

Recommended Hardware for an Image Acquisition Station (Full-Examination-License)

CPU:	Intel Core i7, i5, i3 or similar CPU by AMD (Ryzen 7, 5, 3)
RAM:	8 GB
Hard disk:	256 GB SSD, alternatively 250 GB HDD
Network card:	1 GBit/s; switched connection to the E&L server
Graphics card:	Chipset graphics or PCIe graphics card, min. resolution: 1920 x 1080, 32bit colour depth
Monitor:	at least 22", better 24" TFT display with a resolution of 1920 x 1080 4K/5K resolution monitors are not compatible!
Input devices:	Standard mouse with scroll wheel and high quality keyboard, each connected via USB or PS/2
Operating system:	Windows 10 Pro 64bit → Microsoft .NET Framework 4.7.2 and 3.5 must be installed
Software, required:	Visual C++ Redistributable Packages 2015 – 2019 32bit and 64bit at least CWD 09.08.x Windows Media Player at least version 8, VLC Media Player 32bit (respectively latest version, at least v3.0.16)

Additionally with direct medical device connection to the PC via video cabling (S-Video-Cabling)

PC System:	Only systems with Intel Chipsets and Intel-CPU can be used.
Case:	Must have the capacity to fit expansion cards – full size or half size min. 1x USB 2.0 free for the connection of the Frame grabber
Serial interface:	2x COM-Port for data transmission and image trigger (on-board or via PCI/PCIe card)
Frame grabber:	E&L frame grabber (S-video) with USB 2.0 port

For HDSDI E&L Image Acquisition Station (High resolution HD)

E&L Medical-PC 3 HD by E&L: Core i5 with 3 GHz, 8 GB, SSD 500GB, Windows 10 Pro
→ **Use of a special PCIe-HDSDDI frame grabber required**

For Diagnostic Station (Post-Examination License)

→ As image acquisition station with the following additions:

PC System:	no restriction
Processor:	Intel Core i5, i3 or similar processor by AMD
Hard disk:	SSD ≥ 128 GB, alternatively HDD ≥ 250 GB

For Cardiac Catheter E&L Diagnostic Documentation (Equipment per cardiac laboratory)

1x E&L Image Acquisition Station as above for diagnostic documentation, but with a connectivity option for **2 at least 22" TFT displays (1920 x 1080)**.
One display each for documentation and viewer.
Recommendation for DICOM Viewer display: EIZO MS230W.
There is NO requirement for an X-ray compliant, certified monitor.
1x standard PC with 22" or 24" TFT display (1920 x 1080) for material and progress documentation (alternatively terminal server access)

For E&L PC with Pacemaker Connection

PC System:	Standard PC identical to the diagnostic station, min. 2x USB 2.0 ports free for a connection to pacemaker programming devices.
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Printer

Laser printers are recommended (USB/LAN)

For E&L Remote Maintenance Station – additional equipment

Remote Maintenance:	Site-to-Site-VPN, further VPN connections on request (e.g. Cisco, Sophos or TeamViewer) → The workstation must support a 1920 x 1080 resolution.
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E&L Long-Term Archiving (LTA)

PACS integration, archive system integration (e.g. Silent Cube) or other approved solutions

Application and Database Server

General

We recommend complete server systems from brand manufacturers with support response times of max. 8 hours, resolution min. 1920 x 1080

Processor

4 processor cores with 2 GHz or higher

Mass storage

SCSI/SAS-RAID1- or RAID5 hardware controller with at least 400 GB available, recommended hard disk configuration:

100GB for operating system
300GB (minimum) for application partitions

→ SAN, distributed file system or file server cluster integration possible
→ **Cardiac catheter installations increase the capacity to at least 1TB**

Main storage

8 GB RAM or more (with local SQL-Server at least 16 GB)

Operating System

Windows Server 2019, 2016, 2012R2/2012 Standard Version or better

→ **.NET Framework 4.7.2 and 3.5 must be installed**
→ Client access licenses according to the number of E&L workstations.
→ Windows Server Essentials (2019, 2016) only approved for practices or medical service centres
→ For the use of Novell clients please contact the technical department of E&L.

