ISP and NSP Security Workshop

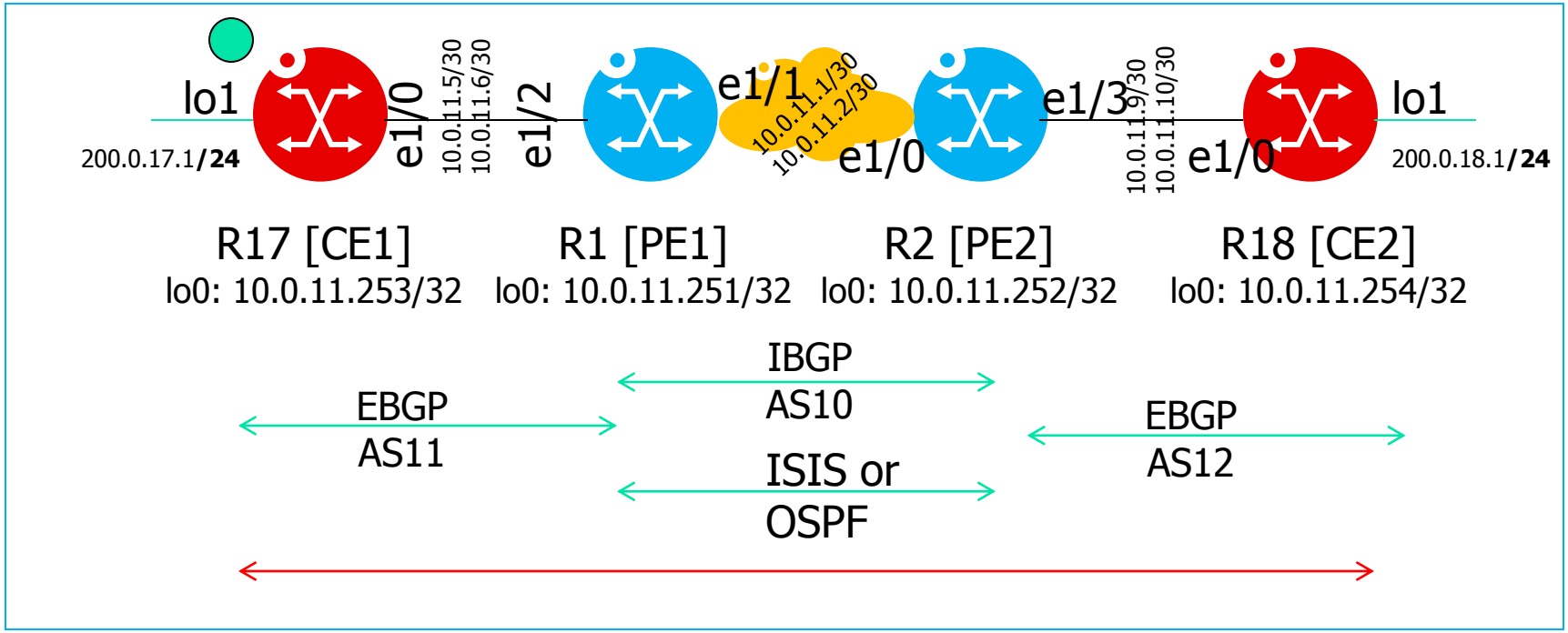
APRICOT 2013

Prefix hijacking

Prefix hijacking and more specifics

- Prefix hijacking can occur in both accidental and malicious scenarios
  - Accidental: YouTube Pakistan Telecom hijack
  - Malicious: Someone wearing a black hat wants to impact your network / steal your reputation
    - Think spammers
- In this lab, we'll take a look at a simple prefix hijack through *more specific* routes, and mitigations for same

Lab starting point



Lab starting check point

- IBGP and OSPF operating PE1-PE2 as per day 1
- EBGP operating between CE1-PE1, CE2-PE2
- Remove IPSEC

Lab

- Configure 200.0.XX.1**/24** as a BGP network on the CE
  - Our existing networks are **/32** networks
    - Remove the /32 networks
- Check that the /24 prefix is received at the PE routers

Lab

- Put on your black hat!
- On CE2, configure a new loopback interface (loopback555) with 200.0.XX.1 – the IP address of CE1!
- On CE2, inject 200.0.XX.0/**25** into BGP

- **What do you see on PE1 and PE2 for BGP routes?**

Lab

- Pinging from PE1 to CE1's loopback1 IP address will now go to CE2!
- **This is a simple example of prefix hijacking**

- What are the options to mitigate this?

Lab

- Configure a prefix-list on the PE2-CE2 BGP session that will permit only CE2's **legitimate prefixes**

- Are there other options for protecting the network from this attack?

CE1 configuration

```
interface ethernet X/X
   description "To PE1"
   ip address 10.0.X.X 255.255.255.252
   no ip redirects
   no ip proxy-arp
!
interface loopback0
   ip address 10.0.X.X 255.255.255.255
!
interface loopback1
   ip address 200.0.XX.1 255.255.255.255
!
router bgp X1
   no synchronization
   no auto-summary
   network 200.0.XX.1 255.255.255.0
   network 10.0.XX.X 255.255.255.255
   neighbor 10.0.X.X remote-as XX
   neighbor 10.0.X.X password <PASSWORD>
   neighbor 10.0.X.X send-community
!
ip route 200.0.XX.0 255.255.255.0 null0
```

