EVLA Overall Software Design

Final Internal Review
Subsystems II
by Tom Morgan

Outline

• Monitor and Control
• AMCS, CMCS
• Online Analysis
• TelCal
• Quick-Look Pipeline
• Data Capture and Format
• Offline Data Reduction
Monitor and Control

- Large Number of External Connections
- Connections with Many other Subsystems
- Wide Range of Data Volumes
- Wide Range of Data Types
- Wide Range of Communication Patterns and Frequencies
Online Monitor and Control

- Focus on Connections with other Online Components
- Manual Control from the User Interface
- Automatic Control via Scheduler and Executor
- Feedback to Executor and Scheduler
Online Monitor and Control

M&C Permanent Store

- Continuous Output of Monitor Data to the Monitor Data Archive
- Updates of Data Essential to Real-Time Operations
- Retrieval of Data Essential to Real-Time Operations
M&C Permanent Store

Monitor and Control

- Monitor Data
- Properties
- Monitor Data Archive
- Telescope System Configuration Database

M&C High Volume Data

- Direct Feed of Raw Output from the Correlator Backend
- Primary Route is to Science Data Archive
- Copy Forked to TelCal when needed
- Copy Forked to QLP when needed
Antenna Control

- Antenna Objects for a Single Sub-array
- Antenna Objects Receive Control Messages from the Executor
- Antenna Objects form and transmit individualized Control Messages to the MIBs
Antenna Control

Online Data Analysis

- Flagging
- RFI Detection and Excision
- Atmospheric Modeling
- Complex Gain
- Pointing Offsets
- Focusing Offsets
- CBE Processes
Flagging

- Needed by TelCal, QLP, Offline Data Reduction, and Operations
- Needs monitor data and desired Antenna state
- Generated once every Correlator Dump (for VLA)
- Sent to DCAF
- Located in Executor (?)

Flags Array

- Cause
- Antenna
- Severity Level (e.g., 0 - 15)

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QLP

- Just enough DR to Display Spectra and Produce “Dirty” Images
- Triggered from DCAF when Sufficient Data is available
- Visibility Data comes directly from CBE
- Visibility Data could come from Science Archive if timely delivery is possible
• Capture and combine Metadata from a number of sources
• Organized data into hierarchy of Integrations, Sub-scans and Scans for each Execution Block
• Associate data from different Integrations, Sub-scans, Scans and Execution Blocks based on time tags
• Reformat for external use
TelCal

- Homeless Function
- High volume data input from CBE
- Complex Gains
- Stored Complex Gains used for Pointing and/or Focus determinations
- Pointing Offsets
- Focus Offsets

TelCal (Integration Level)

DCAP
Calibrator and Flagging Information, Frequency Bands
Complex Gains
TelCal (Complex Gains - May be stored internally as well)
Raw CBE Output

Executor
Complex Gains

CMCS / CBE
Monitor and Control

AMCS

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TelCal
(Scan Level)

- DCAF
  - Pointing / Sub-reflector Positions
  - Stored Complex Gains

- Executor
  - Pointing Offsets / Sub-reflector Corrections

TelCal
(Pointing / Focus Offsets)

Offline Data Reduction

- Offline Data Reduction Requirements provided in SSR
- DCAF will send output to Science Archive in Export Data Format required by the Archive
- Data Reduction packages will access the Archive