6to4 tunnels

Connection of IPv6 domains via IPv4 clouds

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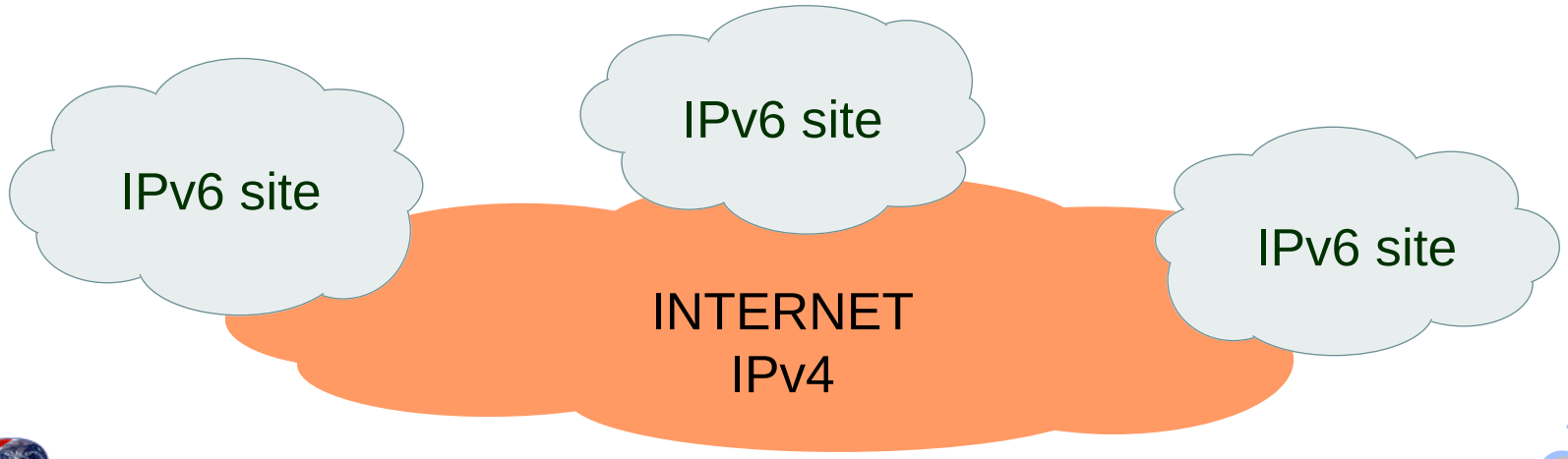
Automatic 6to4 tunnel

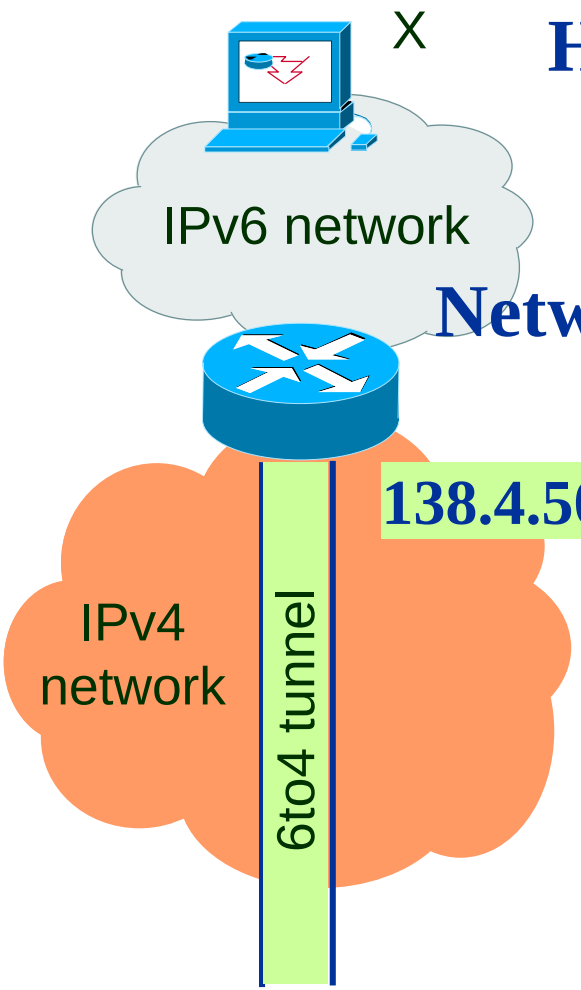
- It communicate IPv6 sites over IPv4 network
- Without explicit tunnel setup
  - Easy to setup
  - With no management overhead
- It treats IPv4 network as a virtual nonbroadcast link



