



# IPv6: Preserve, Prepare, Prosper

2001:420:80:1:c:15:c0:d07:f00d

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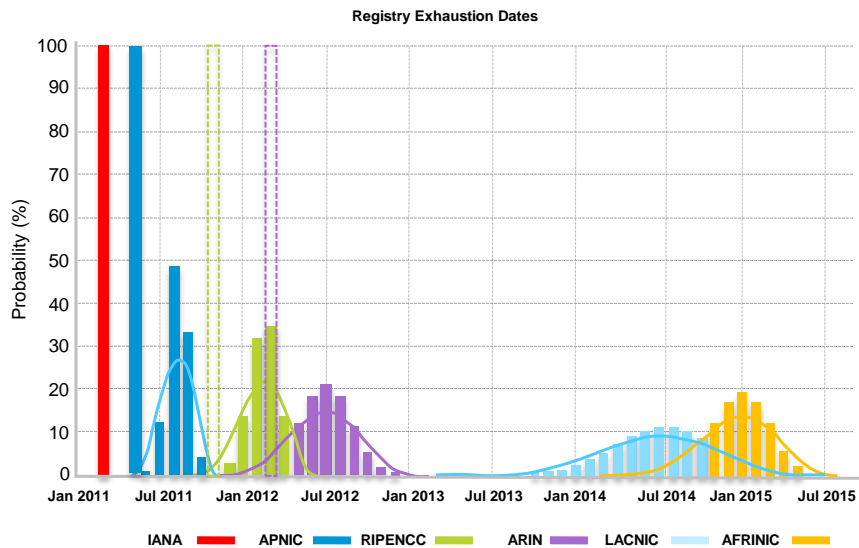
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## Why Are We Here?

IANA Exhaustion  
Feb 3, 14:41:24 UTC



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## By the way ... What is IPv6?

- IPv6 is a network layer protocol.
- It was born in 1994 and was designed to succeed IPv4 and address the IPv4 exhaustion space problem
- IPv6 is DIFFERENT and NOT backwards compatible with IPv4
- IPv6 though was designed with mechanisms to address IPv4 transition

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## IPv6 Addressing Space?

- An IPv4 address is a 32-bit long number allowing for 4,294,967,296 (almost  $4.3 \times 10^9$ ) number of IP Addresses
- In IPv6 we have 128-bits. This gives us 340,282,366,920,938,000,000,000,000,000,000,000,000,000 (more than  $3.4 \times 10^{38}$ ) IP Addresses.
- So in IPv6 we have more than  $7.9 \times 10^{28}$  times the total amount of IPv4 address space range
- This gives us  $\sim 6.67 \times 10^{23}$  IP addresses available per square meter of earth surface

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## Some Address Exhaustion Solutions



