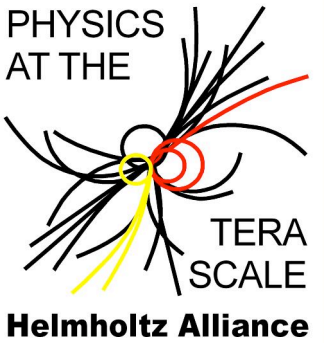
National Analysis Facility: Status and Outlook



HELMHOLTZ ASSOCIATION

Andreas Haupt, Yves Kemp (DESY)

Munich, DPG2009, 9.3.2009

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Initial questions? And answers!

- Why a NAF?
  - To give members of German institutes working on LHC (Atlas, CMS & LHCb) and ILC (and Calice) additional resources to do physics analysis
- Why an Analysis Facility at DESY?
  - E.g. LHC computing models: Most analysis data is there
- What is the broader context?
  - The NAF is part of the Strategic Helmholtz Alliance “Physics at the Terascale” (http://terascale.desy.de/)
- What is the planned size?
  - Size of 1.5 of average Tier2, but with an emphasis on storage

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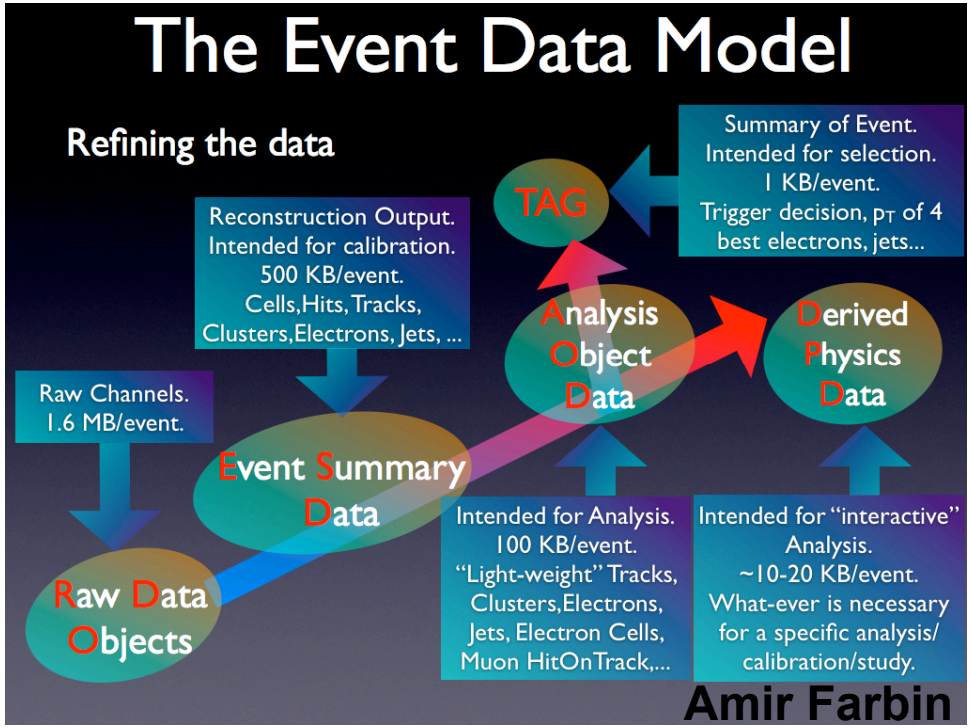
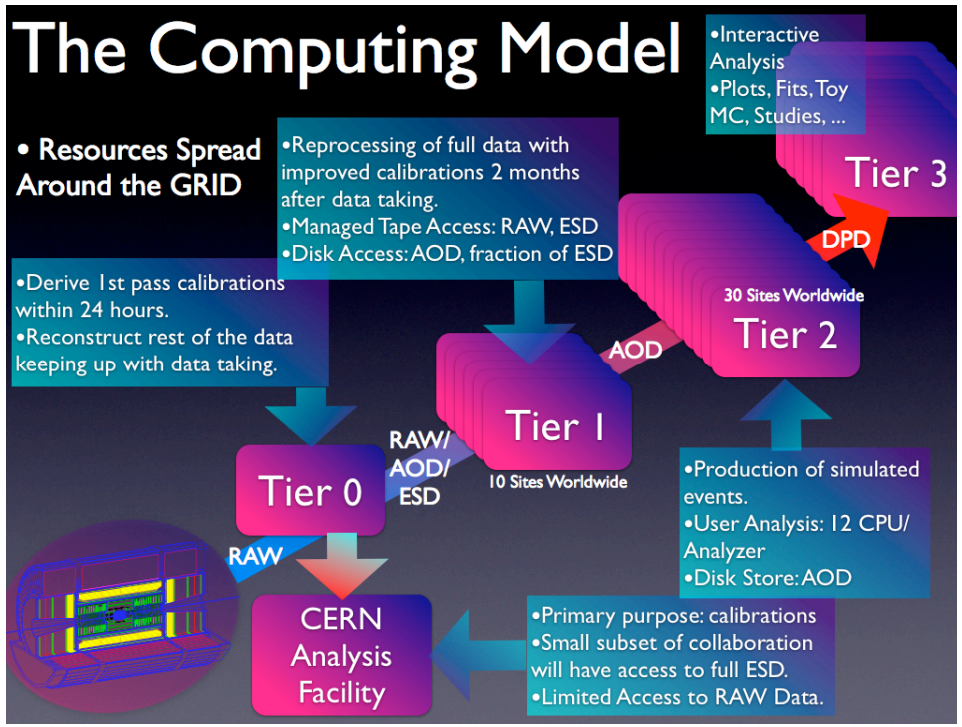
Place in the Computing Models (e.g. Atlas)





