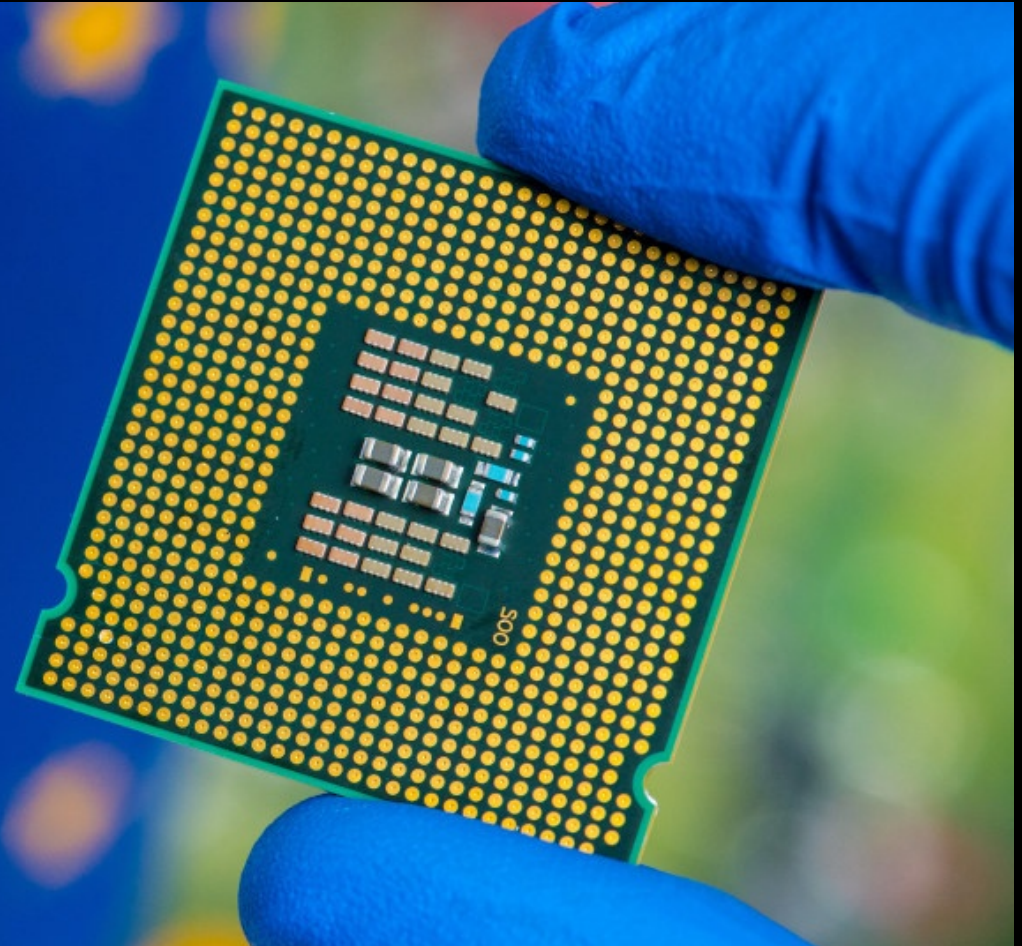


substituting Why Europe's Cloud Market Should Be
with Sovereign and Decentralised

