IPv6-Mostly:
The Definitive Transition

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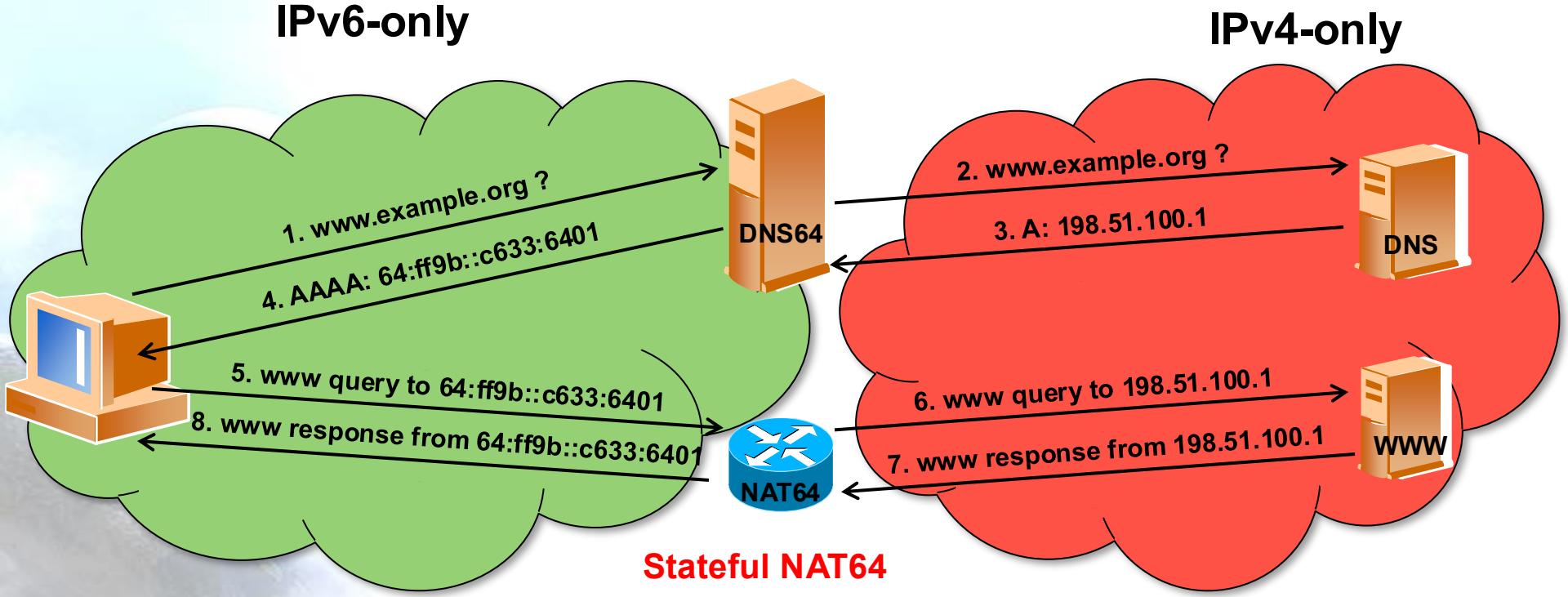
NAT64+DNS64



Stateful NAT64

198.51.100.1 - documentation address (RFC5737)