- Different event descriptions and formats
  - At different stages of the Tier Model
- End-user ready Analysis Format: At the end of the chain
  - Located at Tier2/Tier3 in the Grid Chain
- Analysis Facility should ease access to these data!

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Design key words

- Discussions and requirement papers from experiments

- Improved Grid
- Local Access to Grid Data
- Local ←→ Grid Integration
- Fast Turn-Around for Analysis
- Distributed Ansatz
- New Methods for Analysis

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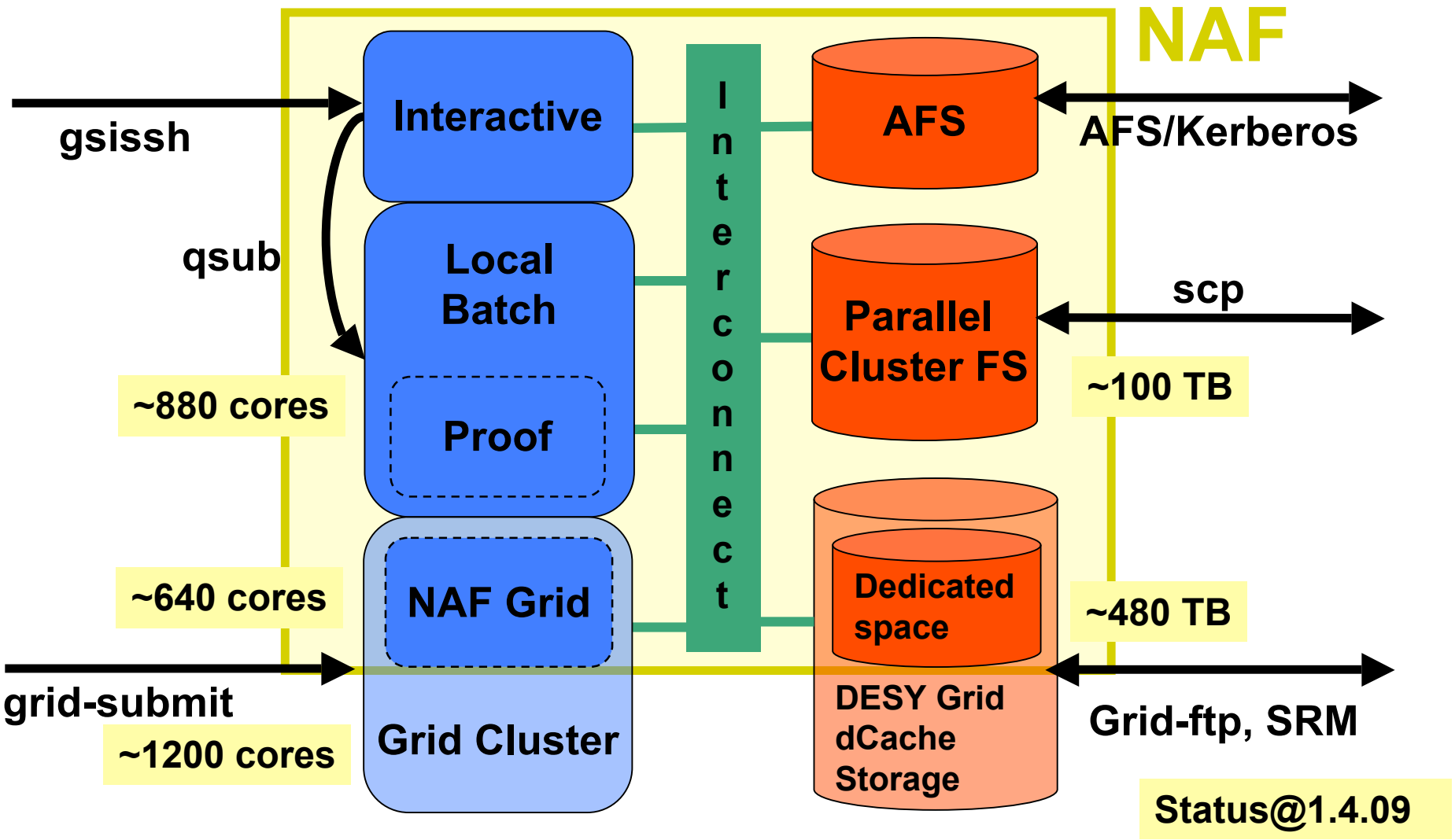
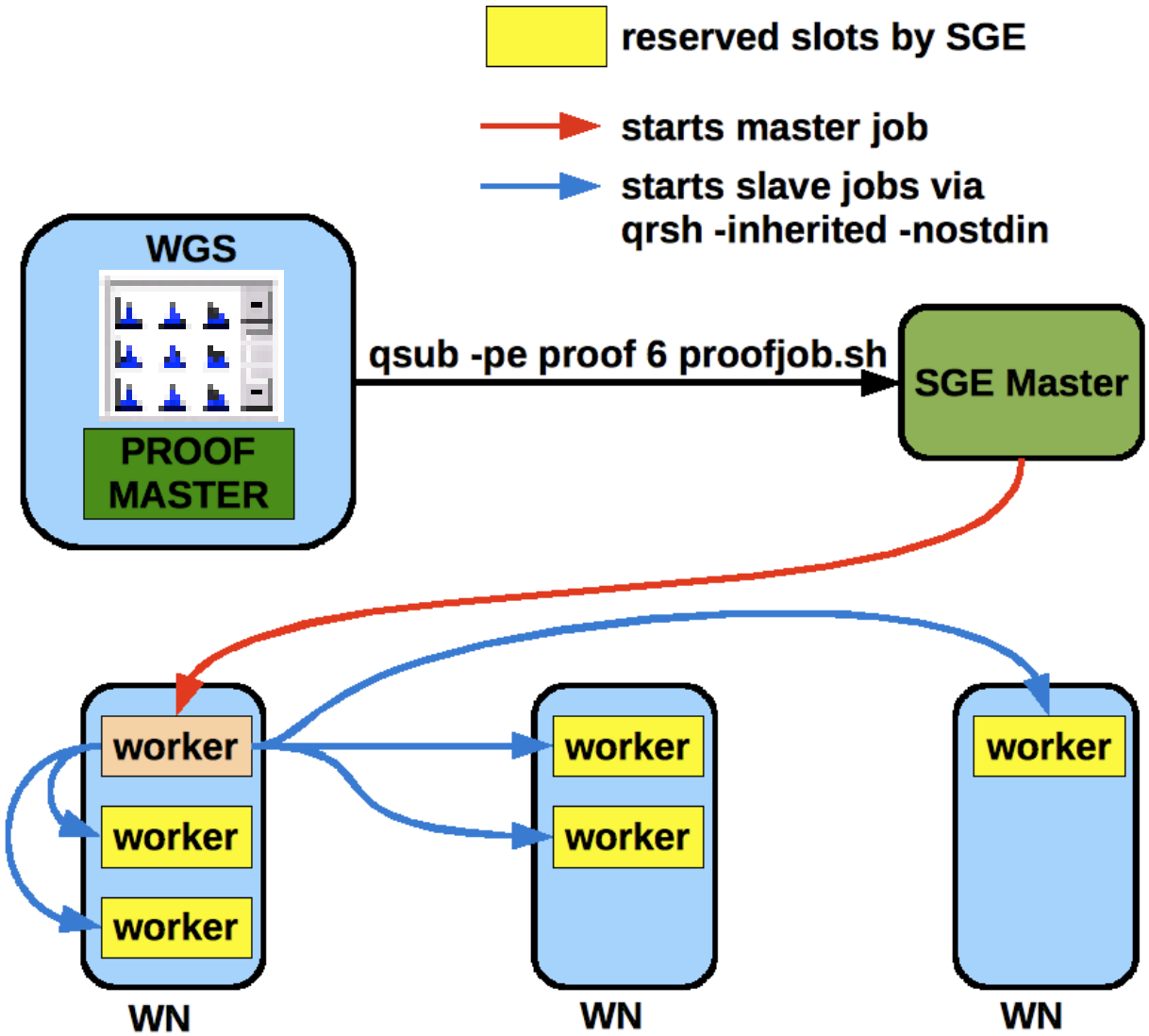
Building blocks