David Sterz
david.sterz@denktmit.de

Let's build European Clouds on Sovereign Hardware beyond GPUs

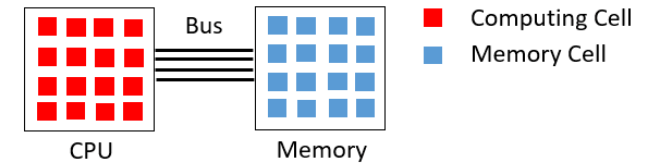
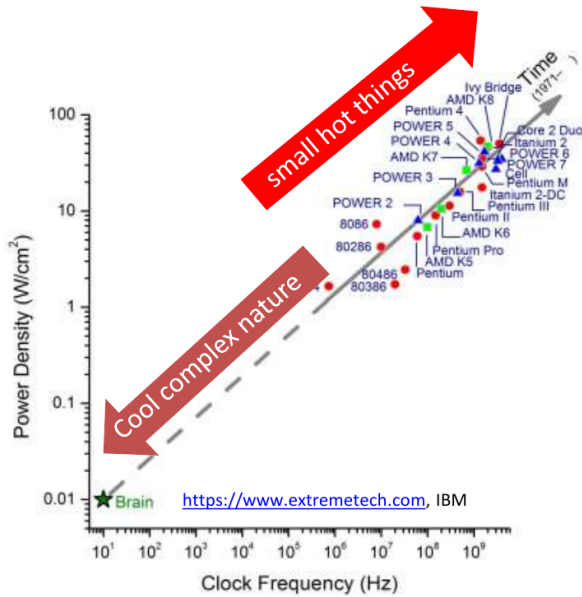
Dr. Sven Köppel
sven.koeppel@denktmit.de



