Key Management in JP

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Outline

JPRS's activities in DNSSEC Key management

- ■ DPS
  - ✓JP DPS
- ■ Key management
  - ✓KSK Ceremony in JP
  - ✓ZSK Ceremony in JP
- ■ Photos

DPS
DNSSEC Policy & Practice Statement

- Comparable to
  - ✓ Certification Practice Statement (CPS) from X.509 Certification Authority (CA)
- Established by KSK / ZSK Manager
- DNSSEC Key Ceremony
  - ✓ Generate key pairs (KSK / ZSK)

DPS - Overview -

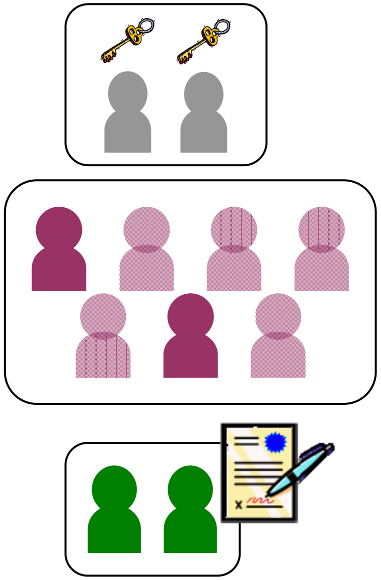
1. Introduction
2. Publication and Repositories
3. Requirements for DNSSEC Practice
4. Facility, Management and Operational Controls
5. Technical Security Controls
6. Zone Signing
7. Compliance Audit
8. Legal Matters

JP DPS

- Published on Jan 14, 2011
  - ✓ https://jprs.jp/doc/dnssec/jp-dps-eng.html
- Adopted then current DPS framework
  - ✓ DNSSEC Policy & Practice Statement Framework
    - draft-ietf-dnsop-dnssec-dps-framework-05 (RFC 6841)
- Key Management in JP
  - ✓ KSK and ZSK Ceremony in accordance with JP DPS

KSK Ceremony in JP

- Once per year in Tokyo
  - ✓held 3 times (2010, 2011, 2012)
- Operated by Trusted Persons
  - ✓Key Activation Observers → JPRS x 2
  - ✓Signing Key Operators → JPRS x 2
  - ✓External Witnesses → Outside x 2



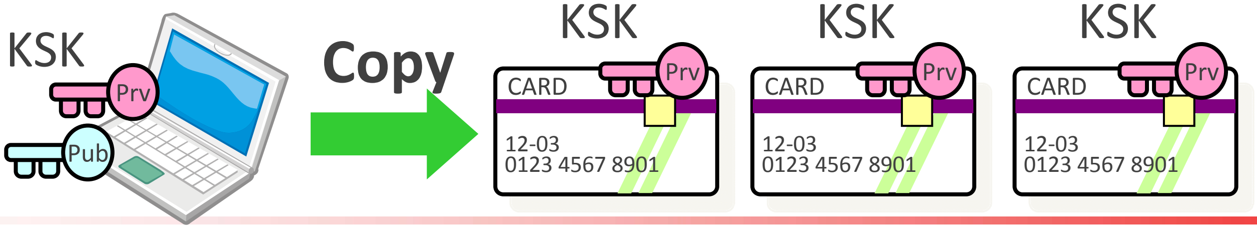
- Approx 5 hours
  - ✓number of steps: 219

How to make KSK?

Pub : Public key

Prv : Private key

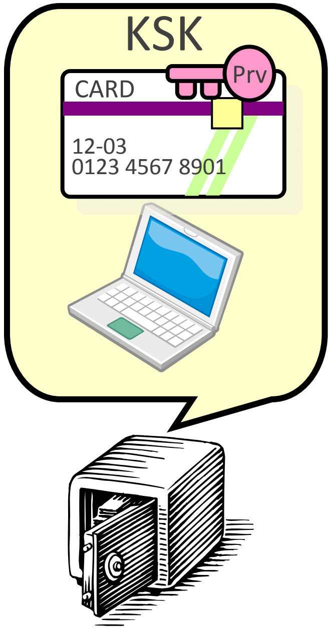
- ■ HSM not used
  - ✓originally designed software by JPRS
- ■ KSK generated on RAMdisk of offline PC
  - ✓generated KSK copied to 6 Smart Cards
    - ●3 Cards per Locations
  - ✓procedure
    - ●Generate ×1, Copy × 6, Remove ×1



