DINASTI - Distributed Infrastructure for Simulations

**DINASTI**

Distributed Infrastructure for Simulations

Novel, ambitious and scalable radio simulation platform for heterogeneous wireless systems.

Interconnecting different system level simulators, such as NS-2, NS-3 and other proprietary tools.

For the interaction of the different simulators, the IEEE 802.21 standard is used.

The common simulation platform allows combining the results of the various simulators and the radio interfaces available on them (e.g., LTE is available on SPHERE).

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**IEEE 802.21 for Integration**

- Inter-operability with other simulators is achieved by utilizing an existing and standardized framework, namely IEEE 802.21.

- The MIH Function is a cost-function, which decides which interface to use for transmission and handles both (node) local scope requests and network requests.

- Interfaces to connect a physical and datalink layer simulator (SPHERE) with a network simulator (NS/2).

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**Scenario**

- Simulator A: Excellent WiFi, WiMAX, UMTS, but no LTE
- Simulator B: LTE only simulator
- The presented framework allows you to use a “best-of-breed approach”

- Baseline simulation scenario built in ns-2

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**General Framework**

- Simulation Plan (e.g., Matlab)
- Simulator A: WiFi (e.g., C++)
- Simulator B: WiMAX (e.g., C#)

- The simulators exchange information via the Central Controller and/or Simulation Plan
- Central Controller is a router/(de)multiplexer

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**Approach**

- The Central Controller is the clock-master for the simulators.
- The Simulation Plan informs the Central Controller of the next time period that can be simulated.
  - Either single events (period in the order of milliseconds);
  - Or multiple events (period in the order of seconds);
- The schedulers of the simulators are hijacked in order to control it remotely (outside of the actual simulator).

- However, interaction between simulators and handovers can be made seamless...

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**Interworking NS-2 with Sphere**

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**Synchronization**

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**Conclusions**

- Simulate larger networks (e.g., NS2 is single threaded, so performance is directly related to the size of the network), “virtually” multithreading the simulators.

- Mix various simulators (e.g., mix sphere (LTE) with NS2 and NS3).

- Almost no changes are required to the simulators (minimum change is the control mechanism for the scheduler).

- Control simulations remotely (e.g., from your lightweight laptop, while using a powerful computer for the actual simulations).

- Quickly implement some functions in Matlab (e.g., build a handover cost-function in Matlab).

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