TÜBİTAK ULAKBİM

Turkish National e-Science e-Infrastructure (TRUBA)

EuroHPC Project

Sevil Sarıkurt

Senior Researcher

TÜBİTAK ULAKBİM, TRUBA

Network Technologies Department, Ankara 06800, TURKEY

TRUBA – Turkish Science e-Infrastructure

- TRUBA: National center providing high performance computing and data storage for all research institutions and researchers in Turkey.

TRUBA 2023

- ✓ Supporting Organization: Presidency of Turkey, Presidency of Strategy and Budget
- ✓ TRUBA Turkish Science e-Infrastructure

Resources

- ✓ 25.000 CPUs
- ✓ Performance of new generation GPUs (A100): 600 Tflops
- ✓ 216 GPUs (P100, V100, A100)
- ✓ 14 PB Lustre data storage space

Usage

- ✓ 13M CPU hours/month
- ✓ > 3500 registered researcher
- ✓ > 350 researcher using the system at the same time
- ✓ > 100 National Scientific Research Project support
- ✓ National Corporate collaborations : Disaster and Emergency Management Presidency, Ministry of Environment, Urbanisation and Climate Change, Kandilli Observatory, Turkish Aerospace Industries, TÜBİTAK SAGE, TUBITAK National Observatory, TÜBİTAK Marmara Research Center.

TRUBA – Turkish Science e-Infrastructure

TRUBA
Turkish Science e-Infrastructure

Our goals:

- To provide research infrastructure and support services that will enable our researchers to compete under equal terms with their international colleagues.

- To take one more step towards realizing the strategic goal of providing commercialized services that are difficult to obtain or costly under normal conditions, by using the existing infrastructure and knowledge of private/public/university researchers.

