CNAF

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INFN computing and CNAF

- INFN computing infrastructure is distributed among several sites
  - CNAF, which hosts the INFN Tier1 for WLCG is the main one
- The Tier1 accounts for nearly half of total computing and storage resources dedicated to INFN experiments (> 40)
  - Farm power: 420 kHS06 (~42 kcores)
    - ~600 kHS06 Q1 2022
  - ~56 PB of disk, ~100 PB of tape (2 libraries)
  - Standard services offered to all collaborations
    - Computing farm, on-line storage, long term archive (HSM), cloud
    - Also small HPC farm available
  - Current CNAF staff: ~60 collaborators (9 technicians, 30 technologists, ~20 fixed term)
- Huge increase of resources foreseen in the coming years
  - By 2025:
    - 1-1.2 MHS06 (~100k cores) for the HTC farm/cloud
    - 100 PB of disk
    - 220 PB of tapes
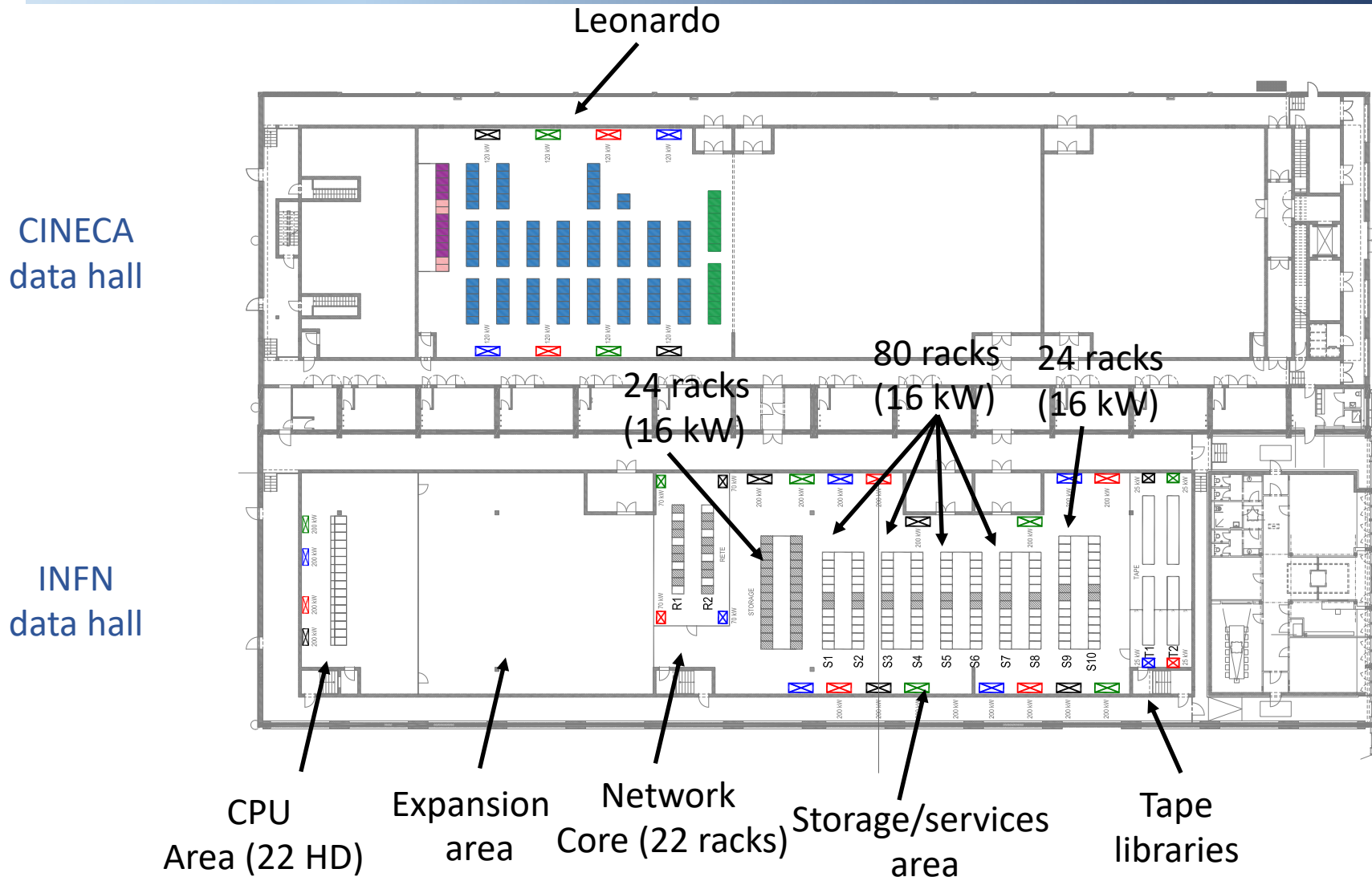 - And even more (up to x2-3) from 2027 (HL-LHC)

INFN and CINECA joint initiative for Tecnopolo

- Present CNAF site could host computing resources up to end of LHC Run3
  - Max 1.4 MW of power and cooling capacity
  - Refurbish of cooling plant would be needed
- In 2019 ER Region decided to promote a new district, the Tecnopolo, devoted to research, innovation and technological development
  - Former "Manifattura Tabacchi"
- 3 halls (B1-B3) assigned to ECMWF
  - Renovation completed
- C2 assigned to CINECA to host Leonardo pre-exascale machine (2022)
- Tier1 will be migrated to the adjacent hall B5 (2023)
  - More than 2000 m² of data hall
  - Up to 10 MW of power and cooling capacity
    - 3 MW until 2025
  - Space for 180 + 80 racks and 4 libraries
- INFN and CINECA data centers will share technological infrastructure (power and cooling)
- Possible use of Leonardo as pledges for INFN experiments
  - A direct network interconnection between the two data centers

The layout of the data halls

Leonardo

CINECA data hall

INFN data hall

24 racks (16 kW)

80 racks (16 kW)

24 racks (16 kW)

CPU Area (22 HD)

Expansion area

Network Core (22 racks)

Storage/services area

Tape libraries

INFN requirements

2025:
- CPU (~1.2 MHS06) – part of pledges from Leonardo + up to ~20 racks
- Disk (~100-120 net PB) – from 12 to 40 racks depending on the storage model
- Tape – space to install up to 4 libraries
- Services – 24 racks

Storage area with 16 kW racks
2 options for racks in CPU area:
- 40 kW racks (with cooling plenum)
- Racks with DLC (80-90 kW) in Phase 2

B5 status (September 2021)