APT/ITU Conformance and Interoperability Event 2015
7 – 8 September 2015, Bangkok, Thailand

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HATS, Japan and ITRC, Iran

REPORT OF NGN END-TO-END SERVICE INTEROPERABILITY TESTING ON APT/ITU C&I EVENT 2015 ORGANIZED BY HATS

Contact: Email:
HATS, Japan
ITRC, Iran

3rd APT / ITU Conformance & Interoperability Event Workshop
7 – 8 September 2015, Bangkok, Thailand

Report of NGN End-to-End Service interoperability testing on APT / ITU C&I event 2015 organized by HATS

Yasubumi Chimura / Hideo Himeno ,HATS
Japan
Hassan Yeganeh, ITRC
Iran

Agenda

- NGN E2E service interoperability testing
  - Summary of NGN E2E Interoperability testing
  - Introduce NGN services
  - Configuration on test environment
  - Testing guideline (VoIP & Multimedia)
  - Result of Interoperability testing
- NGN E2E remote interoperability testing
  - Introduce ITRC
  - Summary of NGN E2E remote interoperability testing
  - Result of remote testing
  - Challenge for future Remote interoperability testing

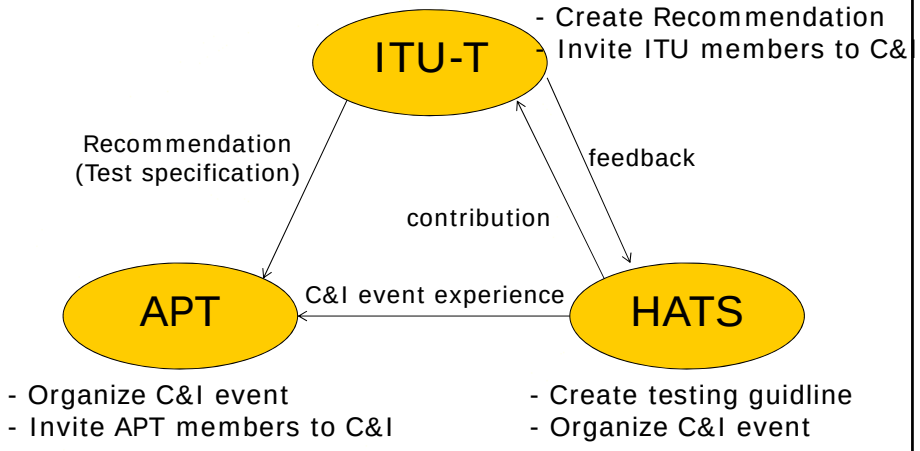
ITU-T
Video Letter

Report of NGN End-to-End Service interoperability testing
on APT/ITU C&I event 2015 organized by HATS

NGN E2E service interoperability testing

HATS CONFERENCE IN JAPAN
YASUBUMI CHIMURA, OKI
HIDEO HIMENO, NEC CORPORATION

Cooperation in NGN E2E C&I event



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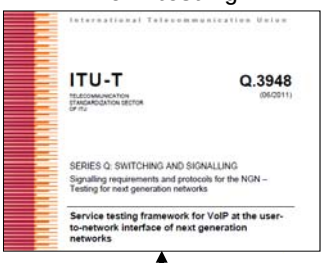
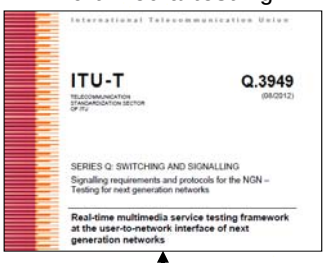
Test Specifications in ITU-T related with HATS documents

