

HPC ALLIANCE FOR APPLICATIONS AND SUPERCOMPUTING INNOVATION: THE EUROPE – JAPAN COLLABORATION



Funded by the European Union





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DELIVERABLE 1.1

Survey of supercomputing facilities access policy







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Glossary of Terms

ltem	Description
ABCI	AI Bridging Cloud Infrastructure
AIST	National Institute of Advanced Industrial Science and
	Technology
AMED	Japan Agency for Medical Research and Development
	(AMED)
CoEs	European Centres of Excellence
EU	Europe
EuroHPC JU	European High Performance Computing Joint Undertaking
НРС	High Performance Computing
HPCI	High Performance Computing Infrastructure
JHPCN	Joint Usage/Research Center for Interdisciplinary Large-scale
	Information Infrastructures
JST	Japan Science and Technology Agency
KPIs	Key Performance Indicator
MEXT	Ministry of Education, Culture, Sports, Science and
	Technology of Japan
PI	Principal Investigator
RIKEN/R-CCS	RIKEN Center for Computational Science
R&I	Research and Innovation
SRG	Supercomputing Resource Group
WP	Work package







Executive Summary

Europe and Japan have signed a Digital Partnership in 2022, covering a wide range of areas including High Performance Computing. EuroHPC JU implements this Digital Partnership through the HANAMI project, focusing on international collaboration between Europe and Japan around HPC. DGCONNECT and EuroHPC JU propose to establish cross access to supercomputers¹. This cross access consists in opening the European supercomputers (pre-exascale and exascale) to the Japanese researchers who contribute to HANAMI and, on the other side, in providing to European researchers access to Japanese supercomputers.

Since EuroHPC owns the European supercomputers, HANAMI cannot implement such agreement alone. What HANAMI can do, nevertheless, is to describe in a consistent manner the different access policies to the supercomputers, which is a pre-requisite for enabling cross access. This deliverable, in the future, will be used as a basis to provide recommendations to EuroHPC JU in order to implement the cross access with its counterpart in Japan.

This document details the current access policies of the different supercomputing facilities (in Europe and in Japan) in terms of eligibility and access modes.

¹ <u>https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-eurohpc-ju-2022-inco-04-01</u>







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1. Introduction

This deliverable describes the EuroHPC JU and Japanese supercomputers respective access policy. This step falls under the Task 1.3 of the Work Package 1, which is dedicated to describe the facilitation of reciprocal access for European and Japanese researchers to advanced Japanese and EuroHPC JU supercomputing resources.

The first chapter presents the target supercomputers (in Europe and in Japan), before describing in a second chapter, the conditions to access to the European supercomputers. Note that for this section, we address the EuroHPC JU conditions and the national/research organization conditions, since these may be different. A final chapter provides a description of the policy access for the Japanese supercomputers.

We then conclude on the future work and perspective related to the supercomputers cross access.







2. Target Supercomputers

2.1 European supercomputers

DGCONNECT and EuroHPC promote the cross access for supercomputers between Europe and Japan. In this context, HANAMI has designed a Supercomputing Resource Group (SRG) to describe in the most accurate way access conditions. The SRG is in charge of surveying the current access policies of target supercomputers for the HANAMI research teams. HANAMI (and the SRG more specifically) includes the major supercomputers within Europe, among which:

- Deucalion INESC-TEC, Portugal
- JUPITER FZJ, Germany
- Leonardo CINECA, Italy
- LUMI CSC IT Center for Science, Finland
- MareNostrum5 BSC, Spain
- Name to be defined by the "Jules Verne" consortium CEA, France

2.2 Japanese supercomputers

On the Japanese Side, HANAMI aims to facilitate access to the Fugaku supercomputer, operated and hosted by RIKEN/R-CCS in Kobe. Fugaku is an exascale machine, with a design particularly interesting for the European researchers since the future European processor designed by the EPI (European Processor Initiative) is expected to propose comparable features.

