The Interoperability Test for IPv6 Network equipment

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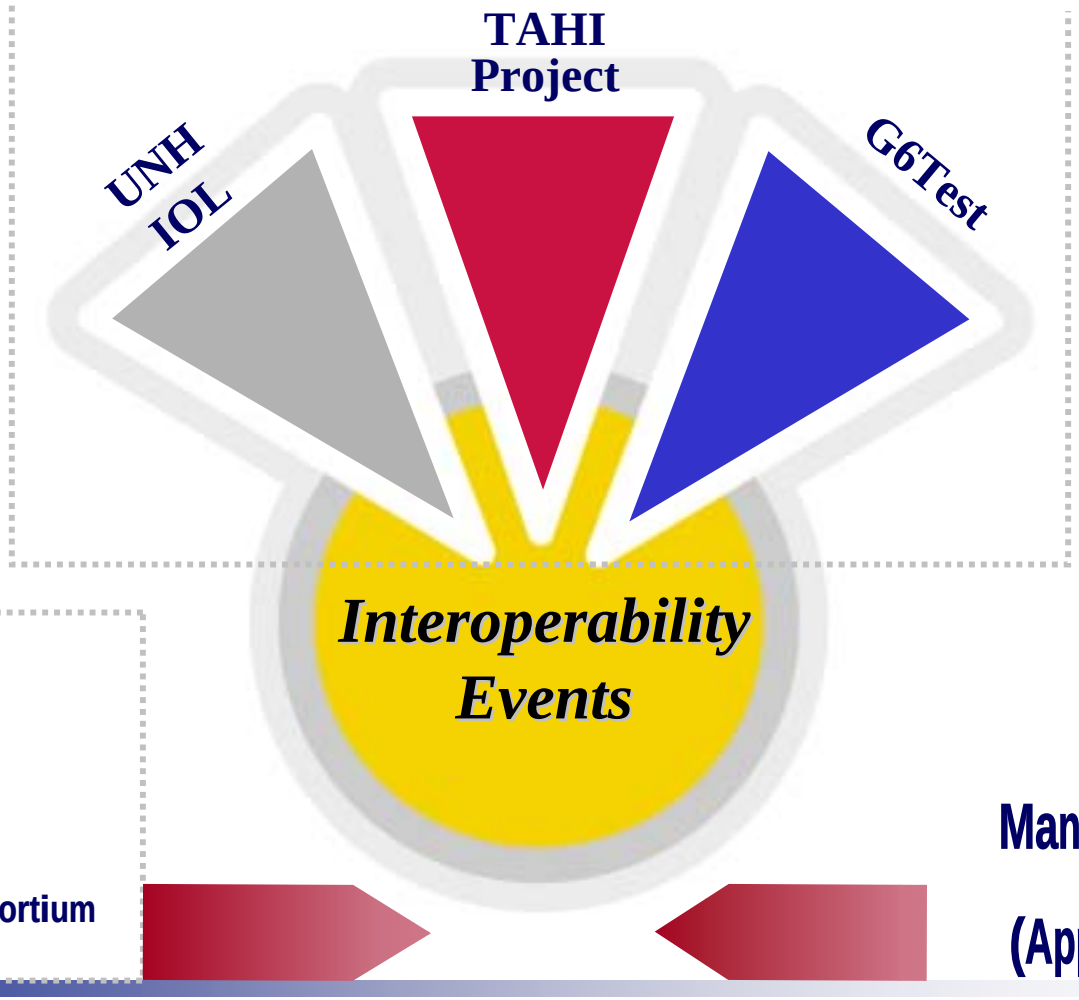
Why Interoperability Test?

- **The participants**
  - **Testers**
    - **To evaluate and enhance their test suites during the events**
    - **To advertise their testers and technology**
  - **Vendors**
    - **To isolate conformance and interoperability problems before the product reaches the market**
    - **To enhance the confidence on the final deliverable**
    - **To discuss with other companies and share experience**
- **The organizers**
  - **To detect ambiguities in standards**
  - **To enhance the quality of standards**

International IPv6 Testing Activities (1)

Technical Part



Organizing Part

- Connectathon
- TAHI Project
- ETSI Plugtests
- UNH IOL IPv6 Consortium

Many Vendor

(Applicants)

International IPv6 Testing Activities (2)

