Newsletter Focus

TERABIT, THE DATA HIGHWAY FOR ITALIAN RESEARCH

On 14 March 2023, a new project was launched in Italy: TeRABIT (Terabit Network for Research and Academic Big Data in ITaly). Supported by the EU funds of Italy's Recovery and Resilience plan, the project aims to build by 2025 a next-generation integrated computing and network infrastructure to improve collaboration and information exchange among Italian scientific communities. The project is managed by INFN, with OGS (Italian Institute of Oceanography and Experimental Geophysics), CINECA and GARR, the Italian National Research and Educatoin Network.

The project's goal is to build a high-performance integrated computing and network infrastructure and make it available to scientific communities across the country, eliminating disparities in access to high-performance computing and increasing opportunities for Italian researchers to collaborate and compete at the highest level in Europe and around the world, regardless of their geographical location. The infrastructure will be based on last-generation dedicated fibre optics, which will be highly reliable and connected to the entire national territory and the rest of the world, allowing data to be exchanged at terabit speeds (1,000 billion bits per second).

TeRABIT will integrate and enhance three large strategic research infrastructures: GARR-T, PRACE-Italy and HPC-BD-AI, offering by 2025 a cutting-edge digital infrastructure to all researchers on the national territory, in close collaboration with ICSC, the National Research Centre in High-Performance Computing, Big Data and Quantum Computing of Bologna.

In particular, TeRABIT will build in Sardinia an optical fibre extension of the island's research network and, for the first time, a double super-fast optical fibre connection made with submarine cables which will ensure not only rapid data transmission but also redundancy and reliability of the system, in favour of the entire scientific community of the island. The infrastructure created by TeRABIT will also be functional in supporting Italy's candidacy to host the Einstein Telescope (ET), the European project for a third-generation interferometer for the detection of gravitational waves. The area of the disused mine of Sos Enattos, in Sardinia, is the Italian candidate site for this ET: it has unique geological features, including very high levels of seismic silence that

make it especially suitable for hosting the interferometer. ET is expected to produce massive amounts of data, to be shared with a worldwide community: a high-performance network interconnection is therefore mandatory for success.

Further information

The three research infrastructures that TeRABIT will integrate and enhance are:

GARR-T is the technological evolution of the GARR network infrastructure, supporting the education and research community in Italy. The infrastructure will be upgraded with connections at capacities up to terabit per second, reaching geographic areas complementary to those already covered through other interventions, thus reducing the digital divide for the research community.

PRACE-Italy is a high-performance computing infrastructure (HPC) – Italian node of the European PRACE infrastructure – which will upgrade its Tier-1 category HPC system, developing a hybrid architecture and connecting it to the other Exascale centres of EuroHPC as CINECA supercomputer Leonardo, part of ICSC.

HPC-BD-AI is a computing infrastructure distributed across multiple sites across Italy and capable of managing high-performance computing resources, big data and artificial intelligence applications. It will create HPC systems of smaller size, which will be available to the community according to the paradigm of edge computing. The project is led by the INFN.