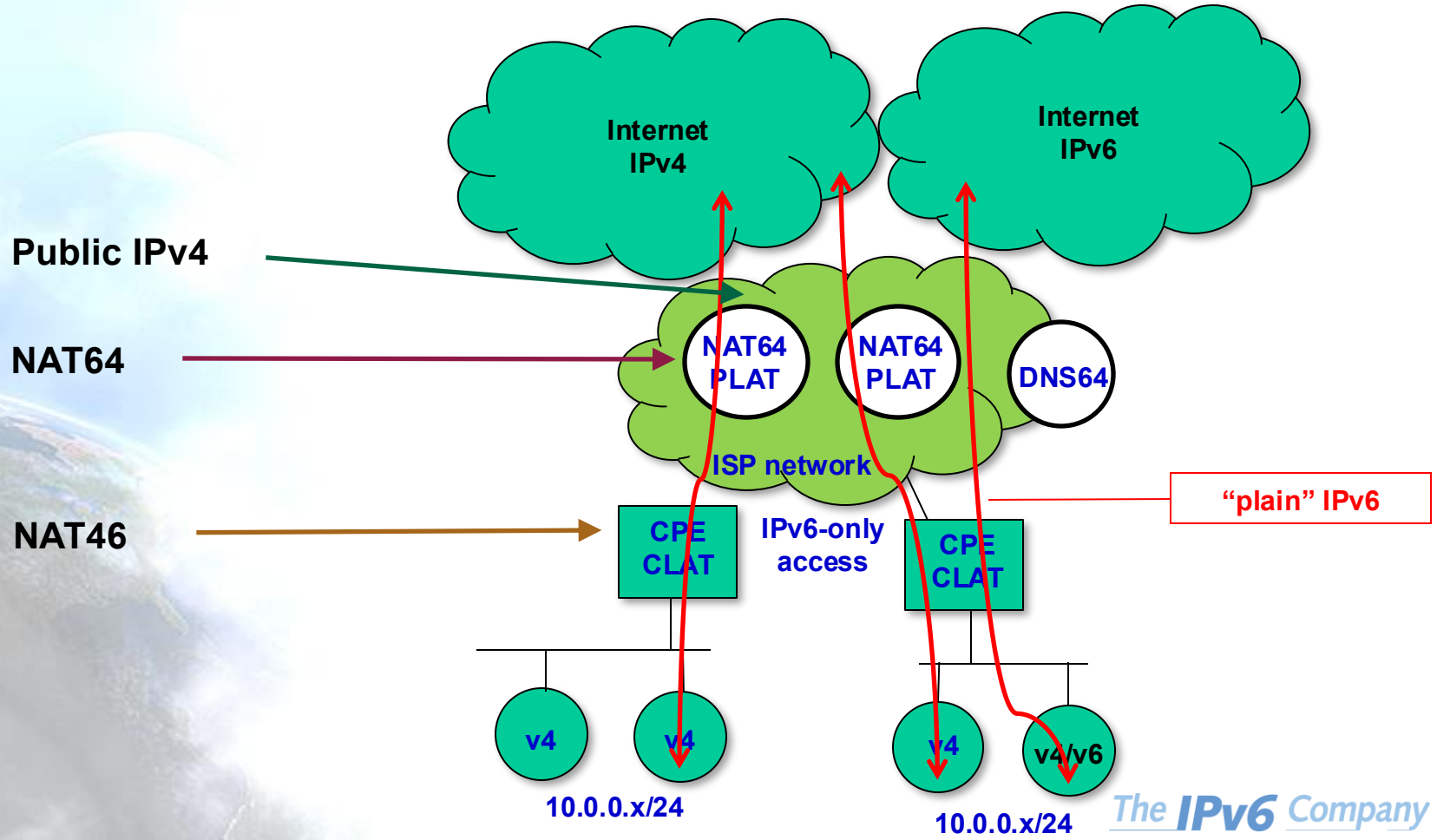
64:ff9b::/96 - NAT64 WKP (RFC6052)

