

BGP/MPLS L3VPN's Deployment Scenario's

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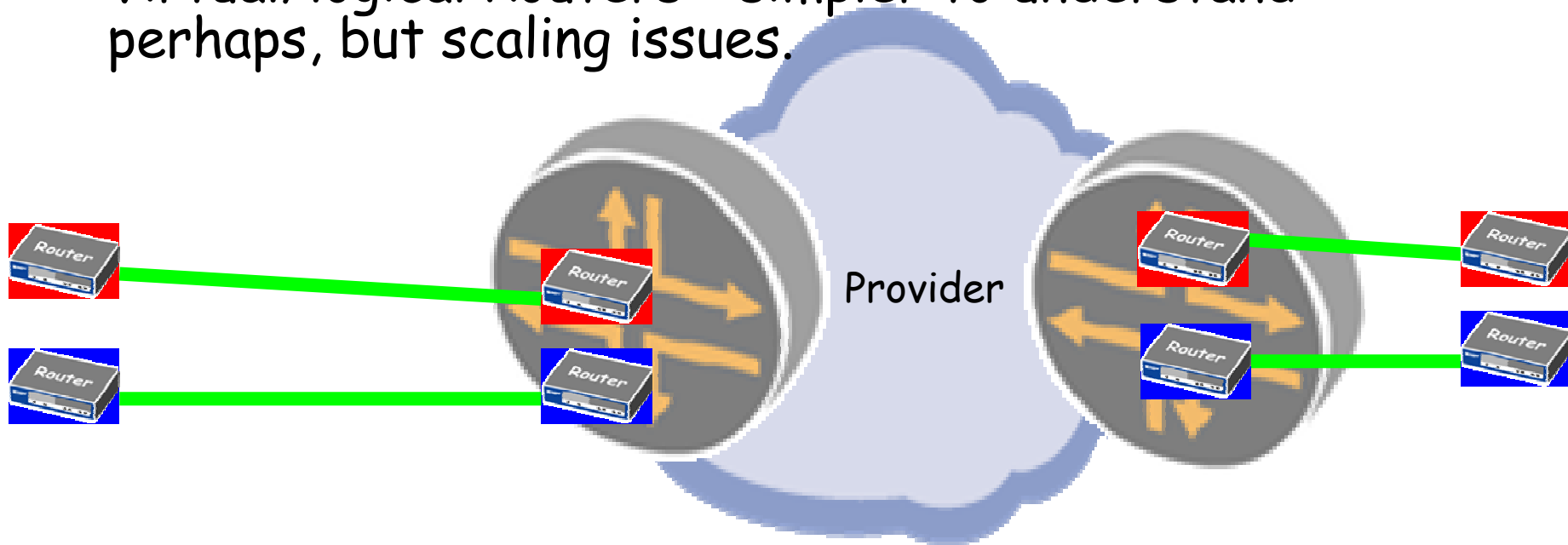


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Layer 3 VPN's

- RFC2547bis
- BGP/MPLS IP VPN's
- Other options
 - Virtual/logical Routers - simpler to understand perhaps, but scaling issues.



Influencing Deployment

- Cost ~2 x IP connectivity
- Expected to be 1:1 in 2-3 years

Predicted Revenue for IP VPN Services – Asia Pacific

Year	Revenues	Growth
2003	\$1.69b	24.9%
2004	\$2.11b	25.4%
2005	\$2.72b	28.7%
2006	\$3.36b	23.4%
2007	\$4.06b	20.9%
2008	\$4.62b	13.7%
2009	\$5.14b	11.5%

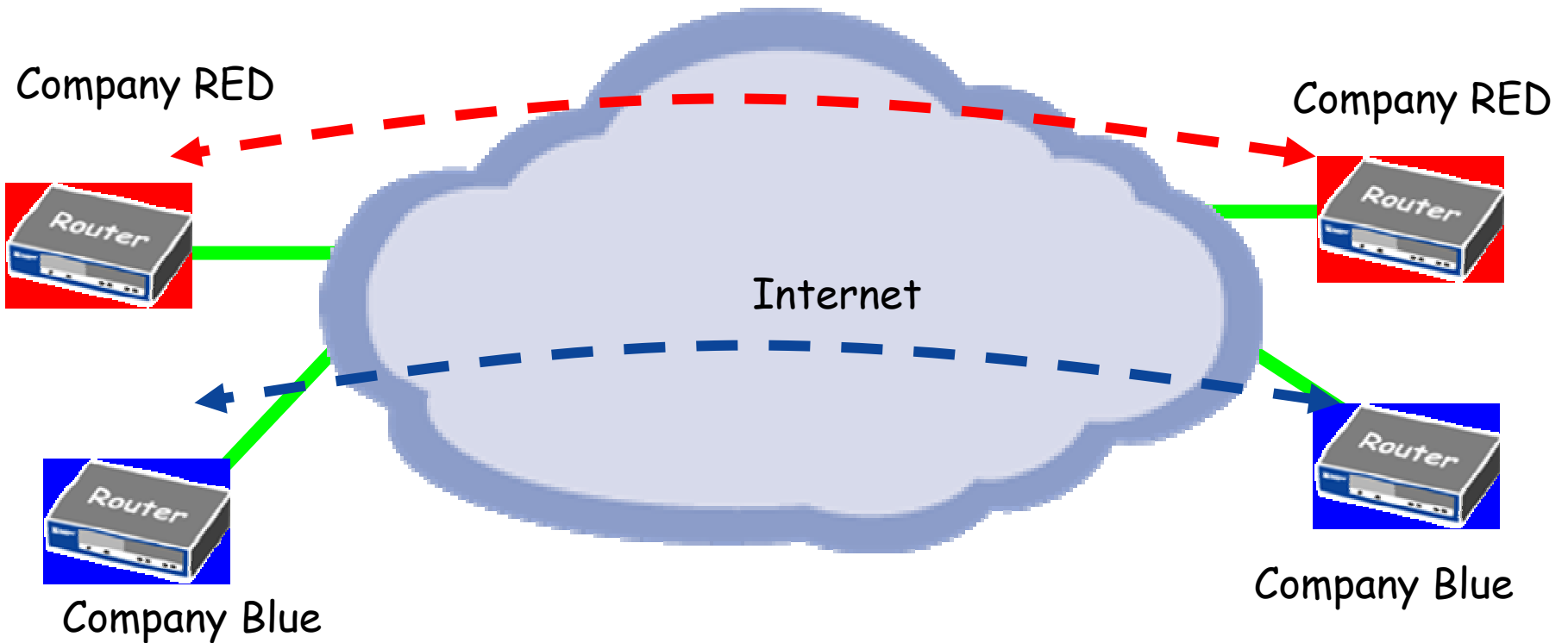
Layer 3 VPN's (2547bis BGP/MPLS VPN's)

