Infor LN UI 11.3 Sizing Guide

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Contents

About this guide

This document provides performance guidelines, deployment, and sizing information to implement Infor LN UI. The information provided in this document is based on Infor LN UI version 11.3.

This sizing guide is targeted for Windows deployments using the Tomcat web server.

Intended audience

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

Related documentation

Refer to these documents for more information:

Document Title
Infor LN UI Administration Guide (U9790 US)
Infor LN UI Difference Study (P3669 US)
Infor Ming.le-LN Plug-in User Guide (LN UI) (U9791 US)
Infor Ming.le Sizing White Paper (B0076 US)

Abbreviations and terminology

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

Abbreviation	Description
Named or licensed user	A user with credentials to login 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 contains both the application server and 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
JVM	Java Virtual Machine
Infor Labs PBC	Performance and Benchmark Center. This department is responsible for maintaining the sizing guide
ION	Integrated Open Network platform
IFS	Infor Federation Services
ADFS	Active Directory Federation Services
IWA	Integrated Windows Authentication
STS	Security Token Service
Tomcat	Web server and Java Servlet Engine, delivered together with Infor LN 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.

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Chapter 1 Introduction

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Infor LN UI 11.3

Infor LN UI is the HTML5 compliant browser-based user interface for Infor LN 10.3 and higher. The LN UI consists of these components:

- A web application that facilitates access to LN applications. This is the main component of the LN UI.
- A web application dedicated to the administration of the LN UI deployment.

Infor LN UI 11.3 can be installed in the stand-alone mode or as an Infor Ming.le™ plug-in (based on Microsoft SharePoint).

The table describes the main characteristics of each mode:

Deployment mode	Ming.le / SharePoint	SSL	SSO / Federation Services
Infor LN UI stand-alone mode	No	Optional	Optional
Infor Ming.le-LN plug-in	Mandatory	Mandatory	Mandatory

The Infor LN UI 11x is the successor of the Infor Web UI 10x product which contained a Java based Swing UI. See “Infor LN UI Difference Study” document for differences between Infor LN UI and previous Infor Web UI releases.

See the related documents section for more information on the LN UI product.

Standalone mode

LN UI versions 11.2.1 and later provides a stand-alone mode offering a home page with favorites, bookmarks, and a list of recently used sessions. The stand-alone mode does not require Infor Ming.le™ and the Infor Ming.le-LN plug-in. See the *Infor LN UI* Administration Guide.

Chapter 2 Deployment scenarios

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

Infor LN UI can be deployed in two modes:

- Stand-alone mode
- Infor Ming.le plugin

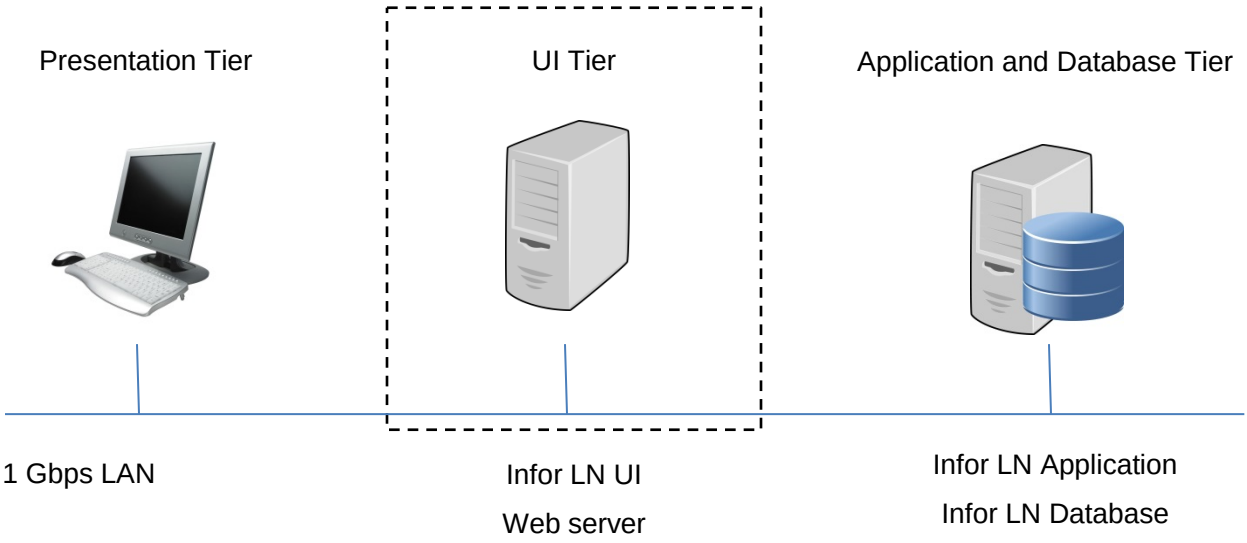
These scenarios are described:

- Typical deployment
- Deployment using a separate HTTP server

The scenarios do not include Infor Ming.le, see the *Infor Ming.le Sizing White Paper* for sizing and deployment information on Infor Ming.le document.

