



DOE Science Grid Testbed: Status, Testing, and Tools

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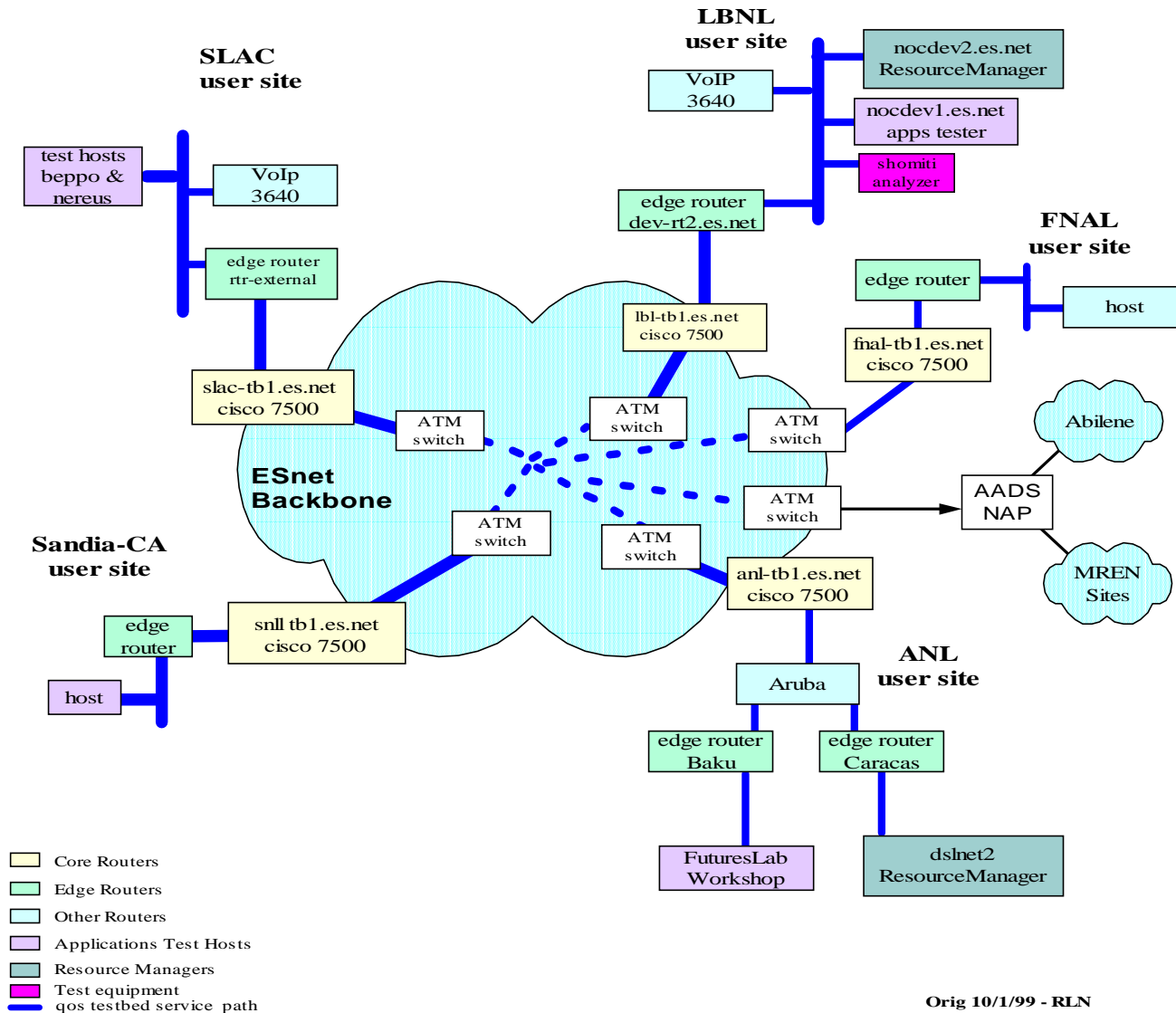
Acknowledgement to Becca Nitzan on whose work much of this is based

First Joint Internet2/DOE QoS Workshop

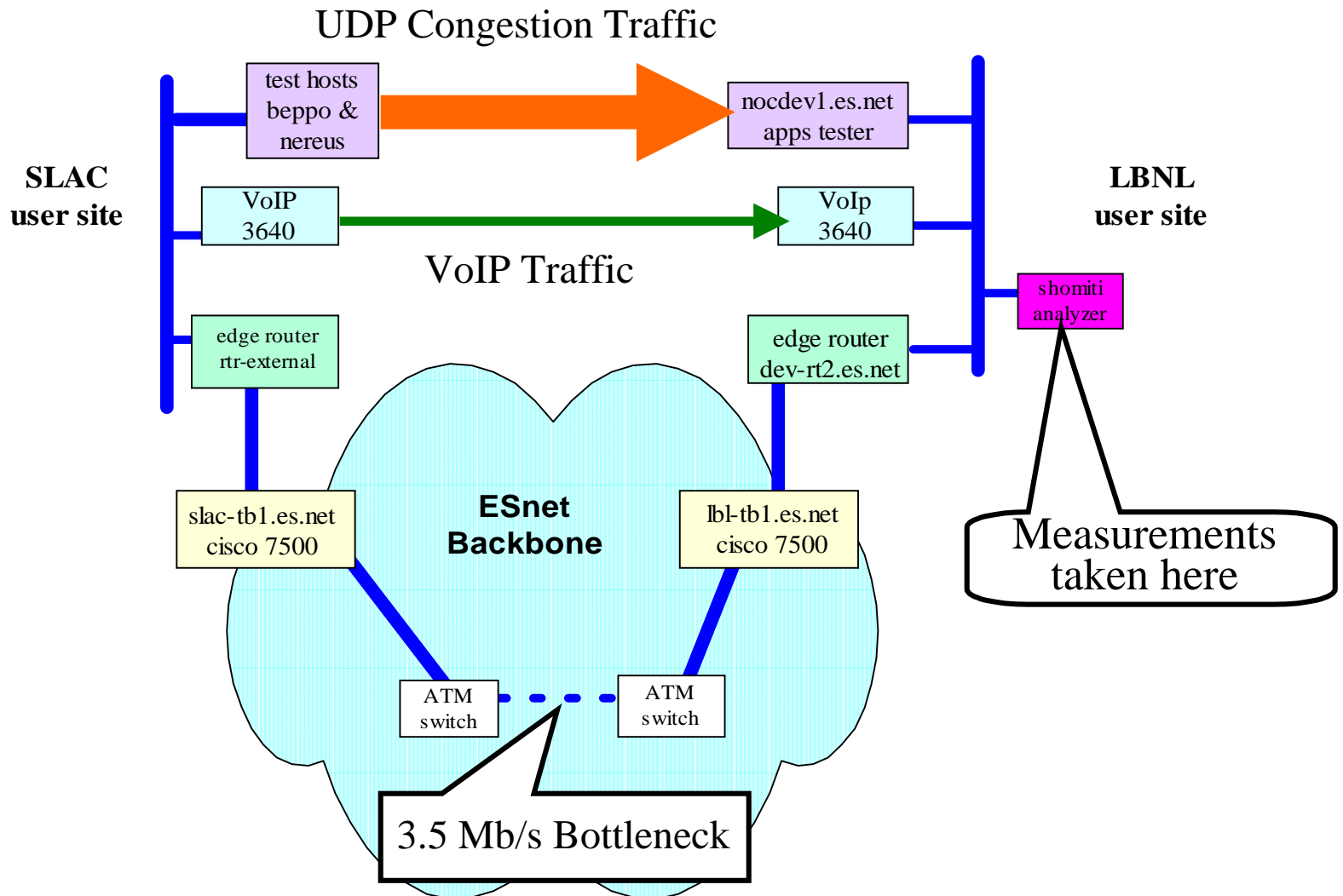
Summary of this talk

- **Current DOE Science Grid testbed**
- **VoIP QoS Jitter/Latency Test Results**
- **ESnet QoS Looking Glass**
- **LBNL's Interim Calendaring System**
- **LBNL's AS QoS State Manager**

