Requirements of congestion management for a backplane Ethernet

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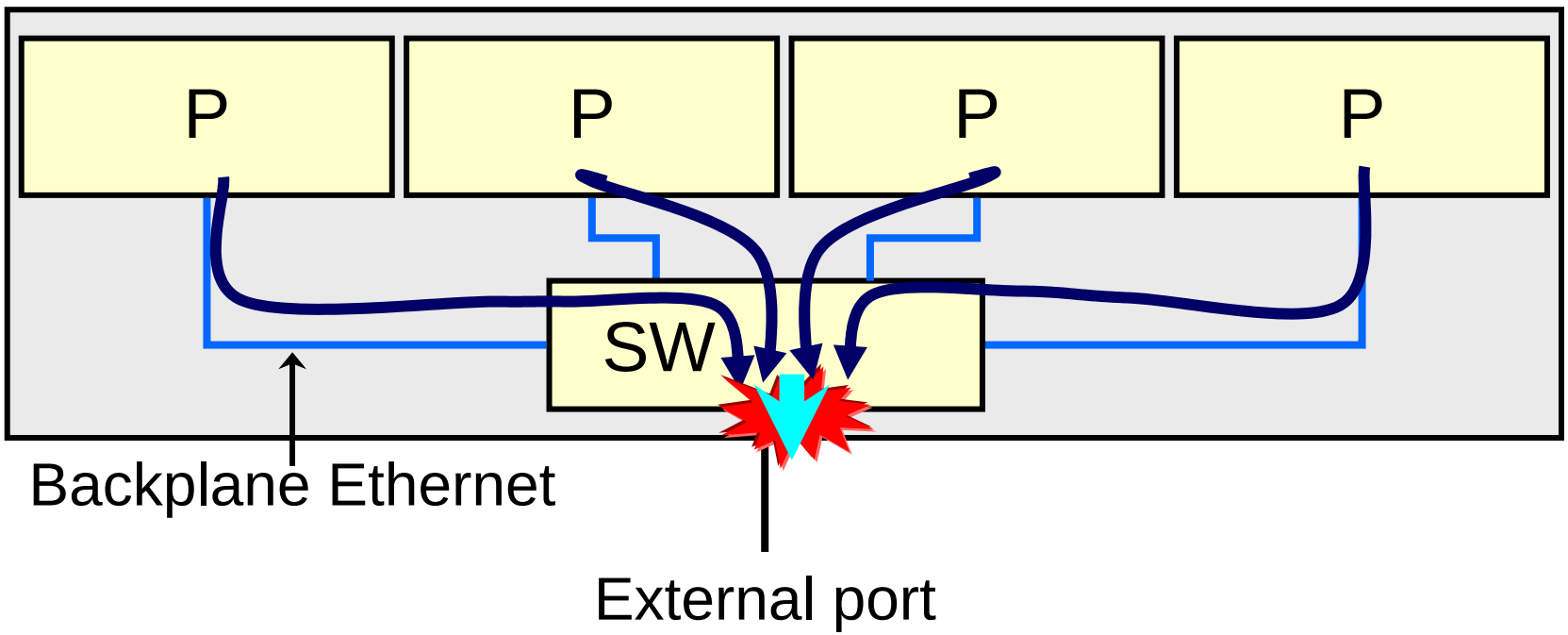
Objective

