Address claiming protocol feasibility exploration

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8 September 2015

FCoE Address Claiming Protocol

- FCoE (Fibre Channel over Ethernet) has a protocol it uses to enable end nodes claiming local addresses.
- These following slides from a presentation to INCITS T11 cover part of that protocol that could be adapted to a generic address claiming protocol

Presented to IEEE 802.1 DCB and Security meeting on Local Addressing, 8 Sept 2015. Comments by Pat Thaler regarding applicability to a generalized address claiming protocol.

VN2VN Multi-Point ~~and Point-to-Point~~

T11/10-156v0, March 2010

Claudio DeSanti, Cisco
Erik Smith, EMC
Bob Nixon, Emulex
John Hufferd, Hufferd Enterprises

Roger Hathorn, Lou Ricci, IBM
Fred Knight, NetApp
Craig Carlson, QLogic

Terminology

N_Port_ID is a 24-bit value used in the lower 24 bits of an FCoE end node MAC address. The upper 24 bits is a fixed value in the local address space.

- **FIP Frames:**

  N_Port_ID Probe Request (multicast to All-VN2VN-ENode-MACs)

  N_Port_ID Probe Reply (unicast)

  N_Port_ID Claim Notification (multicast to All-VN2VN-ENode-MACs)

  ~~P2P Claim Notification: a N_Port_ID Claim Notification with the P2P flag set to one (multicast to All-PT2PT-ENode-MACs)~~

  N_Port_ID Claim Response (unicast)

  ~~P2P Claim Response: a N_Port_ID Claim Response with the P2P flag set to one~~

  N_Port_ID Beacon (multicast to All-VN2VN-ENode-MACs)

  formerly VN2VN Advertisement

  ~~P2P Beacon: a N_Port_ID Beacon with the P2P flag set to one (multicast to All-PT2PT-ENode-MACs)~~

