



European Processor Initiative

# European Union Automotive

Artifi

Cyber Security

Embedded Computing

UPC



European Processor Initiative

is all about this !!

ckdoor Free

omputing

ence

# Supercomputer

Deep Learning

Supercomputing

# ADAS



and



# EuroHPC in a Nutshell

The signatory **Member States** commit to **working together** with the Commission for **deploying an integrated world-class HPC infrastructure**.



2 1 3

One of the objectives is to have EU exascale supercomputers in the global top 3 ranking by 2022-2023.

The EuroHPC declaration has been launched on 23 March 2017 at the Digital Day in Rome.

## #EuroHPC (High Performance Computing) Declaration

Signatory member states

Seven countries – France, Germany, Italy, Luxembourg, Netherlands, Portugal and Spain – signed the declaration in March 2017.

Further six countries – Belgium, Slovenia, Bulgaria, Switzerland, Greece and Croatia – have joined them in this effort ever since.



(as of today (Sept. 2018) 17 EU members have joined EuroHPC.)

### EuroHPC Joint Undertaking



It is a legal and funding instrument to

- acquire and operate a world-class pre-exascale supercomputing infrastructure;
- develop exascale supercomputers based on competitive EU technology.

2019  2026

It is foreseen to **start operating from 2019 until 2026.**



**It will be composed of public members** (until now 20 Member States have signed up) and **private members** (representatives from HPC and Big Data stakeholders, including academia and industry).



It will get a budget of around **€1 billion**, of which 50% comes from the EU and 50% from the participating countries. Private entities will provide contributions in kind.



It will provide **financial support** (procurement or Research & Innovation grants) following **open and competitive calls**.

# EPI Mission

- ▶ **European independence** in High Performance Computing processor Technologies
  - EU Exascale machines based on EU processor by 2023
  - Tentatively, one pre-exa machine in 2021 with Gen1 processor

**AND**

- ▶ Based on a **solid, long-term economic model**
  - Go beyond the HPC market (not large enough)
  - Address the needs of European Industry → Car manufacturing market

# EPI Vision

- ▶ Develop (and sell) an EU-made family of High-Performance Processors for:
  - High Performance Computers
  - Connected mobility & AD Autonomous (Driving computing needs beyond 2023)
  - Other markets under exploration (Server, Cloud)
- ▶ Leveraging technical synergies between the markets and aggregate financial efforts across these markets



# EPI – short term expected impact



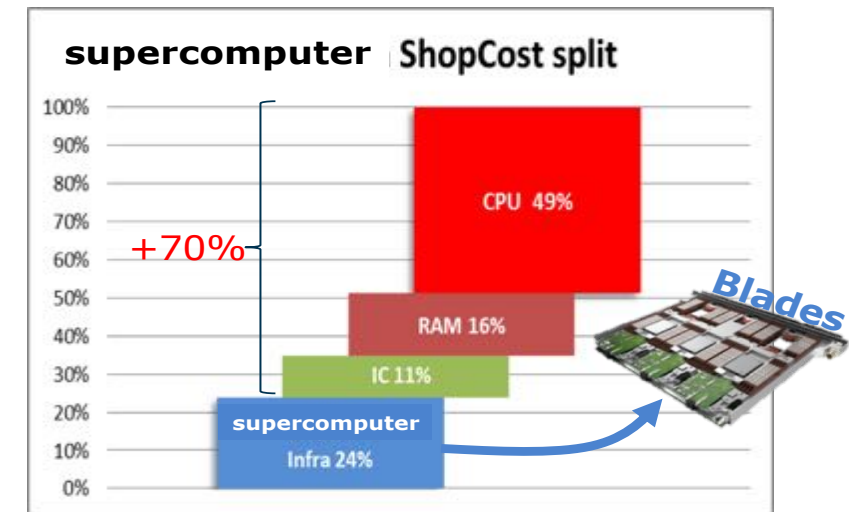
## Sovereignty

- Protect EU science, Innovation a IP
- Protect Data
- Avoid Embargo from non EU countries
- ITAR free (not at beginning)

## Independence from US/PRC components

- Create a EU based  $\mu$ proc vendor
- Create value in EU
  - IP
  - €€
- Create employment
- ➔ Apply Airbus model to high-end  $\mu$ proc

## Cost savings



CPU + RAM ➔ 65% costs

# Scalability allows wide market potential coverage



Core Developments

HPC



eHPC  
(Automotive)



IA & BigData



Safety critical

Space



Industry 4.x



???

