HATS, Japan and ITRC, Iran

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

Bangkok, Thailand, 7 - 8 September 2015 

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  

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ITU-T
Video Letter

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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

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Cooperation in NGN E2E C&I event

**ITU-T**
- Create Recommendation
- Invite ITU members to C&I
- Create testing guideline

**APT**
- Organize C&I event
- Invite APT members to C&I
- Create Recommendation
- Invite ITU members to C&I

**HATS**
- C&I event experience
- Create testing guideline

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Test Specifications in ITU-T related with HATS documents

- **ITU-T Q.3948** VoIP testing
  - HATS-J-101-V1.0

- **ITU-T Q.3949** Multimedia testing
  - HATS-J-102-V1.2

- **ITU-T Q.3951** T.38 IP-FAX testing
  - HATS-J-103-V1.0
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)
Introduce NGN services

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

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
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)

![Diagram of testing guidelines](image)

Photo in Testing

![Images of testing sessions](image)

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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

NGN-SIP Test Topology
Basic SIP Call Flow with Proxy Server

![Basic SIP Call Flow Diagram]

- **UAC (User Agent Client):** 192.168.1.8
- **Proxy Server:** 192.168.1.1
- **UAS (User Agent Server):** 192.168.1.2

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1. **Invite:** UAC sends an invite to the UAS.
2. **200 OK:** Proxy server responds with a 200 OK message.
3. **RTP (media session):** Media session begins.
4. **180 Ringing:** UAS sends a 180 Ringing back to the Proxy server.
5. **200 OK:** Proxy server responds with a 200 OK message.
6. **BYE:** UAC sends a BYE message to the Proxy server.

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**RTP (media session):**

- **ACK:** ACK message is sent to the UAS.
- **100: 200 OK:** 200 OK message is sent to the UAC.
## Result of Remote VoIP interoperability testing of the End-to-End service / ITU-T Q.3948

<table>
<thead>
<tr>
<th>Item</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Sending side (Terminal B)</td>
<td></td>
</tr>
<tr>
<td>Terminal registration</td>
<td>✓</td>
</tr>
<tr>
<td>Confirmation of Audio communications</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong> Transmission rate of Audio</td>
<td>✓</td>
</tr>
<tr>
<td><strong>4</strong> Other (if required)</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>5</strong> Disconnection by Network</td>
<td>✓</td>
</tr>
<tr>
<td><strong>6</strong> Disconnection by terminal</td>
<td>✓</td>
</tr>
</tbody>
</table>
### Result of Remote NGN multimedia service interoperability test check sheet (ITU-T H.264)

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Judging standard</th>
<th>Result (Yes or No)</th>
<th>Remarks (problems, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Sending side (Terminal B)</td>
<td>Terminal registration</td>
<td>Confirm receiving the correct response from Network.</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>Deletion of terminal registration</td>
<td>Confirmation of the audio communication</td>
<td>Confirm receiving the correct response from Network.</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Confirmation of the audio communication</td>
<td>Confirm the communication of audio and the video in each mode. Record the mode used.</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Confirmation of the video communication</td>
<td>Confirm the communication of audio and the video in each mode. Record the mode used.</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Setting and Confirming the RTP packet format</td>
<td>Confirm the packetization mode of [IETF RFC 6184]</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Update of Session Timer</td>
<td>Confirm that the PPS/SPS is transmitted.</td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Call disconnection</td>
<td>Confirm that Terminal disconnected properly when Terminal disconnected.</td>
<td>Yes</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>Fall back reconnection</td>
<td>Confirm that returning an error response with the correct code for setting the warning capability mismatch and resending and establishing to ensure communication dropped.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 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

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