Provider provisioned VPN

- ISP runs backbone for customer
 - Customer can be another ISP!
- Attractive to
 - Customer who do not want to run their own backbone
- Not attractive to
 - Customer who doesn't trust carrier
 - Customers who's jobs are threatened

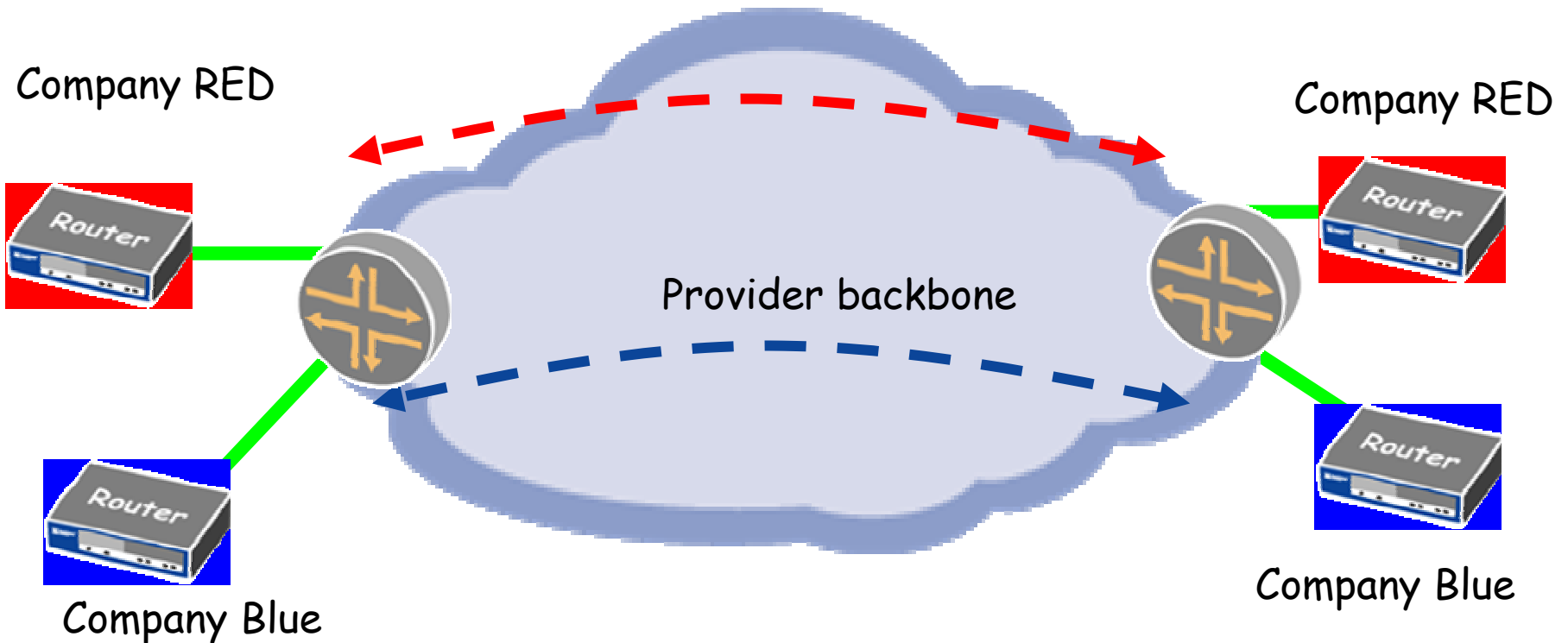
Traditional VPN's

- CPE based
- Customer controlled
- No value add for provider



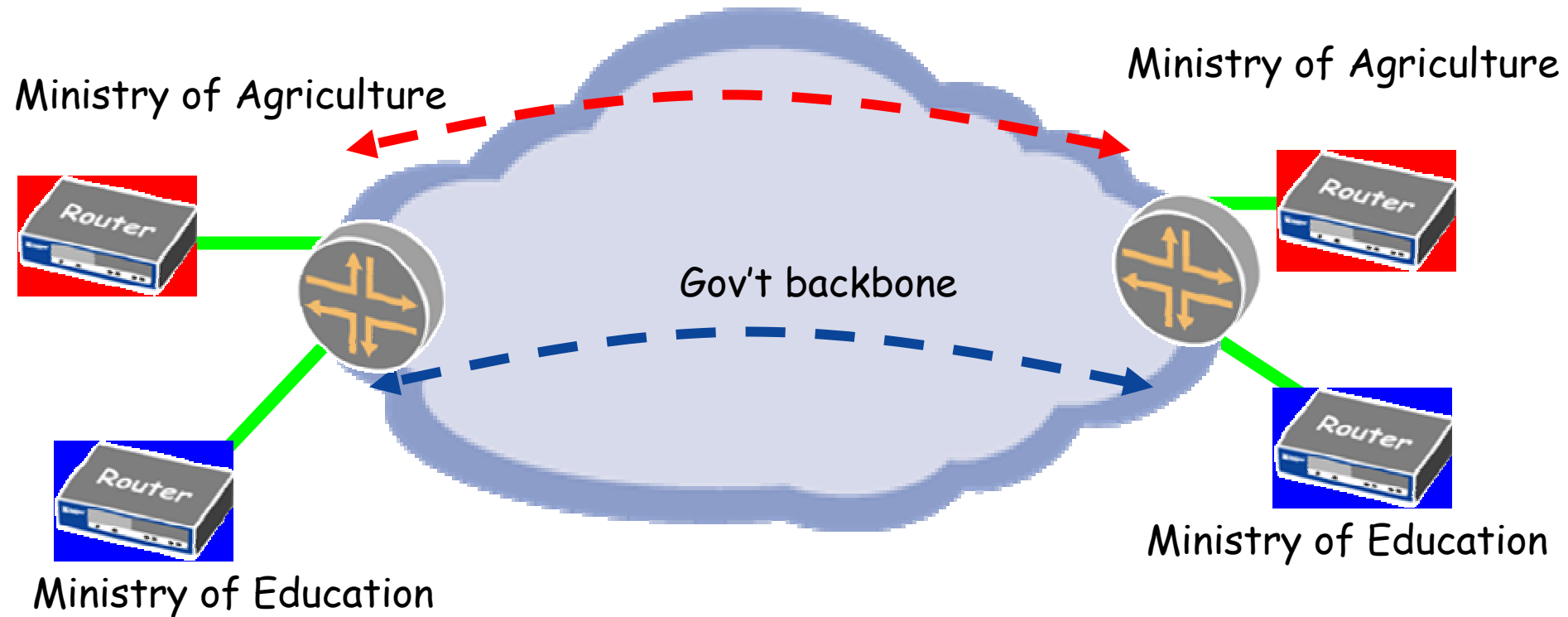
Provider provisioned VPN's - PPVPN

- PE based
- Customer outsource backbone
- Value add for provider
- Single Site Provisioning (BGP, + Route refresh + Route Target Filtering)



