

Putting
IPv6
to work



North American IPv6 Summit

Grand Hyatt, Denver, Colorado

September 23-25, 2014

Rocky Mountain IPv6 Task Force



IPv6 Enabled OpenStack



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Rocky Mountain IPv6 Task Force



Nephos6

The **Cloud** and **IPv6** Company



IPv6

Cloud

Education



Consulting



Product

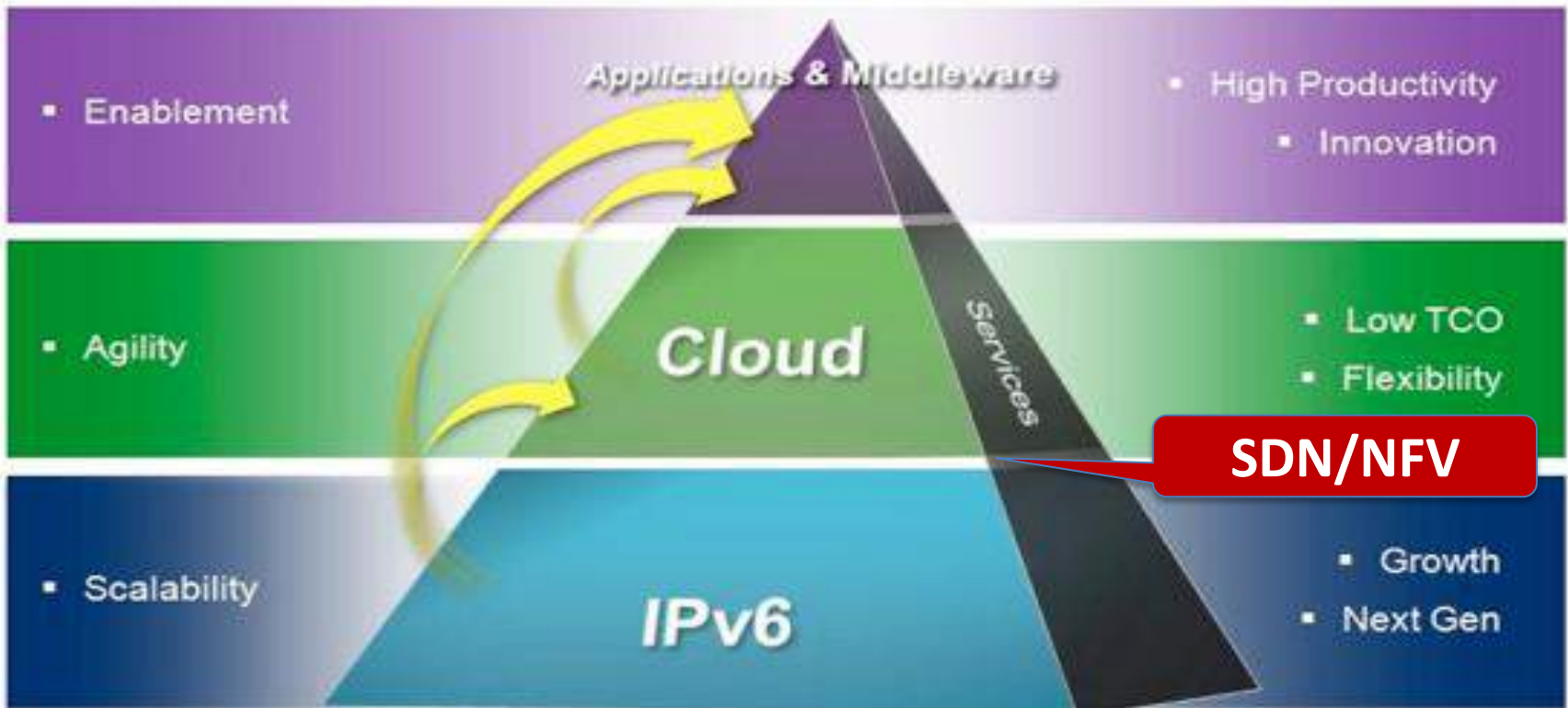


Cloud and IPv6



Driver

Business Results



The inflection points are complex, simultaneous, interdependent and touch every aspect of IT

