Enterprise Server.

Infor Workspace architecture

This section explains the Infor Workspace architecture.

Microsoft SharePoint

Infor Workspace resides within the Microsoft SharePoint 2010 framework.

To correctly deploy and support SharePoint Foundation 2010 products, you must understand these structural elements:

- **SharePoint Server farm:** The top-level element of a logical architecture design for SharePoint Foundation.
- **SharePoint Web application:** An IIS Web site that is created and used by SharePoint Foundation 2010.
- **Content database:** Provides storage Web application content. You can separate content into multiple content databases at the site collection level.
- **SharePoint Site collection:** A set of Web sites that have the same owner and share administration settings.
- **SharePoint Site:** One or more related web pages and other items such as lists, libraries, and documents that are hosted inside a site collection.

SharePoint server farm

A SharePoint server farm is a set of one or more server computers working together to provide SharePoint Foundation functionality to clients. For simple scenarios you can start up a SharePoint 2010 farm by installing and configuring everything you need on a single server computer. A SharePoint farm in a typical production environment runs SQL Server on a separate, dedicated database server and can have multiple front-end web servers. Each SharePoint farm runs a single SQL Server database known as configuration database. SharePoint Foundation creates a configuration database whenever it creates a new farm in order to track important farm-wide information.

SharePoint web application

A SharePoint web application is a collection of one or more IIS web sites configured to map incoming HTTP requests to a set of SharePoint sites. A SharePoint web application also maps each SharePoint site to one or more specific content databases.

SharePoint site collection

A site collection is a container of sites. Every site collection has a top-level site. In addition to a top-level site, a site collection can optionally contain a hierarchy of child sites.

SharePoint site

A SharePoint site is an endpoint that is accessible from across a network such as the Internet, an intranet or an extranet. A site is a storage container that allows users to store and manage content such as list items and documents. A site is a customizable entity that allows privileged users to add pages, lists, and child sites. A site is a securable entity whose content is accessible to a configurable set of users. A site can also be an instance of an application. A site can also be used as an integration point to connect users to backend data sources such as a database application or a line of business application.

Infor Workspace

Infor products are organized inside a site collection. The root site of the site collection is used for Infor Workspace. The root site is also used to store common content and data across different products. For example, application information, application drill back views definitions, application deployment information, and shortcuts. Each Infor product such as Infor LN, EAM, SyteLine, and XM, is associated with a dedicated SharePoint subsite.

Infor products can choose to use any of the SharePoint Foundation 2010 features and store any information in the sub-site that corresponds to their product.

The products that run in the Workspace shell can be categorized into two types:

- Non-SharePoint applications
- SharePoint-based applications

Non-SharePoint applications are products such as Infor LN, EAM, SyteLine, and XM, etc. that do not run on a SharePoint server. Instead, these products run on a different application server outside of SharePoint.

SharePoint-based applications run on the SharePoint server. These applications leverage the SharePoint features for their business logic and user interface.

Authentication

These methods of authentication are supported in an Infor Workspace environment:

- Integrated Windows Authentication (IWA)
- SAML token based authentication with Microsoft AD FS

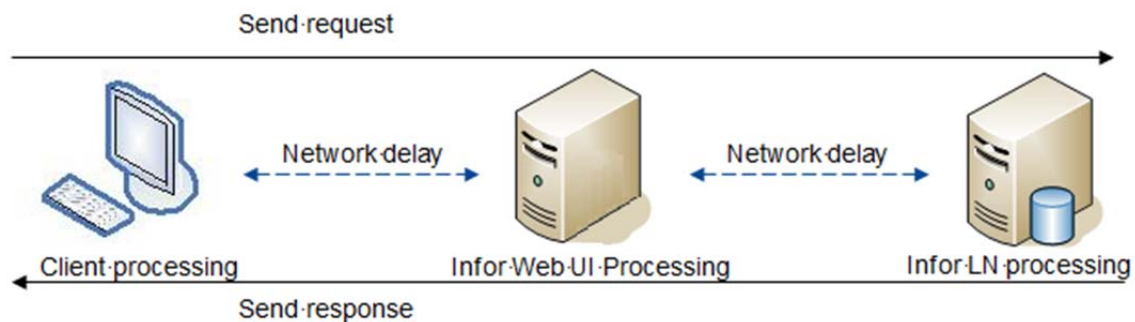
The Infor Federation Services (IFS) application has a supportive role in user management in an Infor multi-application environment. In this environment, IFS facilitates the central authentication and authorization. The implementation of IFS is required in a single sign-on deployment.

If the authentication method is SAML token based, the proper configuration of Microsoft AD FS, including the registration of Infor applications, is performed by IFS.

Infor ES Web UI performance

All delays in the Infor ES Web UI chain are serialized. Therefore, you must consider these delays when making sizing decisions. Most GUI user actions go through the complete chain of client processing, Web server processing, Infor LN processing, and the process of sending results. Delays in the client because of a slow CPU and all network delays are added to this complete chain. The Infor ES Web UI response time delay is affected by client processing, the Web server network, Web server processing, the backend network, Infor LN processing, and the process of sending results back to the client.

This diagram shows the total response time:



Infor Workspace can be deployed in several different scenarios. The scenario that you choose depends on your performance, security, and functional requirements.

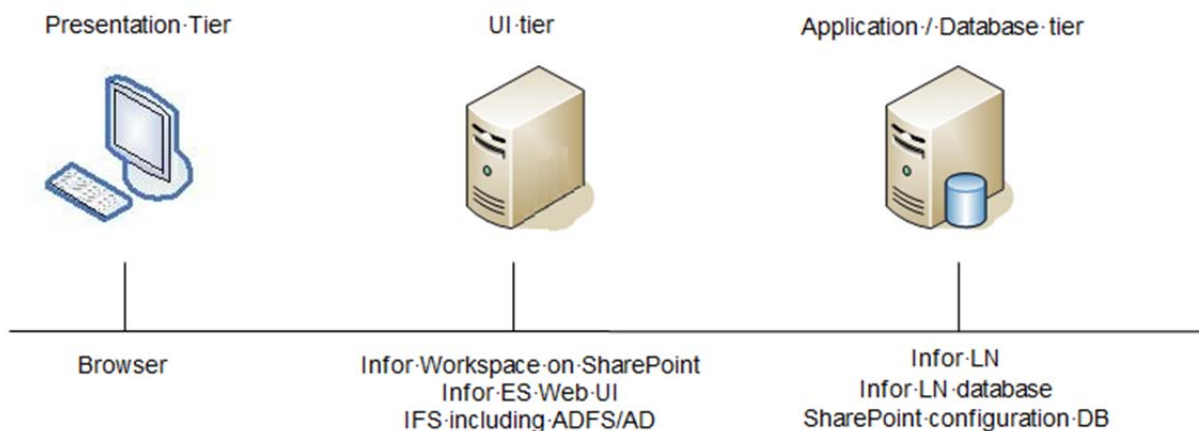
The scenarios in this chapter are specifically for the deployment of Infor Workspace with Infor ES Web UI. The backend is the Infor LN application. Note that when Infor ES Web UI is run in standalone mode, the SharePoint and Workspace UI tier is not used.