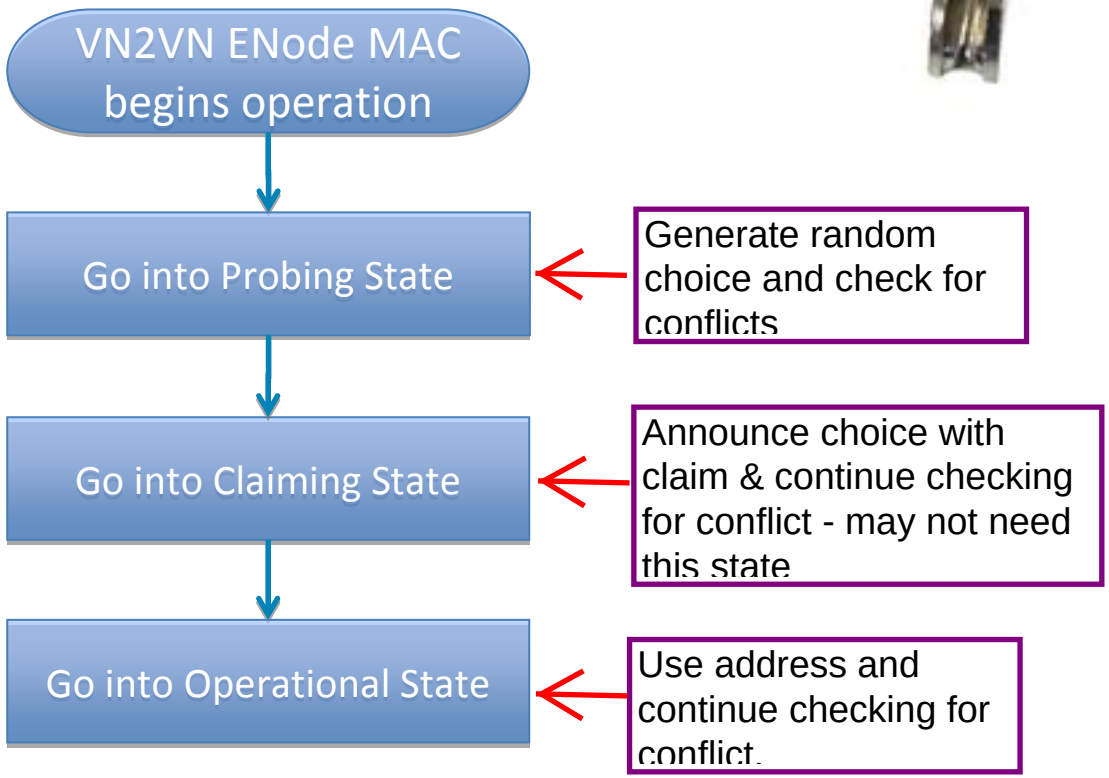
- **LUID: Locally Unique N_Port_ID**

Agenda

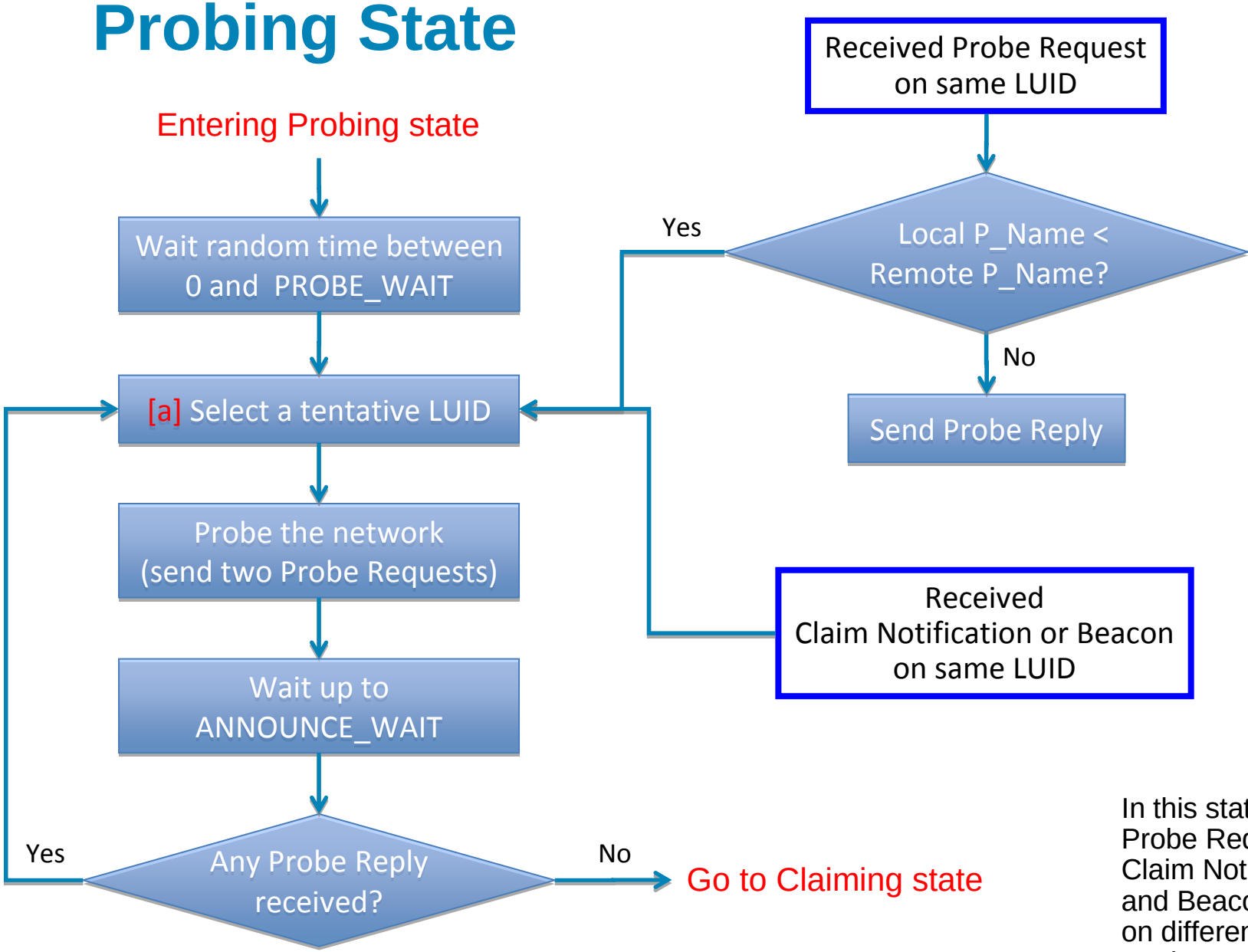
- **VN2VN Operation**
- ~~**PT2PT Operation**~~
- ~~**Combined Operation**~~

Point to point (PT2PT) operation is a special case that applies to FCoE. It doesn't apply to a generic address claiming mechanism so only the VN2VN slides are presented.

