System requirements

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Warning

> **Warning**
>
> The hardware requirements in this document are based on our experience with existing GLIMS 9 customers, the input we have got from Progress Software, and a series of stress tests we have performed in order to measure the impact of the new Application Server-based architecture on the server load.
>
> These system requirements are known to be correct for GLIMS 9.9. Today there is no reason to assume that future GLIMS versions will require major changes to these system requirements. However, these requirements may change over time.

Document history

Current version: 9.9.1

Version date: 26/11/2019

The following changes were made to the system requirements since GLIMS version 9.8:

- Use OpenEdge 11.7.5
- Add support for Oracle 12.2
- Add support for Windows 2016
- Add support for Windows 2019
- Add support for SuSE Linux Enterprise Server 12
- Add support for SuSE Linux Enterprise Server 15
- Drop support for 32 bit Linux servers
- Rephrase requirements for GLIMS in multi site environments and in virtual environments
- Increase disk space requirements due to the new Progress OpenEdge version
- Add .NET Framework version requirements
- Increase memory requirements on the application server in a multi-tier architecture
- Clarify that latency requirements are about roundtrip latency
- Increase CoreMark requirements
- Allow slightly higher network latencies
- Use JRE 1.8 instead of JRE 1.7 + clarify Java license policy
- Rephrase how GLIMS runs as a 32 bit application on a 64 bit Windows

Terminology

Database server

The server running the database processes. Fully separating the database from the application is only supported when running on an Oracle database.

Application server

In a "multi server architecture" this is the server running GLIMS communication processes, task schedulers and Application Servers. When running out of interface connections in the "single server architecture", an additional application server can be added.

Remote desktop server

The server running the GLIMS clients in a Windows Terminal Server / Citrix environment.

GLIMS Report Builder print server

GLIMS clients and task schedulers can send their print jobs to one or more dedicated print servers instead of processing the print job locally. This improves printing speed, reduces the amount of data sent to remote sites and allows defining the Windows printers on a single machine instead of defining them on all GLIMS clients.

Fat client

A PC running a locally installed GLIMS client.

Single-tier architecture

In this architecture, both the database and the application (application servers, communication services and task schedulers) are running on the same machine.

Multi-tier architecture

In this architecture, the database and the application are each running on their dedicated server. Only supported when running on an Oracle database!

Interface

This is a connection with an external software package. Examples are analyzer connections, hospital information system connections, lab-2-lab connections etc …

Server requirements

Single-tier architecture

	Small < 800 orders/day < 40 clients < 25 interfaces	Medium <1600 orders/day < 80 clients < 50 interfaces	Large <3200 orders/day < 100 clients < 75 interfaces (UNIX) < 50 interfaces (Windows)
Processor	**Intel Xeon / Itanium** 8 vCPUs e.g. 4 hyper threaded physical cores or 8 virtual cores 2.4 GHz or better **IBM Power7** 1 core, 4 threads	**Intel Xeon / Itanium** 16 vCPUs e.g. 8 hyper threaded physical cores or 16 virtual cores 2.4 GHz or better **IBM Power7** 2 cores, 8 threads	**Intel Xeon / Itanium** 24 vCPUs e.g. 12 hyper threaded physical cores or 24 virtual cores 2.4 GHz or better **IBM Power7** 3 cores, 12 threads
CoreMark ([1])	> 14.000 Iterations/second per core		
RAM	Windows: 8 GB Unix: 8 GB	Windows: 12 GB Unix: 16 GB	Windows: 16 GB Unix: 32 GB
Hard disk expected IOPS on the database disk	150 IOPS	300 IOPS	450 IOPS
Hard disk layout	When using **local disks**, the minimum amount of disks depends on the type of disk and the required amount of IOPS. As a rule of thumb, one standard SAS drive can provide between 150 and 200 IOPS. Higher amounts of IOPS can be obtained by configuring the disks in stripe sets. Every disk should be mirrored for safety and performance reasons. 3 logical disks must be created in RAID 10 (mirroring + striping): - A logical disk for the OS and the application (Example: drive C: + D:) - A logical disk for the database (Example: drive E:) - A logical disk for the backup (Example: drive F:) Minimum 10k RPM (15k RPM is recommended) for OS + DB. The use of a **SAN** is supported. In this case GLIMS needs at least one LUN for the database and one LUN for the backup. The application can be installed either on a local disk or on a third LUN. The use of Fibre Channel access to the disks is strongly recommended. iSCSI and NFS should be used with caution. Depending on the capabilities of the SAN hardware, data and indexes can be spread over multiple LUNs using different disks and different controllers. This will further improve performance. The use of RAID5 should be avoided for performance reasons.		
Hard disk size	On average, the following disk sizes should be sufficient to keep 5 years of routine data online:		
	Application: 50 Gb Database: 80 Gb Backup: 80 Gb	Application: 50 Gb Database: 160 Gb Backup: 160 Gb	Application: 50 Gb Database: 300 Gb Backup: 300 Gb
Network	1 Gbit network connection The roundtrip latency between the Glims server and its clients (either running on PCs in the lab or on a remote desktop server) should not be higher than 500 microseconds on average [2].		
Monitor	Supporting at least 1280 x 1024 x 24-bit resolution and color depth		
Backup	OS compliant tape backup system, or a centralised backup solution		

