USGv6:

A Technical Basis for The Next Generation Internet

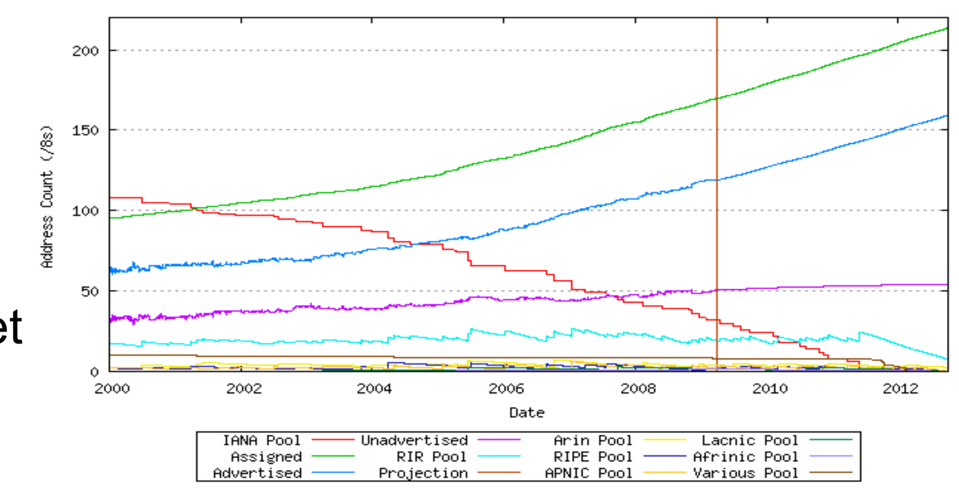
http://www.antd.nist.gov/usgv6/

National Institute of Standards and Technology
U.S. Department of Commerce

INFORMATION TECHNOLOGY LABORATORY

The IPv4 Sky is Falling!..?

- **Are we running out of IPv4 Addresses?**
  - Depends on the meaning of "we" and "out".
  - But in general, YES!.
- **When?**
  - Very speculative "science" but things will get "interesting" in the next 2-3 years.
- **What will happen then?**
  - Use IPv6?
  - Deploy big NATs in the sky?
  - New models of IPv4 address management / ownership?
- **How to Expedite IPv6 Adoption?**
  - Vast installed base of IPv4 & 20+ years experience.
  - Mission critical systems.



