Infor Business Intelligence Hardware Recommendations Guide

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About this guide

The purpose of this guide is to help determine the hardware requirements for Infor Business Intelligence. It is intended as a guide for budgeting estimates and does not replace the detailed sizing exercise provided at the beginning of the implementation of your chosen product.

This sizing guide contains information based on benchmarks in a lab environment and customer experience. The information in this sizing guide is generic to serve as many different situations as possible. But each situation is unique. To determine hardware sizing requirements, consider the specific needs of each customer.

Organization

This guide contains these chapters:

Chapter	Description
Introduction.	High-level overview of Infor Business Intelligence.
Prerequisites.	Details the current prerequisites and limitations.
Components.	Provides details of the Infor BI platform and associated components.
Enterprise architecture.	Describes the architecture of the associated components and their data stores.
Hardware recommendations.	Provides information on the hardware and network recommendations for the Infor BI and associated components.
Monitoring BI applications and tools.	Provides an overview of how to monitor your Infor BI environment.

Related documents

You can find documents in the product documentation section of the Infor Xtreme Support portal, as described in 'Contacting Infor'.

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.

Introduction

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Infor Business Intelligence encompasses planning, budgeting, forecasting, financial consolidation, management reporting and analysis. It includes web-based client components supported by server and administrative components. The server components are the foundation of the application. The administrative components provide tools to set up, design, administer, and maintain the centralized database and application. Users can access the appropriate reporting and data pages via a web browser or Microsoft Office Excel.

These are the main server components involved in running an application:

*   The database server stores the metadata (accounts, structures, and so on), fact data, report definitions, and user security for the application database.
*   The application server submits and manages requests to the database server, performs calculations and returns data.
*   The web server manages the presentation of the application using the user's browser in coordination with Application Studio.

Prerequisites

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This chapter highlights what you need to know in relation to current prerequisites and limitations.

d/EPM hardware requirements

Infor Dynamic Enterprise Performance Management does not require any special consideration. The figures and recommendations for Infor BI in this document apply equally to Infor d/EPM. The PMServer details are documented in the *Infor Corporate Performance Management Hardware Recommendations Guide*.

Sizing

Sizing is not a one-time activity, and must be carried out several times during the lifetime of a solution. The hardware architecture must be adjusted to the dynamics of the enterprise. Sizing is an ongoing process. There are many reasons to carry out a sizing.

Sizings are frequently carried out for pre-sales reasons at the beginning of an implementation to estimate the hardware budget. The sizing in this situation will be very rough and high-level, because few details are known.

During later stages of the implementation project more detailed information, which has influence on the sizing, becomes available. The customer's business process and how the BI Application will be used become clear. These can have an impact on the size of the hardware infrastructure.

Before a customer goes live, it is recommended to re-evaluate the sizing and buy the required hardware as late as possible to reflect ongoing changes during project implementation. Later, it is also advised to re-evaluate the size of the hardware infrastructure frequently based on customer's business growth and dynamics in making adjustments in their BI Application.

Concurrent users vs. named users

All user numbers given in this document are concurrent users, all being active at a given moment in time. When sizing Infor BI applications for concurrent or named users, we have typically seen ratios of around 10%. For example, of 200 users, 10% or 20 users would, on average, be concurrent at any time. This ratio will vary according to the way in which Infor BI is implemented

Virtualized environments

There are no hardware-related functions implemented in Infor BI products. Software should function error-free in virtualized systems provided all operating system functions are passed on through the virtual environment.

In the software market there is a wide variety of virtualization and remote solutions. A few solutions are more comprehensively supported and regularly tested. Information on these can be found in the *Infor BI Platform Support Guide*.

Virtualization does not increase server capacity. Virtualization has an overhead which results in less server capacity or less server throughput. The benefit of virtualization is that idle resources can be used more efficiently. By running multiple VMs on the same host (physical server), over commitment of the physical resources (CPU, Memory, and so on) can occur. In this case all VMs on this host will suffer performance problems.

More information and additional considerations when using a virtualized environment are available in KBA 1173111 and KBA 602274 on InforXtreme.