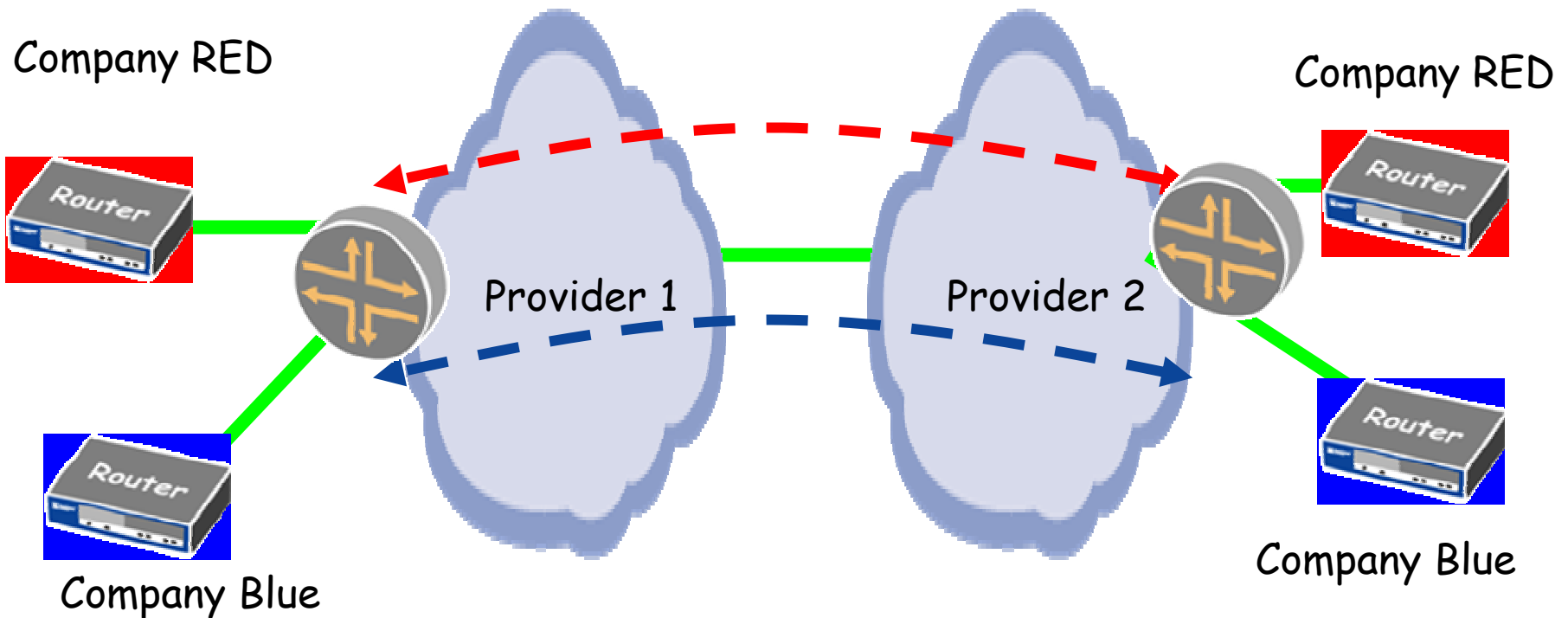
Sharing Network backbones

- Infrastructure built by one department
- Shared by other departments
- Cost effective government spending
- Examples
 - Gov't backbones
 - Industry Aligned



