

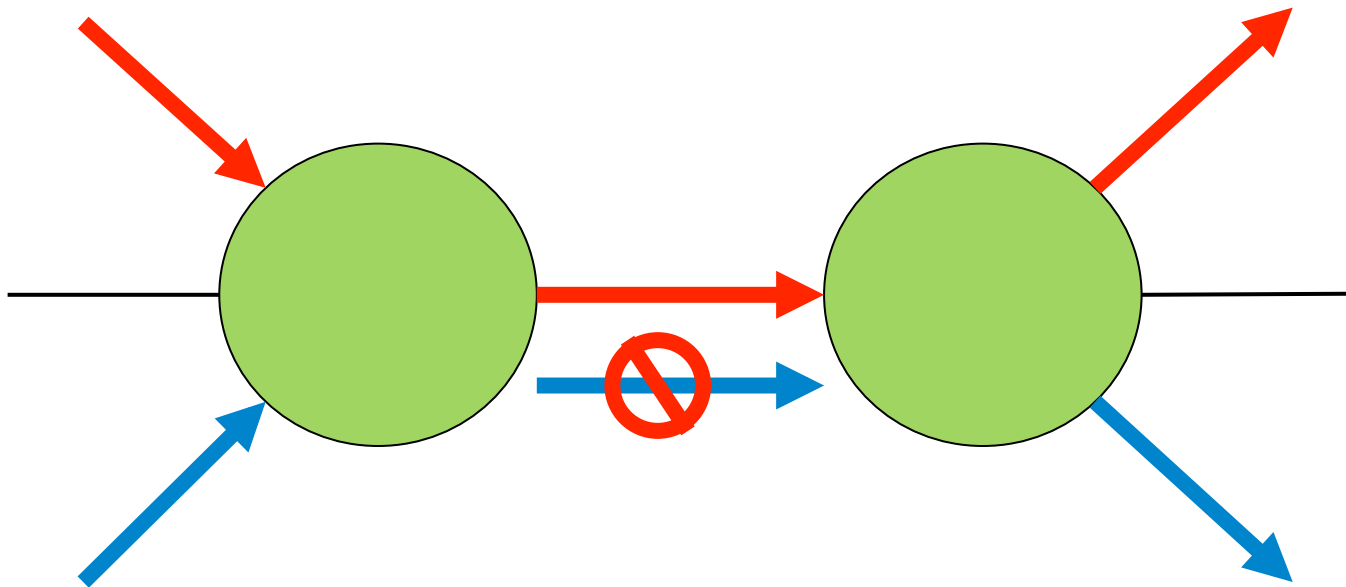
# Non-blocking SpaceWire network

23/04/2012

M. Nomachi

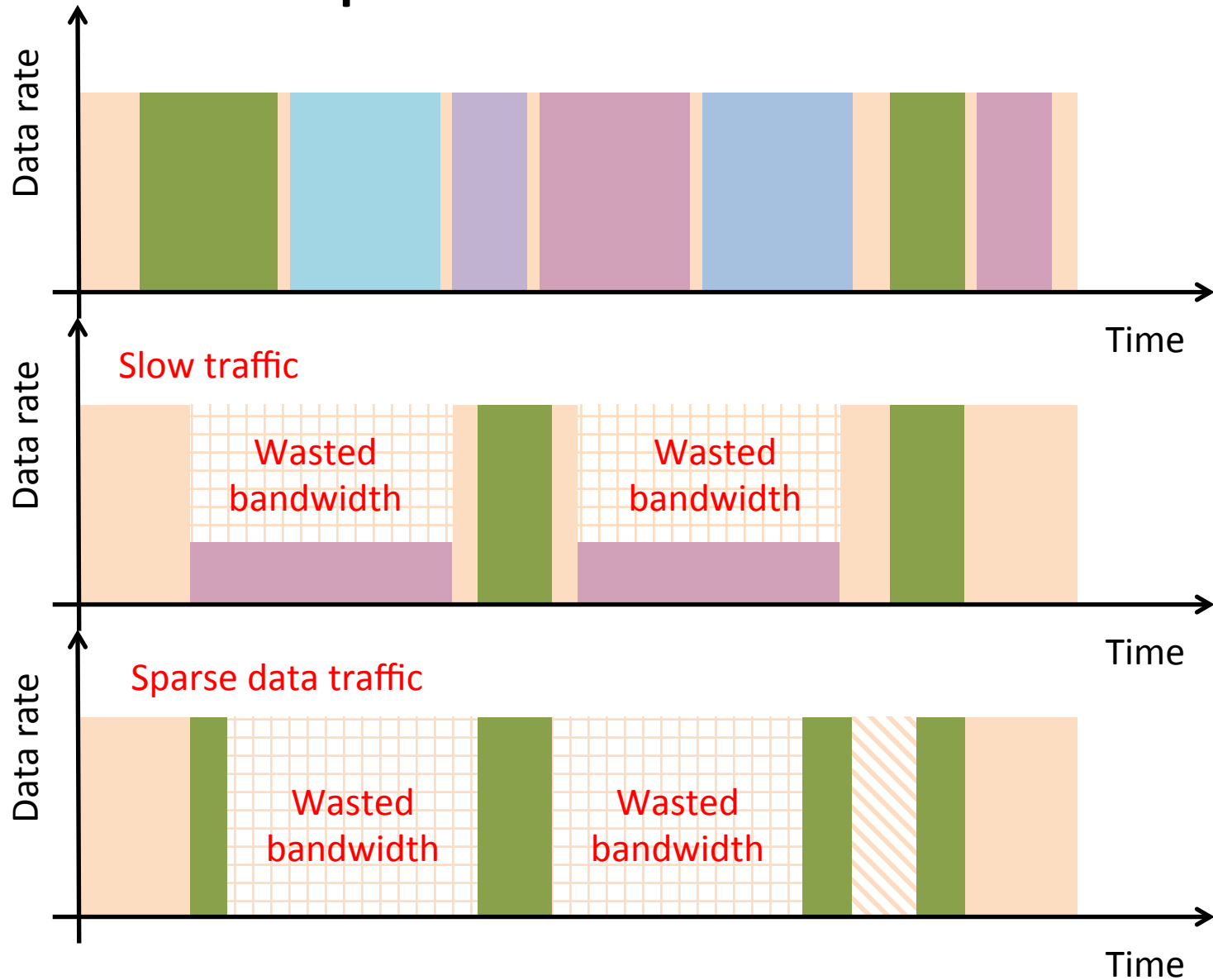


# Blocking in multi-router network



A link between routers is the point of congestion.  
In the case of failure at the destination, it blocks the other traffics.  
Slow traffic or sparse traffic lower the utilization of the link.

