2011 DREN Conference

Department of Veterans Affairs IPv6 Transition Progress

August 16, 2011

Presented by: Steven Pirzchalski
VA IPv6 Transition Manager
Outreach Chair, Federal IPv6 Task Force

Major VA IPv6 Transition Drivers

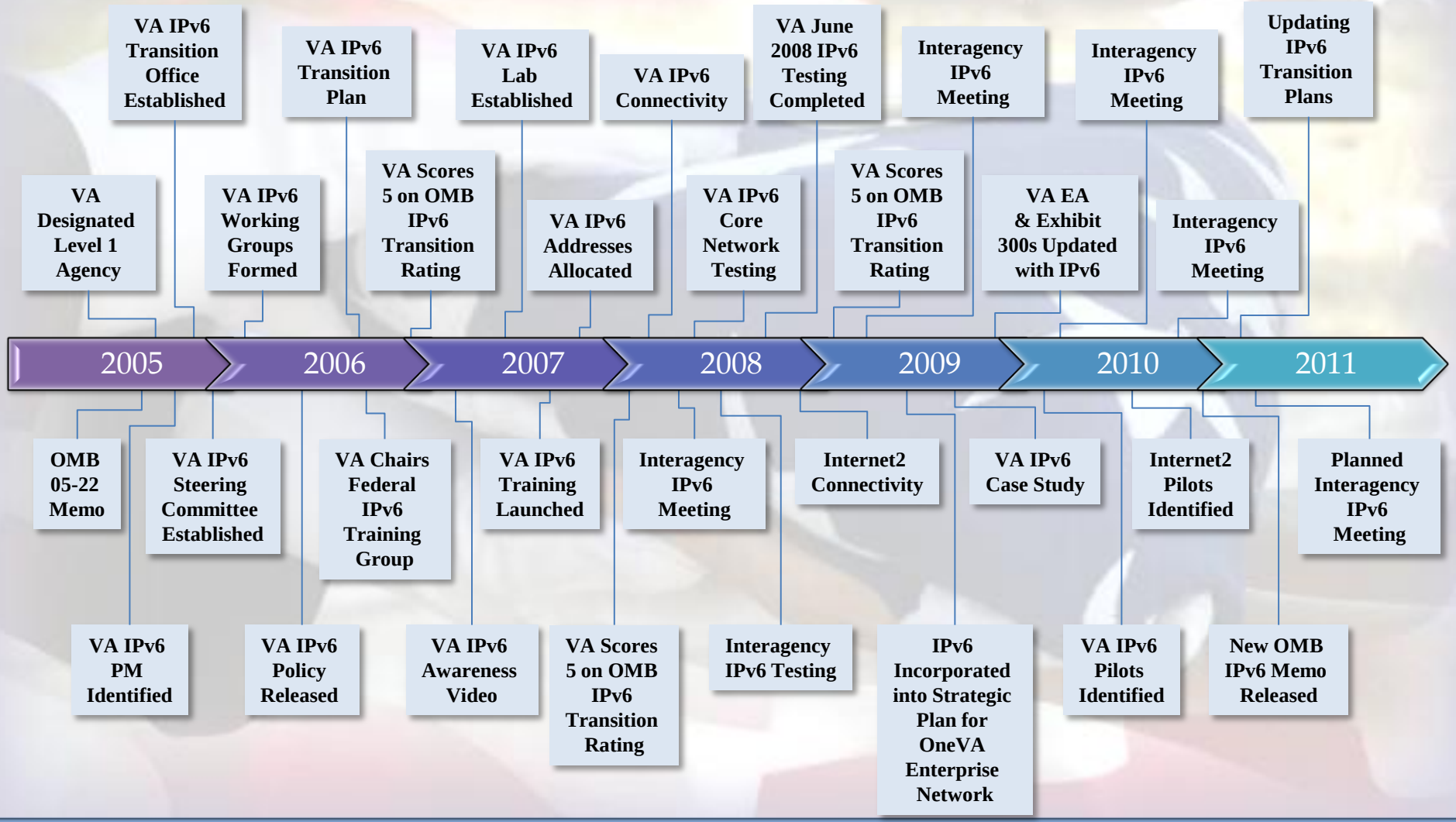
OMB Directive

Veteran Service Continuity

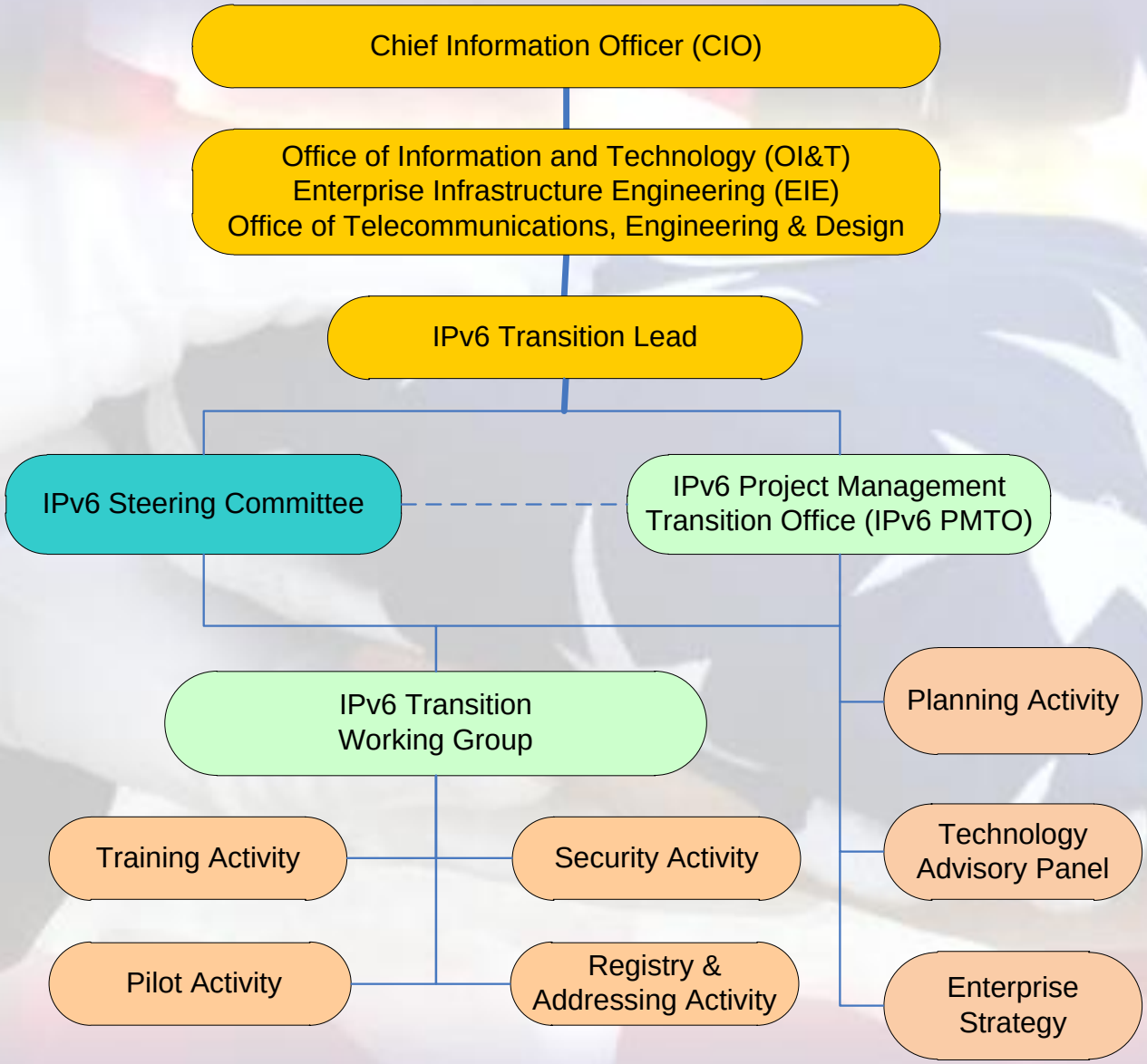
