Distributed Network Management Security

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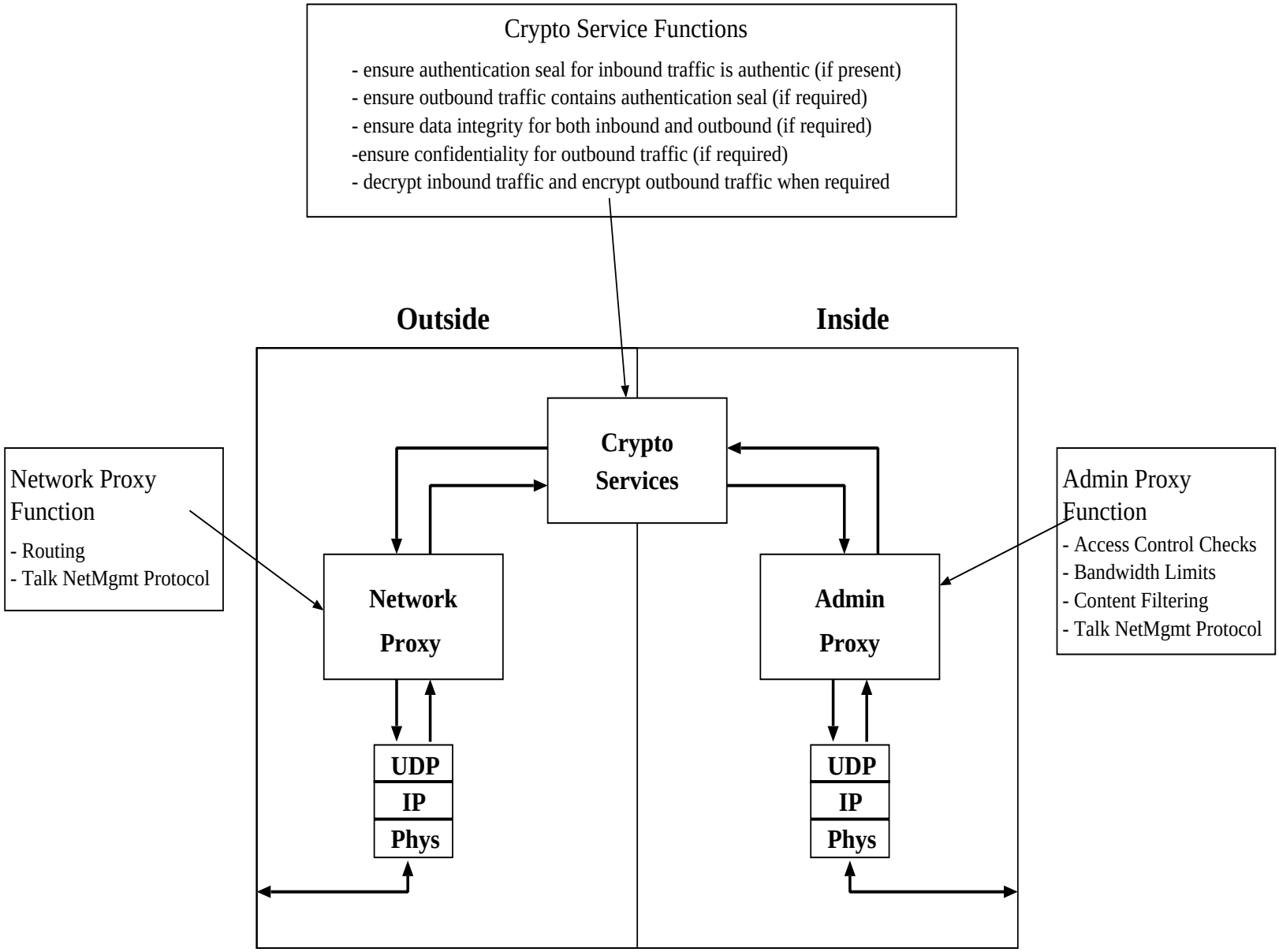
Problems with SNMPv2 Security

- Scalability with RFC 1441 - 1452
- Migration from existing SNMPv1 base
- Key Management
- The SNMPv2 ‘meltdown’

