

Cuộc sống đích thực

VNPT



## THE TECHNICAL SOLUTIONS TO MIGRATE IPV6 IN NETWORK OF CPT

Hanoi, 05/2012

VIETNAM POSTS AND TELECOMMUNICATIONS GROUP  
CENTRAL POSTS AND TELECOMMUNICATION





# Agenda

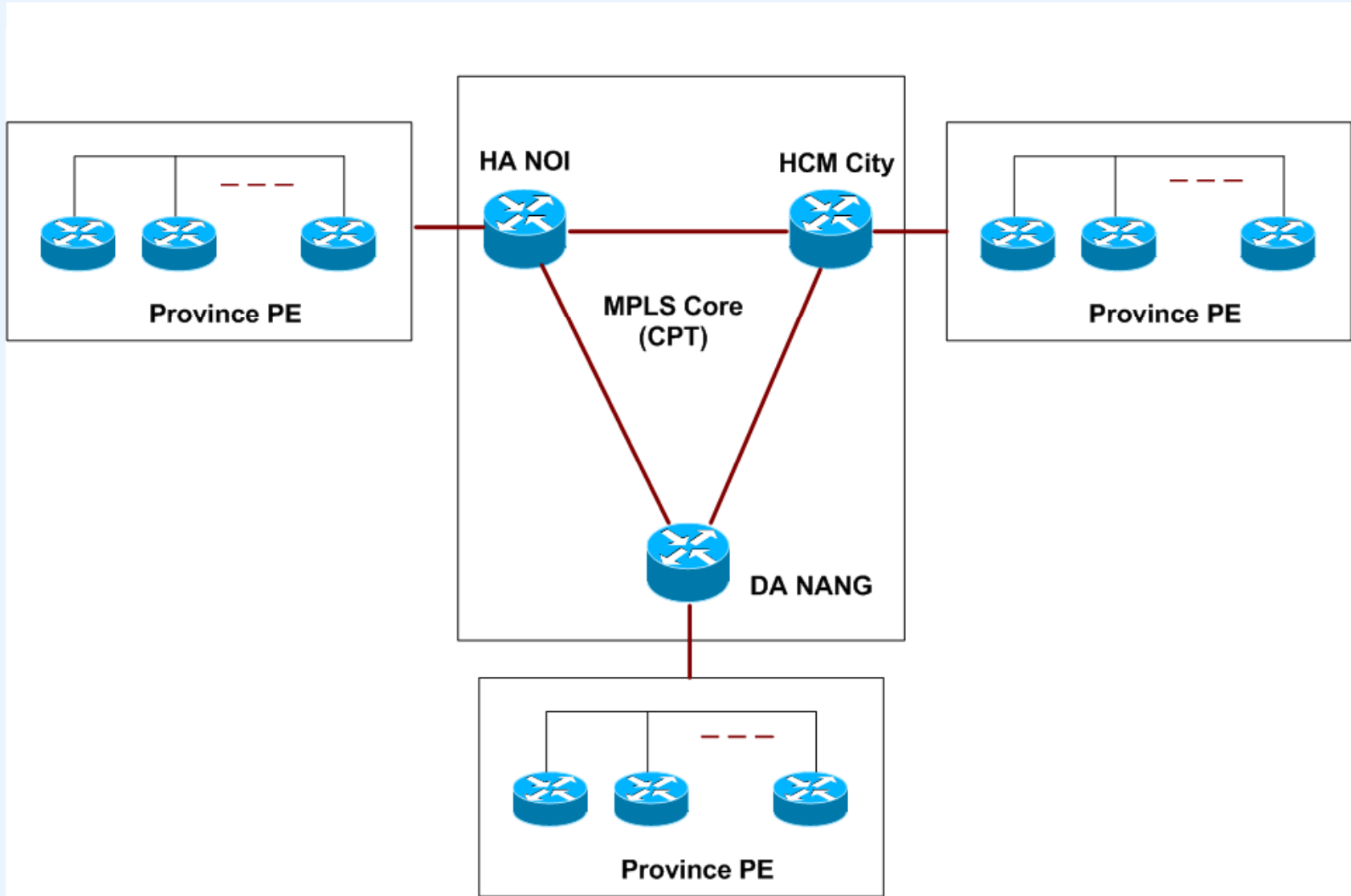
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1. CPT's network infrastructure and ability to migrate IPv6
2. Technical solutions for IPv6 migration in CPT
3. Deploying IPv6 testing with CPT Network
4. Some problems associated solutions to migrate IPv6
5. IPv6 Action Plan of CPT



