Data Driven Simulation Framework

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Motivation

Challenges in Testing monitoring and control systems for large projects like SKA.

\[ T = M \times N \]

- \( T \) = Total number of testable functionalities
- \( M \) = Total number of Control Nodes
- \( N \) = Number of testable functionalities per node

- Unit testing not enough – need dynamic behavior testing.
- Huge manual effort to implement individual simulators.

Solution cost optimized by the auto generation of simulators through simulation framework.

Conclusions

<table>
<thead>
<tr>
<th>Observation</th>
<th>Result</th>
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<tbody>
<tr>
<td>Manually coding 1 bare bone simulator</td>
<td>~ 2 hours</td>
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<tr>
<td>Creating the DSL specification for 1 control node</td>
<td>~ 0.5 hours</td>
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Proposed Architecture

Internal Details & Usage of Generated Simulator

A model driven engineering approach could be used to generate bare-bone simulators.

- The simulator can be plugged in place of a node that needs to be simulated.
- Test suite can also be generated to test the simulator.

Technology Stack and Configuration Data

Roadmap Ahead

As a result we can conclude that:

- More effort is required to create "N" simulators manually.
- Less effort required through simulation framework.

Roadmap Ahead

- Step towards domain intelligent environments
- Capturing knowledge through family of models
- Incrementally enriching environment and creating better simulations