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Subject: IPv6 Deployment in the USA

1) Benefits and possible uses

A major benefit of IPv6 deployment is to release the IP networking industry from the constraints of an artificial shortage of addresses. The end result of this artificial shortage has been an overstrong interventionist role for ARIN (American Registry for Internet Numbers). This has constrained the ways in which businesses can deploy and use IP networking technology which, in turn, stifles the market for creative new communications services. IPv6 is not a magic bullet but it does unleash the possibility of creative uses for networks that would require large numbers of addressable endpoints such as portable communications devices (21st century cellphones) and intelligent households. Imagine a world in which your baby monitor can page you during an evening concert when the decibel level passes a certain threshold. This would require both baby monitor and cellphone/pager to have unique addresses that can communicate over the Internet. Similar scenarios might involve a security service which monitors fire sensors in commercial buildings in order to develop a sophisticated profile of what constitutes "normal" operations so that management can be alerted when abnormal situations occur and intervene before employee mistakes result in property damage events.

2) Current conditions regarding deployment of IPv6

Dividing the world into three regions, Asia-Pacific, Europe and North America, it is fair to say that IPv6 deployment is most advanced in Asia-Pacific. Europe is perhaps a year behind them and North-America is two to three years behind Europe. This is not a good situation to be in considering that the two major manufacturers of IP networking equipment (Cisco and Juniper) are both American companies. It creates a vacuum into which Asian companies could expand enabling them to eventually dominate Internet routing and switching services. Because of the push into IPv6 by the populous Asian countries, the pressure on IPv4 addresses has greatly diminished and the projected exhaustion point has moved from 2006 to approximately 2025. There is a danger that American companies will interpret this as an excuse for not planning their IPv6 strategy and when market demand for IPv6 does materialize, offshore operators such as NTT will be in

a stronger position to meet that demand than U.S. companies. The main role for the NTIA in regard to IPv6 deployment should be to ensure that all American companies have incorporated IPv6 into their strategic plans and roadmaps and begun the process of familiarization with IPv6. This would mitigate many risks by ensuring that American companies could deploy quickly when IPv6 market conditions mandate action.

3) Economic, technical and other barriers

There are no serious economic or technical barriers. It is true that some money would need to be spent to upgrade software such as operating system versions or routing software, but such upgrades are already a normal business expense and simply a matter of time. On the technical side, it is true that some IPv6 software is not as fully optimized as the IPv4 equivalent but this is mitigated to some extent by more powerful hardware in both computers and routers. Again, a prudent shift into IPv6 through phased deployment is both economically and technically possible today. The major barrier to implementation is psychological. Both technologists and managers are too comfortable with the status quo and are not willing to put the required effort into continued learning and knowledge aquisition. This is not something that can be easily changed by government because it is an inherent characteristic of the larger organizations which now dominate the Internet. ISPs have merged with telcos, router and switch manufacturers have consolidated, and even large enterprise users of networked communications have experienced a lot of consolidation. The role of government should be to focus on supporting the innovative small firms who fill the same position in the network ecology that ISPs filled in the 1994-1996 timeframe when the Internet grew 1500% per year. In particular, continuing technology trends have sparked new markets involving so-called embedded devices in which the computer is merely a means toward and end, not the be all and end all of the device. Consider some of the latest cellphones with integrated pagers, digital cameras and gameplaying. Or the home Internet gateway routers that are more powerful than an Internet backbone router from Cisco in 1994. It is quite possible to evolve an IPv4 network into IPv6 incrementally beginning with a small number of IPv6 customer services at the edge. The V6OPS working group of the IETF is currently working on a draft RFC that explains how the various transition scenarios can be achieved and this document should be included in the NTIA review.

4) Appropriate role for government

The government should collect and disseminate information on IPv6. Government is the collective represntation of a society and in this respect, the government should ensure that society is aware of what IPv6 is, what IPv6 could do for us, and that IPv6 is available today for those entrepreneurs and early adopters who will invest some effort. Government can illuminate the road ahead and government can ask questions of business leaders and of various domestic non-governmental organizations. Government should help to create a domestic IPv6 market by funding appropriate research projects, supporting educational institutions in offering IPv6 learning programs and by demanding that all vendors of software and hardware bidding on government contracts have a clearly delineated roadmap to IPv6 that is published on their websites. It is not yet appropriate for government to require the use of IPv6 where the technology does not provide clear benefits, but it is appropriate to demand that vendors give some thought to future plans and communicate those plans to the public and to the government.

Thank you

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