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”ParallaX”
Parallel Acceleration

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2011-11-02

Programmer Productivity is in Crisis

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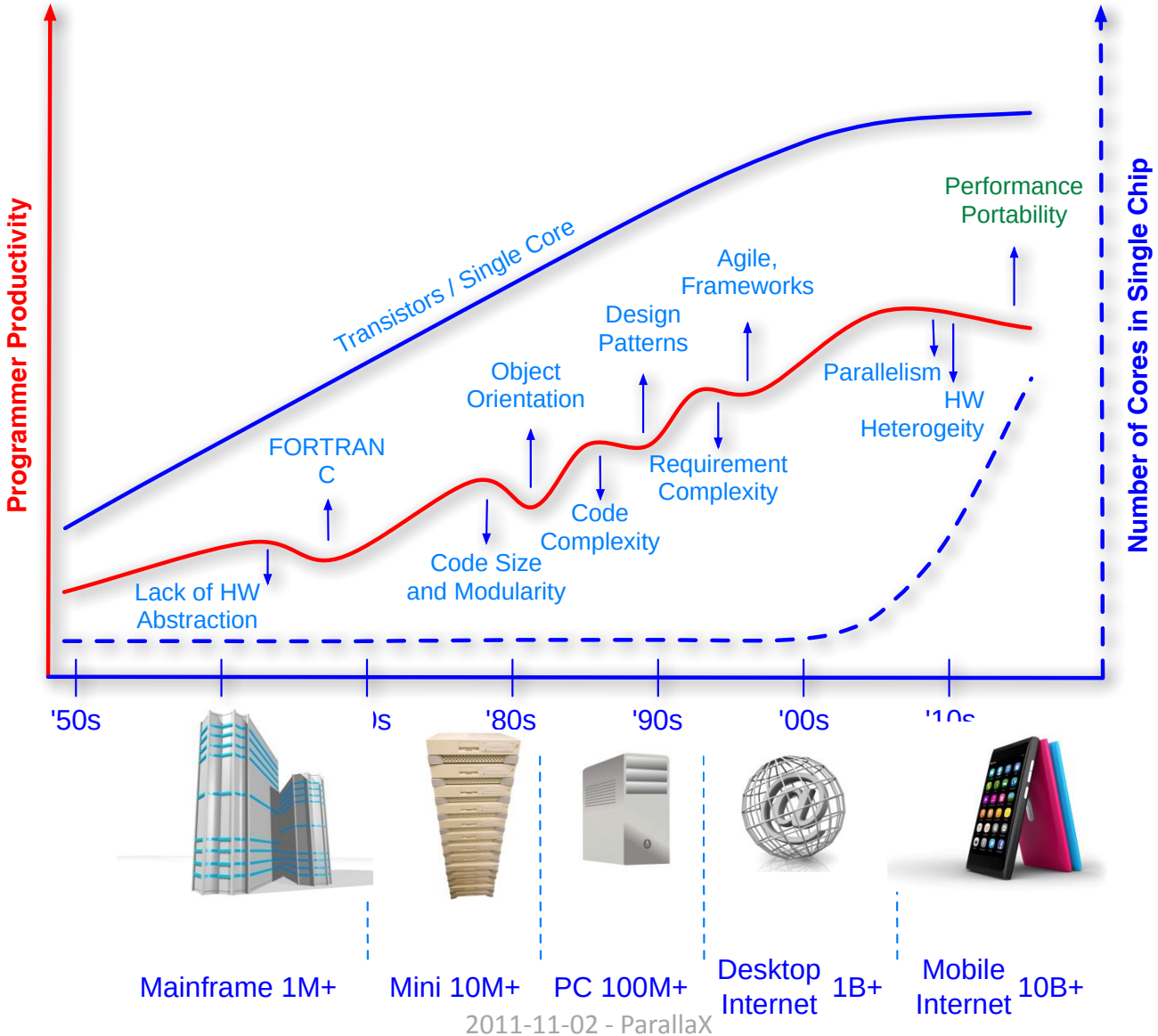

Owning the Embedded Multi-Core

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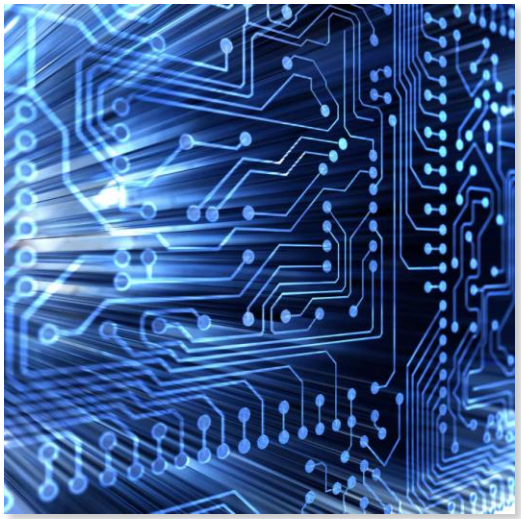
VISION

By 2020 the Finnish ICT industry is a **recognized leader in the heterogeneous computing domain** due to it's expertise in hardware and software for mobile devices, and business approach in integrating various vertical industry segments.



