FLOW OF MONITORING DATA THROUGH THE MeerKAT TELESCOPE CONTROL SOFTWARE

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The MeerKAT telescope, under construction in South Africa, is comprised of a large set of elements. The elements expose various sensors to the Control and Monitoring (CAM) system and the sampling strategy set by CAM per sensor varies from several samples a second to infrequent updates. This creates a substantial volume of sensor data that needs to be stored and made available for analysis.

The flow of sensor data through the CAM system, shows the various memory buffers, temporary disk storage and mechanisms to permanently store the data in HDF5 format on the network attached storage (NAS).

Controller
- Takes commands from the control application, accepts a query parameter, creates a request and forwards it to the Broker. The Broker is responsible for processing a query and returning a response.
- The Broker forwards the request to the appropriate system for processing.

Proxy
- Accepts a request from the Controller or Broker.
- The request is then redirected to the appropriate system.

Monitor
- Monitors the system for any errors or exceptions.
- Provides feedback to the Controller or Broker.

Pulld Handler
- Retrieves data from the storage node.
- Sends the data to the foreign data wrapper.

Foreign Data Wrapper
- Converts the data into a format that can be accessed by the HDF server.

HDF Server
- Stores the data in an HDF5 file.

IPython
- Provides a command line interface for data manipulation.

Legend
- KATCP
- Redis
- PostgreSQL

Sensor Sample
- On each node in the HDF server, a sample of recent sensor data is stored in a separate file.
- The sample is then indexed in a database for easy access.

Conclusion
- The system is designed to handle the large amount of data generated by the MeerKAT telescope.
- The system is scalable and can handle the information generated in real-time.