Upcoming Talks
From DESY

Christoph Beyer

- Wed 16.05.18@15:00: News from the DESY batch-clusters

Yves Kemp

- Thu 17.05.18@15:40: A smorgasbord of tools around Linux at DESY
DESY Site Report - Agenda

01 DESY 2030 Strategy

02 Campus Development @ Zeuthen

03 Infrastructure @ Zeuthen
• Second cold aisle operational
• New UPS
• VoIP phones via HH
• New datacenter routers

04 Research Computing
• Puppet, Printing & Windows
• BeeGFS for CSSB
• Petra III, Flash & XFEL
• Zwicky Transient Facility AMPEL
• CTA-OES

05 Some DV Projects
• Monitoring
• OpenStack
Fundamental Changes...

The Old Logo
Fundamental Changes...

The New Logo
Strategy “DESY 2030”
CT results are assessed using DESY perspective.

Decisions are fed back

CT results serve as input for DESY level strategy

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Decisions are fed back

CT results serve as input for DESY level strategy
DESY. Die Entschlüsselung der Materie
Drei historische Ereignisse

1. 16. Dezember 1959
   Gründung DESYs
   Einfluss von Werner Heisenberg

2. 26. Februar 1964
   Erste Elektronen beschleunigt
   „Der 1. Herzschlag des Zentrums“

3. 11. November 1991
   Zusammenschluss IIH mit DESY (Zeuthen, ZN)
   Eine deutsch-deutsche Erfolgsgeschichte

DESY 2030
Unsere Strategie für die Zukunft
Our Strategy for the future
DESY - Astroteilchenphysik

Die großen Herausforderungen

„Welche Rolle spielen hochenergetische Teilchen in der Evolution des Universums?“

„Können wir die Funktion von (Bio-) Materialien auf allen relevanten Längen- und Zeitskalen abbilden?“

„Können wir neuartige Hochgradientenbeschleuniger entwickeln?“

„Was ist die Physik jenseits des Standardmodells?“
New Interpretation of the Logo

Directions of DESY

- Accelerator Science
- Photon Science
- Astroparticle Physics
- Particle Physics
Over-Interpretation?
Directions of DESY
**HEUTE**

Wichtiges Tier-2 Zentrum
- LHC
- BELLE (Japan)
30.000 Knoten, 20 PB-disk

**MORGEN**

Interdisziplinäres Datenzentrum
- Teilchenphysik
- Photon Science (PETRA IV, XFEL-FLASH)
- Astroteilchenphysik

viele 100.000 Knoten, viele-100.000 PBdisk

Hamburger CDCS
Mission Critical Goals for the Future

Results of the Strategy Process

- PETRA IV next large scale project
- Contribution to extension of XFEL (FLASH@XFEL-Strategy)
- Handling of enormous amounts of data and Scientific Computing
- Contributions to LHC, esp. upgrade
- Extension of Astroparticle Physics in Zeuthen
- Development of interdisciplinary platforms
- Adjustments in supporting infrastructure and administration

Press Release:
http://www.desy.de/news/news_search/index_eng.html?openDirectAnchor=1356&two_columns=1
Campus Development
@ Zeuthen
Vision of the Campus in Zeuthen

2019+
International reference point for astroparticle physics (APP)

DESY APP division

CTA SDMC

Regional networks to
• universities
• schools

Research and innovation center for metropolitan region BB

Employees
• Today: 280
• Future: 400 (incl. guests)
CTA Science Data Management Center and New Canteen

- Architect competition probably starting July 2018 – aim to finish by 2020
Training center

- Funding still open – aiming for 2025
“Temporary” Office Space for CTAO & Guesthouse

Negotiations with club about cooperation progressing

Renovation/Enablement ongoing → June/July
IT Infrastructure
IT Infrastructure
Zeuthen

• 3x 180 kW UPS – sufficient for 1h @ 250 kW; can be extended with fourth module
• Phones currently replaced by VoIP
  - Avaya Integral 33 → Cisco IP
  - 2x CUCM (Cisco unified call manager): 1x publisher, 1x subscriber
  - 450 IP-phones + Cisco Jabber Clients
  - 80 IP-DECT phones
  - 1 operator device @ gate keeper
• Data center routers going to be replaced this summer
IT Infrastructure
Zeuthen

