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SKA Distributed Tango Facilities Use Case

The use case was captured in a google doc that can be viewed and commented on at:
https://docs.google.com/document/d/1RSFKpdjPn37OG9cYnTYXNbUwuj-1HMgdW3tnYfYIlkw/edit#
Feel free to comment on the google doc and use it to collaborate as needed.

Use case text pasted here for convenience (without diagrams):

SKA Distributed Tango Facilities Use Case

Background

After attending the Tango workshop at ICALEPCS in October 2015 and some discussions at the conference a very early suggestion for using distributed Tango control systems for the SKA project where described (with very little hands-on experience with Tango at the time).This is in Appendix A.

Below is a conceptual description of the use case for distributed Tango facilities for the SKA project.
The SKA-Mid telescope is being used as example for this use case.

Use case description

For this use case, let's assume the SKA-Mid consists of the following functional Elements:
TM (Telescope Manager) - central monitoring and control system
SDP (Science Data Processor) - science data processor
CSP (Central Signal Processor) - correlator, beam former, pulsar timing engine, pulsar search engine
DISHes (1 to N, N ±200 for SKA Phase 1, ±3000 for SKA Phase 2)

TM is the central monitoring and control system for the SKA-Mid telescope and orchestrates the other Elements into a working telescope. Each of the Elements is expected to implement an LMC (Local Monitoring and Control) Tango device server providing a standardised monitoring and control interface to TM.

Each of the Elements, including each Dish, has to operate as a stand-alone entity (in terms of starting up, restarting, deployment, upgrading, etc.) and will themselves most probably be a Tango facility with its own Tango host and hierarchy of sub-elements, applications, components and devices.

All these distributed Tango facilities then need to be coordinated by TM into a central SKA-Mid Tango facility. TM implements Leaf nodes (Tango Clients) that connect to each of the Element LMCs at the bottom of the TM hierarchy (and the Element LMC typically being at the top of the hierarchy of the Element's Tango facility). A question here would be if there are any aspects of Tango architecture or known limitations that will impact the decision on whether to have a separate standalone TM Tango facility in addition to SKA-Mid Tango facility, vs combining these into a single central SKA-Mid Tango facility only with no TM Tango facility.

Remote logging from the distributed Tango facilities is another related use case. The roles and responsibilities specified for the LMC includes support for remote logging. A possible approach to this would be that each Element implements an Element Log Consumer Tango device to provide localised logging for that Tango facility, gathered and stored at the Element. And that the LMC Tango device of the element collaborates with the Element Log Consumer to distribute the logs from a selected component and level (as commanded via the Element LMC interface) to TM via a remote log message on the Element LMC interface.

A suggestion of the distributed Tango facilities for SKA-Mid is provided in the following diagram. Discussion, suggestions, pro's and con's of this approach are invited.

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Please contact me should further clarification be required before the LMC Harmonisation workshop.

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Summary

TM is the central monitoring and control system for the SKA-Mid telescope and orchestrates the other Elements into a working telescope. Each of the Elements is expected to implement an LMC (Local Monitoring and Control) Tango device server providing a standardised monitoring and control interface to TM.

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All these distributed Tango facilities then need to be coordinated by TM into a central SKA-Mid Tango facility.

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