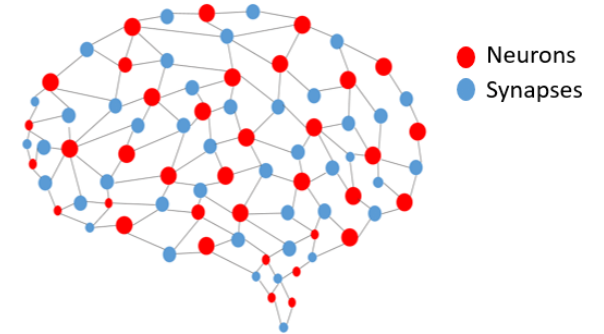
**Urgent need
for compute**



Current ways of doing AI are neither sustainable nor scalable

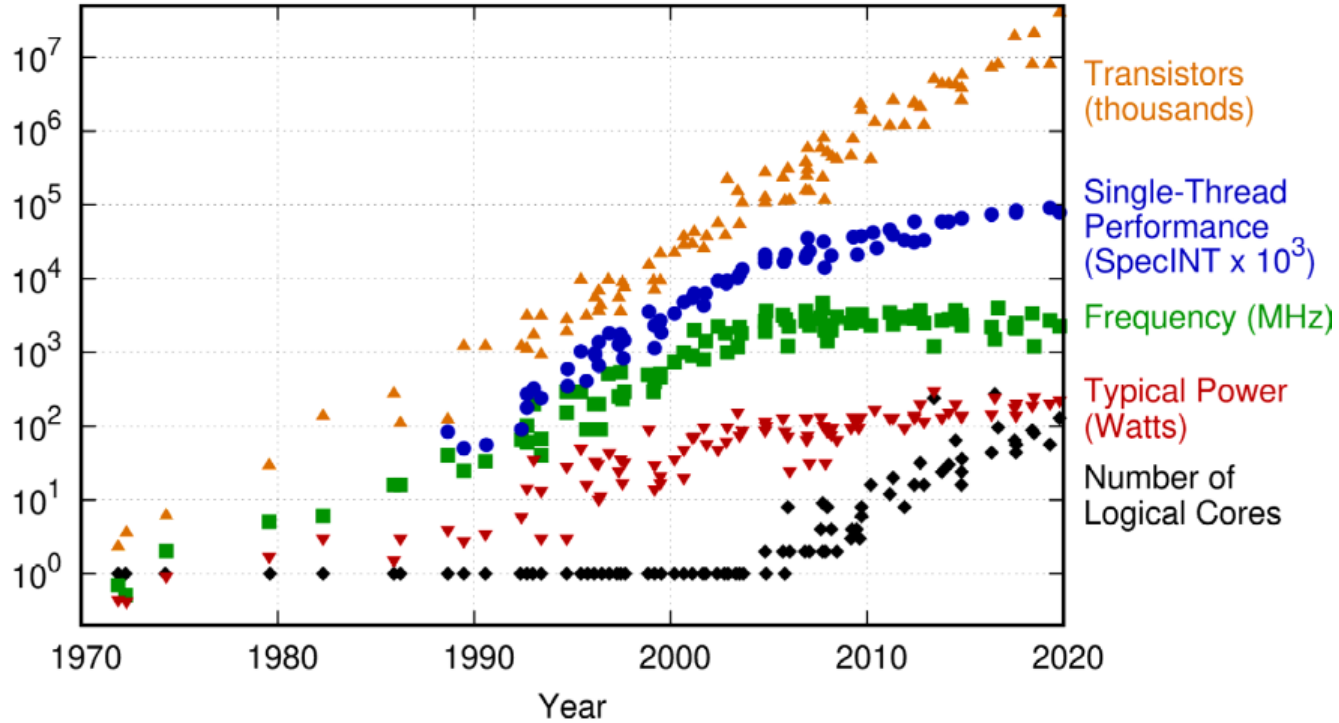


(a) Von Neumann Computing System



(b) Brain Computing System

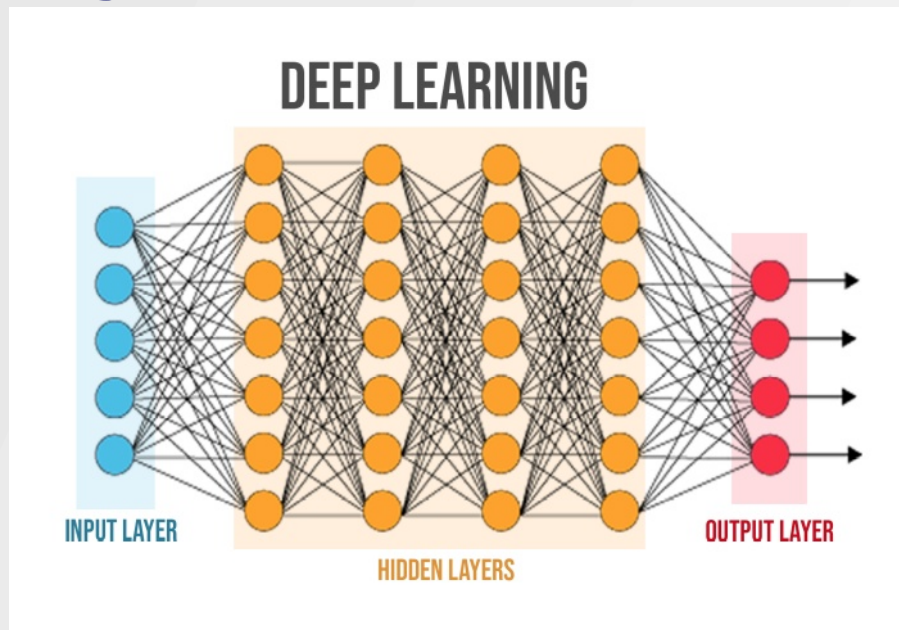
48 Years of Microprocessor Trend Data



Original data up to the year 2010 collected and plotted by M. Horowitz, F. Labonte, O. Shacham, K. Olukotun, L. Hammond, and C. Batten
New plot and data collected for 2010-2019 by K. Rupp