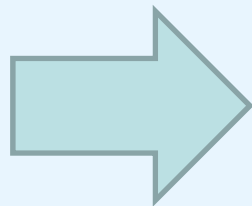
CPT's network  
infrastructure  
&  
Ability to migrate  
IPv6





# Cisco's network elements and IPv6 features

- **Core Router** : Cisco 7600 series
- **Core Switch**: Cisco 6500 series
- **Firewall**: Firewall Services Module (FWSM on 6500)
- **Access/Aggr/Ref Router**: Cisco 7600 series
- **Man Switch**: Cisco 6500 series

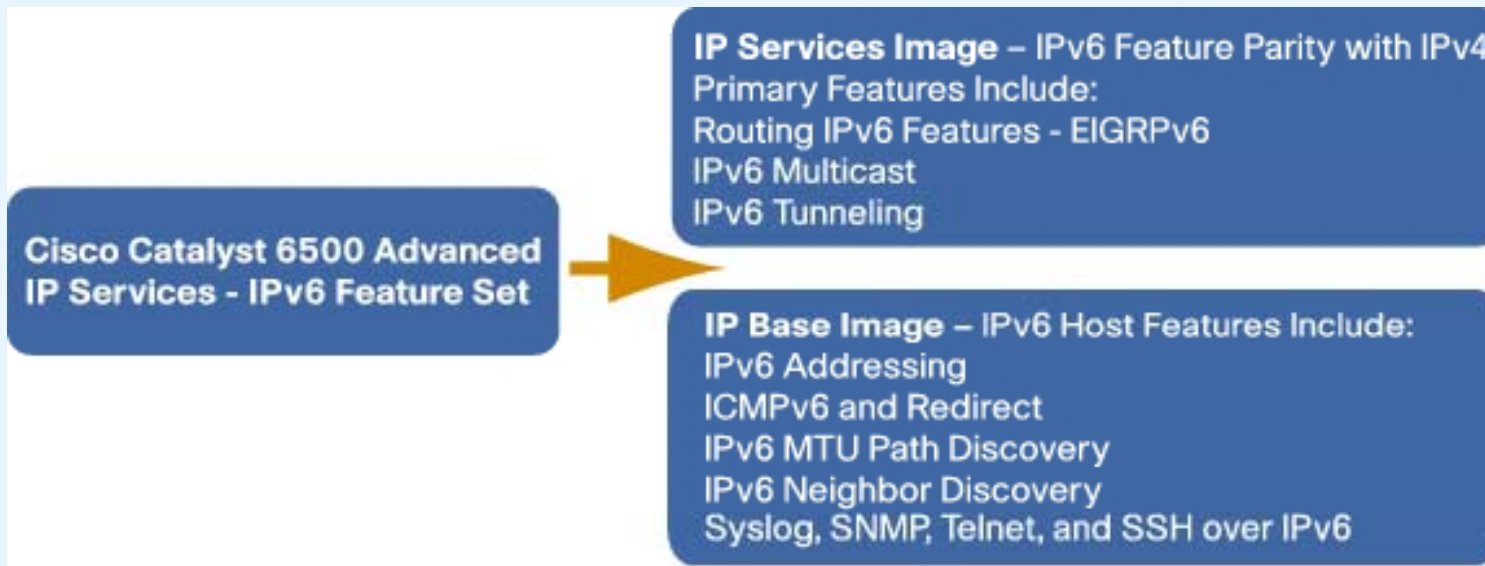


<p><b>Cisco IPv6 Features</b></p>	<ul style="list-style-type: none"> <li>+ IPv6 Addressing</li> <li>+ IPv6 Repackaging</li> <li>+ IPv6 Switching</li> <li>+ IPv6 Routing</li> <li>+ IPv6 Security</li> </ul>
	<ul style="list-style-type: none"> <li>+ ...</li> </ul>



# Cisco 65xx switches & IPv6 features

## - IPv6 Repackaging



- IPv6 VPN over MPLS: IPv6 VPN over MPLS (6VPE) Operation