http://www.potaroo.net/tools/ipv4/index.html

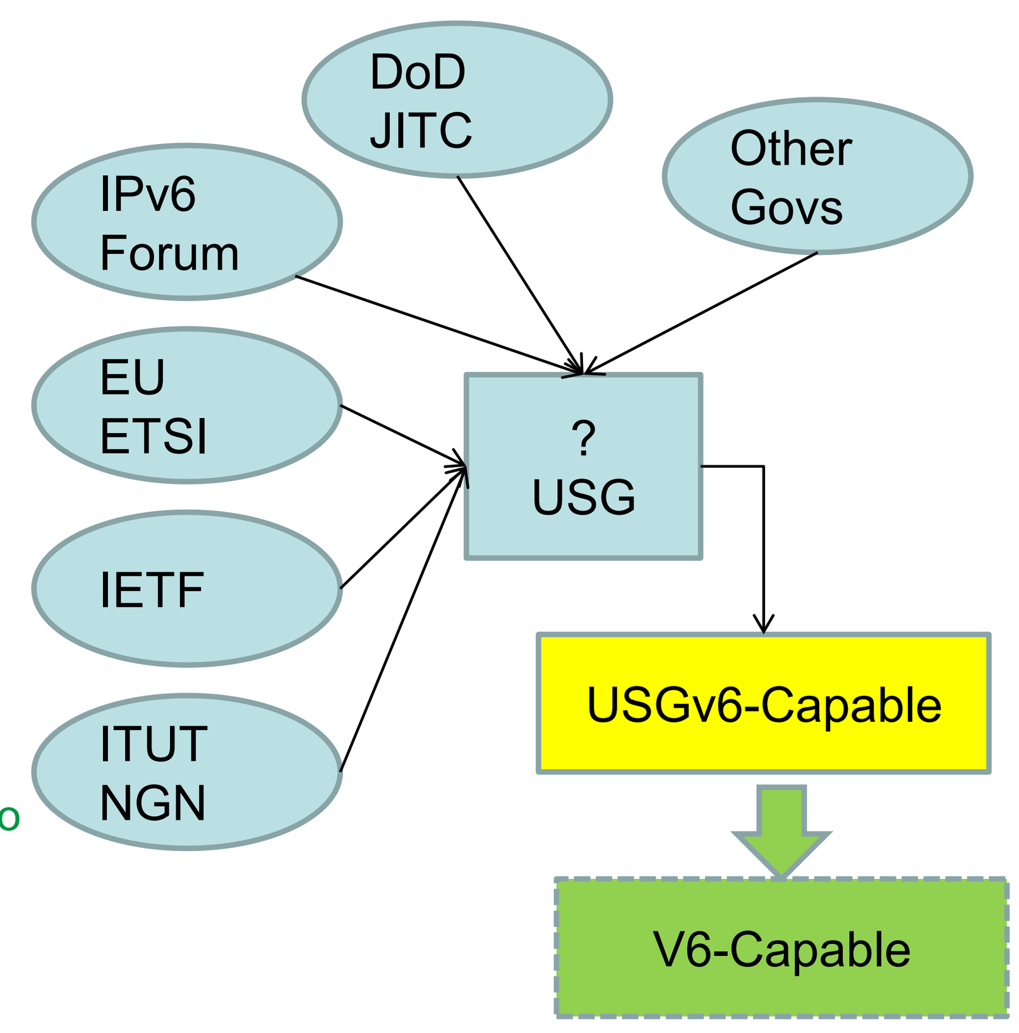
Projected IANA Unallocated Address Pool Exhaustion: 30-May-2011
Projected RIR Unallocated Address Pool Exhaustion: 03-Oct-2012

USGv6 History & Context

- **OMB - Policy M-05-22 & FAQ**
  http://www.whitehouse.gov/omb/memoranda/fy2005/m05-22.pdf
  http://www.whitehouse.gov/omb/egov/documents/IPv6_FAQs.pdf
  - **All Agencies** – Plan for IPv6 adoption. Deploy & use "IPv6 capable/compliant" products in "core" networks by June 2008.
    - Requires agencies to "ensure orderly and secure transition"
    - FAQ: "Agencies should verify …capability through testing …are required to maintain security during and after adoption …"
  - **NIST** – "The National Institute for Standards and Technology (NIST) will develop, as necessary, a standard to address IPv6 compliance for the Federal government."
  - **OMB & GSA** – "Additionally, as necessary, the General Services Administration and the Federal Acquisition Regulation Council will develop a suitable FAR amendment for use by all agencies."
- **NIST Activities**
  - **Surveyed the state of industry**, DoD, and foreign profile / testing efforts.
    - Met with DoD, JITC, IPv6Forum, UNH/IOL, TAHI, ETSI, INRISA, USG IPv6 Working Group, Large users and vendors.
  - **Recommended development of USG IPv6 Profile/Test program**
    - and explicit goal of fostering harmonization across industry/user groups and planning for USG exit as soon as prudent.

Yet Another Profile/Test Program?

- **Goals:**
  - Program to meet USG requirements.
  - Minimize USG centric involvement.
- **Surveyed the State of Industry.**
  - Met with all know players nationally/internationally.
  - Reviewed all profile/test programs.
  - Searching for open/public/international program that could meet USG needs.
- **Result:**
  - Found none that currently could meet goals.
  - Create a new program that others could converge to.
  - Look to transfer profile / test program back to the industry as soon as possible.
  - Retaining only those functions/roles that are inherently governmental.