Typical deployment

This diagram shows a typical installation of Infor LN with a separate Infor LN UI web server.

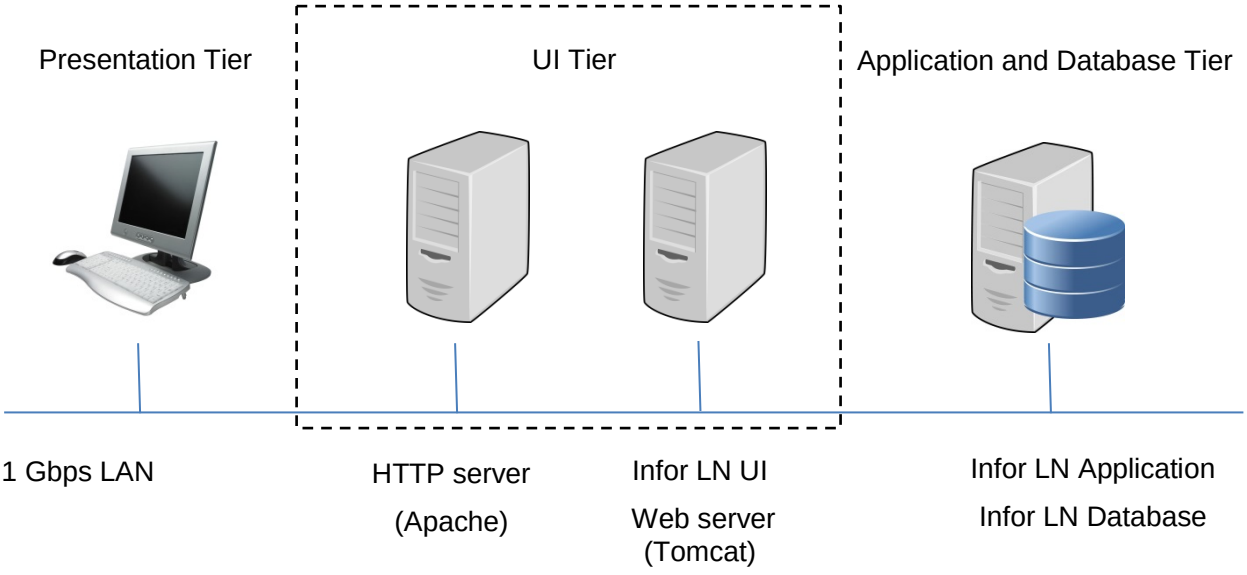


HTTP server for Infor LN UI

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 with a separate HTTP server and a LN UI application web server:



Chapter 3 Client requirements

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This chapter provides the client requirements for Infor LN UI 11.3.

Note:

- LN UI does not require any client side java plugin. An HTML5-capable browser is sufficient.
- See the *Infor LN UI Administration Guide* for a list of supported browsers.
- See the *Infor Ming.le Sizing White Paper* document for sizing and deployment information on Infor Ming.le.

Hardware requirements

This section provides the hardware requirements for the Infor LN UI client system.

CPU

Rendering of the Infor LN UI screens is CPU intensive; outdated or slow CPUs cause visible delays in the client. We recommend that you use at least a dual core CPU with an individual core speed of 2.0 GHz or faster.

Memory

The memory requirement for the Infor LN UI client is 1 GB. This does not include memory that is required by the operating system or other applications. For expert LN users the memory requirement is 2 GB.

Minimum memory sizes include the operating system, but exclude memory required for other applications.

Deployment		Minimum internal memory size for desktop or notebook	Additional memory on existing desktop or notebook
Common user	Infor LN UI	2 GB	1 GB
Expert user	Infor LN UI	3 GB	2 GB

Network requirements from client to web server

This section provides the network requirements for the Infor LN UI server.

Product	Average network load per user
Infor LN UI	15 kbps With compression of static and dynamic content enabled.

LAN connection

The minimal network requirement between the client and the web server over a Local Area Network (LAN) is 100 Mbps for either a switched or dedicated network.

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 transfer of 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.

A maximum recommended latency for the Infor LN UI client is 150ms – 200ms for a roundtrip.

Caution: More than 200ms latency increases the response time to an unacceptable level and decreases the number of concurrent users.