HANAMI also intends to study the access tracks regarding HPCI (High Performance Computing Infrastructures) supercomputers. HPCI is a Japanese HPC infrastructure connecting the flagship system (among which Fugaku) and the systems of major universities and national laboratories with high-speed academic network. HPCI







realizes the scientific and technological computing environment where a wide range of users in Japan can access national HPC resources efficiently.

The HPCI Systems other than Fugaku (gathering more than 10 supercomputers among Japan) are operated within the framework of the HPCI project commissioned by the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

It is managed by RIST, acting as the Representative for HPCI Operation, and the other organizations in charge: RIKEN, the University of Tokyo, the University of Tsukuba, the Research Organization of Information and Systems (ROIS), and the Foundation for Computational Science (FOCUS).

HPCI is gathering 15 supercomputers, listed in the Figure below:

RIKEN R-CCS Supercomputer Fuga	iku	Grand Chariot	AOBA-S		Site	Computing Resources (Architecture)
1	in the second	2	2	1	RIKEN R-CCS	Supercomputer Fugaku (A64FX)
				2	Hokkaido University	Grand Chariot (Xeon Gold 6148) Polaire (Xeon Phi 7250)
		Univ. of Tsukuba Pegasus	The Univ. of Tokyo/JCAHPC Wisteria/8DEC-01 (Odyssey)	3	Tohoku University	AOBA-A (SX-Aurora TSUBASA) AOBA-B (AMD EPYC 7702) AOBA-S (SX-Aurora TSUBASA)
				4	University of Tsukuba	Cygnus (Xeon Gold 6126 + Tesla V100) Pegasus (Xeon Platinum 8468 + NVIDIA H100)
CCESC				5	The Univ. of Tokyo/JCAHPC	Wisteria/BDEC-01 (Odyssey) (A64FX)
The Univ. of Tokyo Wisteria/BDEC-01 (Aquarius)	Tokyo Inst. of Tech. TSUBAME4.0	Nagoya Univ. "Flow" Type I	Kyoto Univ. Camphor3	6	The University of Tokyo	Wisteria/BDEC-01 (Aquarius) (Xeon Platinum 8360Y + NVIDIA A100)
·	7 1 1 1 1			7	Tokyo Institute of Technology	TSUBAME4.0 (AMD EPYC 9654 + NVIDIA H100)
				8	Nagoya University	Supercomputer "Flow" Type I FX1000 (A64FX) Supercomputer "Flow" Type II CX2570 (Xeon Gold 6230 + Tesla V100)
Osaka Univ.	Kyushu Univ.	JAMSTEC	AIST	9	Kyoto University	Camphor3 (Xeon Max 9480)
SQUID	GENKAI	EARTH SIMULATOR	ABCI	10	Osaka University	SQUID (Xeon Platinum 8360, NVIDIA A100, SX-Aurora TSUBASA)
	Pode ITO Previous System			11	Kyushu University	GENKAI Nodegroup A (Xeon Platinum 8490H) GENKAI Nodegroup B (Xeon Platinum 8490H + NVIDIA H100)
ISM Septempar System for Data Assimilation	RIKEN R-IH Supercomputer HBW2			12	JAMSTEC	Earth Simulator (ES4) (SX-Aurora TSUBASA, AMD EPYC 7742)
				13	AIST	ABCI 2.0 (Xeon Gold 6148 + NVIDIA V100, Xeon Platinum 8360Y + NVIDIA A100) * Computational resources managed by the rules of the resource provider.
				14	ISM	Supercomputer System for Data Assimilation (Xeon Platinum 8280L)
				1000		

 RIKEN Information R&D and Strategy Headquarters
 HOKUSAI BigWaterfall 2 (Xeon Max 9480)

Figure 1 - HPCI supercomputers







2.3 Conclusion regarding the target supercomputers

The scope of the cross access exercise facilitated by HANAMI is limited (at least in the first phase) to pre-exascale and exascale systems in Europe, and Fugaku in Japan. However, this does not prevent to study a larger network of supercomputers, including the petascale systems in Europe for example and other infrastructure organizations in Japan.







3. European supercomputers' access policy

3.1 Synthesis of EuroHPC JU access policy

In this section we focus on the access policy (eligibility and access modes) for the EuroHPC supercomputers. It addresses only the EuroHPC resources and not the resources managed by the respective consortia.