Cost Control

Technology Leadership

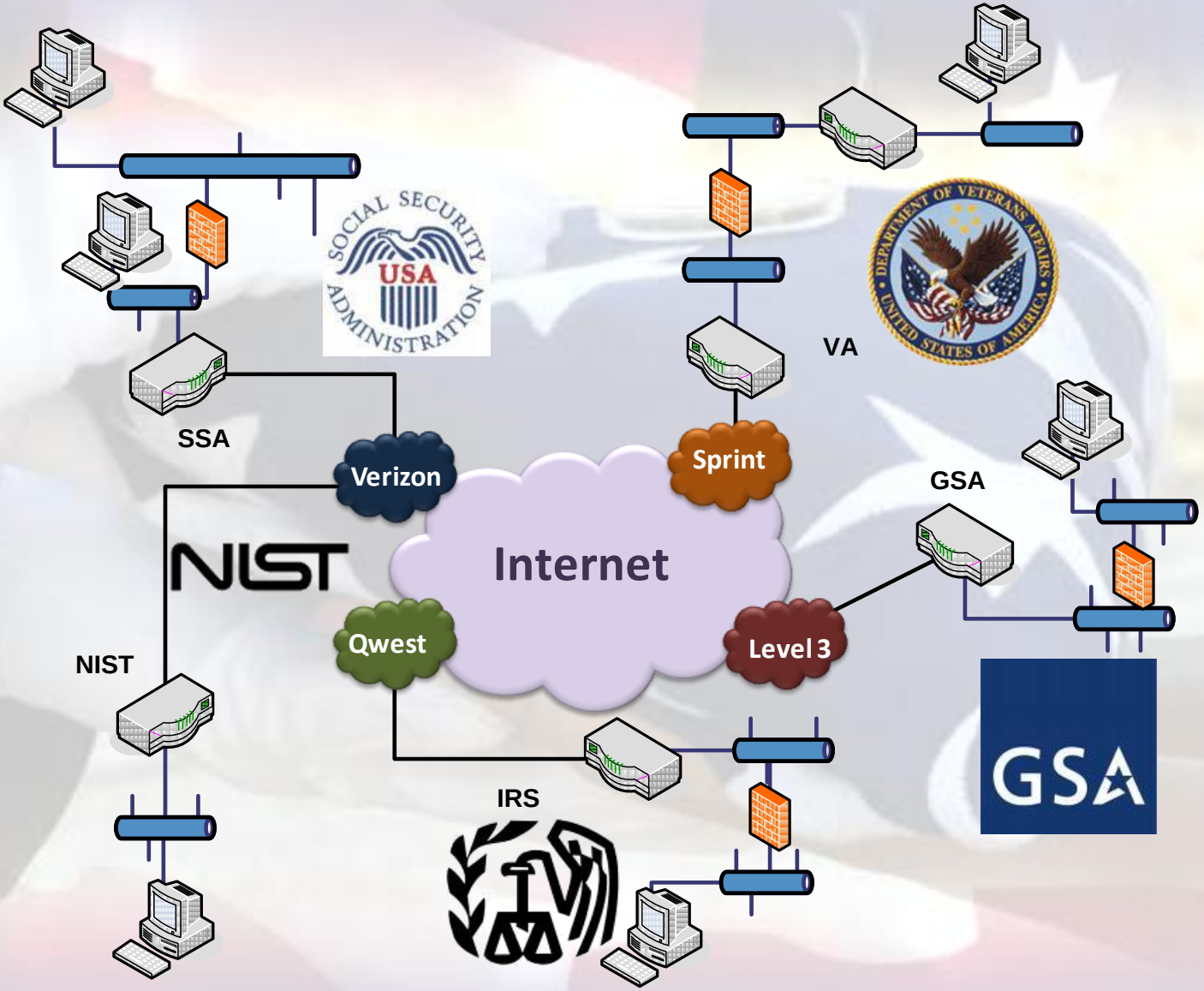
VA IPv6 Transition Timeline - Historical



VA IPv6 Governance Structure



Multi-Agency IPv6 Testing



Evolving Transition Approach

- **A true transition approach – IPv6 will become the dominant protocol**
- **Implementation Phases**
  1. **Public Services – Maps to OMB Directive for 2012**
  2. **Internal Services – Maps to OMB Directive for 2012**
  3. **IPv4 Decommissioning – VA Directive for 2015**
- **VA Timeframes more aggressive than OMB directives in many cases**
  - **Developed Bi-Annual Implementation Milestone Approach**
- **Will utilize transition mechanisms where necessary for IPv4 legacy systems and interactions**