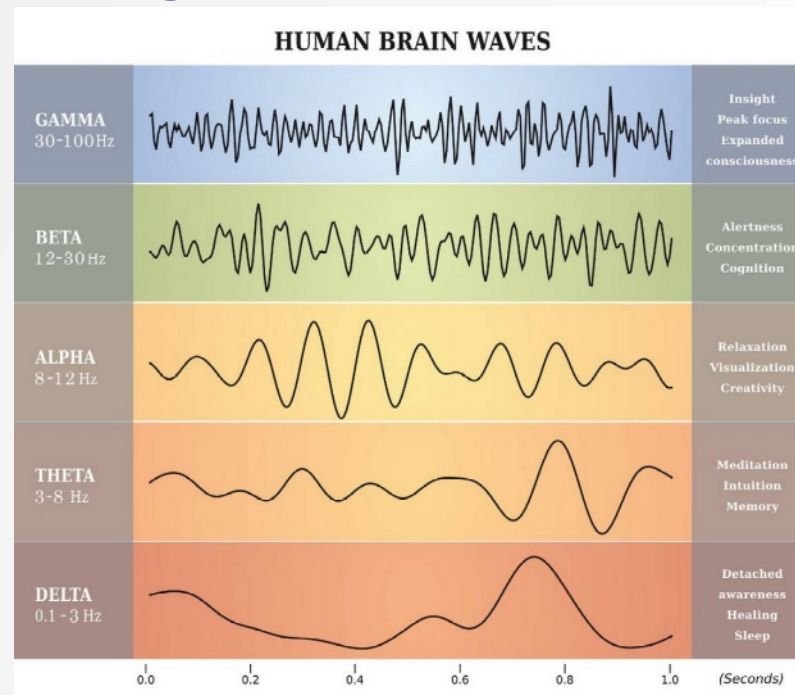
Compute as the Human Brain

Digital Arithmetics



Symbolic computing & sparse linear algebra

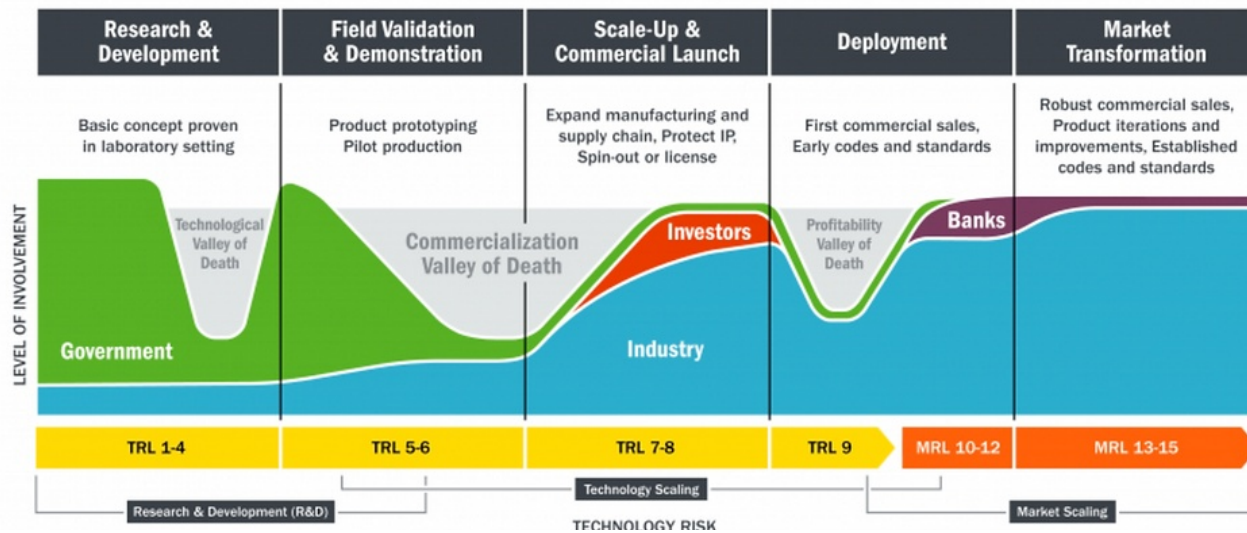
Analog processes in nature



Wave-based computing & dense interconnects

European tech to the rescue





Digital/CMOS



Analog

anabrid

Photonic



AKHETONICS



Q.ANT

Quantum

IQM

eleQtron



Pasqal



planqc

