

# Info from CMS

# Overview

- CMS near-term plans (aka the comp model again).
- Challenges for the next year, and how we will cope.
  - Site commissioning.
  - User support.
  - Site communication.

# Plans

- Slides stolen from Joe Incandela
  - <http://tinyurl.com/5qs2d2>



# Startup Model: PD and Skims

- **Goals for Physics:**
  - Widespread access to RECO and some RAW
  - Ease of access to all data important to early analyses
    - Ability to fully develop all aspects of an analysis with data at Tier-3 and/or Tier-2
  - **Reliability**
    - Place important data at multiple Tier-2 sites
  - Express Stream for Low latency DQM and physics level monitoring of data out of Tier-0.
- **PD**
  - Full sample in RECO format distributed to Tier-2s
- **Skims**
  - **PD-based: 10%**
    - Subscribed to T2 by Groups and Users
    - Each PD could have a skim of high ET portion
    - Some PDs could have 10-15% random sampling skims – useful for control samples
    - A Few PDs could have low ET skims

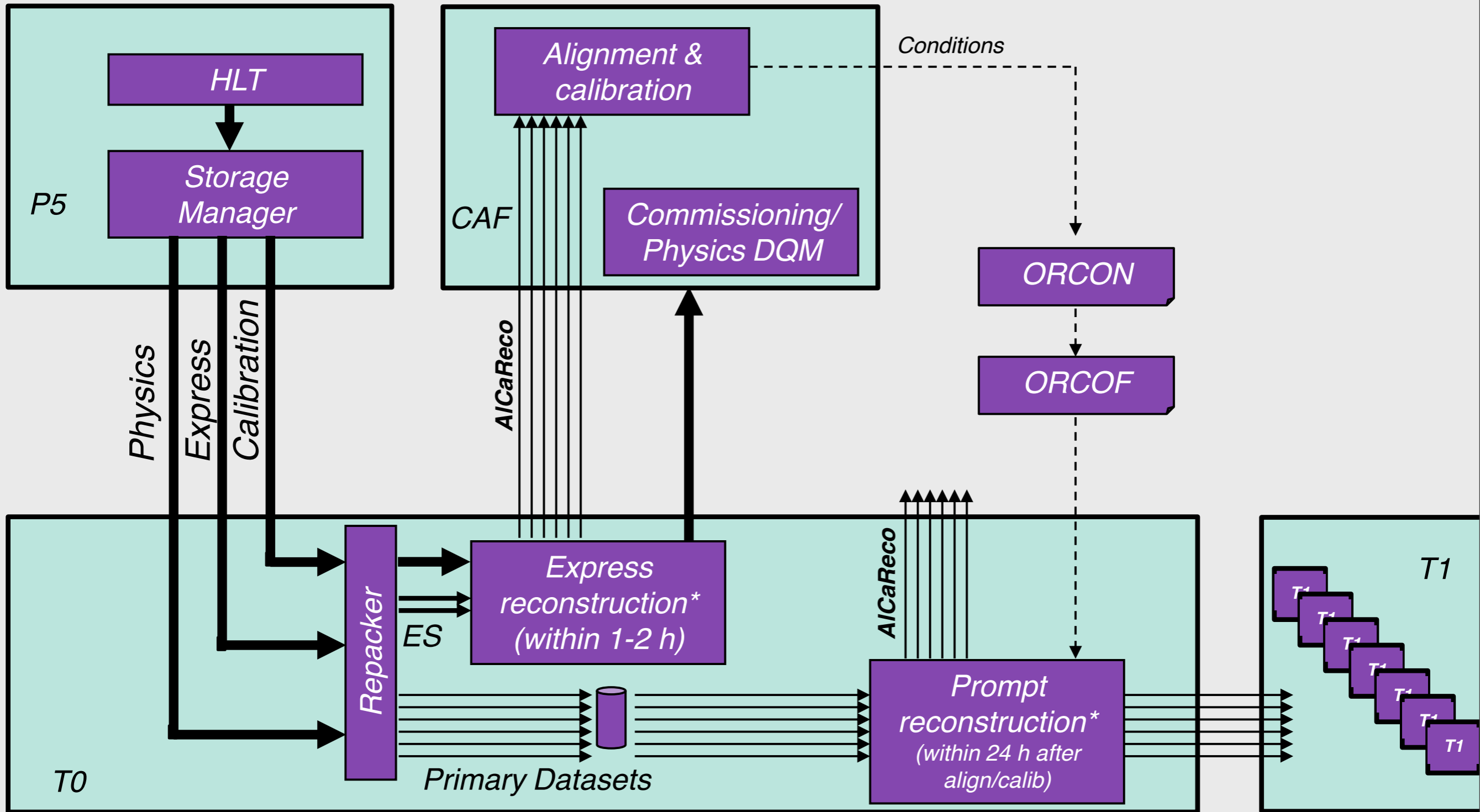


# Tier-0, Tier-1, Tier-2 and Tier-3

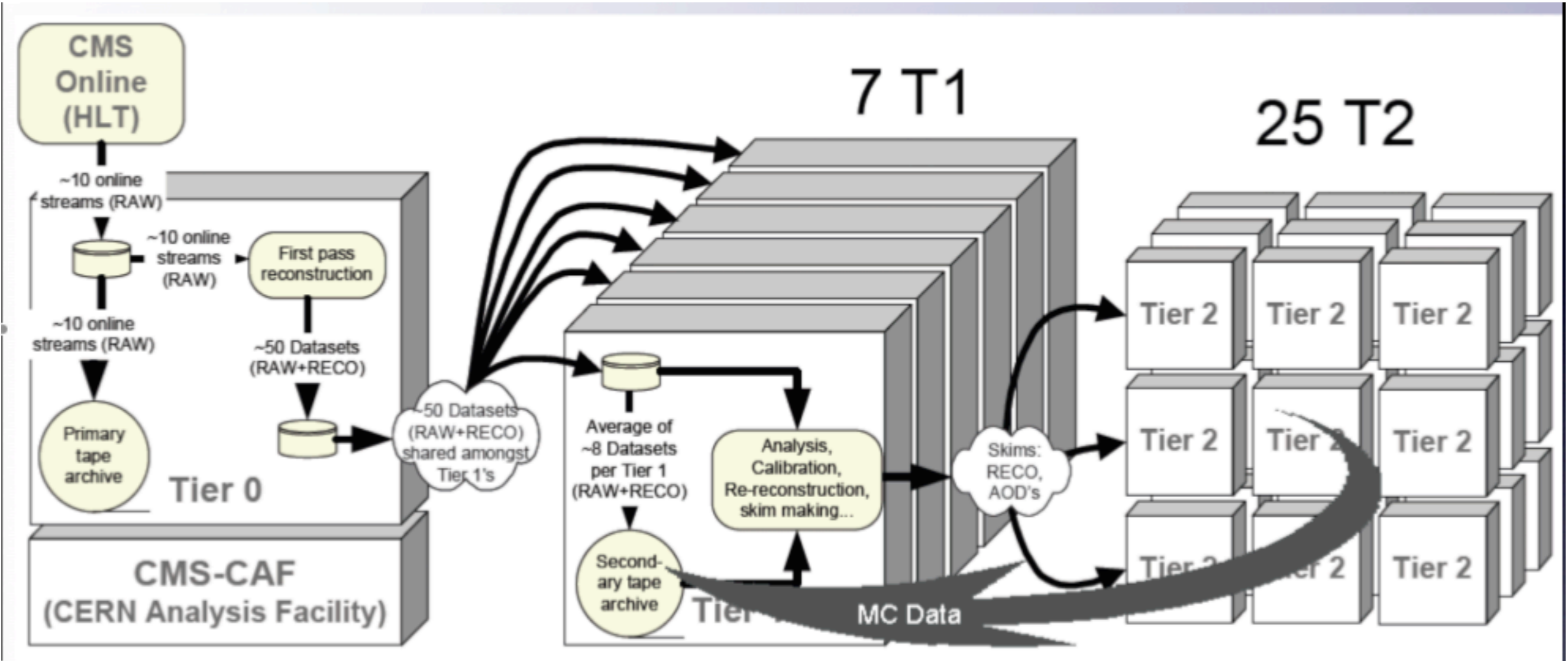
- Tier-0 Sacred
- Tier-1 Semi-sacrosanct
  - DataOps, and small number of DataOps-trained DPG/POG/PAG-group designees
- Tier-2 Accessible to all of us mere mortals
- Tier-3 “Yours”



# Streams & Datasets



\*including AICaReco skims





# Data at Tier-2 and Tier-3

- Tier-2/Tier-3
  - 1-2 PD
    - 30 TB total space
  - 1-2 Physics Groups
    - 30 TB space each
  - Tier-3: N users
    - 0.5-1.0 TB each
- Note!
  - A few T2-GROUP Associations for redundancy
    - Small number is better
      - Fewer customers means better service & less book-keeping