c6.33.64.01 - IPv4 to hex

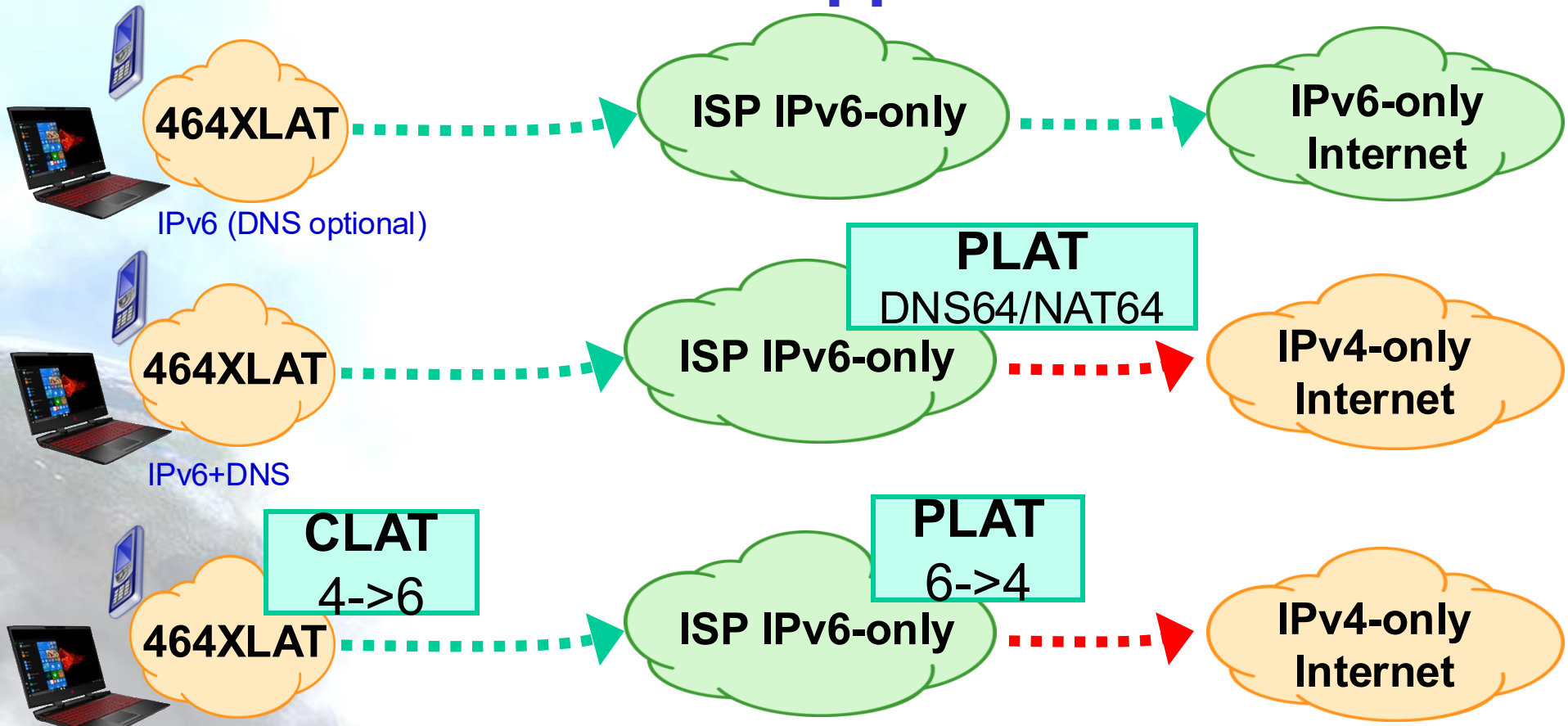
A Bit of History: 464XLAT

- 464XLAT (RFC6877): RFC6145 + RFC6146
- Very efficient use of scarce IPv4 resources
  - N*65.535 flows per each IPv4 address
  - Network growth not tied to IPv4 availability
- IPv4 basic service to customers over an-IPv6 only infrastructure
  - **WORKS** with applications that use socket APIs and literal IPv4 addresses (Skype, etc.)
- Allows traffic engineering
  - Without deep packet inspection
- Easy to deploy and available
  - Commercial solutions and open source

464XLAT


Internet
IPv4
Internet
IPv6
Public IPv4
NAT64
NAT46
NAT64
PLAT
NAT64
PLAT
DNS64
ISP network
"plain" IPv6
CPE
CLAT
IPv6-only
access
CPE
CLAT
v4
v4
v4
v4/v6
10.0.0.x/24
10.0.0.x/24

Possible “app” Cases



Motivation for IPv6-Mostly

- Cost of Dual-Stack
  - Foster IPv6-only adoption
- Cost of VLANs for IPv6-only
  - Users in WiFi using the wrong SSID
  - Wired 802.1x authentication not having all the info
- Cost of NAT
- Avoid Happy Eyeballs issues
- Usage of IPv4 addresses when not needed
- Support of IPv4-only, IPv6-only and dual-stack hosts

IPv6-Mostly Advantages

- Incremental, selective, automatic move to IPv6-only
  - Only if both client and server “agree”
- No delays in configuring IPv4 and/or IPv6
  - Per interface

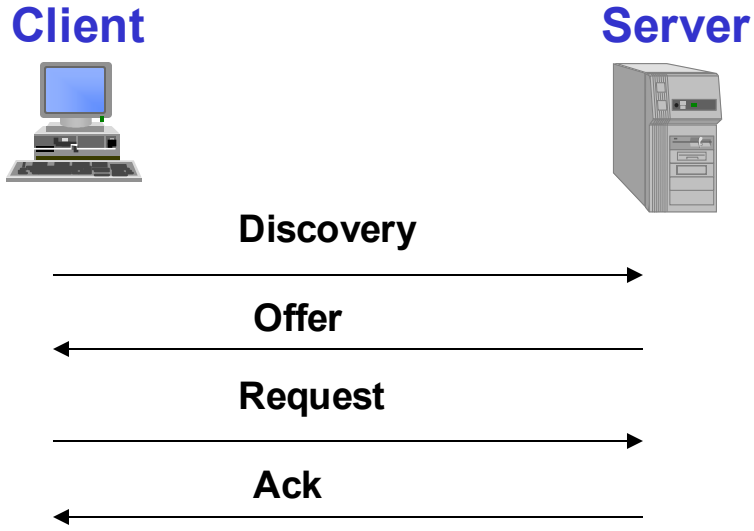
RFC8925: IPv6-Only Preferred Option for DHCPv4

- IPv6-Mostly Network:

  A network that provides NAT64 (possibly with DNS64) service as well as IPv4 connectivity and allows the coexistence of IPv6-only, dual-stack, and IPv4-only hosts on the same segment. Such a deployment scenario allows operators to incrementally turn off IPv4 on end hosts, while still providing IPv4 to devices that require IPv4 to operate. But IPv6-only-capable devices need not be assigned IPv4 addresses.