- EIGRP for IPv6: OSPF for IPv6 (OSPFv3) and RIP for IPv6 (RIPng)
- Encrypting IPv6 Traffic





# Cisco 76xx & IPv6 features

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HTTP Access over IPv6 (Management)

Multicast IPv6 Enhancements

Tunneling of IPv4 and IPv6 Packets

IPv6 Routing: OSPF for IPv6 (OSPFv3) and RIP for IPv6 (RIPng)

**VPN over MPLS: IPv6 VPN Provider Edge (6VPE) over MPLS**

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# Technical solutions for IPv6 migration in CPT



# Requirements and technical solutions

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## 1. Requirements:

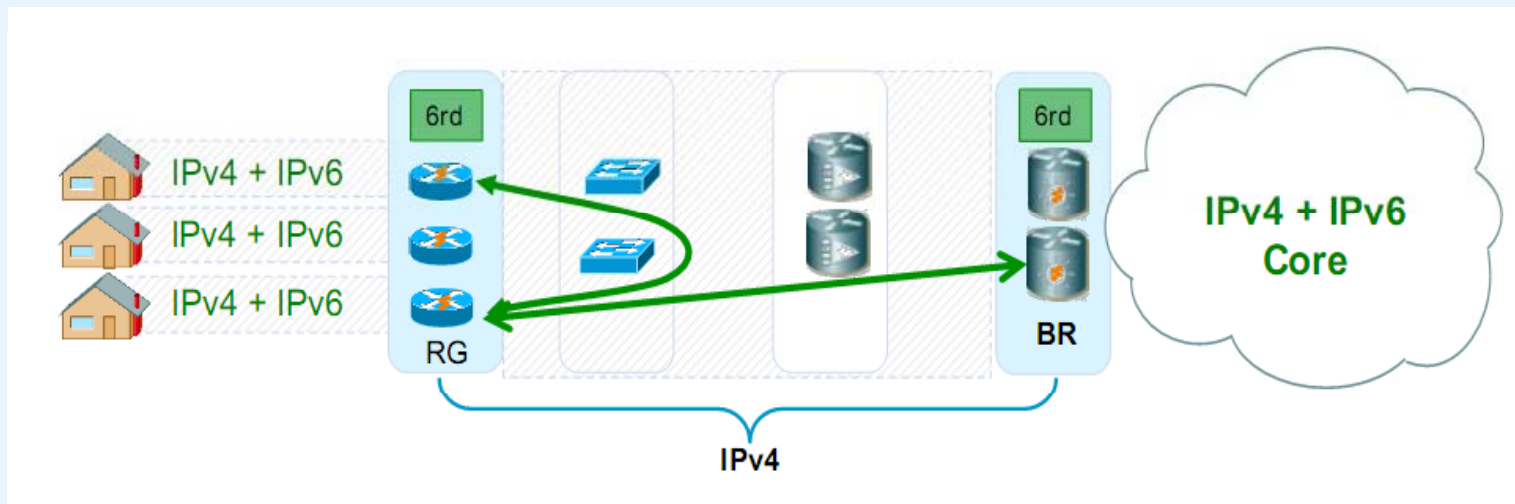
- Do not break the existing structure of the network infrastructure
- Provide services conveniently and efficiently
- Separate IPv6 traffic of each customer