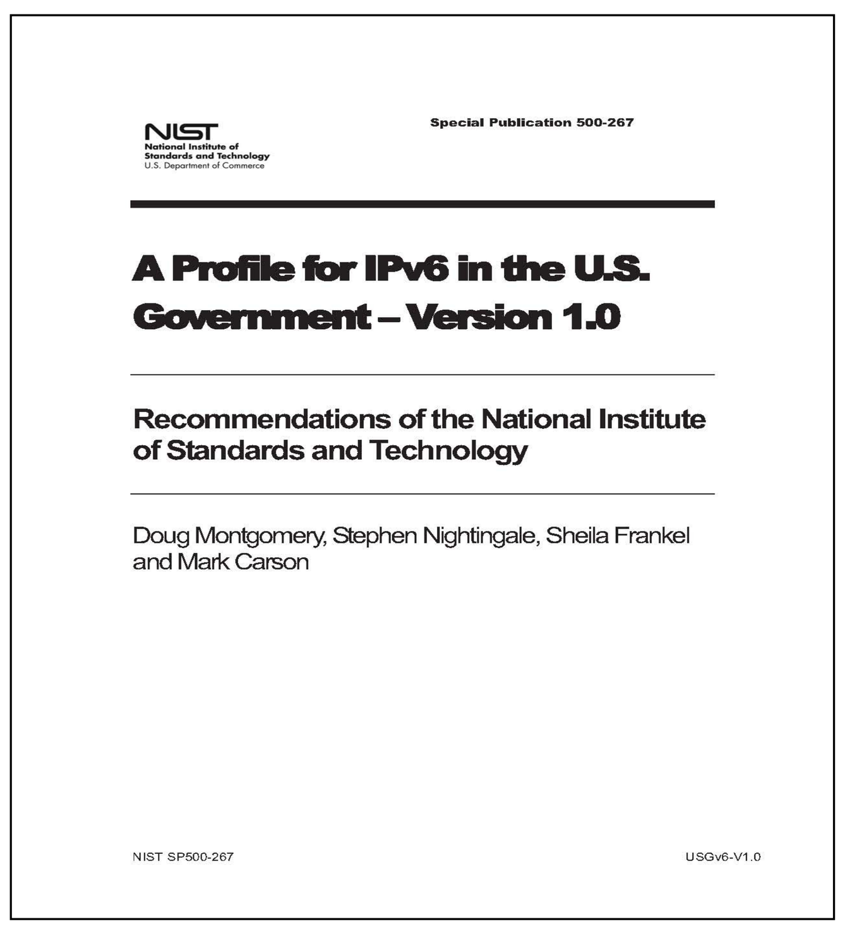


USGv6-V1.0

http://www.antd.nist.gov/usgv6/

USGv6 Profile:

- **Defines what "IPv6" means.**
  - Cites 150+ RFCs to define "low bar" requirements for hosts, routers and network protection devices.
  - Establishes a vocabulary to express procurement requirements between users, policy makers and vendors.
  - Policy free as emitted by NIST, but can provide the basis for other USG policies.
- **USG / User / Vendor Collaboration**
  - Two public comment periods, numerous public/vendor meetings and outreach efforts.
  - Highly coordinated and harmonized with DoD / IPv6 Profiling effort.
- **Outlines Test Program.**



