

# **Improved Transmission Selection**

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# Congestion Management and Transmission Selection

- BCN (Backward Congestion Notification) will be enabled only on select priorities inside the CM cloud
  - Traffic sourced or destined outside the cloud will use/map to different priorities
- In order to ensure fair configurable bandwidth sharing between CM traffic (which will backoff due to congestion) and non-CM traffic (which may not backoff due to congestion) better standardized transmission selection mechanism is needed
- This requires a separate PAR (than one being currently worked upon for Congestion Notification)

# Proposed Mechanism

- Presented by Paul Congdon in 2005
  - May and July 2005: Proposal to improve expedited forwarding
    - <http://www.ieee802.org/1/files/public/docs2005/new-congdon-improved-queuing-0505.pdf>
    - <http://www.ieee802.org/1/files/public/docs2005/new-congdon-improved-queuing-0705.pdf>
- Improved transmission selection
  - Provides minimum bandwidth guarantees for egress classes
  - Allows groups of equal priority traffic to be defined

Traffic Class	Minimum guaranteed bandwidth	Scheduling priority
	Weight	Priority Group
0	0	0
1	0	1
2	0	2
3	0	3
4	0	4
5	0	5
6	0	6
7	0	7

# The Forwarding Process

## Subclause 8.6 The Forwarding Process

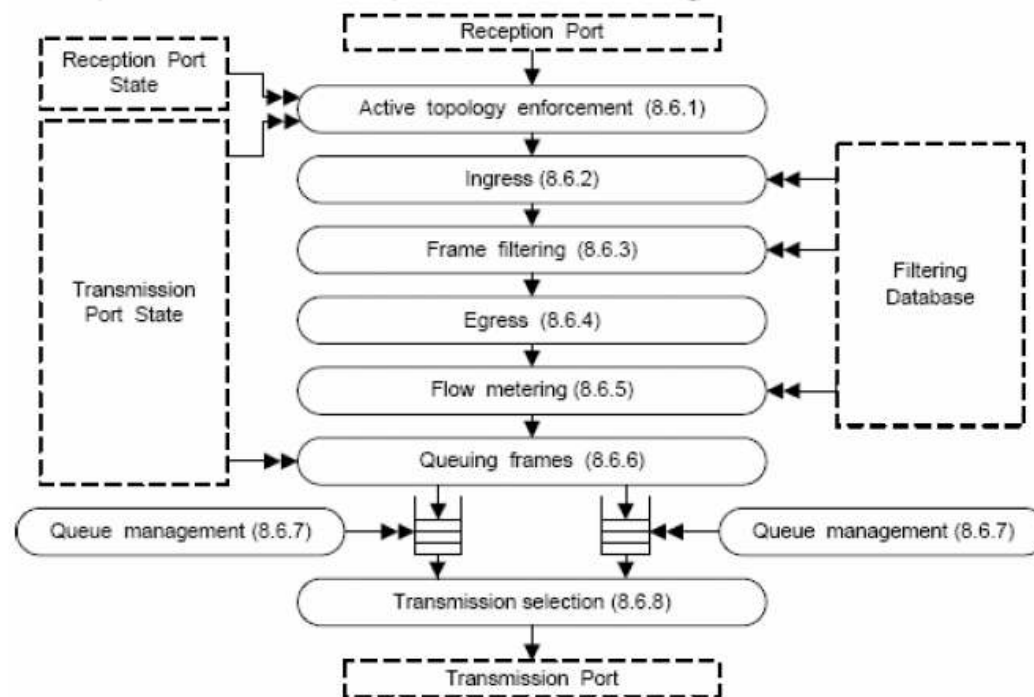


Figure 8-9—Forwarding Process functions

# Transmission Selection

## Subclause 8.6 The Forwarding Process

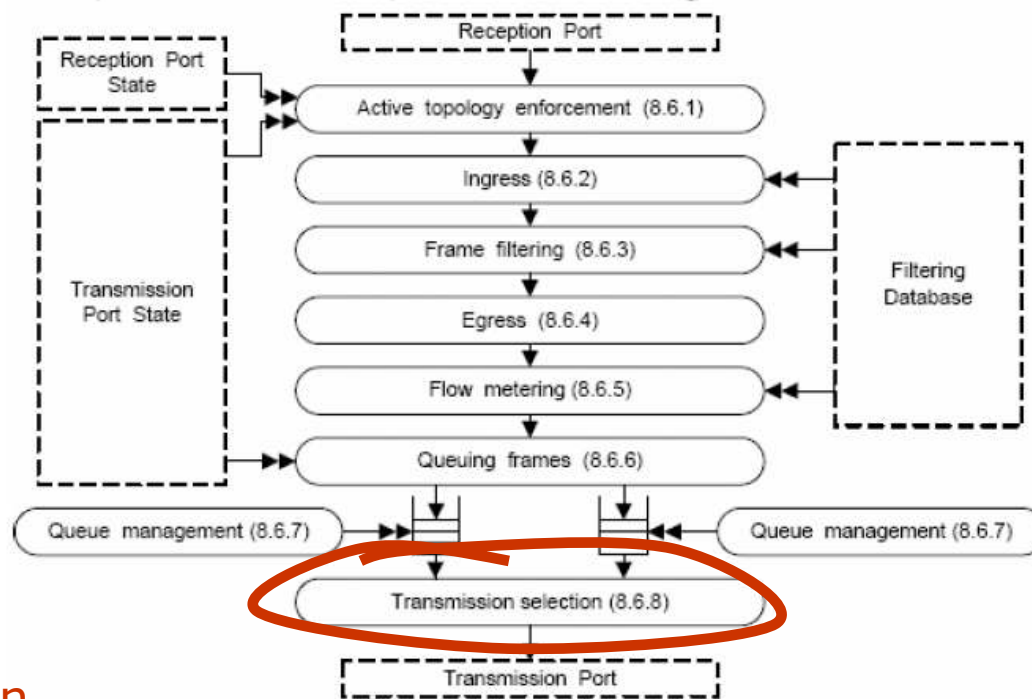


Figure 8-9—Forwarding Process functions

Add new optional transmission selection mechanism in 8.6.8

# Summary of Changes

- Addition to Sub-Clause 8.1.6 on additional support for expedited forwarding
- Modifications to Sub-Clause 8.6.8 to describe the new optional mechanism
- Addition to Sub-Clause 12.6 to add to the list of managed objects
- New Sub-clause 12.6.4 for new managed objects
- Addition of new PICS to Annex A.14 and A.16
- A new informative Annex or addition to Annex G to describe the rationale behind improved transmission selection

## Addition to 8.1.6: Traffic expediting

A Bridge classifies frames into traffic classes in order to expedite transmission of frames generated by critical or time-sensitive services. The function that supports the use and maintenance of information for this purpose is

- a) Explicit configuration of traffic class information associated with the Ports of the Bridge.

Bridge also (optionally) enforces bandwidth sharing. The function that supports the use and maintenance of information for this purpose is

- a) Explicit configuration of weights and priority groups associated with traffic class information at Ports of the Bridge.

# Modification to 8.6.8: Transmission Selection

The following algorithm shall be supported by all Bridges as the default algorithm for selecting frames for transmission:

- a) For each Port, frames are selected for transmission on the basis of the traffic classes that the Port supports. For a given supported value of traffic class, frames are selected from the corresponding queue for transmission only if all queues corresponding to numerically higher values of traffic class supported by the Port are empty at the time of selection;
- b) For a given queue, the order in which frames are selected for transmission shall maintain the ordering requirement specified in 8.6.6.

Additional algorithms, selectable by management means, may be supported as an implementation option so long as the requirements of 8.6.6 are met.

## CHANGE TO:

The algorithm supported by Bridges for selecting frames for transmission is described in the following sections. Additional algorithms, selectable by management means, may be supported as an implementation option so long as the requirements of 8.6.6 are met.

*8.6.8.1: Provide current strict priority algorithm here. This is the default algorithm that shall be implemented by all Bridges.*

*8.6.8.2: Describe the new optional improved transmission selection mechanism.*



## Addition to 12.6: Forwarding Process (Bridge Management)

The objects that comprise this managed resource are

- a) The Port Counters (12.6.1).
- b) The Priority Handling objects for each Port (12.6.2).
- c) The Traffic Class Table for each Port (12.6.3).

Add:

- d) The optional Transmission Selection Table for each port (12.6.4)

## 12.6.4: Enhanced Traffic Scheduling Tables

### - NEW

Managed objects for optional improved transmission selection mechanism. Transmission Selection table managed object is described here.

# Addition to A.14, A.16: PICS

Annex A.14: Add PICS to read and set Transmission Selection table (optional PICS)

Annex A.16: Add PICS for support of improved transmission selection mechanism (optional PICS)

# New Annex or addition to Annex G

Describe the rationale behind improved transmission selection mechanism. Show the need for allocating minimum bandwidth limits to certain traffic classes to avoid starvation of lower classes. Discuss the need for allocating different traffic classes (bridge queues) to different traffic while treating them in the same priority group.

Show use cases of improved transmission selection and how it can be configured to provide various behaviors:

- Strict Priority
- Deficit Weighted Round Robin
- Modified Deficit Weighted Round Robin
- Rate Controlled Priority Queuing

# Summary

- CM Track should evaluate need for defining improved transmission selection mechanism
  - Should discuss whether this specification is required for deploying CM capable devices in Data Center and Backplane environments
- Will provide required text changes by the Interim meeting for further discussion