Network Cloning in Virtual Emulation Environment

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January 5, 2011

DC SPIN Presentation, January 5, 2011
Challenge

- Develop virtual environment that allows
  - Testing of actual software that runs on real machines
  - Cloning of actual real-world network configurations
  - Seamless integration with real environment

VEE allowed testing of Internet protocol software implementations effectively and inexpensively under operational scenarios.
TeleniX
Virtual Emulation Environment

- Develop and test Internet protocol software implementations based on standards
- Create clone of a network with full-fidelity
- Configure clone to match real-world config.
- Emulate clone under operational scenarios

Clone has code, API, configuration and command fidelity. Clone behaviors are indistinguishable from its real counterpart.
VEE supports system over its life cycle. Clone emulation offers unprecedented risk reduction capability.

Mission Operations

- Test computer network operations (CNOs)
- Support mission planning & optimization
- Reverse unknown protocols
- Reverse engineer network not your own
- Support mission planning/optimization
- Provide insight to NCW decision makers
- Conduct cyber training

Operations

- Test upgrades before deployment
- Diagnose operational problems
- Support application optimizations
- Provide analytics for real-time network mgmt
- Conduct continuity of operation planning
- Support carrier-class IP infrastructure & SLAs
- Test IA and cyber security

Conventional

- Check completeness of requirements
- Develop enterprise architecture
- Emulate integrated (OVs/SVs/TVs) architecture
- Demonstrate CONOP
- Measure KPPs, test MOPs, MOEs and NR-KPPs
- Support MDP B/C with quantitative data
- Conduct risk reduction/mitigation

New Approach

- Support testing – DT&E, integration, system, …
- Build high fidelity clone of a system
- Evaluate commercial products
- Conduct risk reductions and what-ifs
- Test deployment under operational scenarios
- Demonstrate performance, robustness, scaling
- Demonstrate survivability and cyber security

Distinction between clone and real system disappears
VEE offers unprecedented visibility to decision-makers. VEE allows testing of a new technology or an operational concept inexpensively.
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Virtual Emulation Environment

Significant applications funded by the DoD/IC include:

- Cloning, emulating, optimizing and baselining network deployment
- Emulating data center virtualizations and storage architectures
- Emulating GIG security architectures: IPsec, HAIPE, Black/Red networks
- Emulating QoS architectures on all-IP infrastructures
- Diagnosing operational problems such as routing and security
- Testing implementations of Internet architectures and protocols
- Emulating IPSec integration with routing protocols (OSPF, RIP, BGP)
- Emulating base access thread in Joint Biometric Architecture
- Emulating sensor-to-shooter thread in an Army architecture
- Testing Joint Chiefs of Staff IPv6 Operational Criteria #5 (JSOC #5)
- Emulating Army’s WIN-T Increment 1 deployment
- Generating high-fidelity data sets with proper encapsulations
- Reconstructing IP network from data collection
- Emulating next generation DNI analytics
- Emulating computer network operations (CNA, CND, CNE)
- Emulating mission planning and optimization

VEE allows reliable and robust software development and offers unprecedented insight into cloned network operations.