Generally there is information concerning limits, specifics or known compatibility issues in the virtualization or remote solution documentation.

Running OLAP server on virtualized environments

OLAP Server is an in-memory database, That is, all the data is held in-memory and used from there when it is run. Therefore, the availability of enough RAM in a fast way is the critical performance factor. If the machine starts to swap out memory to disc, its performance will suffer dramatically.

This dependency on fast RAM access also has consequences for virtual environments. In such environments, the resources RAM, and cores are shared among multiple virtual machines. This can have a negative impact on the performance of the OLAP Server, because the VM with the OLAP Server must wait for the system resources. Our recommendation is to run the OLAP Server either on dedicated hardware (real physical hardware) or as the only virtual machine on a host system. This enables the OLAP Server to deliver the best possible performance.

Memory aspect

The increased write-back performance of the Infor OLAP database server is due to the fact that OLAP is an in-memory database. However, this means that OLAP requires exclusive full access from the processor to the memory. In a virtualized environment, each VM shares access to the main memory with all other VMs. Normally, this access cannot be configured. The number of channels to the memory is limited. In such an environment, OLAP cannot reach full performance.

CPU aspect

Infor OLAP calculation time is normally spread over thousands and millions of single calculations. In virtualized environments, processor cores can be assigned to VMs. However, this setting cannot always guarantee exclusive access to these cores. For example, assigning four cores to a VM means that if during a time period the host system recognizes that a VM needs more processor power, then the system assigns more cores to this VM for this time period and up to a maximum of four cores. This overhead can lead to serious performance issues.

Conclusion

Taking these considerations into account, our recommendation is to run the OLAP Server either on dedicated hardware (real physical hardware) or as the only VM on a host system. This enables the OLAP Server to deliver the best possible performance.

Performance warranties

Infor has performed this sizing thoroughly, but cannot guarantee optimal performance because there are many variables in the sizing procedure. Infor assumes no liability for any damages or extra costs that result from recommendations in this sizing guide.

Components

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This chapter introduces on a high level the Infor Business Intelligence platform and its associated components. The summaries should give you an understanding of the components that are under heavy load during normal use of an Infor BI application.

For more details, the descriptions provide an architectural overview, and identifies the key influences on performance and sizing factors

Application Studio

Summary

Infor BI Application Studio is designed to run as a full client or as a web server. You install Application Studio on a client to create and administer reports. Application Studio WebServices installed on a web server enables access to your reports with a browser.

Description

Application Studio stores its content in the Repository database. This database must be accessible either locally or remotely. Application Studio can connect to different business databases such as OLAP Server, relational business databases, or Microsoft Analysis.

These components must be available to use Application Studio:

- Application Studio.
- Repository.
- Repository Administration.

Application Studio WebServices runs one instance of the report rendering engine to calculate, on-demand, the required reports for each user. The engine uses users' security profiles to ensure that they can view only the reports and data to which it is intended they have access. When an Infor BI user requests a new report, Application Studio WebServices:

- Requests the report definition from the repository.
- Requests the required data from the associated business database (for example, OLAP server).
- Calculate the reports.

- Stores the report as DHTML on the hard disk from where the web server provides the report to the browser.

The memory required by the rendering process depends on the kind of report and the size of the data model in the business database. In addition to the values, the meta data in the Repository must be transferred from the database server to the report engine to calculate the reports correctly. Application Studio uses only one processor core per user. The windows operating system handles the allocation of available CPU cores to calculate reports of other users. It is primarily the memory and the number of processor cores that affect the performance of Application Studio WebServices. The factors that affect hardware requirements are the number of users and the size of the data model.

Dashboards

Summary

Dashboards is designed to run as a web server. Dashboards can be accessed using the native iOS or Android Apps or directly using a web browser to show dashboards and access reports from connected Application Studio reports.

Description

Dashboards stores its content in the repository database. This database must be accessible either locally or remotely. Dashboards can connect to multiple Application Studio report catalogs at a time to show their reports — either in the Web UI, Dashboards, or by serving the iOS or Android Motion Dashboards apps.

