Cisco Support Community Expert Series Webcast:

Get Ready for the World IPv6 Launch!

Salman Asadullah
Cisco Distinguished Engineer

May 8th, 2012

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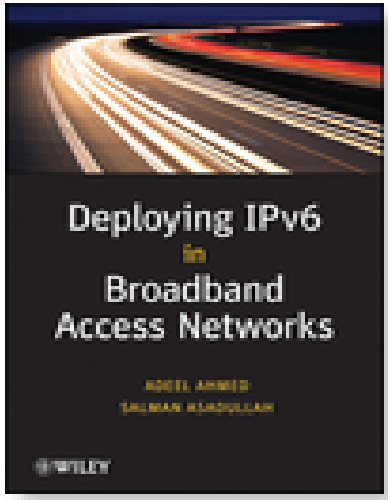
Feature Speaker



Salman Asadullah

- Cisco Distinguished Engineer
- IPv6 Forum Fellow
- Broadband Forum Ambassador
- Co-chair IPv6 Ready Education and Certification Logo Program
- Cisco Live Distinguished Speaker
- Co-Author of multiple books and IETF RFC/IDs including “Deploying IPv6 in Broadband Access Networks – ISBN # 0470193389”

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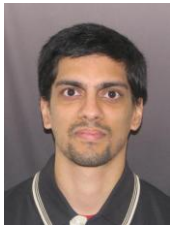
Feature Expert Panel

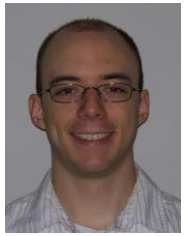
Phillip Remaker
Cisco Distinguished Engineer

Srinivasa Neppalli
Cisco Sr. Solution Architect

Jim Bailey
Cisco Sr. Technical Leader



Rama Darbha
Cisco TAC Escalation Engineer



Pete Lumbis
Cisco TAC Escalation Engineer

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Thank You for Joining Us Today

Today's presentation will include audience polling questions

We encourage you to participate!

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Thank You for Joining Us Today

If you would like a copy of the presentation slides, go to

https://supportforums.cisco.com/community/netpro/network-infrastructure/ipv6-transition

Or directly at, https://supportforums.cisco.com/docs/DOC-24247

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Polling Question 1

What is your level of experience with IPv6?

a) No idea what is IPv6.

b) I know some basic IPv6 concepts.

c) I know some basic IPv6 concepts however do not have any deployment experience.

d) I know most of the IPv6 concepts, topics, issues and have deployment experience.

e) I'm THE IPv6 Guru. What do you want?

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Agenda

- Remember World IPv6 Day (W6D)?
- What is World IPv6 Launch (W6L)?
- How might it affects you and your customers?
- How should you plan and prepare?
- Key Takeaways?

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World IPv6 Day: IPv6 test flight!

- June 8, 2011 from 0:00 UTC to June 9, 2011 0:00 UTC
- Coordinated IPv6 activation by ~ 300 websites & CDNs*
- Worldwide test bed for data gathering
- http://isoc.org/wp/worldipv6day/

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* Content Delivery Networks

World IPv6 Day: Rem-i-nisc-ing

- It was an excellent well coordinated industry wide effort where major worldwide content providers and 300 other organizations including Cisco offered their content over IPv6 for a 24-hour period. Which by the way proved once again; “Even competitors can work together when it comes to a common positive goal.”
- As hoped for, World IPv6 Day results motivated more organizations across the industry – Internet service providers, hardware and software vendors and content providers – and turn into simple business decision to prepare and offer their services on IPv6 to ensure a successful transition.
- It proved that IPv6 doesn't seem to create a new undiscovered batch of technical cases or technical major issues.
- Based on results; there was no noticeable increase in the volume in the Service Provider call-centers world-wide.

* Source: http://www.isc.org/solutions/survey

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World IPv6 Day: Rem-i-nisc-ing

- Providing DNS quad-A records does not mean “the end of the world”. Well, we kind of knew that, but the "uh our call centers will be inundated with excessive calls" was the argument which has been proven wrong.
- These great results are without most people running Happy Eyeballs (only Chrome had a Happy Eyeballs-like algorithm), think about if a Happy Eyeballs-like algorithm implementation is widely adopted?
- We had a great test flight, lets make IPv6 production reality!

