

HARDWARE AND SOFTWARE REQUIREMENTS FOR HAL E-BANK

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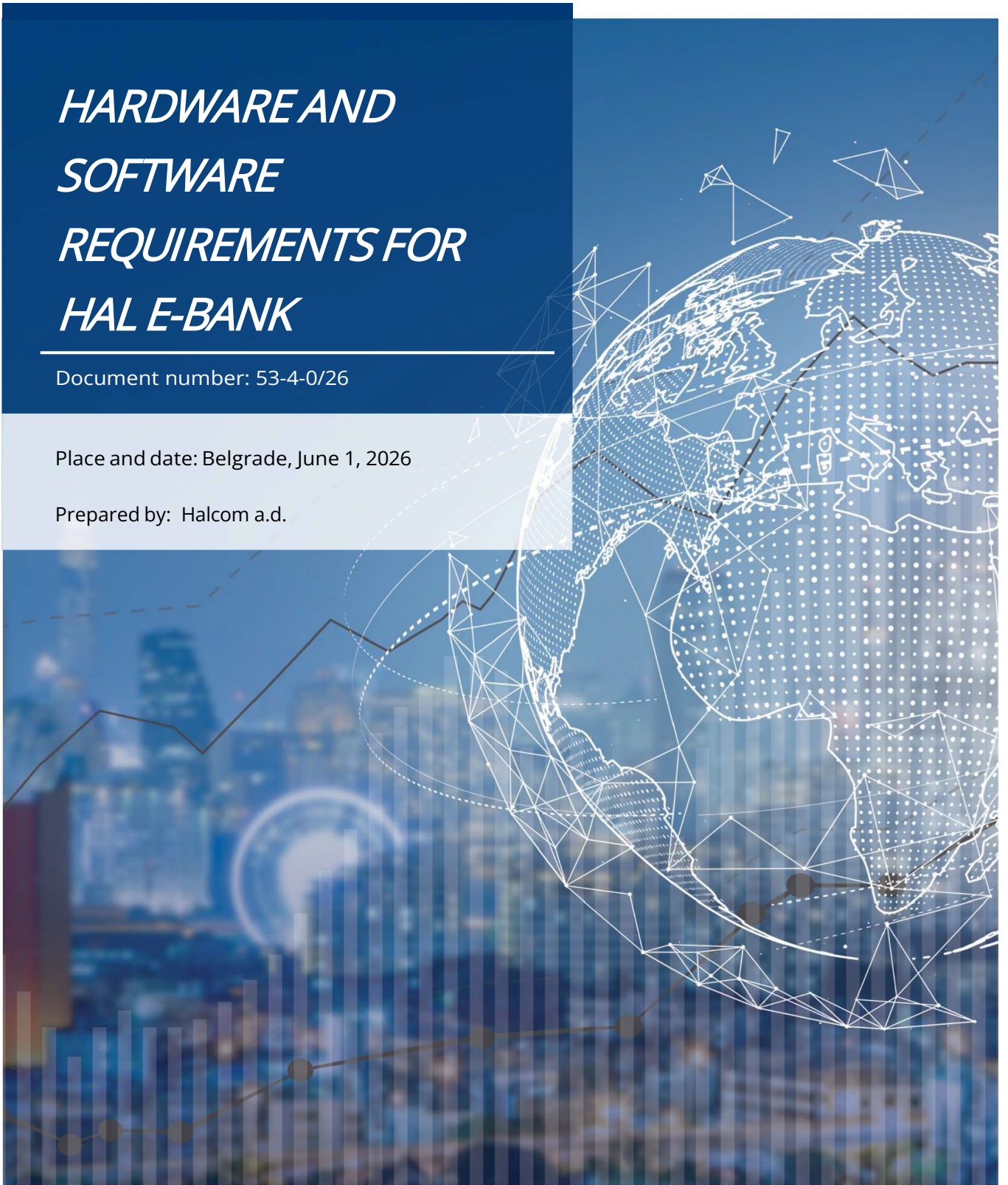


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1. HARDWARE AND SOFTWARE REQUIREMENTS FOR HAL E-BANK SYSTEM

Preconditions for using Hal E-Bank:

- An appropriate PC with Windows 10 (version 1607) or Windows 11 operating system installed. All Windows operating systems have to be updated with the latest security updates;
- Hal E-Bank software;
- a valid qualified digital certificate issued by Halcom CA and authorized by the bank;
- connection to the bank server (internet access);
- business agreement that you conclude with the bank on doing business via the Hal E-Bank solution.

If your digital certificate is stored on a smart card, you will also need a smart card reader (connect it to your computer).

