Ack Messages for ICN

Mark Stapp, Cisco CCNxCon, May 2015

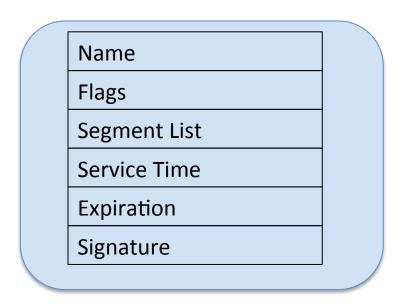
Introduction

- Application service time vs network RTT
- Application-scale Interest ttls
 - Block retransmissions (from all clients)
 - Impact on PIT size
 - May be correct for first Interests, where server has to retrieve and/or compute
- Network RTT Interest ttls
 - May lose PIT path before server/peer can respond
 - Short ttls as DoS vector?
 - PIT entry exhaustion/turnover/churn
 - May be correct for subsequent Interests, where server has results available
- What should the Interest ttl be?
- Could explicit signalling help applications and routers?
 - Cue the InterestAck...

InterestAck Properties

- Follow but do not consume the PIT path
- Compact message; try to avoid disrupting flow balance
- Ack multiple Interests for different segments/chunks
 - Use a list of segment numbers, or a base value + bitmap
 - Server processing is often 'batched'
- Can have a TTL, can be cacheable
 - Benefits multiple clients
- Can convey info useful to application, like server load, estimated service time
 - Can help tune subsequent Interests' TTLs
- Coordination between stack/OS and application
 - Distinct from TCP Ack

InterestAck Packet



- Explicit Packet/Message Type
- Name
 - Match Interest name
 - Hash form for compression; use flag, or dedicated name prefix: /intack/[HASH]
- Multi-Interest Ack using list or bitmap of segment numbers

InterestAck Packet (2)



- Service Time hint
 - Example of additional info in TLVs: Server Load, e.g.
 - Support alternate/redirect a la "thunk" ?
- Expiration or TTL
- Signature block
 - May be pre-generated?
 - Unsigned form also permitted if useful?

InterestAck ... Is Not Enough

- If clients' Interests share names and meet, they may still share (ttl) fate
 - Long PIT entry ttls block retransmissions
- PIT processing needs to allow retransmissions at some interval
 - Still difficult to determine a value that will not lead to blocking of ordered traffic
 - May need to be dynamic, incorporating policy, load, redundancy status, prefix-specific info

Summary

- Difference between application service time and network RTT is a problem
- InterestAck allows for explicit signalling
 - Can also convey info of use to application and/or network stack
- Still need enhancements to PIT processing simplistic version is not adequate
- Futures: relationship with NFN "thunk," manifests