Example

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

Line speed:	1.544 * 1024 = 1581 Kbps
Keep 25% spare bandwidth:	1581 - 25% = 1185 Kbps
Total concurrent users:	1265 Kbps / 15 Kbps = 84 users

VPN connection

You can run the Infor LN UI client over a VPN connection on the Internet. As there is no guaranteed Internet bandwidth, the performance depends on the connection speed of your provider and the quality of the Internet connection. For these reasons, we recommend that you do not use an office-to-office connection via VPN over the Internet.

Wi-Fi connection

Wireless connections often cause additional delays due to varying bandwidth and connection speeds. Therefore, Infor does not recommend using a Wi-Fi connection for the Infor LN UI client.

Browser selection

The Infor LN UI client performance depends heavily on the javascript engine of the browser. Because the latest browser version typically handles javascript better than the earlier versions, we recommend that you use the latest version of your selected browser.

During testing, the javascript handling in Internet Explorer is less efficient when compared to other browsers. Google Chrome is the most efficient browser resulting in both, lower response times and less CPU usage:

LN UI – end user response times	
Google Chrome 52 versus Internet Explorer 11	Up to 1.5-2.0x faster response times

LN UI - CPU usage on the client	
Google Chrome 52 versus Internet Explorer 11	Up to 30% less CPU usage

Caching

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

Compression

Infor LN UI is configured to compress both static and dynamic content being transferred over the network to the client. Compression includes a small CPU overhead, but increases the performance and capacity of the network. The use of compression is more important in WAN networks with lower bandwidths and higher latencies.

When compression is enabled the amount of data sent to the client is reduced by 50-70%.

Infor LN UI automatically compresses the dynamic network traffic between the web server and the client. This compression adds a small amount of CPU overhead to the web server and to the client browser. Compression reduces the network traffic between the Infor LN UI web server and Infor LN UI client by 50-70%.

The web server can also be configured to compress static content. This ensures a performance improvement during the login of the application. See *Appendix A*.

The bandwidth figures shown in this chapter are based on both static and dynamic compression usage.

Antivirus setting

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

Virtual Desktop environment

You must remember these points when deploying the LN UI in a virtual desktop environment:

- LN UI is a resource intensive client running in a browser. Deploying the LN UI in a virtual desktop environment requires significant resources on the server farm hosting the virtual desktops.
- The selected browser brand and version make difference in the resource usage and end-user performance on the server farm.
- LN UI performance and resource usage is different in a virtual desktop environment due to the unavailability of a graphics processor (GPU).
- Selecting the *software rendering* option of a browser may result in lower resource usage and improved response time on the server farm.

We recommend that you test your virtual desktop environment thoroughly before moving to production.

Login performance

The login performance of Infor LN 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 with low bandwidth WAN connections.

It is recommended to use the static and dynamic content compression to reduce the amount of data that is sent over the network. See the *compression* paragraph in this chapter.

System message

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

Chapter 4 Server requirements

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This chapter provides the hardware and software requirements for the Infor LN UI web server.

See the *Infor LN UI Administration Guide* for the latest product requirements and a list of supported platforms and web servers.

See the *Infor Ming.le Sizing White Paper* for sizing and deployment information on Infor Ming.le.

Software requirements

Java Runtime Environment (JRE)

For the Infor LN UI web server, we recommend that you run Java 8 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.

Note: Using a 32-bit JVM is not recommended.

Multiple JVMs

If Infor LN UI is used without customizations, the estimated number of concurrent users that can run on one 64-bit JVM is at least 1,000.

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

Hardware requirements

This section provides the hardware requirements for the Infor LN UI web server system.

CPU requirements

This table shows the minimum CPU requirements for Infor LN UI:

Component	Concurrent users per CPU core
Infor LN UI	250

Important:

- The minimum required CPU clock speed is 2.2 GHz.
- We recommend a minimum of 2 CPU cores (or virtual CPUs) for each server or virtual machine hosting the web server.
- These requirements exclude CPU requirements for other applications.

Memory requirements

This table shows the minimum memory requirements for Infor LN UI.

Number of concurrent users	OS base	JVM base	JVM per user	Total (rounded)
Up to 1,000 users	1 GB	2 GB	1 MB / user	4 GB
1,000 – 1,500 users	2 GB	4 GB	1 MB / user	8 GB
1,500 – 2,000 users	2 GB	2 * 4 GB (multiple JVM)	1 MB / user	12 GB

Important:

- These requirements exclude memory for other applications.
- For Infor LN UI, we recommend that you reserve at least 2 GB of memory for the JVM memory heap.

- We recommend a maximum of 1,000 concurrent users per JVM. For larger deployments it is recommended to configure additional JVMs.

Disk requirements

These are the IO requirements for Infor LN UI:

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

Network requirements from web server to Infor LN server

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

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

Virtualization

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

If the version is installed in a virtual 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 the related documents section at the beginning of this guide.

