

The diagram illustrates the internal network structure of AS17821 and its external connectivity. The network is organized into several layers:

- Core Layer:** Consists of two core routers, R2 and R5, connected via their fa0/0 interfaces. R2 is connected to R5 via a link labeled "e1/3".
- Edge Layer:** Includes edge routers R11 and R8. R11 is connected to R2 via its fa0/0 interface. R8 is connected to R5 via its fa0/0 interface. Both R11 and R8 have e1/2 interfaces connected to the core.
- Switch Layer:** Contains two switches, SW1 and SW2. SW1 is connected to R11 via its fa0/0 interface and to R2 via its fa0/2 interface. SW2 is connected to R8 via its fa0/0 interface and to R5 via its fa0/2 interface.
- AS Border Routers:** AS17821 is connected to the IPv4 Internet via AS6939 (Hurricane) and AS4608 (APNIC NOC). The connection to AS6939 is via the TS router (AS131107) and the connection to AS4608 is via the NTV router (AS45192).
- External Connections:**
  - AS17821 has eBGP Peers with AS6939 (Hurricane) and AS4608 (APNIC NOC) via the TS and NTV routers.
  - AS17821 has eBGP Peers with AS131107 (TS) and AS45192 (NTV) via the R2 and R5 routers.
  - AS17821 has eBGP Peers with AS131107 (TS) and AS45192 (NTV) via the SW1 and SW2 switches.
- Internal IP Addressing:**
  - Loopback addresses (lo 0) are assigned to all routers and switches.
  - Interface addresses (e1/0, e1/1, e1/2, e1/3, fa0/0, fa0/1, fa0/2, fa0/5, fa0/8, fa0/11) are assigned to all interfaces.
  - AS17821 has a red border around its internal network, indicating its own address space.

No configuration required

### Verify Configuration:

```
ping 192.168.1.6      [...]
ping 192.168.1.10    [...]
```

IPV6 WAN Interface conf Router4:

No configuration required

Wait for R5 & R11 to finish configuration then perform following verification to analyze network effect.

Verify Configuration:

```
ping 2001:df0:a:f02::2          [...]
ping 2001:df0:a:f03::2          [...]
```

IPV4 WAN Interface conf Router5:

```
config t
interface Ethernet1/2
description Transit with AS45192
no ip redirects
no ip directed-broadcast
no ip unreachable
no cdp enable
ip address 192.168.1.6 255.255.255.252
no shutdown
exit
exit
wr
```

Verify Configuration:

```
ping 192.168.1.5                [!!!!]
```

IPV6 WAN Interface conf Router5:

```
config t
interface Ethernet1/2
ipv6 address 2001:DF0:A:F02::2/64
ipv6 enable
exit
exit
wr
```

Verify Configuration:

```
ping 2001:DF0:A:F02::1          [!!!!]
```

IPV4 WAN Interface conf Router6:

No configuration required

Wait for R5 & R11 to finish configuration then perform following verification to analyze network effect.

Verify Configuration:

```
ping 192.168.1.6          [...]
ping 192.168.1.10        [...]
```

IPV6 WAN Interface conf Router6:

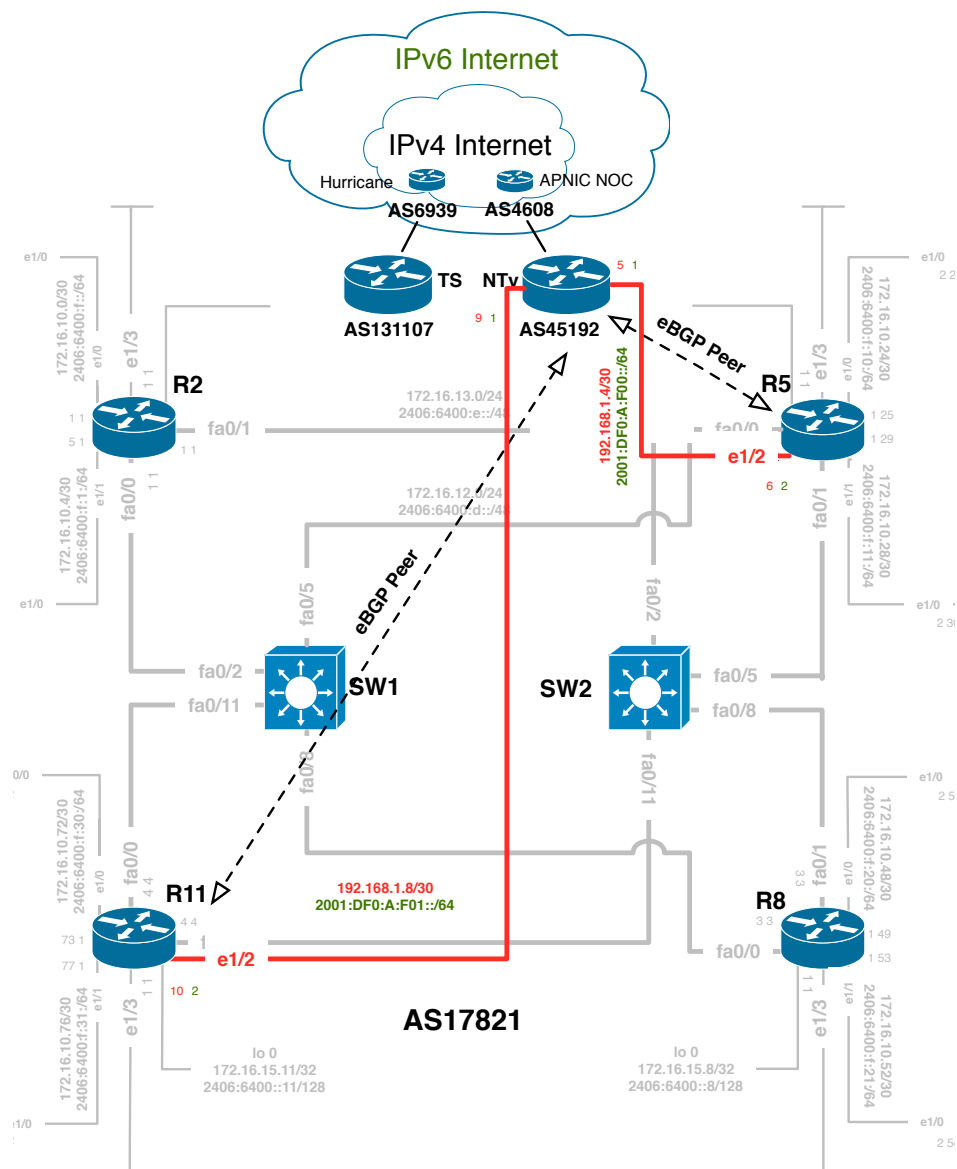
No configuration required

Wait for R5 & R11 to finish configuration then perform following verification to analyze network effect.

Verify Configuration:

```
ping 2001:df0:a:f02::2    [...]
ping 2001:df0:a:f03::2    [...]
```

## Native Transit Service eBGP Conf Region 2:



IPV4 eBGP Peering conf Router4:

No configuration required

Wait for R5 & R11 to finish configuration then perform following verification to analyze network effect.

Verify Configuration:

```
sh bgp ipv4 unicast summary      [Number of prefixes received from peers]
sh bgp ipv4 unicast             [Any new prefix?]
sh ip route bgp                 [Any new prefix?]
sh bgp ipv4 unicast neighbors   [Regional core Router] received-routes/routes
sh ip route
```

```
ping 192.168.1.6      [!!!!]
ping 192.168.1.10    [!!!!]
ping 192.168.1.1     [!!!!]
```

IPv6 eBGP Peering conf Router4:

No configuration required

Wait for R5 & R11 to finish configuration then perform following verification to analyze network effect.

