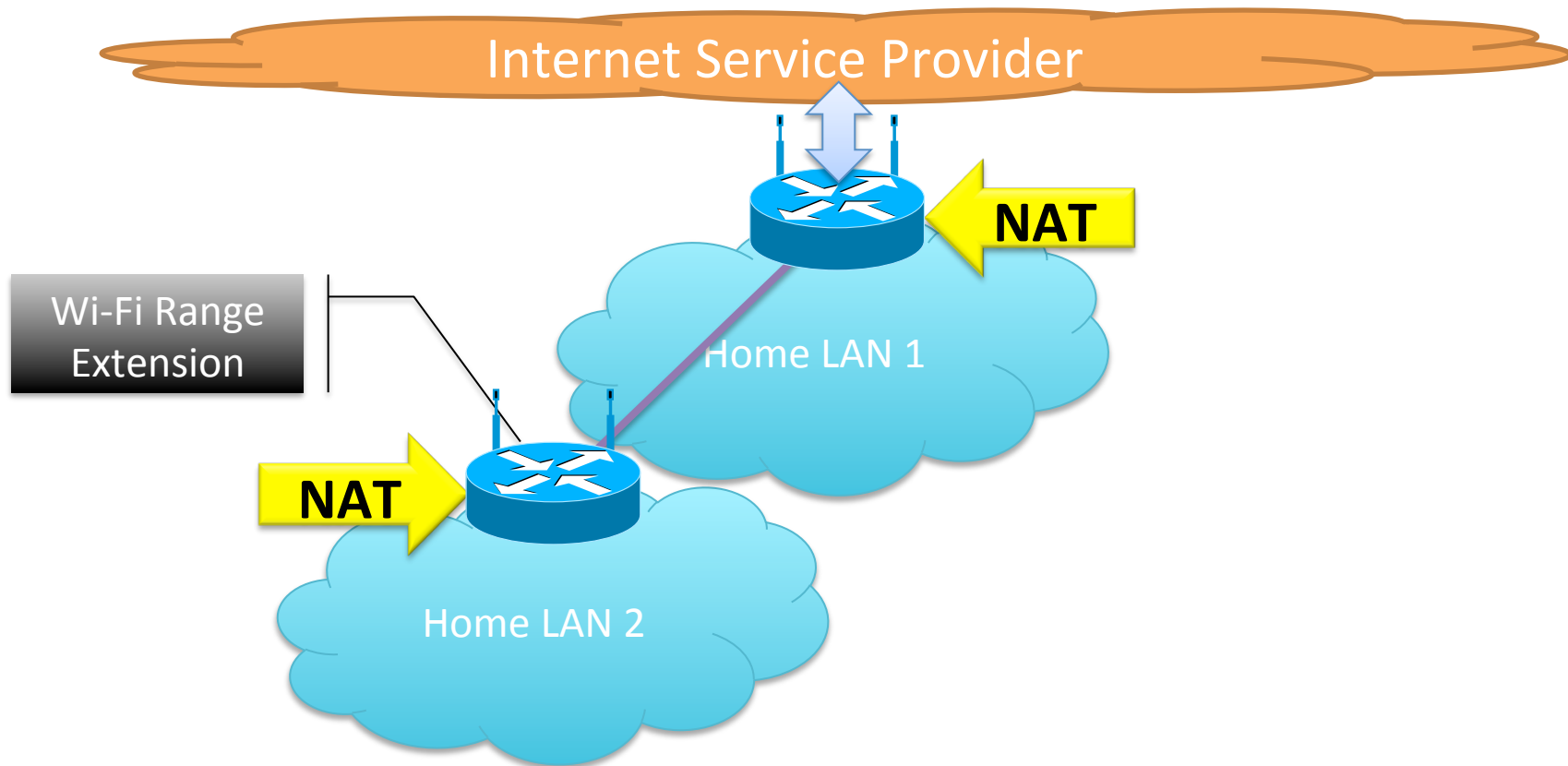


The Future of Home Networking: A Problem Statement

Chris Grundemann
NANOG 56 | Dallas, TX
xx October 2012

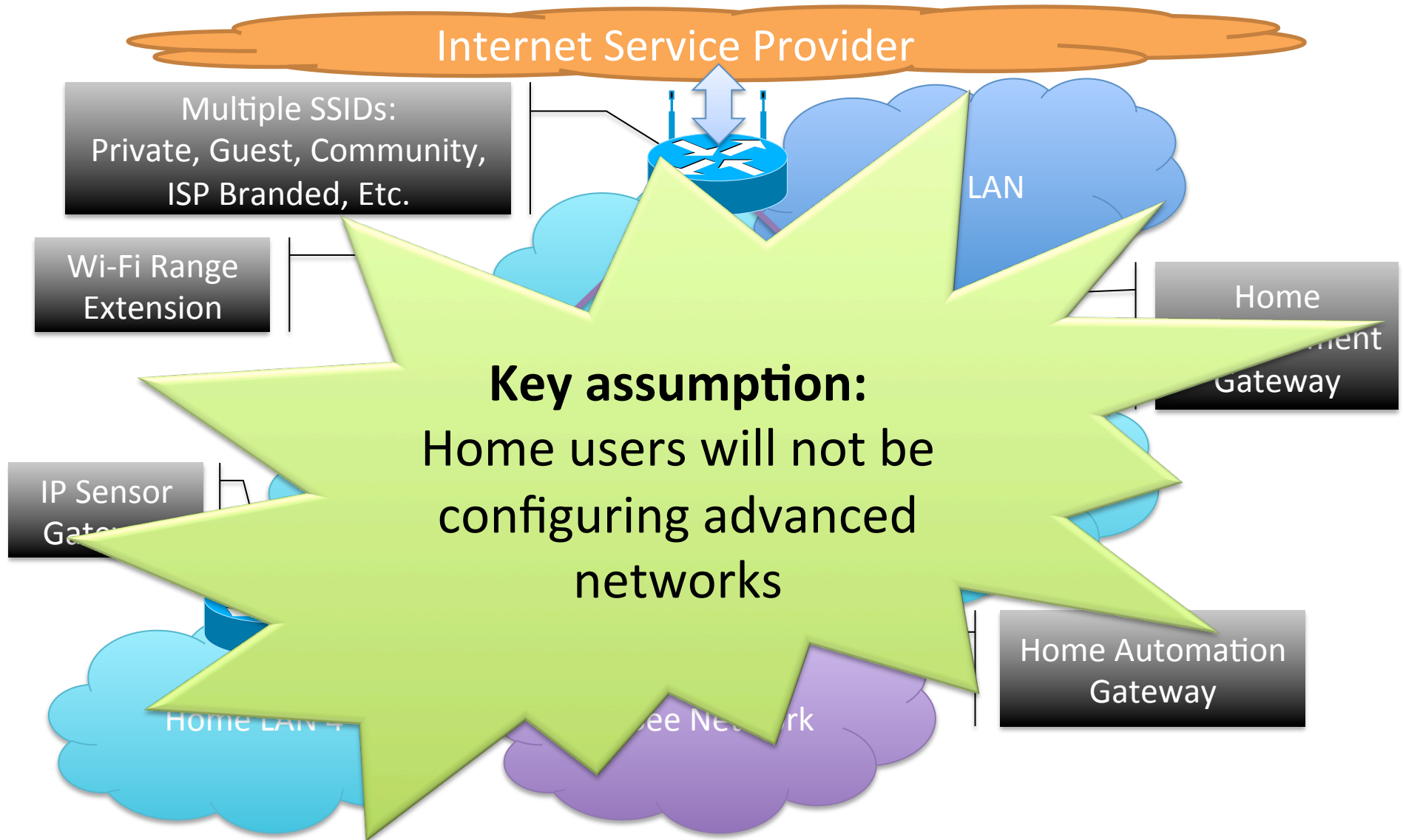
Yesterday's Home Network



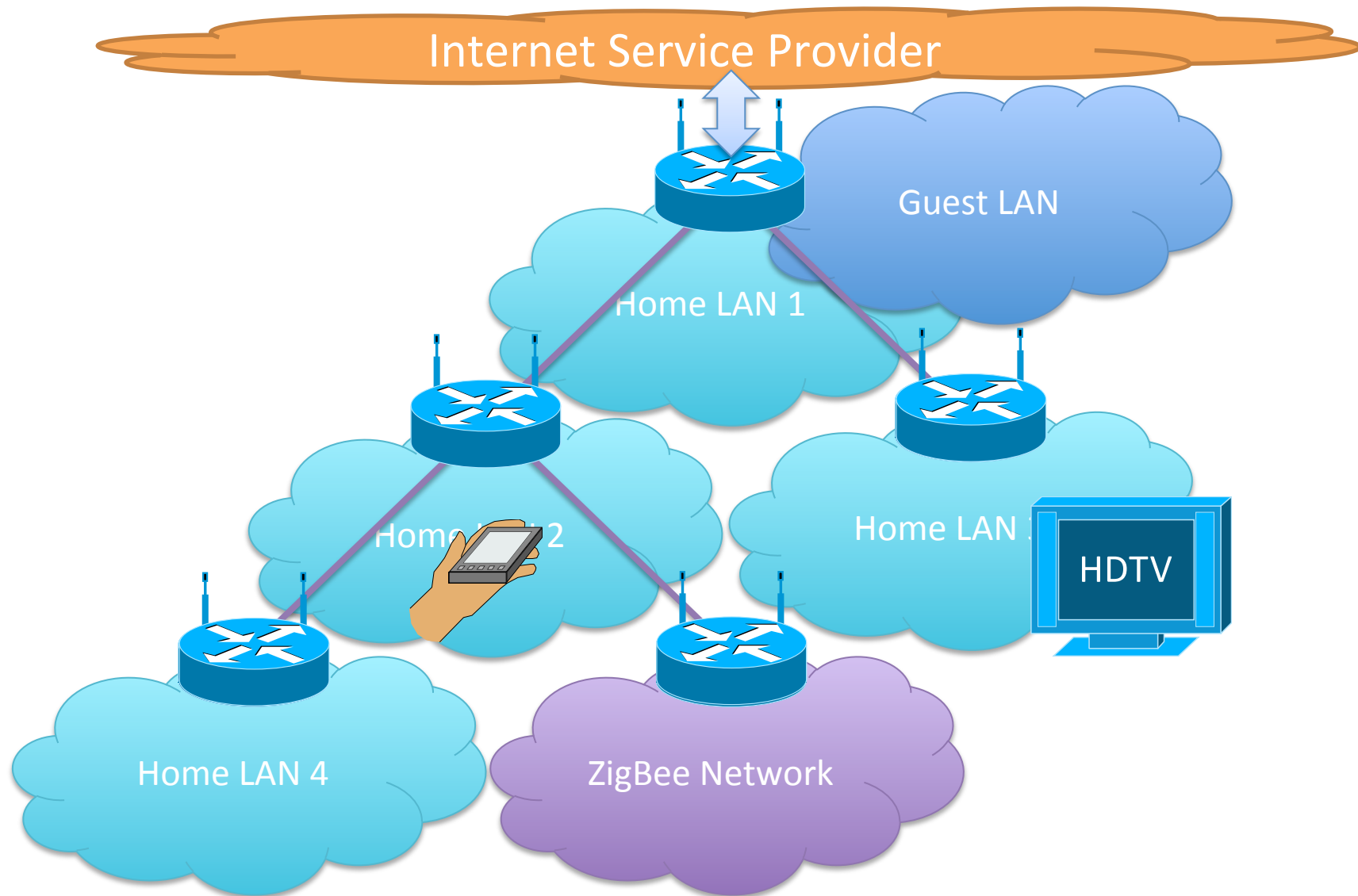
Emerging use cases for the home network

- Separation of guest users from home users
- Community Wi-Fi
 - Wi-Fi GW in the subscriber home is used to provide Wi-Fi roaming services
- Femto cell
 - GW in the subscriber home is used to provide cellular services
- Smart grid
- Security, Monitoring, & Automation
- Multi-homing
- Video content sharing and streaming between the devices inside the home
- IP video streaming from the internet
- Telecommuting and corporate IT requirements (e.g. network separation)
- Ever increasing devices in the subscriber home
- Emergence of Heterogeneous link layer technologies (e.g. low powered sensor networks) with different requirements

