EPI Processor

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EPI Project and EPI processor

- European Processor Initiative (EPI) is an EU H2020 Project
  - To design a roadmap to foster low-power high-performance processor technologies
  - 26 EPI partners in 3 streams : GPP chip for HPC application, acceleration technologies and automotive application
  - EPI carries on the activities in previous Mont Blanc projects

- SiPEARL is the entity that
  - Developing the first EPI GPP processor implementation
  - Aligning its schedule with EuroHPC timeline
  - Promoting its eHPC use in automotive applications

GPP : General-Purpose Processor

SIPEARL

European Processor Initiative epi

SiPEARL – Roadmap

European Processor Initiative

EPI IP's Launch Pad
&
Pan European Research
Platform for HPC and AI

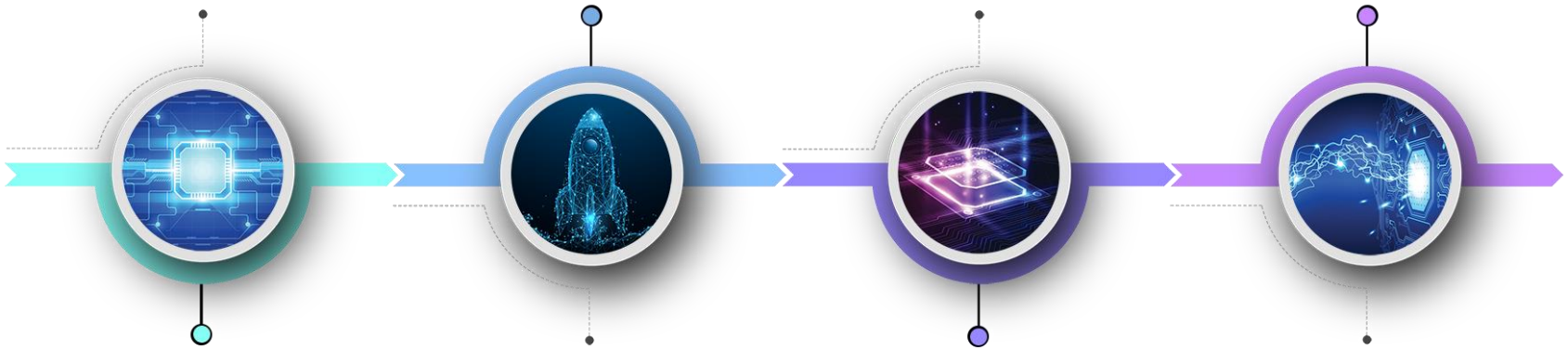
2021

2021-2022

2022-2023

Gen3 GPP Family

2024-...



