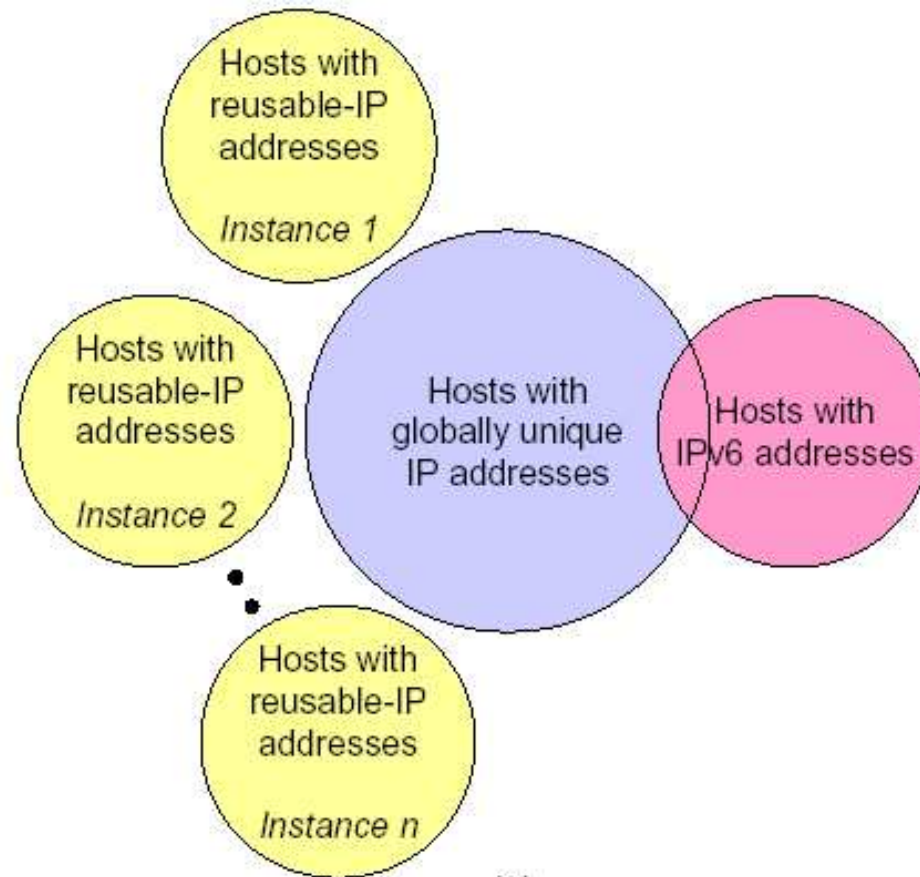


A Waypoint Service Approach to Connect Heterogeneous Internet Address Spaces

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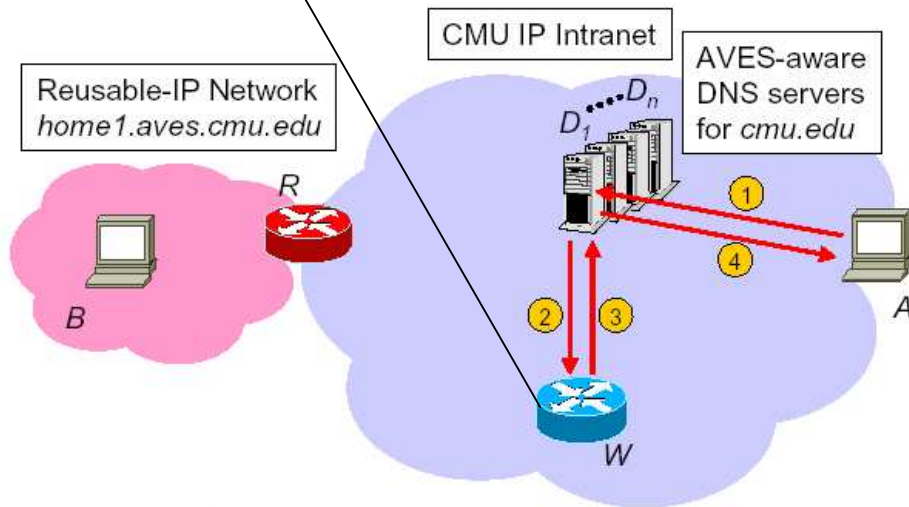
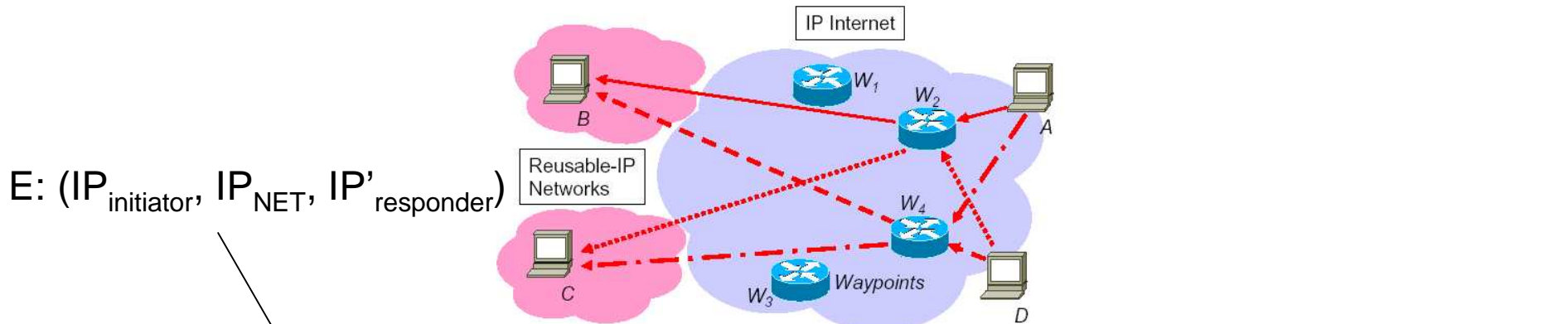
T.S. Eugene, Ion Stoica, Hui Zhang. "A Waypoint Service Approach to Connect Heterogeneous Internet Address Spaces." USENIX, pp. 319-332, June 2001.

