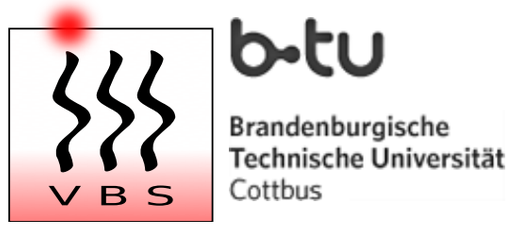
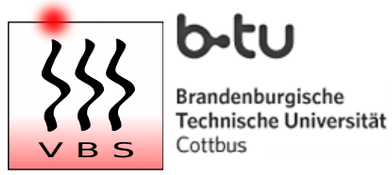
Wireless100 Gb/s? How do you deliver *that* Data Rate to computing systems?

Jörg Nolte
Chair for Distributed Systems and Operating Systems
BTU Cottbus



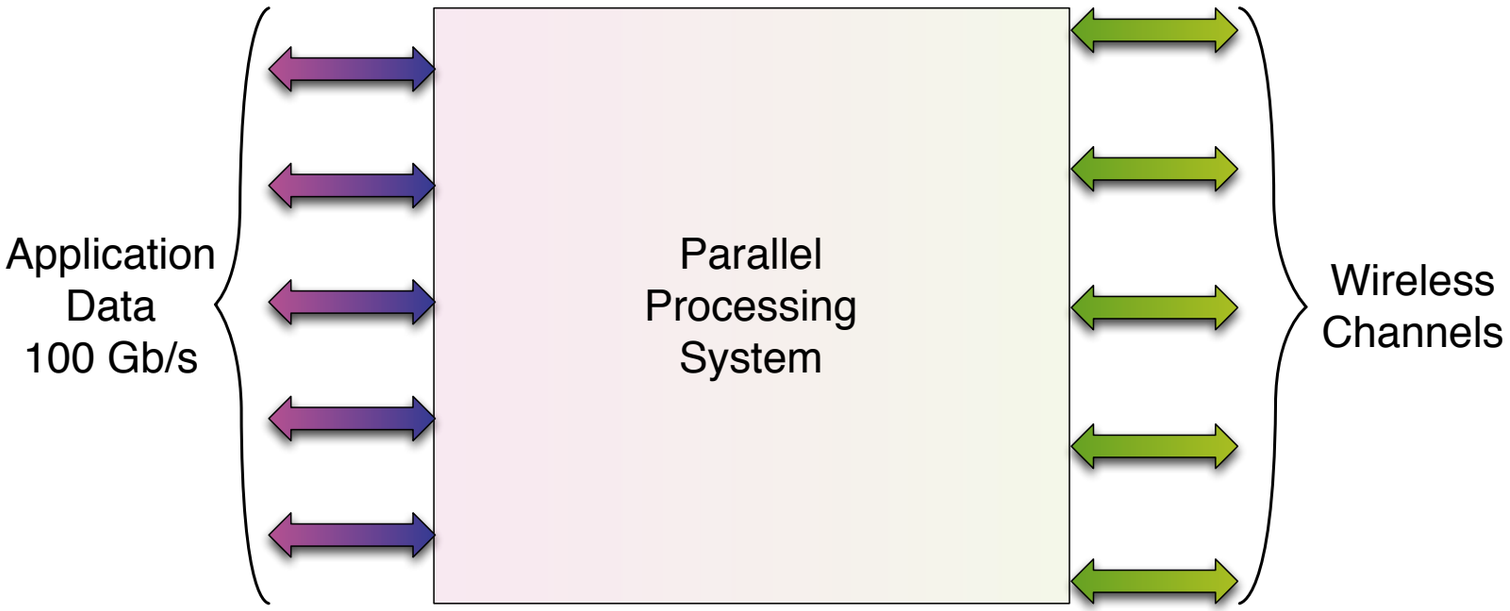
Problem Statement



- Packet processing in 10Gb/s-Ethernet is already challenging
- ... CPU/NIC interface becomes a bottleneck!
- ... frequent interactions between NIC and OS need to be avoided

- 100Gb/s looks like a nightmare!
- How do we cope with the tremendous data rate?

The Problem



- Many wireless channels
- ... need to be implemented
- .... combined
- ... and merged
- ... onto few DMA-channels
- Parallel processing is mandatory!