- PD copies
  - Each one stored in at least 2 Tier-2s
    - One in Europe one outside Europe
    - Most likely 4+ copies of the most heavily accessed PDs
  - Accessed via CRAB
- Group spaces
  - Large enough to hold 1-2 copies of PDs
  - Subscribed startup skims
  - Special PAT skims, other reduced samples, etc.
  - Special RAW samples
  - Accessed via CRAB
- USER Spaces
  - Skims of skims, user code, special sub-samples for development



# Standard Physics Use Case

## – Physics Groups

- **Subscribe skims to group space**
  - Startup skims initially (more on this later)
  - Special startup RAW samples for development
- **Develop specialized skims if needed**
  - Test heavily on skims in group space
  - Run skim on PD, when sure it's ready
  - Add skim to official skims run at T1 when you know it is widely used

## – Users

- **Run on Skims in Group space**
  - Write sub-samples to your area and/or
  - Develop code, test all aspects of your analysis on data in your area or skims in Group space
- **When fully ready run analysis on PDs or skims at Tier-2s via CRAB**
- **Basic idea:**
  - **Make your life easy by running on big samples as little as possible**



# Exceptions

- RAW
  - Development work that does not need large raw samples
    - Groups can request small RAW samples to be transferred to group spaces
  - Analyses that need elements of RAW data that we never expect to put into RECO/AOD
    - AICaRECO DPG-type use-case run at CAF
    - POG/PAG case can run at Tier-1
      - Designated handful of individuals trained in official DataOps tools, running well-tested work-flows at Tier-1 as rarely as possible



