European Processor Initiative
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P. Notton / GM European Processor Initiative
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1. Genesis
2. Setup
3. Benefits of scalability
3. Roadmap
4. Challenges
5. Conclusions
2023 Exascale Supercomputers

1,000,000,000,000,000,000,000 Operations per sec.
10-20MW
Hundreds of Exa-Byte Data
From Supercomputers to Autonomous cars  
(source = Gartner, July 2018)

<table>
<thead>
<tr>
<th>Class</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compute, Data &amp; Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing Capacity (TFLOPS)</td>
<td>40</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>DRAM (GB)</td>
<td>1</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Non Volatile Storage GB)</td>
<td>100</td>
<td>300</td>
<td>500</td>
</tr>
<tr>
<td>data link interface (Gbps)</td>
<td>0,1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Only 10 Class 5 Vehicles in 2024 are equivalent to a current Top500 Supercomputer

| compute power consumption  
(watts to reach processing power capacity) | 3 | 4 | 5 |
|-------------------------------------------|---|---|---|
| 35 Gflops/w  
(GPP exascale class proc >2023) | 1 143 W | 2 286 W | 3 429 W |
| What if ... 70 Gflops/w | 571 W | 1 143 W | 1 714 W |
| What if ... 140 Gflops/w | 286 W | 571 W | 857 W |
| What if ... 280 Gflops/w | 143 W | 286 W | 429 W |

General Purpose (very) high-end processors in 2024
Accelerator high-end processors in 2024
Accelerator (Most) high-end processors in 2024
Likely unrealistic in 2024
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Amazon exec and Super Micro CEO call retraction of spy chip story.

NSA May Have Backdoors Built Into Intel And AMD Processors

The US Cloud Act v The EU's GDPR - Data Privacy & Security

A jet sale to Egypt is being blocked by a US regulation, and France is over it.

Car hacking remains a very real threat as autos become ever more loaded with tech.
But…

HPC for

Citizens
Addressing major societal challenges of modern society (e.g. health, more efficient public services, cybersecurity, safer and greener transport)

Researchers and scientists
Underpinning innovation in almost all scientific disciplines
Deeper insights into unexplored systems of high complexity

Industry
+ innovative
+ efficient (resources and time)
- costly

Currently, EU industry provides about 5% of supercomputing resources worldwide, but consumes one third of them.

In June 2012, the EU had 4 machines in the global top 10 supercomputers. Today the fastest system in the EU ranks 13 on the global list – about 10 times slower than the world’s fastest machine.²

Compared to its competitors in the USA, China and Japan, Europe is underinvesting in supercomputing, with an annual funding gap of €500-750 million.²

EC expectations from ICT-42 & EPI value proposal

**EPI expected impacts (as per EC request)**

- Get a world class processor for the Exascale machines supplied by EuroHPC in 2023
- Develop a sustainable economic model

**EPI is an H2020 project but with industrial mindset & product delivery oriented**
EPI is an essential part of EuroHPC

European High Performance Computing Joint Undertaking (EuroHPC JU):

- Setup in Nov 2018 (operational until 2026)
- Composed of public and private members
- Budget of ~1B€ (50% EU, 50% participating countries) + 400M€ from private entities
- Will provide financial support
- (public procurement, Research and Innov. Grants)
1. Genesis

2. Setup

3. Benefits of scalability

3. Roadmap

4. Challenges

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23 partners: Wide expertise and excellent combo

AUTOMOTIVE FOCUS

INDUSTRY FOCUS
HPC & RESEARCH FOCUS

Università di Pisa
EPI 23 partners, from research to industry from consortium to EU high-tech fabless

Fabless company
Industrial hand of EPI
Incorporated by a couple EPI members
EPI : End2End Solutions for both Servers and Edge

EPI Common Development Platform
- Synergies
- Fast-time to market
- Cost controlled
Unique in the universe of H2020 programs: From IP to Product/Solution
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2. Setup
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Scalability allows wide market potential coverage

Core Developments

HPC

eHPC (Automotive)

AI & BigData

Cost driven

Cloud & Servers

Space

Safety critical

Industry 4.x

Committed

future
EPI technologies will be everywhere to protect you or your business

To control your autonomous car safely

To help National and European sovereignty, science and research

To protect your digital life and your personal data’s
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EPI Common Platform

- Gen 1 GPP
- Adv. 64bits core & RISC-V
- Few IPs Integration
- Pan European Research Platform for HPC & AI
- EPI IP’s launch pad

- Gen 2 GPP
- Adv 64bits core & RISC-V
- Some IPs
- EPI Common Platform

- Gen 3
- Adv 64bits core & RISC-V
- Many IPs

- HPC System PreExascale
- Exascale
- Automotive CPU

External IPs
- 2021
- 2022
- 2023
- 2024
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3. Roadmap
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Challenge 1: Cost of Advanced Design SoC

9 digits budget...Building such a Product needs lots of cash...
While EPI is warming up, out there…. EPI Reaps $58M To Speed Development of Its 7nm AI Chip Set to Raise $100 Million Led by Intel Capital

C... Raises US$100 Million In Series A Funding president launches new company with backing from Carlyle Group

Intel Leads $75 Million Investment in AI Chip Startup

A stealthy startup called C... million to build deep learning hardware raised around Round III

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Challenge 2: What is really European?

Design Tools

VC’s

Backend / Packaging Sub-Contractors

Architects & Design team

Intrallectual Property

IP

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With EPI, Europe has the ambition to repeat the Airbus success
To anticipate our 2019 Financial Roadshow
European Union
Automotive
Embedded Computing
Cyber Security
UPC
Artificial Intelligence
Backdoor Free
Computing
Experience
Supercomputer
Deep Learning
Supercomputing
ADAS

is all about this!!
THANK YOU

European Processor Initiative

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