Tomorrow's Home Network



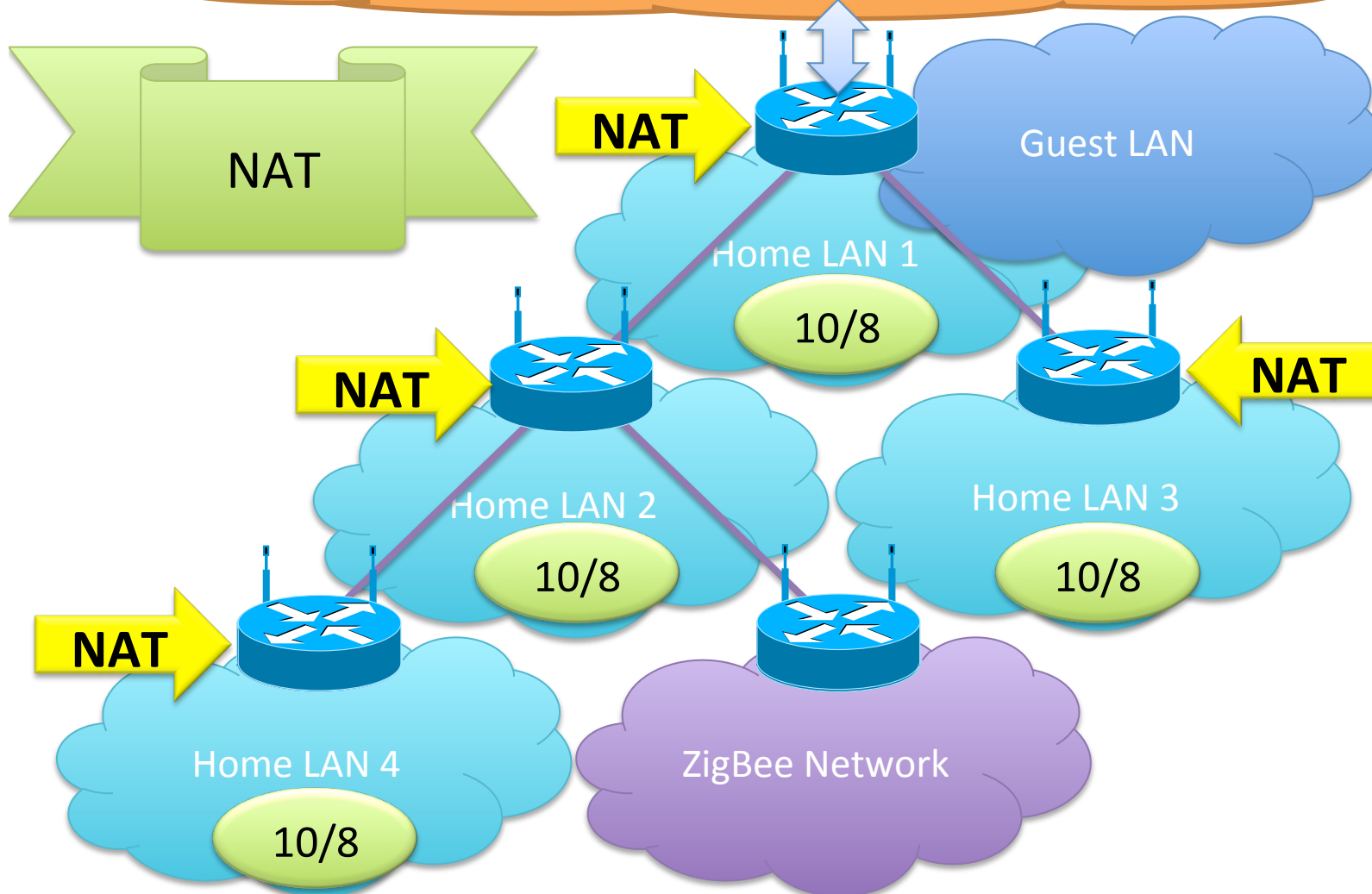
Problem One: Prefix-distribution & Routing



IPv4

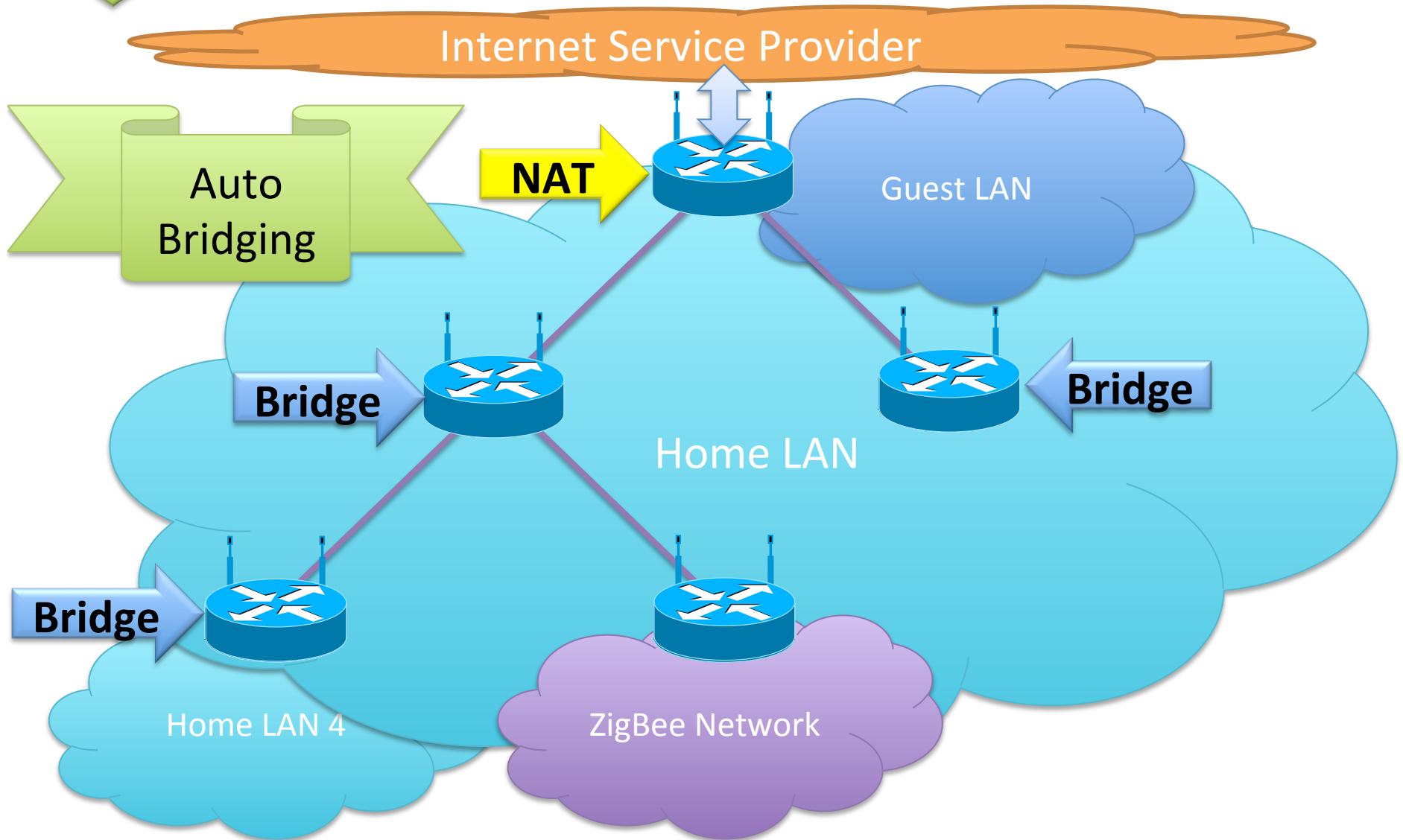
Problem One: Prefix-distribution & Routing

