



OpCoast

Capabilities Overview

CB-MANET PROPOSERS DAY

August 2005

by

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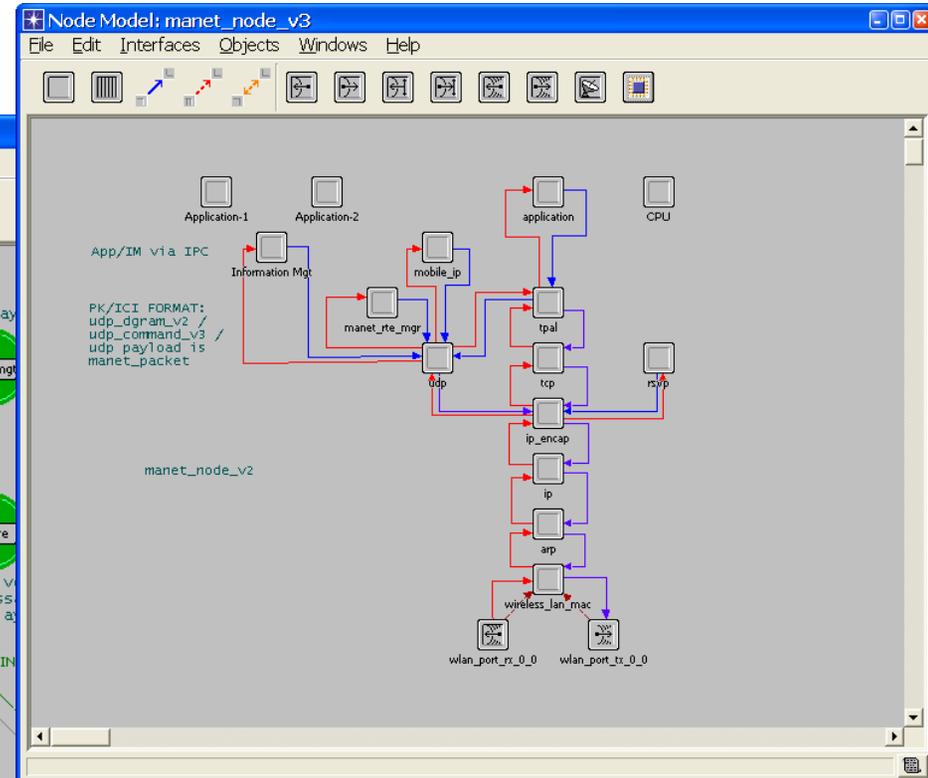
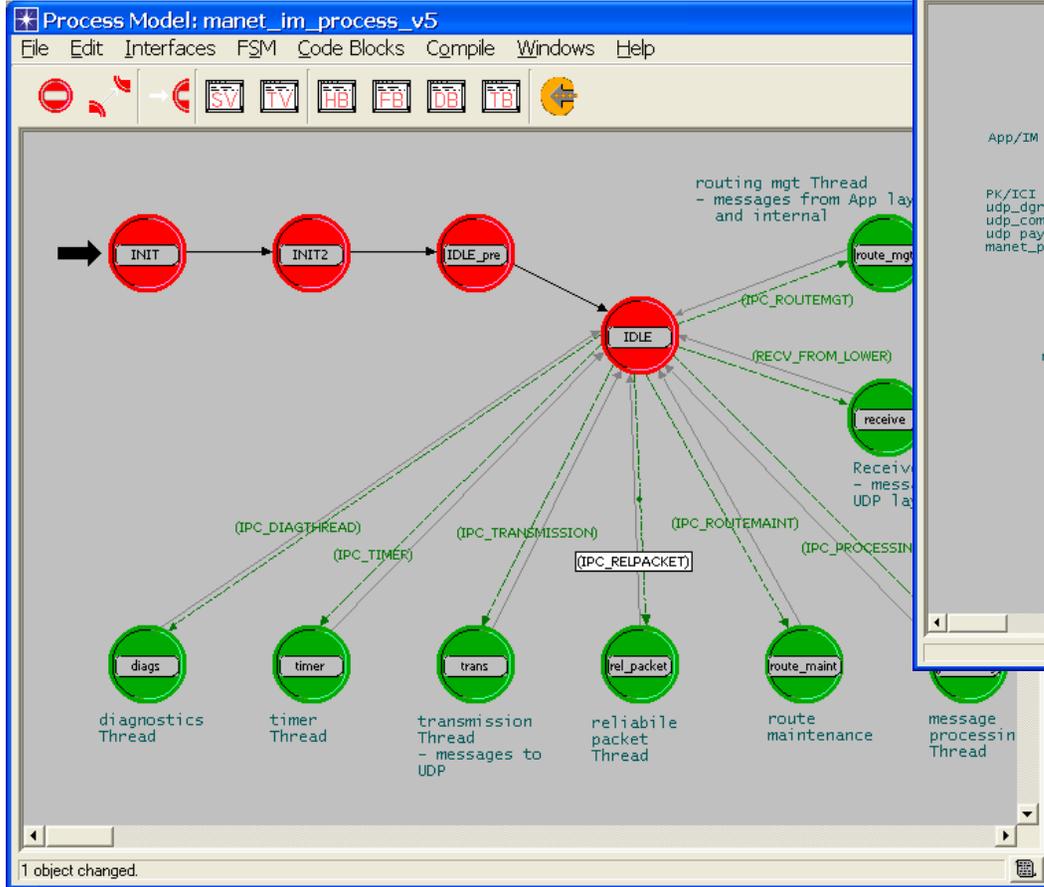
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David L. Rhodes, Ph.D. (Founder)

