

Internet Protocol Version 6 (IPv6)

Is There a Business Case?

Tuesday
7 July 2009
Confidential
5:00pm – 6:30pm

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Agenda

- **IP Version 4**
- **IP Version 6**
- **Drivers – Technical/Business**
- **The Business Case**
- **First Steps to Deploy**
- **Summary**

What Happened in the 1980's?

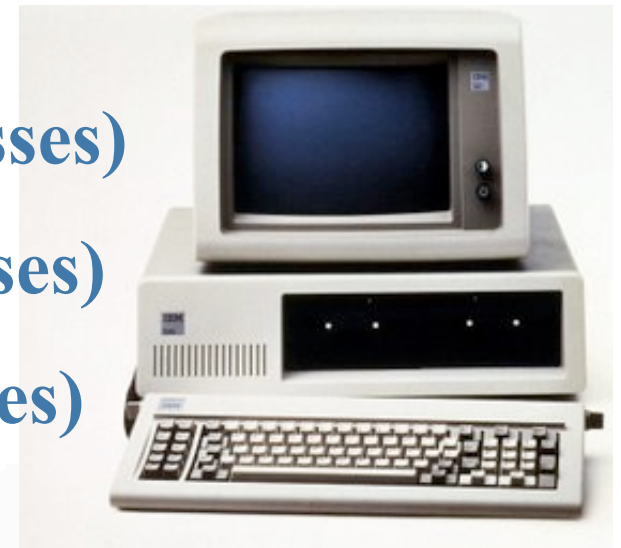
Big Hair & IP Address Free-for-all!

32 bit address space

Represented as nnn.nnn.nnn.nnn

where 'nnn' represents 8 bits so from 0-255

- **Class A = nnn.*.*.* (16 million addresses)**
- **Class B = nnn.nnn.*.* (64,000 addresses)**
- **Class C = nnn.nnn.nnn.* (256 addresses)**



IPv4 Depletion workarounds phase 1

- Private Addressing (RFC1918) coupled with NAT
- Classless Addresses
- Dynamic addressing from ISP

But... What Problems Did These Workarounds Cause?

IP Version 4 – Current Address Allocation Map

Each number = 1 block of 16 Million Addresses (nnn.*.*.)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

NNN = Allocated
 NNN = Unallocated
 NNN = Private
 NNN = Experimental

IPv4 Depletion workarounds phase 2 - considerations

- Under consideration now
 - Release 'Experimental' Range – Class E
 - Allow Trading of IP Address Allocations
- Possibilities
 - Reclaim public addresses back from market
 - Charge more....
- Longer term answer: IP Version 6

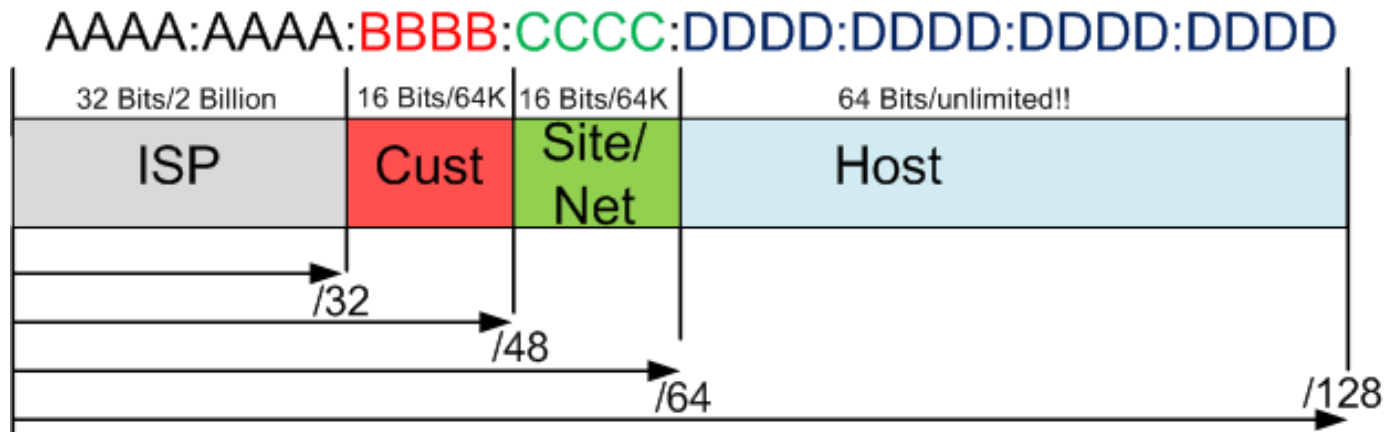
IPv4 Depletion – How will it affect your business

