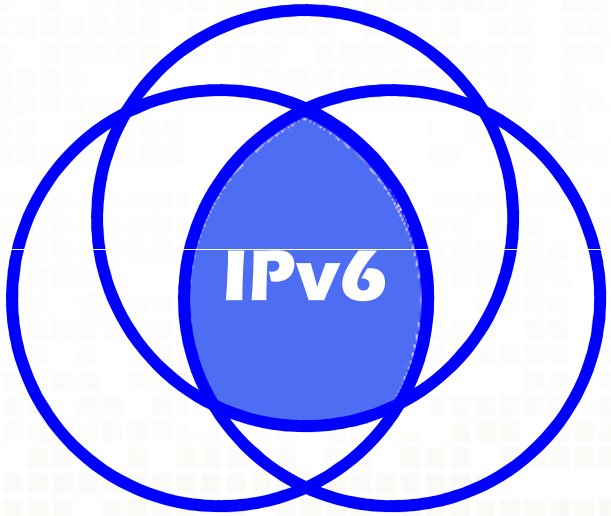
Tactical Challenges of Government IPv6 Deployments

Ralph Wallace **Command-Control LLC (C^2)**

Challenges



Change

"Any sufficiently advanced technology is indistinguishable from Magic"

Arthur C. Clarke

Change

The people who are starting college in 2009 were born in 1991.

They've always had a microwave

The CD was introduced before they were born.

They cannot fathom not having a computer.

They have had a cell phone since they were 14.

They have always had cable TV.

They need their IPhone and IPod/ITunes.

The World Wide Web is their home.

MySpace, FaceBook, Twitter, YouTube, Hulu.

Why Change?

Change

Last year in OIF (Operation Iraqi Freedom), within the networked enterprise in the Iraq area of operations, 3700 SharePoint portals were established. 80% were homegrown portals established to form "social networks" between soldiers in the field and their personal networks within the Army, enabling mission effectiveness.

Marines used Google Earth in Iraq because they couldn't get images through "official" channels.

Why Change?

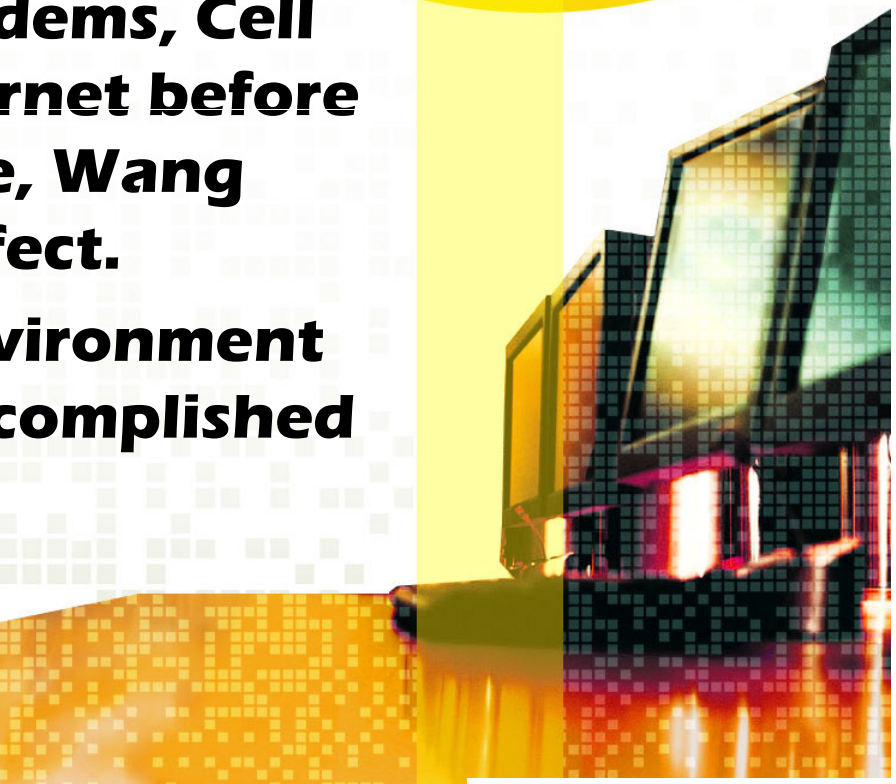
Change

The average age of a career civil servant in a decision making position is approximately 48 years old.