- Degrade user experience, on-line services and commerce
- Operational expense



- Started
- Doesn't help high-growth / high-population regions



- Best long-term option
- Unlimited growth for people, services & devices

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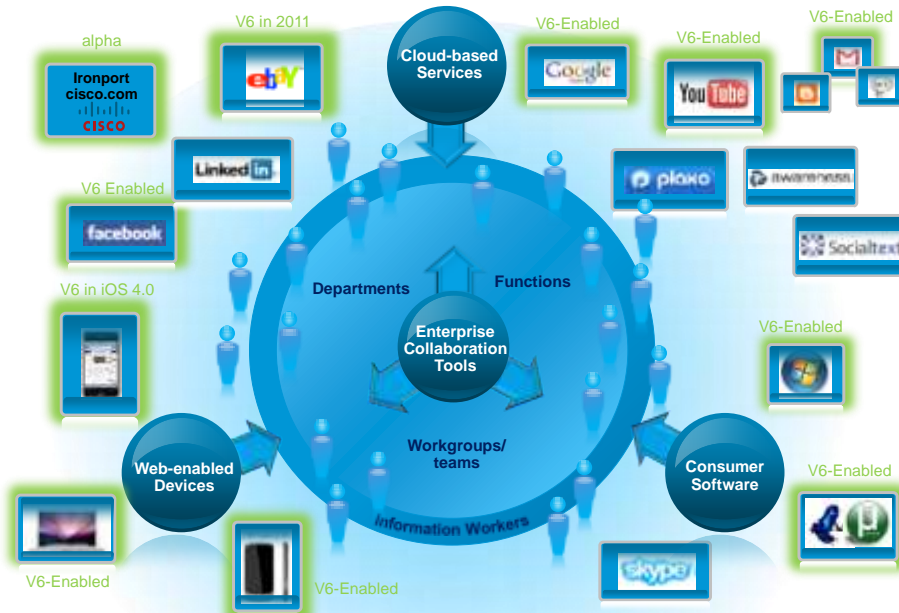
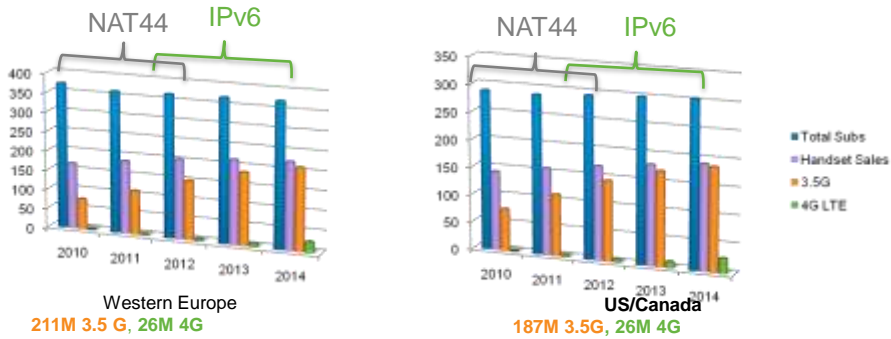


Image Source: Forrester, "Three Mega Business Trends Will Reshape the Tech Sector" © 2010 Cisco and/or its affiliates. All rights reserved. Cisco Confidential 6

# “Smartphone” device growth



Mobile device churn rate is high, full turnover in less than 3 years

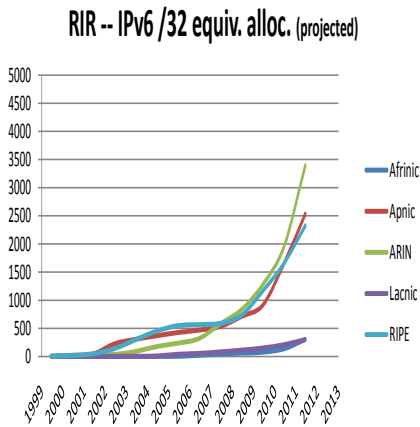
Opportunity: over 3 Billion IPv6 capable mobile devices by 2014  
 Key Milestones : 4G is IPv6 by default , 3G (Rel9) enable dual stack



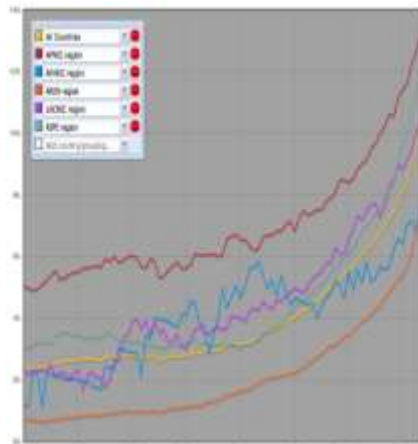
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# We're not there yet



/32 allocation CAGR over 18months: 100% !



% of IPv6 enabled AS's by Region



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June 8 2011 – 00h00-23h59 (UTC)  
 24-hr IPv6 “Test Flight”  
 IPv6 access on website’s “front door”  
 (DNS AAAA Record on www.company.com)  
 Note: This is not about turning off IPv4!

