SC3 – Draft Milestones

Jamie Shiers, CERN-IT-GD

24 February 2005

What have we learnt so far? (SC1 PM)
(James' summary from SC-RAL)

- ☠ **SC1 did not succeed**
  - We did not meet the milestone of 500MB/s for 2 weeks
- We need to do these challenges to see what actually goes wrong
  - A lot of things do, and did, go wrong
  - *[Ed: Andrew Sansum's concerns re: SC2]*
- We need better test plans for validating the infrastructure before the challenges (network throughput, disk speeds, etc…)
  - Ron Trompert (SARA) has made a first version of this
- We need to proactively fix low-level components
  - Gridftp, etc…
- ➢ **SC2 and SC3 will be a lot of work !**

April Milestones (1/2)

M2.08	SC2 complete	April SC meeting
	SC2 is complete having achieved 100MB/s T0-each participating T1, together with 500MB/s aggregate (T0) plus 500MB/s to FZK and FNAL.	
Mg.03	Plans for 10Gbit network connectivity	April SC meeting
	Each Tier1 should present its plan for obtaining 10GBit connectivity to CERN.	
Mg.04	T1-T1 and T1-T2 data rates	April SC meeting
	The required data rates between T1 and T2 sites should be presented, based on the T2 list from the March SC meeting	
Mg.05	Draft network topology and usage schedule	April SC meeting
	A first draft of the expected network topology and usage schedule, including T0 and T1 sites should be presented,	

April Milestones (2/2)

M3.02	SC3 detailed milestones	April SC meeting
	The detailed milestones for SC3 should be presented, including the list of T1 and T2 sites that will be involved, the schedule and the choice of experiments that will initially take part.	
M3.04	SC3 plan by experiment	April SC meeting
	The key features of the experiments computing models that will be stressed during SC3 should be identified together with corresponding milestones.	
Mg.06	Plan for remaining T1 sites to join Service Challenges	April SC meeting
	The plans for the remaining T1 sites to actively participate in the Service Challenges should be presented.	
Mg.07	Initial plan for including T2 sites to SC3	April SC meeting
	An initial plan for adding T2 sites to SC3 should be presented. This should include the foreseen resources at the given T2, its primary and alternative T1, including network routing considerations, as well as contact names.	

Future Milestones

M3.05	Confirmation of sites for SC3	May SC meeting
	The list of sites that will participate in SC3 should be confirmed, together with detailed schedule and configuration plans	
		June SC meeting
		July SC meeting
		September SC meeting
		October SC meeting
		November SC meeting

SC3

Baseline Milestones
From Les' 25 Jan Presentation to PEB

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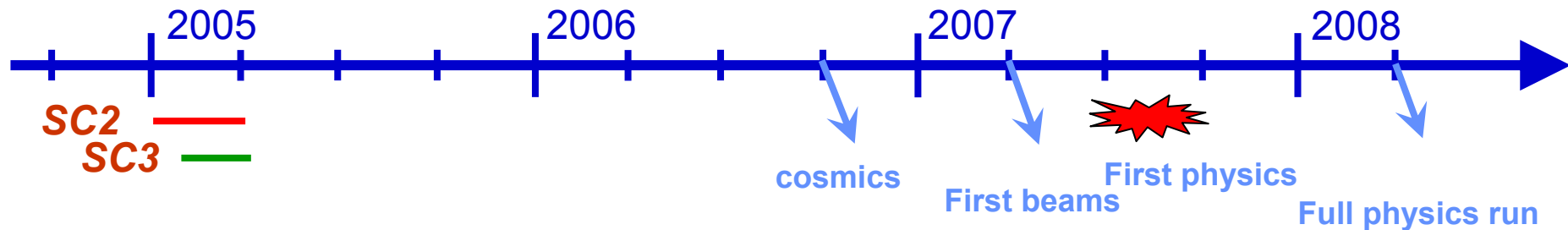- **The current 500 MByte/s facility used for SC2 will become the *testbed* from April onwards (10 ftp servers, 10 disk servers, network equipment)**

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   2006   2007   2008

SC2 ———
SC3 ———

cosmics

First beams

First physics

Full physics run

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)

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 ??

tape-network-disk bandwidths

2005   2006   2007   2008

SC2

SC3

cosmics

First beams

First physics

Full physics run
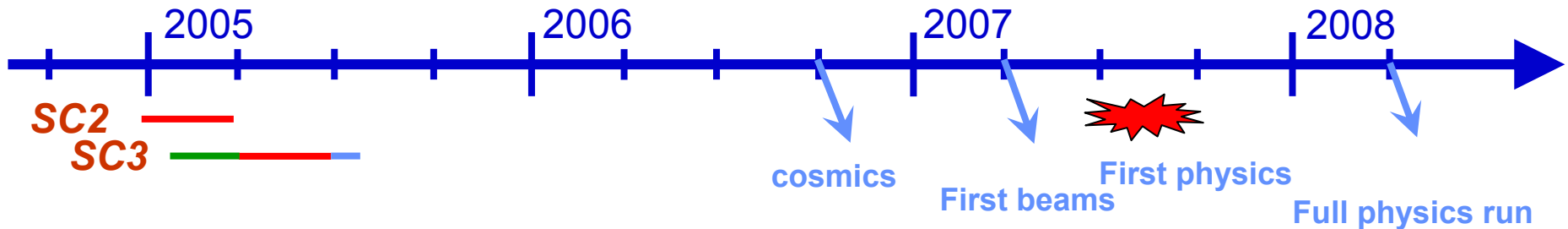
2005 Q2-3 - SC3 additional centres