In-Memory



AXELERA
ARTIFICIAL INTELLIGENCE



SMRON

Neuromorphic



SpiNNcloud

Semiconductor R&D Public Funding Situation in Europe

Research

Application



European
Innovation
Council



EuroHPC
Joint Undertaking

SPRIN-D

BUNDESAGENTUR
FÜR SPRUNGINNOVATIONEN

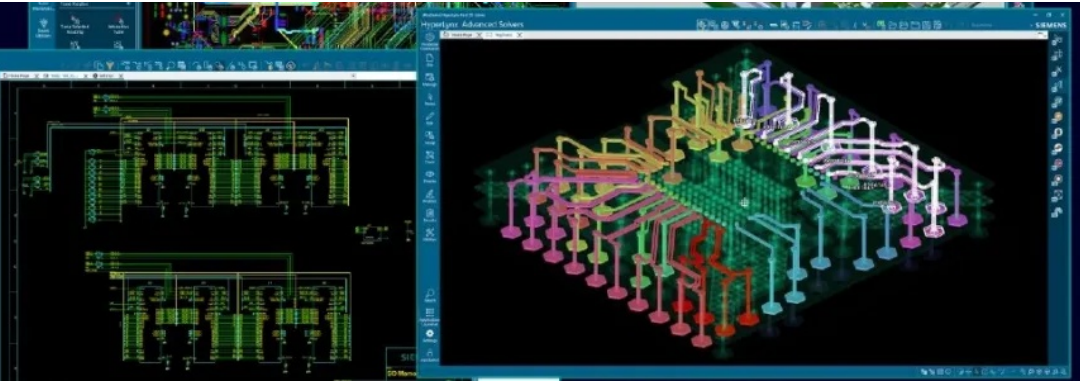


Value Chain from Semi to Cloud



Chip Package Board Drivers Runtime Cloud API Application