One instance of Application Studio's report rendering engine is started by Dashboards per user and report catalog to show the required reports for each user. Like Application Studio, Dashboards also uses the security profiles of users to ensure that they can only see and edit dashboards they are intended to work with. Application Studio's security concept is applied on top of the one for dashboards when reports are loaded in Dashboards: dashboards and reports are separate entities that are handled by separate applications, and so are the dashboard catalog and the report catalogs. When an Infor BI user requests a dashboard with Application Studio reports on it, Dashboards does the following:

- Requests the dashboard definition from the repository, applies all standard security checks, loads the dashboard meta data.
- Establishes connections to one or multiple Application Studio WebServices instances to access the report catalogs whose reports are shown on the dashboard.
- Requests the reports from Application Studio which involves all single steps described earlier (calculation, rendering, storage, and so on).

The overall memory that is required to work with dashboards mainly depends on the number, size and complexity of the involved Application Studio reports including the connected data models.

The central process that runs Dashboards is the Dashboards ASP.NET application running under IIS (w3wp.exe). Application Studio WebServices consists of two processes, one ASP.NET application that runs under IIS (w3wp.exe), and as many WebHost instances as there are users connected to one report catalog (Mis.onVision.WebHost.exe).

From a pure Dashboards perspective consider the following: The Dashboards ASP.NET needs to cache metadata from the repository, for example, the dashboard folders, the dashboard definitions, and the permissions. The amount of memory consumption per user mainly depends on the number of dashboards in the dashboard catalog that is used. Memory consumption can also be influenced by the ASP.NET/IIS itself. This depends on your general server settings regarding caching.

Office Plus

Summary

Infor BI Office Plus is a full client, designed to run within Microsoft® Office Excel. You install Office Plus to a standard client to create and administer reports and to use its ad-hoc reporting capabilities.

Description

Office Plus stores its content in the BI Repository database. This database must be accessible either locally or remotely. Office Plus can connect to different Business database such as OLAP Server or Microsoft Analysis.

These components must be available to use Office Plus:

- Microsoft® Office Excel.
- Office Plus.
- Repository.
- Repository Administration.

Office Plus is a client application and needs Microsoft Office, including VBA, as underlying components. Depending on the design of the reports, and the functionality of the connected business database, the client can perform calculations on the client machine instead of using the server capability.

Designer

Summary

Designer is designed to run as a full client or as an unattended data load application on a server. You install Designer to a standard client to create and administer OLAP Server databases and associated User Management. You install Designer to a server that enables overnight data load and cube update processes.

Description

Designer stores its content in a relational database. This database must be accessible either locally or remotely.

These components must be available to use Designer:

- OLAP Server.
- Repository.
- Repository Administration.

As the Designer is the data load tier within the Infor BI architecture, the load process is a significant factor. During the load process the Designer extracts the data from a source for transformation. Furthermore, a star schema is created for the cube data load. All stages are in collaboration with the SQL server database. Finally, the prepared data is pushed to OLAP Server to update dimensions, cubes and values. The duration of the entire load process depends on many variables such as the size and amount of structural and transactional data. The loading time can be between several minutes, up to several hours.

After the initial data load is completed, the Designer requests only new or changed data from the source system. This happens periodically, for example, nightly or weekly.

The initial data load is significant for the Designer SQL server, and can affect the performance of other applications. For example; if you run the Repository for Application Studio on the same SQL server and you have 24 hour reporting, then this can affect the report request time.

OLAP Server

Summary

OLAP Server is designed to run OLAP databases for local or remote access. You install OLAP Server to a standard client to use with local databases. You install OLAP Server with the Network Service to a server that enables the access to your databases by other consumers.