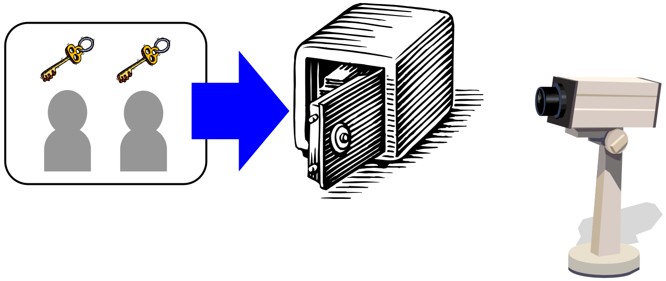
Location of KSK

Prv : Private key

- In Safety-boxes
  - ✓two geographically diverse locations



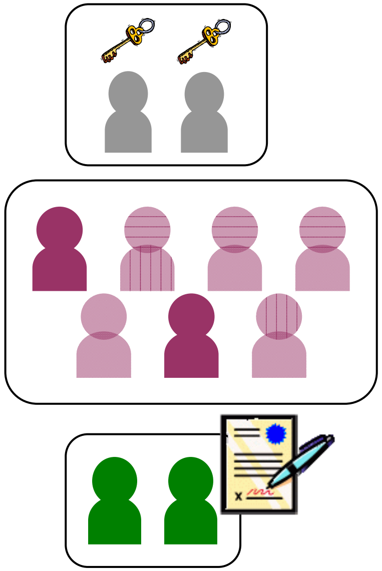
- Safety-box Specification
  - ✓2 physical keys
    - ●each key managed by different dept. in JPRS
      - – Customer Services Dept. and Systems Dept.
  - ✓Security Monitoring
    - ●door sensor
    - ●video monitoring / recording



ZSK

ZSK Ceremony in JP

- Every 3 months in Tokyo
  - ✓held 21 times
- Operated by Trusted Persons
  - ✓Signing Key Operators → JRPS x 2
  - ✓Key Activation Observers → JPRS x 2
  - ✓Internal Witnesses → JPRS x 2
- Approx 4 hours
  - ✓number of steps: 190



