The Standard

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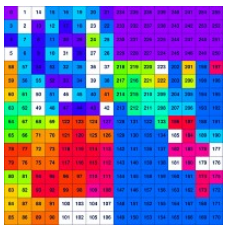
The Standard is the journal of IPv6 Now Pty Ltd, specialists in IPv6 training, transition and innovation:
ipv6now.com.au
ipv6now.co.nz

IPv6Now and Ai Group have constructed VIC6 to help industry make the transition to the new Internet Protocol, IPv6:
vic6.net

Seed funding for the VIC6 project was provided by MultiMedia Victoria

What's this and why should it make you nervous?



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"Engineering in a crisis is never a good idea…"

As always, Vint Cerf said it well. I've just returned from New Zealand and a series of IPv6 Hui (conferences organised by InternetNZ), headlined by Vint, Tony Hain, Hiroshi Esaki and our own Tony Hill.

A key theme repeated by all presenters at the Hui was the importance of the so called "soft issues" raised by IPv6, beyond the technical issues – staff training, experience, failure of applications, inaccurate vendor claims, and budgetary/benefit IPv6 calculations skewed by an IPv4 perspective.

Furthermore the difficulty of solving the soft issues, and the time needed to address them, is extremely easy to under-estimate. Vint Cerf's warning was very clear: the time to start IPv6 adoption is now.

Kevin Karp with Vint Cerf, Vice President Google, at NZ Hui, August 2009 (Keith Davidson, InternetNZ)

In this issue of *The Standard* we look at the NZ Hui in more detail, cover AGIMO's welcome advance of their IPv6 timetable (*by 3 years!*), analyse just how fast those IPv4 /8 blocks are disappearing out the door, and tell you about the progress of VIC6 and its excellent IPv6 testing facilities. We hope you enjoy these insights into IPv6 from a local as well as an international perspective, and welcome any feedback.

Don't forget: the 2009 Australian IPV6 Summit is coming up, Melbourne 7-9 December 2009 – ipv6.org.au/summit

Kevin Karp
Business Director IPv6Now

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Accelerated AGIMO Timetable

Dr Kate Lance, Communications Manager, IPv6 Now Pty Ltd

The Australian Government Information Management Office (AGIMO) has released version 2 of its IPv6 implementation strategy (July 2009). Strikingly, it has brought its deadline *closer by three years*. Version 1, from late 2007, had Transition taking place up to 2012, and Implementation up to 2015. Now Transition must be complete by the end of 2011, and Implementation "should be completed end-December 2012". It's a tight timetable.

Stage 1, Preparation - reviewing, stocktaking, training, threat assessment - needs to be well underway by the end of this year. Stage 2, Transition, requires upgrades of hardware, software, operating systems and gateways (or ISPs), so they are IPv6-ready, tested, and certified to the 'appropriate level of security' by the end of 2011. Stage 3, Implementation, requires final testing, threat and risk assessment and certification, before a coordinated enabling of IPv6 across government agencies must take place by the end of 2012.

AGIMO intends that Government Internet-based services will remain accessible to all citizens and agencies, whether using IPv4 or IPv6. It also understands the importance of ramping-up IPv6 skills, not being driven by market shortages, and the opportunities that IPv6 offers for enhanced service delivery.

This is all excellent news for the IPv6-aware community, and shows commendable foresight and flexibility by the government. Read more about it at:
www.finance.gov.au/e-government/infrastructure/internet-protocol-version-6.html

Asia Pacific Region May be the First to Suffer IPv4 Shortages

Tony Hill, MD IPv6Now, Chair Australian IPv6 Summit Steering Committee

I warmly welcome the revised Australian Government transition plan for uptake of IPv6, issued by AGIMO. The plan brings completion of Australia Government uptake forward by 3 years, for completion in 2012. The revision takes account of more recent projections of when IPv4 addresses will run out.

From international discussions, it is now clear that the rate of uptake of IPv4 addresses has continued at a constant rate since the 1990s, and that if nothing changes the pools of addresses will run out in 2011/2012. ICANN has already decided that the last five blocks of IPv4 addresses will automatically be allocated among the five regional Internet registries around the world, which means that Asia Pacific, with about 50% of the world population, will get the same final allocation as Africa and South America.