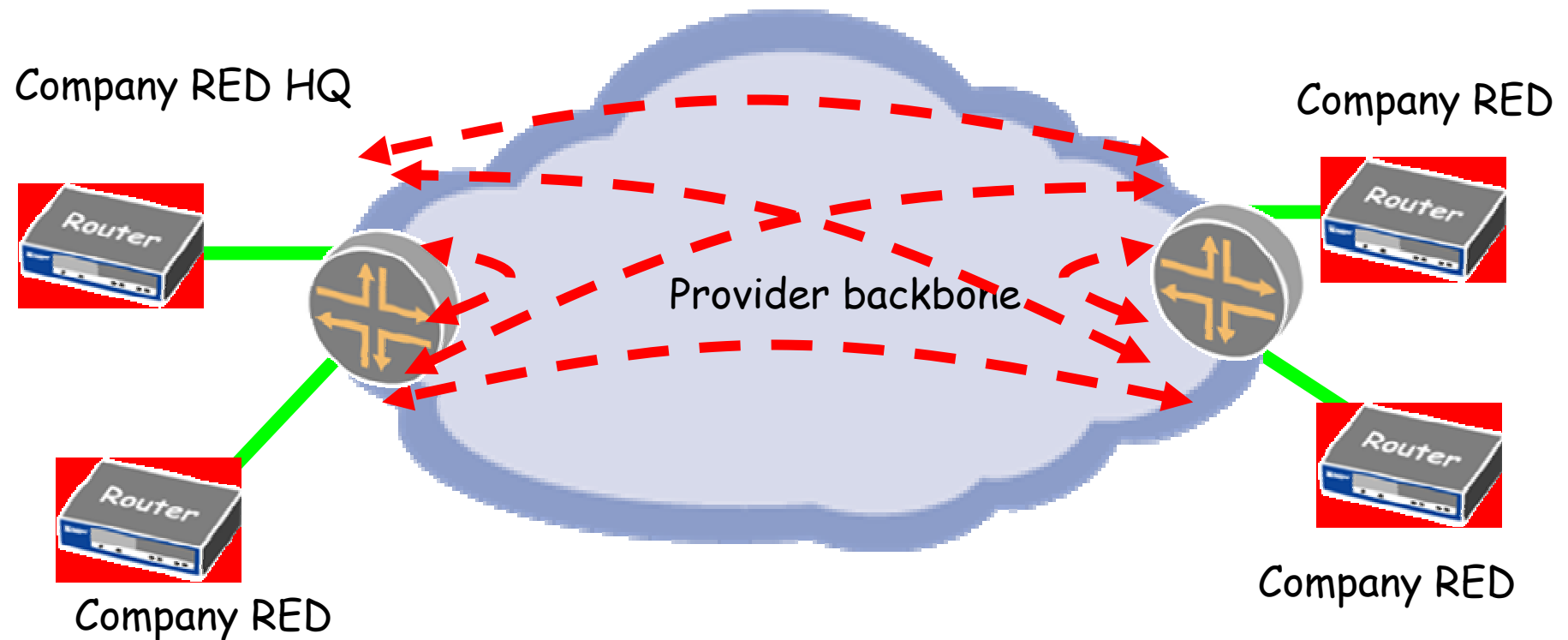
InterAS VPN's

- Requires Co-operation
- Opportunity for global coverage



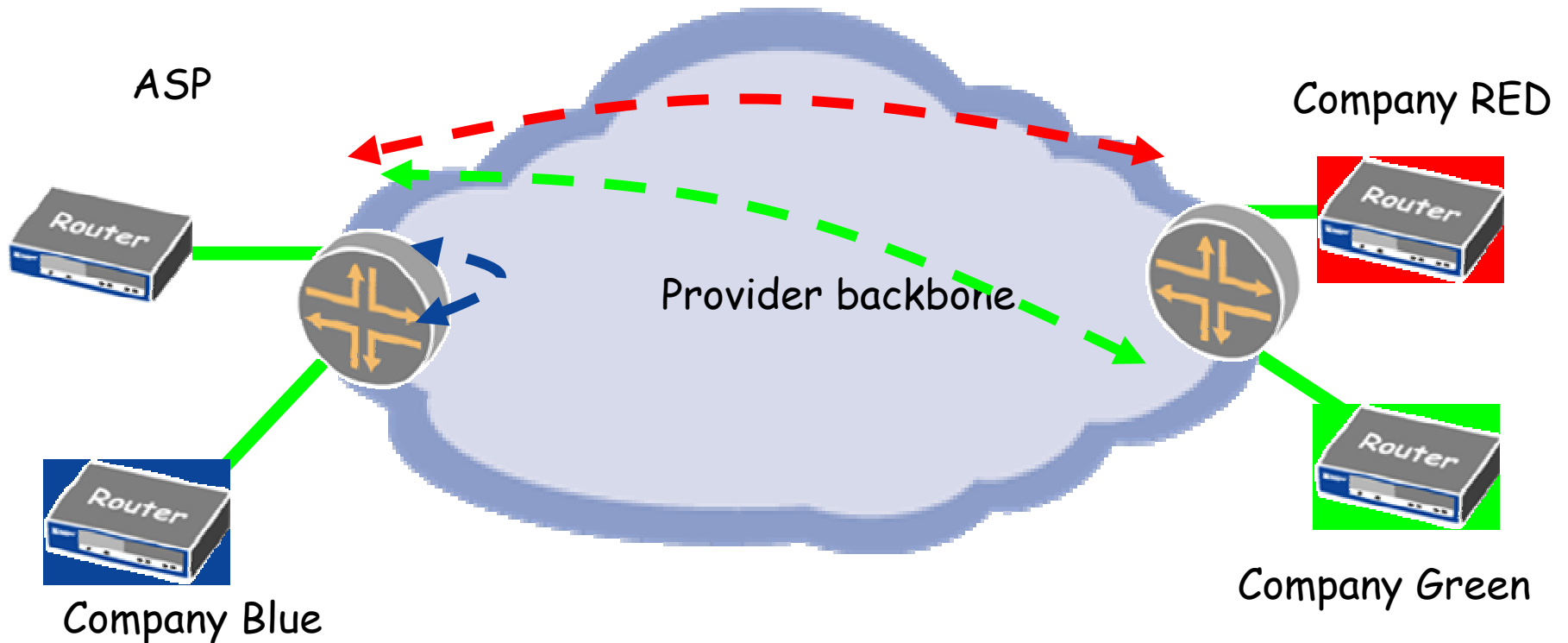
Site Connectivity

- Partial or Full Mesh is supported
- Full Mesh is more cost effective and competitive with traditional solutions



Overlapping VPN's

- Suites application / service providers



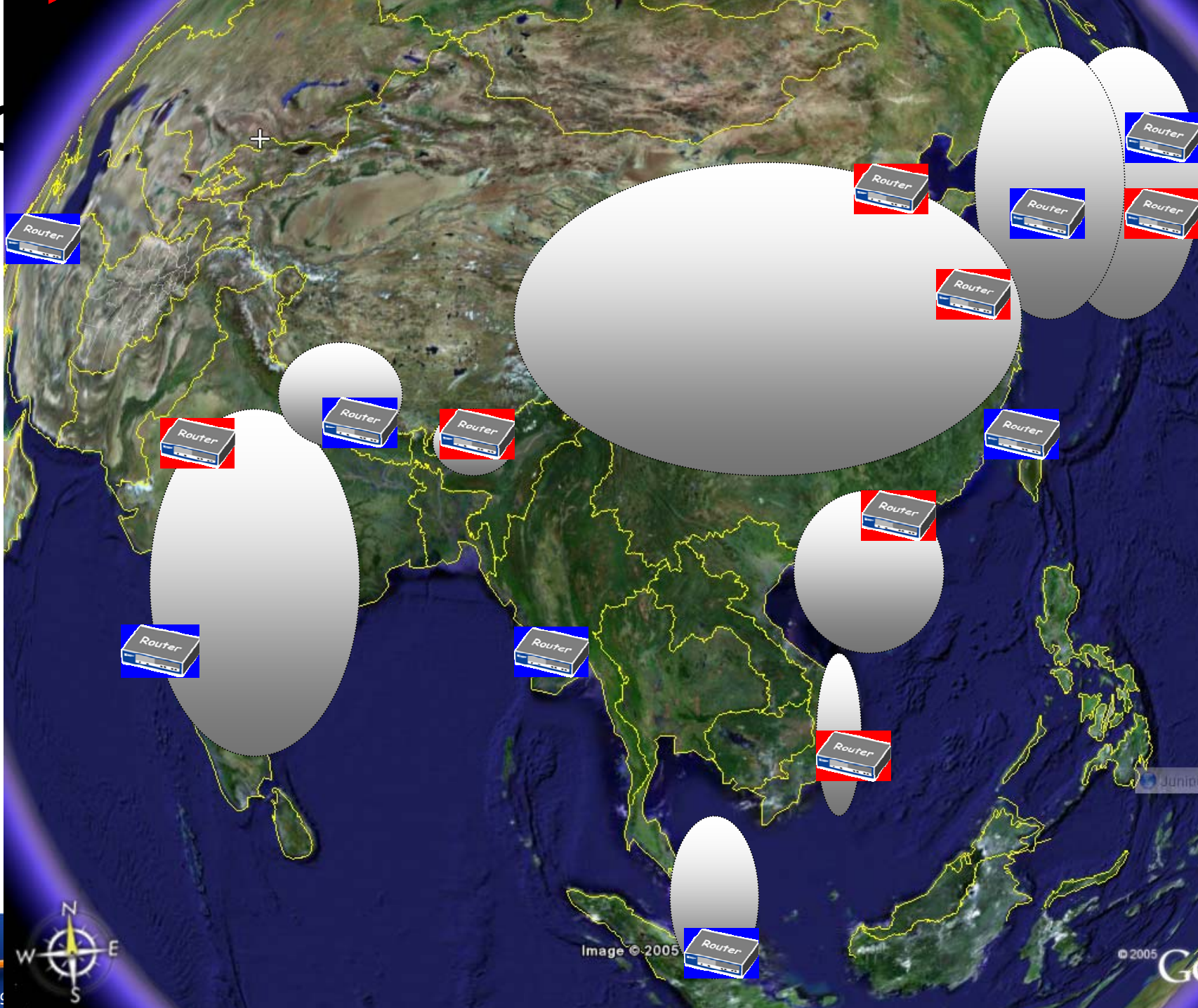
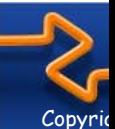