Coordinated by: 

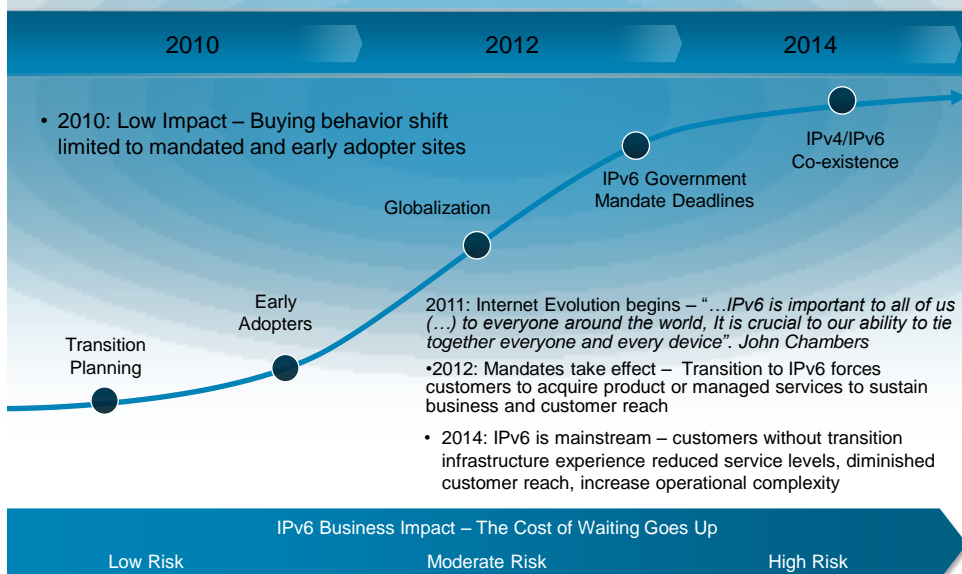
<http://isoc.org/wp/worldipv6day>

<http://isoc.org/wp/worldipv6day/participants>

<http://supportforums.cisco.com/community/netpro/network-infrastructure/ipv6-transition>

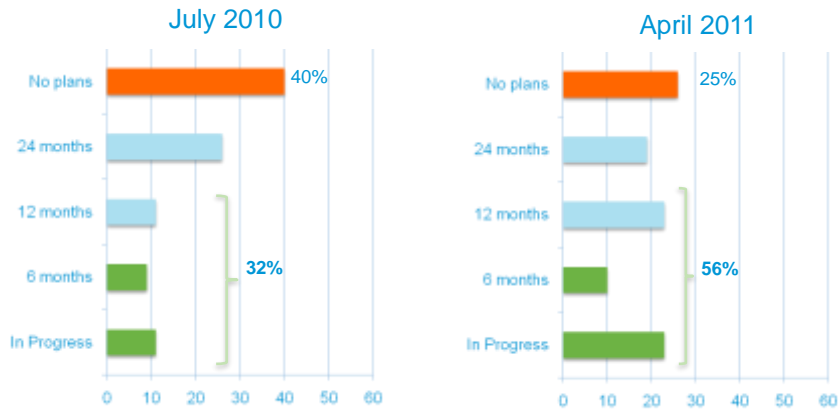
# World IPv6 Day: Jumping In Together

## Failure to Act Will Impact Business IPv6 Estimated Adoption Timeframes



## Enterprise Action Plan : ETAB survey

“when are you planning to deploy IPv6 in production”



Main driver = Internet evolution: 65%



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## Managing an Orderly IPv6 Transition

IPv6 Is Not a Rip-and-Replace Proposition

<b>Preserve</b>	<p>Preserve the customer's existing investment</p> <ul style="list-style-type: none"> <li>Audit and leverage existing IPv6 capabilities</li> </ul>
<b>Prepare</b>	<p>Prepare a migration and deployment plan</p> <ul style="list-style-type: none"> <li>Identify and enable critical IPv6 functional areas</li> </ul>
<b>Prosper</b>	<p>Prosper through the transition to IPv6 Internet</p> <ul style="list-style-type: none"> <li>Enable all systems with dual-stack capabilities</li> <li>Grow seamlessly as customers transition to IPv6</li> </ul>