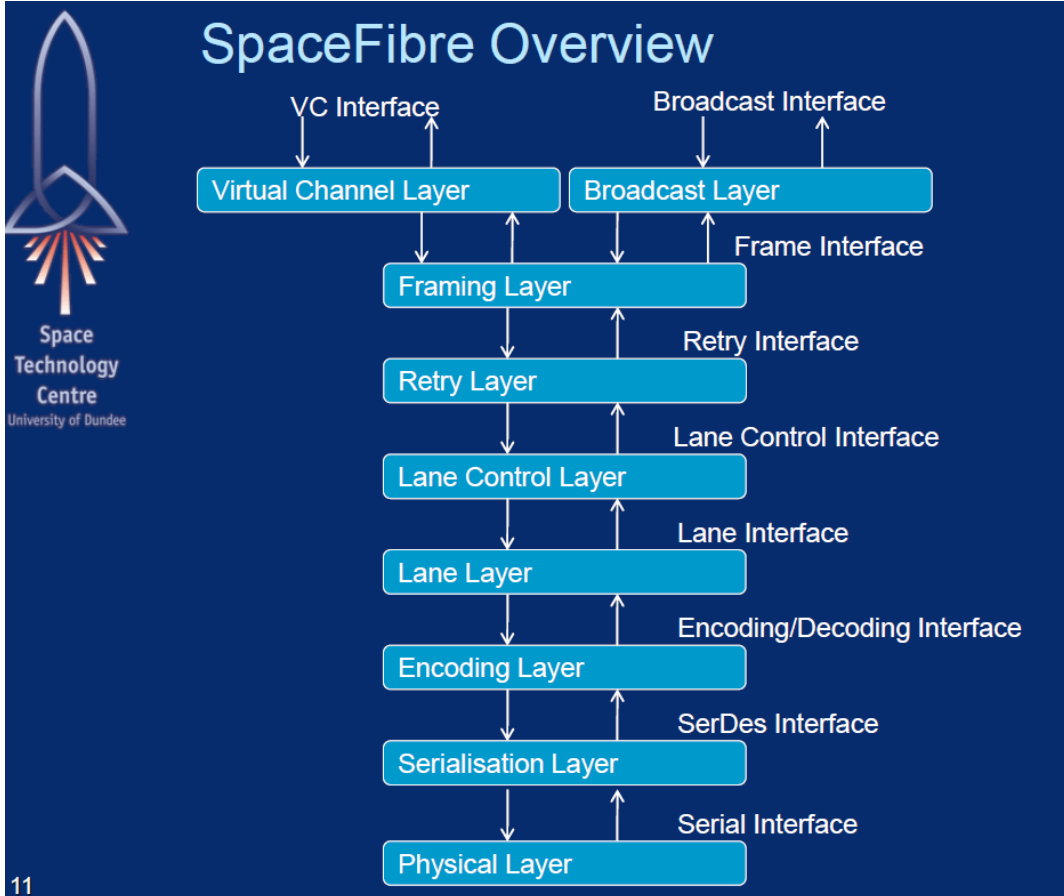
# SpaceWire traffic



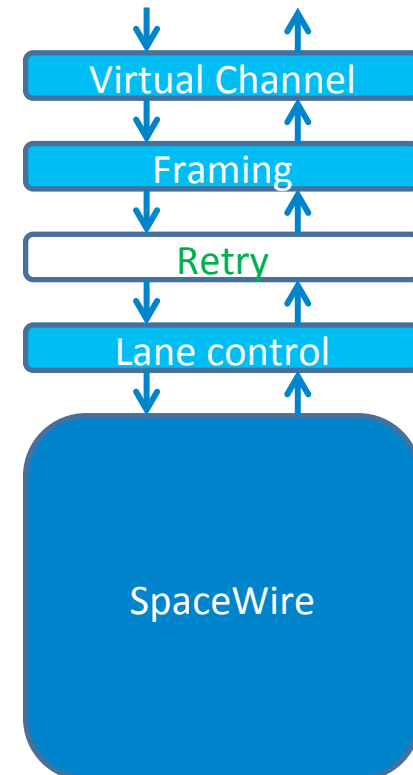