DNMS Solution

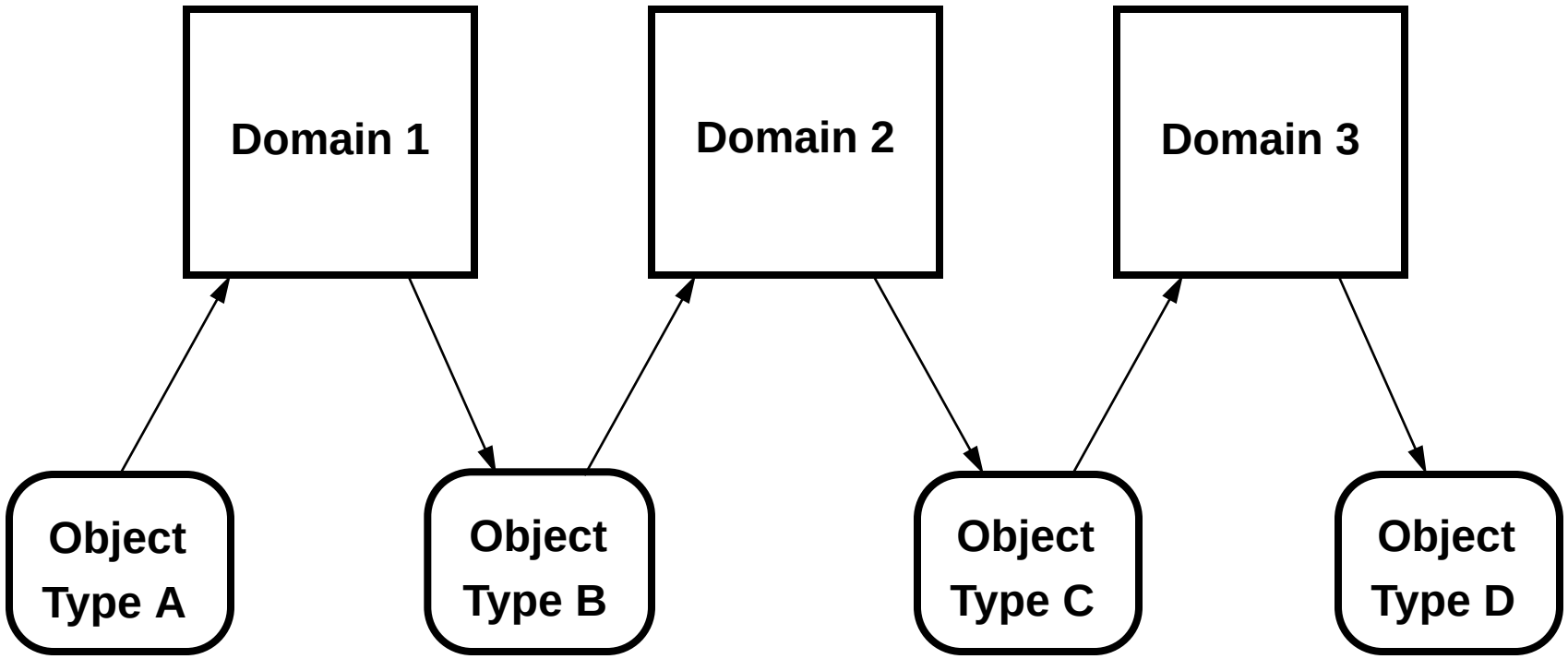
- Place SNMP Security Services on Firewall
- Add use of certificates for keys
- Allow SNMPv1 messages
- Autodetection of Management Entities
- Architecture on following slide


Crypto Service Functions
- ensure authentication seal for inbound traffic is authentic (if present)
- ensure outbound traffic contains authentication seal (if required)
- ensure data integrity for both inbound and outbound (if required)
-ensure confidentiality for outbound traffic (if required)
- decrypt inbound traffic and encrypt outbound traffic when required
Outside
Inside
Crypto Services
Network Proxy Function
- Routing
- Talk NetMgmt Protocol
Admin Proxy Function
- Access Control Checks
- Bandwidth Limits
- Content Filtering
- Talk NetMgmt Protocol
Network Proxy
Admin Proxy
UDP
IP
Phys
UDP
IP
Phys

Type Enforcement

- Type Enforcement is a form of mandatory protection
- Similar to ‘multilevel security’ but more flexible
- Access rules based upon ‘domain’ and ‘type’
  - ‘domain’ is a program’s security attribute
  - ‘type’ is a data item’s security attribute
- Access is forbidden unless a rule specifically allows it
  - Accesses can be read, write, execute, create, destroy, chtype, etc.
- Network separation can be guaranteed via Type Enforcement

Pipelines in Type Enforcement



DNMS Use of Type Enforcement

- Each DNMS component runs in a distinct domain
- Network and Admin proxies defined only to external or internal network
- Message flow constrained through crypto proxy
- DNMS has no access to local management data
- Aids in future assurance of operation

Future DNMS Work

- Further use of centralized Key Management
- Add notifications (Traps and v2 Informs)
- Utilize SNMPv3
  - May move much of crypto services to network and admin proxies
- Really do autodetection
- Investigate use of network-level encryption in conjunction with DNMS/SNMP authentication.

DNMS as an SNMP Guard

- Add Access Control to flow
- Filter by SNMP views and objects
- Add filtering of content