RBridges:
ARP/ND Optimization

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Issue

- ARP / ND multi-destination frames are a substantial burden on LANs

Layer 2 ½ a natural place

- ARP/ND operates in a layer 2 cloud
- With smart components inside the cloud, and no modification of IP node behavior, can cut down on ARP/ND traffic inside the cloud

What types of things can RBridges do?

- Proxy ARP/ND (if first RBridge thinks it knows the answer), learning from
  - previous ARP/ND replies
  - "deep inspection" of data packets
  - ESADI advertisements (layer 3, layer 2) pairs
- Block the query (e.g., another pending to D, "recent" nonreply from D)
- Unicast the query to the expected D's RB

ESADI review

- End System Address Distribution Information
- Per-VLAN advertisements
- Multicast like a data packet, only received (and explicitly processed) on links with that VLAN
- Optional to transmit, optional to receive
- Currently spec talks about advertising L2 addresses, but the original design allowed also advertising (layer 3, layer 2) pairs

ESADI

- DRB R1 can closely monitor its attached IP nodes without bothering the rest of the cloud, e.g., through

  - Do ARP/ND queries to ensure the endnode is still there

  - Static configuration

- Advertise "definitive" information via ESADI

Blocking ARP/ND Queries

- Defense against obnoxious endnode querying too often

- If multiple sources query for the same destination within some amount of time

- At decapsulating RB R2: If some ports statically configured, R2 need not forward query to ports known not to have D, or if R2 knows (D,x) exists, R2 can proxy respond
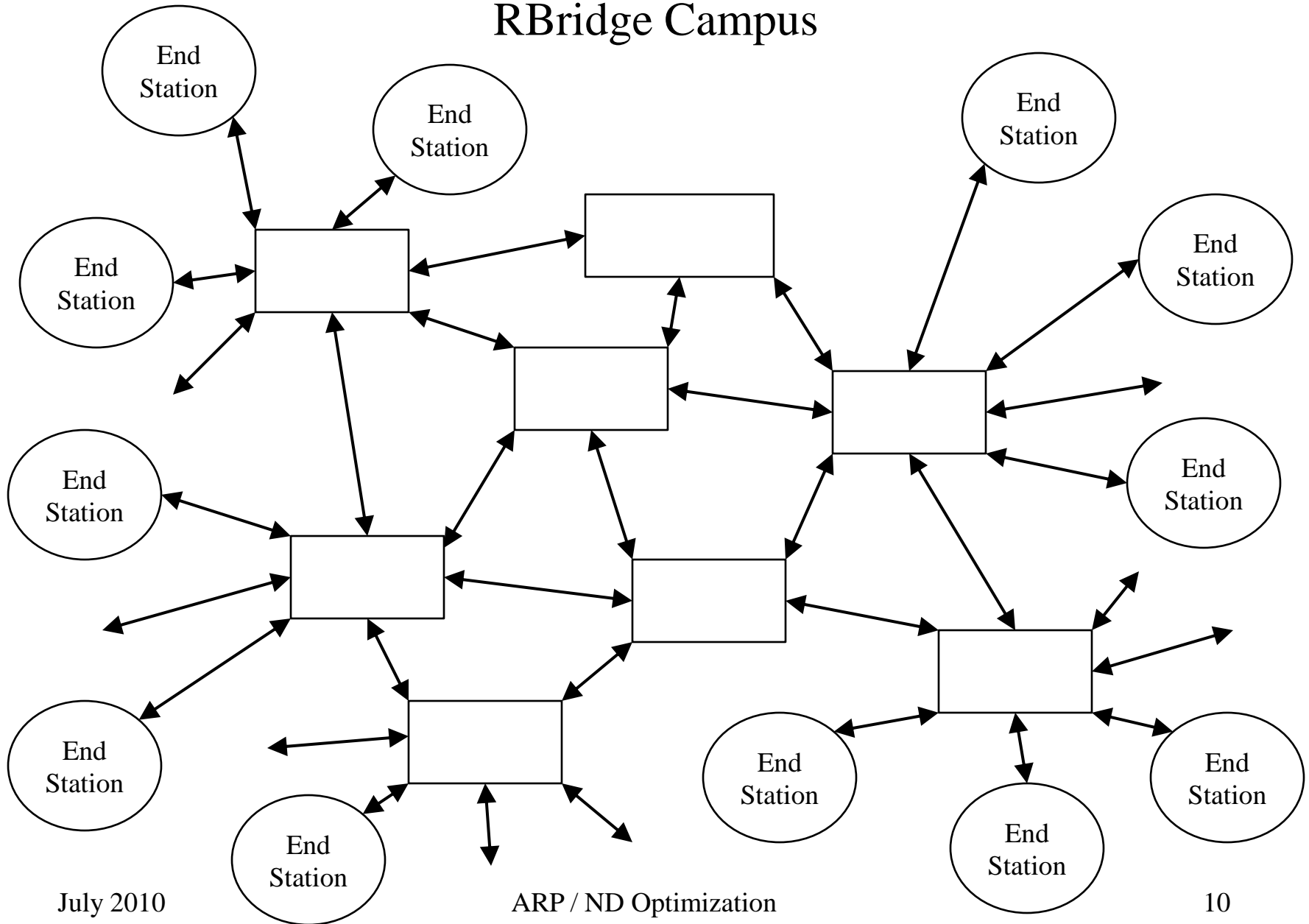
What does "unicasting" a query mean?