DOE Science Grid Testbed



VoIP Latency/Jitter Testing

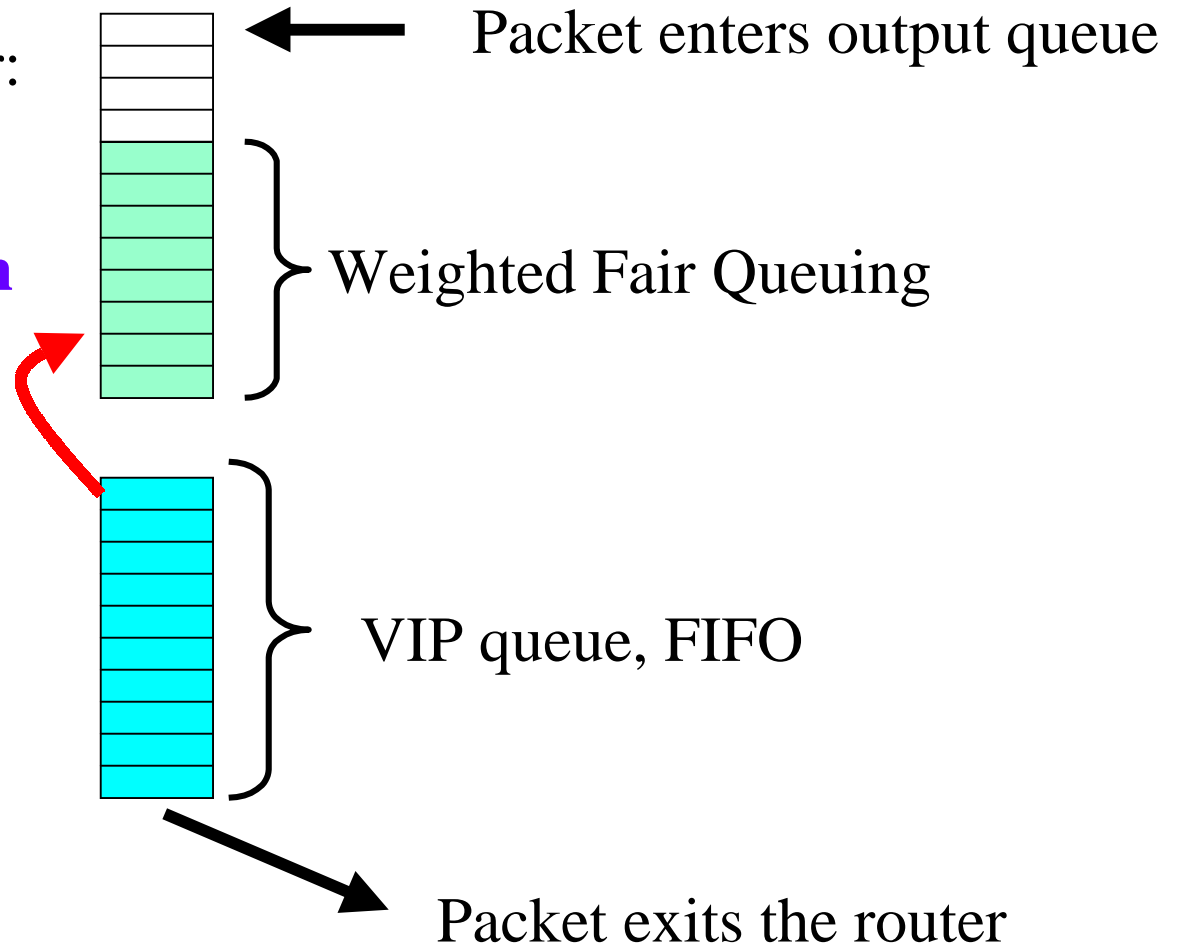


Queuing delay in a router is an issue:

- We (Becca) noticed that when under congestion, queuing delays may occur. The high priority traffic can be affected.

In the router:

Typically there must be backpressure from the *packet-FILLED* VIP queue in order for the WFQ algorithm to kick in.



Cisco implemented a new command to address this:

Original configuration snippet

```
class-map match-all voice  
  match ip precedence 3
```

```
policy-map qos-control  
  class voice  
    bandwidth 3000
```

```
interface ATM0/0/0.1 multipoint  
  service-policy output qos-control
```

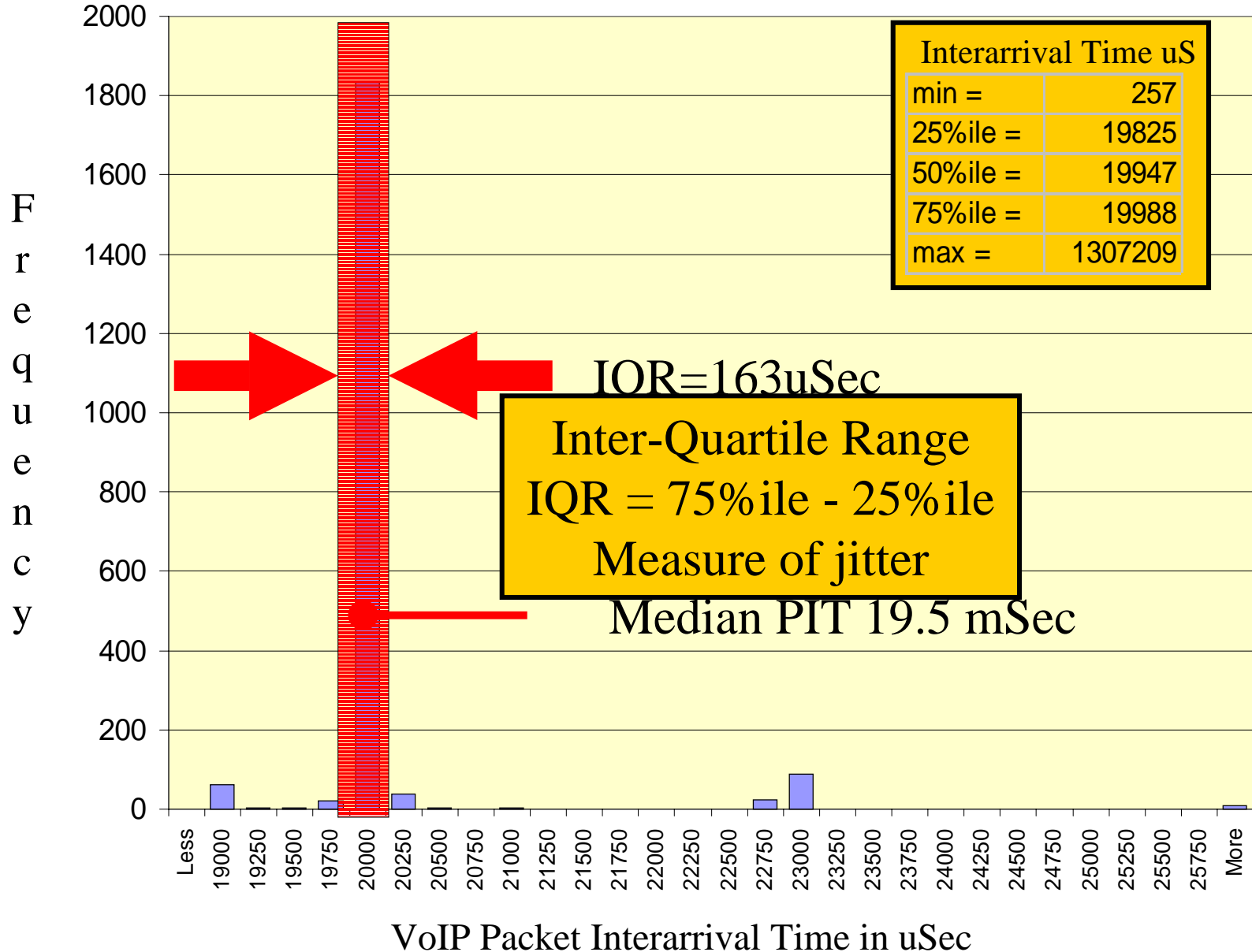
New configuration snippet

```
class-map match-all voice  
  match ip precedence 3
```

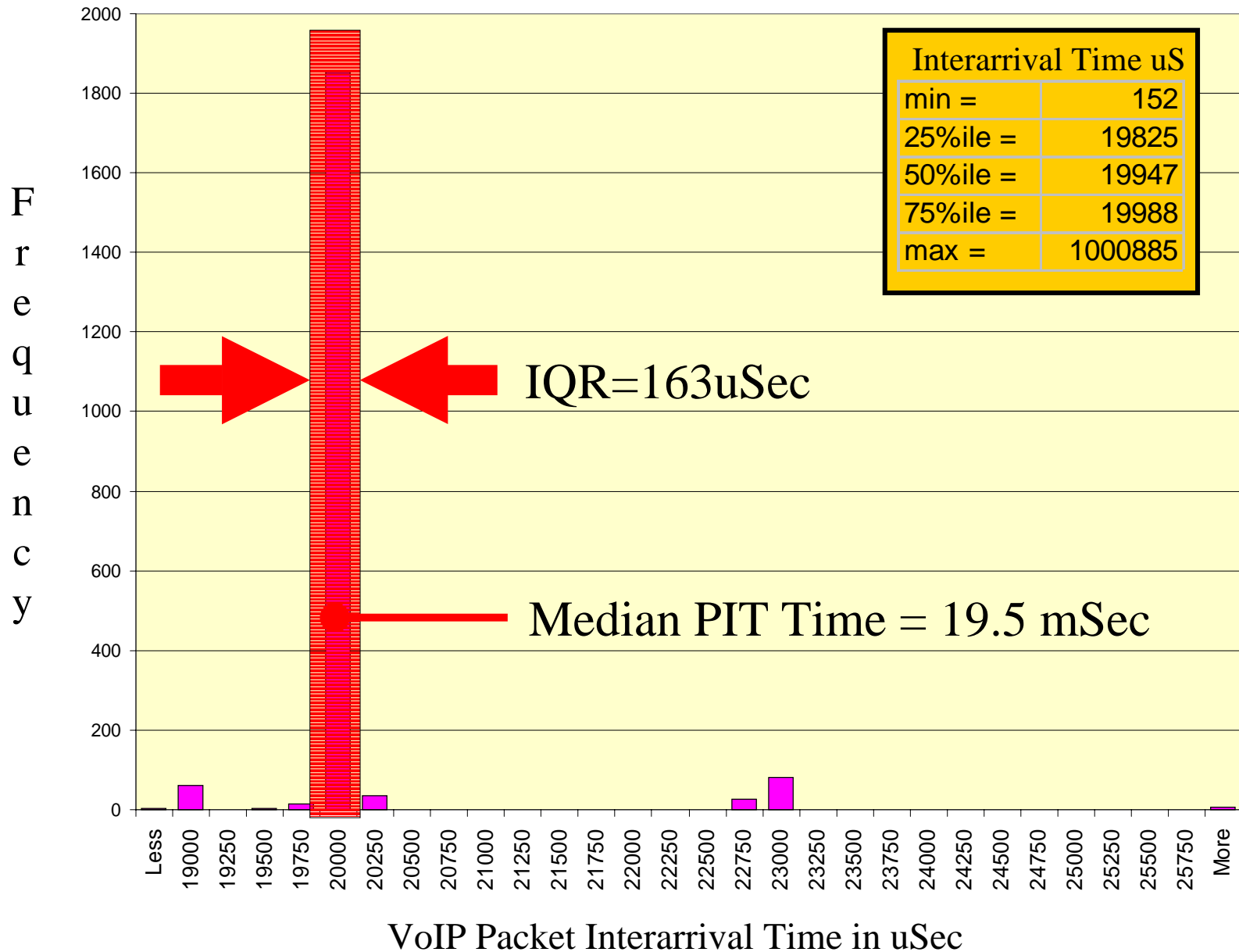
```
policy-map qos-control  
  class voice  
    priority 3000
```

```
interface ATM0/0/0.1 multipoint  
  service-policy output qos-control
```

