CMS - 2025 Resource Estimation (1st iteration)

Our working assumption on extra resource:

- An additional 50 /fb compared to the approved 2025 resource request, considering part of the 2025 RUN occurred in 2024.
  - Affects both collision data and MC
- A slightly higher pile-up results in a modest increase in the HLT rate,
  - from 7.5 kHz to 8 kHz (+0.5 kHz).
  - Request for tape (+0.5 kHz) and Tier-0 disk (+5%)
- We prioritize addressing the Tier-0/1 tape requests for and CERN disk. CPU and Tier-1/2 disk are expected to be manageable.

Parameter	Approved 2024	Updated 2024	Preliminary 2025	Final 2025
LHC				
LHC Energy pp [TeV]	13.6			
Average (Peak) pileup	62 (65)			
Integrated luminosity / year [fb^{-1}]	110		120	
Livetime pp / year [$s/10^6$]	5.2		6.3	
Livetime HI / year [$s/10^6$]	1.7		1.7	1.4
Heavy Ion run type	Pb-Pb		Pb-Pb	Pb-Pb, O-O, Pb-O
CMS-Specific				
Prompt HLT Rate [kHz]	2.6			
Parked HLT Rate [kHz]	3.0	4.9	3.5	4.9
HLT Scouting Rate [kHz]	30		35	30
L1 Scouting Rate [kHz]	-	1.1	1.1	
Run 3 MC events / year in billions	53		57	
Phase-2 MC events / year in billions	0.5			

2025 Running Conditions for Computing

Estimates including contingency

- ATLAS/CMS luminosity: < 150/fb
- ATLAS/CMS average pile-up: 65 (peak PU 67)
- LHCb luminosity: < 15/fb
- ALICE luminosity (pp): < 100/pb
- Running time pp: < 6.5 x 10^6 seconds
- Running time ions: < 1.2 x 10^6 seconds

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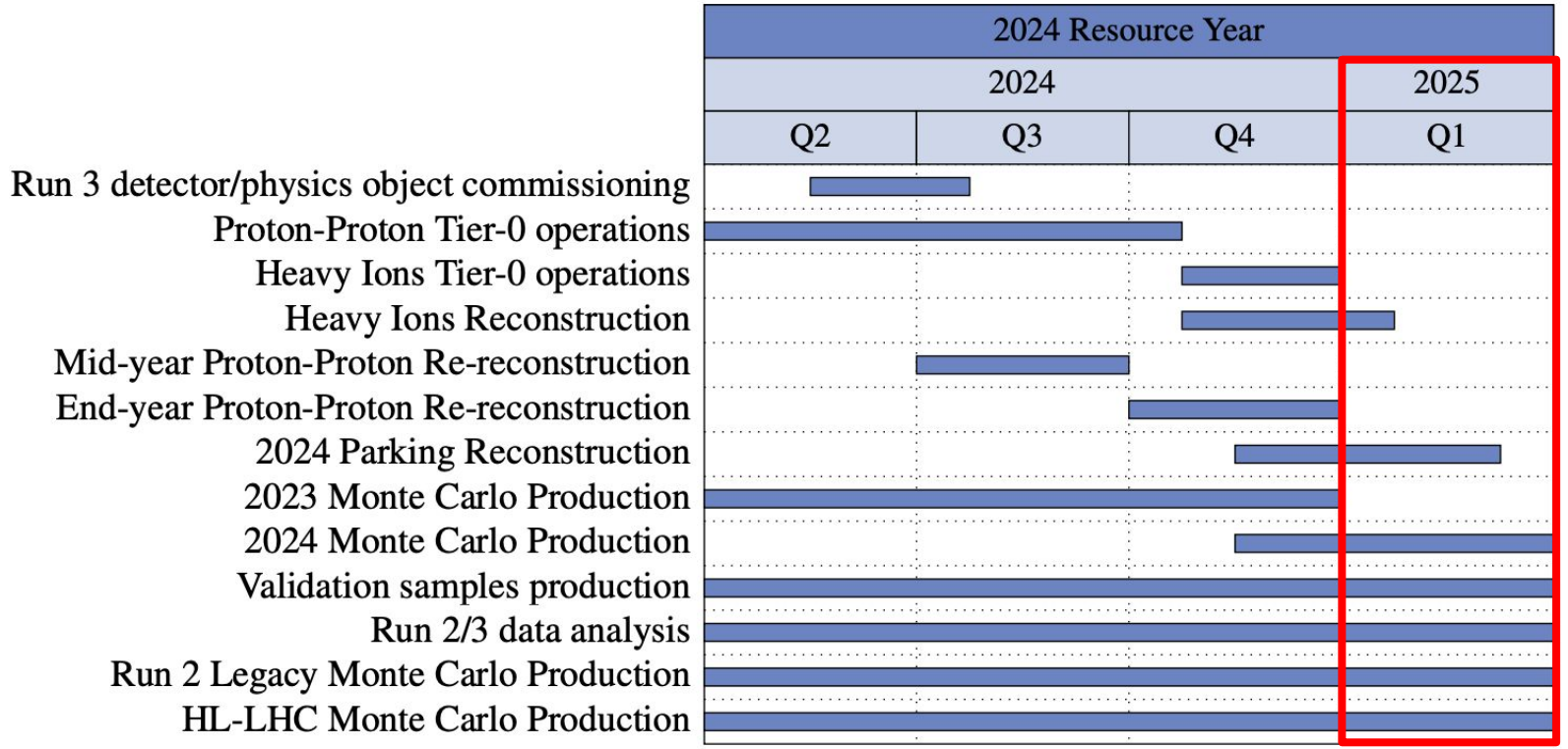
- **Current tape utilization**
  - Tier-0:
    - Total 320 PB
    - Used 287 PB
    - **Available 44 PB**
  - Tier-1 (exclude JINR):
    - Total 318 PB
    - Used 292 PB
    - **Available 26 PB**
  - 2024 MC is ongoing
  - In addition to the plan, we have Data ReReco
  - With all activities, we may run out of tape for 2024 at the end of Q1 2025



- **Current 2025 resource**

2025 Request	Request (PB)	Pledged (PB)
Tier-0 tape (disk)	422 (70)	442 (70)
Tier-1 include JINR	455	411 (90%)

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- Additional resource (Data)
  - Tier-0 (prompt+park): +25 PB
  - Tier-1 (prompt): +9 PB

- Additional resource (MC): +12 PB (Tier-1)

- Conclusion:
  - **Tier-0-Tape**: We request an **additional 25 PB** of Tape.
  - **Tier-0-Disk**: We request **additional 4 PB** to install for Tier-0 operation
  - **Tier-1 Tape**: **Addition of 9 PB** (+deficit)
  - CMS will be grateful for CERN's support of an **additional 12 PB Tape at Tier-0** exceptionally dedicated to Monte Carlo storage in the case that the current deficit of Tier-1 tape storage pledges continues through 2025.

- In addition, CMS is considering tape cleaning campaign which can free up tape on both Tier-0 and Tier-1.