PRECESSION SPECIFICATIONS

This document presents an overview of the technical components and needs for a centralized installation of a Heart Imaging Technologies (HeartIT) Precession System. It is intended as a high-level reference for the functions of the system as well as recommended specifications/configurations of virtualized host systems.

Recommended Server Specification

The following details help to specific the minimum recommended specifications for the server technology hosting Precession.

Processor

A minimum of 6 CPU Cores are required for Precession, 2.4GHz or better.

Memory

A minimum of 32 GB of RAM is required for Precession installations.

Operating System

Red Hat Enterprise Linux is required for Precession. Version 7 is required for new installations.

Network

Precession is best leveraged with a minimum gigabit Ethernet connection from user to server; time required for PUSH and delivery of studies will be dependent on the robustness of the local network from server to workstation and scanner.

Storage

While final space allocation of final volumes can vary by customer adoption, modalities, and user traffic, the installation of at least 4 disk volumes are required for Precession installations. Although the final amounts leveraged can be discussed and reviewed with the Sales and Installations teams as a part of ongoing discussions, the following baselines are offered as for conceptual understanding.

All volumes should be xfs format and leverage the fastest possible / reasonable disk speed for the receipt and conversion and access of scan data.

Recommended Volume Configuration

Volume 1 – Root OS

150 GB is recommended for the root installation of the operating system and subsequent applications/updates, with boot and swap partitions included per Customer standard/preference.

- Format: xfs, Min Size: 150GB
- Recommend high speed physical disks

Volume 2 – DICOM Receipt

A starting space of 100 GB is recommended for this space that manages the receipt and confirmation of DICOM delivery, although the required size may increase as Customer's planned traffic/deployment is reviewed and confirmed during Deployment.

- Partition: /Volumes/dicom_receive
- Format: xfs, Min Size: 100GB
- Recommend high speed physical disks

Volume 3 – Conversion Work Space

A starting space of 100 GB is recommended for the conversion/processing of DICOMs after receipt, although the required size may increase as Customer's planned traffic/deployment is reviewed and confirmed during Deployment.

- Partition: /Volumes/temp
- Format: xfs, Min Size: 100GB
- Recommend high speed physical disks

Volume 4 – Final Study Storage

The amount of initial space required for final study storage is the most variant factor from Customer Site to Customer Site. A baseline of 500 GB as an initial recommendation for smaller active production installations (i.e. less than 10 MR studies per day), but larger installations may warrant starting at 1 – 2 TB. Initial storage needs can be assessed and adjusted in collaboration with Heart IT based on the Customer's modalities, traffic, usage and intended workflow.

- Partition: /Volumes/raid_01
- Format: NFS/CIFS/Locally Attached (xfs),
- Min Size: Determined per above.

(NOTE – Converter Nodes require the same configuration as the Unibus servers, *except* for the Final Study Storage allocation, which is not needed for Converters.)

Networking Specifications

This section is intended for network engineers, analysts, and security officers. It details each network flow possibly utilized by a Precession system, and the reason for requiring that flow. The summary section is a charted overview of the document.

WAN

The WAN section describes connections required specifically to and from the Heart IT infrastructure. These connections are secured via site-to-site VPN connection, with standard security measures leveraged for protection. WAN traffic types may be used for LAN communication, but the reverse is not true.

LAN

The LAN section describes traffic that will be local to an individual installation. Examples include image delivery traffic from scanners and PACS, integration data from EMR systems, and traffic between system nodes. WAN traffic types may be used for LAN communication, but the reverse is not true.

Clients should ensure that their network topology permits the information flows detailed in this document and assign resources to collaborate with Heart IT to accommodate for changes in process connectivity.

Summary

Network	Directionality	Inbound Port	Protocol/Daemon
WAN	in/out	22	SSH
	in/out	80	HTTP (Redirect to HTTPS)
	in/out	443	HTTPS
	in	5666	NRPE
LAN	in/out	104	DICOM C-STORE/C-MOVE
	out	389	LDAP
	in/out	2575	HL7 Protocol
	in	2762	DICOM C-STORE (TLS encryption)
	in/out	3306	MySQL (Multi-node Systems Only)
	in	7000	DICOM C-FIND/C-MOVE (known as Q/R)

WAN

Inbound connections

SSH

HeartIT support staff access the installation nodes via SSH, enabling them to troubleshoot required connections and services, as well as correcting issues with study conversion and report processing. These connections are access-controlled by Heart IT at the source and are translated to 64.246.202.97 as source IP address.

HTTP/HTTPS

This is the system web server, and the essence of the product. Encrypted traffic to HTTPS on port 443 is the default and preferred means, with HTTP traffic automatically redirected to HTTPS. (Redirection allows for effortless management on user side when Domain Names are entered in a browser without specification of protocol.)

NRPE

This daemon is an SSL encrypted listener that manages health check monitoring from HeartIT's support infrastructure. Monitoring is limited to pre-defined commands and responses, locked to only accept requests from the HeartIT source.

Outbound Connections

SSH

Updates to HeartIT applications are retrieved through SSH connections to hosted HeartIT source repositories.

HTTP/HTTPS

HeartIT systems manage globally unique identifiers for each study processed; these identifiers are retrieved through HTTPS SOAP calls to hosted HeartIT servers.

Red Hat OS updates are directed to Red Hat's package management system; retrieval takes place over HTTP/HTTPS most often. Most services can be managed with local proxy and mirrors with collaborative configuration for yum and other packages and libraries.

LAN

Inbound Connections

DICOM C-STORE (Encrypted & Unencrypted)

DICOM compliant listener implementing the C-STORE protocol and, when configured, TLS.

DICOM C-FIND/C-MOVE

DICOM compliant listener implementing the C-FIND protocol. C-MOVE requests result in a C-STORE push to the requested node(s) that are pre-configured within Precession in collaboration with Customer resources.

MySQL/MariaDB

Multi-node Systems Only: Database communications with other servers are limited to processes providing database replication or leveraging separate Converter nodes for resource sharing. All other nodes / addresses are blocked from connectivity.

HL7 Inbound Data

Customer sites may leverage delivery of Orders and ADT messages into Precession; this custom HL7 listener work will start with the default port 2575, which can be changed server-wide if necessary.

Outbound Connections

LDAP

Customers can provision existing group management with this connectivity to allow for authentication and authorization for Precession access.

HL7 Outbound Data

Outgoing HL7 Results messages coincide with HL7 Inbound Data; outbound interfaces will default to 2575 but can be adjusted per Customer receiving systems' needs.

MySQL/MariaDB

Multi-node Systems Only: Database communications with other servers are limited to processes providing database replication or leveraging separate Converter nodes for resource sharing. All other nodes / addresses are blocked from connectivity.

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