Mapping PMIP QoS to WiFi Networks
(draft-kaippallimalil-netext-pmip-qos-wifi-03)

IETF 88 Vancouver, Canada
Updates from version-02 to 03

• Added 2 authors: Rajesh Pazhyannur, Parviz Yegani

• Two main chapters: 3 (admission control based mapping) and 4 (no-admission control)

• Use cases for admission control
  - MN Initiated QoS Signaling
  - Network Initiated QoS Signaling (802.11aa based)
  - Hybrid (WMM based)

• DSCP mapping for non-admission control mechanism.

• Other changes:
  - Moved the architecture section to Appendix.
Why we need per user QoS (and what is missing)

- WiFi radio is a limited resource and has to be managed to achieve better and fair utilization. For example, during WiFi radio congestion or for services like VoIP, per user/flow scheduling and policing can utilize the scarce resources better.

- QoS Policies may be statically configured in WiFi AP on per service basis. However, it cannot differentiate per user.

- Per user QoS policies for PMIP mobile sessions between MAG – LMA are available. DSCP of these flows can be used to prioritize flows at WiFi AP. However, other per user information (ARP, AMBR, GBR) needs to be addressed.

- Mapping from parameters in PMIP QoS to 802.11 AC + other QoS parameters needs to be consistent when different providers and equipment are configured.

Gap:

- How to signal QoS in WiFi access when MN initiates request, and when network pushes QoS.

- How to map WiFi QoS parameters to PMIP QoS.
QoS in Mobile Networks
provided for IP flow/session.
Reservation of resources for GBR flows

QoS in WiFi
provided for Ethernet frames.
No reservation of resources.
Case A: MN Initiated QoS Signaling

Need to associate IP flow/connection for PMIP session with WiFi QoS request

→ TSPEC in ADDTS Request contains IP flow/connection identifier

→ MAG associates request to PMIP session.
Case B: Network Initiated QoS Signaling

MN | AP/WLC (MAG) | LMA | Policy Server
---|-------------|-----|---------------
MN attach/default bearer setup | PBU (update, QoS-option) | IP CAN Session/Gx |
| PBA(QoS-option) | | |
| Application Starts | ADDTS Reserve Request (TCLAS / appl id) | UPA |
| | | Policy Update |
| | ADDTS Reserve Response | UPN (update session, QoS) |
| | | |
| | | |
| Dedicated Bearer: MN Session / INVITE, 183 Session Progress (SDP offer)
| | | |
| | | |
| | | |
| | | |
| Need support of 802.11aa on AP/WLC and MN.
→ MAG uses PBA with new QoS and associates IP flow/connection id.
→ MAG sends ADDTS Reserve Request
**Case C: Hybrid** Network init for PMIPv6, user initiated for WiFi

**MN** 
- MN attach/default bearer setup

**AP/WLC (MAG)**
- PBU (update, QoS-option)
- PBA(QoS-option)

**LMA**
- IP CAN Session/Gx

**Policy Server**

**Dedicated Bearer:** MN Session / INVITE, 183 Session Progress (SDP offer)

**Upper Layer Indication**
- ADDTS (TSPEC)
- ADDTS Response (TSPEC)

**Application Session/Rx**
- Application Starts

**Policy Update**
- UPN (update session, QoS)
- UPA

**Need support of 802.11aa on AP/WLC and MN.**
- MAG uses PBA with new QoS and associates IP flow/connection id.
- MAG sends ADDTS Reserve Request
Mapping of Connection Parameters

a) Connection Mapping
   TSPEC includes IP flow/connection id → PMIP session

b) QoS Class
   802.11 QoS → 802.1D UP (and PMIP QoS)

c) Bandwidth
   Mean Data Rate  \(<\text{less than or equal to}>\)  GBR

d) Pre-emption Priority
   ARP may be used in AP/WLC (MAG) to determine which flow to grant resources/tear down flows on congestion (admission control case).

No reservation/guarantees in WiFi networks.
E2E QoS without Admission Control

- Use DSCP – 802.1D UP mapping defined by GSMA and RFC 4594
- Alternatively,
  use QoS Map set attribute (above figure) for different mappings per user. Map set sent by LMA.
## PMIP – 802.11 QoS Mapping
*added 802.1D UP*

<table>
<thead>
<tr>
<th>QCI</th>
<th>DSCP</th>
<th>802.1D UP</th>
<th>WMM AC</th>
<th>Example Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EF</td>
<td>6(VO)</td>
<td>3 AC_VO</td>
<td>conversational voice</td>
</tr>
<tr>
<td>2</td>
<td>EF</td>
<td>6(VO)</td>
<td>3 AC_VO</td>
<td>conversational video</td>
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<tr>
<td>3</td>
<td>EF</td>
<td>6(VO)</td>
<td>3 AC_VO</td>
<td>real-time gaming</td>
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<tr>
<td>4</td>
<td>AF41</td>
<td>5(VI)</td>
<td>2 AC_VI</td>
<td>buffered streaming</td>
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<td>5</td>
<td>AF31</td>
<td>4(CL)</td>
<td>2 AC_VI</td>
<td>IMS signaling</td>
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<td>AF21</td>
<td>3(EE)</td>
<td>0 AC_BE</td>
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<td>AF11</td>
<td>1(BE)</td>
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<tr>
<td>9</td>
<td>BE</td>
<td>0(BK)</td>
<td>1 AC_BK</td>
<td>e-mail</td>
</tr>
</tbody>
</table>

Table: QoS Mapping between QCI, 802.1D UP, WMM AC

Mapping of QCI/ DSCP → 802.1D UP, WMM AC
IETF next steps

Request for reviews of this draft on mailing list.