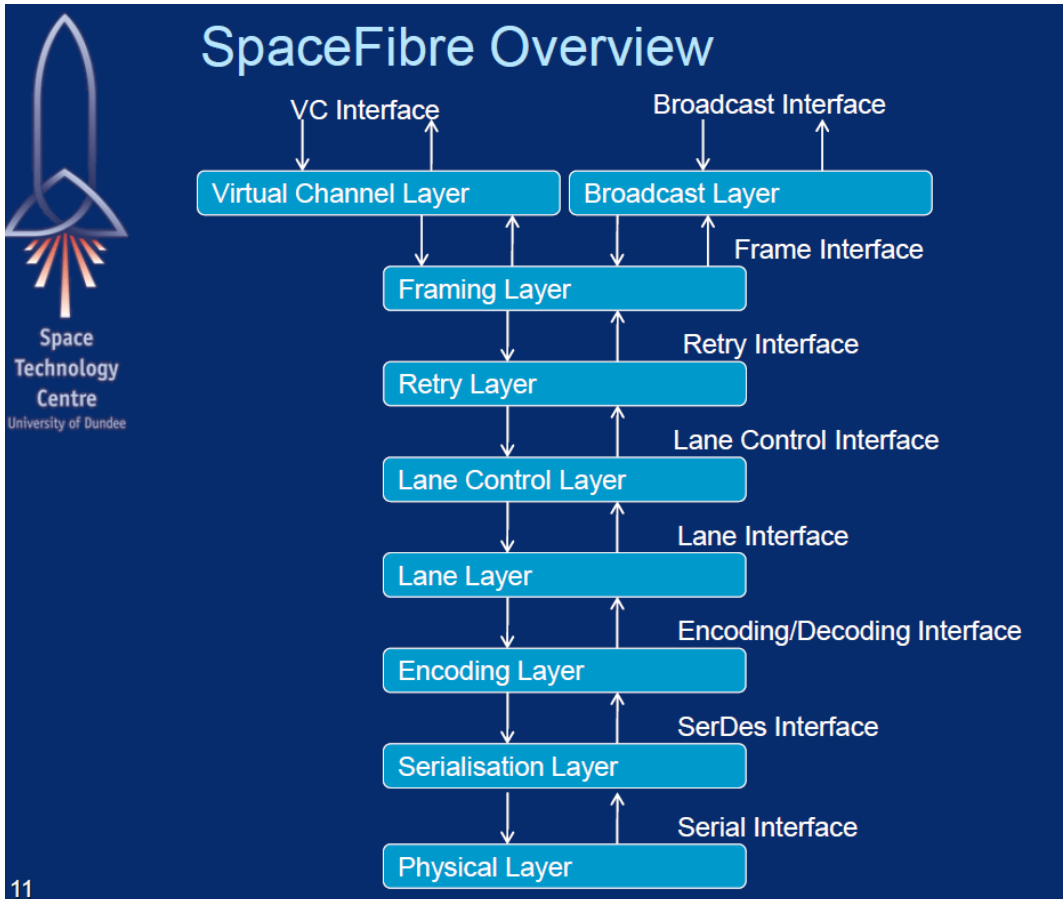
# Non blocking network

