IP over ETH over IEEE802.16

draft-riegel-16ng-ip-over-eth-over-80216-01

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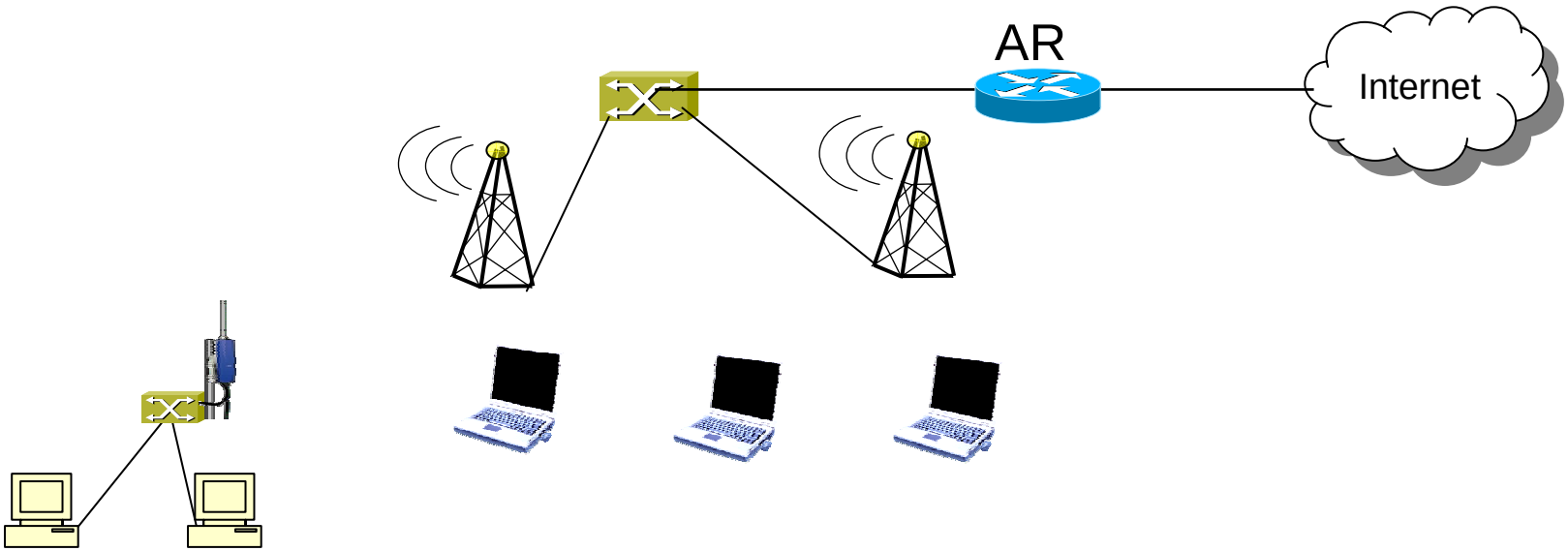
Outline

