[Company]

CRYPTOGRAPHIC KEY MANAGEMENT POLICY

The management of encryption keys

1 Document Version Control

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3 Cryptographic Key Management Policy

3.1 Purpose

The purpose of this policy is to ensure the proper lifecycle management of encryption keys to protect the confidentiality and integrity of confidential information.

3.2 Scope

Confidential and personal information processed, stored, or transmitted on or in company owned, managed, and controlled systems and applications deemed in scope by the ISO 27001 scope statement.

All employees and third-party users.

3.3 Principle

Cryptographic Key Management is based [redacted]

[redacted]

3.4 Generation

Cryptographic keys shall be generated within cryptographic module with at least [redacted]. For explanatory purposes, consider the cryptographic module in which a key is generated to be the key-generating module.

Any random value required by the key-generating module shall be [redacted]

Hardware cryptographic modules are preferred over software cryptographic modules for protection.

3.5 Distribution

The generated keys shall be transported (when necessary) using secure channels and shall be used by their associated cryptographic algorithm within at leas [redacted]. For additional detail for the recommendations in this section refer to [redacted]

3.6 Storage

Developers must understand where cryptographic keys are stored within the application. Understand what memory devices the keys are stored on.

Keys must be protected on both volatile and persistent memory, ideally processed within secure cryptographic modules.

Keys should never be stored in plaintext format.

Ensure all keys are stored in cryptographic vault, such as a hardware security module (HSM) or isolated cryptographic service.

If you are planning on storing keys in offline devices/databases, then [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

3.7 Escrow and Backup

Data that has been encrypted with lost cryptographic keys will never be recovered. Therefore, it is essential that the [redacted] for long-term data stores.

When backing up keys, ensure that [redacted]

Never escrow keys used for performing digital signatures but consider the need to escrow keys that support encryption. Oftentimes, escrow can be performed by the Certificate Authority (CA) or key management system that provisions certificates and keys, however in some instances separate APIs must be implemented to allow the system to perform the escrow for the application.

3.8 Accountability and Audit

Accountability involves the identification of those that have access to, or control of, cryptographic keys throughout their lifecycles. Accountability can be an effective tool to help prevent key compromises and to reduce the impact of compromises once they are detected.

Although it is preferred that no humans can view keys, as a minimum, the key management system should account for all individuals who are able to view plaintext cryptographic keys.

In addition, more sophisticated key-management systems may account for all individuals authorized to access or control any cryptographic keys, whether in plaintext or ciphertext form.

Accountability provides three significant advantages:

1. It aids in the determination of when the compromise could have occurred and what individuals could have been involved.

[redacted]

Certain principles have been found to be useful in enforcing the accountability of cryptographic keys. These principles might not apply to all systems or all types of keys.

Some of the principles that apply to long-term keys controlled by humans include:

- Uniquely identifying keys.
- Identifying the key user.
- Identifying the [redacted]

Two types of audit should be performed on key management systems:

1. The security plan and the procedures that are developed to support the plan should be periodically audited to ensure that they continue to support the Key Management Policy (NIST SP 800-57 Part 2).
2. [redacted]

New technology developments and attacks should be taken into consideration. On a more frequent basis, the actions of the humans that use, operate, and maintain the system should be reviewed to verify that the humans continue to follow established security procedures.

Strong cryptographic systems can be compromised by lax and inappropriate human actions. Highly unusual events should be noted and reviewed as possible indicators of attempted attacks on the system.

3.9 Key Compromise and Recovery

The compromise of a key has the following implications:

In general, the unauthorized disclosure of a key used to provide confidentiality protection (i.e., via encryption) means that all information encrypted by that key could be exposed or known by unauthorized entities. The disclosure of a Certificate of

Authorities' private signature key means that an adversary can create fraudulent certificates and Certificate Revocation Lists (CRLs).

A compromise of the integrity of a key means that [redacted]

A compromise of a key's usage or application association means that [redacted]

A compromise of a key's association with the owner or other entity means [redacted]

A compromise of a key's association with other information means that [redacted]

[redacted]

The following procedures are usually involved:

- Limiting the amount of time, a symmetric or private key is in plaintext form.
- Preventing humans from viewing plaintext symmetric and private keys.
- Restricting plaintext symmetric and private keys to physically protected containers. This includes key generators, key-transport devices, key loaders, cryptographic modules, and key-storage devices.
- [redacted]

[redacted]

- Creating a compromise-recovery plan, especially in the case of a CA compromise. A compromise-recovery plan is essential for restoring cryptographic security services in the event of a key compromise. A compromise-recovery plan shall be documented and easily accessible.

The compromise-recovery plan should contain:

- The identification and contact info of the personnel to notify.
- The identification and contact info of the personnel to perform the recovery actions.
- The re-key method.
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

Any other recovery procedures, which may include:

- Physical inspection of the equipment.

- Identification of all information that may be compromised as a result of the incident.
- [redacted]
- [redacted]

3.10 Trust Stores

Design controls to secure the trust store against injection of 3rd party root certificates. The access controls are managed and enforced on an entity and application basis.

Implement integrity controls on objects stored in the trust store.

Do not allow for [redacted]

[redacted]

[redacted]

3.11 Cryptographic Key Management Libraries

Use only reputable crypto libraries that are well maintained and updated, as well as tested and validated by [redacted]

4 Policy Compliance

4.1 Compliance Measurement

The information security management team will verify compliance to this policy through various methods, including but not limited to, business tool reports, internal and external audits, and feedback to the policy owner.

4.2 Exceptions

Any exception to the policy must be approved and recorded by the Information Security Manager in advance and reported to the Management Review Team.

4.3 Non-Compliance

An employee found to have violated this policy may be subject to disciplinary action, up to and including termination of employment.

4.4 Continual Improvement

The policy is updated and reviewed as part of the continual improvement process.