Required software

→ CWD 09.08.x or later: Visual C++ Redistributable Packages 2015–2019
32/64bit Java Runtime Environment (JRE) at least version 8 update 171
→ up-to-date HTML5-compatible Browser (e.g. Chrome, Edge, Firefox)

Terminal server

Microsoft Terminal server 2019, 2016, 2012R2/2012, Citrix v6.x or higher
→ approximately 700 MB RAM are used per terminal session with E&L software

Virtualization

All versions of VMware, Parallels, Xen and HyperV are supported, depending on the server operating system.

Databases

Microsoft SQL server 2019, 2017, 2016, 2014, 2012 Standard or higher version, SQL server cluster

→ **Exception:** E&L test installations may run with SQL Express (version 2017) under the following conditions:

- max. use of 2 GB RAM (significant performance losses may occur)
- max. database size: 10 GB, physical size, not exceedable
- the „SQL Server Agent“ for e.g. the function „Maintenance Plan“ for automatically adjustable database backup runs is NOT available, i.e. the customer needs to create database backups elsewhere/independently with IT support!

Power supply

Uninterruptible Power Supply (UPS): at least 600VA, at least 10min durability

Data protection

→ see separate E&L data security concept

Components installed on this server

- E&L application incl. data storage
- Interface to the HIS (via CWDConnect)
- Interface to the LTA

Explanatory Notes

Our Hardware specifications are regularly reviewed and revised. They contain the minimum requirements for new components to be procured. Often existing PCs can be used for E&L software systems. If you have any questions, feel free to contact our technical department on +49 9131 / 810 33 - 0.

→ These hardware specifications apply to all product variants of E&L, i.a. CWD, SBB, NBB, and ENDOBASE NEXT

Many E&L software modules can also be installed on Microsoft or Citrix terminal server clients. The only exception are modules that require special hardware resources such as frame grabbers.

→ Please note the separate hardware requirements for cardiac catheter installation!

Stand: 15.02.2022 WL

Central Import Server

General

We either recommend virtualised servers or dedicated server hardware. In the case of a VM server installation, the performance listed below must be provided.

→ **The import server is a new technical variant for connecting devices.**

→ **mandatory for E&L-Release 9.x (NG) and higher**

Processor

4 processor cores with 2.5 GHz or higher

Mass storage

SCSI/SAS-RAID1- or RAID5 hardware controller with at least 200 GB available

Recommended hard disk configuration:

100GB for operating system
100GB for temporary objects

→ SAN, Distributed File System or file server cluster integration possible

Main storage

8 GB

Operating system

Windows Server 2019, 2016, 2012R2/2012

→ **.NET Framework 4.7.2 and 3.5 must be installed**

Required software

→ CWD 09.08.x or later: Visual C++ Redistributable Packages 2015 – 2019 32bit/ 64bit
→ current HTML5- compatible Browser (e.g. Chrome, Edge, Firefox)

DivX codec

DivX 6.9.2 with E&L settings (if video conversion DICOM → AVI is desired/necessary)

Power supply

Uninterruptible Power Supply (UPS): at least 600VA, at least 10min durability (if possible, removes one single point of failure)

Data protection

→ see separate E&L data security concept

Supported object classes

- DICOM (Single-Frame, Multi-Frame, Encapsulated PDF, Structured Report)
- E&L SmartBox objects
- File import: HL7, XML

Existing CWD- installations with Microsoft Windows Server or SQL Server 2008/2008R2, as Windows 7/8.1 are supported to a limited extent by CWD Classic v8.x. We urgently recommend updating these installations!

→ In the event of PC conversions, e.g. the replacement of an image acquisition workstation after several years of operation, please contact our technical department or request our current hardware recommendations.

Cable technology: The cable components supplied with the standard hardware always enable full functionality of E&L in the examination room. The E&L technical department offers additional cabling solutions at an extra charge (Harting industrial connectors, junction boxes, E&L system cables).

If a separate SQL server is to be used then the same requirements apply as for the application server.