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OpenStack and IPv6



- The first one to enable OpenStack for IPv6 (POC in Grizzly first, then Havana)

<http://www.nephos6.com/pdf/OpenStack-Havana-on-IPv6.pdf>

- The first one to design, set up, and monitor an IPv6-only OpenStack system in production

CitKomm / Gen6

- Cisco Preferred Vendor to develop and offer OpenStack Troubleshooting class

To Cisco Global TAC and external customers

Targeting October, 2014

- OpenStack Icehouse Dual-Stack for Dev-test



Provisioning Scenarios



Who Sends RA?	Who Assign Address?	Network Type	New Attribute <i>ipv6_ra_mode</i>	New Attribute <i>ipv6_address_mode</i>	Description
<i>external router</i> (A=1, M=0, O=0)	<i>external router</i>		<i>off</i>	<i>off</i>	<i>VM obtains IPv6 address from external router using SLAAC</i>
<i>external router</i> (A=0, M=1, O=1)	<i>external DHCPv6 server</i>		<i>off</i>	<i>off</i>	<i>VM obtains IPv6 address and optional info from external DHCPv6 server using DHCPv6 Stateful</i>
	<i>OpenStack dnsmasq</i>	<i>Private / Provider</i>	<i>off</i>	<i>dhcpv6-stateful</i>	<i>VM obtains IPv6 address and optional info from OpenStack dnsmasq using DHCPv6 Stateful</i>
<i>external router</i> (A=1, M=0, O=1)	<i>external DHCPv6 server</i>		<i>off</i>	<i>off</i>	<i>VM obtains IPv6 address from external router by SLAAC and optional info from external DHCPv6 server using DHCPv6 Stateless</i>
	<i>OpenStack dnsmasq</i>	<i>Private / Provider</i>	<i>off</i>	<i>dhcpv6-stateless</i>	<i>VM obtains IPv6 address from external router by SLAAC and optional info from OpenStack dnsmasq using DHCPv6 Stateless</i>
<i>OpenStack dnsmasq</i> (A=1, M=0, O=0)	<i>OpenStack dnsmasq</i>	<i>Public</i>	<i>slaac</i>	<i>slaac</i>	<i>VM obtains IPv6 address from OpenStack using SLAAC</i>
<i>OpenStack dnsmasq</i> (A=0, M=1, O=1)	<i>external DHCPv6 server</i>	<i>Public</i>	<i>dhcpv6-stateful</i>	<i>off</i>	<i>VM obtains IPv6 address and optional info from external DHCPv6 server using DHCPv6 Stateful</i>
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Lessons Learned

