Upgrading America's Digital Infrastructure

CIO Council: IPv6 Update

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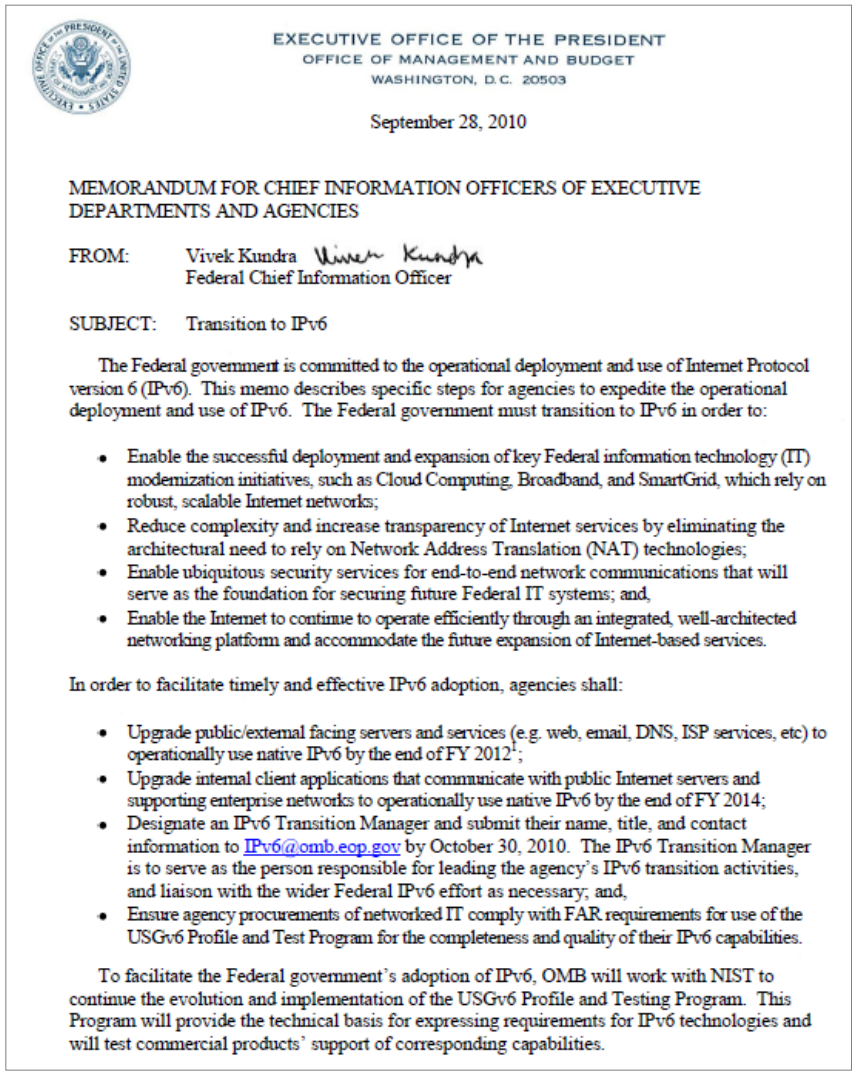
Office of Management and Budget

October 12, 2011

Goals



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

September 28, 2010

MEMORANDUM FOR CHIEF INFORMATION OFFICERS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Vivek Kundra
Federal Chief Information Officer

SUBJECT: Transition to IPv6

The Federal government is committed to the operational deployment and use of Internet Protocol version 6 (IPv6). This memo describes specific steps for agencies to expedite the operational deployment and use of IPv6. The Federal government must transition to IPv6 in order to:

- Enable the successful deployment and expansion of key Federal information technology (IT) modernization initiatives, such as Cloud Computing, Broadband, and SmartGrid, which rely on robust, scalable Internet networks;
- Reduce complexity and increase transparency of Internet services by eliminating the architectural need to rely on Network Address Translation (NAT) technologies;
- Enable ubiquitous security services for end-to-end network communications that will serve as the foundation for securing future Federal IT systems; and,
- Enable the Internet to continue to operate efficiently through an integrated, well-architected networking platform and accommodate the future expansion of Internet-based services.

