MUSE: QoS control architecture for BB access

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BB cluster meeting – QoS workshop
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Positioning of QoS architecture

Source: DSL Forum
Ethernet Network Model

- IP termination
- Ethernet switch (S-VLAN aware or 802.1Q)
- Ethernet (MPLS) aggregation network
- BRAS or Edge Router
- CPE
- Ethernet switch (802.1ad)
- routed (IPv4/IPv6)
IP Network Model

- **IP termination (IPv4/IPv6)**
- **(optional) Ethernet for IPoPPPoE**
- **IP for IPoE (IPv4/IPv6)**
- **Ethernet switch (S-VLAN aware or 802.1Q)**
- **Router (IPv4/IPv6)**
- **BRAS or Edge Router**

- **CPN**
- **CPE**
- **AN**
- **EN**
- **NAP**

- **NSP/ISP**
- **ASP**

- Ethernet / IP / (MPLS) aggregation network
### Four traffic classes in transport network (still under development)

<table>
<thead>
<tr>
<th>Traffic class</th>
<th>Terminology proposed in Muse</th>
<th>3GPP</th>
<th>ITU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elastic</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Non-Interactive</td>
<td>Best effort</td>
<td>Background</td>
<td>Non-critical</td>
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<tr>
<td>Interactive</td>
<td>Transactional</td>
<td>Interactive</td>
<td>Responsive</td>
</tr>
<tr>
<td>Inelastic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Interactive</td>
<td>Streaming</td>
<td>Streaming</td>
<td>Timely</td>
</tr>
<tr>
<td>Interactive</td>
<td>Real Time</td>
<td>Conversational</td>
<td>Interactive</td>
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</tbody>
</table>

Traffic classes further characterized by values for:

- Maximum burst size
- Maximum jitter
- Maximum packet loss

Values are still under discussion in MUSE
Need for control of QoS in transport network

QoS control
Network resource control

CNP
CPE
AGgregation network
EN
NAP
NSP/ISP
Approach for QoS control inspired by 3GPP

Application triggered QoS control

Expected benefits:
- Fixed-mobile convergence, at different levels:
  - services
  - infrastructure
- Nomadicity support
Overall MUSE IMS picture

MUSE focus in QoS control is at parts closest to transport layer: “PDF” and “Go” interface.

Also interest in “Gq” interface because of relevance for open, multi-provider business models.
(1) Service provider oriented model

1. Service request
2. QoS resource request
3. QoS resource reservation, policy enforcement
4. IP media flow established
(2) Application level signaling with policy push

1. End-to-end application level signaling
2. QoS resource request
3. QoS resource reservation, policy enforcement
4. IP media flow established
Not considered for the time being:
Application level signaling with policy pull

1. End-to-end application level signaling
2. QoS resource request
3. QoS resource request approved, authorization token sent to CPE
4. IP media flow request, including token
5. Check of request, based on token
6. Resources made available for IP media flow
Some of the differences with 3GPP IMS

> For the time being, no support of policy pull mechanism with authorization token
  
  • No bearer layer signaling in fixed access network, therefore also no need to correlate bearer layer signaling and application level signaling
  
  • Authorization token only has meaning within one (access) network, therefore no impact on interoperability with 3GPP IMS
  
  • If needed, IP media stream can be identified with 5-tuple (source IP address, destination IP address, source port no, destination port no, protocol ID)

> “Go” is not exactly the same as 3GPP Go
  
  • “Go” still to be developed
  
  • Ethernet and IP network models may require different approaches
MUSE QoS architecture and TISPAN RACS

MUSE QoS architecture

Resource and Admission Control Sub-System (RACS)
Cooperation with TISPAN: Ra, Re / “Go”

MUSE QoS architecture

Resource and Admission Control Sub-System (RACS)

Specify Ra, Re interfaces, based on
- RACS/PDF requirements
- transport network (Ethernet, IP) requirements
MUSE business role model

Applications delivered with an assured QoS

Application ServiceProvider
NetworkServiceProvider
ApplicationServiceProvider
ApplicationServiceProvider
ContentProvider

ConnectivityProvider

Packager

AccessNetworkProvider
AccessNetworkProvider
RegionalNetworkProvider

Customer consumer

Note: one business entity can have more than one business role

Legend:
- Application Service / Content Provider
- Customer
- Packager
- Network Provider
Mapping of QoS control to business roles (note: work in progress)
Cooperation with TISPAN: business roles and inter-operator interfaces

MUSE mapping to business roles

Resource and Admission Control Sub-System (RACS)

Determine how functions from functional architecture can be mapped to business roles

> clarify which interfaces need to be inter-operator
Conclusions

> QoS control architecture based on 3GPP

> MUSE focuses at
  • Interfaces with transport network (“Go”)
  • Consequences of open business model for interfaces (e.g. “Gq”)

> Cooperation with ETSI TISPAN and MediaNet