

Verso il 2030

Introduzione

- La nostra missione è “gestire, utilizzare e sviluppare quelle tecnologie informatiche che sono essenziali per le attività dell’ente di ricerca, e a perseguire la ricerca e lo sviluppo nel campo ICT nel contesto degli obiettivi dell’INFN.”
 - Calcolo scientifico (gestione risorse per esperimenti/collaborazioni in ambito CSN, EPIC, progetti esterni) compreso supporto utenti sviluppo mw/sw,...;
 - Calcolo amministrativo/gestionale (servizi ICT, gestionali, gestione licenze,...);
 - Attività innovative di R&D (funzionale all’INFN);
 - Attività di trasferimento tecnologico.
- Siamo stati all’altezza del nostro compito?
 - Migrazione al Tecnopolo ☺
 - «Ordinaria» amministrazione ☺
 - Progetti PNRR ☺

Weaknesses of CNAF (1/2)

- Quite challenging to keep up with all the activities
 - Some of our permanent staff members are on leave
 - Uncertainty remains regarding the number of temporary staff who will transition to permanent positions
- Difficult to allocate resources for R&D activities
 - A clear indicator is that our publications are almost exclusively proceedings
- During my first term, I initiated a streamlining to eliminate duplication and strengthen all the groups
 - The Network group still lacks sufficient manpower to go beyond normal activities
 - Hiring someone with the required skills and interests is not easy
 - Temporary staff moved to the Storage group to balance the leaves
 - However, the loss of expertise must still be compensated for
 - The activity on the ISO27001 certified cloud is still not fully integrated in the operational flow
 - All other teams have minimal redundancy (often relying on temporary staff)

Weaknesses of CNAF (2/2)

- Technological transfer not very effective
 - Very few projects in the last years
- The Datacloud project introduces additional issues that need to be addressed
 - Some activities are not clearly represented in the current organization chart
 - A proposal for reorganizing the groups to address these issues has been prepared
- The ICSC initiative introduces further uncertainties
 - The support model for other communities still to be clearly defined

Scopo dell'incontro

- Definire una linea di lavoro per i prossimi anni
 - Ingresso nuovo personale (3+6)
 - Perdita di personale TD
 - Interazione con ICSC (surplus personale verso ICSC?)
- Reinterpretare la nostra missione?
 - Es. ottimizzare le nostre attività
 - Investire in R&D su tecnologie »innovative« (es. AI)
- Primo incontro di una serie per ridefinire la mission

Personnel: risks

- The current staff is just sufficient to handle all the activities we are engaged in
 - E.g., we do not have dedicated personnel for ancillary activities such as resource tender management
- If the number of personnel decreases, a possible solution could be to establish a close collaboration with ICSC (yet to be defined), not only to support non-INFN communities but also to assist with some of our core business activities
 - E.g., development of middleware (IAM and other components), management of some services for the data lake
- We also will continue to fill "empty" positions with temporary personnel: agreement with ITS (currently a fellowship for a person in network group), with University of Bologna (1 PhD student and possibly 2 more joining next year)
 - Obviously, this is not without cost: in addition to our commitment to teaching, these individuals have completed part of their training with us, either through internships or graduation projects
- Another source of temporary personnel are external projects
 - The strategy is discussed within C3SN (INFN computing coordination committee): this helps prevent the proliferation of projects that CNAF was involved in in the past
 - We are currently involved in two EU projects related to AAI and in one for Cultural Heritage

Personnel: not only scientific computing

- At CNAF there are other two groups of people not involved in scientific computing
- "Servizi Nazionali" – they manage INFN-wide ICT services (e.g., web, mail etc...)
 - Activity controlled by "Commissione Calcolo e Reti"
- "Sistema Informativo" – they provide support for the digital services related to all administrative and accounting processes at INFN
 - The group at CNAF operates under the functional authority of the INFN Central Administration
- The services provided by both groups operate on a separate infrastructure
- These 2 groups account for ~10 people
- Limited sharing of know-how among these groups and the rest of CNAF

Strengths and opportunities of CNAF (1/3)

