Internet exhausting addresses, but no IPocalypse

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With about seven billion people on the planet, a web-naming protocol doesn't allow for everyone to have a gadget with its own online address. A situation compared to not having enough telephone numbers for everyone.

The Internet is running out of addresses. With everything from smartphones to Internet-linked appliances and cars getting online, the group entrusted with organizing the Web is running out of the "IP" numbers that identify destinations for digital traffic.

The touted solution to the problem is a switch to a standard called IPv6 that allows trillions of Internet addresses, while the current IPv4 standard provides a meager four billion or so.

"The big pool in the sky that gives addresses is going to run out in the next several weeks," said Google engineer Lorenzo Colitti, who is

leading the Internet giant's transition to the new standard.

"In some sense, we are driving toward a wall. We have to do something, and IPv6 is the only real long-term solution."

The pool in the sky is a fast-draining reservoir of IP addresses maintained by the non-profit Internet Corporation for Assigned Names and Numbers (ICANN).

ICANN has been calling for a change to IPv6 for years but websites and Internet service providers have been clinging to the old standard since the birth of the Internet.

"One of the reasons it has taken so long to change is that there is no obvious advantage or killer application for IPv6," Colitti said.

The number of addresses that IPv6 allows for amounts to 340 "undecillion" (followed by 36 zeroes); enough for a trillion people to each be assigned trillions of IP numbers, according to ICANN chief Rod Beckstrom.

"I guess if we could somehow link an IP address to every atom, we might begin to run into problems," Beckstrom said of IPv6 during an interview in his office in the Silicon Valley city of Palo Alto.

"As far as thinking about the number of objects that humans own and use, we are pretty safe."

With about seven billion people on the planet, the IPv4 protocol doesn't allow for everyone to have a gadget with its own online address.

The situation has been equated to not having enough telephone numbers for everyone.

Once the supply of IPv4 addresses ICANN distributes to the five regional centers around the world are gone, computers and other gadgets might have to start sharing instead of having unique identifying numbers.

"You will start to share with your neighbors, and that causes problems because applications can't distinguish you apart," Colitti said. "If your neighbor ends up in a blacklist, you will too."

"The Internet won't stop working; it will just slowly degrade," he continued, explaining that systems would eventually have trouble handling multiple connections on shared addresses. "Things will get slower and flakier."

New websites or online services stuck with shared IP addresses wouldn't perform as well as pre-existing offerings that have numbers all to themselves.

The effort and expense of changing to IPv6 would fall mostly on Internet service providers, websites and network operators that have to make sure systems can handle the new online addresses and properly route traffic.

Consumers, for the most part, shouldn't notice the switch since complex IP numbers would still appear to them as words and domains, such as icann.org.

Some people might need to update routers or modems that connect computers to the Internet.

"It is important that users don't worry," Colitti said, dismissing talk of an 'IPocalypse.'

"But, it is important that we as an industry work together," he noted. "It is critical we preserve this extremely precious Internet and allow it to

grow."

[Google](link), Facebook and other major Internet players will add IPv6 addresses to their systems in a one-day trial run on June 8 to let all parties involved check for trouble spots.

"We need to kick the tires on it at a global scale and see if there are some unforeseen problems," Colitti said. "There is really a rallying cry element to it. No single player can do it alone; we need to work together."

World IPv6 Day will start at 0001 GMT on June 8.

In a worst case scenario, running out of IPv4 addresses with no switch to IPv6 would mean new gadgets wouldn't be able to connect to the Internet because addresses weren't available, according to [ICANN](link).

"Ideally, people will see nothing," Beckstrom said of a transition to IPv6.

But, "if enough networks don't move to IPv6," he continued, "people could literally see nothing because they can't connect the next iPad, iPhone, or whatever."

IPv6 allows for seemingly limitless innovation in the Internet as well as addresses enough for sensors in anything from chairs and thermostats to individual bottles of wine in a cellar to signal when vintages peak.

A full shift to IPv6 will take years, with the remaining stock of old IP addresses being allocated to support the transition, according to Beckstrom.

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