Description

OLAP Server stores its content in its own format that runs in-memory. User and permission management is stored to the Repository database. This database must be accessible either locally or remotely. OLAP Server databases can be maintained by OLAP Administration, Designer or Office Plus. To maintain OLAP Server data access permissions, either the Designer or Office Plus must be available

These components must be available to use OLAP Server:

- OLAP Server.
- Repository.
- Repository and OLAP Administration.
- Designer or Office Plus for data access permissions

Databases can be created automatically or manually. When a database is created automatically, it places a greater load on the OLAP Server than a manually created database. On request from, for example, Application Studio, OLAP Server calculates the specific slice. In-memory the OLAP Server calculates aggregated elements automatically, based on associated base elements and sends the slice to the client. To avoid locking data, the requested slice is handled like a virtual cube for the requesting user. The OLAP Server database purely an 'in-memory' database. This means that, at run time, all the

required data is kept permanently in memory. This contributes to the excellent performance of the OLAP Server.

The number and size of the loaded cubes affect the size and the memory consumption of the data model. The size of a cube depends on the number and size of the dimensions (the number of elements in a dimension) and the number of values (for example, purchase orders) stored in the cube. The OLAP Server calculates the data requested by each user, on demand. Multiple users can use the OLAP Server in parallel. This means that if you add more processor cores, the performance of the OLAP Server improves for multiple users.

BI DataLink Server

Summary

The Infor BI DataLink Server (DataLink Server) product line puts complex ad-hoc querying and reporting into the hands of non-technical users. DataLink Server users can construct complex business intelligence visualizations from their corporate data, using only their domain knowledge.

Description

DataLink Server brings this capability to the Cloud. A set of centrally hosted services is deployed that can be consumed by Infor BI Q&A (Q&A). The benefits include:

- Centralized configuration and administration
- Cloud friendly deployment, meaning that each consumer no longer requires direct access to the data sources
- Support for the latest platforms and technologies such as 64-bit, Windows 8 and Office 2013
- Contemporary and simplified user interface
- Centralized report scheduling and publishing
- Unicode data support.

BI Q&A

Summary

Infor BI Q&A (Q&A) is an executive information system that provides easier, faster ways to interrogate and analyze data held in your data source from within a Windows environment. It is a dynamic link between a data source and Microsoft® Office Excel.

Description

Q&A enables you to extract data from multiple database tables to Microsoft Excel, by defining queries of different types in the cells of Microsoft Excel worksheets. You can keep the extracted data current, by recalculating the queries. You can drill down on any amount to display details of its composition.

You can post the data from Microsoft Excel to an external source, and you can create and schedule tasks to save, print and e-mail your Microsoft Excel workbook.

Enterprise architecture

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With Infor BI, several software and hardware scenarios are possible. This chapter describes how the components are assigned to their associated data stores. Each component can be assigned to a standard server in a distributed Infor BI installation.

Major server components, their roles, installed components, and connections are listed in this table. Although all Infor BI components can be installed on a single machine, common levels of user load will normally require that the components be installed on dedicated machines responsible for specific tasks.

Server	Role	Component	Connected to
Database Server.	The primary component on this server is the selected relational database.	SQL Server or Oracle.	Repository Database Designer Database.
Web Server.	Designates the server running IIS. WebServices and Dashboards is also installed on this server.	Application Studio Web-Services. Dashboards.	Repository DB (Reports, User management) and business database.
OLAP Server.	Holds the Infor BI OLAP Server database and engine	OLAP Server.	OLAP Server DB and Repository DB (User management).

The following common enterprise architecture configurations illustrate the range of possible configurations. Their relationships to specific hardware sizing scenarios are mentioned in more detail later in this document. As the number of concurrent users increase, other scenarios might need to be considered. For large or complex implementations, contact customer support.

Single server

All server components are installed on a single machine.

Specification	Components
Thin Client.	Browser.
Power Client.	Administration components.
Infor BI Server.	• Database Server (SQL Server or Oracle). • OLAP Server. • Application Studio WebServices. • Dashboards.

Two servers

Employing two servers is a basic server configuration for an Infor BI environment. The database server contains all databases and calculation servers. The web server hosts the web server applications.

Option A

In this scenario, the database server contains all databases and calculation servers. The web server hosts the web server applications.

Specification	Components
Thin Client.	Browser.
Power Client.	Administration components.
Web Server.	• Application Studio WebServices. • Dashboards.
Database Server.	• Database Server (SQL Server or Oracle). • OLAP Server.

