RPR Protection Switching

Lars Ramfelt larsh@dynarc.com

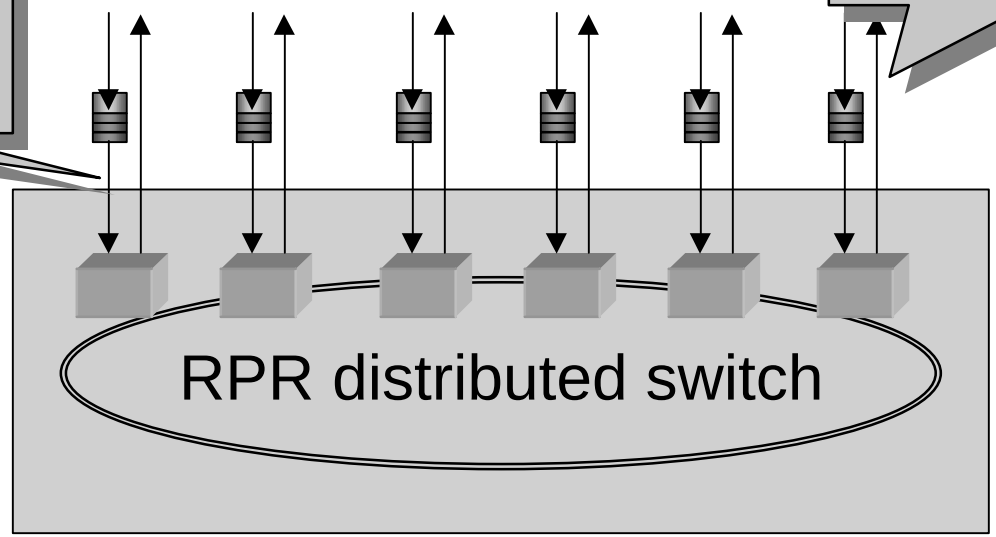
Frederic Thepot fthepot@dynarc.com

DYNARC

Introduction of RPR model

Ingress side:
- Ingress scheduling
- Customer traffic separation
- Congestion buffers (100's of MB)

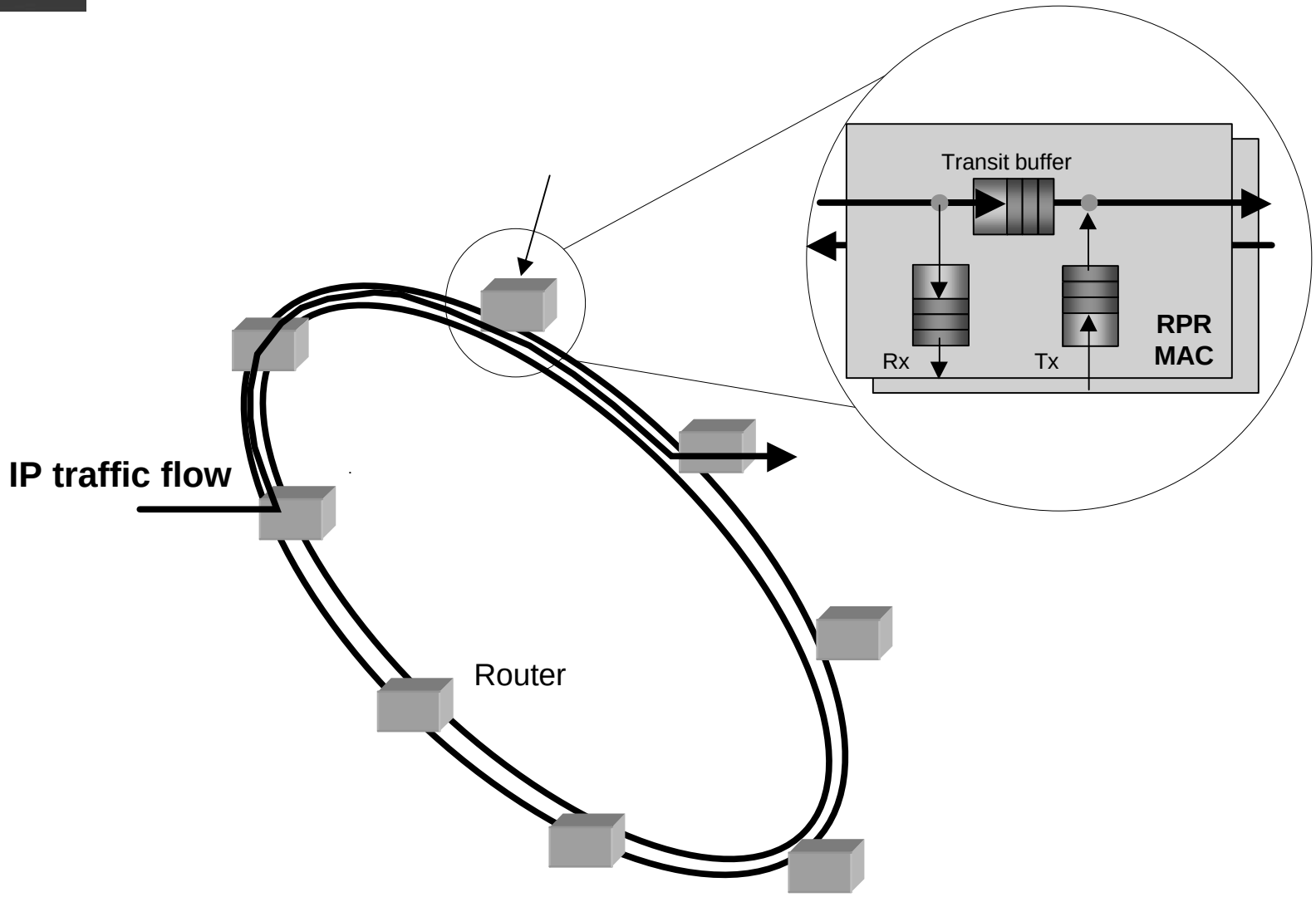
Egress side:
- Flow control / back pressure



