

PoINT Archival Gateway

System Requirements
and
Supported Devices



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1 Introduction

PoINT Archival Gateway is a software solution building a bridge between client applications or systems, respectively, and the supported archival storage devices (e.g., tape libraries) by providing services and functions which are mandatory for data archival solutions in enterprise data centers.

Please refer to the **PoINT Archival Gateway Operation Guide** for a comprehensive description of the software solution including its deployments, functions and terminology.

Chapter 2, System Requirements, specifies basic system requirements that must be fulfilled by server system before you can install and operate the software on the systems.

Chapter 3, Supported Devices, provides detailed information about the supported archival storage devices and about device specific requirements.

1.1 Purpose of the Document

This document describes prerequisites for installing and operating the PoINT Archival Gateway software solution on Linux and Windows server systems. The document is intended to be used by technical managers and administrators of the PoINT Archival Gateway software.

1.2 History of the Document

This section describes the history of the document by enumerating document versions and differences between the versions.

Version 001, 2020/04/09

This is the first official version of the document describing product version 2.0.

Version 002, 2020/05/05

The document has been extended by specifications for IBM 3592 (aka. Jaguar) tape drives and media, and the corresponding sections have been updated.

Version 003, 2020/06/26

The product version has been updated to version 2.1.

Version 004, 2020/09/09

The requirements have been updated and the description has been improved.

Version 005, 2020/12/18

The requirements have been updated.

Version 006, 2021/04/10

The product version has been updated to version 2.2.

Version 007, 2021/07/02

The product version has been updated to version 2.3.

Version 008, 2021/08/27

The product version has been updated to version 2.4. Version 2.4 additionally supports the Windows Server 2022 operating system and the Qualstar Q-Series tape libraries.

Version 009, 2021/12/09

The product version has been updated to version 2.5. Version 2.5 additionally supports the LTO drive and cartridge generation 9.

Version 010, 2022/04/02

The product version has been updated to version 3.0.

Version 011, 2022/09/28

The product version has been updated to version 3.1.

Version 012, 2022/12/16

The product version has been updated to version 3.2. Version 3.2 additionally supports Linux operating system platforms, and the documentation has been extended accordingly.

Version 013, 2023/04/20

The product version has been updated to version 3.3. The list of supported tape libraries has been updated.

1.3 Definitions and Terms

This document uses the following definitions and terms.

PAG, PAG-IFN, PAG-DBN

Acronyms for PoINT Archival Gateway and its interface and database nodes of enterprise deployments

PAG-CGN

Acronyms for the PoINT Archival Gateway compact node combining both interface and database node services in a single node of compact deployments

PAG-EGN

Acronyms for the PoINT Archival Gateway emulator node emulating archival storage devices and associated media by means of local or network file storage systems for test and demonstration purposes

2 System Requirements

This chapter describes the system and hardware requirements which must be fulfilled by a server system before the PoINT Archival Gateway software can be installed as well as recommendations regarding network and transport layer security configuration settings for the operating system.

Please note that the software assumes to run on dedicated server systems. It automatically scales according to the resources of the server systems and pre-allocates large portions of the RAM of the server systems to eliminate latencies and other issues that are typically caused by dynamic allocation procedures during operation.

The requirements, especially with respect to the number and the speed of the CPU cores, basically depend on the required data and object transfer rates or, in other words, on you and on your clients and expectations. The remainder of this chapter assumes that the deployments shall be able to use all connected archival storage devices in parallel and at their maximum data rates, and defines the requirements accordingly.

Note: Regarding the number of CPU cores, the specifications below assume that hyper-threading is enabled and that twice the number of logical CPUs is available in the systems.

Note: The PoINT Archival Gateway software unconditionally makes use of extended instruction sets of modern processors, especially of the extensions MMX, SSE3 and AVX2. More recent extensions are used if applicable and available.

Note: Although the PoINT Archival Gateway nodes can be installed on virtual server systems, the performance of virtual environments is unpredictable and can vary substantially.

