

Big Science Business Forum 2022



| The European Synchrotron

IT needs 2023-2027

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ESRF IT MEDIUM TERM PLAN

- The Extremely Brilliant Source: a game changer for the IT activity and IT infrastructure
- The EBS leads to larger demand for storage and computing power
- Increase driven by higher resolution detectors, larger frame rates (time resolved experiment) and reduced scan duration
- Additional budget constraints with increase of inflation and war in Ukrainia

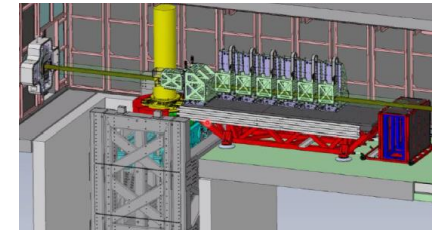
ESRF Medium Term Plan estimates		2021	2022	2023	2024	2025
CPU	Estimates (Nb of cores)	4 000	5 500	7 000	8 500	10 000
	<i>Available</i>	<i>5 200</i>	<i>5 600</i>	-	-	-
GPU	Estimates (Nb of GPU)	66	125	180	240	400
	<i>Available</i>	<i>80</i>	<i>100</i>	-	-	-
DISK STORAGE	Estimates (Po)	15	20	25	30	35
	<i>Available</i>	<i>15</i>	<i>15</i>	-	-	-
TAPES	Estimates (Po)	80	140	220	320	440
	<i>Available</i>	<i>340</i>	<i>450</i>	-	-	-



- Library tape system replaced in 2022 and adequately sized for the years to come
- Disk storage capacity : must be on premises → ESRF investment priority
- Carbon Footprint as evaluation criteria of the CFTs

EXAMPLES : BM18 AND CM02 NEEDS OF IT INFRASTRUCTURE

BM18	2022	2023	Basis
Maximum data daily production	25 TB	150 TB	
Routine data daily prod.	10 TB	25 TB	
Yearly raw data production	2 PB	5 PB	200 days at routine rate
Yearly reconstructed data	2 PB	5 PB	Considered same as raw data production
Disk storage capacity required	2.7 PB	6.7 PB	90 days storage



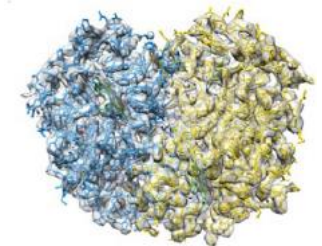
BM18	2022	2023
CPU	256	1000
GPU	16	36



CM01/02	2022	2023
Yearly data production	1 PB	2 PB
Disk storage capacity req.	1 PB	2 PB
CPU	300	600
GPU	20	40



TFS Titan Krios G4



Major sets of Equipment – Technologie

- **Data acquisition**
 - In the range of 10 MB/s to 2.5 GB/s per Beam Line (44 BL) – from sub-second to several hours
 - On-line **data analyses** and Data compression
 - HDF5 file format
- **Data storage**
 - 20 PB available – 3GB/s
 - GPFS file system
 - **Need to address performance needs in the order 5 – 10 GB/s (2023)**
 - Call for Tender
- **Computing**
 - CPU (5.5K Cores), GPU (100)
 - Intel, AMD, Nvidia
 - Call for Tender -> Frame contract
- **Archiving**
 - 2 Libraries up to 11K tapes / Library
 - Tape system, LTO8 / LTO9
 - 10 y. storage
 - Software: CFT ongoing
- **Network**
 - Optical fibers 30 000 km, 36 000 end connections
 - Switches 400Gb/100Gb/40Gb/25Gb, 500 u./35000 ports.
 - Cisco, Extreme Network
 - Ethernet
 - High availability
 - Call for Tender -> Frame contract



BSBF – LONG TERM PLANNING (2026 - 2029) - NEW DATA CENTER

1 MW

Tiers III

PUE 1.2