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   2006   2007   2008

SC2

SC3

cosmics

First beams

First physics

Full physics run
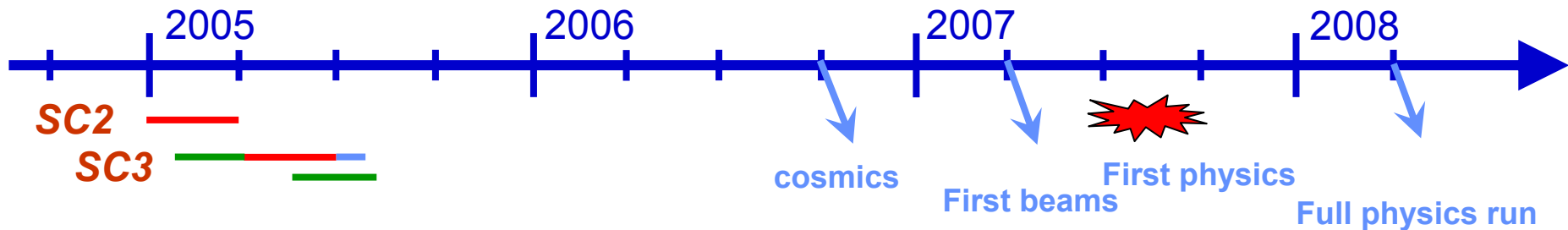
2005 Sep-Dec - SC3 Service

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   2006   2007   2008

SC2
SC3

cosmics

First beams

First physics

Full physics run
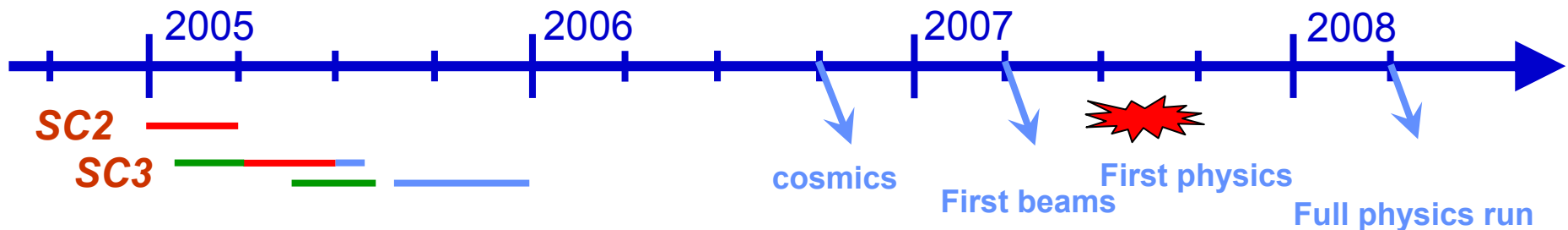
SC3 – Conclusions re: milestones

- SC3 is a huge ("quantum") increase over SC2

- It will require a significant amount of planning

- It will require significant involvement from all partners
  - Experiments, T0, T1, T2, network providers, …

- Target data rates previously presented can stand

- …but this is not where the complexity resides…

SC3 - Challenges

- Whilst there are operational and technical problems around providing reliable file transfer, no-one believes that transferring 'our files' according to 'our patterns' is an insurmountable problem

- **But what will prove?**

- We need to show that entire software chain is sufficiently robust to handle load and usage patterns that will be generated by experiments

- **This needs a significant level of discussion with and involvement from the experiments**

- Including manpower at T0, T1 and also T2 sites…

SC3 - Issues

- (Re-confirm) baseline 'high-level' goals
  - Participating sites, data rates etc.
- Agree time-plan for experiment participation
  - Cannot handle all four simultaneously (yet)
    - But that is the ultimate target...
- Agree specific software elements to be included
  - Drill down from reconstruction -> ... -> analysis to cover details
    - File catalogs, meta-data DBs, conditions DBs etc etc
- Agree specific T2s to be added, together with schedule

- SC3 begins in July

- We have very little time left – must include appropriate test / validation phases
  - One month at least after selection of delivered production-ready components

April Milestones (2/2)

M3.02	SC3 detailed milestones	April SC meeting
	The detailed milestones for SC3 should be presented, including the list of T1 and T2 sites that will be involved, the schedule and the choice of experiments that will initially take part.	
M3.04	SC3 plan by experiment	April SC meeting
	The key features of the experiments computing models that will be stressed during SC3 should be identified together with corresponding milestones.	
Mg.06	Plan for remaining T1 sites to join Service Challenges	April SC meeting
Mg.07	Initial plan for including T2 sites to SC3	April SC meeting

SC3 - Conclusions

- We need to successfully establish baseline services in SC2

- We need full involvement from the experiments as from now

- We need to agree on the details of SC3 using the March and April SC meetings, whilst making continuous progress in the meantime

- We should not forget the issue of adding O(100) T2 sites in the coming year…