2.1 Enterprise Deployment

In an enterprise deployment, one or two PAG-DBNs and multiple PAG-IFNs can be installed on separate server systems. The following sections describe the basic requirements for the respective server systems.

2.1.1 System Requirements for a PAG-IFN

The number of PAG-IFNs required in a deployment depends on the archival storage devices. The archival storage device also defines the number of CPU cores and the amount of RAM of a PAG-IFN. Please refer to chapter 3, Supported Devices, for details.

The system requirements for PAG-IFNs are defined as follows:

- One or two Intel® Xeon® 4th generation or AMD EPYC™ processors, 2.6 GHz or better, at least providing the number of cores as required by the archival storage device
- At least 8 GB of DDR4 2.133 MT/s (L)RDIMM RAM plus the amount of RAM required by the archival storage device, equally distributed over the memory banks of the processors
- A direct attached hard disk system for operating system and page file as well as for the local log file of the PAG-IFN

- System network: at least one 10gb Ethernet port for the internal data communication between PAG-IFNs and PAG-DBNs

Note: The network port must be capable of transferring data at a data rate which is equal to the sum of the data rates of all drives which are connected to the PAG-IFN. For example, if you connect 8 LTO-9 drives to the PAG-IFN, this data rate is equal to $8 * 400 \text{ MB/s} = 8 * 3.200\text{gb/s} = 25.600\text{gb/s}$, and you need to use a 25gb Ethernet port or better.

Note: The system network should leverage jumbo packets (i.e., MTU 9014). Enable use of jumbo packets for all associated network interface cards.

Note: If applicable (e.g., iSCSI), you may connect the drives to the system network, too. This does not require raising the bandwidth.

- Client network: one or more 10gb Ethernet ports, provided by one or more network interface cards, for external data communication between the client applications and the PAG-IFNs

Note: The client network must be capable of transferring data at a data rate which is equal to the sum of the data rates of all drives which are connected to the PAG-IFN (see above).

- Administration network: at least one 1gb Ethernet port for the server system administration (e.g., RDP)
- Operating system: Linux with kernel version 4.0 or higher, Windows Server 2012 R2 Standard or Enterprise edition, Windows Server 2016, Windows Server 2019 or Windows Server 2022.

Note: Contact PoINT Software & Systems GmbH to get the list of Linux distributions and versions that have currently been tested.

Note: The PAG-IFN server systems can be members of an active directory domain. Domain membership is an option, but not a requirement.

Note: For security and performance reasons, client and administration networks should be strictly separated from the system network by appropriate network techniques by, e.g., defining VLANs or switch port groups or by using separate switches.

2.1.2 System Requirements for a PAG-DBN

A PAG-DBN provides the database services to an arbitrary number of PAG-IFNs. The corresponding system requirements are defined as follows:

- One or more Intel® Xeon® 4th generation or AMD EPYC™ processors, 2,6 GHz or better, providing 4 cores plus 1 additional core per connected PAG-IFN
- At least 64 GB of DDR4 2.133 MT/s (L)RDIMM RAM, equally distributed over the memory banks of the processors
- A direct attached hard disk system for operating system and page file
- System network: one or more 10gb Ethernet ports for the internal data communication of the PAG-DBN with other PAG-DBNs, PAG-IFNs and, if applicable, the archival storage systems

Note: The system network should leverage jumbo packets (i.e. MTU 9014). Enable use of jumbo packets for all associated network interface cards.

- Administration network: one or more 1gb Ethernet ports for the server system administration (e.g., RDP) or, if applicable, for the web service and the System Administration GUI of the PoINT Archival Gateway

- Local disk storage: two additional and separate direct attached volumes, one high-performance volume (i.e., SSD or NVMe) and one redundant (i.e., RAID) high-capacity volume (e.g., SAS 10k RPM HDD) for the databases and logs

Note: The required capacity of these database volumes solely depends on the total number of object versions that shall be stored. For example, for storing one billion object versions, the capacity of the high-performance volume should be 100GB, and the size of the high-capacity volume should be 200GB. In case that your clients store custom metadata and tag sets with the objects, the size of the high-capacity volume needs to be raised accordingly (e.g., 1 KB of additional metadata and tags per object version requires an additional space of 1 TB). For differing numbers of objects, you can raise or reduce the capacities accordingly.

