



Simulation Methodology & OD Estimation

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Mascotte project

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Motivations for a New (yet another) Component Architecture

The Component Consensus

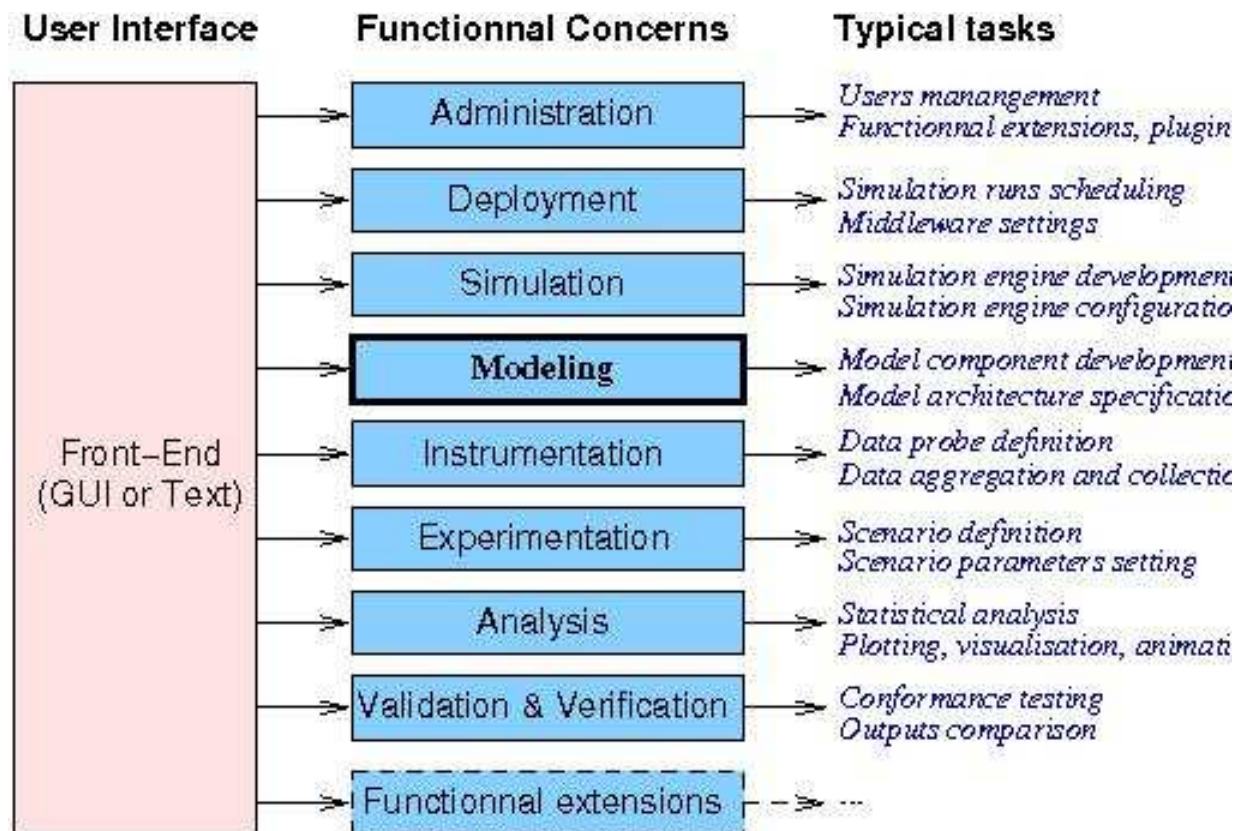
- Simulation = Modeling + Software
- So far ...
 - Simulation Community focused on Modeling issues
 - But SE issues raised (eg: reuse models)
 - Software Engineering Community focused on Software issues
 - But with no particular application in mind
- Both eventually agree on **Component** approach

Toward a "bi"-Component Approach ?

- Can we gain reuse property thanks to M&S components/formalisms ?
- Claim: **No.**
 - M&S components **do not** solve SE issues !
 - Especially the reuse one

Reuse Issues Still Pending in Simulation

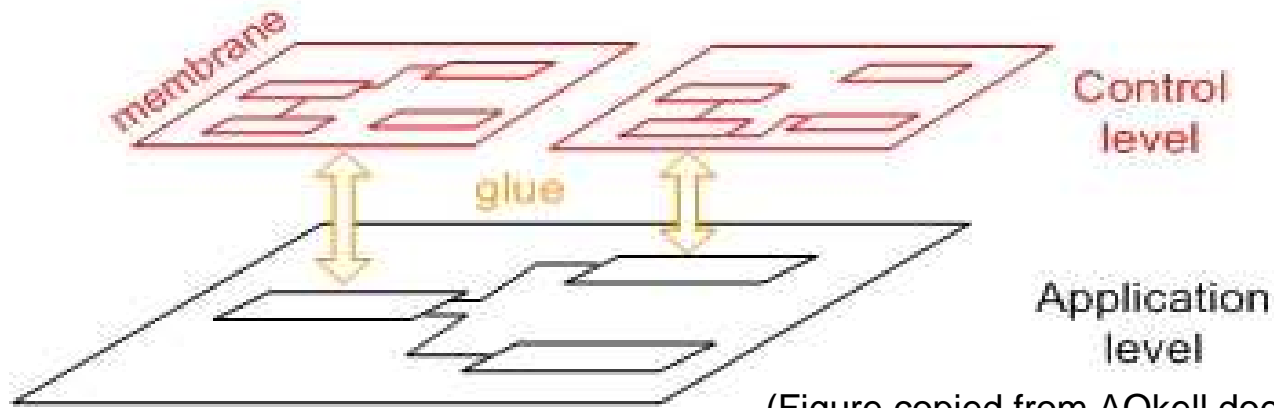
- Models are only one **concern** of simulation



(Non-)Separation of Concern Issue

- Typical modeling code (even component-based) may be mixing:
 - Behavior modeling concerns
 - Topological modeling concerns
 - Instrumentation concern
 - Probes, data collection
 - Stats computations, Animation, ...
 - Dynamicity concerns
 - Create/destroy comps, mutate comps/arch, ...
 - Deployment concerns
 - Deployment on a cluster/grid
 - Debugging, verification, ...