As a consequence, international discussion of IPv6 has now developed substantial urgency. This is especially significant to the Asia Pacific region, where IPv4 addresses may well run out ahead of many other parts of the world.

International analysis has recently pointed out that large-scale NAT solutions will not be able to provide suitable user performance or support next-generation communications devices. In addition, shortages of IPv4 addresses will not only affect organisations that don't upgrade, but even those that are planning to use dual stack IPv4/IPv6 systems to transition and grow their networks will face the same problms.

Planning for IPv6 should be a major concern of all businesses in Australia and the Asia Pacific. Locally we are fortunate to have the unique resources of the VIC6 Testbed Network (**vic6.net**) for analysing IPv6 capability and compliance, without impinging upon organisational production systems. IPv6Now is also a valuable resource for IPv6 solutions of all kinds, including business-ready SLA-guaranteed tunnels, professional dual-stack or native IPv6 hosting, and training programs ranging from general to hands-on technical (**ipv6now.com.au**).

Are You Worried Yet?

Dr Kate Lance, Communications Manager, IPv6 Now Pty Ltd

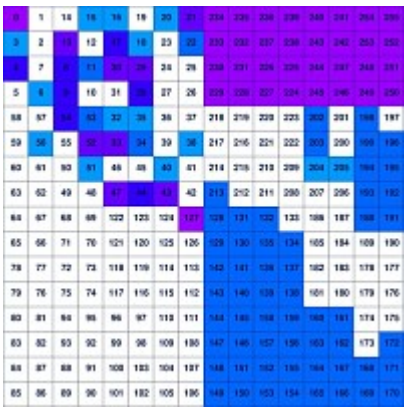
You've probably seen a few of those ominous IPv4 depletion counters, ticking merrily away towards zero address hour, but what are they based upon?

Most take their data from the mathematical modelling of Geoff Huston, and as of 30 August 2009, Huston calculates that 'the IANA unallocated IPv4 address pool will be exhausted on 22-Jul-2011 and the RIR unallocated IPv4 address pool on 13-May-2012'. Another researcher, Stephan Lagerholm, using different methods, arrives at dates some months earlier than Huston: the IANA IPv4 pool will run out on 10-Jan-2011 and the RIR IPv4 pool on 26-Mar-2012.

What does all this mean? IANA is the Internet Assigned Numbers Authority, the body that allocates blocks of address space to the five Regional Internet Registries, RIRs – RIPE NCC (Europe), ARIN (North America), APNIC (Asia Pacific), AfriNIC (Africa), and LACNIC (Latin America and the Caribbean).

The 'IPv4 address space' is simply a list maintained by IANA. That list has 256 blocks, each containing 16,777,216 IPv4 addresses. The first 8 bits of the addresses in a single block are the same, so they are called /8s (slash-eights).

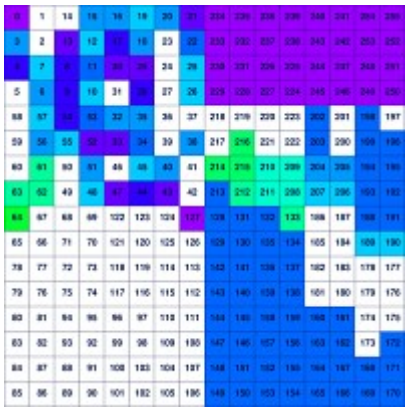
So we have 256 block x 16,777,216 IPv4 addresses = 4,294,967,296 (say, 4.3 billion) IPv4 addresses in total. That used to seem like a big number. You can plot those 256 /8 blocks in a square (this seemingly simple layout is actually a fractal mapping of contiguous blocks: the original was devised by Randall Munroe).



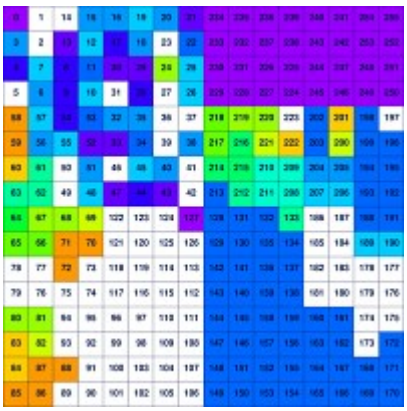
End of 1994

(Left): the allocated IANA IPv4 address space at the end of 1994.
The Internet was about to explode, and work had already begun on 'IP Next Generation' (later IPv6) although only a few visionaries seemed to believe it would ever matter.