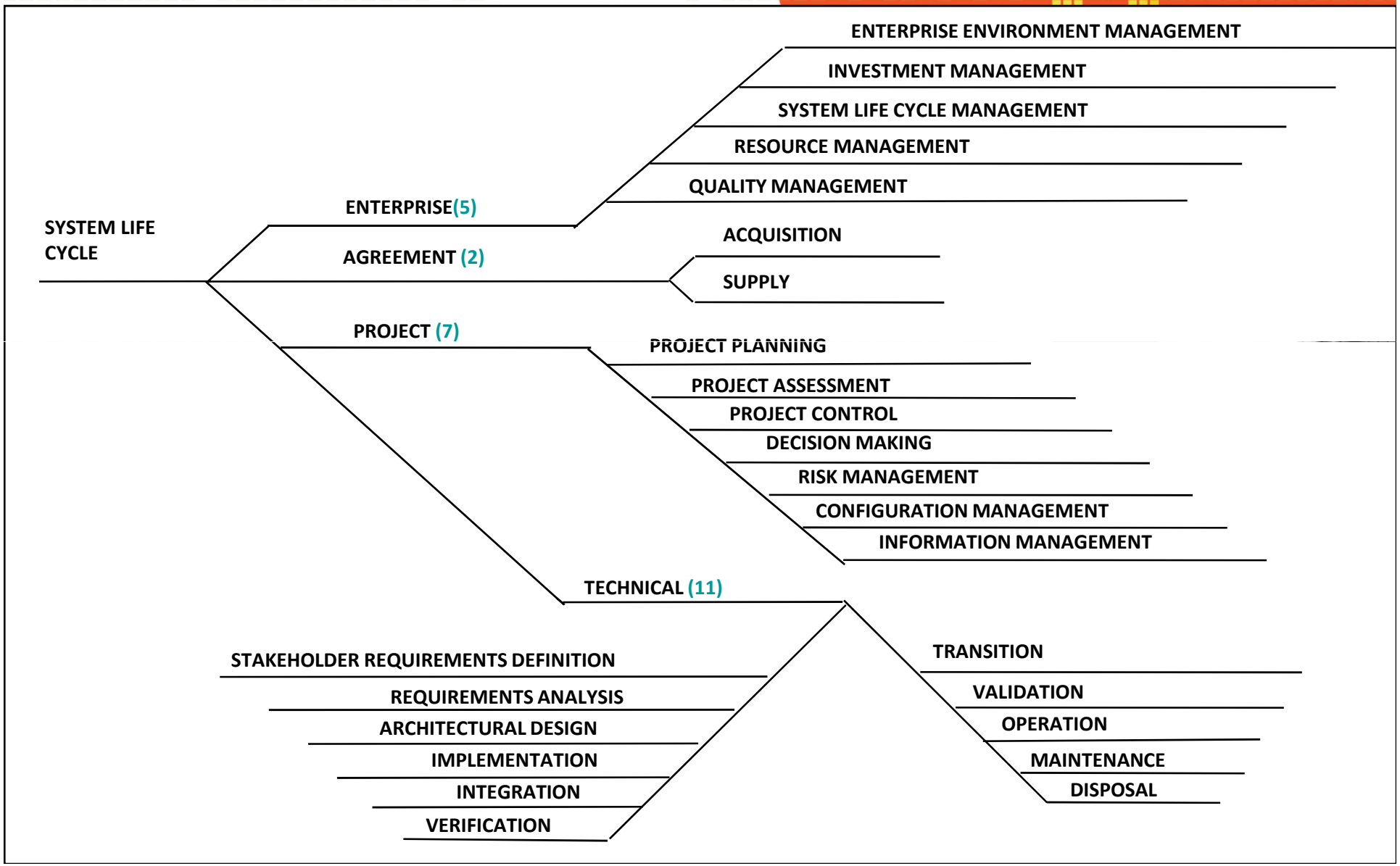
They remember AOL Chat rooms, Bulletin Boards, 1200 Baud modems, Cell phones called "Bricks", the Internet before Google, Banyan Vines, Netware, Wang word processors, and WordPerfect.

