Lightweight 4over6 Deterministic Architecture

draft-farrer-lw4o6-deterministic-arch

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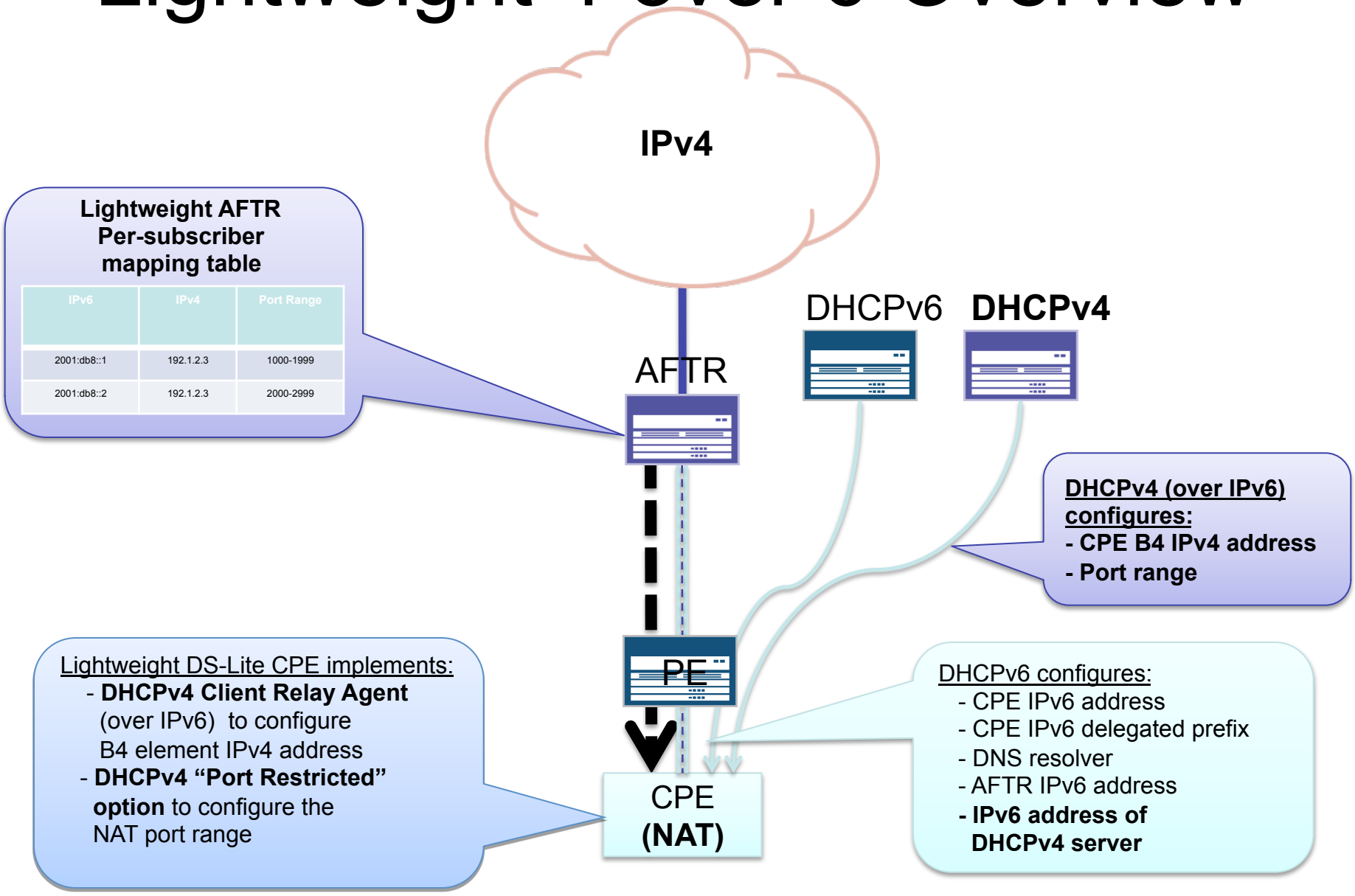
I. Farrer, A. Durand

Motivation

- Scaling an lwAFTR implementation for 100Ks+ users with 100sGbs of 4over6 traffic
  - Current implementations of lwAFTRs for tunnel encap/decap provide upto 10s of Gbps each
- Scaling through many isolated lwAFTR implementations has a number of problems
  - Managing many lwAFTRs, each with unique provisioning overheads
  - Adding lwAFTR redundancy to this model results in large amounts of wasted hardware
  - Adding/removing packet forwarding capacity requires service impacting changes and CPE reconfiguration

