INTERNET PROTOCOL VERSION 6

Federal Government in Early Stages of Transition and Key Challenges Remain

Why GAO Did This Study

The Internet protocol (IP) provides the addressing mechanism that defines how and where information such as text, voice, music, and video move across interconnected networks. IP version 4 (IPv4), which is widely used today, may not be able to accommodate the increasing number of global users and devices that are connecting to the Internet. As a result, Internet version 6 (IPv6) was developed to increase the amount of available address space. In August 2005, the Office of Management and Budget (OMB) issued a memorandum specifying activities and time frames for federal agencies to transition to IPv6. GAO was asked to determine (1) the status of federal agencies' efforts to transition to IPv6; (2) what emerging applications are being planned or implemented that take advantage of IPv6 features; and (3) key challenges industry and government agencies face as they transition to the new protocol.

What GAO Recommends

GAO recommends that federal agencies work through two of the groups that play key roles in transitioning the federal government to IPv6 to address key challenges they face as they proceed with the transition. In oral comments on a draft of this report, OMB generally agreed with the results and described actions being taken to address GAO's recommendation.

www.gao.gov/cgi-bin/getrpt?GAO-06-675.

To view the full product, including the scope and methodology, click on the link above. For more information, contact David A. Powner at (202) 512-9286 or pownerd@gao.gov or Keith A. Rhodes at (202) 512-6412 or rhodesk@gao.gov.
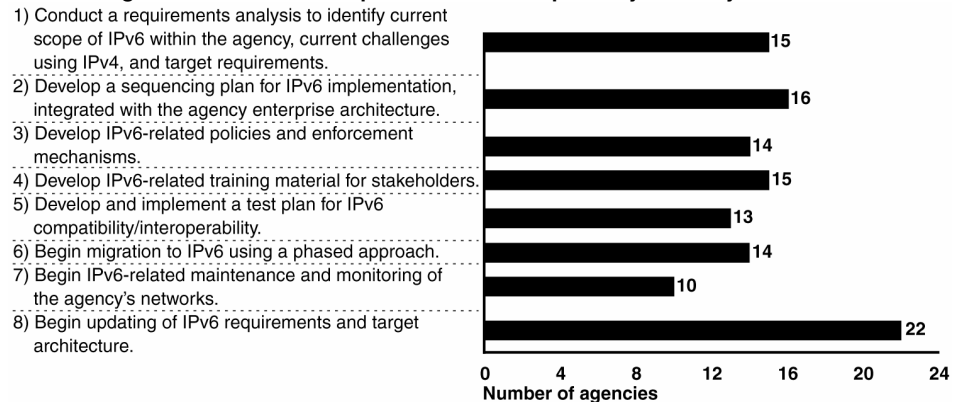
What GAO Found

Federal agencies have taken steps in planning for the transition to IPv6, but several have not completed key activities. For example, almost all of the 24 major agencies have assigned an official to lead and coordinate the IPv6 transition. However, ten agencies had not developed IPv6-related policies and enforcement mechanisms. (See figure for the status as of April 2006 of agencies' efforts in meeting OMB required activities.) Until agencies complete key activities, their transition planning efforts risk not being successful. To help address this risk, agencies are required to report their progress in completing key planning activities to OMB.

Status of Agencies' Efforts to Complete Activities Required by February 2006

Activity	Number of agencies
1) Conduct a requirements analysis to identify current scope of IPv6 within the agency, current challenges using IPv4, and target requirements.	15
2) Develop a sequencing plan for IPv6 implementation, integrated with the agency enterprise architecture.	16
3) Develop IPv6-related policies and enforcement mechanisms.	14
4) Develop IPv6-related training material for stakeholders.	15
5) Develop and implement a test plan for IPv6 compatibility/interoperability.	13
6) Begin migration to IPv6 using a phased approach.	14
7) Begin IPv6-related maintenance and monitoring of the agency's networks.	10
8) Begin updating of IPv6 requirements and target architecture.	22

Source: GAO analysis of agency data.

Applications that take advantage of IPv6 features are being planned or implemented both within and outside of the federal government, including applications to support emergency response, enhance warfighting capabilities, and facilitate continuity of operations planning. However, these applications are few, in large part because organizations are still in the early stages of the transition or because they lack incentives to use the new protocol.

Transitioning to IPv6 presents several challenges. Significant challenges include managing information security in an environment that is more vulnerable to threats; incorporating IPv6 features into applications' business cases to identify new and better ways of meeting mission goals; and interfacing with partners that may be in various stages of the transition. Other challenges include maintaining dual IPv4 and IPv6 environments for an extended period of time and implementing standards required by the use of the new protocol. All of these challenges could impede progress if they are not addressed by agencies as they proceed with the transition.