These scenarios are described:

- Typical deployment
- Large deployment
- Deployment including direct reporting
- Deployment using a separate HTTP server

Typical deployment

This diagram shows a typical Infor Workspace deployment that has Infor LN and Infor ES Web UI:



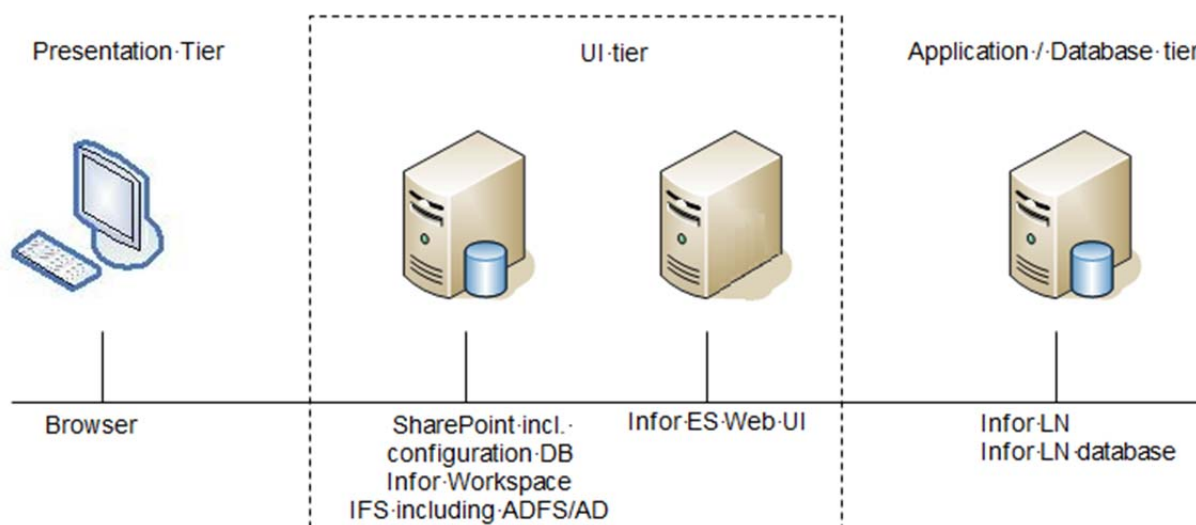
In this scenario the UI components are stored in a single UI tier, and the application and database components are stored on another tier. This configuration is recommended for small installations.

For installations that have a maximum of 50 users, you can install Infor LN, Infor Workspace, and Infor ES Web UI on the same server. For larger deployments, we recommend a separate UI server for these reasons:

- Separate servers can be better tuned for their specific task.
- If Infor LN and Infor ES Web UI are installed on the same server, the overall performance may be reduced for all users. The latency for the UI and Infor LN backend are stacked. If the server becomes saturated, the response time can be longer with a single server scenario than with a multiple server scenario.
- A separate Web server is better for security. For more information, see “Security.”

Separate Infor Workspace server

When multiple Infor applications are running in Infor Workspace, you can run Infor Workspace on a different server than the other Infor applications, such as Infor ES Web UI, as shown in this diagram:



Location of the SharePoint configuration database

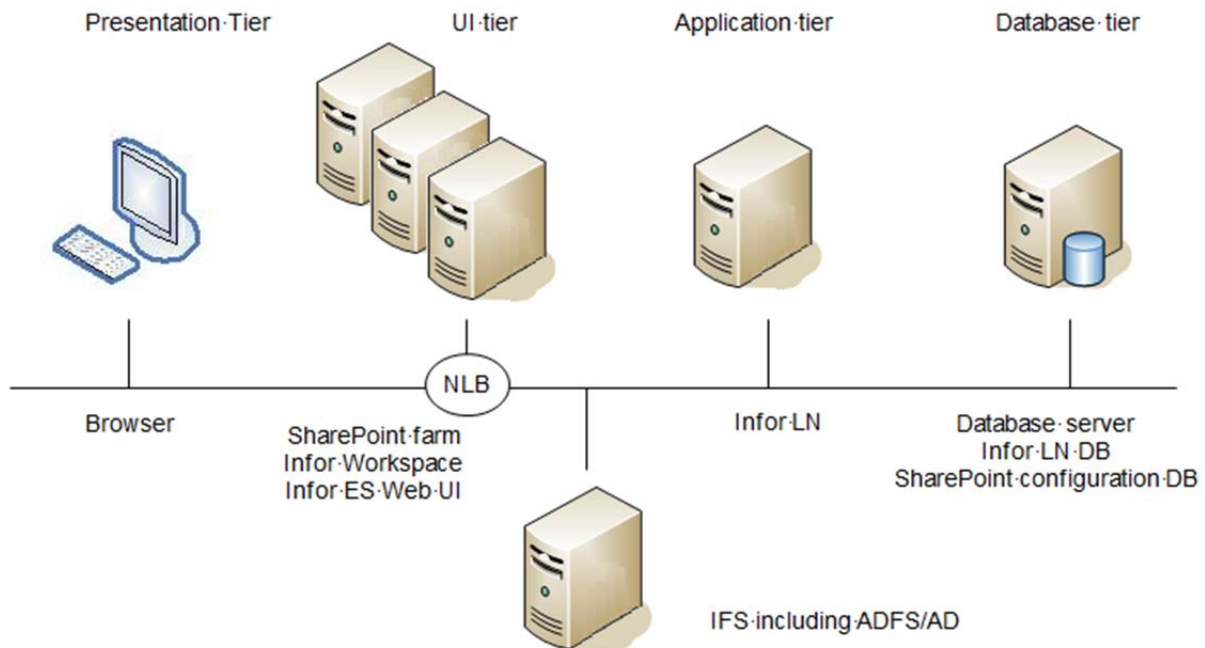
You can store the SharePoint configuration database (Microsoft SQL Server only) either on the Workspace server or on the database server that is used for the Infor LN application. The advantages of using a central database server include fewer licenses and more options for high availability.