Verify Configuration:

```
sh bgp ipv6 unicast summary    [Number of prefixes received from peers]
sh bgp ipv6 unicast           [Any new prefix?]
sh ipv6 route bgp             [Any new prefix?]
sh bgp ipv6 unicast neighbors [Regional core Router] received-routes/routes
sh ip route
ping 2001:df0:a:f02::1        [!!!!]
ping 2001:df0:a:f03::1        [!!!!]
```

IPv4 eBGP Peering conf Router5:

```
config t
router bgp 17821
address-family ipv4
neighbor 192.168.1.5 remote-as 45192
neighbor 192.168.1.5 activate
exit
exit
exit
wr
```

IPv4 eBGP Nexthop conf Router5:

```
config t
router bgp 17821
address-family ipv4
neighbor IPV4-iBGP-REG2 next-hop-self
neighbor IPV4-iBGP-TRCORE next-hop-self
exit
exit
exit
wr
```

IPv4 eBGP prefix announcement conf Router5:

```
config t
router bgp 17821
address-family ipv4
aggregate-address 172.16.0.0 255.255.224.0 summary-only
exit
exit
exit
wr
```

Verify Configuration:

```
sh bgp ipv4 unicast summary      [Number of prefixes received from peers]
sh bgp ipv4 unicast             [Any new prefix?]
sh ip route bgp                 [Any new prefix?]
sh bgp ipv4 unicast neighbors [Regional core Router] received-routes/routes
sh ip route
ping 192.168.1.6                [!!!!]
ping 192.168.1.10              [!!!!]
ping 192.168.1.1                [!!!!]
```

IPv6 eBGP Peering conf Router5:

```
config t
router bgp 17821
address-family ipv6
neighbor 2001:df0:a:f02::1 remote-as 45192
neighbor 2001:df0:a:f02::1 activate
exit
exit
exit
wr
```

IPv6 eBGP Nexthop conf Router5:

```
config t
router bgp 17821
address-family ipv6
neighbor IPV6-iBGP-REG2 next-hop-self
neighbor IPV6-iBGP-TRCORE next-hop-self
exit
exit
exit
wr
```

IPv6 eBGP prefix announcement conf Router5:

```
config t
router bgp 17821
address-family ipv6
aggregate-address 2406:6400::/32
exit
exit
exit
wr
```

Verify Configuration:

```
sh bgp ipv6 unicast summary      [Number of prefixes received from peers]
sh bgp ipv6 unicast             [Any new prefix?]
sh ipv6 route bgp               [Any new prefix?]
sh bgp ipv6 unicast neighbors [Regional core Router] received-routes/routes
sh ip route
ping 2001:df0:a:f02::1          [!!!!]
ping 2001:df0:a:f03::1          [!!!!]
```

IPv4 eBGP Peering conf Router6:

No configuration required

Wait for R5 & R11 to finish configuration then perform following verification to analyze network effect.

Verify Configuration:

```
sh bgp ipv4 unicast summary      [Number of prefixes received from peers]
sh bgp ipv4 unicast             [Any new prefix?]
sh ip route bgp                 [Any new prefix?]
sh bgp ipv4 unicast neighbors [Regional core Router] received-routes/routes
sh ip route
ping 192.168.1.6                 [!!!!]
ping 192.168.1.10                [!!!!]
ping 192.168.1.1                 [!!!!]
```

IPv6 eBGP Peering conf Router6:

No configuration required

Wait for R5 & R11 to finish configuration then perform following verification to analyze network effect.

Verify Configuration:

```
sh bgp ipv6 unicast summary      [Number of prefixes received from peers]
sh bgp ipv6 unicast              [Any new prefix?]
sh ipv6 route bgp                [Any new prefix?]
sh bgp ipv6 unicast neighbors [Regional core Router] received-routes/routes
sh ip route
ping 2001:df0:a:f02::1          [!!!!]
ping 2001:df0:a:f03::1          [!!!!]
```