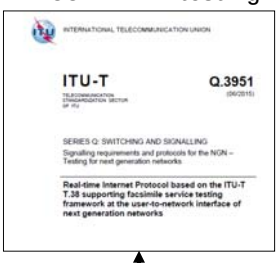
ITU-T Q.3948
VoIP testing



ITU-T Q.3949
Multimedia testing



ITU-T Q.3951
T.38 IP-FAX testing



contribution

HATS-J-101-V1.0 HATS-J-102-V1.2 HATS-J-103-V1.0

Harmonization of Advanced Telecommunication Systems HATS

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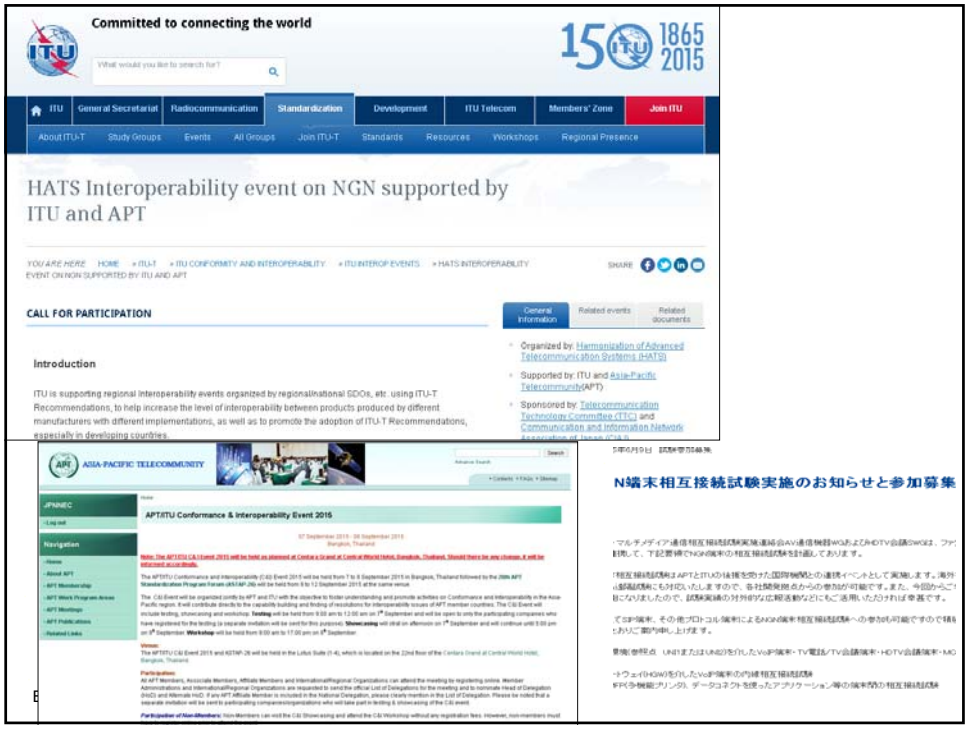

Summary of NGN E2E Interoperability testing

- HATS is pleased to inform you of the 4th HATS Interoperability event on NGN supported by ITU and APT. This event is held following HATS Interoperability Event on NGN supported by ITU-T and last year's 2nd APT/ITU Conformance and Interoperability event . This event aims to assure the interoperability of the NGN equipment which complies with ITU-T Recommendations and TTC standards. This interoperability event will be organized by HATS and use the HATS test specifications which are developed based on the ITU-T Q.3900 Recommendation series. This event will be held under the sponsorship of TTC and CIAJ.
- EVENT DATE : 14th July 2015
- TEST Location : CIAJ in Japan
- TEST Members : NTT, NEC Engineering, neix, SONY,OKI, ITRC (Remote Test)

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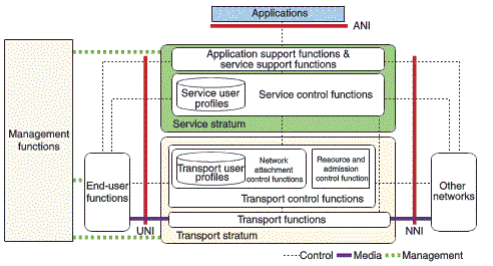
Introduce NGN services

- NTT has been provided NGN Services from 2008, based on ITU-T Recommendations.



