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Colleges could profit as internet runs out of addresses

Skyrocketing number of web-enabled devices will force a shift to new protocol, known as IPv6

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Technology experts have been preparing for the depletion of IPv4 addresses since the 1990s.

The internet is running out of numerical addresses – known as IP addresses – and that might not be so bad for colleges and universities prepared for the transition to the next web protocol, as campuses could sell their current IP addresses and help fill budget shortfalls prevalent in higher education.

The spread of internet use in Asia and the proliferation of internet-connected phones worldwide are causing the internet to run out of numerical addresses, which act as “phone numbers” to ensure that surfers reach websites and eMails find their destination.

The top-level authority that governs such addresses will distribute the last batches on Feb. 3, two people with knowledge of the situation told The Associated Press.

Campus technologists and internet policy experts said the switch from the current IPv4 to the next generation of IP addresses – IPv6 – has been closely tracked since the mid-1990s.

Higher education has been “earlier on the IPv6 adoptions curve” than many in the business world, said Ed Horley, co-chair of the California IPv6 Task Force [2], which has raised awareness of the transition from the depleting number of IPv4 addresses and offered strategies for switching to IPv6.

Moving away from IPv4 to IPv6 could become profitable for colleges and universities that have had to trim operation budgets in recent years, he said.

“Some may even capitalize on the IPv4 depletion problem and sell portions of their existing IPv4 address space they aren’t using to help with revenue shortfalls,” Horley said.

Many colleges are prepared for the switch, he said, although most campuses that have already enabled IPv6 for student use are in Canada, Asia, and Europe.

Tim Chown, a computer science professor at Southampton University in the U.K., is among a group of researchers that have tracked IPv6 developments for about 15 years, according to the university [3].

Chown, who helped launch the university's first IPv6-run device in 1997, has advocated "dual stacking," or running IPv6 alongside IPv4 while institutions are making the shift.

Because IPv4 and IPv6 aren't compatible, Horley said campuses that don't use dual stacking – attempting an immediate change to the newer protocol — might run into technical problems during the transition.

"I do not believe this will impact student learning if the university and college IT departments get the deployments done correctly," he said. "The good news is that getting IPv6 address space should be easy and affordable, and depending on their peering providers, something they can start working with immediately."

Transitioning from IPv4 to IPv6 doesn't mean consumers will suddenly find websites unreachable, though. And if everything goes according to plan, web users won't even notice.

"It will just be 'business as usual' if everyone gets their job done," said John Curran, CEO of the American Registry for Internet Numbers, or ARIN, one of five regional groups that dole out such addresses.

ARIN covers the U.S., Canada and the Caribbean.

The Internet Assigned Numbers Authority, the top-level administrator of the system, has called a press conference in Miami on Feb. 3. One person said its last five "blocks" of internet protocol, or IP, addresses will be distributed then.

These blocks, each with 16.8 million addresses, will be distributed to the regional registries.

That means the regional groups will have IP addresses to distribute further to internet service providers, websites, and others before running out.

Curran expects to deplete his allotment in six to nine months.

Universities might be able to "avoid major growing pains" if companies, organizations, and institutions that hold the rights to hundreds of millions of unused IPv4 addresses reallocated those addresses and built "their systems with IPv6 standards," said Raymond Schroeder [4], director of the University of Illinois at Springfield's Center for Online Learning, Research, and Services.

"This certainly is a point of transition. … The success of the internet has far outstripped our visions of decades ago," he said. "But it doesn't have to be a point of disaster or scarcity of addresses."

The current internet address system, IPv4, has been in place since the 1980s.

It allows for a theoretical maximum of 4.3 billion addresses in use, far beyond what was thought necessary for what was then mainly a network for academic use.

Engineers have known for years that the pool of these IP addresses would one day run out.

Websites and service providers have been experimenting with a new technology that allows for many more addresses — an infinite number, for all practical purposes.

But many have been slow to do so because of a lack of immediate benefits. The exhaustion of IP addresses at the top level puts pressure on them to move more quickly.

Curran said only about 2 percent of websites support IPv6.

However, many of those are the most-visited sites on the internet, including Google and Facebook. He expects smaller sites to scramble for IPv6 addresses now.

As internet service providers run out of IPv4 addresses, they'll have to give subscribers IPv6 addresses.

The challenge lies in connecting them to websites that have only IPv4 addresses. In essence, IPv4 and IPv6 are different "languages."

Several "translation" technologies are available, but they haven't been tested on a large scale, Curran said. That could lead to problems reaching some websites, or slow surfing.

"We're estimating how these boxes will work, but we haven't seen one deployed with tens of thousands of customers on it yet," Curran said.

The "end game" — the distribution of the last five blocks — was triggered by the distribution of two of the last seven blocks on Feb. 1.

They went to the Asia Pacific Network Information Centre, the regional registry for East Asia (including India), Australia, and the Pacific islands.