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World IPv6 Launch: This time it's for real!

- June 6th, 2012 it is!
- 1100 + (and counting) Website Operators, Network Operators and Home Router Vendors will turn on IPv6 and leave it on permanently!
- Hundreds more will do so unofficially ?????
- Largest new protocol implementation on the Internet!!!
- http://www.worldipv6launch.org/

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* Content Delivery Networks

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Possibly issues?

- Most sites or hosts **will not notice this change**
- Typical impacts
  - Slow connection startup as IPv6 fails and falls back to IPv4*
  - Slow performance due to congested IPv6 paths*
  - Failed connectivity due to mis-configured devices
  - Failed connectivity due to standards non-compliant devices
  - Failed connectivity due to incorrect DNS entries
  - Many more specific and detailed ideas http://www.getipv6.info/index.php/Customer_problems_that_could_occur
- Cisco.com
  - **Only www.cisco.com itself** will be reachable via IPv6
  - Experience should be the same as www.ipv6.cisco.com is today

* Does not apply if using Happy Eyeballs (RFC6555)

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Impacted Users

Website Owners

Network Operators (end users)	IPv4 Only	Dual Stack (IPv4/IPv6)	Dual Stack with IPv6 problem
IPv4 Only	✓	✓	✓
Dual Stack (IPv4/IPv6)	✓	✓	✗
Dual Stack with IPv6 problem	✓	✗	✗

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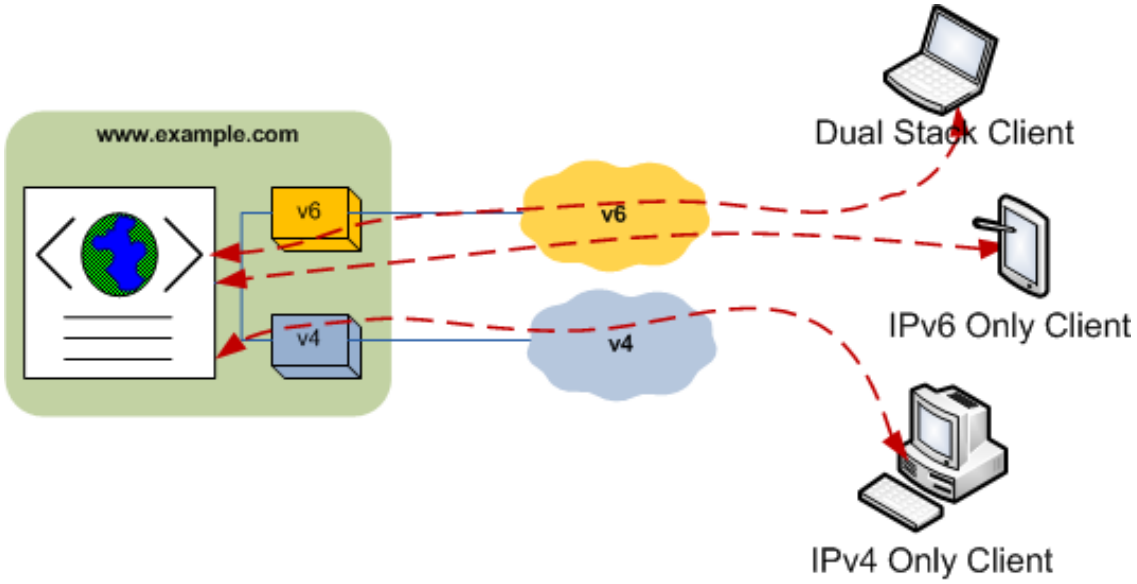
Step Back: How are Clients Served?