- This is one of the most common configurations for small to medium sized applications.
- Keeping the OLAP Server and database server on the same computer helps prevent network traffic bottlenecks for Budgeting applications.

Option B

In this scenario, the database server contains only the databases. The web server hosts the web services and calculation servers.

Specification	Components
Thin Client.	Browser.
Power Client.	Administration components.
Web Server.	• Application Studio WebServices.

Specification	Components
	• Dashboards.
	• OLAP Server.
Database Server.	Database Server (SQL Server or Oracle)

- Optional: dedicated database server for RDBMS
- Used when the SQL Server instance is shared by several applications.
- Used by companies with a policy of having a dedicated database server with no other applications allowed on that computer
- All BI specific databases and calculation servers are served by the BI web server as well

Three servers

As applications grow through complexity and increased numbers of concurrent users, the configuration can be extended to three or more servers.

Specification	Components
Thin Client.	Browser.
Power Client.	Administration components.
Web Server.	• Application Studio WebServices. • Dashboards.
OLAP Server.	• OLAP Server. • Designer (optional).
Database Server.	SQL Server or Oracle.

- Provides flexibility and scalability.
- Suitable where Oracle is used and the OLAP Server cannot run on the same server as Oracle
- Used by companies with a policy of using dedicated web servers and dedicated database servers.
- Suitable for applications with large number of concurrent users.

Additionally, it is possible to increase the number of web servers in this architecture when scalability is needed. You can even use dedicated Web Servers for Application Studio WebServices only or just for Dashboards.

Specification	Components
Thin Client.	Browser.
Power Client.	Administration components.
Web Server.	• Application Studio WebServices.

Specification	Components
	• Dashboards.
OLAP Server.	• OLAP Server.
	• Designer (optional).
Database Server.	SQL Server or Oracle.

Application growth

As your application grows, in terms of number of users, application complexity, or database size, it is good practice to monitor the resource utilization of your servers. Use the Windows Performance Monitor during peak usage times, and during large consolidations, to observe processes such as processor and memory utilization. Such periodic monitoring helps to ensure that your users continue to obtain reliable performance as the environment and application change.

If the application begins to require additional resources; a number of options are available to help scale the application. One option is to upgrade the hardware, by adding memory or by using servers with additional processors or faster processors. If you have a one or two server configuration, review the previous configuration scenarios to determine if a different configuration would better suit the needs of your application.

Infor BI can also scale beyond these basic configurations in these ways:

- Multiple OLAP Servers. This configuration is useful for applications with large and complex calculation requirements. With multiple OLAP Servers, the workload can be balanced either by user group or by function.
- Multiple web servers for Application Studio WebServices or Dashboards. This configuration can improve performance for applications with large or complex views and high volumes of users. These are the methods for distributing users among multiple web servers:
  - Manually direct groups of users to different web servers through distinct URLs.
  - Leverage the Microsoft Network Load Balancing service available with Windows Server 2008 R2.
  - Use third-party load balancing software that supports non-stateless web applications. Infor BI's web server maintains state information as it services each user's request.
- A combination of multiple OLAP Servers and web server pairs can be used. For example, various groups of users can have their own dedicated web and OLAP Server pair.
- Database clustering can be used to provide failover and improve scalability.

Hardware recommendations

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The recommendations given in this chapter represent a good faith effort to identify recommended hardware configurations. You should select the hardware configuration that best suits your needs, use the recommendations as a starting point for a general configuration and then monitor performance over time. You should also be aware that your initial hardware configuration might not be adequate in the future and you might need to upgrade hardware to accommodate application growth and expansion.

The Platform Support Guide provides details on the supported operating systems as well as other supported software versions.

Background

Application factors

Two factors affect hardware requirements. First is the user load distribution. At most customer sites, the load distribution varies according to the nature of the application, but all applications have peaks and troughs.

Peak periods might have a daily or weekly rhythm for analytic or reporting applications. Budgeting applications experience high peaks during the budgeting process, with the heaviest loads occurring just before deadlines. Financial consolidation and management reporting applications experience their highest demands during the period after new results are available. For correct sizing, these peak periods must be anticipated and equipment sized accordingly.