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- Networking Modeling, Simulation, Technology
 - “Full stack” modeling and simulation
 - Multi-state routing algorithm, patent-pending
 - Highly efficient optimization over many parameters (e.g., power, distance, path quality)
 - “NetFunnel” Overlay routing for congestion avoidance, patent-pending
- System Modeling
 - New ‘application in the loop’ simulation technology (Simulation Plug-in “SPlug”)
 - Expert level OPNET modeling
- Other Activities (not covered here):
 - Tactical and Distributed Systems
 - Multilevel Security Research
 - Distributed/Parallel Software and Web Development
 - Lawful Interception

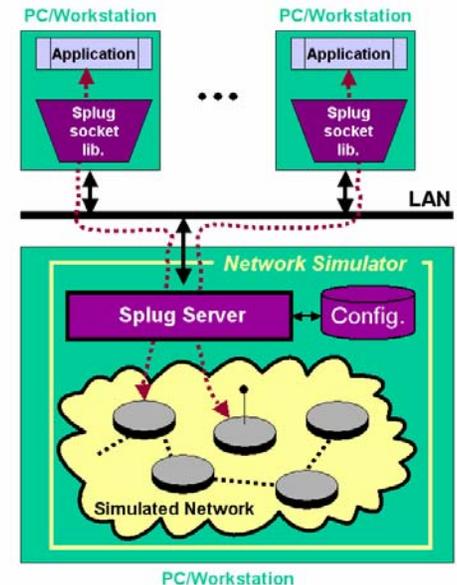
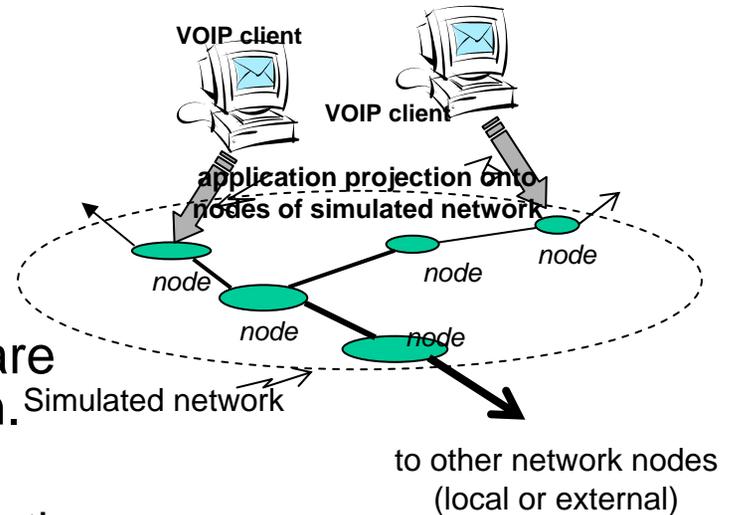


To be presented at *MILCOM 05* (classified session): D. Carberry, K. Chadha, B. Epstein, D. Rhodes, "Modeling of a Distributed Multithreaded Information Management System," *MILCOM 05*, Atlantic City, NJ, November 2005.