- The query, as transmitted by the endnode, is not modified in any way

- The TRILL header
    - Flag showing it is not a multidestination frame
    - First RB = (obvious)
    - Last RB = suspected RB attached to D

- Inside, the ARP/ND query, with Ethernet header = broadcast or multicast dest address

- If destination link is multidestination cloud, ARP/ND query is broadcast/multicast **on that one link**
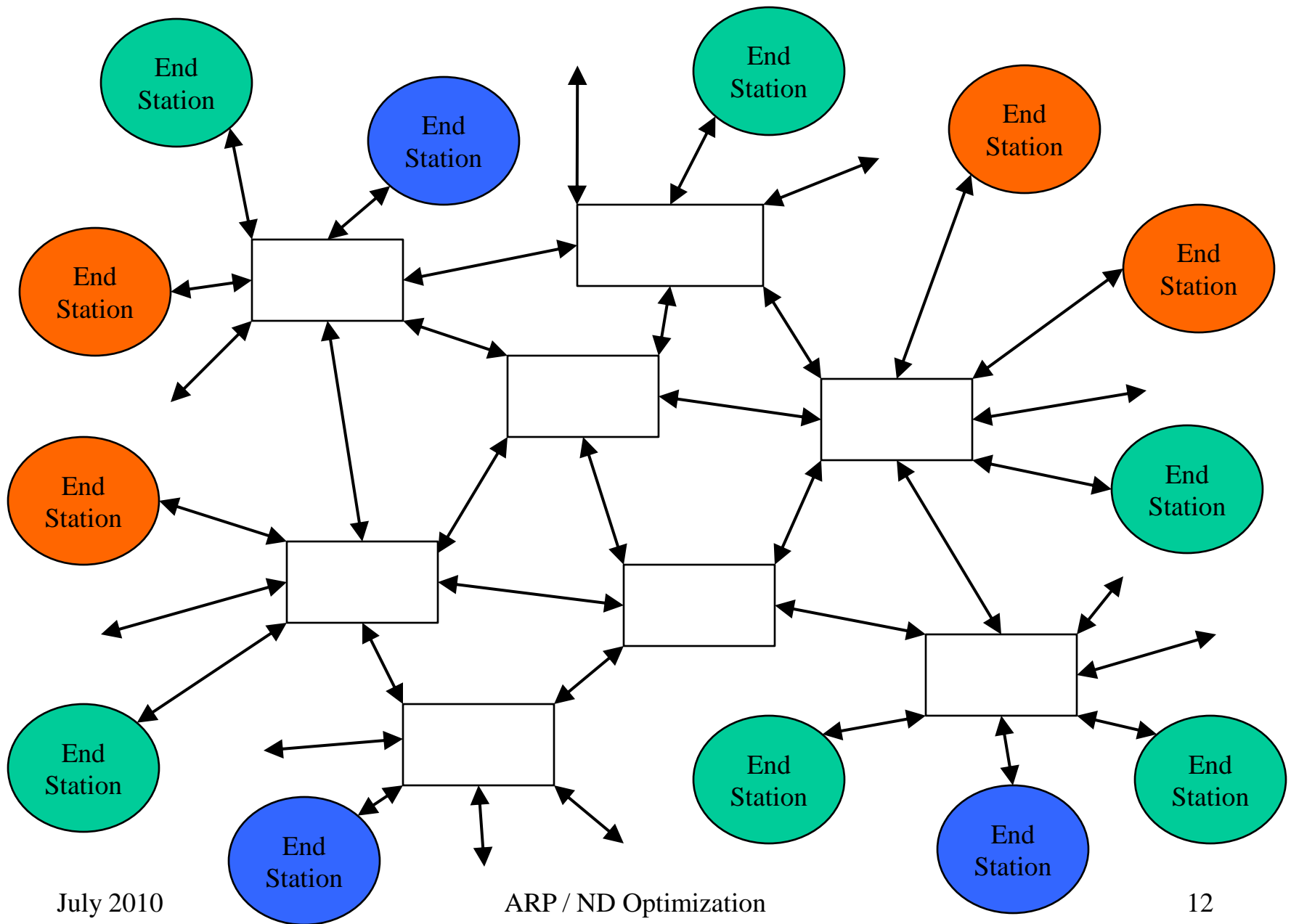
Why Unicast a query?