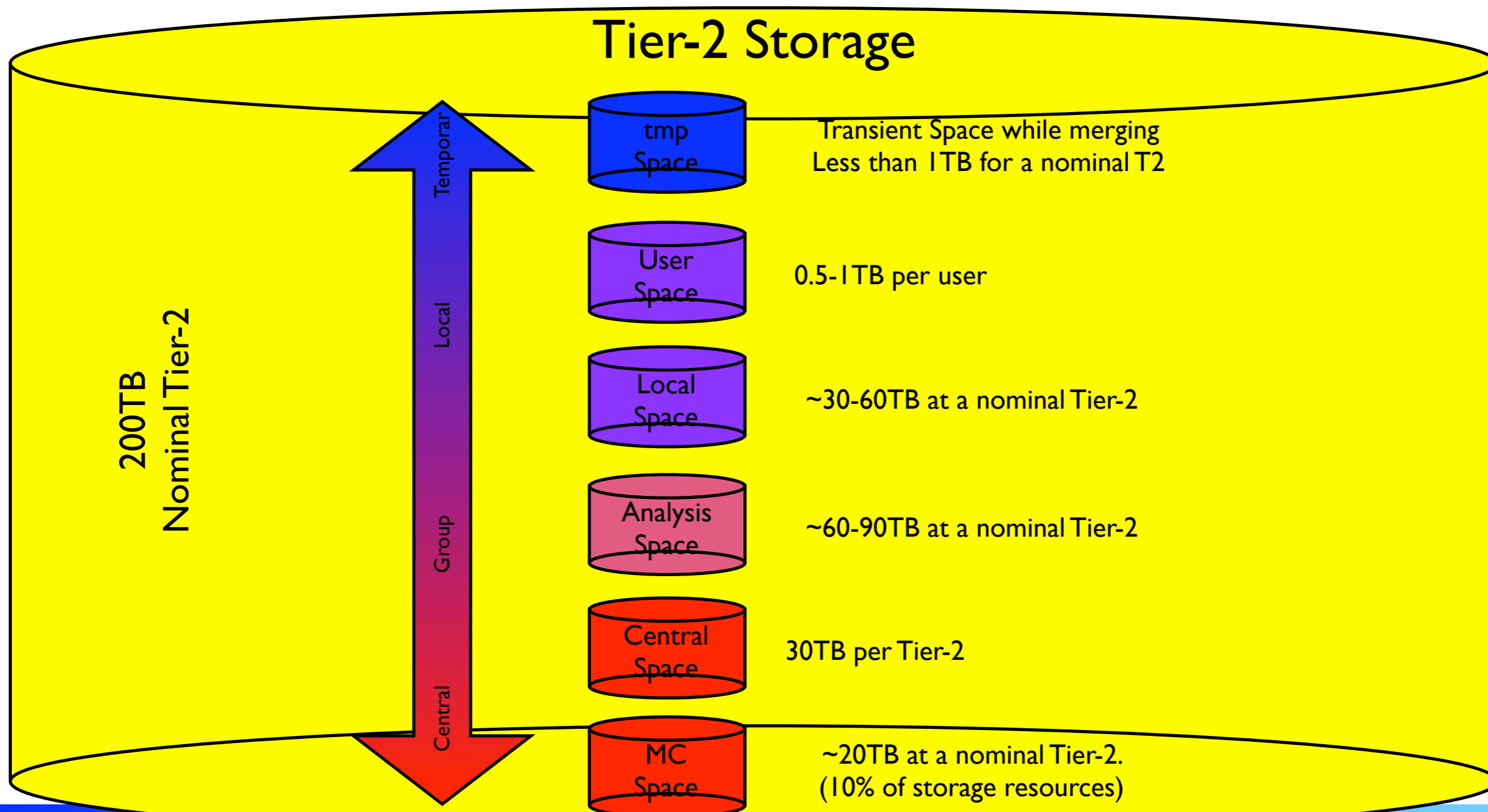
# Looking forward

- PD (trigger bits only)
  - Study “asymptotic” form via E32 trigger tables
  - Early data-taking will need special treatment, so need also to study the low lumi tables
    - Will need to think about how we want PD definitions to evolve with rising luminosity
- Skims (trigger info)
  - Define a number of proto-skims for startup
    - Inclusive, broadly useful
    - Re-reconstructed when data is re-reconstructed
  - As data arrives and is understood
    - Groups develop and test their preferred skims if needed
      - These get added to the suite of skims run at Re-Reco cycles

# Breakdown of Tier-2 Storage

Looking at the expected analysis access and the amount of data produced in 2008 we will be able to host the RECO sample out to the Tier-2 centers.