In order to facilitate timely and effective IPv6 adoption, agencies shall:

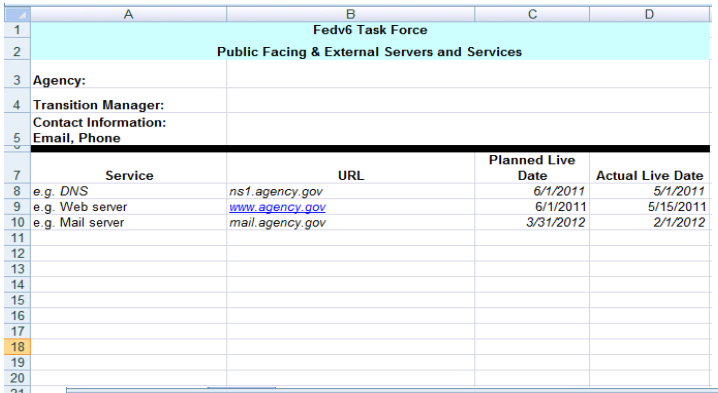
- Upgrade public/external facing servers and services (e.g. web, email, DNS, ISP services, etc) to operationally use native IPv6 by the end of FY 2012[1];
- Upgrade internal client applications that communicate with public Internet servers and supporting enterprise networks to operationally use native IPv6 by the end of FY 2014;
- Designate an IPv6 Transition Manager and submit their name, title, and contact information to IPv6@omb.eop.gov by October 30, 2010. The IPv6 Transition Manager is to serve as the person responsible for leading the agency's IPv6 transition activities, and liaison with the wider Federal IPv6 effort as necessary; and,
- Ensure agency procurements of networked IT comply with FAR requirements for use of the USGv6 Profile and Test Program for the completeness and quality of their IPv6 capabilities.

To facilitate the Federal government's adoption of IPv6, OMB will work with NIST to continue the evolution and implementation of the USGv6 Profile and Testing Program. This Program will provide the technical basis for expressing requirements for IPv6 technologies and will test commercial products' support of corresponding capabilities.

- Upgrade public/external facing servers and services (e.g. web, email, DNS, ISP services, etc) to operationally use native IPv6 by the **end of FY 2012**
- Upgrade internal client applications that communicate with public Internet servers and supporting enterprise networks to operationally use native IPv6 by the **end of FY 2014**
- Ensure agency procurements of networked IT comply with FAR requirements for use of the USGv6 Profile and Test Program for the completeness and quality of their IPv6 capabilities

Memorandum available at: http://www.cio.gov/documents/IPv6MemoFINAL.pdf

IPv6 Plan Checklists



Fedv6 Task Force

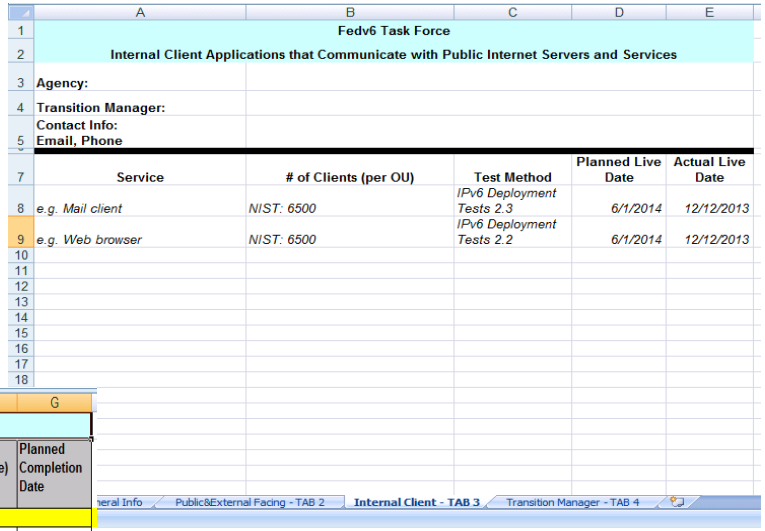
Public Facing & External Servers and Services

Agency:

Transition Manager:

Contact Information:
Email, Phone

Service	URL	Planned Live Date	Actual Live Date
e.g. DNS	ns1.agency.gov	6/1/2011	5/1/2011
e.g. Web server	www.agency.gov	6/1/2011	5/15/2011
e.g. Mail server	mail.agency.gov	3/31/2012	2/1/2012