From a performance perspective, the load on the SharePoint configuration database is low; therefore, there is no effect on the CPU sizing of the Infor LN server.

The SharePoint configuration database instance does require memory. We recommend that you reserve 2GB of internal memory on the server that will host this database.

Large deployment

In a large deployment a separate database server is used to store both the Infor LN database and the SharePoint configuration database. Optionally a scale-out scenario with a network load balancer (NLB) can balance the load over multiple servers in a SharePoint server farm. This diagram shows a large deployment scenario:

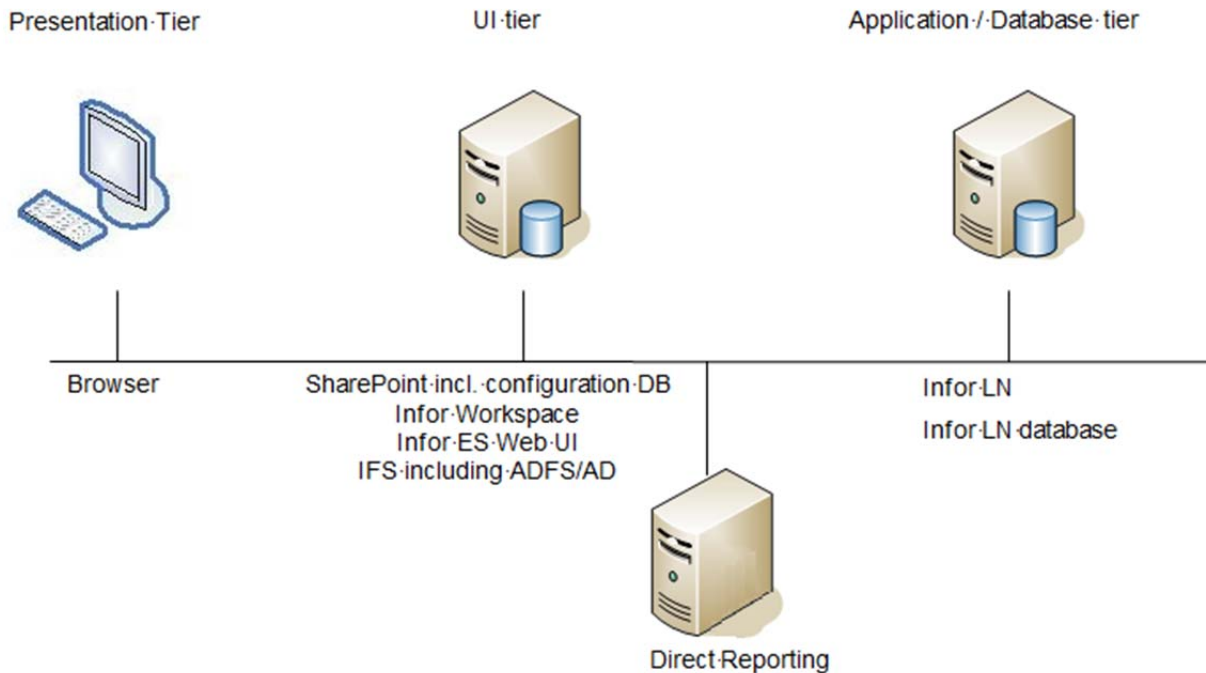


Note: IFS is installed on a single server. You can have only one instance of IFS and the SharePoint configuration DB.

You can run the Infor ES Web UI servers in a load-balanced environment or run these servers independently. However, constraints exist when running them in a load-balancing scenario. For further information, see *Infor ES Web UI - Deployment in a High-available Environment* (B0072 US).

Separate reporting server

In this scenario, the reporting solution runs on a separate server, which decreases the load on the Infor ES Web UI server. This diagram shows a deployment scenario where Infor ES Web UI and the reporting solution are on different servers:

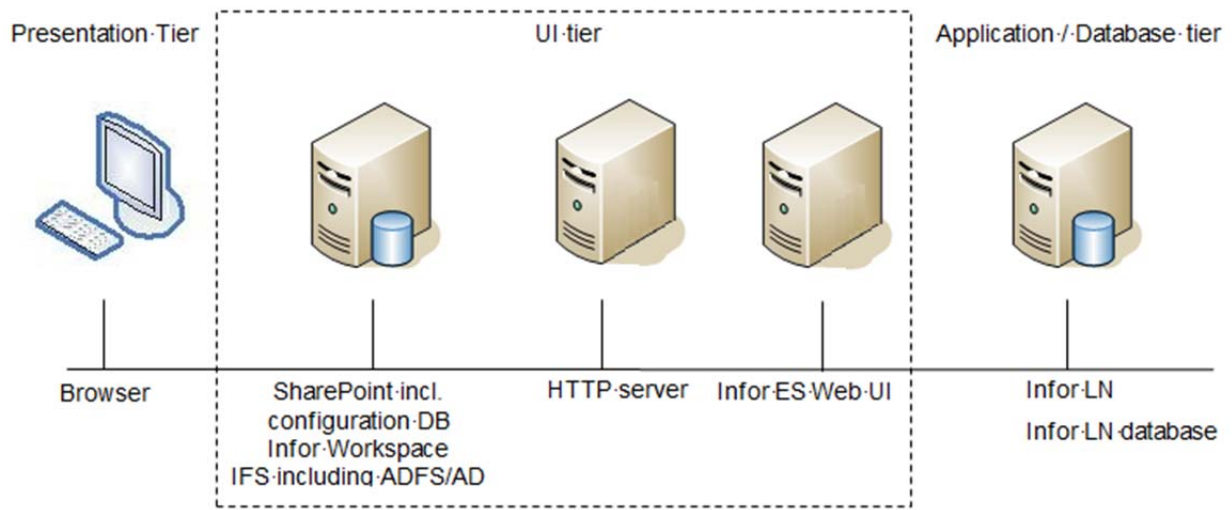


Separate HTTP server for Infor ES Web UI

You can deploy a separate HTTP server instead of using the embedded HTTP server in Tomcat.

