Distributed Information Processing

25th Lecture

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Outline

- Review
  - Information Protection
  - PKI Example
  - DRM Example
- Q&A

Review: Information Protection

- ATM PIN Security
  - Splitting of a Customer's PIN into Two Parts and Storing Them Separately
    - PIN Offset in the ATM server
    - Natural PIN derived with the PIN key in the PIN machine

CustomerPIN =(?) f(Acct#, PINOffset, PINKey)

Natural PIN Is Not Stored Anywhere in the Entire Process

Review: PKI Example

- Basics
  - Digital Signature (DS)
    - DS(I,pr) for Information I and a private key pr
  - Certificate C (Containing a Public Key and DS)
    - C(pu,pr0) for a public key pu and pr0 from CA

$$A \xrightarrow{\quad I \quad} B$$

Used to Make DS in C (by Encrypting the Rest of C)

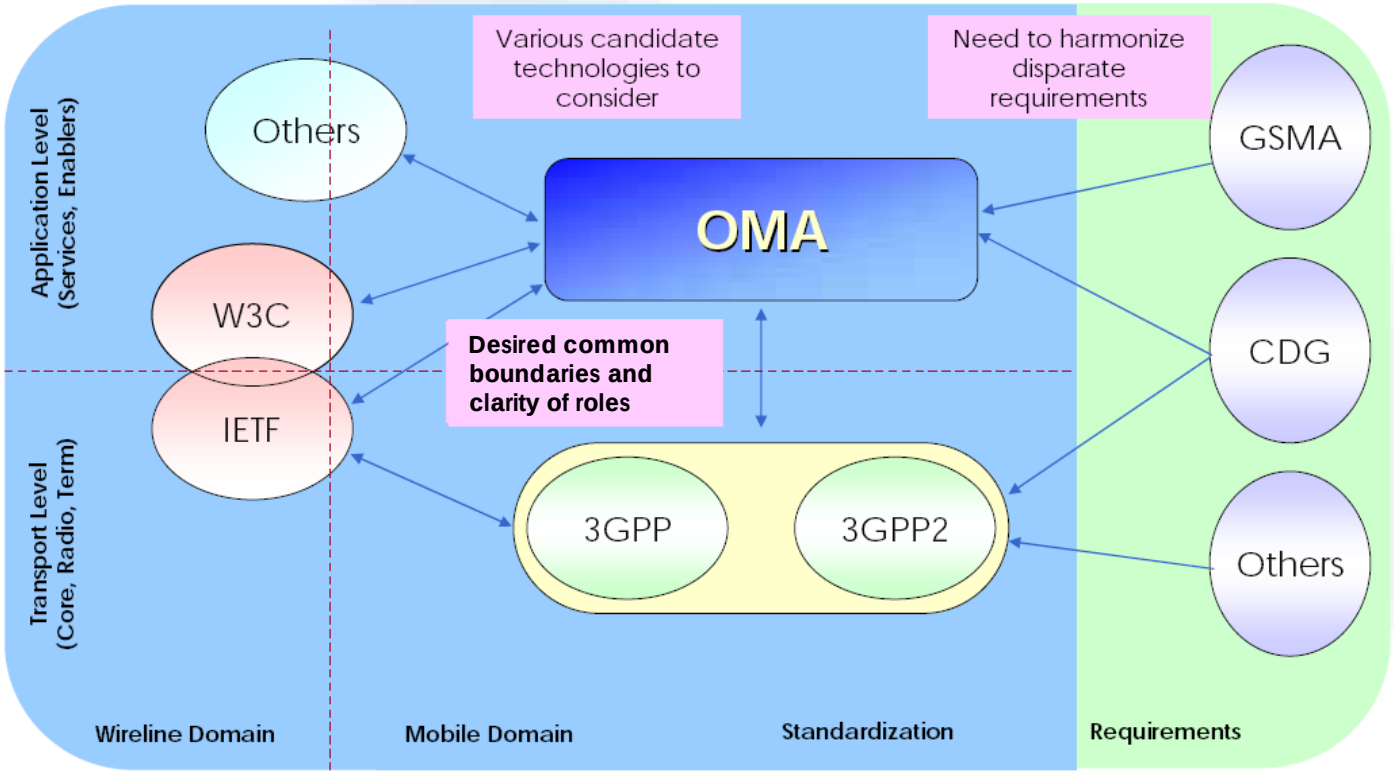
- Question
  - Is This Secure?
    - A sends B I+DS(I,pr1)+C1(pu1,pr0)
    - B verifies C1(pu1,pr0) by obtaining C0(pu0,pr0) from CA
      - Verification with DS of C1(pu1,pr0), and pu0
    - B verifies DS(I,pr1) with pu1