Requirements

- All IPv6 sites should have at least one globally unique IPv4 address
  - With IPv6 prefix (2002::/16)
  - All addresses should be available in a DNS
- There is only one 6to4 router per site
  - With dual stack
  - The IPv6 site routing prefix is the IPv4 router address
- Any independently managed NAT is not allowed along the path of the tunnel
- If IPv6 MTU is too large for some intermediate IPv4 subnet, fragmentation will be used

Address conversion



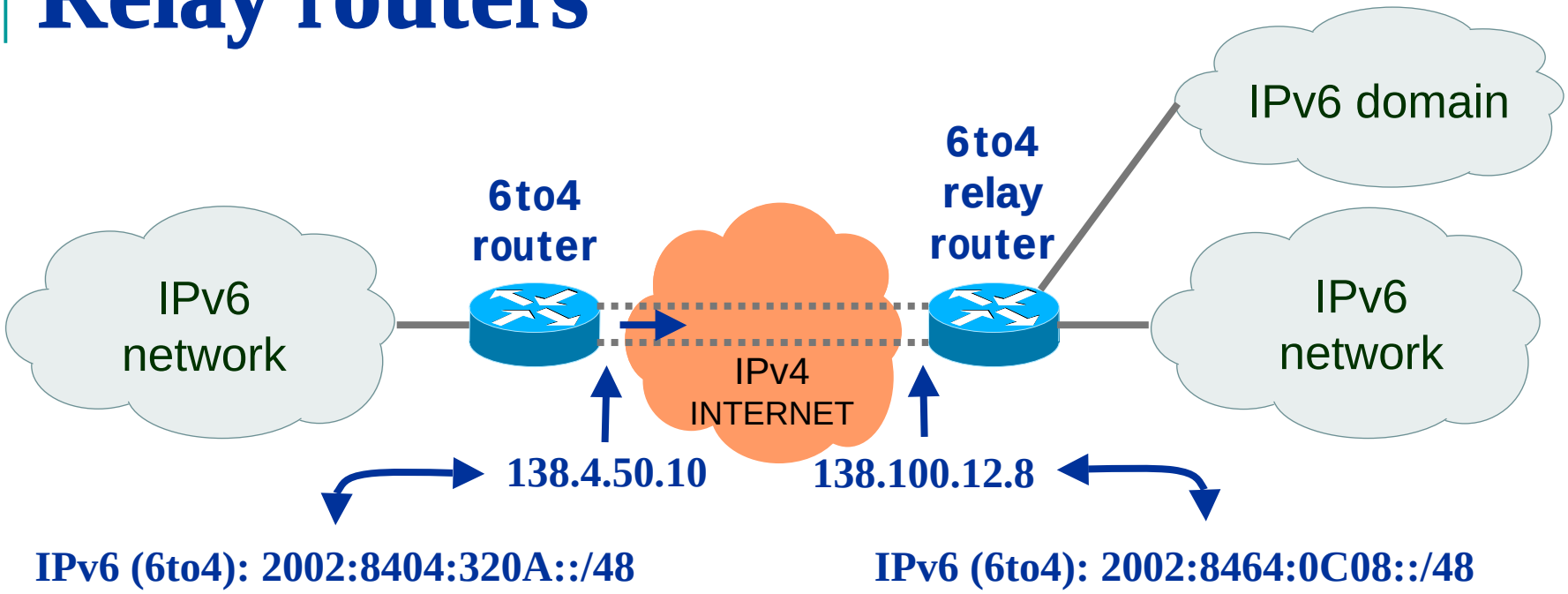
Host address: 2002.8A04.320A::1

Network prefix: 2002.8A04.320A::/48

138.4.50.10

- Each site have only one 6to4 address assigned
- All sites need to run an IPv6 interior routing protocol such as RIPng for routing within the site

Relay routers



- IPv6 interdomain routing points to a specific relay router
- Relay Routers define which 6to4 prefixes should be advertised
  - A prefix list is usually defined
  - Configure multiple Relay Routers using 6to4 anycast address
    - Discover the nearest available router automatically
    - Switch to another Relay Router in case of failure

Conclusions

- Benefits:
  - Easy setup with no management overhead
  - Tunnels are up only during active connections
    - Automatic start and stop
  - Transparent to IPv6
    - Applications are not affected
  - Scale well

- Limitations:
  - No independently managed NAT
  - Configuring multiple relay routers using 6to4 anycast address is under study

References

- *Connection of IPv6 Domains via IPv4 Clouds*. B. Carpenter, K. Moore. February 2001. RFC3056.

- Implementations
  - Windows NT
  - Proyecto KAME: Linux y FreeBSD