Internet Service Provider



IPv4

Problem One: Prefix-distribution & Routing



IPv4

Problem One: Prefix-distribution & Routing

Internet Service Provider

Routing
Protocol

NAT

Guest LAN

Home LAN 1

10.1/16

Home LAN 2

10.2/16

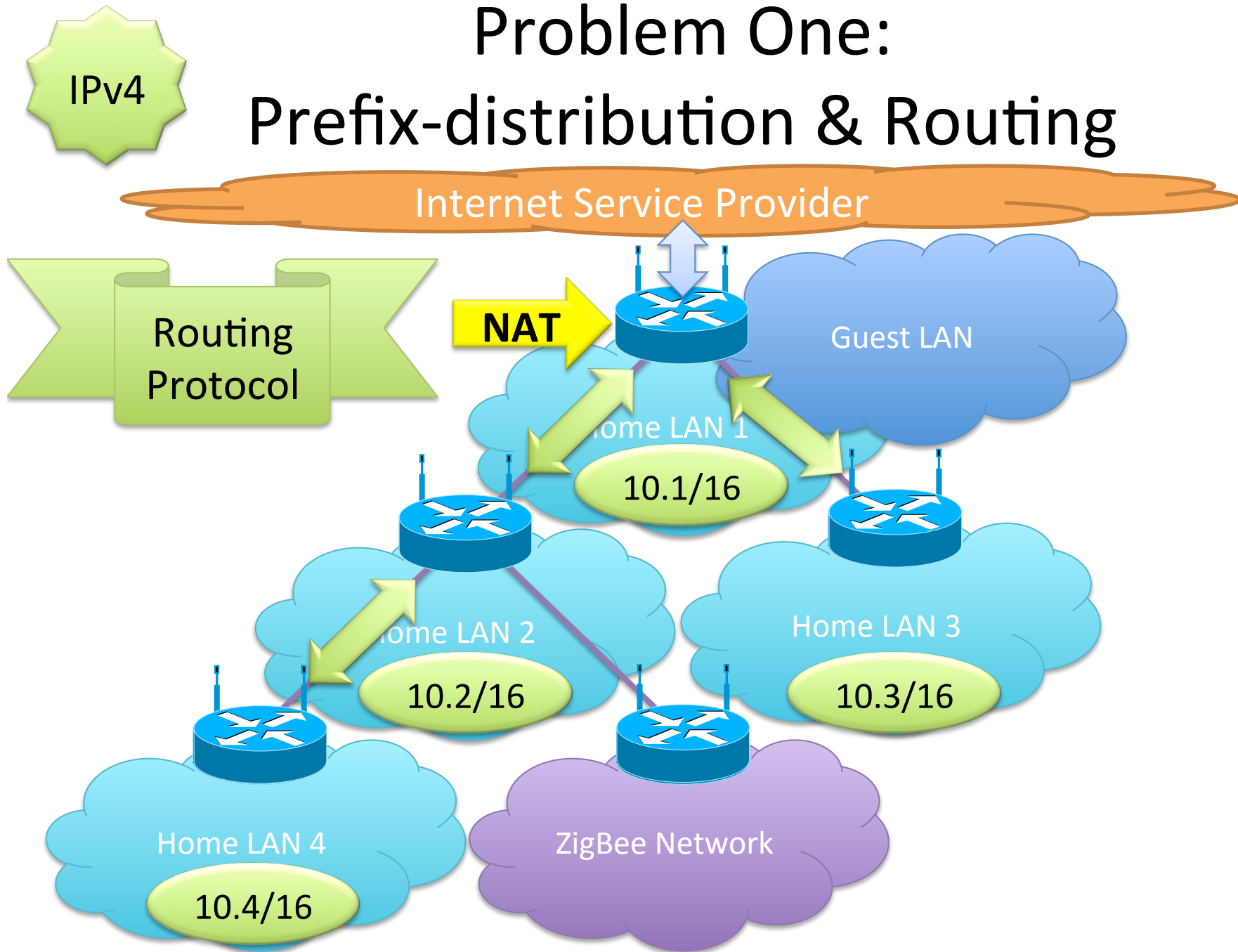
Home LAN 3

10.3/16

Home LAN 4

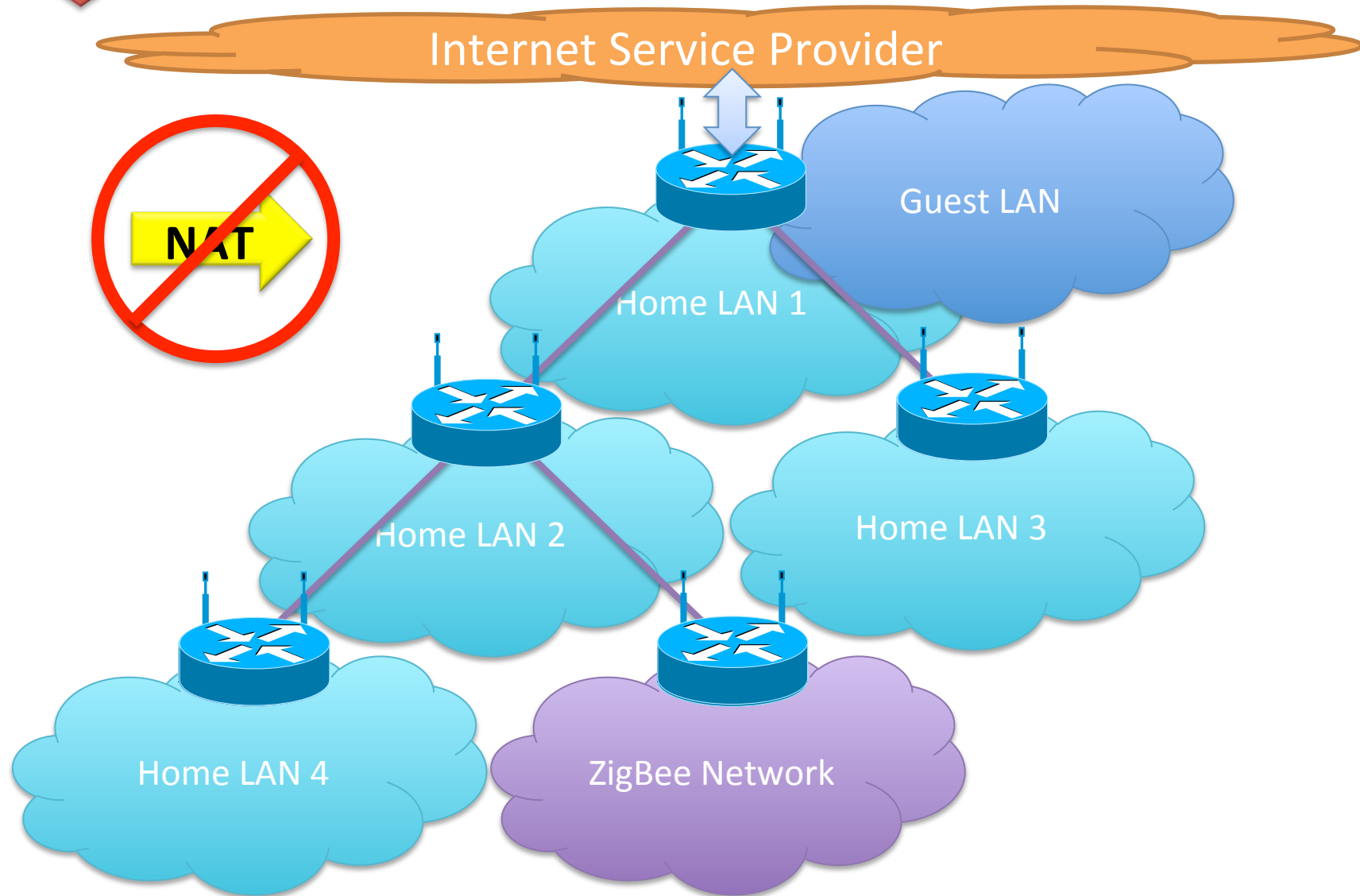
10.4/16

ZigBee Network





Problem One: Prefix-distribution & Routing



IPv6

Problem One: Prefix-distribution & Routing