- Addressing harder to obtain
 - cost increases
 - lock-in to ISP
- Network growth may be difficult/impossible
 - Comcast requirement for 60 Million Addresses!
- Growing unreachable target markets will become a business problem
-But – No Y2K, effects will be gradual

IPv6 – The Benefits

- Huge address space
- Security: IPSec mandated to be *available*
- Mobility: Built into IPv6
- Performance

IPv6 Benefits #1 – The HUGE address space



2404:D000:0005:0103:0000:0000:0000:0001

ISP /32 Prefix is '2404:D000' – in this case, the GSN

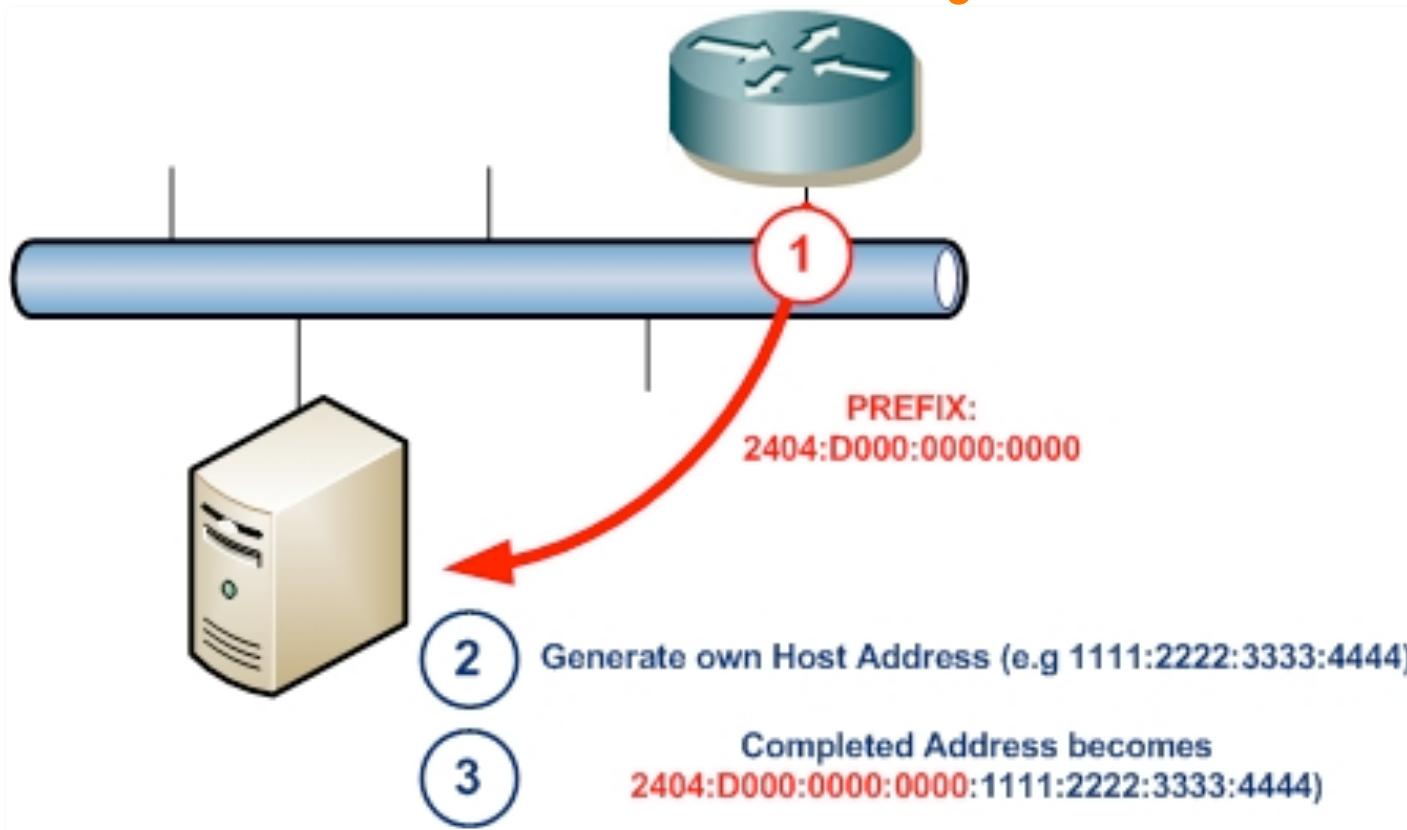
Customer /48 prefix, includes ISP plus customer number '0005'

