

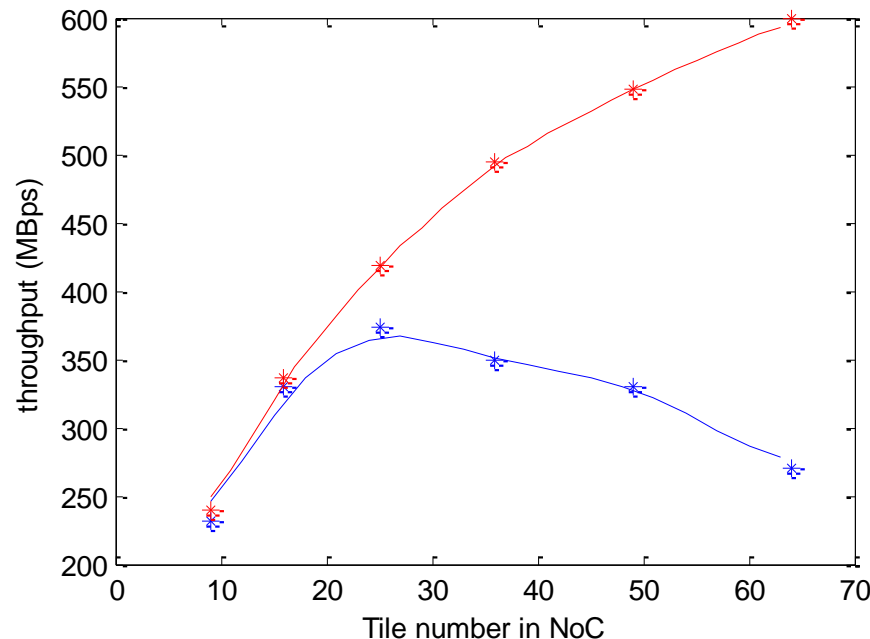
Router for NoRC

summary of work so far

Wei Song

Problems of SystemC Model

- Random routing neglects location information
 - Low throughput and high loss rate when small tiles per function number

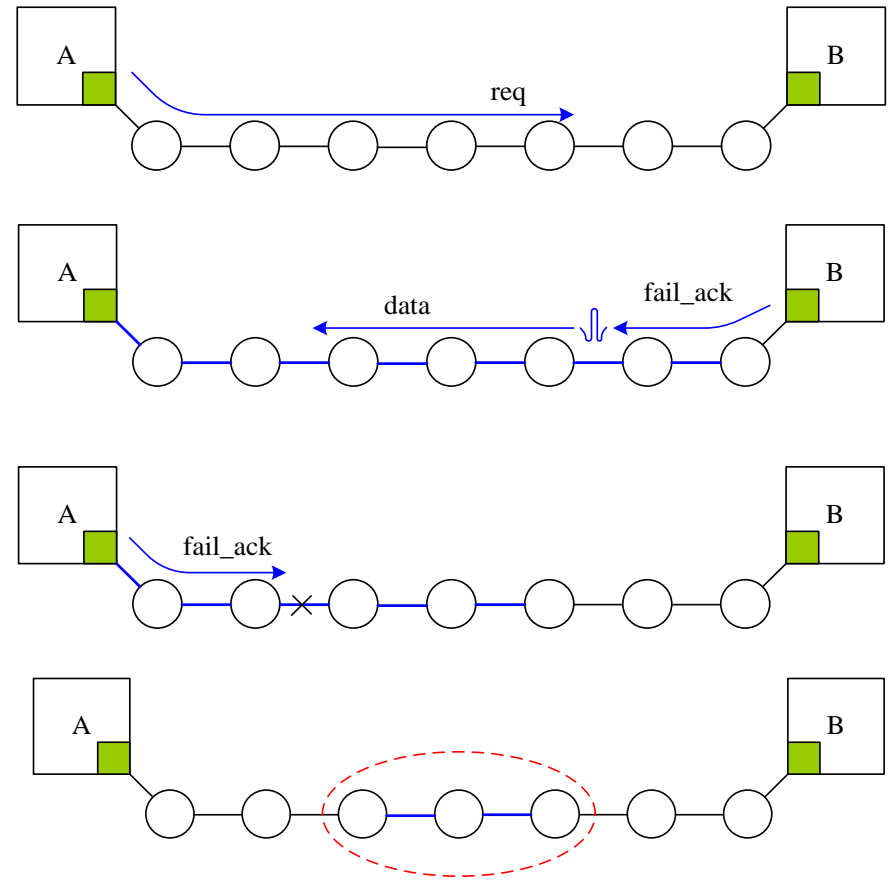


Problems of SystemC Model

- High retry rate with huge delay when inject rate is high (connection oriented)
 - Frame level loss rate is around 90% at highest throughput
 - Flit level loss rate can be 60%

Problems of SystemC Model

- Vulnerable to live deadlock (connection oriented)



Solutions

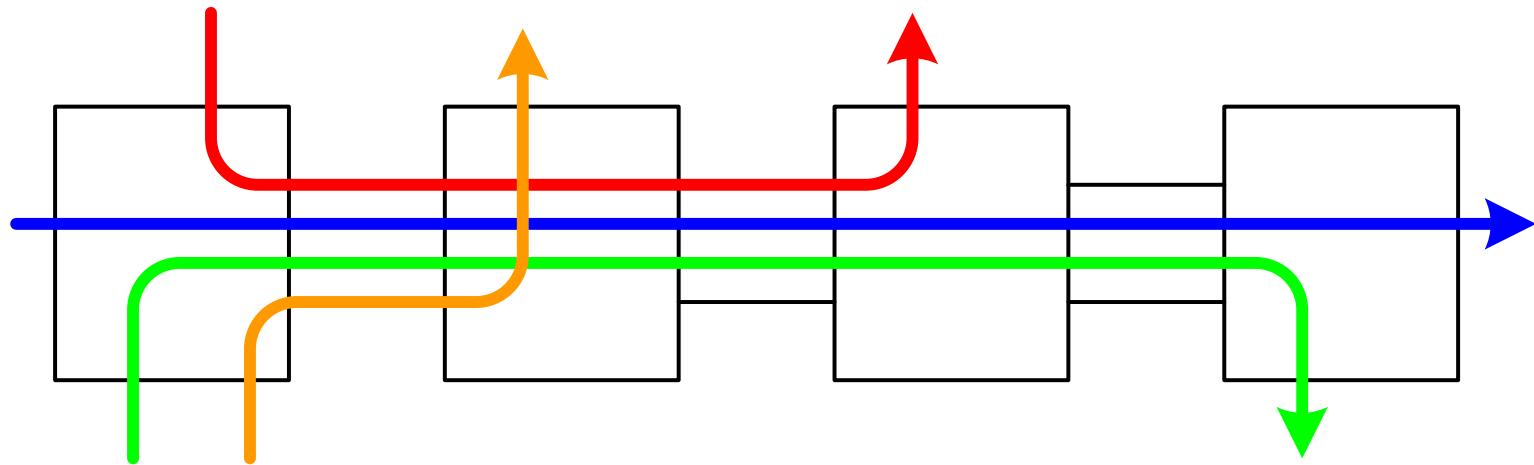
- Sharing link with multiple communication pairs
 - Reduce the loss rate
- Random-XY routing
 - Reduce rout hop count, reduce loss rate and rout using location information
- Clock signal from Network Adapter
 - Use this long time clock to avoid deadlock

