



# Gen-i Enterprise IPv6

# Some of what we are seeing in the market...



- Customers movement of production facilities into Asia requiring connectivity between New Zealand and Asia using IPv6 (either in native form or via 4to6).
- Mergers / Acquisitions into Asia requiring connectivity between New Zealand and Asia using IPv6 (either native or via 4to6).
- Large Enterprises wanting environments to trial IPv6 due to expansion in China and requesting IPv6 allocations from Gen-i.
- Microsoft features that prefer IPv6 to implement. E.g. Microsoft Direct Access
- Development of applications and delivery of IPv6 services by Asian providers
- New Zealand IPv6 Task Force driving awareness in New Zealand and the need for business to create their respective IPv6 strategies and involve their service providers.
- Initial development of IPv6 applications / services (generally business specific applications).
- Websites moving to IPv6
- IPv6 internal & external testing by customers
- Major internet players such as Google, Facebook, Yahoo!, Akamai and Limelight Networks offering their content over IPv6 for a 24-hour "test flight" last June 2011
- **World IPv6 Day – 6 June 2012**

# The Gen-i LAN Management IPv6 Strategy



## For LAN Management Gen-i has focused on:

1. **Skills** → Training, Lab facilities
2. **Awareness** → Skills, Assessments, understanding current services (Non Functional Requirements and KPI's under IPv6)
3. **IP addressing:** → Training, Lab facilities, access to address administration tool
4. **DNS:** → Skills base capabilities (fulfilment, assure and security) and system (platform enhancements)
5. **GIS / GWS** → Skills, base capabilities (fulfilment, assure and security):
6. **Management Platform** → Skills, base and enhanced capabilities and specific GMS / GMP enhancements
7. **IP Telephony** → Skills, base capabilities, enhanced capabilities and specific fulfil, assure and security enhancements
8. **Mobile** → Skills, base capabilities, enhanced capabilities and specific fulfil, assure and security enhancements
9. **Internal Applications** → Skills, base capabilities, enhanced capabilities and specific fulfil, assure, security enhancements as well as system and application enhancements

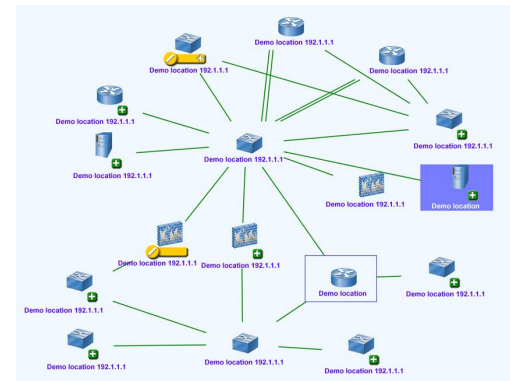
# Stage 1: Education



<u>Skill Level</u>	<u>Audience</u>
<b>General Introduction of IPv6            Protocols, Addressing            Management (assure and fulfil) - SLAAC            IPv6 Services (Multicast, QOS, DNS, DHCPv6)            IPv6 Security            IPv4 and IPv6 Co-existence            Mobile IPv6            Migration</b>	<b>Enterprise Architects</b>
<b>General Introduction of IPv6            Protocols, Addressing            Management (assure and fulfil) - SLAAC            IPv6 Services (Multicast, QOS, DNS, DHCPv6)            IPv6 Security            IPv4 and IPv6 Co-existence            Mobile IPv6            Migration            System Configuration</b>	<b>Professional Services            Solution Architects / Solution Designers            Operations</b>
<b>General Introduction of IPv6            IPv6 services            Management (assure and fulfil)            IPv6 Security</b>	<b>Service Line Managers / Product            Managers</b>
<b>General Introduction of IPv6</b>	<b>Sales (Customer facing)            Marketing            Interested parties</b>
<b>IPv6 and Business            Placing IPv6 into business terms</b>	<b>Executive</b>

