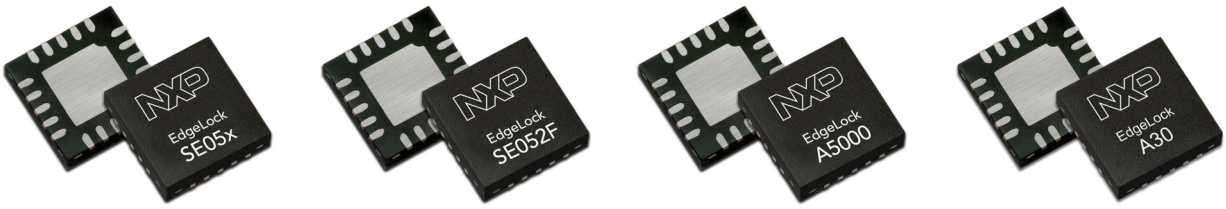
Use Case

EdgeLock® secure elements
and authenticators

Secure, FIPS- and Matter-Compliant IP Cameras

Secure, FIPS- and Matter-Compliant IP Cameras

As prime targets for cyberattacks, IP cameras are among the most vulnerable devices in the consumer and Industrial IoT (IIoT) landscape. NXP addresses this challenge with turnkey security solutions for IP cameras, featuring a FIPS 140-3 Level 3 certified secure element and secure element solutions that support Matter compliance. These solutions transform potential security liabilities into trusted assets, enabling secure and reliable video monitoring.



Challenge

IP cameras present a number of risks. They're often used in sensitive applications, such as security and surveillance, which attract hackers. Manufacturing and other industrial applications also use IP cameras as part of essential business processes, which means business-critical tasks, such as late-stage configuration, in-field updates, smart analytics, and periodic maintenance, can be hijacked or abused. What's more, installation in unsupervised locations creates opportunities for physical attacks and, because IP cameras have a relatively high degree of functionality, they're attractive targets for use in network strikes, such as Distributed Denial of Service (DDoS) attacks.

At nearly every point in the IP camera's life cycle there are opportunities for manipulation or theft. If the IP camera is manufactured at an untrusted facility, security credentials can be tampered with prior to shipment.

During installation, hackers can steal the private information used for legitimate access. Every session with the cloud presents an opportunity to spoof the authentication process, and any video transmission can be stolen or modified as part of a deepfake attack. Such modifcations, also known as video tampering, including the creation and dissemination of deep fakes, can pose significant risks, such as the spread of misinformation, false narratives, and damage to reputations. This can lead to the dissemination of inaccurate or fake information, with potential social and political consequences. The rise of fake images, created by artificial intelligence (AI), makes it all the more important to be able to verify the origin and validity of footage.

Given so many points of risk with IP cameras, security needs to be a fundamental part of device operation. Fortunately, there are a number of security certifications that can guide development and help ensure devices use industry-recognized protections. While FIPS was initially driven by the North American market, it has since become a globally recognized benchmark. Devices compliant with FIPS 140-3 are verified to use proven and standardized cryptographic algorithms. Similarly, devices that conform to the Matter specification for smart home applications incorporate built-in security mechanisms.

IP cameras need to store and protect sensitive information, such as credentials and security keys. A growing number of standards, including Matter, require devices to use silicon, and not software, for storage and protection. Adding a silicon-based root of trust, in the form of a secure element, protects vulnerable transactions of all kinds, and helps ease certification.

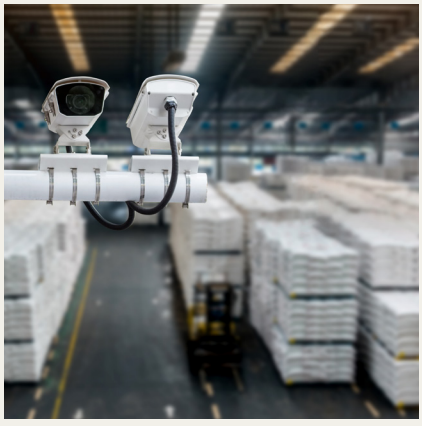
Solution

NXP offers a broad range of EdgeLock secure elements and authenticators for IP Camera security. All solutions are Common Criteria EAL 6+ certified and provide secure key storage and secure cryptograhic algorithms through the integrated IoT applet supporting the latest IoT security use cases. The EdgeLock SE052F is a FIPS 140-3 L3 certified secure element easing the FIPS compliance required by many IP camera solutions. This variant, like all others, supports Matter security through robust management of Matter credentials and the implementation of essential cryptographic protocols.

Applications

Smart Home

Smart City



Industrial

Moreover, the EdgeLock SE051H is purpose-built for Matter, offering comprehensive support for the required algorithms and cryptographic functions. It also simplifies device onboarding by enabling NFC-based setup alongside traditional QR code methods.