The second factor is the complexity of the application. There are a number of factors that can impact the suitability of these recommendations, including, but not limited to, amount or level of data, number of dimensions, number of members in dimensions, formulas, number of databases and applications, complexity of report definitions and number of users.

The hardware sizing recommendations were derived by using a series of customer reports of average complexity to estimate peak user load. In the current architecture, this memory consumption was recorded:

Component	Memory Requirement per User
Application Studio reporting on OLAP Server.	100 - 140 MB

Component	Memory Requirement per User
Dashboards display multiple Application Studio Reports each user up to five users each additional user requires.	100 - 120 MB 10 - 20 MB

Note: Every Dashboards user needs to considered as Application Studio user as well, so both memory requirements needs to be added.

Technical aspects

Basic performance is defined as the response average users receive during normal usage when they request information from the application. BI Application Studio allocates memory per user and can take advantage of all existing memory 64-Bit operating systems. OLAP Server is a native 64-Bit application and can use all available memory in a 64-Bit operating system. Dashboards will implicitly require additional resources if there are Application Studio reports displayed as widgets on the dashboard itself. Each connection to a report catalog that is used on a dashboard has to be considered as an additional user for Application Studio.

Scenario execution parameters

Each scenario was chosen to reflect a real-life situation in which business requirements might require modification of the hardware environment. Each scenario was enacted with a different number of users, working concurrently on the system with defined delays of about 30 seconds.

Each scenario follows a specific use case. The use cases reflect the usual tasks undertaken by reporting and budgeting users. Typically, a use case begins with a logon to the system and navigation to the defined reports.

Hardware sizing scenarios

This section reviews the hardware requirements for the different installation configurations presented earlier. Hardware recommendations will be offered for the single server and the two server options.

To assist in configuring enterprise scaling, using multiple servers for large applications, the requirements associated with major server components are isolated in the Enterprise Components section.

All recommendations are for productive environments running on 64-Bit equipment where more than 8 GB memory is required.

General network requirements

In a multi-server environment at least a 1000 Mbit network connection is required. The recommended connection speed for client-server connections is 100 Mbit. The network latency must be less than 10 milliseconds for both. To use the Motion Dashboards application outside a WiFi connection, at least a 3G network connection is required.

General server requirements

The hardware recommendations refer to the available hardware at the time the tests are run.

We used an Intel Quad Core, 2.8 GHz XEON 54xx processor running our tests. You can use similar or better hardware. The Infor BI applications will require roughly 50-80 GB of disk space per server instance.

Single server

Infor BI can be run on a single server. A single server can be used as a test server or for a specific Model. For example, Infor CPM Applications.

Test server

All Infor BI components, as well as the RDBMS, can be installed on a single test server for application development.

Specification	Recommendation	
Concurrent Users.	1-10	10-25
CPU Cores.	2	2-4
Memory [GB].	6-8 + Size of OLAP database.	8-10 + Size of OLAP database.

The above scenario includes the installation and running of Application Studio and WebServices, Dashboards, Designer, OLAP Server, Office Plus, as well as MS SQL Server or Oracle. A Windows operating system is assumed.

OLAP Server and Application Studio/Dashboards

Infor BI can be used for reporting and analysis using its multi-dimensional database. The following illustrates the specification for a single server being used in a production environment. Analytical reports on the business model are delivered through Application Studio WebServices and optionally shown on Dashboards.

For more than 50 concurrent users, we recommend the enterprise architecture with multiple servers. Usually, dedicated Database, Web and Calculation servers (configuration 3) provide you with flexibility if one of the servers requires more performance when you increase the number of concurrent users or volume of data.

Specification	Recommendation		
Concurrent Users.	1-20	20-50	>50

Specification	Recommendation		
CPU Cores.	2-4	4-8	Not recommended.
Memory [GB].	6 - 8 + Size of OLAP database.	8-12 + Size of OLAP database.	Not recommended.

