



*open*WNS

Open Source Wireless Network Simulator

A Simulation Platform for Wireless Systems

Chair of Communication Networks

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Outline

*open*WNS

Open Source **W**ireless **N**etwork **S**imulator

A Simulation Platform for Wireless Systems

- Motivation
- What it is and what it's not
- Objectives
- Simulation Platform
- Funding Scheme & Timeline
- Support Actions
- Community Buildup & Early Beta Testers



Motivation

- Performance evaluation by means of simulation is an integral part of any
 - standardization,
 - system development or
 - research activity.
 - Typically such activities involve multiple parties, which pursue different interests.
 - Results of own evaluations need to be defended and evaluation results of other parties need to be reviewed.
- ➔ Common open source system level simulation platform promotes
- Reduction of Cost and Effort
 - Quality Increase
 - Process Speed-up
 - Integration of Results for End-To-End Evaluation in Collaborative Projects

What it is and what it's not

What *open*WNS is

- Dynamic Event Driven System Level Simulation Platform
 - Investigations of dynamic protocol behavior
 - Cross-layer effects
 - Online calculation of intra- and inter-cell interference
- Full fledged protocol stacks
 - Released during project
 - **IEEE 802.16 e,j**
 - **3GPP UMTS (Release 7)**
- Typical Results
 - Protocol level results
 - E2E Packet Delay, Throughput
 - Buffer Fill Levels
 - Retransmissions
 - BER, PER, FER
 - Physical layer results
 - SINR distributions (over area, per terminal, per cell)

What *open*WNS is **NOT**

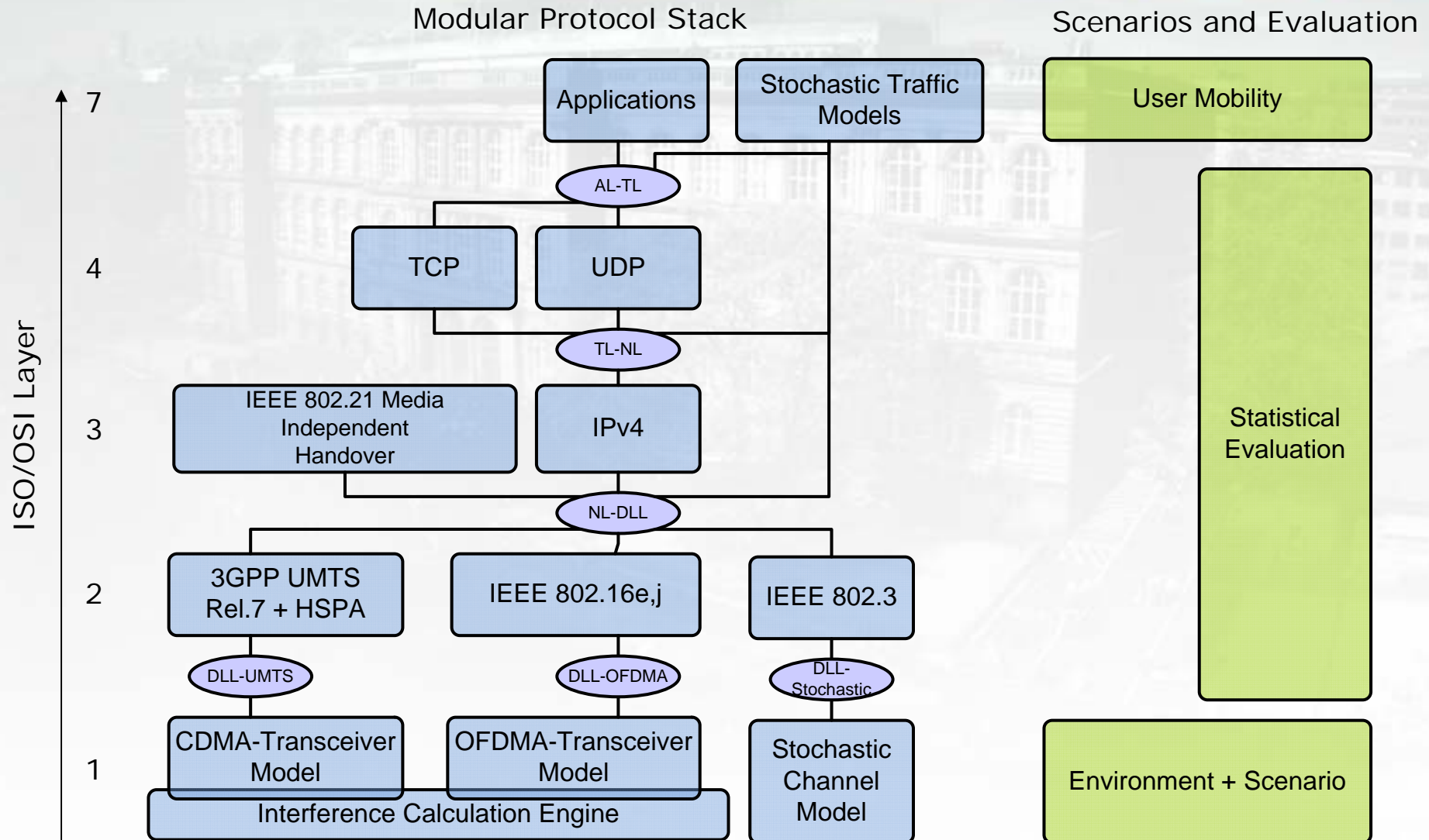
- Radio planning tool with ray tracing capabilities covering large scenarios of several 100 km²
- Tool to design and run protocol stacks on an FPGA
- Monte-Carlo Simulator

