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802.16.1 MAC Simulation Tools: Recommendations

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Brian Petry

3Com

12230 World Trade Dr.

San Diego, CA 92128

Voice: 858-674-8533

Fax:

E-mail: [brian\\_petry@3com.com](mailto:brian_petry@3com.com)

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Purpose:

Consider the information presented for choosing MAC simulation/modeling tools

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# **MAC Simulation Tools: Recommendations**

Brian Petry, 3Com

Purpose: Lend some of my  
experience to spur discussion of tool  
choices

(See document: 802.16mc-00/06)

# Outline

- Requirements
- Two Tools
- Recommendations

# Requirements

- Inexpensive
- Reliable, predictable
- Easy to use/maintain
- Simulate bearer services (mandatory and recommended)
- Discrete-event based

## Requirements (cont.)

- Models built for networking
- Network-oriented traffic and error models (statistical, self-similar and trace-based)
- Existing network protocol models (layers and topologies)
- Good “upper layer” models built-in

## Two Tools

- DARPA/VINT (Virtual Internetwork Testbed) Network Simulator (*ns*)
- NIST HFC/ATM Simulator

## *ns*

- DARPA-funded maintenance
- Key VINT contributors/members: UCB, LBL, Xerox/PARC, USC/ISI
- Used by numerous commercial and academic entities for many network models
- Network-, IP-orientation (no ATM)
- UNIX/Linux and Windows
- I had a good experience with MAC layer modeling
- <http://www-mash.cs.berkeley.edu/ns/>

# **NIST HFC/ATM Simulator**

- From the High-Speed Network Technology (HSNT) group at NIST, MD
- Based on the NIST/ATM Simulator
- For 802.14, TCP/IP & ATM/ABR models added (note error in 802.16mc-00/6)
- Limited support for other higher layers
- UNIX-based



# Current NIST/HSNT Work

(from David Su, Nada Golmie)

- Helping 802.15 develop SDL specification
- Helping 802.15 analyze coexistence effects on MAC layers (e.g., 802.11 and 802.15)
- Evaluating tool choices for 802.15 work
- Will help 802.15 MAC performance analysis
- <http://w3.antd.nist.gov>

# Recommendations

- At least start with the NIST Simulator
- An *ns*-based simulation would attract more attention by academia and industry
- Task group should consider “porting” ATM and HFC models to *ns*
- *ns* is “cool”
- *Any other ideas?*

## Notes

- SDL tools for editing protocol specs may be used, in a limited fashion, for simulation and verification.
- Is ATM “good” for *ns*?
- Another “big” simulator: [www.sssnet.org](http://www.sssnet.org), Rutgers University

## **Notes (cont.)**