IPv6 is the foundation of a lifecycle management discussion



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## Enterprise Use Cases

Use Case	IPv6 Technology	Relevant Products
<b>IPv6 Internet Presence Use Case</b> <ul style="list-style-type: none"> <li>Get started on the IPv6 Internet Edge for Outside – In deployment</li> </ul>	<b>Stateful NAT64</b> <ul style="list-style-type: none"> <li>Allows IPv6 or dual-stack hosts to talk to IPv4 infrastructure (for example, web content)</li> </ul>	<ul style="list-style-type: none"> <li>Stateful NAT on ASR-1000</li> <li>ACE Proxy (2HCY11)</li> </ul>
<b>Dual Stack Use Case</b> <ul style="list-style-type: none"> <li>Set up devices to run IPv4 and IPv6 in parallel</li> <li>Link hosts and islands of IPv6 devices together</li> </ul>	<b>IPv6 and IPv4</b> <ul style="list-style-type: none"> <li>IPv6 switching and routing stacks</li> <li>IPv6 over IPv4 tunneling protocols</li> <li>First Hop Security</li> <li>Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Catalyst 6K, 4K, 3K, 2K</li> <li>Nexus 7K, ASA Security Appliance</li> <li>AnyConnect VPN client</li> <li>ASR 1000</li> <li>ISR G2</li> <li>NAM</li> </ul>

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## Cisco IPv6 Professional Services

### Prioritize Critical Areas of Your Business and Network As You Scale Beyond IPv4 Limitations

#### Solution Overview

By the end of 2011, Internet traffic will be using the next-generation Internet protocol: IPv6.

IPv6 adoption must be addressed using a phased approach with careful validation and testing to avoid disrupting the IPv4 network or introducing vulnerabilities.

#### Through a Phased Approach, We Help You to:

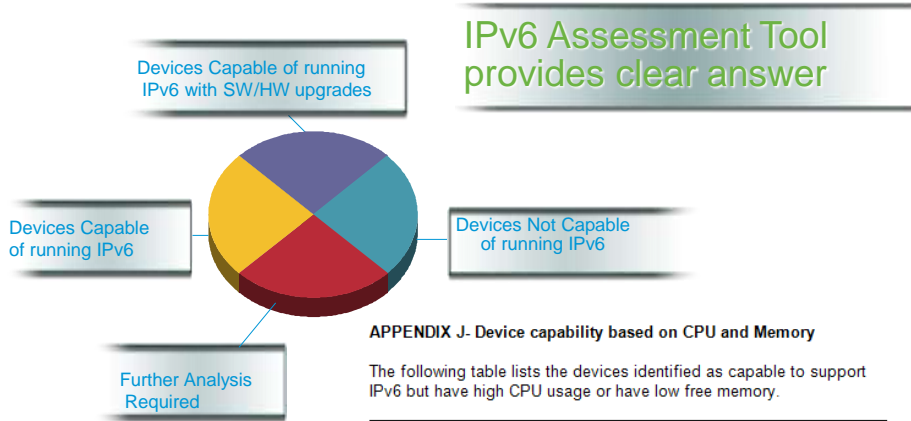
1. Identify the highest priority IPv6-critical areas in your network.
2. Assess those areas to determine the scope of your IPv6 design.
3. Develop a design that enables IPv6 to be introduced without disrupting your IPv4 network.
4. Test and implement IPv6 in pilot mode, then extend over time into production deployment.
5. Repeat steps for subsequent areas of your network through ongoing optimization.

Proactively Budget Time, Money, and Resources

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# Is my network IPv6 ready ?