Internet Service Provider

Prefix
Delegation

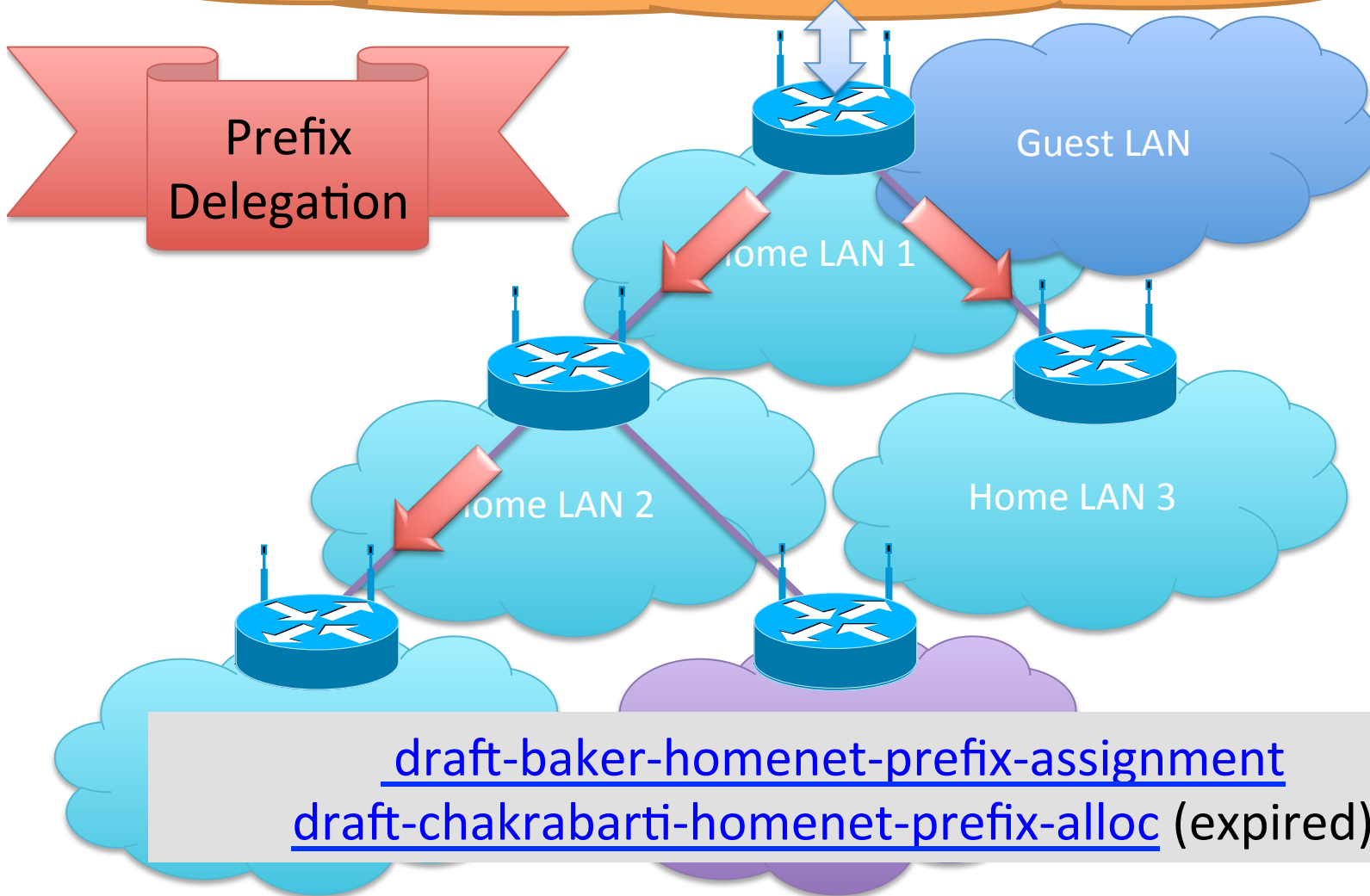
Guest LAN

Home LAN 1

Home LAN 2

Home LAN 3

[draft-baker-homenet-prefix-assignment](#)
[draft-chakrabarti-homenet-prefix-alloc](#) (expired)



IPv6

Problem One: Prefix-distribution & Routing

Internet Service Provider

Prefix
Delegation

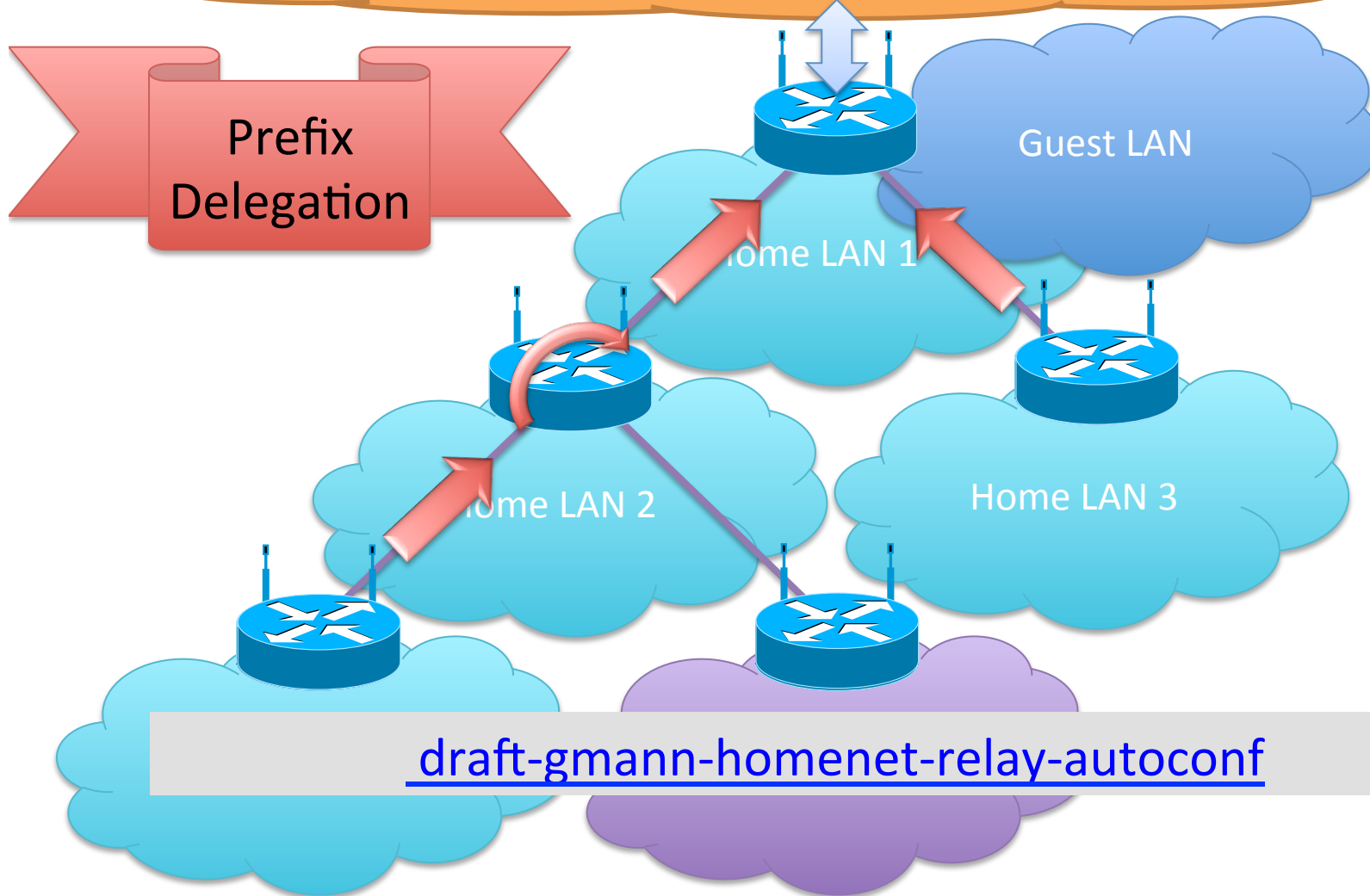
Guest LAN

Home LAN 1

Home LAN 2

Home LAN 3

[draft-gmann-homenet-relay-autoconf](#)



