



2023 Internet2 Technology Exchange

Science DMZs and Networking for All

Hands-on session 1: Configuring perfSONAR

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<https://research.cec.sc.edu/cyberinfra/>

University of South Carolina (USC)

Energy Sciences Network (ESnet)

September 18, 2023



# perfSONAR 5 Lab Library

- Lab experiments

Lab 1: Introduction to Mininet

Lab 2: Setting Administrative Information via perfSONAR Toolkit GUI

Lab 3: Scheduling Regular Tests Using perfSONAR GUI

Lab 4: Configuring Regular Tests Using pScheduler CLI Part I (throughput, latency, and traceroute)

Lab 5: Configuring Regular Tests Using pScheduler CLI Part II (repeat, store, monitor, and cancel)

Lab 6: Defining Regular Tests with a pSConfig Template

Lab 7: Configuring pScheduler Limits

Lab 8: Visualizing pScheduler Measurements using Grafana

Lab 9: Observing the Impact of TCP Window Scaling and Small TCP Buffer Sizes

Lab 10: Investigating the Effects of MTU Mismatch

# Organization of the labs

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Each lab starts with a section *Overview*

- Objectives
- Lab topology
- Lab settings: passwords, device names
- Roadmap: organization of the lab

## *Section 1*

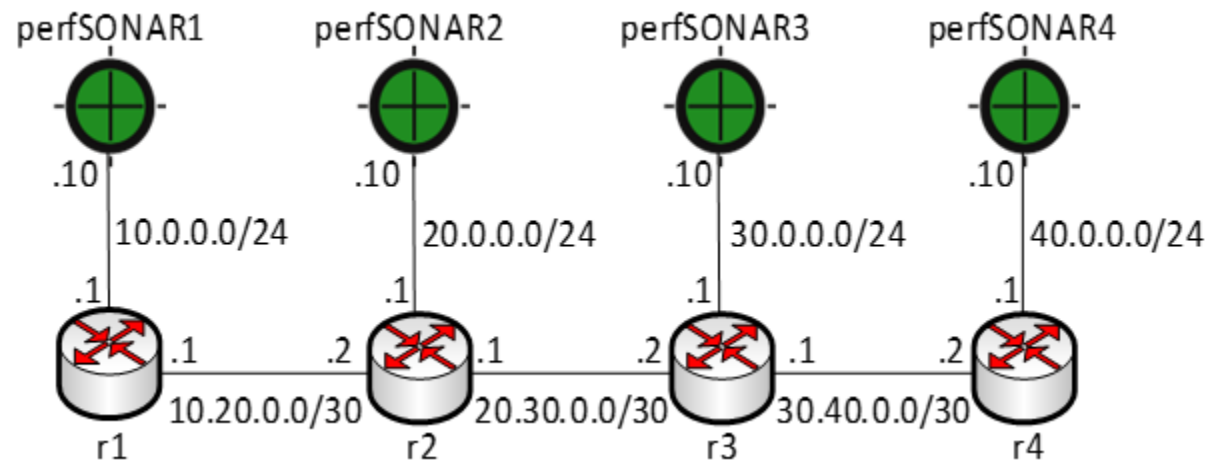
- Background information of the topic being covered (e.g., fundamentals of perfSONAR)
- Section 1 is optional (i.e., the reader can skip this section and move to lab directions)