Self-Signed

Outline: DRM Example

- DRM Example: OMA (Open Mobile Alliance) DRM
  - Open Mobile Alliance
  - Overview of OMA DRM V1.0
  - Overview of OMA DRM V2.0
  - DRM Architecture
  - Domains
- Summary

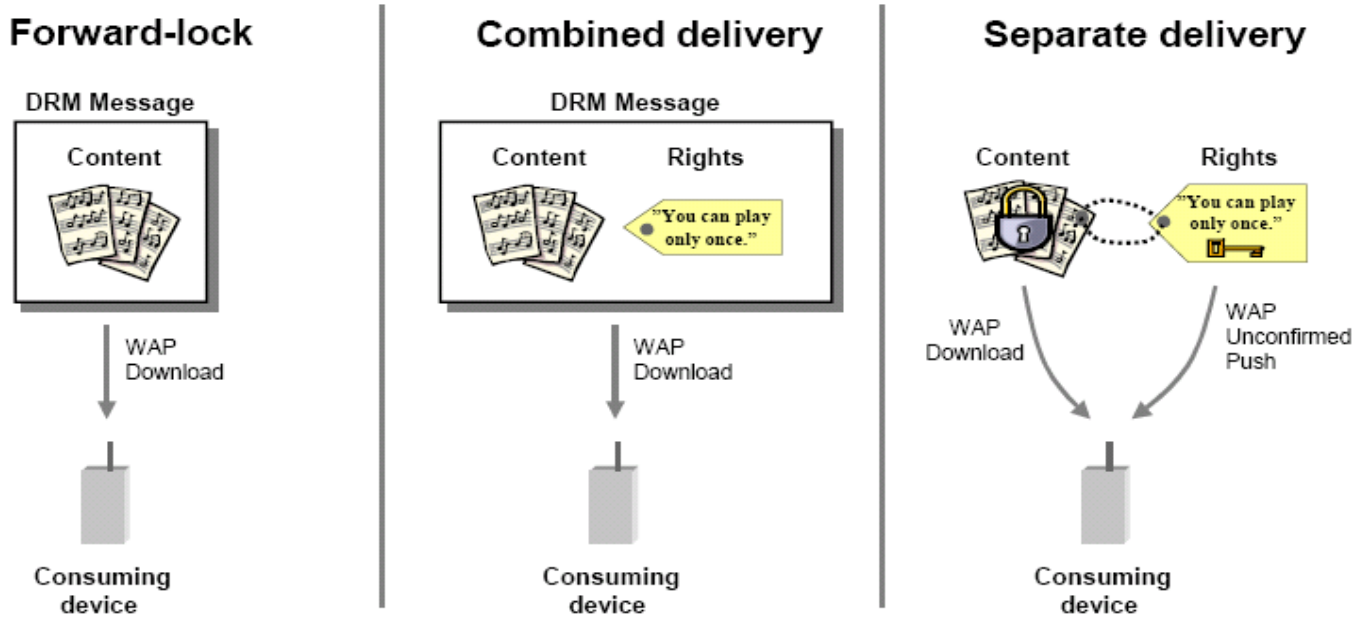
Open Mobile Alliance



GSMA : Global System for Mobile communication Association
CDG : CDMA Development Group
3GPP : 3rd Generation Partnership Project
W3C : World Wide Web Consortium
IETF : Internet Engineering Task Force

Overview of OMA DRM V1.0

- To



- Prevent peer-to-peer distribution of low-value content
- Prohibit device from forwarding content to other devices
- Consider only one media object