A separate HTTP server improves security and provides more flexibility and functionality, for example, load balancing. For larger installations, Apache performs better than Tomcat because Apache runs native rather than within a JVM.

This diagram shows a deployment scenario that has an Infor Workspace server, a separate HTTP server, and Web server.



For smaller configurations, you can install a separate HTTP server and the Web application server on the same physical server.

This chapter provides the client requirements for the software and hardware stack on which Infor Workspace and Infor ES Web UI run.

Software requirements

These documents provide information on the software requirements for the Infor Workspace and Infor ES Web UI client system:

Title	Document reference	Location
<i>Infor Web UI – Installation and Configuration Guide</i>	U8715 US	Infor LN documentation portal
<i>Infor Workspace Installation and Configuration Guide Version 10.3 for Active Directory</i>	26133	Infor Xtreme
<i>Infor Workspace Installation and Configuration Guide Version 10.3 for Active Directory Federation Services</i>	26134	Infor Xtreme

Hardware requirements

This section provides the hardware requirements for the Infor Workspace client system.

CPU

Delays on user actions in the GUI have a direct relationship with CPU speed and power. We recommend that you use at least a dual core CPU with an individual core speed of 2.2 GHz or faster.

Memory

The memory requirement for Infor Workspace and the Infor ES Web UI client is 1 GB. This amount does not include memory that is required by the operating system or other applications. For expert LN users or users that use additional Infor client applications in Infor Workspace, the memory requirement is 2 GB.

Screen resolution

We recommend that you use set the screen resolution to 1280 x1024. Infor Workspace screens are designed for this resolution.

Caching

Browser caching reduces the amount of data that must be downloaded from the Web server, which reduces response times and network load. The use of caching is more important in WAN networks with lower bandwidths and higher latency.

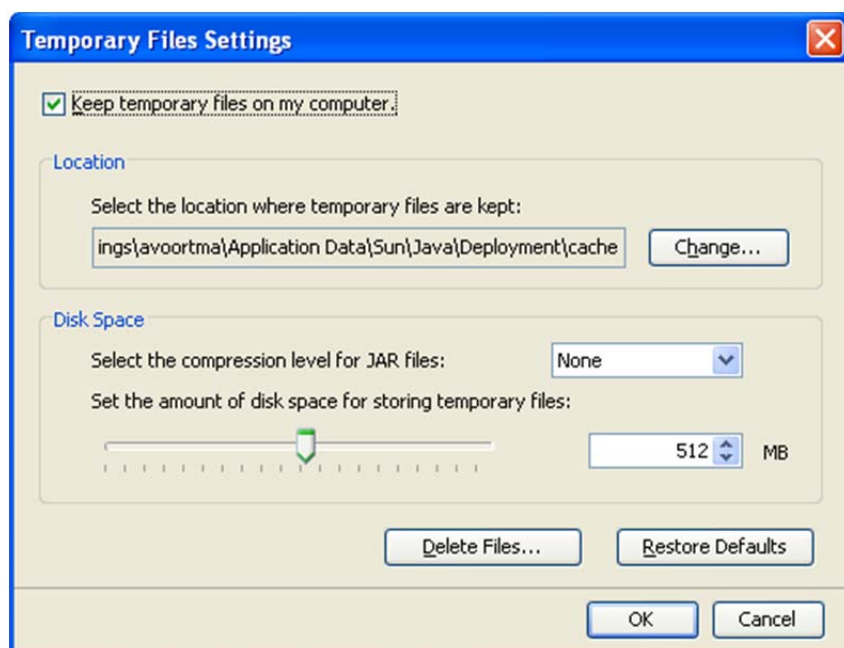
Caching can be used for static (unchanging) content only such as icons. When you sign in to Infor ES Web UI for the first time, approximately 6 MB of static content is downloaded to the browser and is cached. Therefore, the next login will be faster.

Infor ES Web UI uses the Java Sun plug-in caching mechanism. When running in standalone mode, the caching mechanism of the browser is not used. When Infor ES Web UI runs within Infor Workspace the static content of the SharePoint framework is stored in the browser cache.

The default Sun Java plug-in installation has the correct cache options for optimally using Infor ES Web UI. You can change these settings by using the Java control panel.

To change the cache settings for the Sun Java plug-in:

- 1 Navigate to the Java control panel.
- 2 Click the **General** tab, and then click **Settings** in the Temporary Internet Files section.
- 3 Ensure that the **Keep temporary files on my computer** check box is selected. This screen shows the correct caching settings of the Sun Java plug-in:



Antivirus setting

Virus scanner settings can slow down the startup of Infor ES Web UI on the client. If the startup is slow, disable the **Scan within compressed files** option in the virus scanner on the client.

Chapter 4 Server requirements

4

This chapter provides the hardware and software requirements for the Infor Workspace server. The requirements in this section are based on the systems that were used during the benchmarks. Infor Workspace performance has been measured in combination with Infor ES Web UI.

For additional SharePoint Foundation 2010 hardware and software requirements, see the hardware and software requirements page on the Microsoft TechNet site:

<http://technet.microsoft.com/en-us/library/cc288751.aspx>

Software requirements

These documents provide information on the software requirements for the Infor Workspace and Infor ES Web UI server:

Title	Document reference	Location
<i>Infor Web UI – Installation and Configuration Guide</i>	U8715 US	Infor LN documentation portal
<i>Infor Workspace Installation and Configuration Guide Version 10.3 for Active Directory</i>	26133	Infor Xtreme
<i>Infor Workspace Installation and Configuration Guide Version 10.3 for Active Directory Federation Services</i>	26134	Infor Xtreme

Java Runtime Environment (JRE)

For the Infor ES Web UI server, we recommend that you run J2SE version 1.7 with the latest update, 64-bit version. With a 64-bit JVM, you can allocate more memory, which enables scaling to a higher numbers of users.