STRENGTHS

Our strengths lie in **world wide leadership in wireless, mobile and industrial automation**. We are the **recognized leader in applied signal processing** and **open source software**. Finnish **industry is vertically integrated** from large to small companies and universities.

STRATEGY

We will **take advantage of technology change** and **leverage strong nomadic and industrial cluster**. We will create **widely usable enablers for Finnish industry differentiation** and **push for higher education and entrepreneurship**.

Industry Projects as Drivers

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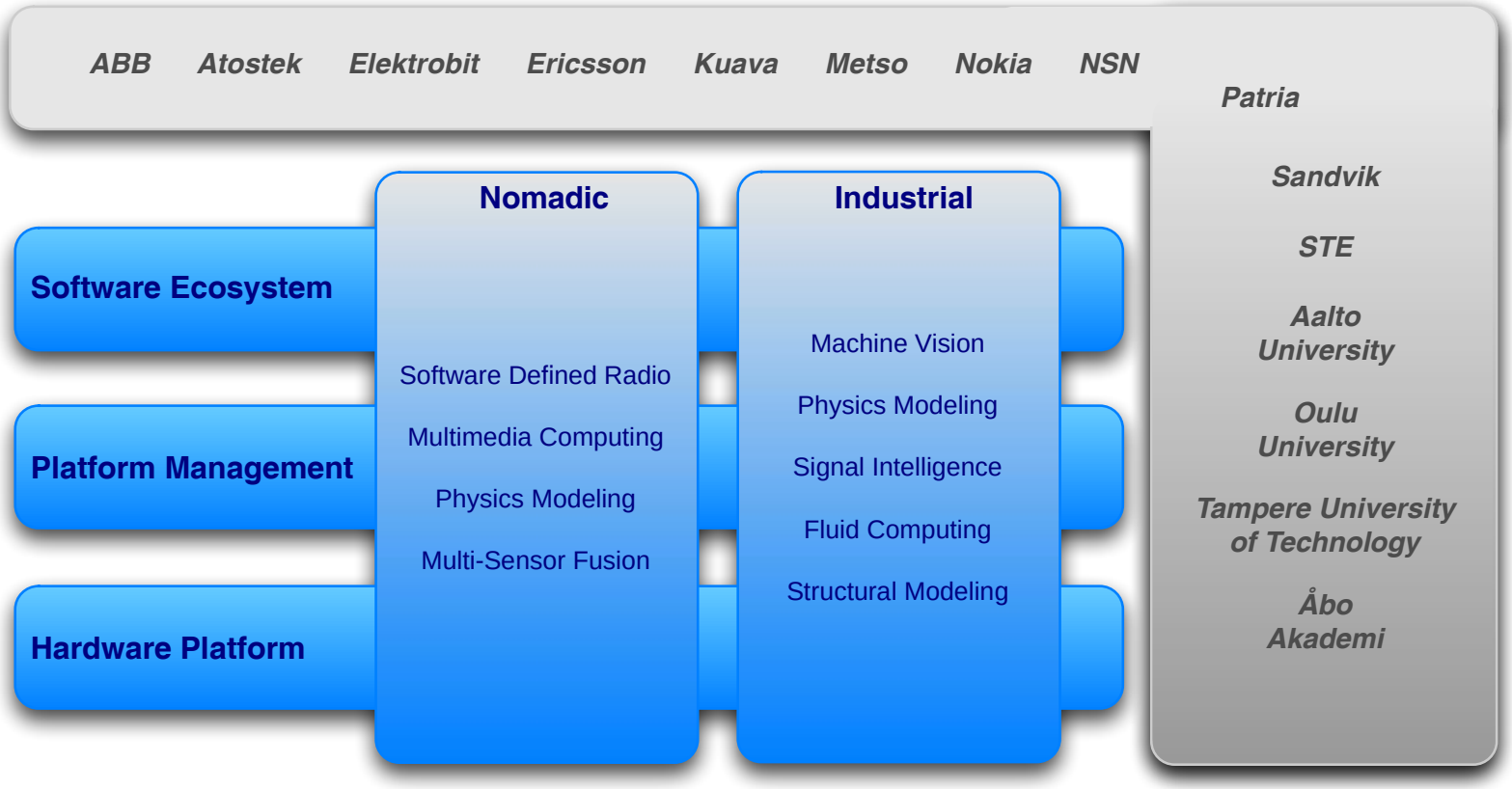

Significant Opportunities

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TECHNOLOGY

- Hardware heterogeneity
- Power and energy
- Performance portability

BUSINESS

- Products with vertically organized value chains
- Design ecosystem
- Consulting opportunities based on new know-how

FINLAND

- Sustaining and adding high value-add jobs
- Fostering co-operation
- Supporting the industry to make the next technology leap