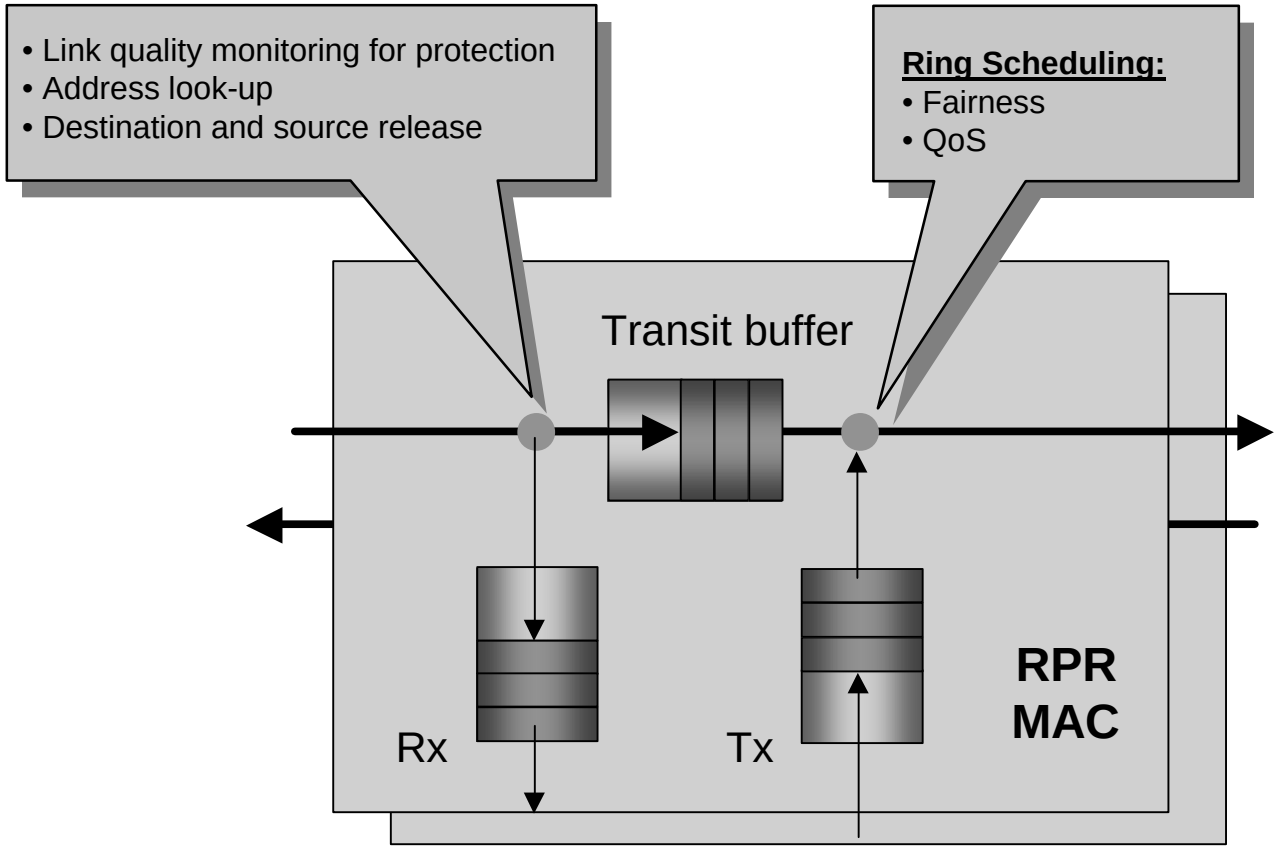
Distributed switch

- *The main Issue is "control message **latency"** on the ring*
- *Performance model **should be the same** as for centralized switch!*
- *Base traffic case:*
  - *Equally distributed source and destination addresses*
  - *Hub environment, single and dual hub cases*
- *Diffserv model **should be the same** as for a centralized switch*