A 32-bit JVM is not recommended.

Multiple JVMs

If Infor ES Web UI is used without customizations, the estimated number of users that can run on one 32-bit JVM is 500. A 64-bit JVM can support at least 1000 concurrent Web UI users.

For high-end scaling (> 1,000 concurrent users), we recommend that you install multiple JVMs. If one JVM is saturated, the scalability improves when the work is distributed across multiple JVMs.

Hardware requirements

This section provides the hardware requirements for the Infor Workspace and Infor ES Web UI server system.

CPU requirements

This table shows the minimum CPU requirements for Infor Workspace and Infor ES Web UI both for Tomcat and WebSphere.

Component	Concurrent users per CPU core
Infor Workspace 10.3 with Infor LN Web UI	250

The minimum required core speed is 2.0 GHz. We recommend a minimum of 2 cores or virtual CPUs for each server or virtual machine.

These requirements exclude CPU requirements for other applications. For a server hosting Microsoft SharePoint, the minimum amount of CPU cores is 4. Benchmarks were carried out with Tomcat 7 using Java SE Development Kit 1.7 64-bit on the Windows 2008R2 x64 platform. The benchmark executed 1,000 highly active concurrent users and generated an average web server load of almost 800 hits per second. Although WebSphere and Linux have not been tested, the same results are expected.

Example

This table shows a sample hardware configuration:

Number of concurrent users	CPU
Up to 500	2 cores XEON (2 GHz)
Up to 1,000	4 cores XEON (2 GHz)

Memory requirements

The memory requirements are the same for both Tomcat and WebSphere. This table shows the minimum memory requirements for Infor Workspace with Infor ES Web UI.

Number of concurrent users	OS	Workspace	SharePoint DB	JVM base	JVM per user	Total (rounded)
Up to 1,000	1 GB	2 GB	2 GB	1 GB	2 MB / user	8 GB

These requirements exclude memory for other applications. For a server hosting Microsoft SharePoint, the minimum amount of memory is 8 GB. For Infor ES Web UI, we recommend that you reserve at least 1 GB of memory for the JVM memory heap.

Disk requirements

These are the IO requirements for Infor Workspace and Infor ES Web UI:

- Minimum of 100 GB disk space
- IOPS: 300 per 1,000 concurrent users

10 GB initial disk space is sufficient for SQL Server. However, we recommend that you also plan accordingly for future growth. For information about tuning guidelines for SQL Server database files, see “Tuning Microsoft SharePoint 2010 and Infor Workspace.”

Typical deployment

The next table shows an overview of the server requirements for Infor Workspace based on the typical deployment scenario described in “Deployment scenarios.” This configuration has sufficient capacity to support 1,000 highly active concurrent Workspace and Web UI users. However, for 500 users or more, we recommend using the large deployment scenario.

Installed products	CPU	Internal memory	Disk IOPS	Network
Microsoft Windows 2008 R2 Microsoft SharePoint 2010 Including IFS Infor Workspace 10.x Infor ES Web UI 10.x	4 Processor cores 2.0 GHz or better	Minimum 8 GB	300	1 Gbps LAN

Large deployment

This section provides an overview of the web server requirements for Infor Workspace, Infor ES Web UI, and IFS based on the large deployment scenario described in “Deployment scenarios.” The number of CPU cores and the amount of memory depends on the number of concurrent users. The minimal configuration is sufficient to support 1,000 users. When you add more users, you must adjust the CPU and memory size accordingly.

Workspace server

This table shows the hardware requirements for the Infor Workspace server:

Installed products	CPU	Internal memory	Disk IOPS	Network
Microsoft Windows 2008 R2 Microsoft SharePoint 2010 Infor Workspace 10.x	4 Processor cores 2.0 GHz or better	Minimum 8 GB	100	1 Gbps LAN

Web UI server

This table shows the hardware requirements for the Infor ES Web UI server:

Installed products	CPU	Internal memory	Disk IOPS	Network
Microsoft Windows 2008 R2 Infor ES Web UI 10.x	4 Processor cores 2.0 GHz or better	Minimum 4 GB	200	1 Gbps LAN

IFS server

This table shows the hardware requirements for the IFS/ADFS server:

Installed products	CPU	Internal memory	Disk IOPS	Network
Microsoft Windows 2008 R2 IFS/ADFS	2 Processor cores 2.0 GHz or better	Minimum 4 GB	-	1 Gbps LAN

Virtualization

We recommend that you use the latest version of VMware ESXi/vSphere, Citrix XenServer or Microsoft Hyper-V for virtualization.

If you have a virtualized environment, the number of CPU cores can be replaced with the number of virtual CPUs with a minimum of 2 vCPUs.

More information

For more detailed sizing and deployment information, see the documents that are listed in “Related documents” at the beginning of this guide.

See Infor Xtreme solution 22881401 for performance-related information on Infor LN.

This chapter provides sizing information about the network requirements for Infor Workspace and Infor ES Web UI. These network requirements are described:

- Network requirements between the client and the Infor Workspace / Infor ES Web UI Web server
- Network requirements between the Web server and the Infor LN application server

The network requirements for Infor ES Web UI in a thin client environment are provided in a separate document. See *Infor ES Web UI - Sizing and Deployment for a Thin Client Solution* (B0067 US).

Network requirements between the client and Web server

This section provides the network requirements for the Infor Workspace and Infor ES Web UI server.

LAN connection

The minimal network requirement between the client and the Web server over a Local Area Network (LAN) is 10 Mbps switched or dedicated.

WAN connection

Wide Area Network (WAN) is an extranet, internet connection, or both. Because of the larger latency of the lines, WAN performance is always slower than LAN performance.

For WAN network connections, these factors affect user performance:

- Speed/bandwidth of the link, mostly expressed in kilobits per second (Kbps) or megabits per second (Mbps).

- Latency of the link, mostly expressed in milliseconds (msec). Latency is the time that it takes to complete a roundtrip from the client to the Web server and back to the client.
- Quality of the link in terms of packets lost, disconnects, and retransmits.

Latency for a link is caused by these factors:

- Network topology that consists of switches, routers, gateways, congestion, and medium delay (satellite link). These factors delay the network packets.
- Speed or bandwidth versus the amount of traffic. Roundtrips take longer with slow speed or small bandwidth links than they do on fast speed or high bandwidth links.