NIST National Institute of Standards and Technology U.S. Department of Commerce

Special Publication 500-267

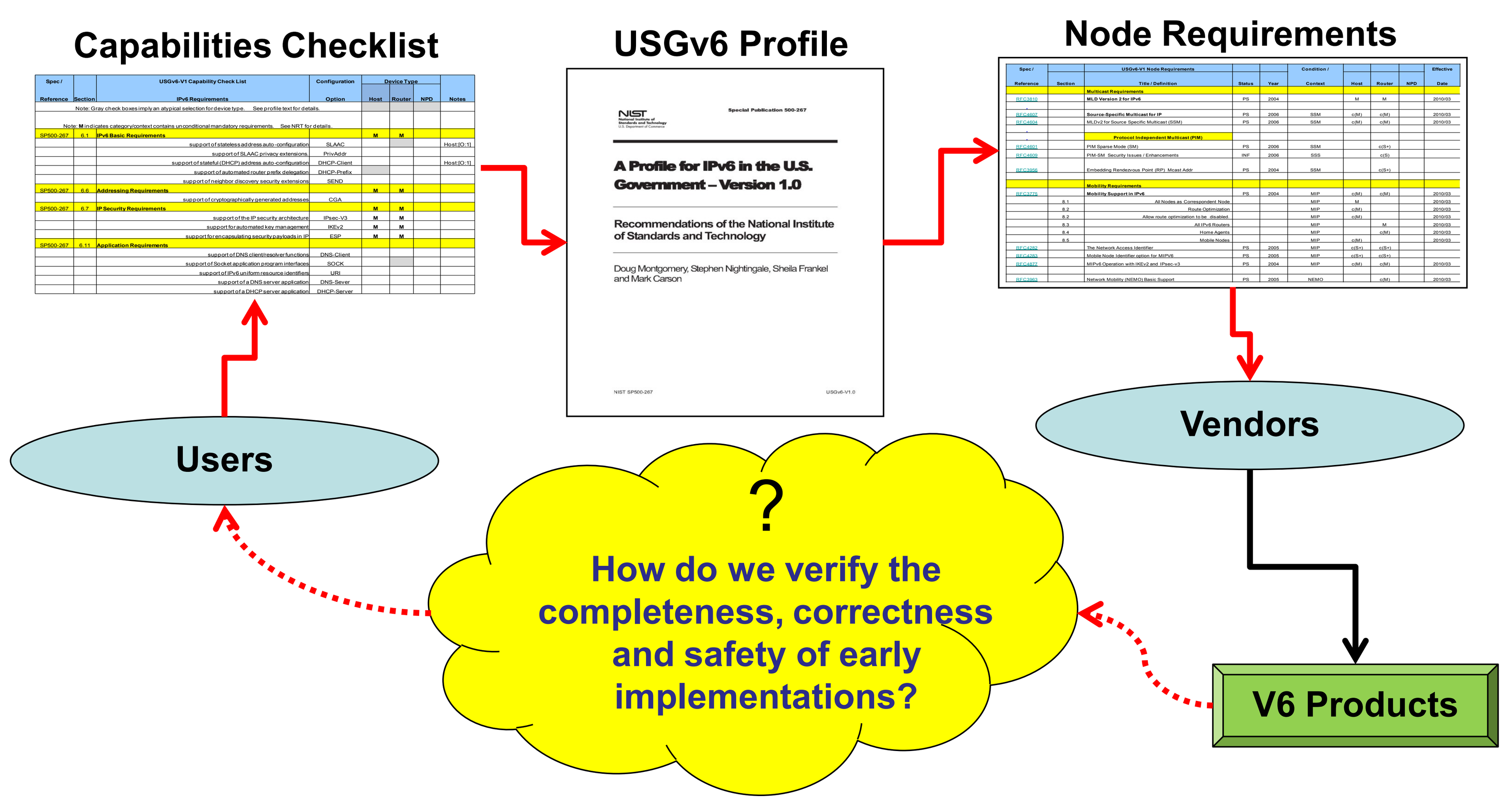
A Profile for IPv6 in the U.S. Government – Version 1.0