## 2. Technical solutions proposed:

a) Tunnel: 6RD

b) DualStack: 6VPE

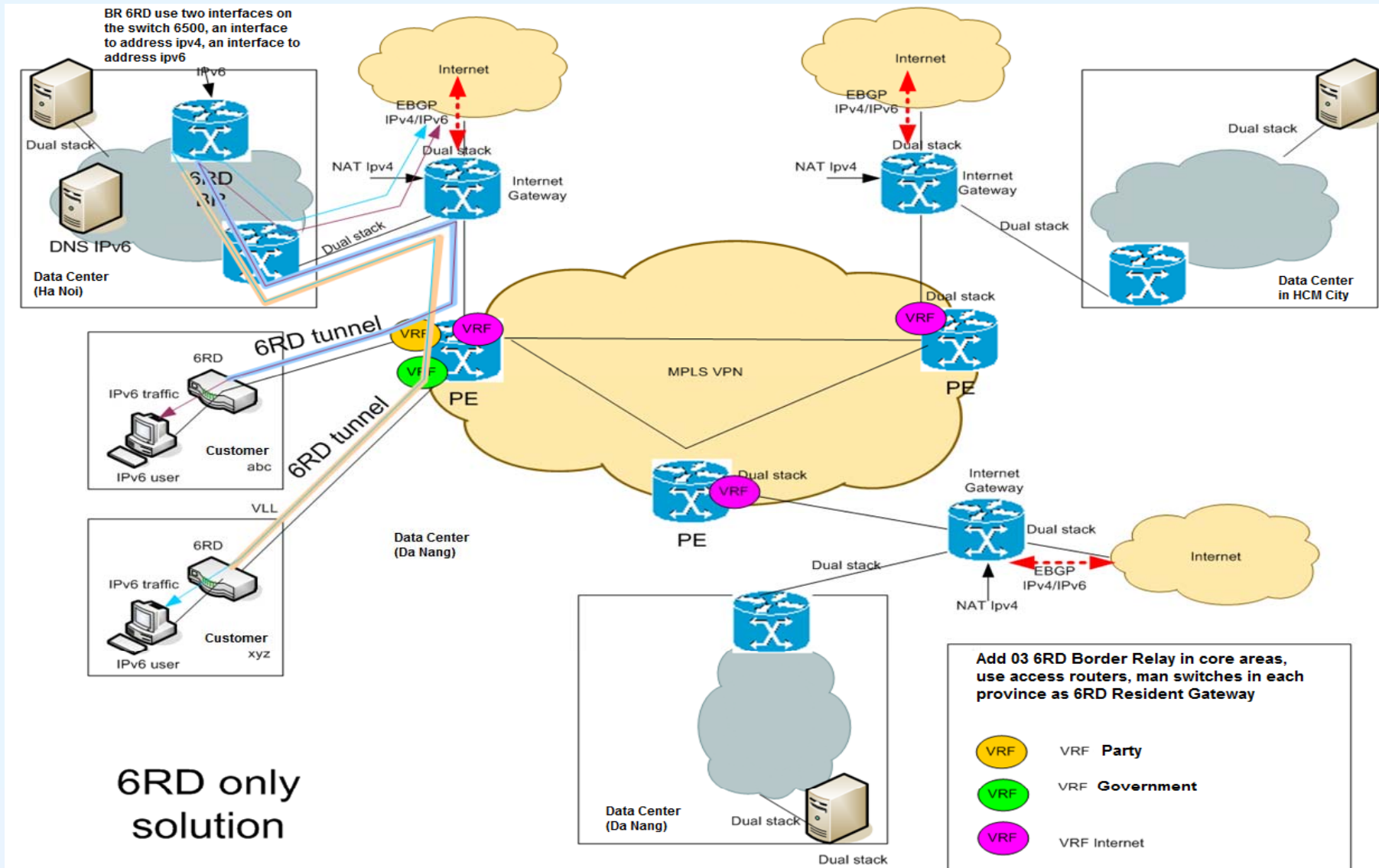
# About 6RD



- Defined in RFC 5969
- Tunneling IPv6 through available IPv4 network infrastructure.
- Includes components: 6RD Boder relay & 6RD resident gateway (CE), tunnel will be created between two network elements: 6RD BR & 6RD RG.



