IPv6 ND On-/Off-link Determination

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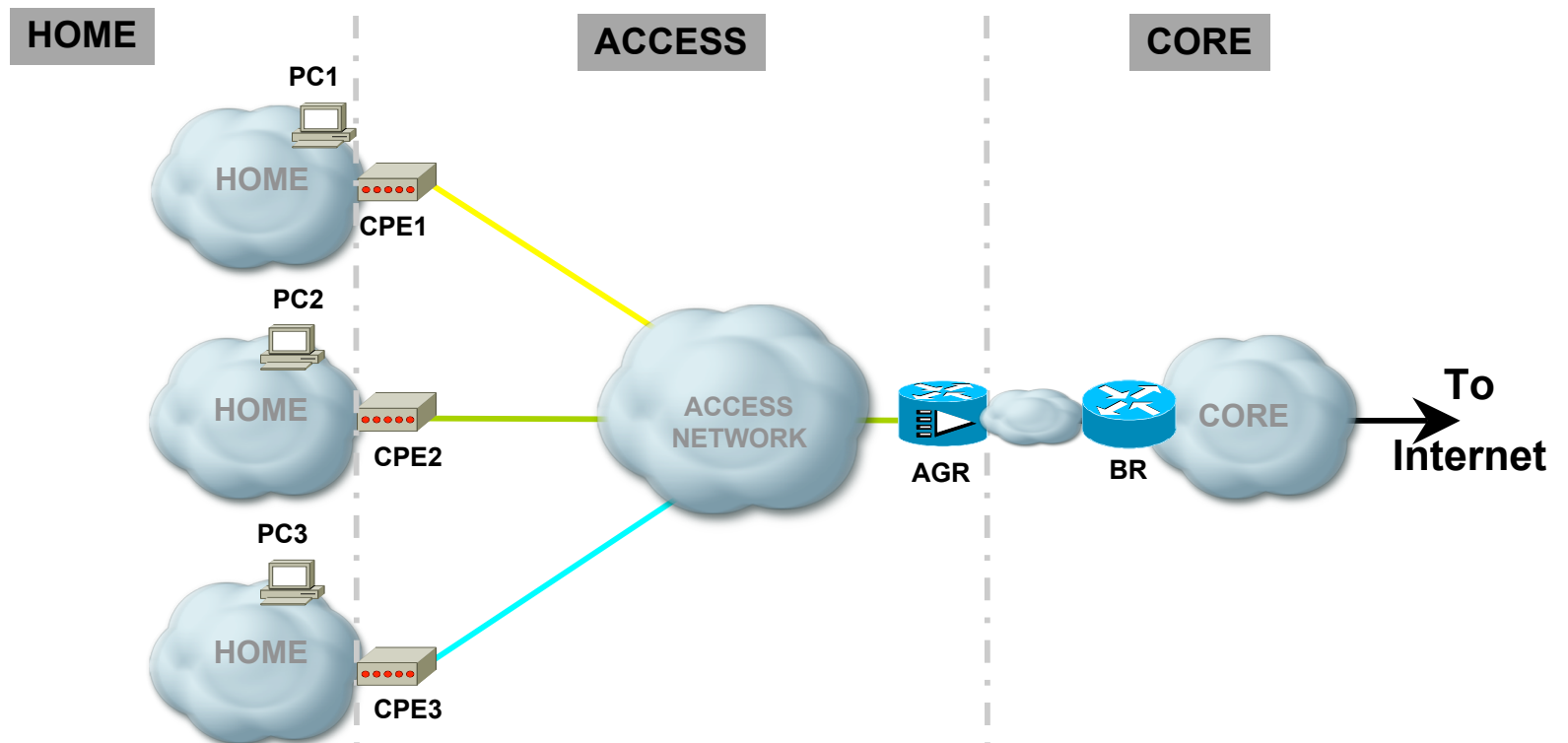
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Agenda

- Why is off-link mode important? Why bother?
- On-link and Off-link determination issues
  - Issues with RFC 4861
- Brief update on the following drafts
  - draft-wbeebee-on-link-and-off-link-determination-00 (Standards Track)
  - draft-wbeebee-nd-implementation-problems-00 (Informational Track)
  - draft-wbeebee-nd-updates-00 (Standards Track) – not actively pursuing
- Consensus call

Why is off-link important?

- All subscriber hosts in aggregated routed networks are always off-link for both IPv4 or IPv6 – physical connectivity of the network dictates this off-link behavior

- Subscribers in such networks are 200 million and counting. Data obtained from "OECD Broadband Statistics to December 2006"

http://www.oecd.org/document/7/0,3343,en_2649_34223_38446855_1_1_1_1,00.html

Aggregation router deployment

HOME

ACCESS

CORE

PC1

HOME

CPE1

PC2

HOME

CPE2

PC3

HOME

CPE3

ACCESS
NETWORK

AGR

BR

CORE

To
Internet

BR – Border Router
AGR – Aggregation Router
HFN – Hybrid Fiber Network
CPE – Customer Premises Equipment
(like a cable/DSL etc. bridged modem)

Why is off-link important? (contd.)

- Testing of IPv6 hosts behind modems in aggregated routed network shows data forwarding confusion due to on- vs. off-link

- Router does not signal on-link to host but host gets confused about on-link mode and assumes on-link causing host to lose network connectivity

- Basic host data forwarding breaks down if off-link is not clearly specified

On-link and Off-link Determination Issues

- IPv6 defined off-link as a new mode that didn't exist in IPv4
  - Signaled using an RA from the router
- However, RFC 4861 (ND RFC) only specifies on-link definition. Definition of off-link mode is vague:
  - Section 2.1 in RFC 4861 defines off-link as "opposite of on-link". Even on-link can be confusing in certain scenarios
  - Section 6.3.4 of RFC 4861 says "off-link cannot be assumed" but also alludes to off-link behavior
- As a result of these ambiguities, even seasoned IPv6 folks may not know how to configure RA on a router to signal off-link

Overview of
draft-wbeebee-on-link-and-off-link-determination-00

- Draft includes Host models that show explicitly what is off-link and what to configure on router to signal off-link

- Clarifications related to router behavior is provided in Router models section – mainly Redirect

Overview of
draft-wbeebee-nd-implementation-problems-00

- Draft modeled after RFC 2525
- Some common ND problems are collected
- Problems types are related to on- vs. off-link and host implementation confusion due to subtle differences between IPv6 and IPv4
- We are open to collecting any more problems the community wants added to this draft

Overview of
draft-wbeebee-nd-updates-00

- This draft presents updates to the ND RFCs relating to on- and off-link determination

- The draft not actively pursued by authors nor IETF 6man WG

- However, if any new IPv6 ND protocol work gets taken up, this draft should be considered so that on- vs. off-link can be clarified for ND

Consensus Call

- Since the basic connectivity of a large network is impacted for IPv6, the drafts are within the charter of 6man, and the drafts do not propose any radical changes to the specifications, do we have consensus for the following?
    - 1st and 2nd drafts be added to 6man WG as work items