ZSK

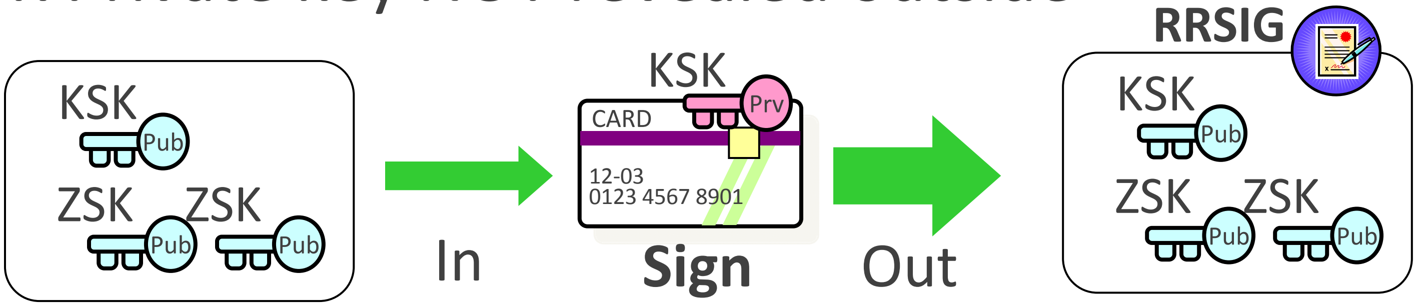
Sign & Transport DNSKEY RRset

Pub : Public key

Prv : Private key

■ Sign DNSKEY RRset in Smart Card

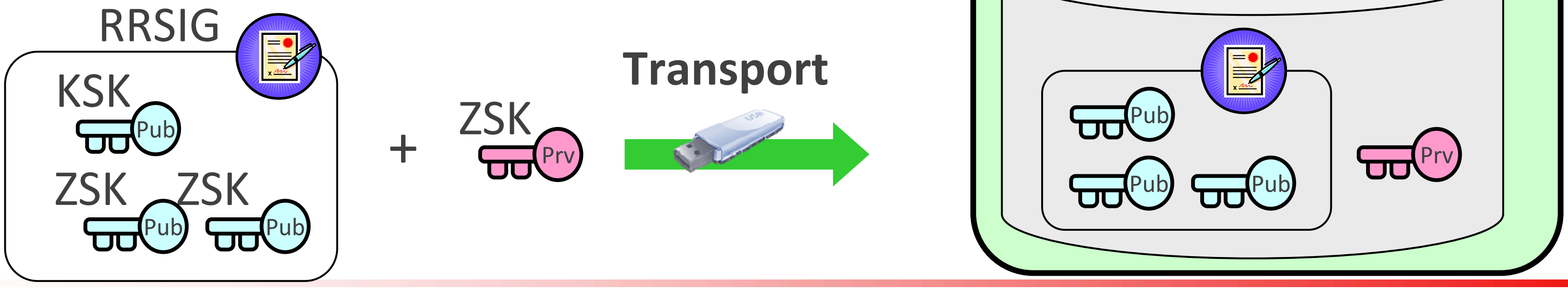
✓KSK Private key NOT revealed outside



■ Transport DNSKEYs and RRSIGs

✓using Encrypted USB Storage

JP Zone Management Server