- The Datacloud project and the ICSC initiative are also great opportunities!
- CNAF will be the pillar of the INFN data lake and one of the key actors in the ICSC framework
 - Tecnapolo is the INFN data center with the highest potential for growth, both in terms of space (2000 m²) and power (up to 10 MW)
 - The proximity to CINECA facilitates the development of a shared infrastructure
 - CNAF has the know-how for giving a fundamental contribution to development and management of the central services
- The know-how and expertise acquired in more than two decades of developing and managing our computing infrastructure
 - Set-up and operations of the INFN Tier1 coping with the requirements of more than 60 collaborations
 - Including EPIC Cloud, the ISO 27001 certified cloud infrastructure to manage sensitive data for biomedical/genomic projects
 - Important contributions in the field of distributed computing (Grid and Cloud)
 - Authorization: **VOMS** (Grid era), **Indigo-IAM** more recently
 - Data Management: **StoRM** suite (GEMSS, Storm-webdav, Storm-RestAPI)
 - Participation (often with leadership roles) in key EU initiatives and projects (several in the last decade and, recently, the NRRP ones)

Strengths and opportunities of CNAF (2/3)

- As part of WLCG, we have collaboration with other sites (CERN, IN2P3-CC,...)
 - We have also a collaboration agreement with ITER to share our know-how on Data Management
- One of CNAF's key strengths is the User Support team, which serves as a bridge between CNAF and the experiments
 - They enable the optimal utilization of CNAF
 - Their support goes beyond merely providing instructions for tasks; they engage with experiments to determine the best-fitting solutions
 - To extend this activity across the entire Datacloud, contributions from other sites are mandatory
 - Additionally, to expand beyond INFN, a commitment from ICSC will be required
- We also take part in a few INFN experiment, which also helps strengthen our relationships with our colleagues

Strengths and opportunities of CNAF (3/3)

- The people
 - We come from diverse backgrounds, encompassing several fields of STEM
 - A wide range of expertise is an enrichment for CNAF: it allows us to approach challenges from multiple perspectives
 - ~1/3 are fixed term, young researchers: very motivated and well-prepared
 - The younger team members bring skills that are not commonly found among the permanent staff
- Close relationships with the university to attract young researchers
 - Several members of CNAF teach in master's and PhD courses
 - We offer fellowships for summer students, graduates and PhD students

Strategic role and the mission of CNAF in the years ahead (1/3)

- With the migration at Tecnopolo, CNAF is able to consolidate its strategic role for INFN computing
- The main priority is now building the national data lake according to the Datacloud project (this also in the framework of ICSC initiative)
 - CNAF will most likely bear the largest burden in managing the infrastructure
 - CNAF will also contribute to provide the services (e.g., data replication and self-healing, batch clusters on demand, Jupyter notebooks, ...) on top of the infrastructure
- In addition to managing the infrastructure, CNAF (along with the US team) should assist new experiments in developing computing models that can effectively utilize its services

