Milestones for the LCG Service Challenges next 18 months

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Data Rates

- **Nominal data rate between CERN and all Tier-1s**
  ➔ the long term sustained average data rate
  - *Raw data + ESD*
  - ***to be verified after digesting the mass of computing nodel data***
  - **Mbytes/sec – network and magnetic tape**

	ALICE	*ATLAS*	*CMS*	*LHCb*	*Total*
CERN	120-600	750	700	100	**1.7-2.2 GBytes/sec**
Av.Tier-1	20-100	75	100	60	**260-340 Mbytes/sec**

- **To achieve this –**
  -- we must be able to run for long periods at *at least twice this rate*
  -- with the network sustaining 2-4 times this rate

2005 Q1 - SC2

SC2 - Robust Data Transfer Challenge

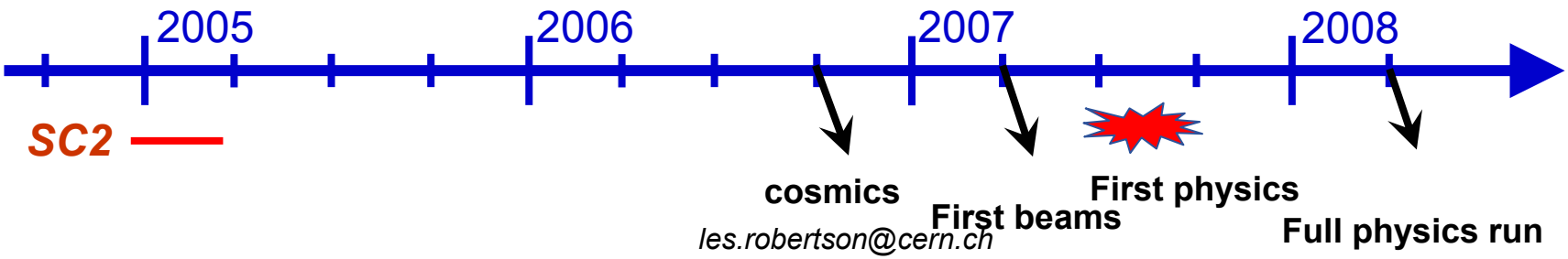
Set up infrastructure for 6 sites

- Fermi, NIKHEF/SARA, GridKa, RAL, CNAF, CCIN2P3

Test sites individually
– at least two at 500 MByte/s with CERN

Agree on sustained data rates for each participating centre
Goal – by end March sustained 500 Mbytes/s aggregate at CERN

In parallel - serve the ATLAS "Tier0 tests"



2005 Q1 - SC3 preparation

Prepare for the next service challenge (SC3)
-- in parallel with SC2 (reliable file transfer)

Build up 1 GByte/s *challenge* facility at CERN

- The current 500 MByte/s facility used for SC2 will become the ***testbed*** from April onwards (10 ftp servers, 10 disk servers, network equipment)

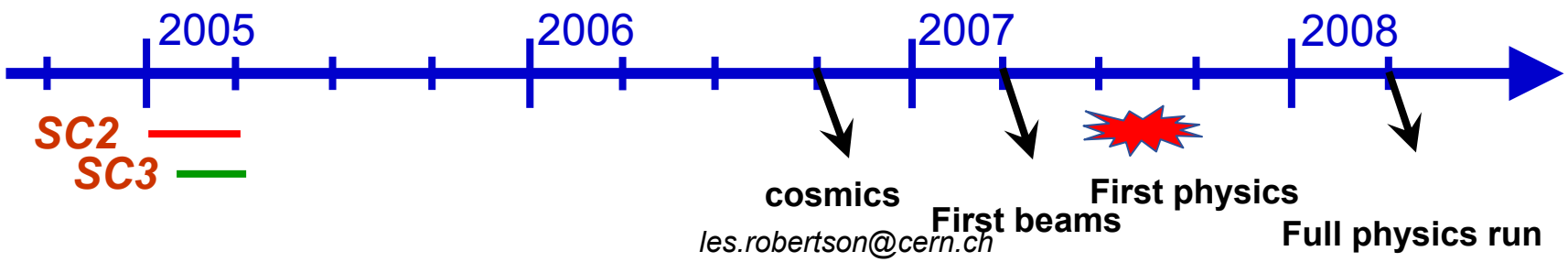
Build up infrastructure at each external centre

- Average ***capability*** **~150 MB/sec** at a Tier-1 (to be agreed with each T-1)

Further develop reliable transfer framework software

- Include catalogues, include VO's

disk-network-disk bandwidths



2005 Q2-3 - SC3 challenge

SC3 - 50% service infrastructure

- Same T1s as in SC2 (Fermi, NIKHEF/SARA, GridKa, RAL, CNAF, CCIN2P3)
- Add at least two T2s
- "50%" means approximately 50% of the nominal rate of ATLAS+CMS