IP over ETH over IEEE802.16

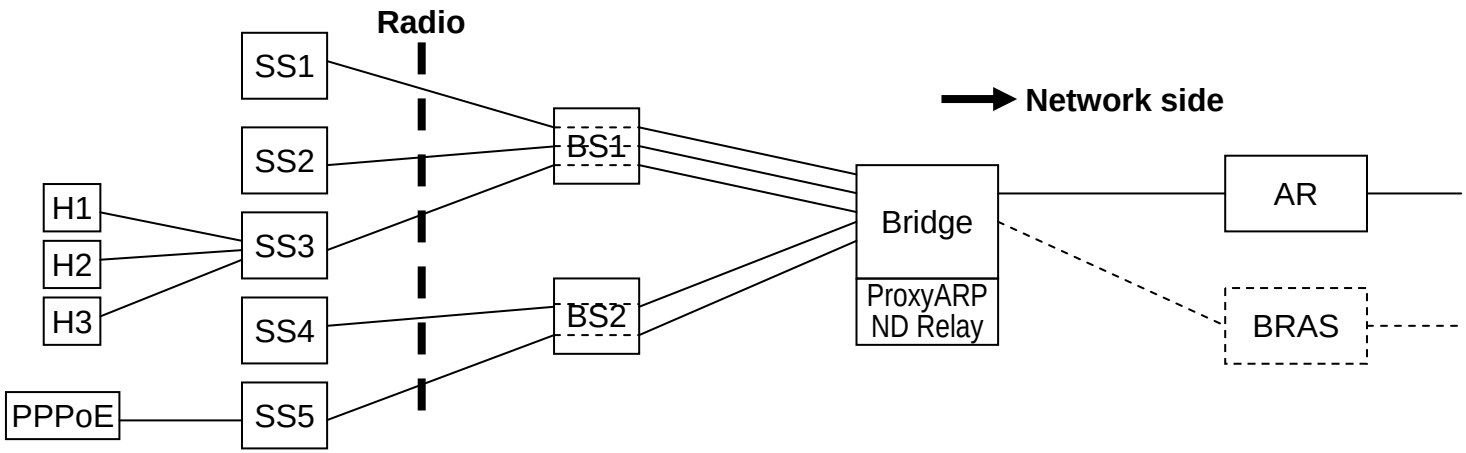
- IPoETH-CS Problem Statement
- Link models
- Deployment scenarios
- Results of 16ng Interim on Sept. 12/13 (Mannheim, Germany)
- ETH-CS Conference Call on Oct. 18
- I-D draft-riegel-16ng-ip-over-eth-over-80216-01.txt
- Discussion on the mailing list
- Conclusion and next steps

IP over Ethernet over IEEE802.16



- **No issues when there is sufficient bandwidth and terminal power**
  - Usually the case for wired Ethernets
- **Wireless issues:**
  - Shared transmission resource
    - (multiple transmissions for multicast messages)
  - Limited terminal power; terminal has to wake up to receive packets
    - Power issue is more critical than shared transmission resource

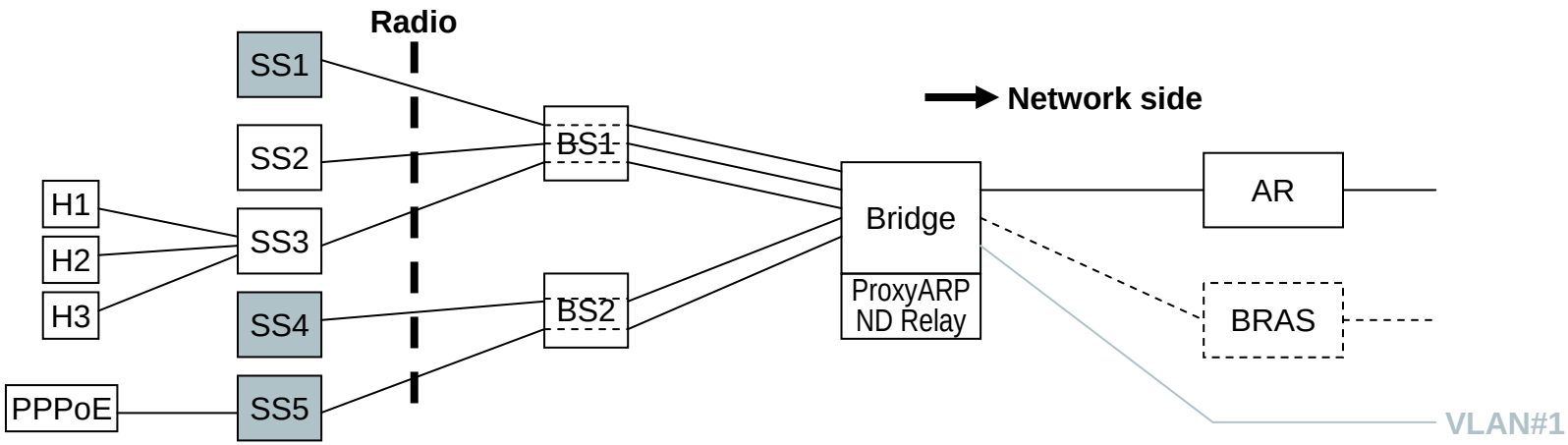
IPoETH-CS Link Model



- SS1, SS2, SS4
  'standard host' – single MAC, single IP
- SS3 (H1, H2, H3)
  'GW w/ multiple hosts behind' – multiple MAC, multiple IPs
- SS5 (PPPoE)
  'ETH bridge' – Multiple MACs, no IPs

