



# Central Management Server Setup

perfSONAR Sampler

2nd European perfSONAR User Workshop

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# How most of us are introduced to perfSONAR

perfSONAR Toolkit on [srn-ps.stanford.edu](http://srn-ps.stanford.edu)


 [srn-ps.stanford.edu](http://srn-ps.stanford.edu) at 171.67.92.73 [Edit](#)

**Organization:** Stanford University UIT-Networking

**Address:** Stanford, CA 94305 US ([map](#))

**Administrator:** Networking Systems ([netw-perfsonar@lists.stanford.edu](mailto:netw-perfsonar@lists.stanford.edu))

Services			<a href="#">View services logs</a> 
SERVICE	STATUS	VERSION	PORTS
<a href="#">esmond</a> ▾	Running	4.3.4-1.el7	
<a href="#">lsregistration</a>	Running	4.3.4-1.el7	
<a href="#">owamp</a> ▾	Running	4.3.4-1.el7	861
<a href="#">pscheduler</a> ▾	Running	4.3.4-1.el7	
<a href="#">psconfig</a>	Running	4.3.4-1.el7	
<a href="#">twamp</a> ▾	Running	4.3.4-1.el7	862

Test Results (15 Results) [Configure tests](#) 

Search:

Results for the last...

1 week ▾

▲ SOURCE	↕ DESTINATION	THROUGHPUT	LATENCY (MS)	LOSS
<a href="http://srn-ps.stanford.edu">srn-ps.stanford.edu</a> 171.67.92.73 <a href="#">Graphs</a>	ant-04-060.SUNet 171.67.206.3	→ n/a ← n/a	→ 1.15 (rtt) ← n/a	→ n/a ← n/a

# What is often the next view of perfSONAR

**ESnet perfSONAR Dashboard**

☰ Dashboards   ☰ Reports   ↗ Add Your Node   ⚙ Settings   ↗ External Resources

### 1: ESnet to ESnet Packet Loss Dashboard

ESnet - ESnet to ESnet Packet Loss Testing - Loss

Loss rate is <= 0.001%   Loss rate is > 0.001%   Loss rate is >= 0.1%   Unable to find test data   Check has not run yet

✔ No problems found in grid

ESnet - ESnet Hub to Small DOE Site Border Packet Loss Testing - Loss

Loss rate is <= 0.001%   Loss rate is > 0.001%   Loss rate is >= 0.1%   Unable to find test data   Check has not run yet

✔ No problems found in grid

ESnet - ESnet to ESnet European Packet Loss Testing - Loss

Loss rate is <= 0.001%   Loss rate is > 0.001%   Loss rate is >= 0.1%   Unable to find test data   Check has not run yet

✔ No problems found in grid

### ESnet - ESnet Backup Paths - Loss

Loss rate is <= 0.001%   Loss rate is > 0.001%   Loss rate is >= 0.1%   Unable to find test data   Check has not run yet

⚠ Found a total of 2 problems involving 2 hosts in the grid

Hosts with problems: amst-owamp.es.net, cern-513-owamp.es.net

While the image is daunting, this makes things look even more complex

The screenshot shows the 'ESnet perfSONAR Dashboard' interface. At the top, there is a blue header with the title. Below it, a navigation bar contains 'Dashboards', 'Reports', 'Add Your Node', and 'Settings'. A dropdown menu is open under 'Dashboards', listing 10 numbered items: '1: ESnet to ESnet Packet Loss', '2: ESnet to ESnet Throughput Testing', '3: ESnet to DOE Sites', '4: ESnet to Large Facilities', '5: ESnet to Europe', '6: ESnet to International', '7: ESnet to ESGF Sites', '8: ESnet to GA-EAST', '9: ESnet Backup Paths', and 'ARM NAT Measurements'. Below these are 'ESnet' and 'GridFTP Development'. At the bottom of the dropdown is 'All Grids'. To the right, a 'Loss Dashboard' is partially visible, showing a title 'Loss Dashboard' and a subtitle 's Testing - Loss'. A legend indicates 'Loss rate is >= 0.1%'. Below the legend is a grid of nodes, each with a label and a green square icon. The labels include 'denv-owamp.es.net', 'east-dc-owamp.es.net', 'elpa-owamp.es.net', 'fnal-owamp.es.net', 'ga-owamp.es.net', 'hous-owamp.es.net', 'kans-owamp.es.net', 'lbi-owamp.es.net', and 'linl-owamp.es.net'. At the bottom of the grid, 'aofa-owamp.es.net' and 'aha-owamp.es.net' are partially visible.

