



Infor Staffing Optimizer for Healthcare Hardware and Software Recommendations

Release 4.1.1.0

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Contents

- About this guide.....5**
 - Related documents5
 - Contacting Infor.....5
- Chapter 1: Server configuration.....6**
 - Virtual servers6
 - Dedicated and shared servers.....6
- Chapter 2: Server software.....7**
 - Operating system7
 - Web server7
 - PowerShell8
 - Internet Information Services (IIS).....8
 - Microsoft .Net Framework9
 - Microsoft .Net Core9
 - IIS URL Rewrite9
 - Database9
 - Java Runtime Environment (JRE).....10
 - Database server10
 - Microsoft SQL Server - Transactional Database.....10
 - Microsoft SQL Server - Data Warehouse11
 - SQL Server Data Tools - Data Warehouse11
- Chapter 3: Minimum server hardware configurations.....13**
 - Two server configuration (500-1000 PPD)13
 - Two server configuration (1500-2000 PPD)14
 - Three server configuration15
 - Hard drive encryption16
- Chapter 4: Workstation configuration.....17**

Web browser17

About this guide

This guide provides hardware and software recommendations for Infor Staffing Optimizer for Healthcare (Staffing Optimizer). Infor has developed the Staffing Optimizer software application to enable swift data collection and accurate data analysis. Staffing Optimizer is a one-of-a-kind solution that supports the GRASP® Methodology and incorporates it into a single easy-to-use solution.

Use this guide as a reference to prepare your site for the installation of Staffing Optimizer.

Intended audience

This guide is for administrators who are responsible for the installation and maintenance of Staffing Optimizer.

Related documents

You can find these documents in the Infor Xtreme Support portal:

- *Infor Staffing Optimizer for Healthcare Release Notes*
- *Infor Staffing Optimizer for Healthcare Administration Guide*
- *Infor Staffing Optimizer for Healthcare User Guide*
- *Infor Staffing Optimizer for Healthcare HL7 Interface Administration Guide*
- *Infor Staffing Optimizer for Healthcare Available Hours Interface Administration Guide*

Contacting Infor

If you have questions about Infor products, go to the Infor Xtreme Support portal.

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

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

Chapter 1: Server configuration

This is the recommended server configuration for Staffing Optimizer.

Virtual servers

Staffing Optimizer can be installed on a virtual server such as VMWare Server, Oracle VirtualBox, or Microsoft Hyper-V Server. Do not use virtual servers for databases due to performance issues.

Dedicated and shared servers

The database server should be dedicated to the Staffing Optimizer database. Staffing Optimizer uses SQL Server stored procedures and user-defined functions extensively for much of the application's business logic, placing greater demands on the SQL Server.

The Staffing Optimizer application server may be shared with other applications as needed.

Cloverleaf and Microsoft SQL Server should be installed on different servers to prevent out-of-memory exceptions.

Chapter 2: Server software

This is the recommended server software for Staffing Optimizer.

Operating system

Staffing Optimizer uses Microsoft SQL Server, Internet Information Services, and custom Windows Services, all of which require a Microsoft Windows operating system. Windows Server operating systems that are capable of running the software referenced here are supported. These operating systems include:

- Windows Server 2016
- Windows Server 2012 R2 (Standard, Enterprise, or Datacenter)
- Windows Server 2012 (Standard, Enterprise, or Datacenter)

Both 32 and 64-bit versions of these operating systems are supported, but we recommend using Windows Server 2012 R2 Standard, 64-bit, to support additional memory.

Staffing Optimizer requires the Enterprise edition only when a Failover Cluster is going to be implemented.

All service packs and patches should be updated as provided by Microsoft to ensure the security and stability of the server.

Web server

Staffing Optimizer is a web application distributed via Microsoft Internet Information Services (IIS). IIS is a component of the Windows Server operating system and versions vary based on the installed operating system. Current versions of IIS installed on the recommended versions of Windows Server are supported.

PowerShell

PowerShell is used to automate the deployment process. The deployment process requires that PowerShell 4.0 or newer be installed. This can be installed by using Server Roles and selecting these features:

- Windows PowerShell
 - Windows PowerShell 4.0
 - Windows PowerShell 2.0 Engine
 - Windows PowerShell ISE

Some options will be automatically added as they are prerequisites to the options selected. After you install the base version of Powershell, install the latest version. PowerShell is part of the Windows Management Framework, which can be found at <https://www.microsoft.com/en-us/download/details.aspx?id=54616>. We recommend installing the most recent version.

Internet Information Services (IIS)

Staffing Optimizer is distributed using Internet Information Services (IIS). You can install IIS by using the Server Roles and selecting these options:

- Web Server (IIS)
 - Web Server
 - Common HTTP Features
 - Default Document
 - HTTP Errors
 - Static Content
 - Health and Diagnostics
 - HTTP Logging
 - Performance
 - Static Content Compression
 - Security
 - Request Filtering
 - Application Development
 - .NET Extensibility 4.5
 - ASP.NET 4.8
 - ISAPI Extensions
 - ISAPI Filters
 - Management Tools
 - IIS Management Console

Some items will be automatically added as prerequisites to the selected item.

