

# Data Processing in the Era of Specialization



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# A Renaissance for database systems research

- Martin has pioneered and continues contributing many new ideas to database systems
- He did this at a time where there was limited appetite for innovation in databases: the big engines dominated
- We are in a new era of database research where almost nothing is cast in stone and where Martin's creativity will continue inspiring us!

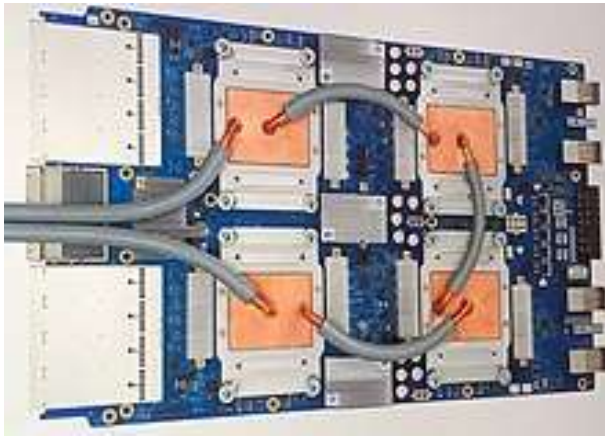


# Specialization on the rise

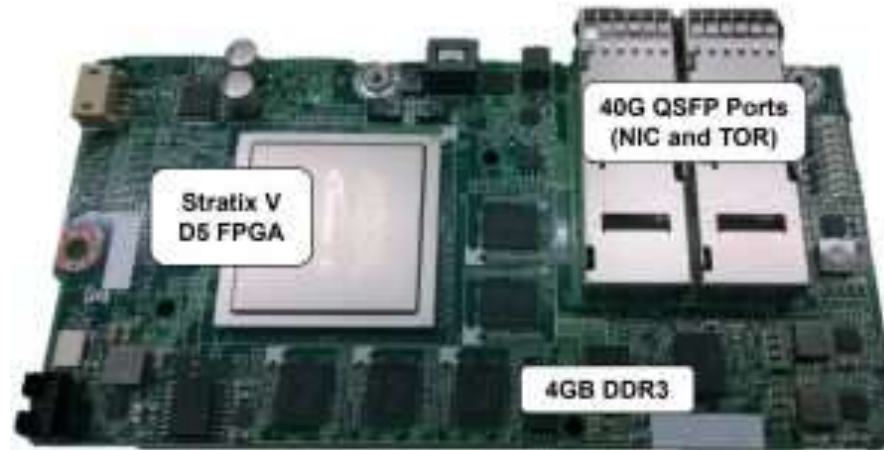
- General purpose is history
- Specialization is the name of the game
- Cloud computing is the game changer:
  - Turning IT into a service industry instead of a manufacturing gig
  - Hyperscalers dominating the market
  - Economies of scale
  - Not have to worry about client side deployment
  - Build what works best for the job (conventional computers ain't it)