VA IPv6 Implementation Schedule
2012 OMB Milestone

VA IPv6 Execution Requirements	Other Interested Parties	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	9 Jun-15	10 Dec-15
Public Facing Execution											
Network Connectivity											
VA Gateway 1 IPv6 Enabled	Internet2, AT&T, Qwest										
VA Gateway 2 IPv6 Enabled											
VA Gateway 3 IPv6 Enabled											
VA Gateway 4 IPv6 Enabled											
Addressing											
ISP Provided IPv6 Addresses	Internet2, AT&T, Qwest										
Announce VA IPv6 Addresses	Internet2, AT&T, Qwest										
Routing											
Basic IPv6 Routing	Internet2, AT&T, Qwest, Cisco										
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.va.gov IPv6 enabled	GSA (.gov)										
ns2.va.gov IPv6 enabled											
ns3.va.gov IPv6 enabled											
ns4.va.gov IPv6 enabled											

VA IPv6 Implementation Schedule
2012 OMB Milestone Cont.

VA IPv6 Execution Requirements	Other Interested Parties	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	9 Jun-15	10 Dec-15
va.gov Domain											
Phase 1	TBD Hosting Provider, Internet2										
Phase 2											
Phase 3											
Mail											
Inbound SMTP IPv6 Enabled	Microsoft										
Outbound SMTP IPv6 Enabled											
Security											
DMZ Basic IPv6 Security	IBM, Cisco										
DMZ Comparable IPv6 Security											
Full IPv6 Security											
Network Management											
Basic IPv6 Network Management	Cisco, HP, Solarwinds, OPNET, NetScout										
Comparable IPv6 Network Management											
Full IPv6 Network Management											
VA Public Facing Domains											
1 Public Facing Domain IPv6 Enabled	Various VA IT Vendors										
35% Public Facing Domains IPv6 Enabled											
100% Public Facing Domains IPv6 Enabled											
Pilots											
Mission Pilots	TBD										

VA IPv6 Implementation Schedule
2014 OMB Milestone

VA IPv6 Execution Requirements	Other Interested Parties	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	9 Jun-15	10 Dec-15
OneVA Enterprise Network Execution											
Network Connectivity											
Core/Backbone Network	AT&T, Qwest, Cisco										
Infrastructure Routers 25%											
Infrastructure Routers 50%											
Infrastructure Routers 100%											
Addressing											
Internal IPv6 Addresses Allocated	Cisco, Microsoft										
DHCPv6 Enabled 25%											
DHCPv6 Enabled 50%											
DHCPv6 Enabled 100%											
Routing											
Core/Backbone Network Routing	Cisco										
Infrastructure Routing 25%											
Infrastructure Routing 50%											
Infrastructure Routing 100%											
Domain Name Services (DNS)											
Internal DNS IPv6 Enabled	NA										
Data Centers											
Data Center 1 IPv6 Enabled	Various VA IT Vendors										
Data Center 2 IPv6 Enabled											
Data Center 3 IPv6 Enabled											
Data Center 4 IPv6 Enabled											
Mail											
Exchange IPv6 Enabled	Microsoft										

VA IPv6 Implementation Schedule
2014 OMB Milestone Cont.

VA IPv6 Execution Requirements	Other Interested Parties	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	9 Jun-15	10 Dec-15
Internal Applications & Services											
IPv6 Enabled Apps & Services 25%	Various VA 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%	Microsoft (Various VA IT Vendors)										
Internal Servers IPv6 Enabled 50%											
Internal Servers IPv6 Enabled 75%											
Internal Servers IPv6 Enabled 100%											
User Computers IPv6 Enabled 25%	Microsoft (Various VA IT Vendors)										
User Computers IPv6 Enabled 50%											
User Computers IPv6 Enabled 75%											
User Computers IPv6 Enabled 100%											
PDA/Mobile Devices IPv6 Enabled 25%	RIM										
PDA/Mobile Devices IPv6 Enabled 50%											
PDA/Mobile Devices IPv6 Enabled 75%											
PDA/Mobile Devices IPv6 Enabled 100%											
Mission Devices IPv6 Enabled 25%	Various VA IT Vendors										
Mission Devices IPv6 Enabled 50%											
Mission Devices IPv6 Enabled 75%											
Mission Devices IPv6 Enabled 100%											
Pilots											
Enclave Pilot Phase 1	Microsoft, Cisco (Various VA IT Vendors)										
Enclave Pilot Phase 2											
Enclave Pilot Phase 3											
Mail Pilot											