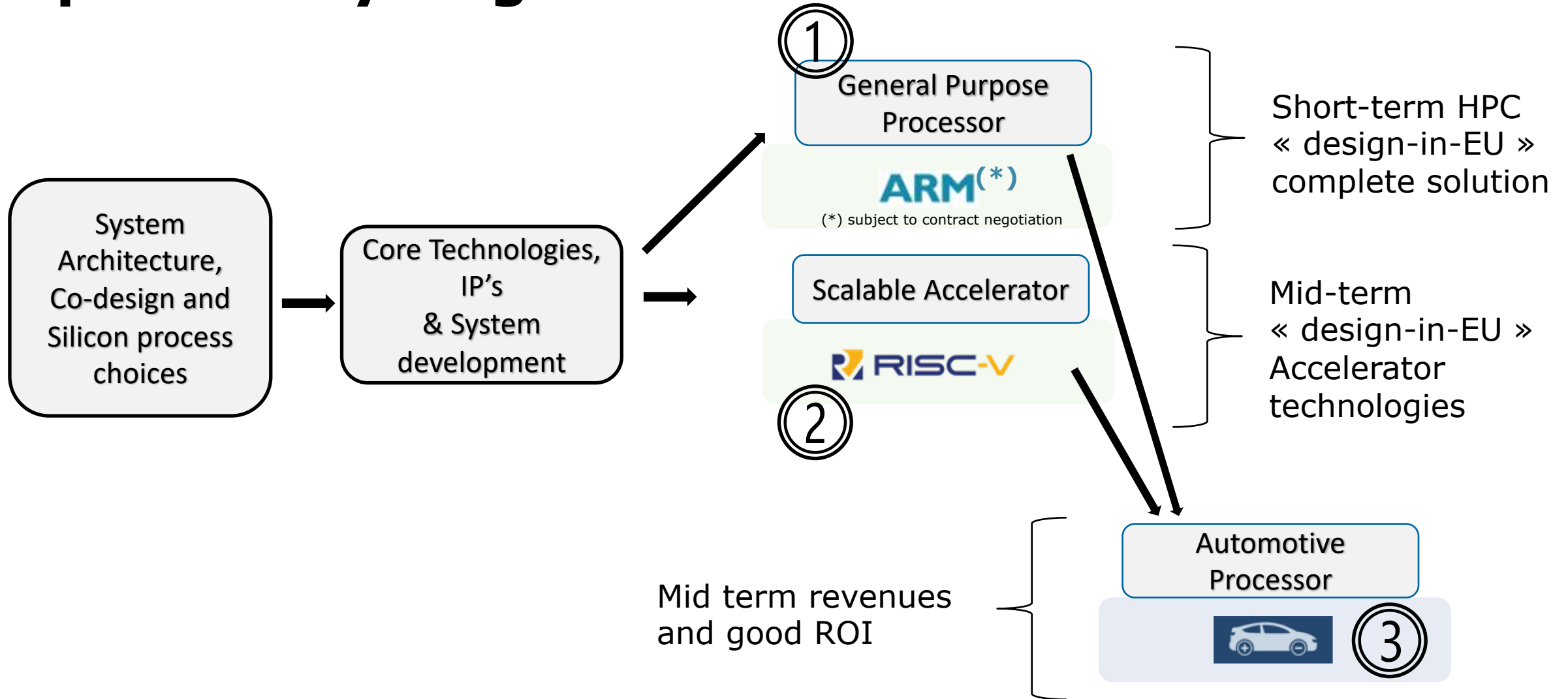
Cloud  
& Servers



Committed

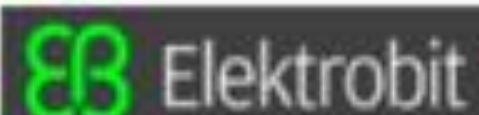
future

# 3 trends with common technologies and optimum synergies



# Multiple expertises

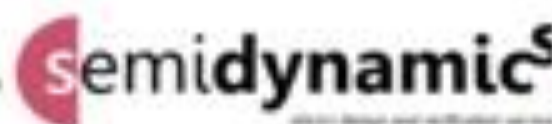
## AUTOMOTIVE EXPERTS



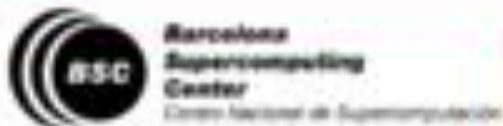
23 partners:

- Companies have 350.000+ employees & 120B€+ of sales
- Research / Universities have thousands of students and access to top talents

