

IPv6

BE READY FOR THE NEW INTERNET

BlueCat Networks is the Leader in [IP Address Management \(IPAM\)](#) and DNS (DNSSEC)/ DHCP Core Services, including the centralized agentless management of Microsoft Windows® DNS/DHCP services. Available in, software (VMware), hardware (appliance) and Managed Service ([Proteus Cloud Services](#)) deployment models, BlueCat Networks has sold to a large number of Global Fortune 1000 companies and many classified and unclassified government agencies. With the exponential growth in IP addresses, BlueCat Networks solves critical network management issues by centrally managing, controlling and auditing IPv4, IPv6, DNS and DNSSEC networks. BlueCat Networks' award-winning solutions provide unparalleled network uptime and scale for small to large organizations.

www.bluecatnetworks.com



IPv6 Needs IP Address Management (IPAM)

IPv6 is unfamiliar to most and can not be easily tracked on a spreadsheet.

Be Prepared

IPv6 is inevitable. Whether you slowly transition services and systems to IPv6 or whether you take the plunge, your organization needs to prepare for IPv6 now. As available IPv4 addresses deplete and as the number of IPv6-only clients grows, deploying IPv6 means the difference between being seen or being absent on the new Internet.

A successful implementation of IPv6 will require accurate knowledge of your IPv4 network in order to map IPv4 to IPv6 addresses – and to get that mapping, organizations need DDI (DNS, DHCP and IPAM) tools. BlueCat Networks has the tools and experience to guarantee a successful integration with, or migration to, IPv6.

Length of IPv6 Addresses

IPv6 addresses are 128-bits long and are represented in hexadecimal, a format that is unfamiliar to most people. Added to this is the fact that IPv6 networks and notation will not be as easy to manipulate, which can lead to assignment errors and management headaches.

IPv6 2001:fecd:ba23:cd1f:dcb1:1010:9234:4088

IPv6 provides an extended IP address pool and flexibility in allocating addresses.

IPv4 192.121.10.1

The pool of IPv4 addresses is expected to be exhausted sometime within the next year.

An IPAM solution will minimize the amount of data entry required. After the blocks and networks are configured, there is no longer any need to handle the actual IPv6 addresses.

Multiple IPv6 Addresses Per Interface

Another IP address management consideration is the number of IPv6 addresses per interface. Not counting any multicast addresses, three to four IPv6 addresses are required per IPv6 interface:

- Global Unicast – unique public address
- Local unique private IP address – unique private Unicast address
- Local link address – never routed and kept on the shared network
- The loopback address – where ::1 is equivalent to IPv4 127.0.0.1

An IPAM solution will obtain an accurate and up-to-date picture of the state of your IPv6 (and IPv4) network at any time with IP discovery and reconciliation, keeping you current as devices are added and removed from the network.

In all cases, an IP Address Management solution will be required just to properly manage IPv6 addresses. But the need for IPAM starts even before assigning addresses to IPv6 clients – IPAM starts at the planning stage because you need to know the current IPv4 landscape.

To deploy IPv6, you will need an IP address management system capable of discovering your existing IPv4/IPv6 space, modeling out your IPv6 network, tracking IPv6 and dual-stacked IPv4/IPv6 systems, as well as the services, including DNS and DHCP, to provide the IPv6 naming and addressing infrastructure.

Today, IPv6-only traffic represents a relatively small amount of all Internet traffic, but the number of allocated IPv6 addresses is increasing rapidly. This represents a growing trend of new IPv6-enabled ISPs and cable providers who conduct their business using IPv6 exclusively, because they can no longer receive the appropriate IPv4 space they need to service their customers.

Available IPv4 addresses from the Internet Assigned Numbers Authority (IANA – www.iana.org) pool will be exhausted by summer 2011 (see <http://www.potaroo.net/tools/ipv4/index.html>). When the IPv4 addresses are fully depleted, many new Internet-facing services will only support IPv6.

Being Ready Means Revenue to Your Business

If you have a web presence, or if your business extends to emerging markets, then you must consider IPv6 now for public services such as your website. Many parts of the world have already started migration to IPv6 which is why your website is most likely inaccessible to them. Another reason to integrate IPv6 today is that IPv6-only applications are now available to the mass market. Microsoft Direct Access and many industry-specific applications have adopted IPv6, and deploying them starts with having an adequate IPv6 infrastructure.