VN2VN Operations

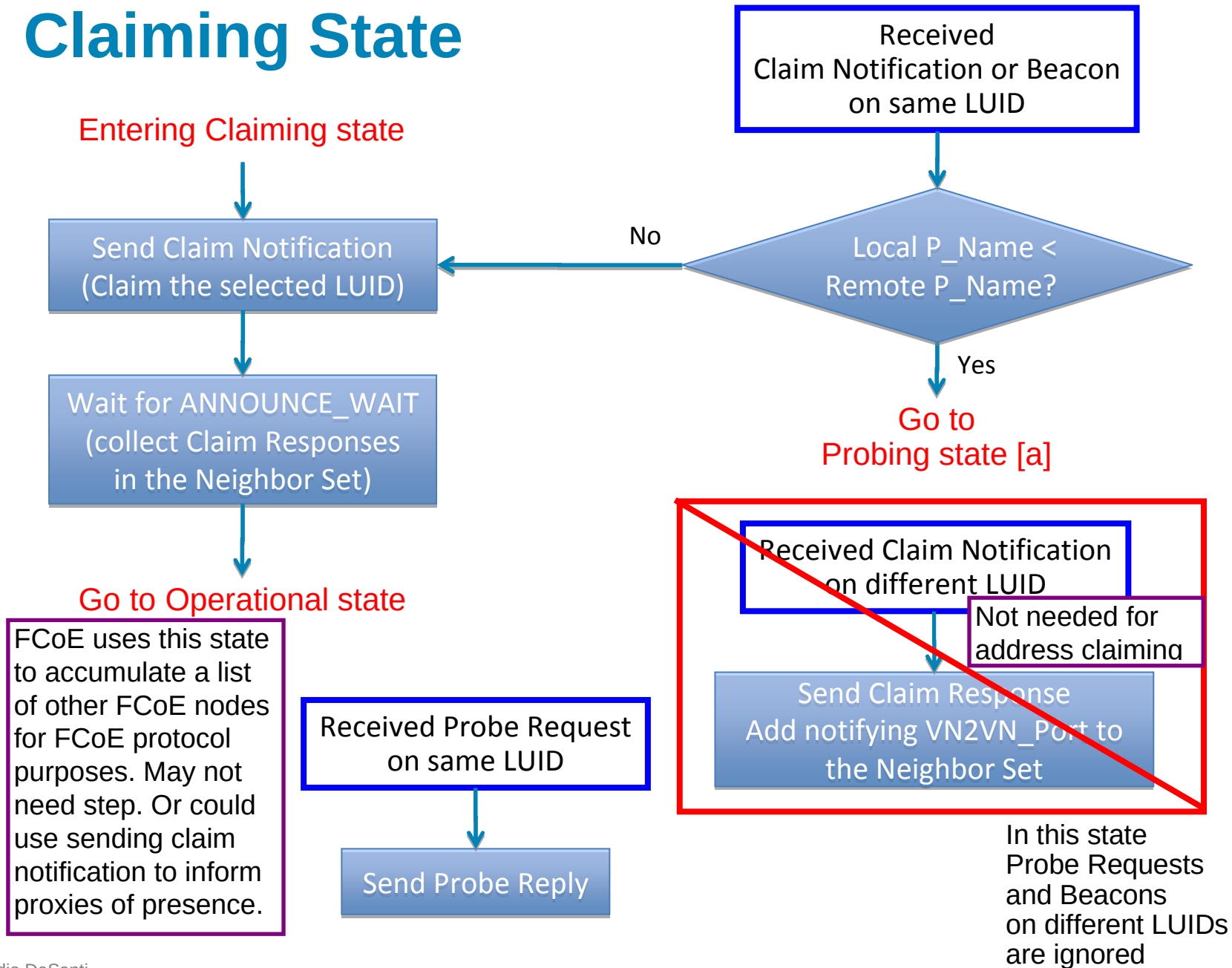


Probing State



In this state Probe Requests, Claim Notifications, and Beacons on different LUIDs are ignored