- Key techniques
  - **Buffering**
    - Avoid Sparse traffic for reducing link occupation.
  - **Framing**
    - Avoid overflow at the destination. Low latency.
  - **Flow control**
    - Avoid overflow at the destination. Avoid blocking.
  - **Quality of Service**
  - **Multilane**
    - Multiple SpaceWire link for higher performance.
- **Virtual channel on SpaceFibre** has them.

- Virtual Channel Interface
  - Used to send and receive SpaceWire packets



- Virtual Channel Interface
  - Used to send and receive SpaceWire packets

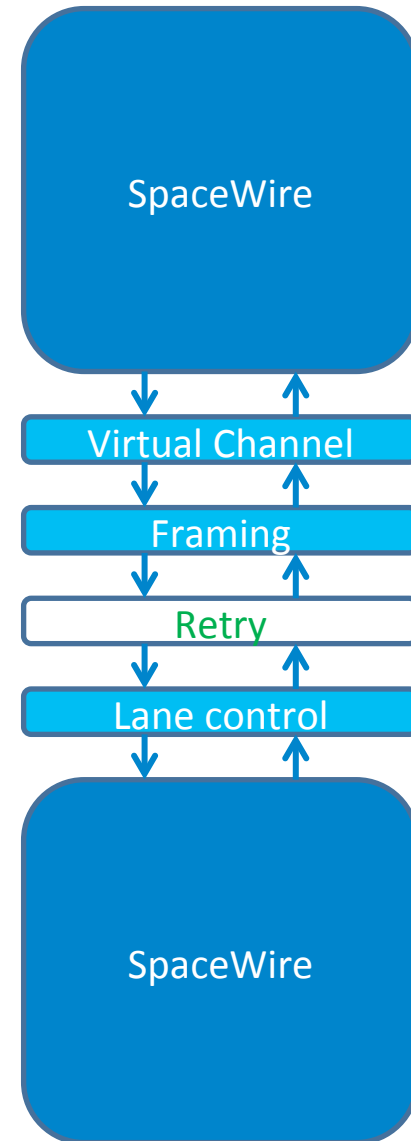
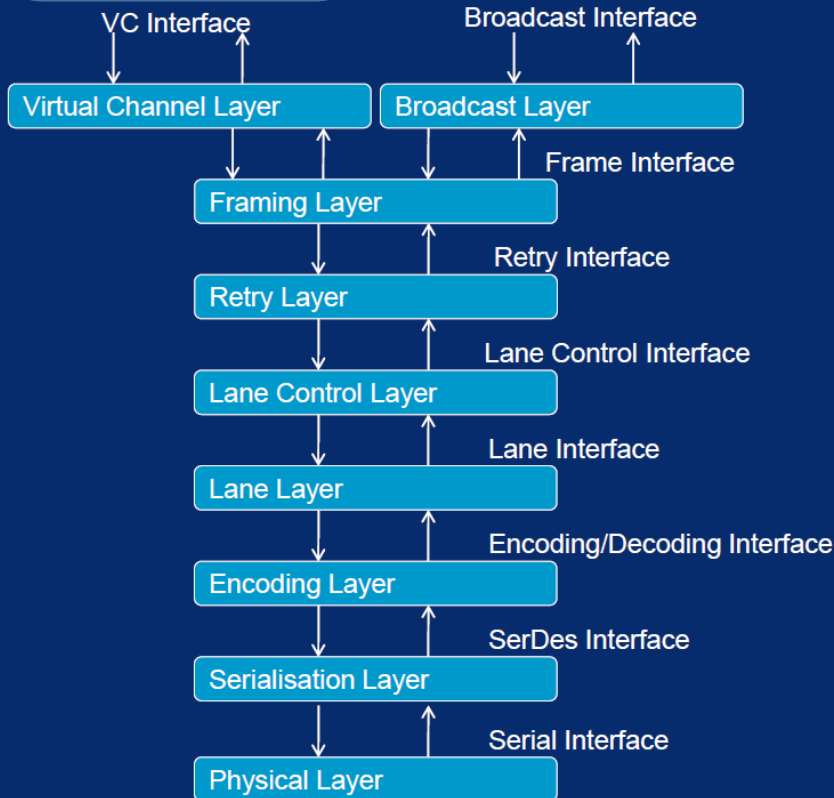


