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.

Proposed Architecture

Conclusions

<table>
<thead>
<tr>
<th>Observation</th>
<th>Result</th>
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</thead>
<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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As a result we can conclude that
- More effort is required to create "N" simulators manually.
- Less effort required through simulation framework.

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

Road-map Ahead

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