Site arbitrarily set to 8 bits, so '01' is customers first site

Network arbitrarily set to 8 bits, so '03' is network 03 at site 01

Host can be set with different methods, this case, a static '1'

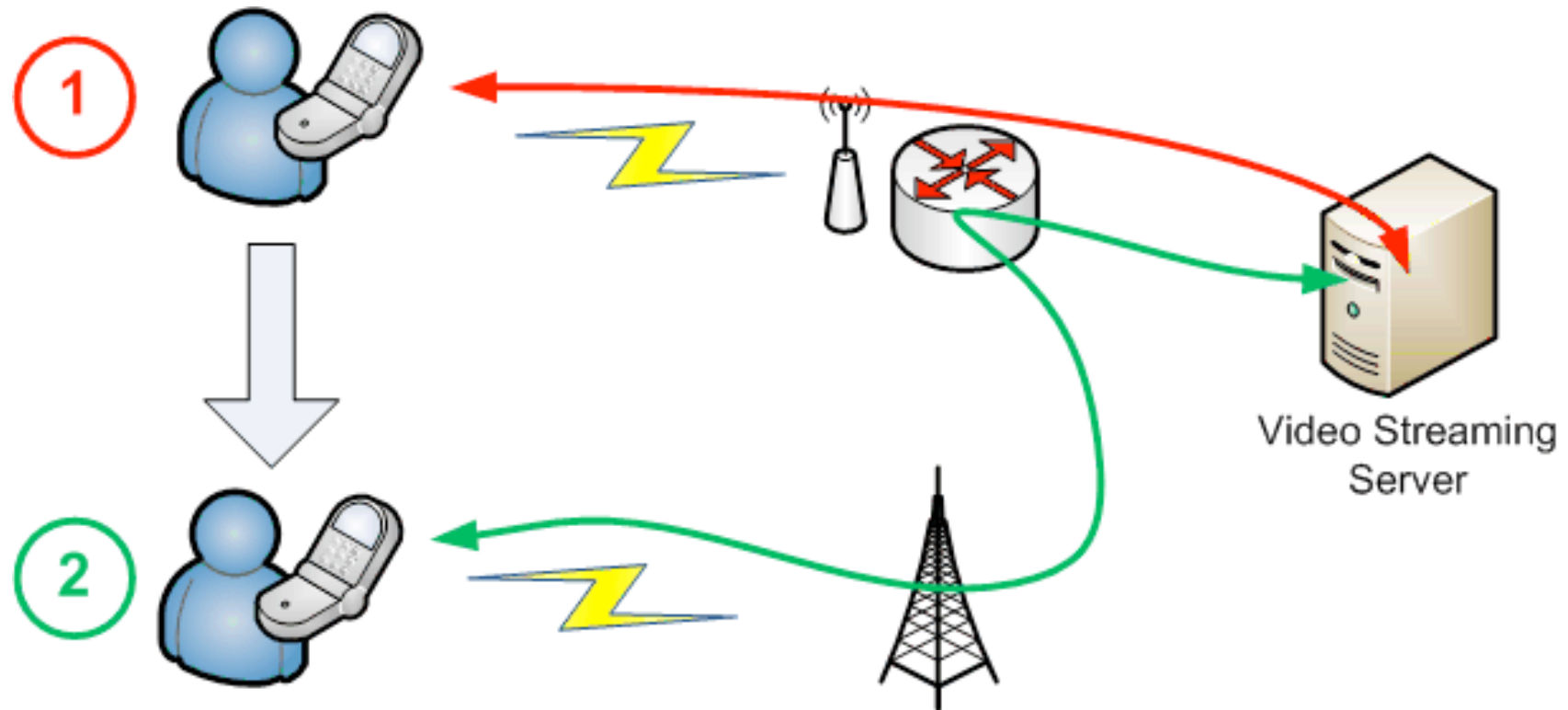
IPv6 Additional Benefits – Autoconfiguration