They've operated in an IPv4 environment throughout their career and accomplished their mission successfully.

Why change?



Change - Process



ACQUISITION & TECHNOLOGY

THE WILL TO CHANGE

DoD Systems and Software Engineering
A Strategy for Enhanced Systems Engineering

Kristen Baldwin

Acting Director, Systems and Software Engineering

Office of the Deputy Under Secretary of Defense

(Acquisition and Technology)

Analysis of Program Failure

- **Specific Causes of Program Failure (Systemic Root Cause Analysis findings)**

We do not start programs right

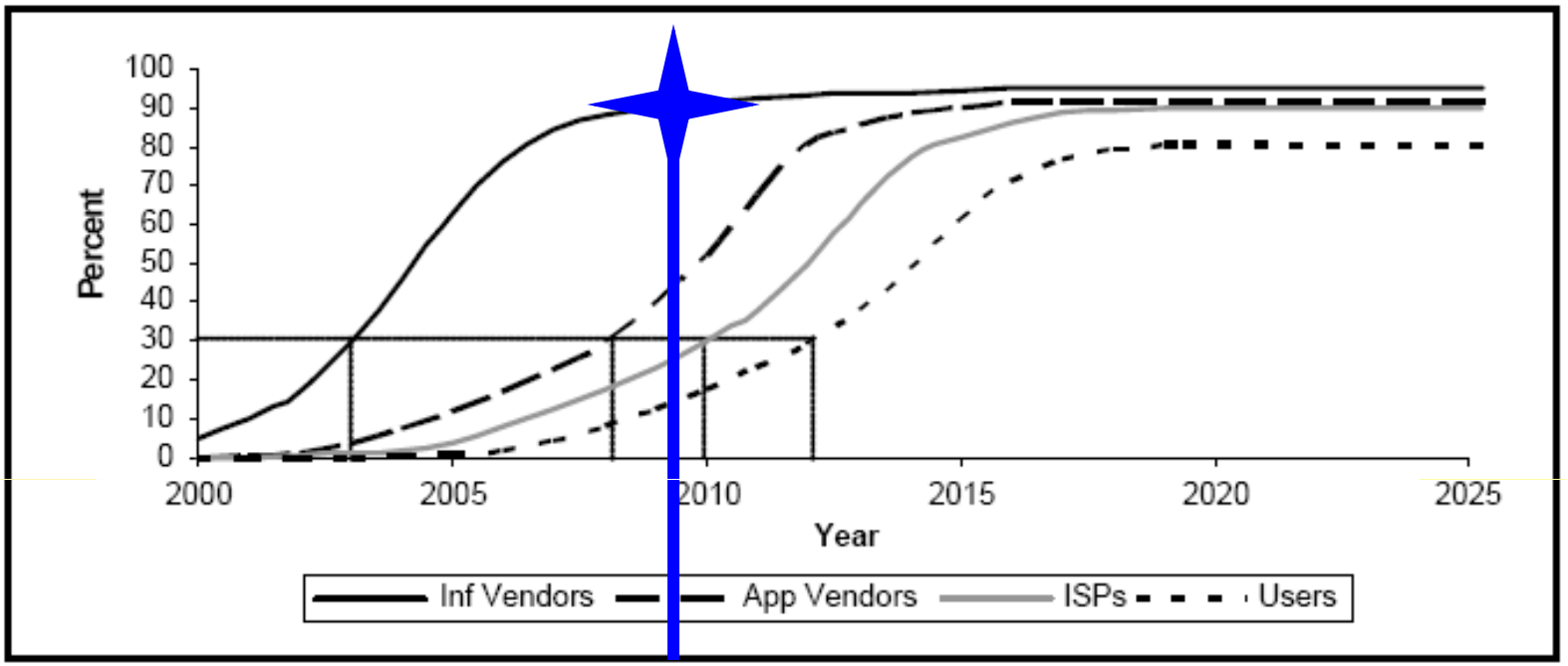
- Insufficient requirements analysis and definition at program initiation
- Lack of rigorous SE approach
- Optimistic/realistic reliability growth – not a priority during development
- Inadequate software architectures, design, development discipline, and organizational competencies