VA IPv6 Implementation Schedule
2015 VA Milestone

By 2015, all computing, application, and network resources must tum off IPv4 as a communication mechanism in VA unless there is a waiver from my office or the device/service runs in an enclave.

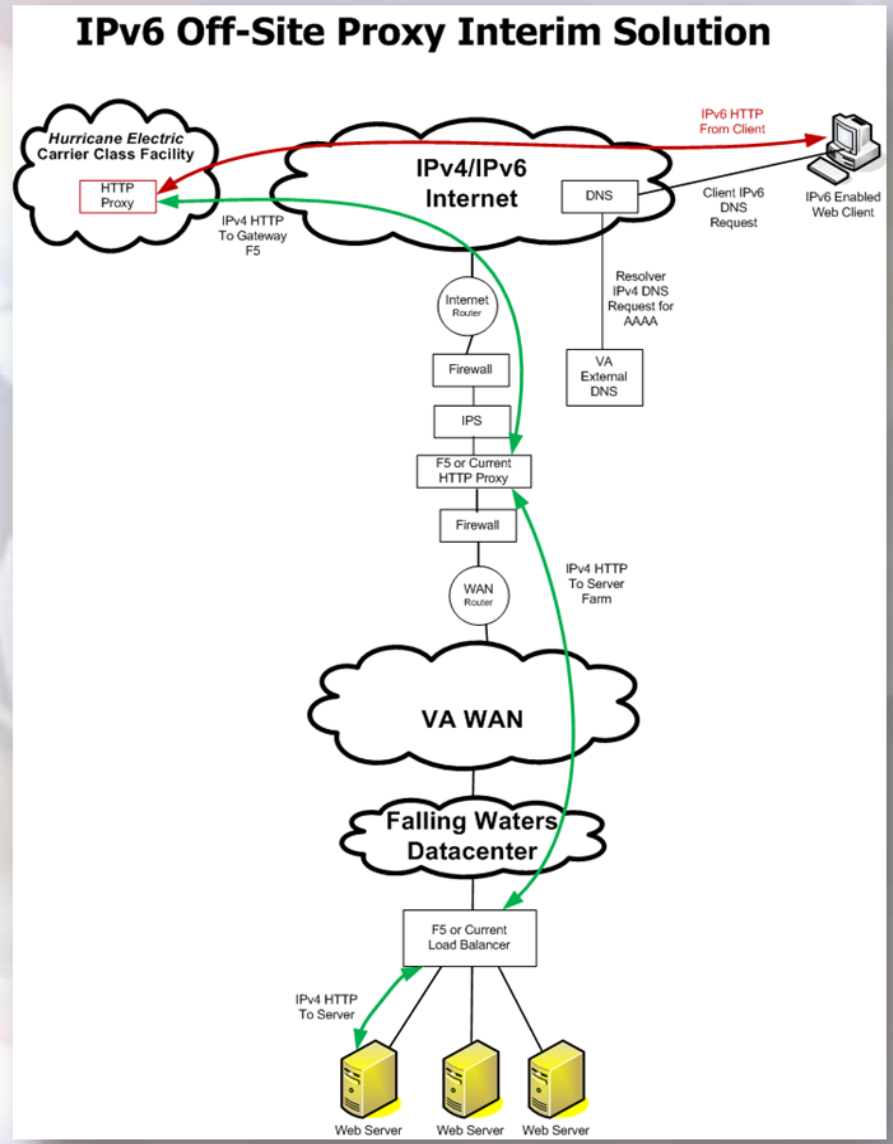
VA IPv6 Execution Requirements	Other Interested Parties	Milestone									
		1	2	3	4	5	6	7	8	9	10
		Jun-11	Dec-11	Jun-12	Dec-12	Jun-13	Dec-13	Jun-14	Dec-14	Jun-15	Dec-15
IPv4 Decommissioning											
IPv6 Only Enclave Pilot Phase 1	All VA IT Vendors										
IPv6 Only Enclave Pilot Phase 2											
IPv4 Utilization 90%											
IPv4 Utilization 75%											
IPv4 Utilization 50%											
IPv4 Utilization 25%											