## INDUSTRY EXPERTS



## HPC & RESEARCH



CHALMERS

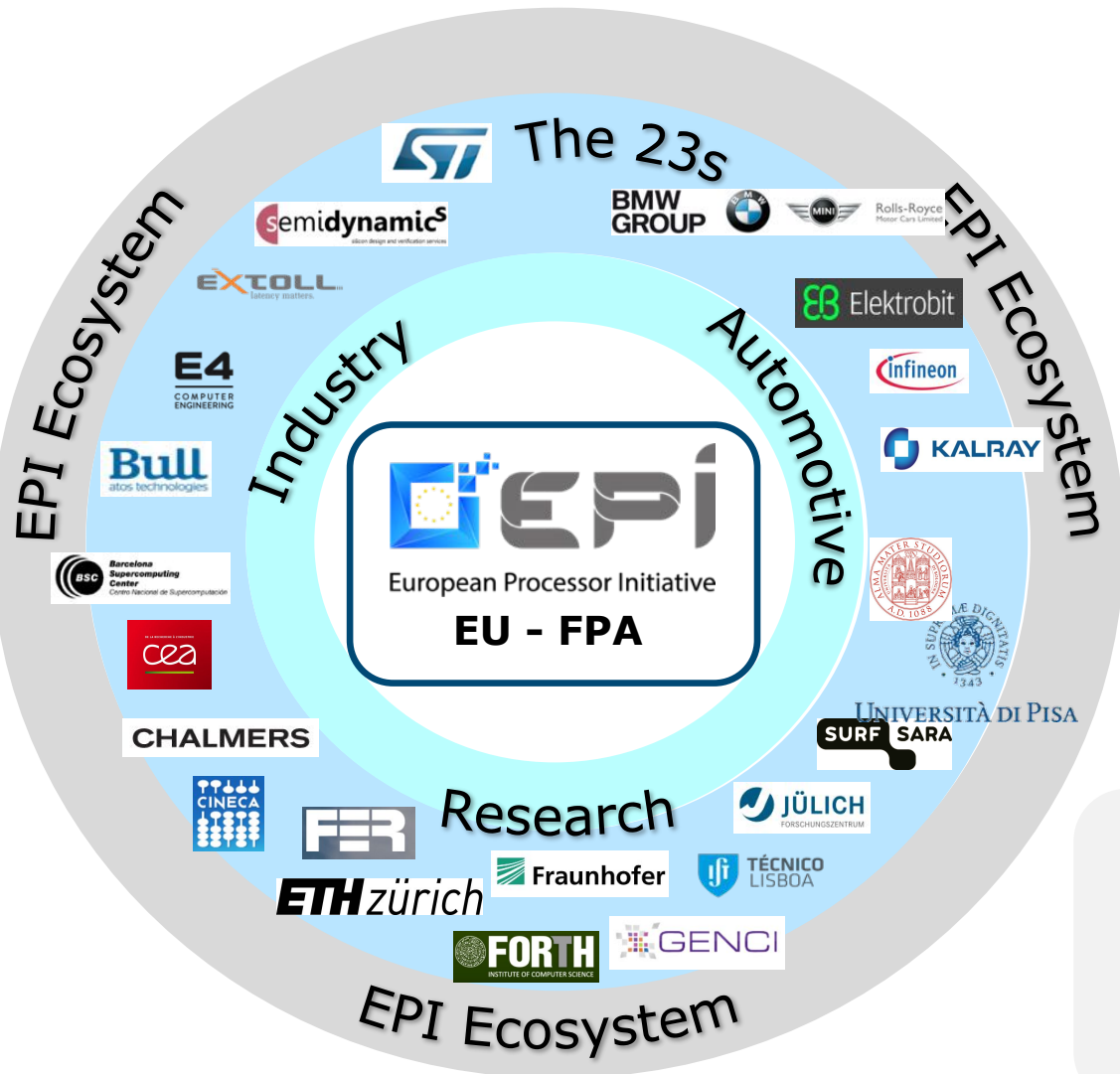


ETH zürich





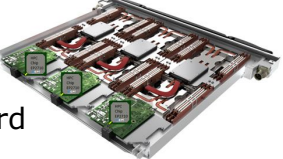


UNIVERSITÀ DI PISA

# EPI 23 partners, from research to industry from consortium to