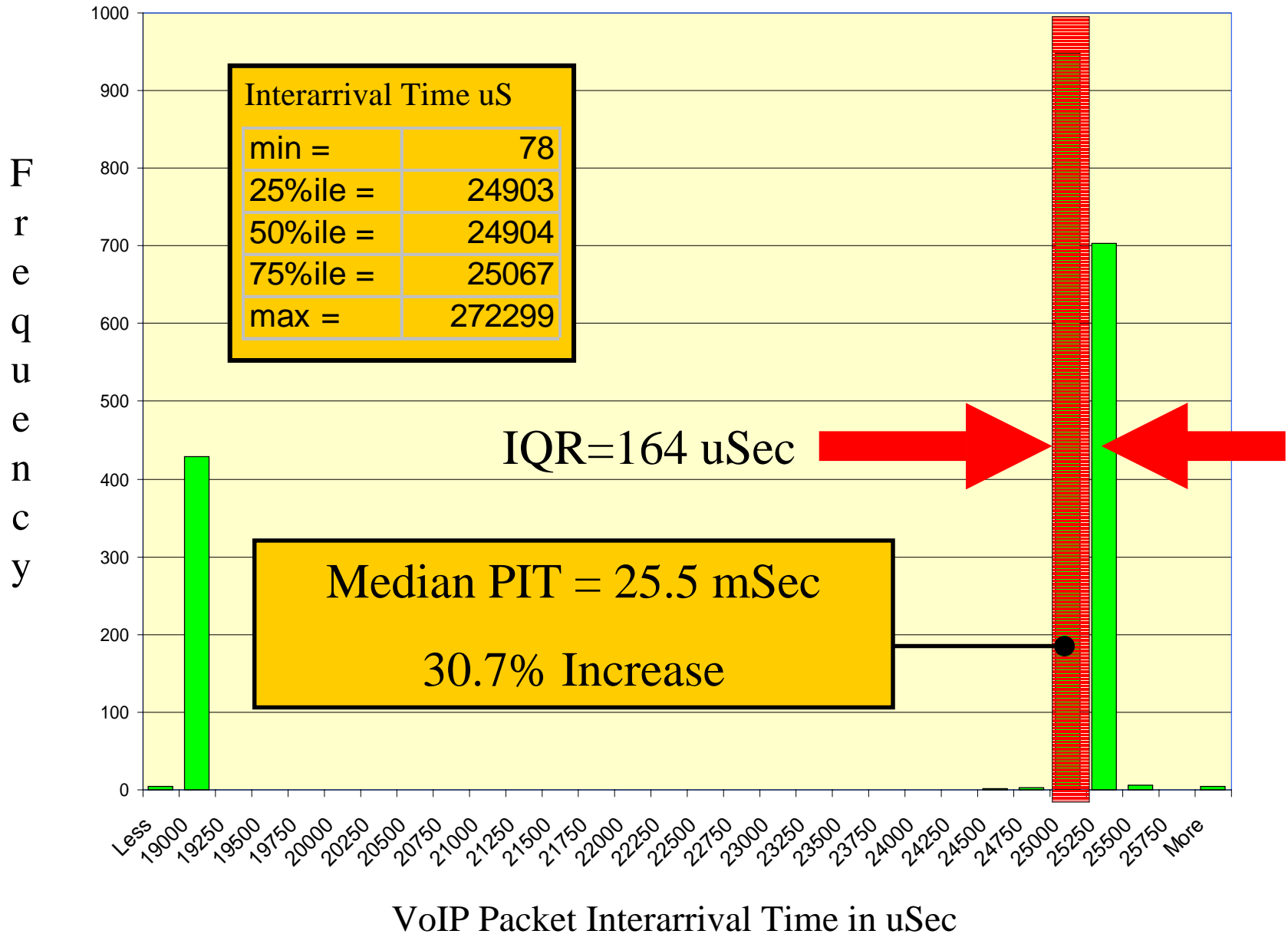
No Congestion, Bandwidth cmd



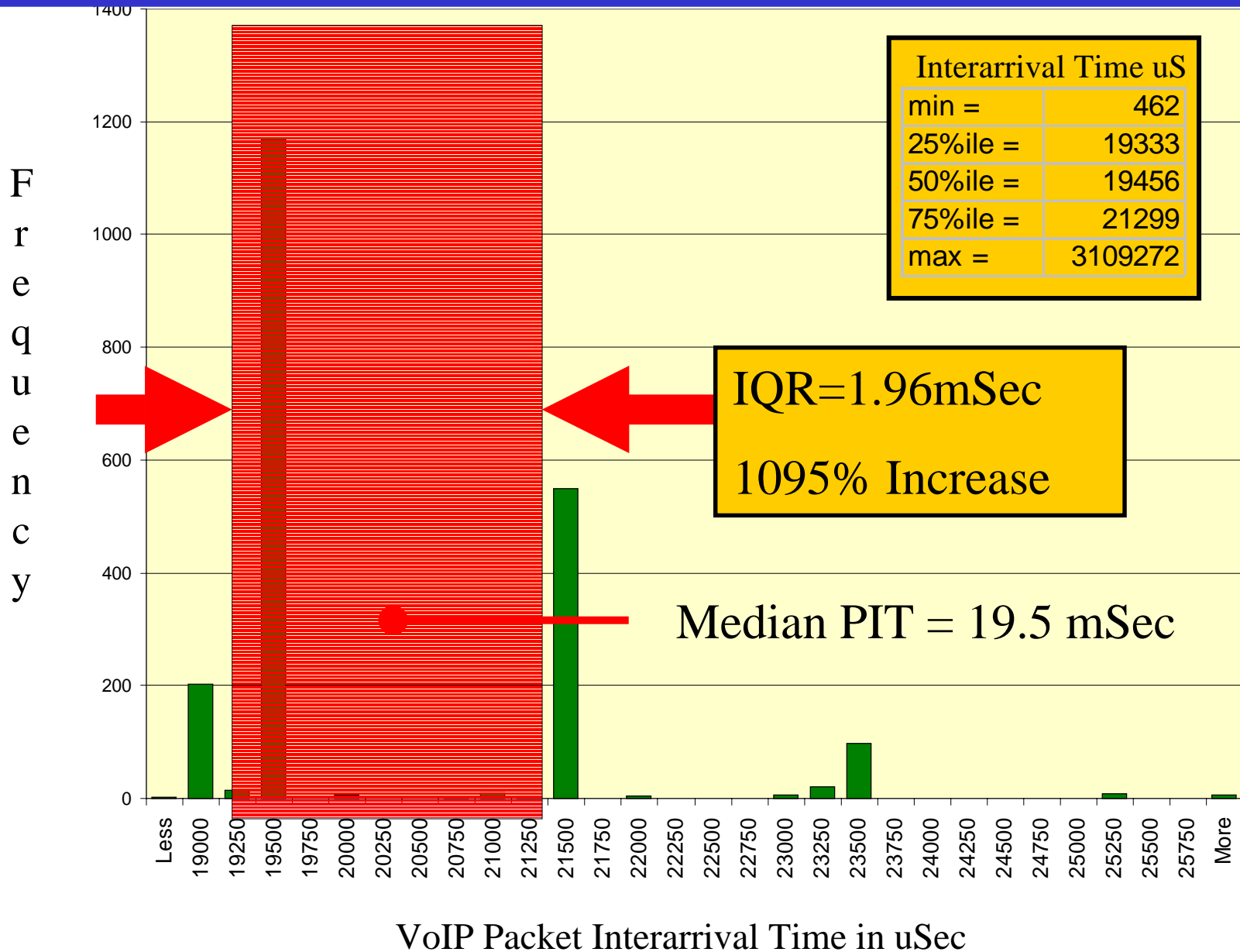
No Congestion, Priority cmd



Congestion, Bandwidth cmd



Congestion, Priority cmd



Problem:

How to give network administrators access to core testbed routers?

Deployed Solution:

We've set up a proxy server looking-glass to view router information, especially for data not available via SNMP.