3.1.1. Eligibility

Researchers from academia, research institutes, public authorities, and industry established or located in an EU Member State or in a Member State or in a third country associated to the Digital Europe Programme or to Horizon Europe shall be granted the Union's share of access time to EuroHPC JU supercomputers acquired after 2020.

Digital	The funding is available for entities from the EU Member States
Europe	as well as other countries associated to the Programme. The
Programme	decision to associate a country (or not) is left to the European
eligible	Commission based on the scope and objectives of the
countries ²	Programme. Currently, EFTA/EEA countries (Iceland, Liechtenstein
	and Norway) are fully associated with the programme. Ukraine,
	Montenegro, North Macedonia, Serbia, Albania, Kosovo, Türkiye
	and Moldova are associated, while Bosnia and Herzegovina is in
	the process of being associated.
Horizon	Albania; Armenia; Bosnia and Herzegovina; Faroe Islands; Georgia;
Europe	Iceland; Israel; Kosovo; Moldova; Montenegro; New Zealand

² https://digital-strategy.ec.europa.eu/en/faqs/questions-and-answers-digital-europe-programme





eligible	(under specific conditions); North Macedonia; Norway; Serbia;
countries ³	Tunisia; Türkiye; Ukraine; United Kingdom (under specific
	conditions); Canada (under specific conditions); Morocco;
	Switzerland (under specific conditions).

Table 1 - Eligible countries within Digital programme and/or Horizon Europe

3.1.2. Access tracks

The EuroHPC JU has procured pre-exascale and petascale supercomputers (the EuroHPC supercomputers) which are operated by supercomputing centers (Hosting Entities) in the European Union. EuroHPC JU manages the access time (from 35% for petascale systems up to 50% of pre-exascale systems total capacity) of EuroHPC supercomputers

The table below describes briefly the current access modes for the European supercomputers and the associated schedule to apply.

Call	Cut-off	Allocation starts	Duration	Nodes
		(after submission)		
Development	Monthly	2-3 weeks	1 year	4 500 > X > 800
Benchmark	Monthly	2-3 weeks	3 months	3 500 > X > 400
AI and Data-	Bi-	2 months	1 year	50 000 > X > 7
Intensive	annual			100
Applications				
Regular	Bi-	4 months	1 year	60000>X>15000
	annual			
Extreme Scale	Bi-	6 months	1 year	245000>X>120000
	annual			

Table 2 - Overview of EuroHPC JU access schedules and conditions

³ <u>https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/list-3rd-</u> country-participation_horizon-euratom_en.pdf







The table below gives more details about the conditions (in terms of "type of simulation" a researcher can execute) for each access mode.

Access mode	Description
Development	The purpose of the EuroHPC JU Development Access calls is to
	support researchers and HPC application developers by giving
	them the opportunity to develop, test and optimize their
	applications on the upcoming/available EuroHPC JU Pre-exascale
	and/or Petascale system prior to applying for an Extreme Scale
	and/or Regular Access. The EuroHPC JU Development call is
	designed for projects focusing on code and algorithm
	development and optimization and development of AI
	application methods. This can be in the context of research
	projects from academia or industry, or as part of large public or
	private funded initiatives as for instance Centers of Excellence or
	Competence Centers.
Benchmark	The EuroHPC JU Benchmark Access calls is an extension of the
	development one. The EuroHPC JU Benchmark call is designed
	for code scalability tests or for test of AI applications and the
	outcome of which is to be included in the proposal in a future
	EuroHPC JU Extreme Scale and Regular Access call.
Al and Data-	The call is designed to serve industry organizations, small to
Intensive	medium enterprises (SMEs), startups, as well as public sector
Applications	entities, requiring access to supercomputing resources to
	perform artificial intelligence and data intensive activities.
Regular	The call is designed to serve research domains, industry open
	R&D and public sector applications that require large-scale
	resources. The Regular Access mode is open to all fields of







	science, industry and the public sector. The expected impact in					
	the application's domain should justify the need for large					
	allocations in terms of compute time, data storage and suppo					
	resources. This access mode distributes resources from the					
	EuroHPC JU petascale and pre-exascale systems.					
Extreme Scale	The call is open to all fields of science, industry and public sector					
	justifying the need for and the capacity to use extremely large					
	allocations in terms of compute time, data storage and support					
	resources. The Extreme Scale Access mode is designed for					
	applications with high-impact, high-gain innovative research,					
	open to all fields of science, industry and public sector justifying					
	the need for and the capacity to use extremely large allocations					
	in terms of compute time, data storage and support resources.					
	This access mode distributes resources from the EuroHPC JU					
	pre-exascale systems.					

