Broadband Networks, Integrated Management & Standardization

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Broadband Networks and Services
- Network Technologies -

- Home Network
- Access network
- Transport network
- Server network
- IP network

<table>
<thead>
<tr>
<th>Residential Gateway Centric</th>
<th>Ether network base</th>
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<tbody>
<tr>
<td>10Mbps-100Mbps Access</td>
<td>BPON, DSL base</td>
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<tr>
<td>10Gbps Link, IP routers</td>
<td>GMPLS enabled OTN</td>
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<tr>
<td>Cluster Network,</td>
<td></td>
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<tr>
<td>GbFC, iSCSI, 10G standard</td>
<td></td>
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<tr>
<td>IP routing</td>
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<td>Multicast, Diffserve, etc.</td>
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Broadband Services

• Contents Delivery Applications
  – Archived Contents (Point-to-point)
  – Streaming Contents (Multicast)

• Uni-directional to Bi-directional
Broadband Network Architecture

Home network

ISP networks

ASP networks

Network Operator networks

Server Network

Streaming, Archiving, Cashing
Distributed Processing engine

IP Network

Various CoS support, IP multi-cast
Low latency, Bandwidth Guarantee

Transport Network

Bandwidth allocation, Secure transport
Reliable transport. Cut through, etc.

Contents Delivery, User Data Cash
Portal Gateway, Multimedia com.
End-to-end Management of Transport Network - connection control procedure-

• Connection establishment component in ASON
End-to-end Management of Transport Network - routing aspect -

• Source and Step-By-Step Routing for ASON provides an end-to-end connections of the transport network. (alternative: Hierarchical routing)
Case study: CDN service management

- Scenario: User receives a stream contents from CDN network

1. Service request
2. User authentication
3. Service grant (Set up information)
4. Set-up request (Set up information)
5. Multi-cast configuration
6. Bandwidth request/allocation
7. Contents delivery
8. Performance report
Management of the broadband networks

• Goal: End-to-end management of sub-networks:
  – Service management rather than network management.

• Requirements for sub-networks:
  – Rapid service provisioning;
  – Autonomous service restoration;
  – QoS sensible application acceptance.

• Management areas of importance:
  – Configuration: service provisioning, autonomous systems configuration,
  – Performance: QoS report.
Design method for the broadband network management

• Conditions
  – Diversified(& ing) Management Protocols
    • SNMP, CORBA, CMIS/P, XML…
  – Diversified(& ing) SDOs
    • cf.SDO(Standard Development Organization)

• Approach
  – Protocol Independent Interface Design
    • Use of UML method
  – Electric document exchange between entities
Issues on the design method

• **UML**
  – What are the protocol independent common services, naming and addressing methods?
  – Conversion to SNMP, CORBA, GDMO models

• **Use of XML for document exchange**
  – What are Rules, Objectives and Guidelines of XML use?
  – Development of the GTDD
    • cf. Global Telecommunications Data Dictionary
tML Framework Scope

- Complete Trading Partner Spec.
  - Business Process Scenario
  - Trading Partner Profile/Agreement
  - Data & Vocabulary
- Business Rules
- tML Schemas
- Implementation Infrastructure Profile
  - Message Structure
    - Header & Encoding Rules
    - Payload
  - Reliable Connectivity

- tML Framework
  Rules, Objectives, Guidelines for Development of tML Schema

- tML Document
  Structured according to tML Schemas
  Developed according to tML Framework
Conclusions

• The broadband network as integration of sub-networks:

• Vertical integration of the broadband network management:

• Protocol independent management interface design:
  – Naming, Addressing, Common Service issues need to be solved.

• There are standardization efforts in ITU-T:
  – ASON (Automatically switched optical network) Rec.G.8080/Y.1304
  – tML (Telecommunications Markup Language) Rec.M.3030
  – TMN methodology amendment Rec.M.3020