We do not manage programs right

- Insufficient trade space
- Insufficient risk management
- Inadequate IMP, IMS, EVMS
- Most programs lack quantifiable entrance/exit criteria
- Maturing "suitability" (e.g., RAM) is not always a priority

Timing

Figure ES-1. Penetration Estimates of IPv6 in the United States



You Are Here

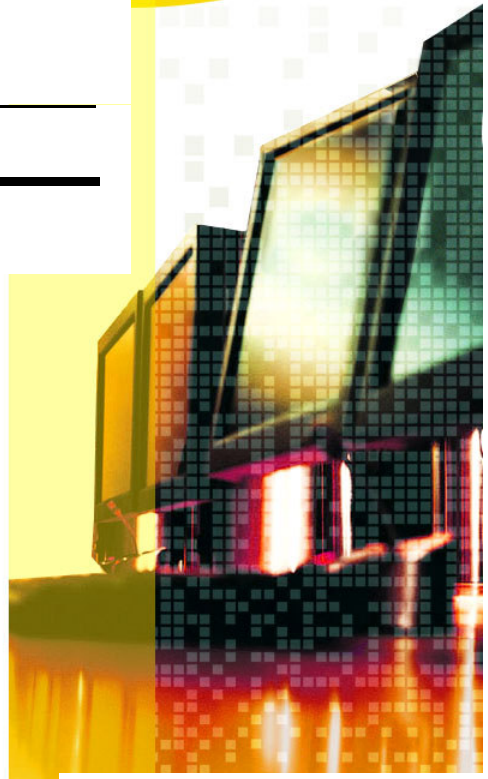
Timeline Courtesy of National Institute of Standards and Technology (NIST), circa October 2005

Costs

	Costs (Present Value [PV] Millions $2003)[a]
Infrastructure vendors	$1,384
Application vendors	$593
ISPs	$136
Users	$23,321
Total	$25,434

[a] Calculated using a 7 percent real social discount rate.

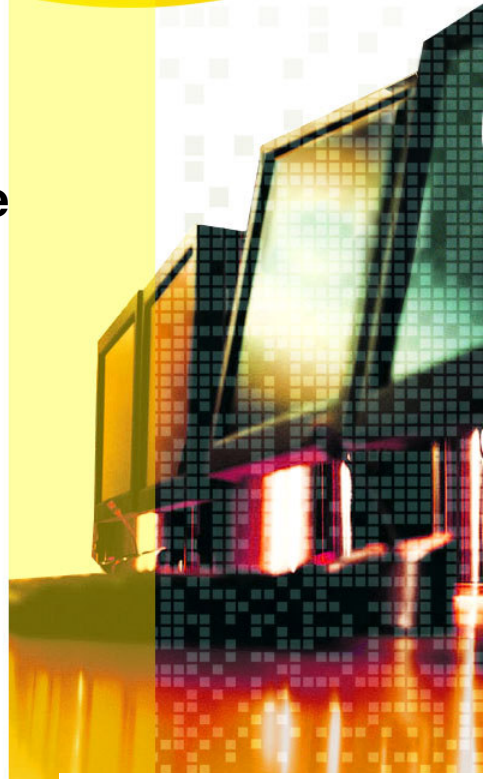
Data Courtesy of National Institute of Standards and Technology (NIST), circa June 2003



Costs

"Interviews with stakeholders indicated that hardware and software costs to upgrade to IPv6 will be negligible for the majority of Internet users because IPv6 capabilities will be deployed as part of routine upgrade cycles **Over the next 4 or 5 years** the majority of network hardware, operating systems, and network-enabled software packages (e.g., databases, email) sold will include IPv6 capabilities.

As a result, labor costs will constitute the majority of the cost of upgrading to IPv6 for users, and training will constitute the majority of these additional labor costs. Training on the fundamentals and implementation of the IPv6 protocol will depend on individual staff's relative needs based on past experience with IPv4 and potential future applications."



