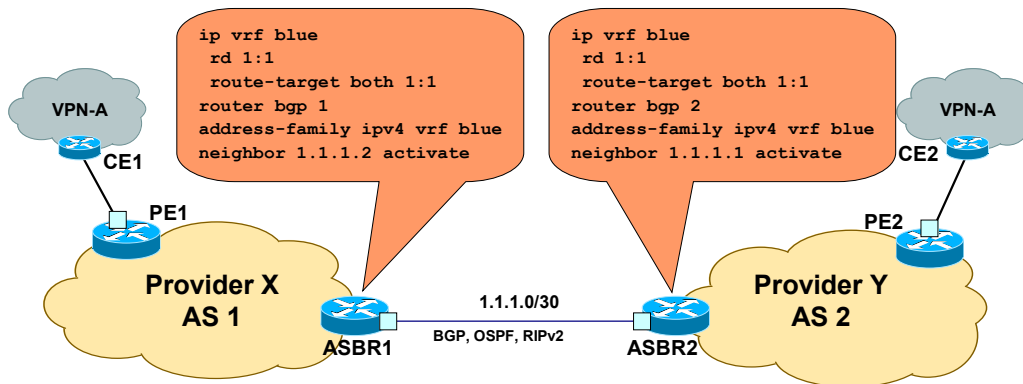


# **MPLS Inter-AS VPNs**

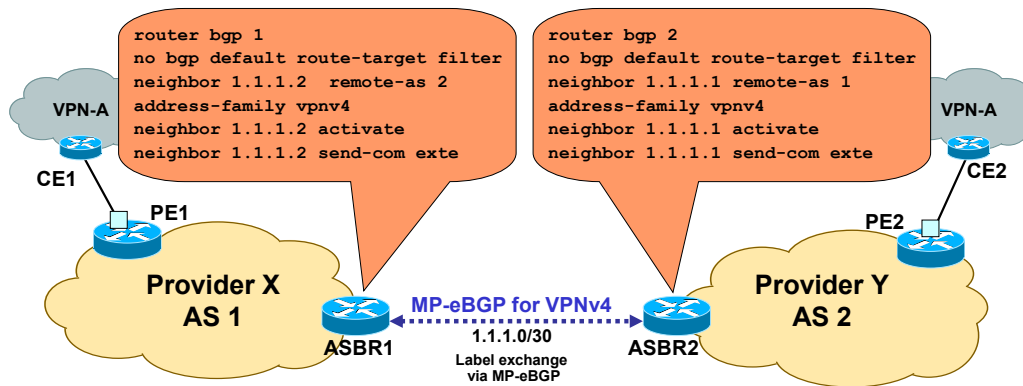
Configuration on Cisco Devices

# #1: Back-to-Back VRF



- **Note: ASBR must already have MP-iBGP session with iBGP neighbors (RRs or PEs)**

## #2: MP-eBGP between ASBRs



- **Note: ASBR must already have MP-iBGP session with iBGP neighbors (RRs or PEs)**

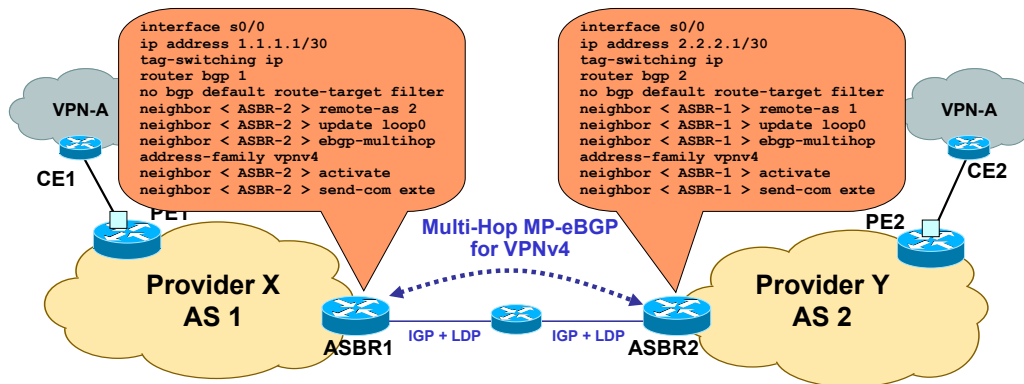
## #2: Receiving ASBRs



- **May allocate a new label if desired**
  - ♦ Depends on next-hop-self configuration
    - Default off
- **Will automatically create a host route (/32) for its ASBR neighbor**
  - ♦ **Must be advertised into receiving IGP if next-hop-self is NOT in operation to maintain the LSP**
    - **Either through redistribution or passive-interface on PE-ASBR link with network statements**

Note that /32 host route is created regardless of whether nhs is set or not on the receiving PE-ASBR. This is because we need an implicit-null entry within the LFIB for the originating PE-ASBR (implementation specific), even though we do not use the entry within the LFIB.

