

# Embedded Security Shield By Kaspersky Lab and BE.services GmbH



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# With ESS, over 300 PLC vendors now have the ability to protect their products from cyberattacks

The industrial control system (ICS) is the core of industrial automation and, with the advent of Industry 4.0 and the Industrial Internet of Things (IIoT), it will retain its role at the heart of smart manufacturing. However, as industrial environments evolve, security considerations increasingly come to the fore. The proliferation of connected devices and the complexity of managing IT / OT convergence in a smart manufacturing era make industrial control systems increasingly susceptible to cyberattacks.

## Challenge

Due to their important role in the cyber-physical systems of modern industrial enterprises, industrial control systems have become a prime target for cyberattacks. Without proper protection, an ICS can fall victim to generic malware, such as the Kido worm or WannaCry ransomware, advanced persistent threats (APT), such as Duqu, or, in some cases, even cyberweapons, such as Stuxnet.

Attacks on industrial control systems take place every day. In 2016, the number of attacks on ICSs more than doubled.

As manufacturers have been focusing on product quality and functionality, most embedded systems are inherently insecure. For example, CODESYS runtime is typically executed as one big process, often having high privileges. So any successful attack on the CODESYS gateway component will result in the whole system being compromised and the intruders getting direct access to field buses.

## The Kaspersky Lab solution

Kaspersky Lab and BE.services have developed Embedded Security Shield (ESS) to protect industrial control systems that use CODESYS-based programmable logic controllers (PLCs) from cyberattacks. ESS is based on Kaspersky Security System (KSS), the security engine initially developed by Kaspersky Lab for its KasperskyOS secure operating system. KSS is suitable for embedded systems because of its size and performance characteristics.

To ensure a high level of ICS security that meets IEC 62443 requirements, ESS separates the CODESYS Runtime System into two isolated domains — the Communication component and the Core component.

“As a provider of embedded software technologies and engineering services to support ICS manufacturers in their migration to Industry 4.0 and IIoT, it is mandatory to cover cyber security in our offering. ICSs have become common targets, triggering expensive loss of production or environmental damages. We count on Kaspersky Lab’s experience in cybersecurity to provide solutions for embedded systems, on which we base the Embedded Security Shield. Together, we allow hundreds of ICS manufacturers in different vertical markets to implement high-level cyber security, with little effort, even to their legacy products!”

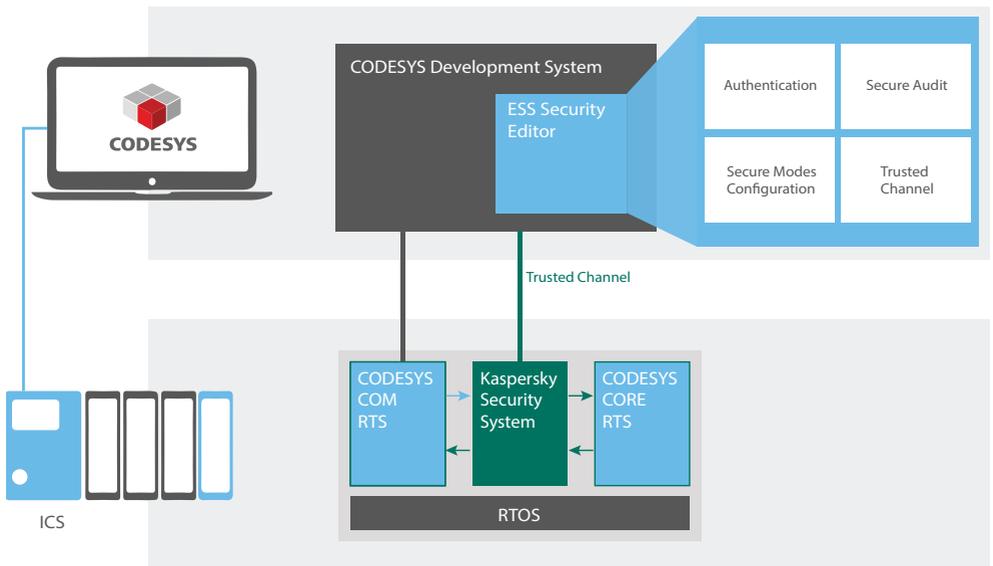
**Dimitri Philippe,**  
CEO, BE.services GmbH

The Communication component handles requests from the control network (i.e. from SCADA). Requests are passed to the Core component, which is responsible for running the PLC program and communicating with equipment over the field bus. All interactions between the Communication component and the Core component are monitored by Kaspersky Security System (KSS) to assure security policy compliance. If a request violates the policy, it won’t be passed to the Core component.

To implement secure PLC management, ESS provides additional components: a trusted channel (TLS-based and independent of CODESYS RTS), audit facilities, and role-based mutual authentication.

Security policies are defined and configured by the security administrator using the ESS Security Editor provided in the CODESYS IDE as an additional plug-in.

A very important feature of the ESS solution is that it does not require any changes to PLC programming and all configuration activities are carried out from the CODESYS IDE – a programming, configuration and debugging environment that is familiar to users.



## About Kaspersky Lab

Kaspersky Lab is a global cyber-security company celebrating its 20th anniversary in 2017. The company's deep threat intelligence and security expertise is constantly transforming into security solutions and services to protect businesses, critical infrastructure, governments and consumers around the globe. Kaspersky Lab's comprehensive security portfolio includes leading endpoint protection and a number of specialized security solutions and services to fight sophisticated and evolving digital threats. Over 400 million users are protected by Kaspersky Lab technologies and we help 270,000 corporate clients protect what matters most to them. Learn more at [www.kaspersky.com](http://www.kaspersky.com).

## About BE.services

BE.services GmbH is a solution and service provider in embedded software for industrial automation, with offerings ranging from consulting on the selection of technologies for automation vendors to specific development tasks or turn-key projects. BE.services is also a distributor and system integrator of Kaspersky Operating System (KOS), a dedicated secure OS for connected devices and KSS for non-CODESYS-based ICS.

# Result

Main features and benefits:

- **High level of security**  
ESS significantly increases the security level of CODESYS-based PLCs, covering the most critical aspects of secure operation: separation of the control network from field buses, secure and flexible (re)configuration management, certificate-based authentication/authorization for secure remote access.
- **Complete integration**  
ESS provides full integration of KSS with CODESYS, both in the runtime and in the IDE, helping to save time and implementation costs.
- **Performance**  
ESS is compatible with hard real-time systems. According to test results, it introduces only minimal delays caused by security policy calculations.
- **Versatility**  
The system is based on a technology that can easily be adapted to existing firmware. Additional communication channels can also be secured using ESS.

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