Lightweight 4 over 6 Overview



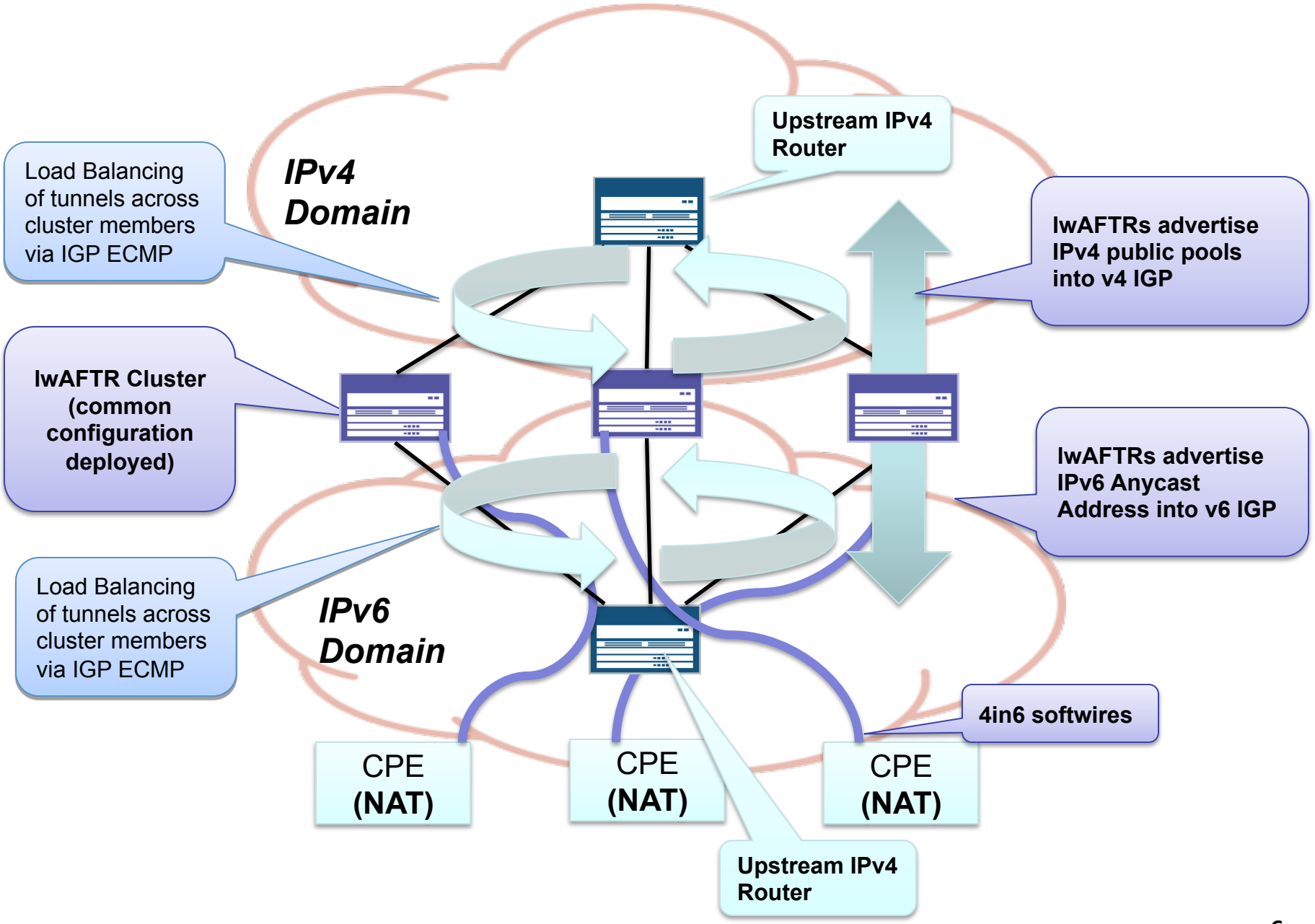
Key Characteristics for the Deterministic Architecture

- Use the per-subscriber stateful nature of Lightweight 4 over 6 to parallelize lwAFTR functionality
  - Architecture is suitable for use by any softwire concentrator that is not per-flow stateful (e.g. not suitable for regular DS-Lite)
- Avoid the use of an additional layer of dedicated load balancing infrastructure
  - Load balancing is achieved using Equal Cost Multipath routes to between the lwAFTRs and the upstream/downstream routers
- lwAFTRs can be added/removed with minimal service impact
  - Only IGP reconvergence is required
- Enables an active/active resilience model for the lwAFTRs
  - Avoids the 1+1 resilience that isolated implementations would need

Deterministic Architecture Reqs.

- lwAFTRs are grouped into clusters
- All cluster members share common
  - Subscriber binding table (binding IPv4+restricted port range to IPv6 address)
  - IPv6 anycast address (used as lwAFTR tunnel endpoint)
  - Pools of reachable user public IPv4 addresses
- lwAFTRs participate in IGPs with the upstream (IPv4) and downstream (IPv6) routers
  - IGP must support Equal Cost Multipaths (ECMP)
- An IPv6 Anycast addresses is used as the tunnel endpoint address
  - This must be associated with a logical/loopback interface on the lwAFTR

Lw4o6 Deterministic Architecture



Lw4o6 CPE Cluster Provisioning