EU high tech fabless, enabling EPI ecosystem



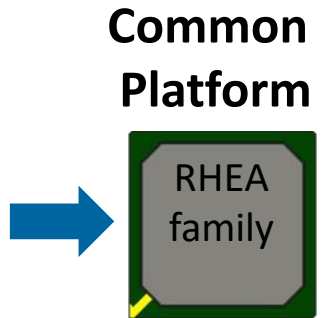
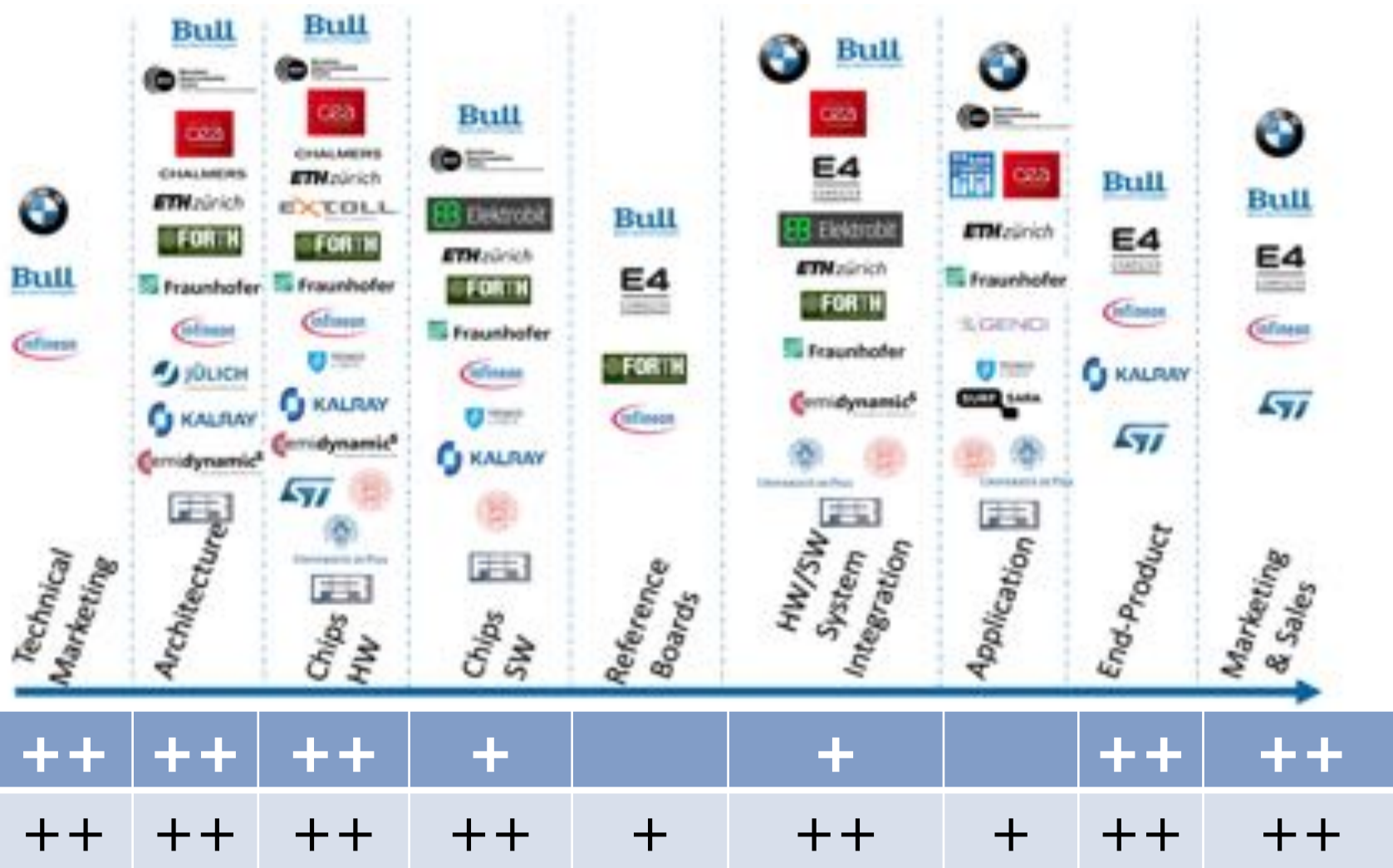
Fabless company  
Industrial hand of EPI  
Incorporated by a  
couple EPI members  
and external investors