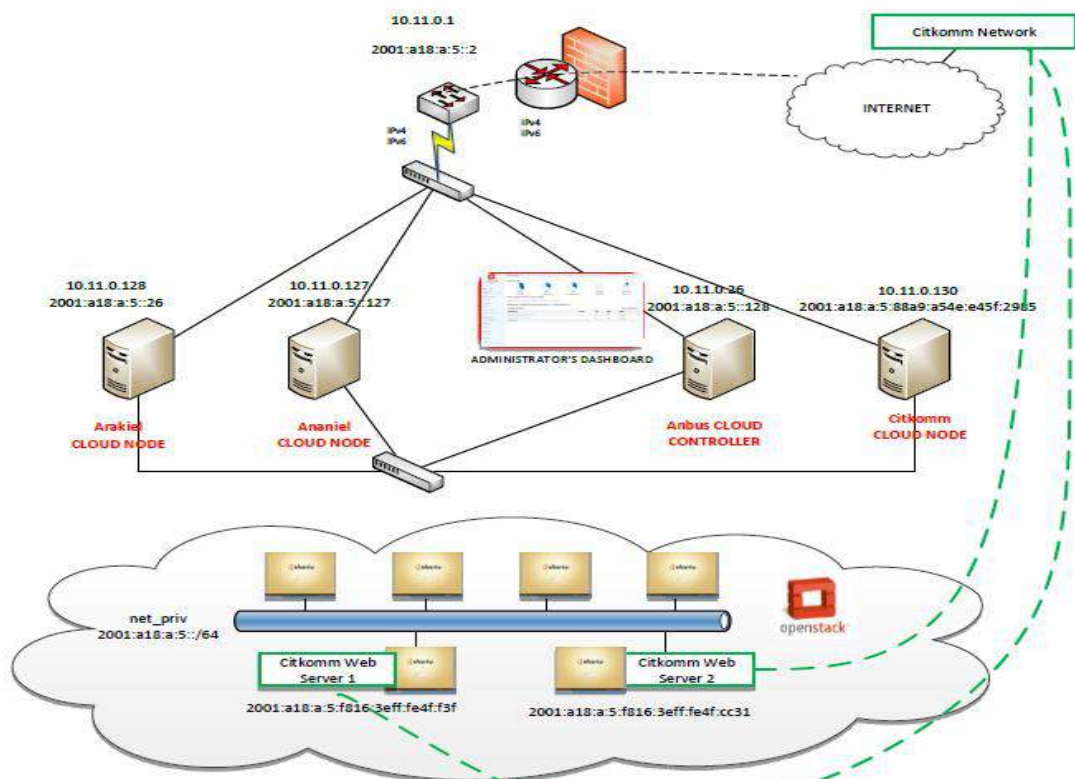
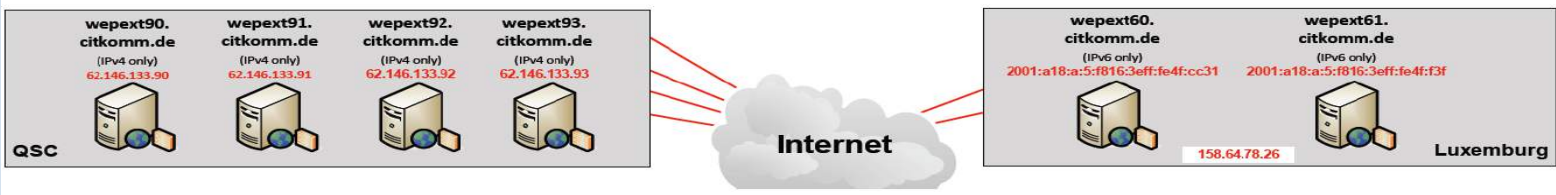


- Get the community of OpenStack contributors to understand and become comfortable with IPv6
- Develop IPv6 based products not just IPv6 ready products
- Innovate around IPv6, don't carry the IPv4 baggage
- Provide solutions that are IPv6 ready right out of the box
- Test in the context of IPv6 and dual-stack environments

Any product that is not IPv6 based is legacy from day one.



IPv6 for European Elections



IPv6 only OpenStack



Instances

Logged in as: admin Settings Help Sign Out

Instances Filter [+ Launch Instance](#) [Soft Reboot Instances](#) [Terminate Instances](#)

