Analysis and Rating of QoS Approaches for E-Service Infrastructures

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Abstract

Implementing e-services successfully requires an adequate service infrastructure which delivers a solid base for reliable services. A major part of this service infrastructure is the transport infrastructure which e.g. constitutes the Internet. This transport infrastructure is responsible for delivering a reliable end to end transport service with different service levels which is a prerequisite for any e-service built on top of it.

Current approaches concerning the provision of QoS for end to end services in the Internet concentrate on the network layer. QoS characteristics, resulting from a top down analysis, which are needed by current and future e-services were not the primary design goal of these approaches.

The ATM technology was designed with the top down analysis in mind. Therefore it is a solid base for building a QoS infrastructure. However ATM is currently only used for some parts of the Internet and therefore it is not able to provide an end to end service in common. Hence end to end QoS provision must be solved by the network layer.

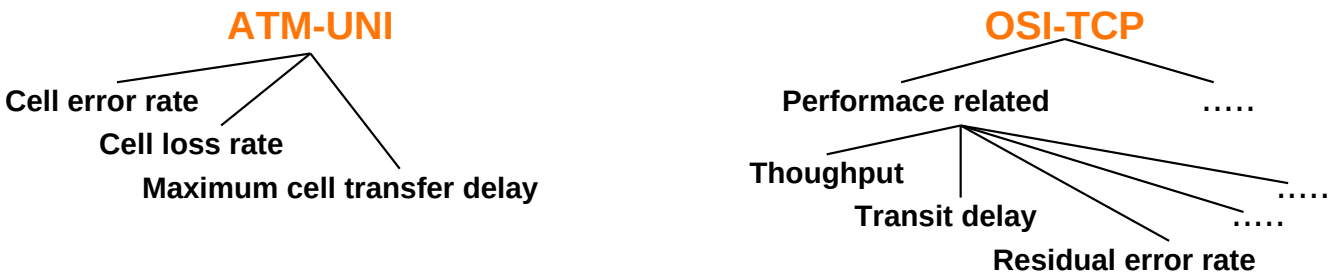
The criteria to analyse the capabilities can be derived from a combination of general QoS parameters defined by ITU-T and the concrete QoS concepts of ATM.

The evaluation of two state of the art QoS provision technologies of the network layer, Differentiated Services and Integrated Services, is carried out by the application of the developed criteria catalog. As the main result we present the comparison of the scenario independent ratings of Differentiated Services and Integrated Services.

Keywords: Service Management, Quality of Service, Diffserv, Intserv, Criteria Catalog

1 Development of Criteria for the Comparison of Transport Services

Step 1 Information gathering



Step 2

Elimination of redundant parameters

Step 3

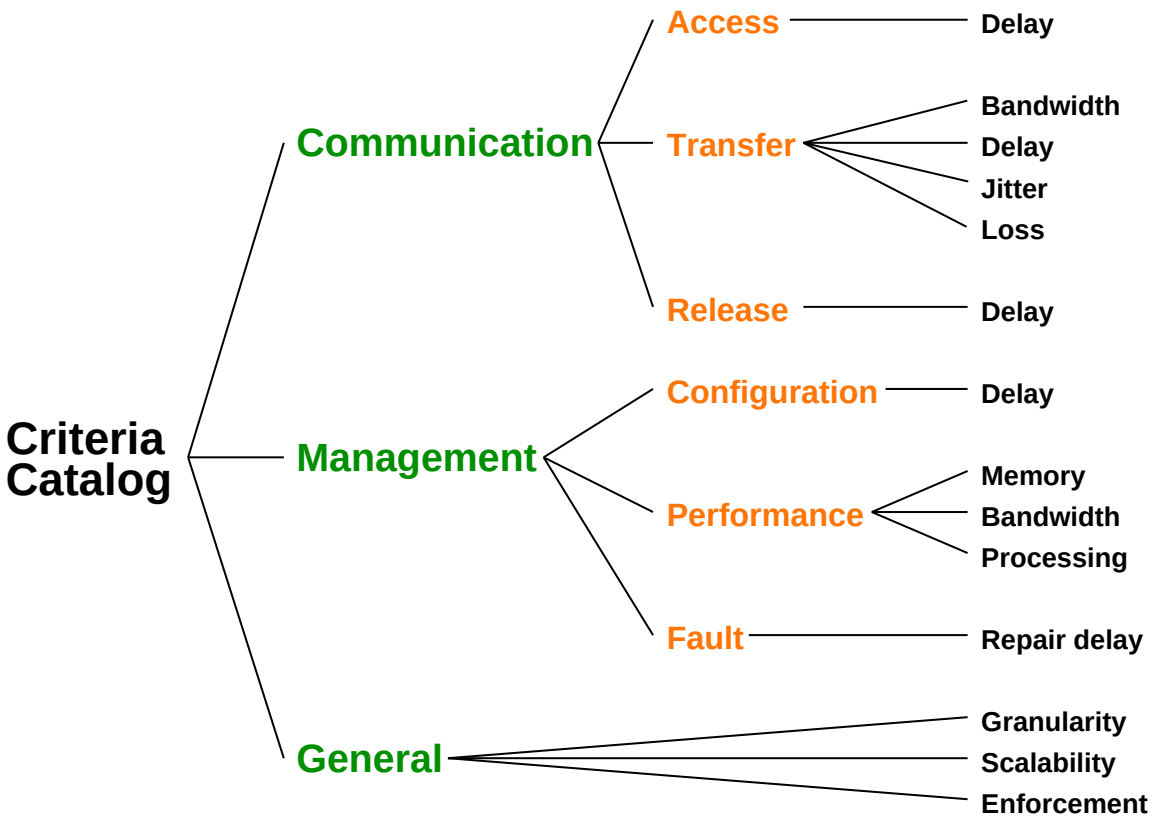
Elimination of technology specific parameters

