DM Services and Software Status (and Evolution)

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DM System Architect

LSST Commissioning Plan Review
January 24-26, 2017
Outline

- DM Science Pipelines for Commissioning
- LSST Science Platform for Commissioning
- Data Products and Processing Services
- Service Evolution
- Service Testing
- Hardware and Network Evolution
DM Science Pipelines for Commissioning

- **DM will** provide sufficient functionality to support hardware when it is delivered:
  - The Auxiliary Telescope:
    - Instrument Signature Removal (ISR), spectrophotometry, atmospheric fitting
  - ComCam:
    - ISR, PSF characterization, photometry, astrometry
  - LSSTCam:
    - Calibration products (including Collimated Beam Projector processing)
    - ISR, PSF characterization, photometry, astrometry
- **DM will** provide a full stack, capable of carrying out the survey, before the Science Verification phase
- In reality, DM **expects** to provide a full stack, sufficient to start Operations, before the ComCam sustained operations phase.
- **We will** have tested these levels of functionality using precursor data (predominantly HSC and ZTF) before the start of Commissioning.
HSC vs. HST

HSC \( (riz, \sim 2.5\text{hours}) \)  

HST \( (640\text{ orbits } \sim 500\text{ hours}) \)

c. 500 LSST visits (credit: Hitoshi Murayama)
The DM Replan

- As you may know,
  - *LSST DM is coming to the end of a major replan so the exact status of the system during Commissioning is not yet clear.*

- This replan will be followed by a review of DM, which is expected by Summer 2017.

- In particular, we may delay implementation of some components, e.g.:
  - "Multifit" for galaxy shape measurement
  - Crowded field photometry (although alerts in crowded fields will be available)

- We do not expect these delays to impact our ability to commission the hardware systems, or to prevent us from issuing alerts as soon as templates are available.
LSST Science Platform for Commissioning

- Portal for viewing automated metrics from production
- Notebook for human-driven analysis and investigation
- Commissioning Cluster at Base Center provides ad hoc computing, storage, and database; batch production services at NCSA are available
- Software for single-frame processing including PSF and WCS estimation, image differencing, wavefront processing; spectrophotometric pipeline for Aux Telescope
Service Start-Up and Operations/Maintenance Plan

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<th>FY2018</th>
<th>FY2019</th>
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Service List

- Archiving service (Camera and Aux Telescope Spectrograph)
- Telemetry Gateway service
- Engineering and Facilities Database transformation service
- Data Backbone
- OCS-controlled Batch Processing service
- Offline (and Catch-Up) Processing service
- Prompt Processing service
- Data Release Production service
- Science Platform environment on Commissioning Cluster
- Data Access Center user services and Science Platform
- LSST Event Mini-Broker hosting
Service Availability at Early System AI&T

- Archiving service (Camera and Aux Telescope Spectrograph)
- Telemetry Gateway service
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5% capacity

Files

Batch, Notebooks, Files
Service Availability before ComCam Sustained Operations (Feb 2020)

- Archiving service (Camera and Aux Telescope Spectrograph)
- Telemetry Gateway service
- Engineering and Facilities Database transformation service
- Data Backbone
- OCS-controlled Batch Processing service
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Product databases

Full capability
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### Service Availability before Science Verification (Nov 2020)

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- OCS-controlled Batch Processing service
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- Science Platform environment on Commissioning Cluster
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- LSST Event Mini-Broker hosting
Service Testing before Delivery to Commissioning

- DM Continuous Integration including testing at varying cadences using L1 Integration, Verification Cluster, and Prototype Data Access Center environments on simulated and precursor data; real data when available
- DPP operations "dress rehearsals"
- Cross-subsystem early integration pathfinder exercises
Hardware and Network Availability at Early System AI&T

- Auxiliary Telescope archiving and processing hardware
- Commissioning Cluster compute and storage
- L1 archiving and prompt processing hardware at Base and Archive (5%)
- L2 Data Release processing, QA, QC hardware at Archive (5%)
- Tape library system
- Network links operational at production speed
- Prototype Data Access Center hardware
- Initial Archive and Base hardware installed and tested during May 2018-Sep 2019
Hardware and Network Evolution

- Expansion of L1 hardware at Base and Archive and L2 hardware at Archive to 100% before Full System AI&T (May 2020)
- Production Data Access Center hardware at Archive before Full System AI&T (May 2020)
- Production Data Access Center hardware at Base before Science Verification (Nov 2020)
Backup Slides
Early Integration Pathfinder Exercises

- DM Demonstrates ability to compile and link against the v1 DAQ software
- Test of Populating EFD with Camera Telemetry
- OCS-DM-TCS-CCS Start/end of night test
- Test of EFD transformation under DM device control
- Full OCS-TCS-CCS-DAQ-DM Test: Complete Visit
- Full OCS-TCS-CCS-DAQ-DM Test: Mini Night
- Full OCS-TCS-CCS-DAQ-DM Test: Daily Cycle, Including Calibration