PERFSONAR

Lab 9: pSConfig Web Administrator

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“CyberTraining CIP: Cyberinfrastructure Expertise on High-throughput Networks for Big Science Data Transfers”
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Overview

This lab presents how to create and publish pSConfig templates using pSConfig Web Administrator (PWA). This tool is a web-based user interface for perfSONAR administrators to define and publish pSConfig templates, which automates tests executed by test nodes, and provides topology information to various services, such as MadDash.

Objectives

By the end of this lab, the user will:

1. Understand PWA architecture.
2. Create host groups.
3. Define tests specifications.
4. Configure test parameters.
5. Publish pSConfig archive.

Lab topology

Figure 1 illustrates the topology used for this lab. The topology includes three perfSONAR nodes labeled perfSONAR1, perfSONAR2, perfSONAR3 and a Client host. The perfSONAR nodes run a Linux CentOS 7, and the Client runs a lightweight Linux distribution (Lubuntu). The Client host is used to access perfSONAR graphical user interface.
Lab settings

The information in Table 1 provides the credentials to access to perfSONAR nodes and the Client host.

Table 1. Credentials to access perfSONAR1, perfSONAR2, perfSONAR3 and Client.

<table>
<thead>
<tr>
<th>Device</th>
<th>IP Address</th>
<th>Account</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>perfSONAR1</td>
<td>192.168.1.10</td>
<td>admin</td>
<td>admin</td>
</tr>
<tr>
<td>perfSONAR2</td>
<td>192.168.2.10</td>
<td>admin</td>
<td>admin</td>
</tr>
<tr>
<td>perfSONAR3</td>
<td>192.168.3.10</td>
<td>admin</td>
<td>admin</td>
</tr>
</tbody>
</table>

Lab roadmap

This lab includes the following tasks:

1. Section 1: Introduction.
2. Section 2: Configuring hosts.
3. Section 3: Configuring host groups.
4. Section 4: Setting test specifications.
5. Section 5: Configuring pSConfig output.

1 Introduction

pSConfig Web Administrator (PWA) is a web-based user interface for perfSONAR administrators to define and publish pSConfig configuration files. The output automates tests executed by test nodes, and provides topology information to various services, such as MaDDash.

In addition to providing a user-friendly interface for creating pSConfig file, PWA allows multiple users to collaborate on the configuration of tests specifications, host groups, and configs. Users can be designated super-admins or normal users, depending on how much access they need. It is also possible to allow users to edit some configuration files, but not others.

The architecture shown in the figure 2, assumes the names of the instances as pwa-admin1, pwa-pub1, nginx mongodb, sca-auth and postfix. The user can modify and add more publishers (pwa-pub), to improve publisher performance, if needed.
PWA is deployed using a series of docker containers some are PWA-specific and provided by the perfSONAR project. In this lab the user will use PWA interface to create a pSConfig file. This file groups perfSONAR nodes to run pScheduler tasks specified by the user. The output is published in order to accessible by all the nodes.

<table>
<thead>
<tr>
<th>Container</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pwa-admin</td>
<td>PWA UI and API</td>
</tr>
<tr>
<td>pwa-pub</td>
<td>It is used for publishing Configs defined in PWA</td>
</tr>
<tr>
<td>sca-auth</td>
<td>Authentication module used by the GUI</td>
</tr>
<tr>
<td>nginx</td>
<td>Web server, used as a proxy to access the PWA and SCA components</td>
</tr>
<tr>
<td>mongodb</td>
<td>MongoDB, used by pwa-admin and pwa-pub</td>
</tr>
<tr>
<td>postfix</td>
<td>It is used to run a mail server in another docker container</td>
</tr>
</tbody>
</table>

1.1 PWA overview

The pSConfig Web Admin (PWA) is provides the tools for managing pSConfig configuration files. In order to generate and publish a pSConfig file, the user goes through three parts:
• *Host Group*: A group of hosts that are user-selected that all can perform a certain type of test.

• *Test spec*: Test configuration for a test to run; this can include tool and test parameters, scheduling configuration, etc.

• *Config*: In the context of PWA, a Config is an actual test configuration that brings together Host Groups and Testspecs to generate a pSConfig output. The user can use this to configure meshes or other topologies.

2 Configuring hosts

In this section, the user will configure the host information. The *Hosts* form displays a list of all perfSONAR nodes and services loaded from configured Lookup Service (sLS) data sources or defined manually (ad-hoc hosts). In this lab, the user will configure ad-hoc hosts. These hosts are perfSONAR1, perfSONAR2 and perfSONAR3. In order to proceed, the user must login the Web User Interface.