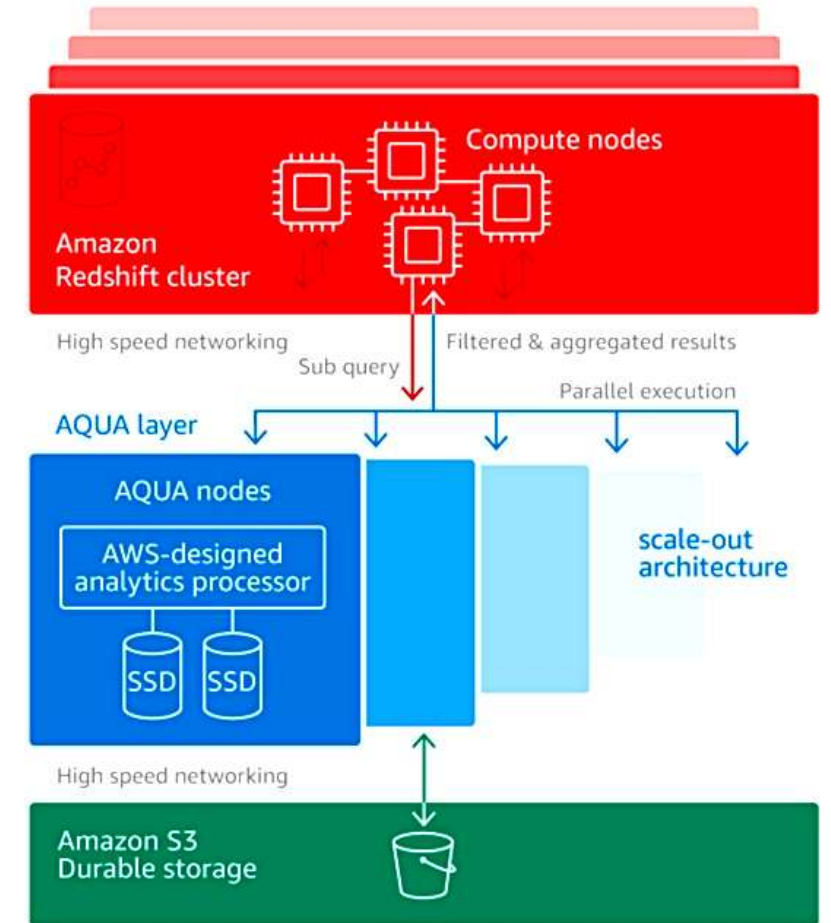
# Examples abound ...



Google's TPU



Microsoft's Catapult



Amazon's AQUA

# Not only the big ones ...


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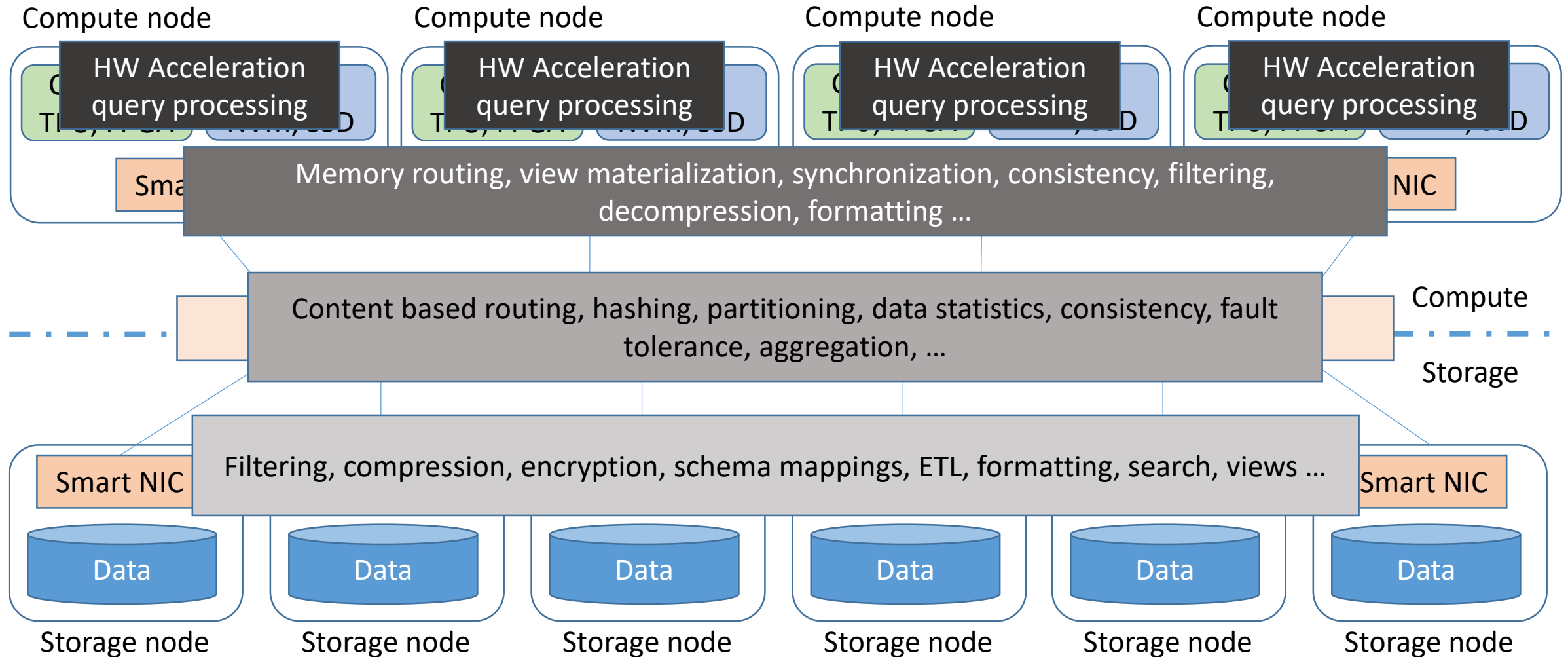