Challenges

- Achieve low error rates at PHY level and find the right balance between channel performance and the number of PHY channels

- Design low-latency MAC protocols, that can handle many PHY channels simultaneously

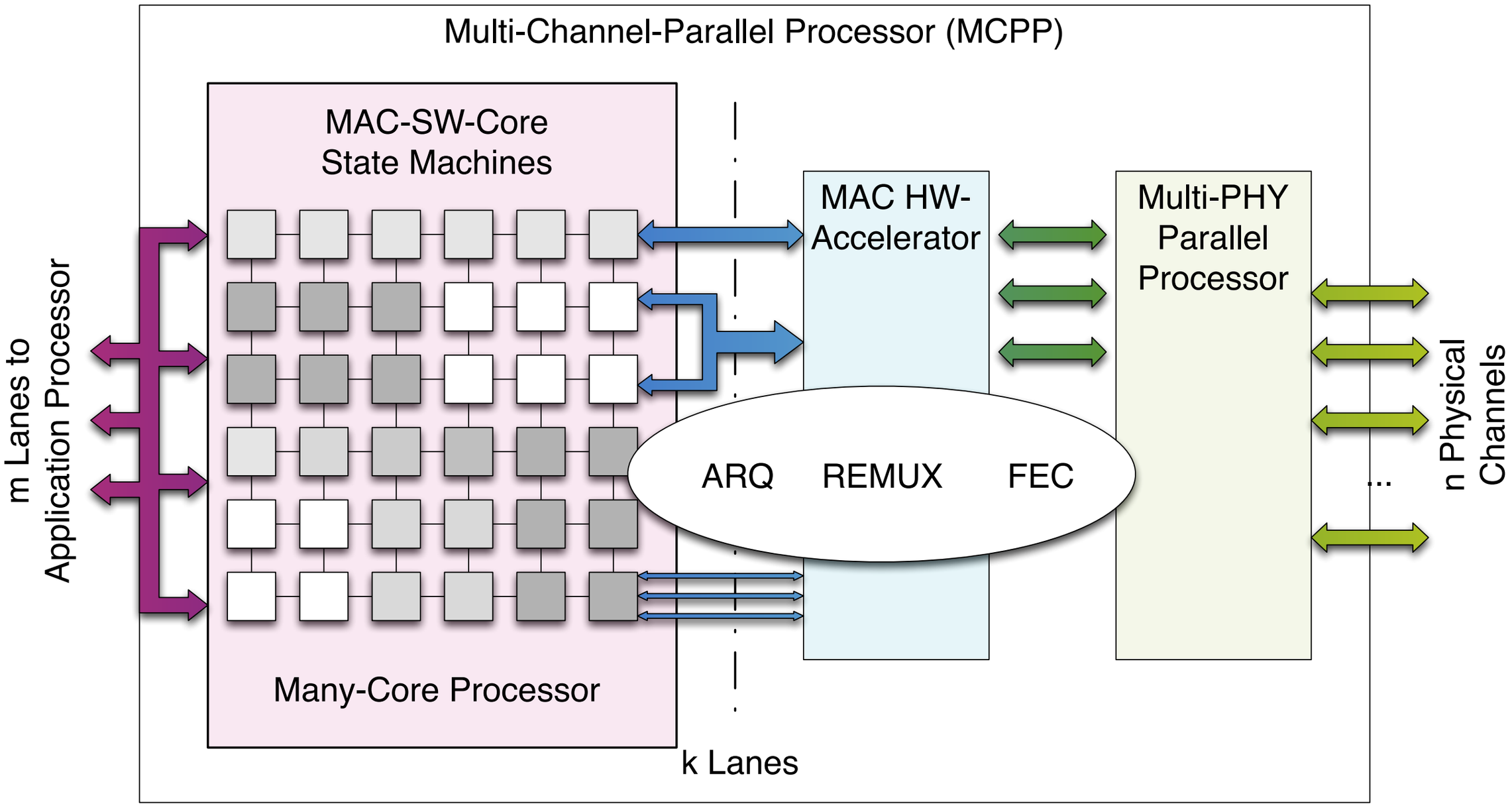
- Design suitable HW accelerators for MAC, FEC and packet processing

- Identify suitable processing models and design platforms for high-speed parallel protocol processing

- Exploit low-power many-core technology for high-level protocol processing

Is *this* the future NIC?

Brandenburgische Technische Universität Cottbus



Conclusion

Brandenburgische Technische Universität Cottbus

- A 100 Gb/s network must provide an end-to-end solution for applications
- ... it does not make sense to first implement an ocean and then try to drain it with a straw!
- Parallel processing is mandatory on each layer !
- A co-design of all layers from PHY to higher level protocols eliminates bottlenecks and balances functionality between layers
- A Multi-Channel Parallel Processor with suitable HW-accelerators is possibly the solution