ESnet
The Energy
Sciences
Network

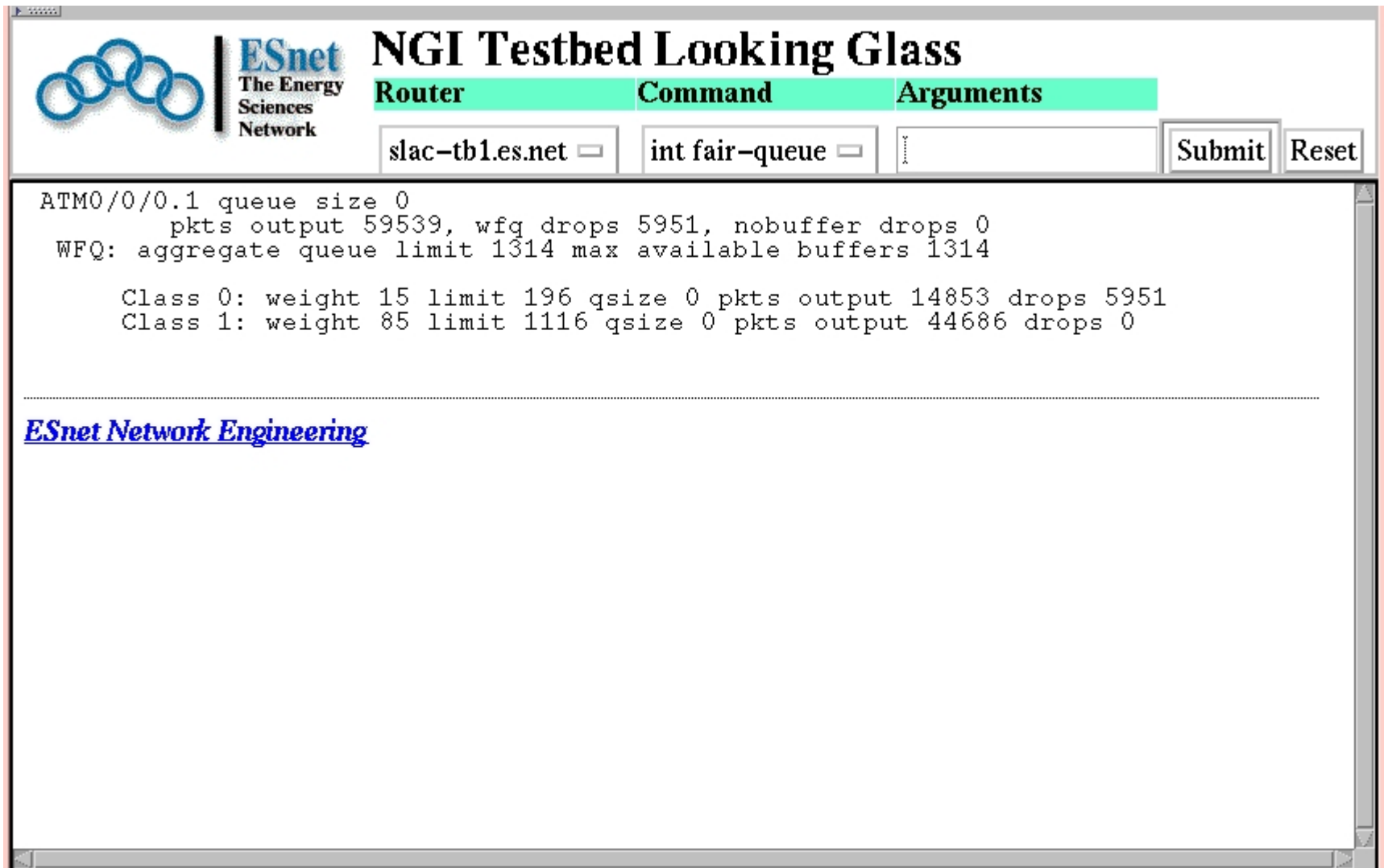
NGI Testbed Looking Glass

Router	Command	Arguments
<input type="text" value="anl-tb1"/>	<input type="text" value="atm vc"/>	<input type="text" value="I"/>

Looking Glass re... he

Submit Reset

This example show WFQ status, note that drops are showing up on the low priority queue only.



The screenshot shows a web interface titled "NGI Testbed Looking Glass" with the ESnet logo. It features a form with three input fields: "Router" (slac-tb1.es.net), "Command" (int fair-queue), and "Arguments" (empty). "Submit" and "Reset" buttons are to the right. The output area displays the following text:

```
ATM0/0/0.1 queue size 0
  pkts output 59539, wfq drops 5951, nobuffer drops 0
WFQ: aggregate queue limit 1314 max available buffers 1314

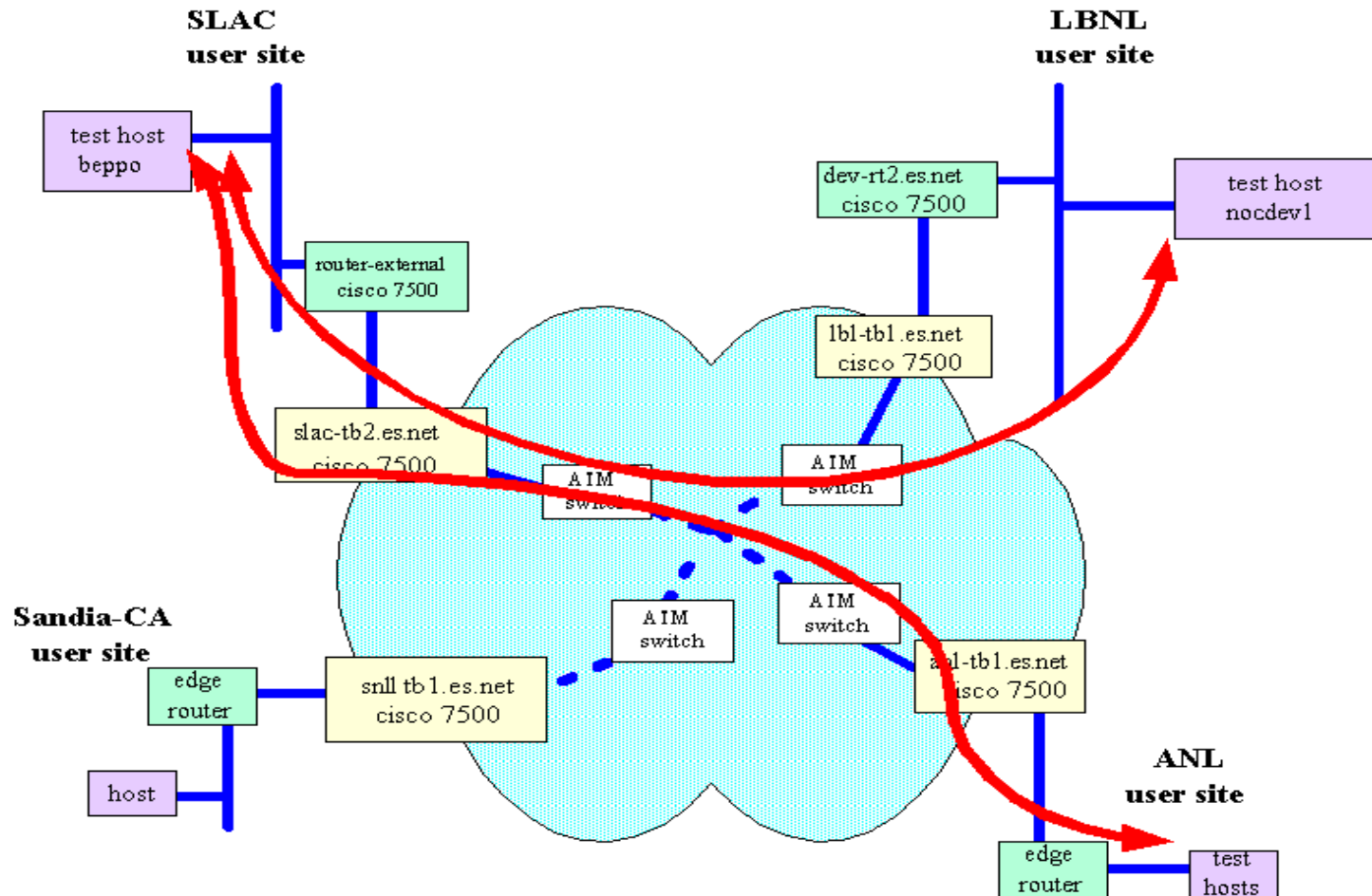
  Class 0: weight 15 limit 196 qsize 0 pkts output 14853 drops 5951
  Class 1: weight 85 limit 1116 qsize 0 pkts output 44686 drops 0
```

Below the output is a horizontal dotted line and a link for [ESnet Network Engineering](#).

Problem:

How to schedule usage of
network resources for testing.

Individual test paths that conflict; the router at SLAC has two tests running through it.



LBNL's Interim Calendaring System

Selena Sol's Groupware Calendar Demo: February - 2000 - Netscape

File Edit View Go Communicator Help

February - 2000

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9 SLAC->LBL testing	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29				

For day-at-a-glance-calendar, click on the day number on the calendar above.