➔ This settles on hierarchy of storage at the Tier-2s



# UK Tier2 picture

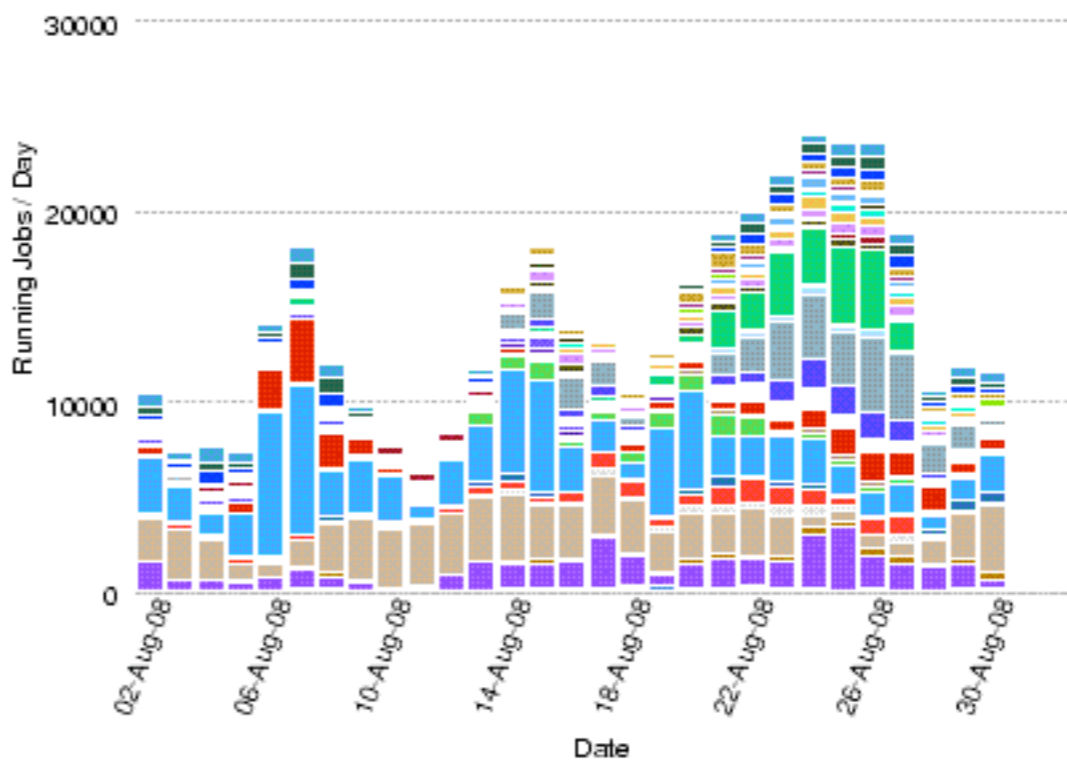
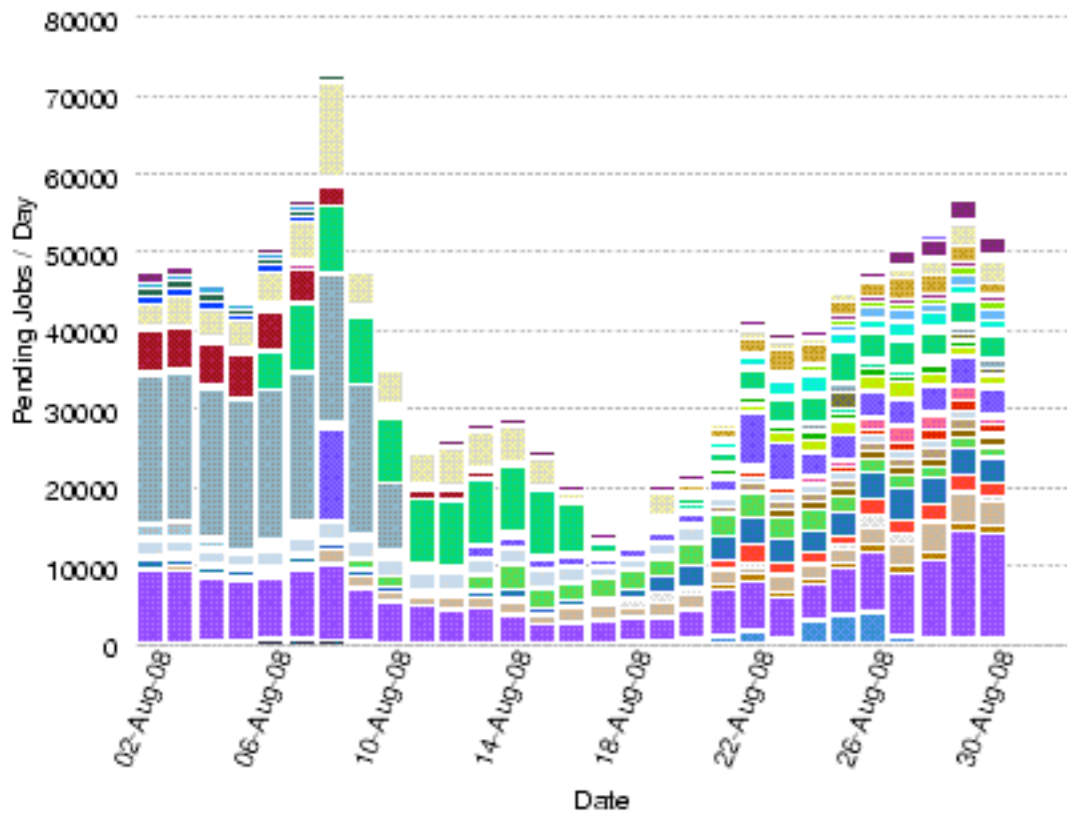
- Tier 2 sites London (Brunel and Imperial), SouthGrid (RALPP).
- Other UK sites considered Tier 3, used for MC mainly with analysis possible - no service level obligation to CMS.
- Bristol users to use RALPP.
- Physics Groups:
  - London: Egamma (IC), EWK (Brunel), SUSY (IC).
  - SouthGrid: Exotica (RALPP).
  - Trigger (tbd)

