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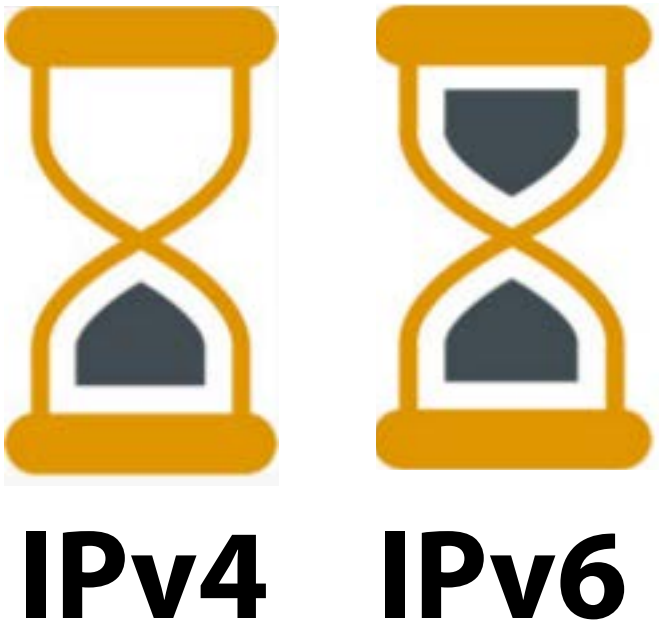
IPv6 Deployment Status & Challenges



Introduction

In June of 2012, IPv6 was launched as the official solution to the increasing scarcity of IPv4 addresses. The acceptance and deployment of IPv6, which will become the new standard as IPv4 is phased out, has progressed in the last six years, but still has a long way to go due to multiple factors. This eBook covers IPv6 and its history, its current status, and what obstacles there are related to continued adoption of the new standard.

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According to a 2017 paper by the Internet Society, IPv6 has moved to the deployment stage known as the “Early Majority”. The intention is for IPv6 to be a new standard for IP addresses, with its vast amount of address space compared to the original four billion plus addresses available with IPv4. Four billion seemed like plenty of addresses when the Internet was a small collection of connected servers, but that number is now woefully inadequate with the explosion of connected individuals, many of whom own multiple connected devices.

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Potential IPv4 scarcity has been known since 1990, and in the years following there were attempts to delay the inevitable depletion of addresses. Some of the ways used to stave off the inevitable have included Carrier Grade NAT or NAT444. Solutions like these were only meant to buy more time until IPv6 deployment was completed, and they, along with other methods, are able to stretch out the lifespan of IPv4 addresses from an initially predicted date of 1995 all the way up to the present.

As IPv6 has been deployed around the world since 2012, the process has been a marathon rather than a sprint. ISPs have been trying to make a plan around deploying IPv6 while also dealing with issues such as phasing from IPv4 to IPv6, as well as dealing with systems that are only compatible with IPv4. There have been plenty of obstacles preventing full adoption of IPv6 worldwide. But as IPv4 addresses continually dry up, necessity has forced change over the last few years as more companies have been proactive about adopting IPv6. Even with this need to transition, though, there has actually been a slowdown in IPv6 adoption over recent months, according to an article by The Register in May 2018. i i

As of 2017, one issue facing IPv6 adoption has been “legacy applications”, mainly used in the enterprise market. These are older, critical applications set up by companies where migrating to IPv6 can cause problems if those systems only support IPv4. This is likely one reason why some companies may be moving slower than others at IPv6 adoption, as they may be hesitant to be put more money into upgrading their legacy systemsto make them compatible with IPv6.

There are solutions to this issue, and one is simply being more proactive. Some companies have been planning ahead for when budgets allow them to begin work on setting up for IPv6. Others who still need to use IPv4 have the option of using a Dual Stack configuration, which uses both IPv4 and IPv6 communication, giving them time to move toward full IPv6 adoption in the future.

Mobile wireless carriers, in contrast, have made much more progress toward IPv6 adoption. Verizon Wireless, for example, has reported that IPv6 is used for around 90% of its traffic. i While Verizon and other wireless companies seem committed to IPv6, T-Mobile has been making unexpected developments. Instead of just moving everything to IPv6, the mobile wireless company also added the ability to provide IPv4 services. i i For the wireless market, though, IPv6 has become the majority.

In terms of why IPv6 hasn't already become the standard in the years since its launch, there isn't any one simple answer. There have been opinions that not enough is being done to get everyone out from under the thumb of IPv4. Some companies are still making do with their IPv4 setups; or, as mentioned earlier, budget issues may also be preventing steps forward.

As for the future of IPv6, as well as IPv4, some predictions have been made. The IPv4 Market Group, a broker of IPv4 addresses, is predicting that IPv6 will have reached 50% of users by the start of 2019. Swisscom, a telecommunications company operating in Switzerland and Italy, expects that IPv4 will barely be in use on theirnetwork by 2024. i Taking into account that these predictions were made before the more recent findings of a slowdown with IPv6 adoptions, those dates may now fall further down the line.

What may be happening with IPv6 could be the result of the end of IPv4 not being seen as dire as say a "Y2K" issue. With companies still functioning with IPv4, and there not really being a defined deadline to transition, it's easy to see why there may be some slowdown as organizations put it off. Companies generally don't like to spend money until it is absolutely necessary, especially when there is no visible return on that investment.

For these reasons, a slower migration to IPv6 may become the standard for many. Companies may be planning for the change now, but they will eventually need to switch over to IPv6. In the course of time IPv6 will become the predominant standard as more and more websites and users are switched over, but there will still be pockets of IPv4 that will not be reachable on an IPv6-only network. This means a continued need to provide access to both networks for the foreseeable future.

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