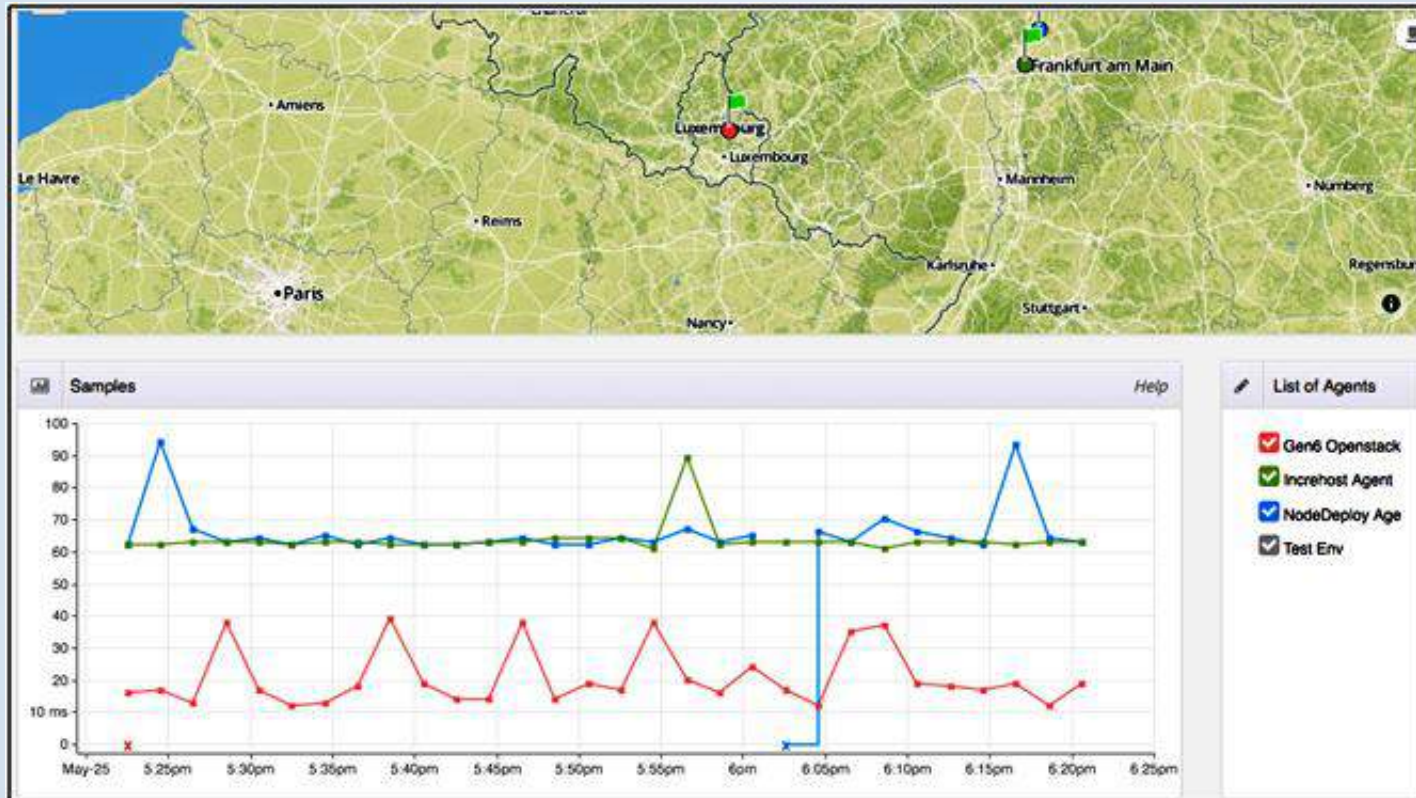
<input type="checkbox"/>	Instance Name	Image Name	IP Address	Size	Keypair	Status	Task	Power State	Uptime	Actions
<input type="checkbox"/>	productionserver2	ElectionWebServer	2001:a18:a:5:f816:3eff:fe4f:f3f	Voting Machine T-1000 20GB RAM 6 VCPU 80.0GB Disk	-	Active	None	Running	3 weeks, 3 days	Create Snapshot More
<input type="checkbox"/>	productionserver1	ElectionWebServer	2001:a18:a:5:f816:3eff:fe4f:cc31	Voting Machine T-1000 20GB RAM 6 VCPU 80.0GB Disk	-	Active	None	Running	3 weeks, 3 days	Create Snapshot More