1. Routers advertise all interface prefixes (64 bits)
2. IPv6 Nodes can generate their own 64 bit addresses
3. Prefix PLUS generated host address = 128 bit IPv6 Address

IPv6 Additional Benefits – Mobility

- IPv6 Supports Mobility



Technical Drivers



- Simplification of network design
 - Unlimited Addressing
 - Autoconfiguration (DHCP doesn't need to give IP Addresses)
 - No Address Translation Architecture Problems
- Global Secure end-to-end communication
- Performance improvements
 - No Broadcasting
 - Better packet format, no checksums

Business Drivers for IPv6



- Regulatory/Leadership – US Govt Depts, NZ - Karen/GSN/FX
- Main Drivers
 - Enable New Services
 - Reaching New Customers (increasing as time goes on...)
- Nice To Haves
 - Reduced Costs for Peer-to-peer Application Development
 - Enhanced mobility user experience
 - Privacy of corporate data

Business case for IPv6

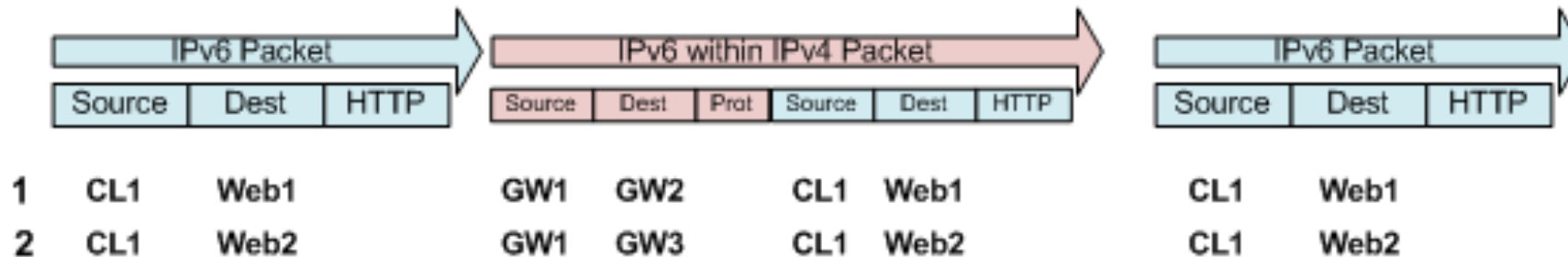
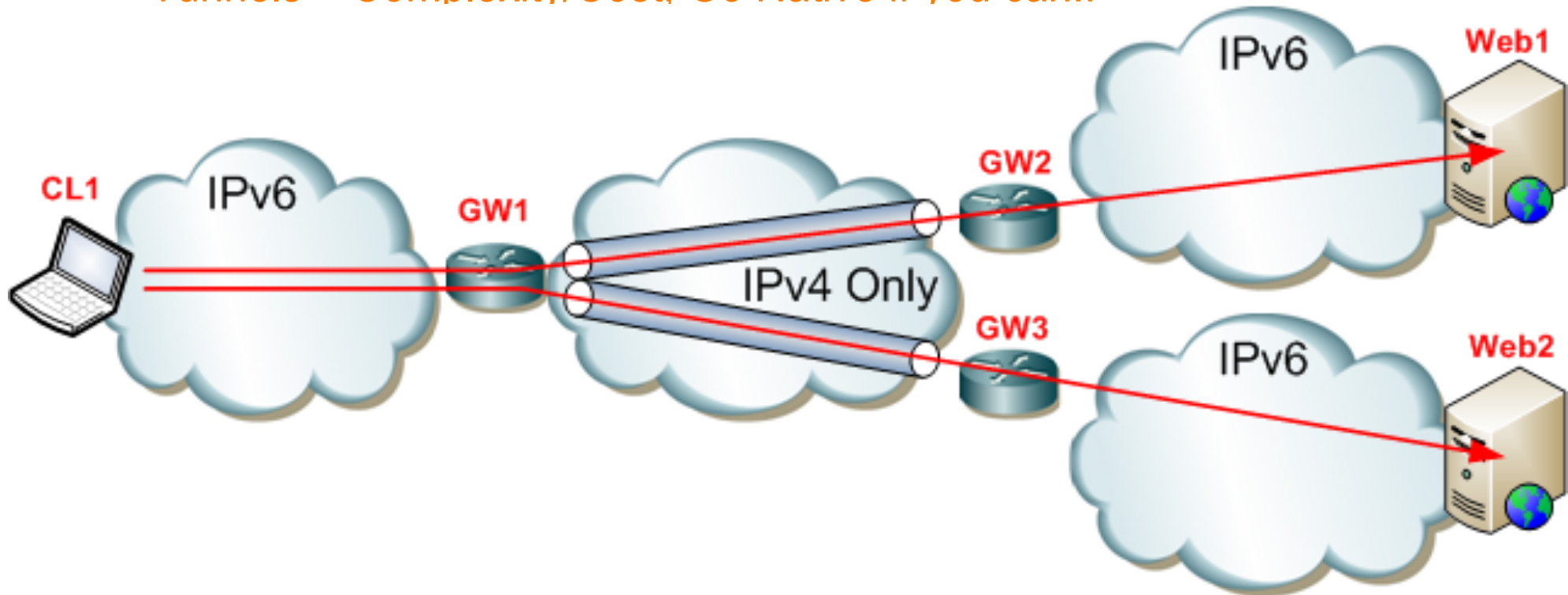
- It's an infrastructure/capacity planning thing.....
- Revenue impact
 - Short term: Likely to be zero
 - Longer term – difficult to calculate:
 - Access to new IPv6-only customers
 - Retention of existing customers
 - Business agility – ability to provide new services
- What is the value of showing leadership in this area
- Cost of deployment will increase if delayed
- Reduce the cost of deployment = better ROI