Table 3 - Description of EuroHPC JU access track purpose

3.2. Synthesis of current cross accesses between European and Japanese supercomputers

This paragraph details how researchers can be granted supercomputing resources through national supercomputers. We give an overview of European supercomputers access, from the national point of view first, and then from a research organization point of view.







3.2.1. National access modes and eligibility

We summarize in the table below the policy conditions regarding the member state supercomputing resources for the following supercomputers:

Supercomputers	Access conditions				
Deucalion	MACC and Deucalion computing resources can be accessed				
	through the periodic competitive calls of the National				
	Advanced Computing Network (RNCA) and EuroHPC JU. These				
	calls are open to researchers working or collaborating with				
	Portuguese and European institutions. International				
	researchers are invited to collaborate with any Portuguese or				
	European research group in order to gain access to these				
	infrastructures.				
JUPITER	Eligible are scientists with affiliations to German universities or				
	research facilities. Here, the nationality of the applicant				
	"Principal investigator (PI)" is irrelevant. European collaborators				
	from other countries are allowed as long as the PI is from a				
	German institution.				
Leonardo	CINECA is granting access through ISCRA (Italian				
	Supercomputing Research Allocation) programs. For ISCRA				
	calls PIs are expected to be affiliated to an Italian institution,				
	while no restriction is applied for the Co-PI and collaborators.				
	It is expected that the research will be performed at Italian				
	institutions.				
LUMI					
	The LUMI consortium countries have different policies for				
	accessing LUMI. For Finland, access to the LUMI				
	accessing LUMI. For Finland, access to the LUMI supercomputer is granted to academic users who are				
	The LUMI consortium countries have different policies for accessing LUMI. For Finland, access to the LUMI supercomputer is granted to academic users who are associated with a Finnish institution of higher education or				
	The LUMI consortium countries have different policies for accessing LUMI. For Finland, access to the LUMI supercomputer is granted to academic users who are associated with a Finnish institution of higher education or research, and to industry users from organisations established				
	The LUMI consortium countries have different policies for accessing LUMI. For Finland, access to the LUMI supercomputer is granted to academic users who are associated with a Finnish institution of higher education or research, and to industry users from organisations established or located in Finland. Collaborative projects with other				
	The LUMI consortium countries have different policies for accessing LUMI. For Finland, access to the LUMI supercomputer is granted to academic users who are associated with a Finnish institution of higher education or research, and to industry users from organisations established or located in Finland. Collaborative projects with other academic and industrial users, both within Finland and				







	that the lead researcher, or Principal Investigator (PI), of the					
	project is affiliated with a Finnish organisation.					
MareNostrum5	BSC and MareNostrum computing resources can be accessed					
	through the periodic competitive calls of the Spanish					
	Supercomputing Network (RES). These calls are open to					
	researchers working or collaborating with Spanish and					
	European institutions. International researchers are invited to					
	collaborate with any Spanish or European research group in					
	order to gain access to these infrastructures.					
Jules Verne	Membership of the project leader					
future	• be in a French research organization, or in a company					
supercomputer	(French or foreign but justifying a research activity in					
	France)					
	• be on a medium or long-term stay in one of recognized					
	French research organism.					
	For all types of access, the project leader must be a permanent					
	member of a management structure, research, a post-doctoral					
	fellow or an engineer (CDD/CDI).					
	Membership of the project users					
	• Personnel from a foreign laboratory and participants in					
	a project associated with a French research (eg ANR or					
	European and international projects).					
	Access to national computing resources and use of resources					
	Access to the GENCI supercomputers must be done from the					
	French territory, except in special cases duly accepted by the					
	computing center (as in the case of a French researcher staying					
	abroad).					