Blockers

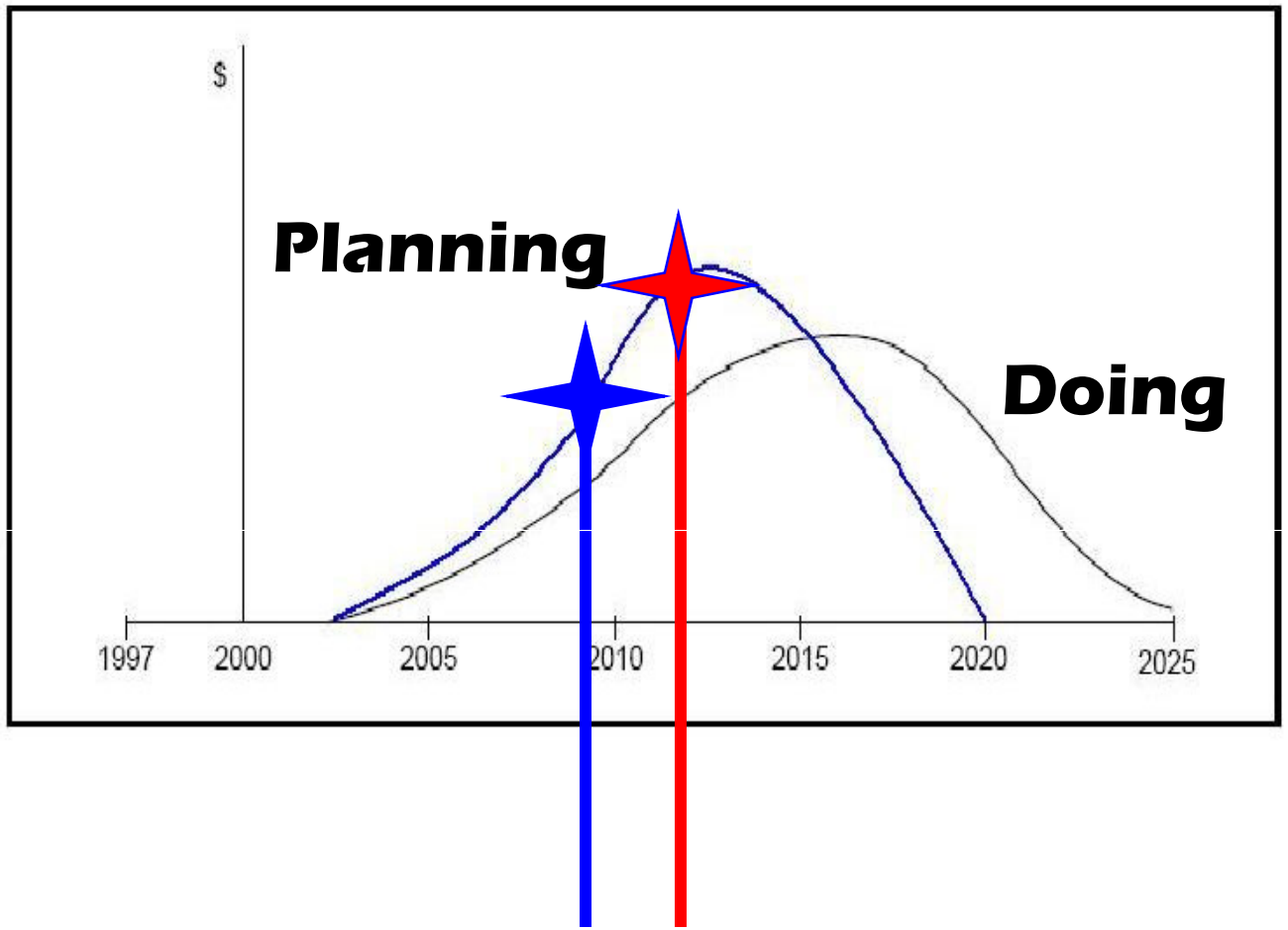
1. How do we do non-repudiation in routers with IPv6?

2. a. How does an agency who is maintaining a native IPv6 at home function for road warriors?
b. How do the laptops sense the network they are on so they know “talk IPv6 here but talk IPv4 in the hotel”?