Encapsulate a SpaceFibre Frame in a SpaceWire packet.  
 Do all nodes need to handle Virtual channel?

- Virtual Channel
- Used to

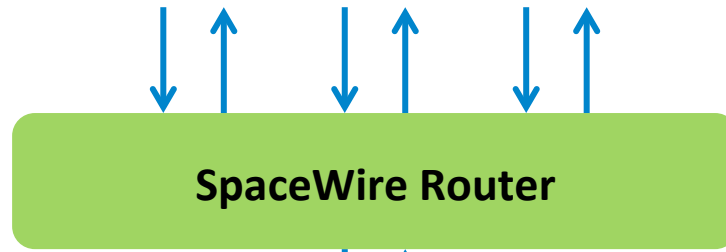
SpaceWire

## Overview

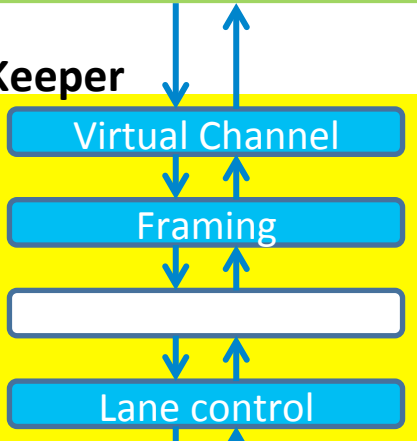


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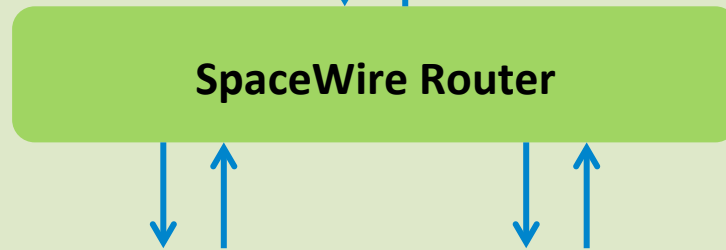
SpaceWire network