(Right): the allocated IANA IPv4 address space at the end of 1999.
The dot.com craze was almost at its peak, but IPv4 address space was handling it all very nicely, thank you.



End of 1999

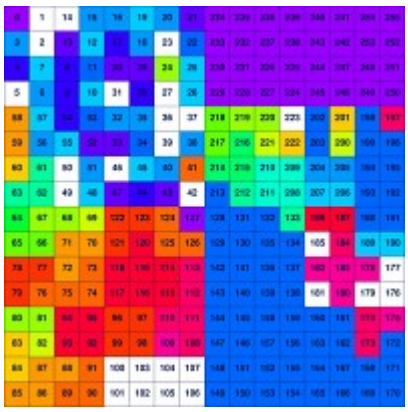


End of 2004

(Left): the allocated IANA IPv4 address space at the end of 2004.
Alarm bells had started quietly ringing, but indifference and denial were still the order of the day, despite the efforts of a few.

(Right): the allocated IANA IPv4 address space, August 2009.

Are you worried yet?



August 2009

Most of the 4.3 billion IPv4 addresses have been assigned. Only 27 blocks remain out of the original 256, and five of those are earmarked, one for each RIR when all the other addresses are gone: that will be December 2010 according to Lagerholm, or July 2011 according to Huston. And when the five RIRs have burned through all of their remaining holdings – around March to May 2012 – that's it for unallocated IPv4.

Diehards mumble into their beers about 'taking back' non-used addresses, especially from those groups with vast holdings from the early days of the Internet. But the burn rate of current allocations means that *an entire /8 block is consumed every 5 to 7 weeks*, and that rate is accelerating.

Even if all of the unused addresses were somehow clawed back (from organisations financially and logistically dependent upon them), only one or two years could be bought: to say nothing of the havoc that would be unleashed upon the global routing tables. Similarly, a recent proposal to release the reserved 'Class E' IPv4 space would buy only limited time, although it might help ease some transition pressure.

I had planned to end this article with another picture: the IPv4 address space marked inside a map of the IPv6 address space – I imagined maybe a pixel-sized dot in a square just like those above. Then I did the maths…

To print (at 300 dpi) a single IPv4-address-space sized dot on an IPv6-sized piece of paper means that the piece of paper would have to be *24 million kilometres square*. It would reach about half-way from here to the planet Venus.

Have you begun your IPv6 adoption plan yet?

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1. IPv4 counters: http://inetcore.com/project/ipv4ec/index_en.html, http://ipv6.he.net/statistics/
2. Geoff Huston's IPv4 address report: http://www.potaroo.net/tools/ipv4/
3. Stephan Lagerholm's IPv4 depletion site: http://ipv4depletion.com/?page_id=4
4. Randall Munroe's XKCD: http://www.xkcd.com/195/
5. P. Wilson, G. Michaelson, G. Huston, Internet Draft: http://tools.ietf.org/id/draft-wilson-class-e-02.txt

Colour key to the years of allocation of the IPv4 /8 blocks plotted above.

Data was drawn from
http://www.iana.org/assignments/ipv4-address-space/
(last updated 2009-08-03)

Why IPv6 Matters in Our Health Networks

George Fong, Project Facilitation Manager, IPv6 Now Pty Ltd

When we do a demonstration of a videoconference under IPv4 and a videoconference under IPv6, the difference to the participant is going to be exactly nothing – *if we get it right*! The point about the importance and significance of IPv6 to communication in health networks such as Grampian Regions Health Authority, Loddon Mallee, Hume, Gippsland and the South West Alliance of Rural Hospitals is network *complexity*.

All of these networks (essentially WANs with significant numbers of LANS within them) live independently of each other. To connect each of the networks together there are a multitude of bridging points between them; specific bits of hardware that do the inter-network traversals.

Each of those independent networks is made up of a small handful of real IP addresses and then a proliferation of NAT'd networks in each health unit, including multiple layers of NAT. There are cells of health units stretching from the outskirts of Melbourne to the South Australian border. *NATS abound like clusters of coral in the Great Barrier reef!*

Videoconferencing gear is scattered across the networks - all traversing NATs. There are bridges and multipoint control units at each traversal point between the networks. So some videoconferences might traverse several NATs and cross several bridges etc just to hook up.

