



FCT-Anlagenbau GmbH relies on WALL IE – Industrial Ethernet Bridge and Firewall

## Real machine security – instead of low-cost compromises

With the triumphal march of Ethernet networking, cybersecurity also plays a central role. In the process, the central task is to securely integrate machine networks into the higher level production network. Helmholz has been offering a practicable solution for around two years now: the WALL IE firewall combines bridge and firewall functions. New features are now available.

The following also applies in digitalized production: Control systems and automation networks are vulnerable when no appropriate security measures are present. Cybersecurity in Ethernet-networked production environments therefore primarily means securely integrating machine networks into higher level production networks or delimiting these from them. The machine network, meaning the network of an automation cell with one or more machines, is thereby to be considered as a LAN (Local Area Network), the production or company network as a WAN (Wide Area Network).

In order to securely realize the interface between the two, only the detour via complex firewall solutions has been possible to date. However, these are by nature oversized for this special purpose. And that also means: correspondingly expensive and complicated in terms of handling. Low-cost compromises that endanger security are even less of a possibility.

### High-performance alternative

Helmholz has offered a solution with the high-performance and uncompli-

cated Industrial Ethernet Bridge and Firewall WALL IE since 2015. The robust Ethernet components allow easy integration of machine networks into the higher level production network. In concrete terms, the components protect the networks in that they precisely regulate which participants may exchange data with which device.

In practice, a user utilizes the components, for example, to completely separate its logistics systems from other networks. The access rights are thus reliably limited to authorized persons. The automation network is protected accordingly. In contrast, the networks or IP addresses positioned behind the WALL IE remain hidden and are not visible from outside. If the company network is now threatened by a virus or malware due to a hacker attack or the negligence of an employee, the automation network behind the WALL IE remains unaffected and correspondingly secure.

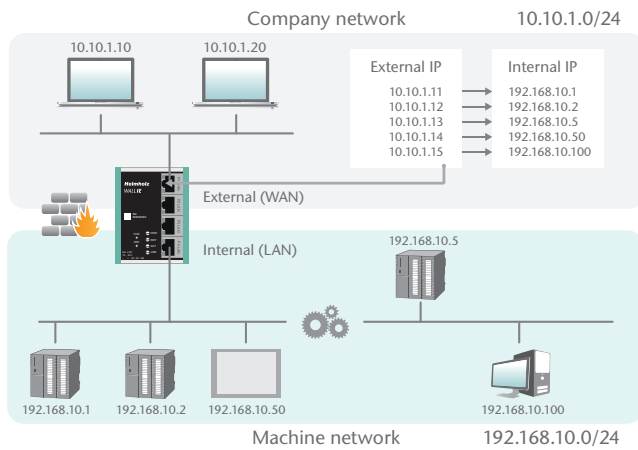
### Packet filter regulates data transfer

The prerequisite for this is created by a packet filter functionality: The packet filter enables the limitation of access between the production network and

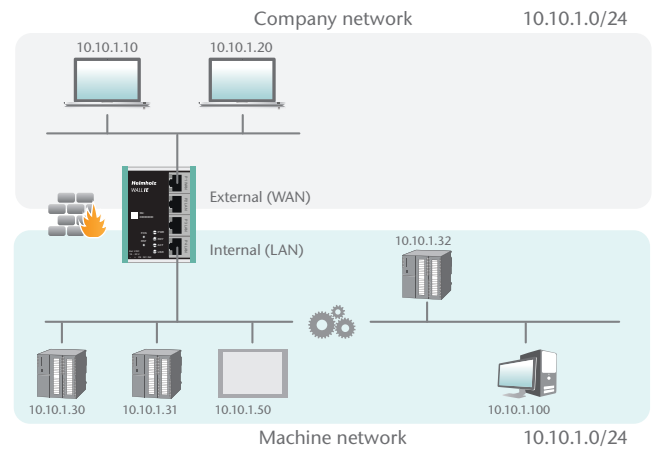
the automation cell. For example, it can be configured that only certain participants from the production network may exchange data with defined participants from the automation cell. The data packet will otherwise be rejected or discarded. IPv4 addresses, protocol (TCP/UDP) and ports are available on layers 3 and 4, as well as MAC addresses on layer 2.