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

Appendix A Tuning the Infor LN UI web server

A

Tomcat

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

Tuning 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 uses 1 thread. The minSpareThreads parameter can be set to 10% of the maxThreads parameter. To change these parameters, edit the server.xml in the <*Web UI installation directory*>\<apache-tomcat-*version*>\conf directory.

Example for an installation up to 1,000 concurrent users:

```
<Connector connectionTimeout="20000" port="8312" minSpareThreads="100"
maxThreads="1000" protocol="HTTP/1.1" redirectPort=""/>
```

Enabling static content compression

By enabling static content compression, the size of the data transferred to the client is reduced. It is recommended to enable this in the Tomcat server.xml file:

```
<Connector connectionTimeout="20000" port="8312" minSpareThreads="100"
maxThreads="1000" protocol="HTTP/1.1" compression="on"
compressableMimeType="text/html,text/xml,text/plain,application/javascript
,text/css" useSendfile="false" redirectPort=""/>
```

Tuning the Java Virtual Machine

For optimal performance, it is recommended that you install the 64-bit Oracle JVM and run the JVM in server mode. A 64 bit JVM runs by default in server mode which improves performance.

The Infor LN UI installation includes JRE1.8. You can download the latest version of the Oracle JRE or JDK 1.8 from http://java.oracle.com.

When more than 1000 concurrent users are accessing the UI on a single JVM, you can use the AggressiveHeap option to enable better performance settings in the Oracle JVM. This also optimizes CPU usage of the Infor LN UI web server.

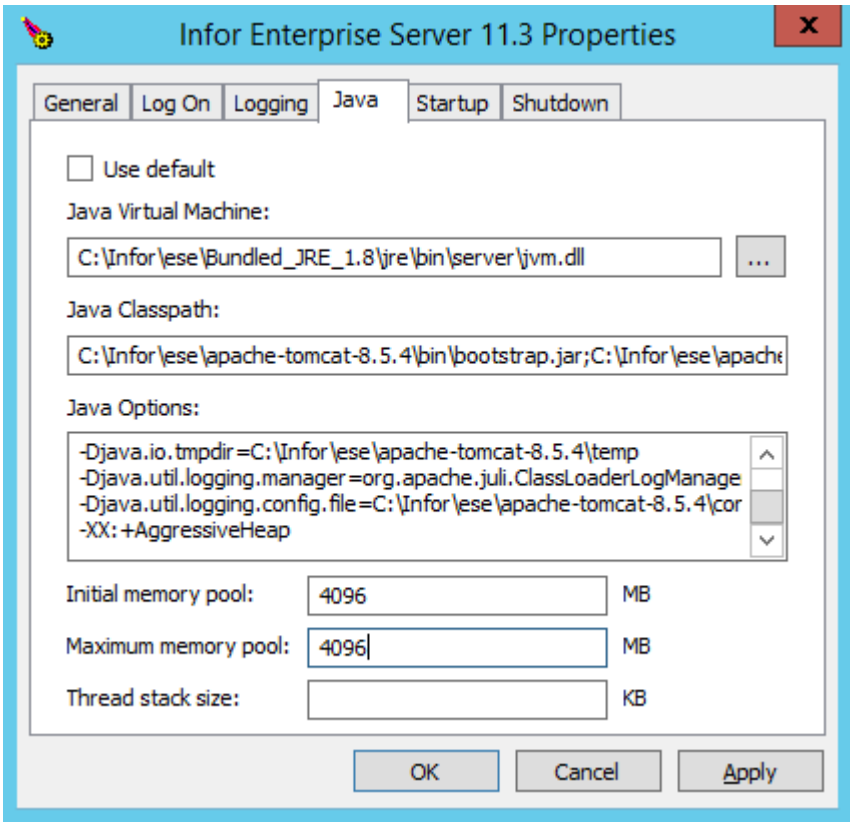
The recommended parameter settings for the JVM are:

Concurrent Infor LN UI users	JVM settings
Up to 1,000 concurrent users	-Xms2048M -Xmx2048m
As of 1,000 concurrent users	-XX:+AggressiveHeap -Xms4096M -Xmx4096m

Windows service configuration steps

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-8.5.4\bin`.
3. Run this command: `tomcat8w.exe //ES/InforEnterpriseServer`. The Infor ES Properties screen is displayed.
4. Click the **Java** tab.
5. Ensure the ..\server\jvm.dll is selected as displayed:



6 Set the value of the Initial memory pool and the value of the Maximum memory pool fields to 4096 MB respectively.

7 Add -XX:+AggressiveHeap to the Java Options field.

8 Restart the Infor LN UI Tomcat service.