Fedv6 Task Force

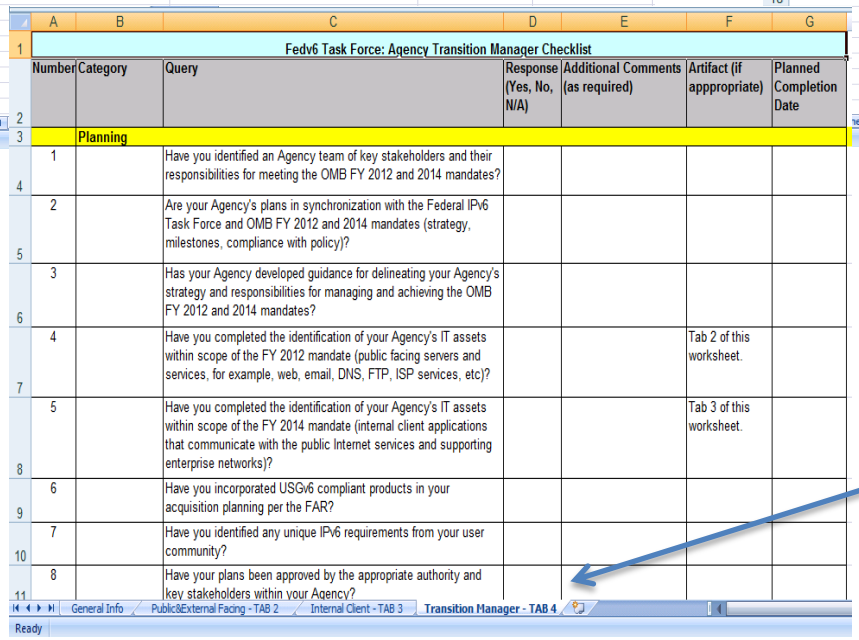
Internal Client Applications that Communicate with Public Internet Servers and Services

Agency:

Transition Manager:

Contact Info:
Email, Phone

Service	# of Clients (per OU)	Test Method	Planned Live Date	Actual Live Date
e.g. Mail client	NIST: 6500	IPv6 Deployment Tests 2.3	6/1/2014	12/12/2013
e.g. Web browser	NIST: 6500	IPv6 Deployment Tests 2.2	6/1/2014	12/12/2013



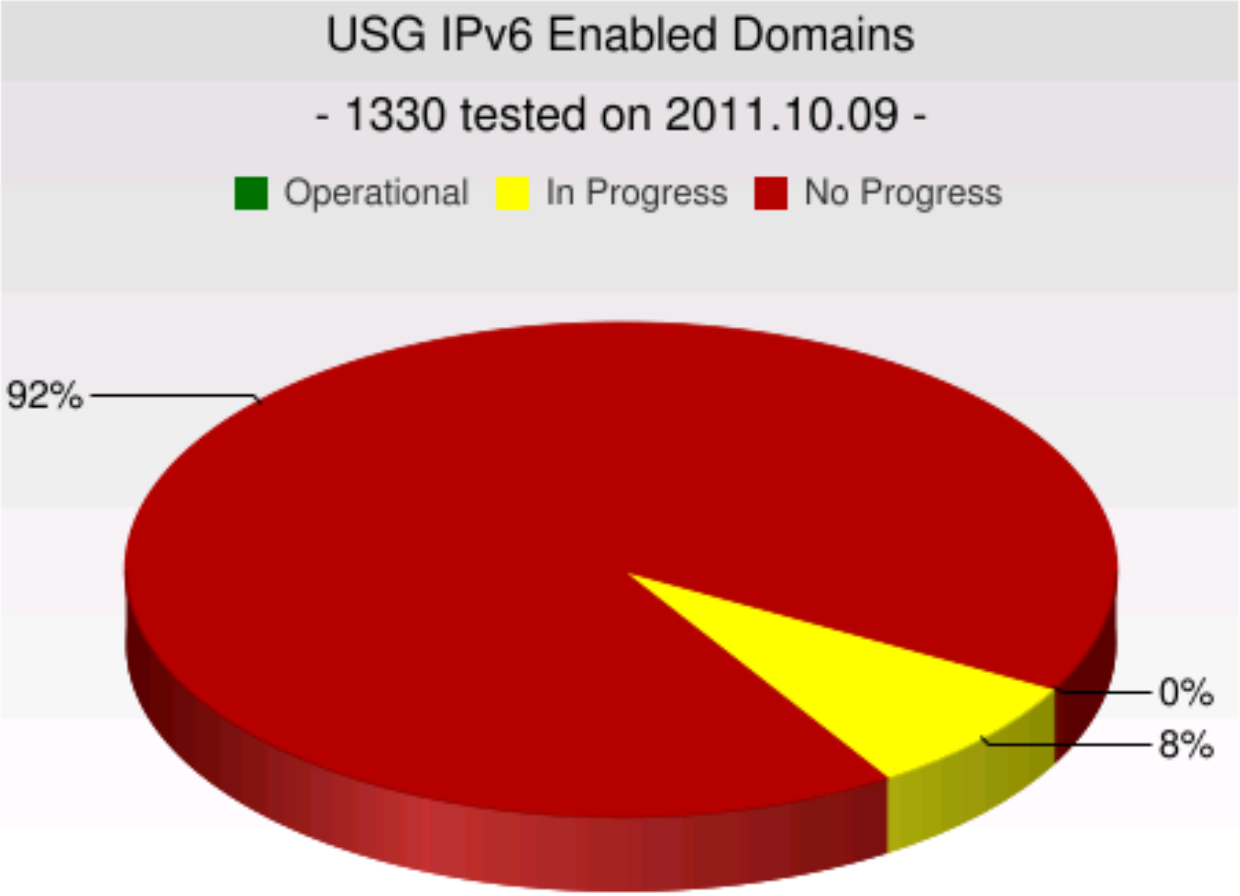
Fedv6 Task Force: Agency Transition Manager Checklist