Displaying 2 items

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Tested and Monitored



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OpenStack Integration



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Results

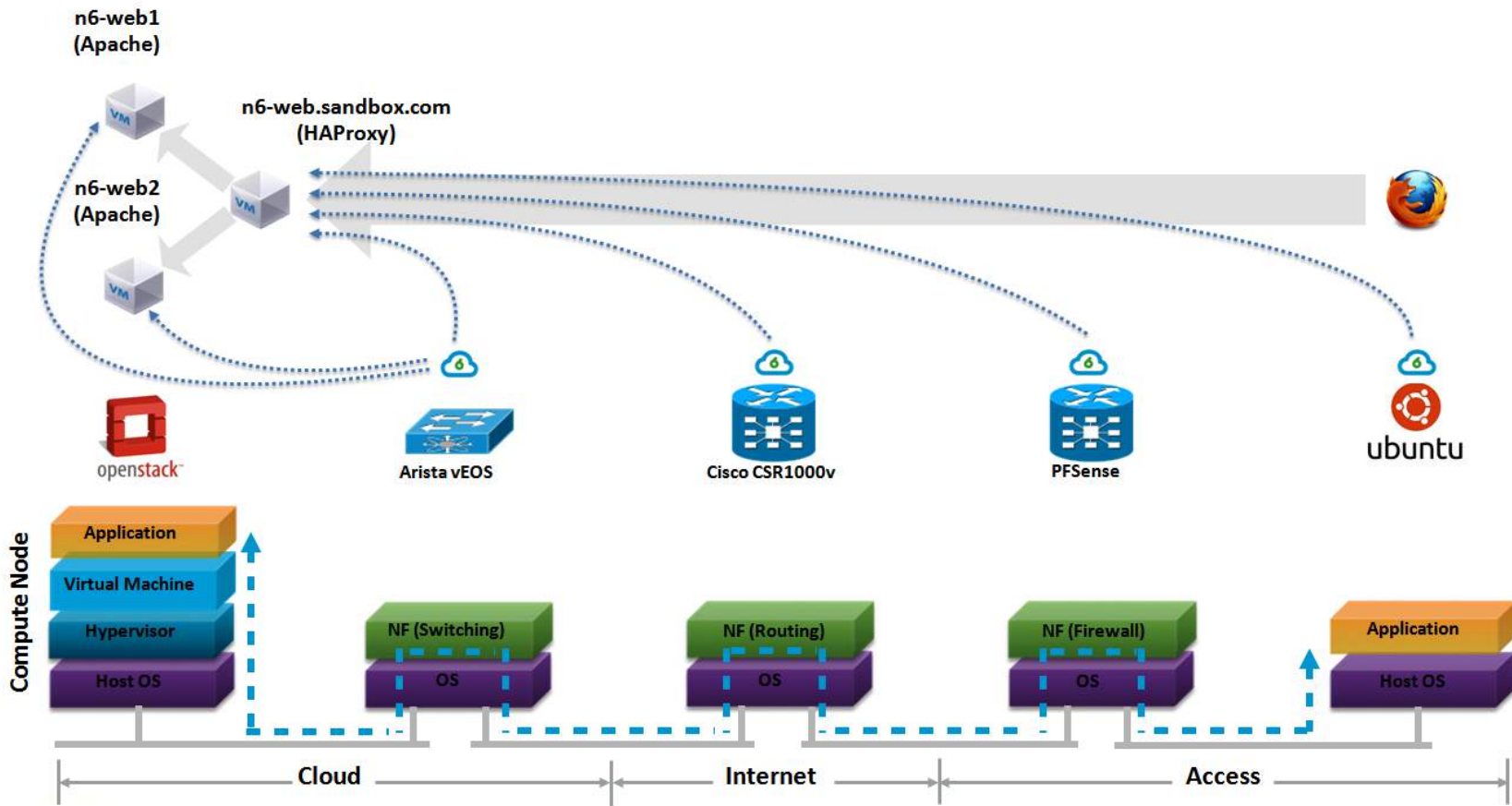


5% of traffic to election sites was over IPv6!
Extensive testing and benchmarking for both IPv4 and IPv6. First year with no reported issues!

“During the elections, a production ready, IPv6-based Openstack Cloud established at the University of Luxembourg successfully delivered election results to German voters, a “World First” to pioneer the future of the open world of cloud computing!” Latif Ladid



Demo Setup



Conclusions



The promise of cloud cannot be met without IPv6!

You cannot wait for others to do it
Regardless of your area of expertise, start to think IPv6

Any product that is not IPv6 based is legacy from day one.

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Thank You



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