# Challenges

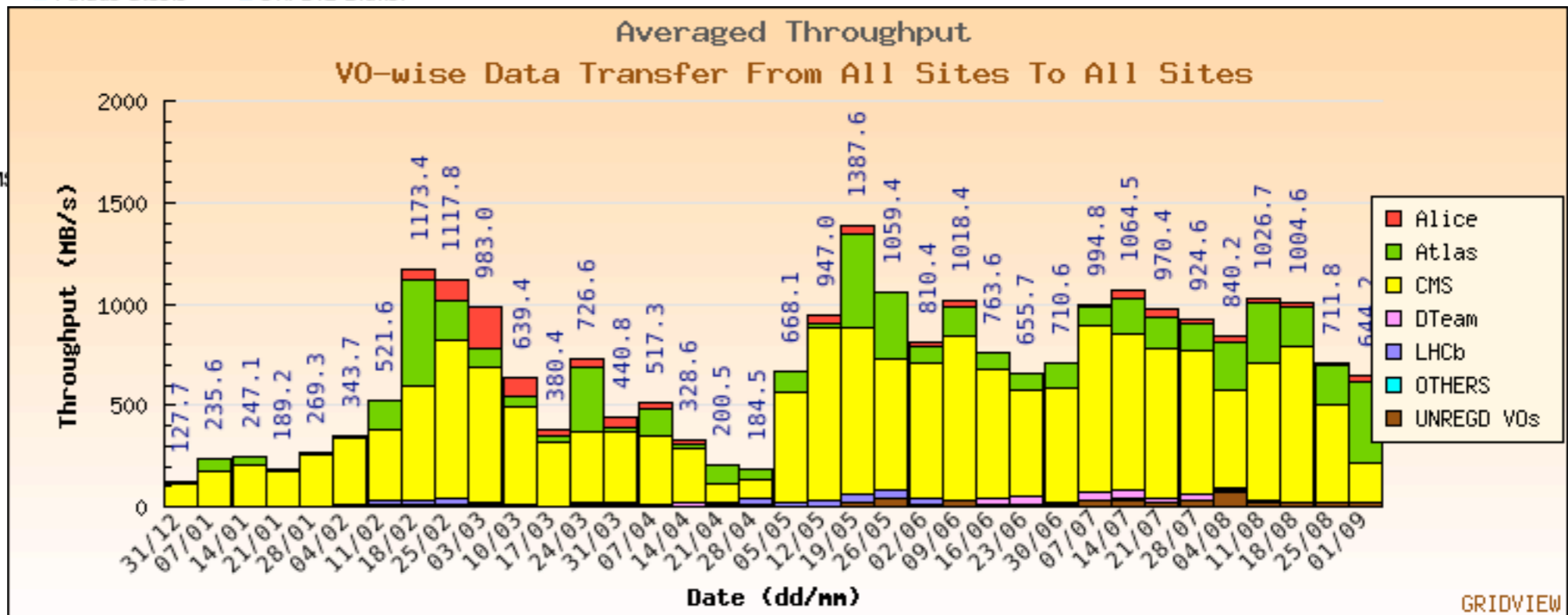
- The elements of the model exercised in the recent challenges worked to an acceptable level
- But how to use effectively and efficiently?
- What about the unknown unknowns?
- Manage people? (Unreasonable) Expectations?  
Efficient usage? Can a user kill part/whole system?
- Large part of this is a organisational and communication problem.

# Recent Issues

- User banning from Tier 1 - Not user friendly, what are Tier 1 ce's anyway - all sites given CMS name TX\_CC\_name\_subsite.
- Data only at 1-2 sites, which invariably schedule downtime simultaneously / lack required software.
- Lack of central skimming results in multiple users running over large amounts of data.
- CAF vs grid.
- Some users afraid to touch the system in case it breaks others push to breaking point and beyond.
- Non technical: Assigning physics groups to sites took 3 months. (Only just completed)



- BEIJING-LOG2
- BEgrid-ULB-VUB
- BUDAPEST
- BelGrid-UCL
- CERN-PROD
- CIEMAT-LOG2
- CIT\_CMS\_T2
- CSCS-LOG2
- DESY-HH
- FZK-LOG2
- GLOW-CMS
- GRIF
- HEPGRID\_UERJ
- Hefhy-Vienna
- IFCA-LOG2
- IN2P3-CC
- IN2P3-CC-T2
- IN2P3-IRES
- INDIACMS-TIFR
- INFN-BARI
- INFN-LNL-2
- INFN-PISA
- INFN-ROMA1-CMS
- INFN-T1
- ITEP
- JINR-LOG2
- LIP-Coimbra
- LIP-Lisbon
- MIT\_CMS
- Nebraska
- Purdue-RCAC
- Purdue-Steele
- UKI-LT2-Brunel



