DSH.LMC
Logging & Monitoring

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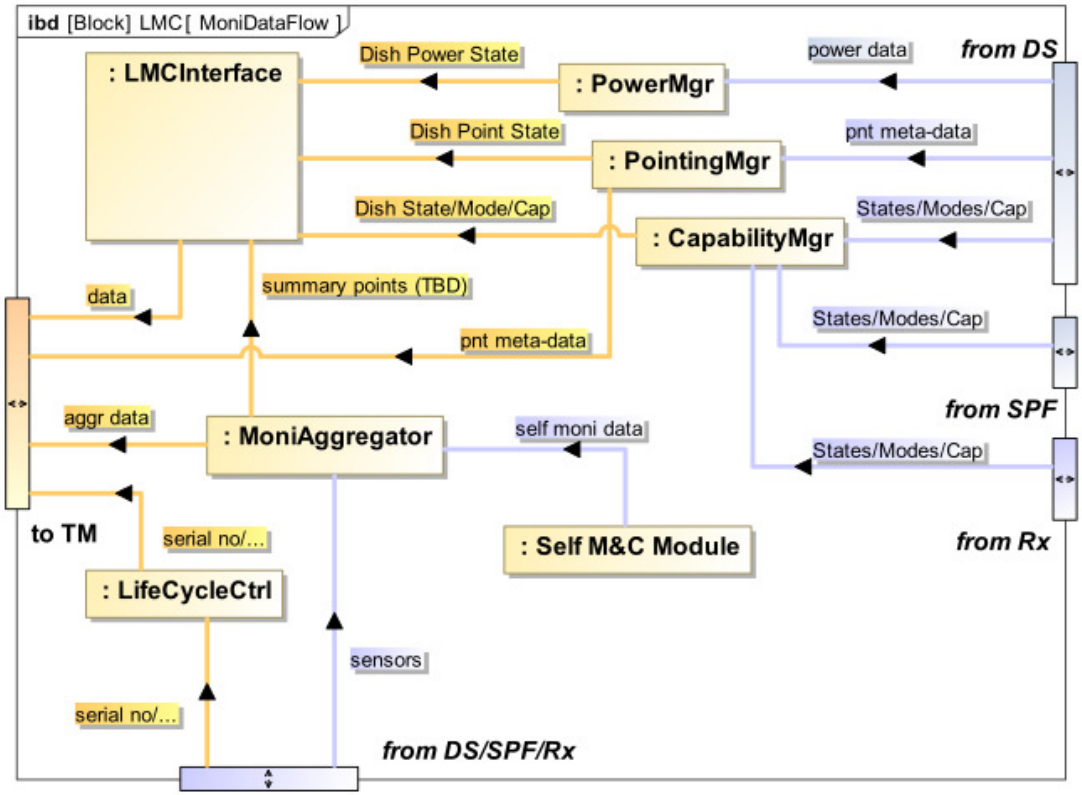
Outline

- **Monitoring**
  - Relevant Requirements
  - Design Assumptions
  - Self Monitoring
  - Patterns and best practises
- **Logging**
  - Relevant requirements
  - Design assumptions

Monitoring Requirements (LMC L4 ReQ)

Id	Description
R.LMC.FMON.1	**LMC Aggregate Sensors** LMC shall make provision for sensor aggregation from other sub-elements and a "drill-down" capability for monitoring points in the DSH as requested by TM.
R.LMC.FMON.16	**LMC Report Sensors** LMC shall make provision for "drill-down" monitoring points for the LMC components in the DSH to enable fault diagnostics, in accordance with the LMC interface guideline.
R.LMC.FMON.21	**LMC Structure of Reporting** LMC shall report monitoring information in a hierarchical structure corresponding to the product breakdown structure.
R.LMC.FMON.20 R.LMC.FMON.23	**LMC monitoring data rate** Self-monitoring: The LMC self-monitoring data rate reported to TM shall be less than 50kbps. Monitoring: The maximum LMC-TM data rates for the SKA_MID Dish shall be 200kbps for monitoring data.
R.LMC.FMD.2 R.LMC.FMD.4	**Meta-data reporting** LMC Send estimated pointing LMC send pointing correction sensor.
R.LMC.FMON15	**LMC Report predicted failures** LMC shall report to TM all DSH monitoring points that are required for preventive maintenance or for predicting failures.

Monitoring - Design Assumptions



Assumptions

- Summary/rolled up points (dish states/modes/cap...) @ at the LMC interface device, forwarded from internal LMC components
- Meta-data goes directly to TM without being defined in the Interface
- Serial numbers, etc.. will be retrievable from the Interface device via command but not defined there
- Physical moni points going in the interface are TBD

Monitoring aggregation

- Unique device with ALL Dish monitoring information aggregated in a structure (e.g. an XML formatted string)?
- What functionalities to be provided (e.g. tree navigation/cutting depth/...)?
- Is the aggregate reporting on TM request (e.g. not polled/events)?

Monitoring - Patterns & Best practises

Best practises to organize monitoring points in the hierarchy

- Aggregate all monitoring points to one device → Tango anti-pattern?
  - ✓ How to have information on hierarchy location and belonging component? (usually given by the mother device...)
  - ✓ Add properties to each moni points (e.g. componentId/Level)?
- The Tango way: aggregate by hardware/logical component?
- Find optimal balance between too many/unneeded hierarchy levels traversed and one device exposing the all world
  - ✓ Common LMC device categories to split and logically organize moni points?

