Implementation and Simulation of LVS in ns-2

Presented by Yuzhuang Hu
yhu1@sfu.ca

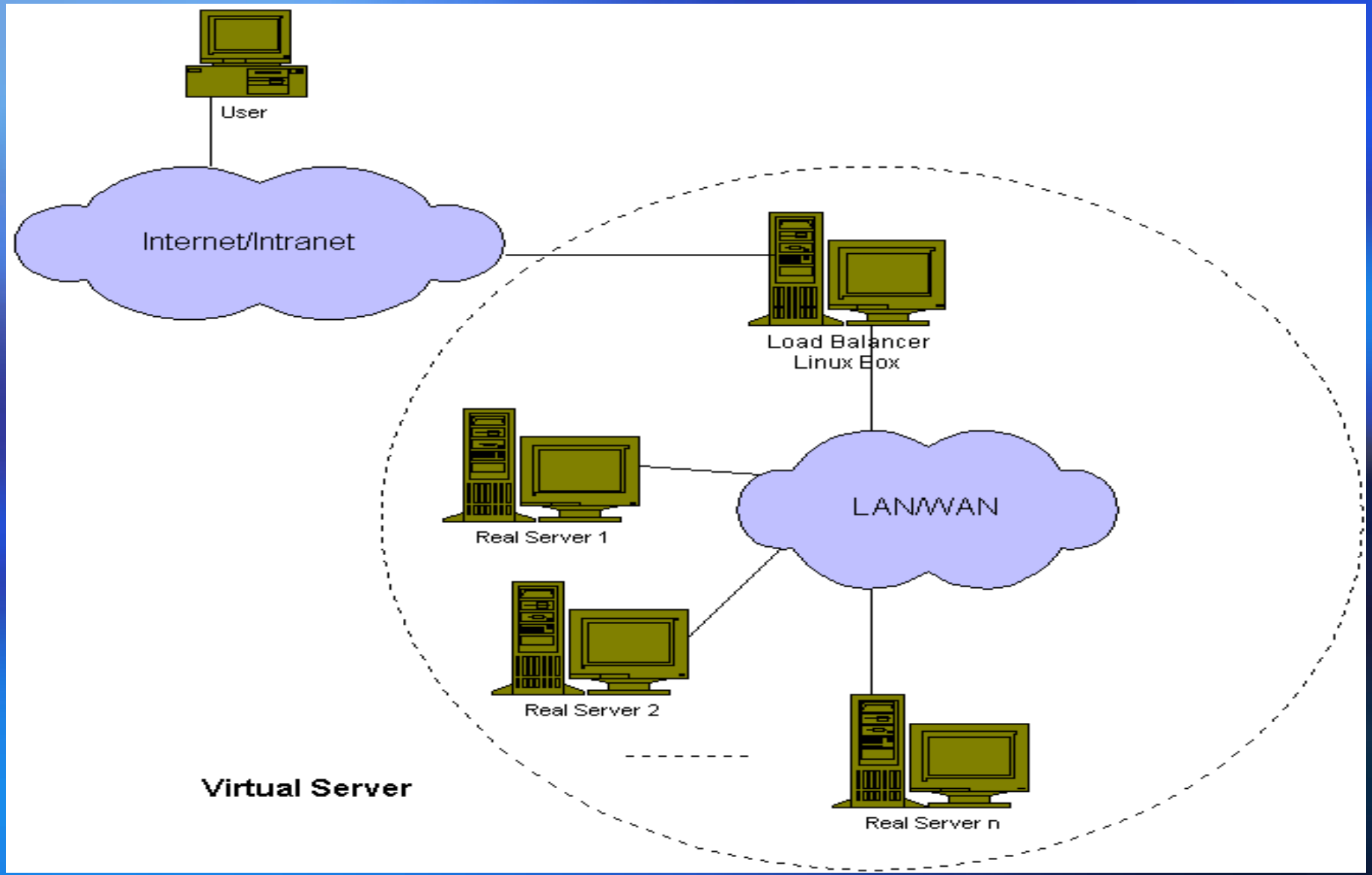
Roadmap

- Project introduction and motivation
- Related work
- Implementation issues of lvs in ns
- Simulation scenarios
- Future work

