NEPTUNE for fast and easy deployment of OMF virtual network testbeds

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NEPTUNE: Network Emulation for Protocol TUNning and Evaluation

• Open-source cluster-based network emulation system developed at University of Napoli Federico II
• Based on XEN for node virtualization
• Link virtualization through XEN virtual interfaces and NETEM
• Description of topologies in a proprietary XML format

OMF: cControl and Management Framework

• OMF is a framework for the automatic execution of experiments on a networking testbed developed and maintained by NICTA and Winlab-Rutgers
• To execute an experiment, user supplies an “experiment description” specifying the testbed resources to be used and the steps needed to execute the experiment
• The main components of OMF are:
  • Aggregate Manager: controls the whole set of testbed resources
  • Resource Controller: manages a single resource, e.g. a node
  • Experiment Controller: accepts as input the Experiment Description and orchestrates the testbed resources in order to execute the experiment

Deployment of OMF-ready virtual testbeds in NEPTUNE

Our system allows the fast creation of "virtual OMF testbeds", a feature that can be useful for teaching OMF and democing its capabilities.

Experiment execution:
  • User first describes the network, i.e. nodes and links, by using the web interface of Neptune.
  • User then adds to the system the machine which hosts the Aggregate Manager and the Experiment Controller
  • User run a script which configures the OMF component taking in input the topology file created by Neptune (see Figure below).

Proof-of-concept experiments

• We created a virtual testbed replicating the experimental setup of a real network in order to run it a VOIP experiment
  • Setup and picture taken from (*).
  • The real network is composed of two satellite links, the first one between Fortaleza and Rio De Janeiro, the second between Rio de Janeiro and Manaus.
  • The objective of the test is to infer the setup of the real network, then change a parameter of the virtual testbed, i.e. the delay of one link, and evaluate its impact on the VOIP quality

Future developments

• Integration of wireless emulation models and mechanisms into the virtual substrate provided by NEPTUNE
• Integration of a virtual testbed into public large scale testbeds such as PlanetLab Europe
• Authentication of users through PlanetLab

OMF is available online at [http://mytestbed.net/](http://mytestbed.net/)