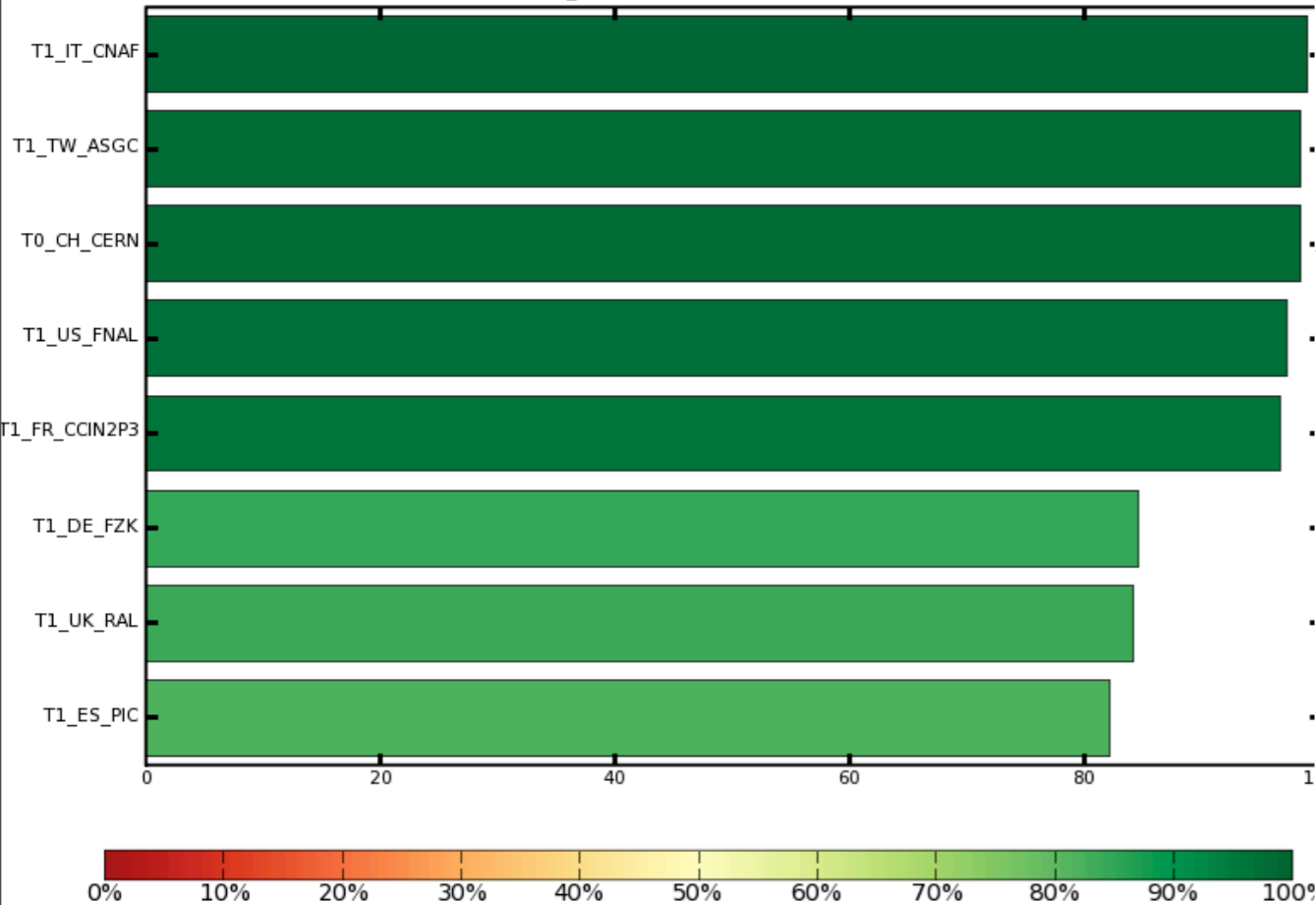
# Site Commissioning

- How to improve the user T2 experience?
- (banned from Tier 1's)
  - SAM tests
  - jobRobot
  - Transfer tests
    - 3 day period to download ~20MB/s for 24 hours from a given site.
  - Set quality metrics.
    - Require sites to maintain a quality level for 5 out of 7 days (T2 not weekends).
    - Staying commissioned is easier than getting there in the first place.
    - <https://twiki.cern.ch/twiki/bin/view/CMS/SiteCommRules>