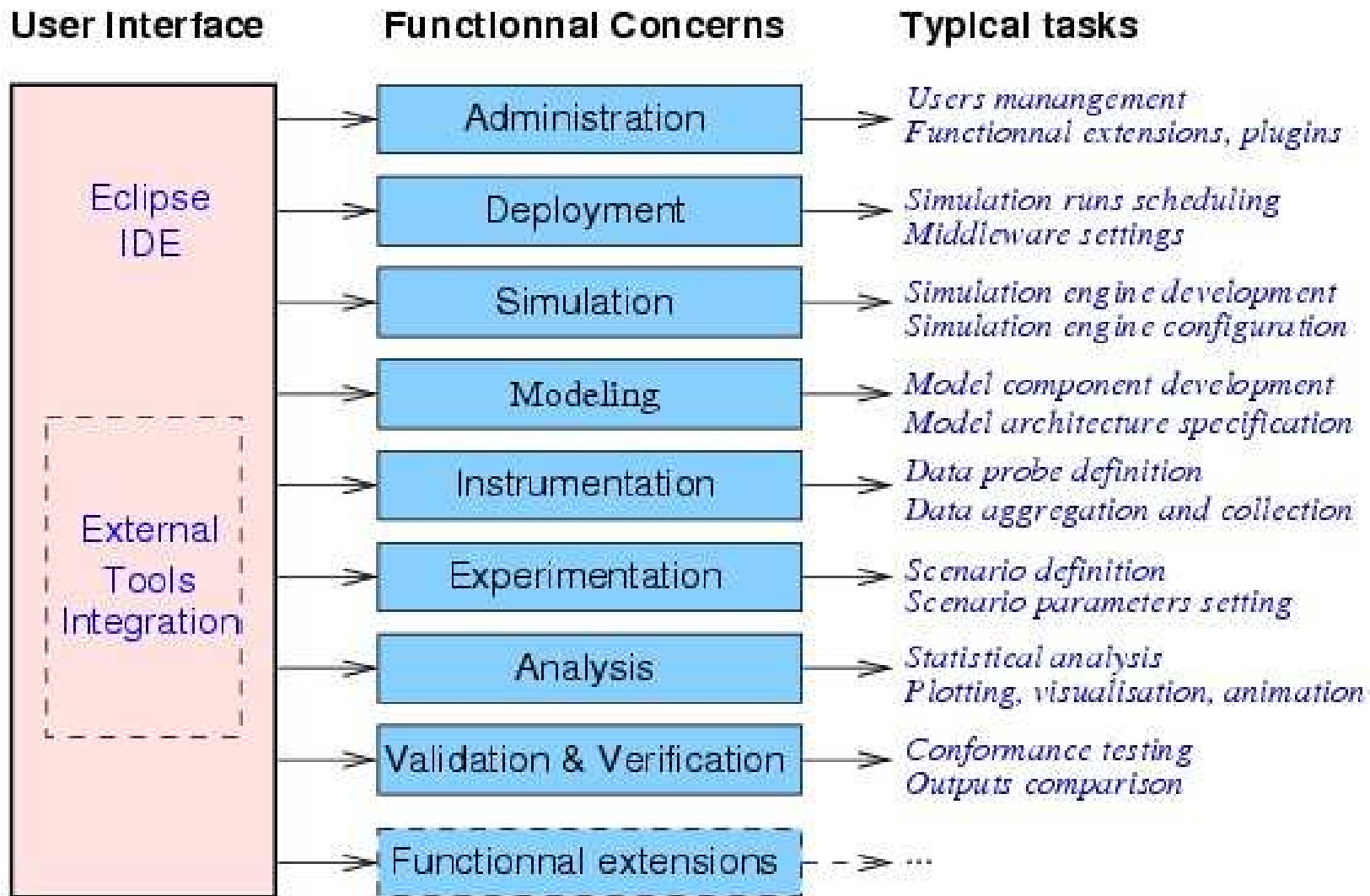
Applying Separation of Concerns



(Figure copied from AOkell documentation)

- Application Level : model implementation
- Control Levels
 - Simulation API
 - Instrumentation
 - Distribution ...

OSA Functional Architecture



Contributions to AriWheels

■ Simulation

- ❑ Omnet++: transportation
- ❑ NS: Network stacks
- ❑ OSA: merge (encapsulate) network & transportation models ?

■ Estimation of OD Matrix

- ❑ Previous work in MobiVIP project
- ❑ Idea: extend/apply to Bus (with JC Maureira)
- ❑ Use GPS+Ari network

OD Matrix Estimation in MobiVIP

- **MobiVIP: small automated cars in city**
 - Idea: use cars to collect data
 - About traffic
 - About user Origin-Destination
 - Existing Work in Mascotte (C. Savio & P. Mussi)
 - Solutions to improve OD estimation
- **AriWheel**
 - Same idea: use cars to collect **GPS** data
 - position & destination
 - Toward a smart GPS navigation system
 - adapt to traffic congestion **before** the congestion occur...

Smart GPS ?

Traffic probes

- Traffic sensors
- In flow vehicles

- In flow "friendly" vehicles
- GPS interactions + AriNet