Simple MAC model



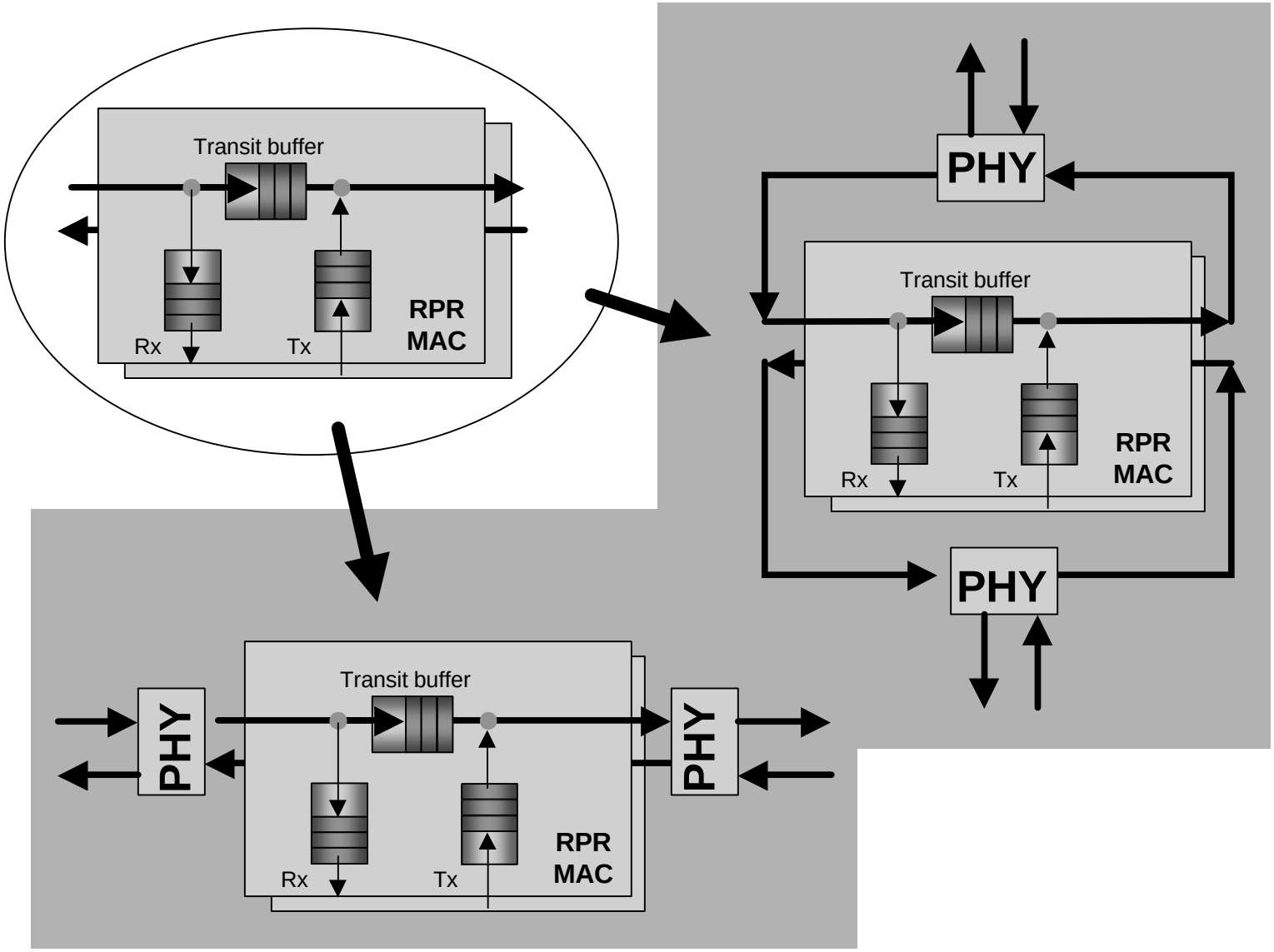
The MAC



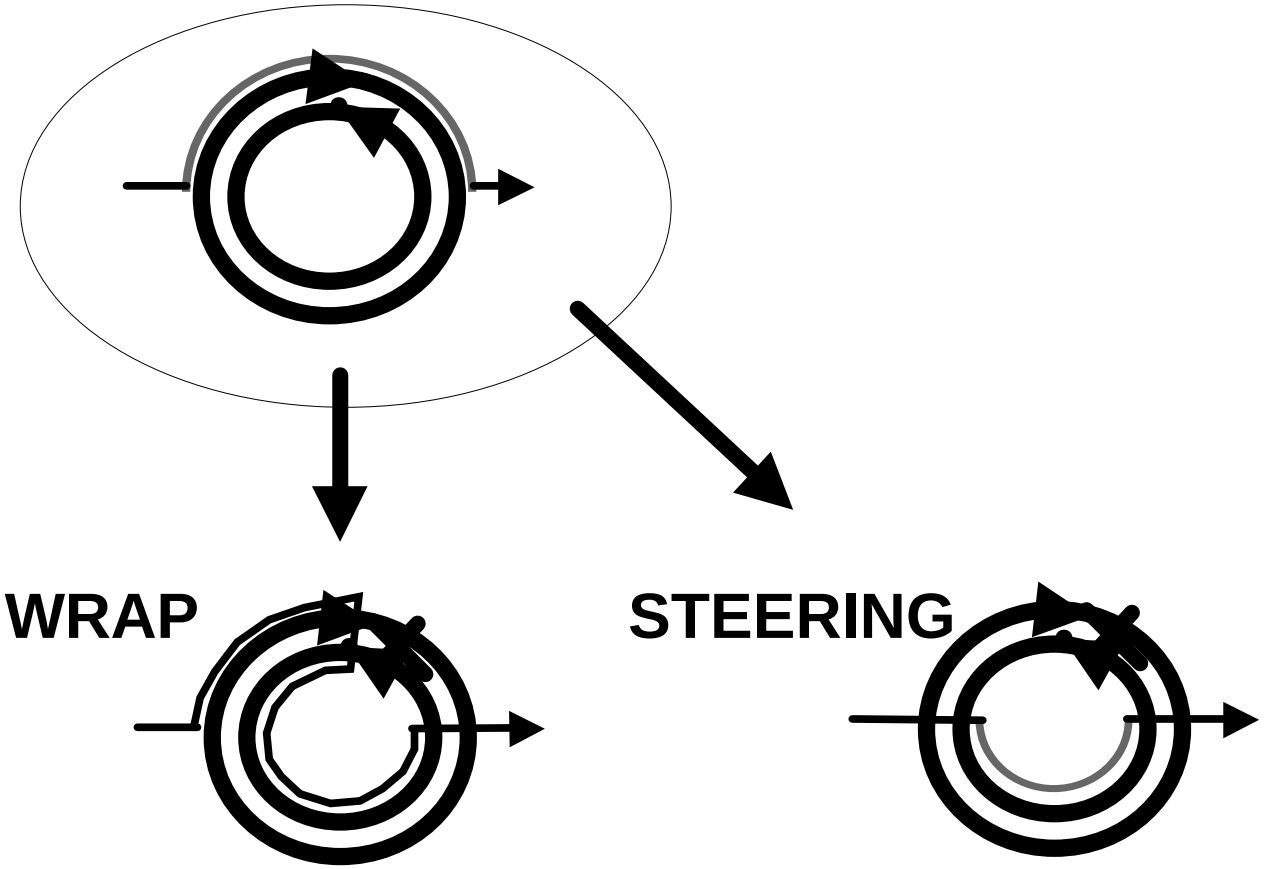
Variants:

- *Multiple Tx queues*
- *Multiple Transit queues*
- *Packet drop in Transit buffer*