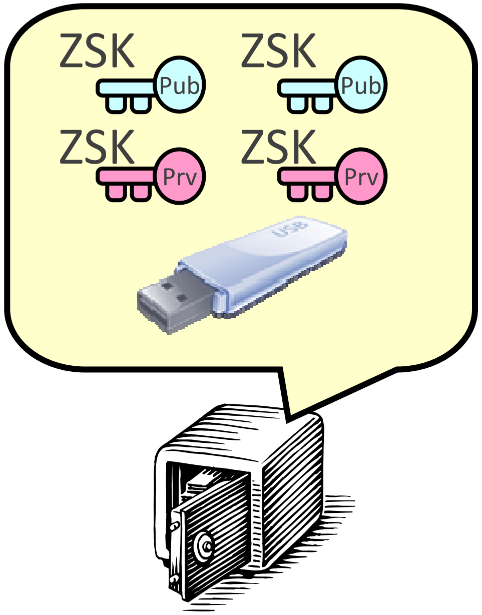
ZSK

Location of ZSK

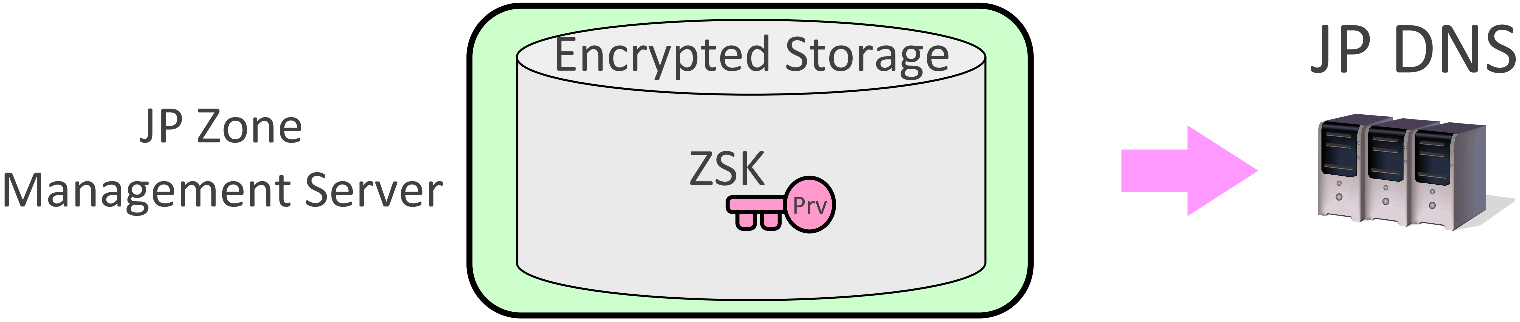
Pub : Public key

Prv : Private key

- In Safety-boxes
  - ✓two geographically diverse locations



- In JP Zone Management Server(s)
  - ✓used to sign JP Zone for every 15 minutes