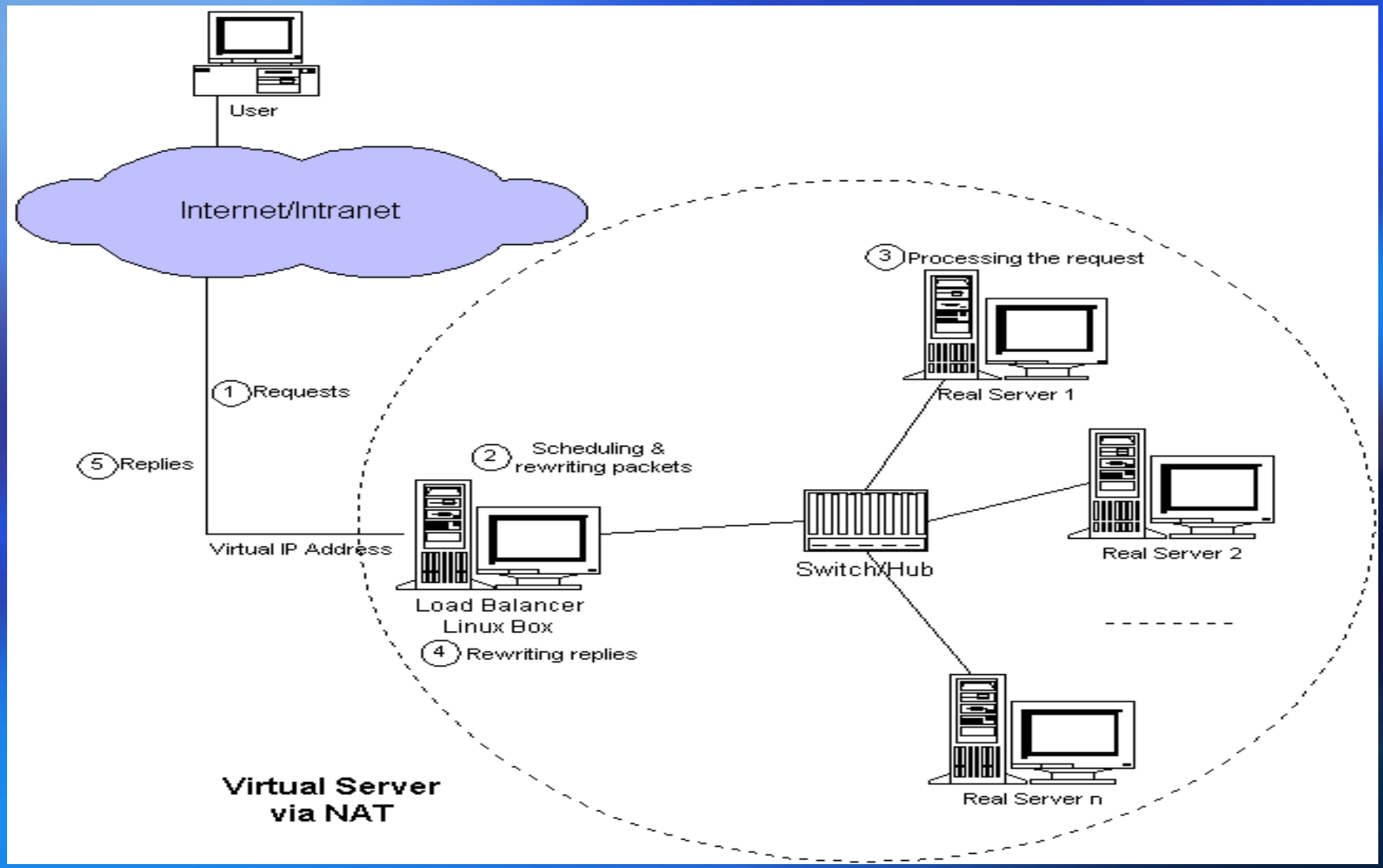
Project Goal and Motivation

- Goal: implement and simulate lvs in ns-2
- Understanding lvs
- Understanding ns
- Evaluate the performance of lvs
- Provide a platform for further research and study of lvs

