

The Three Desasters for Digitization

and how to avoid them

11. Juli 2019 | Dr. Kai Martius

What really threatens digital revolution

Cryptography

Quantum Computers can disruptively render everything digital insecure

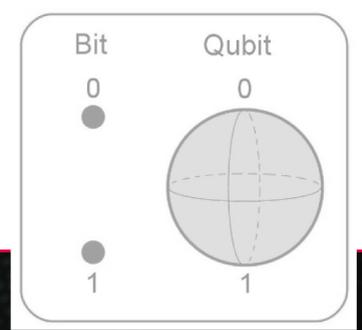
Business Models

Monopolization of efficiency gains by big data centers and “*aaS” platforms

Climate

Energy consumption of “digital” becomes a significant problem

The Quantum Computer Threat



“Classic Computer”

Today’s Algorithms are optimized for Zero / One Logic

Scalability well-known, Moores Law

Not well-suited for “hard problems”
(like factorization...)

Quantum Computer

“Continuum” of state

Scales **dramatically** better for specific problems... like factorization (Shor)

Currently “inventing the transistor”, but...

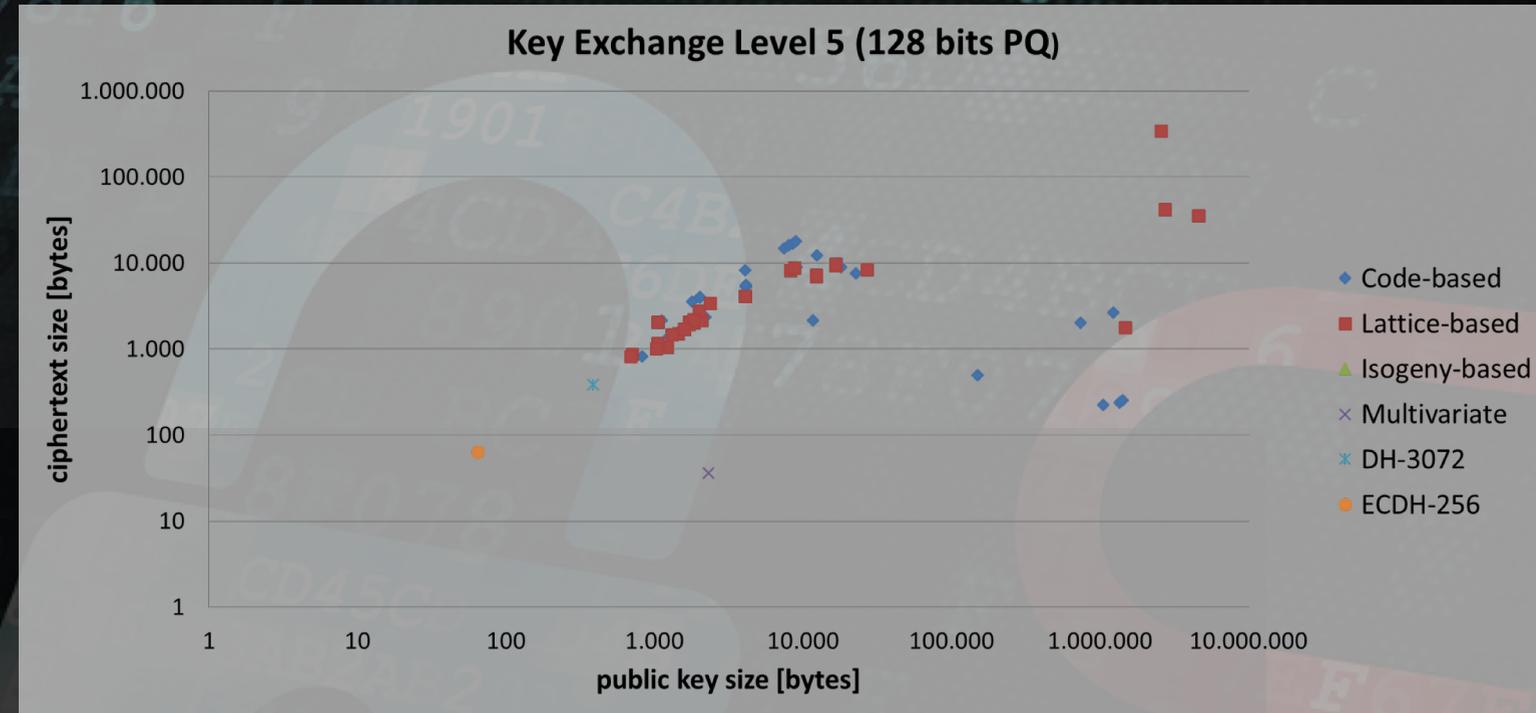
The Quantum Computer Threat – what to do?

