and IPv6

Andrew Johnson, ASD/Controls
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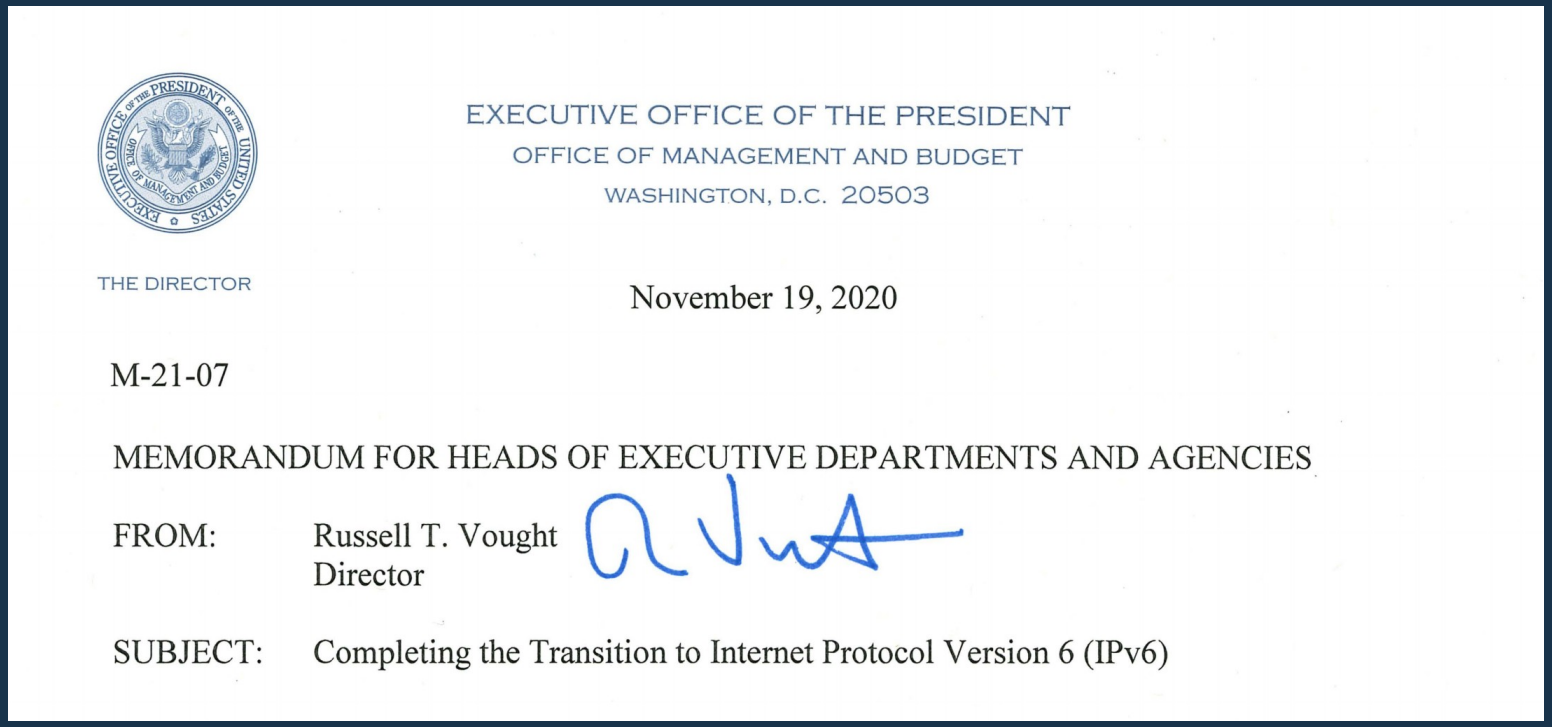

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

THE DIRECTOR

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MEMORANDUM FOR HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Russell T. Vought
Director

SUBJECT: Completing the Transition to Internet Protocol Version 6 (IPv6)

Applies to US Department of Energy Lab's

EPICS

EPICS

DOE is expected to transition its networks to IPv6

Preparing for an IPv6-only Infrastructure

… no later than FY 2023, all new networked Federal information systems must be IPv6-enabled at the time of deployment, …

a. At least 20% of IP-enabled assets on Federal networks are operating in IPv6-only environments by the end of FY 2023;
b. At least 50% of IP-enabled assets on Federal networks are operating in IPv6-only environments by the end of FY 2024;
c. At least 80% ofIP-enabled assets on Federal networks are operating in IPv6-only environments 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

EPICS Networking

How much does EPICS rely on IPv4?

EPICS Base was designed for IPv4

- Most C/C++ code uses libCom networking APIs for OS portability
  - They only handle IPv4 addresses and create sockets on IPv4 networks
- CA sends search and beacon messages as UDP/IPv4 broadcasts
  - The CA protocol includes raw IPv4 addresses in its messages
  - A CA server's identity is its TCP/IPv4 address and port number
- PVA protocol messages allow for IPv6 addresses
  - But the implementation only supports IPv4 sockets (libCom APIs)
- The IOC's logClient code can only forward messages to IPv4 servers
- Asyn can only connect to IPv4 devices
  - The VXI-11 protocol (networked GPIB) is IPv4-only

Is EPICS Doomed then?

No, but we have work to do!

How much work?

- Network protocol design changes for both CA & PVA
- LibCom networking API changes suitable for all target OS's
  - Socket and Interface APIs, IP address parsing & printing, DNS engine
- CA client library (libCa)
- CA server library (rsrv)
- PVA client and server (pvAccess & PVXS)
- IOC Log client
- Asyn Driver
- Wireshark plugin cashark
- PCAS & CA Gateway
- Java CA library (caj/jca)
- Java CA Server (jcas)
- Java PVA (org.epics.pva)

There are other implementations too: CaProto, EpicsSharp, …

Who Needs EPICS on IPv6?

In addition to the US DOE Laboratories

Talk to EPICS Council

Council will be developing a plan

- Let them know your site's position/needs for IPv6 support
  - Will you need CA support on IPv6 (for older clients that can't use PVA)?
  - Would a build-time switch (IPv4 or IPv6 but not both) work for CA?

- Council coordinate EPICS development resources; looking for
  - Developers with IPv6 experience (C/C++, Java, ...)
  - $$$ to pay for development
  - Expect to need help with testing (different routers etc.)

- Comments from maintainers of other CA implementations?

Questions: Q&A for this session
Discussion: Meeting/session chat