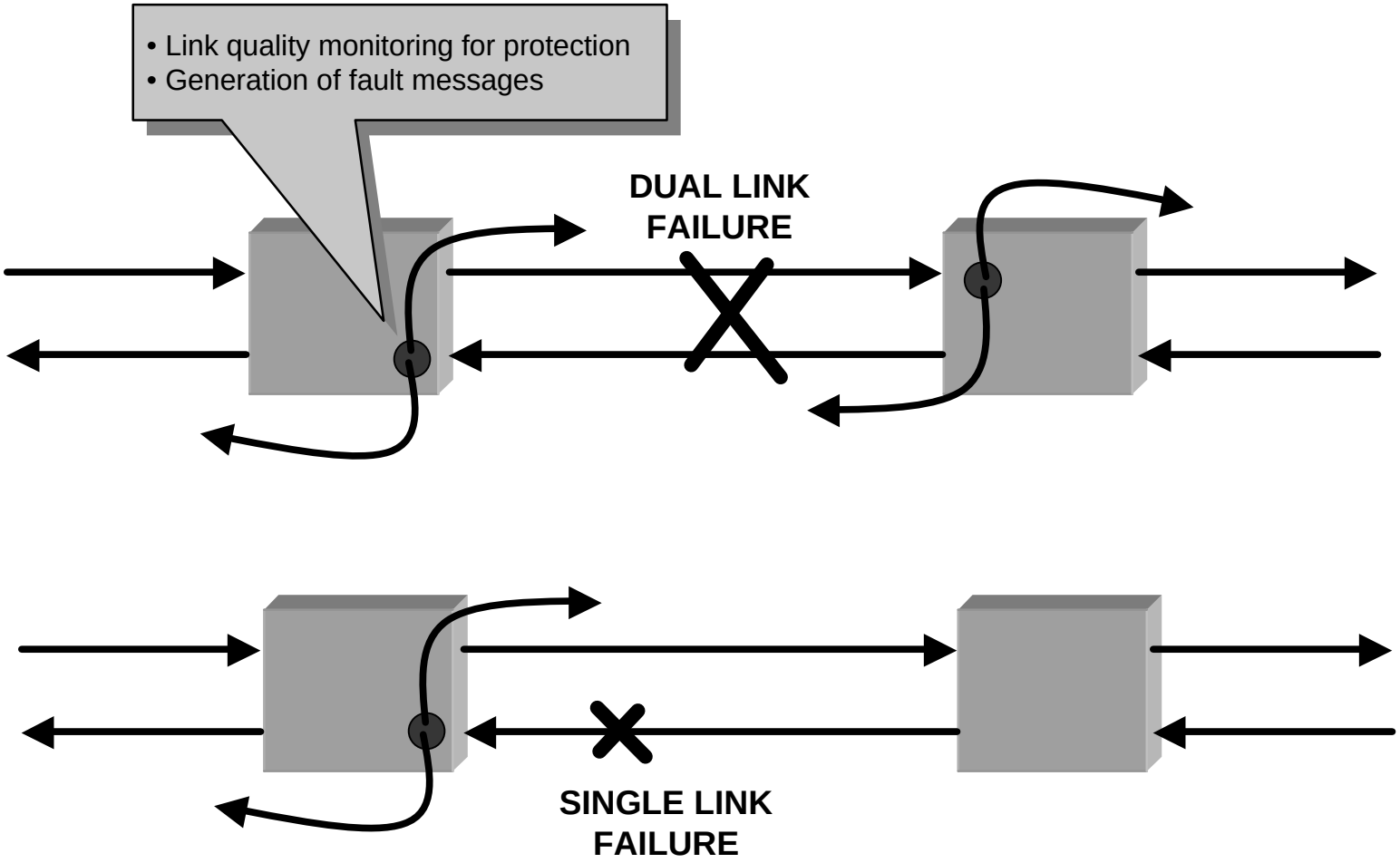
Implementation alternatives



Wrap versus Steering (1)



