# Tier-2 @ DESY
# Grid Tools for Atlas

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**on behalf of DESY IT**

# Grid @ DESY

- **DESY operates the DESY Production Grid since August 2004**

- **Grid resources spread among two sites: Hamburg and Zeuthen**

- **Support of many different experiments/VO:**
  - **Running: H1, Zeus, Hermes, Calice**
  - **About to start: Atlas, CMS, (soon LHCb)**
  - **Construction/planning phase: ILC, IceCube**
  - **Other: Geant4, ILDG, GHEP, …**

# Grid @ DESY

- **Generic infrastructure:**

  - **Single infrastructure for all VOs**

  - **Has proven to be best operational model**

    – **Best support**

    – **Best resource sharing**

    – **Easiest deployment of new components**

- **ScientificLinux 3 (Migration to SL4 on the way)**

- **gLite Middleware**

→ **The Atlas T2 is an "application" on the Desy-Grid Cluster**

# Resources @ DESY Grid Cluster

- **CPU cycles:**
  - 700 CPU cores (700 job slots) in 5 different clusters
  - 1020kSI2k
  - Caveat: Shared among all experiments!!!!
    - Atlas share (fairshare to be precise) is 33%
    - Atlas does not have 33% at all times! (neither the other groups)
- **Grid storage:**
  - ~150 TB disk, ~40 TB dedicated to Atlas
  - Tape backend exists, but not planned in the Tier2 context
- **Network:**
  - Officially 1Gbit/s WAN connection shared by all groups
  - 1Gbit/s or 10Gbit/s LAN and VPN Hamburg-Zeuthen
- **Core services: Resource Broker, VOMS server, LFC ...**

**As of today!**

# Revised hardware resources plan
## ramp up (total for DESY)

|            | 2007 | 2008 | 2009 | 2010 |
|------------|------|------|------|------|
| CPU [kSI2k] | 380 | 1500 | 2300 | 4000 |
| Disk [TB]  | 150  | 460  | 840  | 1440 |
| Tape [TB] (?) |   |      |      |      |

# Statistics:

## #Submitted jobs

- 19%
- 34%
- 9%
- 23%
- 0%
- 15%

Legend: Atlas, CMS, ILC, Zeus, H1, Others

## CPU time

- 6%
- 23%
- 26%
- 22%
- 1%
- 22%

Legend: Atlas, CMS, ILC, Zeus, H1, Others

## Wall time

- 7%
- 25%
- 19%
- 20%
- 1%
- 28%

Legend: Atlas, CMS, ILC, Zeus, H1, Others
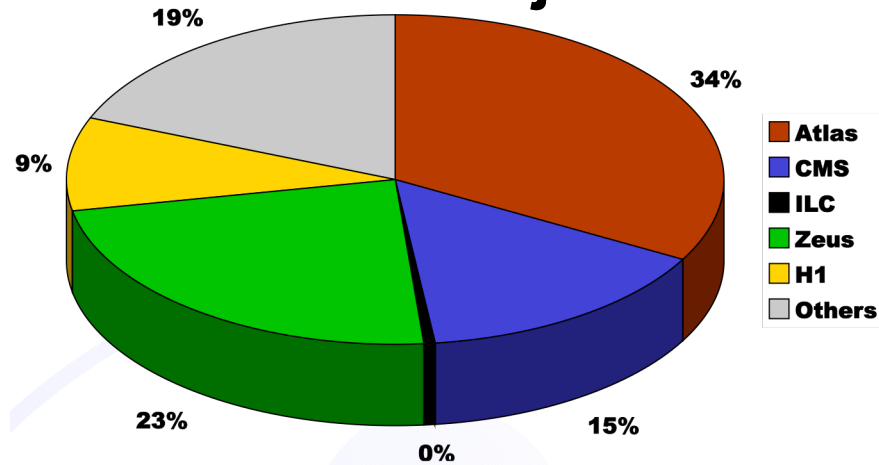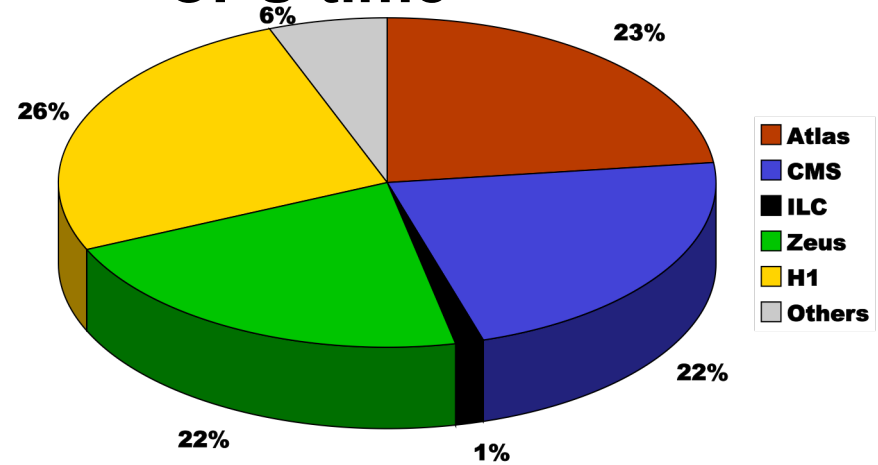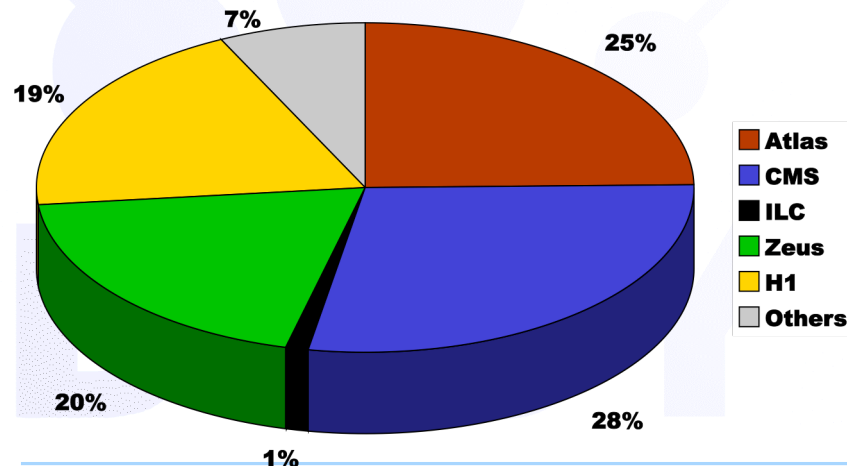
- From 1.1.07 - Now
- All Desy CE
- 100% is
  - 631.000 jobs
  - 2192 kh Wall time
  - 1495 kh CPU time