Current Link Sharing Technology

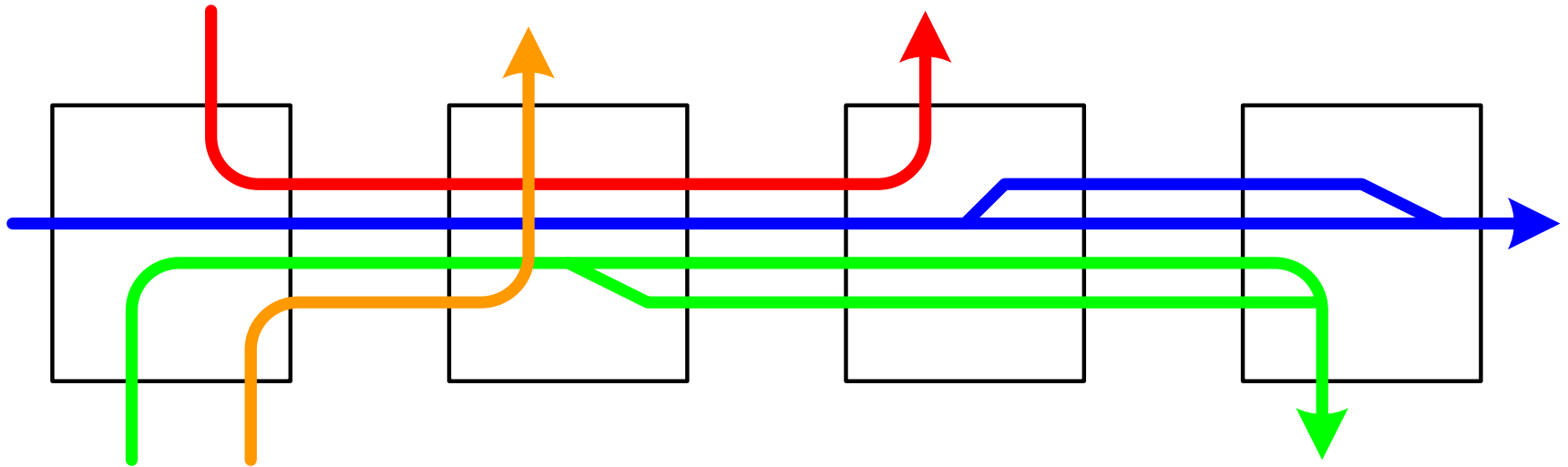
- Virtual Channel
 - Huge buffer size, fully developed technique
- TDMA
 - Complex control logic with time slot allocation table
- SDM
 - Fixed bandwidth allocation
- CDMA
 - Central arbiter requires