- **Connectathon (http://www.connectathon.org)**
  - **The first event for IPv6 held in 1993**
- **TAHI Project (http://www.tahi.org)**
  - **Dedicated specially to IPv6 and organized in Japan**
  - **Organized by the TAHI Project**
  - **The 3rd interoperability test event held in January 2002**
- **ETSI Plugtests (http://www.etsi.org/plugtests)**
  - **The first IPv6 interoperability event held in 2000 (called bake-off)**
  - **The last event was in September 2002 at France(3rd)**
- **UNH IOL IPv6 Consortium (http://www.iol.unh.edu/consortiums/main.html)**

Conformance Testing Activities Summary(1)

IPv6 Core Protocol

	Main independent experts		
	G6TEST	TAHI	UNH
C1. IPv6 Core Protocol			
a)IPv6 Specification *[RFC 2460]*	X	X	X
b)IPv6 Jumbo Payload Option *[RFC 2675]*	X		X
c)ICMPv6 *[RFC 2463]*	X	X	X
d)Neighbor Discovery *[RFC 2461]*	X	X	X
e)Path MTU Discovery *[RFC 1981]*	X	X	X
f)Stateless Address Autoconfiguration *[RFC 2460]*	X	X	X
g)Redirect *[RFC 2461]*	X		X
h)DHCPv6			
g) SIP			

(Source : Technical Programme to support IPv6 Interoperability events Version 2, 2002. 6., ETSI)

Conformance Testing Activities Summary(2)

Mobile IPv6

	Main independent experts		
	G6TEST	TAHI	UNH
Mobile IPv6(v13):			
a)Correspondent Node Part	X		
b)Home Agent Part	X		
c)Mobile Node Part	X		
Mobile IPv6(v14):			
a)Correspondent Node Part			X
b)Home Agent Part			
c)Mobile Node Part			
Mobile IPv6(v15):			
a)Correspondent Node Part	P2002		
b)Home Agent Part	P2002		
c)Mobile Node Part	P2002		

Conformance Testing Activities Summary(3)

Transition , Routing & Security

	Main independent experts		
	G6TEST	TAHI	UNH
Transition:			
a)IPv6 over IPv4 Tunnel		X	
Routing:			
a)RIPng Operations *[RFC 2080]*			X
b)OSPFv3 *[RFC 2740]*			
c)EGP *[RFC 904]*			
d)BGP4+ *[RFC 1771]*			
e)ISISv6			
Security:			
a)IPSec AH *[RFC 2401, RFC 2402]*		X	
b)IPSec ESP *[RFC 2401, RFC 2406)*		X	

Interoperability Testing Activities Summary(1)

IPv6 Core Protocol

	Main independent experts		
	G6Test	TAHI	UNH
1. *IPv6 Basic Interoperability:*			
a)IPv6 Basic Specifications		X	X
b)IPv6 over PPP *[RFC 2472]*	X		
c)ICMP echo interoperability			X
d)TCP interoperability			X
e)UDP interoperability			X
f)SIP *[RFC 2543]*			
g)SCTP *[RFC 2960]*			

Interoperability Testing Activities Summary(2)

Transition & Routing

	Main independent experts		
	G6Test	TAHI	UNH
Transition Mechanisms:			
a)6over4			
b)6to4 encapsulation	X		
c)SIIT/NAT-PT *[RFC 2765, 2766]*	X		
d)ISATAP			
e)DSTM			
Routing:			
a)RIPng *[RFC 2080]*		X	
b)OSPFv3 *[RFC 2740]*			P2002
c)EGP *[RFC 904]*			
d)BGP4+ *[RFC 1771]*		X	
e)IS-ISv3			

Interoperability Testing Activities Summary(3)

Security , Compression & Multicast

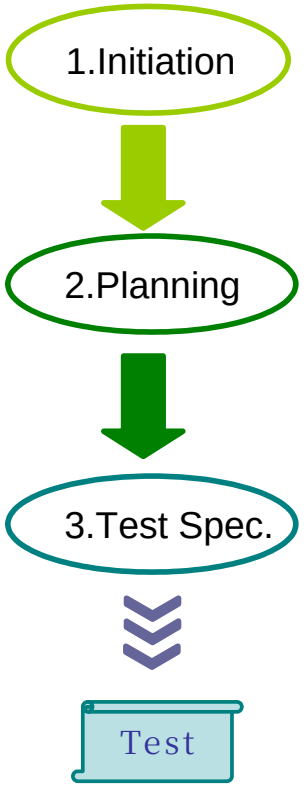
	Main independent experts		
	G6Test	TAHI	UNH
4. *Security:*			
a)Ipsec *[RFC 2401, 2402, 2406]*		X	
b)IKE *[RFC 2409]*		X	
5. *Compression:*			
*a)*ROHC	X		
b) 3GPP PDCP and ROHC			
6. *Multicast*			
a) Multicast Listener Discovery(MLD) *[RFC 2710]*			