TRUBA Projects

TRUBA Resources

TRUBA Plans

EuroHPC JU & Project Calls

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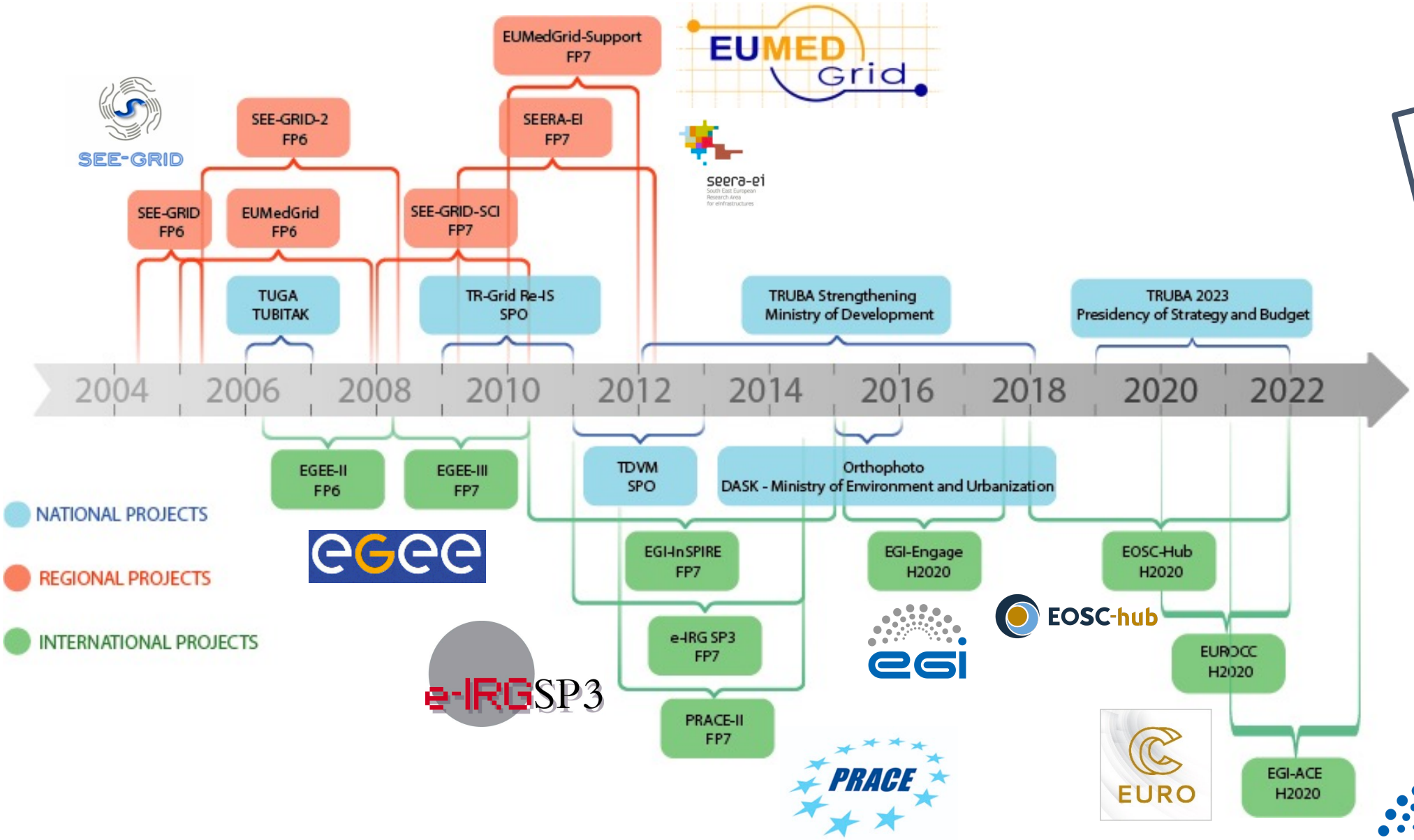
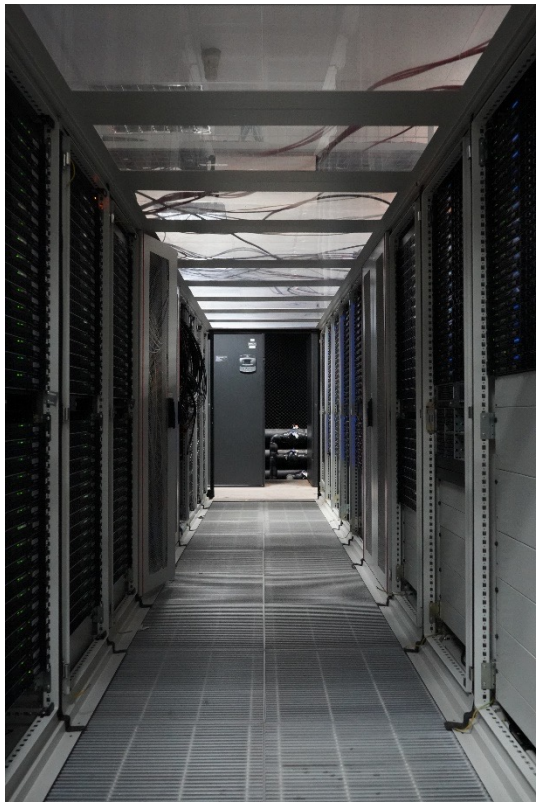
TRUBA - Projects

TRUBA
Turkish Science e-Infrastructure



- 6 National Project
- 15 EU Project
- 3 EU Formation Membership

TRUBA – EU Memberships



- **EGI – Advanced Computing for Research**
  - Membership since 2010
  - EGEE projects, EGI.eu projects
  - Data-intensive computing, cloud computing
- **EuroHPC Joint Undertaking (**EuroHPC JU**)**
  - Membership since 2019
  - One of the member countries for MareNostrum 5 pre-exascale supercomputer
  - EuroHPC projects
  - High performance computing, artificial intelligence, high performance data analysis
- **EOSC – European Open Science Cloud**
  - Membership since 2020
  - Integrity and protection of Research Data
  - Processing of research data
  - cloud computing

