EVLA Data Processing PDR

Observation Scheduling

Boyd Waters, NRAO
e2e-EVLA Interaction

Observation Scheduling Software

Proposal Preparation and Submission
Observation Preparation
Observation Scheduling
Data Archive
Image Pipeline
Data Post-Processing

Monitor & Control System

Observation Scheduling
Data Archive
Image Pipeline
Data Post-Processing

Antenna
Feed
Receiver
IF System
Fiber Optics Transmission System
Local Oscillator

Monitor and Control System

CBE Correlator

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Diagram Design: B. Clark

Diagram showing the e2e-EVLA II system with the following components:

- E2E
  - Data Reduction System
  - "Observe"
    - "How's it going" Screen
  - Scheduler
- M & C
  - Astronomer
  - System
    - M & C
    - Correlator
    - Other hardware
- Archive

The diagram illustrates the flow between these components as part of the e2e-EVLA II system.
Observation Scripting Path

Scriptor

Intentional Proposal

Prioritized Proposal

project

Queue

Real-time

XML

XML

Observing Table

Glish Script

Data representation

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Scheduling Phases

1. **Scheduling Phases**
   - **Real-Time Scheduler**
   - **Control Scripts**
   - **Test Engineer**
   - **Observing System**
   - Calibration Data is a specific kind of "conditions" data.
   - Dynamic Scheduler
   - Array Operator
   - Real-Time Scheduler
   - **Queue**
   - **Visibility Data**
   - **9. Remote Observing Toolkit**
   - **Prioritized Proposal**
   - **Generate Observing Scripts**
   - **Scriptor**
   - **8. Observation Scheduling Toolkit**
   - **5. Observation Scripting Toolkit**
   - Calibration Data
   - Normalized Proposal
   - **[Image] Observation Monitoring and Control System**

2. **Observation Monitoring and Control System**
   - Test Engineer
   - Visibility Data
   - Calibration Data
   - **Monitor Data**
   - Control Scripts - "as observed"
Dynamic Scheduling

Structure the Observation…
…so that we can…

**Respond to Events on a Short Time Scale**

Changing conditions (e.g. weather)
Targets of Opportunity (e.g. GRBs)

→ **Block-Based Scheduling**
Observing Block

Preamble

Post-amble

~20(?) minutes nominal
Observing “Session”

• A series of blocks
• Preamble is run ONLY for the FIRST
• Post-amble is run ONLY for the LAST
Observing Block Constraints

• “Run this block until the calibrations converge”
• “I can’t run unless the previous block has run successfully”
• “I MUST run at 16:42:30 GST on 30 May 2002”
  – (fixed scheduling is dynamic scheduling with time-domain constraints)
Block Templates

- Debug blocks
- Template blocks
- “Default” blocks
Block-Based Scheduler

Telescope sees **ONE BLOCK AT A TIME:**

**Block Queue**

- **Preamble**
- **“Post-amble”**

- **Observing Block**

**Implications:**

- Simplifies the telescope state data
- Telescope reports block execution status back to the block queue
- All “observing logic” is maintained by the Block Queue
Block Execution

Input Queue:

Execution:
Next Steps

• Gather and Codify Requirements
  – Observing Block constraints

• M&C ↔ Observing System Interaction
  – Formal Model

• Observing System Scripting
  – How instrument commands and observing constraints are expressed