Fault signaling

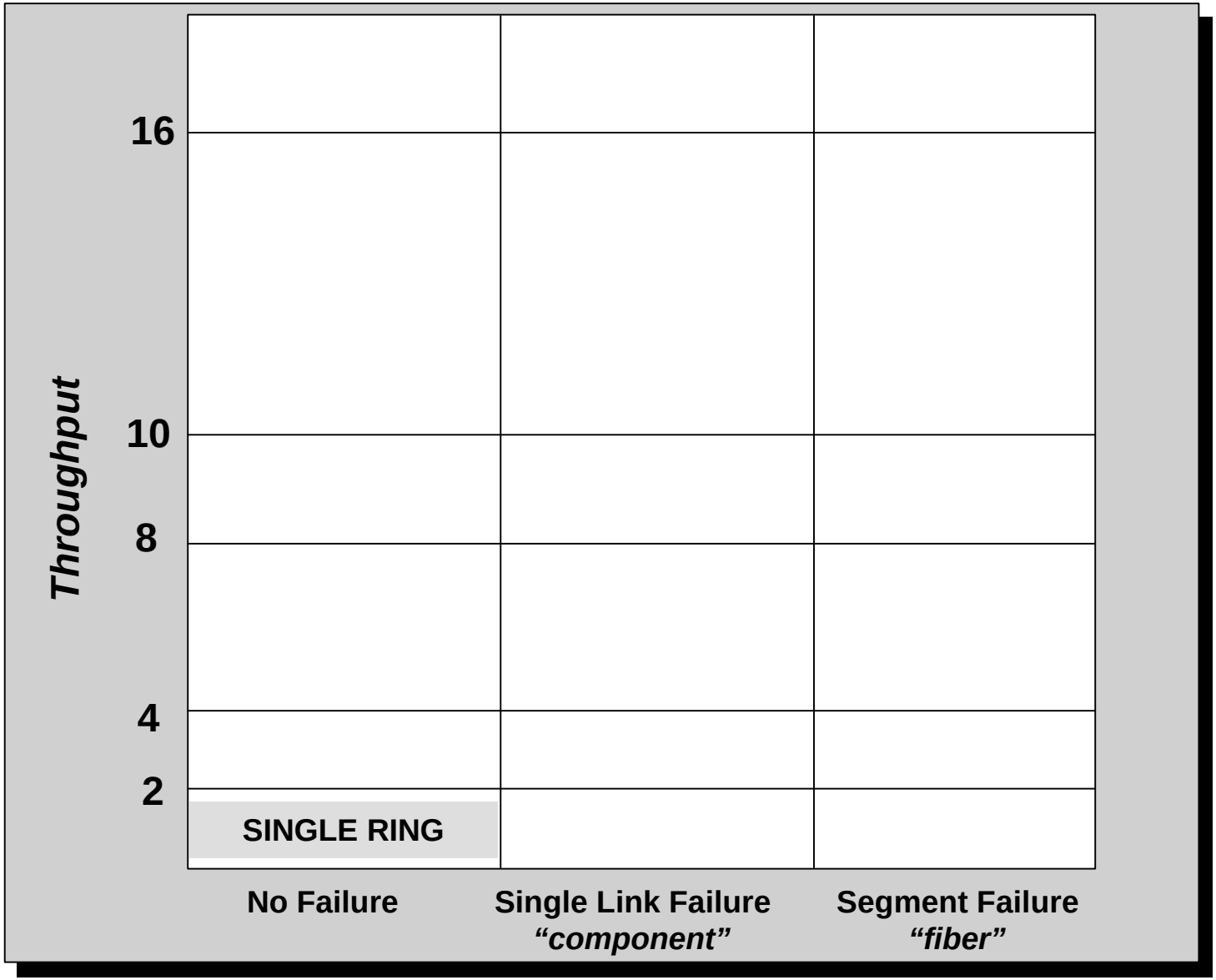


DYNARC