PROOF & SGE



- Allows massive parallelization of analysis jobs
- Keep interactive “ROOT prompt”
- Used mainly by CMS (Uni HH)
- Allows for multi-user and multi-group operations
- Accounting possible

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ATLAS Tag DB

- Tags - summary physics data for events
  - efficient selection of interesting events
  - direct navigation to these events
- 2 formats
  - ROOT files: useful as indices to event
  - Relational Database: useful for querying
- 1 kB/event, includes pointers to AOD, ESD and RAW data files
- TAG DB @ DESY in the NAF context?

Browsing the dCache namespace & access to dCache

SRM & gridftp
Using Certificate

Desktop/DESY-WGS
Dcap: UID2/GID2

Grid WN
Gridftp: Certificate
Dcap: UID1/GID1

NAF WGS&Batch
Dcap: UID3/GID3

Four different identifies access the same (meta)-data: Coherent access rights scheme not possible!

One single authentication/authorization needed!

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Decommissioning of /pnfs mount

- Solution:
  - Always use certificate/VOMS based authentication and authorization
- Protocols
  - Gridftp (same as before)
  - Gsidcap: Same as dcap, but with GSI authz

    Minimal overhead: +O(500ms) seconds per session
- E.g. ROOT supports gsidcap
- Meta-Data handling (e.g. file browsing)
  - /pnfs - mount also problematic: relies on dCap
  - dcTools developed at DESY by summer student Malte Nuhn
  - On NAF: ini dctools → dcls -l /pnfs/desy.de/ilc

- dCache group will decommission /pnfs mount soon!
  Please use replacement tools!

