

## Enterprise Security for Worldwide ATM Manufacturing

*Nautilus Hyosung, one of the largest ATM manufacturers in the world, needed a hardened, standards-compliant solution that would allow it to inject its Encrypting PIN Pads (EPP) with asymmetric keys and certificates used to authenticate its ATMs with host systems. Hyosung approached Futurex about designing a custom solution with specific requirements and a tight time frame. From start to finish, the project was completed and implemented in less than two months. Project leaders from Hyosung worked together with Futurex's Solutions Architect team to build a secure, compliant, and customized solution that met and exceeded Hyosung's expectations.*

Encrypting PIN Pads (EPP) are found all over the world: in ATMs, at gas pumps, in grocery stores, and even on vending machines. EPPs are electronic touchpads that allow cardholders to enter their PIN in a secure manner when making purchases or ATM withdrawals using their debit cards. When one or more of these devices can be found on almost every street corner, maintaining its security is essential.

EPPs work using asymmetric keys that are injected by a secure key injection device. The public and private key pair is used for performing remote key loading from a trusted remote key management server. They are also used to secure sensitive data that is exchanged over large, public spaces. Public keys, which can be widely distributed, encrypt the data. Only the private key, which must be protected, can decrypt the data. EPP devices require these private keys to verify and approve cardholder transactions.

### Nautilus Hyosung

With over 30 years of experience in the industry, Nautilus Hyosung has developed proven technologies to help customers achieve greater effectiveness in their businesses and better bottom line. Based out of South Korea, Nautilus Hyosung Inc. is a technology leader of self-service solutions in hardware, software, and banking services to the financial services.

<http://www.nautilus.hyosung.com>



### The Business Case

Nautilus Hyosung's ATMs make up approximately 70% of machines located in non-financial sectors, particularly in the U.S., such as restaurants and convenience stores. Hyosung needed a way to securely inject asymmetric keys into both its new and existing EPPs. The solution needed to be cost-effective, easy to implement and maintain, and compliant with industry regulations.

When Hyosung contacted Futurex about a custom development project, it had several specific needs. Hyosung wanted assistance in further enhancing several aspects of its already-robust infrastructure, including ensuring its EPPs would remain compliant with regulatory requirements, developing a solution to securely inject the necessary private keys, updating its procedure documentation according to TR-39 standards, and training its staff on TR-39 audit control objectives to prepare for future audits.

In addition to implementing a new key injection solution, Hyosung also wanted to evaluate and make enhancements to its onsite secure facility where the key injection process would take place. To do so, it needed to have its secure facility evaluated based on TR-39 control objectives before the facility actually underwent a TR-39 audit.

Because this high-visibility project had tight deadlines, Hyosung requested its new solution be completed and ready to implement within approximately a month's time, allowing it to continue producing and distributing its advanced ATM solutions worldwide. With customers all over the world, Hyosung could not afford a loss of productivity during the course of this project.

## Nautilus Hyosung's Requirements

Hyosung's goal was to focus on enhancing several aspects of its business and data security. Because Hyosung's technology is located all over the world, it needed to ensure all of its devices would be secure and compliant with regulations in several different markets.

Jude Heejun Han, Deputy Senior Manager of Software Engineering for Hyosung, saw an opportunity to implement a solution that would further bolster Hyosung's ability to continue to grow while maintaining compliance with TR-39 and Payment Card Industry (PCI) PIN regulatory requirements.

Hyosung would use its new technology to inject its EPPs with asymmetric keys and digital certificates used in authenticating its ATMs with host systems. Because this process must be TR-39-compliant, its secure facility would need to be audited as well. Hyosung had several requirements regarding its custom key injection solution.

### **Requirement: Ensure compatibility with both new and existing EPPs**

Hyosung needed its new asymmetric key injection solution to be compatible with its existing EPPs as well as its newer devices. The solution would need to be versatile enough to support both product lines and allow for continued growth of its innovative solutions.

### **Requirement: Adhere to TR-39 and PCI PIN standards**

Fulfilling compliance requirements was a major concern. Hyosung wanted to make sure its new solution was compliant with TR-39 and PCI PIN standards regarding the key injection process.

## TR-39 Standards

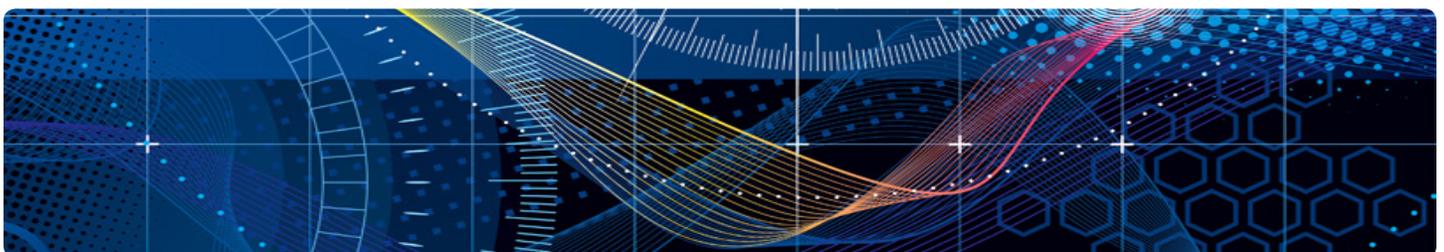
*TR-39, a standard published by Accredited Standards Committee (ASC) X9, regulates the treatment of encryption, key management, and key protection. Per TR-39 regulations, all digital signing must be performed in a secure facility that has undergone rigorous audits of engineering, manufacturing, and production processes. These audits are performed on a regular basis by a third party auditor.*

### **Requirement: Update documentation and train staff on TR-39 control objectives**

Hyosung requested assistance with the creation of procedure documentation to meet TR-39 regulations, and it also wanted its staff fully trained on the use of the Manufacturer-Class Certificate Authority Server by Futurex. Additionally, it wanted to train its staff on TR-39 audit control objectives such as the effectiveness and clarity of its key injection documentation, how to know if its secure facility was compliant, and verifying its other hardware security solutions were compliant.