IPv6

Problem One: Prefix-distribution & Routing

Internet Service Provider

Routing
Protocol

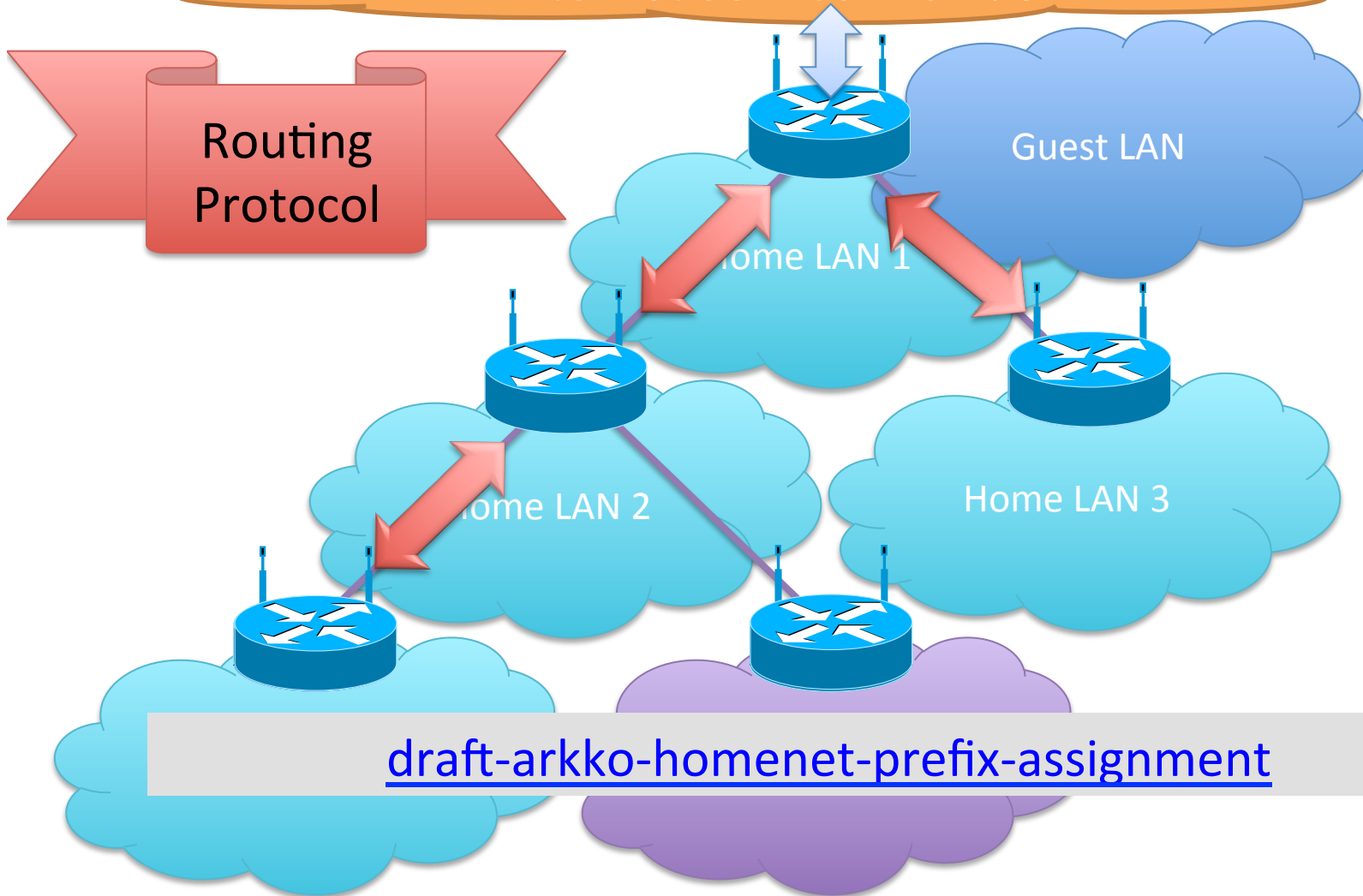
Guest LAN

Home LAN 1