Example

This example shows the number of Infor ES Web UI users that can run on a T1 1.544 Mbps 150 ms link:

Line speed:	$1.544 * 1024 = 1581 \text{ Kbps}$
Keep 25% spare bandwidth:	$1581 - 25\% = 1185 \text{ Kbps}$
Total concurrent users:	$1265 \text{ Kbps} / 12 \text{ Kbps} = 98 \text{ users}$

Login performance

The login performance of Infor Workspace and Web UI depends on whether the browser cache is filled. After the browser cache is filled, subsequent logins are much faster.

During login, data is transferred to the client, which can affect the performance of other users that have low bandwidth WAN connections.

This table shows how much content can be downloaded when the browser cache is empty:

Client	Downloaded content with empty browser cache
Infor Workspace main page including social	3 MB
Infor ES Web UI	6 MB

Compression

Infor ES Web UI compresses the network traffic between the Web server and the client. This compression adds a small amount of CPU overhead to the Web server. Overhead for Infor ES Web UI client for decompressing is small. With compression enabled, network traffic between the Infor ES Web UI Web server and Infor ES Web UI client decreases by a factor of 3. The bandwidth figures shown in this chapter are based on compression.

Infor ES Web UI compression is enabled by default for network packages that are more than 100 bytes. You can configure compression by using the Infor ES Web UI Administration console. However, we recommended that you use the default settings.

System message

Infor ES Web UI regularly checks for Administrator system messages. Administrators can set a system message that has important information for the users. If you do not use this functionality, you can disable the check for system messages to save roundtrips. You can also increase the polling interval. You can disable or change this check in the Infor ERP environments section of the Infor ES Web UI Admin console. If you disable this check, the performance slightly increases, especially on a WAN connection.

VPN connection

You can run the Infor ES Web UI client over a VPN connection on the Internet. Because the Internet does not have guaranteed bandwidth, the performance depends on the connection speed of your provider and the quality of the Internet. For these reasons, we recommend that you do not use an office-to-office connection via VPN over the Internet.

Network requirements between Web server and Infor LN server

Because of the large amount of network traffic between the Infor ES Web UI server and the Infor LN application/database server, Infor ES Web UI is not supported for installations where the Infor ES Web UI Web server is remotely located (WAN connection) from the Infor LN application/database server.

All web servers should have a 1 Gbps LAN bandwidth and the latency between web servers, application servers, and database servers should be less than 1ms.

Infor ES Web UI provides access to business-critical data sources. The level of security that you implement depends on whether Infor ES Web UI is used in an Internet environment or an intranet environment: In an Internet environment, security is more important than in an intranet environment. In an intranet environment, the Infor ES Web UI security is usually covered by the security protection of the network.

Because security is an extensive subject, note that this document contains only security guidelines and solution options.

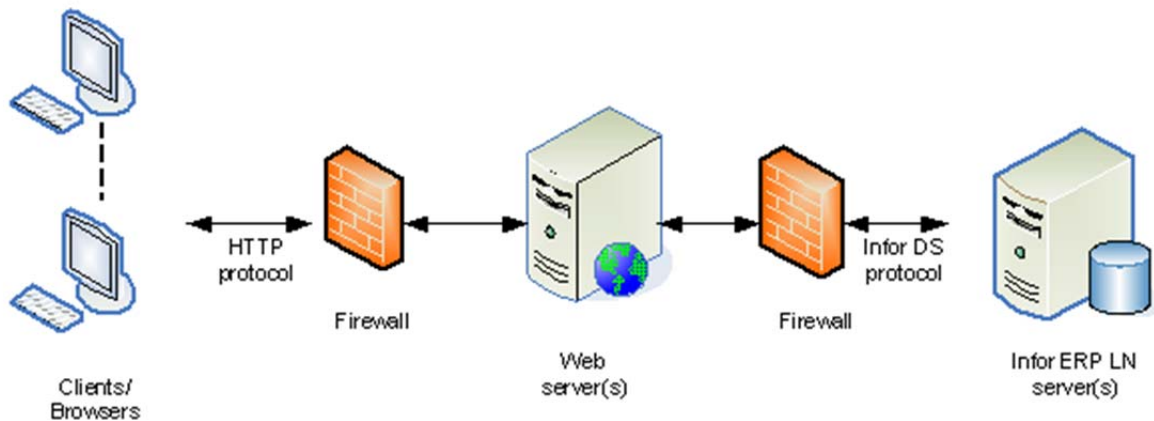
VPN

A Virtual Private Network (VPN) is a software layer that is implemented on top of an existing larger network. VPNs are used to create private network environments or to create a secure environment on top of an insecure network such as the Internet.

We recommend that you use VPN network security in combination with other security options.

Firewall

A firewall is used to block unauthorized access while the firewall permits authorized communications. A firewall is a device used to permit, deny, or decrypt all incoming and outgoing network traffic. Firewalls can be implemented in either hardware or software. Firewalls are frequently used to prevent unauthorized internet users from accessing private networks that are connected to the Internet. All network traffic leaving the private network passes through the firewall, which examines each message and blocks those that do not meet the specified security criteria. There can be firewalls in various places in a network configuration. This diagram shows an example of a firewall setup:



Secure Sockets Layers (SSL)

Infor ES Web UI can run completely under SSL for additional security.

SSL is an encrypted protocol that provides security for communications over networks. Multiple implementations of secure sockets are available. SSL introduces some network overhead and CPU resources to encrypt and decrypt.

Single Sign On (SSO)

Infor ES Web UI users can log on using SSO authentication.

Depending on configuration settings, users can be signed on automatically based on their OS credentials. After signing in once, users can navigate between applications without signing in again. For example, after signing in, a user can drill back from Key Performance Indicators (KPIs) to details in Infor LN. During the drill back actions, the related Infor LN sessions are started automatically, and the user does not have to sign in to Infor LN.

The SSO user authentication is handled by IFS/ADFS or Integrated Windows Authentication (IWA).

For more information about single sign on, see *Infor LN - Configure Single Sign On* (U9559 US).