Proof of concepts are 100% paid by EU and are made the best experts in their domain

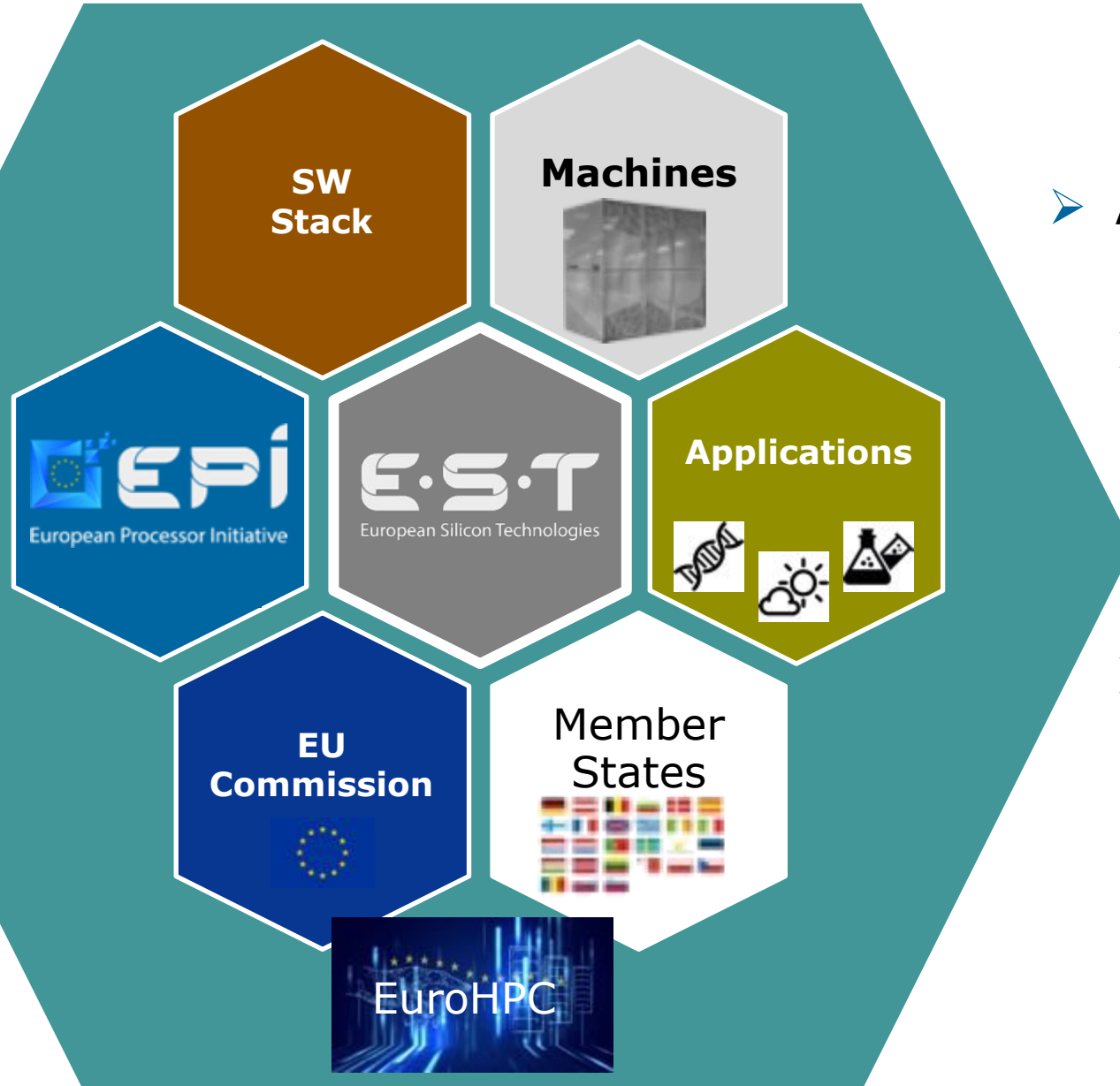
-  EPI Common Platform PCI card
-  EPI Mother Board
-  EPI HPC Blade
-  EPI BMW Adas demo
-  RHEA family