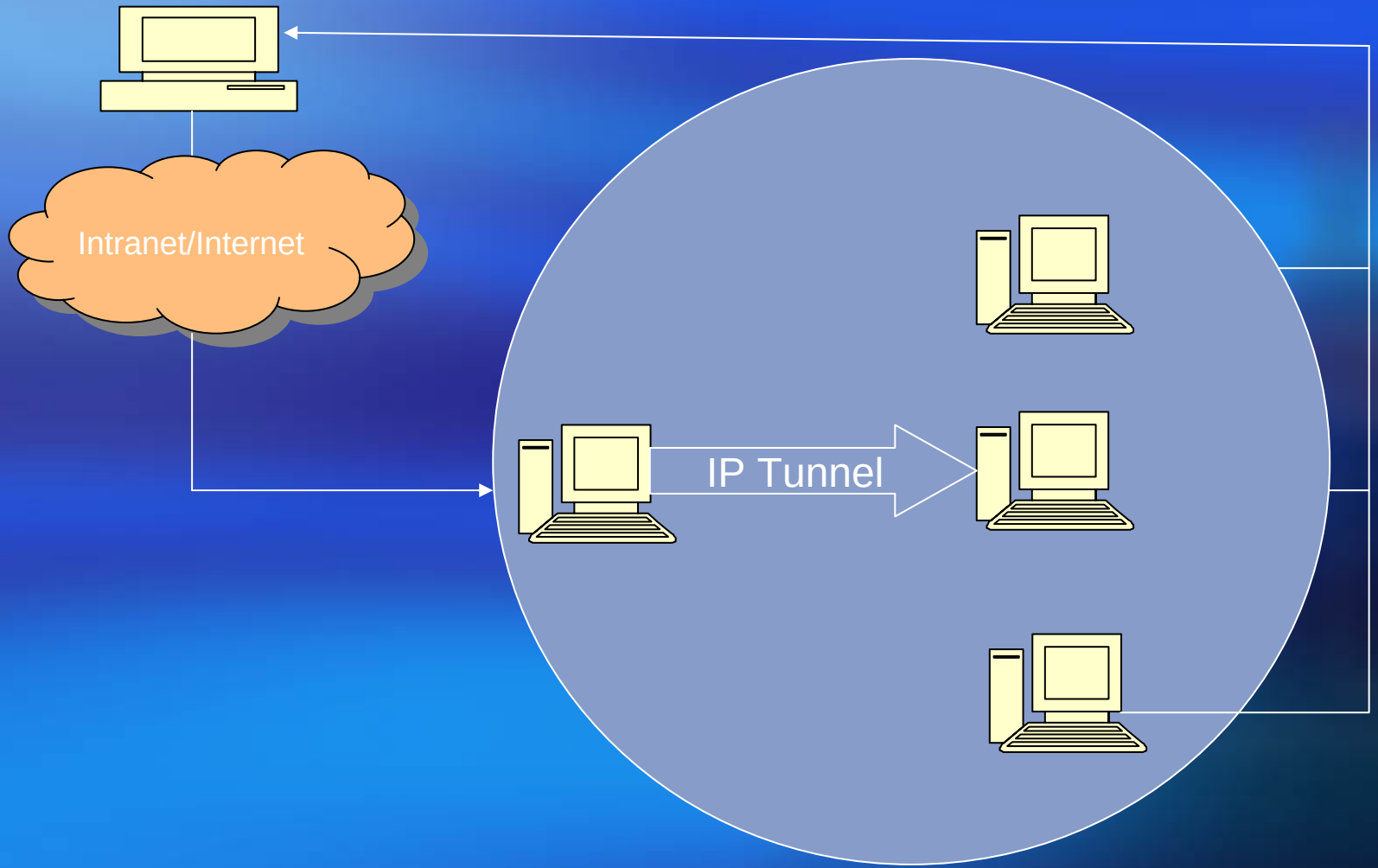
What is lvs?


User
Internet/Intranet
Load Balancer
Linux Box
Real Server 1
LAN/WAN
Real Server 2
Real Server n
Virtual Server