Note: If applicable, you should equip the server with a battery-backed RAID controller providing 2 GB cache memory or more.

- Operating system: Linux with kernel version 4.0 or higher, Windows Server 2012 R2 Standard or Enterprise edition, Windows Server 2016, Windows Server 2019 or Windows Server 2022.

Note: Contact PoINT Software & Systems GmbH to get the list of Linux distributions and versions that have currently been tested.

Note: The PAG-DBN server systems must be members of an active directory domain to enable adoption of security principals from this domain or from trusted domains (see chapter 4 of the Operation Guide). If you do not intend to utilize external security principals, domain membership is an option, but not a requirement.

Note: For security and performance reasons, the administration network should be strictly separated from the system network by appropriate network techniques by, e.g., defining VLANs or switch port groups or by using separate switches.

2.2 Compact Deployment

In a compact deployment, one or two PAG-CGNs can be installed on separate server systems. The PAG-CGN combines the functions of a PAG-DBN and a PAG-IFN on a single server system. The following sections describe the basic requirements for the server system.

2.2.1 System Requirements for a PAG-CGN

The requirements for a PAG-CGN are basically equal to the sum of the requirements as defined in the previous sections. However, due to synergy effects, the system requirements regarding processor and RAM are lower and are defined as follows:

- One or two Intel® Xeon® 4th generation or AMD EPYC™ processors, 2.6 GHz or better, at least providing 4 cores plus the number of cores as required by the archival storage device
- At least 32 GB of DDR4 2.133 MT/s (L)RDIMM RAM plus the amount of RAM required by the archival storage device, equally distributed over the memory banks of the processors

3 Supported Devices

The following sections provide information about the types of archival storage devices supported by PoINT Archival Gateway.

If your device is not included in the respective list, refer to the information provided at www.point.de or contact PoINT Software & Systems (support@point.de).

3.1 Media Changer Devices

A media changer is commonly called a library. PoINT Archival Gateway supports the following types of libraries.

3.1.1 Tape Libraries

PoINT Archival Gateway supports tape libraries of the following vendors. Please also refer to the current release notes in file "ReadMe.html" for the latest comments and recommendations regarding the supported tape library products.

Vendor	Product
actidata	actiLib LTO Family
ADIC	Scalar Series
BDT	FlexStor II, MultiStak and MultiStor
Cristie	GigaStream T Series
Fujitsu	Eternus Series
HP/HPE	MSL Series
IBM	TS Series
Overland-Tandberg	NEO Series
Qualstar	Q Series
Quantum	Scalar Series
Spectra Logic	T Series

A PoINT Archival Gateway system can control up to eight tape libraries and up to twenty-four tape drives per library. Up to eight tape drives can be connected to a particular PAG-IFN server system, provided that a sufficient number of adapter cards (e.g., FC adapters and ports) is present.

Note: In exceptional cases (e.g., if one of your PAG-IFN server systems has failed and needs to be repaired), you can temporarily connect up to sixteen tape drives to a particular PAG-IFN server system to avoid a drive shortage. Although this temporary configuration overload the system and degrades the system performance accordingly, it can significantly reduce the number of load cycles and tape media changes.

The library (i.e., the robotics) control interfaces have to be connected to all PAG-DBN server systems. PoINT Archival Gateway takes care that only one PAG-DBN uses the interface at a time.

Note: Small and medium libraries (aka. tape loaders) typically do not provide a separate library control interface, but provide this interface via the drive interfaces. Such libraries cannot be used in an enterprise deployment of PoINT Archival Gateway (i.e., with separate PAG-DBN and PAG-IFN server systems), but require a compact deployment (see chapter 2 of the Operation Guide).