Step 4

Classification

- Communication phases
- Management effort

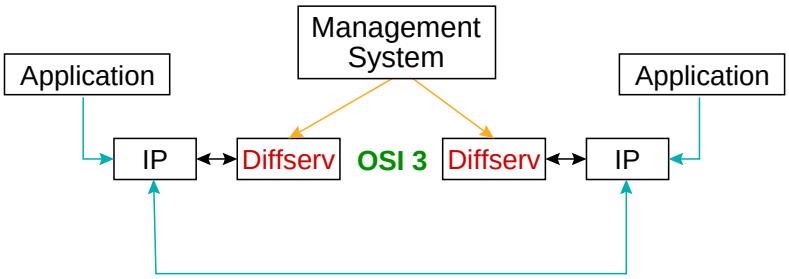
Step 5


Criteria Catalog
Communication
Access
Delay
Transfer
Bandwidth
Delay
Jitter
Loss
Release
Delay
Management
Configuration
Delay
Performance
Memory
Bandwidth
Processing
Fault
Repair delay
General
Granularity
Scalability
Enforcement

2 Example Application: Diffserv and Intserv over Ethernet

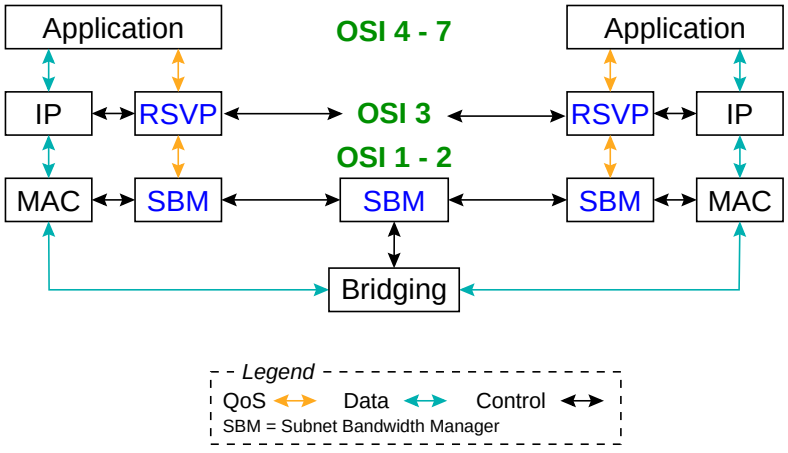
Differentiated Services

- Connection less
- Traffic classes aggregating flows
- Identical per hop behavior for all routers
- Packet marking at Diffserv boundary
- Configuration via management



Integrated Services

- Connection oriented
- Flow specific treatment
- Per hop multi header field flow identification
- Technology specific mapping
- Configuration via signaling (RSVP)



Results

		Access		
non-applicable	Communication	Delay	Communication	round trip delay
		Transfer		
layer 3 guaranteed		Bandwidth		guaranteed
layer 3 guaranteed		Delay		guaranteed
layer 3 controled		Jitter		controlled
layer 3 guaranteed		Loss		guaranteed
		Release		
non-applicable		Delay		round trip delay, timeout
		Configuration		
central management	Management	Delay	Management	signalling
		Performance		
O(#classes)		Memory		O(#flows)
none		Bandwidth		O(#flows)
O(#classes)		Processing		O(#flows)
		Fault		
automatic, immediate		Repair delay		round trip delay
rough	General	Granularity	General	fine
yes		Scalability		limited
only layer 3		Enforcement		layer 1 - 3

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