As a special feature, WALL IE can be used in both the NAT operating mode and as a bridge. In the bridge operating mode, WALL IE acts as a layer 2 switch. In contrast with normal switches, however, packet filtering is also possible in this operating mode. This means that the restriction of access to individual areas of your network can be achieved without having to use different networks for this purpose.

WALL IE is conceived for 100 MBit industrial Ethernet. The software foundation is Linux-based and was completely developed by Helmholz itself. The hardware is industry-compatible, robust, and suitable for installation on the DIN rail. The configuration of the WALL IE takes place quickly and easily via a responsive web interface. The Helmholz developers al-



Basic NAT, also known as „1:1 NAT“ or „Static NAT“, is the translation of individual IP addresses or of complete address ranges.



In the bridge operating mode, WALL IE behaves like a layer 2 switch between the automation cell and the production network.

lowed their many years of experience to flow into the clearly structured user prompting. The online access is subject to strict password protection and runs over an encoded HTTPS connection.

#### Router operating mode and NAT functionality

In the router operating mode, which is used by most users, the WALL IE forwards the data traffic between various IPv4 networks (Layer 3) and uses packet filters for limiting access to the automation network. In the process, address translation by way of Network Address Translation (NAT) is supported. The use of NAT also makes it possible to incorporate several automation cells of the same kind with the same address range into the production network. Collisions that might otherwise be caused by the unambiguous addresses in the overall network are thus excluded. As a positive side effect, IP addresses can also be saved in the production network. Static routes are used for communication with other automation cells. To this purpose, the network and the address of the router responsible for this (“Next Hop”) must be configured.

WALL IE supports two NAT functionalities in the router operating mode: Basic NAT and NAPT. Basic NAT (also known as “1:1 NAT” or “Static NAT”) is the translation of individual IP addresses and of complete address ranges. The translation takes place exclusively at the IP level, which means that all ports can be addressed without explicit forwarding. In the case of NAPT (Network Address and Port Translation, also known as “1:N NAT” or “Masquerading”) on the other hand, not only the IP addresses, but

also the port numbers are rewritten. All addresses of the automation cell are translated into a single address of the production network. The sender addresses of packages from the automation cell are replaced by these.

#### New functionalities

Effective immediately, a new firmware with additional functionalities is available for the WALL IE. In this way, the DHCP protocol (Dynamic Host Configuration Protocol) allows an automatic assignment of addresses and DNS names per DHCP server on the LAN and DHCP client on the WAN side. In addition, an own rule is no longer required for each individual port, because entire port ranges are bundled by way of wild cards.

All specifications for the WALL IE can be defined and configured user-specifically. Helmholz also offers its customers this added value through individualization as a service. The already user-specifically configured firewall is then delivered ready-to-use, and must then only be supplied with power.

#### FCT-Anlagenbau GmbH relies on WALL IE

Convinced by the advantages, the Sonneberg-based FCT Anlagenbau GmbH also relies on WALL IE as a standard for the realization of bridge and firewall functions. “An ever increasing number of customers are calling for network access for their systems, for example, for the archiving of data,” is how Jan Pommer from the Electronics Design department describes the way to get there. “We therefore began systematically searching for a suitable NAT translation quite some time ago.” From his perspective, two points in particular spoke in favor of the Helm-

holz solution: the compact design and the functional scope. “The three terminals correspond precisely to our requirements, more isn’t necessary,” is Pommer’s estimate. And there was something else that also convinced the plant manufacturers: “For us as a company, as well as for myself, IT security is enormously important. And here WALL IE shows the best results.” The prerequisite for this is that the Ethernet bridge and firewall has been set up correctly. However, here too there were never difficulties for Jan Pommer and his colleagues: “The support from Helmholz provided us with excellent support from the very beginning, and the installation of WALL IE is really no problem with some experience.”

FCT Anlagenbau GmbH has already successfully realized numerous customer applications with the WALL IE.

#### The Bottom Line

The individually configurable WALL IE Industrial Ethernet Bridge and Firewall from Helmholz combines bridge and firewall functionalities. It thus ensures real machine security and has in the meantime also demonstrated this repeatedly in practice.

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