- To clarify the requirements of congestion management for a backplane Ethernet

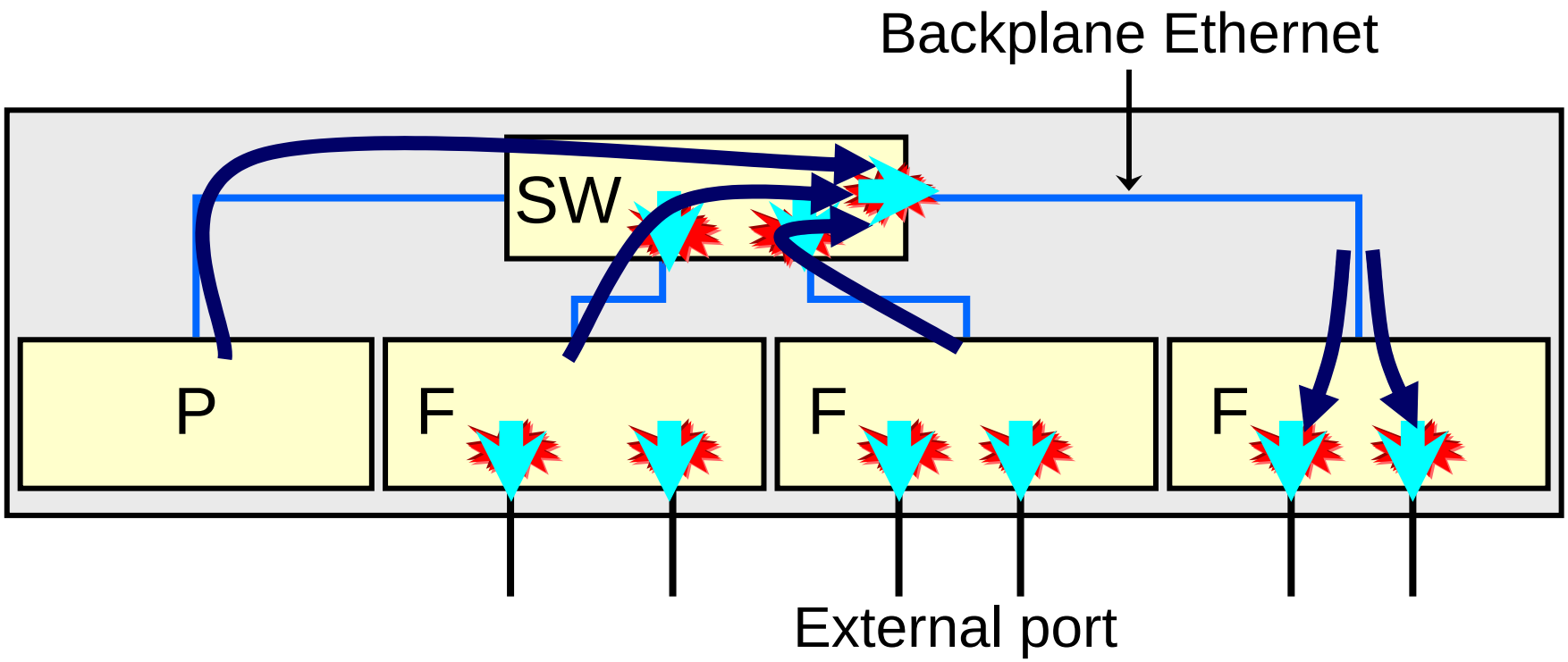
Blade server model



Possible congestion points

SW: Switch blade
P: Processing blade

Blade router model



Possible congestion points

SW: Switch blade
P: Processing blade
F: Forwarding blade

Requirements for QoS control

- Achieves interoperability of multi-vender P, F and SW blades for the following QoS control functions

  (1) Diffserv

  Drop packets based on its priority-class
  Protect latency critical traffic

  (2) HOL blocking prevention

  Drop packets based on its destination port
  Maximize bandwidth utilization

(1) Diffserv

- Two approaches
  - Each blade supports multiple queues and performs class-based scheduling independently.
  - The blade that doesn’t have sufficient buffers nor a class-based scheduling mechanism notifies a congestion information backward.

(2) HOL blocking prevention

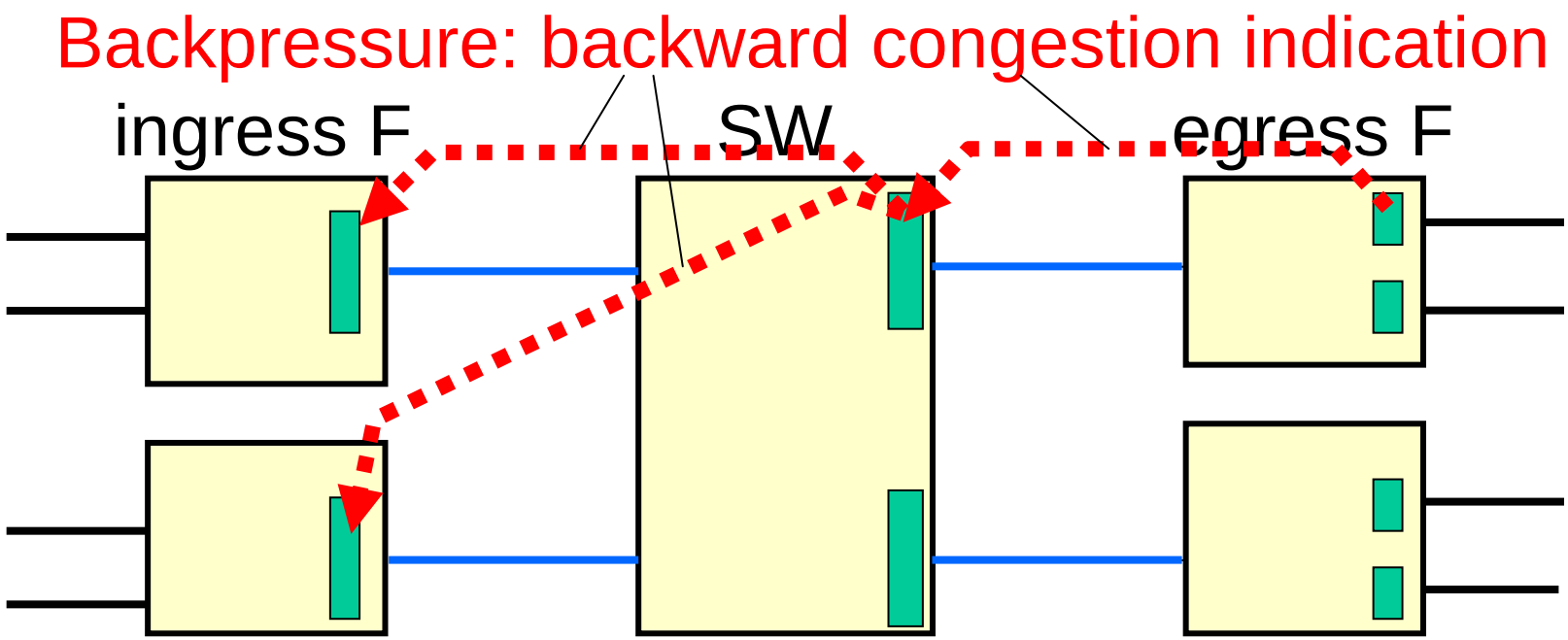
- Two approaches
  - Each blade has a HOL blocking prevention mechanism and operates independently.
  - The blade that doesn’t have a HOL blocking prevention mechanism notifies a congestion information backward.

