LOFAR20 Operations

2nd MSSS Meeting
Dwingeloo
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Hanno Holties

Current Status (CS1)

- Much learned w.r.t. LOFAR operations
  - Operating two systems
  - Remote operation
  - LOFAR:
    - Central coordination
    - Low level process control
    - Many "squashed bugs"
    - Collaboration Development - Operations

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Current Status

- Much yet to be done/improved
  - Operator interfaces
    - Scheduling, Monitoring & Control applications not functional for CS1 operations
    - System Health Management in rudimentary state
  - System inspection tools
    - Mainly "engineering" tools
  - Idem for data inspection tools
  - Standard/default offline processing
    - Pipelines & scripts
    - Scheduling functionality
  - Data management
    - Datasets
    - Metadata

LOFAR20 Operations: Usage

- Large commissioning projects
  - Probing the capabilities of LOFAR
  - Preparation for scientific operation
- Further development/engineering
  - Roll out of stations
  - Software development
- Some room for initial scientific projects
  - Best effort
  - Hands on/limited support
- Maintenance

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LOFAR20 Operations: Tasks

- Coordination system usage
  - Track & plan engineering & maintenance activities
  - Mediate w.r.t. observation time
- Initiate & Monitor observation processes
  - Online: observations
  - Offline: standard pipelines
  - Data management: archiving & cleaning up
- Monitor & Control system state
  - MAC Interface
  - SHM
  - Special purpose data inspection
- Three operators, two systems
  - Require tools & automation
  - Minimize 'manual' checks & interventions
- Science support
  - Being built up (slowly)

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LOFAR20 Operational system

- ◆ **Defined system state**
  - ⊕ Commissioning & Acceptance
    - • Hardware/stations
    - • Software releases
  - ⊕ => Less agile
    - • Development will continue
    - • Implemented ≠ Operational
      (vs instability & lower efficiency)
    - • Handover procedures engineering – operations
  - ⊕ Roll Out continues…

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LOFAR20 (CEP) Resources

◆ Resource usage

⊕ Enable (semi) continuous operation
- Automation/scripting
- Pipelines

⊕ Streamlining dataflow
- Reduce data before archiving
- Limited availability raw data in time

⊕ Separation usage & access
- Online processing
- Pipelines
- Commissioning & Development
  - User access

⊕ Central coordination

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LOFAR20 Data management

- Really start "throwing away" raw data
  - Scheduled offline processing
  - Scheduled data transfer & clean up
- Project based storage
  - Proprietary data
  - Allocation
- Long term archive
  - Search & retrieval facility
  - PB storage

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LOFAR20 Central Processing

- ◆ Ensure processes are not in each others way
  - ⊕ Banking of storage for online process
  - ⊕ Offline processing:
    - • Storage partitions?
    - • Job scheduling?
    - • Dedicated machines?
    - • Dedicated timeslots?
    - • Processing requirements?
      => use cases!
  - ⊕ Clean up local/temporary disk space

LOFAR20 Some numbers: Time

- 1/4/2009 - 31/12/2009:
  - ~6480h
- 1/3rd efficiency:
  - ~2160h
- MSSS (single beam)
  - ~1237h
- Other modes/projects...

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LOFAR20 Some numbers: Storage

- LOFAR20 temporary storage (Phase 1 CEP)
  - ~500TB
- MSSS raw data
  - ~2.7 PB
  - ~370 TB/week (100% observing time)
- LOFAR20 long term storage
  - TBD (hundreds of TB's)
- MSSS post DP3 data
  - ~11TB
  - ~1.5TB/week
- Databases…

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LOFAR20 Some numbers: Processing

- LOFAR20 CEP internal bandwidth (burst)
  - ~25 Gbps
- LOFAR20 CEP processing capacity
  - ~5 Tflops
- LOFAR20 CEP offline architecture?
- MSSS requirements?

Scaling storage & processing
        with number of stations