Enhanced DAD
6man,IETF 82, Taipei

draft-hsingh-6man-enhanced-dad

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Agenda

- Problem
- Mitigation
- Enhanced DAD Algorithm

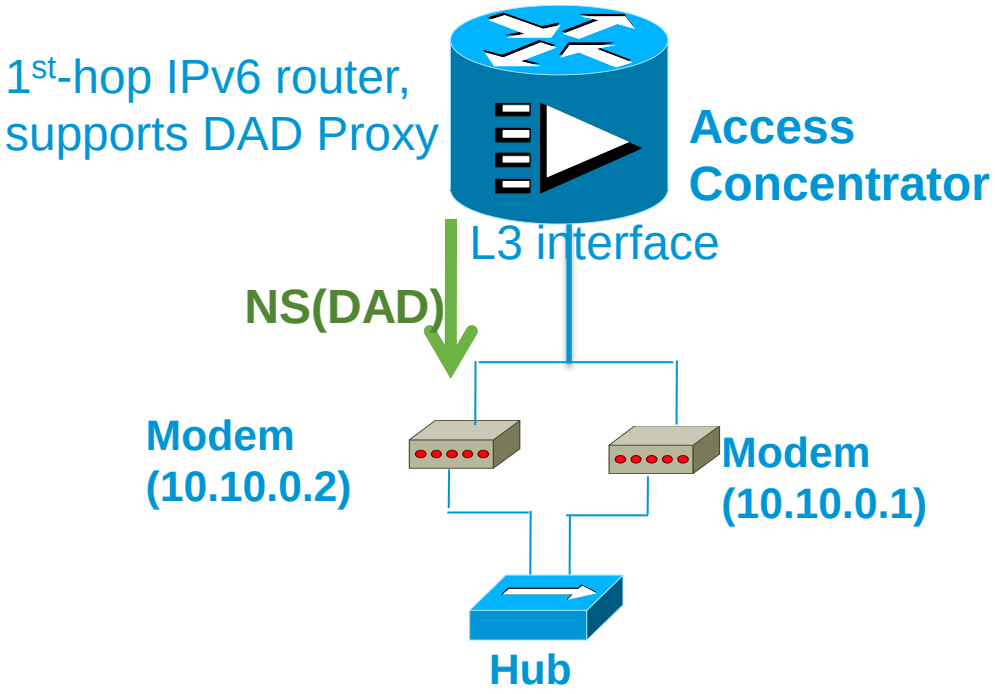
Problem

- Looped back or reflected DAD probe is a well-known problem from Appendix A in RFC 4862.
- The circuit-switch SP community would like IPv6 to self-heal after a network Loopback test is stopped.
- Another SP deployment in cable broadband causes a serious problem due to looped back DAD probe.
- Reflected DAD probes have also been encountered in switched networks.
- 6man has DAD Proxy for a WG work item. Thus broadband access concentrators can now run into serious problems due to looped back DAD probe.

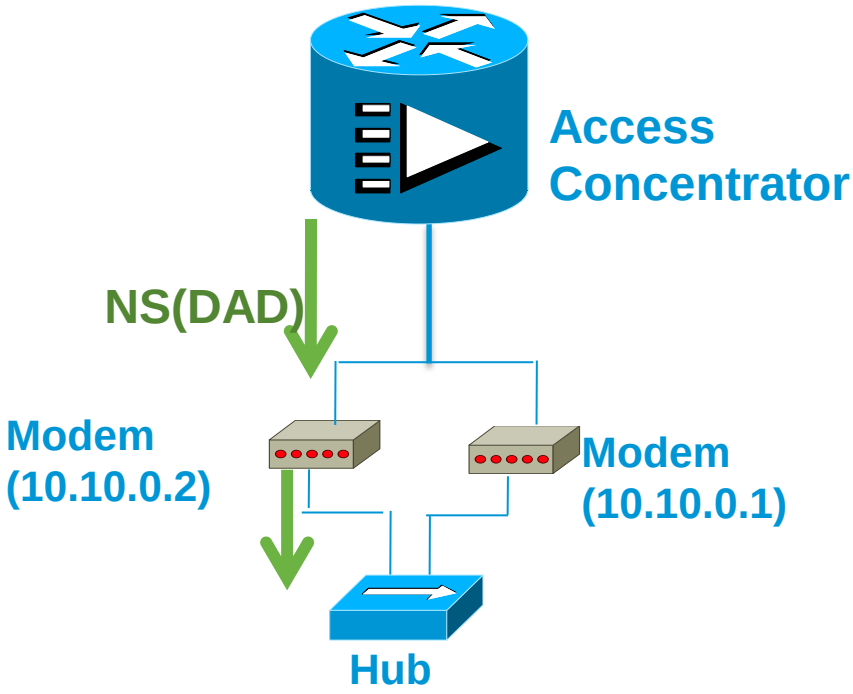
Circuit-switched Loopback

- Loopback testing is underway on a circuit connected to an interface on a router.
- Interface is enabled for IPv6. Interface issues a DAD probe.
- The DAD probe is looped back and interface is stuck in duplicate detected state.
- Loopback testing is stopped. IPv6 still does not self-heal while IPv4 does.
- Manual intervention is required.