→ But since it is open source, you never know ...

Objectives

- To realize an **open source event-driven system level simulator** for the performance evaluation of wireless communication networks
- To establish a simulation platform which allows for the detailed simulation of protocol stacks (close to emulation) and at the same time allows for the **accurate calculation of the interference situation** (intra- and inter-cell interference) based on advanced channel models.
- To identify and implement **advanced channel models** (e.g., for MIMO, SDMA or OFDMA).
- To establish a protocol framework which allows for **rapid prototyping** by offering a set of strictly tested protocol components (e.g., ARQs, flow handling, association management, handover procedures) and extension points within these for the customization.
- To implement two wireless communication systems: **UMTS Release 7** (focus on HSPA) and **IEEE 802.16 e/j** (WiMAX).
- To establish a **process to integrate community contributions** into official releases of the simulation platform.
- To have **regular releases** of the simulation platform ensuring fast response to change requests from the community.
- To build a simulation platform which **enables clustering EU projects**.
- To identify or define an **appropriate license model**.

openWNS Simulation Platform

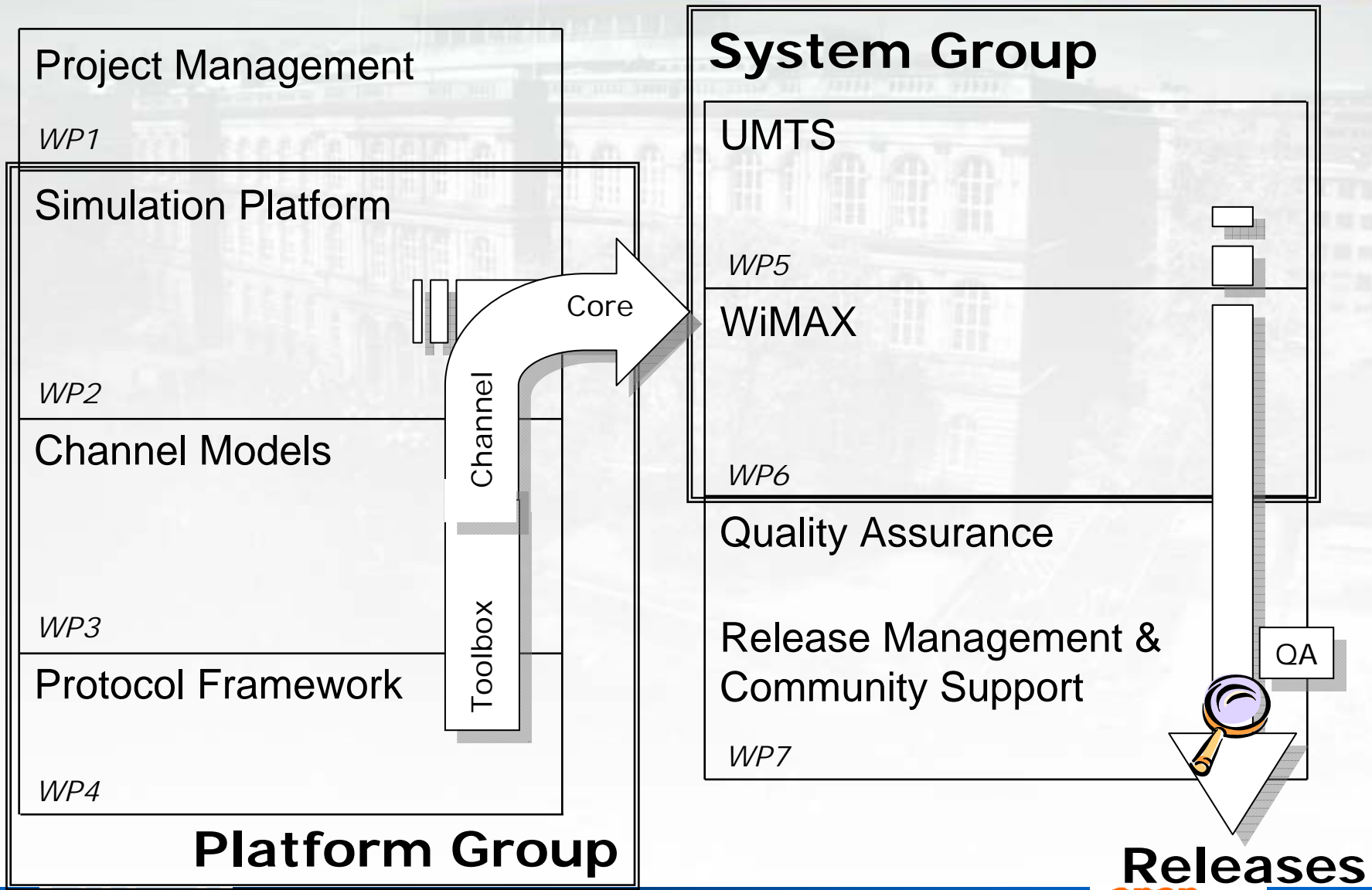


openWNS Funding Scheme

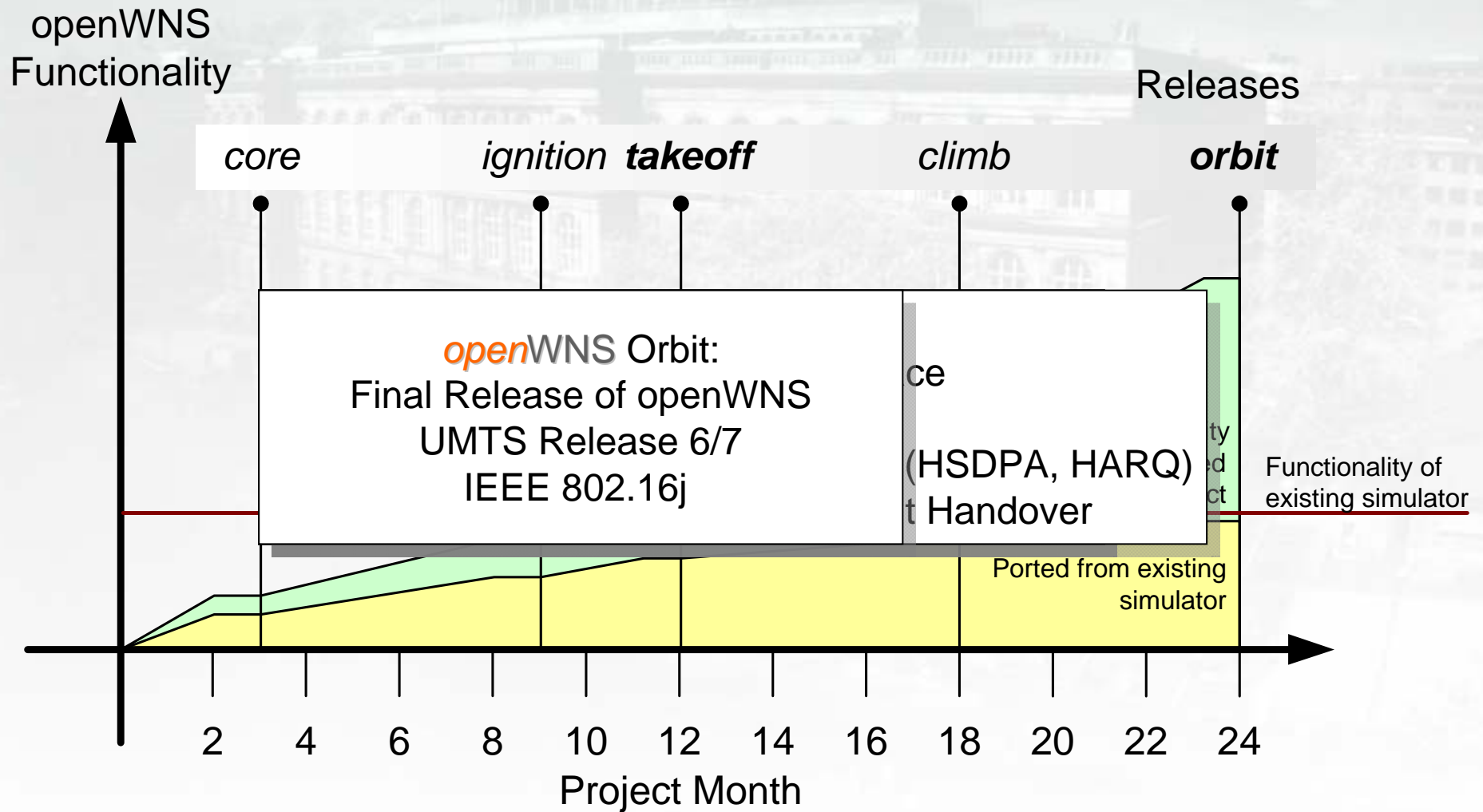
- openWNS Project as part of 7th FP (EU)
 - Small or medium-scale focused research actions (STREP)
 - Project start: by the end of 2007
 - Project end: by the end of 2009
- Target of EC Contribution : 2.5 Mio €
- Target Efforts : 360 PM
- Project Duration : 2 Years
- Current Consortium:
 - 2 SMEs
 - 2 Universities
 - 4 Manufacturers
 - 1 Operator (Strategic Support)