Dynamic Allocated Link Sharing

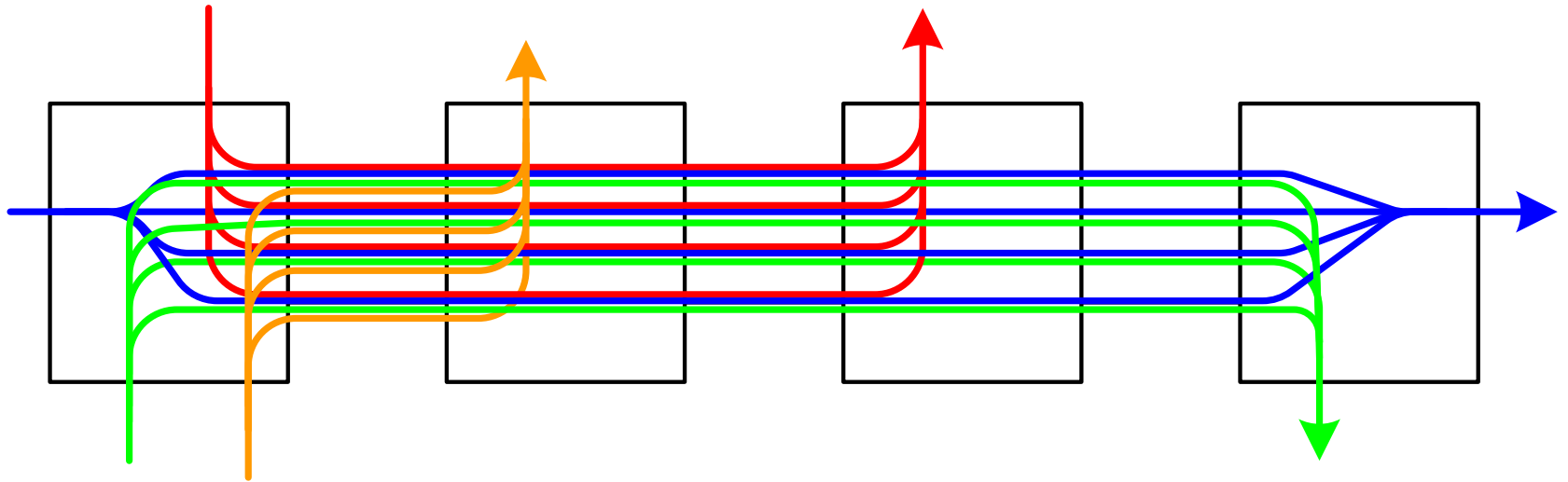
- Developed from SDM
 - Problems of SDM



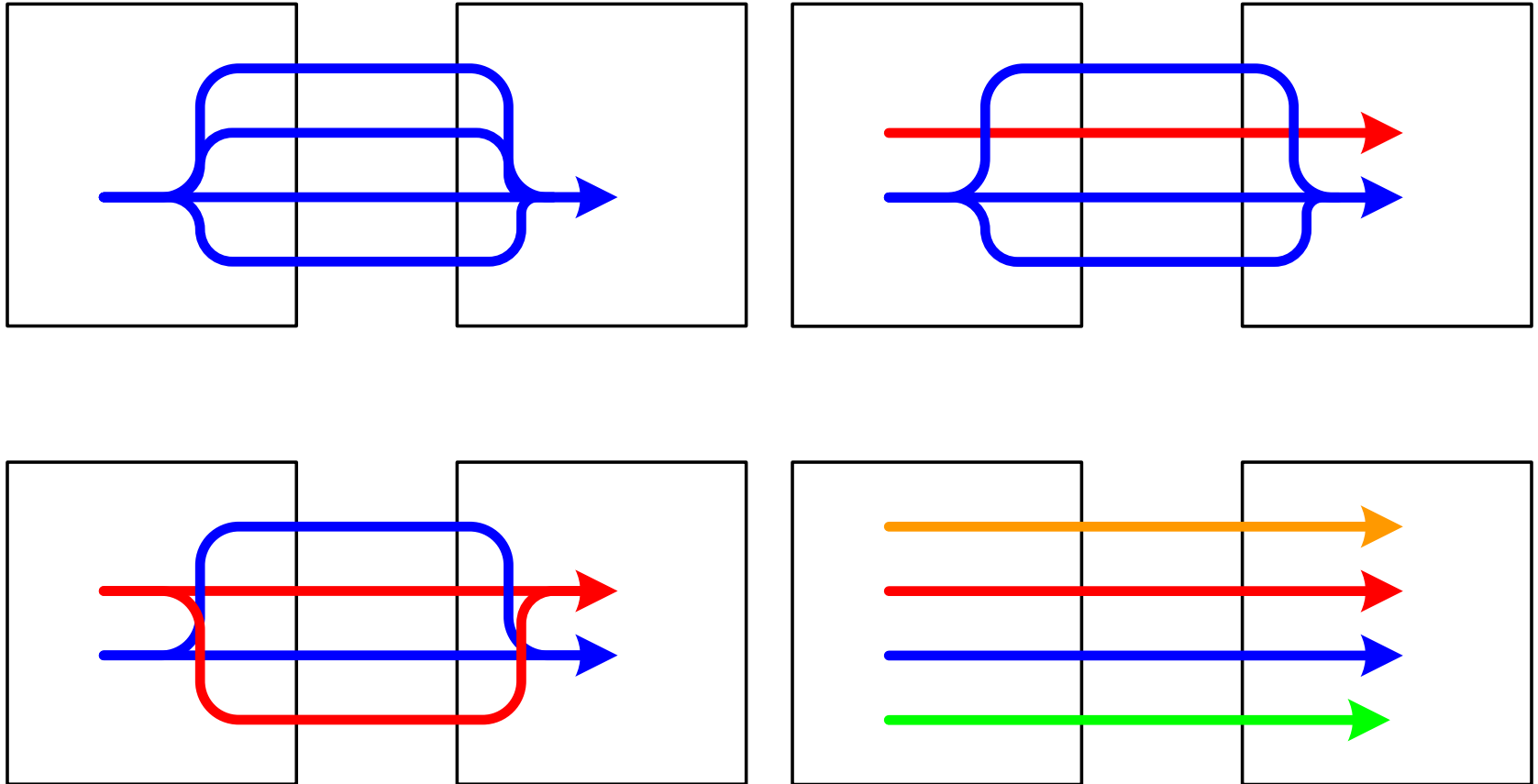
Dynamic Allocated Link Sharing



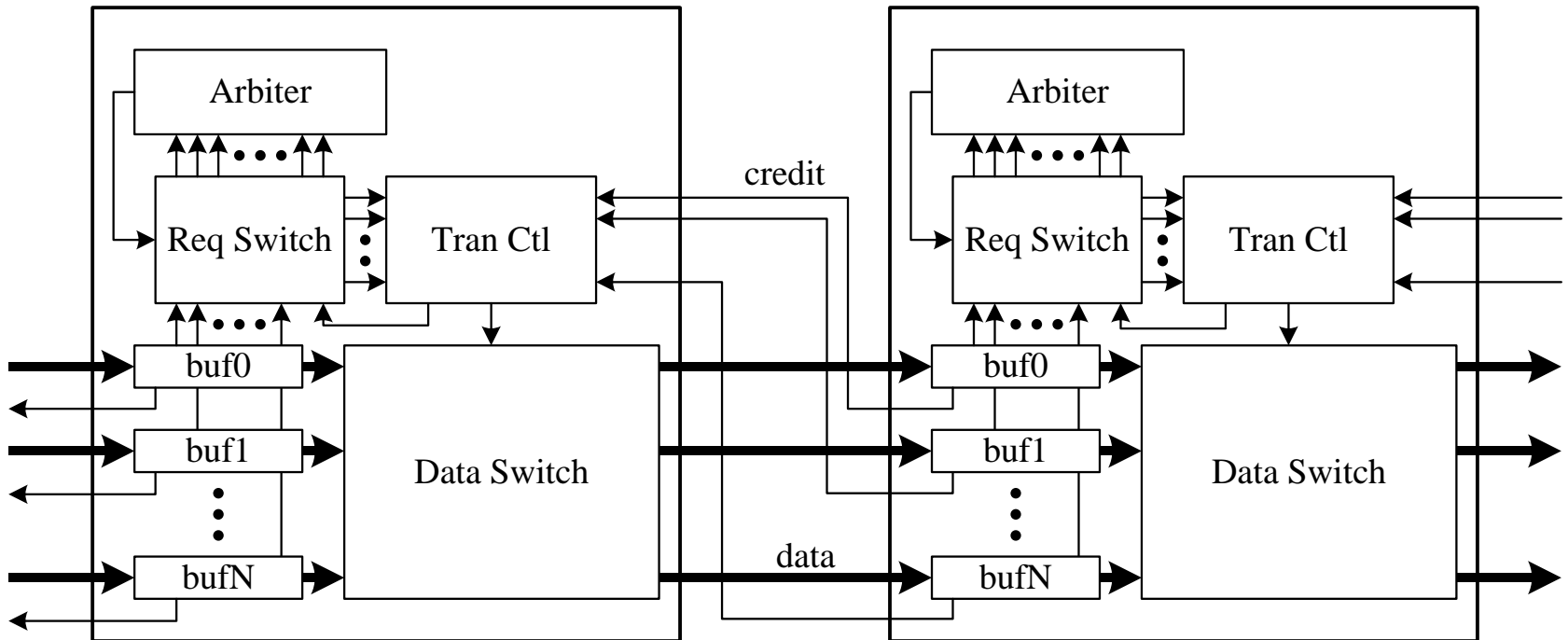