ION (Interoperable Open Network) (1)

- A Group Interoperability Test Event in Korea
- Technical Part + Organizing Part
- Past Events in 2002
  - SIP(Session Initialization Protocol) : July 2 ~ July 6
  - H.323 : July 8 ~ July 12
  - WIPI (Wireless Internet Platform for Interoperability) : September 16 ~ September 18
  - IPv6 (Internet Protocol version 6) : October 7 ~ October 11
- Scheduled Events in 2002
  - MHP(Multimedia Home Platform) : November 13 ~ November 15
  - VPN(Virtual Private Network) : November 25 ~ November 29
  - SIP : December 9 ~ December 13

ION (Interoperable Open Network) (2)

- **Procedure**



1. **Initiation : A company asks TTA to hold an event for specific technology**
2. **Planning : TTA sets up a schedule to hold the event and announces a plan to other companies for joining**
3. **Test Spec. : The TTA and applicant companies discuss how to test**
4. **Test : According to the test spec., Applicant companies perform the interoperability test**

IPv6 ION (The 4th ION 2002) (1)

- Test Duration : 2002. 10. 7 ~ 11 (5 days)
- Systems Under Test : Router(2),Translator(3), IPv6 Embedded S/W(1)
- Applicants

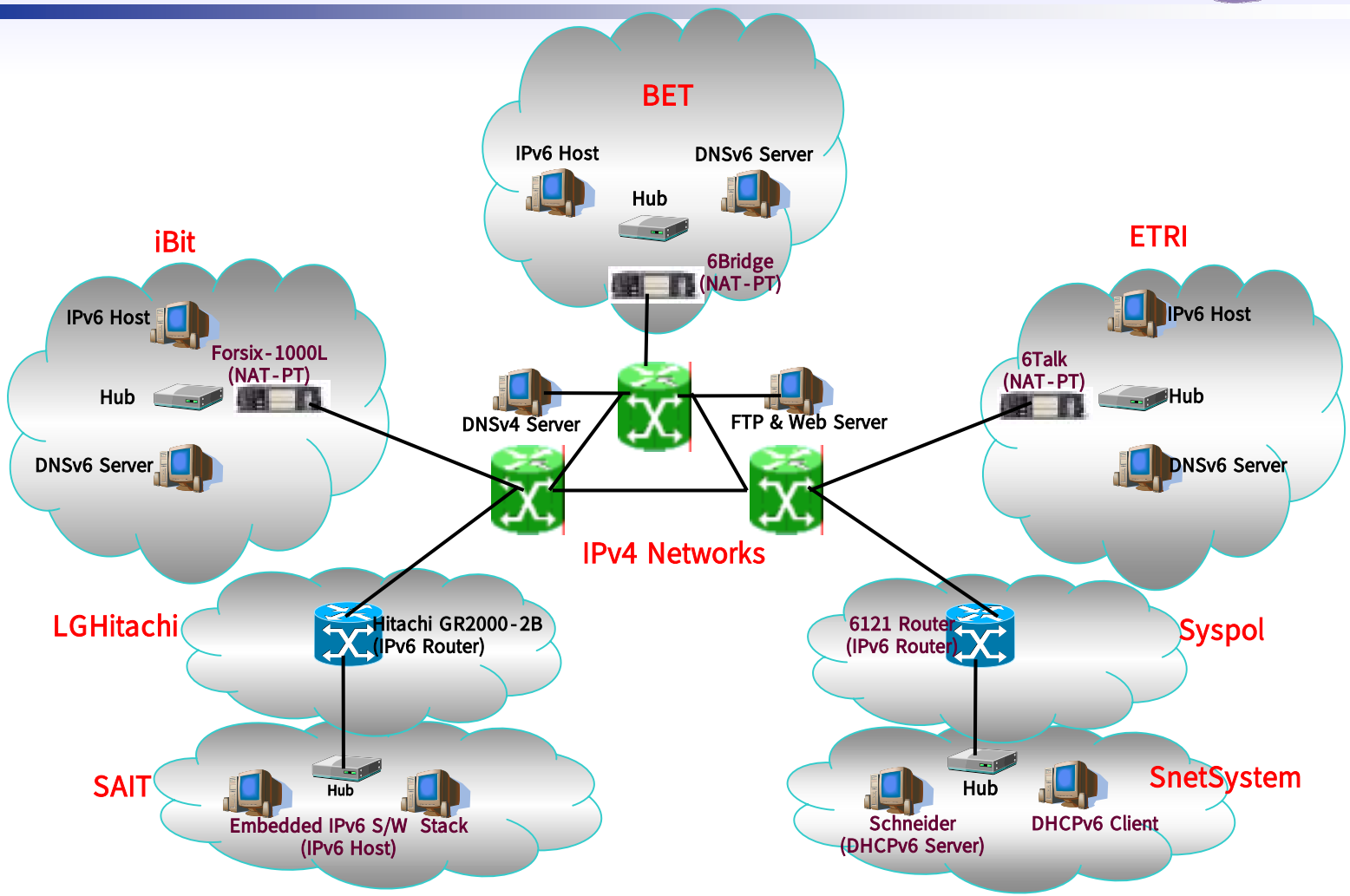
㈜아이비트

- Organizers
  - ETRI, IPv6 Forum Korea, KISA, OSIA, TTA
- Sponsors
  - Agilent Technologies, IXIA, NetTest, Network Associates Inc., Spirent Communications

IPv6 ION (The 4th ION 2002) (2)

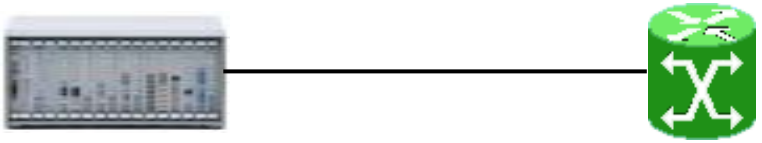
- Test coverage
  - Conformance Test
    - IPv6 Basic Spec.
    - Transition Mechanism
    - NDP(Neighbor Discovery Protocol)
    - Autoconfiguration
    - ICMPv6, etc.
  - Interoperability Test
    - Autoconfiguration Check
    - Unicast Communication(Host↔Router, Router↔Translator, Host↔Host)
    - Redirect & RA Message Option Processing Check
    - DNS ALG, FTP ALG
    - RIPng, BGP4+

Network Configuration



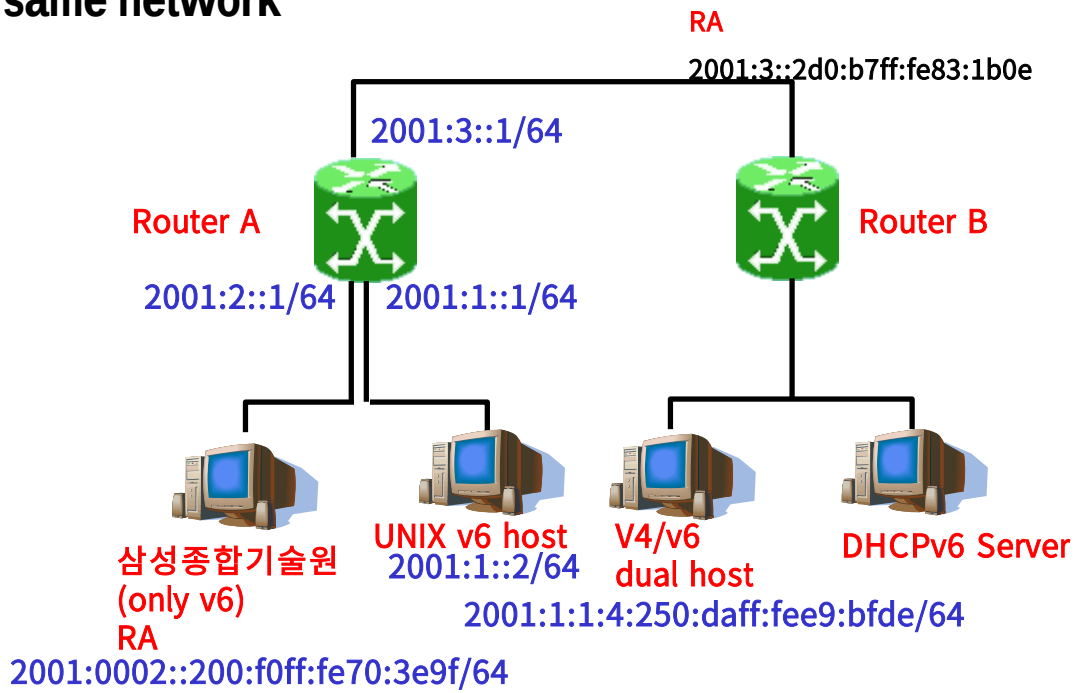
IPv6 Test Methods (1)