Way too many dashboards and sights to take in.

# How to move from the 1x1 perfSONAR to the ESnet view and multiple dashboards?

The ever popular [docs.perfsonar.net](https://docs.perfsonar.net) web site has all the answers!

It actually does, but it is a long read to move from that that simple ‘all in one’ Toolkit, to a multi-dashboard MaDDash grid web site.

The perfSONAR team realized this and a few years ago Andy Lake pulled together a 2-3 page readable document for how to set up a Central Management web site and how to get the agents testing and reporting results to the Central Management system.

This is included in the main [docs.perfsonar.net](https://docs.perfsonar.net) table of contents in one place only, the main page, a link from “[MaDDash Quick Install Guide](#)”.

The link opens a Google Doc file and has a step by step process for how to get a MaDDash system going.

## MaDDash Quick Install Guide v4

07/2020

All commands here are based on a default, minimal CentOS 7 installation. Other Linux variants may require modifications to these commands to work properly (yum vs apt-get, repository locations, etc). All commands require root access, so either use *sudo* before each command or use *sudo su* and save yourself some typing. Commands as entered will be in *italic print*.

# What to expect from this presentation

The first paste of commands into the terminal window is a quick run through of all the commands discussed at a github project site:

<https://github.com/preese/perfSONAR-Sampler>

The Github project shows an implementation of Andy's document using a set of VMs and some tools to quickly bring all the pieces together.

If all goes well, the pasted commands will build 6 edge nodes and one MaDDash server, it will show a mesh dashboard and a disjoint dashboard. All of this will take place on a single NUC and should complete in ~15 minutes.

We'll talk about the JSON files and other features of the project while it installs in the background.

# Hardware and IP chart used



## Chart for perfSONAR-Sampler

Second host interface name: enp0s20f0u2

Address segment for the IPs in use: 192.168.1.0/24

Name	IP#	Mac Addr
ps1	192.168.1.210	52:54:00:73:6f:41
ps2	192.168.1.211	52:54:00:73:6f:42
ps3	192.168.1.212	52:54:00:73:6f:43
md	192.168.1.213	52:54:00:73:6f:44
dj1	192.168.1.214	52:54:00:73:6f:45
dj2	192.168.1.215	52:54:00:73:6f:46
dj3	192.168.1.216	52:54:00:73:6f:47

When you make changes to the above chart, plan to make similar edits to:

top section of **Vagrantfile**

top sections of both **mesh.json** and **disjoint.json**

the **hosts** file

Then the IP for that MaDDash server is used in several files.

**Testpoint-MaDDashbuild.yml** 2 instances of 192.168.1.213 and one use of the address segment

**Maddash-dj.yml** 2 instances of 192.168.1.213



# More on the IP chart used

## Chart for perfSONAR-Sampler

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md	192.168.1.213	52:54:00:73:6f:44
dj1	192.168.1.214	52:54:00:73:6f:45
dj2	192.168.1.215	52:54:00:73:6f:46
dj3	192.168.1.216	52:54:00:73:6f:47