VA IPv6 Implementation Progress

- **Network Connectivity & Routing**
  - **VA Gateway East IPv6 operational**
  - **(2) VA IPv6 labs IPv6 operation**
- **Addressing**
  - **(3) /48's currently being advertised from VA's /32**
- **DNS**
  - **AAAA's being advertised over IPv4 service today**
  - **IPv6 DNS enablement (and DNSSEC) installed, waiting final ESCCB approval**
- **Web Services**
  - **www.va.gov IPv6 operational since June 3, 2011**
  - **Internal & external Solution Operational today**
    - **Load-balancing**

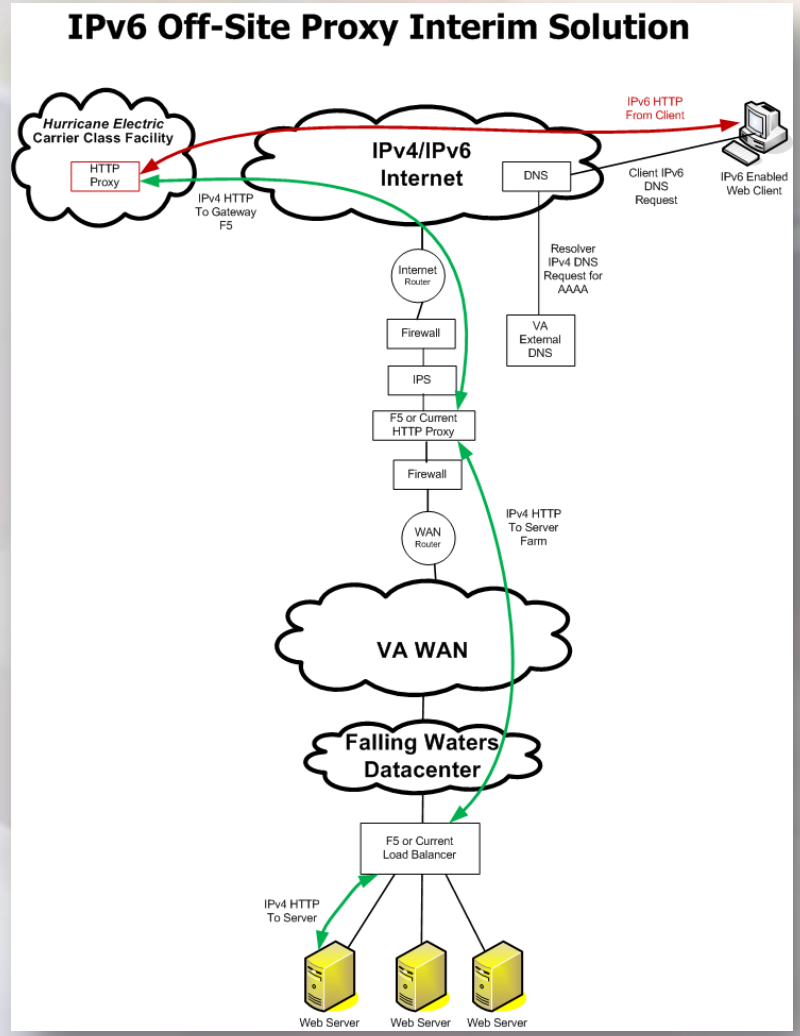
VA Participation in World IPv6 Day

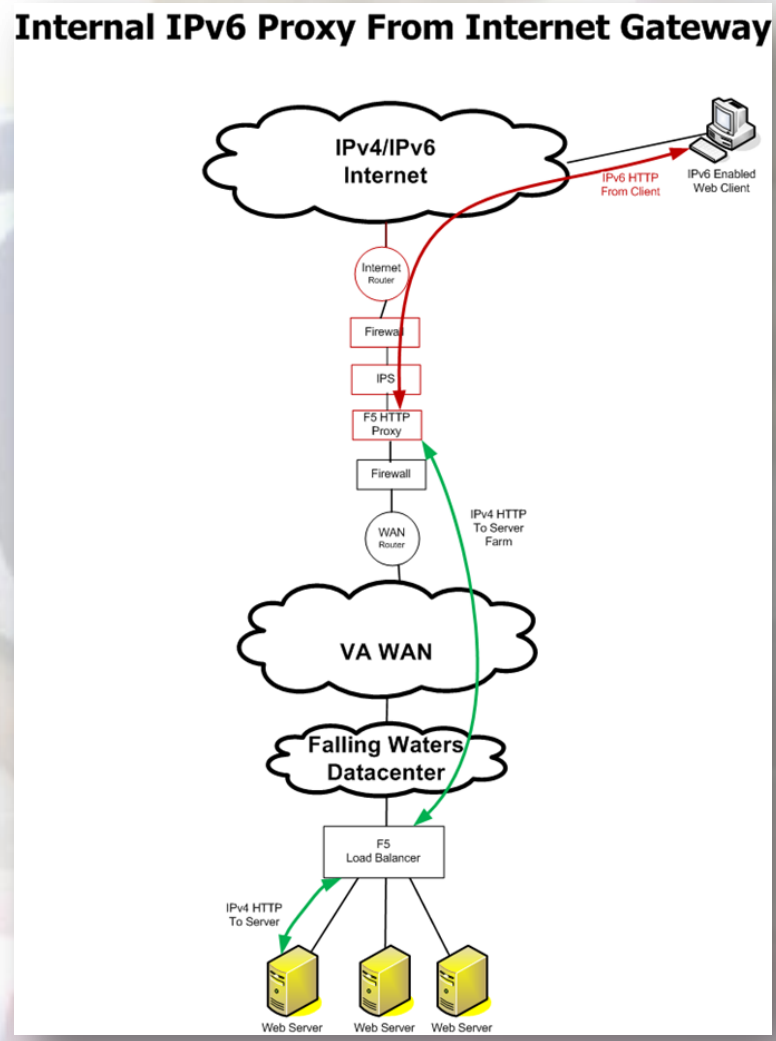
- VA was 1st US Agency to sign-up for World IPv6 Day
- Enabled IPv6 operational capability on June 3rd, 2011
- IPv6 operation capability not just for World IPv6 Day
- No problems identified



Currently Dual Approach for www.va.gov

Dual approach for load balancing & redundancy until all gateways are IPv6 operational





Planned VA IPv6 Implementation Progress by December 2011

- **Network Connectivity & Routing**
  - **All (4) VA Internet Gateways IPv6 operational**
- **Addressing**
  - **Full implementation of VA IPv6 addressing plan**
  - **/35s announced (BGP) out of each Gateway**
- **DNS**
  - **All DNS servers IPv6 operational**
  - **AAAA's for each VA public facing service**
  - **DNSSEC operational**