Number	Category	Query	Response (Yes, No, N/A)	Additional Comments (as required)	Artifact (if appropriate)	Planned Completion Date
	Planning					
1		Have you identified an Agency team of key stakeholders and their responsibilities for meeting the OMB FY 2012 and 2014 mandates?				
2		Are your Agency's plans in synchronization with the Federal IPv6 Task Force and OMB FY 2012 and 2014 mandates (strategy, milestones, compliance with policy)?				
3		Has your Agency developed guidance for delineating your Agency's strategy and responsibilities for managing and achieving the OMB FY 2012 and 2014 mandates?				
4		Have you completed the identification of your Agency's IT assets within scope of the FY 2012 mandate (public facing servers and services, for example, web, email, DNS, FTP, ISP services, etc)?			Tab 2 of this worksheet.	
5		Have you completed the identification of your Agency's IT assets within scope of the FY 2014 mandate (internal client applications that communicate with the public Internet services and supporting enterprise networks)?			Tab 3 of this worksheet.	
6		Have you incorporated USGv6 compliant products in your acquisition planning per the FAR?				
7		Have you identified any unique IPv6 requirements from your user community?				
8		Have your plans been approved by the appropriate authority and key stakeholders within your Agency?				

- OMB hosted initial agency meetings Nov 15, 2010 to Jan 18, 2011
- Agencies submitted completed IPv6 plan checklists (v1.0) to OMB in April 2011
- Agencies will be requested to re-submit Tab 4 of the checklist (v1.1) to OMB in preparation for agency progress meetings