We don't need the RTBH route-maps anymore, so remove those if present

PE1 configuration

```
interface ethernet X/X
   description “To PE2”
   ip address 10.0.X.X 255.255.255.252
   no ip redirects
   no ip proxy-arp
!
interface loopback0
   ip address 10.0.X.X 255.255.255.255
!
router bgp X0
   no synchronization
   no auto-summary
   neighbor 10.0.X.X remote-as X1
   neighbor 10.0.X.X password <PASSWORD>
   neighbor 10.0.X.X send-community
   neighbor 10.0.X.X ebgp-multihop 2
   neighbor 10.0.X.Y
   neighbor 10.0.X.Y send-community
   neighbor 10.0.X.Y next-hop-self
   neighbor 10.0.X.Y password <PASSWORD>
```

PE2 configuration

```
interface ethernet X/X
   description “To PE2”
   ip address 10.0.X.X 255.255.255.252
   no ip redirects
   no ip proxy-arp
!
interface loopback0
   ip address 10.0.X.X 255.255.255.255
!
router bgp X0
   no synchronization
   no auto-summary
   neighbor 10.0.X.X remote-as X1
   neighbor 10.0.X.X password <PASSWORD>
   neighbor 10.0.X.X send-community
   neighbor 10.0.X.X ebgp-multihop 2
   neighbor 10.0.X.Y
   neighbor 10.0.X.Y send-community
   neighbor 10.0.X.Y next-hop-self
   neighbor 10.0.X.Y password <PASSWORD>
```

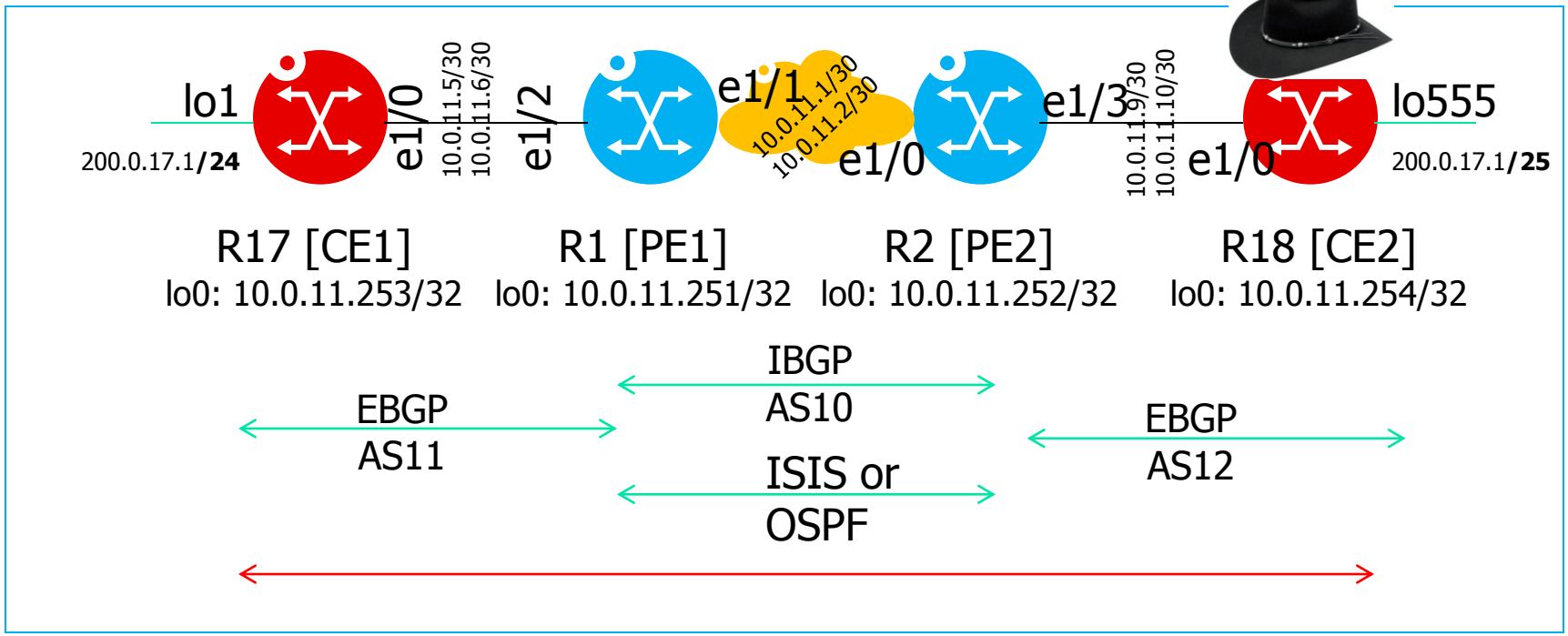
CE2 configuration

```
interface ethernet X/X
    description "To PE2"
    ip address 10.0.X.X 255.255.255.252
    no ip redirects
    no ip proxy-arp
!
interface loopback0
    ip address 10.0.X.X 255.255.255.255
!
interface loopback1
    ip address 200.0.XX.1 255.255.255.255
!
interface loopback555
    ip address 200.0.YY.1 255.255.255.255
!
router bgp X2
    no synchronization
    no auto-summary
    network 200.0.XX.1 255.255.255.255
    network 10.0.XX.X 255.255.255.255
    network 200.0.YY.1 255.255.255.128
    neighbor 10.0.X.X remote-as XX
    neighbor 10.0.X.X password <PASSWORD>
    neighbor 10.0.X.X send-community
!
ip route 200.0.YY.1 255.255.255.128 null0
```

This is CE1's IP

We don't need the RTBH route-maps anymore, so remove those if present

Lab **black-hat mode**



Lab

- Because CE2 announced 200.0.17.0/25 to PE2, and CE1 announced 200.0.17.0/24 to CE1, the longer prefix won
- Traffic for 200.0.17.1 ended up at CE2!
- Prefix-list on PE2-CE2 BGP session will prevent PE2 from announcing CE1 addresses