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# Review of the JSON files

```
~/Documents/PS-Talk/mesh.json (no function selected) 1 { 2 "meta": { 3 "display-name": "1 PSproj" 4 }, 5 6 "archives": { 7 "Home_esmond_archive": { 8 "archiver": "esmond", 9 "data": { 10 "measurement-agent": "{% scheduled_by_address %}", 11 "url": "http://192.168.1.213/esmond/perfsonar/archive/" 12 } 13 } 14 }, 15 16 "addresses": { 17 "ps1": { "address": "192.168.1.210" }, 18 "ps2": { "address": "192.168.1.211" }, 19 "ps3": { "address": "192.168.1.212" } 20 }, 21 22 "groups": { 23 "Home_group_mesh": { 24 "type": "mesh", 25 "addresses": [ 26 { "name": "ps1" }, 27 { "name": "ps2" }, 28 { "name": "ps3" } 29 ] 30 }, 31 }, 32 "tests": { 33 "test_throughput": { 34 "type": "throughput", 35 "spec": { 36 "source": "{% address[0] %}", 37 "dest": "{% address[1] %}", 38 "duration": "PT20S" 39 }, 40 }, 41 "test_rtt": { 42 "type": "rtt", 43 "spec": { 44 "source": "{% address[0] %}", 45 "dest": "{% address[1] %}", 46 "count": 10, 47 "interval": "PT1S", 48 "length": 1000 49 }, 50 }, 51 "test_latencybg": { 52 "type": "latencybg", 53 "spec": { 54 "source": "{% address[0] %}", 55 "dest": "{% address[1] %}", 56 "flip": "{% flip %}" 57 }, 58 }, 59 "test_trace": { 60 "type": "trace", 61 "spec": { 62 "source": "{% address[0] %}", 63 "dest": "{% address[1] %}" 64 }, 65 }, 66 }, 67 "schedules": { 68 "Home_schedule_PT2H": { 69 "repeat": "PT2H", 70 "sliprand": true, 1 { 2 "meta": { 3 "display-name": "2 DJ" 4 }, 5 6 "archives": { 7 "Home_esmond_archive": { 8 "archiver": "esmond", 9 "data": { 10 "measurement-agent": "{% scheduled_by_address %}", 11 "url": "http://192.168.1.213/esmond/perfsonar/archive/" 12 } 13 } 14 }, 15 16 "addresses": { 17 "ps1": { "address": "192.168.1.210" }, 18 "ps2": { "address": "192.168.1.211" }, 19 "ps3": { "address": "192.168.1.212" }, 20 "dj1": { "address": "192.168.1.214" }, 21 "dj2": { "address": "192.168.1.215" }, 22 "dj3": { "address": "192.168.1.216" } 23 }, 24 }, 25 26 "groups": { 27 "Home_group_disjoint": { 28 "type": "disjoint", 29 "a-addresses": [ 30 { "name": "dj1" }, 31 { "name": "ps1" } 32 ], 33 "b-addresses": [ 34 { "name": "ps2" }, 35 { "name": "ps3" }, 36 { "name": "dj2" }, 37 { "name": "dj3" } 38 ] 39 }, 40 }, 41 "tests": { 42 "test_throughput": { 43 "type": "throughput", 44 "spec": { 45 "source": "{% address[0] %}", 46 "dest": "{% address[1] %}", 47 "duration": "PT20S" 48 }, 49 }, 50 }, 51 "test_rtt": { 52 "type": "rtt", 53 "spec": { 54 "source": "{% address[0] %}", 55 "dest": "{% address[1] %}", 56 "count": 10, 57 "interval": "PT1S", 58 "length": 1000 59 }, 60 }, 61 "test_latencybg": { 62 "type": "latencybg", 63 "spec": { 64 "source": "{% address[0] %}", 65 "dest": "{% address[1] %}", 66 "flip": "{% flip %}" 67 }, 68 }, 69 "test_trace": { 70 "type": "trace",
```

# Review of some project files, Vagrantfile

```
# -*- mode: ruby -*-
# vi: set ft=ruby :

nodes = [
  {:hostname => 'ps1', :ip => "192.168.1.210", :mac => "52:54:00:83:6f:41", :dev => "enp0s20f0u2" },
  {:hostname => 'ps2', :ip => "192.168.1.211", :mac => "52:54:00:83:6f:42", :dev => "enp0s20f0u2" },
  {:hostname => 'ps3', :ip => "192.168.1.212", :mac => "52:54:00:83:6f:43", :dev => "enp0s20f0u2" },
  {:hostname => 'md', :ip => "192.168.1.213", :mac => "52:54:00:83:6f:44", :dev => "enp0s20f0u2" },
  {:hostname => 'dj1', :ip => "192.168.1.214", :mac => "52:54:00:83:6f:45", :dev => "enp0s20f0u2" },
  {:hostname => 'dj2', :ip => "192.168.1.215", :mac => "52:54:00:83:6f:46", :dev => "enp0s20f0u2" },
  {:hostname => 'dj3', :ip => "192.168.1.216", :mac => "52:54:00:83:6f:47", :dev => "enp0s20f0u2" }
]

Vagrant.configure("2") do |config|
  nodes.each do |node|
    config.vm.define node[:hostname] do |config|
      config.vm.box = "centos/7"
      config.vm.network :public_network, :dev => node[:dev], :mode => "bridge", :mac => node[:mac], :ip => node[:ip]
      config.vm.provision "file", source: "/home/vagrant/.ssh/id_ed25519.pub", destination: "/home/vagrant/.ssh/authorized_keys"
      config.vm.hostname = node[:hostname]
      config.vm.provider :libvirt do |domain|
        domain.memory = 2048
        domain.cpus = 1
        domain.storage_pool_name = "default"
      end
    end
  end
end
```