2.1 Accessing the web user interface

**Step 1.** On the Client host and open web browser.

**Step 2.** On the address bar, type the URL `https://192.168.1.10:8443`.

**Step 3.** The user will be given an authentication screen. Type `admin` as the *Username* and `admin` as the *Password*. Click on *Login*.
2.2 Adding hosts to the directory

Step 1. On the left part of the web interface, click on Hosts.

Step 2. A form will be displayed. On left side, it is displayed the list with all the public perfSONAR nodes. On the right side, it is shown all the information about the selected node. In this lab, the user will define the configuration of each host. To proceed, click on New host.
Step 3. A form will be shown up on the right side. The fields must be completed with the following information:

- **Hostname**: This label is used to identify the host on the Global Lookup Service (GLS). For this lab, complete this field with the IP addresses of perfSONAR1 (192.168.1.10), perfSONAR2 (192.168.2.10) and perfSONAR3 (192.168.3.10).
- **Site Name**: The name of the site, typically this comes from the GLS. Complete this information typing perfSONAR Lab.
- **Host Description**: This information will be displayed in MaDDash as the row/column labels. Add a brief description about the host.
- **toolkit_url**: This is the URL that links back to the toolkit instance on MaDDash matrix view. Complete this entry with the IP addresses of perfSONAR1, perfSONAR2 and perfSONAR3 respectively.

In the figure below, it is given the configuration of perfSONAR1 node (192.168.1.10). Complete the form with the information shown below, then click on Create to save the configuration.
Step 4. Scroll down to add information about the measurement archive (MA). In this lab, perfSONAR2 node is configured to store the measurement data collected by each node. Check the box Use local MA and complete the field Local MA URL with the IP address of perfSONAR2 (192.168.2.10), then click on Update to save the configuration.

Step 5. Click again on New host to add information about perfSONAR2 node (192.168.2.10). Complete the form with the information shown below and click on Create to save the configuration.
Step 6. Scroll down to add information about the measurement archive (MA). In this lab, perfSONAR2 node is configured to store the measurement data collected by each node. Check the box Use local MA, then complete the field Local MA URL with the IP address of perfSONAR2 (192.168.2.10), then click on Update to save the configuration.

Step 7. Click again on New host to add information about perfSONAR3 node (192.168.3.10). Complete the form with the information shown below and click on Create to save the configuration.
3. **Configuring host groups**

A host group is a logical grouping of perfSONAR nodes. The user may reuse a single host group for multiple configuration files. In this section the user will configure two groups of perfSONAR nodes. Both groups include perfSONAR1, perfSONAR2 and perfSONAR3. The first group is for throughput tests, and the second group is for latency measurements.

3.1 **Configuring Throughput Group**

**Step 1.** On the left part of the web interface, click on *Host Groups*. 
**Step 2.** Click on *New hostgroup*.

**Step 3.** Write *group1* as the name. This name will be a tag to identify the host group during the test configuration.
Step 4. Click on Service Type. A list will be displayed, select Throughput.

Step 5. On Hosts field, type the IP address of perfSONAR1 node (192.168.1.10) to search for the host configured on the last section. A list will be displayed, select 192.168.1.10 to add the node to the group.
Step 6. Repeat the previous step but now, complete the form with perfSONAR2 (192.168.2.10) and perfSONAR3 (192.168.3.10) IP addresses. Then, click on Create to save the configuration.

3.2 Configuring latency group

Step 1. In order to create a new group, click again on New hostgroup.
Step 2. Write *group2* as the name. This will be a tag to identify the host group during the test configuration.

Step 3. Click on *Service Type*. A list will be displayed, select *Latency*. 
Step 4 As in the previous section, on the Hosts field, type the IP address of perfSONAR1 node (192.168.1.10) to search for the host configured on the last section. A list will be displayed, select 192.168.1.10 to add the node to the group. In addition, add perfSONAR2 (192.168.2.10) and perfSONAR3 (192.168.3.10) IP addresses. Then, click on Create to save the configuration.

