IPv6 QoS

Speaker name
email address

Copy … Rights

- This slide set is the ownership of the 6DEPLOY project via its partners
- The Powerpoint version of this material may be reused and modified only with written authorization
- Using part of this material must mention 6DEPLOY courtesy
- PDF files are available from www.6deploy.org
- Looking for a contact ?
  - Mail to : martin.potts@martel-consulting.ch

Outline

- Introduction to QoS
- Metrics
- QoS Architectures
- IPv6 header & QoS
- Configuration Examples
- Conclusions

Introduction to QoS

- QoS developments in IP networks is inspired by new types of applications:
  - VoIP, audio/video streaming, networked virtual environments, interactive gaming, videoconferencing, video distribution, e-commerce, GRIDs & collaborative enviroments, etc.
- **Quality-of-Service (QoS)** is a set of service requirements (performance guarantees) to be met by the network while transporting a flow.

Metrics

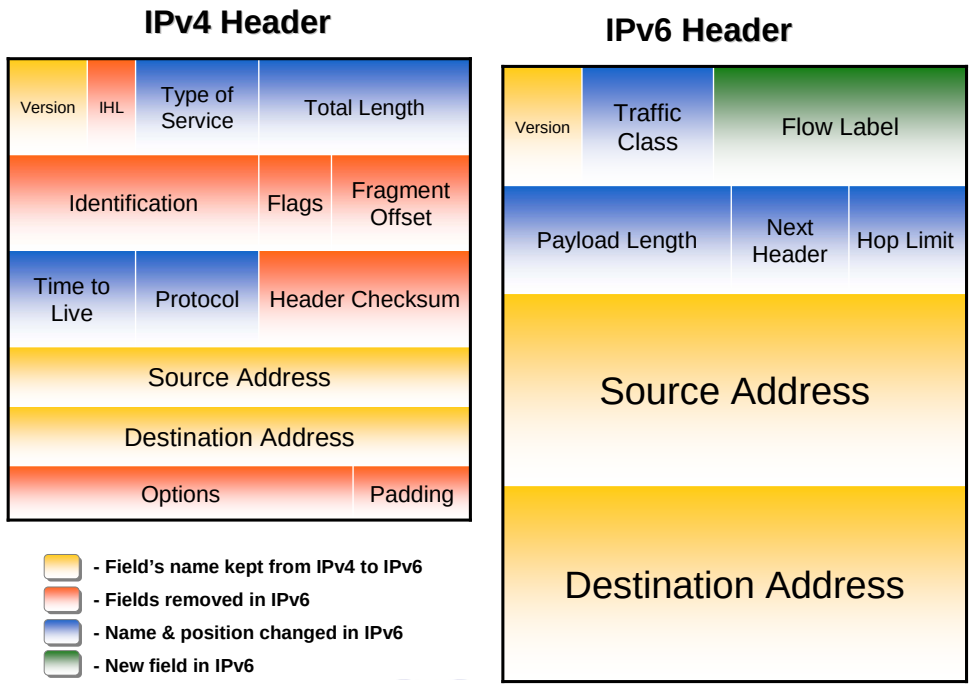
- Performance guarantees are usually assessed with the next metrics:
  - Bandwidth
  - Delay
  - Inter-packet Delay Variation – *Jitter*
  - Packet loss

QoS Architectures

- Best Effort Internet
- Integrated Services
  - Performance guarantees to traffic and resource reservations are provided on per-flow basis.
  - Guaranteed & Controlled Load Service
  - Scaling issues (per flow state information)
- Differentiated Services
  - Performance guarantees are provided to traffic aggregates rather than to flows.
  - Per-Hop Behaviours (PHB): EF & AF
  - Lack of any signalling protocol for resource allocation (admission control) and QoS mechanisms control.
  - Example of services: Premium, “Silver”, LBE

IPv6 & IPv4 Header Comparison

- The IPv6 header is redesigned.
  - Minimize header overhead and reduce the header process for the majority of the packets.
  - Less essential and optional fields are moved to extension headers



IPv6 and IPv4 headers are not *interoperable.*

QoS fields in IPv6 Header

- Traffic Class
  - An *8-bit* field used to distinguish packets from *different classes or priorities*.
  - Provides the *same* functionality as the ***type of service*** field in the IPv4 header.
- Flow label
  - A *20-bit* field defining the packets of the flow.
  - Selected by the source and never modified in the network.
  - Fragmentation or encryption is not anymore problem, as in IPv4.

Configuration steps in MQC

- Define Class Map
  - Separate traffic into classes based on access lists (ACLs), DSCP/ToS, MPLS EXP, protocol, etc. or combinations of those criteria

    `class-map [match-any | match-all] class-name`

- Define Policy Map (Service Policy)
  - Associate a class map with one or more QoS policies, e.g. bandwidth allocation, queue management, (re)-marking

    `policy-map policy-map-name`

Configuration steps in MQC

- Apply a Service Policy to an interface
  - Associate a policy map to an physical or logical interface at input or output.

    `service-policy {input | output}` *`policy-map-name`*

Configuration examples

```
class-map match-any ip_premium_out
  match ip dscp 46
  match ip dscp 47
  match ip dscp 40
  match mpls experimental 5

class-map match-any lbe_out
  match ip dscp 8
  match mpls experimental 1
```

IP Premium classification *class-map*

LBE classification *class-map*

Configuration examples

```
policy-map QoS_out
   class ip_premium_out
    priority
   class lbe_out
    bandwidth percent 1
   class class-default
    exit
   exit

interface POS 0/1
   service policy output QoS_out
```

QoS policy definition *policy-map*

Apply *service policy* to an interface

Conclusions

- The IPv6 protocol, in terms of QoS support, is **neither superior nor inferior** to IPv4 counterpart.
- The *flow label* field in the IPv6 header may ease provision of services in the future.
- There is no difference in the QoS configuration among IPv6 and IPv4 traffic.

Revision Questions!

- What are the difference related to QoS between the IPv6 and IPv4 headers? Is there any improvement in the IPv6 and why?
- Shall we expect different performance guarantees for IPv6 and IPv4 traffic? Under which conditions?