ShowNet on Interop Tokyo 2002 First Largest Demonstration Network of IPv4/IPv6 Dual Stack

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What is ShowNet

- INTEROP
 - Tradeshow of the network equipments.
 - Conference and exhibition
 - Since 1986 at US, 1994 at Japan
- ShowNet
 - Provides the Internet connectivity to the exhibitor's booth.
 - Demonstration on inter-operability among the advance network equipments.

ShowNet Japan

- ShowNet at Japan has been demonstrating since 1994, starting with INTEROP Tokyo.
- First 4 years, Network was designed as single design for the world wide INTEROP shows.
- From '98, ShowNet has been designing and implementing by the domestic NOC team with contributors from Japan and US.
- iLab of INTEROP US is wreck of a Old ShowNet.

Design of the network

• Rib

- between exhibitor booth and backbone
- Backbone
 - Backbone network on the Show floors
- External
 - Link between Backbone network and the Internet



2002 NOC Rack



NOC Meeting at HotStage



Brief History of the ShowNet Technology at Japan(I)

	External	Backbone	Rib(Drop)	Misc
1994	T1	ATM, FDDI	10Base-T	
1995	T1,JSAT 2Mbps	S.A.	S.A.	
1996	6Mbps x3	S.A.	S.A.	First IPv6 support
1997	FDDI(100M)	ATM, LANE, 100FX	10/100base- Tx	Conn. To 6bone
1998	OC3 ATM, T3	GbE, 100FX	S.A.	
1999	OC12 x2, OC3 ATM	GbE, OC12 OverWDM	+ OC3	IPv6 for every Booth

Brief History of the ShowNet Technology at Japan(II)

	External	Backbone	Rib(Drop)	Misc
2000	OC48 x2 OC3ATM x2	OC192,OC48, GbE	10/100BaseTx 1000BaseTx ADSL	
2001	OC48 x5	GbE, OC48 over Sonet Ring	10/100BaseTx 1000BaseTx DSL,OC48, OC3	
2002	OC192 x3 OC48	10GbE, GbE	10/100BaseTx 1000BaseTx	IPv4/v6 Dual Stack

The design of ShowNet 2002

- External connectivities
 - OC 192 x3 and OC48 x1
- Backbone network
 - 10Gbit Ethernet
 - Taged VLAN
- Ribs
 - 10/100BaseTx
 - 1000BaseSx
- IPv4/IPv6 as single network with dual stack

Topics and result of ShowNet2002

- Interoperability on 10Gbit Ethernet
 - Juniper M160, Cisco GSR, Foundry BigIron15000 and Extreme Black diamond were satisfy the inter-operability with 10GbE LR as backbone network.
 - 1000BaseSX were provided to the exhibitors, And several different switches were used at exhibitors side. But we did not have any trouble on 1000BaseSX.
- IPv4 Multicast streaming with 35Mbps DVTS
 - Every backbone routers and Hitachi GR, and all backbone L2 switches could handle the several DVTS multicast streaming.
- Interoperability on OC-192 SONET as Externel Link
 - OC-192 SONET are interoperable among Juniper M160, Cisco GSR and Fujitsu GEO 900.

Most important topic on ShowNet 2002 Japan

- IPv4 and IPv6 Networks are designed as single network.
- IPv4 and IPv6 dual stack routers and switches.



- 1997-1998
- PC based IPv6 routers, no commercial routers
- Separate network from IPv4 Network, because L2 switches could not handle the IPv6 packets
- # of exhibitors connected via IPv6: 3 to 5

Brief History of the IPv6 on ShowNet; Second Stage

- 1999-2001
- Shared L2 networks by IPv4 and IPv6 using VLAN.
- There were IPv4/IPv6 Dual stack routers and switches. BUT:
 - Sufficient number of the routers.
 - Interoperability ?
- Provided IPv6 connectivity to the every booth.

IPv4 Configuration 2001



IPv6 Configuration, 2001



2001 Network Config. IPv4 and IPv6





IPv4/IPv6 Network Configuration 2002



External network

- Routers
 - Juniper M160(OC192, 10GbE)
 - Cisco GSR(OC192, 10GbE)
 - Fujitsu Geo980(OC192, GbE xN)
- IX
 - JPIX, JPNAP, NSPIXP-2 and NSPIXP-6
- Transit connectivities
 - OCN and Verio with IPv4 and IPv6





Backbone Routers/Switches

- 10GbE routers
 - Cisco GSR, Juniper M160
- 10GbE L3/L2 switches



- Foundry BigIron15000, Extreme BD, Cisco 7600, NEC IX5500
- Routers
 - Hitachi GR(VRRP)



Routing Protocols

- Same topology but different protocols
- IPv4
 - External: BGP4
 - Internal: OSPFv2
- IPV6
 - External: BGP4+
 - Internal: OSPFv3 and RIPng







Pingman: Network Monitoring Tools(IPv4 and IPv6)



Conclusion

- ShowNet Japan 2002 is first largest demonstration of the IPv4/v6 Dual stack networks as single plain network with about 8 router and switches vendors, over the 15 equipments.
- We can believe that IPv4/v6 Dual stack networks is very helpful for the operation and management for futre network.



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