## *Section 2... n*

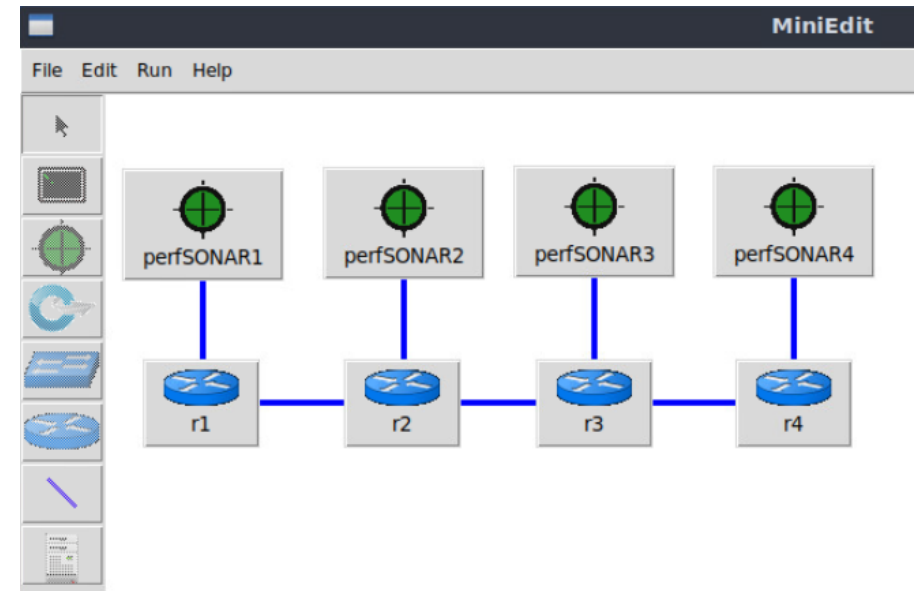
- Step-by-step directions

# Lab Description

- This lab shows how to use pScheduler to run latency, throughput, and trace tests.
- The lab shows how to use the default and specific tools.
- The user will interact with a perfSONAR node via the CLI



Lab scenario

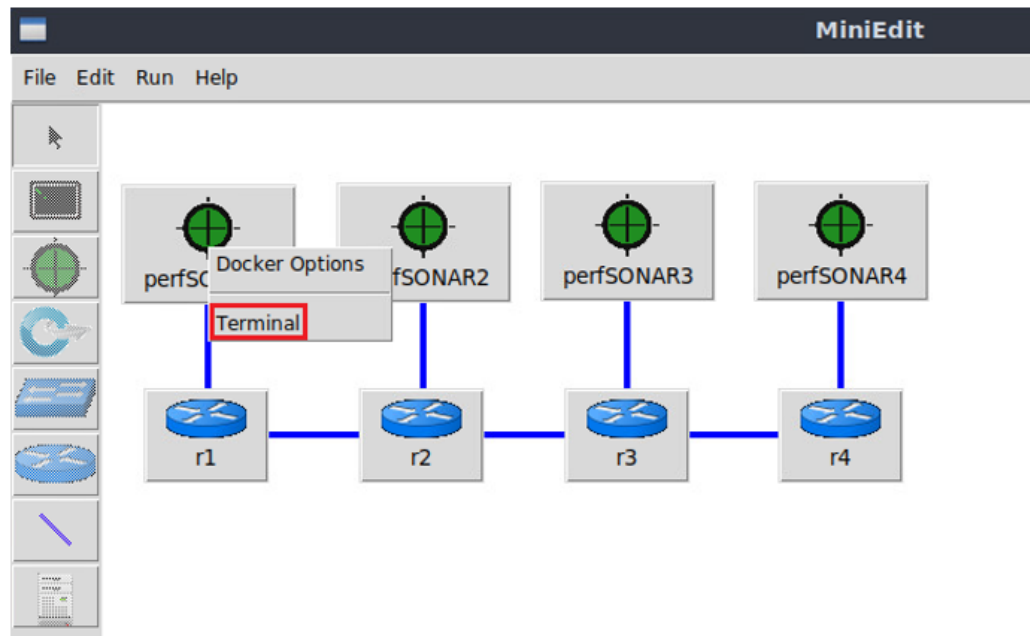


Mininet topology

# Lab Description

- The user can coordinate regular test between local and remote nodes for troubleshooting purposes.

```
pscheduler task throughput --source 10.0.0.10 --dest 20.0.0.10
```



Accessing perfSONAR's CLI

```
@perfSONAR1:/
[root@perfSONAR1 /]# pscheduler task throughput --source 10.0.0.10 --dest 20.0.0.10
Submitting task...
Task URL:
https://10.0.0.10/pscheduler/tasks/a2418572-2a79-4e0b-b278-7042d74b0ffe
Running with tool 'iperf3'
Fetching first run...

Next scheduled run:
https://10.0.0.10/pscheduler/tasks/a2418572-2a79-4e0b-b278-7042d74b0ffe/runs/e8513aba-4731-453b-b982-878d9405d743
Starts 2023-06-16T15:58:36+00:00 (~5 seconds)
Ends 2023-06-16T15:58:55+00:00 (~18 seconds)
Waiting for result...

* Stream ID 5
Interval    Throughput    Retransmits    Current Window
0.0 - 1.0   1.64 Gbps     1935           7.23 MBytes
1.0 - 2.0   1.91 Gbps     0              7.67 MBytes
2.0 - 3.0   1.92 Gbps     0              8.07 MBytes
3.0 - 4.0   1.91 Gbps     0              8.41 MBytes
4.0 - 5.0   1.92 Gbps     0              8.71 MBytes
5.0 - 6.0   1.91 Gbps     0              8.97 MBytes
6.0 - 7.0   1.91 Gbps     0              9.18 MBytes
7.0 - 8.0   1.92 Gbps     0              9.36 MBytes
8.0 - 9.0   1.91 Gbps     0              9.50 MBytes
9.0 - 10.0  1.88 Gbps     45             6.80 MBytes

Summary
Interval    Throughput    Retransmits    Receiver Throughput
0.0 - 10.0  1.88 Gbps     1980           1.85 Gbps

No further runs scheduled.
[root@perfSONAR1 /]#
```