- Dual stacked (IPv4 and IPv6 enabled hosts) as well as IPv6 only hosts use IPv6 network
- IPv4 only clients will use IPv4 network

- IPv6 data paths are independent of IPv4 paths
- IPv6 capable devices will prefer IPv6 connectivity
- IPv6 paths may see unprecedented stress
- IPv4 only sites will see no changes

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Happy Eyeballs Factor

- World IPv6 Day great results where only Chrome was running Happy Eyeballs-like algorithm
- Happy Eyeballs became RFC 6555 and widely adopted:
  - Enabled by default in Firefox 13
  - Enabled by default in Chrome
  - Enabled by default in Apple iOS 4
  - Enabled by default in OSX 10.7.
- Everything interesting _except Internet Explorer_ already support Happy Eyeballs, or will do very, very soon.
- With Happy Eyeballs: Happy Users and Network Administrators
  - Host simultaneously attempt initial connection using both IPv4 and IPv6
  - Fast response even if IPv6 (or IPv4) path is down
  - Users no longer trying to disable IPv6
  - Reduces IPv4 usage (reduces load on CGN)

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Polling Question 2

What primary impact do you expect with World IPv6 Launch?

a) No impact since I am 100% IPv4.

b) People may have trouble reaching my IPv6 enabled servers.

c) My IPv6 users may have trouble reaching Google/Facebook.

d) No impact, same as World IPv6 day last year.

e) No impact, since I am 100% dual-stacked (IPv4/IPv6) and using Happy Eyeballs.

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Administrative: What Should I Do?

- Educate your IT staff and management about the W6L
- Familiarize yourself with the W6L participant list at ISOC.
- Alert your customers, if appropriate
- Prepare to measure raw IPv4 and IPv6 traffic levels to understand the impact
  - Traffic Measures: Use Netflow to tell about IPv4 and IPv6 mix
  - Website Measures: Use Invisible IFRAME elements to understand user mix
  - Do your current measurement tools understand or report on IPv6?

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Administrative: What Should I Do?

- Some existing interesting IPv6 measurement research:
  - http://labs.apnic.net/ which teaches some techniques including using Google Analytics
  - http://test4.vyncke.org/testv6/ which lets your site participate in IPv6 research
- Prepare a post-event user feedback form for subjective measurements regularly
- Have formal IPv6 plan and strategy
  - Break the problem down into phases
    - Internet Edge, internal core, data center, edge access, etc
    - Design and build around those phases
    - Get executive support, resource allocation and funding

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Service Provider: How can I prepare?

- "ISPs participating in World IPv6 Launch will enable IPv6 for enough users so that at least 1% of their wireline residential subscribers who visit participating websites will do so using IPv6 by 6 June 2012."
- AT&T, Comcast, Free Telecom, Internode, KDDI, Time Warner Cable and XS4ALL have all committed to join this initiative.
- Perform tests in advance of World IPv6 Launch
- Prepare to measure raw IPv4 and IPv6 traffic levels to understand the impact
- Anticipate user questions/issues
  - Build up a FAQ
  - Self help portal

*Source: http://www.internetsociety.org/news/world-ipv6-launch-solidifies-global-support-new-internet-protocol

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Enterprises: How can I prepare?

- Work with you ISP to determine their IPv6 capabilities
- Involve all aspects of IT organization to determine overall IPv6 capabilities
  - Security - How will the security architecture be impacted by IPv6 integration?
  - Applications - What applications need to support IPv6?
  - Data Center - What places in the data center need to support IPv6?
  - Network infrastructure - Where does IPv6 need to be supported?
- Are these areas ready to support IPv6?
  - Answer will drive how you design and build the integration plan for initial phases
- You may already be an IPv6 provider, without knowing
  - http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps6553/white_paper_c11-629391.html
- If you want to start providing IPv6
  - https://supportforums.cisco.com/docs/DOC-14969

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Website Provider: How can I prepare?

- Alert users of the website change in advance
- Ensure that AAAA DNS Resource Records are published and correct
- If you use a CDN, ensure that they are ready to handle IPv6
- Ensure your ISP is ready to handle IPv6
- Measure (or alert) IPv6 capable users in advance

  http://getipv6.info/index.php/Warning_broken_users_with_JavaScript
- Perform tests in advance of World IPv6 Launch