Rhea Family - Gen1 GPP

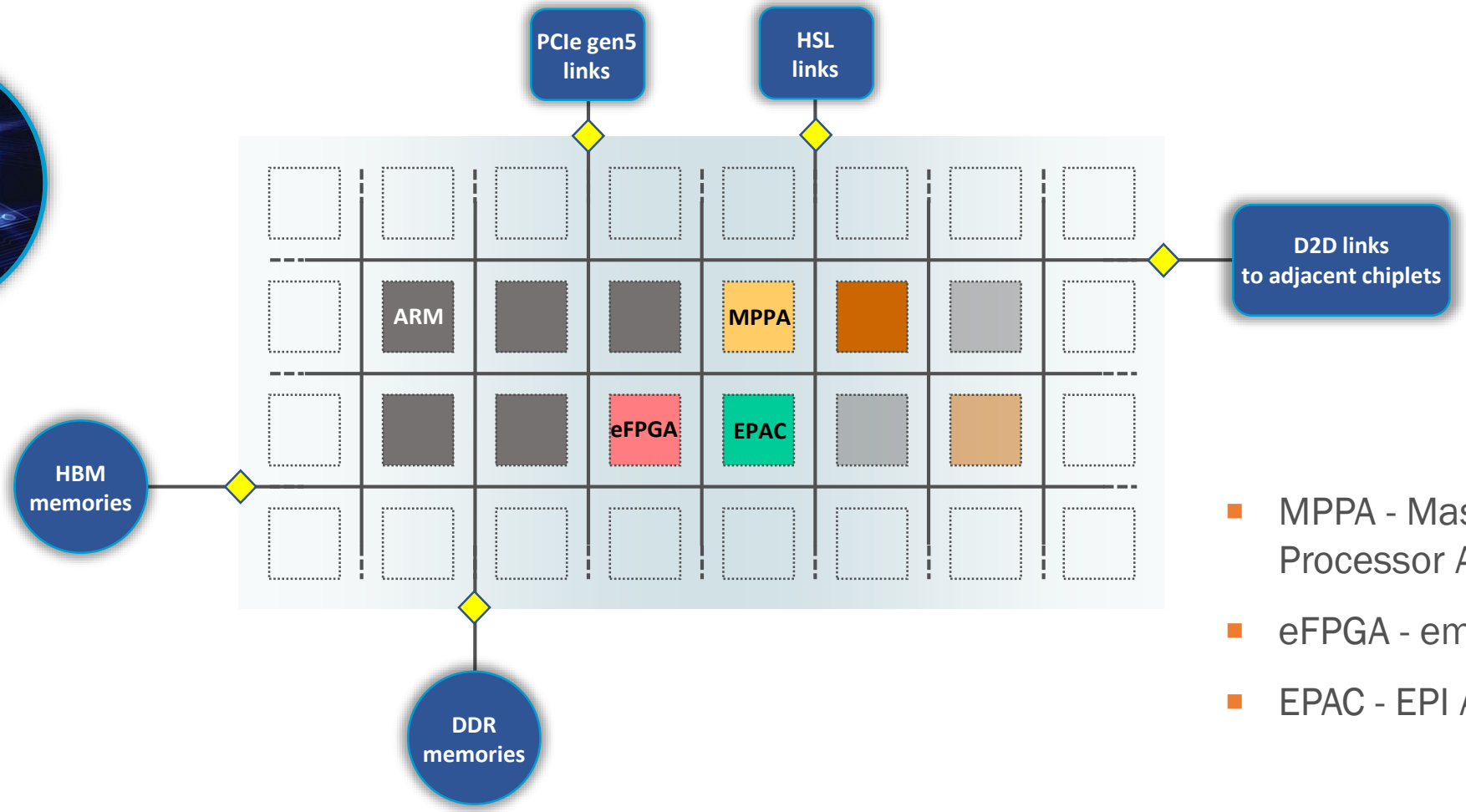
EPI Common Platform
ARM & RISC-V
External IPs
•
HPC System PreExascale
Automotive PoC