New IT projects such as Unified Communication, HD videoconferencing, mobility, network management services for large heterogeneous infrastructures, network automation, and other applications that require more than one million new IP devices such as smart grids and sensor networks, provide an excellent opportunity to include IPv6 in your planning. Many new IT projects can benefit from IPv6 with features such as jumbo frames, IPSec integration, multicast improvements, mobile IP, simplified routing in addition to accommodating more IP addresses and to completely bypass NAT to enable better performance and seamless operation.

Don't wait until the last minute to start your IPv6 planning – the loss of connectivity will be costly for you.

Being Ready Has Real Financial Benefits

While you may not be ready to deploy IPv6, you need to start planning your migration to IPv6. IPv6 is not a matter of “if” but “when”, so your organization needs to understand the benefits of IPv6 and be ready to deploy as soon as you need it.

There are many advantages to getting ready now:

- **Staying ahead of the competition.** You don't want to miss out on business opportunities from IPv6 enabled customers and end-users. As IPv6 traffic grows, ensuring that your website and other public services are IPv6 enabled will be critical to ensure that you capture as much of your target audience as possible. Already 2% of the top one thousand websites (ranked by Alexa; www.alexacom.com) have an IPv6 website (OECD; www.oecd.org, April 2009) compared to 0.2% one year earlier. You need to ensure that your website is IPv6 enabled.
- **Removing the obstacle of lack of IPv4 addresses by using IPv6 addresses.** New applications may warrant the need for many more IP addresses or the removal of NAT (Network Address Translation). As you add more IPv4 addresses to your current network today, the greater the IPv6 migration effort you'll be facing later. Start planning for IPv6 with your existing projects.
- **Remove costly barriers.** IPv6 is inevitable. Delaying IPv6 will be costly later because it requires:
 - Even denser deployment of IPv4 NAT which results in more resources used against your public IPs that can result in resource starvation
 - Using network middleware to convert/translate IPv4/IPv6 traffic
 - Diagnosing network problems through NATs and gateways is significantly more complicated
 - Automated configuration changes require complicated rules when NATs and Gateways are in the data path

You should start by identifying existing bottlenecks caused by NAT and gateways to see if IPv6 can remove performance obstacles and complexities.

- **Planning well in advance.** Have your plan ready now.

- US government agencies must support IPv6 for all public-facing services including Web, email, DNS and ISP services by September 30, 2012, as announced September 28, 2010 from the Executive Office of the President (Office of Management and Budget – OMB)
- The Australian Government Information Management Office mandated all Australian Government agencies to be IPv6 capable by end of 2012

Start planning now – many organizations have already started.

To plan and to eventually deploy IPv6, you will need an IP address management system capable of managing IPv6 addresses without errors.

To Start the Planning - IPv6 Needs IP Address Management (IPAM)

Before deploying, you will need to discover your IPv4 and IPv6 network assets, to plan and to model your IPv6 addressing scheme and to map your IPv6 network onto existing IPv4 resources.

IPAM provides a disciplined approach to these easy steps in preparing for IPv6:

- Discover and take inventory of your resources for IPv4 and IPv6
- Plan and model the deployment – from the discovery stage, you can plan and model how your IPv6 network should be deployed
- Map your existing IPv4 network to your IPv6 space – visualize how you can integrate your current IPv4 network and devices into your proposed IPv6 space
- Then implement – when you're ready!

Steps	Actions
Discover	<ul style="list-style-type: none"> ■ Document existing IPv4 network and equipment ■ Understand existing (if any) IPv6 capabilities
Plan and Model	<ul style="list-style-type: none"> ■ Determine what IPv6 capabilities are going to be used? ■ Understand what equipment may need to be updated ■ Model IPv6 space to determine optimal design ■ Understand devices to be updated and how
Map	<ul style="list-style-type: none"> ■ Map existing IPv4 space to proposed IPv6 space ■ Document updates to existing devices ■ Document which devices will need to be added/replaced
Implement	<ul style="list-style-type: none"> ■ Deploy IPv6 capable DNS and DHCP ■ Deploy IPv6 capable network equipment

“Dual-stack” implementations are becoming the defacto standard for integrating IPv6 with existing networks. These networks require simultaneous support of IPv4 and IPv6 links, DNS, DHCP, and other key information with your entire IP space. Proteus is the ideal platform for supporting “dual-stack” networks.