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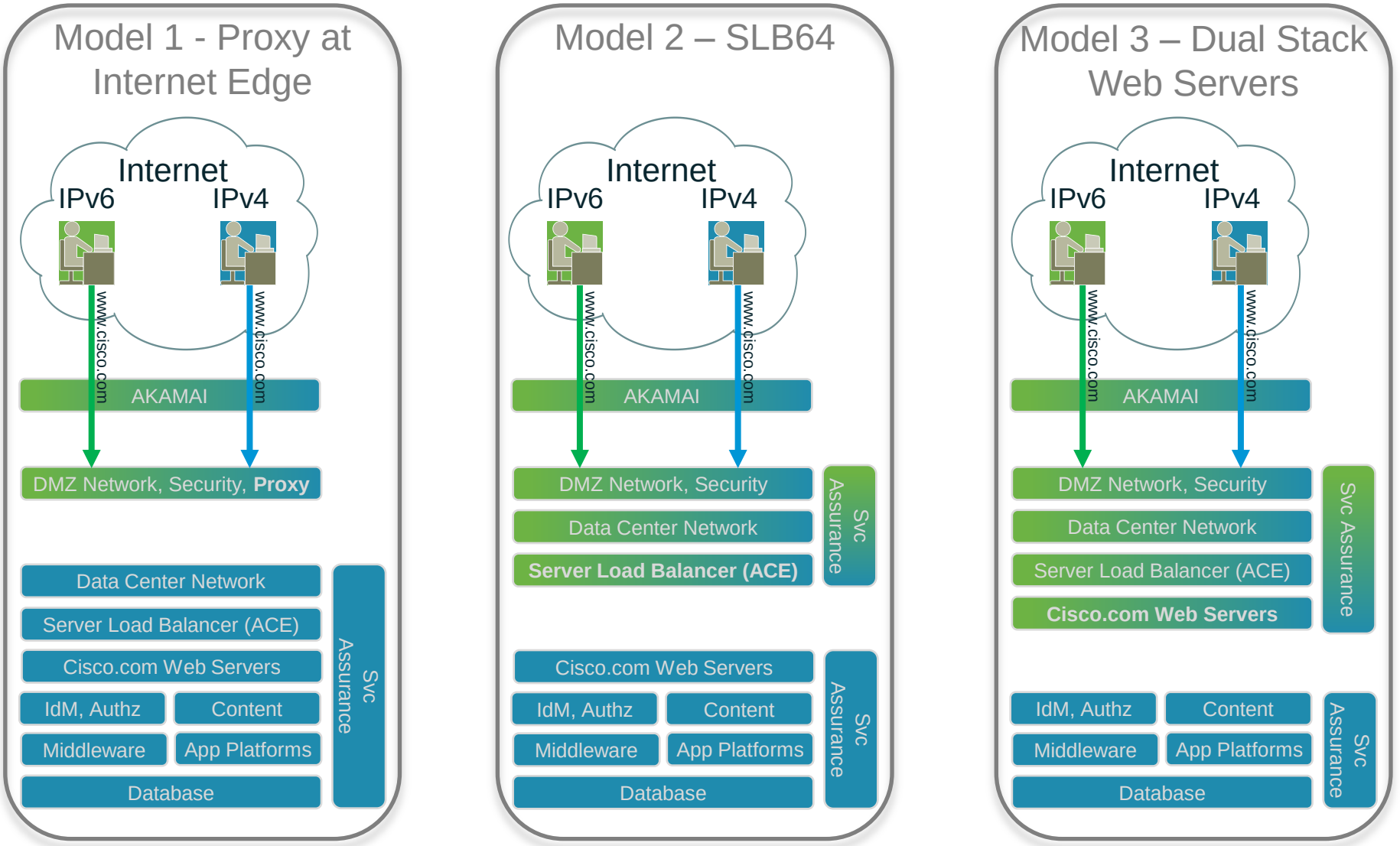
Architecture for IPv6 Web Presence



http://www.cisco.com/en/US/docs/solutions/Enterprise/Borderless_Networks/Internet_Edge/InternetEdgeIPv6.html