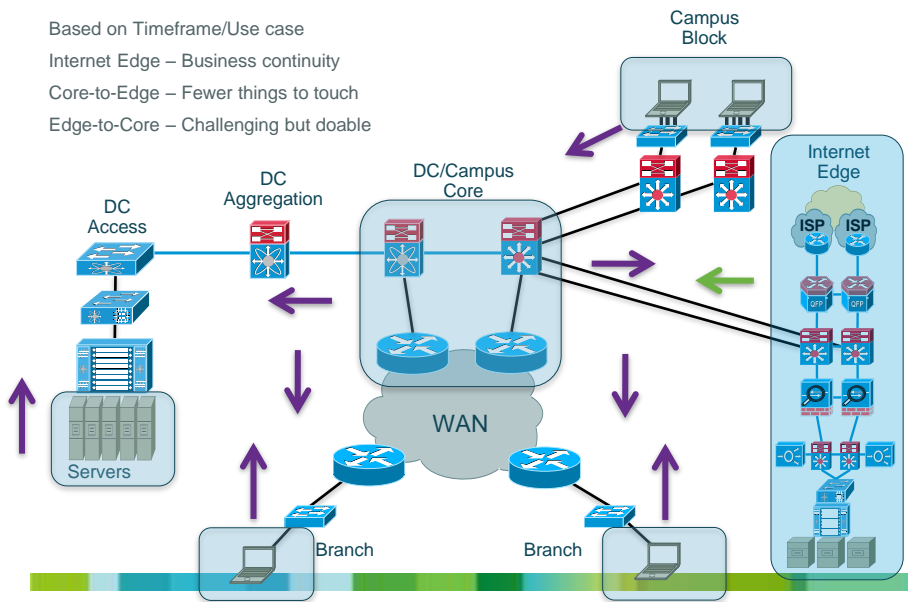
## APPENDIX J- Device capability based on CPU and Memory

The following table lists the devices identified as capable to support IPv6 but have high CPU usage or have low free memory.

Device Name	Product Name	Total Memory	Free Memory	CPU usage
Device60	CHAS-7507=	264	43	15
Device61	GSR10/200-AC	2048	928	72
Device62	CISCO7609	1024	100	22
Device63	GSR10/200-AC	2048	200	32
Device64	GSR10/200-AC	2048	800	52

# Where do I start?

- Based on Timeframe/Use case
- Internet Edge – Business continuity
- Core-to-Edge – Fewer things to touch
- Edge-to-Core – Challenging but doable

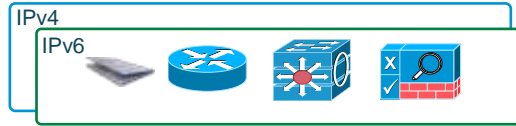




# IPv6 Co-existence Solutions

## Dual Stack

Recommended Enterprise Co-existence strategy



## Tunneling Services

Connect Islands of IPv6 or IPv4



## Translation Services

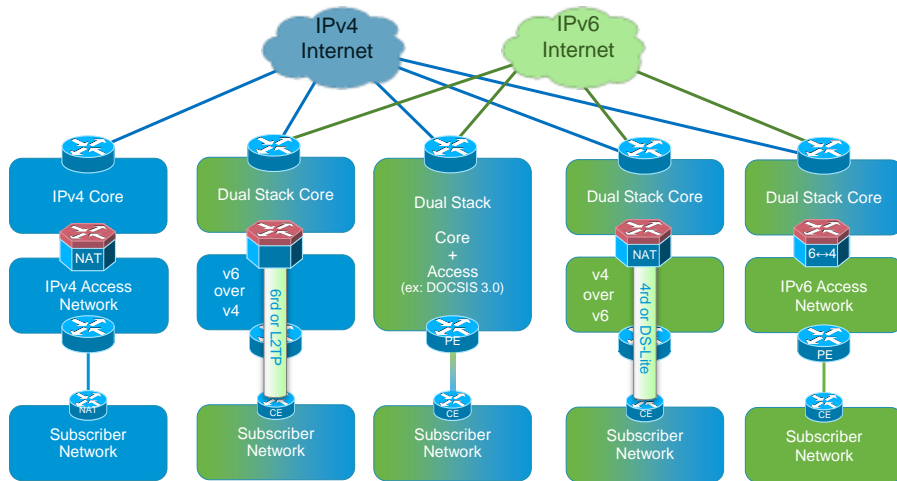
Connect to the IPv6 community



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# SP Network Transitional Technologies



Preserve

Prepare

Prosper

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# Conclusion

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## Key Takeaways and Resources



Start now and position for growth

Next Steps:  
Assess, Plan, Design Trial, Train, Roll out

Map out opportunities to be IPv6 ready in planned technology refresh cycles

Enable your network evolution to IPv6 with Cisco

IPv6 on Cisco.com  
<http://www.cisco.com/go/ipv6>

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Thank you.