  - **VA IPv6 glue records in .gov (pending .gov roadmap)**
- **Web Services**
  - **VA 250+ public domains IPv6 operational**
- **Mail**
  - **IPv6 SMTP relay service in operation**
- **NIST Monitor – All Green**

Challenges – ISP Service

- **Internet2 IPv6 services - no problems**
- **Networx carrier IPv6 services - problems**
  - **Account team knowledge**
  - **Ordering process**
  - **Cutover process**
  - **Service availability**
  - **Changes in underlying capabilities from IPv4 only to dual-stack**
- **VA utilizes (2) Networx carriers**
  - **Qwest IPv6 ISP services expected to be activated in August 2011**
  - **AT&T IPv6 ISP services expected to be activated by November 2011**
  - **Internet2 in use today**

Challenges - Mail

- Current mail security devices do not support IPv6
- Beta IPv6 code expected in next 60 days
- Production IPv6 code not until early CY2012
- IPv6 reputation service still not fully baked
- Working on alternative approach for near-term implementation
  - IPv6 mail relay
  - White list service

Challenges – MPLS Backbone Services

- Only impacts 2014 milestone
- Networx carriers
- More challenging than ISP services
- May take 18+ months for full dual stack capability
- In many cases requires new circuit provisioning
- Exploring use to tunnels as near-term solution until native IPv6 capability available