- **Conformance Test**



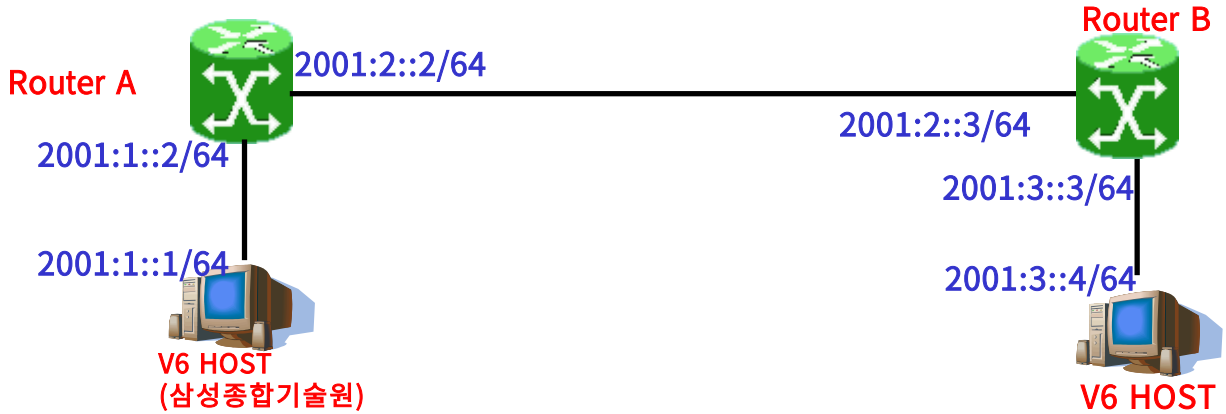
IPv6 Test Methods (2)

- **Interoperability for Hosts in the same network**



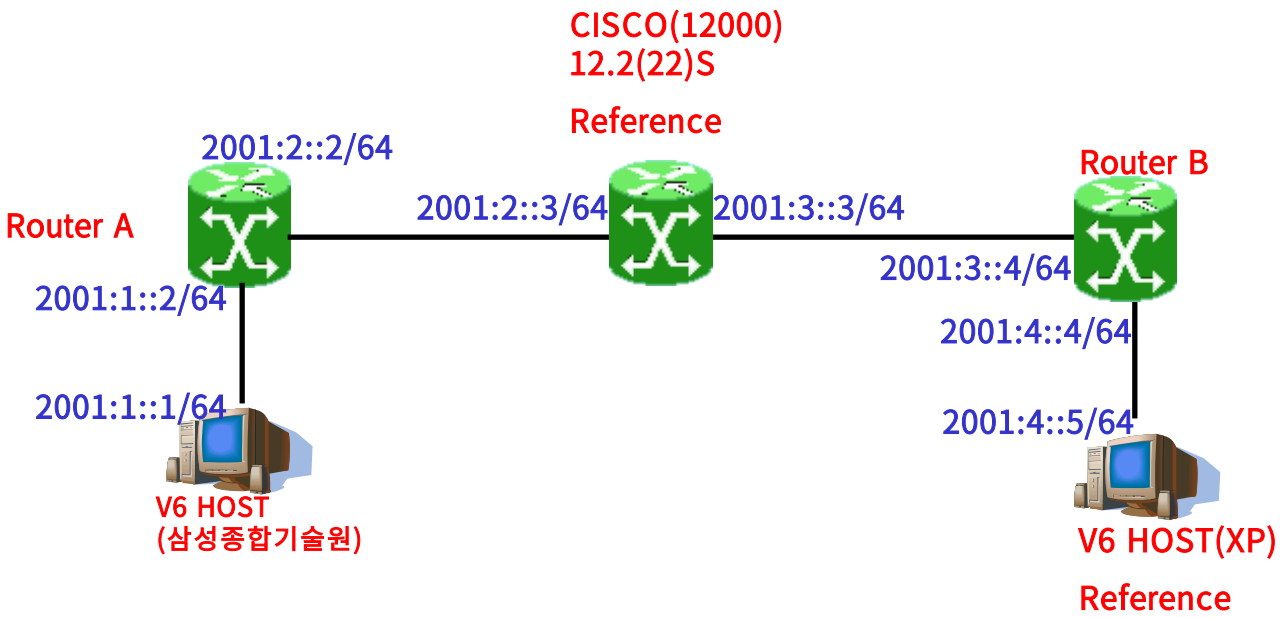
IPv6 Test Methods (3)

