ICN Control Signaling

Thomas C. Schmidt

t.schmidt@haw-hamburg.de
Problem Statement

• Need to disseminate control information
  • ChronoSync often used by routing protocols
  • Problem: Interests are broadcasted to trigger dissemination

• Need to propagate unscheduled content updates
  • Alert, call, publishing announcement
  • Problem: Various push-type primitives proposed
    (that impose security threats and counteract routing)

• Separation of control and data messaging
  • Interest-Data live on the protocol data plane
  • Problem: protocol control plane superimposed by semantic overloading
Use Cases

• Prefix + Name advertisements to populate FIBs
• Name/Content advertisements for triggering update alerts
• Network information
• Network bootstrapping & management
• ...
What did We Hear Today?

• „Inverted Interest“
• „Special Interest“
• “CCNInfo Request/Reply”
• “Update Package”
• “ICMP” Package
• “RPC” Method
• “Register”
• …
Control Plane?

Wanted:

• A clean message design for
  • Control state transfer
  • Alerting of errors or informational

• Between neighboring hops
  • No new attack surface
  • No new routing or forwarding logic

• Dedicated (appropriate) processing in the stack
  • No unwanted transactional state
  • No intermingling with Interest-data communication logic
Do We Need an 'ICMP' Packet?

- **Interest:**
  - Opens transaction state, expects response

- **Data:**
  - Stuck down the stack without open request (transaction state)

- **Control?**:
  - Processed within the stack – not delivered to application (but: AL-interface triggers possible)
  - No forwarding – packet discarded after local processing
  - Type differentiation – crisp semantic constraints on state access and stack operations
Quo Vadis?

• Do we need/want work on third control packet?
Backup: Considered Harmful

• Push packet
  • This just breaks the paradigm

• Persistent Interest/persistent subscription (COPSS)
  • Implements a persistent data path (for DDoS)
  • Can cause broadcast disasters (the pushme-pullyou case)

• Interest notification (data in Interest, Ack in ‘data’)
  • `Push light` packet
  • Again breaks the paradigm