OEM

# Multi-Disciplinary expertise: from EPI to E-S-T



# EPI & E·S·T are the EuroHPC Industrial cornerstone

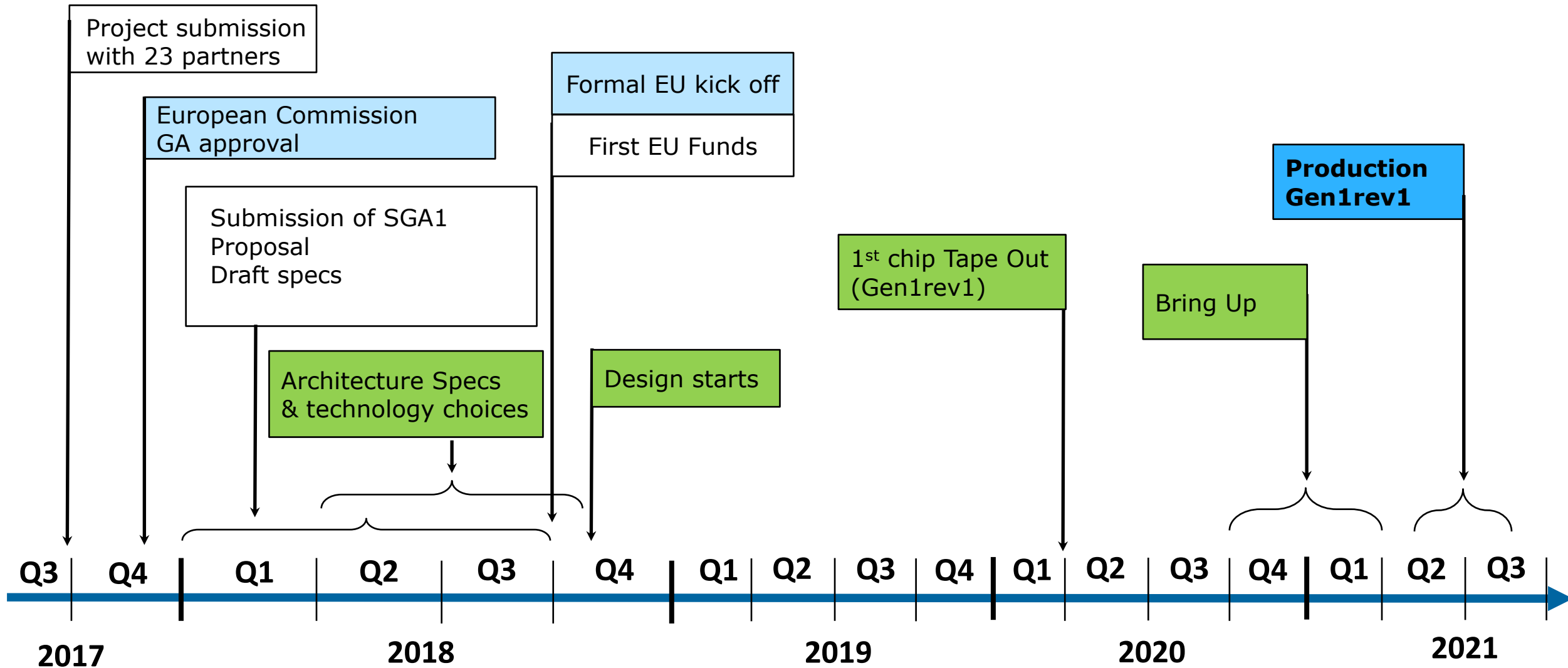


➤ **April 2016**

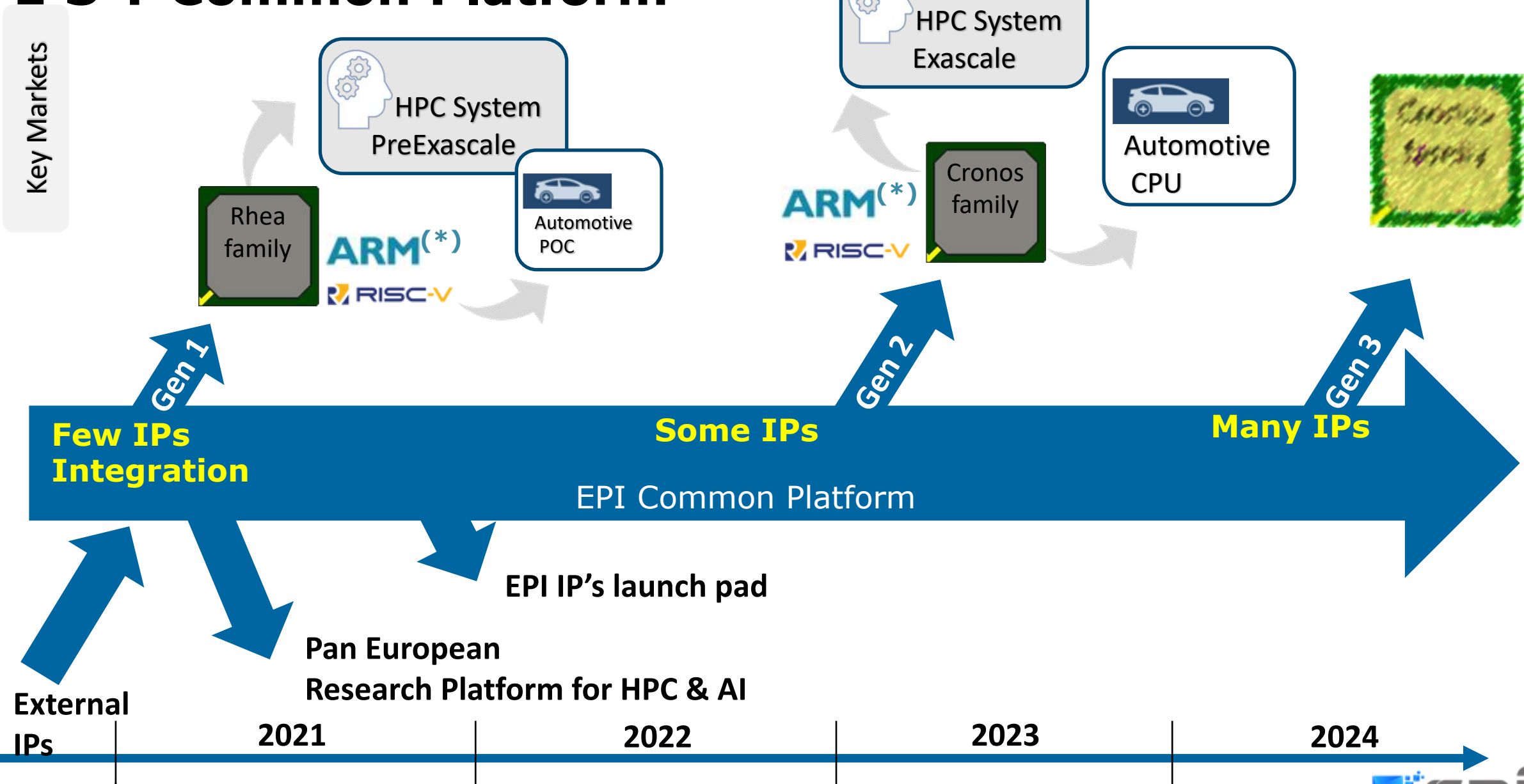
- « foster an HPC ecosystem capable of developing new European technology such as low power HPC chips »
- « ...acquisition of two co-design prototype exascale supercomputers in 2020, at least one based on European technology, which will rank in the Top3 of the world »

# Roadmap & Products Common Platform

# EPI & E-S-T Timing for the first 36 months (not on scale)



# E-S-T Common Platform





Gen 1 GPP



