Towards EXtreme scale Technologies and Accelerators for euROhpc hw/Sw Supercomputing Applications for exascale

Fact Sheet

<table>
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<tr>
<th>Project Information</th>
<th>Funded under</th>
<th>Total cost</th>
<th>EU contribution</th>
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<tbody>
<tr>
<td>TEXTAROSSA</td>
<td>INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT)</td>
<td>€ 6 012 708,75</td>
<td>€ 2 051 376,42</td>
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<tr>
<td>Grant agreement ID: 956831</td>
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<td>DOI 10.3030/956831</td>
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<td>Start date 1 April 2021</td>
<td>End date 31 March 2024</td>
<td>Coordinated by AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE Italy</td>
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Project description

Performance boost for exascale computing systems

Capable of a billion calculations per second, exascale computing still needs to overcome technology gaps that limit performance and energy efficiency. There is a need to increase computation ability and enable the seamless integration of
reconfigurable accelerators in heterogeneous high-performance computing (HPC) multi-node platforms. The EU-funded TEXTAROSSA project aims to tackle these gaps by applying a co-design approach to design and develop an efficient supercomputer system based on new hardware accelerators, innovative two-phase cooling equipment, advanced algorithms, methods and software products for traditional HPC domains as well as for emerging domains in high performance artificial intelligence and high performance data analytics.

**Objective**

To achieve high performance and high energy efficiency on near-future exascale computing systems, a technology gap needs to be bridged: increase efficiency of computation with extreme efficiency in HW and new arithmetics, as well as providing methods and tools for seamless integration of reconfigurable accelerators in heterogeneous HPC multi-node platforms. TEXTAROSSA aims at tackling this gap through applying a co-design approach to heterogeneous HPC solutions, supported by the integration and extension of IPs, programming models and tools derived from European research projects, led by TEXTAROSSA partners. The main directions for innovation are towards: i) enabling mixed-precision computing, through the definition of IPs, libraries, and compilers supporting novel data types (including Posits), used also to boost the performance of AI accelerators; ii) implementing new multilevel thermal management and two-phase liquid cooling; iii) developing improved data movement and storage tools through compression; iv) ensure secure HPC operation through HW accelerated cryptography; v) providing RISC-V based IP for fast task scheduling and IPs for low-latency intra/inter-node communication. These technologies will be tested on the Integrated Development Vehicles mirroring and extending the European Processor Initiative ARM64-based architecture, and on an OpenSequana testbed. To drive the technology development and assess the impact of the proposed innovations TEXTAROSSA will use a selected but representative number of HPC, HPDA and AI demonstrators covering challenging HPC domains such as general-purpose numerical kernels, High Energy Physics (HEP), Oil & Gas, climate modelling, and emerging domains such as High Performance Data Analytics (HPDA) and High Performance Artificial Intelligence (HPC-AI).

**Fields of science**

natural sciences > computer and information sciences > **artificial intelligence**

natural sciences > computer and information sciences > computer security > **cryptography**

natural sciences > mathematics > pure mathematics > **arithmetics**

natural sciences > physical sciences > **theoretical physics**
Programme(s)

H2020-EU.2.1.1. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT)  
H2020-EU.2.1.1.2. - Next generation computing: Advanced and secure computing systems and technologies, including cloud computing

Topic(s)

EuroHPC-01-2019 - Extreme scale computing and data driven technologies

Call for proposal

H2020-JTI-EuroHPC-2019-1

See other projects for this call

Funding Scheme

EuroHPC-RIA - EuroHPC-RIA

Coordinator

AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE

Net EU contribution
€ 219 135,00

Address
Lungotevere Grande Ammiraglio Thaon Di Revel 76
00196 Roma

Region
Centro (IT)  Lazio  Roma

Activity type
Research Organisations

Links
Contact the organisation  Website  Participation in EU R&I programmes
Participants (14)

FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV

Germany
Net EU contribution
 € 84 997,50
Address
Hansastrasse 27c
80686 München
Region
Bayern > Oberbayern > München, Kreisfreie Stadt
Activity type
Research Organisations
Links
Contact the organisation Website Participation in EU R&I programmes HORIZON collaboration network
Non-EU contribution
 € 84 997,50

CONSORZIO INTERUNIVERSITARIO NAZIONALE PER L'INFORMATICA

Italy
Net EU contribution
 € 0,00
Address
Via Ariosto 25
00185 Roma
Region
Centro (IT) > Lazio > Roma
**UNIVERSITA DEGLI STUDI DI TORINO**  
Italy  
Net EU contribution  
€ 42 980,00  