Proteus includes the following IPv6 benefits:

- End-to-end IPv6 Address Management including routing prefixes for global Unicast, subnet IDs and interface IDs
- A disciplined approach in modeling your IPv6 network. Proteus gives your administrators a best practice approach while insulating you from the complexity of defining and allocating IPv6 blocks, networks and addresses
- IPv6 DNS Management – including AAAA and the IP6.ARPA reverse space
- IPv6 DHCP Management – stateless option support (through discovery)
- IPv6 Network discovery to inventory your IPv4 and IPv6 networks
- Parallel management with IPv4 networks allows simultaneous management of “dual-stack” devices (devices that support IPv4 and IPv6) including mapping IPv4 devices to their IPv6 address(es) and vice versa
- Proteus Blueprint – a data transformation tool that imports data from different systems including CSV files and allows you to manipulate and massage your existing IPv4 and IPv6 data before importing it into Proteus.

BlueCat Networks' IP Address Management (IPAM) Solution: Proteus - The Tool for IPv6

Proteus is the industry leading IP Address Management (IPAM) platform. It is a highly intuitive, business-oriented tool that allows you to manage your IPv4 and IPv6 address spaces. Our integrated approach to DNS, DHCP and IPAM uses a multi-core system that links changes to the entire IP space. When you change an IPv6 address associated with an AAAA DNS record, the change is updated in both DNS and in the IPv6 space, removing the need to update multiple areas.

To deploy IPv6, you will need an IP address management system capable of discovering your existing IPv4 and IPv6 space, modeling out your IPv6 network, tracking IPv6 and “dual-stacked” IPv4/IPv6 systems, as well as the services needed for the IPv6 naming and addressing infrastructure (DNS and DHCP).

Planning Phase	Feature	Description
Discovery	IPv4 and IPv6 Discovery	<ul style="list-style-type: none"> ■ Automated tool to build out block and network structure based on discovery results ■ Uses non-intrusive firewall-friendly SNMP discovery ■ Will discover mixed environments running both IPv4 and IPv6 router can be IPv4 or IPv6 enabled ■ By MAC address
Plan and Model	Create and Add IPv6 Blocks	<ul style="list-style-type: none"> ■ Creation of IPv6 Block for Unique Local Address Space (/8 to /128) ■ Creation of IPv6 Block for Global Unicast Address Space (/3 to /128) ■ By MAC address
	Create, Auto-create IPv6 and Add Networks	<ul style="list-style-type: none"> ■ Ability to create /64 to /128 networks ■ Ability to automatically create networks that do not exist within Proteus when creating IPv6 hosts from DNS ■ Conformance to CIDR boundaries
	Get Next Available IPv6 Network by Prefix	<ul style="list-style-type: none"> ■ Proteus can automatically allocate an IPv6 address based on a network prefix
	Migration of IPv6	<ul style="list-style-type: none"> ■ Allows you to import foreign data in XML format. If the data is not ready for XML, Proteus Blueprint can convert various data structures to XML; Proteus Blueprint also allows administrators to massage the data before converting to XML.
	API Support	<p>The Proteus API supports:</p> <ul style="list-style-type: none"> ■ Adding and getting IPv6 blocks and networks ■ Adding, getting, assigning, reassigning and clearing IPv6 addresses
Map	Map IPv4 Devices to IPv6 Address	<ul style="list-style-type: none"> ■ Based on a MAC address and host name (DNS name) or an IPAM specified device, Proteus identifies the association of IPv4 and IPv6 addresses to a device
Implement	IPv6 DNS Management	<ul style="list-style-type: none"> ■ Support for AAAA and the IP6. ARPA reverse space ■ Dynamic DNS (DDNS) support ■ DNSSEC support
	IP Reconciliation	<ul style="list-style-type: none"> ■ Leverages discovery to reconcile actual IP usage on the network with your IPAM system to ensure up-to-date and accurate IP and network information ■ Allows you to reclaim unused IP space and discover new or unknown systems
	IPv6 Address Management	<ul style="list-style-type: none"> ■ Stateless auto-configuration support (through discovery) ■ Object tagging allows you to group your data so that it fits your business model, based on user-defined fields to provide a meta-data system for objects within the system in virtually any way you can imagine ■ Ability to track dynamic DHCP leases and dynamic DNS data provides you with the ability to aggregate information in the system for troubleshooting purposes

Be ready for the new Internet

For more information on IPv6 click here.

Being Ready Has Real Financial Benefits

RFC	Description
2374	An IPv6 Aggregatable Global Unicast Address Format
3177	IAB/IESG Recommendations on IPv6 Address Allocations
3587	IPv6 Global Unicast Address Format
3879	Deprecating Site Local Addresses
4193	Unique Local IPv6 Unicast Addresses
4291	IP Version 6 Addressing Architecture
4292	IP Forwarding Table MIB
4293	Management Information Base for the Internet Protocol

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