The above scenario includes the installation and running of OLAP Server and Application Studio WebServices, Dashboards as well as MS SQL Server or Oracle. A Windows operating system is assumed.

Administrator clients would be installed on client machines.

Enterprise configurations

The Infor BI application is dependent on many factors, including the complexity of the calculations, available hardware, and number of concurrent users. While the Infor BI components can be installed on a single server, they also can be distributed over multiple servers to balance concurrent user and processing loads. Hardware recommendations targeted for each major server components are given below.

Database Server

The relational database server has either MS SQL Server or Oracle installed. It is the primary data store for the metadata, fact data, report definition and user permissions.

Specification	Recommendation
CPU Cores.	4-8
Memory [GB].	6-10

The database server has MS SQL Server or Oracle installed.

OLAP Server

The memory requirements depend primarily on the size of the database.

Specification	Recommendation	
Concurrent Users.	50-100	100-250
CPU Cores.	2-4	4-8
Memory [GB].	4-6 + Size of OLAP database.	6 + Size of OLAP database.

Web Server

Specification	Recommendation
Usage.	Reporting against OLAP Server database.
Concurrent Users.	100

Specification	Recommendation
CPU Cores.	4-8
Memory [GB].	18

Application Studio WebServices and Dashboards are installed on this server.

Client workstations

Administrator computer

For administration purposes a typical Office PC is recommended. If it will also be used for designing or testing scenarios, more memory should be added.

Specification	Recommendation
CPU Cores.	2
Memory [GB].	4 or higher.

Designer memory requirements are dependent on the size of the analytic application being built in Infor BI. Large, complex analytic scenarios might require more.

Web end user computer

Application Studio WebServices delivers reports in pure DHTML and needs, as a 'zero installation client', just the minimal hardware to run the web browser on the computer or mobile devices.

Specification	Recommendation
CPU Cores.	2
Memory [GB].	4 or higher.

BI DataLink Server

Q&A Microsoft® Office Excel Client

Hardware prerequisites are driven by the software prerequisites as the Infor BI Q&A (Q&A) Microsoft® Office Excel client is lightweight in comparison. That is, the minimum hardware specification for the software prerequisites is sufficient for the Q&A Excel client.

DataLink Server

Hardware prerequisites are driven by the software prerequisites as the DataLink Server is lightweight in comparison. That is, the minimum hardware specification for the software prerequisites is sufficient for DataLink Server. As an ad-hoc query tool, the final performance experienced by users will be determined by the profile of the queries/reports that are submitted and the specification of the database

server. It is strongly recommended that a Database Administrator monitors the database performance regularly.

Database Server

DataLink Database Server

Hardware prerequisites are driven by the software prerequisites of SQL Server. As an ad-hoc query tool, the final performance experienced by users will be determined by the profile of the queries/reports that are submitted and the specification of the database server. It is strongly recommended that a Database Administrator monitors the database performance regularly.

Monitoring BI applications and tools

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This chapter provides a high-level understanding of how to monitor your Infor BI environment. Monitoring Infor BI components such as servers or databases is useful in identifying bottle necks within your applications.

The following topics will guide you towards a set of common tools that can be used to monitor and measure the components of interest. You will need basic knowledge of Windows operating system and of Windows administrative tools.

Measurement tools

This section focuses on the monitoring and measurement tools that are usually installed with your Windows operating system.

These tools are used for the different monitoring tasks described:

Tool	Description
Windows Task Manager.	Add these columns to the Processes tab of Windows Task Manager: • Virtual Memory Size - the VM size lists memory consumption more precisely • CPU Time - the CPU time shows in detail how much time the process consumes
Performance Monitor.	The Performance Monitor, as part of the Windows installation, is used to monitor measures like the Virtual Memory size more precisely and can record over a long time period if required. Additionally the data it gathers can be collected and analyzed using common Excel work sheets. For convenience, the OLAP server installs additional counters that can be selected within the Performance Monitor.
SQL Server Profiler.	The SQL Server Profiler enables you to monitor in detail each single SQL request sent to the server. The requests can be collected and analyzed; for example, the time consumed by the server for specific requests.
Log service.	With Repository Administration you have access to a logging application especially for applications such as Application Studio and OLAP Server. The log files are

Tool	Description
	not designed to be monitored online. The logged information is saved directly to specific containers where the data can be analyzed. Logging targets the machine on which the application is running.
	Activating logging uses additional resources and should, therefore, be used only when specific issues within the applications on the client need special attention.

