



# Policy Statement

## Deploying the next generation Internet:

## ICC statement on the introduction of IPv6

*Prepared by the Commission on E-Business, IT and Telecoms*

### Introduction

ICC is uniquely positioned to encourage business and governments around the world to promote the benefits of a smooth transition from IPv4 to IPv6. Representing Internet users and service providers globally, ICC endorses the progressive introduction by business of IPv6 and advocates for increased awareness among business and governments on the benefits of IPv6.

IPv6 is the acronym for Internet Protocol version 6. IPv6 is the 'next generation' Internet Protocol designed by the Internet Engineering Task Force ([www.ietf.org](http://www.ietf.org)) to coexist with and ultimately replace the current version Internet Protocol, IP version 4 ("IPv4"). Internet Protocol (IP) is a set of technical rules governing how information travels around and can be found on the Internet. IP lets different computers communicate with each other over the communications networks that comprise the Internet.

Every network interface on the Internet has a unique IP number. These numbers are called IP addresses and they can be typed directly into a browser or linked to a named web address such as [www.yourcompany.com](http://www.yourcompany.com)

### IPv4

Today, the Internet relies mostly on IPv4, the version of the Internet Protocol that was specified nearly twenty years ago. IPv4 is still robust, but it supports a relatively limited number of IP numbers. Several factors are driving increased demand for IP numbers:

- The number of Internet users increases significantly each year, creating more and more demand for IP addresses. While IPv4 allows for four billion computers on the whole network, IPv6 allows for upwards of 35 trillion interconnected networks.<sup>1</sup> As developing countries work towards bridging the digital divide and increasing their access and connectivity to the Internet, the demand for IP addresses will continue to grow.

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<sup>1</sup> Source: 'IBM Vision for IPv6 in the era of e-business on demand', July 2003

- Future Internet application developments such as wireless communications, mobile computing and next generation telephony will further increase demand for IP addresses.
- The increasing popularity of mobile devices such as mobile phones, portable devices and laptops will also greatly drive demand for IP addresses. Cars and household appliances may also be assigned IP numbers as they too become communications devices.

The availability of IP addresses using IPv4 has been increased through the deployment of dynamic address translation. Furthermore, the integration of IPv6 and the coexistence of IPv6 and IPv4 will be facilitated since new technologies and applications using IPv6 may actually “free-up” some IPv4 addresses as earlier technologies and applications are replaced. The transition from an IPv4-only environment, which began a number of years ago, may continue for an undetermined period of time.

## The benefits of IPv6

The new version of the Internet Protocol, IPv6, will enable new capabilities beyond IPv4, including providing greatly increased availability of IP addresses.

The benefits of IPv6 include:

- The number of IP addresses available with IPv6 is enormous -  $3.4 \times 10^{38}$  (i.e. 10 to the power of 38) – and will not be exhausted in the foreseeable future
- IPv6 improves the efficiency of the Internet. Simplified packet header information allows for more straightforward and efficient routing of Internet packets. Shorter routing tables are possible because most Internet service providers can receive address space in adjacent blocks, offering greater convenience to their clients and also allowing for a more efficient structure in the Internet’s core routing tables.
- IPv6 creates opportunities for new types of services that prioritize Internet traffic flows. It is ‘auto-configurable’, meaning devices like laptops, PDAs and mobile phones can be given their own unique IP addresses easily and without delay. This will simplify the installation and maintenance of home, vehicle and small office networks.
- IPv6 improves security by facilitating network-level security. It has security services at the IP-layer as a ‘native’ feature (i.e. IPSec includes the following capabilities: data origin authentication, rejection of replayed packets, and encryption). Also, allowing each communications device to have its own unique IP number facilitates ‘end-to-end security’, meaning that an entire communication session can be conducted securely rather than just the parts that use a virtual private network.
- IPv6 provides the basis for continued technical innovation in communications technologies.