Available on the Max wiki: https://max.omb.gov/community/x/EhPVI

IPv6 Deployment Monitor … broad view



Sample IPv6 Execution Timeline

Sample Agency IPv6 Execution Timeline 2012 Public Facing Execution	Key Stakeholders (External)	Milestone 1 Jun-11	2 Dec-11	3 Jun-12	4 Dec-12	5 Jun-13	6 Dec-13	7 Jun-14	8 Dec-14
Network Connectivity									
Internet Gateway 1 IPv6 Enabled	Networx or other Carriers (ISP)	■							
Internet Gateway 2 IPv6 Enabled		▒	■						
Internet Gateway 3 IPv6 Enabled		▒	■						
Internet Gateway 4 IPv6 Enabled		▒	■						
Addressing									
ISP Provided IPv6 Addresses	Networx or other Carriers (ISP)	■							
Announce Agency IPv6 Addresses	ARIN	▒	■						
Routing									
Basic IPv6 Routing	Networx or other Carriers (ISP) Routing Vendors	■							
IPv6 BGP Routing Gateway 1		▒	■						
IPv6 BGP Routing Gateway 2		▒	■						
IPv6 BGP Routing Gateway 3		▒	■						
IPv6 BGP Routing Gateway 4		▒	■						
IPv6 Multi-home Routing			▒	■					
Domain Name Services (DNS)									
ns1 IPv6 enabled	GSA (.gov) DNS Providers	■							
ns2 IPv6 enabled		▒	■						
ns3 IPv6 enabled		▒	■						
ns4 IPv6 enabled		▒	■						
Primary Agency Domain (www.agency.gov)									
Phase 1	Cloud/Hosting Providers Web Vendors	■							
Phase 2		▒	■						
Mail									
Inbound SMTP IPv6 Enabled	Cloud/Hosting Providers SMTP/Mail Security Vendors	▒	■						
Outbound SMTP IPv6 Enabled			▒	■					
Security									
DMZ Basic IPv6 Security	MTIPS/TICAP Providers Security Vendors Security Service Providers	■							
DMZ Comparable IPv6 Security		▒	▒	■					
Full IPv6 Security			▒	▒	■				
Network Management									
Basic IPv6 Network Management	Network Management Vendors	■							
Comparable IPv6 Network Management		▒	▒	■					
Full IPv6 Network Management			▒	▒	■				
Public Facing Domains									
1 Public Facing Domain IPv6 Enabled	Cloud/Hosting Providers Web Vendors	■							
35% Public Facing Domains IPv6 Enabled		▒	■						
100% Public Facing Domains IPv6 Enabled		▒	▒	■					
Pilots									
Mission Pilots	Impacted Vendors/Providers	▒	▒	■					

Legend
In Progress
Complete

Sample Agency IPv6 Execution Timeline 2014 Enterprise Network Execution	Key Stakeholders (External)	Milestone 1 Jun-11	2 Dec-11	3 Jun-12	4 Dec-12	5 Jun-13	6 Dec-13	7 Jun-14	8 Dec-14
Network Connectivity									
Core/Backbone Network	Networx or other Carriers Router Vendors	▒	▒	■					
Infrastructure Routers 25%				▒	■				
Infrastructure Routers 50%				▒	▒	■			
Infrastructure Routers 100%				▒	▒	▒	■		
Addressing									
Internal IPv6 Addresses Allocated	ARIN DCHPv6 Vendors		▒	■					
DHCPv6 Enabled 25%				▒	■				
DHCPv6 Enabled 50%				▒	▒	■			
DHCPv6 Enabled 100%					▒	▒	■		
Routing									
Core/Backbone Network Routing	Networx or other Carriers Router Vendors		▒	■					
Infrastructure Routing 25%				▒	■				
Infrastructure Routing 50%					▒	■			
Infrastructure Routing 100%					▒	▒	■		
Domain Name Services (DNS)									
Internal DNS IPv6 Enabled	DNS Vendors		▒	■					
Data Centers									
Data Center 1 IPv6 Enabled	Networx or other Carriers Router Vendors IT Vendors Service Providers	▒	▒	■					
Data Center 2 IPv6 Enabled				▒	■				
Data Center 3 IPv6 Enabled					▒	■			
Data Center 4 IPv6 Enabled					▒	■			
Mail									
Exchange IPv6 Enabled	Mail Vendors			▒	▒	■			
Internal Applications & Services									
IPv6 Enabled Apps & Services 25%	Application Vendors Service Providers IT Vendors		▒	▒	■				
IPv6 Enabled Apps & Services 50%				▒	▒	■			
IPv6 Enabled Apps & Services 75%					▒	▒	■		
IPv6 Enabled Apps & Services 100%						▒	▒	■	
End Device Transition									
Internal Servers IPv6 Enabled 25%	Server & OS Vendors Virtualization Vendors IT Vendors		▒	■					
Internal Servers IPv6 Enabled 50%			▒	▒	■				
Internal Servers IPv6 Enabled 75%			▒	▒	▒	■			
Internal Servers IPv6 Enabled 100%			▒	▒	▒	▒	■		
User Computers IPv6 Enabled 25%	Laptop/Desktop & OS Vendors		▒	■					
User Computers IPv6 Enabled 50%			▒	▒	■				
User Computers IPv6 Enabled 75%			▒	▒	▒	■			
User Computers IPv6 Enabled 100%			▒	▒	▒	▒	■		
PDA/Mobile Devices IPv6 Enabled 25%	PDA Vendors			▒	■				
PDA/Mobile Devices IPv6 Enabled 50%				▒	▒	■			
PDA/Mobile Devices IPv6 Enabled 75%				▒	▒	▒	■		
PDA/Mobile Devices IPv6 Enabled 100%				▒	▒	▒	▒	■	
Mission Devices IPv6 Enabled 25%	IT Vendors Device Vendors			▒	■				
Mission Devices IPv6 Enabled 50%				▒	▒	■			
Mission Devices IPv6 Enabled 75%				▒	▒	▒	■		
Mission Devices IPv6 Enabled 100%				▒	▒	▒	▒	■	
Pilots									
Enclave Pilot Phase 1	IT Vendors	▒	■						
Enclave Pilot Phase 2			▒	■					
Enclave Pilot Phase 3				▒	■				