Dynamic Allocated Link Sharing



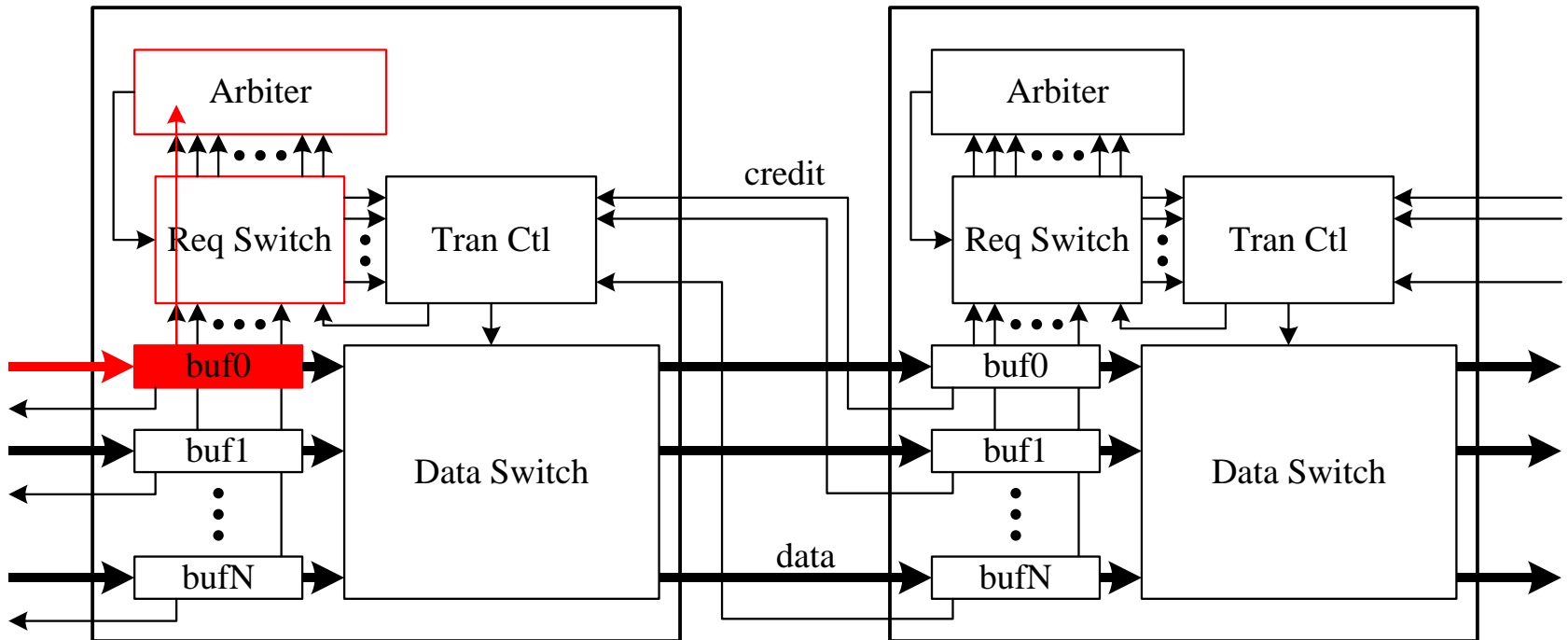
Dynamic Allocated Link Sharing



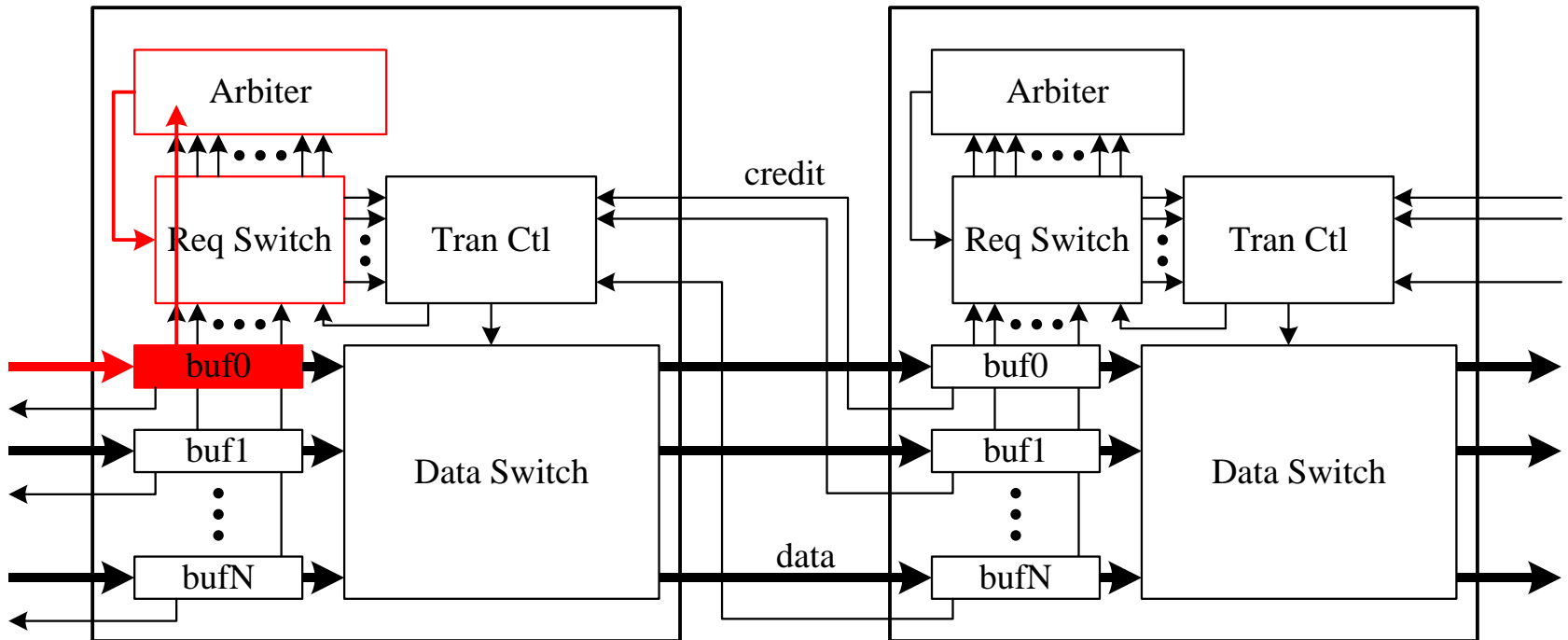
Router Architecture



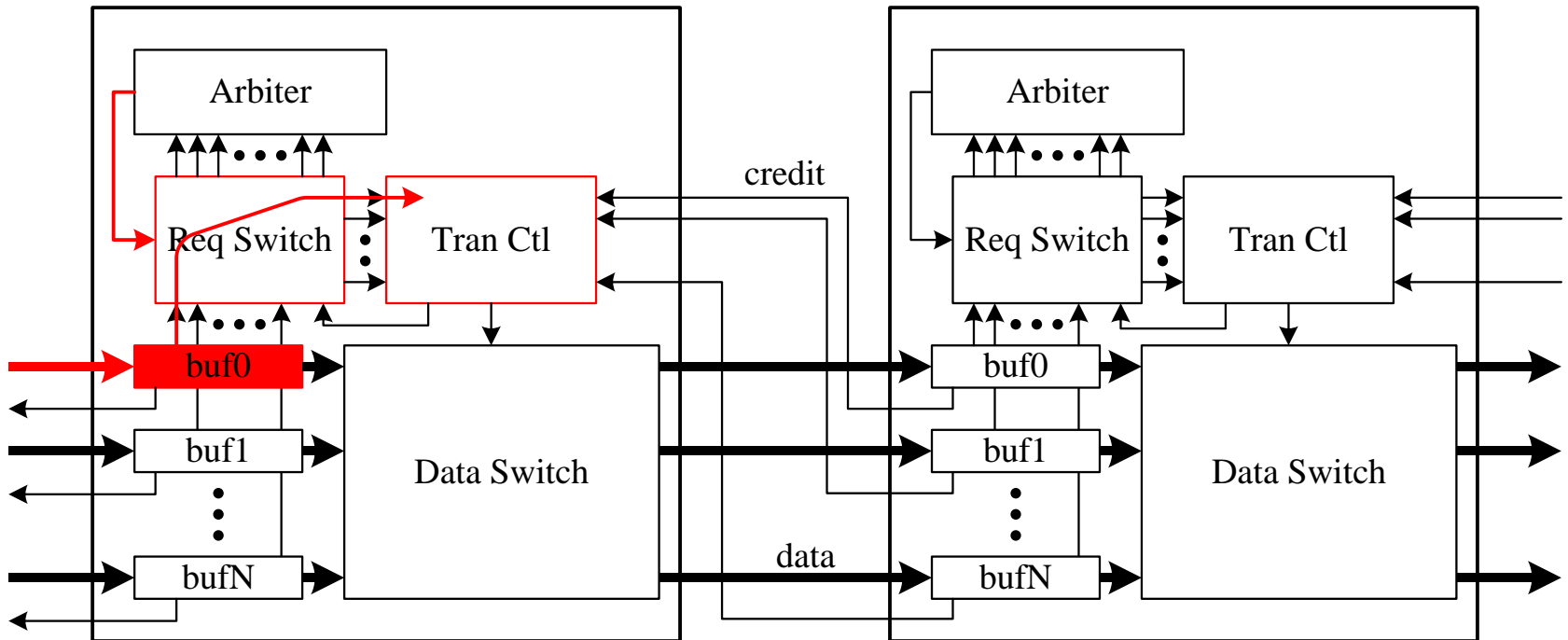
