Computing Service

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1.   Summary

The Computing Service of LNF deals with the configuration and administration of data transmission network, of the IT infrastructure and of the computing resources of LNF and AC (Central Administration). Furthermore, it also plays a relevant role for INFN by managing several IT services, relevant at national level. In detail, the Computing Service manages:

- *The network infrastructure:* the structured cabling system, both copper and optic fiber, the Local Area Network equipment (Layer 2 and Layer 3 switches), the wireless network equipment, the Wide Area Network connections and access routers, the firewalls and the devices for the management of information security;
- *The following Storage infrastructure and Mass Storage resources:* Storage Area Network, Network Attached Storage, Distributed File System (Andrew File System), Tivoli Storage Manager to provide backup and archiving services through magnetic tape libraries;
- *Several virtualization system infrastructures:* a set of machine clusters based on Intel processor, used to manage several virtualization environments;
- *A set of infrastructure services for ensuring the functionalities of the network:* the Dynamic Host Configuration Protocol and the Domain Name System servers, security servers (Log and Audit recording, monitoring system), virtual servers for providing the national infrastructure of authentication and authorization, etc.;
- *A set of critical IT services:* the eMail system (i.e. email relays, inbox server, webmail, Antivirus and Antispam), Database Servers, web and streaming servers, log servers, printing servers, monitoring systems, etc.;
- *Various computing resources:* Windows domain, Linux virtual systems for general users access: bastion host, interactive login, specific applications execution, etc.;
- *The web hosting services for INFN, AC and LNF:* web servers and portals, database and application servers.
- *The Disaster Recovery of services and data relevant or critical for INFN:* the protection of the Institute's applications and business data;
- *IT Security:* a set of cybersecurity strategies that prevents unauthorized access to organizational assets such as computers, networks, and data, in compliance with current legislation and the General Data Protection Regulation.
- *Software development:* the design, implementation, and maintenance of software applications tailored to meet local and national needs of the organization.

Moreover, the Computing Service provides also support to:
- facilities and experiments which autonomously manage their computing resources and in particular to the IT infrastructure based on the computational grid of the ATLAS experiment and to the virtualization systems for DAΦNE control within the Accelerators Division;
- configuration and administration of workstations and personal computers used by employees, associates, graduate students, undergraduates, guests, LNF services and/or INFN experiments;

- the use of IT resources exported or shared and of distributed devices and peripherals.

2. Activities developed in 2024

During 2024, the Computing Service updated and maintained the network, storage and virtualization infrastructures, as well as basic services and scientific and business IT resources, both with local and national value.

The Service also continued an update process of the Storage Area Network and of the storage and archiving system, increasing the storage capacity both on disk and on tape.

The Computing Service has also defined and developed the object storage infrastructure capable to provide different methods of access to storage via network (block access, distributed filesystem, compatible S3 object store, etc.). The object storage has been used as a buffer for data recovery of the KLOE experiment.

It has also developed a PaaS cloud infrastructure to support the execution and orchestration of container based workloads, creating various test and production environments for the use of several LNF facilities, including the control service of experimental equipment and particle accelerator machines.

Furthermore, during 2024, the Computing Service was involved in the development of some important software applications useful to all INFN users. Notable software developments include:
- A workplace safety management application to handle job assignment cards and radioprotection cards.
- A system for booking institutional resources requiring approval workflows (technical note INFN-24-01 LNF 4/3/2024).

Finally, the Computing Service continues to collaborate in the maintenance of a Business Continuity and Disaster Recovery system for national IT services and for the ERP solution of the INFN.