Home LAN 2

Home LAN 3

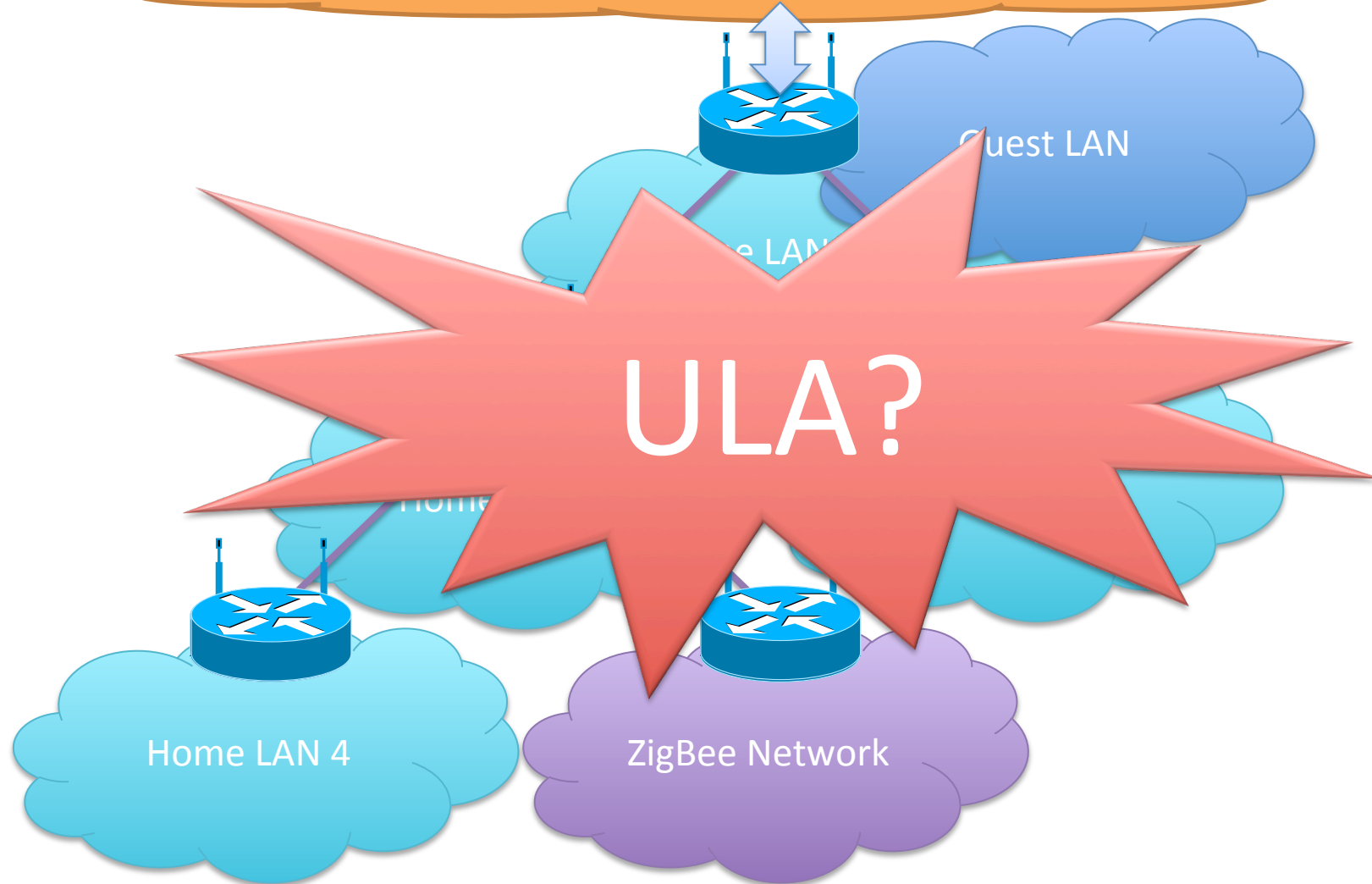
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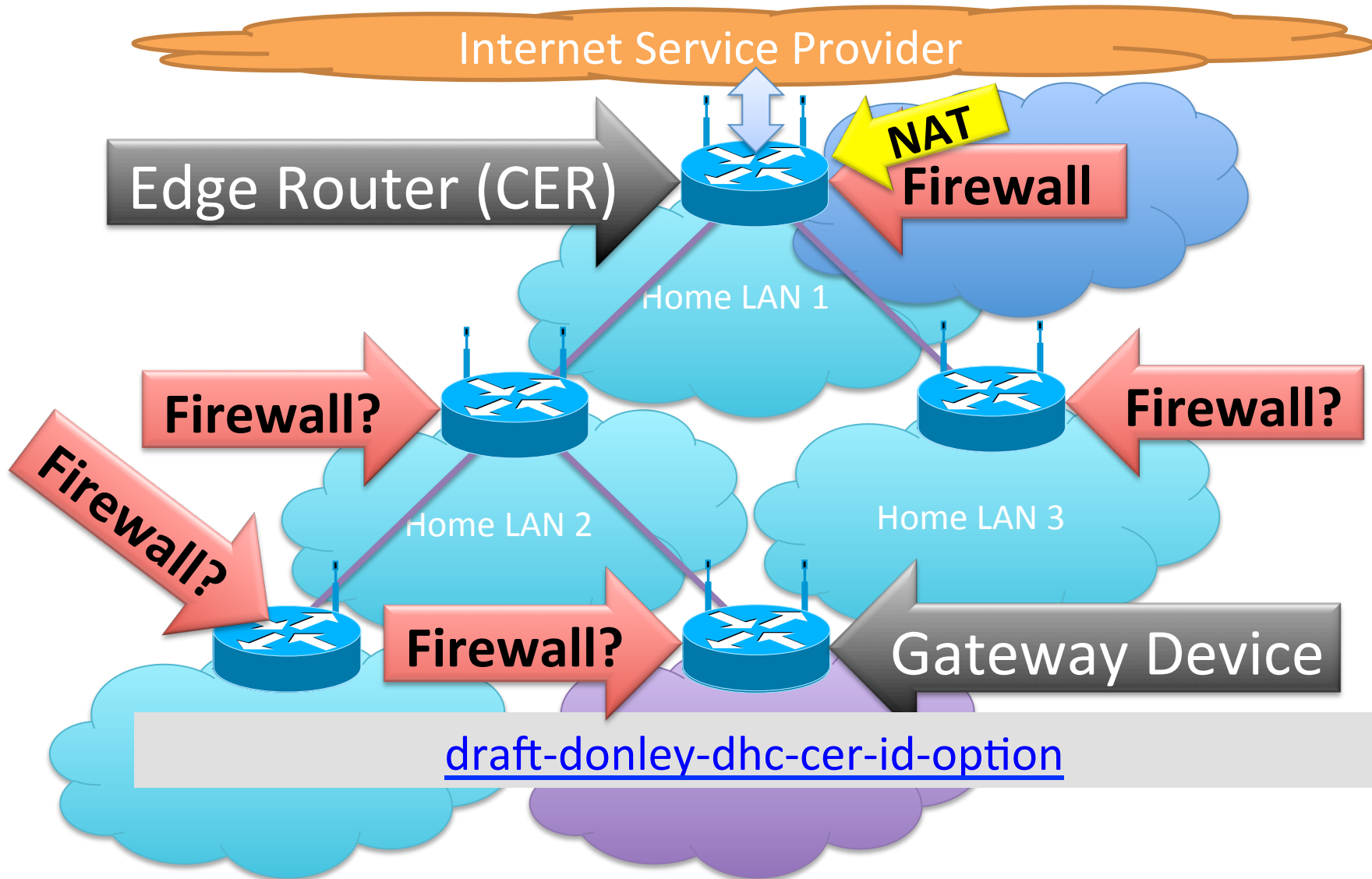
IPv6

