The ASON Trial Objective

- **ASON trial of 3TNET**: a high capability broadband communication network built in 2005 by China Telecom and Huawei at Shanghai. 3TNET has successfully carried VoD services based on ASON BUNI and IPTV services based on ASON Multicast for more than 20,000 subscribers.

- **Video on Demand application**: dynamically provide bandwidth for burst video request and video file transmission. Develop the Burst-UNI to evaluate VoD service.

- **Broadcast TV application**: ASON control plane supports point to multi-point connections and automatic rerouting of the multicast tree derived from the nearest leaf-node or from the root. In case when a failure happens, the network can fast reroute the impacted branches.
The core trial network deployed among 9 cities near Shanghai
BUNI-A: Burst UNI Agency. BUNI-A can be combined with UNI-C, to perform the function of signaling agency, the routers don’t need to support the UNI-C function. Routers can apply for bandwidth via the BUNI-A at data plane.

*Background: major interfaces in the trial network are GbEs, point-to-multi-point technology is required for video services. Burst UNI are defined to satisfied such kind of application. All UNI-N and UNI-Cs shall support BUNI.*
Services are tested over this ASON network

- **Video On Demand service (VoD)**
  Burst UNI requests are generated from a UNI-C or multiple UNI-Cs to evaluate control plane capability

- **Multicast Service**
  For BTV application, video distribution server can request to set up a multicast tree for transporting video data streams to multiple destinations

- **Run two services in parallel**

Both VoD and multicast service use Switched Connections (SC).
A simplified VoD Service Model

1. Request video from BMG to MS.
2. In case MS lack video which is requested, MS will ask the remote CDP for the file. Request contains interface IP address (MS-IPO).
3. CDP asks BUNIA to set up a connection from CDP-IP0 to MS-IP0.
4. BUNIA transfer the CDP-IP0 and MS-IP0 as corresponding TNA addresses, TNA11&TNA21, then ask UNIC for connection.
5. UNIC requests UNIN for connection between TNA11&TNA21.
6. After setting up the connection, CDP sends video to the destination.

UNIN : Huawei OptiX OSN9500
UNIC: UNI Client developed by Shanghai Jiaotong Univ.
CDP: Video content server
MS: VoD servers.
ACR: Multi-service Switch
TSR: Terabit Switch Route
The burst requests can be initiated parallel from the same source via UNI interface.
Every 10s setup the SCs, connections can be held for 8s.
Services run as unprotected in ASON network
Centralized CDP with multiple MSs
• The burst requests can be initiated parallel from different sources via UNI interfaces.
• Every 10s setup the SCs, connections can be held for 8s.
• Services run as unprotected in ASON network
• Distributed MSs only
<table>
<thead>
<tr>
<th></th>
<th>Total SC requests</th>
<th>SC Setting up time (ms)</th>
<th>SC tearing down time (ms)</th>
<th>Statistic of Setting up time&gt;1s</th>
<th>Statistic of tearing down time&gt;1s</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 concurrent requests w/o other services running in core network</td>
<td>41034</td>
<td>650</td>
<td>69</td>
<td>105/0.26%</td>
<td>0/0%</td>
</tr>
<tr>
<td>6 concurrent requests with other services running in core network</td>
<td>44178</td>
<td>638</td>
<td>70</td>
<td>120/0.27%</td>
<td>0/0%</td>
</tr>
</tbody>
</table>
1. BUNIA transfer the addresses of DVB-IP0 and ACR-IP0 as TNAs, then asks UNI-C to request for setting up connection.
2. UNI-C requests to UNI-N for connection.
3. When successfully setting up the connection to leaf node (blue-colored line), UNI-C sends back confirming message to DVB-IP via B-UNIA.
4. DVB-IP continues setting up the connection to next leaf node, so as to build a broadcast tree.
5. Teardown request can be issued by the root or a leaf. Root can also delete a whole multicast group.
• Multiple Trees from the same root
• Can find out the best route for the trees.
• Support the dynamic rerouting of the tree if failure happens.
• All the multicast services are set as Silver services (dynamic rerouting).
Multiple multicast trees from different roots
No limitation of the tree number.
Support the dynamic rerouting of the tree if failure happens.
1. Multicast-tree of SC service is a unilateral and fastness-bandwidth tree-connection from one source to multi-sources.

2. Multicast-tree of SC service is built by one-to-one root and leaf setup, support leaf grafting and pruning; the processes of leaf setup and deletion are both self-governed.

3. There is no limitation to the number of leaves in a multicast-tree.

4. Network can find out the best route for the trees.

5. Network supports the dynamic rerouting of the tree if a failure happens

6. All the multicast services are set as Silver services (dynamic rerouting) or Copper services (no protection).
Summary

- **3TNET successfully runs the ASON control plane for VoD and BTV applications, serving over 20,000 subscribers.**
  - Develop Burst UNI function for VoD
  - Develop Ethernet controlled by ASON control plane for the GE services.

- **Multicast transport capability is performed over ASON network**
  - Since there is no multicast feature in UNI 1.0, the team has to modify existing protocol in order to accomplish the task

- **The trial gives carrier an good experience about running these advanced applications over ASON network**
  - Evaluate ASON network capability
  - Assess the service model and architecture model
  - Evaluate service management and operation procedure
  - Identify back office integration for supporting advanced video services

**Suggestion:**
- OIF adds multicast capability in UNI signaling
Thank You
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