TEST CASES TO FIND THE BEST ARCHITECTURE IN TERMS OF PERFORMANCE

mihal.brumbulli@pragmadev.com
emmanuel.gaudin@pragmadev.com
PragmaDev

- French software editor based in Paris
- Provides modeling and testing tools for event driven applications covering the whole lifecycle

Executable specification
V cycle
Executable test cases

Implementation model

Test cases to find the best architecture in terms of performance
Why optimizing performances

- Increasing complexity of systems
- More and more distributed systems
- Performance is a non functional aspect that is paramount but difficult to address
  - It would be interesting to use a real functional model
  - It would be interesting to use real scenarios
Architecture and allocation

- SDL technology allows to design an executable model very early in the development process of a system
  - Functional requirements can be verified on the model

- SDL architecture is abstract, there is no information regarding the final allocation

- SDL execution takes no time, or an undefined time to execute
  - There is no help in the model to find the best architecture in terms of time or energy consumption
Functional model

- Architecture
- Communication
- Behavior
Adding performance information

Add performance information that can be dependent on the data manipulated in the model.
Allocation

- Allocation with UML deployment diagram
- Component is named after the SDL agent with 2 properties:
  - internalTransferTimeUnits
  - internalTransferPayloadUnits
- Execution node property:
  - timeUnitValue
  - payloadUnitValue
- Connection properties to replace component ones when inter node communication:
  - transferTimeValue
  - transferPayloadValue

- Timer runs is parallel
- Payload adds up

Test cases to find the best architecture in terms of performance
Stimuli

- Use real TTCN-3 test cases
- Abstract and executable like SDL model
- Note the test case execution has no impact on the performance
Cross simulation

Run a test case against the model including timing aspects.

Test cases to find the best architecture in terms of performance
Cross architecture

Execute the model on:
- A set of architectures

Against:
- A set of test cases

Test cases to find the best architecture in terms of performance
Conclusion

• Functional SDL models are unchanged
• Real TTCN-3 test cases
• Ease the trade off to find the best architecture