Status and progress of the LSST Scheduler

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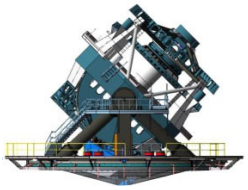
SAC Meeting
February 21 2018

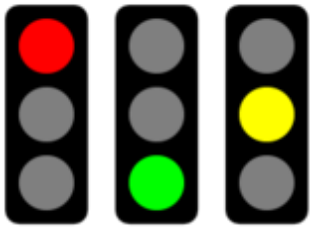


Overview

- OpSim: The Operation Simulation environment.
  - It is composed of two main packages (and several other sub-packages).
    - sims_ocs: The Simulated Observatory Control System or SOCS
    - ts_scheduler: The main scheduler code base
  - Provide a framework to perform **realistic** simulations and optimization studies mimicking the actual observatory operation
  - Enable quick and easy swapping of SOCS by the actual OCS

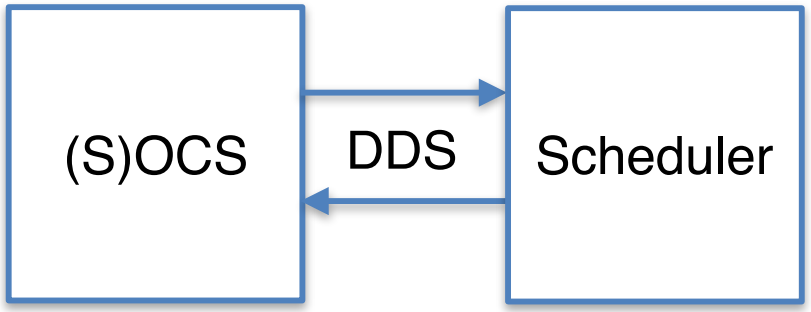
Progress and Status

- OpSim v4 being used to produce new baseline strategy (Lynne's presentation)
  - Contains important changes and improvements in both the main packages and other sub-packages (e.g. sky brightness models)
  - Still not officially released
- Latest version of Scheduler includes some new scheduling algorithms features:
  - Time balancing between proposals
  - Better control of visit distribution with respect to airmass and hour angle
  - Look ahead for time series and **area distribution*** proposals (* - with v1.2 of scheduler)
  - **Driver-API v0**