Value Chain from Semi to Cloud



Chip

Package

Board

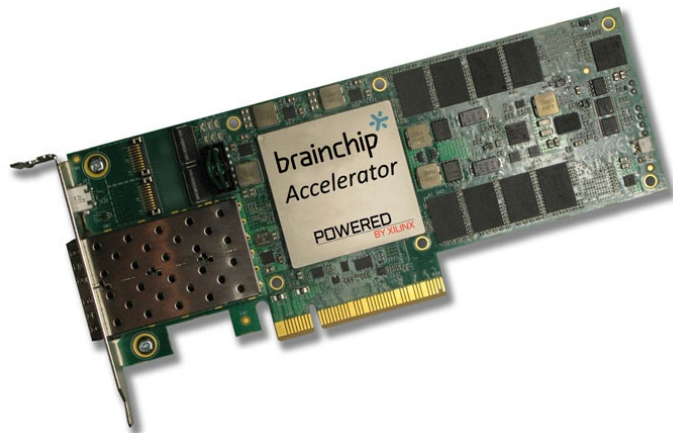
Drivers

Runtime

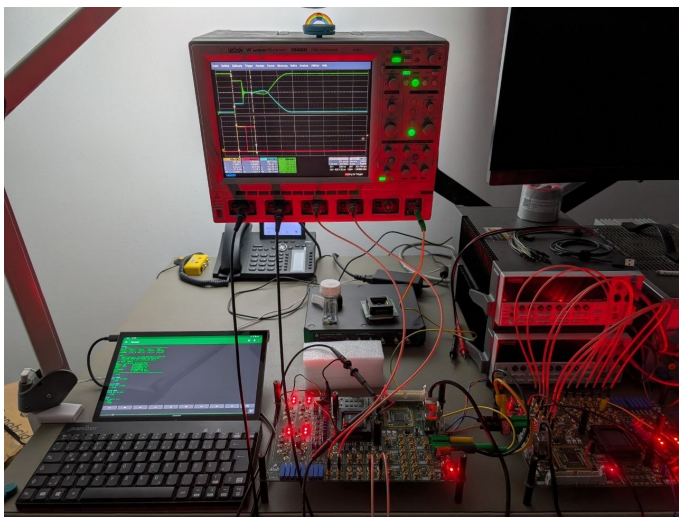
Cloud API

Application

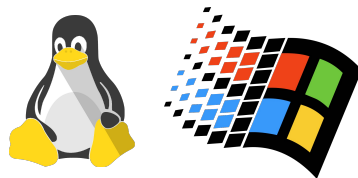
Value Chain from Semi to Cloud



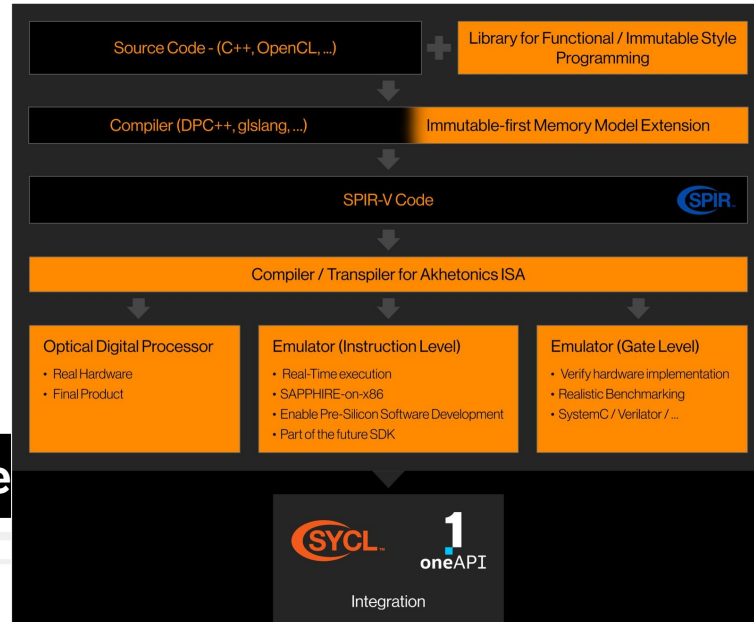
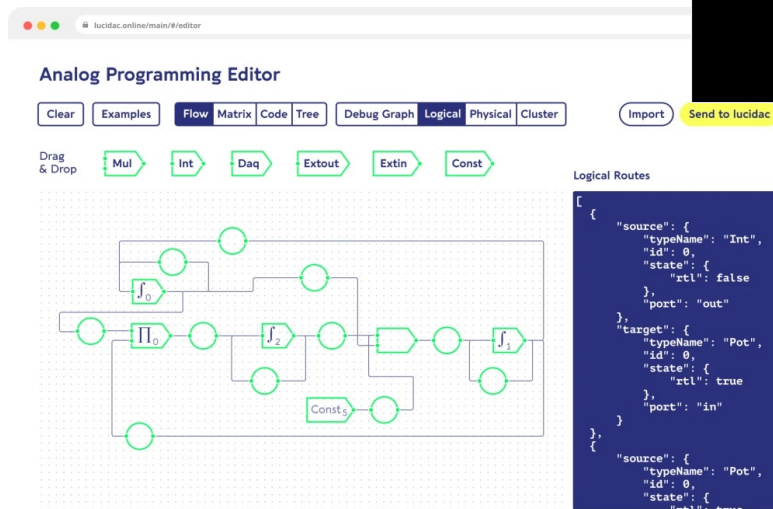
Chip **Package** **Board** Drivers Runtime Cloud API Application