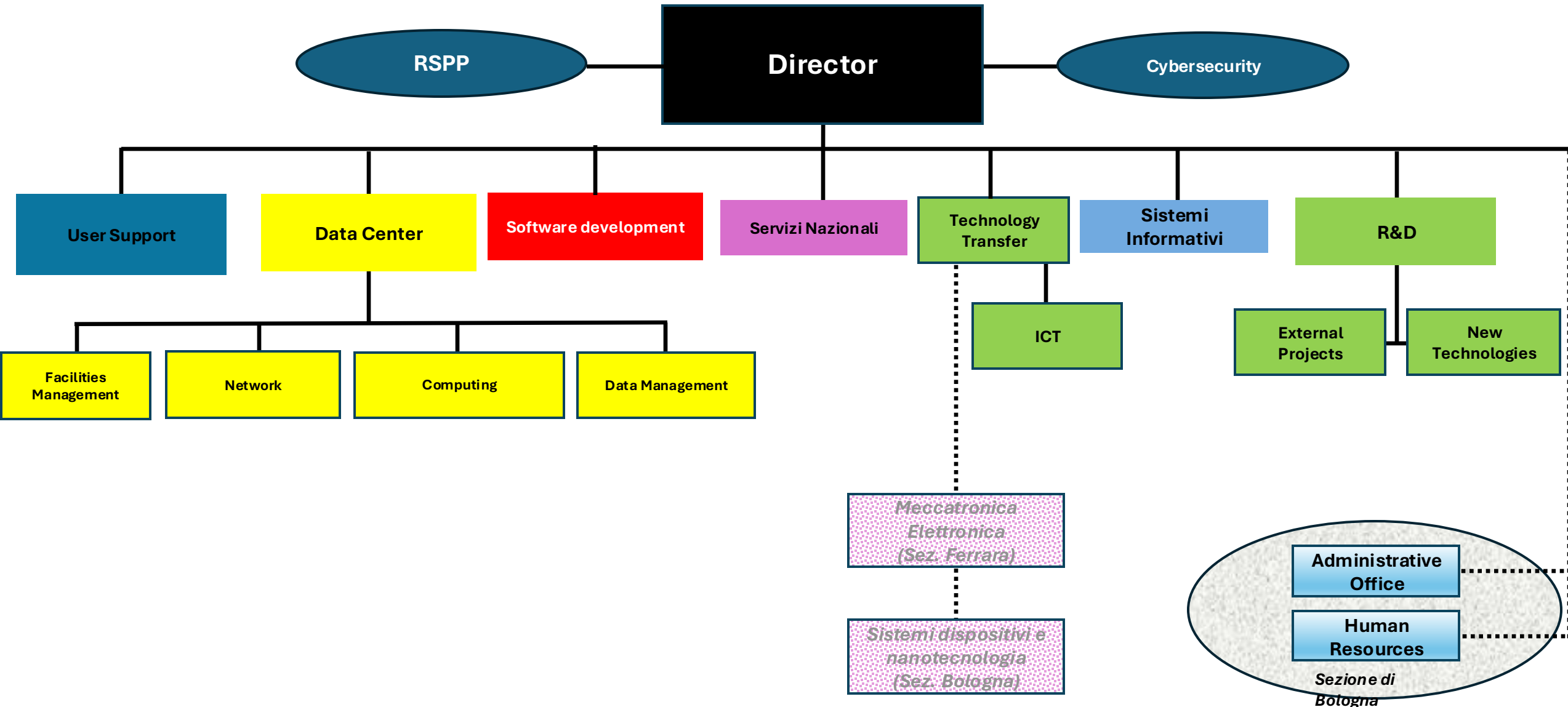
Strategic role and the mission of CNAF in the years ahead (2/3)

- Another fundamental aspect to consider is R&D, which is essential for getting and maintaining a competitive advantage in developing new computing technologies
- In recent years, R&D has been primarily associated with middleware and infrastructure development
 - Emerging (or already established) technologies such as AI and QC should be included in our work program
 - We have a few activities related to AI, and some of our younger colleagues possess expertise in this area
 - An important application would be the study of AI techniques for predictive maintenance applied to data center services
 - We participate in BOQA (Bologna Quantum Alliance) as observers
 - Other technologies to be investigated are related to data privacy, particularly for applications in genomics
 - Homomorphic computing, SDN could facilitate the creation of a general-purpose cloud capable of processing sensitive data

Strategic role and the mission of CNAF in the years ahead (3/3)

- A different organizational structure is more effective for achieving these goals
 - The new organization chart will reflect the structure of the Datacloud project, i.e., incorporating the Datacloud WPs structure into the operational teams of CNAF
 - The User Support will be enhanced to serve as a general front-end service for CNAF and Datacloud (though this will require a strong support from outside CNAF)
 - With a full integration of EPIC activities into the data center operations
- In the new organization, I aim to reestablish a (small) R&D group tasked with scouting and managing external projects, consolidating R&D efforts, and disseminating the results
 - R&D will be a cross-functional activity involving various teams at CNAF, in collaboration with other groups within Datacloud, and potentially ICSC
 - This would become very challenging if the current personnel are not retained or if the collaboration with ICSC proves ineffective
- The approach to technological transfer needs to be reevaluated

New organizational chart (proposal)



Personnel distribution

New organizational chart (proposal)					
Unit	Permanent staff	Temporary staff	Fellowships	On leave	Total
Direction	1				1
Tier1	15	6	2	2	21
User Support	1	2			3
R&D	5	2	2	2	7
Software Development	2	4	1		7
Technology Transfer	1				1
SSNN	4	1			5
Sistemi Informativi	6	1		1	6
Cybersecurity	1		1		2
RSPP	1				1
Other	2	1	1		4
TOTAL	39	17	7	5	58