MOBILE NETWORK MODELING
Technical Interchange VII

17-19 March 2015

Holiday Inn Arlington at Ballston
4610 N. Fairfax Dr.
Arlington, VA 22203

Invitation for presentations and attendance

The Naval Research Laboratory (NRL) and Army Research Laboratory (ARL) are co-hosting the seventh in a series of technical interchanges to exchange information on Mobile Network Modeling with an emphasis on real-time network emulation, validation, and analysis. This series is in support of developing common wireless network emulation and mobile network modeling capabilities for DoD research and development in the area of tactical networking. Emulation tools and modeling frameworks have been developed to provide a common basis for scalable, real-time experimentation with working network protocols and applications. This includes support of scenario-driven experimentation to allow exploration of complex interactions among network protocols and application concepts in representative tactical environments. This is a technical exchange where participants have also developed capabilities in this area and/or expressed interest in applying such capability.

The purpose of this technical interchange is to exchange information on emulation and model validation technologies that have been developed and can be made available to the greater DoD community working in the area of mobile, wireless network research and development. It is hoped that some convergence can occur in the development of emulation systems, tools, models, and data analysis/validation capabilities.

Please provide specific feedback on training/ deep-dive sessions you would like to attend. A draft agenda is given below. This will be adjusted to accommodate the interests of workshop attendees.

Draft Agenda

Note that Wednesday afternoon and Thursday will have two parallel sessions.

Tuesday, 17 March 2015		
9 AM – 12 PM	Technical Presentations	
12 PM – 1 PM	*Lunch*	
1 PM - 5 PM	Technical Presentations	
Wednesday, 18 March 2015		
9 AM – 12 PM	Technical Presentations	
12 PM – 1 PM	*Lunch*	
1 PM - 5 PM	ns-3 Training	CORE Q&A
Thursday, 19 March 2015		
9 AM – 12 PM	ns-3 Training	EMANE Control & Monitoring Deep Dive
12 PM – 1 PM	*Lunch*	
1 PM – 5 PM	ns-3 Training	*TBD*

Presentations and Abstracts

The previous events included a section on *Introductory Presentations* and *Updates* respectively, where each participating organization provided a brief overview of their recent activities in this area. A similar topic area will be included this year with participants discussing their most recent MNM developments, with emphasis placed on *updates* since the last interchange.

Technical areas of interest include:

* Emulation/Modeling System Validation
* Extensions and optimizations to modeling systems
* Metrics used to evaluate the utility of tactical or mobile network systems
* Radio Models for testing
* Support tools for scenario definition, visualization, data logging, and analysis
* Testbed operations and experimentation Activities

The agenda will include presentations offered in response to this invitation. It is requested that presenters provide materials to Nathan Smith (nathan.smith@nrl.navy.mil) and Brian Adamson (brian.adamson@nrl.navy.mil) prior to the workshop so that they may be consolidated on a

presentation computer ahead of time. Upon permission of the presenters, the presentations will be archived on the access-controlled server hosting NRL's collaborative Mobile Network Modeling project. This is **not** public release, as access to these materials will be available to DoD and DoD contractors only.

The draft agenda will include estimated time allowances for the presentations. Please let us know if the specified time allowance differs significantly from your actual time requirement as we may be able to make some small adjustments to the agenda.

A short (3-5 sentence) abstract is requested for each presentation as well as the name of the person providing the presentation. A workshop program will be assembled and provided with these abstracts once the final agenda is established.

ns-3 Training Info

Please join us for 1 ½ days of introduction to and hands-on training with the ns-3 discrete-event network simulator. ns-3 is a popular open-source tool designed for Internet research, with a different design and different capabilities from its ns-2 predecessor. While extensive documentation is available on the public website[1] of the project, this training offers participants the opportunity to learn about the scope and capabilities of the tools, how to run simulations and emulations, and how to write new code for ns-3.

Tom Henderson, who is a founder of ns-3 and the lead maintainer of the open source project, as well as the Executive Director of the ns-3 Consortium (an organization supporting the sustainability of the project) will lead the training. Ken Renard (ARL) will also lead a session on scalable simulations using the parallel simulation capabilities of ns-3.

The training will be organized around a tour of the simulator on Wednesday and more advanced topics and extensions (more hands-on) on Thursday. We will reserve a portion each day for interactive Q&A and guidance from the instructors, allowing deeper treatment of topics of particular interest.

Wednesday March 18	Thursday March 19
The emphasis of the first half-day will be on getting acquainted with ns-3 and the open source project. • **Introduction to ns-3:** Basic software orientation, survey of capabilities, research performed with ns-3, differences from ns-2, data visualization and management, how the open source project operates. • **Large-scale, distributed simulations** with ns-3. • **Network emulation** and **Direct Code Execution** environments and examples, enabling hardware-in-the-loop and use of real Linux code.	The emphasis of the second day will be on running existing simulations and developing new code. • **Running simulations,** including manipulating and managing configuration, logging, animation and visualization options. • **Debugging simulations** using tools such as gdb, valgrind, and oprofile. • **Mobility and wireless models and scenarios** • Methodology and workflow for **developing new models in ns-3**, using a case study.

Prerequisites and Materials

Basic proficiency in C++ programming is considered a prerequisite for working with ns-3. A basic understanding of computer networking protocols and technology such as TCP/IP, and wireless and wired models (e.g. Ethernet, WiFi, and LTE) is also assumed. Python programming skills can be leveraged but are not required.

Participants will be shown how to compile, test, and debug programs using the Linux operating system and the GNU Compiler Collection (gcc). A basic capability to run programs from the Linux command line is strongly recommended. A Microsoft Visual Studio 2012 environment is available, but the training will be conducted with Linux.

A bootable Live-CD for an Intel x86 architecture, with ns-3 and related software pre-installed, will be provided. This can be run inside a virtual machine or native on x86 laptops. A Docker container may also be provided (TBD). Participants with a Linux machine can also download a tarball and run on their own machines. Handouts will likely also be made available.

For more information on ns-3, see http://www.nsnam.org

Venue

Holiday Inn Arlington at Ballston 4610 N Fairfax Drive, Arlington, VA 22203.

For hotel reservations, please call the hotel front desk: **(703) 243-9800** and mention the **Mobile Network Modeling Technical Interchange VII**.
30 *Government Rate* rooms are being held on a first-come basis.

Hotel Fax: (703) 527-2677

Optional Refreshments

A $15 daily refreshment fee provides for continental breakfast, snacks, and beverages. A full-service restaurant is located within the building.

RSVP

We will need to have an RSVP from participants (presenters and attendees) by 20 February 2014 to get a head count for planning purposes. Please respond to Nathan Smith (nathan.smith@nrl.navy.mil) and Brian Adamson (brian.adamson@nrl.navy.mil).

Points of Contact

Technical Program	Administrative
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