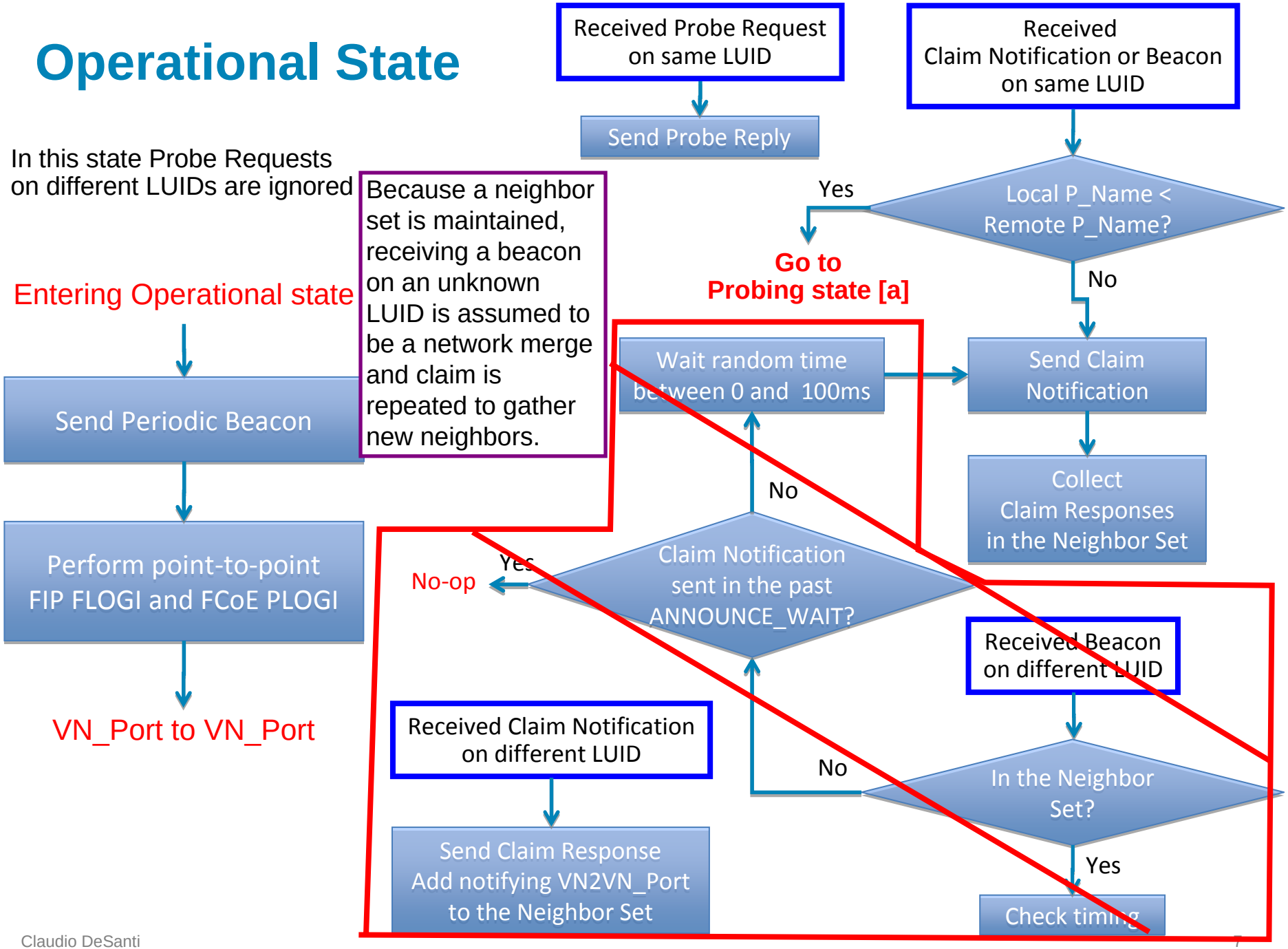
Claiming State



Operational State

In this state Probe Requests on different LUIDs are ignored

Because a neighbor set is maintained, receiving a beacon on an unknown LUID is assumed to be a network merge and claim is repeated to gather new neighbors.



Thank You

Image Credit
Flickr user Kaeru
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Areas for further project work

- Integrating address claiming and address server protocol
  - An address server could respond to an address claim either
    - To provide an address in its block directly, or
    - To indicate its availability to provide addresses
- Adapting for networks where some participants don't receive traffic from others
  - Some devices (e.g. access points) could act as a proxy, keeping track of the addresses claimed by attached devices and responding to conflicts by sending a claim response
- Adapting for higher loss networks
  - FCoE is designed for using on a Data Center Ethernet which has very low BER and packet loss
  - A protocol for a broader range of networks may need more repeats of packet transmits

Example claiming format

Ethertype	Subtype	Flags
Address block		Candidate
lower address octets	Name Type	Name length
Name		

- Subtypes include Probe, Probe Response, Address request (to server), Address server response and Claim/Beacon
- Name types could include EUI-64, ICC ID random value

Thank You