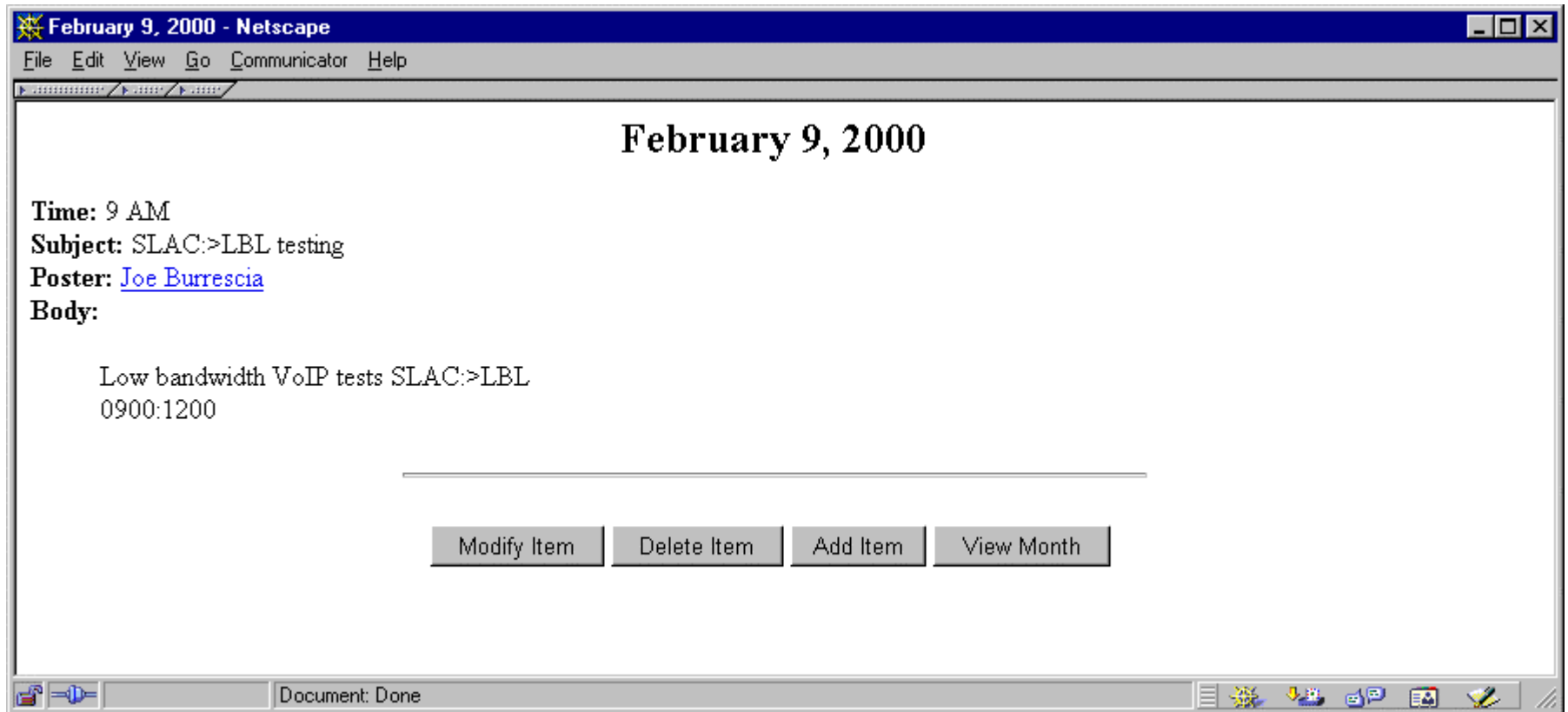
Or, to see another 2000 month, choose one

Or, to see another year, select one

* Note: This calendar is best viewed by opening your browser window to its maximum size. And, you can only submit a month if the year field is cleared.

Document: Done

LBNL's Interim Calendaring System



www-itg.lbl.gov/DSGT/calendar

Problem:

How to schedule/reserve shared network resources.

LBNL's Autonomous System QoS State Manager

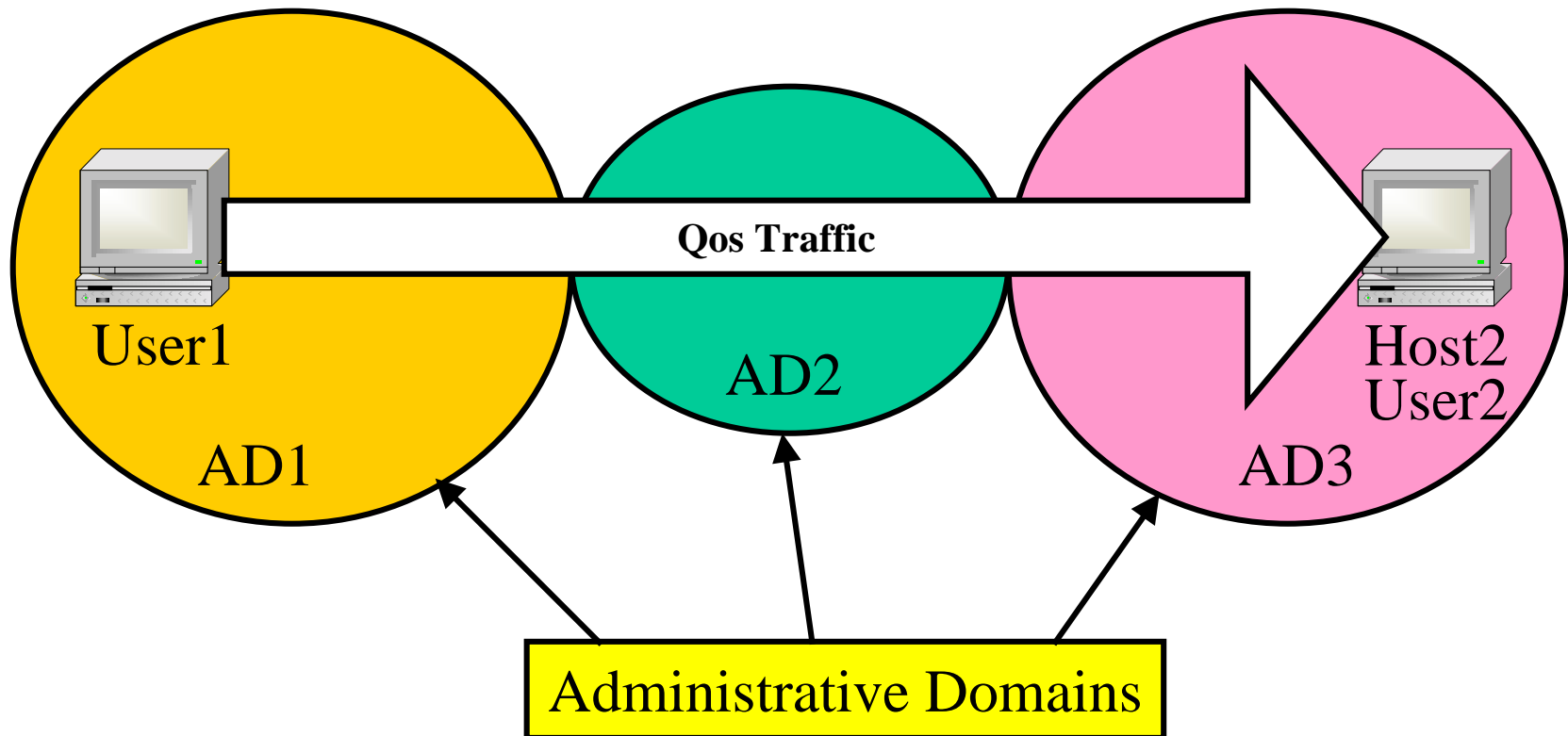
(View from minus 30,000 feet)

- Reservation Manager (RM) keeps track of QoS resources inside an Administrative Domain
 - One RM per Administrative Domain
 - Has knowledge of internal AS topology to the point of mapping QoS paths across possible internal aggregation points from ingress AS to egress AS
 - “Reserves” resources for use
 - Does not modify any of the network resources