Running a regular test with pScheduler

# Accessing the Platform

- Please use the following link to access the platform:
  - <https://netlab.cec.sc.edu/>
- Login using your credentials
- **Username:** user1, user2, ....., userN
- **Temporary Password:** nsf2023

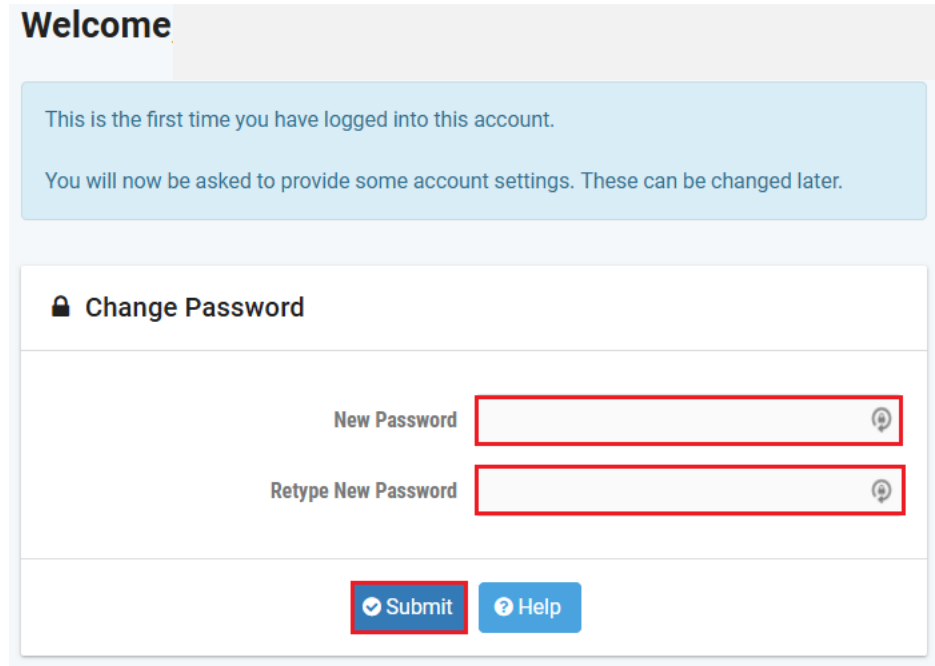


netlab.cec.sc.edu

Username

Password

Login



Welcome

This is the first time you have logged into this account.

You will now be asked to provide some account settings. These can be changed later.

Change Password

New Password

Retype New Password

Submit Help

Cyberinfrastructure  
Lab @ UofSC

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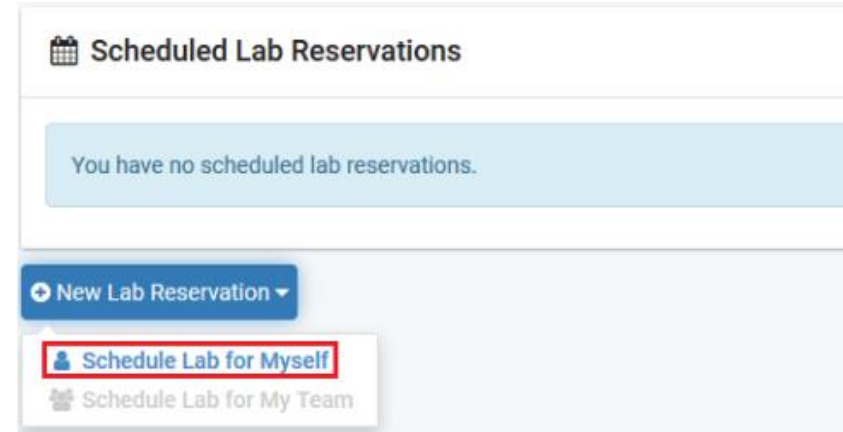
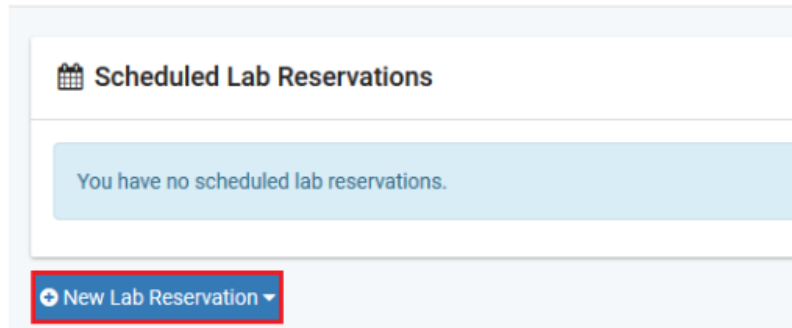
The image shows two screenshots of a web interface, connected by arrows indicating a sequence of steps.