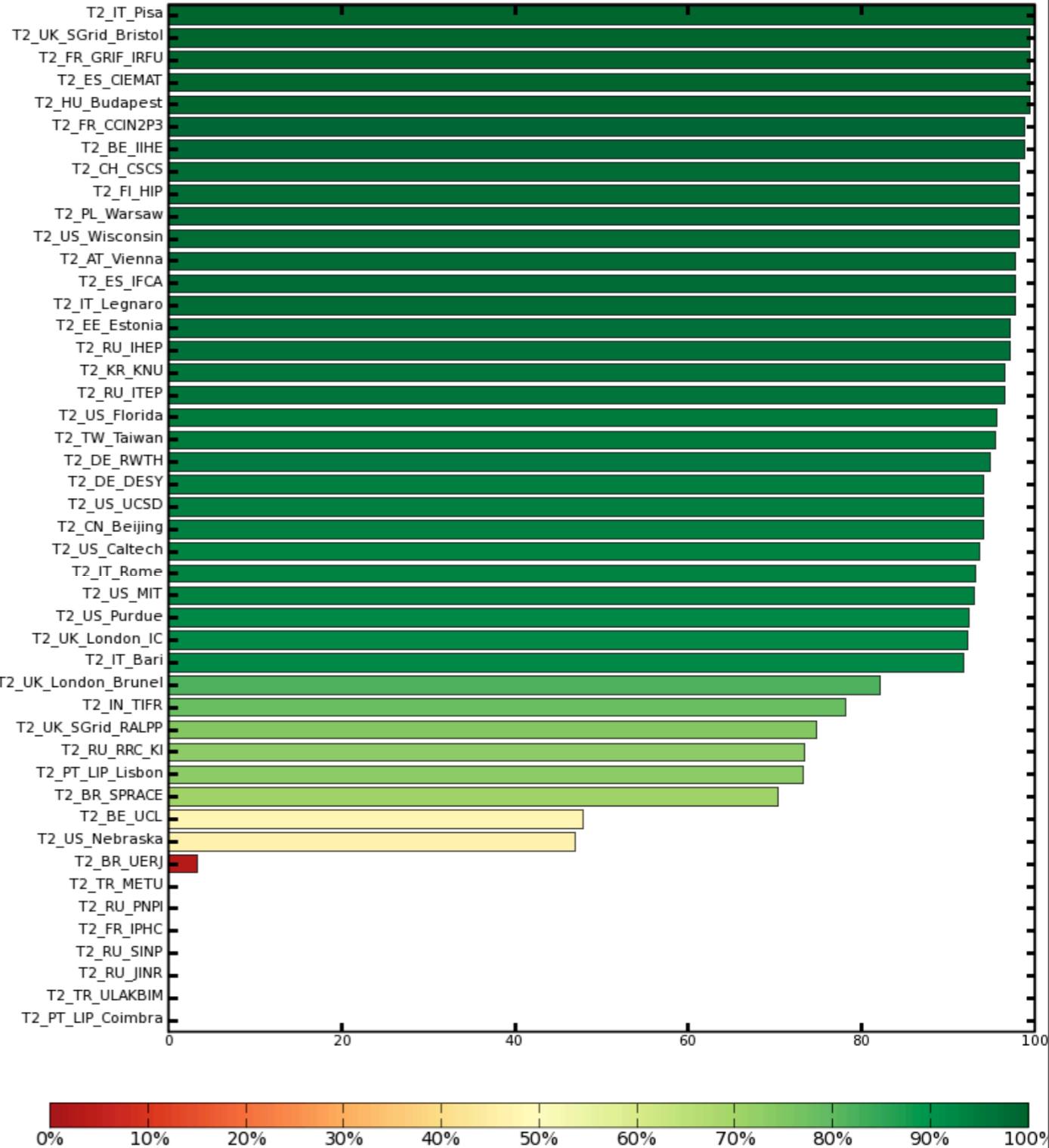
# SAM availability

- Tests include:
  - job submission
  - CMSSW software
  - Analysis test
  - MC with output stageout
  - Conditions data
- Quality levels:
  - Tier 1: > 90%, Tier 2: > 80%
- <http://dashb-cms-sam.cern.ch/dashboard/request.py/samvisualization>

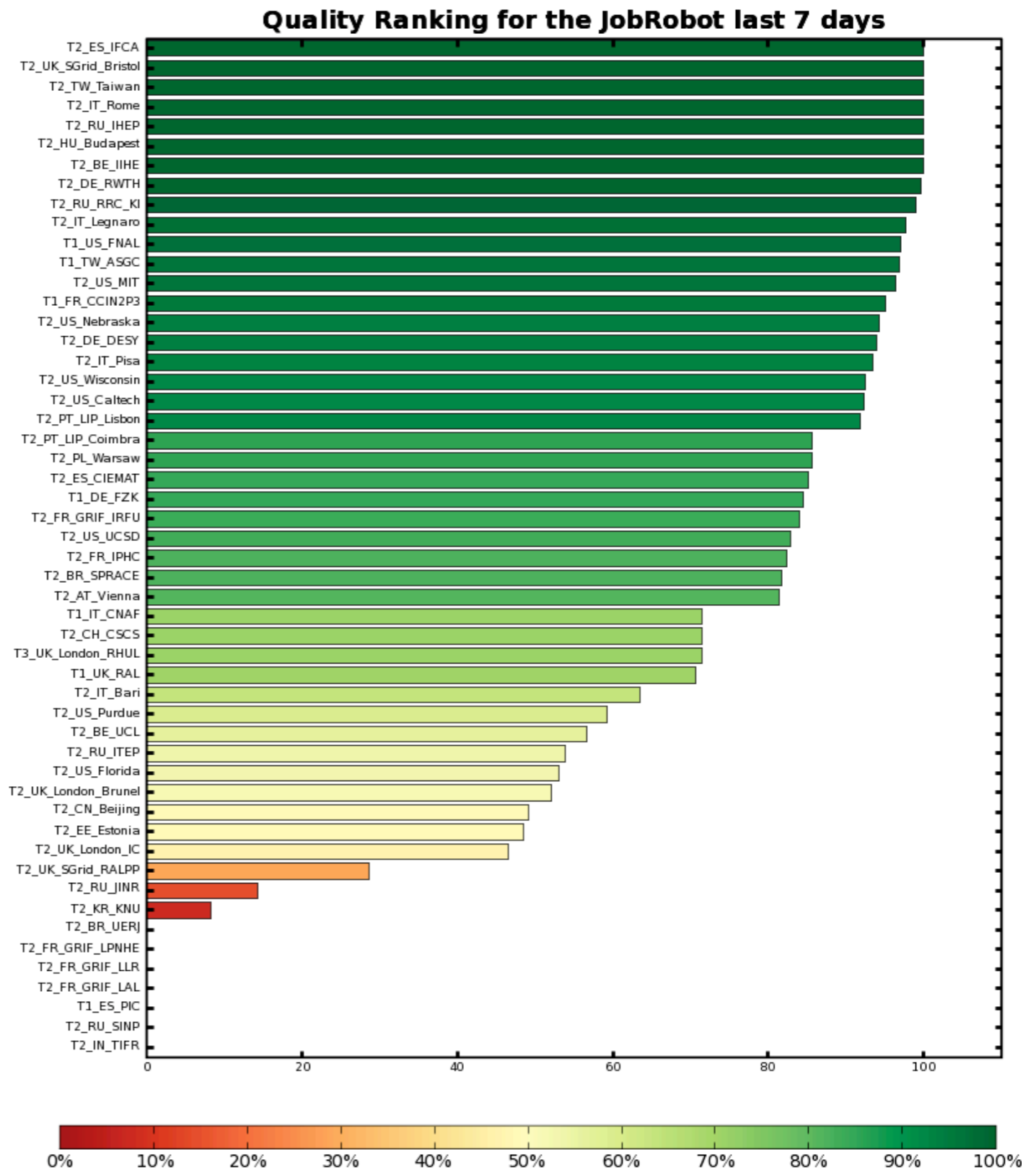
**Site Availability, 2008-08-23 - 2008-08-30**



**Site Availability, 2008-08-23 - 2008-08-30**



- Sample analysis jobs sent on a .5TB sample.
- <http://jobrobot.web.cern.ch/JobRobot/>
- Quality levels:
  - Tier 1: > 95 %
  - Tier 2: > 90 %.