That's just the videoconferencing. Then there are the VoIP systems that span all networks. Make a phone call from a node in SWARH to a node in GRHA? It works, but behind the scenes, it's the network traversal from Hell.

IPv6? It means elimination of NAT, a good possibility of being able to reduce the number of bridges used to traverse networks, lower network latency, less things to break and go wrong... THAT is the point of trying to introduce IPv6 into the health networks.

From the New Zealand IPv6 Hui

Kevin Karp, Business Manager, IPv6 Now Pty Ltd

Murray Milner, Chair; Vint Cerf, Vice President Google and Chief Internet Evangelist; Hon. Nathan Guy, Acting Minister for Communications and Information Technology; Tony Hill, MD IPv6Now, Tony Hain, Cisco Systems (Keith Davidson, InternetNZ)

The New Zealand IPv6 Steering Group roadshowed a highly-successful series of IPv6 Hui (conferences) in Christchurch, Auckland and Wellington in August 2009, see http://www.ipv6.org.nz/hui.html . IPv6 is happening at a faster pace than most attendees had realised, and here are some of my key impressions:

Tony Haine: The smooth transition enabled by dual-stack approach is not possible once the IPv4 pool is exhausted. Obvious: There aren't enough IPv4 addresses to sustain the current v4 model. Corollary:

There aren't enough IPv4 addresses to support the dual stack model over extended period of time.

Hiroshi Esaki pointed out that the maximum number of sessions a NAT can carry is 65536. But using Google Maps needs ~30 simultaneous ports, and iTunes needs ~300 simultaneous ports, so only 2000 to 200 users can be carried by one NAT - doesn't scale.

My presentation: - 5,500 student IPv6-based StudentNet accounts are already in operation with facilities that are just not available under IPv4. Also, some network administrators do not understand hexadecimal notation – to the extent that they are not using addresses that contain any letters!

Tony Hain again: Markets form to balance offer & demand for scarce resources, and discussions on IPv4 subnet trading have already started. Once IPv4 is exhausted, the RIRs can only document, no longer in control of allocations. Problem: Default Free Zone bloat, as smaller & smaller blocks are exchanged.

Vint Cerf: Even with enough IPv4 space of your own, your partners' run-out will affect you. ISPs seem not to recognize the only sensible way to expand internet service is to use IPv6. Some complain of cost without revenue, but discount that they can't expand their services to new customers without address space. If ISPs fail to implement IPv6 then the IPv4 Internet as a whole will suffer a "cascading series of unpleasantnesses". Higher latency because of multi-layer NAT etc, will make web services painfully slow and applications will have to grow in complexity. The increased fragility will result in decreased revenue for content providers and online retailers. Fortunately the cost of acquiring IPv6 is lessening. Interesting stories from large IPv6 deployments in China and elsewhere are surfacing that it's cheaper to run an all-IPv6 network and tunnel IPv4 over it as required, than to maintain a fully dual-stacked network.

A key theme repeated by all presenters at the Hui was the importance of the so called "soft issues" raised by v6 implementation that may not be immediately obvious upon a superficial dual stack implementation of IPv6. Furthermore the difficulty of solving the soft issues was extremely easy to under-estimate as was the time required to adequately address them. Some of these soft issues included:

IPv6Now flies the flag at the NZ Hui

- Training, Training, Training
- Acquisition of expertise and experience
- The costs of retooling applications and custom scripts
- Failure of facilities for configuring networks (eg address fields not long enough or reject colons)
- Vendor descriptions that indicate IPv6 compliance, but when relied upon in production were found to be superficial in their accuracy, sometimes to the point of being totally incorrect
- Budget for IPv6 implementation relies upon identification of benefits, but the benefits of IPv6 cannot be realised by just repeating the implementation of IPv4 with longer addresses.

Presenter after presenter emphasised the soft issues (particularly training) as being the real difficulty, consuming most time in the implementation cycle. This led to the other oft-repeated point... Given that the time required to overcome these soft issues was so routinely under-estimated it puts special emphasis on the need to start adoption NOW.