IPv6 Deployment – what is needed?

- Host Operating Systems support
 - Networking equipment support
 - DNS (DHCPv6 also advisable for options)
 - Applications!
-
- Seek design guidance
 - Reduce complications – initially (see next slide)



Tunnels = Complexity/Cost, Go Native if you can!!



SUMMARY

- IPv4 Address Depletion will happen, next few years
- In short term, no/low cost items, architecture update, audits, refreshes, include in RFP's, ask your ISP/Telco, address planning, hui
- Medium term (1-2 Years) build test network, test applications, SECURITY, equipment and OS software
- Longer term (>3 years) start using IPv6

For whitepaper: Voco Website <http://voco.co.nz/opinions>

The screenshot shows a web browser window with the URL <http://www.voco.co.nz/home>. The browser's address bar and search bar are visible. The website's navigation menu includes: Home, About Us, Our Services, Our People, Case Studies, Opinions, Recruitment, Media & Events, Blog, and Contact Us. The main content area features a 'Welcome to Voco' section with a sub-header 'A company of freethinkers helping organisations leverage the ICT market environment to meet business challenges and realise benefits'. Below this is a photo of Margie Chambers, a woman in a red blazer, with a bio: 'Margie Chambers Hates jargon and insists suppliers talk about the net realities of a solution. View more >>'. To the right, there are sections for 'Case Studies' (highlighting 'Strategy development and communicating the vision for Inland Revenue' with a 'View more >>' link) and 'Voco Blog' (listing '06 July 2009 - TUANZ Innovation Awards', '01 July 2009 - itSMFnz Wellington', and '11 June 2009 - 1st Tuesday Club - McAfee' with 'View other media & events >' and 'View full blog >' links). A banner at the bottom of the main content area reads 'Voco - Premier Sponsor of the innovation awards 2009' with logos for CLEVER, IXC, and others.

The End – GOOD SOURCES OF INFORMATION

- IETF – the real deal, all the details you could ever want to know:-<http://www.ietf.org/rfc.html>
- Microsoft IPv6 Information and articles -
www.microsoft.com/ipv6
- Cisco Implementation - www.cisco.com/go/ipv6
- The IPv6 Task Force Portal – www.ipv6tf.org
- NZ info site (HUI) – www.ipv6.org.nz/hui.html