NERDBOX: An Emulated Internet for Scalability Tests of Running Codes

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ABSTRACT

NERDBOX (Network Emulation for Realistic Deployment and Behavior Observation eXperiments) is an architecture to construct Emulated Internet topology on a network emulation testbed. For a new protocol stack or an application, which is aimed to deploy in the Internet as a new service, it is better to evaluate its running code on a large scale topology before its actual deployment. We have tried to emulate the Internet on a testbed by developing our NERDBOX architecture. We demonstrate remote tests of several applications in emulated inter-AS topologies constructed by NERDBOX.

Categories and Subject Descriptors

C.2.2 [**Computer Communication Networks**]: Network Protocols—*Protocol Verification*

General Terms

Experimentation

Keywords

Evaluation, Scalability, Inter-AS Topology Emulation

1. OVERVIEW OF NERDBOX

Verifying the scalability of a new protocol stack or an Internet scale application, an evaluation environment is required, which can provide a large scale topology based on hardware or hardware virtualization. Unfortunately, no tractable field test method in the real Internet is available, which can grasp the behavior of an application from a birds-eye view, because of lack of technical components and/or operational overhead.

A network emulation testbed has a possibility to provide a tractable large scale network evaluation environment instead of a field test. However, it is difficult to construct a tractable large scale network emulation environment because an experimenter has to handle numerous physical / virtual nodes. To achieve a tractable experiment environment, we are tackling to develop a scalability test environment by emulating the Internet topology. NERDBOX (Network Emulation for Realistic Deployment and Behavior Observation eXperiments) is our proposed architecture to produce an emulated Internet environment for running codes.
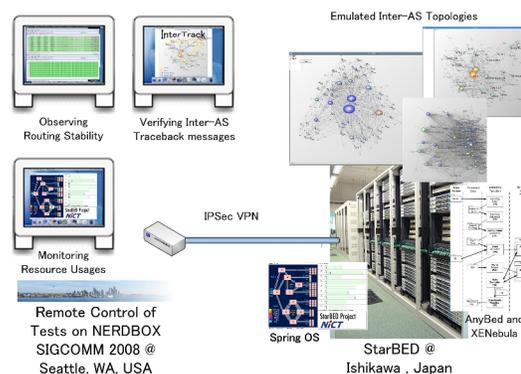
Figure 1: Demonstration Image

The first goal of NERDBOX is to emulate the inter-AS topology of the Internet for verifying Internet wide applications or protocol stacks. We have developed a prototype system of NERDBOX based on SpringOS[1], AnyBed[2] and XENebula in StarBED[1]. With the prototype NERDBOX system, we succeeded to emulate the whole JP Domain IPv4 AS topology (449 ASes) registered in JPNIC (Japan Network Information Center) at 7th January, 2008 by allocating experimental nodes to physical nodes and we also succeeded to construct an IPv4 AS topology composed of top 10,000 ASes on CAIDA's AS Relationship data onto 200 physical nodes with XEN virtualization. Though a remote control demonstration of NERDBOX on StarBED, we would like to get feedback from the audience and call for collaborators with our experiments.

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3. REFERENCES

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