Process of Header



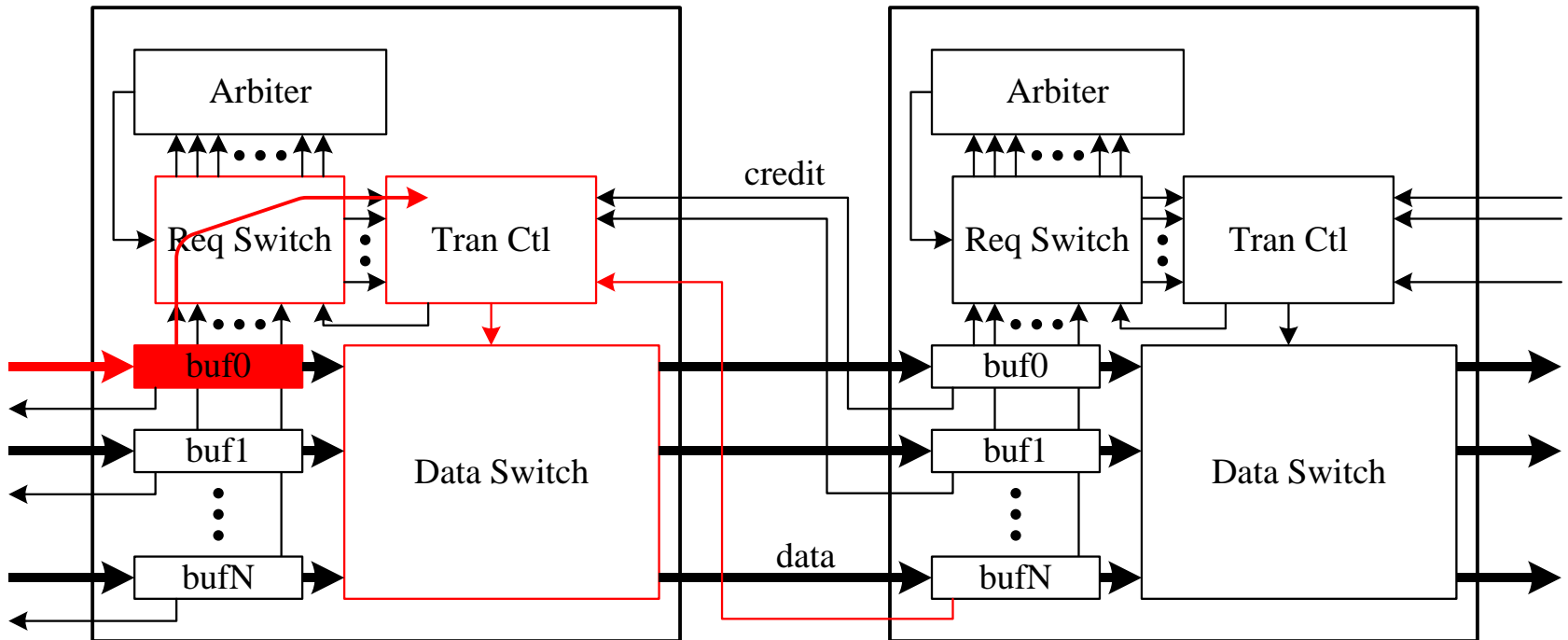
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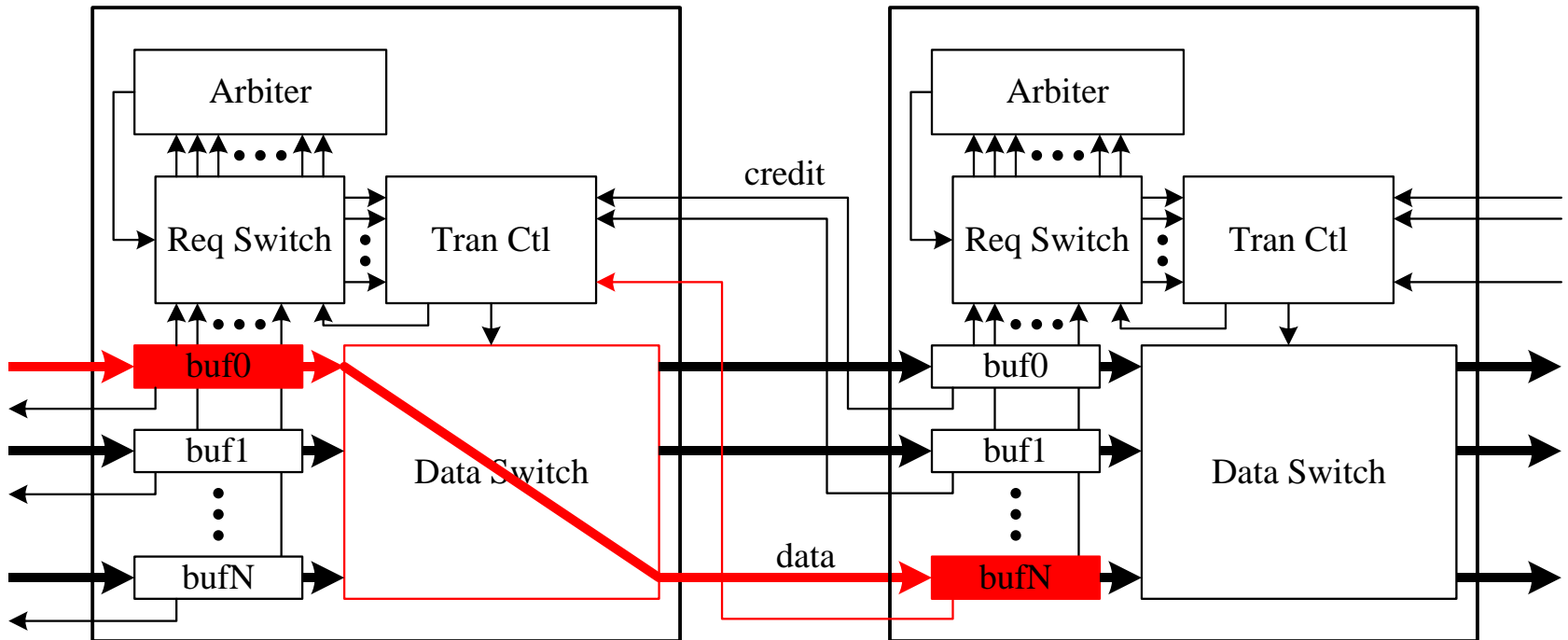
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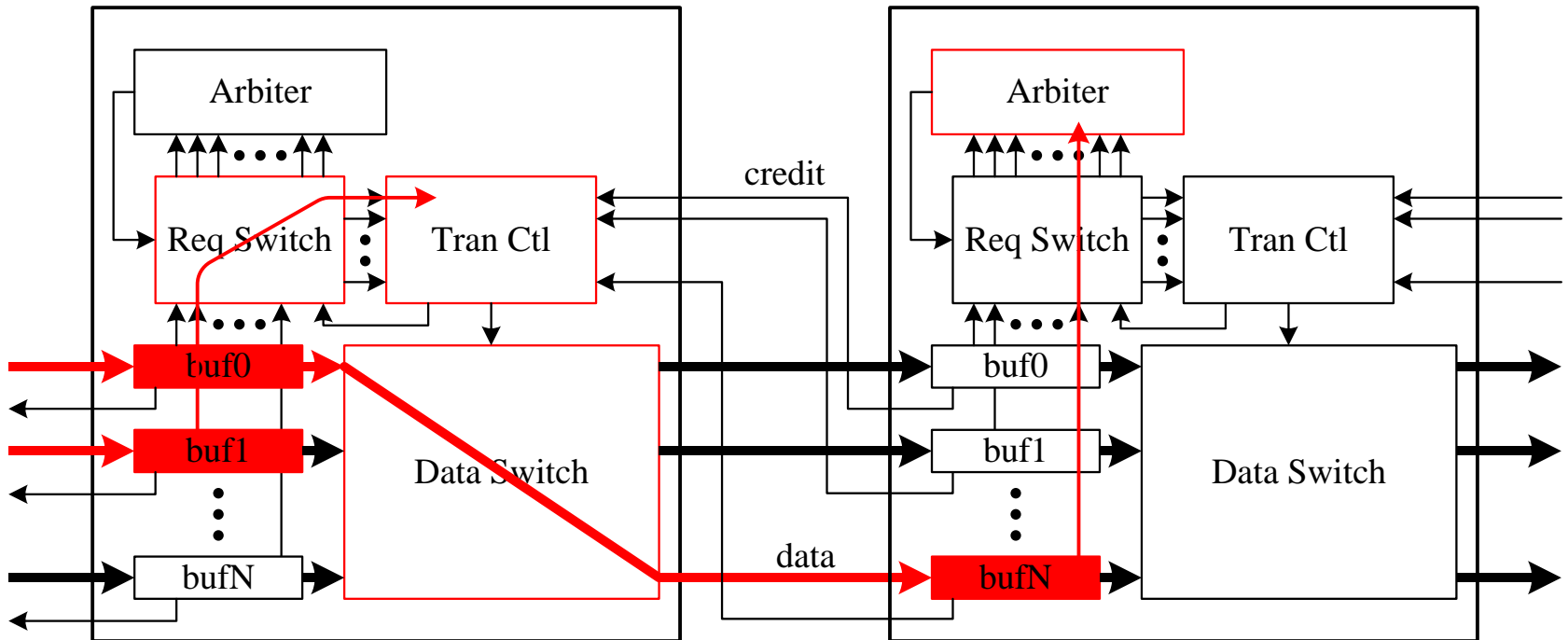
