6to4 Tunnelling

Automatic 6to4 is a multipoint tunnelling mechanism designed to encapsulate IPv6 packets inside IPv4 packets so that v6 networks can communicate across v4 only segments.
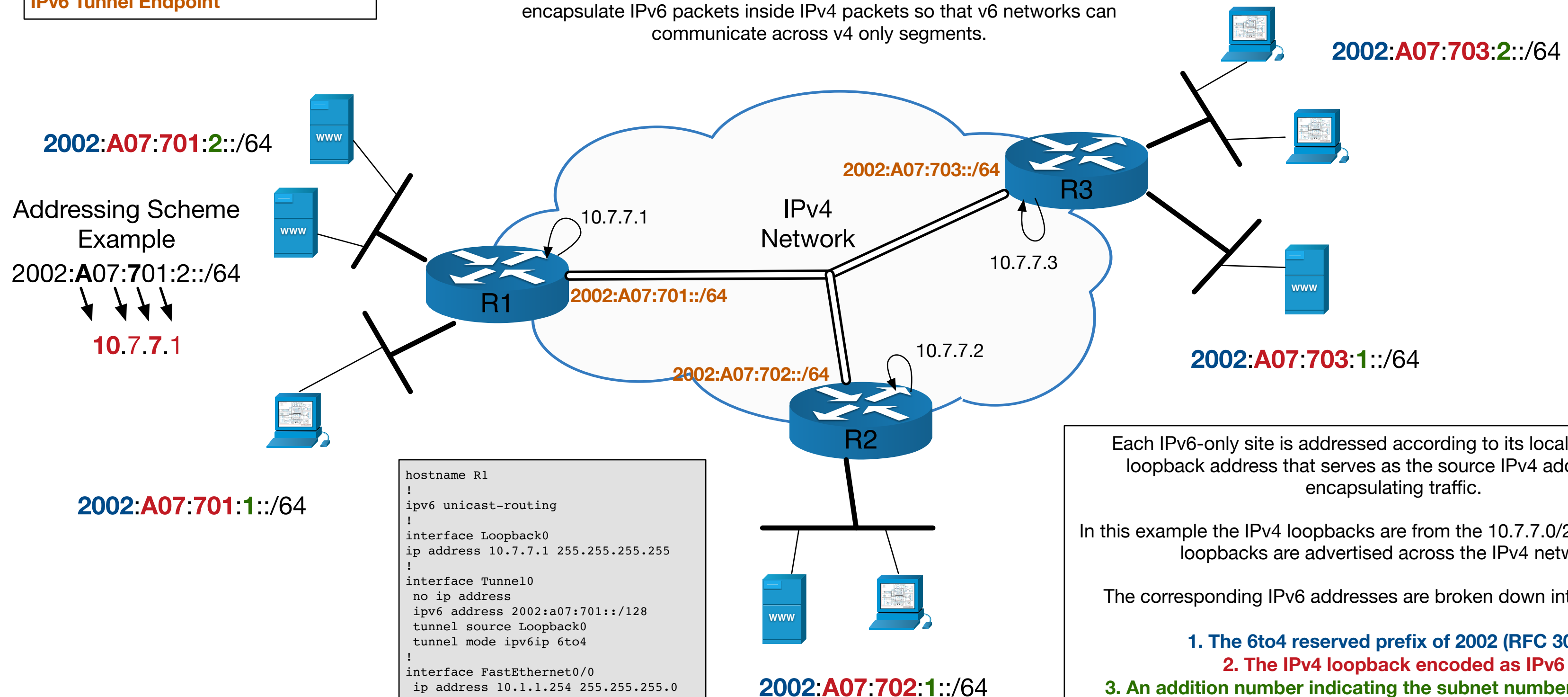
Colour Legend
Reserved 6to4 prefix
IPv6 encoded IPv4 loopback Address
Subnet Number
IPv6 Tunnel Endpoint

2002:A07:701:2::/64

Addressing Scheme Example
2002:A07:701:2::/64

10.7.7.1

2002:A07:701::/64

2002:A07:701:1::/64

IPv4 Network

2002:A07:703::/64

R3

10.7.7.3

10.7.7.2

2002:A07:702::/64

R2

2002:A07:703:2::/64

2002:A07:703:1::/64

2002:A07:702:1::/64

```
hostname R1
!
ipv6 unicast-routing
!
interface Loopback0
ip address 10.7.7.1 255.255.255.255
!
interface Tunnel0
 no ip address
 ipv6 address 2002:a07:701::/128
 tunnel source Loopback0
 tunnel mode ipv6ip 6to4
!
interface FastEthernet0/0
 ip address 10.1.1.254 255.255.255.0
 ipv6 address 2002:A07:701:1::1/64
!
interface FastEthernet0/1
 ip address 10.1.2.254 255.255.255.0
 ipv6 address 2002:A07:701:2::1/64
!
ipv6 route 2002::/16 Tunnel0
```

Each IPv6-only site is addressed according to its local routers IPv4 loopback address that serves as the source IPv4 address when encapsulating traffic.

In this example the IPv4 loopbacks are from the 10.7.7.0/24 subnet. These loopbacks are advertised across the IPv4 network.

The corresponding IPv6 addresses are broken down into three parts:

1. The 6to4 reserved prefix of 2002 (RFC 3056)
2. The IPv4 loopback encoded as IPv6
3. An addition number indicating the subnet number for that site

IPv6 tunnel endpoints are used for the purposes of establishing the tunnel. They are typically the "zeroth" subnet (e.g. 2002:A07:702::/64 which could also be written as 2002:A07:702:0::/64). It's important to observe that the IPv6 tunnel endpoints are not actually in the same subnet.

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