Post-Exascale Vision

Marcin Ostasz, ETP4HPC Office
What is next?

● **Why** do we need a Vision?
● **What** are the **foundations** of our Vision?
● **What** is it going to do?
Why do we need a Vision – The role of HPC in the future?

New Workflows e.g. Autonomous car
The Foundations of the Vision – Step 1: let’s hear what the world has to say…

CAMBRIAN EXPLOSION OF COMPUTING AND BIG DATA IN THE POST-MOORE ERA

Satoshi Matsuoka
Director, RIKEN Centre for Computational Science (R-CCS) - Professor, Dept. Mathematical & Computing Sciences, Tokyo Institute of Technology

FUTURE HPC: THE INTEGRATION OF SIMULATION, DATA ANALYSIS AND MACHINE LEARNING

Rick Stevens
Professor at the University of Chicago and Associate Laboratory Director at Argonne National Laboratory

HPC IN THE LOOP AND CYBER-PHYSICAL SYSTEMS

Marc Duranton
Member of the List Institute of the Research and Technology Department of CEA

FROM THE LATENCY TO THE THROUGHPUT AGE

Jesus Labarta
Director of the Computer Sciences Department at Barcelona Supercomputing Center (BSC)

BIG DATA AND EXTREME COMPUTING (BDEC) DISTRIBUTED SERVICES

Daniel A. Reed
University Chair in Computational Science & Bioinformatics, Pr. of Computer Science, Electrical & Computer Engineering, & Medicine, University of Iowa

AN ARCHITECT’S VIEW ON TECHNOLOGY CHALLENGES AND OPPORTUNITIES IN HPC

Al Gara
Intel Fellow and Chief Architect in the Data Center Group at Intel Corporation

FROM BRAIN RESEARCH TO FUTURE TECHNOLOGIES

Dirk Pleiter
Research Group Leader, Jülich Supercomputing Centre (JSC)
Societal Challenges

- Health
- Inclusive and Secure society
- Digital and Industry
- Climate Energy and Mobility
- Food and Natural Resources

“Missions” (Horizon Europe)
- e.g.: “Halving the human burden of dementia by 2030”,
- e.g.: “Reach net zero greenhouse gas emissions balance of 100 European cities by 2030”

“Thematical Clusters” (Horizon Europe)
- Health
- Inclusive and Secure society
- Digital and Industry
- Climate Energy and Mobility
- Food and Natural Resources

Upstream technologies
- quantum computing
- new memory/storage
- nanoelectronics
- photo-electronics

Application and use scenarios (Simulation, Analytics, AI, IOT)

Applications development: design, algorithms, methods, languages, tools

Technology for HPC Systems: architectures, hardware, software, algorithms, programming, tools,
What is it going to do? –
HPC Work Programme definition

ETP 4 HPC
EUROPEAN TECHNOLOGY PLATFORM FOR HIGH PERFORMANCE COMPUTING

Vision

European Industrial Users

PROJECTS and Results

ETP4HPC IUWG: Value Proposition

EuroHPC Joint Undertaking

Horizon Europe

Courtesy FHG