Computing Service

S. Angius (Tec.), C. Bisegni (Art. 15), D. Maselli (Tec.), R. Orru' (Ass. Ric.),
M. Pistoni (Resp.), C. Soprano (Tec.), D. Spigone (Art. 15), T. Tonto (Tec.)

In collaboration with LNF-DA:
R. Gargana (Art. 23), M. Tota (Ass. Ric.)

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, even if they are centralized at LNF. 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 devices for the management of information security;
- *The following Storage infrastructures 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 the magnetic tape libraries;
- *A virtualization system infrastructure:* a set of machines based on Intel processor, used to manage several virtualization environments leveraging open source software technologies (Linux O-Virt);
- *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 and virtualized IT services:* the Mail system (ie mail relays, inbox server, webmail, Antivirus and Antispam), the Database Servers (Oracle and MySQL), the web and streaming servers, the printing servers, etc .;
- *The scientific computing resources:* computing farms of some experiments, the Windows domain, Linux virtual systems for general users access;
- *Computing management resources for ERP (Enterprise Resource Planning):* the Information System for staff management and payroll, for documents and protocol administration;
- *The web hosting services for INFN, AC and LNF:* web servers and portals, database and application servers.

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 2015

During 2015, The Computing Service has updated the local area network switches, due to the old age and obsolescence of the models installed and operational until few years before. In particular, within the machine room, a network infrastructure based on a 10Gb/s Ethernet protocol was implemented and is used to support the growing data flows coming from the experiments and from the Grid infrastructure. The 10Gb/s ethernet network is currently extended to the slow control room of the particle accelerator. Also the geographical link to the general Internet has been updated to a 10Gb/s bandwidth.

The Computing Service has updated the Storage Area Network, by removing an old Storage System and implementing a new system mainly devoted to the AFS server volumes, but also to provide storage space to the new virtualized services that will be implemented in the future.

The Computing Service has also contributed to the development of the !Chaos project (aimed to the realization of a prototype of Control as a Service open platform, suited for a large number of applications in science, industry and society); and more in detail both to Work Package 2, for the development of the software and of the common framework, and to Work Package 5, for the implementation of a cloud infrastructure aimed to deploy IT resources based on IaaS (Infrastructure as a Service) and PaaS (Platform as a Service) models.

In 2015, driven by the needs of the !Chaos project, the Computing Service has started to plan the study and implementation of an IT Cloud infrastructure for the supply of generic services delivered on demand to all users. The Service then began research and development activities, named RMLAB, for the creation of a Cloud based test environment on a metropolitan area, in collaboration with the INFN site of Roma2 and Roma3, with the goal to reach requirements of stability, high reliability, high availability and scalability, using the open source OpenStack platform.