- **Ethernet is realized on top of IEEE802.16 by a bridge behind BS**
  - BS acts like a L2 converter forwarding a radio link into a wired connection
- **A single bridge is assumed for the whole access network**
  - More easy implementation of filtering functions

Deployment Scenarios



- **Public access scenario**
  - Peer-to-peer communication between SSs is not available by the Bridge
    - All traffic is forwarded to the AR
- **VLAN scenario**
  - Peer-to-peer communication may be enabled within particular VLANs
    - Allows the creation of L2VPNs

Results of 16ng Interim on Sept. 12/13

- **2 I-Ds available for ETH-CS**
  - draft-riegel-16ng-ip-over-eth-over-80216-00.txt
    - Providing framework and IPv4 specifics
  - draft-jeon-ipv6-over-ieee802.16-ethcs-00.txt
    - Providing initial solution for IPv6
- **Conclusion out of the meeting:**
  - Both I-Ds to be merged into one document for IPv4 and IPv6
    - Editor: Hongseok Jeon
  - Refinements:
    - Conceptual network model
    - Adopt ND Relay to support SeND
    - Extended specification on Identification Cache Table
- **Plan for IP over ETH CS Design Call (AI: Jari Arkko)**

IP over ETH CS Design Call on Oct. 20

- **Participants:**
  Jari Arkko, Mark Townsley, Dave Thaler, Max Riegel, Ralph Droms
- **Results:**
  - For IPv4: Proxy ARP is needed because ARP uses broadcast.
  - For IPv6: Multicast is used; RFC 4541 (MLD snooping bridges) can be deployed to prune unnecessary multicast transmissions. RFC4541 may be sufficient for everything else than the all-nodes address.
    - Some intelligent filtering may be needed for these.
  - In the PPPoE case LCP echo should be turned off.
    - Turning it off may cause problems, but in the PPPoE case the subscriber station is usually a gateway with an external power supply.
  - Combination of a periodic RA process with solicited RAs from waking-up node may be the best.
    - No optimization at the access router; it may be unaware of the 802.16 link.
  - No need to revise ND for 802.16 ETH-CS purposes.

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- **Combined draft for IPv4 and IPv6 over ETH-CS**
- **Adoption of conclusions from interim and design call**
  - Refined network model
  - Public access and VLAN deployment scenarios
  - Multicast is realized by multiple unicast messages (no MBS)
  - Standard Learning Bridging
    + Static Filtering Entries (out of authentication process)
  - RFC4541 for multicast snooping bridging
  - Extended Identification Cache Table (ICT) supporting multiple IP addresses per host
  - ND Relay tied into ICT
- **Not yet fully done:**
  - RFC3041 (Privacy extension)
  - RA handling
  - MTU Considerations
  - Security section

ToC

Comments and discussions on the list

Positive feedback out of the WiMAX Forum

Some comments from the list:

- **Why not deploy MBS connections for ARP and DAD?**
  - Answer: MBS connections may reduce consumption of radio resources instead sending same information multiple times over the air but do not solve the issue of needlessly waking up the subscriber stations.
- **Why centralized bridge behind base stations?**
  - Answer: Most easy model without need to synchronize ICTs of several bridges.
- **Section on MTU size does only address GRE tunneling.**
  - Answer: MTU aspects of non-GRE solutions, e.g. VLAN will be added in the next release.

Conclusion and further proceeding

- **I-D on IPv4 over ETH-CS and IPv6 over ETH-CS exists**
  - Merged effort
  - Covers all major issues
  - Compact

- **Next steps:**
  - Adoption as WG item
    - Include further contributions out of the WG
    - Clarify open issues

- **Feedback from Switch Manufacturers desired!**