



# IPv6, US Government, Private Industry, and You

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Planning and Architecture

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USG IPv6 Summit

XX-June-2023



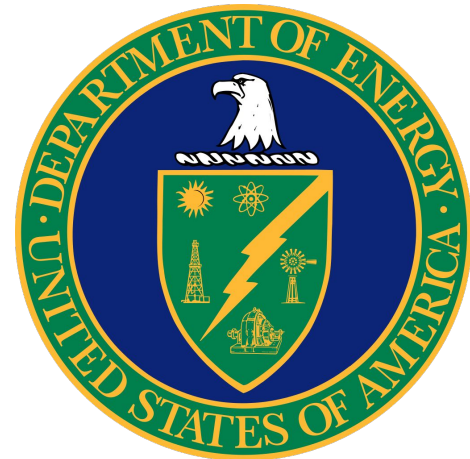
# U.S. Department of Energy, an overview

**The mission of the Energy Department** is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions.

Focus on:

- Energy
- Science and Innovation
- Nuclear safety and Security
- Management and Operational Excellence

(reference: <https://www.energy.gov/mission> )



# U.S. Department of Energy

In the larger context, the DOE works closely with many other USG Agencies, private industry partners, and public institutions

## **Collaborations include**

- Particle Physics, including LHC/CERN
- Climate Science, including IPCC
- Genomics, including biofuels research
- Astronomy and Astrophysics
- Biology, including genetic engineering for medicine production
- Fusion energy research and development
- Materials science
- Fastest Supercomputers in the World
- Quantum computing and quantum networking

The DOE Office of Science is the largest single supporter of basic research in the physical sciences in the United States.

This is **ONE** Agency of the USG.

This does **not** include the services that are consumed by the USG  
Procured services such as:

- Commercial computational resources
- Business applications
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# U.S. Government

## 438 Agencies and Sub-Agencies

*Astoundingly* widely scoped impact.

Non-exhaustively:

- **Any** company with contracts involving the USG
- Vendors wishing to sell to USG
- Contractors supporting USG initiatives
- International collaborations of every kind
- State and Local governments

# Why should you care?

OMB has given clear guidelines on when resources should be IPv6-only

Remember IPX, AppleTalk, DECNet? It sure was nice to not have to support a bag of routed protocols on a given segment.

One goal of [OMB-M-21-07](#) (IPv6-only initiative) is to simplify support, and reduce risk profile.

Agencies will need to retain legacy IP resources to support any partner not utilizing IPv6. This is counter to the memo, requires support resources, and forces what will be a bespoke network model (dual-stack).

# Let's read the text ... what's in M-21-07

(4.) Develop an IPv6 implementation plan by the end of FY 2021 [...] include the following milestones and actions:

- a. At least 20% of IP-enabled assets on Federal networks are operating in IPv6-only environments by the end of FY 2023;<sup>13</sup>
- b. At least 50% of IP-enabled assets ... by end of FY 2024;
- c. At least 80% of P-enabled assets... by the end of FY 2025; and
- d. Identify and justify Federal information systems that cannot be converted to use IPv6 and provide a schedule for replacing or retiring these systems;

(2.) Issue and make available on the agency's publicly accessible website, an agency-wide IPv6 policy, within 180 days of issuance of this memorandum. The agency-wide IPv6 policy must require that, **no later than Fiscal Year (FY) 2023, all new networked Federal information systems are IPv6-enabled at the time of deployment,** and state the agency's strategic intent to phase out the use of IPv4 for all systems;

# Let's read the text ... NISTv6-r1 application capability

The Application and Service capabilities group consists of a framework to define the IPv6 capabilities of a broad range of general applications. User defined capabilities allow the specification of application specific functions and protocols that may not have consensus standard specifications.

[...]

The practical implications of the above guidance will vary with applications and specific implementation. The following lists some of the common issues that will require code modifications to support IPv6 at the application level.

[...]

Users of this profile may supply any additional requirements that must be met by specific applications.



# Let's read the text ... NISTv6-r1 IPv6 only capability

There is no standard definition of what it means for products to capable operating in “IPv6-only” networks

[...]

A product claiming support of the IPv6-Only capability must be fully functional when deployed in an IPv6-only network and provide no less functionality than is currently available in IPv4 environments.

[...]

The product must support full product lifecycle functions (defined below) in an IPv6-only context.

[...]

If the product displays IP addresses, then IPv6 addresses must be displayed according to RFC5952.

[...]

It is expected that the definition of the IPv6-Only capability may evolve over time.

“But they can still have 20% of devices on Legacy IP!”

Right. But his is *per agency*.  
This is a very, very small number of resources, many of which will be used to support legacy devices until they are EOL.