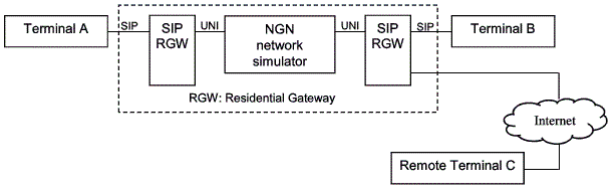
HATS Testing Items

Communication functions	Applied service examples		
	Service category	QoS class	Bandwidth of use (codec)
Interactive (unicast) communication (bidirectional communication) functions	IP telephony (with 0AB-J phone number)	Highest priority	• Wideband speech: 7 kHz (G.722, etc.) • Narrowband speech: 3.4 kHz (G.711, etc.)
	Video telephony (with 0AB-J phone number)	Highest priority	• SDTV class (MPEG4): 2 Mbit/s • HDTV class (MPEG2): 30 Mbit/s
Interactive (unicast) communication (unidirectional communication) functions	Video delivery (VoD) Video delivery (IP broadcast)	High priority	• SDTV class (H.264, MPEG2): 6 Mbit/s • HDTV class (H.264): 10 Mbit/s
Multicast communication (unidirectional communication) functions		Best effort	
PPPoE connection functions	ISP connection	Best effort	

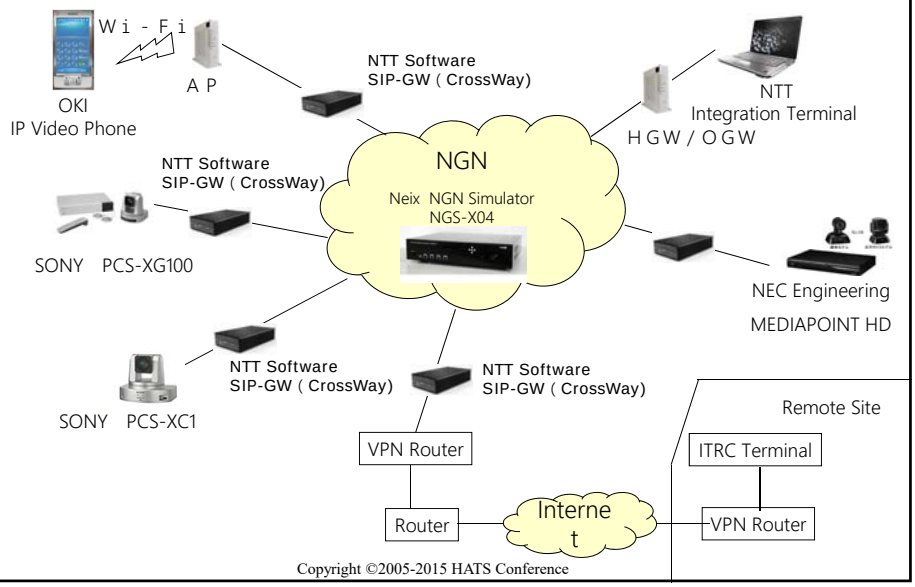
Configuration on test environment

- **Baseline standard**
- Q.3402 as requirements to NGN UNI signalling profile
- Q.3948 Annex C as requirements to NGN registration procedure

- **Interoperability test suites**
- Q.3948 as a service testing framework for VoIP at the UNI of NGN
- Q.3949 as a service testing framework for Visual communications at the UNI of NGN



Configuration on test environment



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Testing guideline (VoIP)

- Test Guideline of VoIP in HATS are based on ITU-T Q.3948

- UNI : Q.3402
- Protocol : SIP
- CODEC : G.711

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Testing guideline (Multimedia)

- Test Guideline of Multimedia in HATS are based on ITU-T Q.3949.
- Protocol : SIP, Video CODEC : H.264 (720p)

Sheet 2: NGN multimedia service interoperability test check sheet (ITU-T H.264)

[Filled in by]

Company/Organization	
Person in charge	
TEL	
FAX	

Test date [(year) (month) (date)] – [ ]
Test location [ ]
UA A [Company/Organization: Model type:]
Remote site [ ]
UA B [Company/Organization: Model type:]
Network [Company/Organization: Model type:]

List of test items / ITU-T Q.3949

No.	Item		Judging standard	Result (Yes or No)	Remarks (problems, etc.)
1		Terminal registration	Confirm receiving the correct response from Network.		
2		Deletion of terminal registration	Confirm receiving the correct response from Network.		
3		Confirmation of audio communication			Sending side encoding mode Receiving side encoding mode
4	Sending side (Terminal A)	Confirmation of video communication	Confirm the communication of audio and the video in each mode. Record the mode used.		Sending side encoding mode Receiving side encoding mode Sending side transmission rate [kbit/s] Receiving side transmission rate [kbit/s]
5		Confirmation of the RTP packet format	Confirm the packetization mode of [IETF RFC 6184]		When transmitted with Single NAL Unit, fill in Yes. Otherwise, fill in No.
			Confirm that the PPS/SPS is transmitted.		When transmitted, fill in Yes. When not transmitted, fill in No.
6		Update of Session Timer	Confirm the session timer is updated by UPDATE request and OK response at least one time.		
7		Call disconnection	Confirm that Terminal disconnected properly when Terminal disconnected.		