openWNS Project Structure



Project Timeschedule



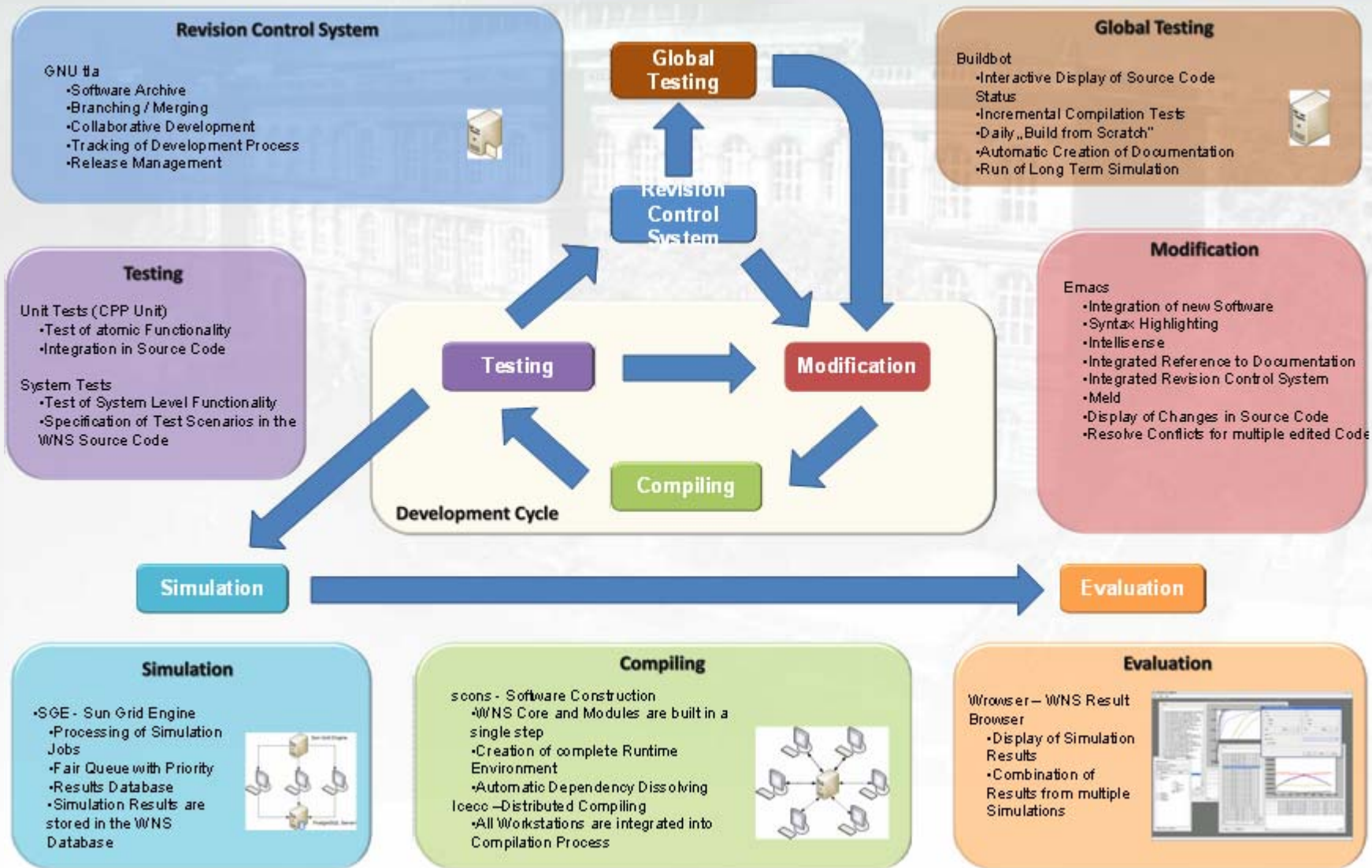
Support Actions Beyond *open*WNS

- External Software Contributions
 - Potential contribution from IMT-Advanced
 - WINNER III Project
 - IEEE 802.16m
 - IEEE 802.11n
- Prototypical 4G Implementation based on public results
- Strategic Support
 - Advisory Board to be established
 - We invite all of you to give Strategic Support

Community Buildup & Early Beta Testers

- Community Buildup
 - Web portal
 - Excellent Documentation
 - Comprehensive Tutorials
 - Integrated Trouble Ticket System
 - Regular releases
 - Work shops
- Early Beta Testers
 - All of the above plus access to internal releases
 - Must be invited by the consortium
 - May not redistributed (unreleased) source code (special license needed)

WNS Demonstration



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