Citrix XenDesktop

You can use Infor ES Web UI with Citrix XenDesktop. This combination provides you with more control to restrict users to only particular applications. If Citrix is used in combination with a dedicated Citrix hardware terminal, it is difficult to copy data from Infor LN.

For more information about Citrix XenDesktop, see *Infor ES Web UI - Sizing and Deployment for a Thin Client Solution* (B0067 US).

Dedicated server for Web server software

Because of performance and security reasons, we recommend that you do not install the Web server software and the Infor LN application software on the same machine. When Infor ES Web UI is used across the Internet, install Infor ES Web UI on a separate Web server in a demilitarized zone (DMZ).

Separate HTTP server for Infor ES Web UI

Certain products such as Tomcat have an embedded HTTP server. For security, we recommend that you separate the HTTP server from the Web application server or servlet container.

Chapter 7 Sizing example

7

This chapter provides a sample sizing scenario. You can use the methodology shown through this scenario to determine your sizing requirements.

Scenario

A company of 800 employees wants to implement Infor Workspace and Infor ES Web UI. The company estimates that 50% (400 users) will work concurrently on Infor ES Web UI. 100 users will connect through a WAN and the remainder will use a LAN.

The company decides to use a Tomcat web server on a Microsoft Windows 2008 R2 server according the typical deployment as described in “Deployment scenarios.”

Sizing

This section shows the sizing for the company.

Client configuration

This table shows the minimum client system configuration for Infor ES Web UI:

CPU	Memory	LAN Network
Dual core CPU (2.2 GHz or higher)	2 GB	10 Mbps

WAN requirement between the client and Web server

100 users will connect to the Infor Workspace Web server through a WAN link. Latency of the WAN is significantly below 100ms. For a WAN, a minimum bandwidth of 128 Kbps is required. Every Web UI user requires 12 Kbps of bandwidth.

Recommended network bandwidth = $(100 * 12 \text{ kbps}) + 25 \% \text{ spare capacity} = 1.5 \text{ Mbps}$

Workspace and Web UI web server requirements

The CPU requirement is calculated by using the CPU requirements table in “Deployment scenarios.” The next table shows the calculations for the CPU requirement for the company based on the number of concurrent users:

Application	Concurrent users	CPU requirement
Infor LN	400 users	$400/250 = 1.6 \text{ core}$
Total		1.6 cores rounded up to 2 cores

The Workspace server requires at least 1 GB of memory for the Windows operating system, 2 GB for Infor Workspace, 2 GB for the SharePoint configuration database, 1 GB for the JVM base, and 0.8 GB for the JVM user component (2 MB / user), which is rounded up a total of 8 GB of memory.

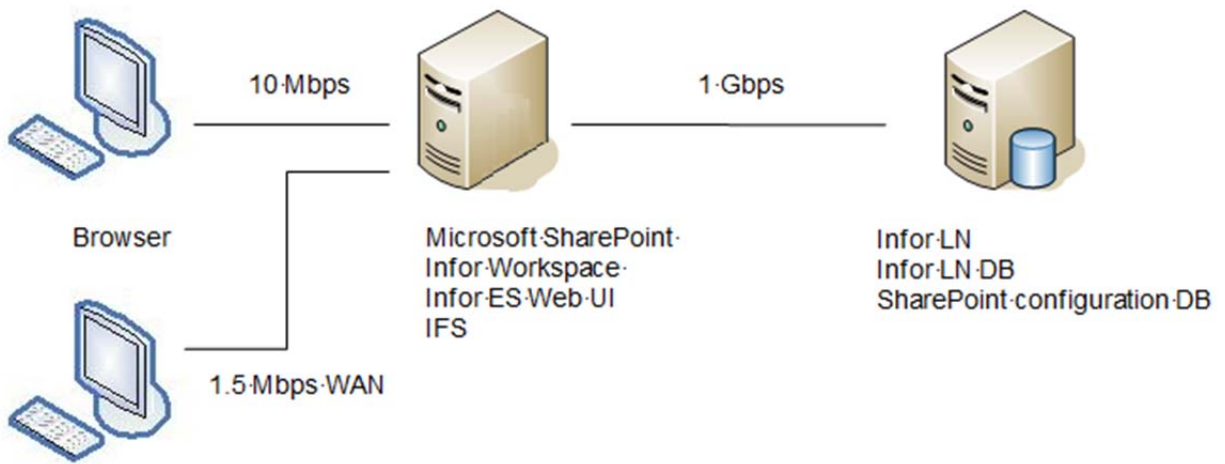
Note that the minimum requirement for a server hosting Microsoft SharePoint is 4 CPU cores and 8 GB memory.

This table shows the hardware requirements for the Workspace server:

CPU	Memory	Disk IOPS	Network
Quad-Core Intel XEON (at least 2 GHz)	8 GB	300	1 Gbps

Recommended hardware configuration

This diagram shows the recommended hardware and software configuration for this company:



Appendix A Tuning Microsoft SharePoint 2010 and Infor Workspace

A

This chapter describes tuning guidelines for Microsoft SharePoint 2010 and Infor Workspace.

Microsoft SharePoint 2010

SQL Server options

Before you deploy SharePoint Server, you must configure SQL Server settings:

- Do not enable auto-create statistics on a SQL Server database where SharePoint Server is installed. SharePoint Server configures the required settings during installation and upgrade. Auto-create statistics can significantly change the execution plan of a query from one instance of SQL Server to another instance of SQL Server. Therefore, to provide consistent support for all customers, SharePoint Server provides coded hints for queries as needed to provide the best performance across all scenarios.
- To ensure optimal performance, we strongly recommend that you set **max degree of parallelism (MAXDOP)** to **1** on SQL Server instances that host SharePoint Server 2010 databases.

Database configuration

For large SharePoint implementations, follow these best practices when you plan and configure your database:

- SharePoint Server 2010 performance can be significantly impeded by insufficient disk I/O for tempdb. To avoid this issue, allocate dedicated disks for tempdb. For high workloads, the average read operation or the average write operation requires more than 10 ms. To ease the bottleneck, either split the files across multiple disks or use faster disks.
- For best performance, place the tempdb on a RAID 10 array. The number of tempdb data files should equal the number of CPU cores. Set the tempdb data files at an equal size. For this

purpose, count dual core processors as two CPUs. Count each processor that supports hyper-threading as a single CPU.

