



Rhea1

The 1st generation European HPC/AI CPU from SiPearl

Rhea1, with high performance, power efficient Arm Neoverse V1 cores, is a CPU family designed specifically for HPC and AI workloads. Each Neoverse V1 core includes Arm Scalable Vector Extension (SVE) for high double precision, single precision, BFloat16 and 8-bit integer performance, addressing the full range of HPC and AI workloads. Incorporating in-package High Bandwidth Memory (HBM2e), Rhea1 delivers extraordinary compute performance and efficiency with an unmatched Bytes/Flops ratio.

Key features

Core	<ul style="list-style-type: none">- Arm Architecture v8.4-A- 80 Arm Neoverse V1 cores- 2x SVE 256 per core supporting 64/32/BF16 and int8- Arm Virtualization Extensions
Cache	<ul style="list-style-type: none">- Per core: 64KiB I/D L1 and 1MiB unified L2- Distributed: 80MiB System Level Cache (SLC)
Memory	8 DRAM interfaces: <ul style="list-style-type: none">- 4 HBM2e, 1024 bits, 64GiB- 4 DDR5, 64 bits, up to 256GiB/DIMM, 1-2 DPC
High-Speed I/O	High-Speed Connectivity: 96 (6 x16) lanes PCIe gen5/CCIX2.0
Package	Socket-supported LGA
Power and Thermal	Power management block to optimize perf/watt across use cases and workloads

Highlights



Sovereignty

To strengthen Europe's technological leadership and independence.



High Performance

To surpass the performance of 10,000,000 desktop computers.



Energy-efficiency

Significant energy savings thanks to Arm-based architecture.



Flexibility

Designed to work with any third-party accelerator (GPU, AI, quantum).



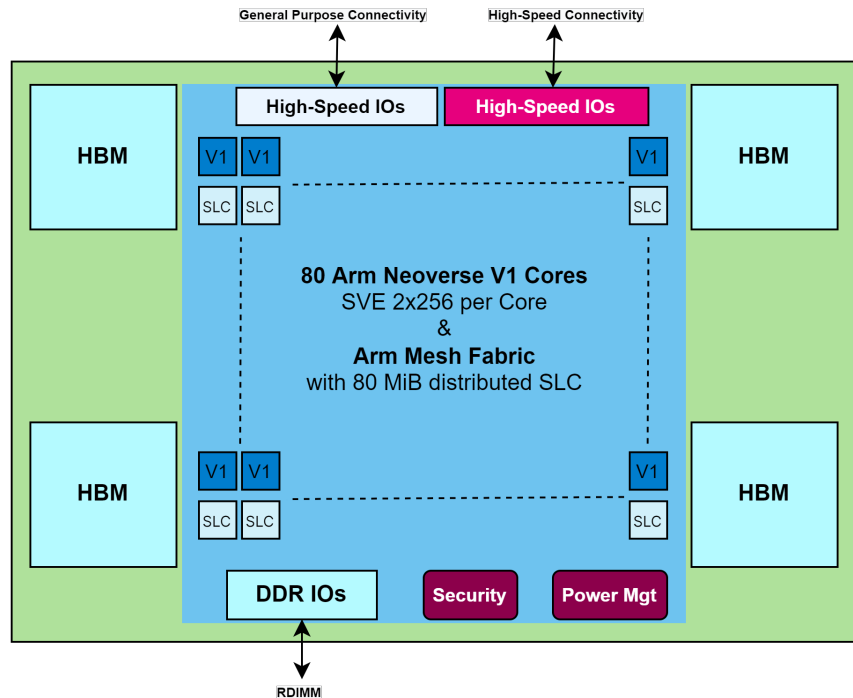
Backdoor-free & kill switch-free security

To protect data with secure end-to-end network transmission.

80 Arm Neoverse V1 cores with SVE, connected through the Arm mesh fabric

64GiB High Bandwidth Memory to optimize data throughput

Block diagram



ABOUT SIPEARL

SiPearl is the European fabless designer of secure high-performance energy-efficient CPUs for sovereign HPC, AI and data centres. These CPUs will help address strategic challenges in the fields of security, defense, medical research, energy, climate and engineering with a reduced environmental footprint.

Featuring 80 Arm Neoverse V1 cores with 61 billion transistors, SiPearl's first-generation CPU, Rhea1, is currently being manufactured. SiPearl's CPUs will equip Europe's first two exascale supercomputers belonging to EuroHPC JU: Rhea1 will be integrated into the JUPITER machine based in Germany and Rhea2 will be part of Alice Recoque in France.

Supported by the European Union and France, SiPearl employs 200 people in France, Spain, and Italy.