- Second cold aisle operational
  - 14 Racks (42 RU)
  - 9 Rittal LCP (Liquid Cooling Package), max. 30 kW/LCP
  - Max. 120 kW/cold aisle due to rate of water flow
  - TOR Cu-Switch: 2x48x10 GbE, 2x40 GbE uplink
  - TOR LWL: MPO 40/100 GbE (8 fibres)
Research Computing
Systems

Migration to Puppet 4 completed

• Preparation: Compilation of all catalogs is large computational effort -> using batch cluster

• Few differences between Puppet 3 and Puppet 4 found and fixed

Printing

• Printing still an important service at DESY

• DESY in process of new call for tender for printer lease

Windows

• Migration W7 -> W10 hottest topic

• paused in 2018Q1 because of unclear situation with desktop support w.r.t Spectre/Meltdown patches and hardware readiness for W10

• now preparing Windows 10 release 1803 for deployment for upgrade

• need to migrate larger parts of DESY with 1803 to keep the timeframe!
Centre for Structural Systems Biology (CSSB)
New Institute on DESY Hamburg Campus

Institute is using light and state-of-the-art electron microscopes

• Using DESY Maxwell HPC cluster for analysis
• Using 3 PB BeeGFS parallel filesystem for storage
• BeeGFS details:
  - Building blocks:
    • Server with 256 GB RAM, and 2x2 TB SSD for Metadata
    • JBOD Chassis with 60 x 8 TB disks attached to server, ZFS used as software RAID
  - Rebranded Supermicro hardware by Megware (small German company, the only platinum partner of BeeGFS)
• System currently in configuration phase
PETRA-III and FLASH  
Hamburg

- ASAP³ data taking and management workflow is well established and running smoothly [1]
- 2 new beam lines added, more to come
- Focus is moving to data analysis
  - Maxwell HPC cluster, GPUs ...
- New data sources are being added to ASAP³
  - Detector development, on-site laser and microscope experiments, long term XFEL accelerator monitoring, ...

[1] Journal of Physics: Conference Series 664 (2015) 042053
European XFEL

Hamburg

- Data taking off-campus in Schenefeld, storage & analysis on the DESY campus
- User runs in November 2017, March & May 2018
  - More continuous operation starting in summer
- About 1 PiB of data stored already, up to 50 TiB per day
- Calibration and analysis using the Maxwell HPC cluster at DESY
- One SASE active, two more starting this year
- Infiniband monitoring developed by IT

SASE: Self-Amplified Spontaneous Emission
Zwicky Transient Facility – Alert Management, Photometry and Evaluation of Light curves (ZTF-AMPEL)

- Transient astronomical events (e.g. supernovae) are detected at U Washington (Kafka-Stream) and other sources
- Facility to react quickly and automatically on events, correlate with other detectors
- Framework to perform analysis on thousands of potential targets
- Technically 2 Dell PE R740(xd): MonoDBs, local processing of quick jobs, submission to farm for medium/long-term jobs

CTA Observation Execution Software (OES) Test bed

- Infrastructure for an improved software development lifecycle
- Continuous Integration (CI) system (Jenkins):
  - Build software
  - Run static code analysis and unit tests
  - Integration tests
  - Packaging of software
- Access for CTA-OES developers (also outside DESY)
- Dedicated cluster in DMZ for build and test jobs
Datacenter Internal Projects

Sample Projects (Zeuthen)

New Monitoring Infrastructure

- Consolidate many monitoring tools, cron jobs, mail generators etc. into consistent environment
- Metric monitoring with Prometheus
- Event monitoring probably with Fluentd and CrateDB
- Visualization with Grafana
- Alerting with Alertmanager

OpenStack

- HH has OpenStack installation moving from pilot operation mode to production mode
- ZN wants to learn OpenStack, Ceph, SDN etc.:
  - 7 Dell PE R640 (2x Xeon 4114, 20 cores, 128GB RAM) for installation, controller and compute nodes
  - 4 Dell PE R740xd for Ceph, each 16x 2TB HDD, 4x 200GB SSD and 1x 3TB NVMe
  - Internal network with 2x 25GbE and replication network 2x 50GbE based on Mellanox ConnectX-5
  - 2x 25/50/100GbE Mellanox SN2100 with Cumulus Linux
- New coworker starting 01.06.2018
Summary

• Strategy with challenging research topics for the next decade and beyond
• Campus development to
  – Allow for increasing headcount
  – Open Institute for public
  – Intensify collaboration with partners
• Continuous development of IT infrastructure to handle upcoming demands
Thank you!

Questions?
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