### **Requirement: Implement enhancements to the Hyosung secure facility**

Per TR-39 requirements, many certificate authority functions, such as digital signing and key injection, must be performed in a compliant secure facility. Hyosung requested an on-site inspection of its key injection facility from the perspective of an auditor before actually subjecting it to an external TR-39 audit for physical compliance as well as operational concerns. This would allow Hyosung to make the necessary adjustments and procedural changes prior to an actual audit.



## The Solution

After evaluating its system requirements and current infrastructure, Nautilus Hyosung elected to implement the Manufacturer Class Certificate Authority Server for its asymmetric key injection needs as well as to sign third-party certificate signing requests (CSRs) for incorporation into its trusted domain.

The Futurex Manufacturer Class Certificate Authority Server provides a robust, easy-to-use solution for creating and storing asymmetric key pairs for encrypting, decrypting, signing, and validating data. Examples of this include establishing SSL connections, authentication of electronic devices, and communication encryption.

It can also be used to sign data with trusted PKI keys to ensure data integrity. It can manage the entirety of the process, including the creation of a self-signed root certificate, management of the subordinate certificate tree and asymmetric key pairs, and the management of a Certificate Revocation List (CRL).

In addition to using the Manufacturer-Class Certificate Authority Server to inject the private keys used as the basis of its remote key loading solution, Hyosung also used it to sign third-party certificate signing requests (CSRs) to place into a trusted domain.

FIPS 140-2 Level 3-certified, the Manufacturer-Class Certificate Authority Server contains physical and logical security features such as two unique faceplate bezel locks for securing the server to the rack, a Secure Cryptographic Device with an epoxy barrier and sensor wires to protect processor and system memory, backup batteries, and multi-user grouping for access restriction, providing dependable security.

Futurex's Solutions Architects worked closely with Hyosung's project managers to develop the custom functionality required for Hyosung's infrastructure. Project managers from Hyosung visited the Futurex campus in Bulverde, Texas during the development process, working alongside the Solutions Architect team to design the requested changes that would allow Hyosung to continue to manufacture innovative ATM solutions.

## Futurex's Solutions Architect Team

Futurex's Solutions Architects are certified TR-39 auditors (CTGA), allowing them to view an organization's infrastructure the same way an auditor would, providing the support needed to pass an audit.

The Solutions Architect team is unique in that individuals who assist from the start of a project will see it through to completion, providing Xceptional Support every step of the way.

Futurex's Xceptional Support team provides a wide range of services, including:

- Installation Support
- Technical Services
- Project Management
- On-Site and Virtual Training
- Consulting
- Customized Hardware and Software Solutions
- Certificate Authority Services
- Customized Manufacturer-Class Solutions
- 24x7x365 Xceptional Support
- Firmware Upgrades and Product Monitoring



## Implementing the Solution

Using Futurex technology, Nautilus Hyosung implemented a comprehensive, custom secure key injection solution that complies with industry standards and regulations as well as its own specific requirements. The project plan was broken down into three phases, where Hyosung and Futurex worked together to implement this solution through a series of on-site visits to the Futurex campus and Hyosung's South Korea headquarters.

**Phase One:** The first phase included the planning and development for the custom solution over the course of several on-site visits. Once development was completed, Solutions Architect Khang Ma traveled to Hyosung's headquarters to assist with implementation of the new hardware.

During these visits, Khang also trained the Hyosung staff on the use of the solution, as well as the TR-39 procedures and control objectives. He also performed an initial assessment of Hyosung's secure facility, providing it with feedback on how to further enhance the security and compliance of the facility before it underwent an actual TR-39 audit.

**Phase Two:** Futurex and Hyosung worked together to develop Hyosung's procedural documentation to meet TR-39 standards regarding the operation of



the Manufacturer Class Certificate Authority Server. Hyosung also performed its own internal audit prior to the official TR-39 audit.

**Phase Three:** After Hyosung's training was complete, Hyosung met with the auditors who would perform the official audit, with Futurex present to help advise.

## The Results

After the integration and preparations were complete, Nautilus Hyosung proudly announced it received a perfect score on its TR-39 audit.

With this new solution, Hyosung was able to enhance the already-robust security of its EPPs, streamline the efficiency of its key injection processes, and implement remote key loading functionality.

"TR-39 compliance is a top of mind issue for all of our clients in the financial services verticals we support. Our ability to provide best-in-class solutions supported by independent auditors' statements of compliance are crucial for all stakeholders," said Han. "We were pleased to be able to partner with Futurex to provide industry leading cryptography solutions."

Hyosung's ATMs are found in the U.S., China, Germany, Turkey, and various other European countries. As one of the leading ATM manufacturers in the world, Hyosung's new solution will allow it to continue to deploy some of the most advanced technology in the industry and continue to provide innovative, cutting-edge solutions to customers around the globe.

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### Jude Heejun Han

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