TRUBA
Turkish Science e-Infrastructure

TRUBA - Scientific Outputs

TÜBİTAK ULAKBİM

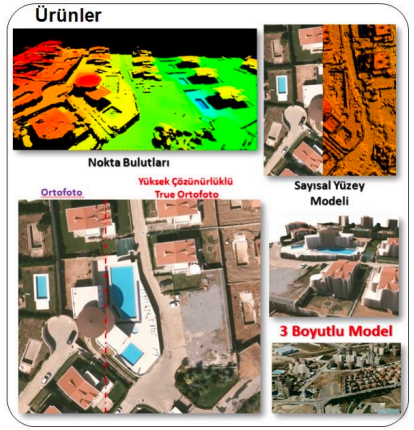
http://portal.truba.gov.tr

> 850
2012-2020

WEB OF SCIENCE

YÜKSEKÖĞRETİM KURULU BAŞKANLIĞI
Tez Merkezi

> 177
2012-2020



> 130
2012-2020

Acknowledgements in oral and poster presentations

Presidency of Turkey
Presidency of Strategy and Budget

Horizon 2020
European Union Funding
for Research & Innovation

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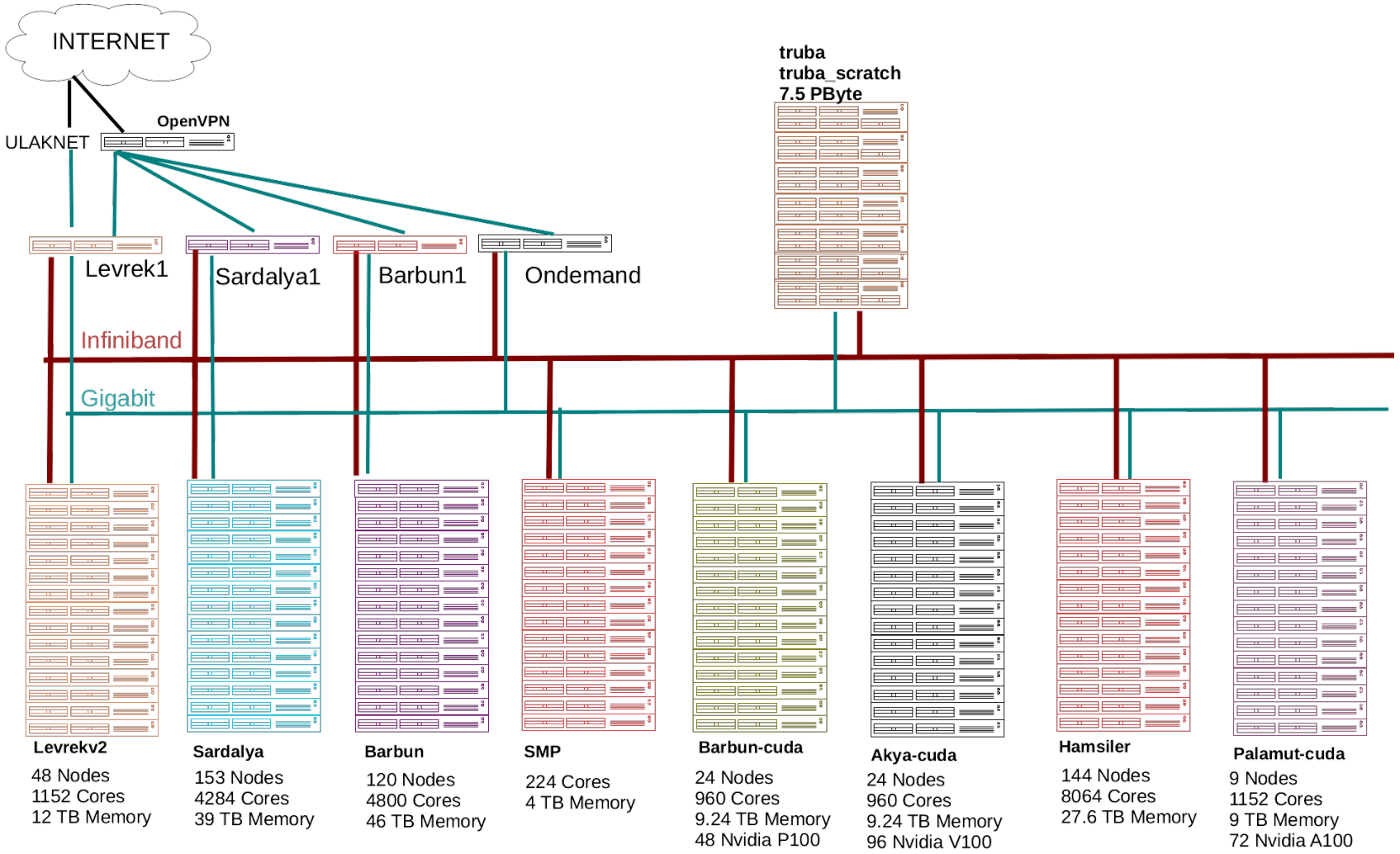
TRUBA – Architecture