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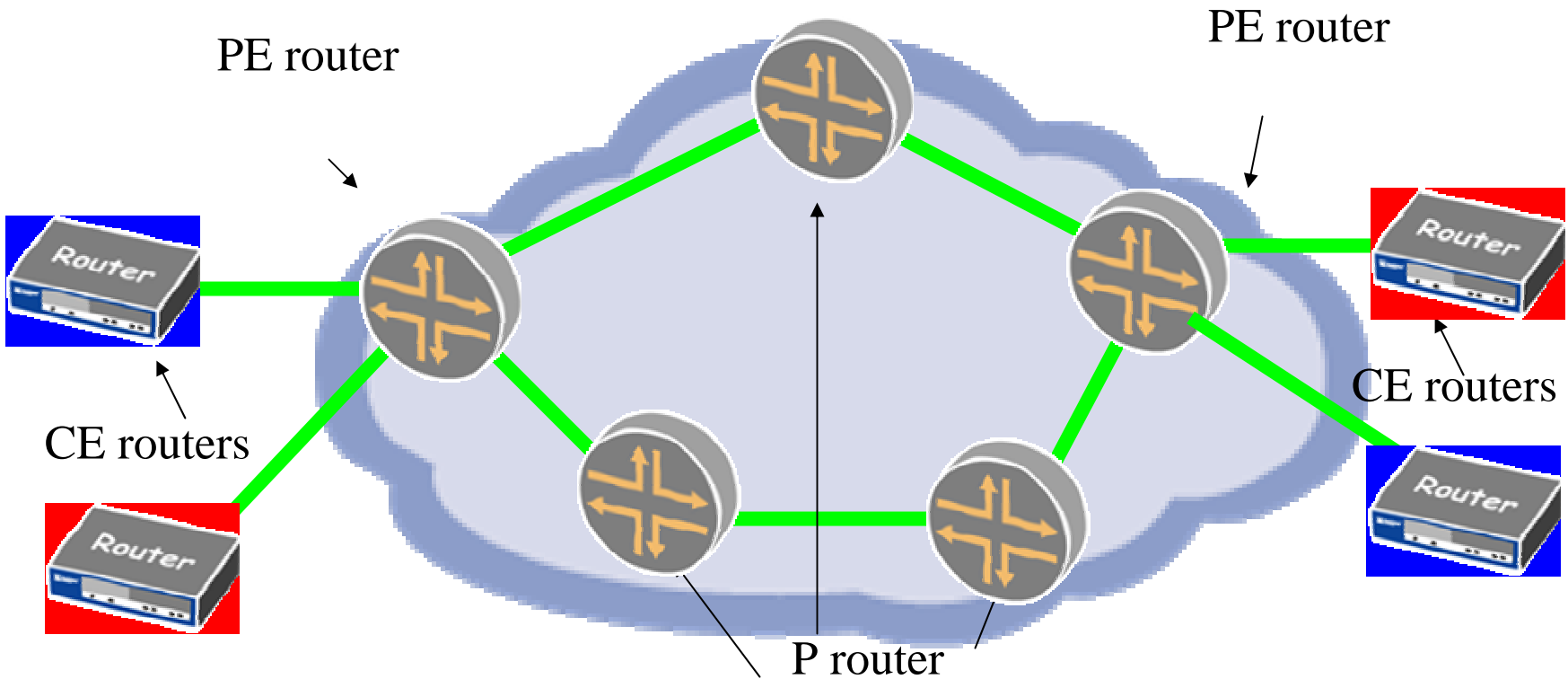
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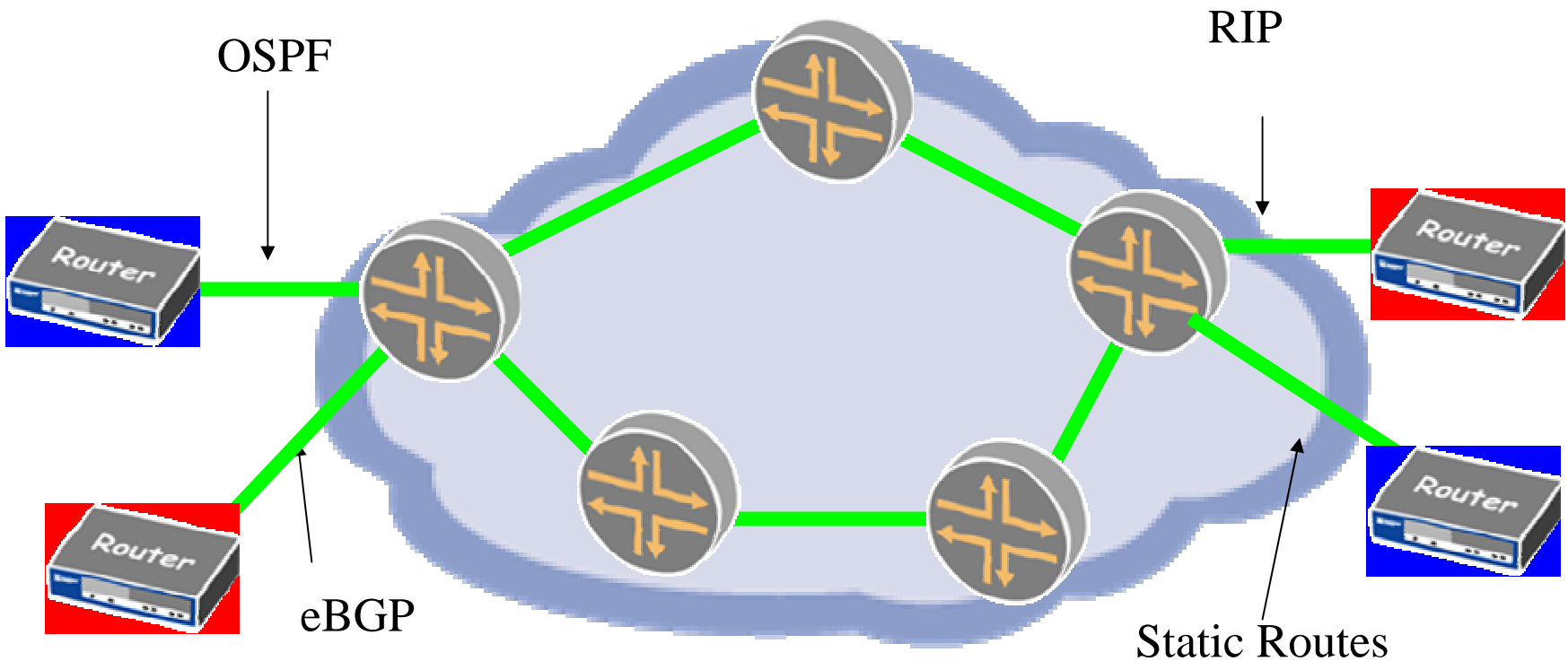
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L3 VPN Terminology



