

# An Integrated Experimental Environment for Distributed Systems and Networks

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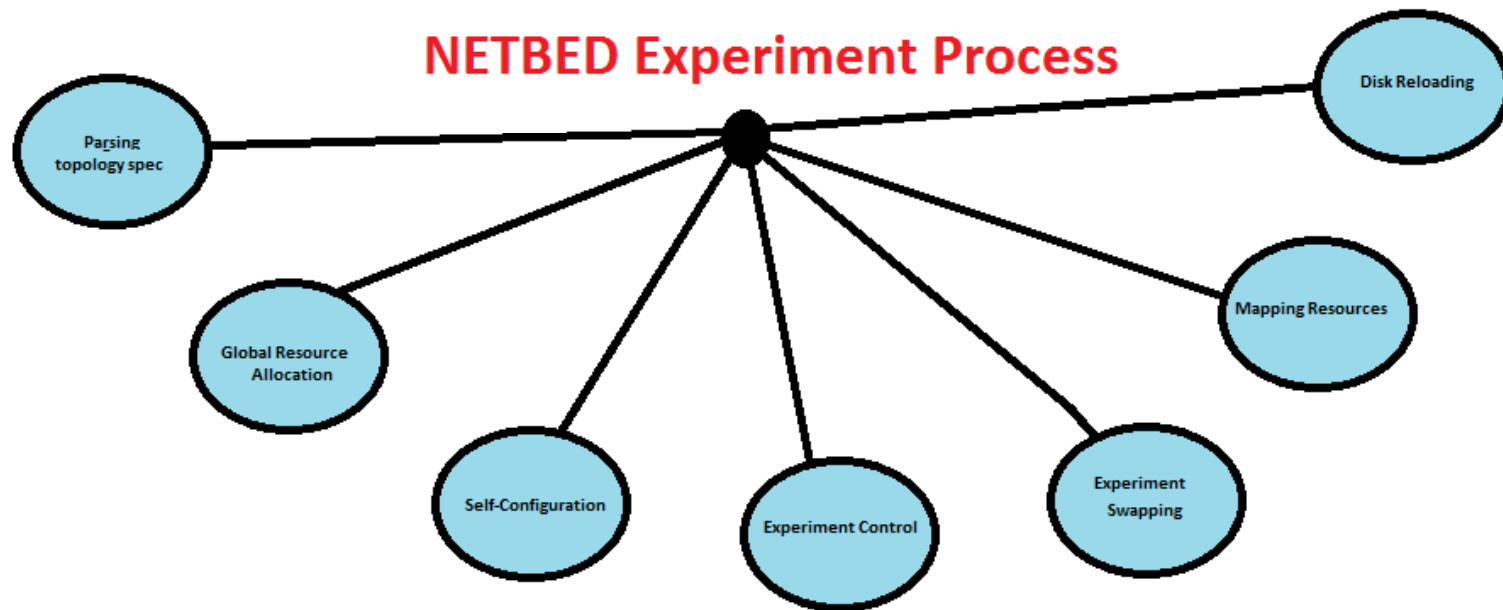
USC ID: 6993245898



# Introduction to Netbed

- An experimentation facility integrating network emulators, network simulators, and live networks.
- Is a time and space shared platform where virtual topology translated to physical nodes from a cluster
- Integrates emulation, simulation and wide area nodes
- It runs arbitrary workload *i.e. any OS image, any code* on “routers” or any program, for any user
- Ns scripts/GUI for specifying virtual topology
- Netbed virtual machine :
  - Abstraction
  - Conservative resource allocation, scheduling and preemption
  - Hard/soft state management

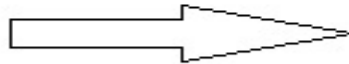
# Netbed Experiments



PC with NETBED  
experimentation  
facility



Mapping desired  
Virtual Topology  
onto the Physical  
Topology



PC with NETBED  
experimentation  
facility



PC with NETBED  
experimentation  
facility



# Question

## **Need for Netbed or any Integrated Environment. Why???**

- Live networks give real results but they cannot be scaled and do not have repeatability
- Pure emulation difficult to configure
- The configuration time can exceed actual experiment time
- Simulation techniques give high amount of *abstraction and hence incur loss of low* level details
- Netbed speeds up emulation and configuration time by virtual topology and events specified by the *ns* script/Java GUI
- It achieves scalability and resource sharing by sharing a physical experiment cluster amongst experimenters on a demand basis
- It provides a “virtual machine” for network experimentation by OS-like tasks [ like resource allocation, scheduling, preemption], single namespace, hard/soft state management, abstraction etc