Gate Keeper

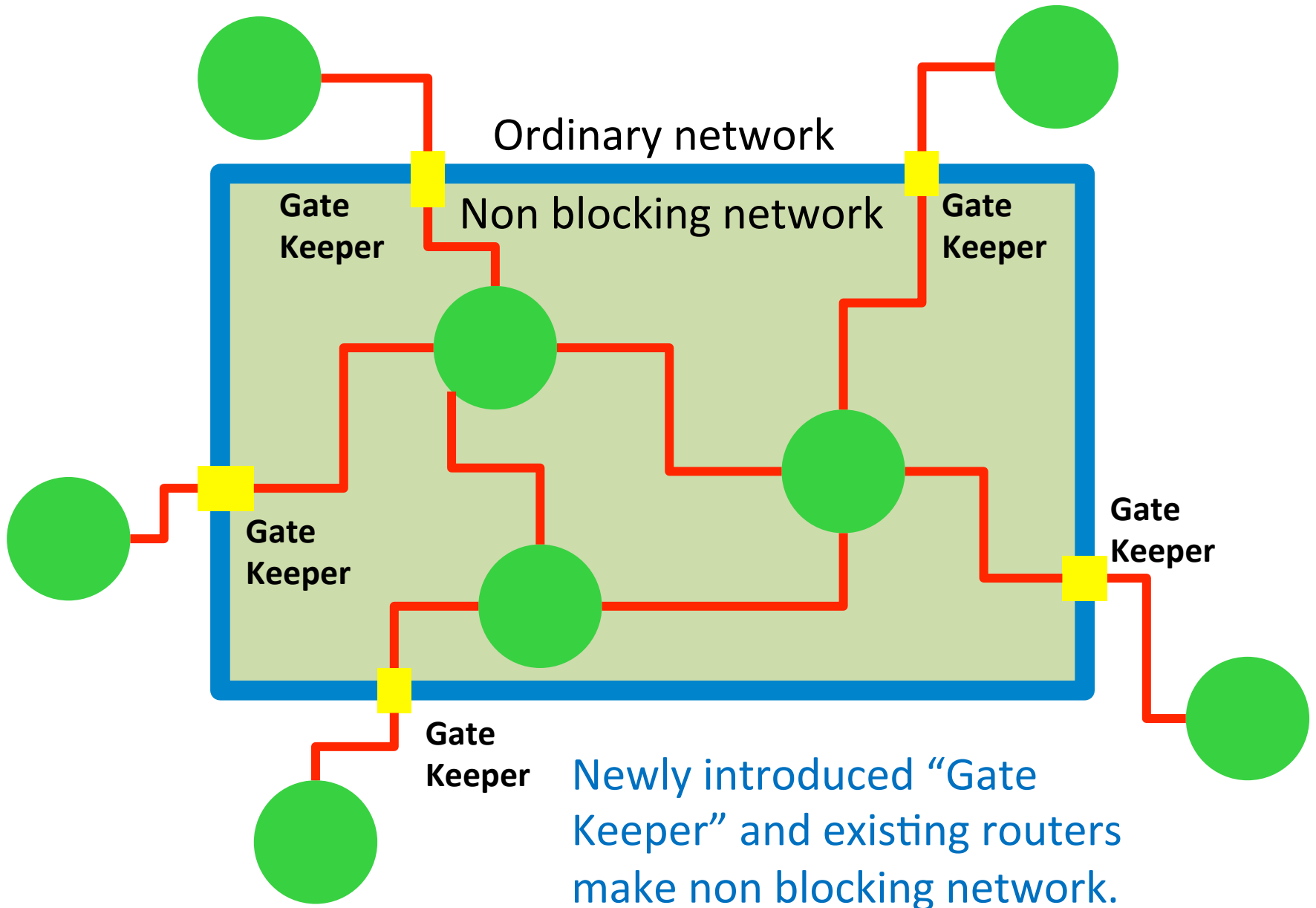


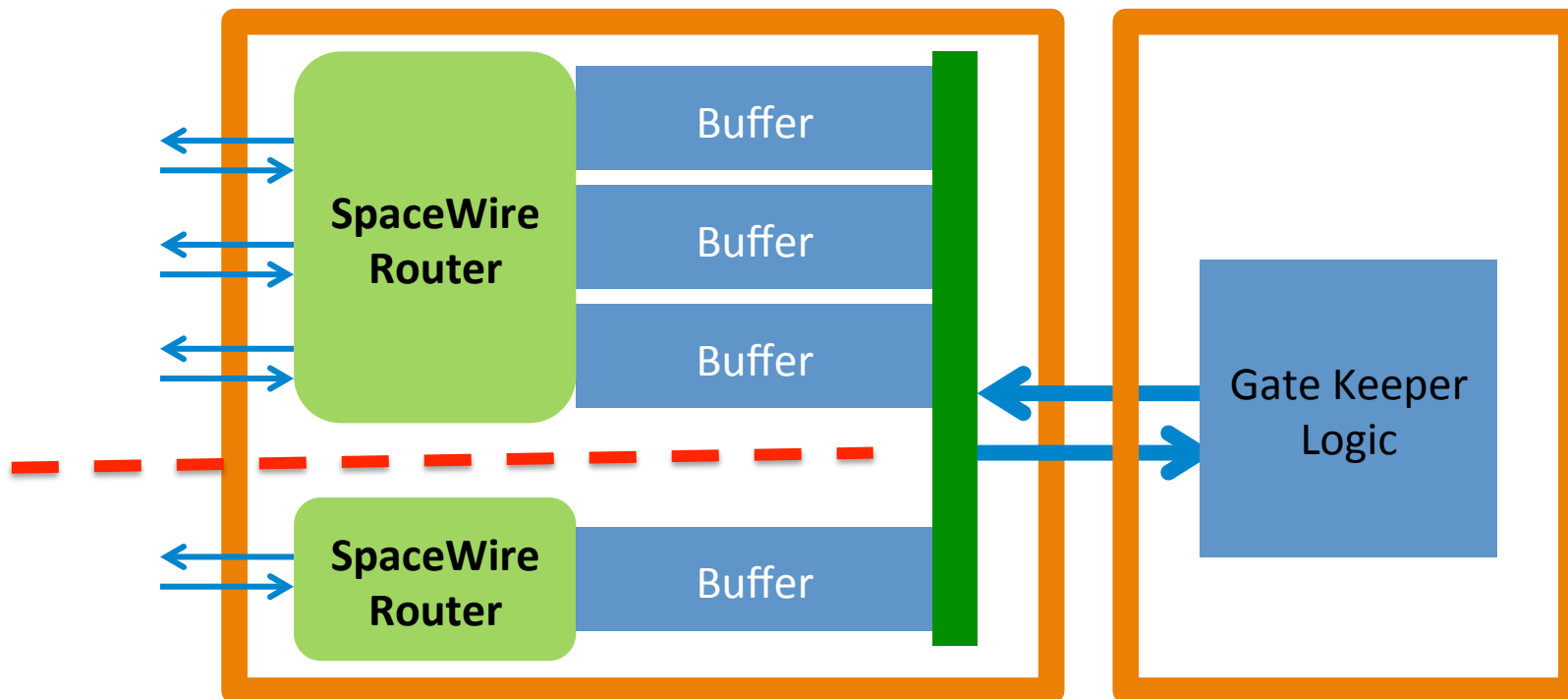
