

## Internet Protocol version 6 (IPv6)

Internet access has become a critical service for businesses; the internet economy is worth £100bn in the UK alone, contributing to over 7% of GDP.

Over time we have come to expect a certain level of performance and user experience from business Internet. We also take it for granted that we will be able to reach everyone, and everyone will be able to reach us.



In terms of deploying new Internet infrastructure it has been 'business as usual' for over three decades. But now it's time for a long-anticipated, underlying logical upgrade to deal with Internet growth. This change will have a global impact on every organisation with an Internet connection, eventually affecting the configuration and operation of every Internet device in the world, from routers, firewalls and servers, to PCs, laptops and smartphones.

### **IPv4 addresses are running out!**

Internet Protocol version 4 was designed to provide 4.3 billion IP addresses and back in 1977 this seemed like more than enough for the experimental research networks of the time. However, by the early 1990s, it became apparent that the Internet would become something much bigger. It was obvious many more IPs would be needed and simply trying to conserve addresses, either through allocation or mechanisms such as NAT, was not going to be sustainable indefinitely.

Internet Protocol version 6 was developed to deal with the exhaustion of IPv4. Version 5 was previously assigned to another experimental protocol which was never publicly used. There are a number of differences between IPv4 and IPv6, but the most important is the huge increase in available address space. The length of an IPv6 address is 128 bits, compared to 32 bits in IPv4, so we have 340 undecillion possible addresses. *But what does that mean?* Well, the earth is about 4.5 billion years old. If we had been assigning IPv6 addresses at a rate of 1 billion per second since the earth was formed, we would have by now used up less than one trillionth of the address space.

### **Why is IPv6 such an important issue?**

BtL understands the strategic importance of IPv6 and is helping customers prepare for the future. We know that Internet access is critical, meaning a failure or degraded level of service can have a serious impact on the following:

- Workforce productivity
- Core business activities
- Ability to compete
- Business growth
- Business continuity

It is important to note that there is no reliable method of translation between IPv4 and IPv6, because the complexity of DNS and application-layer issues are too great to deliver an acceptable level of service. You can't just translate between the old and new Internet. **BtL** have chosen dual-stack as the primary method of transition on our network.

When IPv4 has run out, businesses can no longer make the assumption that the entire Internet will be reachable, or that they themselves will be universally reachable. Unfortunately no organisation can isolate itself or hide from these issues: the internet is a global network, so there are inherent network effects which mean that the actions of others directly affect our own. Regardless of our own plans for IP consumption as a business, we can be assured that the rest of the world will keep adding users, content and services. Eventually these new end points will only be available via IPv6. Therefore we must all act to ensure compatibility in the future. **BtL** has been actively researching, and preparing for IPv6.

### Core networks, systems, and security

Security is improved with IPv6, especially in areas such as VPNs,( virtual private networks). IPv6 builds-in and requires these protocols, which will mean that secure networks will be easier to build and deploy in an IPv6 world. Failure to implement IPv6 properly can also be a security risk, since internal hosts will auto-configure by default and be liable to attack.

The effect on changing from using Ipv4 to Ipv6 will differ depending on how the user uses the internet, for home users there wont be a massive notable change however as larger websites start using Ipv6 the router they use or operating system will need to support how Ipv6's are routed. Your hardware should also be dual stack compliant.

Meanwhile, on our IP network, we are running native IPv6 right now and are currently testing.. Our routers are fully capable of delivering IPv6 packets at line rate, exactly the same as IPv4 packets. Our IPv6 transit and peering connections are fully operational.

**BtL** will support the IETF end-to-end principle by implementing dual-stack (IPv4 and IPv6 in parallel) throughout our network. We believe this is the only way of delivering the high level of performance, user experience and reliability our customers expect.

### Enabling the transition beyond IPv4 exhaustion

**BtL** will take steps to ensure that our own supply of IPv4 addresses lasts as long as possible for new customers on dual-stack services, but eventually we will run out. We are intending, with careful planning, to be assigning IPv4 space for at least the next 2 years.

At this point **BtL** will only be able to issue new customers with IPv6 addresses. We expect the IPv4 Internet to persist for many years until IPv6 has been universally deployed. **BtL** will maintain its usual high level of service and support for business internet services during this time.

For more information or to speak to a member of the **BtL** team please call 0800 011 4088 or email [sales@btlc.co.uk](mailto:sales@btlc.co.uk)