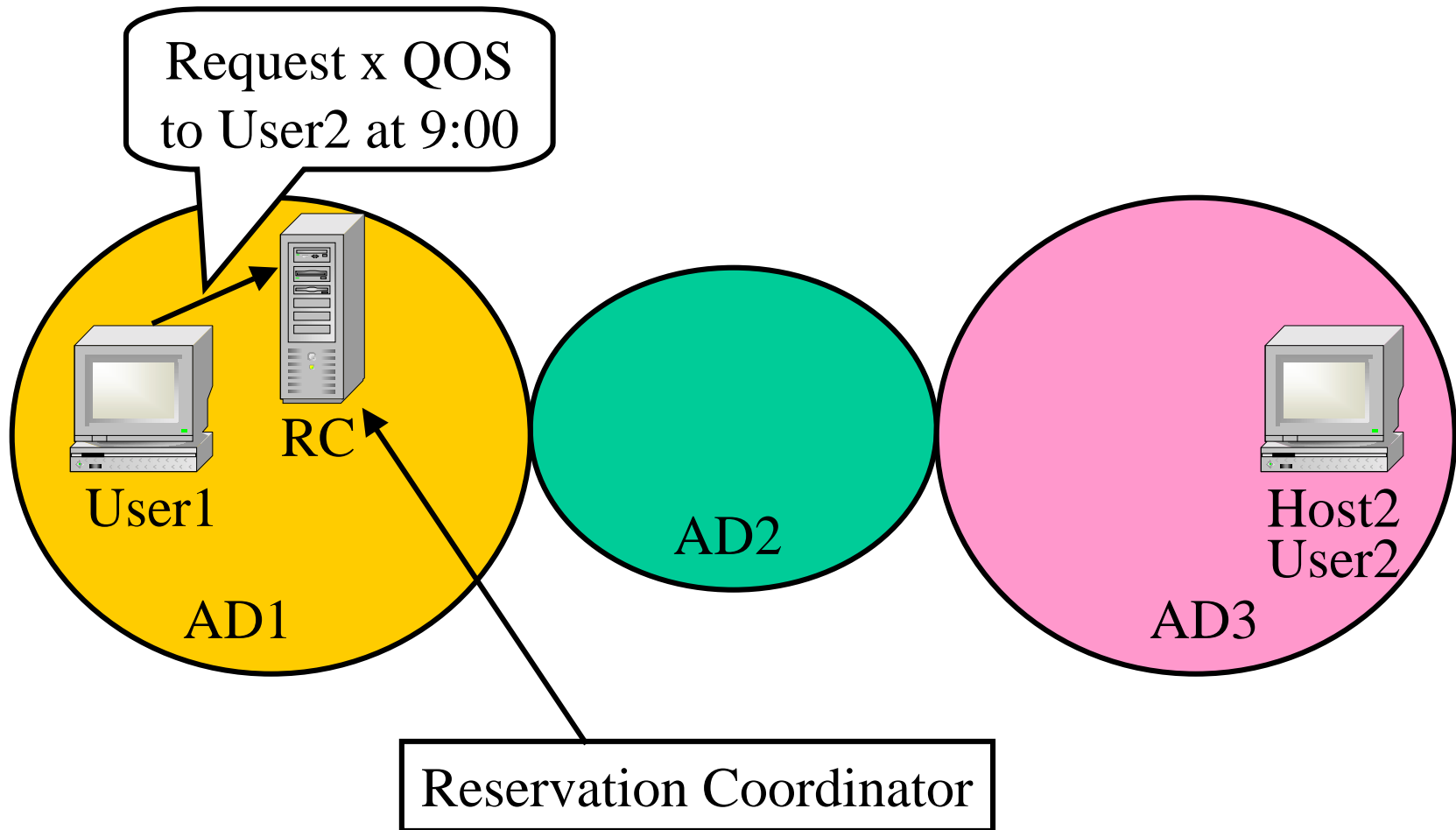
LBL's Autonomous System QoS State Manager

- **RM appears as a “Black Box” to the requestor**
 - Requestor supplies destination address, time, and QoS requirements for reservation
 - RM responds with yes/no and next hop Administrative Domain on path to destination
 - RM keeps state for this reservation so future competing reservations against the same resources can be accepted or rejected

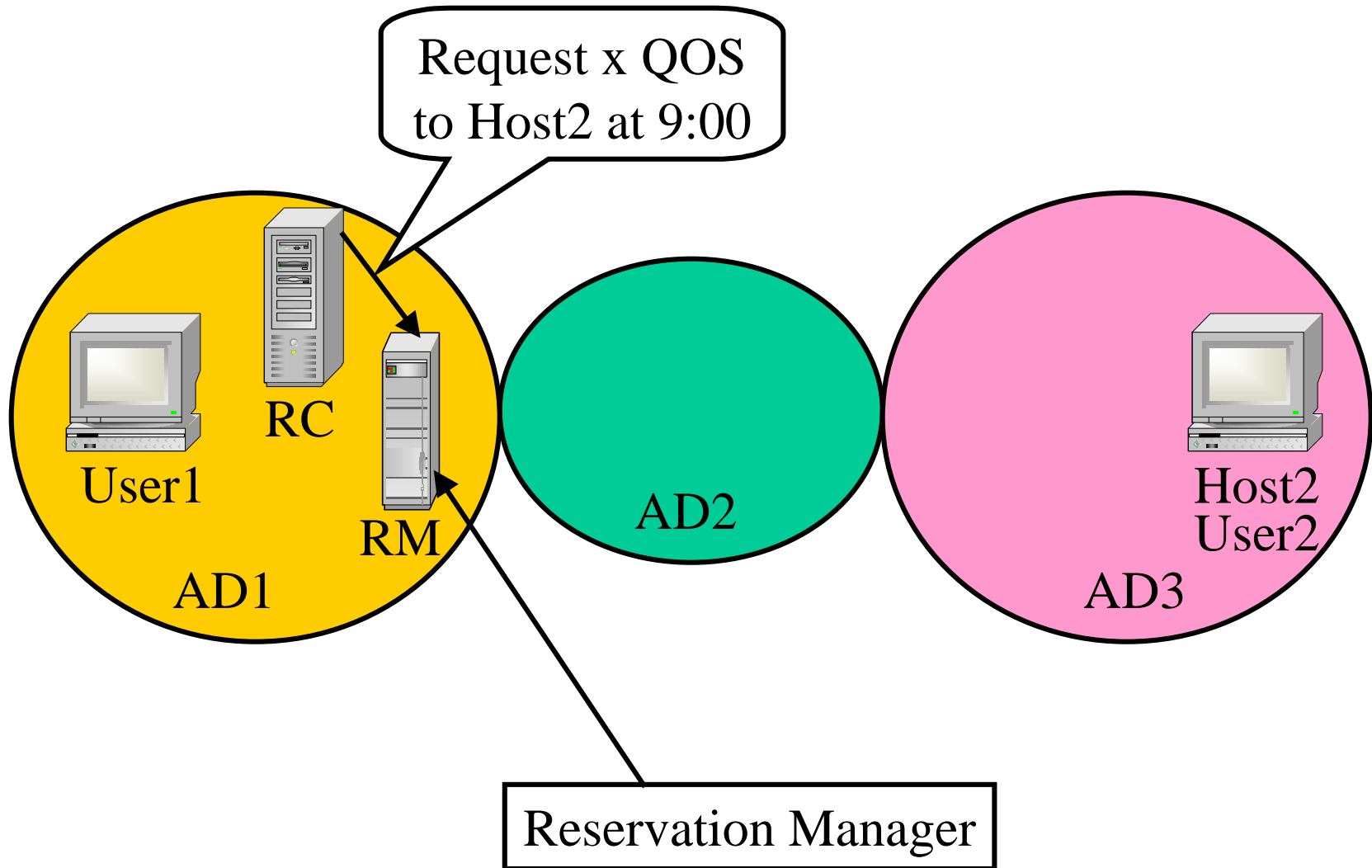
LBNL's Autonomous System QoS State Manager



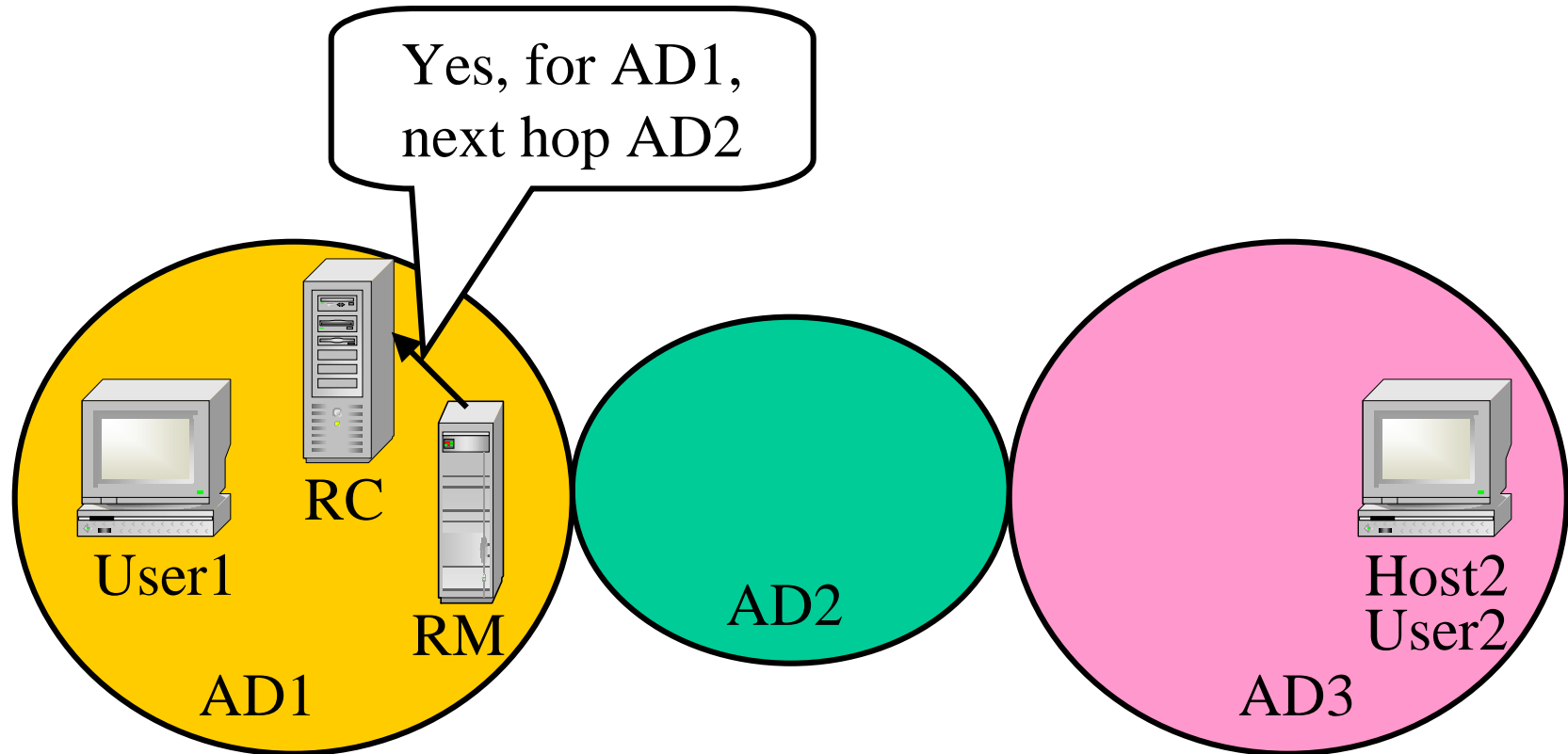
LBNL's Autonomous System QoS State Manager