# <http://lxarda13.cern.ch/dashboard/request.py/siteview>

## Site Status for the CMS sites

Put the mouse over any column header to get the description of the column  
 Clicking on a column header will display the evolution of that column over the last 24 hours  
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Site Name	Visible	JobRobot	SAM TESTS		Production	Analysis	Site usage		Phedex			CMSSW	Open issues	Maintenance
			CE	SRM			Running	Pending	# Links	In rate	Out rate			
T0_CH_CERN	n/a	n/a	OK	OK	100%(3055)	80%(1993)	n/a	n/a	ok	0	186	n/a	info	GOCDB-info
T1_CH_CERN	n/a	SubFail	n/a	n/a	n/a	n/a	n/a	n/a	ok	81	87	n/a	info	GOCDB-info
T1_DE_FZK	OK	96%(404)	error	OK	100%(328)	61%(6017)	89	2555	ok	27	8	OK	info	GOCDB-info
T1_ES_PIC	error	0%(175)	error	error	n/a	0%(1)	35	1657	ok	0	0	OK	info	GOCDB-info
T1_FR_CCIN2P3	OK	100%(300)	OK	OK	100%(123)	n/a	4	929	ok	65	4	OK	info	GOCDB-info
T1_IT_CNAF	OK	99%(400)	error	OK	n/a	99%(142)	55	398	ok	140	97	OK	info	GOCDB-info
T1_TW_AS GC	OK	100%(300)	OK	OK	n/a	94%(144)	4	19	ok	72	91	OK	info	GOCDB-info
T1_UK_RAL	OK	SubFail	OK	OK	n/a	100%(50)	n/a	12	ok	5	3	OK	info	GOCDB-info
T1_US_FNAL	OK	100%(400)	OK	OK	100%(3191)	94%(6582)	574	4221	ok	159	87	OK	info	OSG-downtime
T2_AT_Vienna	OK	pend	OK	OK	n/a	89%(345)	84	57	ok	0	6	OK	info	GOCDB-info
T2_BE_IHHE	OK	100%(144)	OK	OK	n/a	98%(856)	6	1673	ok	0	7	OK	info	GOCDB-info
T2_BE_UCL	OK	87%(404)	OK	OK	n/a	100%(24)	1	77	ok	n/a	n/a	OK	info	GOCDB-info
T2_BR_SPRACE	OK	100%(202)	OK	OK	n/a	n/a	1	158	ok	27	9	OK	info	OSG-downtime
T2_BR_UERJ	OK	50%(201)	error	OK	n/a	n/a	4	93	ok	7	6	OK	info	OSG-downtime
T2_CH_CAF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ok	15	0	n/a	info	GOCDB-info
T2_CH_CSCS	OK	100%(101)	OK	OK	n/a	82%(50)	29	446	ok	0	1	OK	info	GOCDB-info
T2_CN_Beijing	OK	59%(213)	OK	OK	n/a	69%(13)	n/a	89	ok	n/a	n/a	OK	info	GOCDB-info
T2_DE_DESY	OK	100%(101)	OK	OK	n/a	83%(358)	516	1133	ok	12	1	OK	info	GOCDB-info
T2_DE_RWTH	OK	100%(101)	OK	error	20%(1937)	76%(140)	1868	2376	ok	5	0	OK	info	GOCDB-info
T2_EE_Estonia	OK	45%(344)	OK	OK	100%(441)	60%(20)	124	180	ok	0	1	OK	info	GOCDB-info
T2_ES_CIEMAT	OK	pend	OK	OK	100%(6406)	0%(155)	185	663	ok	n/a	n/a	OK	info	GOCDB-info
T2_ES_IFCA	OK	52%(191)	error	OK	n/a	60%(628)	14	732	ok	1	0	OK	info	GOCDB-info
T2_FI_HIP	error	n/a	OK	OK	n/a	n/a	n/a	n/a	ok	1	0	n/a	info	GOCDB-info
T2_FR_CCIN2P3	OK	n/a	OK	OK	n/a	61%(522)	378	1037	n/a	n/a	n/a	OK	info	GOCDB-info
T2_FR_GRIF_IRFU	error	98%(404)	OK	OK	n/a	80%(10)	15	951	ok	0	7	OK	info	GOCDB-info
T2_FR_GRIF_LAL	n/a	SubFail	n/a	n/a	n/a	n/a	n/a	n/a	err	n/a	n/a	n/a	info	GOCDB-info
T2_FR_GRIF_LL R	n/a	SubFail	n/a	n/a	n/a	n/a	n/a	n/a	ok	n/a	n/a	n/a	info	GOCDB-info
T2_FR_GRIF_LPNHE	n/a	SubFail	n/a	n/a	n/a	n/a	n/a	n/a	err	n/a	n/a	n/a	info	GOCDB-info

# User communication

- Need to persuade users to a) use the grid and b) how best to use it
- User support:
  - [http://cms.cern.ch/iCMS/jsp/page.jsp?mode=cms&action=url&urlkey=CMS\\_US](http://cms.cern.ch/iCMS/jsp/page.jsp?mode=cms&action=url&urlkey=CMS_US)
  - workbook, software documentation.
  - tutorials
  - ticketing system
- Support available from CMSUK in the form of more experienced users, experts in large parts of the comp. model, etc.

# Site communication

- Only a few sites so shouldn't be too hard.
- More reliable good - more useful co-ordination (downtime etc).
- FacOps meetings Friday's and corresponding hypernews.
- <https://savannah.cern.ch/projects/cmscompinfrasup/>
- Also check: <http://lxarda13.cern.ch/dashboard/request.py/siteview>
- plus SAM, Dashboard etc.

# Conclusion

- Almost ready to put the theory into practice.
- Complicated technological problem alongside a large human resources / organisational challenge.
- “No battle plan survives first contact with the enemy”.
- Now is not the time for clever ideas.
- Need to educate/enable users to work as easily as possible with limited computing effort.
- Tutorials etc. useful but need community to become self sustaining.