“Be prepared”

Crypto-Agility in Products

“Post Quantum Cryptography” → NIST Challenge

Improve protocols to be PQC-ready → Standardization



The Business Model Threat

„Everything as a Service“

- Software Stacks become invisible

Monetization of Efficiency Gains

- Self-accelerating process



The Business Model Threat – what to do?

Get back into control

- Hardware OEMs will (probably) do something
- Edge Cloud is a chance for „getting back local“
- App'ization = Specialization = broader Competition
- Invest in Open Source based IaaS / PaaS models

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CLOUD
& HEAT

=



SecuStack.
The Secure Cloud.

The Climate Change Threat

Digitization for Good And Bad

- Net effects were (mostly) negative
- Hope to help solving the grid problems (for instance)
- „Cloud“, „Software Defined“ helps a lot to increase efficiency of silicon resources
- But... can do better

9,000 terawatt hours (TWh)

ENERGY FORECAST

Widely cited forecasts suggest that the total electricity demand of information and communications technology (ICT) will accelerate in the 2020s, and that data centres will take a larger slice.

20.9% of projected electricity demand

- Networks (wireless and wired)
- Production of ICT
- Consumer devices (televisions, computers, mobile phones)
- Data centres

0 2010 2012 2014 2016 2018 2020 2022 2024 2026 2028 2030

Nature 561, 163-166 (2018)

The Climate Change Threat – what to do?

Energy Re-Use AND Edge Cloud

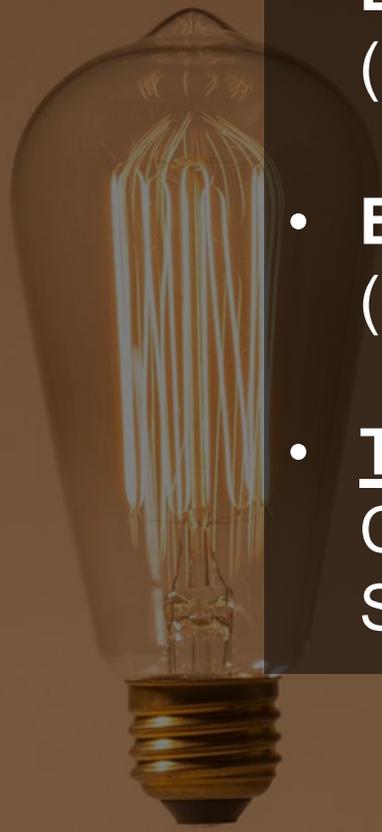
- Water-Cooled Servers as a resource for local heating
- Plus: a Cloud Stack on top
- Perfectly fits to Edge Cloud scenarios



CLOUD
& HEAT

Nature 561, 163–166 (2018)

How to Avoid Desasters?



- **Do early research**
(Post Quantum, Networking, SDx...)
- **Explore new business models and technology**
(sort of risk appetite)
- **Total Cost of „Ownership“**
Cheap today might not be cheap in the long run
Some costs might not yet be payed for

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