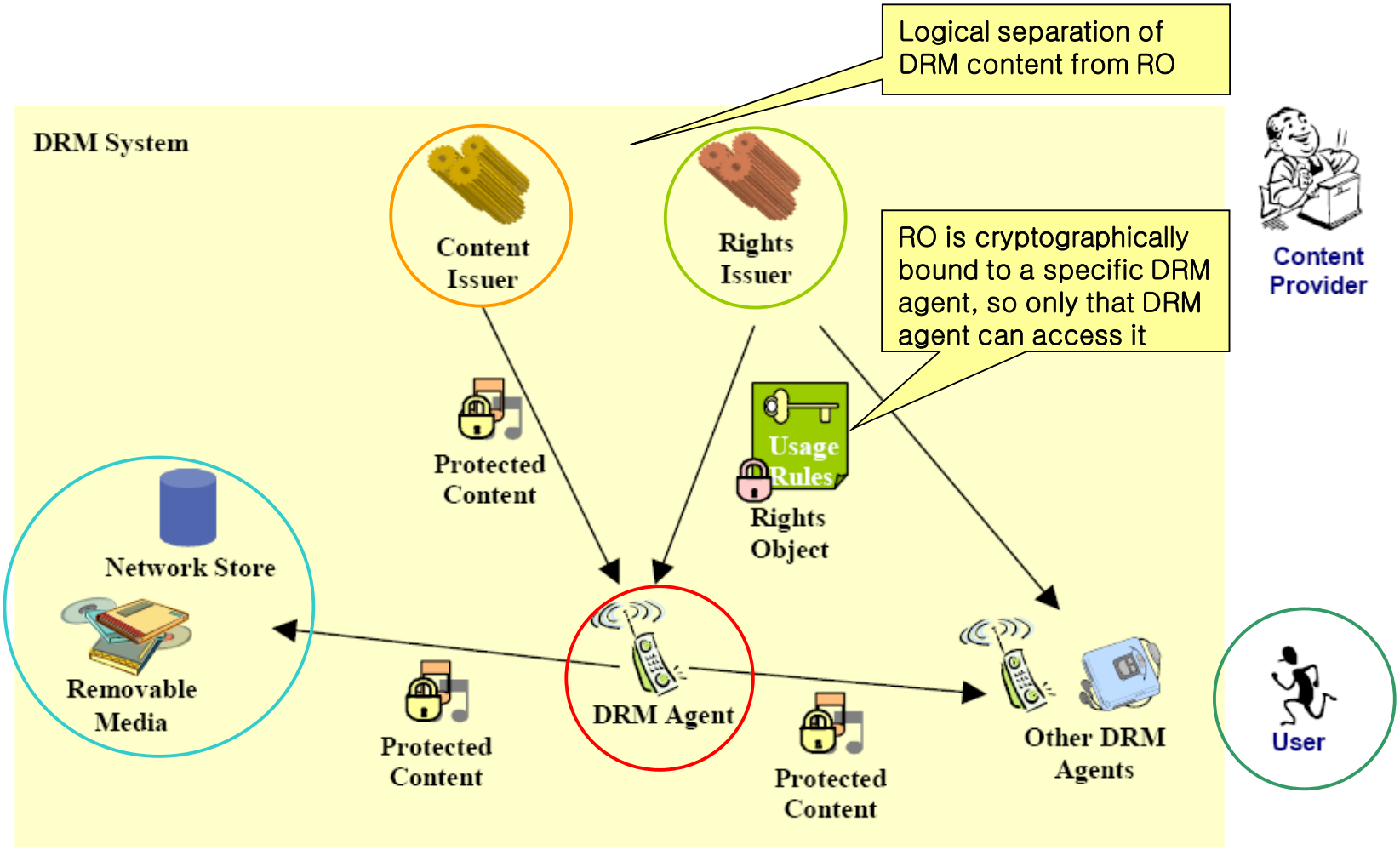
- Define a rights object containing permissions and constraints
- Package both content and a rights object in a DRM message

- Protect higher value content using encryption
- Separate content and a rights object
  - Protected content delivered over any medium
  - Rights object delivered via WAP push

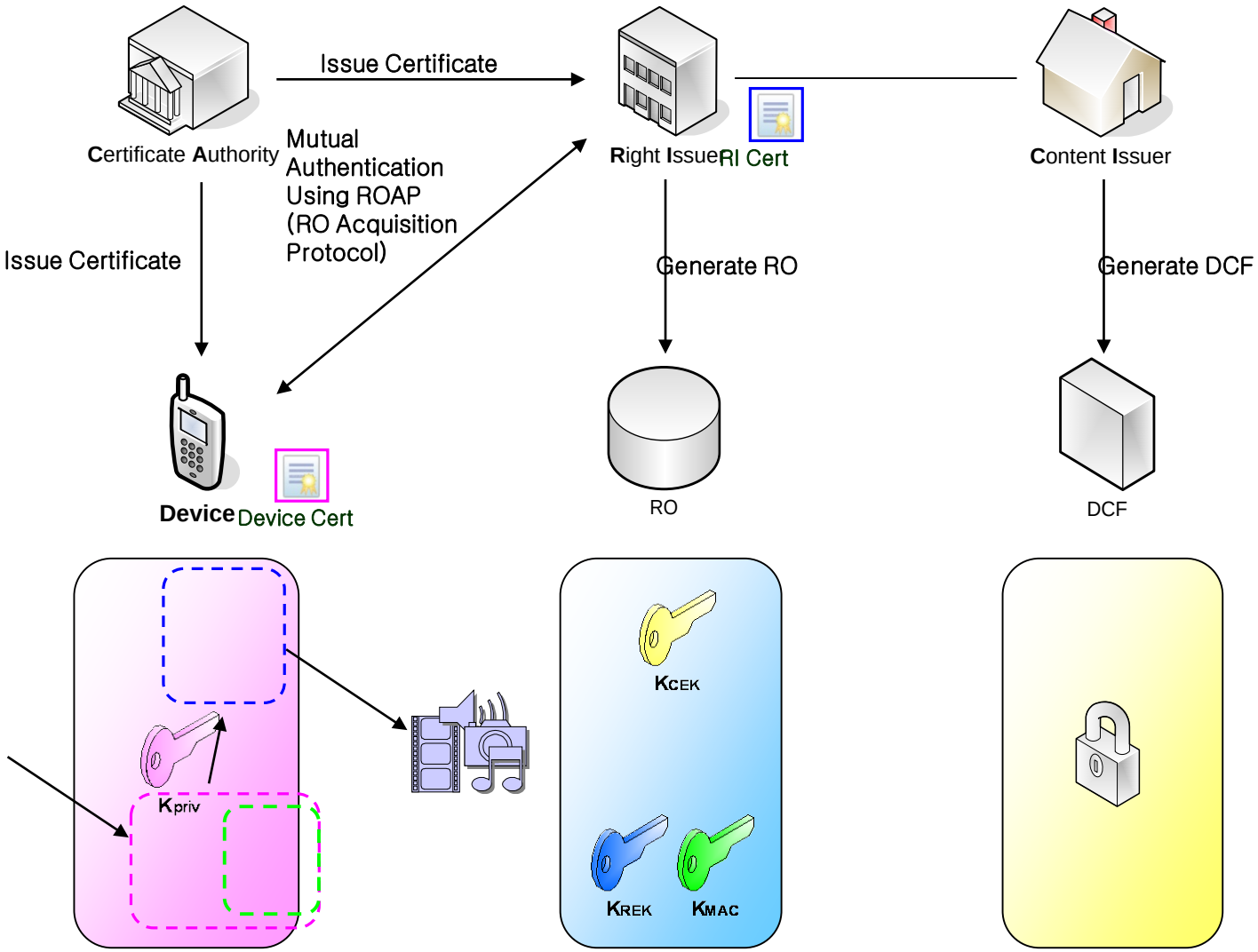
Overview of OMA DRM V2.0

- Target
  - Enhanced Protection of Premium Content
    - Basic Pull Model
    - Push of DRM Content
    - **Streaming of DRM Content** *(Added)*
    - **Domains** *(Added)*
    - **Backup** *(Added)*
    - **Superdistribution** *(Added)*
    - **Export** *(Added)*
    - **Unconnected Device Support** *(Added)*

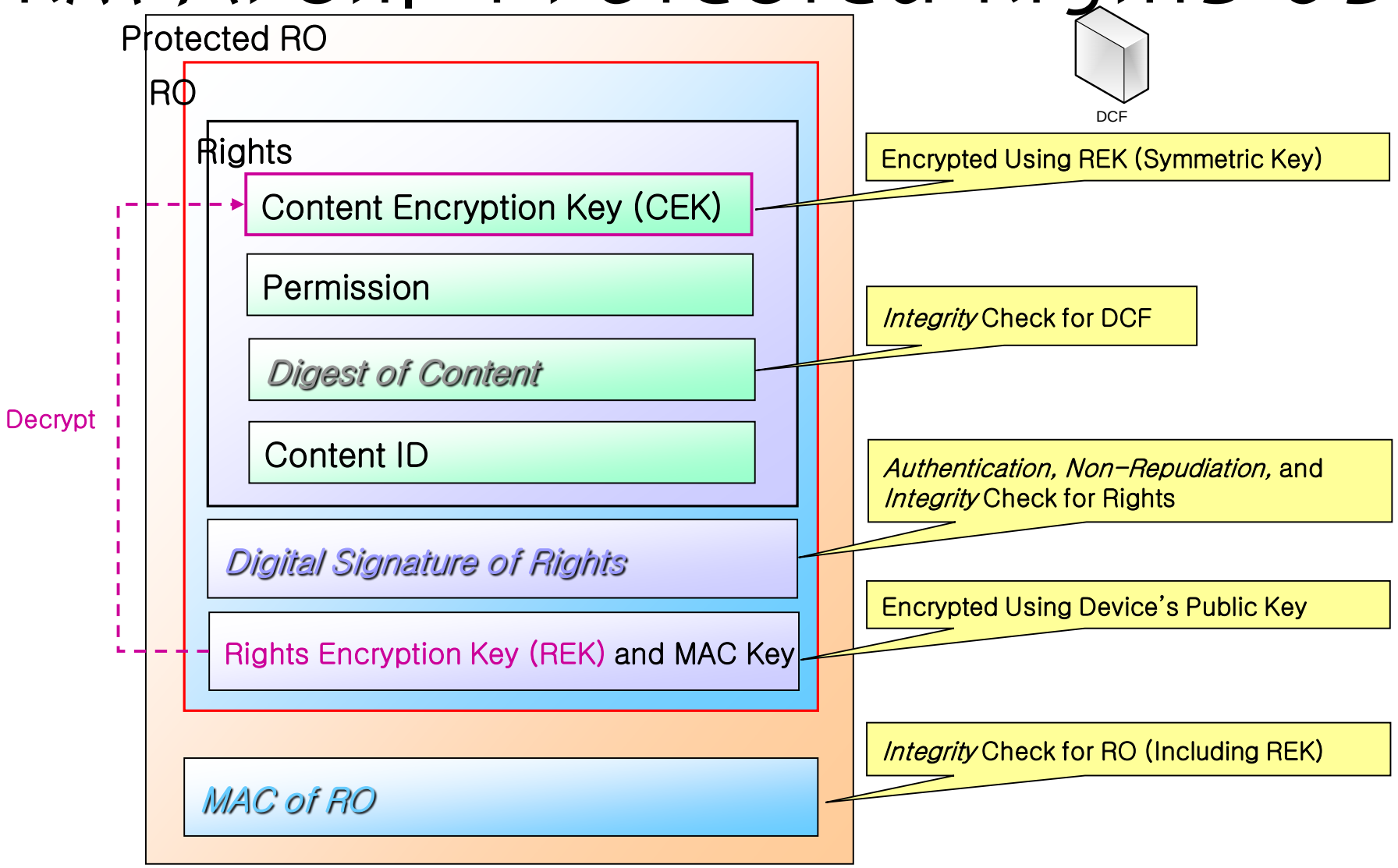
DRM Architecture



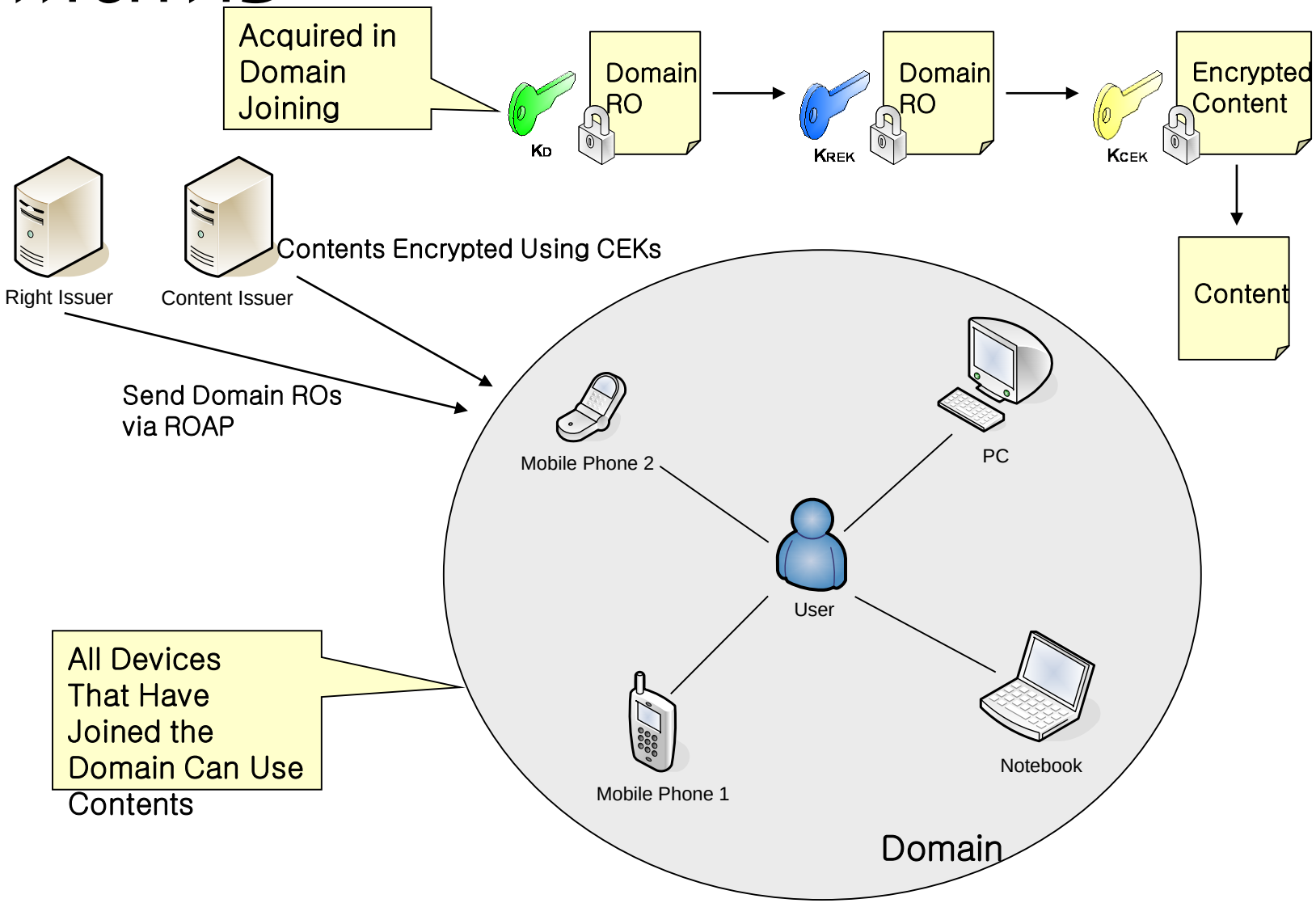
DRM Arch.: Cryptographic Chain



DRM Arch.: Protected Rights Obj.



Domains


Acquired in Domain Joining
KD
Domain RO
KREK
Domain RO
KCEK
Encrypted Content
Content
Right Issuer
Content Issuer
Contents Encrypted Using CEKs
Send Domain ROs via ROAP
Mobile Phone 2
PC
User
Mobile Phone 1
Notebook
Domain
All Devices That Have Joined the Domain Can Use Contents