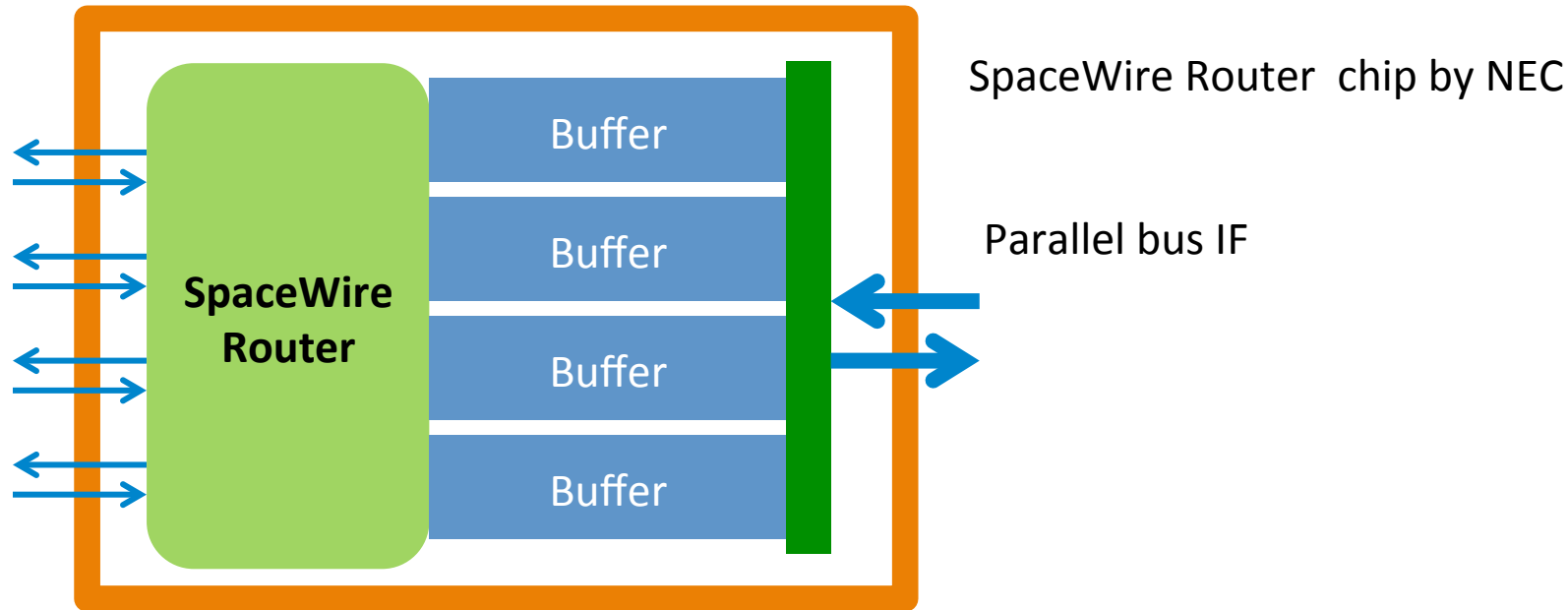
Non blocking  
SpaceWire network