**Address**  
Via Giuseppe Verdi 8  
10124 Torino  

**Region**  
Nord-Ovest > Piemonte > Torino  

**Activity type**  
Higher or Secondary Education Establishments  

**Non-EU contribution**  
€ 0,00

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**UNIVERSITA DI PISA**  
Italy  
Net EU contribution  
€ 153 475,00  

**Address**  
Lungarno Pacinotti 43/44  
56126 Pisa  

**Region**  
Centro (IT) > Toscana > Pisa
**Activity type**
Higher or Secondary Education Establishments

**Non-EU contribution**
€ 394,650,00

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**THIRD-PARTY**

**POLITECNICO DI MILANO**
Italy

Net EU contribution
€ 145,915,00

**Address**
Piazza Leonardo Da Vinci 32
20133 Milano

**Region**
Nord-Ovest > Lombardia > Milano

**Activity type**
Higher or Secondary Education Establishments

**Non-EU contribution**
€ 375,210,00

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**INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET AUTOMATIQUE**
France

Net EU contribution
€ 174,187,50

**Address**
Domaine De Voluceau Rocquencourt
78153 Le Chesnay Cedex

**Region**
Ile-de-France > Ile-de-France > Yvelines
Activity type
Research Organisations

Links
Contact the organisation  Website  Participation in EU R&I programmes  HORIZON collaboration network

Non-EU contribution
€ 174 187,50

THIRD-PARTY
UNIVERSITE DE BORDEAUX
France
Net EU contribution
€ 28 125,00

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Place Pey Berland 35
33000 Bordeaux

Region
Nouvelle-Aquitaine > Aquitaine > Gironde

Activity type
Higher or Secondary Education Establishments

Links
Contact the organisation  Website  Participation in EU R&I programmes  HORIZON collaboration network

Non-EU contribution
€ 28 125,00

BULL SAS
France
Net EU contribution
€ 215 561,25

Address
Rue Jean Jaures 68
78340 Les Clayes Sous Bois

Region
Ile-de-France > Ile-de-France > Yvelines
Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links
Contact the organisation Website Participation in EU R&I programmes HORIZON collaboration network

Non-EU contribution
€ 215 561,25

E 4 COMPUTER ENGINEERING SPA
Italy
Net EU contribution
€ 279 676,74

Address
Via Martiri Della Liberta 66
42019 Scandiano

SME Yes
Region
Nord-Est > Emilia-Romagna > Reggio nell’Emilia

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links
Contact the organisation Participation in EU R&I programmes HORIZON collaboration network

Non-EU contribution
€ 719 169,51

BARCELONA SUPERCOMPUTING CENTER CENTRO NACIONAL DE SUPERCOMPUTACION
Spain
Net EU contribution
€ 110 625,00

Address
Calle Jordi Girona 31
08034 Barcelona

Region
Este > Cataluña > Barcelona

Activity type
Research Organisations

Links
Contact the organisation  Website  Participation in EU R&I programmes  HORIZON collaboration network

Non-EU contribution
€ 110 625,00

INSTYTUT CHEMII BIOORGANICZNEJ POLSKIEJ AKADEMIi NAUK
Poland

Net EU contribution
€ 152 850,00

Address
Noskowskiego 12-14
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Region
Makroregion północno-zachodni > Wielkopolskie > Miasto Poznań

Activity type
Research Organisations

Links
Contact the organisation  Website  Participation in EU R&I programmes  HORIZON collaboration network

Non-EU contribution
€ 356 650,00

ISTITUTO NAZIONALE DI FISICA NUCLEARE
Italy

Net EU contribution
€ 153 160,00
Address
Via Enrico Fermi 54
00044 Frascati
Region
Centro (IT) > Lazio > Roma
Activity type
Research Organisations
Links
Contact the organisation
Website
Participation in EU R&I programmes
HORIZON collaboration network
Non-EU contribution
€ 393 840,00

CONSIGLIO NAZIONALE DELLE RICERCHE
Italy
Net EU contribution
€ 83 438,43
Address
Piazzale Aldo Moro 7
00185 Roma
Region
Centro (IT) > Lazio > Roma
Activity type
Research Organisations
Links
Contact the organisation
Website
Participation in EU R&I programmes
HORIZON collaboration network
Non-EU contribution
€ 214 556,57

IN QUATTRO SRL
Italy
Net EU contribution
Net EU contribution: € 207,250,00

Address
Piazza Dei Re Di Roma 47
00183 Roma

SME: Yes

Region
Centro (IT) > Lazio > Roma

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links
Contact the organisation
Participation in EU R&I programmes
HORIZON collaboration network

Non-EU contribution: € 207,250,00

EC signature date: 31 March 2021
Last update: 22 September 2022
Record number: 234838

Permalink: https://cordis.europa.eu/project/id/956831

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