Monitoring OLAP Server

The OLAP Server starts a separate process for each database, `MIS.Alea.Server64.exe`. If you have multiple databases running, then it is not possible to identify to which database each process relates. In this situation, to ensure that you monitor the correct process, we recommend that you start and monitor only one process at a time.

OLAP database in production environment

The OLAP database in the production environment consumes CPU power and memory in conjunction with the number of users and individual work processes such as:

- Reading data.
- Writing data.
- Automated mass data processes.

This can be monitored with Windows Performance Monitor.

The monitoring should look for:

- The total % usage of the CPU.
- Private bytes consumed.

OLAP Server offers additional Performance Monitor counters to gather more information, for example:

Infor OLAP Server: Connection.Active Users > Number of active users

For more details, refer to the *Infor BI Administrator Manual*.

OLAP database calculations

The OLAP database calculates all values on request. Depending on the design of the database, in terms of element structure, rules, mass data processes, and so on, the calculation could take several seconds. To identify long lasting calculation processes, monitoring should look for the CPU time consumed when a specific request has been run on the database.

Performance Monitor offers the % Processor Time, but to get the actual time used, the Task Manager can be used.

Monitoring Application Studio WebServices

For each user who logs on, Application Studio WebServices starts a separate process on the server machine. The process running for a logged on user is listed as `Mis.onVision.WebHost.exe.`

Application Studio WebServices in a production environment

Application Studio WebServices in a production environment consumes CPU power and memory in conjunction with the number of users. To calculate the overall consumption, all processes running as `Mis.onVision.WebHost.exe` and the IIS worker process (w3p) must be monitored.

Application Studio reports

Application Studio WebServices renders the reports for each user in real time on the server. To calculate the specific CPU and memory consumption of dedicated reports, a single `Mis.onVision.WebHost.exe` and the IIS worker process (w3p) must be monitored.

Application Studio databse requests

Application Studio reports and BI user management are stored to the centralized Repository. The Repository database runs on a database server without any additional components installed, so it can be monitored with the SQL Server Profile tool. SQL Server Profile can be used to monitor all Repository requests on the database.

From a logical point of view the requests send to the Repository database can be separated into three main sections.

Requests for user management

Application Studio requests user permissions while a user is being logged on. The Repository sends additional requests for all required authentication objects that are assigned to the user's account. Depending on the depth of permission inheritance, the SQL Server profiler can monitor long lasting requests.

Requests for the business database

Each report displays data from a connected business database. The requests to connect to the associated database are usually sent immediately after the user has been authenticated. To establish the connection to the business database, Application Studio needs additional information assigned to the current user account. The amount of information, and the time taken, depends on whether permissions have been assigned directly to users, or whether users inherit their permissions through membership of groups.

Requests for reports

After the user has been authenticated and all alias connections have been established, Application Studio can request the start report and additional information. Again the required data is requested from the database and can be monitored by SQL Server Profiler.

All these requests are usually the same when a user requests any other report within their session

Monitoring Dashboards

To monitor and check the actual consumption in a running system from a pure Dashboards perspective, you need to monitor the IIS worker process, `w3wp.exe`, that corresponds to the Dashboards web server.

Monitoring client activities

Under certain circumstances, it could be useful to get more detailed information about the activities of applications such as OLAP Server or Application StudioApplication Studio. Logging the applications can help to analyze and identify specific actions in the applications which need more time to be executed. The Log service needs extra resources because the applications need to send all data to services. The time consumed can be greater than if running without the log services.

Logged information can be used to identify, for example, how long the logon takes:

```
13:58:20.269 Level=Debug, SSOAuthentication.Login with credentials
13:58:20.281 Level=Info, SSO login user <admin> succeeded
```