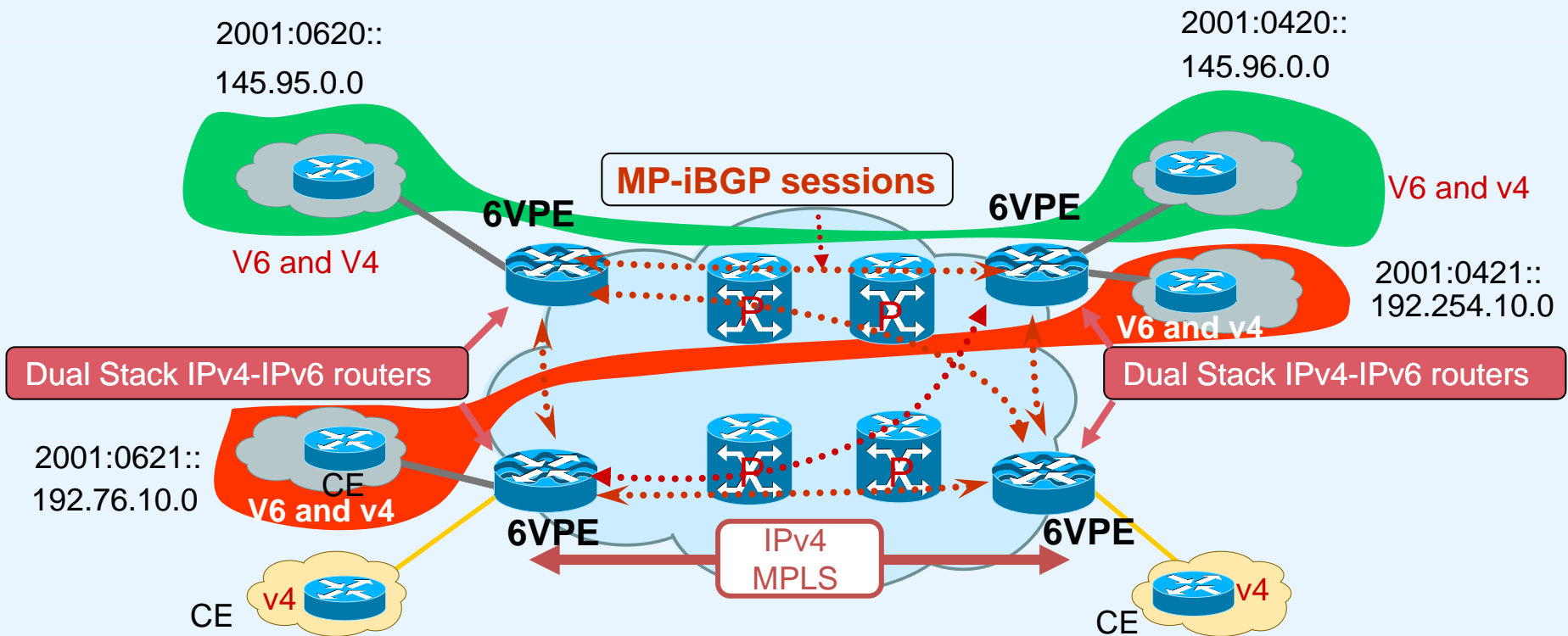
# Tunnel-6RD solution for CPT's Network



## Evaluate using Tunnel-6RD

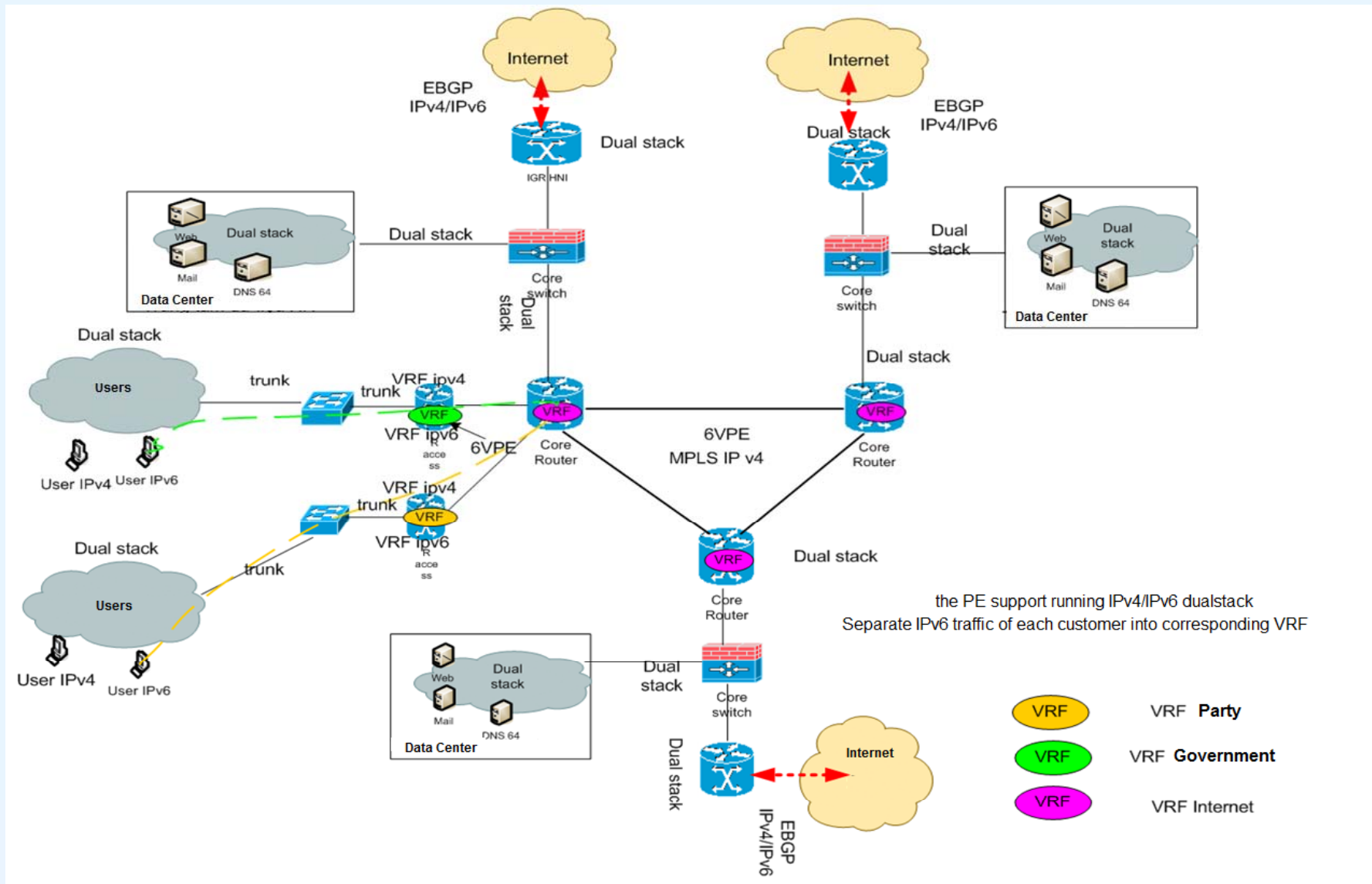
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- Keep the original network design, deploy IPv6 conveniently
- Must to add 6RD Border Relay in core areas, use access routers, man switches in each province as 6RD Resident Gateway
- Create policies on 6RD BR to separate IPv6 traffic between agencies and departments
- The IGR routers is configured IPv6 EBGP to connect to IPv6 network of VNPT