It was clear that the time for a leisurely transition had passed, and by necessity the task would be more rushed than was desirable. The burden to reduce the complications of a rushed transition was clearly up to the members of the audience. Vint Cerf summarised, "engineering done in a panic is invariably poor engineering". His meaning was very clear.

VIC6 Activities and Progress

The purpose of VIC6 is to provide an industry facility in the form of a distributed IPv6 testbed that will enable Victorian organisations to examine IPv6 implementation, integration and innovation, with a view to deploying the protocol within their networks, products and services.

Phase 1: VIC6 Construction

Phase 1 required Ai Group and IPv6Now to promote Victorian industry awareness of IPv6, with a series of workshops to capture industry input. From December 2008 to March 2009, IPv6Now designed, constructed and tested VIC6, accessible from anywhere on the IPv4 Internet. The Network Operations Centre is based at PPS Internet, and the Primary Node is at Lateral Plains in Ballarat.

Phase 2: VIC6 and the Victorian Health Sector

Phase 2 was to demonstrate IPv6 capability to support health applications and enable the sector to gain the understanding and experience necessary for smooth transition to IPv6. Key participants were the Australian Healthcare Messaging Laboratory (AHML), the Centre for Health Innovation (CHI), the Centre for Eye Research Australia (CERA), Eyescan Pty Ltd, the Grampian Rural Health Alliance Network (GRAHNet), and the Medical Software Industry Association of Australia (MSIA).

Six VIC6 Health Sector Workshops were held between April and August 2009. Conferences took place face-to-face and via video and teleconference. The participants' areas of potential IPv6 interest fell into four groups: Network architecture and operations, Standards and interoperability, Clinical services, and Innovative capability.

After substantial planning and implementation, the VIC6 Health Sector Working Group meeting on 28 July 2009 provided a significant demonstration of IPv6 within the health sector. VIC6 succeeded in working with Eyescan to show an improved model of remote access to ophthalmic imaging equipment, despite some substantial challenges. The real-time demonstration showed direct remote access to eye scanning and manipulation software by way of IPv6. Participants saw live access to, and remote operation of, the actual Eyescan computer during the VIC6 Health Working group meeting.

As a marked difference from previous approaches, access to the machine was facilitated by using a domain name, *eyescan1.tunnels.ipv6now.com.au*, rather than the current arrangement that relies on an IP address and port (eg 203.123.456.789:9999). Our approach required no additional intervention from network administrators once the computer itself was configured, and did not depend on configuration of any other parts of the Eyescan network. The technique was supported by IPv6 tunnels and network infrastructure provided by IPv6Now Pty Ltd.

Eyescan pioneered the concept of remote access to the results of ophthalmic scanning by allowing 'remote desktop access'. Under the VIC6 Health Demonstration project, we were able to move the Eyescan 'remote desktop' approach to the new Internet Protocol, IPv6, showing how access to ophthalmic scanning results could be easily arranged between multiple remote locations. There is now the prospect of more thorough research into the efficiency and clinical effectiveness of remote access to ophthalmic scanning results via IPv6.

Phase 3: VIC6 and the Victorian Financial Services Sector

The VIC6 Financial Services Working Group meetings have taken place in July and August 2009. Areas of interest cover readiness testing, transition cost estimating, issues with legacy backend systems, mobile internet access devices, system-to-system messaging solutions, the potential for a message exchange facility on VIC6, authentication issues, IPv6 readiness, and security and potential IPv6 malware.

Phase 4: VIC6 and the Victorian Automotive Manufacturing Sector

VIC6 testbed facilities have been offered to the Dedicated Short Range Communications (DSRC) Industry Panel as part of their work in bringing an IPv6-based vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communications proof of concept demonstration to Australia in 2010. This work is based on VIC6 automotive members supporting the Communications, Air-interface, Long and Medium range (CALM) wireless communication protocols and air interfaces. CALM spans multiple modes of communications and multiple methods of transmissions in Intelligent Transportation Systems (ITS). The CALM architecture is based on a IPv6 convergence layer that decouples applications from the communication infrastructure.

VIC6 TestNet Facilities

Karl Auer, Technical Manager, IPv6 Now Pty Ltd

Now that the Australian Government has revised its IPv6 timetable - planning for implementation in a little over two years - how can your organisation, outside or within government, test for itself whether or not its facilities are also going to be compatible with IPv6?