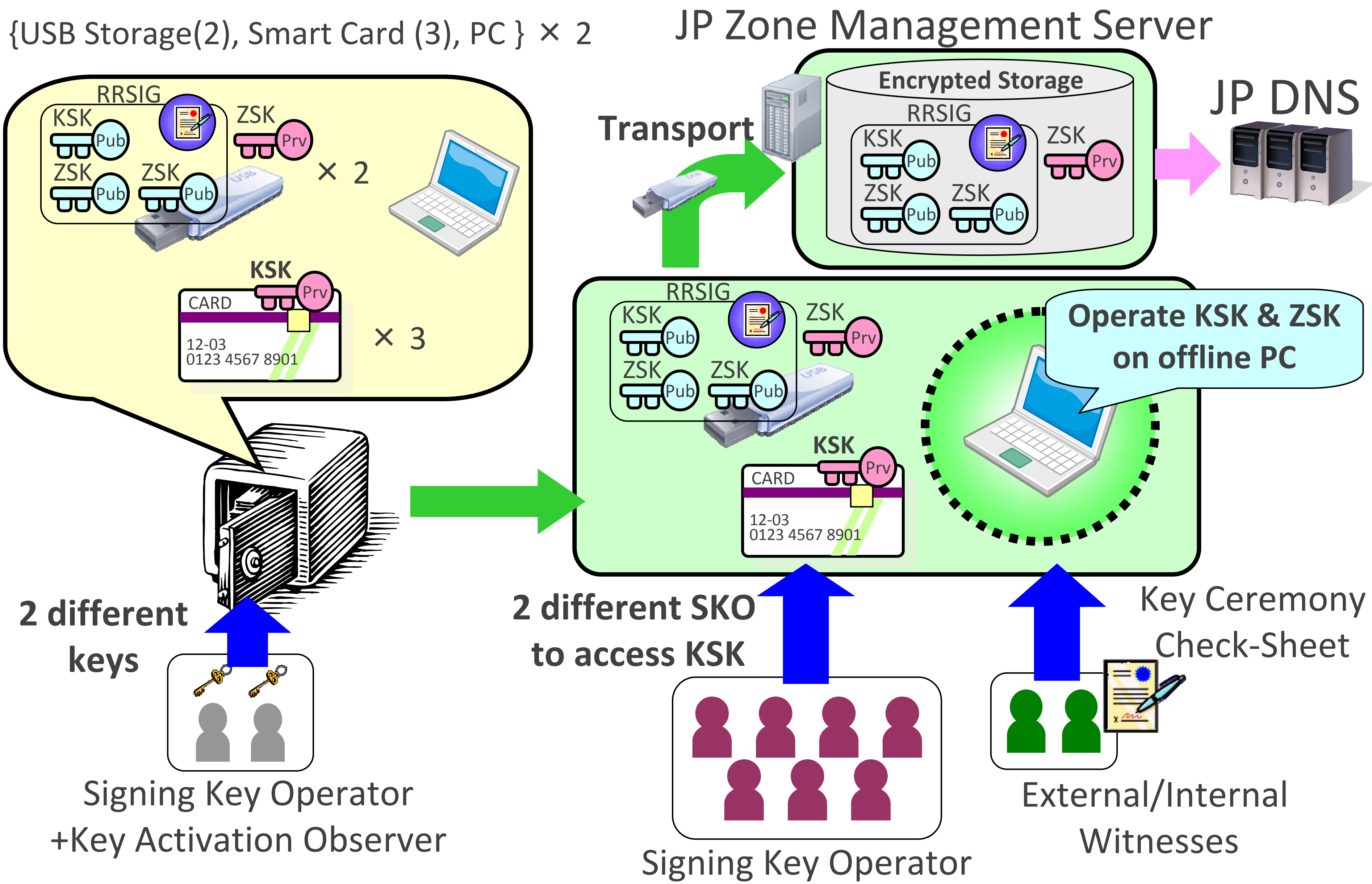
JP Zone
Management Server

Encrypted Storage

ZSK Prv

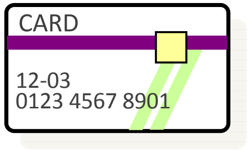
JP DNS

Key Management in JP - Overview -



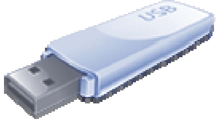
Photos

KSK

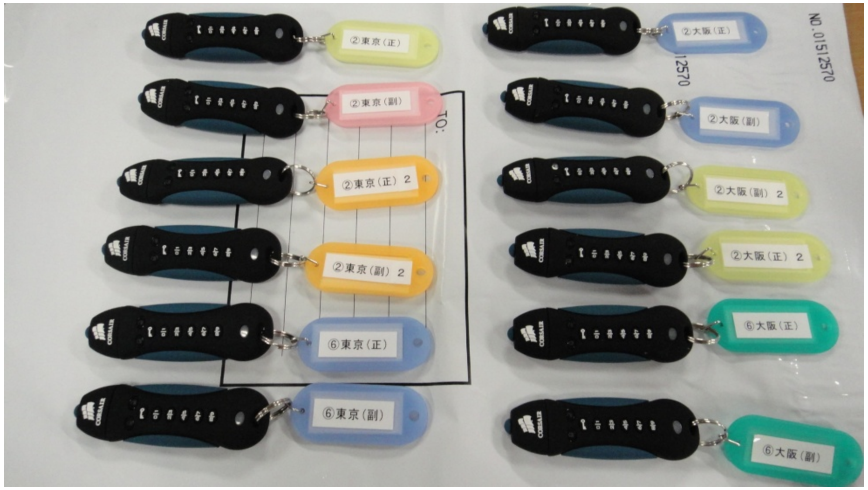


Smart Cards & Reader

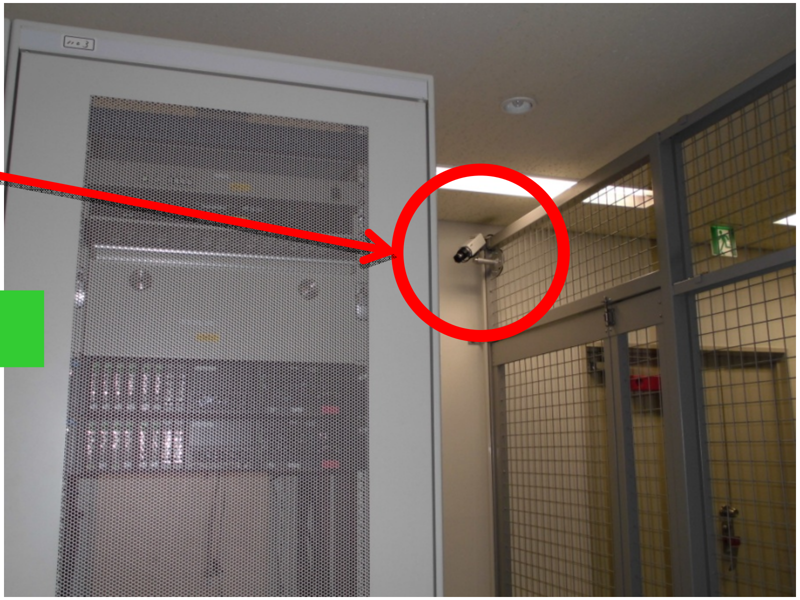
