Topic: N08-225

Scalable Network Technologies, Inc.

Waveform Model Enhancements for Parametric Traffic Generation

SCALABLE provides network design and analysis tools that enable customers to develop, test and deploy, large enterprise wired/wireless networks in a simulated environment. Scalable is working with the MIDS Program office to deliver a capability that allows waveforms with non-IP and IP Operational modes over a Targeting Network Technology (TTNT) and Link 16 to exchange messages at the application layer. This will be used for parametric, bi-directional traffic generation that works across a variety of waveform protocols that can be used by the Joint Network Emulator (JNE). Specific advantages include the scalability of our high fidelity model library which allows large, distributed communication networks to be modeled using standard computing hardware and our experience working with a wide variety of military waveforms.

Technology Category Alignment:

RF Components for sensing, transmission and communication
Synthesis/Analytics/Decision Tools
Cyber
Modeling, Simulation & Test Infrastructure

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SYSCOM: NAVWAR
Contract: N68936-16-C-0080

Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68936-16-C-0080

Department of the Navy SBIR/STTR Transition Program

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SPAWAR SR-2017-296

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WHO

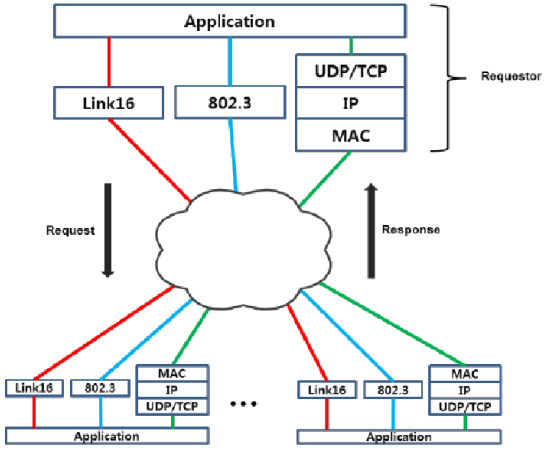
SYSCOM: SPAWAR

Sponsoring Program: JPEO JTRS

Transition Target: MIDS

TPOC:

Other transition opportunities:
NAVAIR, Air Force, MDA



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WHAT

Operational Need and Improvement: Many military application message exchanges can be represented as a request followed by one or more responses. A number of Navy-relevant tactical waveforms feature operational modes that do not exploit higher layers above the Medium Access Control (MAC) layer. Whereas a number of simulation and emulation models exist for JTRS waveforms, these models do not provide a convenient method to describe application traffic and be used to generate traffic sessions with varied communication characteristics. Need: Traffic generator that allows ability to design, configure and generate traffic across all battlefield waveforms and models.

Specifications Required: This effort focuses on design, implementation, and test of the application traffic generator needed to support the necessary scenarios to verify the correct behavior of application such as: 1) Refine understandings of traffic generator's behavior; 2) Define configurable parameter to determine if Higher-layer-bypass option is enabled; 3) Define configurable parameter to determine transport layer if bypassing option is not enabled; 4) Define configurable parameters to enable multicast option; 5) Verification scenarios to test/validate application behavior.

Technology Developed: A model at the application layer used for parametric, bi-directional traffic generation that works across a variety of waveform models that have been developed using simulators and emulators like the Joint Network Emulator (JNE). Scalable is developing an appropriate model, and GUI to facilitate rapid configuration of application traffic, integrate it with existing JNE and EXata model and demonstrate its utility to enhance analysis of complex tactical scenarios, and deliver tested model to the MIDS Program Office.

Warfighter Value: This enables easy application level testing across various waveforms, models. It eliminates concerns of IP/non-IP compatibility for applications as well as request/respond for UDP/TCP/multicast/no transport. It allows for comprehensive testing with diverse traffic scenarios to ensure mission success. In addition, it provides end users ability to pick/choose specific waveforms and models for different tests and find deficiencies in systems prior to deployment.

WHEN

Contract Number: N68936-16-C-0080 **Ending on:** May 31, 2018

Milestone	Risk Level	Measure of Success	Ending TRL	Date
T-1: Design of user config parameters and error handling	Low	TPOC Accept	Level 4-5	October 2017
T 2-3: Framework of appl layer protocol for request and response behavior and bypass the protocol stack from appl layer to MAC	Low	TPOC Accept	Level 4-5	November 2017
T-4: Design of multicast behavior, single requestor and multiple unicast responders	Low	TPOC Accept	Level 4-5	February 2018
T-5: Scenario generation and test the application behavior	Med	TPOC Accept	Level 4-5	April 2018
T-6: Support graphical interface and statistics (StatsDB)	Med	TPOC Accept	Level 4-5	April 2018

HOW

Projected Business Model: SCALABLE is a successful small business that provides a unique solution to measure the operational impact, and cyber implications, of network-enabled command and control systems. The company was founded to transition DARPA–funded technology developed at UCLA and has since had continued success in the transition of its funded research into commercial products. SCALABLE has established a successful track record of SBIR technology commercialization.

Company Objectives: Scalable will transition the enhanced traffic generation technology into JNE. Current JNE users include SPAWAR, PEO C3T, CERDEC, AMRDEC, CDID, Ft Gordon and the Army OTC, among many others. Additionally, many other DoD customers such as U.S. Navy Naval Air System Command (NAVAIR) China Lake use Scalable's EXata software. Many of these customers use multiple combinations of waveforms and models, and require traffic generation for comprehensive analysis. Often, these customers use Scalable tools alongside other waveforms and models, but do not currently have a realistic traffic generation tool that can traverse all models. The traffic generation application produced by this SBIR will allow current and future customers to improve their network design and testing capabilities, leading to less wasted time and resources.

Potential Commercial Applications: Battlefield operations are increasingly driven by networkcentric applications. DoD Enterprise networks carry operational as well as training and simulation traffic. Performance of these networks is crucial, and without realistic testing, mission success cannot be assured. Each branch of service has several divisions that use modeling and simulation to plan, test and analyze DoD communication networks. What's missing: a realistic traffic generator that can plan and deploy traffic across the disparate waveforms and models. The traffic generation tool produced from this SBIR effort will have potential customers not just for Navy programs, but can be applied to many different waveforms and models across the DoD.

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