Further integrating X509 in NAF

Certificate of Authenticity

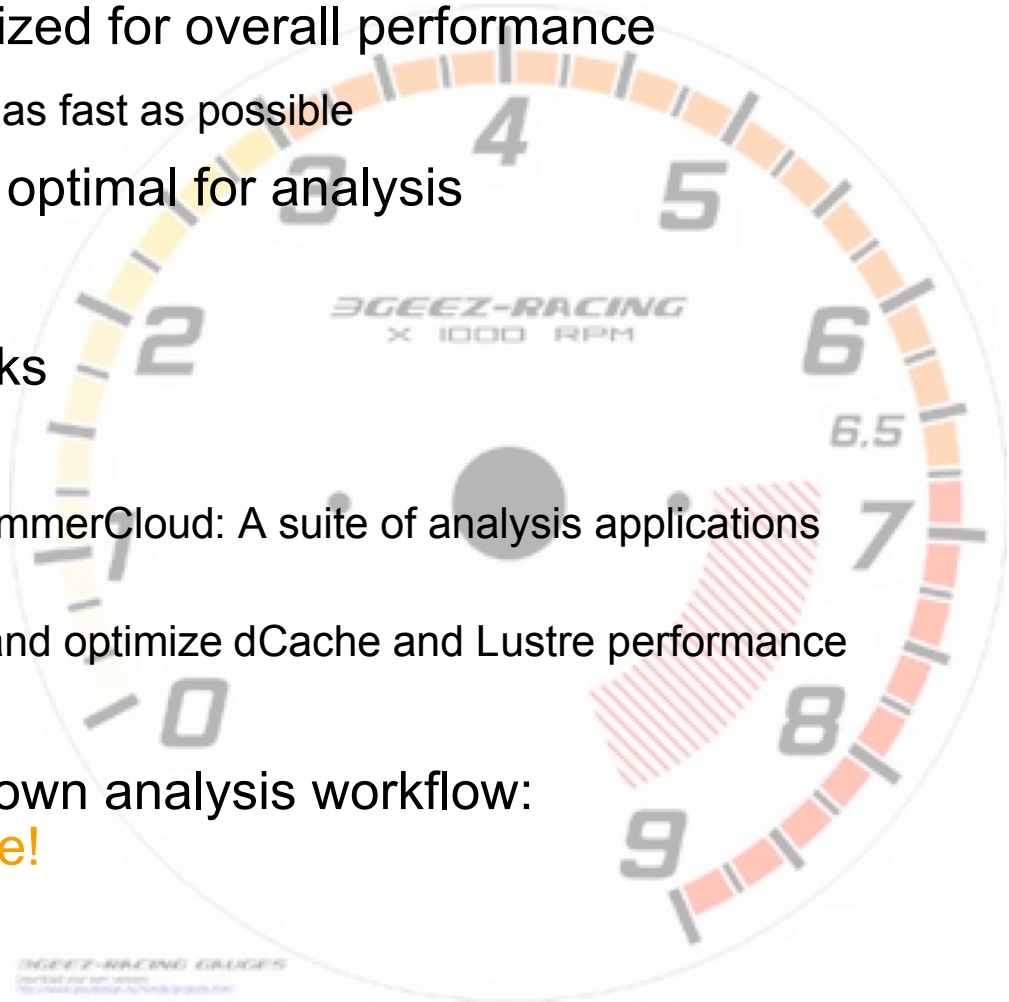
- Gsissh and X509 proxy used to login to NAF
  - Proxy lost in NAF
- Users also need X509 proxy in the NAF
  - To access data e.g. via gsidcap
  - To submit Grid jobs
- Test implementation using MyProxy
  - Details to be discussed with experiments before finalizing
  - MyProxy integration with Kerberos potentially interesting also for other communities

Storage Access: Speed

- Grid Cluster and dCache optimized for overall performance
  - Analysis: Individual job should run as fast as possible
- Lustre: Performance should be optimal for analysis

- Need for Application benchmarks
  - Some benchmarks from CMS
  - Atlas very recently developped HammerCloud: A suite of analysis applications that monitor performance
  - Will use this package to evaluate and optimize dCache and Lustre performance

- If you want to benchmark your own analysis workflow:
  → Contact us! You are welcome!



Summary and Outlook

- The NAF is working: ~300 registered users
- Hardware resources already substantial, enlargement in 2009
- More information, documentation and links to support:
  - http://naf.desy.de/
- Feedback: Through your representative in the NAF User Comitee

- **We all are waiting for our first great challenge: The first LHC colliding-beam data!**

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