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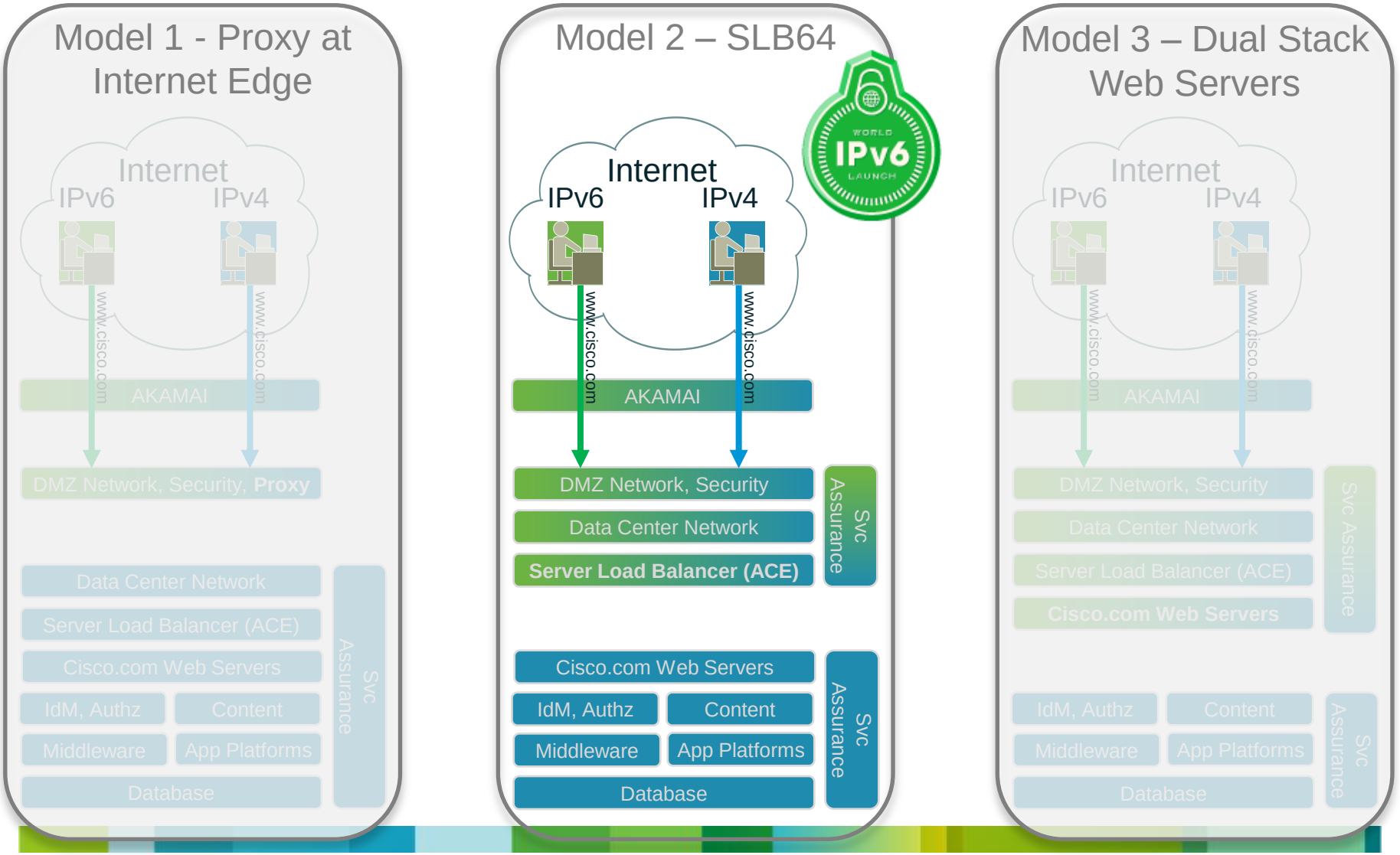
Architecture for www.cisco.com



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Home user: How can I prepare?

- Demand native IPv6 from your Internet service provider!
- Tunnel around your provider
  - Use the 6rd protocol with a provider like Comcast: http://www.comcast6.net
  - Use a Tunnelbroker: http://en.wikipedia.org/wiki/List_of_IPv6_tunnel_brokers
  - Use Teredo: http://en.wikipedia.org/wiki/Teredo_tunneling
  - Make a VPN connection to machine or VM on a dual-stacked network
  - Use Cisco Anyconnect to someone who has an ASA on an IPv6 network
- Use a Windows based application from someone like http://gogonet.gogo6.com/
- Use the 6to4 protocol on a supported router (http://en.wikipedia.org/wiki/6to4)
- Move with someone where they already have IPv6 running
- Rely on RFC6214

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How Can I Test for IPv6 Readiness?