# Desy IT: More than "anonymous" Grid

- **Basic service: Email, Web, … administration**

- **Providing support for local groups:**
  - H1, Zeus, Photon science, theory…
  - … and local Atlas and CMS needs
  - Workgroups server, infrastructure, SW install, …

- **Participating in Data/Analysis challenges**

- **Collaboration with local groups concerning Grid business**

- **National Analysis Facility:**
  - Planning, prototyping and running of the NAF in coordination with the experiment people.

# Contribution to ATLAS DDM ops.

- **Kai Leffhalm from DESY/Zeuthen**

- **Processing of Savannah bug reports**

  - **DQ2 bugs reported by users, missing datasets or files…**

- **Monitoring of RDO and AOD dataset transfer**

- **Deletion of old files**

  - **Problem: Diskspace**

  - **Check if deletion successful**

# DDM ops, contd.

- **Integrity checks of files in Cern-Castor and CERN LFC**
  - Broken transfers, lost files, software bugs
  - Multitude of scripts

- **Develop and extend monitoring tools for DDM operations**
  - Many scripts → high load on catalogs
  - Improvements: Higher speed, less load
  - T1-T2 transfer, deletion and integrity monitoring

- **Coordination of replication activity in DDM ops team**

# Summary

- **DESY has working Grid infrastructure**

  - **Atlas T2 well integrated**

- **Local groups have support beside T2**

- **Collaboration with local groups for T2 business**

- **Planning of NAF**

- **DESY actively participating in DDM operations and development of monitoring tools**

**Backup:**

**ATLAS and CMS resource estimations**

# Revised hardware resources plan

## (C=CTDR, N=New)  for a average <u>Atlas</u> Tier 2
## (Ass.: 30 Tier 2's)

|  | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|
| **CPU [kSI2k]** | 80 N<br><br>700 C<br>(Quast 05) | 580 N<br><br>900 C<br>(Quast 05) | 900 N<br><br>900 C<br>(Quast 05) | 1720 N<br><br>1670 C | 2300 N<br><br>2200 C | 2900 N<br><br>2800 C |
| **Disk [TB]** | 45 N<br><br>340 C<br>(Quast 05) | 260 N<br><br>340 C<br>(Quast 05) | 440 N<br><br>570 C<br>(Quast 05) | 740 N<br><br>800 C | 1040 N<br><br>1140 C | 1300 N<br><br>1470 C |
| **Tape [TB]<br>(?)** |  |  |  |  |  |  |

# Revised hardware resources plan
### (C=CTDR, N=New) for a average <u>CMS</u> Tier 2
### (Ass.: 25 Tier 2's)

|               | 2007           | 2008           | 2009            | 2010            |
|---------------|----------------|----------------|-----------------|-----------------|
| CPU [kSI2k]   | 300 N <br> 400 C | 600 N <br> 900 C | 1000 N <br> 1400 C | 1810 N <br> 2300 C |
| Disk [TB]     | 50 N <br> 100 C  | 170 N <br> 200 C | 340 N <br> 400 C  | 530 N <br> 700 C  |
| Tape [TB] <br> (?) |           |                |                 |                 |