Data Processing in the Era of Specialization

Gustavo Alonso
Systems Group
Department of Computer Science
ETH Zurich, Switzerland
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 ...

Maschi et al, SIGMOD’20
Owaida et al., VLDB’20
Future databases

- **Content based routing**, hashing, partitioning, data statistics, consistency, fault tolerance, aggregation, …
- **Memory routing**, view materialization, synchronization, consistency, filtering, decompression, formatting …
- **Filtering**, compression, encryption, schema mappings, ETL, formatting, search, views …
- **HW Acceleration** query processing

Gustavo Alonso. Systems Group. D-INFK. ETH Zurich
A platform for exploration: Enzian

Joint work with Timothy Roscoe (ETHZ)
Near memory query processing
Accelerating transactions

Barthels et al. PVLDB 2019
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