- (RFC 2547bis) IPv6 VPN (6VPE) activities similar to IPv4 MPLS VPN
- IPv6 packets are sent and received from 6VPE router to 6VPE router via IPv4 LSP's (**IPv4 Label Switched Path**)
- **Some notes of 6VPE :**
  - Do not change the MPLS core
  - Support for IPv4 & IPv6 VPN on the same Interface
  - Configure IPv6 VPN similar to IPv4 VPN
  - IPv6 routing table for each separate customer.

# 6VPE solution for CPT's Network





## Evaluate using 6VPE

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- Separate IPv6 traffic of each customer into corresponding VRF
- Must to upgrade IOS for all equipment that running DualStack
- Enable 6VPE function for PE routers, configure to define the VRF. To connect to internet, It required to add import and export values of the internet VRF to VRF defined
- The IGR routers is configured IPv6 EBGP to connect to IPv6 network of VNPT.

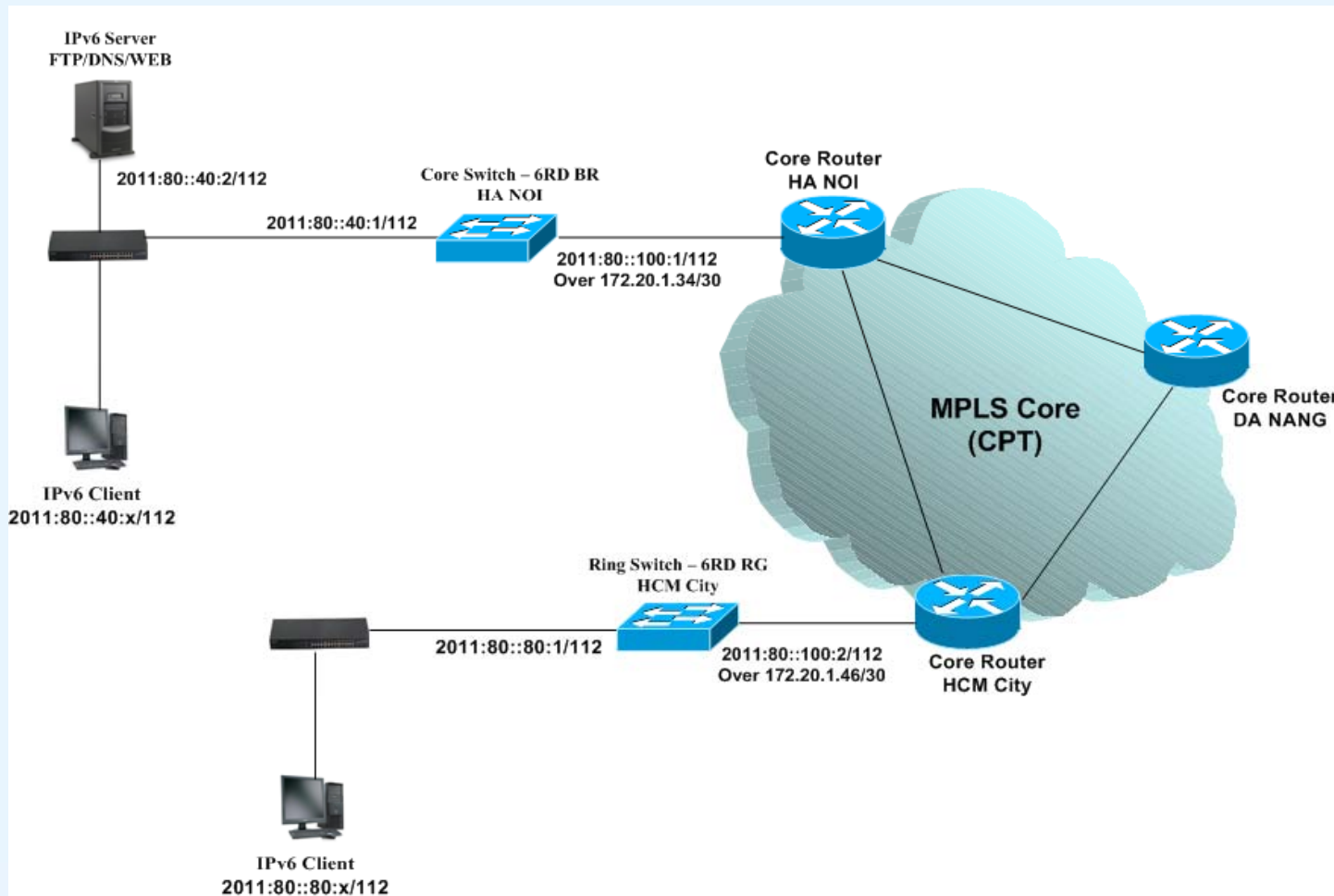




# Deploying IPv6 testing with CPT Network



# Tunnel Test with solution-6RD



## Some technical issues

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### a) Tunnel-6RD:

- Required to configure, manage and operate a lot of the Tunnels if deployed 6RD IPv6 on the whole network
- The routing table on the 6RD BR will be very large and complex

### b) 6VPE:

- Must to upgrade IOS for all router/switch that be running DualStack
  - + Router 76xx (>60): **IOS 12.2SR => IOS 12.2(33)SRB**
  - + Switch 65xx (>20): **IOS 12.2SX => IOS 12.2(33)SXI**