When to forward an attribute?

- Possible rule: When no processing has to be done on that attribute on the device, e.g. only read/write/subscribe features are to be exposed to clients

Writable attribute vs Setter command

- Second approach followed in internal ICDs, e.g. no writable attributes
- Rule of thumb: For direct HW sensor set use WRITE attr, for triggering internal operations (e.g. setting the operating mode attr) use setter commands?

Configure reporting level

- Turn on/off attribute event reporting in a device is a Tango anti-pattern
- Let clients decide what to subscribe to/unsubscribe from

Self Monitoring & Control

Performed by Self M&C Module

- Monitor system services (e.g. mysql/tangoDB/...) and indicators (e.g. cpu/memory/...)
- Monitor LMC Tango server status
- Monitor sub-element host machines
- Monitor system hardware sensors (temperature/...)
- Execute startup/shutdown of system services and LMC Tango devices
- Provides handlers to re-start services/devices automatically
- Report self-monitoring data to TM (mapped to SKA SCM?)

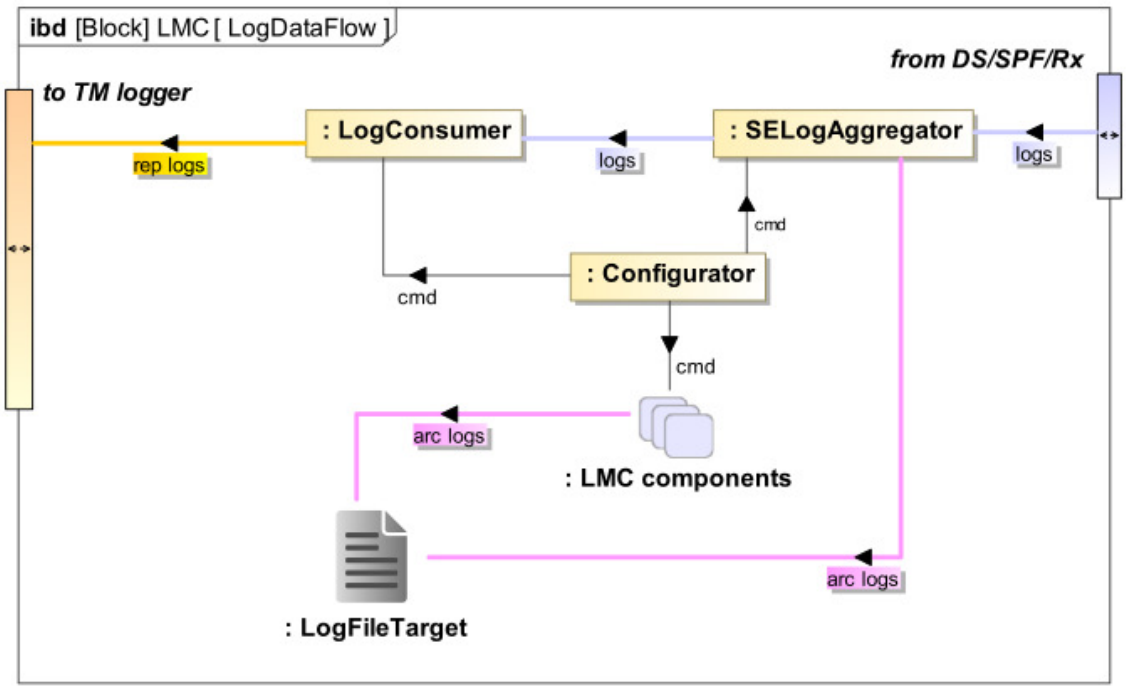
Re-use/specialization of existing Tango devices & open source frameworks

- System Services/Host/Sensors Monitoring and automated service restart handlers
- Performed by Nagios or others (TBD)
- Import of moni data in Tango devices (e.g. for Nagios)
- Tango device driver SNMP (available in Tango device repository)
- New Tango device interfacing with Nagios Query Handler via Unix socket (from Nagios v4) (under devel)
- System Service & Tango device server monitoring & control (startup/shutdown/restart)
- Specialization of Tango Starter & community devices (e.g. Restarter) OSManager)
- Some of these require implementation of missing features

Logging Requirements (LMC L4 ReQ)

Id	Description
R.LMC.FMON.12	**LMC Report Logs** The LMC shall report all log messages for DSH to TM, and shall allow TM to control logging reporting, incuding: a) The destination for logging messages b) The logging level.
R.LMC.FMON.19	**LMC Reporting on missing components** LMC shall not report alarms, events, logs, or faults on missing DSH components
R.LMC.FMON.25	**LMC Remote access of logging files** LMC shall allow TM to access and copy local (to the DSH) logging files (where applicable) TBC.

Logging Requirements (LMC L4 ReQ)



- Different logging levels/targets requested for TM reporting, internal logging and archiving?
- Internal logging = file/archiving logging?
- Common log format across SKA?
- System logs to be integrated and reported?

LogConsumer device role

- Collecting all SubEl and LMC logs device
- "Echo" the received logs to TM at the same received level
- Issue: logging source/timestamp will change, but mitigated by a slight change in Tango core Logger and LoggingEvent classes (TBC)

Configurator device role

- Implements commands to set log levels/targets on all LMC and SubEl devices (but LogConsumer)
- Implements command to set logging levels/targets to LogConsumer, setting the reporting filter to TM