Using the 1 GByte/s *challenge* facility at CERN -

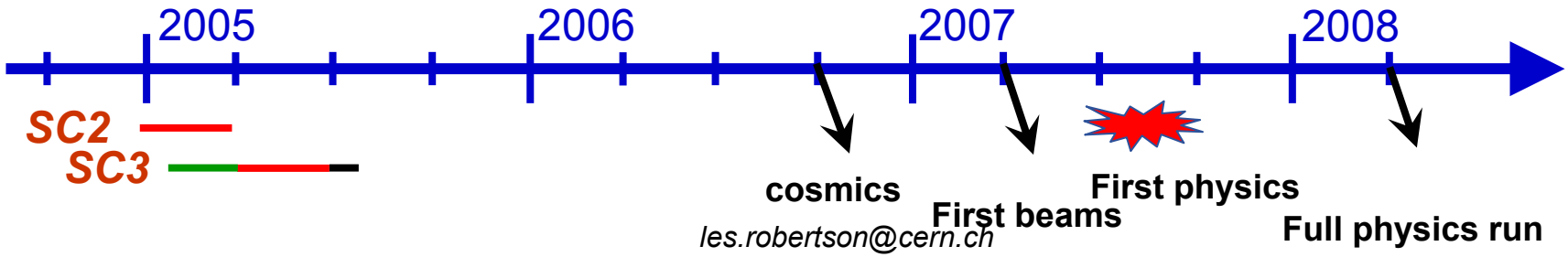
- Disk at T0 to tape at all T1 sites at **60 Mbyte/s**
- Data recording at T0 from same disk buffers
- Moderate traffic disk-disk between T1s and T2s

Use ATLAS and CMS files, reconstruction, ESD skimming codes
(numbers to be worked out when the models are published)

tape-network-disk bandwidths

Goal - 1 month sustained service in July

- **500 MBytes/s aggregate at CERN, 60 MBytes/s at each T1**
- **➔ end-to-end data flow peaks at least a factor of two at T1s**
- **→ network bandwidth peaks ??**



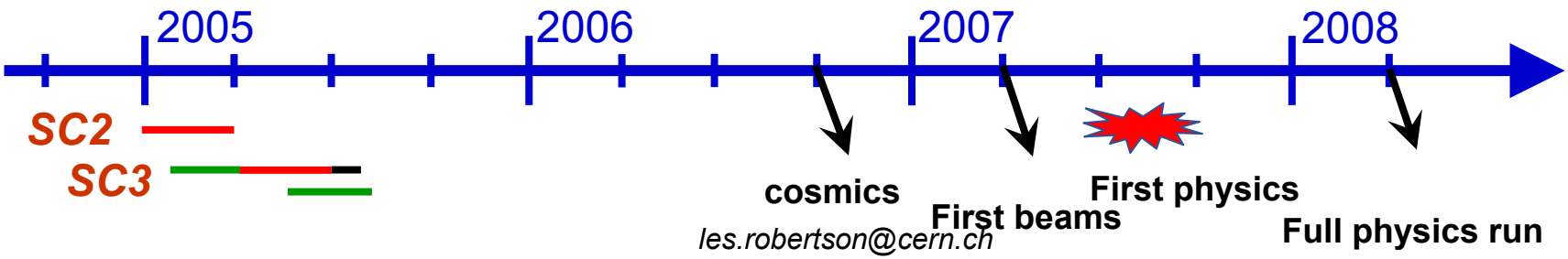
2005 Q2-3 - SC3 additional centres

In parallel with SC3 prepare additional centres using the 500 MByte/s test facility

- Test Taipei, Vancouver, Brookhaven, additional Tier-2s

Further develop framework software

- Catalogues, VO's, use experiment specific solutions



2005 Sep-Dec - SC3 Service

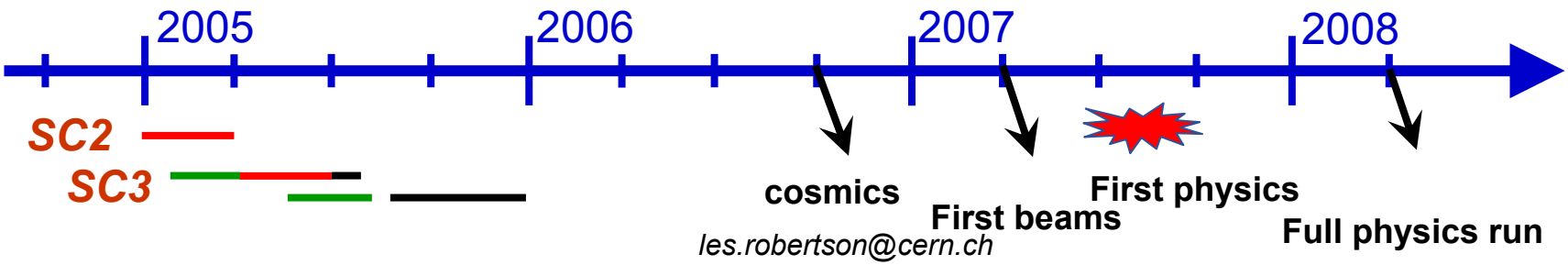
50% Computing Model Validation Period

The service exercised in SC3 is made available to experiments as a stable, permanent service for computing model tests