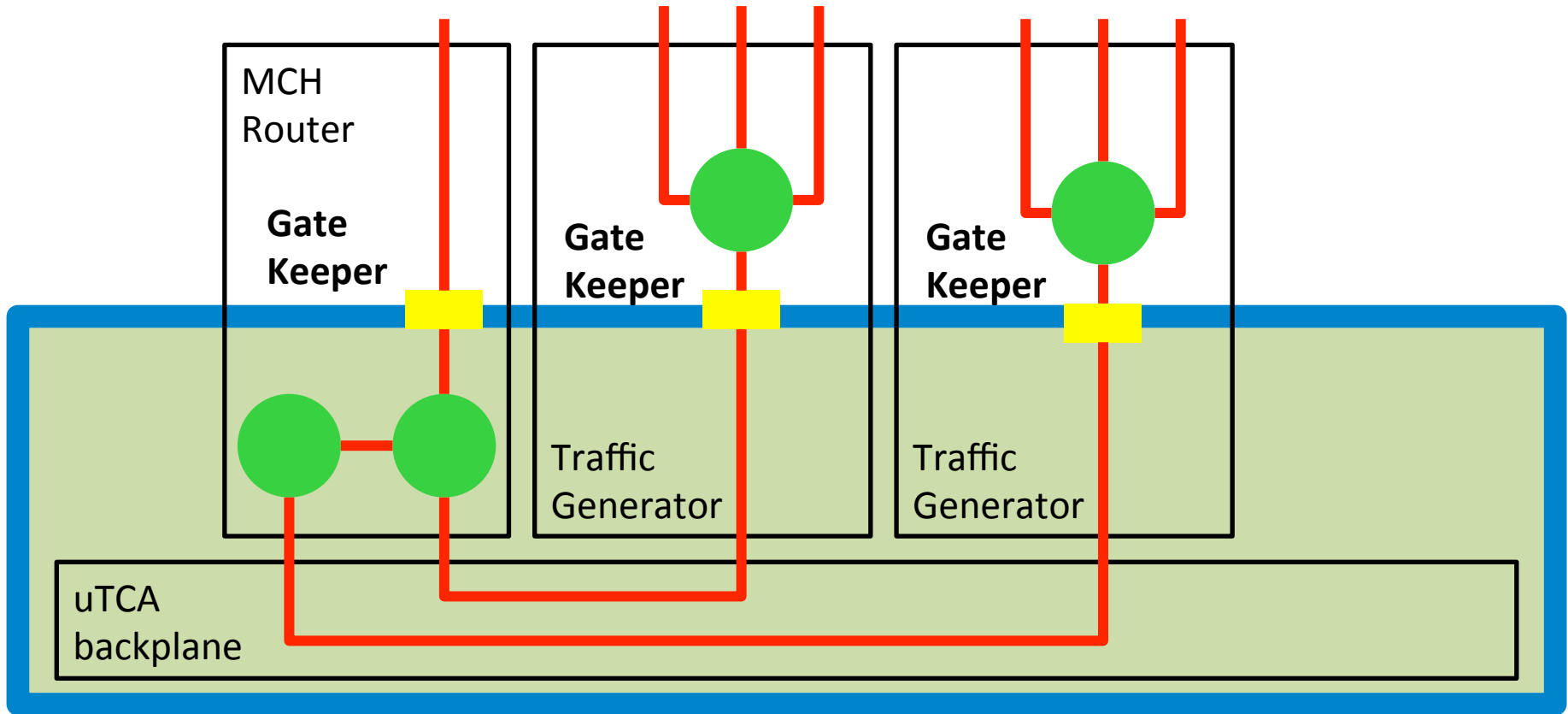


# Gate Keeper





# Non blocking SpaceWire backplane



# Summary

- Multi-Router network may cause BLOCKING.
- BLOCKING avoidance is key for large SpaceWire Network.
- Buffering / Framing / End to end Flow control are key to avoid BLOCKING.
- Virtual channel has them.
- Encapsulate SpaceFiber frame in SpaceWire packet
- Non-blocking network guarded by Gate Keeper.