List of test items / ITU-T Q.3949

No.	Item		Judging standard	Result (Yes or No)	Remarks (problems, etc.)
8		Fall back reconnection	Confirm that returning an error response with the correct code for setting the warning capability mismatch and recalling and establishing to ensure communication dropped.		Warning code Recalling contents
9		Terminal registration	Confirm receiving the correct response from Network.		
10		Deletion of terminal registration	Confirm receiving the correct response from Network.		
11		Confirmation of the audio communication			Sending side encoding mode Receiving side encoding mode
12	Sending side (Terminal B)	Confirmation of the video communication	Confirm the communication of audio and the video in each mode. Record the mode used.		Sending side encoding mode Receiving side encoding mode Sending side transmission rate [kbit/s] Receiving side transmission rate [kbit/s]
13		Confirmation of the RTP packet format	Confirm the packetization mode of [IETF RFC 6184]		When transmitted with Single NAL Unit, fill in Yes. Otherwise, fill in No.
			Confirm that the PPS/SPS is transmitted.		When transmitted, fill in Yes. When not transmitted, fill in No.
14		Update of Session Timer	Confirm the session timer is updated by UPDATE request and OK response at least one time.		
15		Call disconnection	Confirm that Terminal disconnected properly when Terminal disconnected.		
16		Fall back reconnection	Confirm that returning an error response with the correct code for setting the warning capability mismatch and recalling and establishing to ensure communication dropped.		Warning code Recalling contents

Photo in Testing

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Result of Interoperability testing

- VoIP : No Problem
- Multimedia (H.264(720p-HD))
  - Via NGN
    - Error 503 (Service Un-available)
    - Frozen Video Picture (Packet Loss)
  - Via SIP
    - Frozen Video Picture (Packet Loss)

NGN E2E remote interoperability testing

HASSAN YEGANEH, ITRC, IRAN

ITRC
(IRAN TELECOMMUNICATION RESEARCH CENTER)

- This center, With the signing of a memorandum of understanding between the governments of Iran and Japan, was established in 1970.
- Iran Telecommunication Research Center, Was assigned to the Ministry of Communications and Information Technology in 1980.
- Iran Telecommunication Research Center is a center of research in telecommunication and acts as the consultant for the Ministry of Information and Communications Technology with a wide range of activities.

DEVICES UNDER TESTS

- ITRC IP (SIP) Phone
- ITRC Video Phone
- ITRC Soft Phone

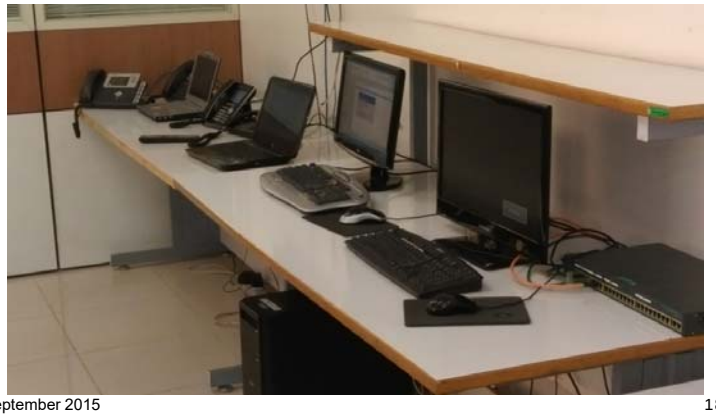
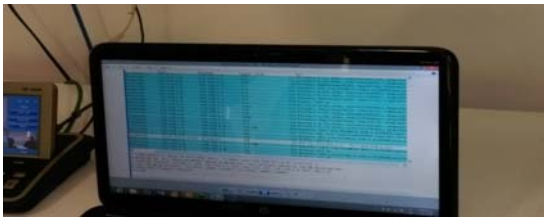