([1]) CoreMark is an industry standard CPU benchmarking tool, published by EEBMC (http://www.eembc.org/coremark).

([2]) This can be tested with hrPing (http://www.cfos.de/en/ping/ping.htm) on Windows or with the standard ping command on UNIX.

Database server

	Small < 800 orders/day < 40 clients	Medium <1600 orders/day < 80 clients	Large <3200 orders/day < 100 clients
Processor	**Intel Xeon / Itanium** 4 vCPUs e.g. 2 hyper threaded physical cores or 4 virtual cores 2.4 GHz or better	**Intel Xeon / Itanium** 8 vCPUs e.g. 4 hyper threaded physical cores or 8 virtual cores 2.4 GHz or better	**Intel Xeon / Itanium** 16 vCPUs e.g. 8 hyper threaded physical cores or 16 virtual cores 2.4 GHz or better
	IBM Power7 1 core, 4 threads	**IBM Power7** 1 core, 4 threads	**IBM Power7** 2 cores, 8 threads
CoreMark ([1])	> 14.000 Iterations/second per core		
RAM	8 GB	16 GB	32 GB
Hard disk expected IOPS on the database disk	150 IOPS	300 IOPS	450 IOPS
Hard disk layout	When using **local disks**, the minimum amount of disks depends on the type of disk and the required amount of IOPS. As a rule of thumb, one standard SAS drive can provide between 150 and 200 IOPS. Higher amounts of IOPS can be obtained by configuring the disks in stripe sets. Every disk should be mirrored for safety and performance reasons. 3 logical disks must be created in RAID 10 (mirroring + striping): - A logical disk for the OS and the application (Example: drive C: + D:) - A logical disk for the database (Example: drive E:) - A logical disk for the backup (Example: drive F:) Minimum 10k RPM (15k RPM is recommended) for OS + DB. The use of a **SAN** is supported. In this case GLIMS needs at least one LUN for the database and one LUN for the backup. The application can be installed either on a local disk or on a third LUN. The use of Fibre Channel access to the disks is strongly recommended. iSCSI and NFS should be used with caution. Depending on the capabilities of the SAN hardware, data and indexes can be spread over multiple LUNs using different disks and different controllers. This will further improve performance. The use of RAID5 should be avoided for performance reasons.		
Hard disk size	On average, the following disk sizes should be sufficient to keep 5 years of routine data online:		
	Application: 10 Gb Database: 80 Gb Backup: 80 Gb	Application: 10 Gb Database: 160 Gb Backup: 160 Gb	Application: 10 Gb Database: 300 Gb Backup: 300 Gb
Network	1 Gbit network connection The roundtrip latency between the database server and the Glims application server, clients or remote desktop server should not be higher than 500 microseconds on average [2].		
Monitor	No special requirements		
Backup	OS compliant tape backup system, or a centralized backup solution		

([1]) CoreMark is an industry standard CPU benchmarking tool, published by EEBMC (http://www.eembc.org/coremark).