2. SINGLE USER VERSION – HAL E-BANK/PERSONAL

2.1 HARDWARE REQUIREMENTS

COMPONENT	REQUIREMENT
Processor	minimal: 1.5 GHz recommended: 2GHz
RAM size	minimal: 4 GB recommended: 8 GB or more
Hard drive space	minimal: 10 GB recommended: 20 GB available hard drive space or more
Screen resolution	minimal: 1024 x 768 pixels recommended: 1920 x 1080 pixels
Additional requirements	Internet connection

If you are using a smart card reader, you will also need available communication ports, depending on the smart card reader type:

Smart card reader/ USB key	WIN 10	WIN 11
HID Omnikey 3021 	✓	✓
IDBridge K30 USB 	✓	✓
ACS ACR38U 	✓	✓
ACR40T-A1 	✓	✓
ACR40T-A5 	✓	✓

2.2 SOFTWARE REQUIREMENTS

You will need appropriate rights to successfully install all the necessary software, otherwise your system administrator should be present. The following software is needed:

- The program to work with qualified digital certificates – Nexus Personal (Windows 10/11).
- Up-to-date driver for smart card reader / USB key must be installed

2.3 CONNECTION SETTINGS

Parameter requirements:

- On the PCs, where Hal E-Bank client or database is installed, time zone must be set to GMT+1.
- Serbian regional settings have to be installed on all workstations (these settings don't need to be selected as default).

In order to connect with the bank server through the firewall, you will need to have an open port for data transfer and updating of the program. IP addresses and required port numbers:

BANK	DNS/IP	PORT	EBU PORT*
Halcom**	ebank.ebb-bg.com	3600	3604
UniCredit banka Srbija	eb.unicreditbank.rs	3600	3604
NLB Komercijalna banka Beograd	ebank.kombank.com	3600	3604
Erste banka Novi Sad	e-bank.erstebank.rs	3600	3604

**EBU PORT is used only for application upgrade directly through Hal E-Bank*

***This is IP address of all banks except those listed below*

- Application does not use HTTP proxy servers, as the basic protocol for data transmission protocol is not HTTP.

The application can be linked directly to the HTTPS server, but not through a proxy server. So far we have received very few requests for implementation of SSL Tunnelling or SSL proxy support. From a safety point of view it is the same whether a company allows access to a URL via SSL proxy or permits the opening of the external links to the exact defined server and TCP port.

The only proxy servers supported by our client are so-called "port forwarding" or "traffic redirection" proxy servers, where all the traffic, which is sent on TCP port of the proxy server, is forwarded to the target e-banking server and remains unchanged.

3. MULTI-USER VERSION – HAL E-BANK/CORPORATE

Hal E-Bank/Corporate is intended for organizations where several persons are responsible and authorized for working with electronic bank and perform payment operations on many computers that are connected to the local area network.

Hal E-Bank/Corporate program works on the client-server principle and requires a shared database, which is usually installed on a server. The database server IBM DB2 has to be installed on the server. On the workstations, where Hal E-Bank Corporate clients are installed, there has to be IBM DB2 Client Application installed and the software has to be properly configured. To perform installation on the server full control administrator rights are necessary.

Additional requirements have to be fulfilled when using Hal E- Bank /Corporate. Workstations have to meet all the requirements stated in Hal E- Bank/Personal section as well!

3.1 WORKSTATION REQUIREMENTS

- A workstation must be connected to the local area network via TCP/IP protocol.
- At least 10 GB of free hard disk space is required.

3.2 HARDWARE AND SOFTWARE REQUIREMENTS FOR SERVER:

- IBM DB2 database OS requirements:
 - **IBM DB2 ver. 12**
 - Windows 11 (Enterprise, Professional)
 - Windows Server 2022 (Datacenter, Essentials, Standard)
 - Windows Server 2025 (Datacenter, Essentials, Standard)

Operating systems are supported as long as they are under the manufacturer's support.

- TCP/IP protocol support.
- Hard drive space required for normal operation of IBM DB2 database is at least 5 GB. Greater amount of hard drive space is required with more frequent use and greater size of the database. An approximate amount can be calculated using the following formula: 5000 transactions = 20 MB hard drive space + received files size.
- Required RAM size:
 - Windows 11, Windows Server 2022 / 2025 at least 4 GB

RAM usage depends on other applications running on the server as well. The server must have enough RAM to manage normal operations without swapping memory.

- Serbian regional settings must be set as default («Region» Administrative» Language for non-Unicode programs – Serbian (Latin, Serbia))
- IBM DB2 database installation.
- Client accesses the server through TCP / IP port 50000, which means that the port must be opened in any firewall or router, which is located between the client and the server location.
- Environment Variables must be added (table below):

VARIABLE NAME	DB2COUNTRY	DB2CODEPAGE	DB2SOURCEPAGE
VARIABLE VALUE	381	1250	1250

4. Contact

If you have any questions, please contact Halcom technical support:

T +381 11 3032432
 E helpdesk@halcom.rs

Webpage: <https://support.halcom.com/sr-en>
 Working hours: 8.00 – 17.00 (on working days).

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