- **Without Reference Equipment**



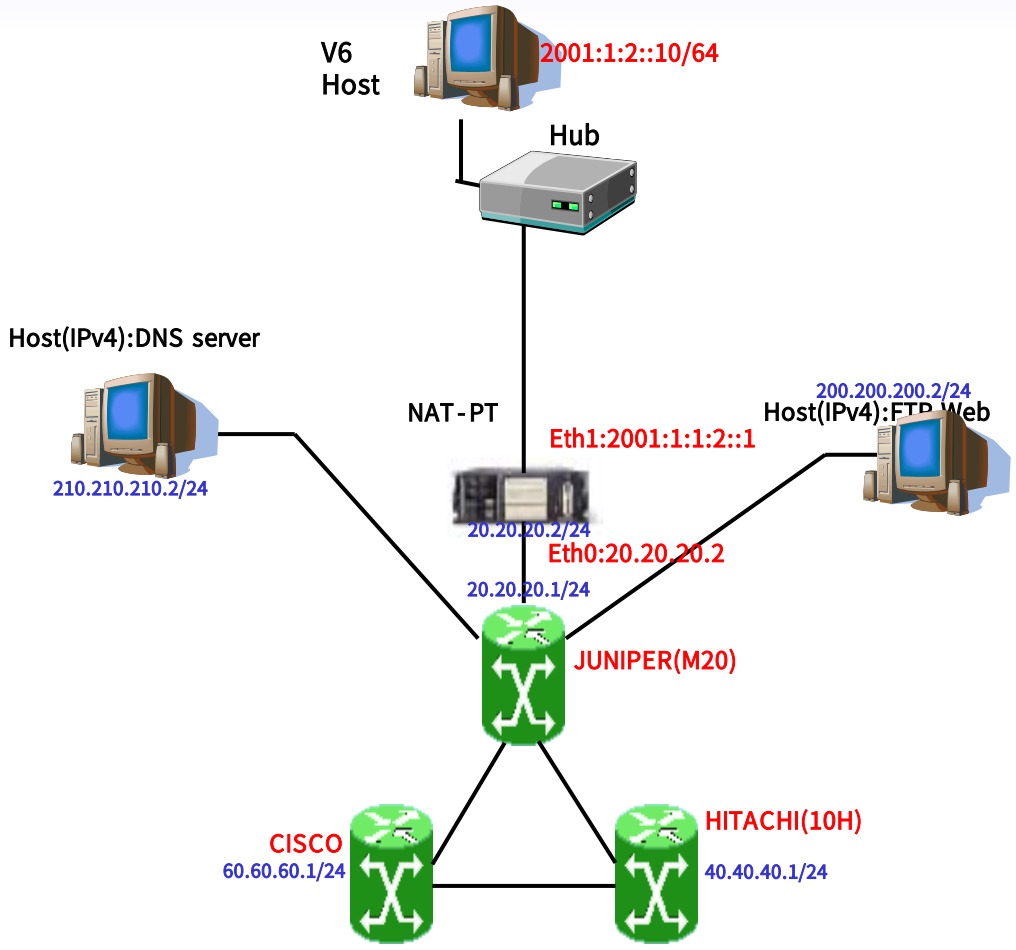
IPv6 Test Methods (4)

