

# RED-SEA in a nutshell

Presenter name



**EuroHPC**  
Joint Undertaking

This project has received funding from the European High-Performance Computing Joint Undertaking (JU) under grant agreement No 955776. The JU receives support from the European Union's Horizon 2020 research and innovation programme and France, Greece, Germany, Spain, Italy, Switzerland.

# The RED-SEA consortium

**EVIDEN**  
an atos business

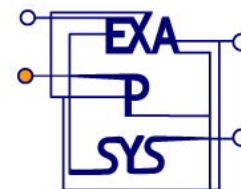


Project start: 01/04/2021  
Project duration: 36 months  
Project budget: 8 M€

**EXTOLL**  
latency matters.



**ETH** zürich



**exact**



Istituto Nazionale di Fisica Nucleare



# We are one of the “SEA” projects

## 3 complementary projects addressing Exascale challenges in a Modular Supercomputing Architecture (MSA) context

- In line with several HW/SW Exascale projects funded under previous European programmes
- Funded by the EuroHPC 2019-1 call focused on SW and applications
  - The EuroHPC Joint Undertaking targets Exascale computers in Europe in 2023-24
  - Should contain as many European components are possible
- Coordinated with other on-going European projects, particularly the European Processor Initiative

### DEEP-SEA: DEEP Software for Exascale Architectures



- Better manage and program compute and memory heterogeneity
- Targets easier programming for Modular Supercomputers
- Continuation of the DEEP projects series

### IO-SEA: Input/Output Software for Exascale Architectures



- Improve I/O and data management in large scale systems
- Builds upon results of SAGE1-2 projects and MAESTRO

### RED-SEA: Network Solution for Exascale Architectures



- Develop European network solution
- Focus on BXI (Bull eXascale Interconnect)

# RED-SEA objectives

## Enable



Enable the design of a new generation of high performance network interconnect

- Leveraging existing European technology (BXI, Exanest ...)
- Able to power the future EU Exascale systems

## Explore



Explore new innovative solutions

- End-to-end network services – from programming models to reliability, security, low latency, and new processors

## Develop



Develop the ecosystem and create a broader community of users and developers combining Research and Industrial teams

- Leveraging open standard and compatible API to develop innovative re-useable libraries and Fabrics management solutions

# The four pillars of RED-SEA research



Architecture, co-design and performance

Optimizing the fit with the other EuroHPC projects and with the EPI processors



High-performance Ethernet

Development of a high-performance, low-latency, seamless bridge with Ethernet



Efficient Network Resource management

Including congestion management and Quality-of-Service targets while sharing the platform across application and users



Endpoint functions and reliability

End-to-end enhancements to network services - from programming models to reliability & security and to in-network compute

# Back-up slide



# RED-SEA contribution to the Modular Supercomputing Architecture

## The MSA network

- BXI as the HPC fabric within each compute module
  - Low latency, high bandwidth
  - Tightly coupled applications
  - HPC features
- Ethernet as the high-performance federative network
  - Offers interface to storage
  - or to other compute modules
- Seamless interface between BXI and Ethernet via a new Gateway solution