TRUBA – CPU Resources

Calculation Nodes	Year	#Node	Architecture	Processor	Performance	RAM
Levrek	2013	128	8 cores x 2 CPU	Xeon E5-2690 2.90GHz	371.2	256 GB
Levrekv2	2014	48	12 cores x 2 CPU	Xeon E5-2680 v3 2.50GHz	960	256 GB
Orkinos	2016	1	14 cores x 16 CPU	Xeon E7-4850 v3 2.20GHz	7.9Tflops	4TB
Sardalya	2017	128	14 cores x 2 CPU	Xeon E5-2690 v3 2.60GHz	1164Gflops	256 GB
Barbun	2018	120	20 cores x 2 CPU	Xeon Scalable 6148 2.40GHz	2048Gflops	384 GB
Hamsi	2021	144	28 cores x 2 CPU	Xeon Gold 6258R 2.70GHz	4800Gflops	192GB

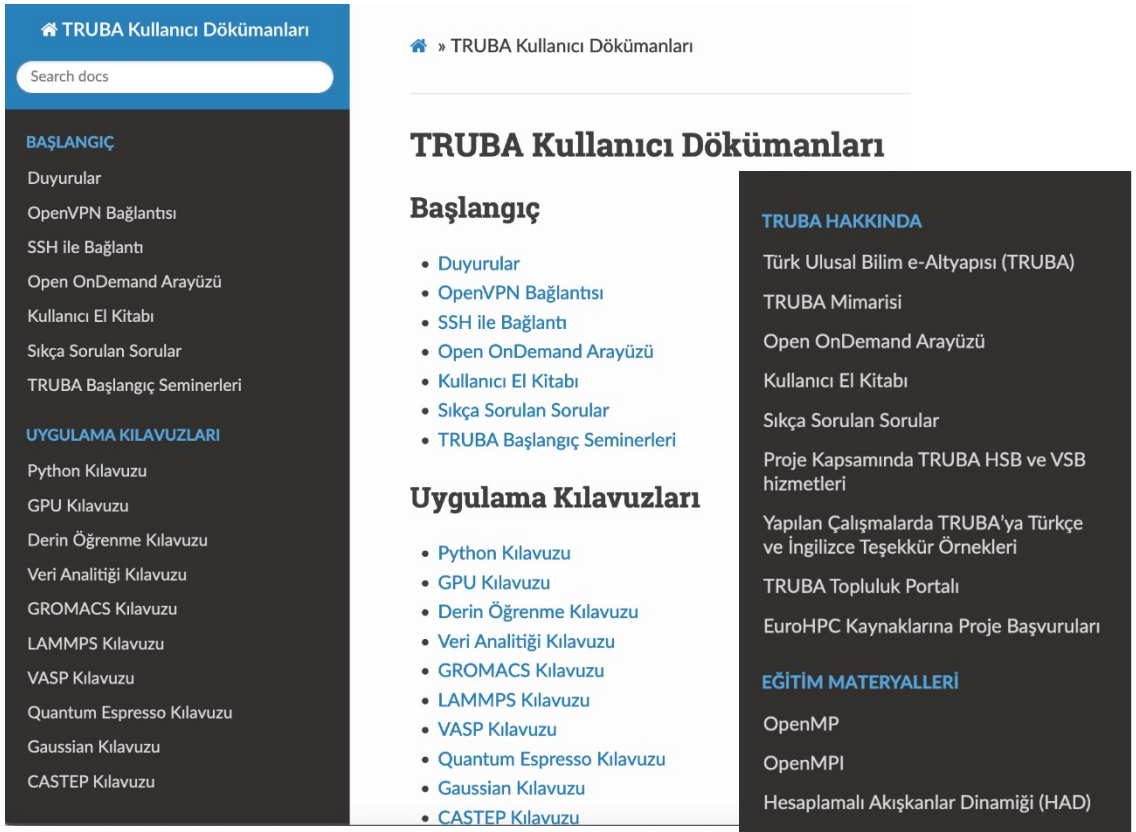
TRUBA – GPU Resources

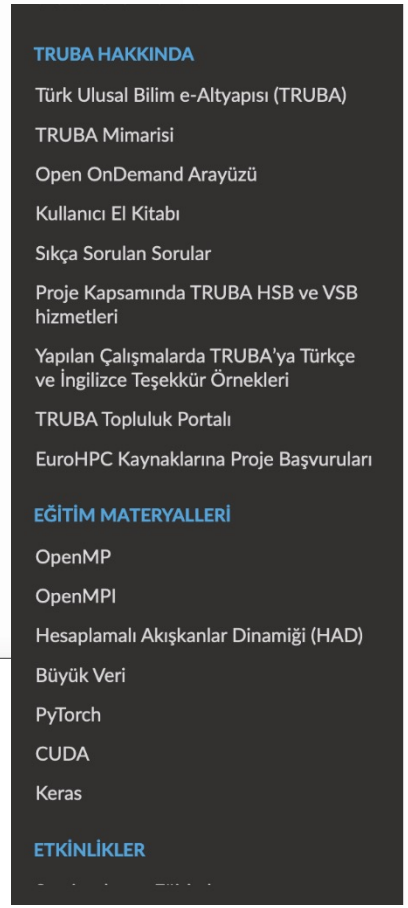
Calculation Nodes	Yıl	#Node	Mimari	İşlemci	Performans	Bellek	#GPU