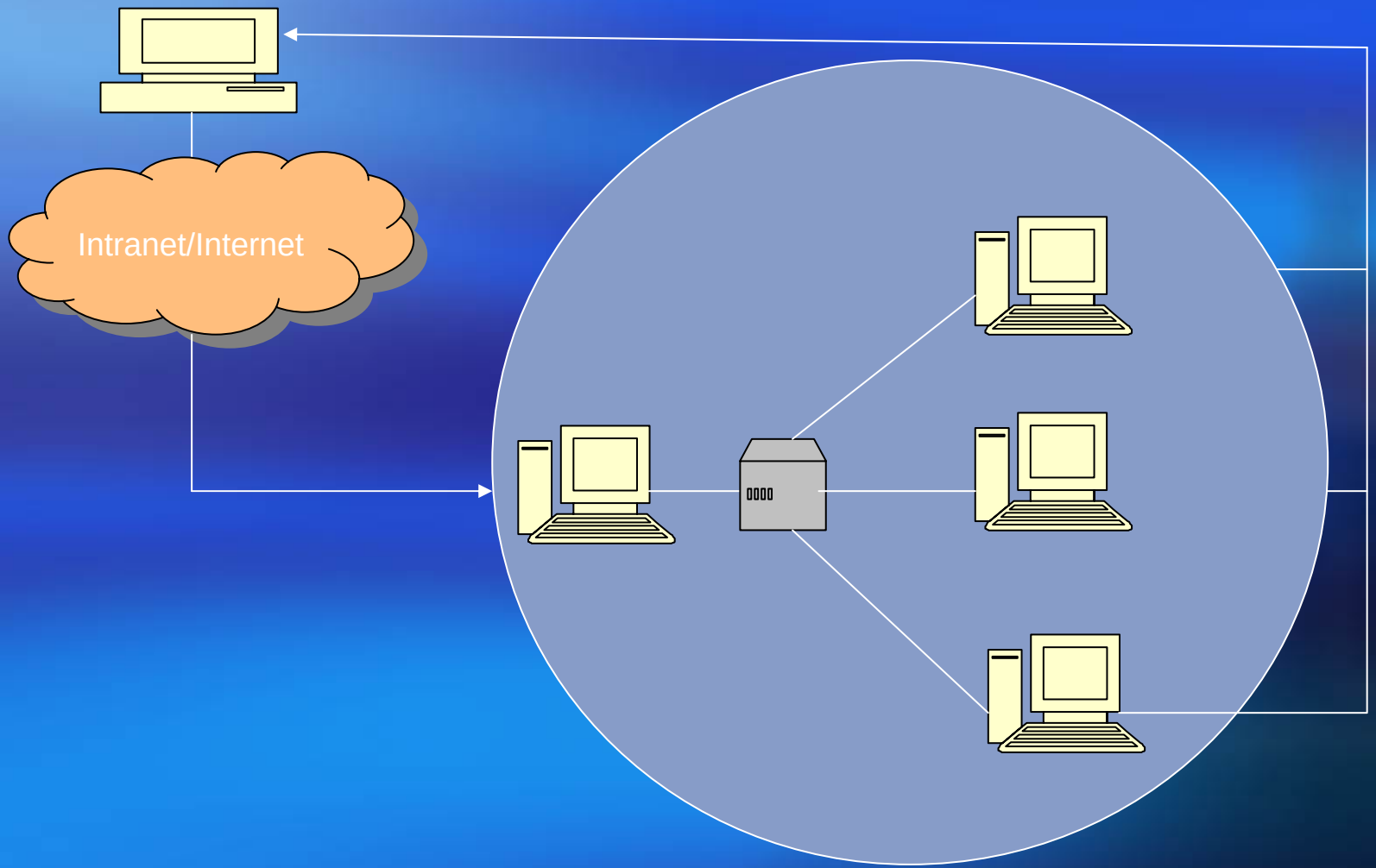
LVS via NAT


User
Internet/Intranet
1 Requests
5 Replies
Virtual IP Address
2 Scheduling & rewriting packets
Load Balancer Linux Box
4 Rewriting replies
3 Processing the request
Real Server 1
Real Server 2
Real Server n
Switch/Hub
Virtual Server via NAT

LVS via IP Tunneling



LVS via Direct Routing



Related work

- DNS redirection
- Client side approach
- The server side application level scheduling approach
- The server side ip level scheduling approach