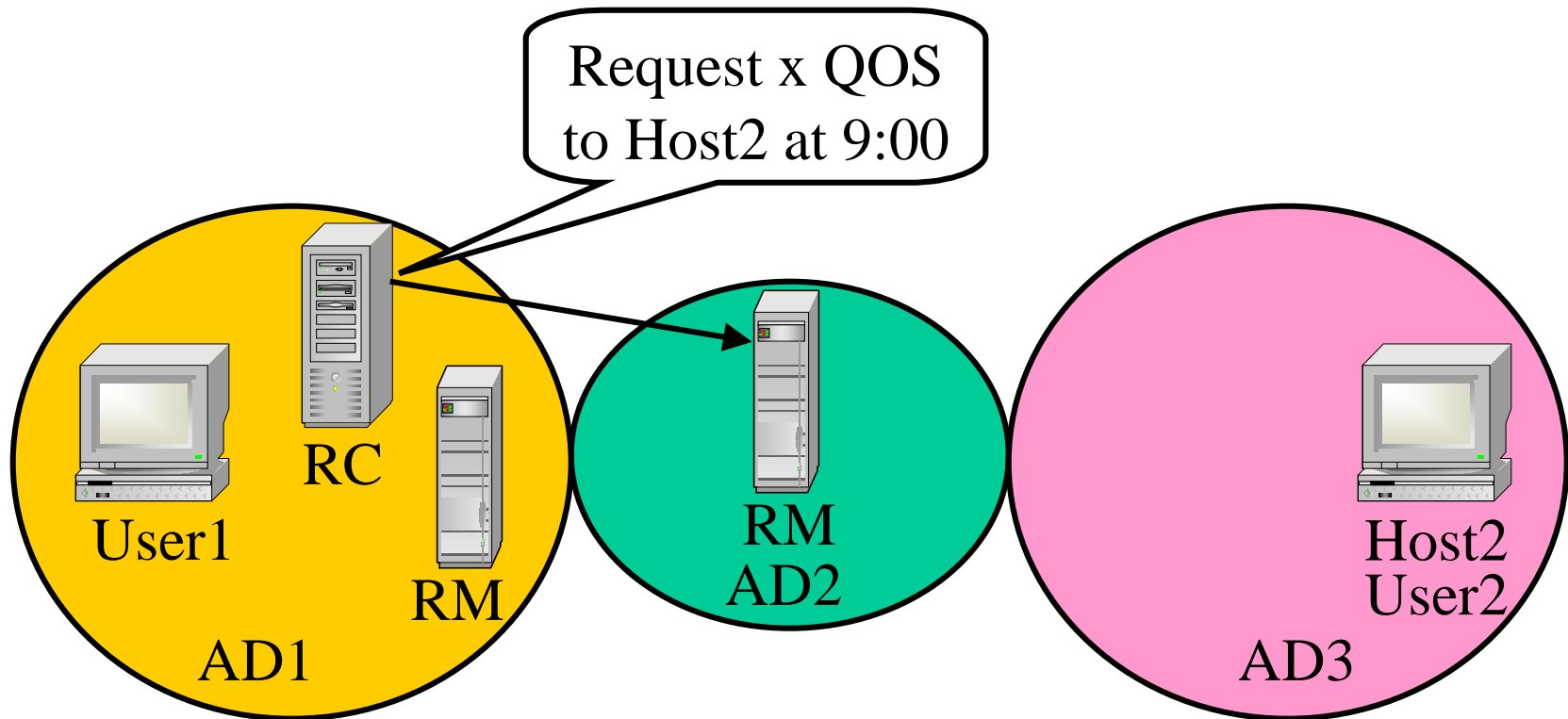
LBNL's Autonomous System QoS State Manager



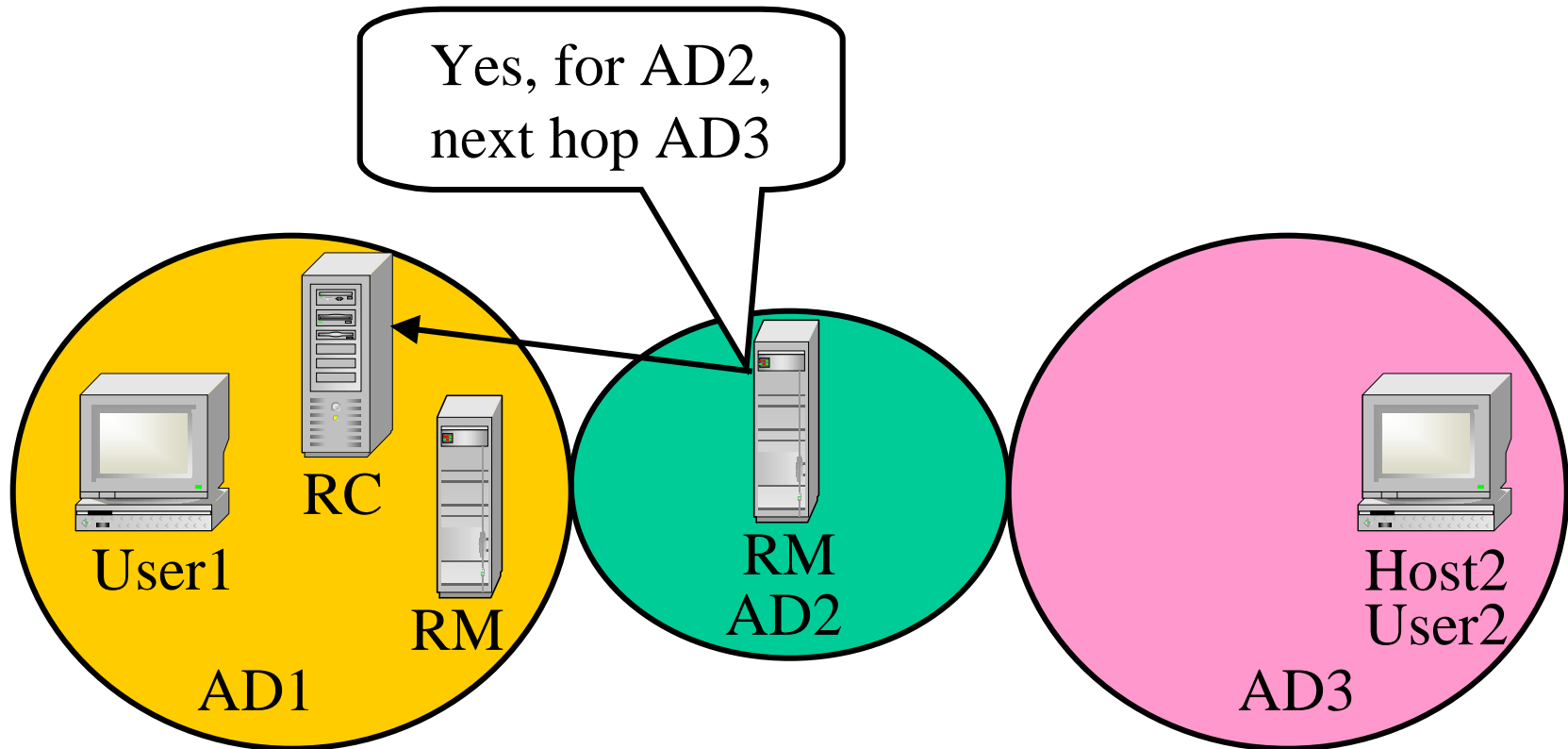
LBNL's Autonomous System QoS State Manager