Table 4 - Details of European supercomputers eligibility access







	PI – restrictions if any	User – restrictions if any	
	Research organization	Research organization	
Deucalion	European	None	
JUPITER German		None	
Leonardo	Italian	None	
LUMI	Finnish	None	
MareNostrum5	European	None	
Jules Verne's	French	None but must provide a French IP	
supercomputer		address. If this is not possible, this is	
		discussed and accepted "case by case".	

Table 5 - European supercomputer eligibility access summary

3.2.2. Research organizations access eligibility

Several European supercomputing centers and/or research organizations within HANAMI may have a bilateral agreement with Japanese research institutes (among which RIKEN/R-CCS). Such bilateral agreements may open a cross access to supercomputers, on European and/or Japanese side.

Bilateral agreements are settled via a Memorandum of Understanding (MoU) that involves only the European center and the Japanese centers. Currently, the following MoU are ongoing:

With RIKEN	With RIKEN/R-CCS
CEA; FZJ (under negotiation)	BSC; CSC; FZJ; INESC-TEC

Table 6 - Bilateral agreements with RIKEN or RIKEN/R-CCS

Thanks to these bilateral agreements, researchers from RIKEN and/or RIKEN/R-CCS can access to BSC, CEA, CSC, FZJ and INESC-TEC supercomputing resources. Note that since these agreements are bilateral, the conditions described in the CEA – RIKEN agreement is not necesserally the same as CSC – RIKEN/R-CCS for example: These 5 agreements might have different access conditions.







In the context of HANAMI, these agreements listed above cannot be considered as a sustainable or granted access, since they involve only a limited number of research organizations and might be also limited according to the organisations researchers are affiliated to. However, this shows the experience of HANAMI members and long term relationship established with Japan regarding the supercomputing cross access and collaboration in general.

INESC-TEC has an ongoing MoU with the National Institute of Advanced Industrial Science and Technology (AIST)⁴. AIST hosts and operated AI Bridging Cloud Infrastructure (ABCI)⁵, which is the world's first large-scale Open AI Computing Infrastructure.

The INESC-TEC/AIST MoU's purpose is to support information exchange and research collaboration in the fields of Advanced Computing, Open Data, and AI, specifically in the areas of High-Performance Computing Infrastructure, High-Performance Computing Applications, and Large-scale Data Visualization. The activities under this MOU are intended to serve and promote the public interest.

⁵ <u>https://abci.ai/</u>





⁴ <u>https://www.aist.go.jp/aist_e/about_aist/index.html</u>



4. Japanese supercomputers' access policy

In this section, we study the eligibility and access modes for the HPCI organization and JHPCN. Note that some HANAMI members already use such access modes for their research with Japan (not necessarily in the context of HANAMI).

4.1. HPCI supercomputers

HPCI supercomputers' access is managed by RIST (Research Organization for Information Science and Technology). The shared computational resources of the HPCI System are allocated to public users. A regular call for proposals opens once per year (autumn). Other than the regular calls, calls for research projects in some categories are open throughout the year.

4.1.1. Eligibility

	PI – restrictions if any		User – restrictions if any	
	Institute	Nationality	Institute	Nationality
HPCI	None if the institute is a research	None	None	None
	organization or a university			
	Japanese if the institute is a	None	None	None
	private company			

Table 7 - HPCI eligibility access summary







4.1.2. Access modes

Project Categories	Duration	Fugaku	Other HPCI Resources
General Access / Junior Researchers ¹¹ / Industrial Access	One year	Twice per year (Period A, B)	Once per year (Period A)
Small Scale Projects for General Access / Junior Researchers ¹¹ / Industrial Access	Up to one year		N/A
Fee-based Access (General / Industrial)	Up to one year	Year-round opening	Year-round opening (Industrial access only)
Trial Access (General / Industrial)	Up to 6 months		Year-round opening (Industrial access only)
Trial Access First-touch option (General / Industrial)	Up to 3 months		N/A
Fee-based Trial Access (General / Industrial)	Up to 6 months		N/A
HPCI Shared Storage	Up to one year	Year-round opening	

*1 Junior Researchers Projects are only for those who are less than 40 years old.