([2]) This can be tested with hrPing (http://www.cfos.de/en/ping/ping.htm) on Windows or with the standard ping command on UNIX.

Application server

	Small < 40 clients < 25 interfaces	Medium < 80 clients < 50 interfaces	Large < 100 clients < 75 interfaces (UNIX) < 50 interfaces (Windows)
Processor	**Intel Xeon / Itanium** 4 vCPUs e.g. 2 hyper threaded physical cores or 4 virtual cores 2.4 GHz or better	**Intel Xeon / Itanium** 8 vCPUs e.g. 4 hyper threaded physical cores or 8 virtual cores 2.4 GHz or better	**Intel Xeon / Itanium** 16 vCPUs e.g. 8 hyper threaded physical cores or 16 virtual cores 2.4 GHz or better
	IBM Power7 1 core, 4 threads	**IBM Power7** 1 cores, 4 threads	**IBM Power7** 2 cores, 8 threads
CoreMark ([1])	> 14.000 Iterations/second per core		
RAM	8 GB	12 GB	16 GB
Hard disk	50 GB of free space		
Network	1 Gbit network connection The roundtrip latency between the database server and the Glims application server should not be higher than 500 microseconds on average [2].		
Monitor	Supporting at least 1280 x 1024 x 24-bit resolution and colour depth		
Backup	OS compliant tape backup system, or a centralised backup solution		

([1]) CoreMark is an industry standard CPU benchmarking tool, published by EEBMC (http://www.eembc.org/coremark).

([2]) This can be tested with hrPing (http://www.cfos.de/en/ping/ping.htm) on Windows or with the standard ping command on UNIX.

Remote desktop server

	Up to 16 users	Up to 32 users	Up to 48 users
Processor	**Intel Xeon** 8 vCPUs e.g. 4 hyper threaded physical cores or 8 virtual cores 2.4 GHz or better	**Intel Xeon** 16 vCPUs e.g. 8 hyper threaded physical cores or 16 virtual cores 2.4 GHz or better	**Intel Xeon** 24 vCPUs e.g. 12 hyper threaded physical cores or 24 virtual cores 2.4 GHz or better
CoreMark ([1])	> 14.000 Iterations/second per core		
RAM	8 GB	12 GB	16 GB
Hard disk	50 GB of free space		
Network	1 Gbit network connection The roundtrip latency between the database server and the remote desktop server should not be higher than 500 microseconds on average [2].		
Monitor	Supporting at least 1280 x 1024 x 24-bit resolution and colour depth		
Backup	OS compliant tape backup system, or a centralised backup solution		

([1]) CoreMark is an industry standard CPU benchmarking tool, published by EEBMC (http://www.eembc.org/coremark).

([2]) This can be tested with hrPing (http://www.cfos.de/en/ping/ping.htm) on Windows or with the standard ping command on UNIX.

GLIMS Report builder print server

	Small **<1200 reports/hour**	Medium **<1600 reports/hour**	Large **<2000 reports/hour**
Processor	**Intel Core / Xeon** 2 vCPUs e.g. 1 hyper threaded physical core or 2 virtual cores 2.4 GHz or better	**Intel Core / Xeon** 4 vCPUs e.g. 2 hyper threaded physical cores or 4 virtual cores 2.4 GHz or better	**Intel Core / Xeon** 8 vCPUs e.g. 4 hyper threaded physical cores or 8 virtual cores 2.4 GHz or better
CoreMark ([1])	> 12.000 Iterations/second per core		
RAM	4 GB	6 GB	8 GB
Hard disk	50 GB of free space		
Network	100 Mbit or 1 Gbit network adapter (recommended)		
Monitor	No special requirements		
Backup	OS compliant tape backup system, or a centralised backup solution		

([1]) CoreMark is an industry standard CPU benchmarking tool, published by EEBMC (http://www.eembc.org/coremark).