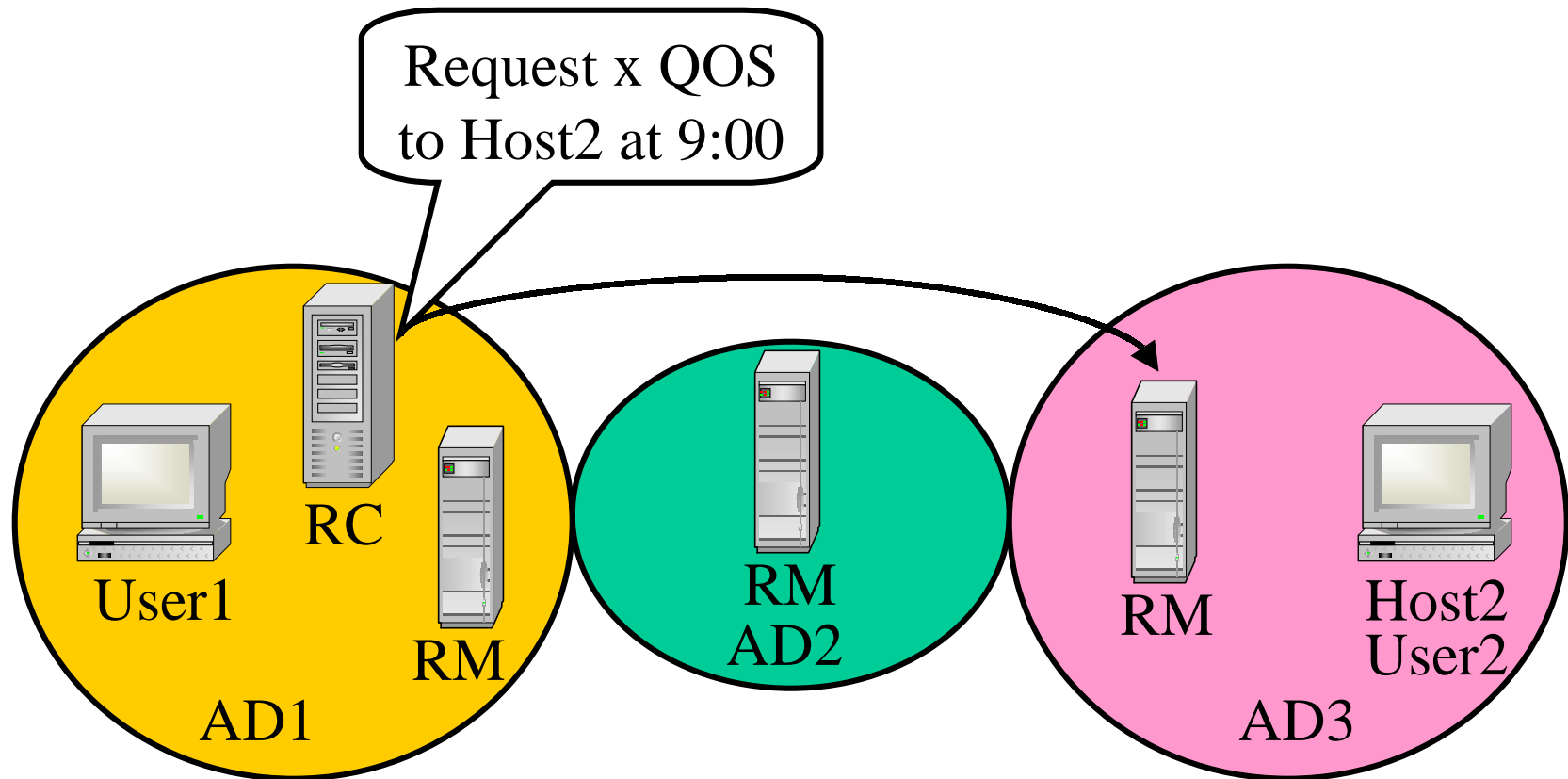
LBNL's Autonomous System QoS State Manager



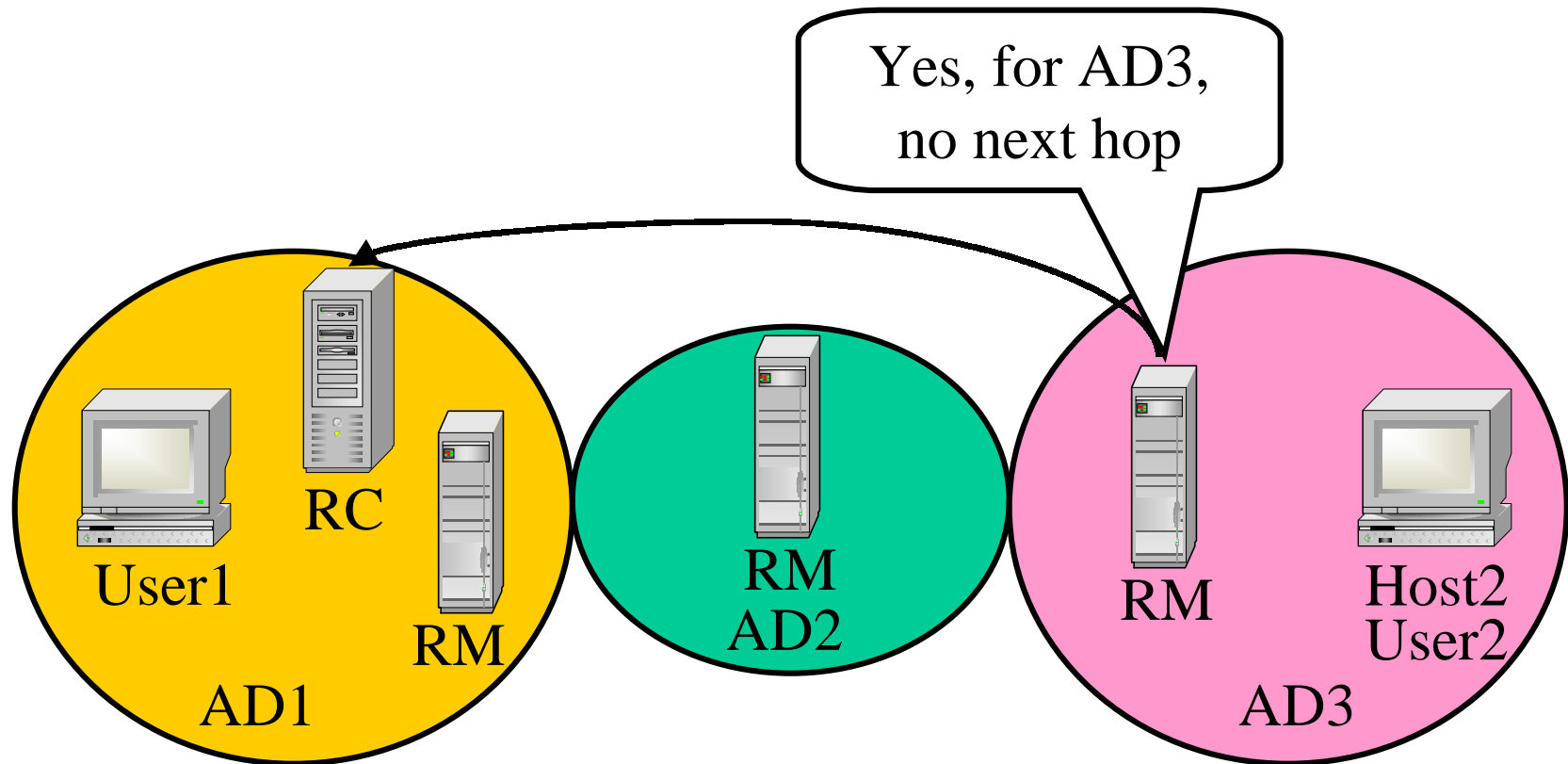
LBNL's Autonomous System QoS State Manager



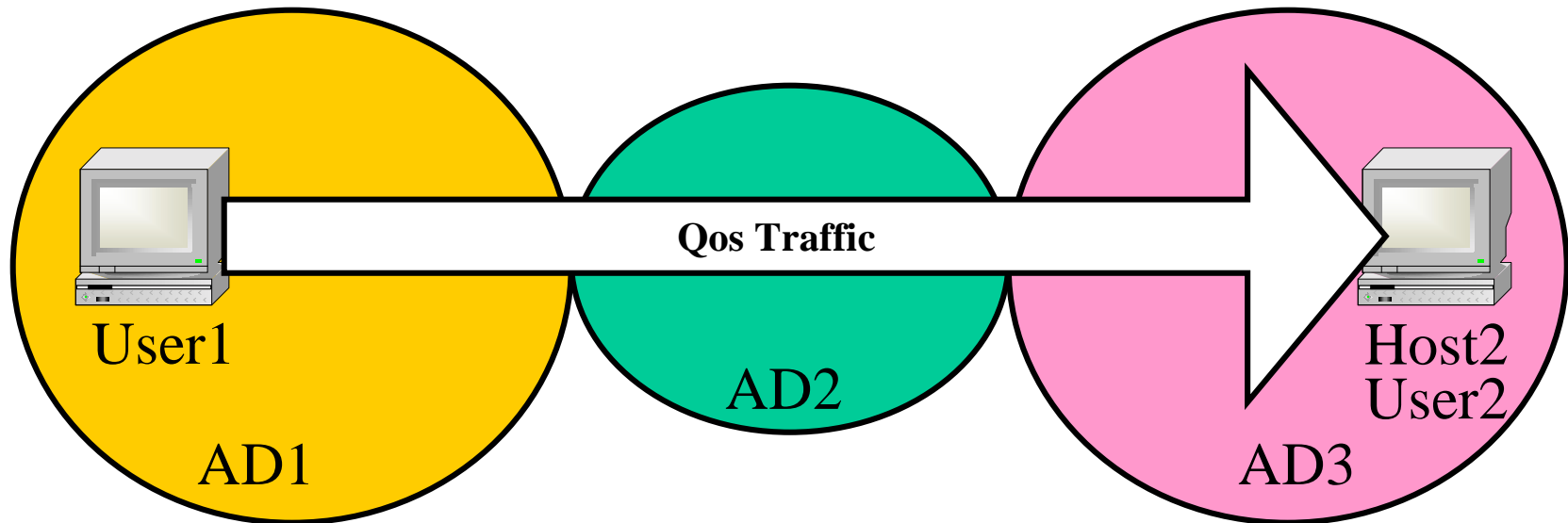
LBNL's Autonomous System QoS State Manager



LBNL's Autonomous System QoS State Manager



LBNL's Autonomous System QoS State Manager



Pointers etc...

Email me: Joe Burrencia <joeb@es.net>

This talk: www.es.net/publish/I2-NGI-QOS-Houston

LBNL Interim Calendar Manager: www-itg.lbl.gov/DSGT/calendar

LBNL AS State Manager: Gary Hoo <gjhoo@lbl.gov>