Congestion Control Mechanisms for Optical Burst Switched Networks

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Outline of Topics

Optical Burst Switching Technique

Congestion Control Mechanisms

Project Plan

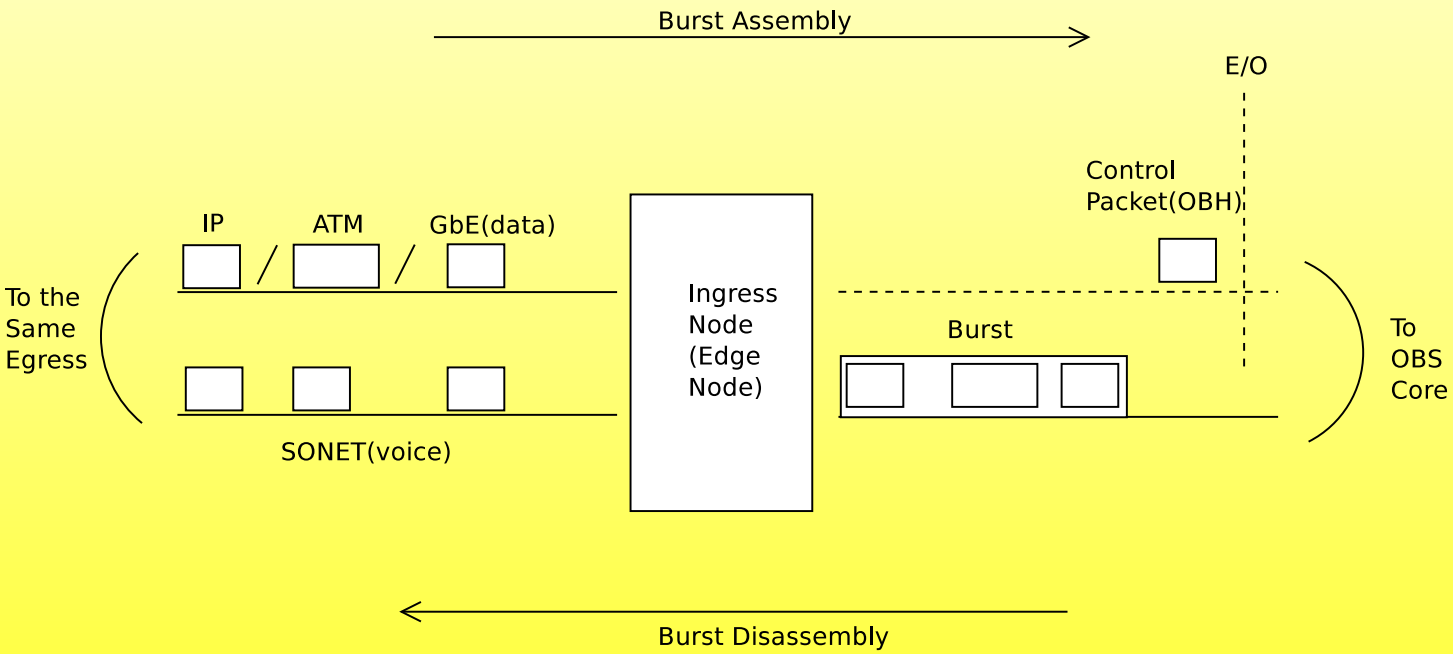
Why OBS?

$$d_{packet} = \cancel{d_{proc}} + \cancel{d_{queue}} + d_{prop} + \underline{\underline{d_{trans}}}$$

Optical Switching Paradigm	Bandwidth utilization	Latency	Implemetation difficulty	Adaptivity
Wavelength	Low	High	Low	Low
Packet/Cell	High	Low	High	High
OBS	High	Low	Medium	High

OBS is fast becoming an important area of research.

How OBS work?



From this figure, we can learn that the load control could be done **only** by the **edge nodes** since they have more intelligence and adequate physical resources.

OBS vs. Circuit & Packet Switching

OBS vs. Circuit Switching

- ☞ ACK
- ☞ Reservation

OBS vs. Packet Switching

- ☞ Buffer

Why Congestion Control

- congestion collapse still occurs even in ideal networks withdout congestion control.

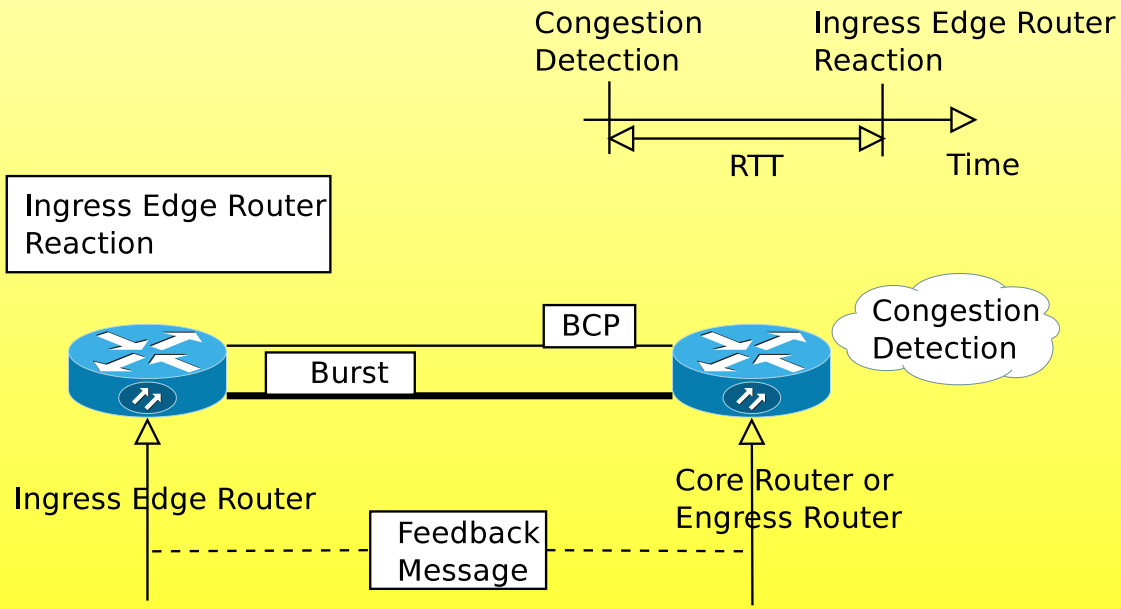
Why Congestion Control

- congestion collapse still occurs even in ideal networks withdout congestion control.
- Contention is inherent to the OBS technique.

So, The goal is:

Keep the load in the acceptable area as long as possible.

How to?


Congestion Detection
Ingress Edge Router Reaction
RTT
Time
Ingress Edge Router Reaction
BCP
Burst
Congestion Detection
Ingress Edge Router
Feedback Message
Core Router or Engress Router

How to evaluate our scheme

Combine simulation & mathematical analysis:

- ☞ Simulation Tool: **Opnet**
- ☞ Analysis Method: **Queuing Theory**

Key parameter:

- ☞ Fairness
- ☞ Loss Probalility
- ☞ Retransmission times

Project Plan

Phase	Start	Finish	Duration
Modeling	12-Jun-2011	12-Jul-2011	one month
Implemetation	13-Jul-2011	20-Jul-2011	one week
Analysis	21-Jul-2011	4-Aug-2011	two week
Report	5-Aug-2011	12-Aug-2011	one week

Project Plan