DHCPv6 Failover Update
IETF85

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DHCPv6 Failover Grand Plan

- **Step 0:** Redundancy considerations
  - Submitted -03 that addresses raised IESG issues (done?)
  - Waiting for IESG to proceed

- **Step 1:** Requirements document (info)
  - WGLC in progress
  - Received several comments (clarification style)
  - Publish -03

- **Step 2:** Design document (std)
  - WG item, published -02
  - Text complete (no major missing parts)
  - Asking for review/comments

- **Step 3:** Protocol document (std)
  - Todo

Possible extension drafts
DHCPv6 Failover Requirements

- WGLC announced Oct. 22, end by Nov. 12
- No comments so far
DHCPv6 Failover Design
Overview

- -02 posted on Oct. 22, 2012
- Fulfills all requirements specified in failover-requirements-02
- Based on v4 failover draft, but simplified
- Hot standby (Active-passive only)
- No load balancing in design spec
  - likely extension
  - some provisioning ready
  - common state machine for base and load balancing

draft-ietf-dhc-dhcppv6-failover-design-02
DHCPv6 Failover Design
Major Concepts / Sections

- Lazy Updates for performance -> MCLT
- Failover Endpoint state machine
- Lease state machine additions
- Binding updates + conflict resolution
- TCP Connection management
- 2 Resource Allocation Algorithms
  - Proportional
  - Independent
- DDNS considerations
- Lease reservation
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Communication

• Communication over TCP
• Reuse bulk leasequery framing, with new failover specific message types
• TLS usage (optional)
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Messages

Connection management:  
CONNECT, CONNECTACK, DISCONNECT

State notifications:  STATE

Individual Lease updates:  BNDUPD, BNDACK

Lease Update Requests:  
UPDREQ, UPDREQALL, UPDDONE

Pool requests:  POOLREQ, POOLRESP

Application level keep alive:  CONTACT
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Resource Allocation

Two algorithms defined

Proportional allocation (“IPv4 failover-style”)
1. Pool may need to be rebalanced.
2. Only unleashed resources are owned by specific server.
3. Useful for limited resources (e.g. prefixes)
4. Released/expired resources return to primary
DHCPv6 Failover Design
Resource Allocation

Independent allocation ("simple split")
1. Useful for vast resources (e.g. /64 address pool)
2. All resources are owned by specific server.
3. Pools are never rebalanced.
4. Released/expired resources return to its owner.
5. Simpler, but MCLT restrictions still apply.
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Synchronized Update

DHCPv6 Client  DHCPv6 Server  Failover Partner

SOLICIT  ADVERTISE  BNDUPD  BNDACK
REQUEST  REPLy
DHCPv6 Failover Design
Lazy update

DHCPv6 Client  DHCPv6 Server  Failover Partner

- SOLICIT
- ADVERTISE
- REQUEST
- REPLY

Crash?

- BNDUPD
- BNDACK
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Maximum Client Lease Time Time (MCLT)

The maximum difference between lease time known by a client and the lease time acknowledged by the failover partner.

Useful in communications-interrupted

- Server does not know if its partner extended any lease
- It knows that its partner could extend by at most MCLT
- To be on the safe side, server assumes that ALL leases were extended by MCLT.
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Next steps

1. Comments are more than welcome
2. Working toward WGLC (needs more review)
3. Start work on protocol draft details (messages, options)
Thank you
Backup
MCLT example

Cast: Client, Server, (Failover) Partner

Valid lifetime = 3 days, MCLT = 1 hour

1. Client asks for an address.
2. Partner ack'd lease time is 0.
3. Client gets 0+MCLT = 1 hour
4. Server updates its partner with 3 days + ½ hour.
5. Partner acks.
6. 30 minutes passes and client renews.
7. Partner's ack'd time is 3 days now.
8. Client receives renewed lease with valid lifetime 3 days.
9. Server updates its partner with expected renewal time (0,5*3 days) + desired potential valid lifetime (3 days) = 4,5 days.
10. Partner acks. Ack'd lease time is 4,5 days.
11. Client renews in 1,5 days and steps 7-10 repeat.