Cronos Family - Gen2 GPP

EPI Common Platform
ARM & RISC-V
•
HPC System Exascale
Automotive CPU

SIPEARL

GPP and Common Platform



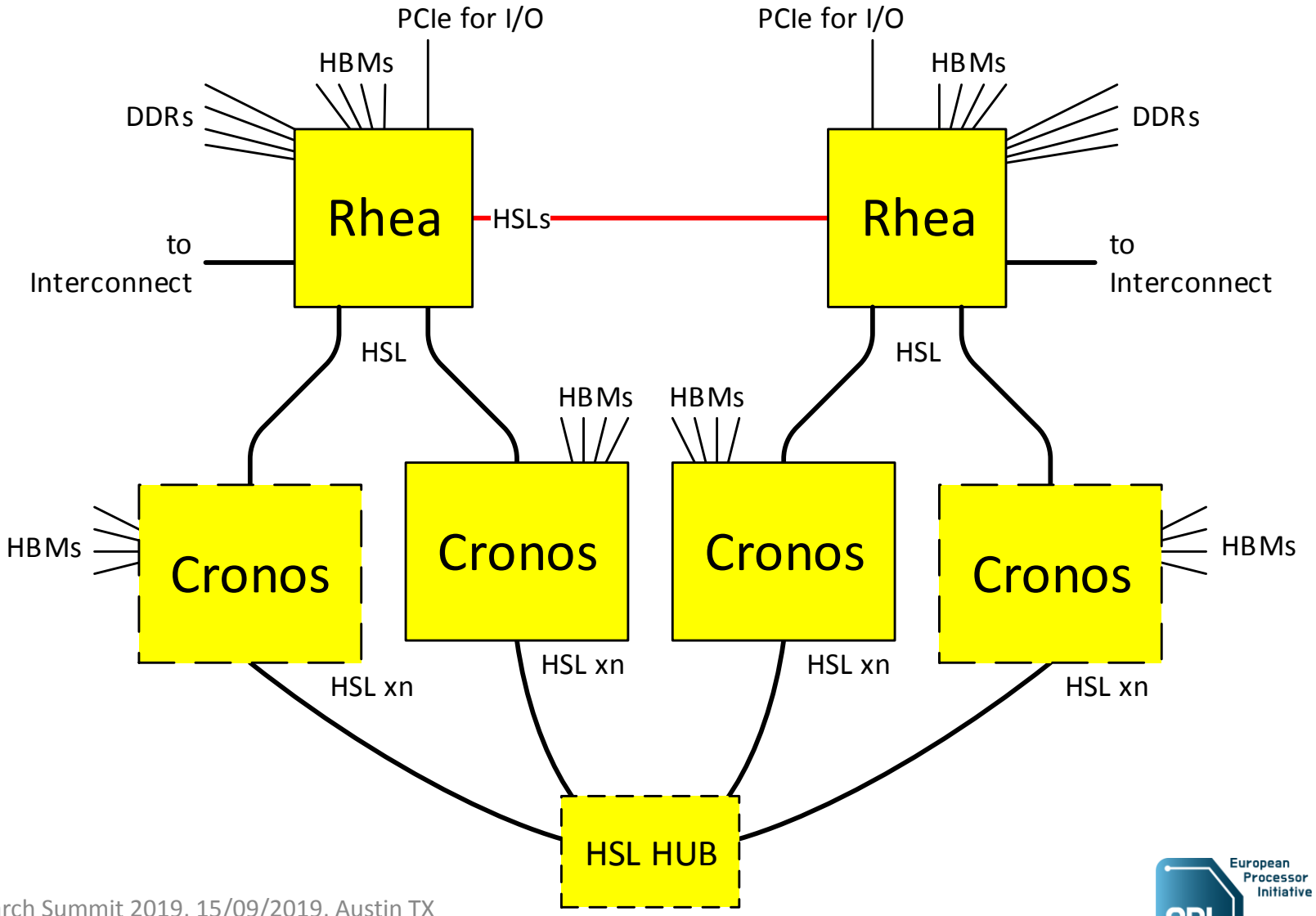
- MPPA - Massively Parallel Processor Array
- eFPGA - embedded FPGA
- EPAC - EPI Accelerator

Rhea designs

- Multi-core Armv8 processor with SVE engines for both control flow and computing
- EPI Accelerators work in I/O coherent mode and share the same memory view
- Coherent NoC with system level cache to keep the data local
- HBM2E, DDR5 and PCIe gen5
- CCIX for SMP and for functional extensions
- Low voltage to improve the energy efficiency