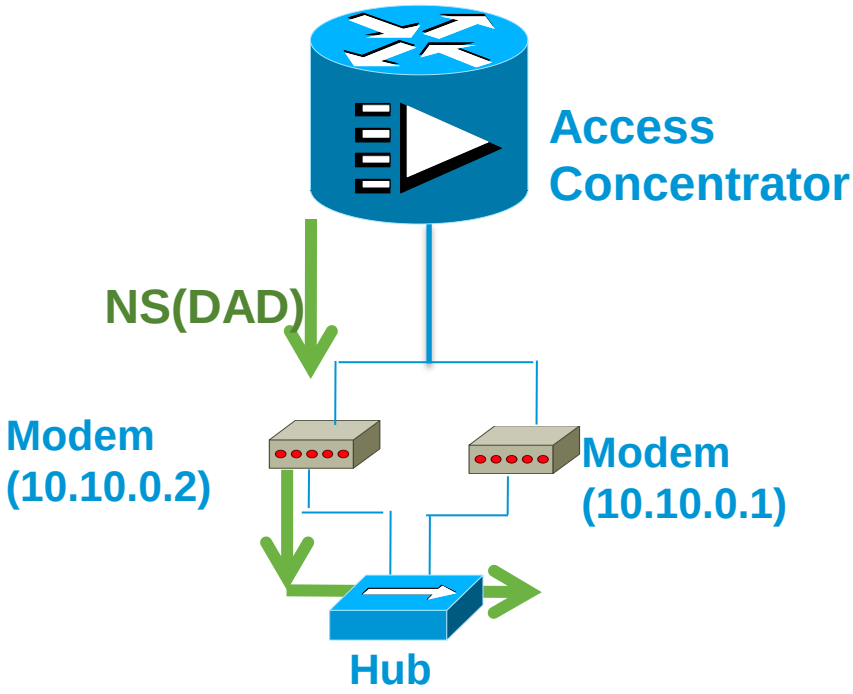
Cable Broadband Problem



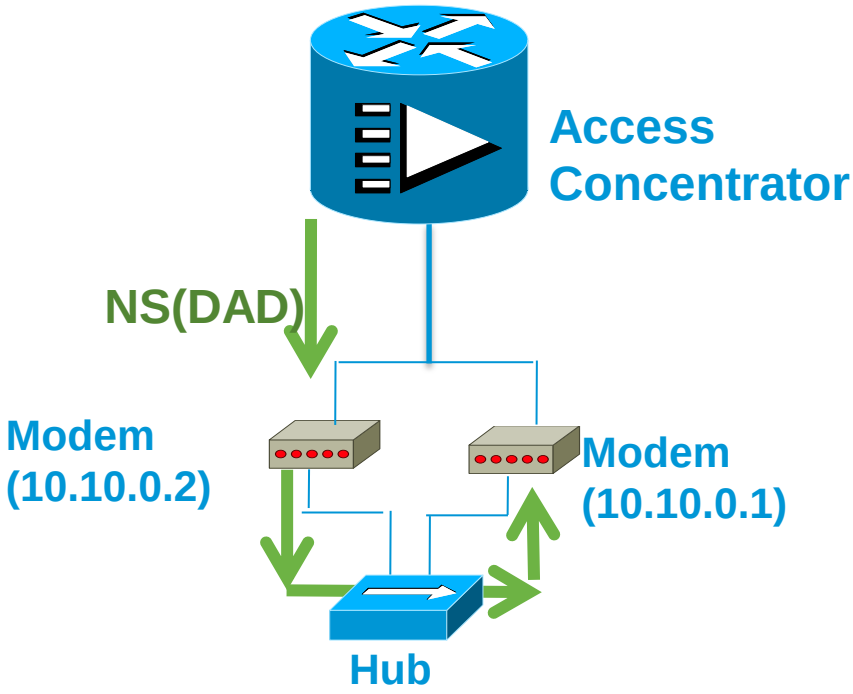
Cable Broadband Problem



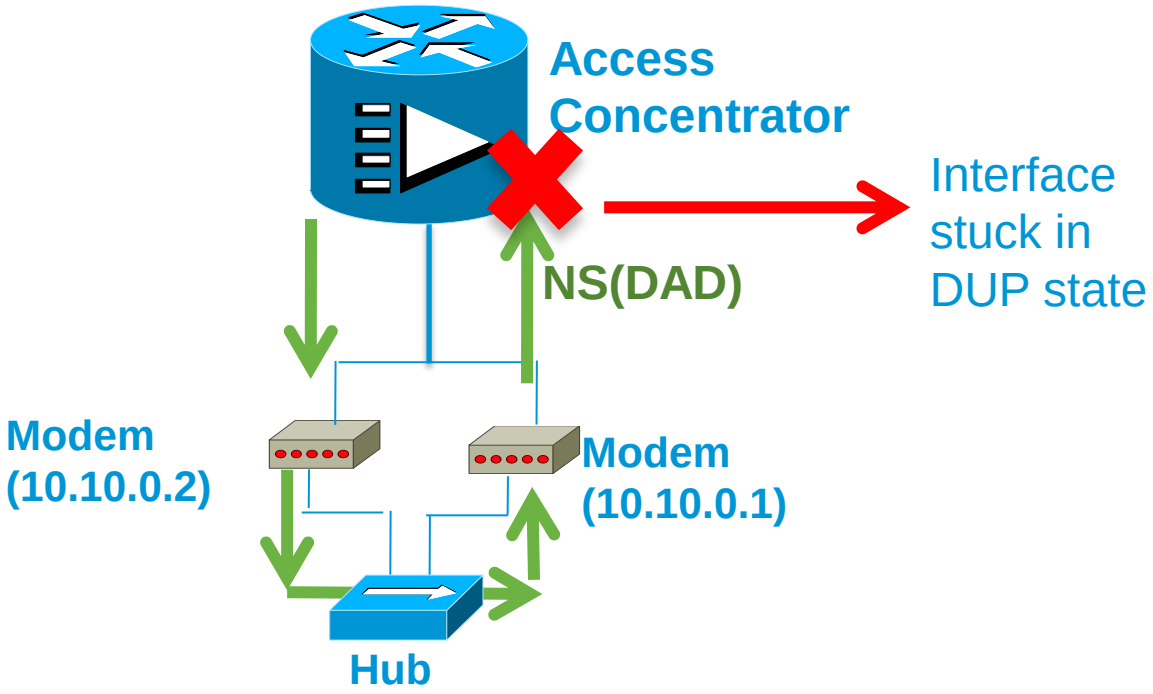
Cable Broadband Problem



Cable Broadband Problem



Cable Broadband Problem



Mitigation

- Disable DAD operation on the network interface. Compromises duplicate address detection.
- Certain L2 protocols such as PPP have a loopback message detection that can be used.

Enhanced DAD Algorithm: Use in unsecured non-SEND network…

- Use the Nonce Option defined in SEND (RFC 3971) to include in DAD Probe.
- No other ND message includes the Nonce Option.
- Similar to RFC 4862, the algorithm works for each address of an interface.
- Sender of NS(DAD) saves nonce per address.

Enhanced DAD Algorithm: Use in unsecured non-SEND network

- If interface address is in tentative or optimistic state and the interface receives a NS(DAD) matching nonce, a looped back NS(DAD) is declared (log message to sys admin and increment stats) and drop the NS(DAD).
- If nonce match is not found, DAD failure of RFC 4862 is declared.

Changes to RFC 4862

- A router that supports IPv6 DAD MUST implement the Enhanced DAD algorithm.
- A network interface on any other IPv6 node that is not a router SHOULD implement the Enhanced DAD algorithm.

Interoperation with SEND

- SEND should make explicit mention of detecting looped back DAD probes.
- In a mixed SEND environment with SEND and unsecured nodes, the lengths of the nonce used by SEND and unsecured nodes MUST be identical.

Actions to Perform on Detecting a Genuine Duplicate

- In certain networks such as a broadband access concentrator network, the concentrator is a trusted node in the SP domain that serves broadband modems in an un-trusted domain.
- In such a network if a client in the concentrator downstream issues a NS(DAD) that matches the IPv6 address of an interface on the concentrator serving the client, the client traffic is blocked and the NS(DAD) dropped.

Summary

- The Enhanced DAD algorithm can detect any looped back ND message. However not recommended for other ND messages – too many messages to maintain state for.
- Security Considerations: Use SEND.
- Pending work: allow catching looped back DAD probe in address assigned state, etc.

Thank you.