Photo in Testing



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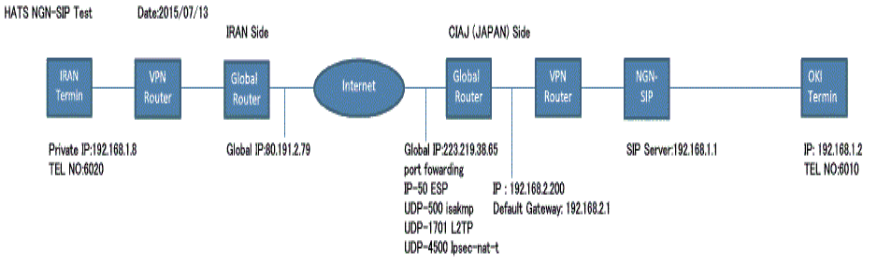
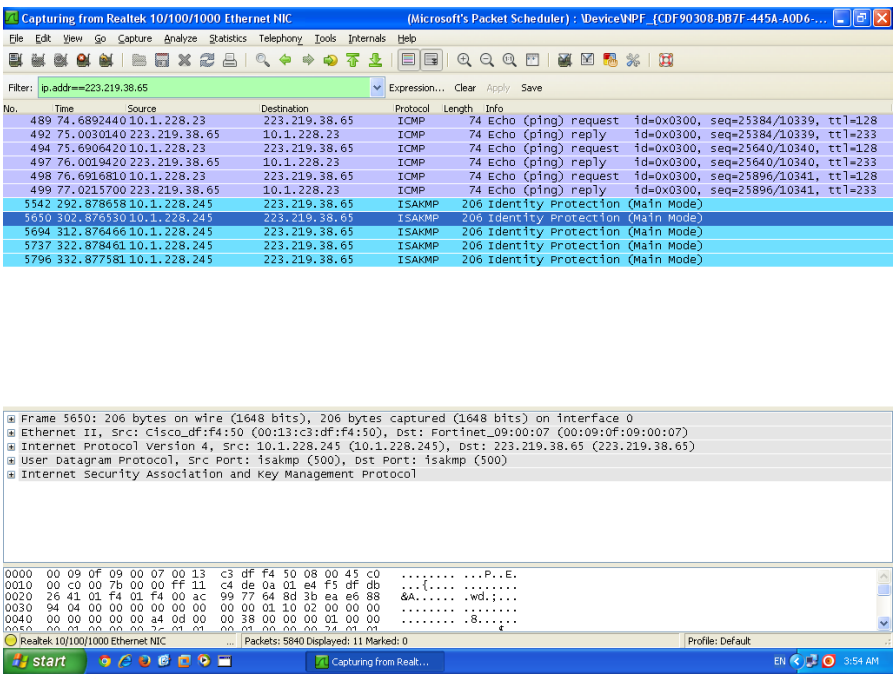
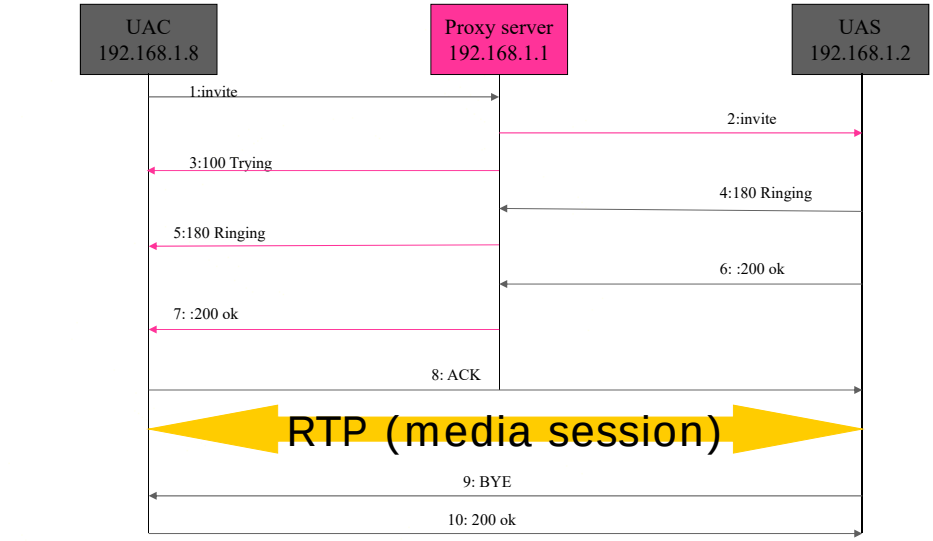
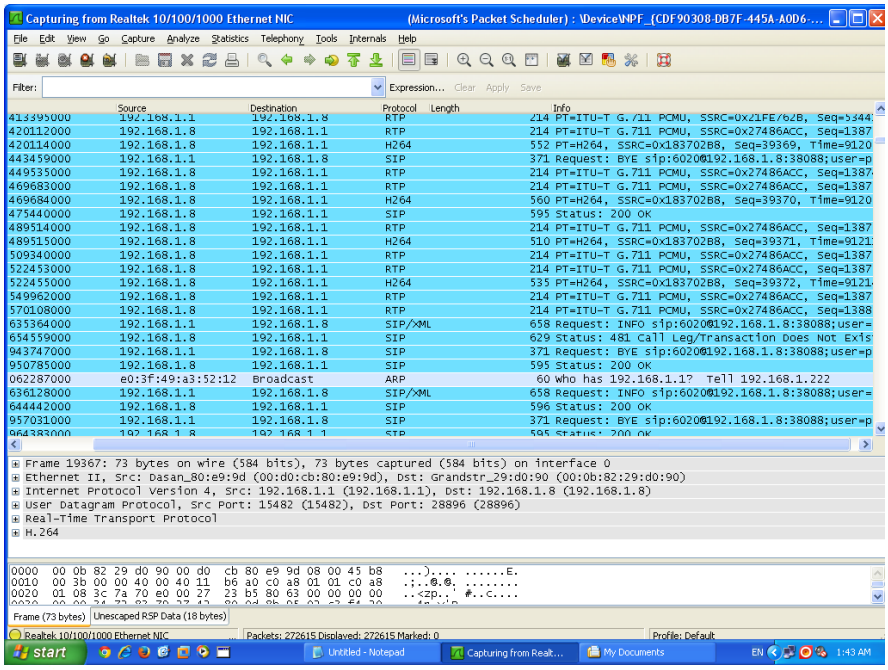
NGN-SIP Test Topology