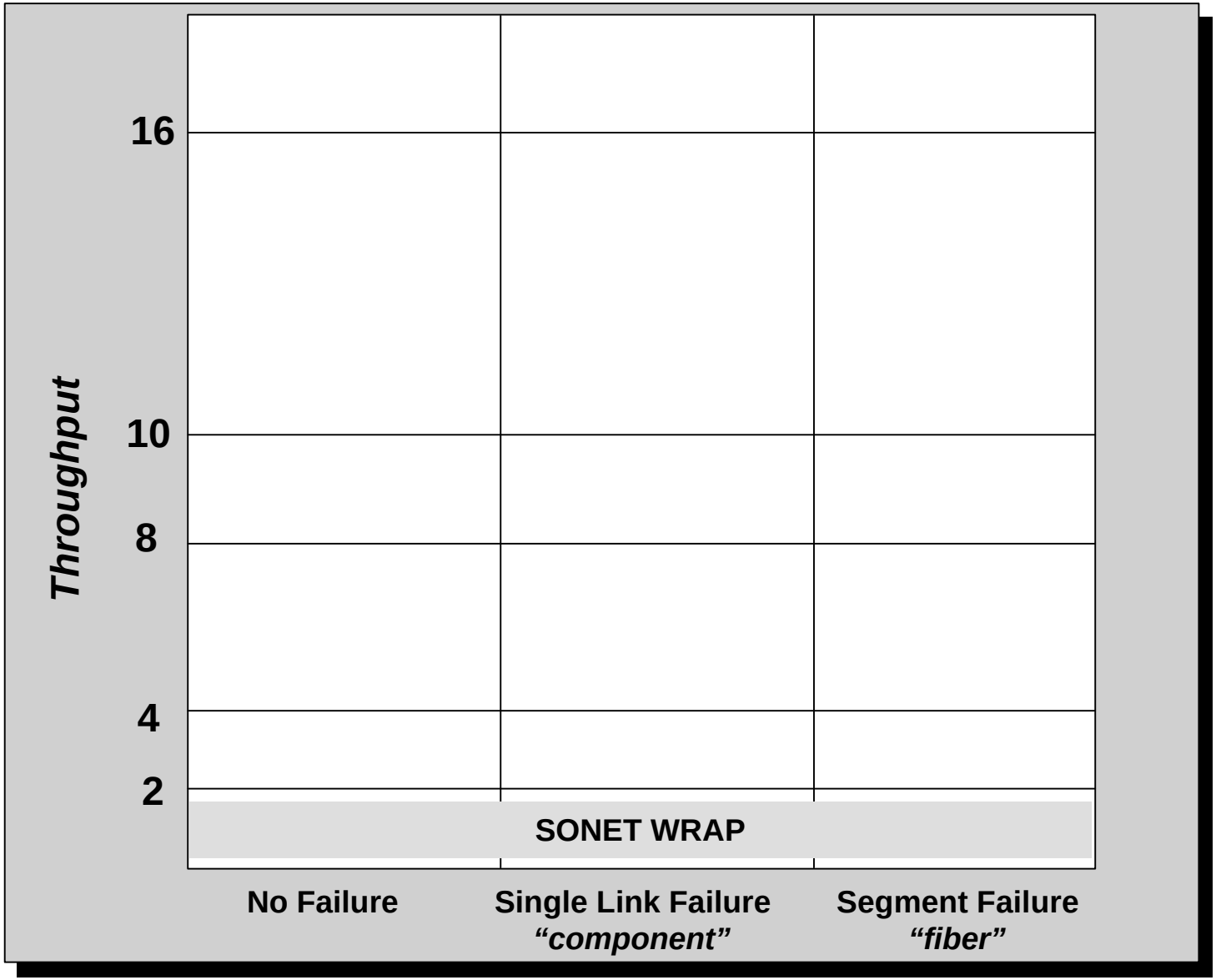
Wrap versus Steering (2)