## How Amadeus used FPGAs to break Moore's Law threshold

The innovation team at Amadeus worked with technology university ETH in Zurich to test how FPGAs can be used in artificial intelligence

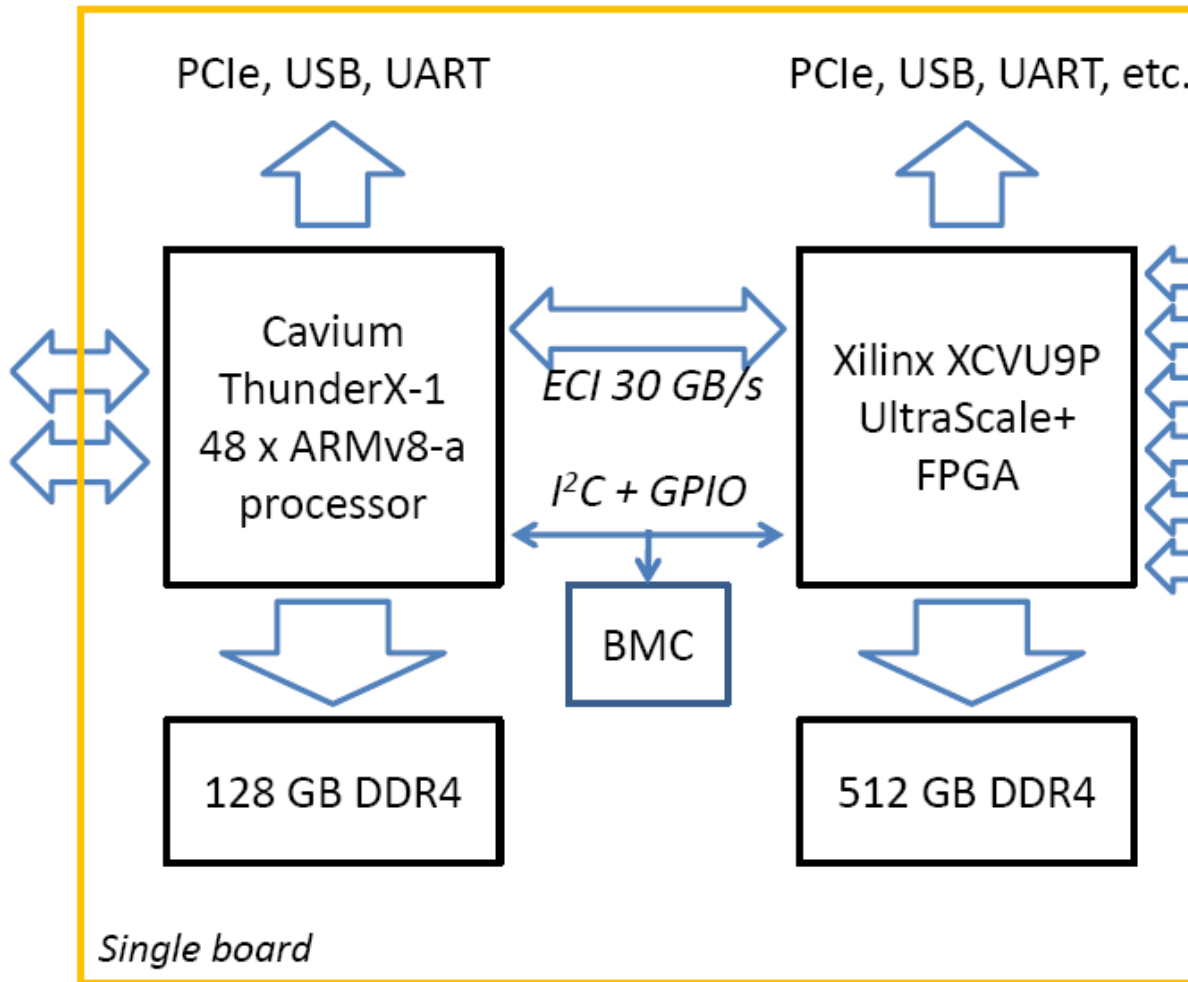
Maschi et al, SIGMOD'20  
Owaida et al., VLDB'20