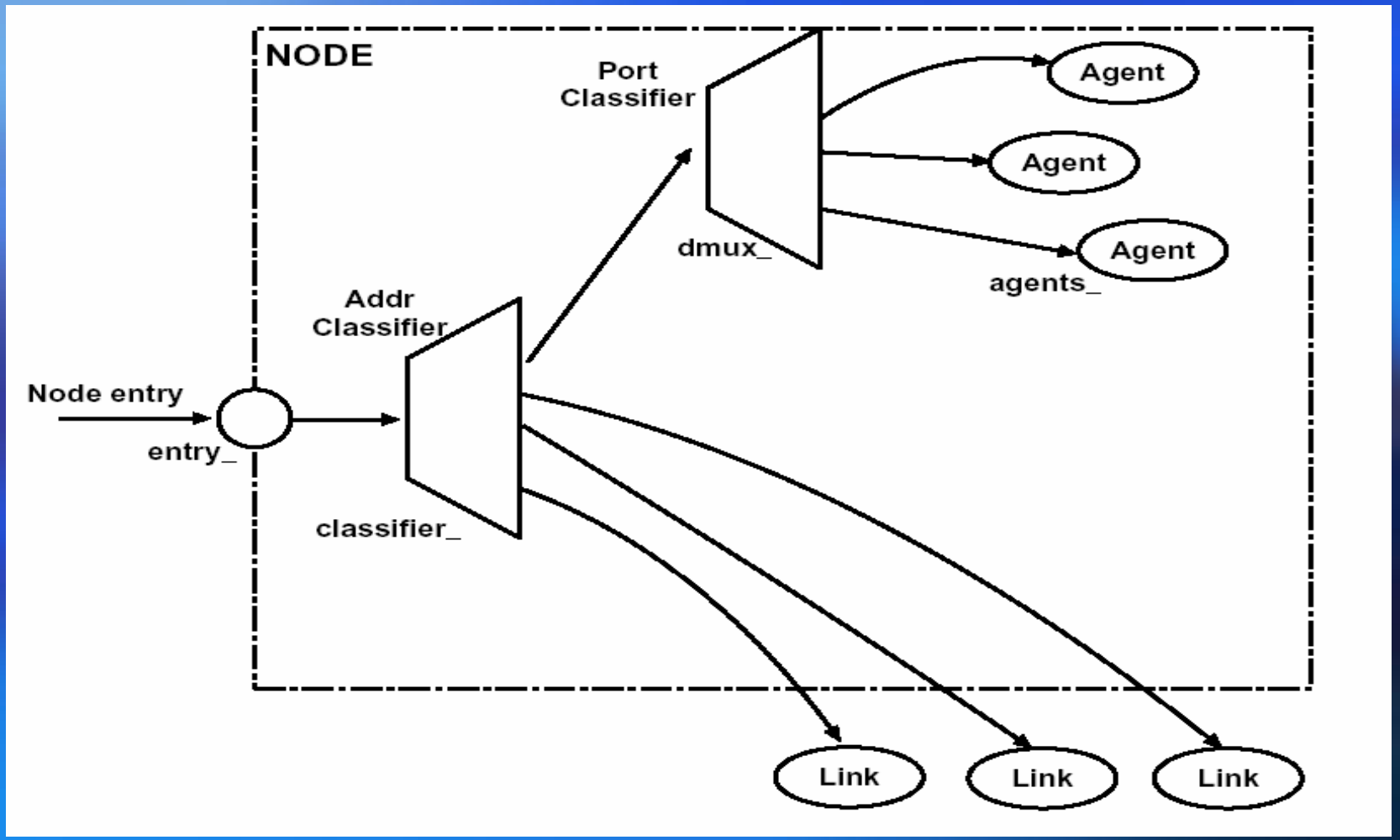
Implementation Issues in ns-2

- How to accept a packet whose destination ip address is different from the node's address?
- How to send a packet whose source ip address is different from the node's address?

Solutions

- Add a virtual ip address in ns agent
  here_.addr_ virtual_addr_
- Add a route for virtual ip address to demultiplexer dmux_
- Note the port of an agent is different from the port of tcp or udp

Node in ns2


NODE
Port
Classifier
Agent
Agent
Agent
dmux_
agents_
Addr
Classifier
Node entry
entry_
classifier_
Link
Link
Link

