CHILI PACS
Hardware and operating system requirements

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Preface

There are different hardware requirements for PACS-/Web servers with medium amounts of data traffic and teleradiology gateways with small amounts of data traffic.

The short-term storage containing the database should reach at least the following values, measured with PostgreSQL/pgbench (transactions per second):

- 750 TPS, for high amouts of data traffic (PACS) > 1800 TPS recommended

Please oberve the following for new external short-term storage connections:

- The short-term storage is mounted directly on the operating system and complies with the following speed requirements for data access:
- latency of read-/write access (random seek) maximum 60 ms
- write performance sequence at least 80 MB/s. (tested with bonnie++ on SLES 11)

A   PACS-/Web server

Recommendation for medium amounts of data traffic

- Minimum 8 CPU cores
- Minimum 8 GB RAM
- 2 network connections
- Gigabit-ethernet network
- 2 power supply units (reliability)
- Disk space depending on the amount of data and derivative time (see below)
- Integrated Management Console (available on HP with iLO advanced)
- Hardware-RAID controller
- UPS

VM-Servers

VM-servers (ESXi) must be assigned the same hardware parameters (RAM, CPUs, etc.) as appropriate hardware servers. The number of network connectins has to be reduced to 1.

HDD physical distribution

- **Volume 1** (minimum 200 GB):
  4 HDDs for operating system and CHILI database as RAID 10 (1 logical drive: 2 x RAM-size for swap partition (max. 8 GB), remaining disk size formatted with file system EXT4 and mounted on "/")

- **1 HDD hotspare**

- **Volume 2:**
  Remaining HDDs with RAID 5 for image data formatted with file system EXT4 (complete partition mounted on "/data", recommended are max. 2 TB, additional partitions mounted on "/data1", "/data2", etc.)

- **1 HDD hotspare for data**
  Only required for different HDD sizes between all volumes

VM server physical distribution

- **Volume 1:**
  Minimum 100 GB storage as EXT4 file system as „/" for the operating system and the CHILI installation.

- **Volume 2:**
  Minimum 100 GB as EXT file system as „/database" for the CHILI database.

- **Volume 3:**
  Ideally, the distribution will be as agreed upon with the CHILI project manager and considering the required data retention time on the server. One or more partitions at 2 TB each as EXT4 file system as /data1, /data2 etc.

B   Teleradiology-Gateway

Requirements for small amounts of data traffic

- At least 2 CPU cores
- At least 4 GB RAM

- 2 network connections
- Gigabit-ethernet network
- 2 power supply units (reliability)
- Diskspace depending on the amount of data and derivative time. Minimum 100 GB (see below)
- Integrated Management Console (available on HP with iLO advanced)
- Hardware-RAID controller
- UPS

VM-Server

VM-servers must be assigned the same hardware parameters (RAM, CPUs, etc.) as appropriate hardware servers. The number of network connections has to be reduced to only 1.

Physical distribution of HDDs

- **Volume 1:**
  Mirroring 2 HDDs for the operating system (1 logical drive: 2 x RAM-size for swap partition (max. 8 GB), remaining disk size formatted with file system EXT4 and mounted on "/" recommended are max. 2 TB, further partitions mounted on "/data1", "/data2", etc.)

- **1 HDD hotspare (optional)**
  Only required if there are more than 2 HDD on volume 1 or RAID 5 on volume 1.

SLES-Configuration

The requirements for the configuration of the operating system also apply to the PACS-/Web server and teleradiology gateway.

Operating system SuSE Linux Enterprise Server 12 (64 bit)

- SLES standard installation with file system EXT4

Bootloader

- Grub2

Language

- English without UTF-8 (locale: en_US) specified in advanced language settings.

Selected SuSE-package groups

- graphical user interface
- KDE Desktop

Required SuSE-packages

- apache2
- apache2-worker
- apache2-mod_jk
- current version of Internet browser (e. g., Firefox)
- grub2
- rsync
- nmap
- tcpdump
- samba server + client
- rrdtool
- gcc
- g++
- kernel-source
- sysstat
- mc
- wol
- iftop
- libreadline
- haveged

Required SuSE-packages on HP Proliant server

- kernel-syms
- net-snmp

Required SuSE-packages on VMware server

- vmware-tools

SuSE-packages that may not be installed

- java / jre
- postgres
- tomcat
- apparmor
- apache2-prefork
- openldap2

Additional settings:

- **Runlevel** 3 for the operating system in order to boot in non-graphical mode.
- **Network settings:** deactivate IPv6 and the firewall

Required programs on HP Proliant server

- HP Support Pack for Proliant in the latest version

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