Automating large-scale simulation and data analysis with OMNeT++

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OMNeT++ Summit 2016
OUTLINE

• Simulation Phases

• Factors vs Parameters

• Five main topics
Panelists

**Red Corner**

- Laura Marie Feeney  
  (Uppsala University, Sweden)
- Kyeong Soo (Joseph) Kim  
  (Xi'an Jiaotong-Liverpool University, Suzhou, China)

**Blue Corner**

- Andras Varga
- Rudolf Hornig  
  (OMNeT++ Team)
• **Modeling**, development and validation/verification are completed.
• We have a pretty good idea on what to test.
• We have a pretty good idea on what to measure.
Simulation Phases

Scenario Generation

• What to simulate.

• How to perform simulation (single PC? Multi PC? How many in parallel?)

• How we write results? How we read them?

• Statistical analysis and result presentation.
Factors vs Parameters

• Non varying parameters

- packets_second = 50
- mobility_type = "linear"

• Varying parameters

- size = \{50, 100\}
- speed = \{1, 2\}
Factors and Simulations

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repeat = 3
Topic 0: Large Scale

• When does a simulation become “large”?

  • Lots of modules
  • Lots of metrics
  • Lots of factors

  Size of the single simulation run

  Number of simulation runs
**Topic 1: Scenario Generation**

- Are factors that important?
- Naming: ID based vs Factor Based

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**.size= ${ 50 , \textcolor{red}{75}, 100 }$
Topic 2: Simulation execution

- Available: `opp_run` and `opp_runall`

- How to deal with a large number of runs (possibly on multiple cores)?

- Is AKAROA your favorite son (still)?

- Need for dynamic stop criterion? (e.g. statistical confidence reached)
Topic 3: Writing/Reading Results

• Available: scavetool + GUI interface (parsing)

• Work on files using regular expressions.
• Results are fully loaded into memory.

• Alternatives?
• Implementing a new writers?

• Connecting results to factors?

output-scalar-file = ${configname}-${runnumber}-${iterationvars}-${repetition}.sca
Topic 4: Result Analysis

- Built-in in OMNeT via GUI
- Connection with R, Octave, Matlab...
- Data representation: **gnuplot** interface anyone?
Topic 5: Unified Framework

Scenario Generator

Parameters

Launcher

Result files

Factors

Result files

Analyzer

values