3. VPN specific Questions:
a. How do we find a VPN solution that works in a mixed environment? Do we have a v4 VPN and a v6 VPN?
b. How does IPSEC work for V6 when it has to tunnel through the public network using v4? Does it go out using a VPN v6 IPSEC tunnel, then hit the public net and get translated to an IPv6 IPSEC tunnel and then go back to an IPv6 IPSEC tunnel at the far end?

4. How will the routers manage the increased address size?

Timing



IPv4 Address Exhaustion

What is the US Government Path Forward?

Federal Government Path Forward

Section 1: Federal IPv6 Transition - Progress to Date

Section 2: Federal IPv6 Transition – The Next Step

Section 3: Leveraging Enterprise Architecture

Section 4: Transition Roadmap and Milestones

Section 5: IPv6 Impact on Federal Initiatives

Section 6: IPv6 in IT Governance and Procurement

Section 7: Acronym Dictionary

Appendix A: Guide to Incorporating IPv6 into IT Infrastructure Segment Architectures

Federal Government Path Forward

Section 3: Leveraging Enterprise Architecture

3.1 Using the IT Infrastructure Segment Architecture

3.1.1 Developing a Service Oriented Infrastructure

3.1.2 Cloud Computing

3.2 EA Driven IPv6 Planning

3.2.1 Using the USG IPv6 Standards Profile

3.3 Developing an IPv6 Transition Strategy Plan

3.4 Integration with Capital Planning

3.5 OMB IPv6 EA Assessment Criteria

Federal Government Path Forward

Section 4: Transition Roadmap and Milestones

4.1 Quick Wins

4.1.1 Establish an IPv6 Test Lab

4.1.2 Web Addressing Change (or Internet Reachable Hosts)

4.2 IPv6 Network Service Deployment

4.2.1 Develop Addressing and Routing Plan

4.2.2 Address Acquisition

4.2.3 Establish Address Management and Allocation Procedures

4.2.4 Domain Name Service (DNS) Assessment

4.2.5 DHCPv6 Assessment

4.2.6 Network Management

4.2.7 Application Development

4.2.8 IPv6 Desktop Access

4.3 Security

4.4 IPv6 Test Program

4.5 Additional Tips

Federal Government Path Forward

Section 5: IPv6 Impact on Federal Initiatives

5.1 TIC (Trusted Internet Computing)

5.2 HSPD-12 (Identity Management)

5.3 IT Infrastructure Line of Business (ITILoB)

5.4 FDCC (Federal Desktop Core Configuration)

5.5 Networx Migration

5.6 DNSSEC

How Do You Manage Change?

Change Model

- Establishing a Greater Sense of Urgency
- Creating a Guiding Coalition
- Developing a Vision and Strategy
- Communicating the Change
- Empowering Others to Act
- Creating Short-Term Wins
- Consolidating Gains and Producing More Changes
- Institutionalizing Changes in the Culture

Source: Adapted from John P. Kotter, "Why Transformation Efforts Fail," Harvard Business Review (March-April 1995): 61.

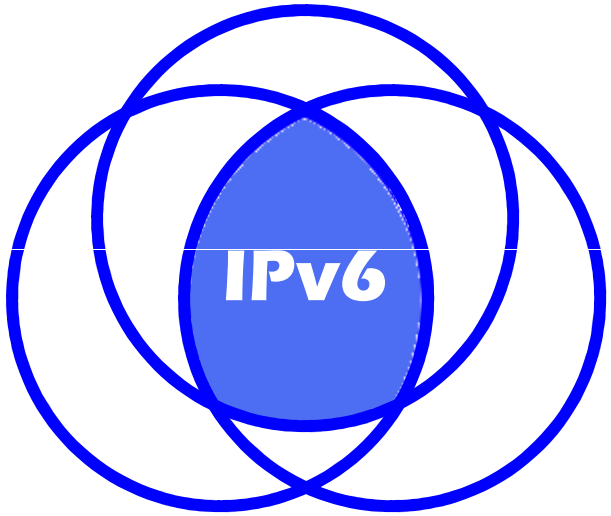
Opportunities To Excel

Value-Based to the Person

Strategically Evolutionary Versus Tactically Revolutionary

Follow The Model

Opportunities To Excel



Questions?

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