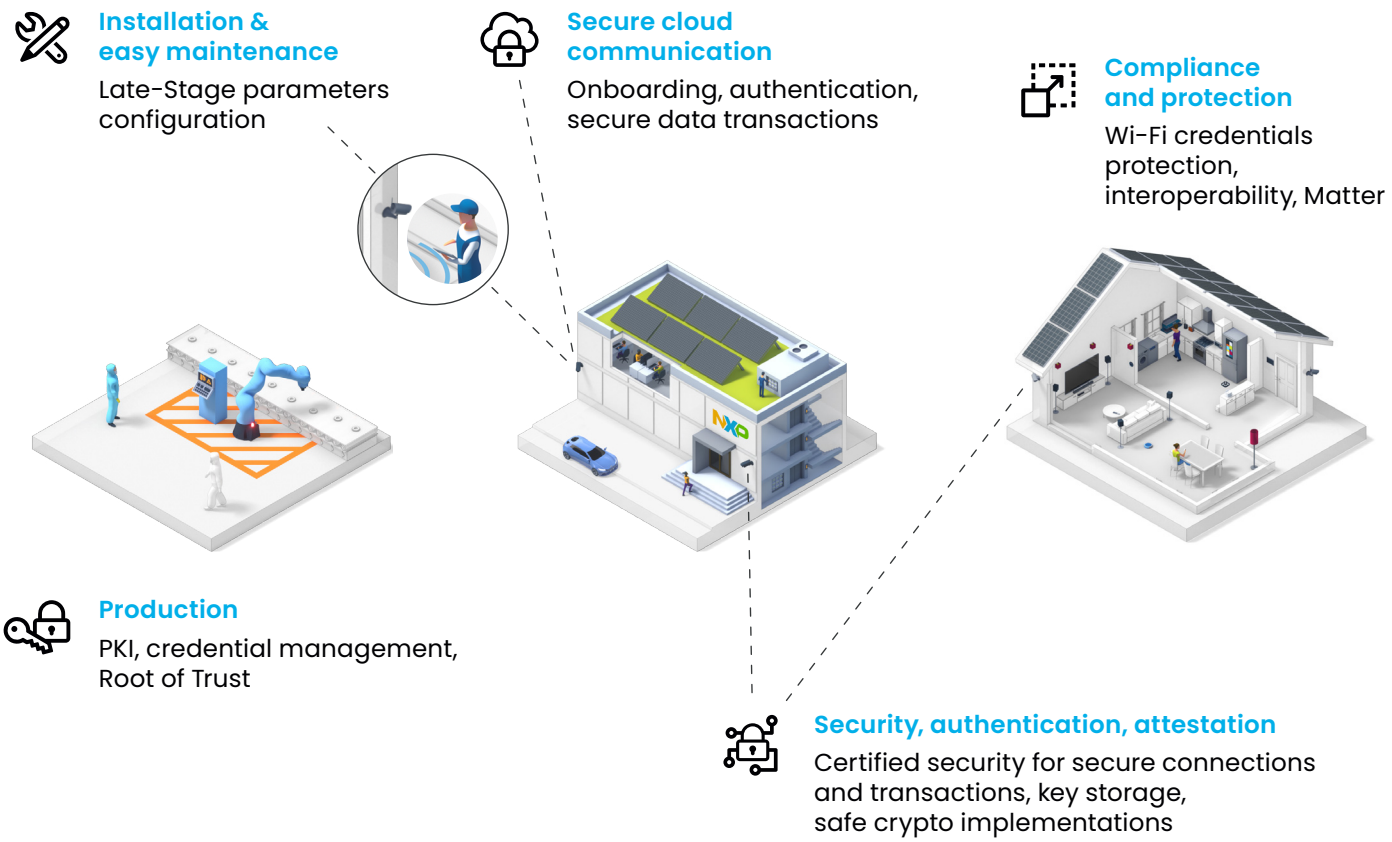
Finally, the NXP EdgeLock 2GO service, certified by the Connectivity Standards Alliance (CSA), provides secure issuance of Matter Device Attestation Certificates and offers flexible, scalable options for device provisioning.

Hardware-based security ensures safe operation, including secure key and credential storage, verified proof of origin, and safe execution of secure algorithms, and protects the essential steps in IP camera operation:

- **Secure cloud onboarding:** By delivering end-to-end security, from chip to edge to cloud, the EdgeLock secure elements and authenticators all make onboarding a zero-touch event. Keys are never exposed to any party during the lifetime of the device.
- **Device-to-device authentication and attestation:** The EdgeLock secure elements and authenticators support mutual authentication, ensuring only authorized devices access the network, and uses encryption to attest the authenticity of data.
- **Late-stage parameter configuration:** Various EdgeLock SE05x variants integrate an ISO/IEC 14443 interface, for use with NFC, so smartphones or contactless readers can safely configure the IP camera by installing a specific setup or loading data.
- **Wi-Fi credential operation:** The EdgeLock SE05x protects the Wi-Fi credentials, including WPA2 passphrases and secret keys, used to authenticate and validate devices before allowing them to use a WLAN or Wi-Fi connection.