Microsoft .Net Framework

Staffing Optimizer is a Microsoft .Net based application built upon the Microsoft .NET 4.8 Framework. Some components use the 4.5.2 version. System requirements for this .Net Framework are at [https://msdn.microsoft.com/en-us/library/8z6watww\(v=vs.110\).aspx](https://msdn.microsoft.com/en-us/library/8z6watww(v=vs.110).aspx).

Microsoft .Net Core

Some components of Staffing Optimizer were developed using Microsoft .Net Core 2.0.5. You can download and install the .Net Core Windows Server Hosting bundle from <https://download.microsoft.com/download/1/1/0/11046135-4207-40D3-A795-13ECEA741B32/DotNetCore.2.0.5-WindowsHosting.exe>. Instructions are at <https://docs.microsoft.com/en-us/aspnet/core/publishing/iis>. These instructions partially overlap with what was done for IIS.

IIS URL Rewrite

Staffing Optimizer requires the URL Rewrite extension for IIS to implement URLs that are easier for users to remember. You can install IIS URL Rewrite from the Microsoft Web Platform Installer, <https://www.microsoft.com/web/downloads/platform.aspx>, or by directly downloading the extension at <https://www.iis.net/downloads/microsoft/url-rewrite>.

Database

Staffing Optimizer requires the use of Microsoft SQL Server as its data repository and for these additional tools included with Microsoft SQL Server:

- Integration Services (SSIS)
- Analysis Services (SSAS)
- Reporting Services (SSRS)

These versions of Microsoft SQL Server are supported:

- SQL Server 2016
- SQL Server 2014
- SQL Server 2012

Both 32 and 64-bit versions of Microsoft SQL Server are supported but we recommend using SQL Server 2014 64-bit.

We recommend using the Standard or Enterprise edition of SQL Server. The Enterprise edition provides some performance benefits over the Standard edition, primarily in that it allows more online operations.

You should license per socket rather than per user.

Java Runtime Environment (JRE)

Staffing Optimizer uses Infor Cloverleaf as its HL7 Integration Engine to interface with Admit-Discharge-Transfer (ADT), care planning, and documentation systems. Cloverleaf is built upon the Java platform. An installer for Java is provided with Cloverleaf, or you can obtain the latest version at <http://www.oracle.com/technetwork/java/javase/downloads/index.html>.

Database server

The database server must have this supporting software installed.

Microsoft SQL Server - Transactional Database

Staffing Optimizer uses Microsoft SQL Server for data storage. The SQL Server requires these components to be installed:

- Feature Selection
 - Instance Features
 - Database Engine Services (no sub-options)
 - Shared Features
 - Management Tools - Basic
 - Management Tools - Complete
 - Server Configuration
 - Service Accounts
 - SQL Server Agent
 - Account Name
 - Account must have permission to access TDB, DW, and AS
 - Startup Type
 - Automatic
 - Collation
 - Database Engine
 - SQL_Latin1_General_CP1_CI_AS
- Database Engine Configuration
 - Server Configuration
 - Authentication Mode = Windows authentication mode (Mixed Mode is acceptable though not required) Data Warehouse / Reporting Server

Microsoft SQL Server - Data Warehouse

Staffing Optimizer uses Microsoft SQL Server for data storage and storage. The SQL Server requires these components to be installed:

- Feature Selection
 - Instance Features
 - Database Engine Services (no sub-options)
 - Analysis Services
 - Reporting Services - Native
 - Shared Features
 - Integration Services
 - Management Tools - Basic
 - Management Tools - Complete
 - Server Configuration
 - Service Accounts
 - SQL Server Agent
 - Account Name
 - Account must have permission to access TDB, DW, and AS
 - Startup Type
 - Automatic
 - Collation
 - Database Engine
 - SQL_Latin1_General_CP1_CI_AS
 - Analysis Services
 - Latin1_General_CI_AS
- Database Engine Configuration
 - Server Configuration
 - Authentication Mode = Windows authentication mode (Mixed Mode is acceptable but not required)
 - Analysis Services Configuration
 - Server Mode = Multidimensional and Data Mining Mode
 - Reporting Services Configuration
 - Reporting Services Native Mode
 - Install and configure

SQL Server Data Tools - Data Warehouse

It is not required it may be necessary to install Microsoft Visual Studio and the SQL Server Data Tools in order to debug processes such as the Extract Transform & Load (ETL) and Reports. You can download Visual Studio from <https://www.visualstudio.com/downloads/>

The Visual Studio Community edition is sufficient. During the installation process, select a custom install, clear the default options, and select **SQL Server Data Tools**. After installation, apply the latest updates.