You could, of course, build your own IPv6 laboratory with highly-trained techies and expensive equipment, at a significant cost in both time and investment (neither of which appear to be in abundant supply at the moment). Or perhaps you could choose to use a state-of-the-art IPv6 testbed facility, courtesy of the Victorian Government.

Due to the foresight of MultiMedia Victoria, we now have the VIC6 TestNet - a fully functioning IPv6 network for testing IPv6 compatibility of hardware and software, *without* any risk of damaging your vital production systems. So just what has VIC6 got, and who helped to build it? Let us count the ways...

The Basics

Thanks to Neighbourhood Cable, the VIC6 TestNet has ***native IPv6 connectivity to the IPv6 Internet***. Your testing is not limited to a closed, local network; you can test with other organisations or individuals around the state, the country or the world.

Thanks to Cisco Systems, you have a ***fully-fledged IPv6 and IPv4 dual-protocol network***. A Cisco router connects the network to the IPv6 Internet, and a Cisco switch provides 10/100/1000 connectivity within the network. VLAN (Virtual Local Area Network) technology allows the 48 ports on the switch to be grouped into various different subnets with different properties. If your testing requires it, we can provide a customised VLAN (or more than one).

Primary VIC6 Node at Lateral Plains, Ballarat

Thanks to Lateral Plains, all of the above ***has a place to live, and expert support personnel to tend it***. Visitors to the node can take a seat in a comfortable workspace and connect their laptops or other equipment to the VIC6 node directly. For more complex testing or experimentation, the node has rack space in a professionally maintained data centre - so if you want to test a router or a switch, or you have a server you'd like to install for a while, we can rack it and stack it for you. Lateral Plains also provides the virtualisation expertise underpinning services like DHCP and DNS.

Thanks to IPv6Now, each node has ***one or more servers providing DNS, DHCP, SSH (Secure Shell) , etc, to VIC6 users***. IPv6Now also provides all VIC6 partners with free remote IPv6 access to the VIC6 TestNet via their tunnel broker – the first commercial tunnel broker in Australia, and still the only one with guaranteed service level agreements.

Thanks to Nominum, ***each VIC6 node has industrial strength DNS, DHCPv4 and DHCPv6 services***. Instances of the ANS, Vantio and DCS3 products handle the normal DNS and DHCP requirements of each node, plus each node has an instance of ANS and an instance of DCS3 available for you to experiment with.

VIC6 workspace area, Ballarat Node

Thanks to Matrium, which has promised some ***very sophisticated testing and simulation equipment for the Ballarat node***. The Spirent Test Centre is expected to be available by arrangement to any VIC6 partner wishing to perform traffic simulation, test a network design and so on, with basic familiarisation assistance to VIC6 members free of charge. More comprehensive assistance (and sales of hardware) can be provided to VIC6 members at a generous discount.

Thanks to PPS Internet, ***the whole VIC6 network is watched over 24/7***. PPS provides NOC (network operations centre) services to monitor the network, back up critical data and provide an escalating response in case of problems.

VIC6 VLANs

The VIC6 TestNet has **four standard Virtual Local Area Networks** available for use, plus one management VLAN and one services VLAN. The DNS, DHCP and other similar services are in the services VLAN. The four "user" VLANS are:

- **Public**: with full access to *and from* the Internet
- **Protected**: with full access *to*, but limited access *from* the Internet
- **No Internet**: with no access to or from the Internet
- **Isolated**: with no access at all to anything outside the VLAN

Devices can be connected to the appropriate VLAN as desired. If a **custom VLAN** with particular characteristics is desired, that can be arranged.

In the public, protected and isolated VLANs, the router advertises a /64 IPv6 subnet, so attached equipment can **use autoconfiguration** to acquire a globally routable IPv6 address.

In the public, protected and isolated VLANs, DHCPv4 and DHCPv6 are available. Attached equipment can acquire **globally routable addresses via DHCP** if so configured. If statically allocated addresses are desired, these are supported too, and the DHCP servers support **stateless IPv6 autoconfiguration**.

Each VIC6 node has an additional instance of the Nominum DCS3 **DHCP server available for experimentation**. In conjunction with a custom VLAN, VIC6 members can obtain total control over the address distribution mechanisms.