# IPv6 Action Plan of CPT



# IPv6 Action Plan of VNPT

Year	Nation schedule	VNPT Schedule
2011	Preparation	Preparation
2012		
2013	Starting	Testing
2014		
2015		
2016	Migrating	Service Providing
2017		
2018		
2019		
2020		completing



## IPv6 Action Plan of CPT

Year	Quarter	Tasks
2011		- Test with 6RD solution
2012	Q1	- Set up the task force on IPv6 CPT
	Q2	- Complete the IPv6 action plan
	Q3	- Install IPv6 servers: Web, Mail, DNS ...
	Q4	- Connect to IPv6 network of VNPT from 03 core areas of CPT network
2013	Q1	
	Q2	- <b>Test with 6VPE solution (stage-1):</b> upgrade IOS for some PE in North area, deploy 6VPE testing and evaluate the results
	Q3	
	Q4	- <b>Test with 6VPE solution (stage-2):</b> upgrade IOS for all PE in North area, deploy 6VPE testing and evaluate the results
2014	Q1	
	Q2	
	Q3	- <b>Test with 6VPE solution (stage-3):</b> upgrade IOS for all routers/switches that be running DualStack in whole network of CPT, deploy 6VPE testing and evaluate the results
	Q4	
2015	Q1	
	Q2	
	Q3	- <b>Provide IPv6 services</b>
	Q4	
2016		- <b>Completing</b>
2017		



# Conclusion

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## **CPT can provide IPv6 services in future:**

1. Internet service
2. Internet value-added services : Web, Mail, DNS ...
3. Virtual private network services (IPv6 -VPN)
4. Audio and video services: Videoconferencing, VoIP, MyTV ...
5. Data transmission services
6. Datacenter services (hosting, virtualization server ...)
7. IPv6 services of VNPT
8. National/international IPv6 services.



**THANK YOU!**