## #2/3: Multi-Hop MP-eBGP

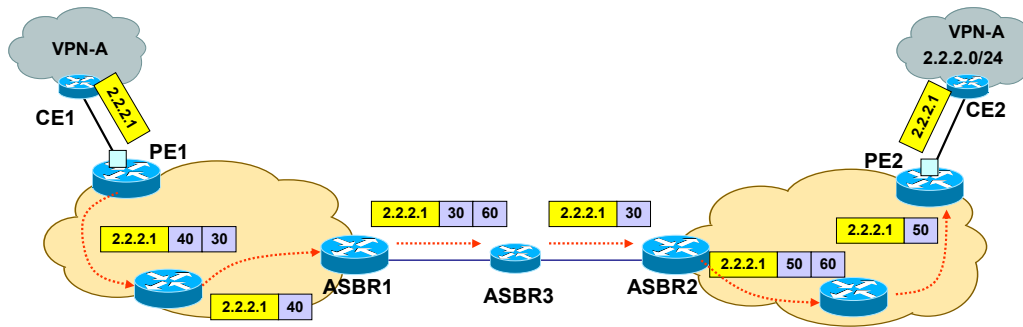


- Multi-Hop MP-BGP session between ASBRs

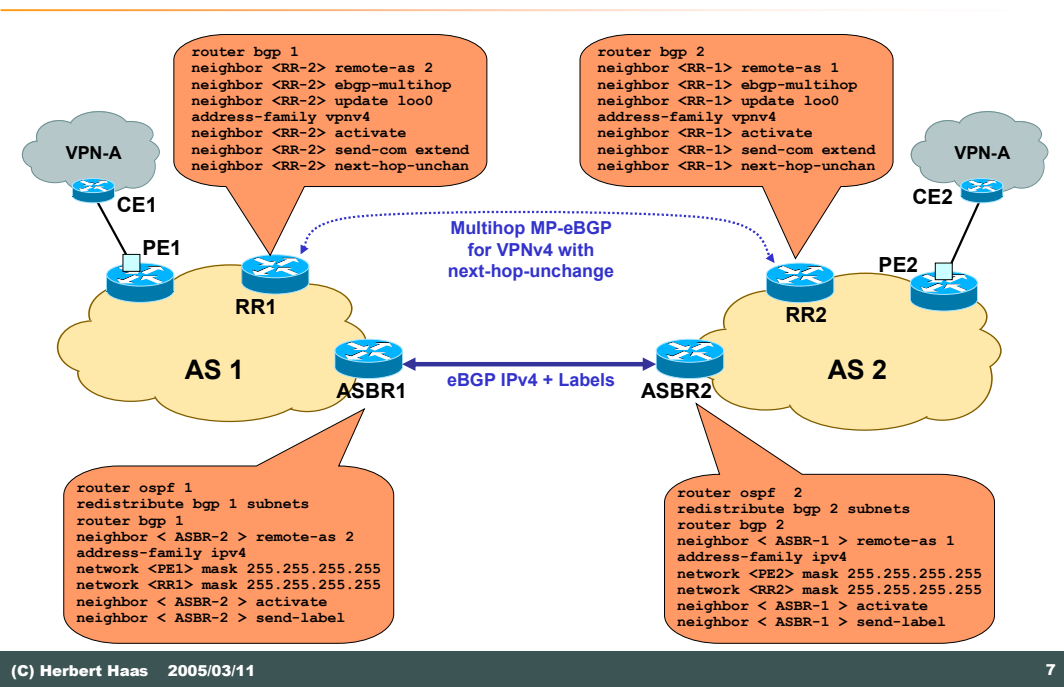
Note LDP is required to maintain the LSP between ASBR routers – this could be done with static routing and static labels ???

See details at <http://nsite.cisco.com/groups/ST5/content/mmpls/web/feature/Inter-AS/inter-as-main.html>

# #2/3: Packet Flow



# #3: MP-eBGP btw ASBRs



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BGP IPv4 with labels in 12.0(21)ST – will also be in 12.2S FCS2 and 12.2(x)T (where x is the 4<sup>th</sup> release of 12.2T)

**iBGPipv4+label could also be used in within AS (instead of “network <x.x.x.x>”) to propagate the label information for PEs.**

# Next-hop Treatment



Update-Type:	Next-hop Attribute:
iBGP to iBGP	no change by default
eBGP to iBGP	no change by default
iBGP to eBGP	change to next-hop-self by default
eBGP to eBGP	change to next-hop-self by default
eBGP to MP-iBGP	change to next-hop-self by default
MP-eBGP to MP-iBGP	no change by default
MP-iBGP to MP-eBGP	change to next-hop-self by default
MP-eBGP to MP-eBGP	change to next-hop-self by default

- **When a router changes the BGP next-hop of an IPv4 or VPNv4 prefix, then this router must allocate a new label**
  - ♦ And advertise this label to the BGP neighbor
  - ♦ Also this router must provide a label binding in the LFIB

## Anton: Check if correct!

The slide gives a summarized answer to the frequently asked question, when does the router change the next-hop of a BGP prefix.

When dealing with Inter-AS, most of us often get confused about the label allocation at ASBR. Following rule might help you understand -

In other words, if the router doesn't change the BGP next-hop of a prefix, then it doesn't allocate any label and doesn't write anything in the LFIB for that prefix.

## Rewrite RT at ASBR



- **ASBR can add/delete RT associated with VPNv4 prefix**
- **Used to secure the VPN environment**

```
ASBR(conf)# router bgp 25
ASBR(conf-router)# neighbor 1.1.1.1 route-map route-target-deletion out
ASBR(conf-router)# exit
ASBR(conf)# route-map route-target-delete
ASBR(conf-route-map)# match extcommunity 101
ASBR(conf-route-map)# set extcomm-list 101 delete
ASBR(conf-route-map)# set extcommunity rt 88:99 additive
ASBR(conf)# ip extcommunity-list 101 permit rt 110:120
```

This is a huge plus for the Inter-AS providers, as it saves them lot of headaches of managing/filtering