LAN in ns-2

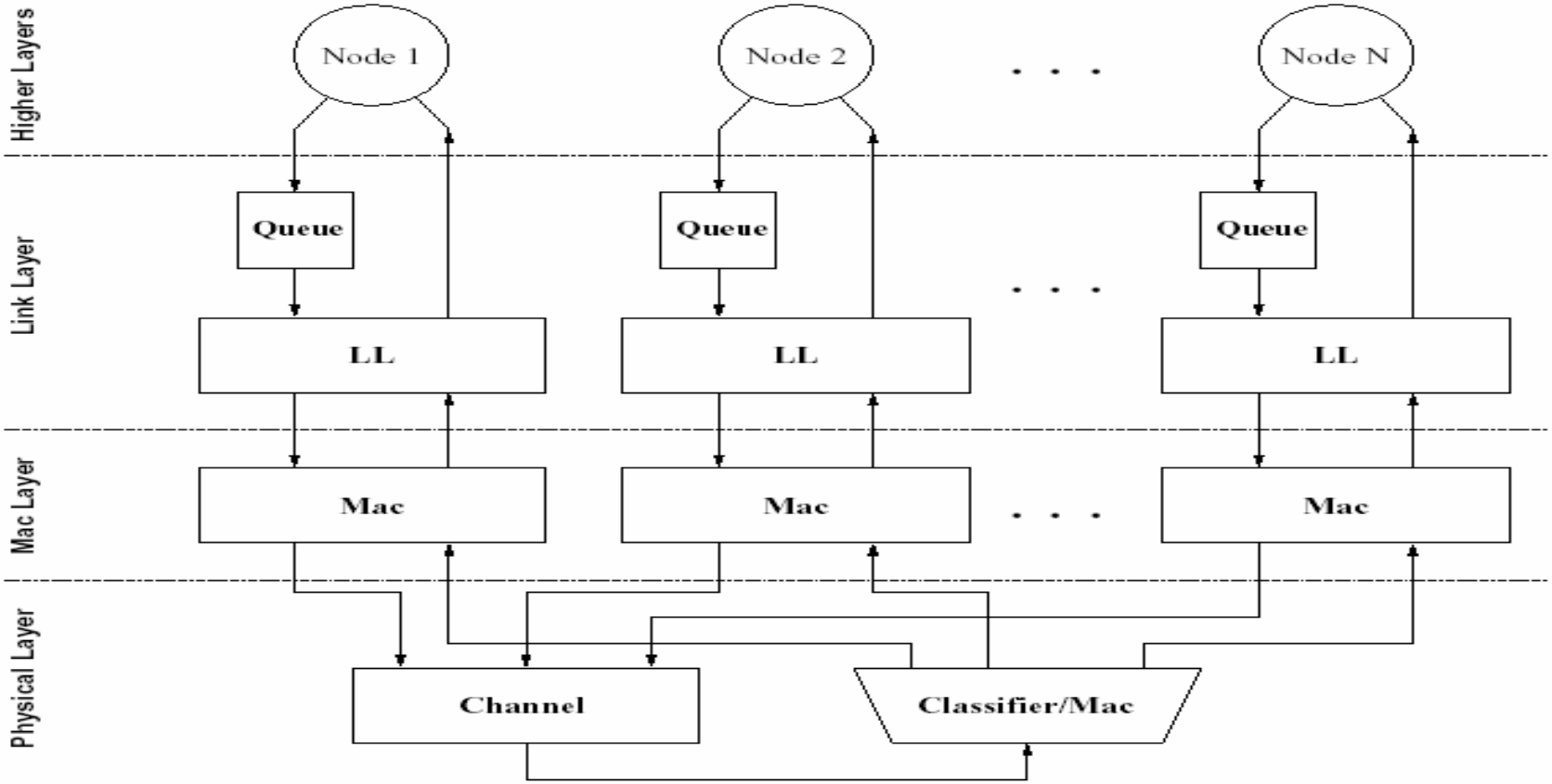