Multi-site environments

When using GLIMS in a multi-site environment over a Wide Area Network (WAN), **the usage of a Remote Desktop Server is always required**, independent of the bandwidth between the sites.

GLIMS is evolving towards a full three tier application model (database + application server + thin clients), but older parts of GLIMS are still client/server based. A client/server application sends many small packets over the network by nature, which makes these parts of the application sensible to network latency. Even when the available bandwidth meets the system requirements, a higher latency, as often observed on a WAN, is known to cause performance problems.

Requirements for GLIMS in virtual environments

The requirements above apply both to physical and virtual environments.

The assigned resources must be dedicated to Glims, at least in a production environment. **CPU and memory sharing ("over-allocation" or "overprovisioning") is not allowed**.

All kinds of power management introduce extra latency and should be disabled at all levels (BIOS, VMWare, Windows).

Please also read the document "MIPS Position Statement Customer Use and Support of GLIMS and SampleNet in Virtual environments".

Software

Supported server operating systems

Windows

> **Notes**
> - Both 32-bit and 64-bit Windows are supported, but in the current version GLIMS still runs as a 32 bit application.

- Windows 2008 R2
- Windows 2012, Windows 2012 R2

> **Notes**
> - Windows 2012 R2 is only supported by Glims 9.5.4 and higher

- Windows 2016, Windows 2019

> **Notes**
> - Windows 2016 and 2019 are only supported by Glims 9.8.10 and higher

UNIX
- Solaris 10
- Solaris 11
- AIX 6.1
- AIX 7.1
- SuSE Linux Enterprise Server 11 SP3
- SuSE Linux Enterprise Server 12
- SuSE Linux Enterprise Server 15
- CentOS 6.6 and higher
- CentOS 7.0 and higher
- RedHat 6.6 and higher
- RedHat 7.0 and higher
- Oracle Linux 6.6 and higher
- Oracle Linux 7.0 and higher
- HP-UX 11i v3 (Itanium)

> **Notes**
> - Only 64 bits operating systems are supported as of GLIMS version 9.9

Support policy related to operating system patches (including Windows Updates)

MIPS doesn't validate individual operating system patches in a proactive way. However, we commit ourselves to investigate and, if possible, resolve the problems when they occur. We encourage our customers to test the operating system patches in a test environment first.

Supported Progress version

Progress **OpenEdge 11.7.5** is required.

Supported Oracle versions

- Oracle Database 11.2.0.1
- Oracle Database 12.1.0.1
- Oracle Database 12.2.0.1

> **Notes**
> - Higher corrective versions of the same Oracle release (e.g. 11.2.0.4, 12.1.0.2…) are also supported, and even recommended.
> - Oracle 18c, 19c and higher are considered as new Oracle releases that are not supported yet.
> - The Standard Edition is sufficient, but the Enterprise Edition + Diagnostic Pack offer better means for performance troubleshooting. When using the Standard Edition, MIPS cannot perform detailed performance troubleshooting at the database level.
> - On Windows, a 32-bit Oracle client is required.
> - Having a 32-bit Oracle client and a 64-bit Oracle database on the same server (the only possibility in single tier architecture on 64 bit Windows systems) is supported since GLIMS 9.8

Supported Java versions

Glims 9.9 requires two Java versions to be installed on the server:

- Server JRE 1.8.0 update 181
- JDK 1.8.0 update 144 (when using Web services or KV-Connect)

The GLIMS version for Windows is shipped with the required Java components. On UNIX systems, the listed Java components (or their equivalents if there is no Oracle Java available for the target platform) need to be available before installing Glims 9.9.

Note that the required Java versions for GLIMS 9.9 are not impacted by the Oracle license policy change, so these versions can still be used free of charge. However, if higher Java versions are being used, the customer must acquire the appropriate Java licenses.