Recommendations of the National Institute of Standards and Technology

Doug Montgomery, Stephen Nightingale, Sheila Frankel and Mark Carson

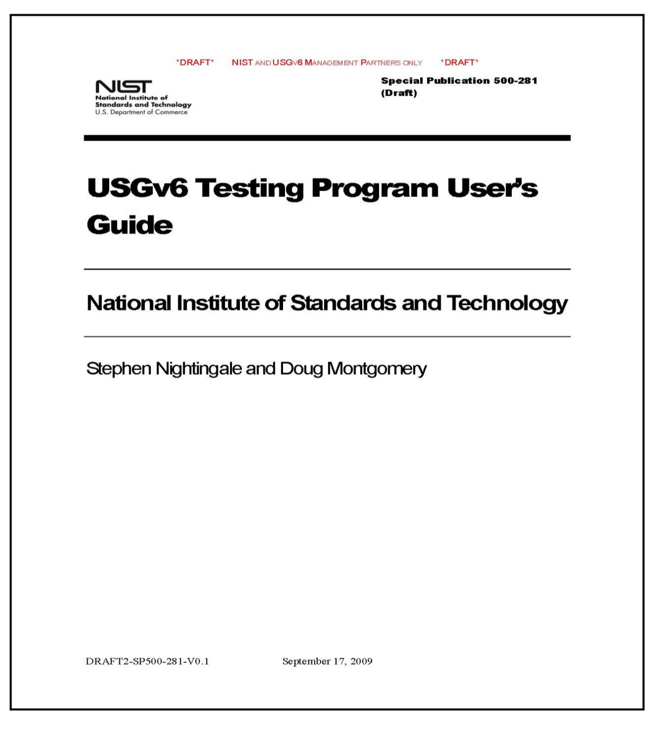
NIST SP500-267 USGv6-V1.0

Protecting Early IPv6 Investments



USGv6 Testing Program

- **Establish a unified testing program:**
  - Conformance, Interoperability, and Functional testing for Hosts, Routers, NPDs
- **Goal: One-stop Worldwide Testing.**
  - Establish program based upon accredited labs, public test specifications and validated test methods.
  - Establish common means of reporting test results.
  - Establish means of tracing vendor's declarations back to accredited test results.
- **Flexible / Open Program:**
  - Support 1st, 2nd, 3rd party conformance testing.
  - Support 2nd, 3rd party interoperability testing and NPD functional testing.
  - Using commercial labs and accreditors.
- **Operational 2010:**
  - Includes Accredited Labs, with tested products



DRAFT NIST AND USGv6 MANAGEMENT PARTNERS ONLY *DRAFT*

NIST National Institute of Standards and Technology U.S. Department of Commerce

Special Publication 500-281 (Draft)