Each VIC6 node has its own DNS, secondaried on IPv6Now nameservers. All services and servers are addressable by name or by IP address; most are dual-stack. This means that your test environment has "all the comforts of home".

Each VIC6 node has an additional instance of the Nominum ANS **nameserver available for experimentation**; DNS views can be created for specific purposes, using whatever nameserver information you desire (although the exchange of DNS information between these servers and the global Internet can only be permitted if consistent with usual DNS practices and norms).

VIC6 racks

An **ssh server is provided**, and each VIC6 partner may have one or more accounts on this server. From this ssh server, connections to other equipment within the VIC6 node can be made. This provides a simple springboard, protecting machines that should not be directly accessible from outside the VIC6 TestNet. Each VIC6 node can also provide, by arrangement, a **virtual server** to VIC6 partners that need to run software within the VIC6 node.

Would you like to know more? Sign up for involvement with the VIC6 project at **vic6.net** and find out how you can use the VIC6 TestNet to better understand your own organisation's IPv6 issues and options, and the most cost-effective implementation pathways to adopt.

Protocol Cringe?

Dr Kate Lance, Communications Manager, IPv6 Now Pty Ltd

Some of you might have seen the recent headline: "Australia leads the way in IPv6 adoption: OECD" in *Computerworld*, 14 August 2009. Good news at last! But sadly no, it was just a beatup. The (unreferenced) OECD report turned out to be the *OECD Communications Outlook 2009*.

On page 163 that report actually says, "Several other countries have taken a lead in deploying IPv6 networks and the number of allocations in other countries also increased in 2008." A mention of AGIMO's strategy (see above) apparently inspired the *Computerworld* reporter to rewrite that sentence as a quote, "Australia has taken a lead in deploying IPv6 networks". The headline writer went one better, thundering, "Australia leads the way in IPv6 adoption"!

Wow. Unfortunately, some good news was swamped by silly exaggeration. So what did the report actually say about our IPv6 situation relative to other OECD countries at the end of 2008?

Australia has the seventh largest IPv6 prefix assignment in the OECD. However, assignment does not necessarily mean in use, so in terms of IPv6 addresses actually routed (hence available for use): "Germany, France, Japan, Australia and the US were comparative leaders at the end of 2008." This is something worth reporting, even if it does not take into account tunnelled IPv6 traffic, i.e. that carried via IPv4, so it's not the complete story.

Even better, as an example of countries taking a lead, it mentioned the AGIMO revised timetable for IPv6. But that was about it. In the 351 pages of the OECD report, only *3.5 pages* of discussion (1%) were devoted to IPv6: that is a significant worry, and maybe it's where the real story lies.

The Executive Report noted in passing, with a relaxed air, "The Internet is expanding but current IPv4 addresses are running short ... there is a need for all network operators to upgrade to a new Internet addressing scheme, Internet protocol version 6". **Well that's all right then. The network operators will take care of it!**

Perhaps the headline writers were on to something after all: compared to the OECD, Australia's AGIMO seems to have a somewhat clearer understanding of the realities of IPv6 adoption.

1. *Computerworld*: www.computerworld.com.au/article/314963/australia_leads_way_ipv6_adoption_oecd
2. OECD Report: browse.oecdbookshop.org/oecd/pdfs/browseit/9309031E.PDF

IPv6 Policy Consensus at APNIC 28

APNIC 28 in Beijing ended on 28 August with two policy proposals related to IPv6 reaching consensus, prop-050: 'IPv4 address transfers' and prop-073: 'Simplifying allocation/assignment of IPv6 to APNIC members with existing IPv4 addresses'. The very interesting arguments for and against the proposals are detailed in the document links below.

www.apnic.net/policy/proposals/prop-050 suggests removing APNIC restrictions on the transfer of registration of IPv4 address allocations and portable address assignments between current APNIC account holders. (Presently only transfers related to mergers and acquisitions are permitted.) This means that the APNIC registry will reflect the current *actual status* of its IPv4 resources, rather than lose track of unregistered IPv4 transfers, which could impact on routing and addressing integrity. It will also provide a stronger incentive for unused IPv4 address space to be utilised during the IPv6 transition.

www.apnic.net/policy/proposals/prop-073 states that any APNIC member organisation that has already satisfied IPv4 criteria needs no further justification to receive IPv6 addresses. A member with an IPv4 allocation would be eligible for an IPv6 /32, and a member with an IPv4 assignment would be eligible for an IPv6 /48, through a simple online request. This policy aims to further promote IPv6 adoption by simplifying the process of applying for IPv6 address space.

