ICN Control Signaling

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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