Barbun-cuda	2018	24	20 cores x 2 CPU +2 x Nvidia P100 GPU	Xeon Scalable 6148 2.40GHz	2048Gflops +9400Gflops	384 GB + 2x16 GB HBM2	2
Akya-cuda	2018	24	20 cores x 2 CPU +4 x Nvidia V100 GPU	Xeon Scalable 6148 2.40GHz	2048Gflops + 4x7800Gflops	384 GB + 4x16 GB HBM	4
Palamut-cuda	2021	9	64 cores x 2 CPU + 8 x Nvidia A100 GPU	AMD EPYC 7742 2.24 GHz	4600 Gflops + 8x9600Gflops	192GB + 8x80GB HBM	8

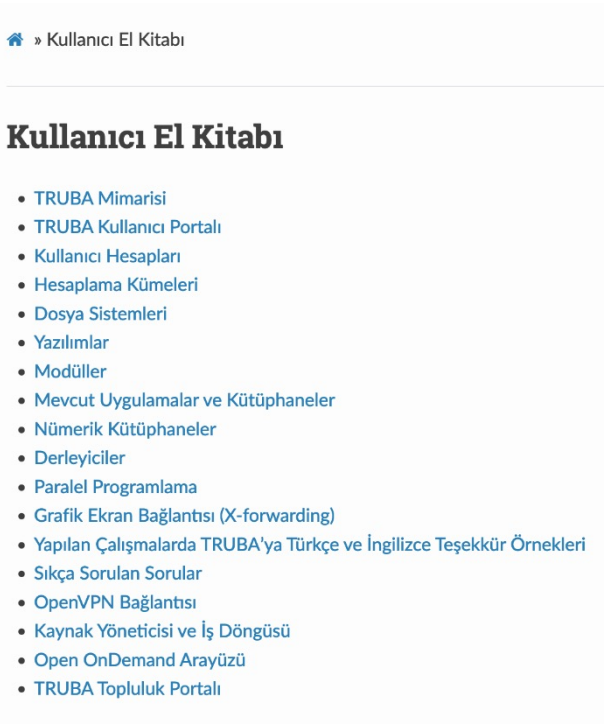
TRUBA – Storage Resources

Storage Area	Size	Purpose	Type
/truba	7.5 Pbyte	Home and application directories	Lustre
/truba_scratch		Working directory, data processing	Lustre
/tmp	450GB-1.5Tbyte	Working directory	Local

TRUBA – Documentation







http://docs.truba.gov.tr

TRUBA – Seminars

Turkish National e-Science e-Infrastructure (TRUBA) for Beginners

Hakan Bayındır (TUBITAK ULAKBIM)