Additional sites are added as they come up to speed

End-to-end *sustained* data rates –

- 500 Mbytes/s at CERN (aggregate)
- 60 Mbytes/s at Tier-1s
- Modest Tier-2 traffic



2005 Sep-Dec - SC4 preparation

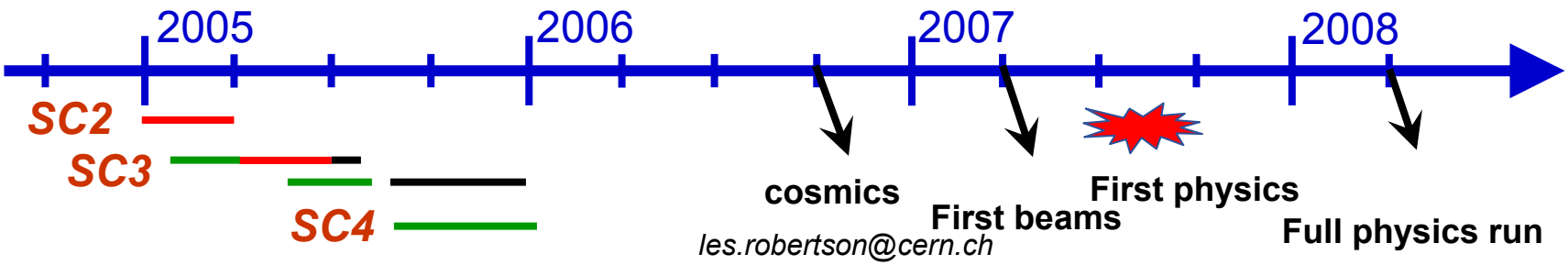
In parallel with the SC3 model validation period, in preparation for the first 2006 service challenge (SC4) –

Using 500 MByte/s test facility

- test PIC and Nordic T1s
- and T2's that are ready (Prague, LAL, UK, INFN, ..

Build up the production facility at CERN to 3.6 GBytes/s

Expand the capability at all Tier-1s to full nominal data rate



2006 Jan-Aug - SC4

SC4 – full computing model services

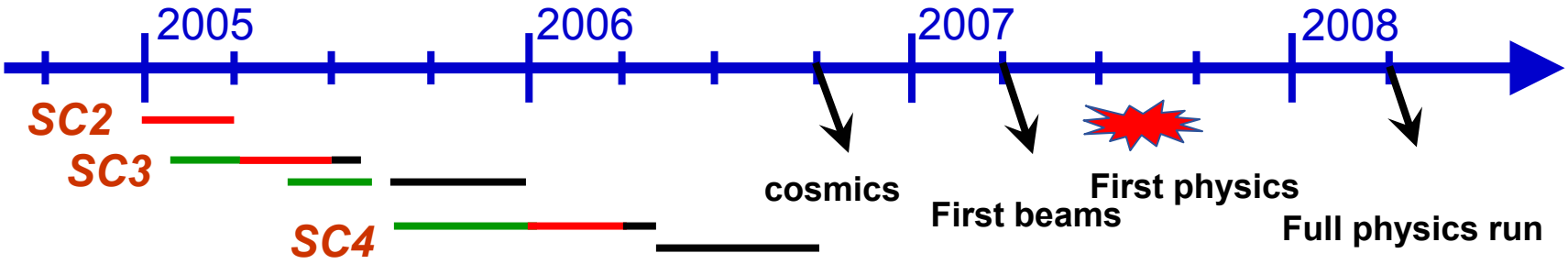
- Tier-0, ALL Tier-1s, all major Tier-2s operational at full target data rates (~2 GB/sec at Tier-0)
- acquisition - reconstruction - recording – distribution, *PLUS* ESD skimming, servicing Tier-2s

Goal – stable test service for one month – April 2006

100% Computing Model Validation Period (May-August 2006)

Tier-0/1/2 full model test - All experiments

- 100% nominal data rate, with processing load scaled to 2006 cpus



2006 Sep – LHC service available

The SC4 service becomes the permanent LHC service – available for experiments' testing, commissioning, processing of cosmic data, etc.

All centres ramp-up to capacity needed at LHC startup

- **TWICE nominal performance**
- **Milestone to demonstrate this 3 months before first physics data → April 2007**