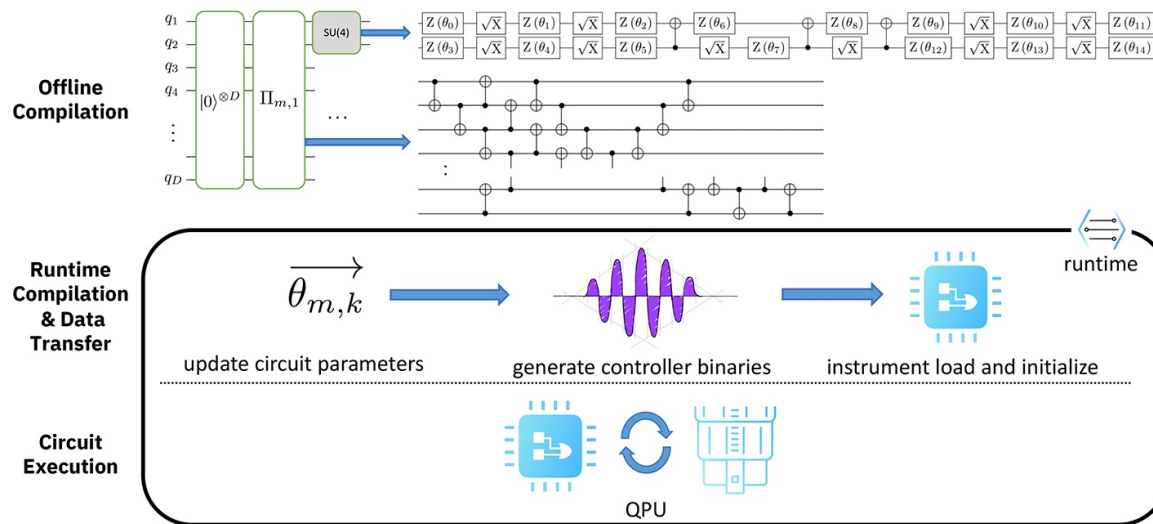
Value Chain from Semi to Cloud



Chip Package Board **Drivers** Runtime



Value Chain from Semi to Cloud

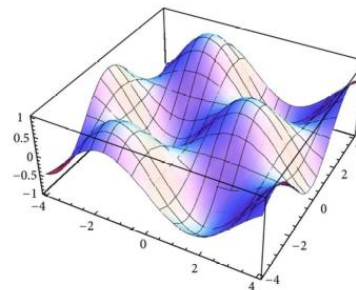


Chip Package Board Drivers **Runtime** Cloud API Application

Value Chain from Semi to Cloud

```
H q[0]  
CX q[0], q[1]  
Measure
```

Job Queue:
Submit
Run
Status
Result



Chip Package Board Drivers Runtime **Cloud API** Application