https://indico.truba.gov.tr/event/12/

Turkish National e-Science e-Infrastructure (TRUBA) FAQs

Sefa Arslan (TUBITAK ULAKBIM)
https://indico.truba.gov.tr/event/11/

TRUBA Projects

TRUBA Resources

TRUBA Plans

EuroHPC JU & Project Calls

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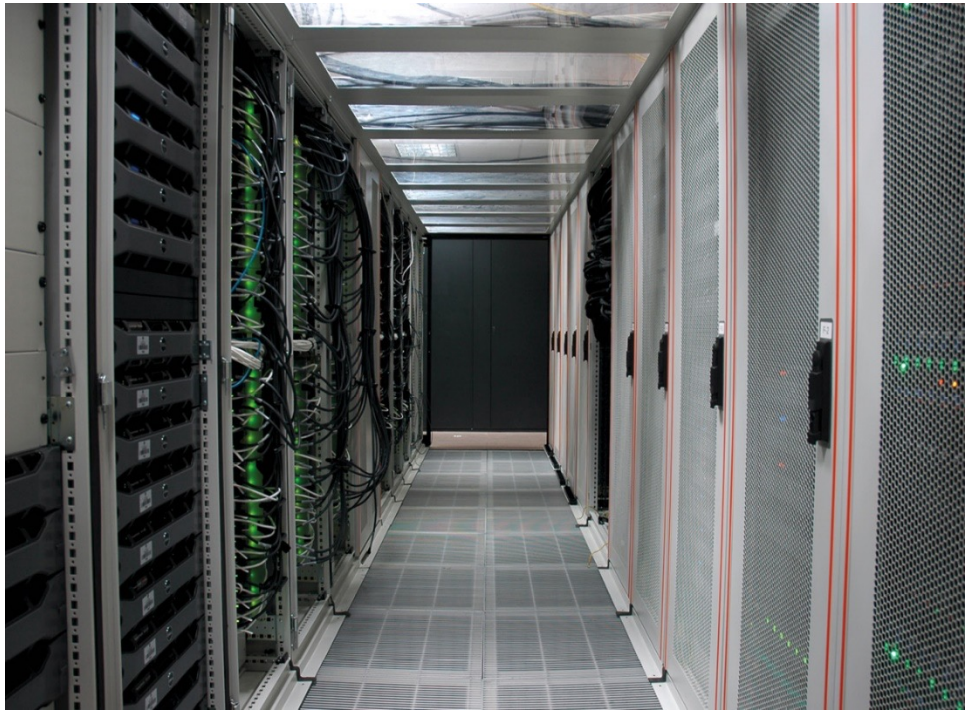
TRUBA – Improvements&Plans

- METU MODSIMMER Data Center construction,
- To expand the resources by following the technology,
- To support our researchers with experts in related research field,
- To put into service new tools that provide ease of use,
- To be involved in national and international projects and to support our research institutions.



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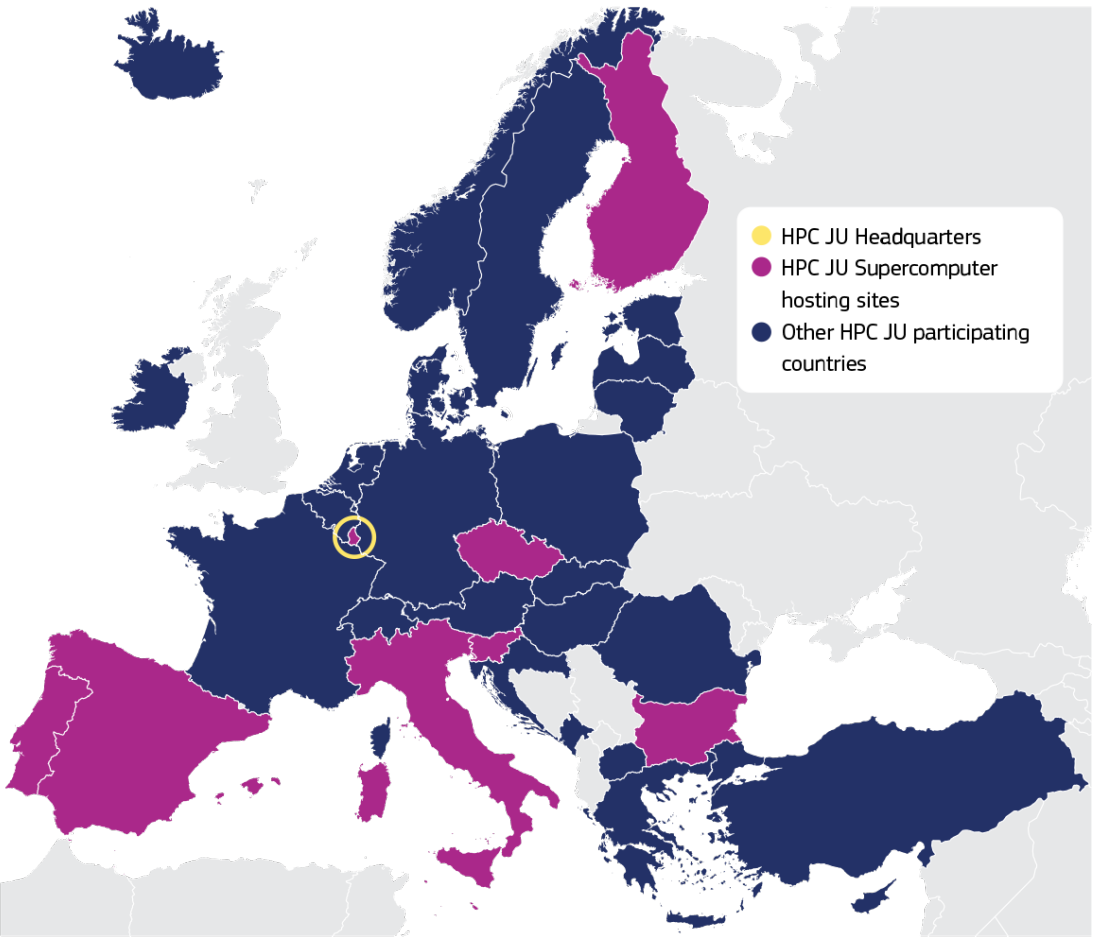
EuroHPC Joint Undertaking (EuroHPC JU)