4 Setting test specifications

The test specification is a set of parameters used by a particular test service. Instead of defining such parameters for each test, the user can define and use them in one or more configuration definitions. In this section the user will configure the tests specification for the host groups created on the last section. The first test specification is for throughput test which corresponds to the group1. The second test specification is for the latency test which corresponds to the group2.
4.1 Configuring throughput test specification

**Step 1.** On the left part of the web browser, click on *Testspec*.

**Step 2.** Click on *New testspec*.

**Step 3.** Type *Throughput_Test* in the *Name* field.
Step 4. Click on Service Type, a list will be displayed. Select Throughput in order to configure a throughput test.

Step 5. A parameter box will be displayed after selecting the Service Type. The user will see different set of test parameters. Below each parameter is shown the description of each field. In this lab, the user will use the default configuration. Click on Create to save the configuration.
4.2 Configuring latency test specification

**Step 1.** Click on New Testspec.

**Step 2.** Type *Latency_Test* in the *Name field.*
Step 3. Click on Service Type, a list will be displayed. Select Latency in order to configure a Latency test.

Step 4. A parameter box will be displayed after selecting the Service Type. The user will see different set of test parameters. Below each parameter is shown the description of each field. Select twamp as the Tool.
Step 5. On the *Schedule Type*, select the second option as shown in the figure below.

Step 6. Click on *Create to save the Configuration*. 
5 Creating pSConfig output

Once the Host Groups and Test Specs are defined, it is possible now to create pSConfig file by combining those entities. Under the Config section, the user will see a list of Configs defined and their basic information. The links displayed next to the Config name is the actual Config URLs that users can download and subscribe on various perfSONAR services. To edit, or see more detail for each Config, click on the Config name in the Configs column.

Step 1. In order to define a configuration file, click on New config.

Step 2. The Config URL shows the url where the configuration file will be published once the configuration is finished. Complete the entry box typing config1.
Step 3. Type *Configuration_1* as the Name.

Step 6. In the description box, add a brief description about the configuration file. This field is optional.
Step 7. The perfSONAR2 node is configured as the Measurement Archive (MA). This node collects the measurement data of all perfSONAR node. Type the IP address of perfSONAR2 in order to configure it as the MA.

5.1 Adding throughput test

Step 1. To proceed, click on Add New Test. A configuration box will be displayed below.
Step 2. Type *Throughput Test* as the *Test Name*.

Step 3. Click on *Service Type*, a list will be displayed, select *Throughput*.
Step 4. Scroll down and click Host Group A, a list will be displayed, select group1. The user will see the IP addresses of the three nodes involved in the test.

Step 5. Click on Testspec, a list will be displayed, select Throughput Test.
Step 6. Click on **Create** to save the changes.

### 5.2 Adding latency test

**Step 1.** To configure the latency test, click again on **Add New Test**.

**Step 2.** Type *Latency Test* as the *Test Name*. 
**Step 3.** Click of Service Type, select *Latency* from the list.

**Step 4.** Scroll down and click *Host Group A*, a list will be displayed, select *group2*. The user will see the IP addresses of the three nodes involved in the test.
Step 5. Click of Testspec, a list will be displayed, select **Latency Test**.

Step 6. Click on **Create** to save the configuration.
6 Visualizing the measurement data using pScheduler monitor

At this point, the user has created and published a pSConfig file. This file is accessible from the perfSONAR nodes on the topology. In this section the user will run the pSConfig archive using a pScheduler agent. First, the user will login to perfSONAR2 node and add the configuration file. Secondly, the user will see the test schedule using pScheduler monitor.

**Step 1.** On the topology, click on perfSONAR2 and enter the username **admin** and password **admin**. Note that the password will not be displayed while typing it.

```
CentOS Linux 7 (Core)
Kernel 3.18.0-957.1.3.el7.x86_64 on an x86_64

perfsonar2 login: admin
Password: 
Last login: Mon Apr 8 16:53:24 on tty1
Welcome to the perfSONAR Toolkit v4.1.5-1.el7
You may create accounts to manage this host through the web interface by running the following as root:

/usr/lib/perfsonar/scripts/mpoolkit-configure.py
The web interface should be available at:
https://[host address]/toolkit

```

**Step 2.** To run the pSConfig template type the following command:

```
sudo psconfig remote add --configure-archives
"https://192.168.1.10:8443/pub/config/config1?format=psconfig"
```

The user will be required to enter the password as **admin**.
Step 3. After a minute, type the command `pscheduler monitor`. The user will see the scheduled tasks through pScheduler monitor. Notice that the latency task is running twice each hour, and the throughput test once every four hours.

Step 4. To exit from pScheduler monitor, press `Ctrl+c`.

This concludes Lab 9.

References