Compilers and scripting engines

Windows

The GLIMS version for Windows version is shipped with precompiled binaries.

VBScript must be enabled in order to run the MIPS Application Management scripts.

OpenEdge 11.7 requires .NET Framework 4.6

UNIX

On UNIX systems, a platform specific compiler must be available before installing GLIMS 9.9:

- Linux: GNU gcc and g++
- AIX: IBM XL C

- HP-UX: HP C/aC++ Developer's Bundle
- Solaris: Sun Studio / Oracle Developer Studio

All platform independent scripts are written in *ksh*.

Client requirements

Hardware

	Fat client	Thin client
Processor	Intel Core i3 2.4 GHz or better	Intel Pentium IV 2.4 GHz
CoreMark ([1])	> 12.000 Iterations/second per core	N/A
RAM	4 GB	512MB
Hard disk	50 GB free space	-
Network	100 Mbit or 1 Gbit network adapter (recommended) The roundtrip latency between the database server and the Glims clients should not be higher than 500 microseconds on average [2].	100 Mbit network adapter
Monitor	Supporting at least 1280 x 1024 x 24-bit resolution and colour depth	

([1]) CoreMark is an industry standard CPU benchmarking tool, published by EEBMC (http://www.eembc.org/coremark).

([2]) This can be tested with hrPing (http://www.cfos.de/en/ping/ping.htm) on Windows or with the standard ping command on UNIX.

Software

Supported Client Operating Systems

> **Notes**
> Both 32-bit and 64-bit Windows are supported, but in the current version GLIMS still runs as a 32 bit application.

- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

Support policy related to Windows Updates

MIPS doesn't validate individual operating system patches in a proactive way. However, we commit ourselves to investigate and, if possible, resolve the problems when they occur. We encourage our customers to test the operating system patches in a test environment first.

Supported Progress version

Progress **OpenEdge 11.7.5** is required

Supported Oracle versions

- Oracle Client 11.2.0.1
- Oracle Client 12.1.0.1
- Oracle Client 12.2.0.1

> **Notes**
> - Higher corrective versions of the same Oracle release (e.g. 11.2.0.4, 12.1.0.2, …) are also supported, and even recommended.
> - Oracle 18c, 19c and higher are considered as new Oracle releases that are not supported yet.
> - A 32-bit Oracle client is required.

Progress OpenEdge Licenses

	Server	Client
Progress OpenEdge database	• OpenEdge Enterprise RDBMS • OpenEdge Application Server Enterprise • Client Networking	• Client Networking • OpenEdge Personal RDBMS
Oracle Database	• OpenEdge DataServer for Oracle • OpenEdge Application Server Enterprise • Client Networking	• Client Networking • OpenEdge DataServer for Oracle

Notes
The "OpenEdge Personal RDBMS" license allows clients to read the static information (translations, database scheme information, ...) from a local copy of the genro database. This impoves the GLIMS performance. Older customers might not have this license.
When using an Oracle database, the static information is always fetched from the database.

Known incompatibilities

GLIMS is being deployed in various customer environments, often living together with outer third party products. Some of these products are known to have minor or major incompatibilities with GLIMS. The table below contains a non-exhaustive list of the currently known incompatibilities and their solution or workaround, if available.

Program	Symptom	Solution / Workaround
Palo Alto Traps	Performance problems	Not known at the time of writing. Contact the Palo Alto product support.
VMWare ESXi 6.0 and earlier	Network performance problems when using Windows 2012 (R2)	Upgrade to ESXi 6.0 Update 2 or higher
VMWare ESXi 6.0 and newer	Network performance problems when the server load increases	Disable adaptive interrupt coalescing on the network interface To do so through the vSphere Client, go to **VM Settings -> Options tab -> Advanced General -> Configuration Parameters** and add an entry for `ethernetX.coalescingScheme` with the value of `disabled` (replace X by the number of the NIC).