https://eurohpc-ju.europa.eu/discover-eurohpc-ju

http://eurocc.truba.gov.tr

EuroHPC “Supercomputing" Ecosystem

- 3 x Pre-exascale: Spain, Finland, Italy
- 5 x Petascale : Bulgaria, Czech Republic, Luxembourg, Portuguese, Slovenia

Turkey & EuroHPC JU

- Ministry of Industry and Technology– TÜBİTAK ULAKBİM
- Pre-exascale - Mare Nostrum 5 (Barcelona Supercomputing Center) partnership

Hosting Consortium:

Spain Portugal Turkey Croatia

EuroCC – High Performance Computing National Competence Center

EuroCC

- Coordinator: Germany (HLRS)
- Consortium: 33 Countries
- Duration: 2 Years
- Budget: 57 M Euro (%50 EU Contribution)
- **TR Budget: 2 M Euro (%50 EU Contribution)**

EuroHPC JU 2019 CSA : EuroCC & CASTIEL

- To establish National Competence Centre (NCC)
- To ensure the participation of academia-public sector-industry to the supercomputing ecosystem
  - ✓ HPC (High-Performance Computing)
  - ✓ HPDA (High-Performance Data Analytics)
  - ✓ AI (Artificial Intelligence)

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National Competence Center

- To provide national coordination and communication in the field of HPC
- Providing analytics, applications and services for the end user
  - ✓ Access to resources
  - ✓ Consultancy
  - ✓ Education from academia to industry and the public sector