Congratulations to APNIC members for working so hard to mitigate some of the difficulties ahead.

IPv6 Packets

Even a rock can get an IPv6 address

http://english.people.com.cn/90001/90781/6737117.html

August 24, 2009, People's Daily Online: China's IP address will be used up in 2 years. As the number of internet users keeps soaring, China's IP address will be used up in two or three years, according to Wu Hequan, an expert from the Chinese Academy of Engineering. China now has 380 million internet users. Every two of them use one IP address. … According to Wu, IPv6 network address, which was developed by the United States, may solve the problem. IPv6 features unlimited resources so that even a rock can get an IP address from it.

IPv6: Oops, it's on by default

http://blogs.techrepublic.com.com/security/?p=1955

July 20th, 2009, Michael Kassner: The number of computers running IPv6 is staggering. Carolyn Duffy Marsan in a NetworkWorld article quoted Joe Klein as saying: "We're probably talking about 300 million systems that have IPv6 enabled by default. We see this as a big risk." What I'm wondering, is how many of the people using the 300 million computers realize IPv6 is enabled or know what it means?

Internet's biggest issue? IPv6 transition, new ARIN CEO says

http://www.networkworld.com/news/2009/070609-arin-ceo-ipv6.html?hpg1=bn
7 June 2009, Carolyn Duffy Marsan to John Curran, new president and CEO of ARIN:
What is the most pressing issue facing ARIN today?
IPv4 address depletion is the most pressing issue facing the Internet community today and for many years to come. The fact that we've been ready for this for a decade doesn't make the transition that we will be going through over the next five years all that much easier. The fact that we've been ready for 10 years adds to the complacency. Rather than averting a sense of crisis, it's caused a lot of people to question: Is this going to happen? Yes, we are going to run out of free IPv4 addresses, and organizations that want to be able to make use of the Internet will need to support IPv6.

Broadband ISPs that Fail to Adopt IPv6 Could be Negligent

http://www.ispreview.co.uk/story/2009/07/23/entanet-uk-broadband-isps-that-fail-to-adopt-ipv6-could-be-negligent.html
23 July 2009, MarkJ: Neil Watson, Entanet's Technical Support Manager, said: "By making IPv6 available, the ISP holds a competitive edge as there are few early adopters within the market. ... By adopting a 'wait and see' approach (which seems even more pointless when the only option to wait for is the inevitable) ISPs are not only missing a competitive opportunity. They are compromising network performance and perhaps even becoming technically negligent. ... As an end user customer you will be affected by your provider's choice of strategy. Ask them what their plans are for IPv6 adoption. Are they already IPv6 compatible and, if not, when are they planning to implement it?"

Six Surprising Facts about IPv6

http://www.breakingpointsystems.com/community/blog/6-surprising-facts-about-ipv6
15 June 2009, Brent Cook : There are other surprising facts of course, including that in 2008, IPv6 celebrated its 10th anniversary …
Fact 1: You can get on the IPv6 internet in 10 minutes for free, even if your ISP doesn't support it.
Fact 2: Individual IPv6 allotments are amazingly huge.
Fact 3: There is not a lot to do on the IPv6 internet.
Fact 4: IPv6 wreaks havoc on your command-line life.
Fact 5: IPv6 is a moving target, your cheat sheet is wrong.
Fact 6: Your IPv6 firewall rules are probably insufficient.

IPv6 Training – You Know You Need It!

Michael Biber, Professional Services Manager, IPv6Now

For those of you looking at Windows7, the new Microsoft OS being released in October, be aware that the Release Candidate installs with ***automatically configured Teredo tunnels***. Your PC will be connected to the IPv6 Internet automatically, and this has major implications. IPv6Now offers comprehensive and tailored training in IPv6 for your staff, management and network support personnel. IPv6Now training is independent of vendor bias, and comes to you from the team that brought you VIC6.
See **ipv6now.com.au/training.php** or contact *michael@ipv6now.com.au* to get this ball rolling.

ipv6.org.au/summit

2009 Australian IPV6 Summit – Melbourne 7-9 December 2009

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