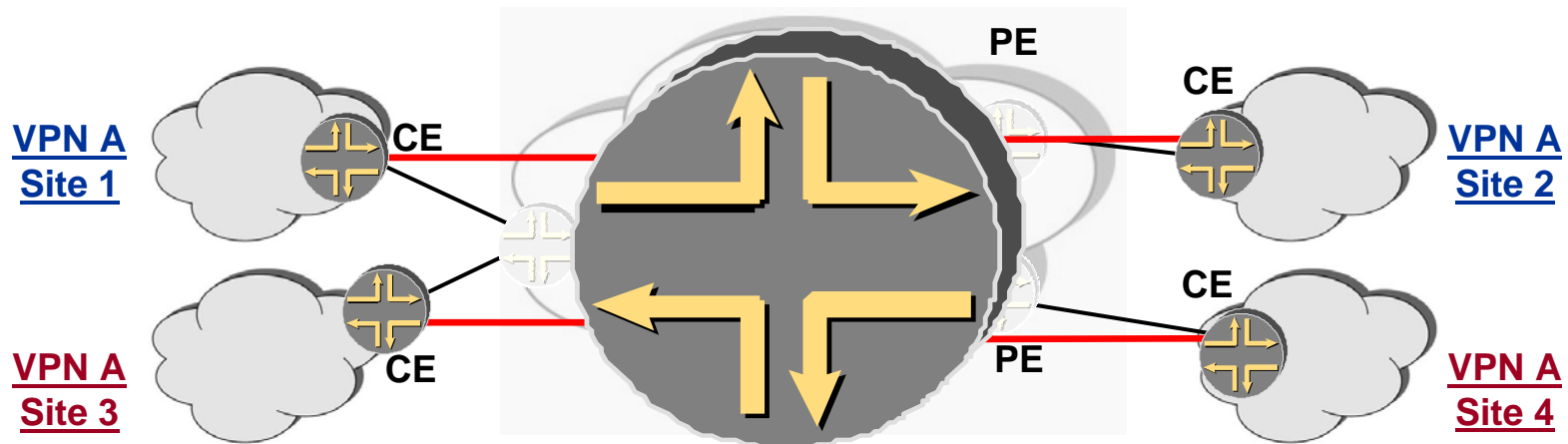
CE-PE interaction

- Any L2 connection, Any routing protocol
- CE peers at layer 3 with PE



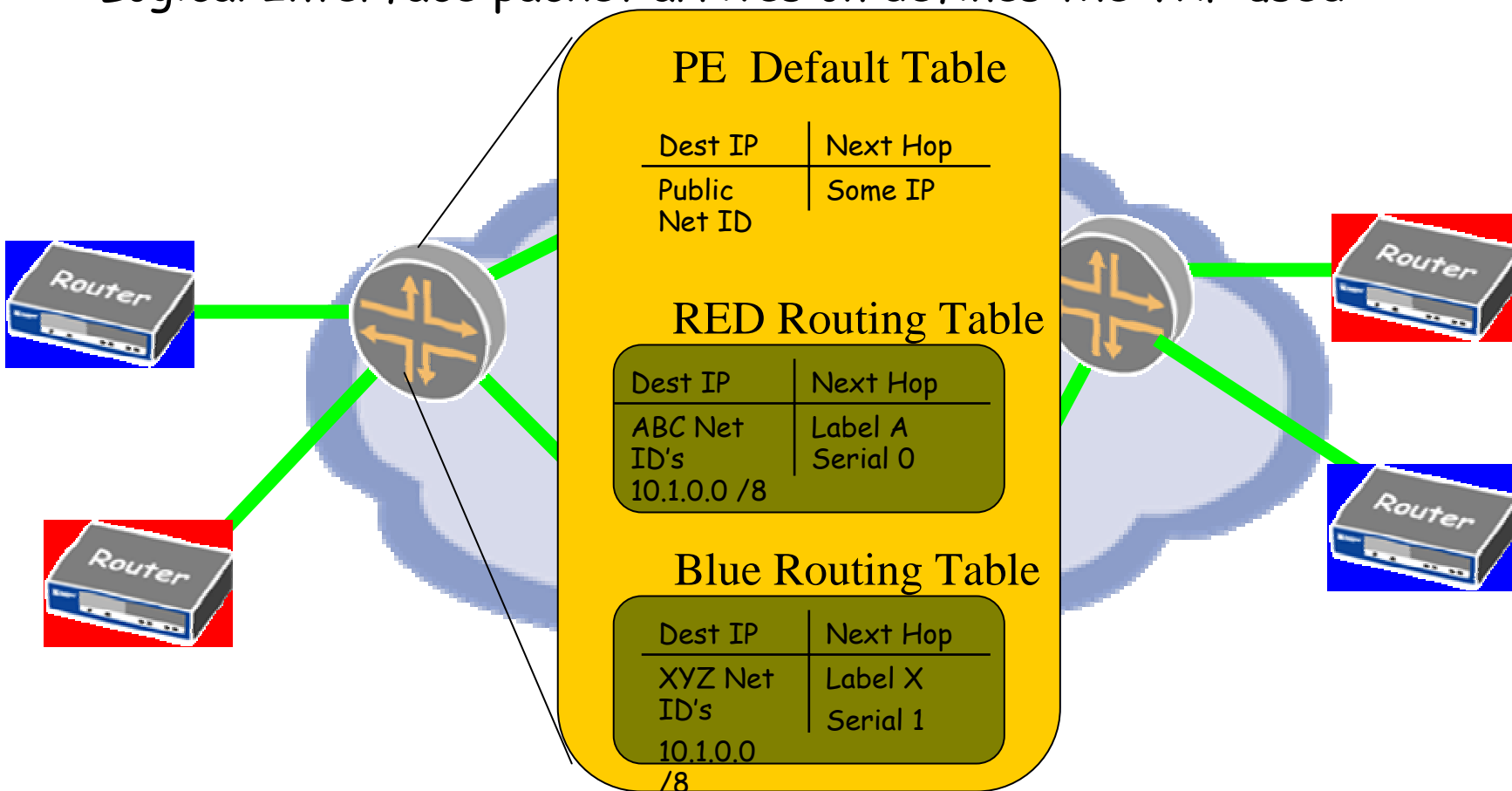
Customer View of L3VPN

- Make the cloud look like a router
- Single site provisioning



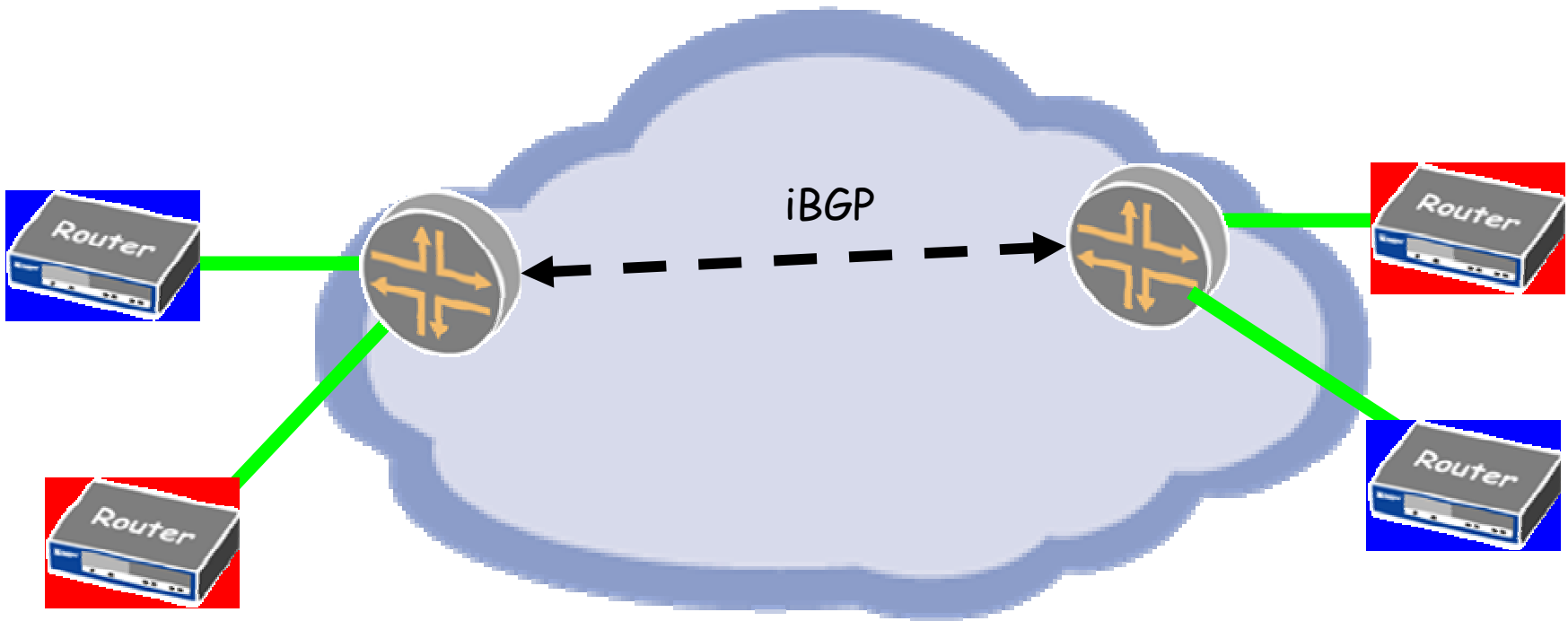
VRF - Virtual Routing and Forwarding instance