Problem One: Prefix-distribution & Routing

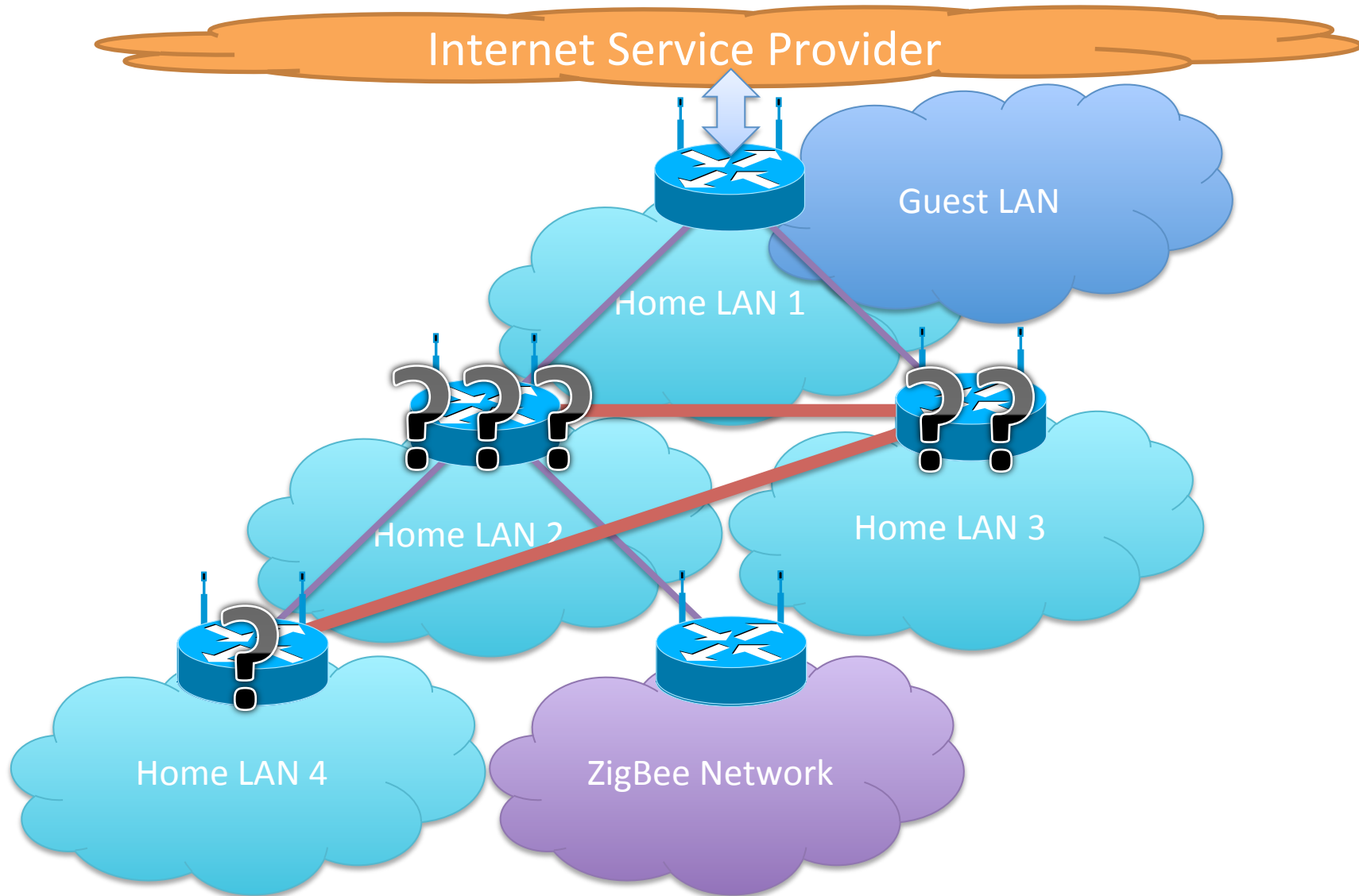
Internet Service Provider



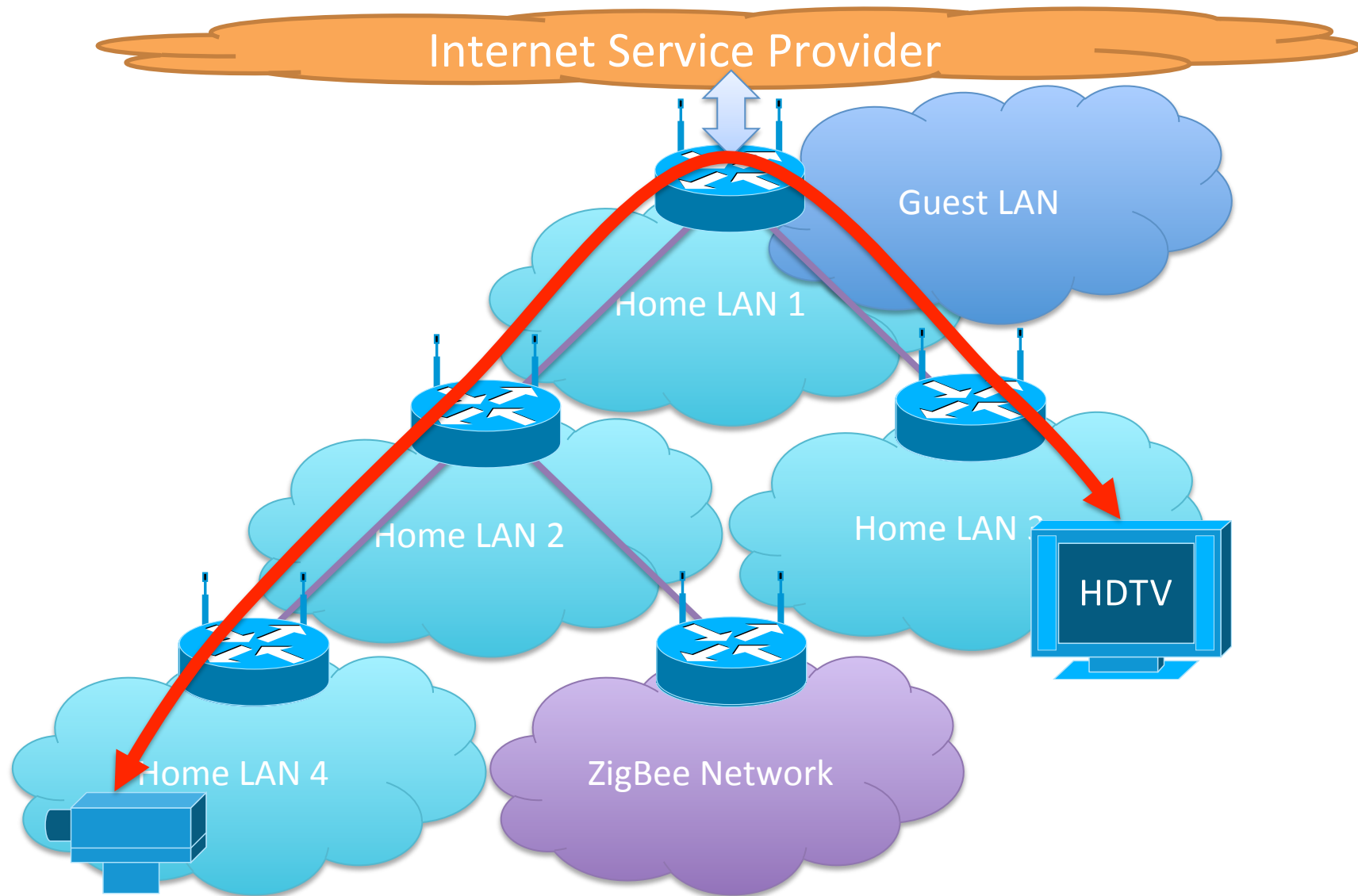
Problem Two: Network Detection



Problem Two: Network Detection



Problem Three: Service Discovery



More Problems

- RF interference
 - Multiple SSIDs, multiple channels, multiple protocols
- Non-IP Gateways
 - Connect zigbee/bluetooth/etc. to IP network
- Multi-Homing and failover
 - How likely is this?
- Troubleshooting
 - Configuration / management
- *And more...*

Solution Space

- DHCP
- Routing Protocol
- Neighbor Discovery?
- OpenFlow or SDN?
- *Your idea here*

Parting Thoughts

- Managed or unmanaged?
- Level of sophistication (users and devices)?
- Service provider vs. Enterprise/Campus vs. Home
- The 80/20 rule



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