Problem

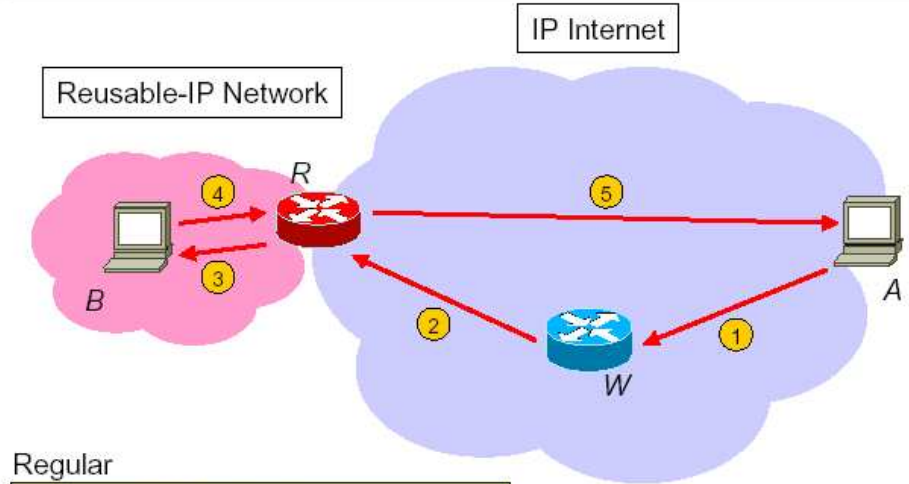


(a)

Solution (AVES)



Step	Action
1	DNS query for B
2	SETUP message (IP_A , IP_R , IP'_B)
3	ACCEPT message
4	DNS reply for B (IP_W)



Regular

Step	Packet sent
1	$[IP_A \rightarrow IP_W]$
2	$[IP_W \rightarrow IP_R [IP_A \rightarrow IP'_B]]$
3	$[IP_A \rightarrow IP'_B]$
4	$[IP'_B \rightarrow IP_A]$
5	$[IP_W \rightarrow IP_A]$

Multi-Homing

Step	Packet sent
3	$[IP'_R, P_R \rightarrow IP'_B]$
4	$[IP'_B \rightarrow IP'_R, P_R]$

Characteristics

- All non-IP hosts simultaneously reachable regardless of N.
- Each IP host can simultaneously reach up to N non-IP hosts.
- If multihoming is used
 - Each port on each non-IP host simultaneously reachable by up to 65,000 TCP, 65,000 UDP, and 1 each port-less protocol connection.
- Trade performance for deployability.

Implementation

- AVES-Aware DNS: Modified BIND
- AVES Waypoint: ipfw (Linux 2.2)
- AVES NAT: presumably also ipfw (Linux 2.2)
- 41-80 Mbps TCP and 96 Mbps UDP on 100Mbit Ethernet LAN.

Related Work

- Port forwarding on NAT gateway
- SSH port forwarding
- SRV DNS records
- IP server (UDP only)
- Host Identity Payload
- HTTP/1.1
- SOCKS
- TRIAD and IPNL

Conclusions