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

PANEL VERSION!

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OUTLINE

- Simulation Phases
- Factors vs Parameters
- **Five** main topics

Panelists

Red Corner

- Laura Marie Feeney

(Uppsala University, Sweden)

- Kyeong Soo (Joseph) Kim

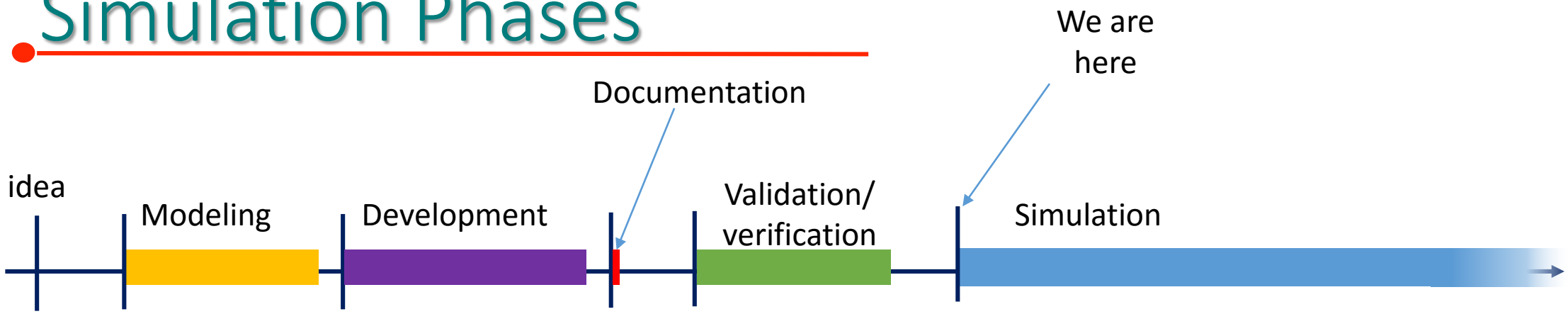
(Xi'an Jiaotong-Liverpool University, Suzhou, China)

Blue Corner

- Andras Varga
- Rudolf Hornig

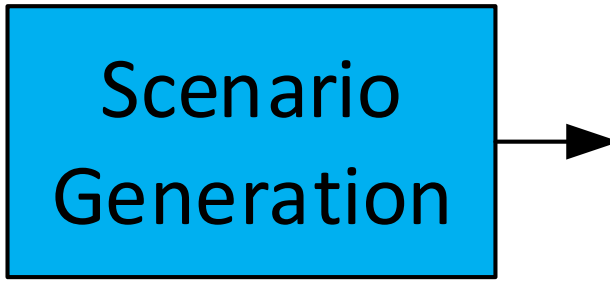
(OMNeT++ Team)

Simulation Phases



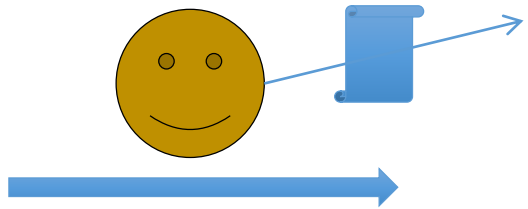
- **Modeling**, **development** and **validation/verification** are completed.
- We have a pretty good idea on what to test.
- We have a pretty good idea on what to measure.

Simulation Phases



- **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”
```

parameters

- Varying parameters

  ${iteration vars}

```
**.size= ${ 50 , 100 }
**.speed = ${ 1 , 2 }
```

factors

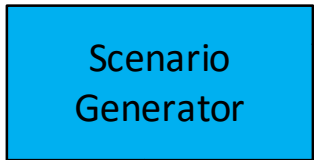
Factors and Simulations

```
repeat = 3
```

ID	size	speed
0	50	1
1	100	1
2	50	2
3	100	2

ID	size	speed	repetition
0	50	1	0
1	50	1	1
2	100	1	0
3	100	1	1
4	50	2	0
5	50	2	1
6	100	2	0
7	100	2	1

Architecture



Topic 0: Large Scale

- When does a simulation become "**large**"?

- Lots of modules
- Lots of metrics

→ **Size** of the single simulation run

- Lots of factors

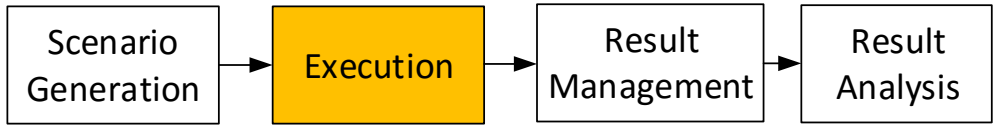
→ **Number** of simulation runs

Topic 1: Scenario Generation

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

ID	size	speed	repetition
0	50	1	0
1	50	1	1
2	100	1	0
3	100	1	1
4	50	2	0
5	50	2	1
6	100	2	0
7	100	2	1

```
**.size= ${ 50 , 75 , 100 }
```

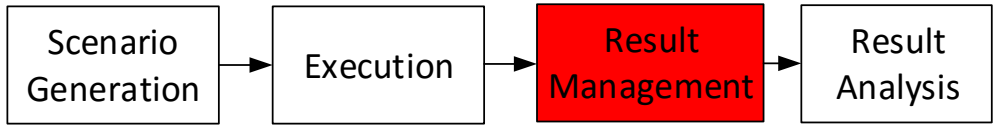


Topic 2: Simulation execution

- Available: **`opp_run`** and **`opp_runall`**

Single configuration

- 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

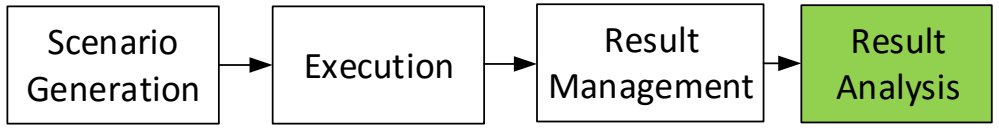
- Available: **scavetool** + **GUI interface** (parsing)

- 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