HPC System  
PreExascale



HPC System  
Exascale

Gen 2 GPP



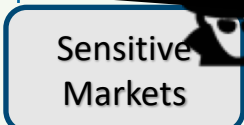
Deep - Learning  
Processor



Deep-Learning  
Processor Cost Down



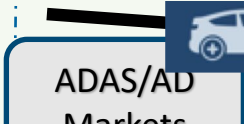
Crypto  
Processor



Crypto-Processor  
Cost Down



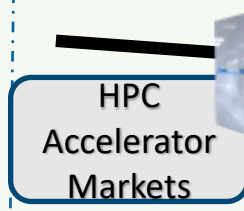
ADAS  
CoPro



ADAS CoPro  
Cost Down



Accelerator



Accelerator  
Cost Down

2021

2022

2023

2024

# Overall architecture concepts

detailed technical specs are under finalization

- ▶ 7nm or better
- ▶ Common floorplan hosting several core technologies (ARM<sup>(\*)</sup> and Risc-V)
- ▶ 2.5D die
- ▶ >600mm<sup>2</sup>
  
- ▶ ARM 8.4/SVE
- ▶ RISC-V DP Flops accelerator
- ▶ MB2020 NOC
  
- ▶ **Focus on ease of use, ease of performance**
  - Best in class Byte/Flops ratio
  - Peak DP Flops is not AT ALL part of the equation

(\*) subject to contract negotiation

# With EPI, Europe has the ambition to repeat the Airbus success



**20's Century**



**21's Century**

# Failure is not an option





European Processor Initiative