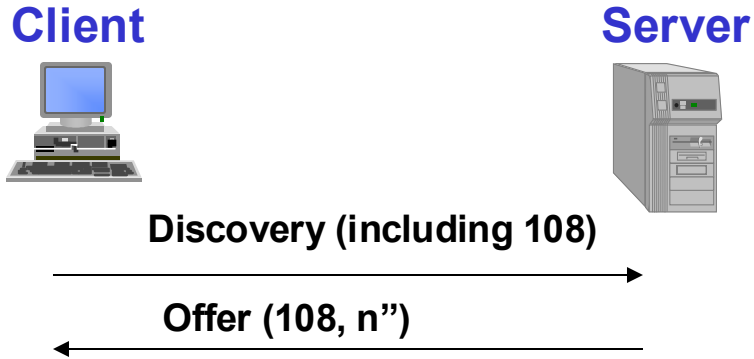
- Specifies a DHCPv4 option (108) to indicate that a host supports an IPv6-only mode and is willing to forgo obtaining an IPv4 address if the network provides IPv6 connectivity.

DHCPv4



Source	Destination	Protocol	Length	Info
0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover -
192.168.1.1	192.168.1.17	DHCP	339	DHCP Offer -
0.0.0.0	255.255.255.255	DHCP	342	DHCP Request -
192.168.1.1	192.168.1.17	DHCP	339	DHCP ACK -

DHCPv4 Option 108 to Disable IPv4!

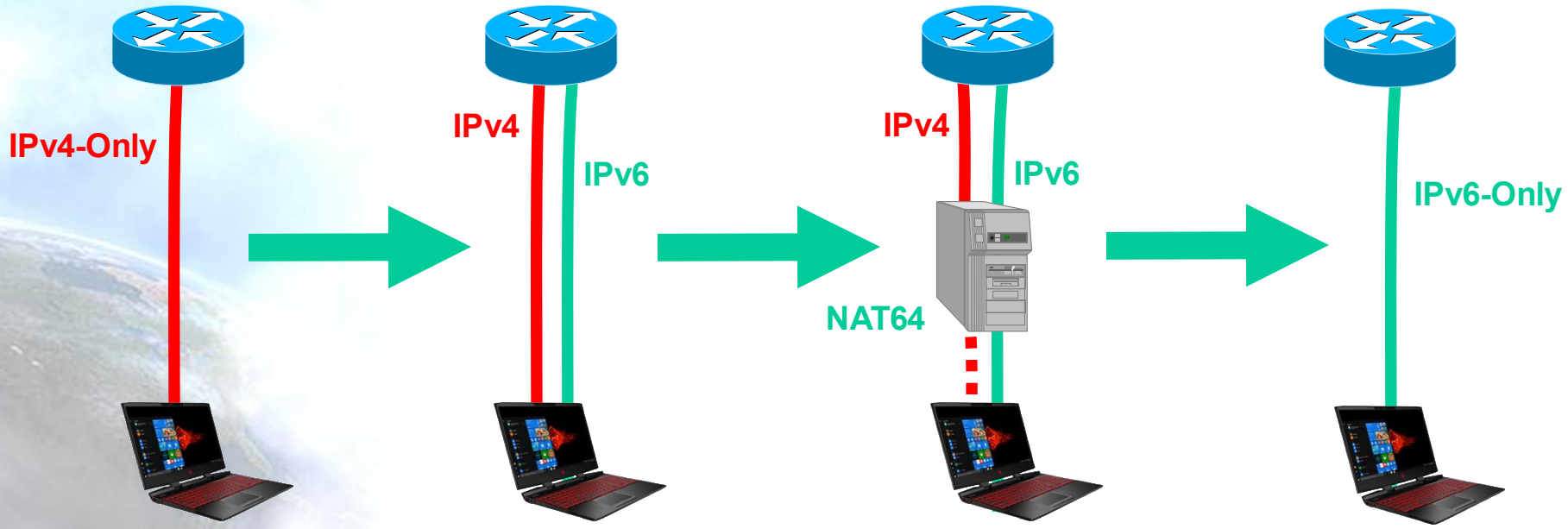


0.0.0.0	255.255.255.255	DHCP	342 DHCP Discover -
192.168.1.1	192.168.1.17	DHCP	341 DHCP Offer -

Options

- CLAT in clients
- Support of RFC8781 (Discovering PREF64 in Router Advertisements)
- V6ONLY_WAIT: 1800”
  - MIN_V6ONLY_WAIT: 300”

IPv6 Phased Transition



IPv6-Mostly in Industry Events

- RIPE meetings
- Cisco Live
- IETF meetings

- Supported in:
  - iOS
  - MacOS
  - Android
  - Linux
  - Windows coming soon!

Thanks!

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