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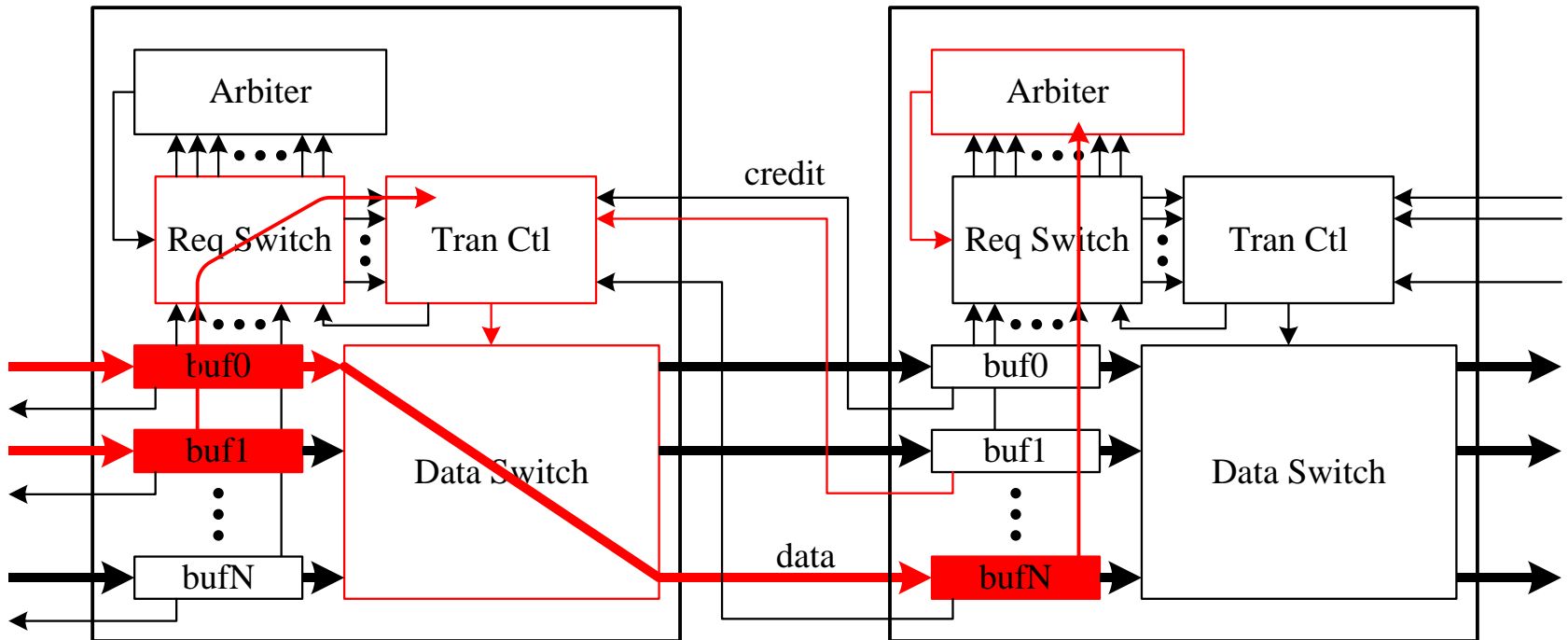
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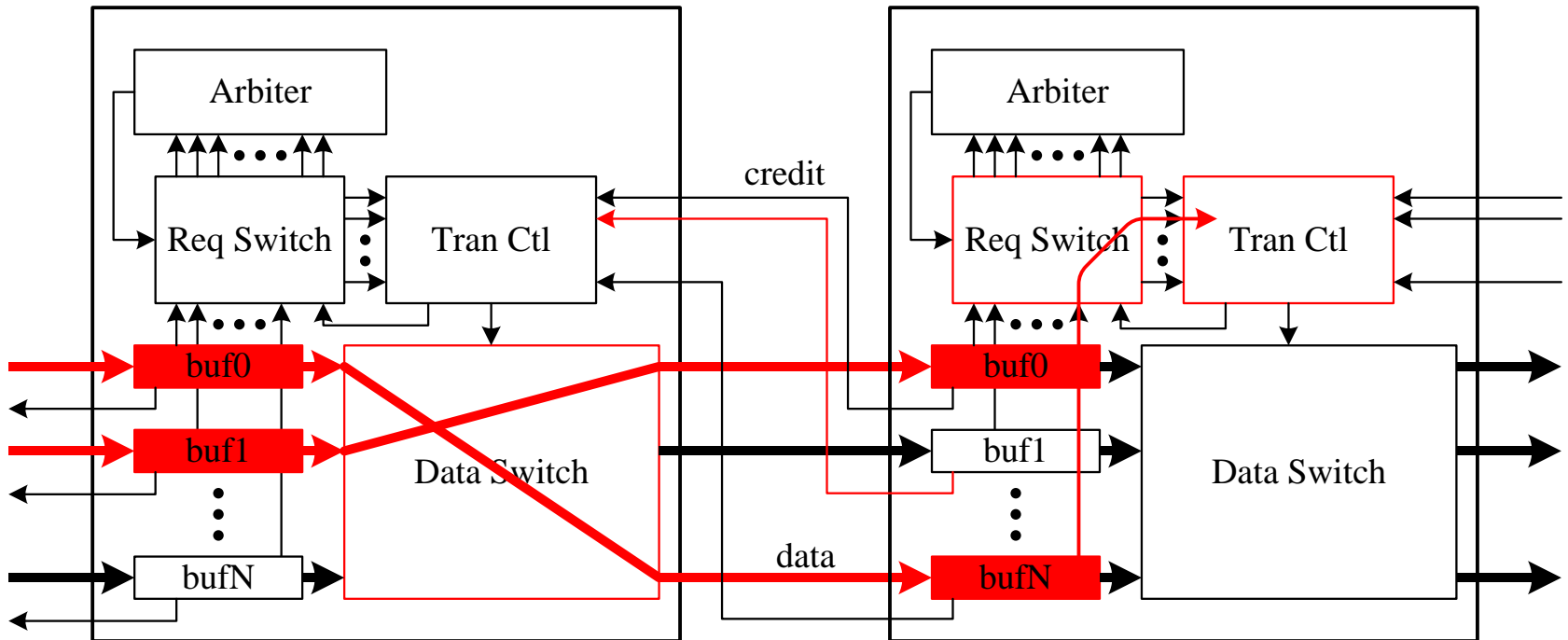
Process of data