- Clients: http://ip6.me, http://ipv6eyechart.ripe.net , http://test-ipv6.com and http://ipv6-test.com
- Websites: http://ipv6-test.com, http://ready.chair6.net/
- Open Port Test: http://www.employees.org/~dwing/scanme.cgi
- Path MTU Test: http://ipv6chicken.com
- IPv6 Challenge! http://apps.facebook.com/ipvsixchallenge/
- Collection of Test Sites (including Speed Test sites): http://www.getipv6.info/index.php/Troubleshoot_IPv6_Issues

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Where Can I Get IPv6 Help?

- Start at http://www.cisco.com/go/ipv6
- Engage Cisco Professional Services

  http://www.cisco.com/en/US/products/ps6553/products_ios_technology_home.html#~svcs
- Help yourself at the self-service support community

  https://supportforums.cisco.com/community/netpro/network-infrastructure/ipv6-transition

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Key Takeaways

- Most significant milestone in global IPv6 adoption
- Need formal IPv6 support plan in every organization
  - IPv6 = as IPv4 today (i.e. IPv6 will touch each and every Product, Technology and Services!)
  - Need IPv6 SMEs in each and every organization across the board (i.e. executive support, resource allocation and funding)
- Anticipated extent of impact is gradual, but many unknowns
- Plans to minimize impact and maximize learning & leadership
- Opportunities to:
  - Demonstrate leadership as IPv6 early adaptors
  - Expedite adoption and deployments
  - Create sense of urgency and awareness around IPv6
  - Promote product and services sales

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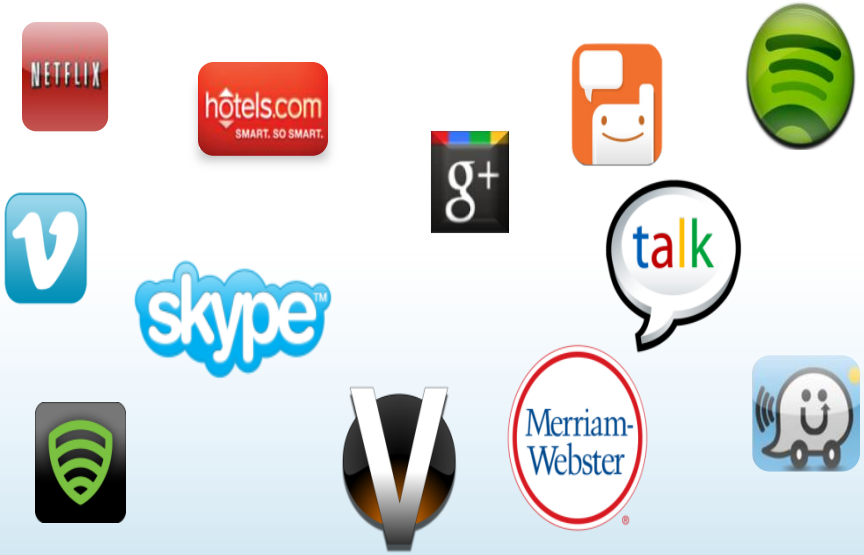
IPv6 “What Works” in Apps

~85%

IPv6 “Brokenness” in Apps



~15%

Join the W6L and fix the remaining 15%!

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Polling Question 3

As a result of this presentation, I will...

a) ...start work on an IPv6 implementation plan.

b) ...accelerate my IPv6 implementation plans.

c) ...do nothing additional, because my plans are on track.

d) ...do nothing, since I don’t think IPv6 affects me.

e) E. ...move to Africa, since they have the most IPv4 addresses.

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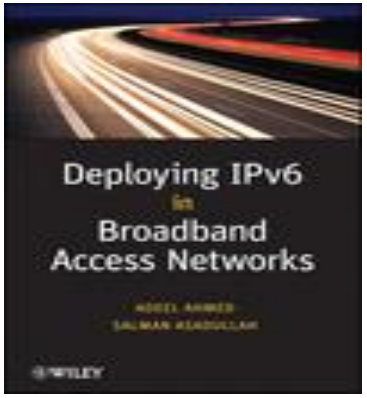
References