Chapter 3: Minimum server hardware configurations

These minimum server hardware recommendations are provided as a guideline to aid in selecting hardware to provide optimal performance for Staffing Optimizer in varying sized facilities. Recommendations have been listed based on estimated number of patients per day (PPD). Also consider these factors when making hardware selections:

- Number of users
- Data entry time (for example, will all users be entering data at the same time, such as during a shift change, or will data entry be spread throughout the day)
- Number of units or wards
- Number of Infor instruments assigned to each patient (for example, Allied Health)
- The length of time that historic data will be retained

Disk storage is the component of the system that has the greatest variance between implementations. A general calculation that can be used to estimate a starting point for disk storage would be 100 KB of storage per scored patient per day per environment. For example, the storage requirements for a system with a production and a test environment that processes 500 patients per day for five years (1,825 days) could be estimated as:

```
(2 Shifts / Day) * (500 Patients) * (1,825 Days) * (100 KB / Scored Patient Shift) = 183 GB
```

Double the estimate to ensure that there is enough working room on the disk for in-place upgrades and other support tasks.

Taking this information into account and evaluating what is currently available in the marketplace, we have provided the minimum server hardware recommendations.

Note: We have offered generalized hardware recommendations. Your organization should consider the configurations that best suit your needs. Your internal IT department is much more knowledgeable about your users and patients and should take some time to evaluate those needs. Work with your internal IT department to evaluate your specific needs, consulting with Infor as needed.

Two server configuration (500-1000 PPD)

500 – 1,000 patients per day, 5 years of history

Application server

IIS for Staffing Optimizer, Staffing Optimizer Integration Service, Cloverleaf

- Processor: Intel Xeon 3.10 GHz, quad core
- Memory: 8 GB, 1600 MHz
- Hard drive: Operating system and software
 - RAID 1
 - 2 x 500 GB 7,250 RPM SATA
- Network: 2 x GB Ethernet (teamed)

Transactional database and data warehouse server

SQL (DB, SSIS, SSAS, SSRS)

- Processor: Intel Xeon 3.10 GHz, quad core
- Memory: 16 GB, 1600 MHz
- Hard drive
 - Operating system and software
 - RAID 1
 - 2 x 500 GB 7,250 RPM SATA
 - Data
 - RAID 5 or RAID 10
 - 4 x 500 GB 7,250 RPM SATA
- Network: 2 x GB Ethernet (teamed)

Two server configuration (1500-2000 PPD)

1,500 – 2,000 patients per day, 5 years of history

Application server

IIS for Staffing Optimizer, Staffing Optimizer Integration Service, Cloverleaf

- Processor: Intel Xeon 3.10 GHz, quad core
- Memory: 16 GB, 1600 MHz
- Hard drive: Operating system and software
 - RAID 1
 - 2 x 500 GB 7,250 RPM SATA
- Network: 2 x GB Ethernet (teamed)

Transactional database and data warehouse server

SQL (DB, SSIS, SSAS, SSRS)

- Processor: Intel Xeon 3.10 GHz, quad core
- Memory: 32 GB, 1600 MHz

- Hard drive:
 - Operating system and software
 - RAID 1
 - 2 x 500 GB 7,250 RPM SATA
 - Data
 - RAID 5 or RAID 10
 - 4 x 1 TB 7,250 RPM SATA
- Network: 2 x GB Ethernet (teamed)

Three server configuration

2,000+ patients per day, 5 years of history

Application server

IIS for Staffing Optimizer, Staffing Optimizer Integration Service, Cloverleaf

- Processor: Intel Xeon 3.10 GHz, quad core
- Memory: 16 GB, 1600 MHz
- Hard drive: Operating system and software
 - RAID 1
 - 2 x 500 GB 7,250 RPM SATA
- Network: 2 x GB Ethernet (teamed)

Transactional database server

SQL (DB)

- Processor: Intel Xeon 3.10 GHz, quad core
- Memory: 32 GB, 1600 MHz
- Hard drive
 - Operating system and software
 - RAID 1
 - 2 x 500 GB 7,250 RPM SATA
 - Data
 - RAID 5 or RAID 10
 - 4 x 500 GB 7,250 RPM SATA
- Network: 2 x GB Ethernet (teamed)

Data warehouse server

SQL (DB, SSIS, SSAS, SSRS)

- Processor: Intel Xeon 3.10 GHz, quad core
- Memory: 32 GB, 1600 MHz

- Hard drive
 - Operating system and software
 - RAID 1
 - 2 x 500 GB 7,250 RPM SATA
 - Data
 - RAID 5 or RAID 10
 - 4 x 1 TB 7,250 RPM SATA
- Network: 2 x GB Ethernet (teamed)

Hard drive encryption

To minimize the risk of data loss due to unauthorized file access, we recommend that you encrypt the hard disks that are used to store the database, log files, and application files.

Chapter 4: Workstation configuration

These workstation hardware recommendations are a guideline to aid you in selecting hardware to provide optimal performance for Staffing Optimizer.

Web browser

Staffing Optimizer can be viewed through many web browsers, including the current version and one version back of these browsers:

- Microsoft Internet Explorer (IE) 10+
- Google Chrome
- Apple Safari

Each browser renders Staffing Optimizer slightly differently. Older versions have security risks and do not render Staffing Optimizer properly.

We recommend using Microsoft Internet Explorer because Microsoft SQL Server Reporting Services is optimized for IE. JavaScript and cookies must be enabled.