# Future databases



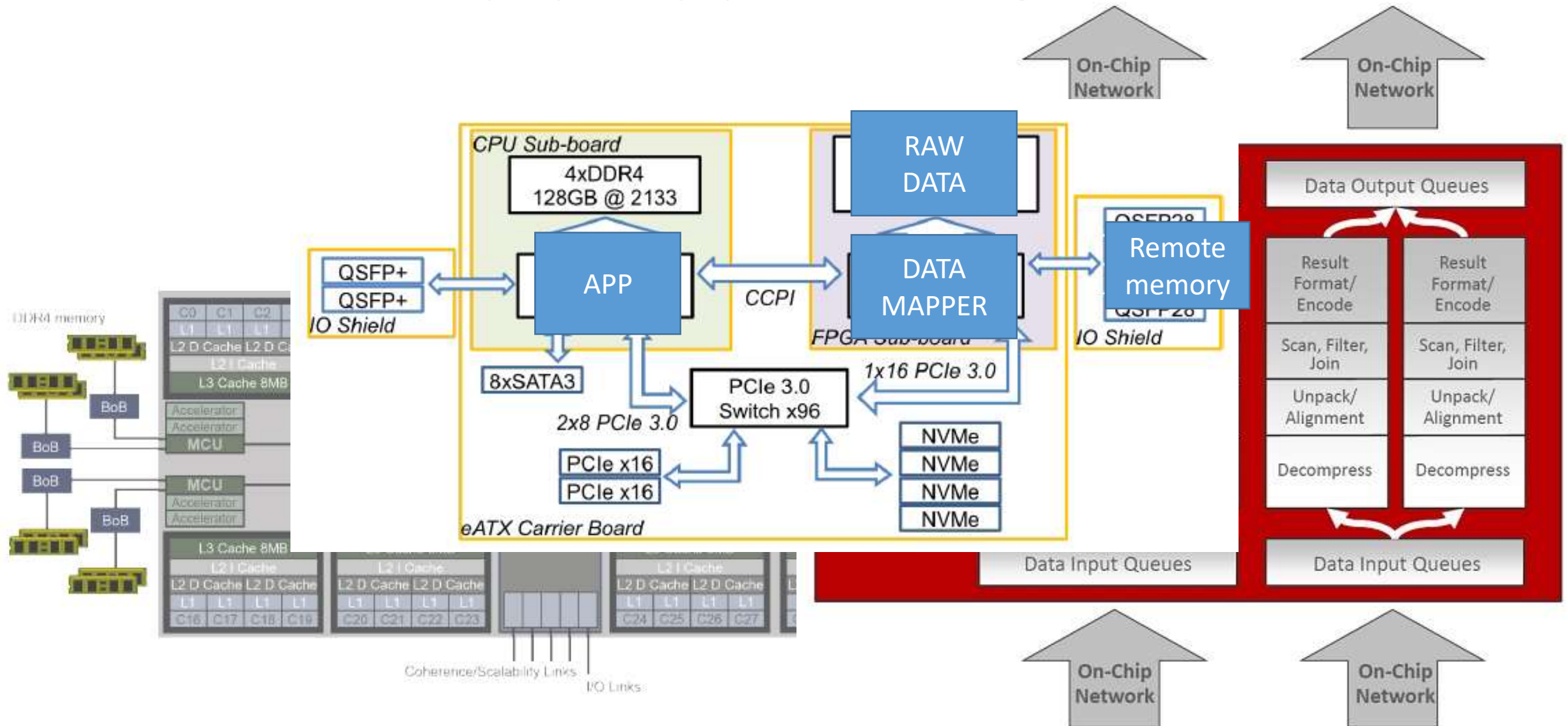


# A platform for exploration: Enzian



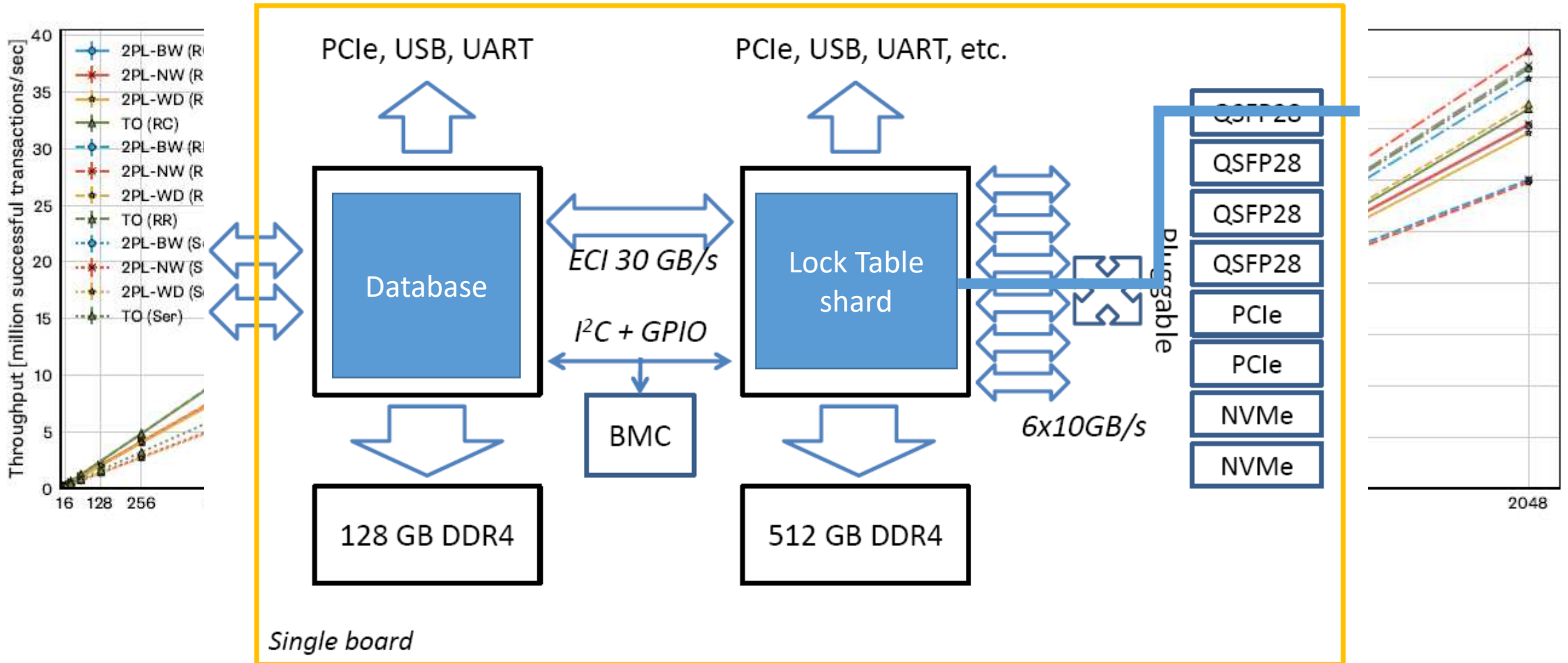
Joint work with Timothy Roscoe (ETHZ)

# Near memory query processing





# Accelerating transactions



# An interesting outlook

As cloud becomes the dominant computing platform ...  
... databases will abandon conventional architectures ...  
... and will become a far more dynamic data processing platform.

We are back to the design board with most assumptions about how  
databases work no longer being valid and almost a blank slate to  
develop new things

Thanks Martin for being such an inspiration all these years