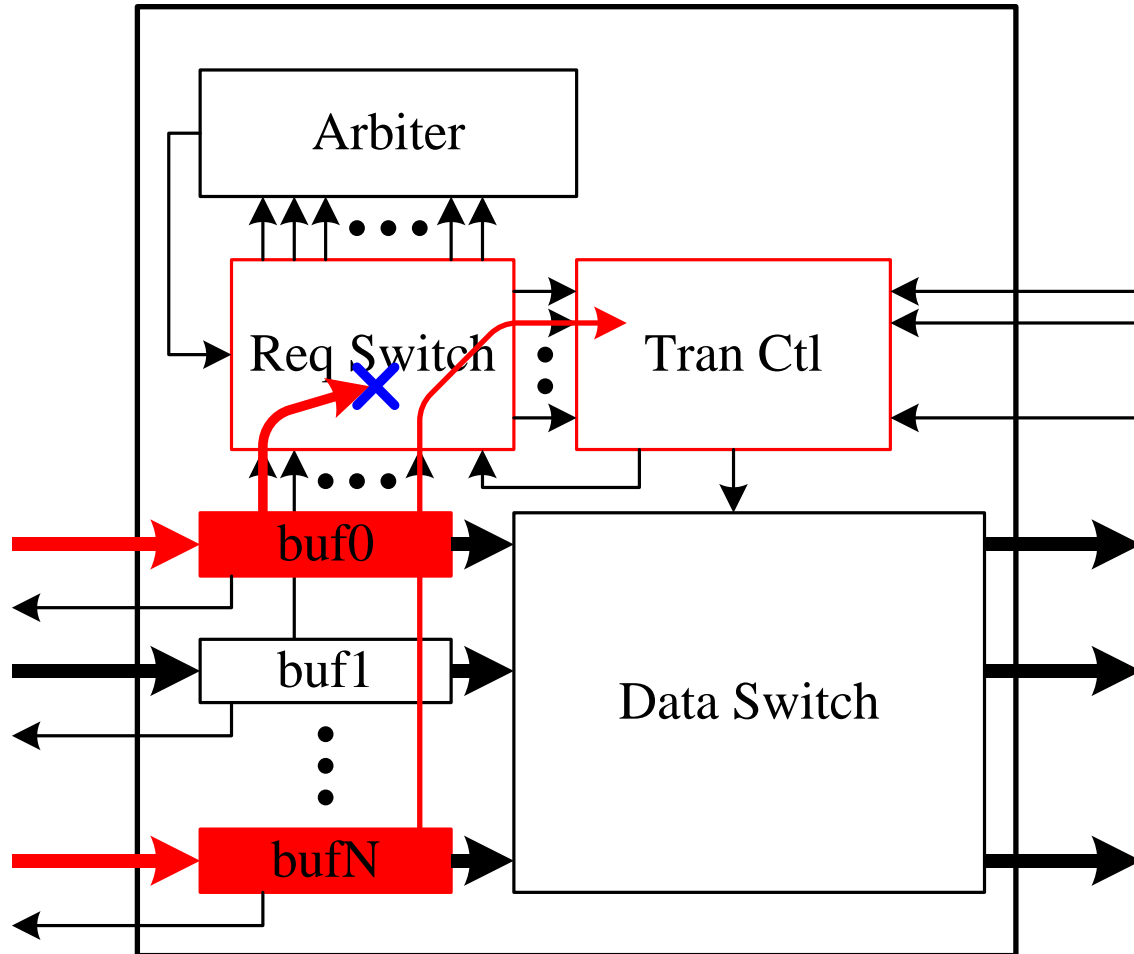
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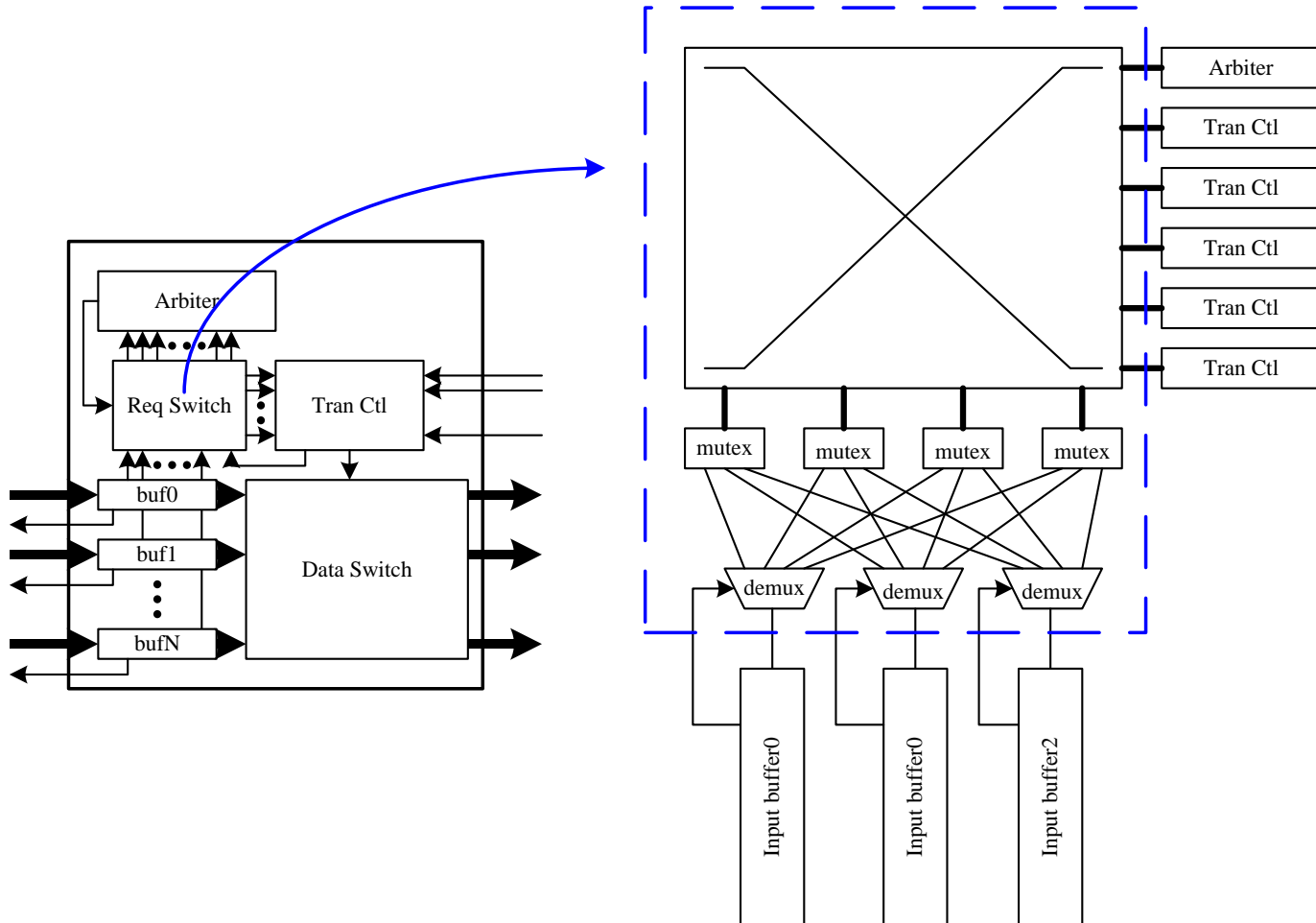
Process of data