# Stage 2: Systems

## Network Management Assure Tools:



Toolset	IPv6 Roadmap	Activity Required	Risk
Topology Discovery, Root Cause Analysis	Upgrade Complete - IPv6 capable	Complete	Low
Network Performance, Availability & Capacity Management	Upgrade Complete - IPv6 capable	Complete	Low
Network Configuration Management & Backup	Upgrade Complete - IPv6 capable	Complete	Low
Server Performance, Availability & Capacity Management	Already Supports IPv6	None	Low
VoIP QOS, Availability & Capacity Management	Upgrade Complete - Pv6 capable	Complete	Low
Desktop & Server Configuration Management	Upgrade Complete - IPv6 capable	Complete	Low

# IPv6 Capability on Gen-i Management Platform



GMS Dashboard

GMS Network

GMS VoIP & PBX

GMS Server

GMS Desktop

GMS Storage

GMS Security

GMS App

Discovery & Monitoring

VoIP/QOS

Server Monitoring

Server Management

Endpoint Management

SAN Management & Monitoring

Email Spam & Malware Scanning

Application Performance Management

Network Config Monitor

MS Lync

Availability & Capacity

Virtual Server Management

Endpoint Protection

Networks availability & capacity

Web-based Application Performance

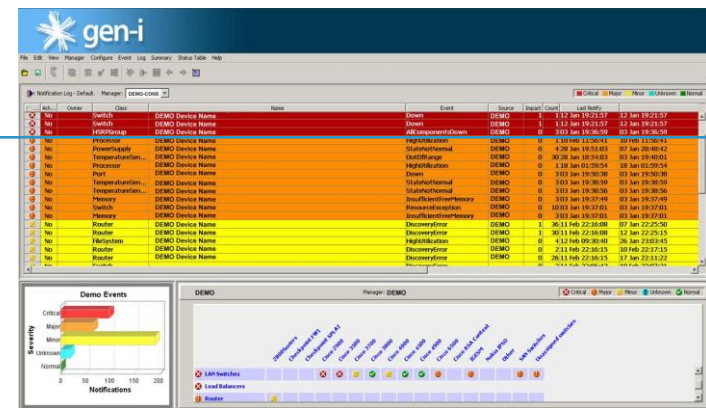
Web Filtering

Netflow

Wireless LAN

Existing Toolset

Capability in development



# Example:



Device Name	Device Type	Vendor	Model	Os Description	Serial Number	Management Ip	Sntp Location	Device Status
	Switch	CISCO	WS-C3548-XL	12.0(5)WC17				Operational
	Switch	CISCO	WS-C3560-24PS-S	12.2(35)SE5 IP LAYER_3 MIN_DRAM_MEG=128				Operational
	Switch	CISCO	WS-C2960-48PST-L	12.2(50)SE5 LAYER_2 SSH 3DES MIN_DRAM_MEG=64				Operational
	Switch	CISCO	catalyst4506e	12.2(52)SG IP				Operational
	Switch	CISCO	WS-C2950G-24	12.1(22)EA2 LAYER_2 MIN_DRAM_MEG=32				Operational
	Switch	CISCO	WS-C2950G-24	12.1(22)EA2 LAYER_2 MIN_DRAM_MEG=32				Operational
	Switch	CISCO	2950-24SX	12.1(22)EA1 LAYER_2 MIN_DRAM_MEG=32				Operational
	Switch	CISCO	2950-24SX	12.1(22)EA1 LAYER_2 MIN_DRAM_MEG=32				Operational
	Router	CISCO	2821	12.4(10b) IP FIREWALL VOICE PLUS SSH				Operational
	Switch	CISCO	WS-C2950-24	12.1(22)EA2 LAYER_2 MIN_DRAM_MEG=32				Operational
	Switch	CISCO	WS-C2950-24	12.1(22)EA2 LAYER_2 MIN_DRAM_MEG=32				Operational
	Switch	CISCO	WS-C2950-24	12.1(22)EA2 LAYER_2 MIN_DRAM_MEG=32				Operational