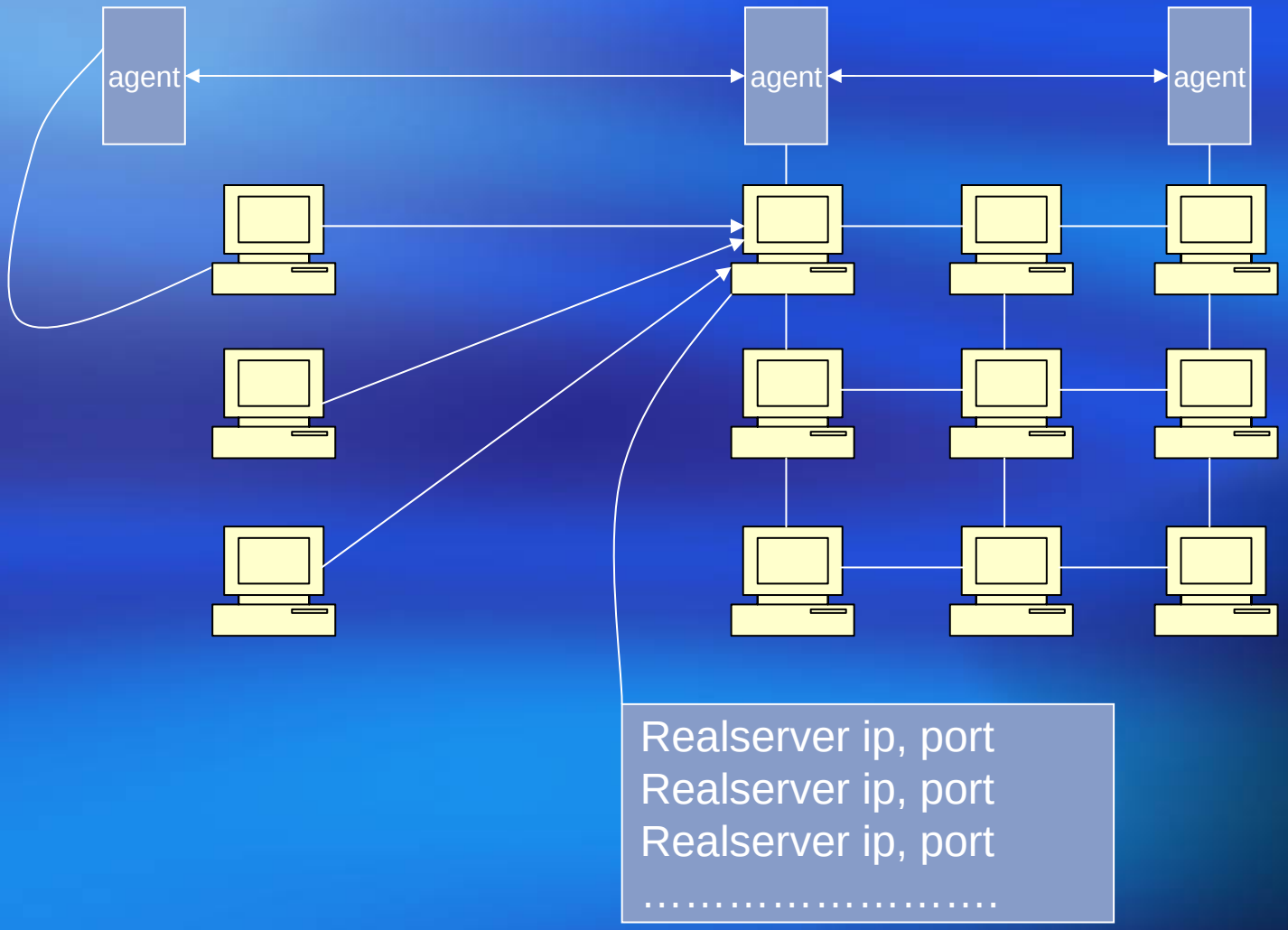
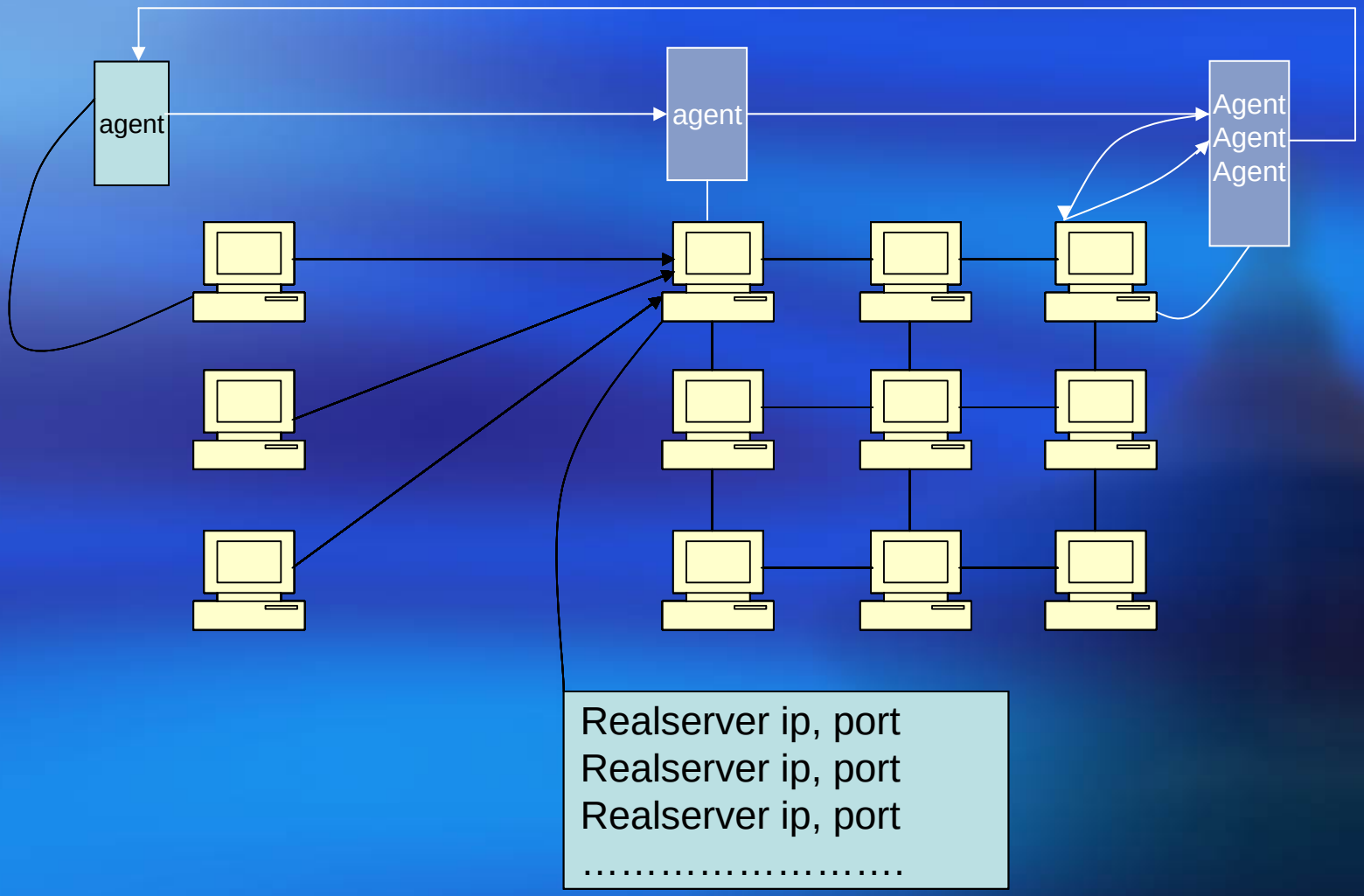