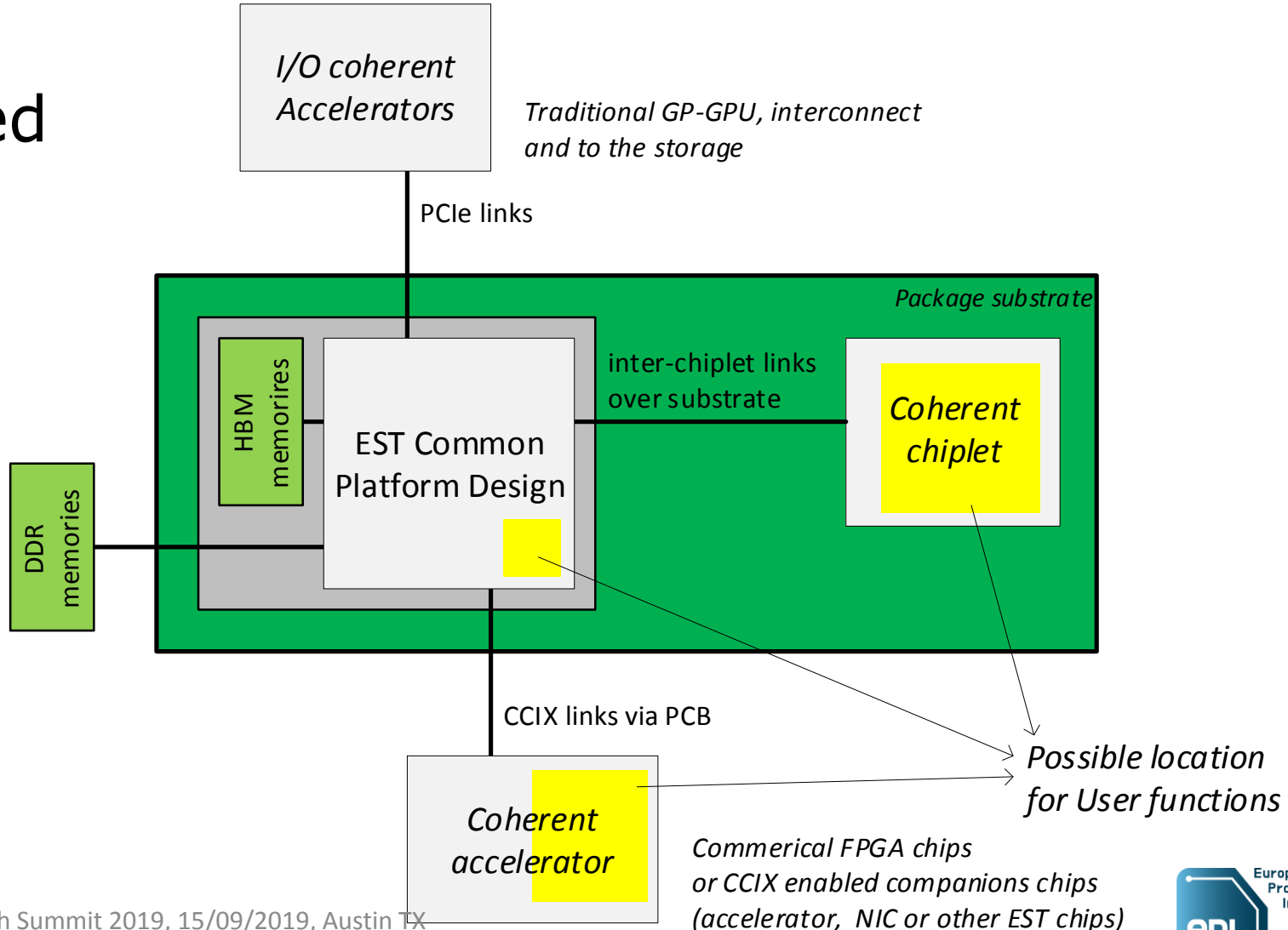
EPI roadmap for HPC

- gen1 / Rhea
  - General purpose
  - Homogeneous
  - Interconnect
  - Memory and storage
- gen2 / Cronos
  - Accelerated
  - Heterogeneous



Heterogeneous Integration

- Integrating customized functions at different levels
  - EPI accelerator IPs today is integrated in RheaR1 design



Challenges

- Programming model for Data-centric processing
  (or 'off-loading' from GPP point of view)

- GFLOPS/$ vs. GFLOPS/Watt vs. single-thread performance

GFLOPS/$	GFLOPS/Watt
= Gigahertz frequency	= Gigahertz frequency
* FLOPs/cycle	* FLOPs/cycle
/ # of transistors (Mgate)	/ Power (Watt)
/ unit transistor cost ($/Mgate)	