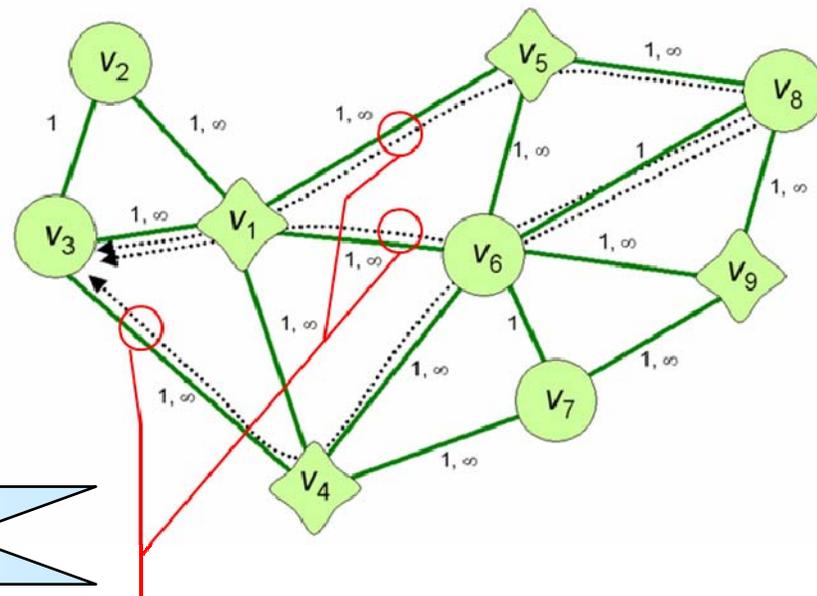
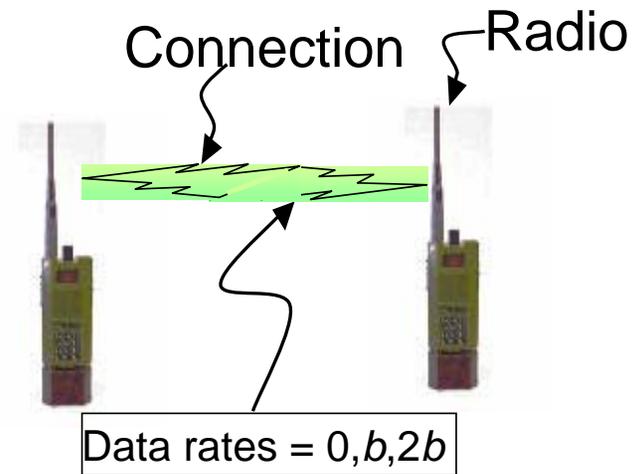
Work also recently presented at *OPNETWORK 05* (classified session), August 2005, Washington, DC.

Simulation Plug-in (SPlug)

- Novel solution for
 - network application development
 - network optimization
- “Injects” actual, user-operated software code into a virtual network simulation.
- Overcomes major design problems:
 - Vacuum in assessing cross-layer reactive behavior between lower layer protocols and higher network layer applications
- Approach allows modeled and actual application-level software to inter-operate
- Network addresses carried in data enabling mobile agent code testing.
- Projects applications onto arbitrary simulated nodes
 - Overcomes major limitation of current network simulation tools and emulation
- Interoperates with common network simulator tools



- Developed a new network routing algorithm: **M**ulti-**S**tate, **D**ynamic **S**hortest **P**ath **A**lgorithm
- Optimal solution for finding routes when links fail or for (pre) finding alternate QoS routes
- Uses:
 - Power-aware routing
 - For military mobile ad-hoc radio networks
 - Saves overall battery consumption
 - Directional antennas
 - Accounts for antenna direction and control in overall path optimizations
 - Adverse topological and weather environments
 - “Smart” way to reroute signals when obstructed
- **Efficiently provide pre-computed routing information to control layer**
- see: David L. Rhodes, “Efficient Routing In Ad Hoc Networks With Directional Antennas,” *IEEE MILCOM*, Nov. 2004.



Dotted lines will be the minimum length routes found by MSD-SPA

Know routes in advance for anticipated node or link failure, mobility, etc.