

## IPv4 – Ipv6: Who Should Know

Thank you for inviting me to offer a few remarks about Internet addressing and IPv6. There is so much that can be said and has been said about IPv6, and then I thought of the question from the Monty Python classic “Life of Brian.”

[PAUSE]

What have the Romans done for us?

In the movie, Reg poses that question to a group of revolutionaries, trying to stir up their anger and hatred of the Romans by recalling the worst of their bloodshed and violence. But he is thwarted when the revolutionaries only remember the good things.

“Aqueducts.” “Sanitation.” “The roads.”

The bottom line: even with all their faults, the Romans had a lot of positives on their balance sheet. They made massive improvements to public health through the delivery of clean drinking water and the removal of waste water. The first Roman aqueduct, bringing water for drinking, fountains, bathing and sewage removal was built in 312BC.

In the years since, we’ve developed complex infrastructures that keep our cities healthy and productive. Water management systems that treat, store and deliver water to our homes. An electrical power network. Sewage collection

and disposal of waste water. Telephone and mobile phone networks. Roads, highways, railways and airports. All these important networks form the backbone of developed nations. Those of us lucky enough to live in developed regions of the world rely upon these networks and rarely give them a second thought. Everyone in this room should be able to have clean water available for drinking, cooking, washing and cleaning without much fuss. We turn on the tap, and water comes out. We flip a switch, and the lights come on.

Today, the Internet has become like water and electricity - an essential part of our infrastructure – the communications infrastructure. And one that has already brought massive improvements and economic development to the lives of over a billion people living in developed countries.

The nature of good infrastructure is that it becomes invisible to its users. How many of us think about the sewer system on a regular basis? For example, do you know if you have a six-inch pipe or a 12-inch pipe taking wastewater out of your home? Do you even need to know?

The technical aspects of the Internet have the same invisibility to most end-users. How many people, outside of those in this room, would notice if an IP address space is 32-bit versus 128-bit?

As technical experts, it is among our responsibilities to improve understanding of technology without overwhelming

the community with an encyclopedia of details about IP addresses.

The most important message we can deliver to end-users about IPv6 is that it expands capacity in a vital way.

In California, where I live, water supplies are scarce. The state is also prone to regular cycles of drought. Because of this, we have massive reservoirs where we store water during years of plentiful rain for use during dry years. And we also practice water conservation as a way of life.

So just as Californians conserve water, we, the technical community, have been conserving IPv4 addresses to await the abundance of IPv6. After years of rapid Internet expansion, that supply of four billion IPv4 addresses was fully allocated – exhausted - in February 2011.

The good news is that the days of scarcity are over. It's like we found a vast supply of water. IPv6 is plentiful, with 18, million, billion addresses in every subnet and more subnets than you can imagine. There is no shortage of addresses in IPv6. It is available and plentiful and everyone can get connected to one common network. Innovation and expansion and economic development can continue.

The importance of continuing to be able to grow the existing network infrastructure should be underscored. One integrated network system is more stable and secure and offers the opportunity to participate globally in economic

developments based on Internet technology. It offers opportunities to late adopters and developing regions. Without the ability to support growth, innovation and possible development opportunities will be limited to those early adopters.

So, our goal with IPv6 is to see it implemented quickly and everywhere. We also need to make sure that it is implemented without the users noticing that the foundation their network experience is built upon has changed - from the version used in the lab experiment that got out of control to the “release version.”

The Internet is an essential part of the communications infrastructure and touches everything in our lives today. We must do our part to keep it stable, secure and useable. If we do our jobs right, the transition will be seamless and, to most people, invisible.

So later, if someone asks, “What have the Geeks done for us?”, the answer will be simply, “The Internet, of course.”