STEERING	WRAP
• Fault signaling on critical path • Performance after failure is optimal (vers. Topology) • Single ring failure • Single ring centric (independent) • Less packet loss, long term • Fail-over time depends on RTT from source to failure • Supports N+1 (ring) redundancy	• No signaling on critical path • Less packet loss, short term • Fail-over time depends on RTT on broken segment only • Always loose both rings on a broken segment • Dual ring centric

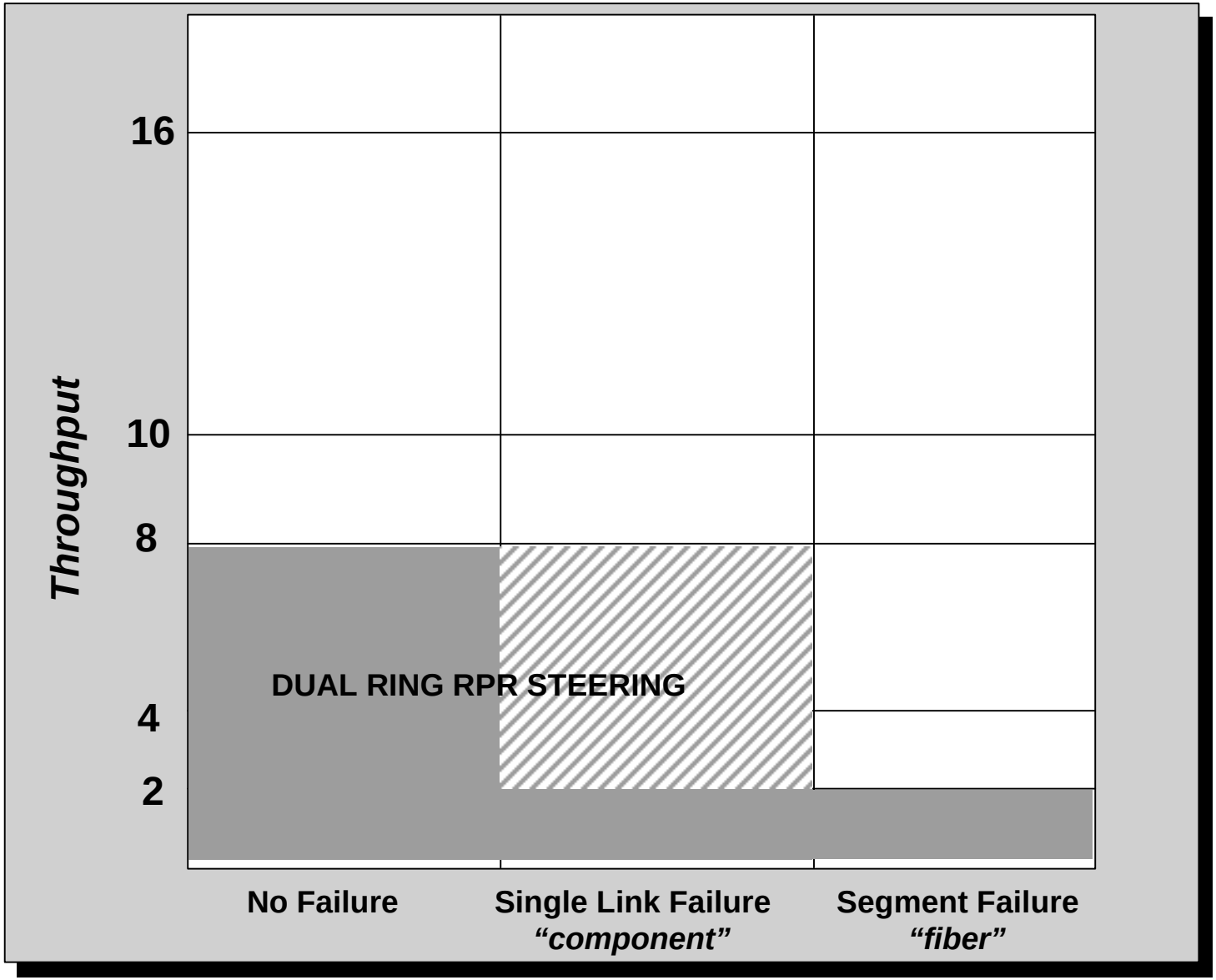
Failure mode performance with SR