Evaluation of the two approaches

- It is difficult that every type of blade has a large and complex buffer for Diffserv.
- It is difficult that every type of blade has a complex mechanism for HOL blocking prevention.
- Backpressure realizes a simple QoS control between blades.

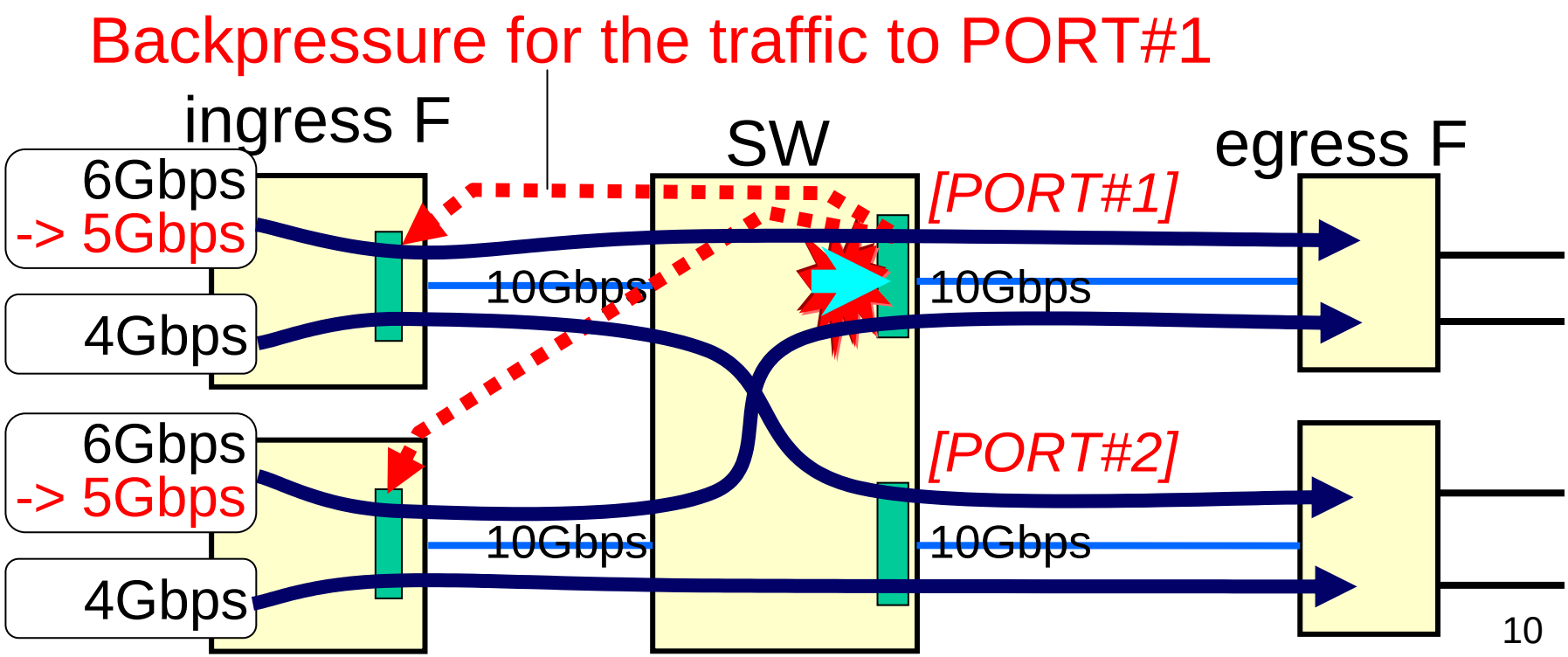
Backpressure

- For interoperability of multiple types of blade, a standardized backpressure mechanism is required.
- For multi-vendor environment, a simple mechanism is desired.



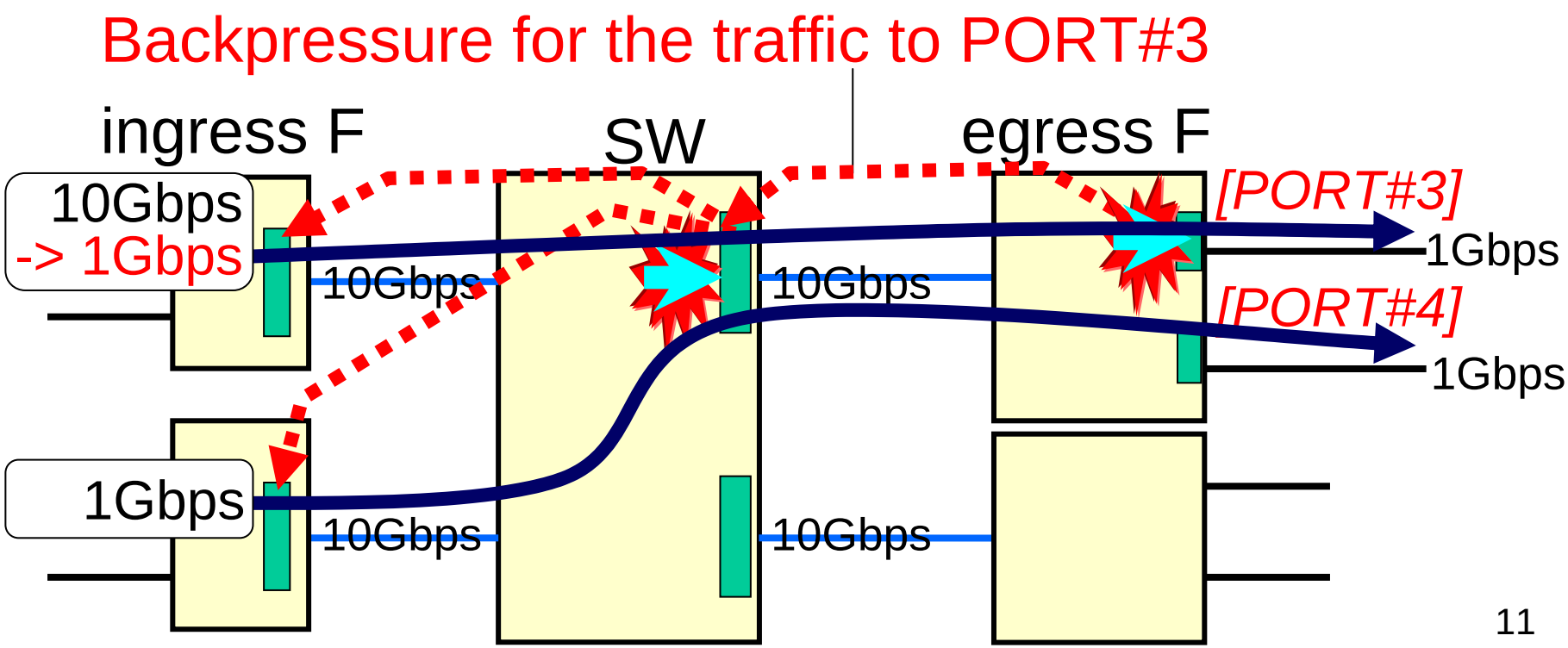
The required functions of backpressure (1/2)

- Destination port based.
- Ratelimit the specified traffic at ingress F.



The required functions of backpressure (2/2)

- Destination port based
- Ratelimit the specified traffic at SW or ingress F.



Summary

- Backpressure enables a SW blade with a small buffer and simple QoS control mechanism for a blade server and router model.
- Simple and standardized backpressure mechanism is desired for a multi-vendor environment.
- Destination port based backpressure improves bandwidth utilization.