- **With Reference Equipment**



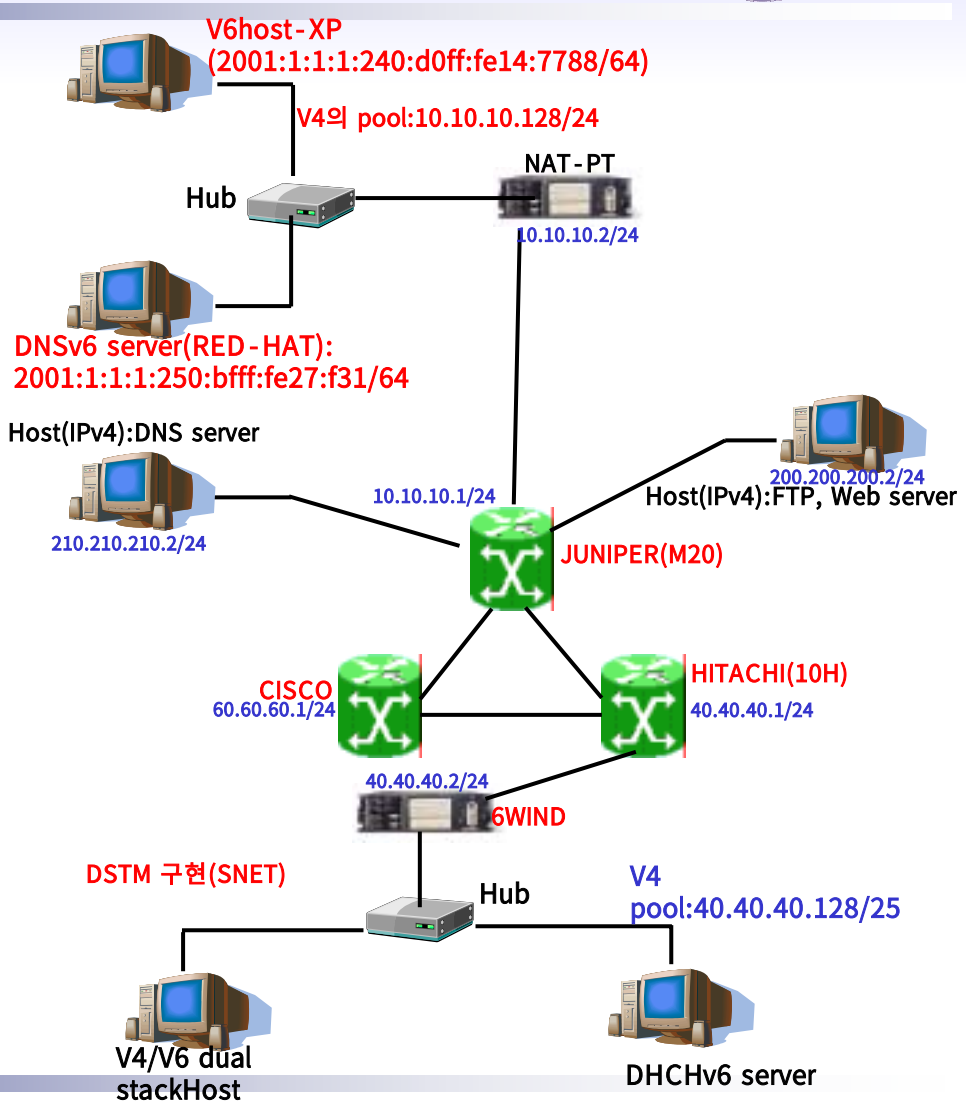
IPv6 Test Methods (5)

- **NAT-PT and Host Test**
  - **Access v4 Server**



IPv6 Test Methods (6)

- **Real Network simulation**
- **Whole system test**
  - **Unicast Communication Test**



After the test …(1)

- **# of sample : 10**
  - 귀사의 상호운용성시험 참여 결과에 대한 만족도는?( )
    ① 매우 만족(80%이상) ②만족(80~60%) ③보통(60~40%) ④기대 이하(40~20%) ⑤ 매우 불만족(0~20%이하)

항목	1번	2번	3번	4번
의견수/10	2	8	0	0

  - 금번 TTA에서 제공하는 IPv6 상호운용성시험 이벤트에 대한 서비스(행사운영, 시험진행, 시험기간, 참가비 등) 만족도는?( )
    ①매우 만족(80%이상) ②만족(80~60%) ③보통(60~40%) ④기대 이하(40~20%) ⑤ 매우 불만족(0~20%이하)

항목	1번	2번	3번	4번
의견수/10	3	6	1	0

The more SUT,
The more benefit

After the test …(2)

After the test …(3)

Thank you !