Performance Matters

Thank you

Parallax targets embedded designers

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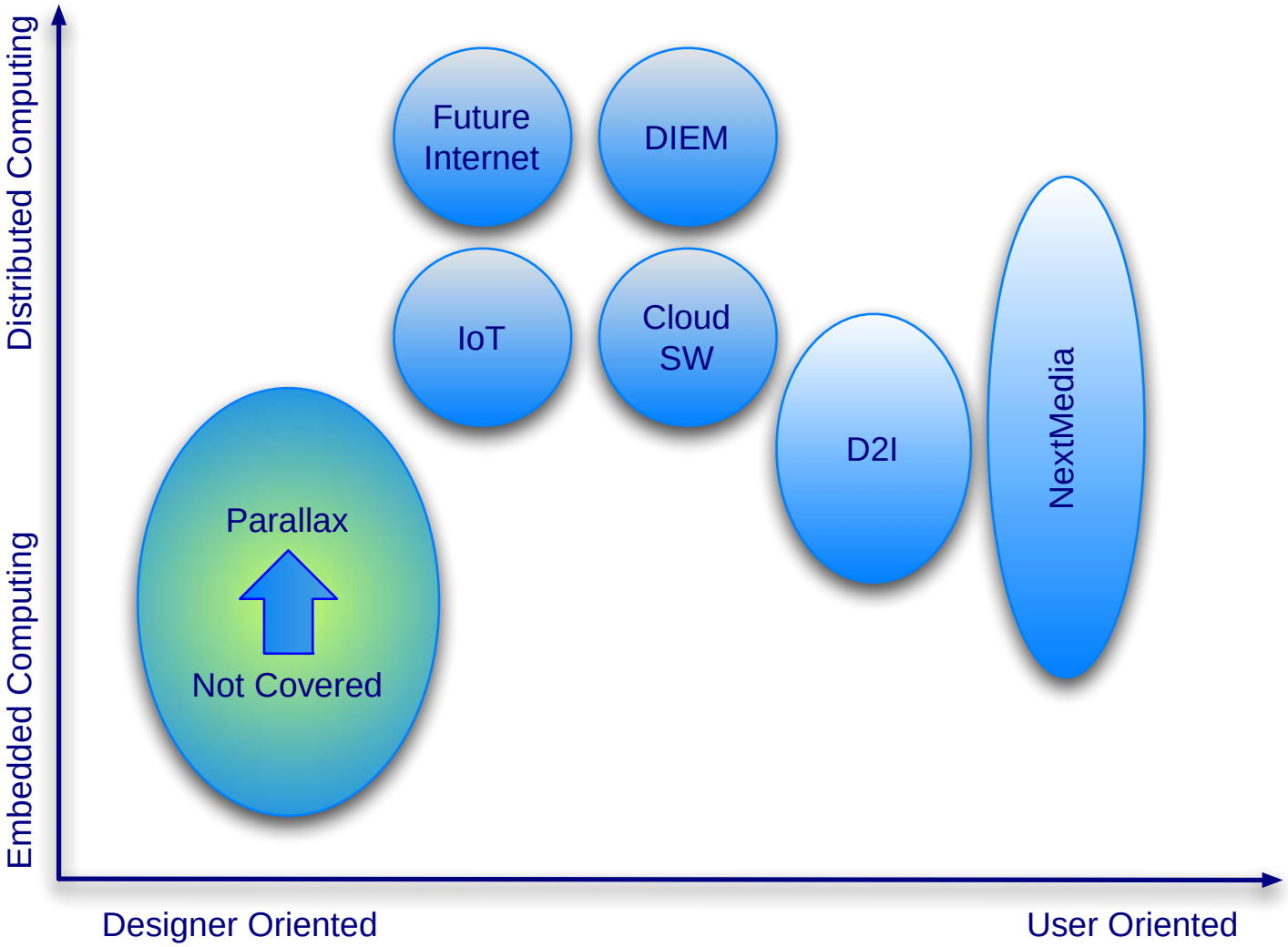

Breakthrough Targets

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- Solve the performance portability problem
- Programmer productivity increase by factor of X (=10)
- Cost to create and maintain computationally intensive applications decreases, due to performance portability of software to parallel, reconfigurable targets
  - Scalability, portability, malleability, and maintainability
  - Essentially a tool problem

Background

- Ongoing transfer of **IP and value** in various application areas from underlying hardware to software
- **Replace dedicated** with **programmable hardware**
- **Enable independent** hardware and software **evolution for strong Finnish embedded and industrial domains**

Solving the Performance Portability

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- By matching the abstraction level faced by the programmer to the application
- By leveraging joint optimization starting from parallel application, through programming model and platform management down to reconfigurable hardware architecture
- By efficiently exploiting all levels of parallelism from parallel program descriptions achieving scalability, portability, malleability and maintainability

Thus

- In a single core efficient utilization of instruction and data parallelism
- In multicore task and thread level parallelism
- In distributed and shared memory architectures efficient distribution of tasks and load balancing between computation nodes
- In hardware leveraging the customization and reconfigurability for a greener computation architecture