## Challenges in IPv6 deployment

As with the upgrade of any network, computer or related technology, deploying IPv6 generates costs, interoperability and resource issues for Internet stakeholders.

- Network routing and related Internet architecture equipment will need to be upgraded or modified to accommodate IPv6 128 bit addressing (as compared to 32 bit for IPv4).
- Although the number of IPv6-enabled Internet applications is constantly increasing, not all applications are presently engineered to work in an IPv6 environment.
- Having both protocols coexist in Internet architecture as IPv6 continues to be deployed generates integration and interoperability costs and challenges.

These issues may require Internet stakeholders to prioritize and concentrate their continued IPv6 implementation where it is most needed and will have the greatest benefit.

## The path forward

It is in the interests of all Internet users that the Internet continue to evolve and thrive. IPv6 is an important step in this regard.

The integration of IPv6 does not have a hard deadline like, for example, the system changes for Y2K did. IPv6 will coexist with IPv4 for a number of years. However, it is still essential that IPv6 deployment be prioritized to ensure that it occurs and that interworking of IPv6 and IPv4 be accommodated.

Governments should not mandate IPv6 transition. Rather, this transition will occur in gradual stages that allow consumers, business and governments to adopt IPv6. Businesses and governments each have an important role to play in ensuring a smooth and timely evolution with IPv6.

## Recommended business actions

In order to continue forward progress in the transition to IPv6, minimize deployment costs, and enable innovative new applications to be developed, it is essential that business and governments understand the benefits and challenges of IPv6. First priorities should include analysis, testing and planning initiatives to ensure the interoperability of IPv4 and IPv6 during a period of smooth coexistence and transition.

- Business should take advantage of scheduled equipment and software upgrades and develop a timeline, programme and procedures to upgrade Internet servers and relevant devices to IPv6, recognizing that the upgrade will require costs and impose burdens. This demonstration of leadership by business will encourage other Internet stakeholders and underline the value IPv6 brings to the Internet.

- Business must recognize that the security and stability of the existing network is an essential requirement in the transition period when IPv4 and IPv6 will coexist.
- Business should continue its efforts to improve government and consumer awareness of the importance and benefits of IPv6, for example, through initiatives such as the IPv6 Forum (<http://www.ipv6forum.org/>), a consortium of vendors, which organizes information events around the world to increase awareness and promote the adoption of IPv6.
- Business should continue to provide expert input into the technical coordination bodies responsible for developing and overseeing IP and its related protocols, particularly the Internet Engineering Task Force (IETF). This input will help ensure that as new technologies develop, they are compatible with and take advantage of IPv6.

## Recommended government actions

Private sector leadership in the technical coordination of the Internet has been responsible for its continued and successful global development. Governments are encouraged to take action to support IPv6 deployment, recognizing that market forces, not government intervention, should be the main driving force for deploying IPv6.

Imposing government-mandated standards or timelines would be an unhelpful approach since this might inhibit targeted deployment efforts or result in inefficient use of limited resources. Government initiatives supporting industry efforts to overcome implementation challenges and increase awareness and prioritization of IPv6 are likely to be more productive and in accordance with the principle of technological neutrality.

- Governments should work to increase awareness of IPv6 and its benefits.
- Governments should support the integration of IPv6 and the coexistence of IPv4 and IPv6 to address user needs, including planning initiatives.
- Governments should avoid mandated standards or legal requirements, and ensure that their policies on IPv6 implementation do not impose deadlines.
- Governments should continue to promote technology neutrality and choice, allowing Internet stakeholders to use new and existing technologies and applications of their choice.
- Governments should support relevant research and development to ensure a smooth and effective integration of IPv6 and associated technologies.

## Conclusion

The deployment of IPv6 requires a significant planning and awareness-raising effort by business and governments in the medium term. The benefits of the introduction of IPv6 will accrue to all Internet users well into the future. ICC encourages business and governments to maximize and coordinate their efforts so that all Internet users will benefit from the increased efficiency and opportunities IPv6 offers.

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