- Consult your storage hardware vendor for information about how to configure all logs and the search databases for write optimization for your particular storage solution.
- Use multiple data files for content databases.
- Only create files in the primary file group for the database.
- Distribute the files across separate disks.
- The number of data files should be less than or equal to the number of core CPUs. Count dual core processors as two CPUs for this purpose. Count each processor that supports hyper-threading as a single CPU.
- Create data files of equal size.

Infor Workspace

Browser performance

The Infor Workspace client performance is depends on the java script handling of the browser. Because the latest browser version typically handles java scripts better than earlier versions, we recommend that you use the latest version of your selected browser.

During testing, the java script handling in Internet Explorer was less efficient than in other browsers.

Tomcat

This section provides the Tomcat settings that improve the Infor ES Web UI server performance.

Maximum number of threads

The Tomcat `maxThreads` parameter determines the maximum number of simultaneous requests that can be handled. By default, this attribute is 200. Every user will use 2 threads. The `minSpareThreads` parameter can be set to 10% of the `maxThreads` parameter. To change these parameters, edit the `server.xml` in this directory:

Web UI installation directory\apache-tomcat-version\conf directory

See this example:

```
<Connector connectionTimeout="20000" port="8312" protocol="HTTP/1.1" maxThreads="2500"
minSpareThreads="250"/>
```

JVM memory settings

For optimal performance, we recommend that you install the 64-bit Sun JVM and run the JVM in server mode. Multicore servers with at least 2 GB of internal memory have a special JVM optimized mode for server-based applications. Our benchmarks indicate Infor ES Web UI performs 10-20 percent faster in server mode.

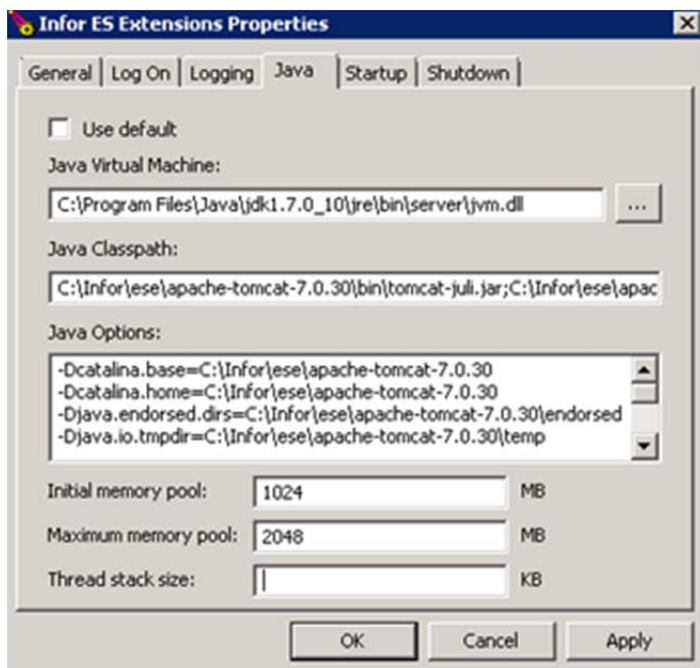
The Infor ES Web UI installation includes the JRE1.7. You can download the latest version of the Sun JRE or JDK 1.7 from <http://java.oracle.com>.

Windows

To use the JVM server mode and increase the memory settings:

- 1 Start a command prompt.

- 2 Navigate to the *Web UI installation directory*\apache-tomcat-version\bin directory. For example, C:\Infor\LN\ese\apache-tomcat-7.0.30\bin.
- 3 Run this command: tomcat7w.exe //ES/InforEServerExtensions.
The Infor ES Extensions Properties screen is displayed.
- 4 Click the **Java** tab.
- 5 Clear the **Use default** check box, and provide the JVM server dll as shown in this screen:



- 6 For a 64-bit JVM, set the initial memory pool to **1024 MB** and the maximum memory pool to **2048 MB**.
- 7 Restart the Infor ES Extensions Tomcat service.

For more information about modifying Tomcat settings, see <http://tomcat.apache.org/tomcat-6.0-doc/windows-service-howto.html>.

Linux

To change the JVM settings on Linux:

- 1 On Linux, edit the catalina.sh file. The file is located in *Web UI installation directory*/apache-tomcat-version/bin/.
- 2 Specify this information:
64-bit JVM
Specify **export JAVA_OPTS=-Xms1024m -Xmx2048m**.
- 3 After the changes are applied, restart Tomcat.

Verifying the installation

After you apply the changes and restart Tomcat, verify the Java settings in the Infor ES Web UI Administration Console Diagnostics. The `java.vm.name` parameter shows whether Infor ES Web UI is using a Server VM or a Client VM. The `java.vm.version` shows the Java version that is used by Infor ES Web UI.

This table shows an example of the Java settings:

Parameter	Value
<code>java.specification.version</code>	1.7
<code>java.util.logging.config.file</code>	C:\Infor\ese\apache-tomcat-7.0.30\conf\logging.properties
<code>java.util.logging.manager</code>	org.apache.juli.ClassLoaderLogManager
<code>java.vendor</code>	Oracle Corporation
<code>java.vendor.url</code>	http://java.oracle.com/
<code>java.vendor.url.bug</code>	http://bugreport.sun.com/bugreport/
<code>java.version</code>	1.7.0_10
<code>java.vm.info</code>	mixed mode
<code>java.vm.name</code>	Java HotSpot(TM) 64-Bit Server VM
<code>java.vm.specification.name</code>	Java Virtual Machine Specification
<code>java.vm.specification.vendor</code>	Oracle Corporation
<code>java.vm.specification.version</code>	1.7
<code>java.vm.vendor</code>	Oracle Corporation
<code>java.vm.version</code>	23.6-b04

WebSphere

This section provides the WebSphere settings that improve the Web server performance.

JVM memory settings

We recommend that you change the JVM memory settings.

To change these settings:

- 1 From the Administration Console, select **Application servers > server name > Process Definition > Java Virtual Machine**.
- 2 Set the initial heap size to **1024 MB**.
- 3 Set the maximum heap size to **2048 MB**.

Server mode JVM

For optimal performance, enable the server mode for the JVM as shown in this screen:

