NIST Key Management Workshop

Cross-Domain Security Interactions: Scenarios and Solutions

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Agenda

- Cross-domain use cases and issues
  - Cloud key management
  - Hardware Security Modules
  - Quantum Key Distribution
- Discussion

Common Security Issues in Cross-Domain Key Interactions

- Trust establishment (contractual and on-line)
- Ownership of keys
- Protection of keys at rest
- Protection of keys in transit
- Propagating key policy
- Negotiating key policy
- Managing access to keys
- Managing key life-cycle
- Visibility of key-related services and infrastructure
- Proof of possession

Defining Cloud Key Management Models

Enterprise

- Keys created, used, stored and managed by enterprise

Hybrid

- Keys created, stored and managed by enterprise, but used by CSP

CSP

- Keys created, used, stored and managed by CSP

Hybrid Key Management

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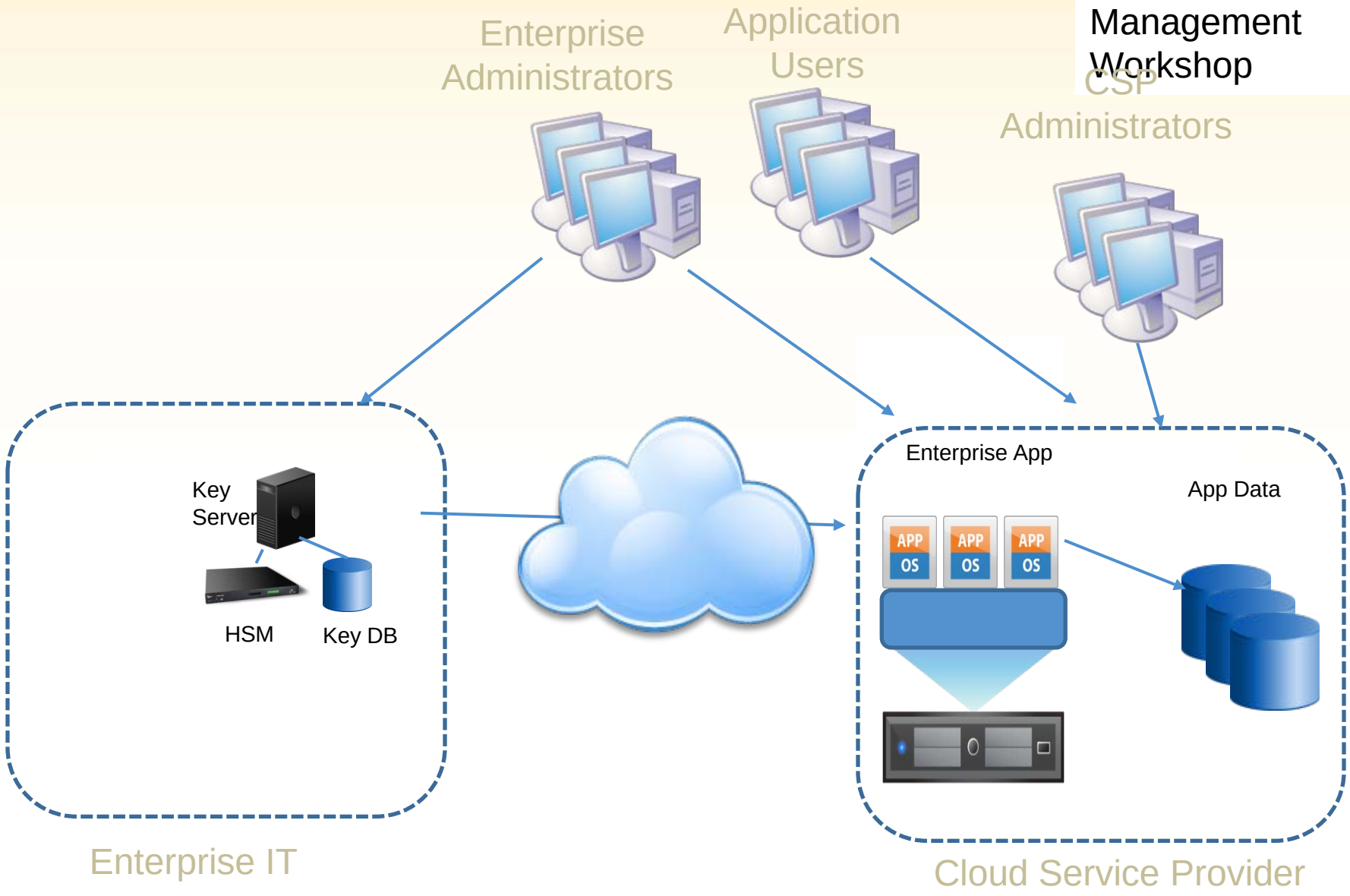

Cross-Domain Security Issues in Cloud Key Interactions

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- Trust establishment (contractual and on-line)
- Ownership of keys
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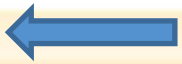

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  - QKD
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A Hardware Security Module is…

…a dedicated crypto processor…

…designed for protection of the crypto key lifecycle…

…validated for security by third parties…

…a Trust Anchor…

Virtualized Hardware Security Modules

Designed for Multi-tenancy

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HSM/KM in Separate Domain from Apps

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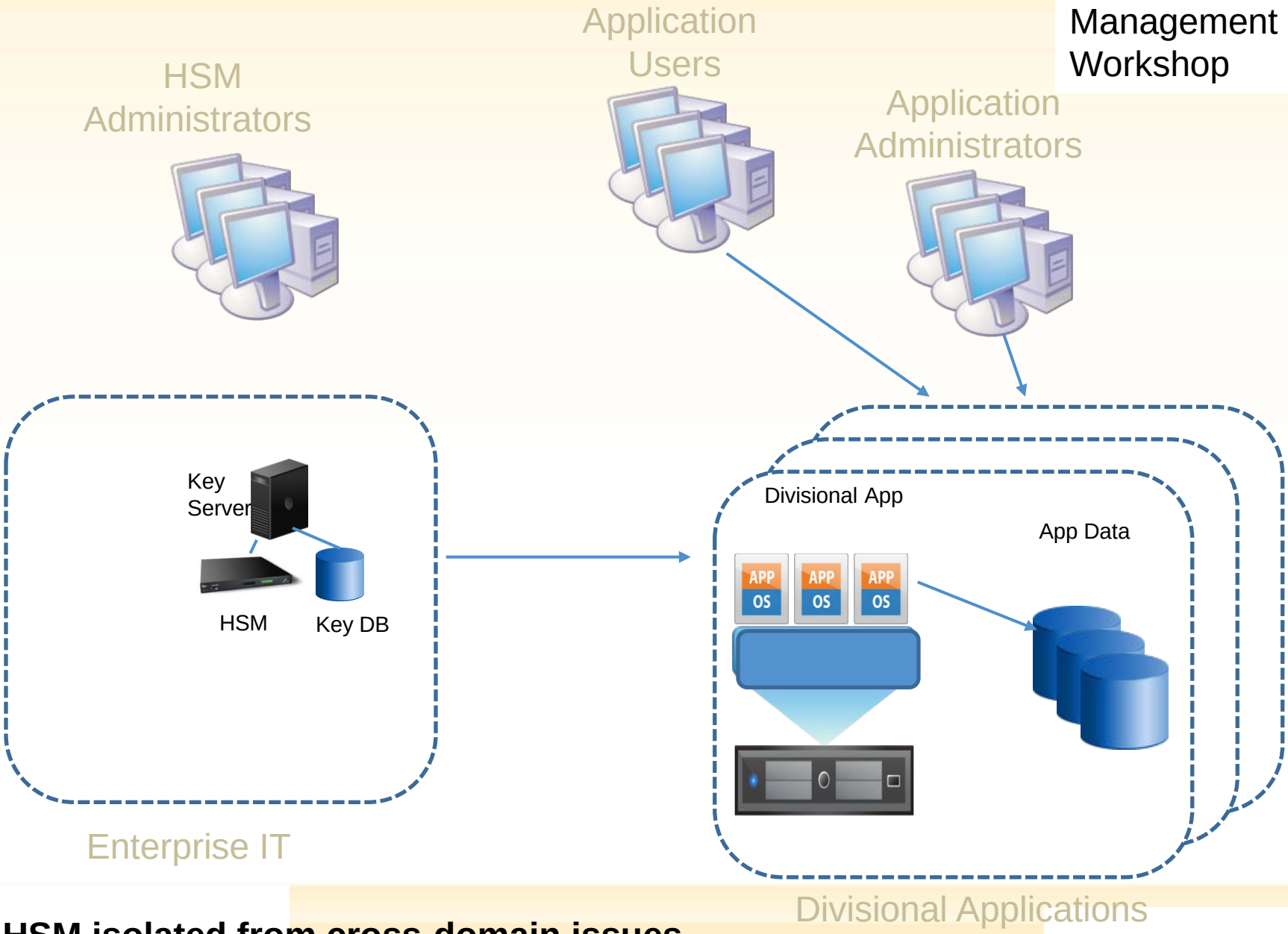
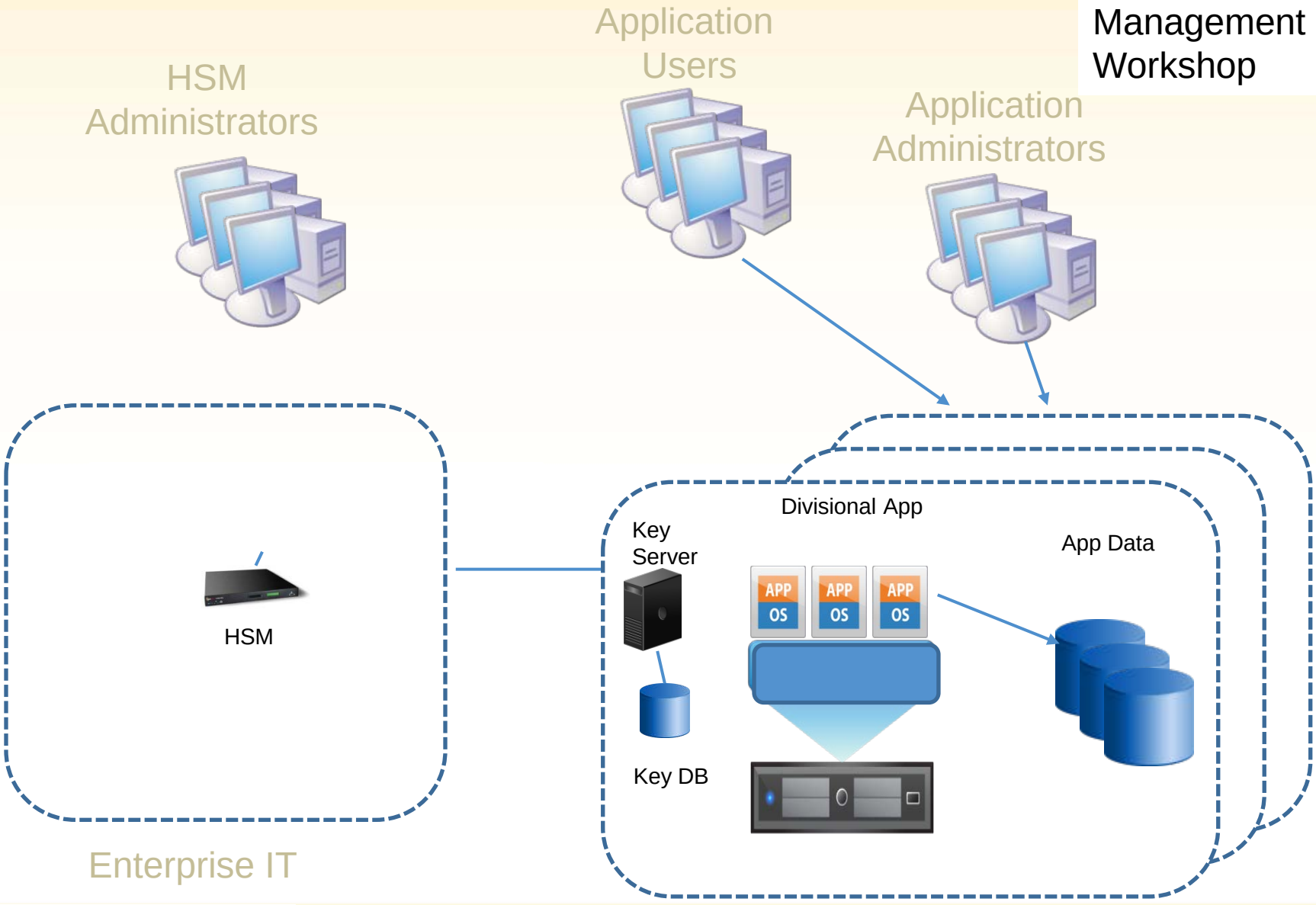


HSM isolated from cross-domain issues

HSM in Separate Domain from KM



Cross-Domain Security Issues in HSM Interactions

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Quantum Key Distribution

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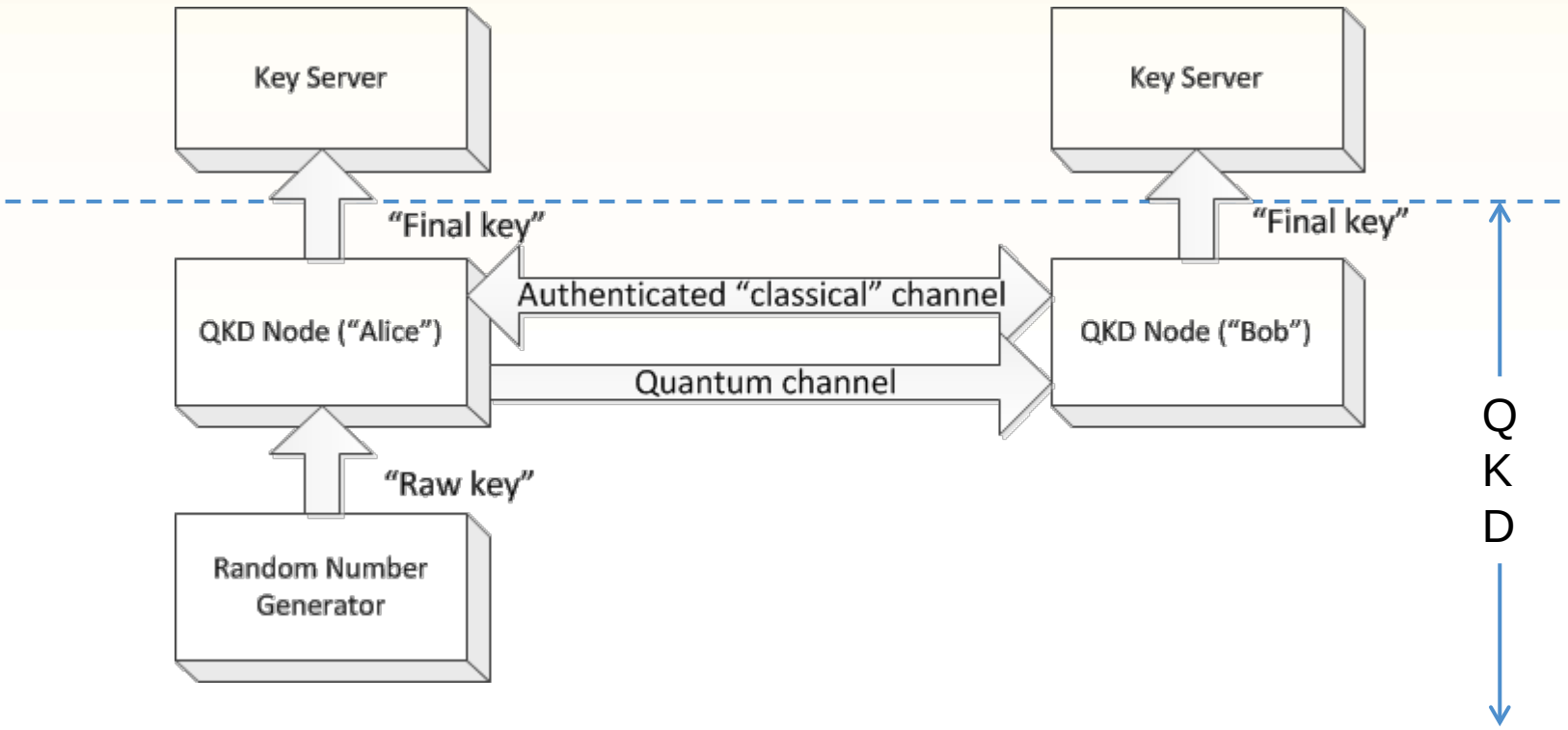

Raw key: True random

Final key: Secure, secret, replicated, synchronised true random

Key Streams and Periodic Keys

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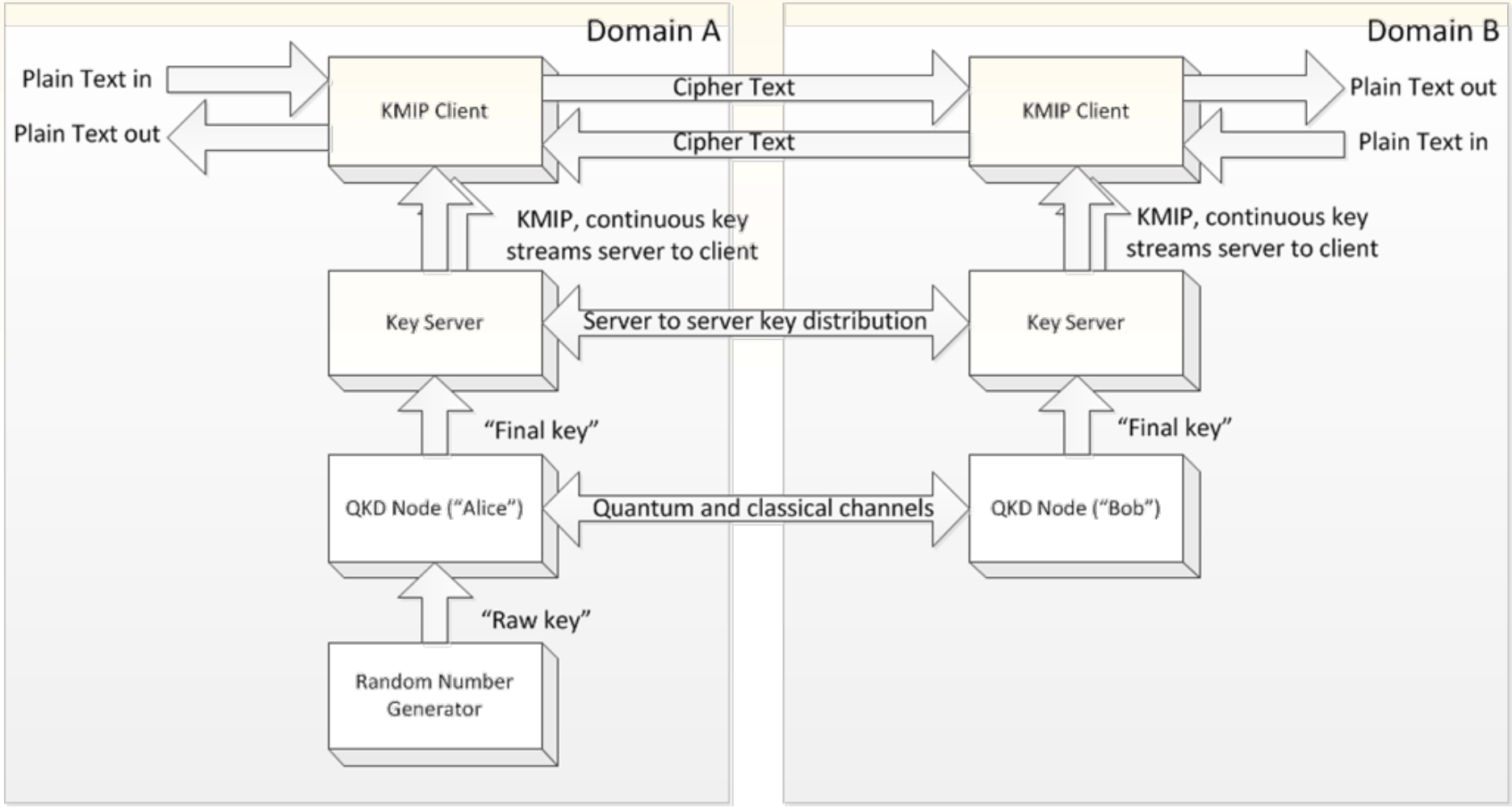

Server: Replicated, synchronised keys across domain boundaries
Client: KMIP operations with key server in same domain

Individual Keys

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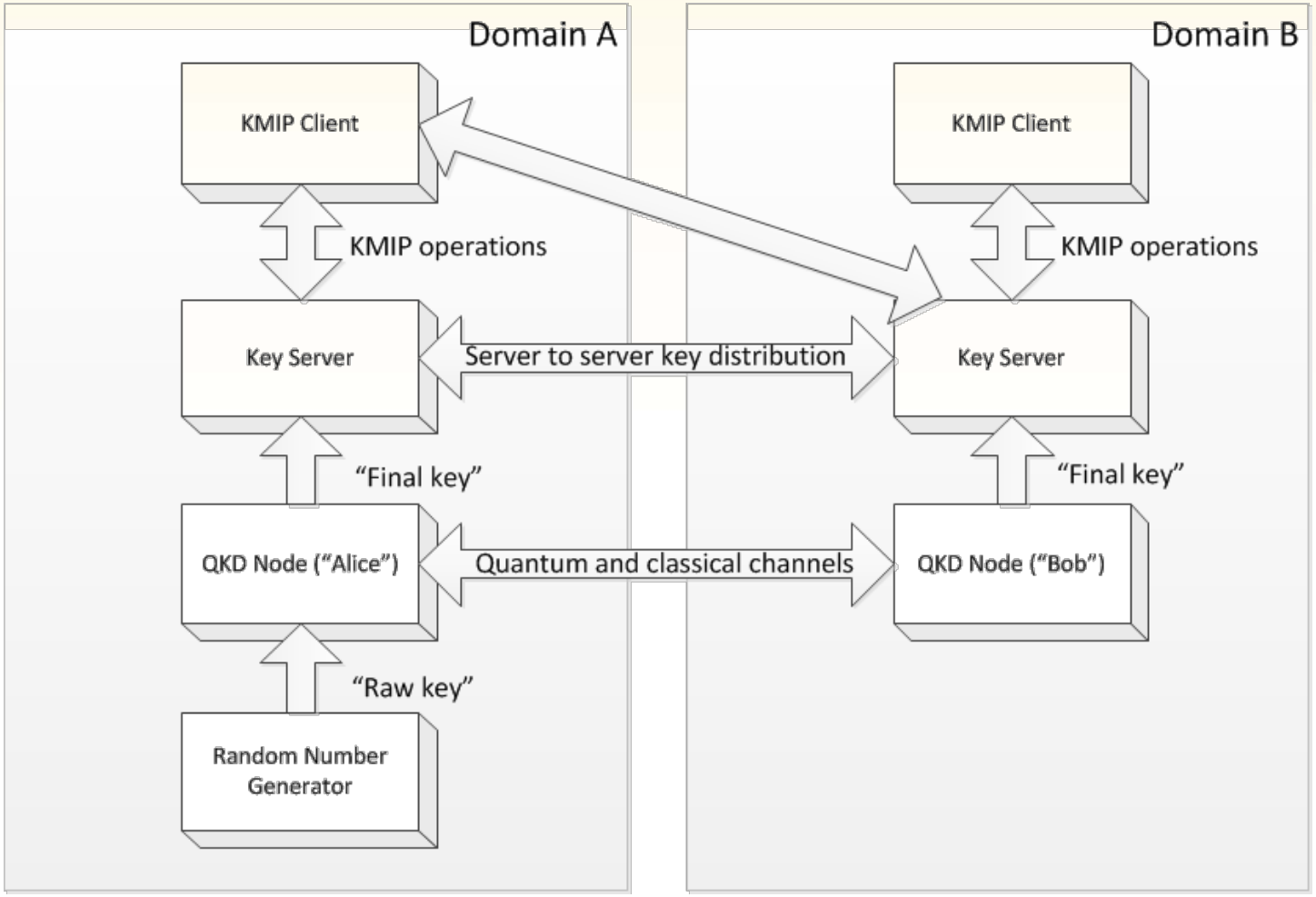

Server: Replicated, synchronised keys across domain boundaries
Client: KMIP operations with key servers in different domains

Cross-Domain Security Issues in QKD Interactions

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Open Discussion of Cross-Domain Security Issues

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Thank you!