- Perhaps have timer
- If "small" time has elapsed since (layer 3, layer 2) info learned, confidently proxy reply
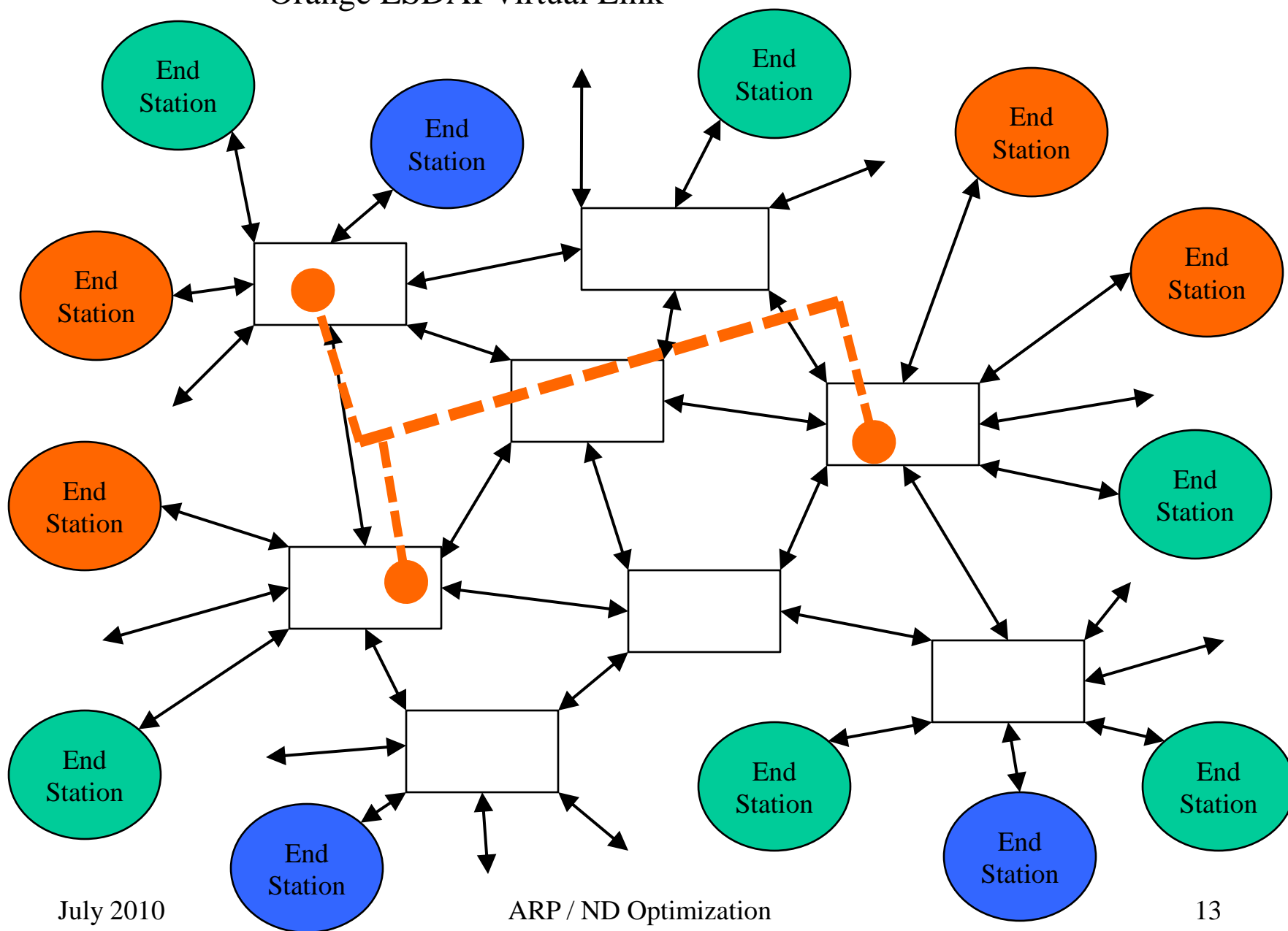- If "medium" time, can verify the cache entry through unicast ARP
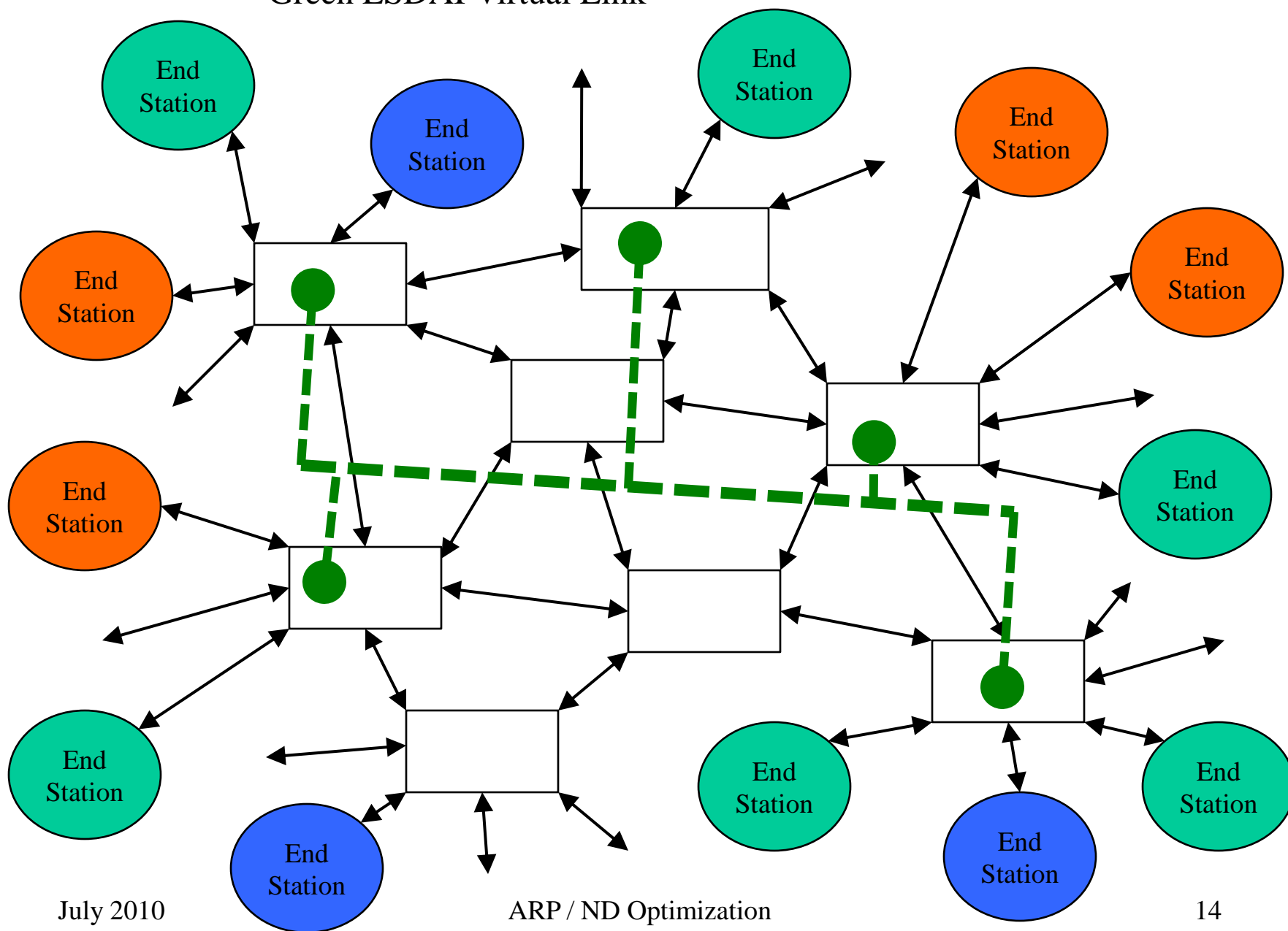
RBridge Campus

ARP / ND Optimization

In the following slides

- Color = VLAN

- Orange and Green use ESADI

- Blue does not

ARP / ND Optimization

Orange ESDAI Virtual Link

Green ESDAI Virtual Link

ARP / ND Optimization

END

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