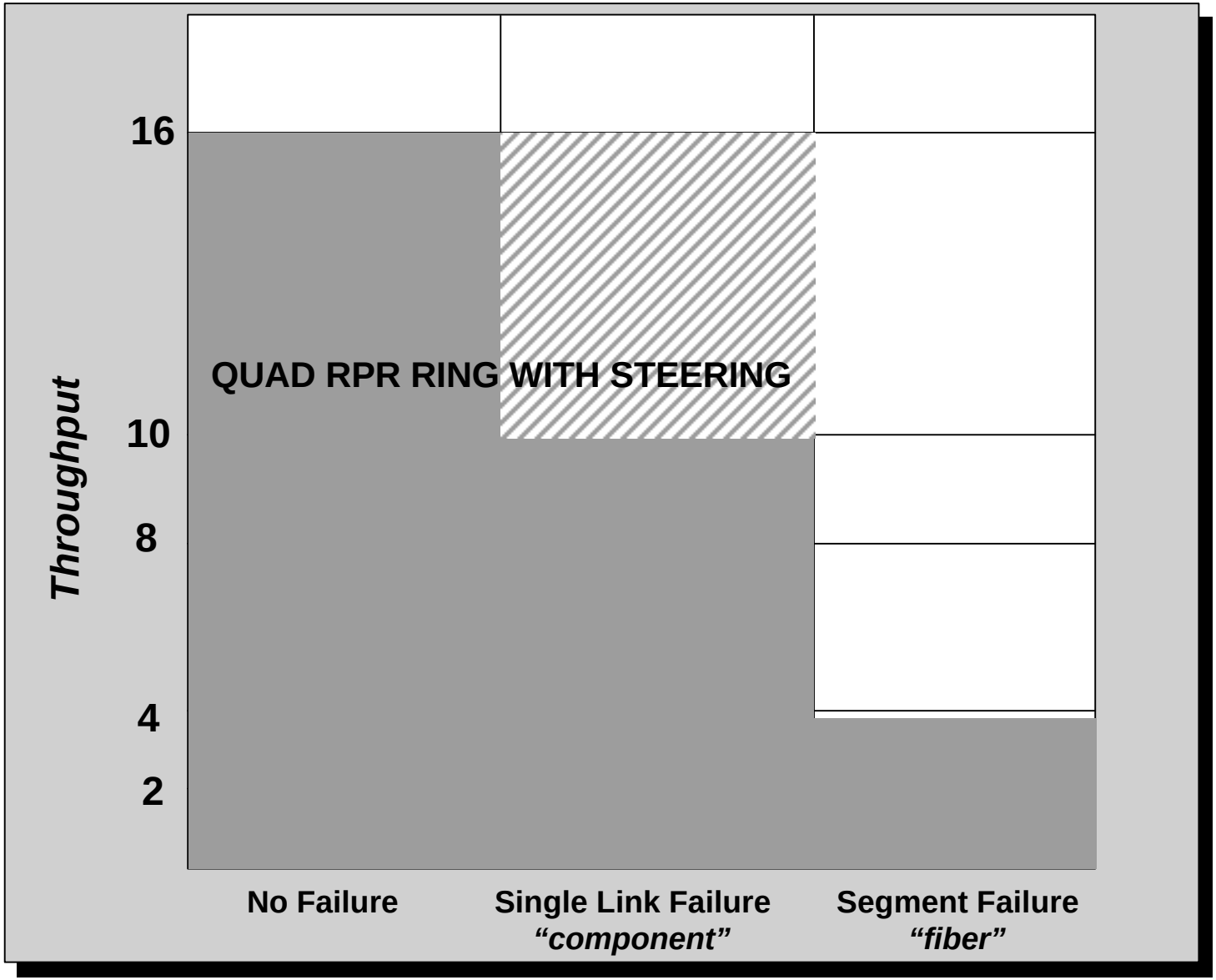
Failure mode performance with SR



Failure mode performance with SR



Failure mode performance with SR



DYNARC

Conclusion

- To minimize performance impact of link failure, independent ring operation with steering is preferable
- More parallel rings increase scalability and improve resiliency (especially for DWDM and component failure)
- Independent ring operation increases flexibility during upgrades and also allows rings to run at different speeds
- Independent ring operation reduces the complexity of the RPR MAC