- VRF per VPN on PE
- Logical Interface packet arrives on defines the VRF used



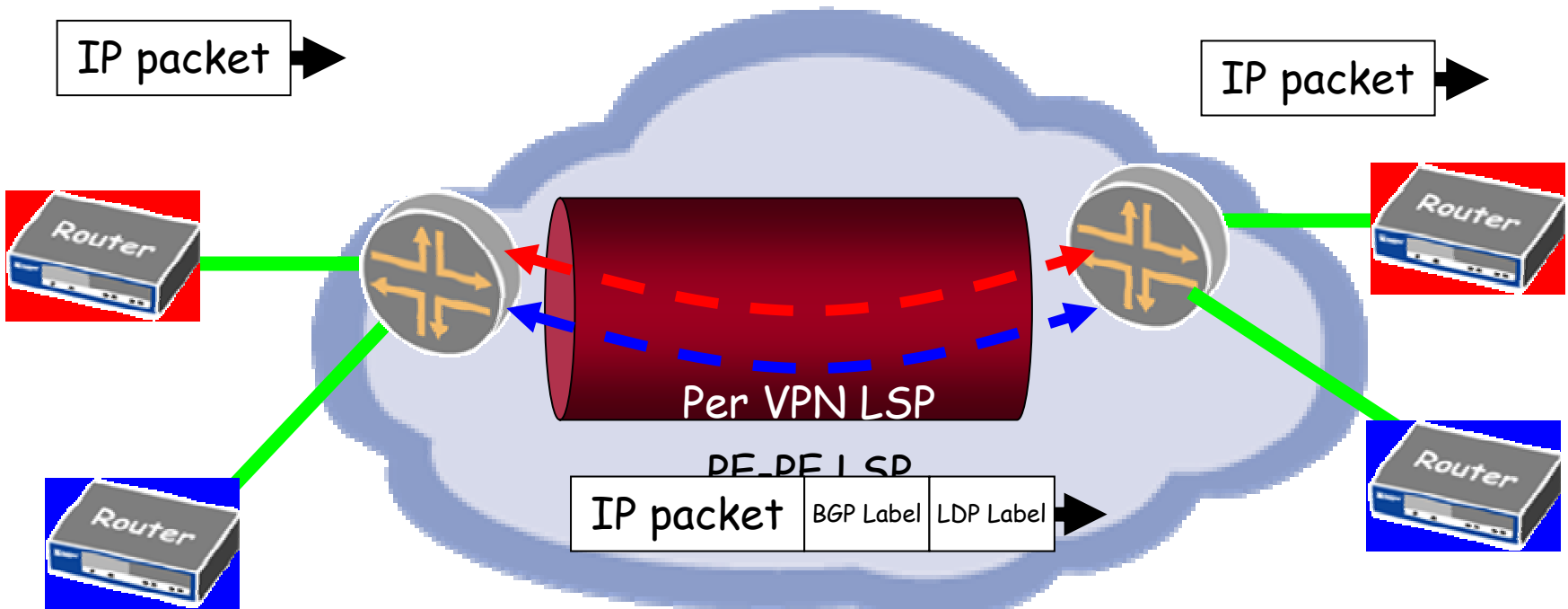
PE-PE interaction

- iBGP between PE's carries routing information
- Assigns label per VPN



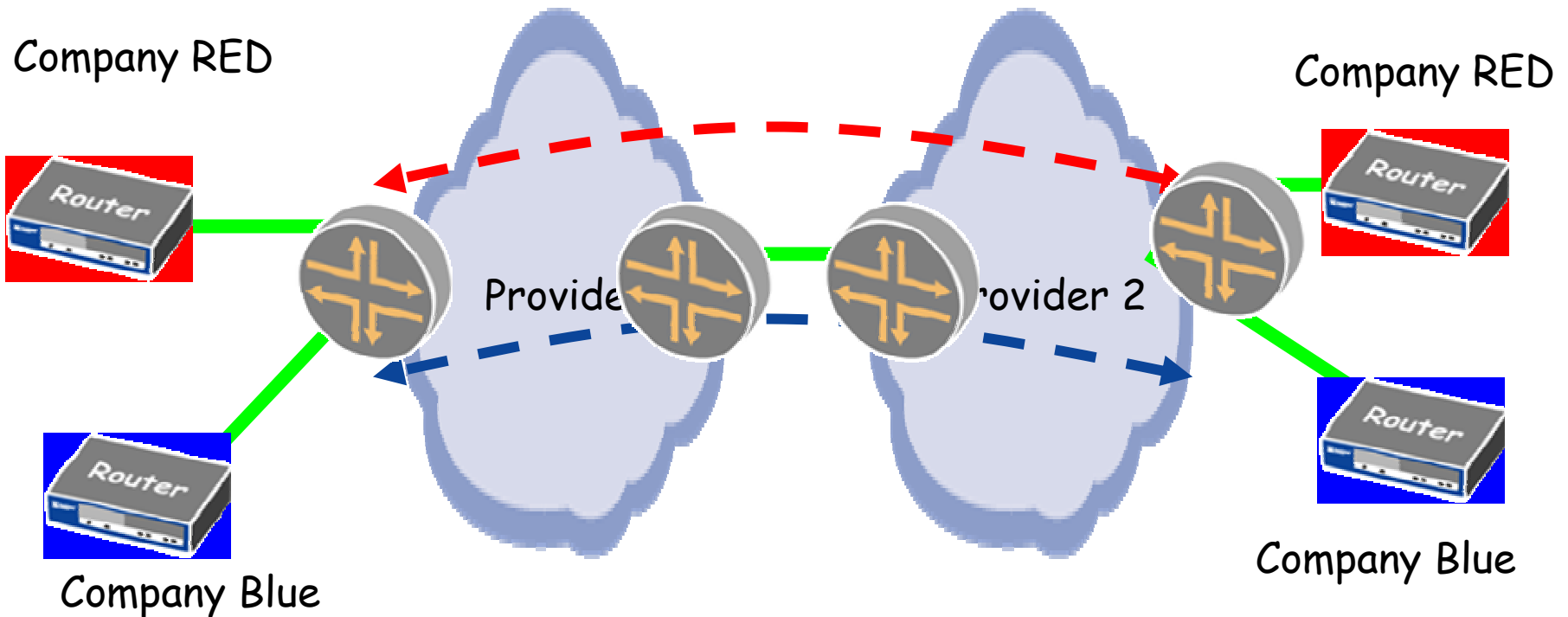
LSP establishment

- Per VPN via BGP label assignment
- PE - PE set up via LDP or RSVP (saves state)



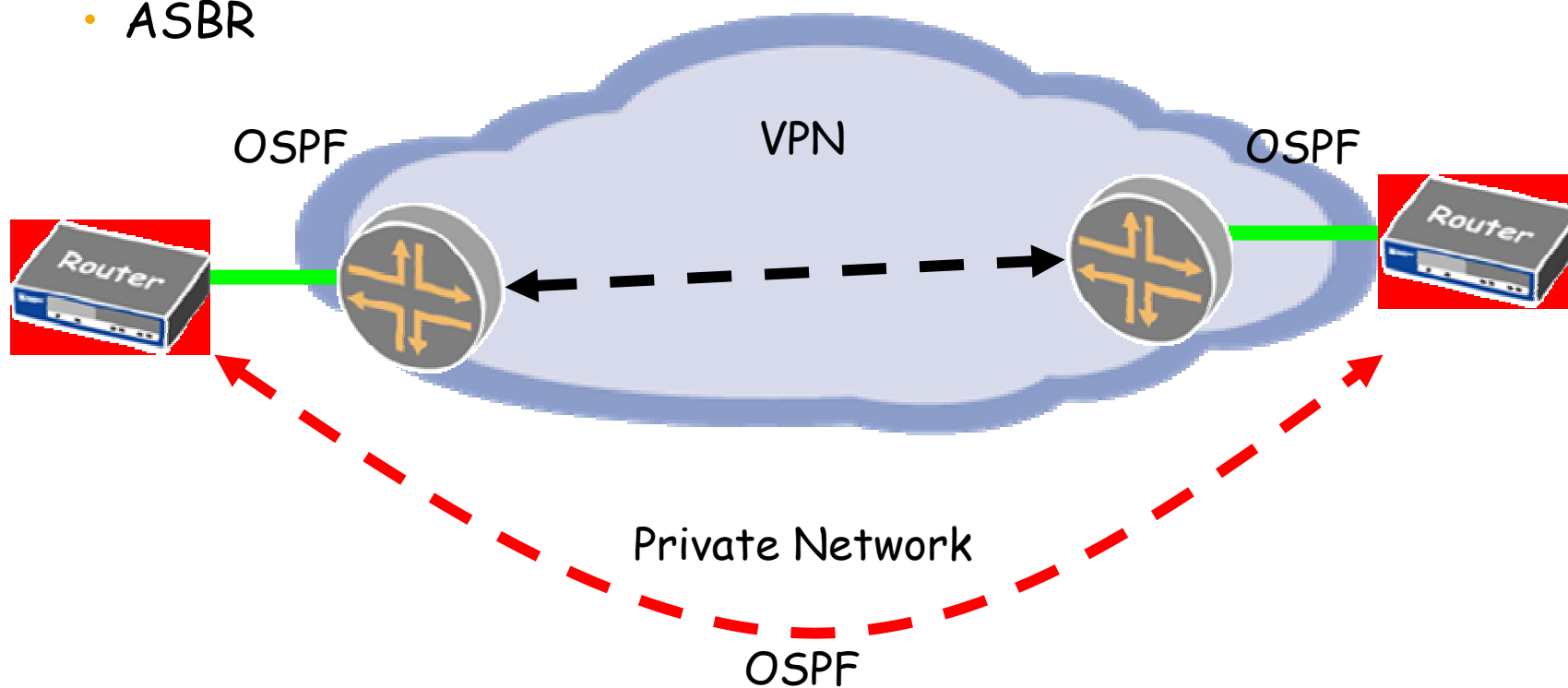
InterAS VPN's

- VRF-to-VRF
- MBGP between ASBR (not OSPF)
- MBGP between PE's



VPN as backup

- Do you want PE to appear as
 - Intra Area Router (Sham Links)
 - ABR
 - ASBR



Issues

- BGP scaling
 - RR, often separate from IP RR
- Inter-AS scaling
 - MBGP between PE's is desirable
- Management
 - Usual MPLS, OAM, root cause automation.
 - Overlap NOC with VPN? Addressing?
- QoS
 - Carriers mapping 4+ queues

Further Reading

1. http://www.juniper.net/solutions/literature/white_papers/
2. http://www.juniper.net/solutions/literature/white_papers/200012.pdf
3. www.mplssrc.com



Thank You !