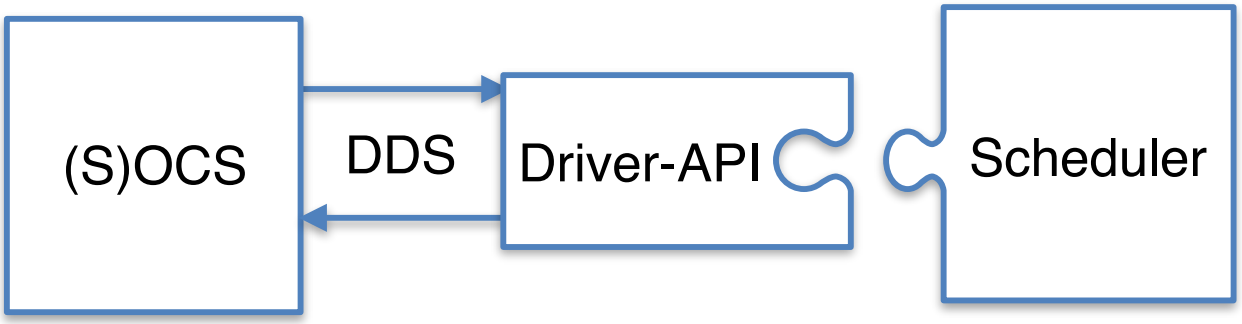


Driver-API

As it was…

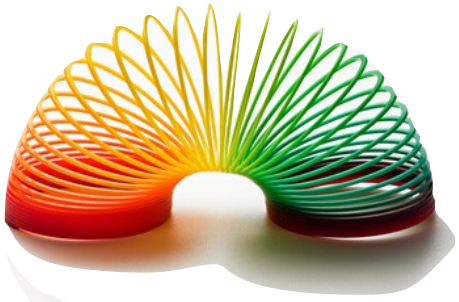


As it will be…

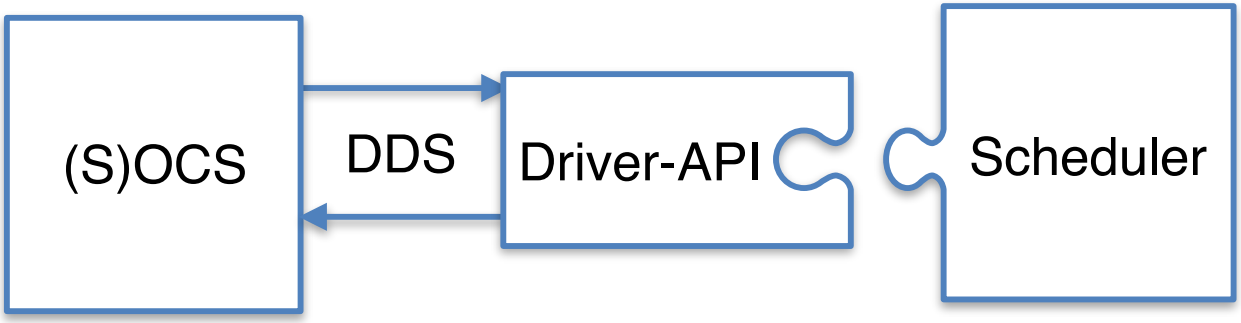


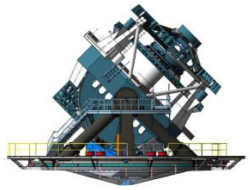
Driver-API: Flexibility

- Encapsulates the complexity of the DDS middleware communication interface
- Establish standard interface mechanism for scheduler functionalities
  - Input telemetry
  - Target generation
  - Target validation
  - Error handling
  - Commands/Events handling



- Support switch to a more flexible algorithm: **Feature Based Scheduler**
- Support survey strategy team optimization efforts and community-driven cadence experiments in a realistic environment (a.k.a. OpSim)
- Support the T&S scheduler team path towards operations





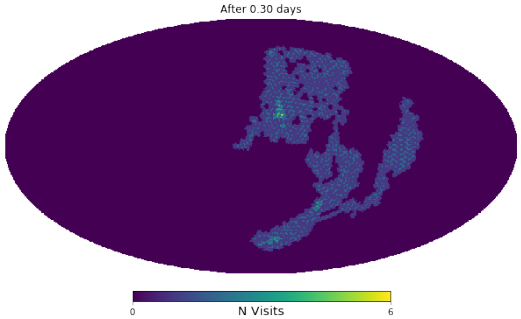
A feature based scheduling algorithm alternative

- Feature based scheduler is similar to current scheduler, but with some subtle important changes

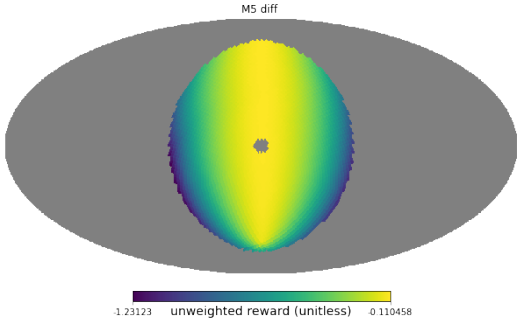
Features → Basis Functions → Reward Function → Decision Function (survey)

- Features
  - Current status of survey progress, sky conditions, telescope status
- Basis Functions
  - Computed from features. HEALpix maps (or scalars). Similar to the “time need” OpSim map, etc.
- Reward Function
  - Linear combination of the Basis Functions. “Similar” to the final ranking OpSim map
- Decision Function
  - Since we are at higher spatial resolution, this converts the Reward Function to an actual pointing

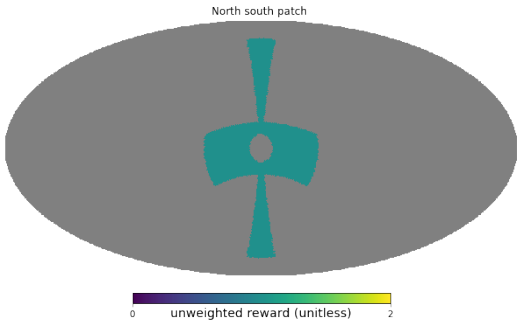
A feature based scheduling algorithm alternative



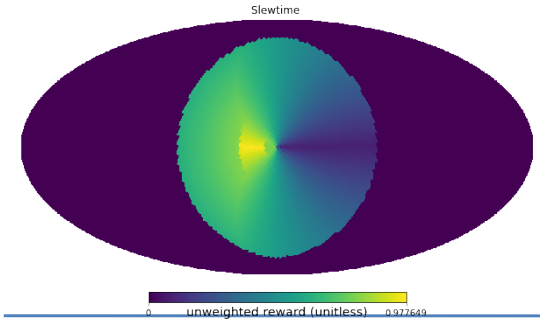
Visit history



5-sigma depth reward map



Alt-az mask



Slew-time reward map