20


Capturing from Realtek 10/100/1000 Ethernet NIC (Microsoft's Packet Scheduler) : \Device\NPF_{CDF90308-DB7F-445A-A0D6-...
File Edit View Go Capture Analyze Statistics Telephony Tools Internals Help
Filter: ip.addr==223.219.38.65 Expression... Clear Apply Save
No. Time Source Destination Protocol Length Info
489 74.6892440 10.1.228.23 223.219.38.65 ICMP 74 Echo (ping) request id=0x0300, seq=25384/10339, ttl=128
492 75.0030140 223.219.38.65 10.1.228.23 ICMP 74 Echo (ping) reply id=0x0300, seq=25384/10339, ttl=233
494 75.6906420 10.1.228.23 223.219.38.65 ICMP 74 Echo (ping) request id=0x0300, seq=25640/10340, ttl=128
497 76.0019420 223.219.38.65 10.1.228.23 ICMP 74 Echo (ping) reply id=0x0300, seq=25640/10340, ttl=233
498 76.6916810 10.1.228.23 223.219.38.65 ICMP 74 Echo (ping) request id=0x0300, seq=25896/10341, ttl=128
499 77.0215700 223.219.38.65 10.1.228.23 ICMP 74 Echo (ping) reply id=0x0300, seq=25896/10341, ttl=233
5542 292.878658 10.1.228.245 223.219.38.65 ISAKMP 206 Identity Protection (Main Mode)
5650 302.876530 10.1.228.245 223.219.38.65 ISAKMP 206 Identity Protection (Main Mode)
5694 312.876466 10.1.228.245 223.219.38.65 ISAKMP 206 Identity Protection (Main Mode)
5737 322.878461 10.1.228.245 223.219.38.65 ISAKMP 206 Identity Protection (Main Mode)
5796 332.877581 10.1.228.245 223.219.38.65 ISAKMP 206 Identity Protection (Main Mode)
Frame 5650: 206 bytes on wire (1648 bits), 206 bytes captured (1648 bits) on interface 0
Ethernet II, Src: Cisco_df:f4:50 (00:13:c3:df:f4:50), Dst: Fortinet_09:00:07 (00:09:0f:09:00:07)
Internet Protocol Version 4, Src: 10.1.228.245 (10.1.228.245), Dst: 223.219.38.65 (223.219.38.65)
User Datagram Protocol, Src Port: isakmp (500), Dst Port: isakmp (500)
Internet Security Association and Key Management Protocol
0000 00 09 0f 09 00 07 00 13 c3 df f4 50 08 00 45 c0 ...P..E.
0010 00 c0 00 7b 00 00 ff 11 c4 de 0a 01 e4 f5 df db ...{....
0020 26 41 01 f4 01 f4 00 ac 99 77 64 8d 3b ea e6 88 &A.....wd.;...
0030 94 04 00 00 00 00 00 00 00 00 01 10 02 00 00 00
0040 00 00 00 00 00 a4 0d 00 00 38 00 00 00 01 00 00 .....8.....
Realtek 10/100/1000 Ethernet NIC Packets: 5840 Displayed: 11 Marked: 0 Profile: Default
start Capturing from Realt... EN 3:54 AM