PoINT Archival Gateway supports and unconditionally enables the **data compression** as well as the logical block protection functions of the tape drives.

PoINT Archival Gateway does not actively support the **data encryption** function of the tape drives. If you want to use the function, please enable and configure it by means of the vendor specific library and drive administration interfaces.

3.1.1.1 Supported Tape Drives and Media

PoINT Archival Gateway supports the following tape drives and media:

- LTO tape drives and media of generations 5 through 9, including the M8 media format and the WORM variants.
- IBM 3592 (aka. Jaguar) tape drive models TS1150, TS1155 and TS1160 and media types C, D and E including their Economy and WORM variants (in detail the media type codes JC, JD, JE, JK, JL, JM, JY, JZ, JV and the formats E08, 55F, 60F).

Note: Tape drives and media of multiple generations can coexist in the same library. PoINT Archival Gateway automatically chooses a compatible drive for loading the particular medium.

Note: PoINT Archival Gateway does not support or use unlabeled tape media. The labels must contain the media type code (e.g., L9 or JE) at the end of the label or bar code, respectively.

Note: New tape media of types LTO-9 and 3592 require a media initialization process. This process is automatically started and performed by the drives as soon as an uninitialized medium is loaded for the first time. The process typically takes about 22 minutes for LTO-9 media and about 3 minutes for 3592 media, but it can take up to 2 hours in case that the drives need to resolve media problems.

3.1.1.2 Additional System Requirements for PAG-IFN Server Systems

The native read and write performance of the tape drive and media generations ranges from 140 MB/s (LTO-5) to 400 MB/s (LTO-9) or from 360 MB/s (3592 formats E08 and 55F) to 400 MB/s (3592 format 60F). The number of additional CPU cores and the amount of RAM required in PAG-IFN server systems depend on the number of connected tape drives and on the media according to the following table. In addition, the number of CPU cores depends on the speed of the chosen CPU and the table specifies the numbers for two exemplary CPU clock rates.

Drives	Media	RAM (GB)	CPU Cores (2.6 GHz)	CPU-Cores (3.2 GHz)
2	LTO-5	48	2	2
4	LTO-5	96	3	3
8	LTO-5	192	6	5

2	LTO-6	48	2	2
4	LTO-6	96	4	3
8	LTO-6	192	7	6
2	LTO-7	48	3	3
4	LTO-7	96	6	5
8	LTO-7	192	12	10
2	LTO-8, 3592 (E08, 55F)	48	4	3
4	LTO-8, 3592 (E08, 55F)	96	7	6
8	LTO-8, 3592 (E08, 55F)	192	14	12
2	LTO-9, 3592 (60F)	48	4	4
4	LTO-9, 3592 (60F)	96	8	7
8	LTO-9, 3592 (60F)	192	16	13

Note: If you know that you are going to apply erasure coding to the data (refer to chapter 7 of the Operation Guide), you can reduce the requirements according to the chosen code rate and multiply the number of CPU cores as well as the amount of RAM by the fraction representing your chosen rate (e.g., code rates 1/2 or 2/4 require half of the resources).

In addition, the PAG-IFN server system must be equipped with one or more adapter cards to connect the drives. Typically, the drives of tape libraries provide a FC interface. If you connect multiple drives via a single FC port, the transfer rate of the port should provide some headroom and at least be equal to 1.5 times the sum of the native data rates of the connected drives. For example, the native data rate of an LTO-9 drive is 400 MB/s or 3200gb/s, respectively, and you can connect up to 3 drives ($3 * 1.5 * 3200\text{gb/s} = 14400\text{gb/s}$) to a 16gb FC port or up to 6 drives ($6 * 1.5 * 3200\text{gb/s} = 28800\text{gb/s}$) to a 32gb FC port. Connecting more drives than 3 or 6, respectively, does not fail, but the performance can decrease and wear and tear of the tape drives and media can increase.