EuroCC@Turkey National Competence Center

EuroHPC Access Modes

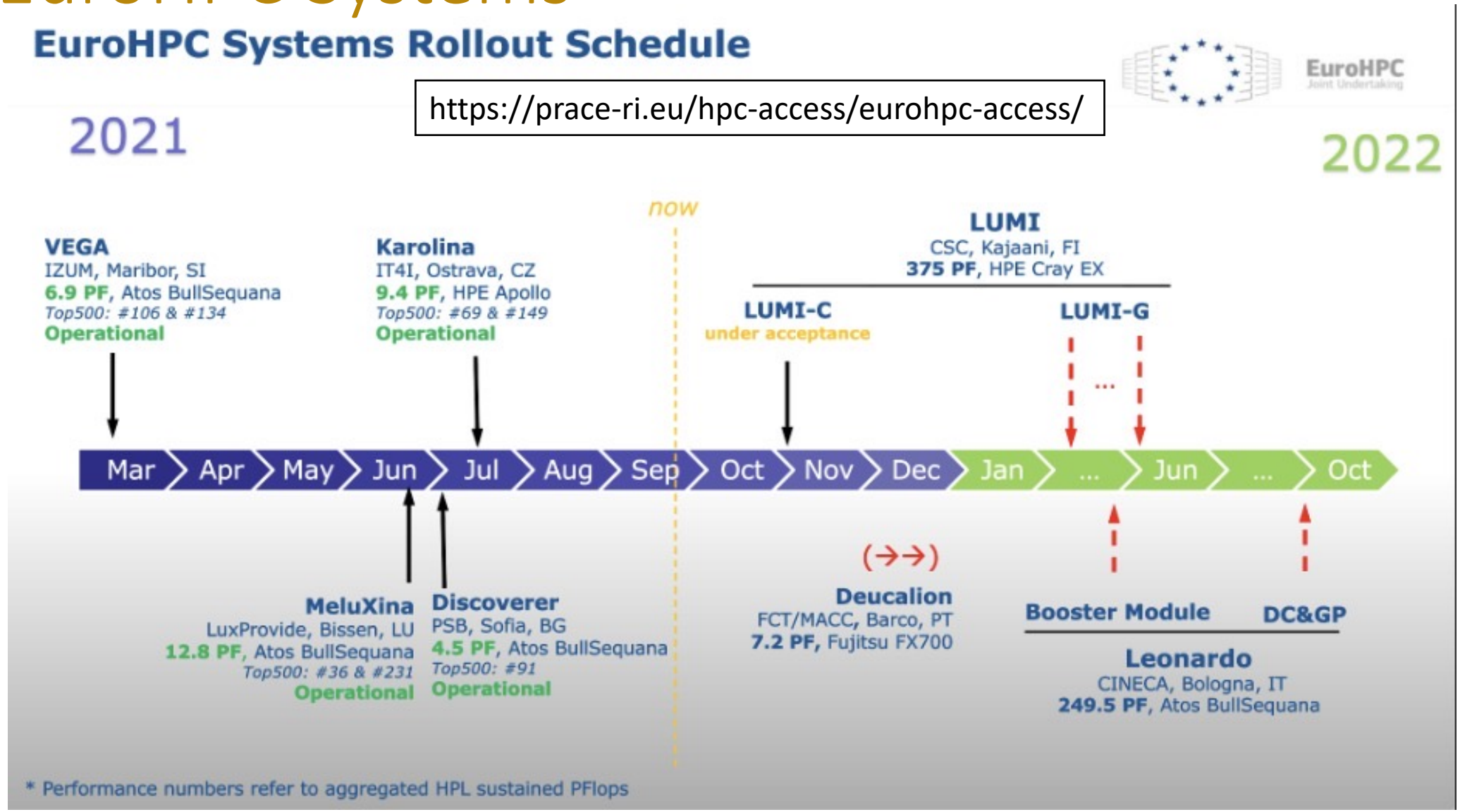
https://prace-ri.eu/hpc-access/eurohpc-access/

EuroHPC Calls

- Access to the super computing ecosystem established in Europe
- Target audience: academia, research institutes, industry, public
- Benchmark&Development Access Call
- Regular Access Mode

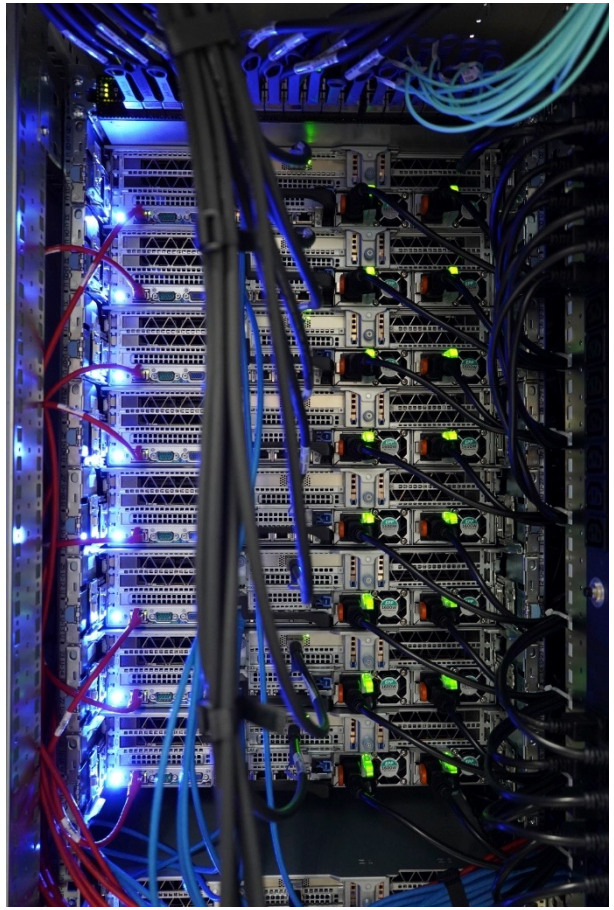
https://prace-ri.eu/hpc-access/eurohpc-access/eurohpc-ju-call-for-proposals-for-regular-access-mode/

EuroHPC Systems



EuroHPC System Report (September 2021)
https://eurohpc-ju.europa.eu/press-releases/eurohpc-ju-releases-report-its-supercomputers

Thank You!



User Support

grid-teknik@ulakbim.gov.tr

TRUBA HPC Center

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