Figure 14.1: Connectivity within a LAN

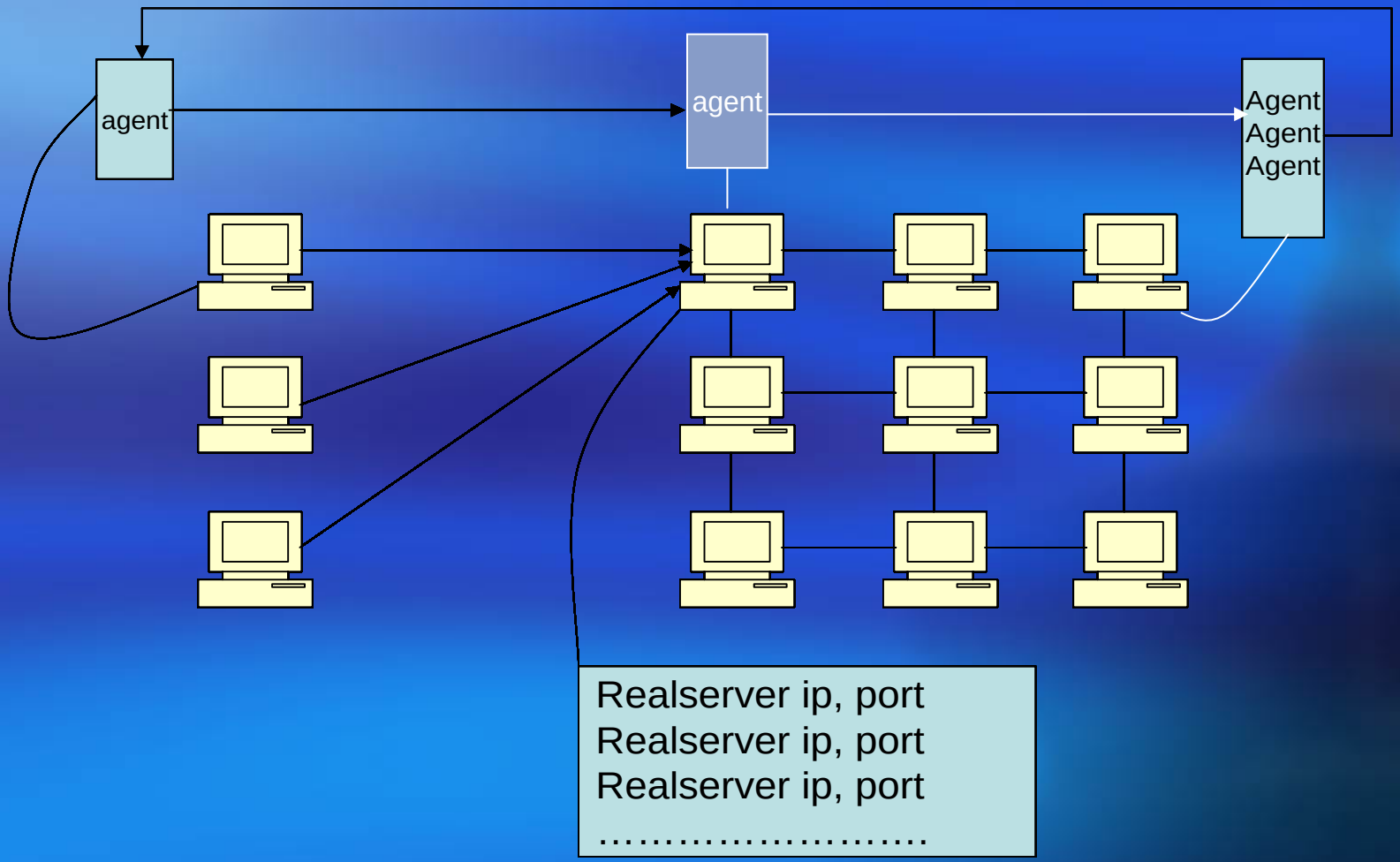
Simulation Scenario for VS via NAT



Simulation scenario via Tunneling



Simulation scenario for vs via direct routing



Completed and ongoing work

- Work completed

  necessary changes in ns-2, simulation script, much of the implementation

- Need to

  complete the implementation soon, simulation, final report

Future work

- Add support for tcp and ftp
- Think about how to deal with the extremely busy web site