- Books
  - Deploying IPv6 in Broadband Access Networks - *Adeel Ahmed, Salman Asadullah,* John Wiley & Sons Publications®
  - Deploying IPv6 Networks - *Ciprian Popoviciu, Patrick Grossetete, Eric Levy-Abegnoli, C*isco Press®
  - IPv6 Security - *Scott Hogg, Eric Vyncke*, Cisco Press®
  - IPv6 for Enterprise Networks - *Shannon McFarland, Muninder Sambi, Nikhil Sharma, Sanjay Hooda*, Cisco Press®
- Sites
  - Cisco Support Community: https://supportforums.cisco.com/community/netpro/network-infrastructure/ipv6-transition
  - CCO IPv6 Main Page www.cisco.com/go/ipv6
  - Cisco Network Design Central www.cisco.com/go/srnd
  - www.ietf.org
  - www.ipv6forum.org



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Q & A

Expert responding some of your questions verbally. Use the Q&A panel to continue asking your questions

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Next Expert Series Webcast in Spanish

Topic: Prevention and Troubleshooting of Wireless and VoIP over Wireless Networks

Wednesday, May 16, at

7:00 a.m. Pacific (UTC -7)

9:00 a.m Mexico City (UTC -5)

4:00 p.m Madrid (UTC +2)

Join Cisco Expert:

Javier Contreras

During the live event you will learn about how to troubleshoot wireless networks, including voice over IP over wireless (VoIPoW), with Cisco expert Javier Contreras. Javier will also talk about how you can prevent wireless connectivity issues, as well as provide important best practices when installing a VoIPoW network. A panel of experts will be ready to respond to your questions.

During this interactive session you will be able ask all your questions related to this topic.

Register for this live Webcast at

http://tinyurl.com/6lqsev8

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Next Expert Series Webcast

Topic: Hierarchical Queueing Framework Overview and Changes on Quality of Service

Tuesday, June 5, at

8:00 a.m. Pacific Time
5:00 p.m. CEST Brussels (UTC +2),
11:00 a.m. EDT New York (UTC -4).

Join Cisco Expert:

Sarah Akella

This session provides an overview of the Hierarchical Queueing Framework (HQF). During the live event, Cisco subject matter expert Sarala Akella will explain the concept of HQF. She will demonstrate some of the relevant changes in quality of service (QoS) that have happened since the introduction of HQF as well as provide implementation best practices for this feature.

During this interactive session you will be able ask all your questions related to this topic.

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Ask the Expert Events in English

Troubleshooting MPLS L3 VPN

Amit Dutta

Learn to troubleshoot multiprotocol label switching (MPLS) Layer 3 (L3) virtual private networks (VPNs)

Cisco Unified Attendant Consoles

Jamie Gale

Learn and ask questions about how the Cisco Unified Attendant Consoles can work with traditional telephony to provide advanced Unified Communications applications and services.

Visit: https://supportforums.cisco.com/community/netpro/expert-corner#view=ask-the-experts
They end on May 18th.

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We invite you to actively collaborate in the Cisco Support Community and social media

https://supportforms.cisco.com

http://www.facebook.com/CiscoSupportCommunity

http://twitter.com/#!/cisco_support

http://www.youtube.com/user/ciscosupportchannel

https://plus.google.com/110418616513822966153?prsrc=3#110418616513822966153/posts

http://itunes.apple.com/us/app/cisco-technical-support/id398104252?mt=8

http://www.linkedin.com/groups/CSC-Cisco-Support-Community-3210019

Newsletter Subscription:
https://tools.cisco.com/gdrp/coiga/showsurvey.do?surveyCode=589&keyCode=146298_2&PHYSICAL%20FULFILLMENT%20Y/N=NO&SUBSCRIPTION%20CENTER=YES

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We have communities in other languages

If you speak Spanish, Portuguese, Japanese, Polish or Russian, we invite you to ask your questions and collaborate in your language:

- Spanish → https://supportforums.cisco.com/community/spanish
- Portuguese → https://supportforums.cisco.com/community/portuguese
- Japanese → https://supportforums.cisco.com/community/csc-japan
- Polish → https://supportforums.cisco.com/community/etc/netpro-polska
- Russian → https://supportforums.cisco.com/community/russian

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Please Take a Moment to Complete the Evaluation

Thank you.