Process of data



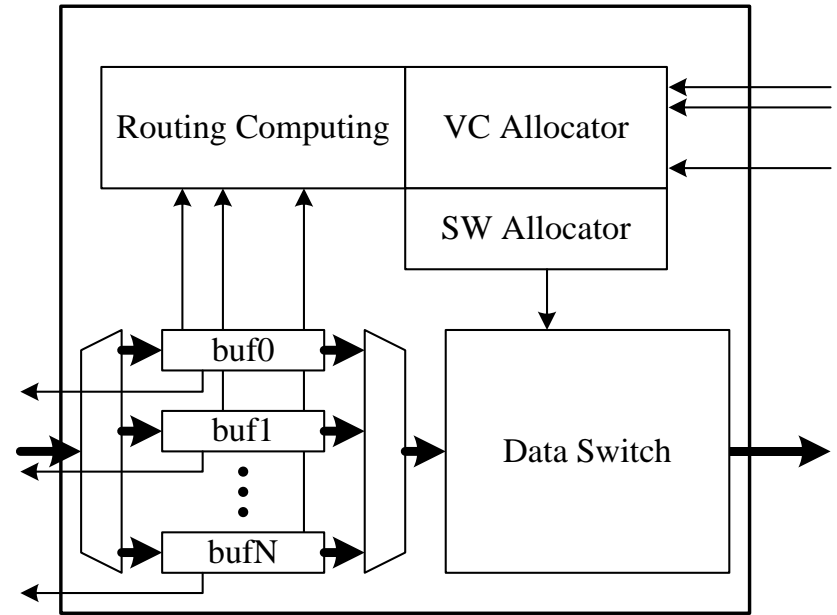
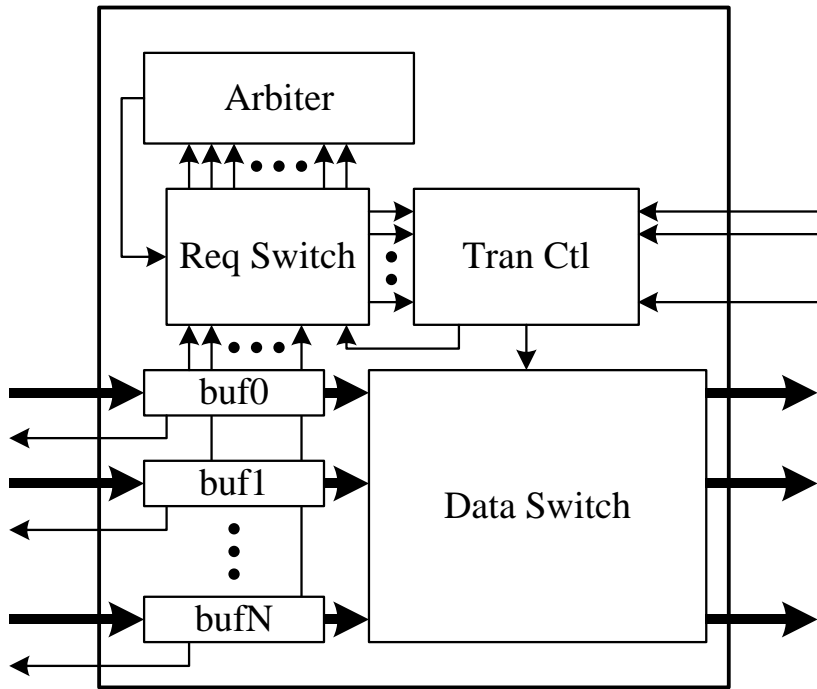
Request Switch



Performance Summary

- Advantages
 - Small buffer size
 - Dynamic link allocation
 - Less bandwidth waste
- Disadvantages
 - Big control logic
 - High congestion rate when network load is huge

Structure Compare with Traditional VC Router



Performance Compare with Traditional VC Router

- Less buffer size, but bigger control logic and switch
- Bigger Latency, bandwidth is divided (same link bandwidth)
- Less dynamic power and leakage power
- High congestion when network load is huge

Over.