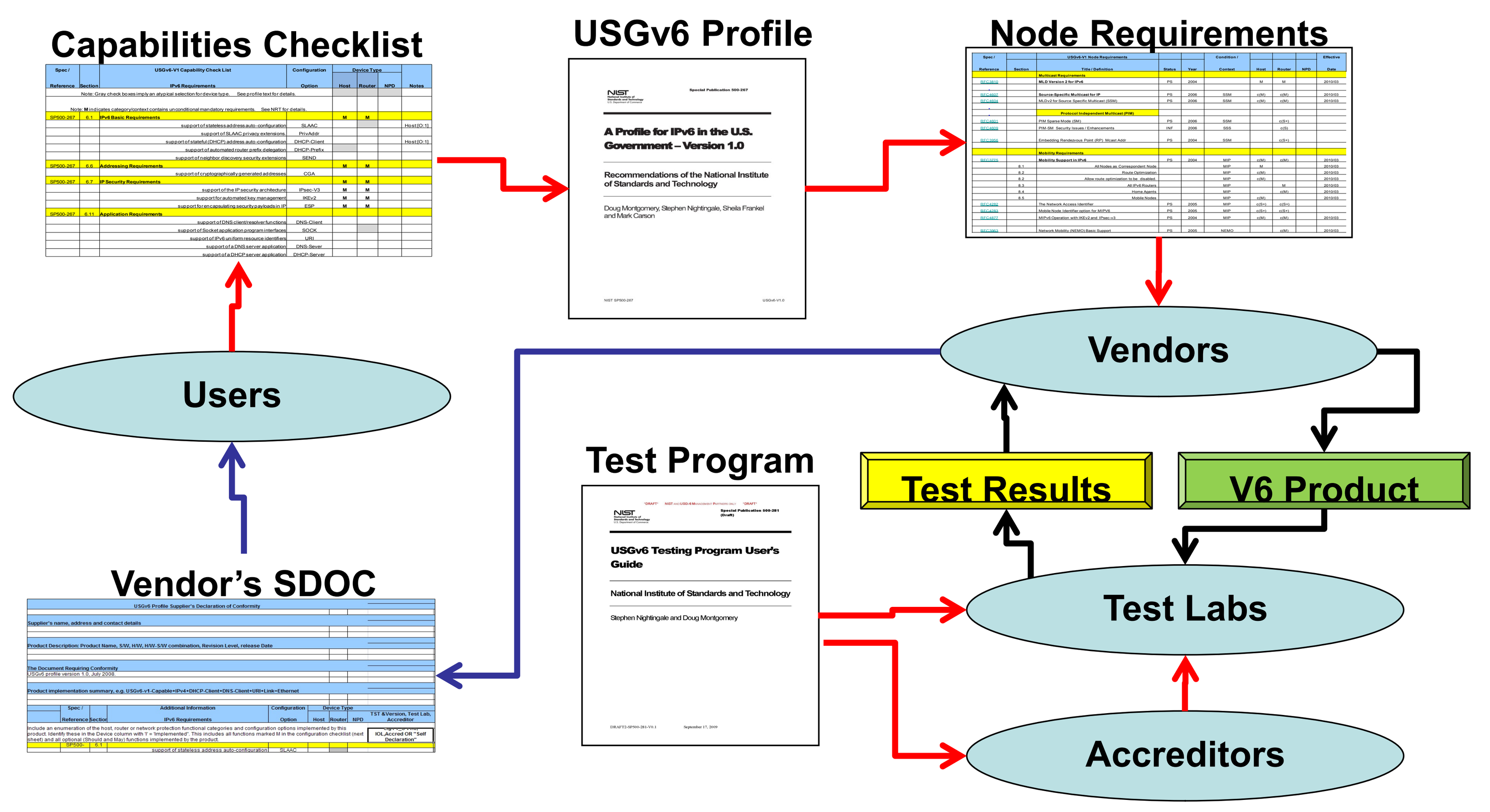
USGv6 Testing Program User's Guide

National Institute of Standards and Technology

Stephen Nightingale and Doug Montgomery

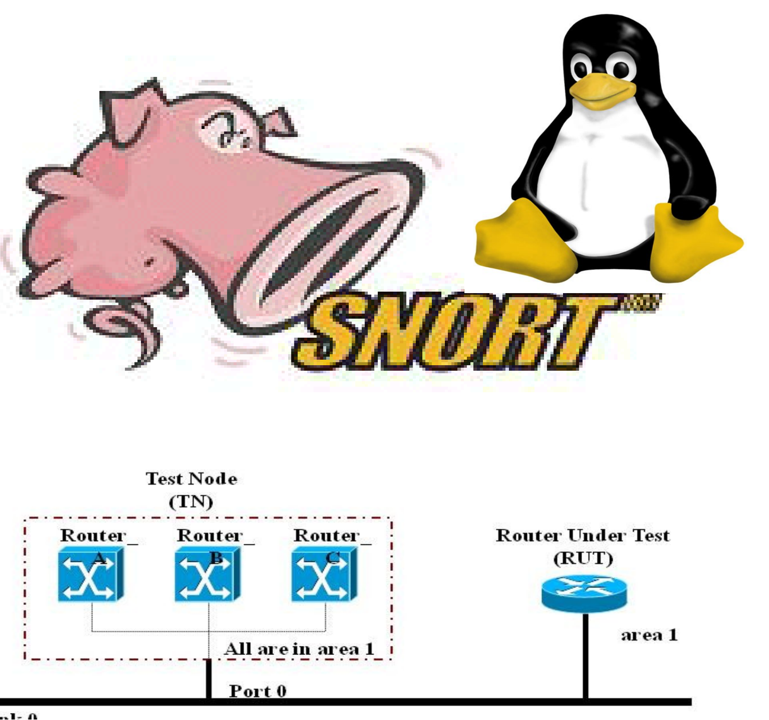
DRAFT2-SP500-281-V0.1 September 17, 2009

Vocabulary for IPv6 Requirements



NIST IPv6 R&D

- **NIST Prototype NDP**
  - Lack of fully functional IPv6 firewalls, IDS / IPS system hinder deployment.
  - Developing open source IPv6Tables/SNORT prototype based upon USGv6/NSA requirements.



- **OSPFv3 Test System**
  - Collaboration with CHT-TL to develop conformance and interop test capability for OSPFv3