# Review of some project files, Ansible

```
---
- hosts: all
  become: yes
  tasks:
    - name: Install EPEL&PS repo to all VMs
      yum:
        name:
          - epel-release
          - http://software.internet2.edu/rpms/el7/x86_64/latest/packages/perfSONAR-repo-8
        state: present

- hosts: ps,dj
  gather_facts: False
  become: yes
  tasks:
    - name: For ps & dj VMs, add perfsonar rpms to all testpoint edge nodes
      yum:
        name:
          - perfsonar-testpoint
        state: present

    - name: For ps & dj VMs, install remote URL and archives, even before the .json is pub
      command: 'psconfig remote add --configure-archives "http://192.168.1.213/psconfig/n

    - name: For ps & dj VMs, restart psconfig-pscheduler-agent
      service:
        name: psconfig-pscheduler-agent
        state: restarted

- hosts: md
  gather_facts: False
  become: yes
  tasks:
    - name: For md VM and remaining lines, add perfsonar-centralmanagment rpm to MaDDash S
      yum:
        name:
          - perfsonar-centralmanagement
        state: present

    - name: Start FW service if not running
      service:
        name: firewalld
        state: started

    - name: Enable FW service
      service:
        name: firewalld
        enabled: yes

    - name: Add http to firewall
      firewalld:
        service: http
        permanent: yes
        immediate: yes
        state: enabled

    - name: Add https to firewall
      firewalld:
        service: https
        permanent: yes
        immediate: yes
        state: enabled
```

# What we'll end up with

### Example Maddash setup, w

☰ Dashboards ☰ Reports \* Settings

1 PSproj  
2 DJ  
All Grids ▾ - All to All-1 - Loss

Loss rate is <= 0.001%   Loss rate is > 0.001%

### Example Maddash setup, with disjoint option

☰ Dashboards ☰ Reports • Settings

#### 2 DJ Dashboard

2 DJ - Disjoint-1 - Loss

Loss rate is <= 0.001%   Loss rate is > 0.001%   Loss rate is >= 0.1%   Unable to find test data   Check has not run yet

✔ No problems found in grid

2 DJ - Disjoint-2 - Ping Loss

Loss rate is <= 0.001%   Loss rate is > 0.001%   Loss rate is >= 0.1%   Unable to find test data   Check has not run yet

✔ No problems found in grid

2 DJ - Disjoint-3 - Throughput

Throughput >= 1Gbps   Throughput < 1Gbps   Throughput <= .5Gbps   Unable to find test data   Check has not run yet

✔ No problems found in grid

2 DJ - Disjoint-4 - Path Count

Paths = 1 packets   Paths > 1   Paths > 2   Unable to find test data   Check has not run yet

✔ No problems found in grid



### Example Maddash setup, with disjoint option

☰ Dashboards ☰ Reports \* Settings

#### 1 PSproj Dashboard

##### 1 PSproj - All to All-1 - Loss

Loss rate is <= 0.001%   Loss rate is > 0.001%   Loss rate is >= 0.1%   Unable to find test data   Check has not run yet

✔ No problems found in grid



##### 1 PSproj - All to All-2 - Ping Loss

Loss rate is <= 0.001%   Loss rate is > 0.001%   Loss rate is >= 0.1%   Unable to find test data   Check has not run yet

✔ No problems found in grid



##### 1 PSproj - All to All-3 - Throughput

Throughput >= 1Gbps   Throughput < 1Gbps   Throughput <= .5Gbps   Unable to find test data   Check has not run yet

⚠ Found a total of 1 problem involving 1 host in the grid



##### 1 PSproj - All to All-4 - Path Count

Paths = 1 packets   Paths > 1   Paths > 2   Unable to find test data   Check has not run yet

✔ No problems found in grid



# The unexpected...