Timing of periodic calls

	Call opens	Project starts	
Period A	September (in the previous year)	April	
Period B March		October	

Figure 2 - HPCI supercomputers access modes

HPCI conditions (in terms of eligibility and access schedule and conditions) are relatively flexible: European researchers can use the HPCI desk to ask for Japanese supercomputing resources.

4.2. JHPCN supercomputers

The Joint Usage/Research Center for Interdisciplinary Large-scale Information Infrastructures is made up of eight centers equipped with supercomputers. These centers are the Information Initiative Center of Hokkaido University, the Cyber science Center of Tohoku University, the Information Technology Center of the University of Tokyo, the Global Scientific Information and Computing Center of the Tokyo Institute of Technology, the Information Technology Center of Nagoya University, the Academic Center for Computing and Media Studies of Kyoto University, the Cyber media Center of Osaka University, and the Research Institute for Information Technology of Kyushu University.







This is a network-type joint usage and collaborative research center, and its core institution is the Information Technology Center of the University of Tokyo. The Center began as a program of the Japanese Ministry of Education, Culture, Sports, Science & Technology (MEXT) in April 2010.

The formal title of this program is "Joint Usage/Research Center for Interdisciplinary Large-scale Information Infrastructures," but it is also known as "Japan High Performance Computing and Networking plus Large-scale Data Analyzing and Information Systems (JHPCN)". Research here is carried out in four areas:

- Very large-scale numerical computation,
- Very large-scale data processing,
- Very large capacity network technology,
- And very large-scale information systems.

4.2.1. Eligibility

	PI – restrictions if any		User – restrictions if any	
	Institute	Nationality	y Institute Nationali	
JHPCN	Japanese	None	Academic	None

Table 8 - JHPCN eligibility access summary

4.2.2. Access modes

JHPCN calls for project might emphasize some specific scientific fields. We do not list here the target scientific fields since they might be subject to change yearly. The table below summarizes the schedule for JHPCN supercomputing resources calls for projects.

Call	Cut-off	Allocation sta	ts Duration
		(after submission)	
JHPCN	Yearly	2 months	1 year

Table 9 - JHPCN access mode schedule







5. Conclusion

This first overview of the different access policies to European and Japanese supercomputers presents the current cross access status, as well as some of the gaps. HANAMI highlights below some of the key findings.

• Accessing to the Japanese supercomputer:

- The Japanese supercomputers are eligible for any researchers, including the non-Japanese one. The access eligibility is sufficiently flexible to accept international research academic researchers as PI. The same applies for the users associated to a project.
- The Japanese access modes are flexible, on the same model globally as EuroHPC JU one. However, the schedule is different (fiscal year in Europe and Japan are different).

• Accessing to the EuroHPC JU supercomputers:

 The European supercomputers are accessible to a list of countries defined by the partners of either Digital Europe Programme or Horizon Europe. Unfortunately, Japan is not among this list, leading to the impossibility for Japanese researchers to submit as PI for supercomputing resources. However, Japanese researchers can access to the EuroHPC JU supercomputers, as users who contribute to a European PI project. This is restrictive in the context of HANAMI, which promotes Europe/Japan collaboration around HPC.

• Accessing to the national supercomputers involved within HANAMI:

- It appears that from one country to another, the PI can be hosted by a European entity (which is the less restrictive condition), or national research organization.
- Ongoing bilateral MoUs between HANAMI's members and Japanese research centers allows a limited number of researchers to access to the Japanese supercomputers and vice-versa.
- HANAMI will design a future roadmap for the EU/Japan collaboration, therefore the future cross-access between EuroHPC JU and Japanese







supercomputers shall include are additional parties that will join the collaboration

HANAMI consortium will propose in the next deliverable (D1.2) to identify the risks inherent to the current conditions to access the supercomputers, and establish recommendations and propositions to mitigate these risks.







6. References

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