IONOS

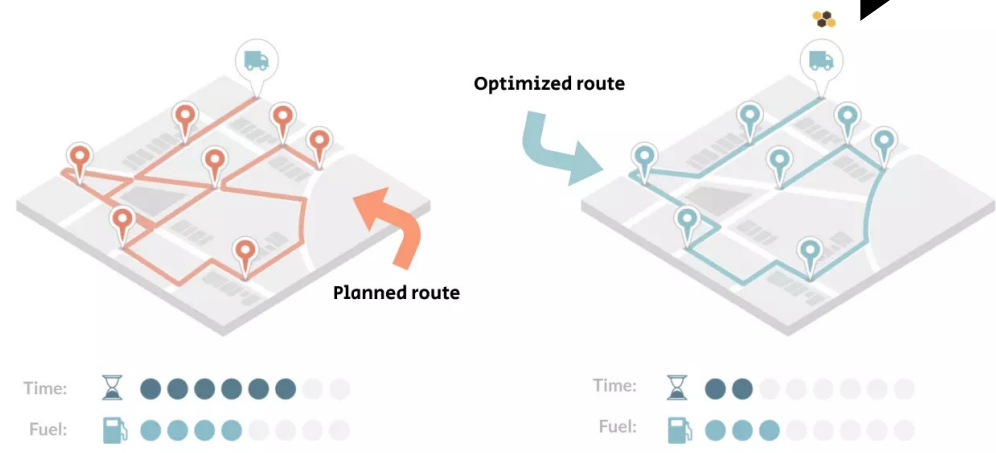


STACKIT

A Brand of Schwarz Digits



Value Chain from Semi to Cloud

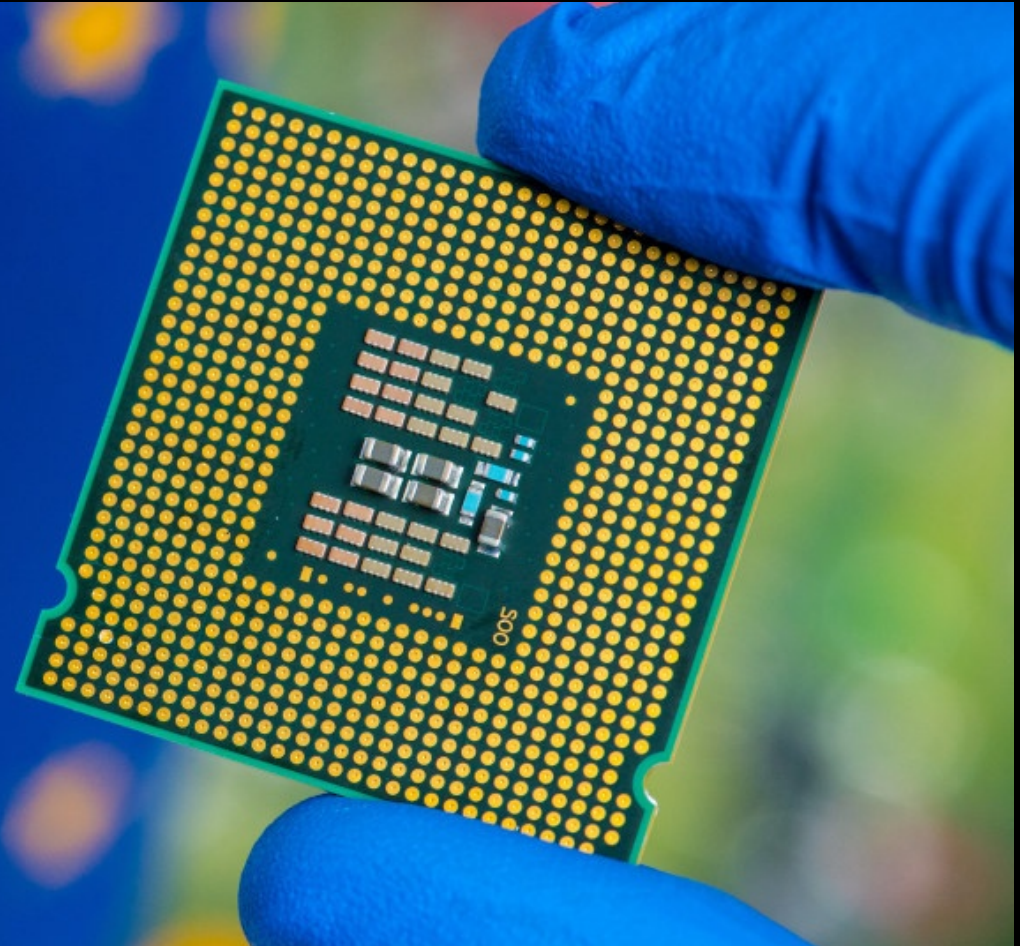


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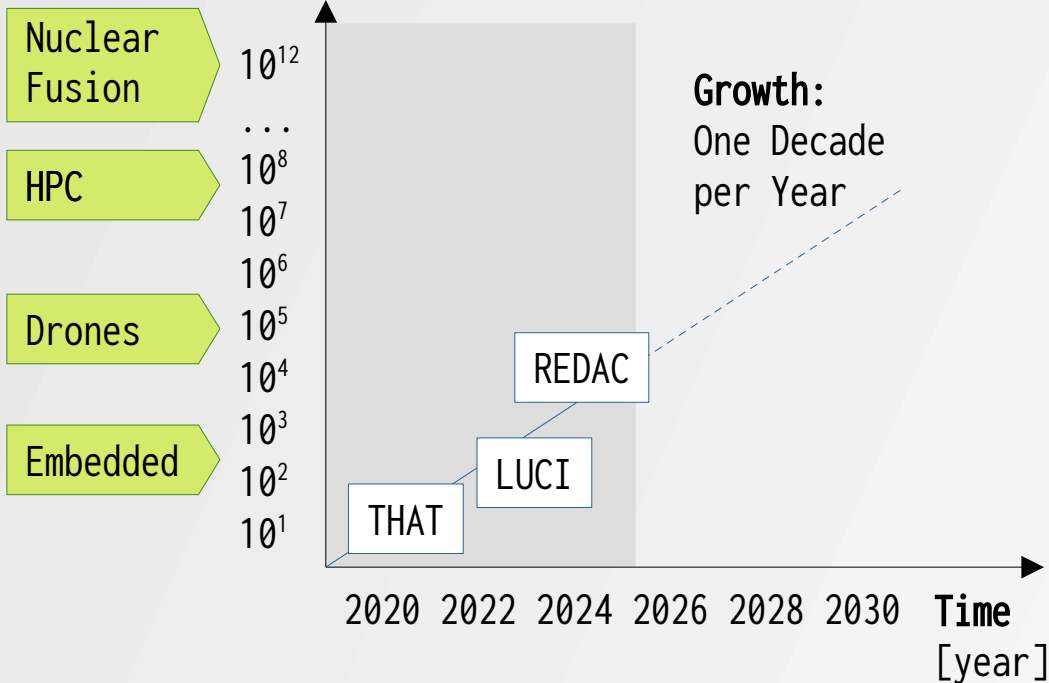


Anabrid resets Moore's law

Scaling analog CMOS for HPC

Circuit Size

[# computing elements]



Cutoff Frequency

[Hz]