To support FIPS certification, the EdgeLock SE052F is a ready-to-use certified platform with security Level 3 for the OS and app, and security Level 4 for the physical security of the hardware.

Block diagram



The EdgeLock secure elements and authenticators, including the EdgeLock SE052F, offer full life-cycle protection for IP cameras

Learn more

The NXP Design Community site offers helpful hints, easy-to-follow how to's, and detailed application notes for use with the EdgeLock secure elements and authenticators, while our product pages link to detailed specs, designs tools & software, training & support, and more.

NXP Design Community
community.nxp.com/t5/Secure-Authentication/bd-p/secure-authentication

EdgeLock A5000 Secure Authenticator
nxp.com/A5000

EdgeLock SE050 Secure Element
nxp.com/SE050

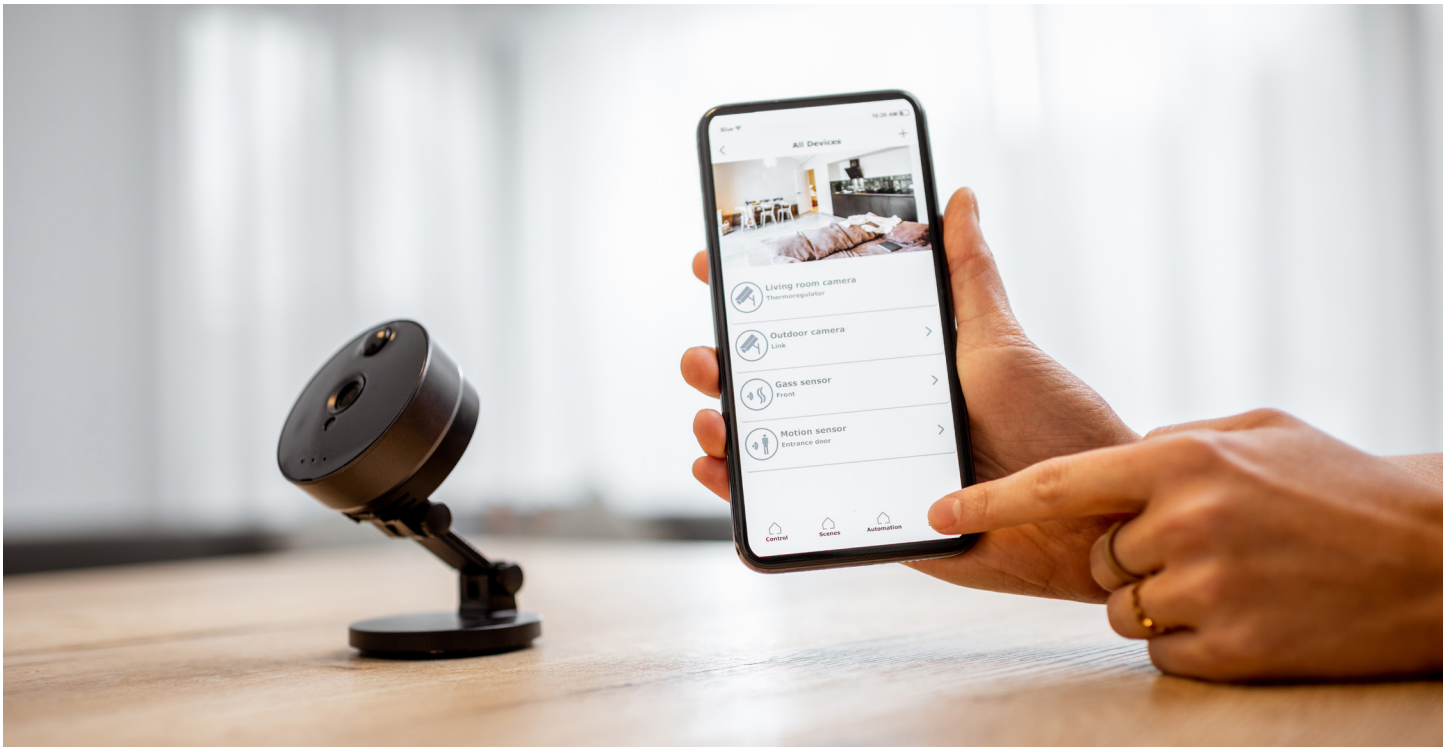
EdgeLock A30 Secure Authenticator
nxp.com/A30

EdgeLock SE051H Secure Element
nxp.com/SE051H

EdgeLock 2GO Service Platform
nxp.com/EdgeLock2GO

EdgeLock SE052F Secure Element
nxp.com/SE052F

Matter
nxp.com/matter



nxp.com/iotsecurityusecase

Date of release: July 2025