ZSK

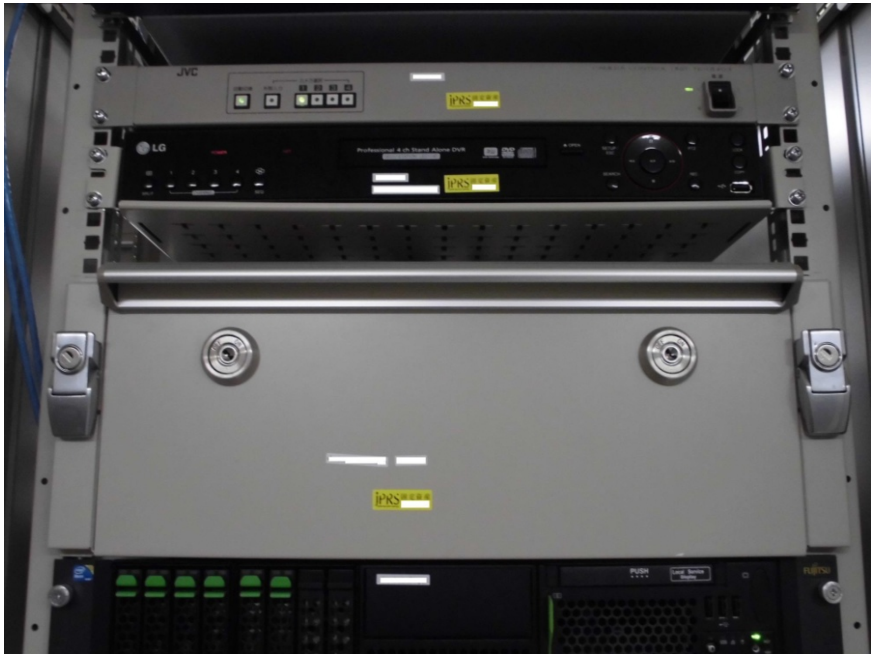


Encrypted USB Storages

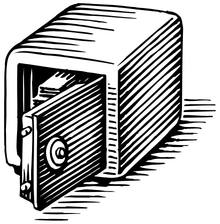


Video Camera

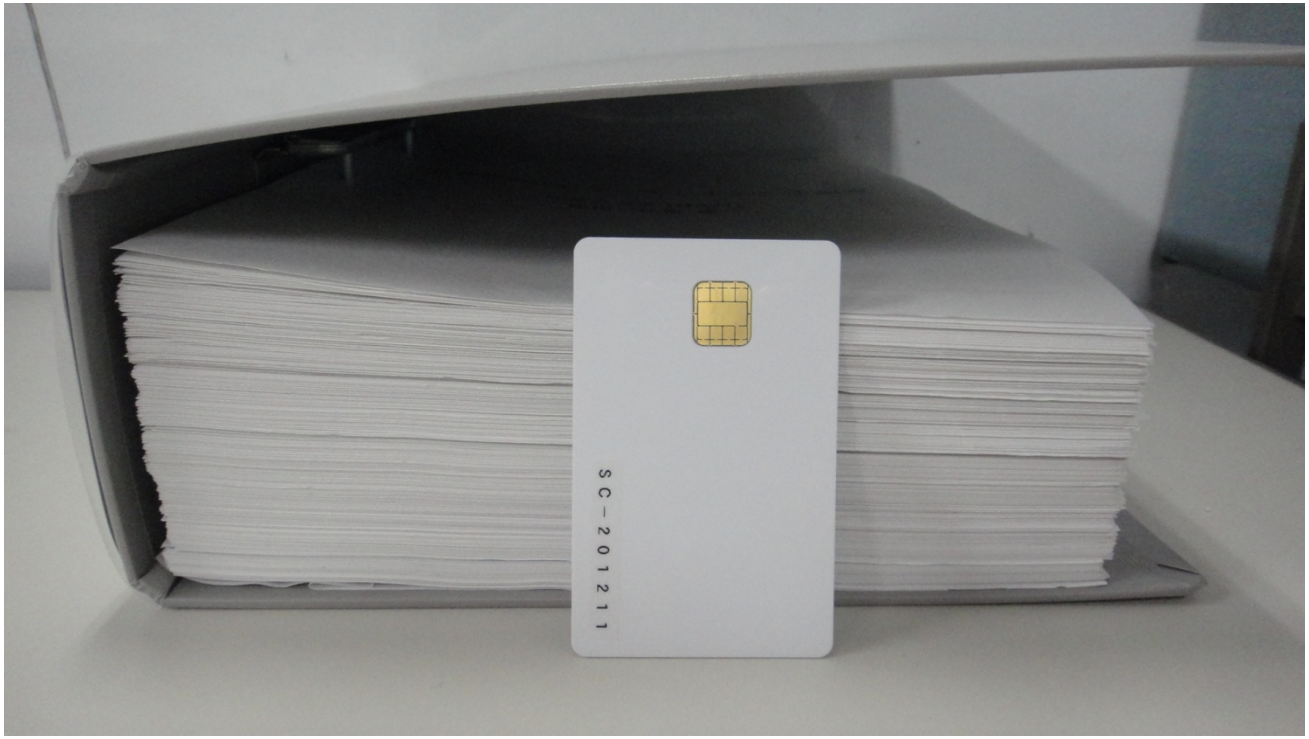




Safety-box
(custom-made)



KSK Ceremony Scripts on Oct 2012



Smart Card Size: 85.5×54.0×0.76mm

JPRS
JAPAN REGISTRY SERVICES