The first screenshot is titled "Change E-mail Address". It features a light blue header with the text "Please enter a valid e-mail address." and "You can leave this blank if you do not want to receive e-mail from the system." Below this is a form with a "Change E-mail Address" title and a "Change" icon. The "E-mail Address" field contains "testuser@example.edu". At the bottom, there are two buttons: "Submit" (highlighted with a red box) and "Help".

The second screenshot is titled "Date and Time Settings". It features a header with a clock icon and the title "Date and Time Settings". Below this are four settings, each with a dropdown menu: "Time Zone" (set to "(GMT-05:00) Eastern Time (US & Canada)"), "Date Display Format" (set to "YYYY-MM-DD (2016-09-15)"), "Time Display Format" (set to "24 Hour (15:37)"), and "First Day of Week" (set to "Sunday"). At the bottom, there are two buttons: "Submit" (highlighted with a red box) and "Help".

# Accessing the Platform

- Click on New Lab Reservation
- Click on Schedule Lab for Myself





# Accessing the Platform

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- Select the course
- For this session, we will use “Introduction to perfSONAR with Mininet”

Multiple course topics are available in this class. Please select one.

## Intoduction to perfSONAR with Mininet

This lab series focuses on perfSONAR using Mininet

## Network Tools and Protocols

Network Tools and Protocols

# Accessing the Platform

- Select the Lab
- For this session, we will run:
  - Lab 3: Configuring Regular Tests Using pScheduler CLI Part I (throughput, latency, and traceroute)

🚩 This lab series focuses on perfSONAR using Mininet

Lab Name	Action
<a href="#">Lab 1: Setting up Administrative Information via perfSONAR Toolkit GUI</a>	▼
<a href="#">Lab 2: Scheduling Regular Tests Using perfSONAR GUI</a>	▼
<a href="#">Lab 3: Configuring Regular Tests Using pScheduler CLI Part I (throughput, latency, and traceroute)</a>	▼
<a href="#">Lab 4: Configuring Regular Tests Using pScheduler CLI Part II (repeat, store, monitor, and cancel)</a>	▼
<a href="#">Lab 5: Defining Regular Tests with a pSConfig Template</a>	▼
<a href="#">Lab 6: Configuring pScheduler Limits</a>	▼
<a href="#">Lab 7: Visualizing pScheduler Measurements using Grafana</a>	▼
<a href="#">Lab 8: Observing the Impact of TCP Window Scaling and Small TCP Buffer Sizes</a>	▼
<a href="#">Lab 9: Investigating the Effects of MTU Mismatch</a>	▼
<a href="#">Lab 10: Observing the Effects of Packet Reordering</a>	▼

Show  entries Showing 1 to 10 of 10 items < 1 >

# Accessing the Platform


- Select the next available POD and allocate time

## Pod Scheduler

September 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Selected Day  
**September**  
**5**  
2023

Current Time  
  
**18:37**  
Eastern Time (US & Canada)

	perfSONAR_H3_Master perfSONAR	perfSONARv3_H3_17001 perfSONAR	perfSONARv3_H2_17002 perfSONAR	perfSONAR_H3_17003 perfSONAR
18:00				
19:00				
20:00				
21:00				
22:00				



## Add Reservation

Pod perfSONARv3\_H2\_17002


Reservation Type Instructor Private Reservation

Reserve For Jose Gomez

Lab Exercise Lab 3: Configuring Regular Tests Using pScheduler CLI Part I

Time Zone Eastern Time (US & Canada)

Start Time 2023-09-05 18:38

End Time 2023-09-05 19:30 

Length of Reservation 41 mins.

# Accessing the Platform

We will use the NETLAB virtual platform:

- **URL:** <https://netlab.cec.sc.edu/>
- **Username:** user1, user2, ....., userN
- **Temporary Password:** nsf2023