Key Focus Areas for Agencies

Procure all necessary Services, equipment, and software

- Review efforts to obtain new IPv6 services (e.g., Networx/MTIPS), and update existing agency contracts
- Procure necessary equipment and software: Procurement, Acquisition and IT teams need to collaborate
- Follow-up with your vendors/service providers on any IPv6 related issues, and elevate issues as needed

Execute Your Implementation Plan

- Review your quarterly milestones to stay on track
- Use the “IPv6 Transition Manager’s Checklist” and “Sample IPv6 Execution Timeline” as progress guides
- Leverage the IPv6 Deployment Test Suite provided by NIST
- Monitor agency progress via the NIST IPv6 Deployment Monitor

Actively Manage Joint Initiatives

- Ensure the identification of all department-wide IPv6 services and match this inventory to funding
- Review IPv6 inventory and agency websites published on data.gov for discrepancies[1]
- CIOs, IPv6 Transition Managers, and other relevant parties, should meet regularly to review progress

1 - http://explore.data.gov/Federal-Government-Finances-and-Employment/Federal-Executive-Branch-Internet-Domains/k9h8-e98h

Resources

- September 28, 2010 OMB Memorandum
  http://www.cio.gov/documents/IPv6MemoFINAL.pdf

- IPv6 FAR Amendment
  http://edocket.access.gpo.gov/2009/pdf/E9-28931.pdf

- USG v6 Profile (NIST SP 500-267)
  http://www.antd.nist.gov/usgv6/usgv6-v1.pdf

- NIST USGv6 Deployment Test Suite
  http://www.antd.nist.gov/usgv6/

- Suppliers Declaration of Conformity Template
  http://www.antd.nist.gov/usgv6/sdoc.html

- USGv6 Test Method: General Description and Validation, NIST SP 500-273
  http://w3.antd.nist.gov/usgv6/NIST-SP-500-273.v2.print.pdf

- USGv6 Testing Program User's Guide , NIST SP 500-281
  http://w3.antd.nist.gov/usgv6/docs/NIST-SP-500-281-v1.0.pdf

Resources (continued)

- Guidelines for the Secure Deployment of IPv6 , SP 800-119
  http://csrc.nist.gov/publications

- NIST IPv6 Deployment Monitor
  http://fedv6-deployment.antd.nist.gov/

- IPv6 Wiki For Transition Managers
  https://max.omb.gov/community/x/EhPVI

- NTIA IPv6 Web-page and Resources
  http://www.ntia.doc.gov/category/ipv6

- Planning Guide/Roadmap Toward IPv6 Adoption within the U.S. Government
  http://www.cio.gov

Contacts

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Background

Progress to Date

- FAR amended December 2009 to include requirements for IPv6
- NIST developed a testing infrastructure, which is working to test IPv6 products
- NIST deployed the IPv6 Deployment Monitor
- OMB and IPv6 Task Force conducted Agency meetings between November 15, 2010 and January 18, 2011
- Task Force initiated monthly Interagency IPv6 WG meetings in February 2011
  - Share Information; Identify Open Issues; Learn from Examples
- Task Force and Transition Managers studied Virginia Tech Deployment Model
- Task Force developed IPv6 FAQs
- Agencies submitted IPv6 plan checklist to OMB in April 2011
- Networx/MTIPS vendor day hosted in May 2011
- IPv6 Interagency subgroups established in May 2011 to target issues
  - Technology, Outreach, and IT Management subgroups
  - Aligned to ACT-IAC groups
- 15 of 24 CFO Act agencies participated in ISOC's World IPv6 Day on June 8, 2011
- Task Force distributed "Sample IPv6 Execution Timeline" on September 14, 2011
- Task Force and ACT/IAC in process of updating IPv6 Roadmap (originally issued in May 2009)