Basic SIP Call Flow with Proxy Server
UAC
192.168.1.8
Proxy server
192.168.1.1
UAS
192.168.1.2
1:invite
2:invite
3:100 Trying
4:180 Ringing
5:180 Ringing
6: :200 ok
7: :200 ok
8: ACK
RTP (media session)
9: BYE
10: 200 ok



Result of Remote VoIP interoperability testing of the End-to-End service / ITU-T Q.3948

	Item		Result	
			Success	Failure
1	Sending side (Terminal B)	Terminal registration	✓	
2		Confirmation of Audio communications		
3		Transmission rate of Audio	✓	
4		Other (if required)	N/A	
5		Disconnection by Network	✓	
6		Disconnection by terminal	✓	

Result of Remote NGN multimedia service interoperability test check sheet (ITU-T H.264)

List of test items / ITU-T Q.3949

No.		Item	Judging standard	Result (Yes or No)	Remarks (problems, etc.)
9	Sending side (Terminal B)	Terminal registration	Confirm receiving the correct response from Network.	Yes	
10		Deletion of terminal registration	Confirm receiving the correct response from Network.	Yes	
11		Confirmation of the audio communication		Yes	Sending side encoding mode Receiving side encoding mode
12		Confirmation of the video communication	Confirm the communication of audio and the video in each mode. Record the mode used.	*Because of Packet Loss, Sometimes, it is stopped video	Sending side encoding mode Receiving side encoding mode Sending side transmission rate [2000 kbit/s] Receiving side transmission rate [420 kbit/s]
13		Confirmation of the RTP packet format	Confirm the packetization mode of [IETF RFC 6184]	Yes	When transmitted with Single NAL Unit, fill in Yes. Otherwise, fill in No.
			Confirm that the PPS/SPS is transmitted.	Yes	When transmitted, fill in Yes. When not transmitted, fill in No.
14		Update of Session Timer	Confirm the session timer is updated by UPDATE request and OK response at least one time.	Yes	
15		Call disconnection	Confirm that Terminal disconnected properly when Terminal disconnected.	Yes	
16		Fall back reconnection	Confirm that returning an error response with the correct code for setting the warning capability mismatch and recalling and establishing to ensure communication dropped.	N/A	Warning code Recalling contents

Challenges for Remote Interoperability Testing

- Need for Sufficient Time to Make a VPN Connection
- Router Configuration Matching on both Sides
- Changing the Test Topology
- Need for Sufficient Time for Test Program
- Packet Loss during Video Communication
- Limited Time for Debugging
- Need for Routines that should be taken if the test fails

CONCLUSION

1- The tests were successfully performed

2- Excellent cooperation on all sides

Thanks to APT and all participants for the test arrangements and full cooperation