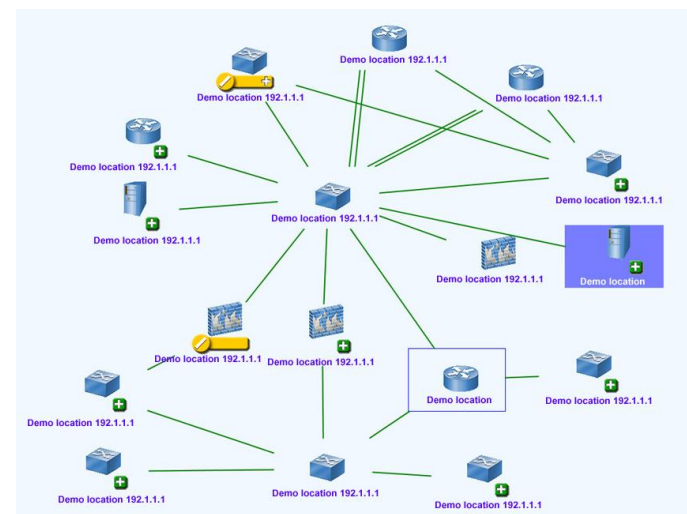


# Stage 3: Labs



## IPv6 test and development environments in Wellington & Auckland

- Dedicated IPv6 Lab for techo's
- Bring devices in for testing
- Vendors contributing
- Clients asking
- “Whitelist” slowly building
- “Gotcha’s” becoming known





# Security is a driver



## Consider.....

- The advertisement of addresses; i.e. every IPv6 is a public IP address and if required, and if not how this is blocked.
- Device access / Device Configurations (certainly when these are auto configuring)
- Routing protocols
- Interactions between IPv4 and IPv6
- IPv6 Default ports / addresses on deployed systems (Microsoft) which are not yet part of an IPv6 environment but could be accessible via IPv6.
- VPN rules
- Capabilities around Intrusion Detections Systems, Deep Packet Inspection devices.
- Control points / compliance statements.

# In addition to IPv4 security issues there are more in IPv6...



## **IPv6 Header in general**

- Extension Headers replace IP Options & can create new vulnerabilities
- The “covert channel” problem still exists in IPv6

## **IPv6 Addresses**

- IPv6 introduces multicast scope, making it more manageable, but complex
- IP address scanning is feasible despite the large IPv6 address space
- There are addresses embedded inside the packet; not much more than IPv4, but worse

## **IPv6 Transition and Tunnelling**

- IPv6 transition schemes make wide use of tunnels which obscure inside traffic from security devices; not new, just more prevalent
- Most schemes use unauthenticated tunnels

## **Packet Size and Fragmentation**

- IPv6 requires PMTU discovery, endpoint only fragmentation, and a min MTU of 1280 bytes - but nothing says that packet fragments must be at least 1280.
- Extension Headers between the IPv6 and the L4 headers combined with fragmentation may prove to be a difficult problem for firewalls.
- IPv6 transition and tunnelling makes this MUCH more complicated, as nested fragmentation in v4inv6 and v6inv4 tunnels is possible.

## **IPsec**

Wide variety of options: IKEv1/v2, PSK/EAP/PKI, 4in4/6in4/4in6/6in6

## **ICMPv6**

Some of ICMPv6 functionality is the same as in IPv4

But with Neighbourhood and MTU Discovery, ICMP is integral part of IPv6

ICMPv6 error messages should include as much of the error packet as possible

# Where to from here for Gen-i



gen-i

- Fully IPv6 capable Monitoring & Configuration Management Platform – already monitoring/managing customer's dev & test environments
- Professional Services and their ability to help customers with IPv6
  - Consultancy – path to IPv6
  - Implementation Planning
  - How to handle “Cloud”
  - Security – perimeter & internal
  - Lab facilities