用 python 扩展 snmp

这段时间在做服务器状态监控，为了省事就借助 snmp 协议来实现，这里把 snmp 的安装配置和 python 扩展 snmp 记录一下，也方便我以后查阅。

一、安装 snmp

1、linux 下安装 net-snmp

环境：CentOS 6.3_64

1.1 通过 yum 查找 snmp 完整名称

yum search snmp

```
 * base: mirrors.ta139.com
 * extras: mirrors.ta139.com
 * updates: mirrors.ta139.com
============================== N/S Matched: snmp ==============================
cluster-snmp.x86_64 : Red Hat Enterprise Linux Cluster Suite - SNMP agent
libvirt-snmp.x86_64 : SNMP functionality for libvirt
net-snmp.x86_64 : A collection of SNMP protocol tools and libraries
net-snmp-devel.i686 : The development environment for the NET-SNMP project
net-snmp-devel.x86_64 : The development environment for the NET-SNMP project
net-snmp-libs.i686 : The NET-SNMP runtime libraries
net-snmp-libs.x86_64 : The NET-SNMP runtime libraries
net-snmp-perl.x86_64 : The perl NET-SNMP module and the mib2c tool
net-snmp-python.x86_64 : The Python 'netsnmp' module for the NET-SNMP
net-snmp-utils.x86_64 : Network management utilities using SNMP, from the
                      : NET-SNMP project
perl-SNMP_Session.noarch : SNMP support for Perl 5
php-snmp.x86_64 : A module for PHP applications that query SNMP-managed devices
rsyslog-snmp.x86_64 : SNMP protocol support for rsyslog
foghorn.x86_64 : Foghorn DBUS/SNMP service
openhpi-subagent.x86_64 : NetSNMP subagent for OpenHPI
```

1.2 安装 net-snmp

yum install net-snmp -y

安装成功，版本为 5.5：

```
[root@localhost ~]# whereis snmp
snmp: /etc/snmp /usr/share/snmp
[root@localhost ~]# whereis snmpd
snmpd: /usr/sbin/snmpd /usr/share/man/man8/snmpd.8.gz
[root@localhost ~]# rpm -qa | grep snmp
net-snmp-5.5-41.el6_3.1.x86_64
net-snmp-libs-5.5-41.el6_3.1.x86_64
[root@localhost ~]#
```

1.3 更改配置文件

文件路径：/etc/snmp/snmpd.conf

在默认配置文件的基础上更改以下几个关键点：

```
40 #        sec.name  source          community
41 com2sec notConfigUser  default       public
42
43 ####
44 # Second, map the security name into a group name:
45
46 #        groupName      securityModel securityName
47 group   notConfigGroup v1           notConfigUser
48 group   notConfigGroup v2c           notConfigUser
49
50 ####
51 # Third, create a view for us to let the group have rights to:
52
53 # Make at least  snmpwalk -v 1 localhost -c public system fast again.
54 #        name           incl/excl     subtree         mask(optional)
55 #view    systemview    included   .1.3.6.1.2.1.1
56 #view    systemview    included   .1.3.6.1.2.1.25.1.1
57 view    all    included   .1
58
59 ####
60 # Finally, grant the group read-only access to the systemview view.
61
62 #        group          context sec.model sec.level prefix read   write  notif
63 #access  notConfigGroup ""      any       noauth    exact  systemview none nc
64 access  notConfigGroup ""      any       noauth    exact  all  none none
65
```

说明：

41 行的是默认值不用改动，这里的 public 比较关键，下文要用的到。

47 行和 48 行是 snmp 协议版本。

57 行和 64 行用 all 把权限放开（注意这里只是为了 demo）

1.4 启动 snmp 服务

/etc/init.d/snmpd start

或者

service snmpd start

配置开机启动：

chkconfig snmpd on

1.5 验证 snmp

snmpwalk -v 1 -c public IPADDR .1

附：

启动服务后如果不能正常运行，首先查看防火墙状态：/etc/init.d/iptables status

根据需要进行以下操纵：

临时关闭防火墙：/etc/init.d/iptables stop

永久关闭防火墙：chkconfig --level 35 iptables off

将 161 端口和 162 端口设置通过防火墙：

vi /etc/sysconfig/iptables

添加如下内容：

-A INPUT -m state --state NEW -m udp -p udp --dport 161 -j ACCEPT

-A INPUT -m state --state NEW -m udp -p udp --dport 162 -j ACCEPT

如图所示：

```
1 # Firewall configuration written by system-config-firewall
2 # Manual customization of this file is not recommended.
3 *filter
4 :INPUT ACCEPT [0:0]
5 :FORWARD ACCEPT [0:0]
6 :OUTPUT ACCEPT [0:0]
7 -A INPUT -m state --state ESTABLISHED,RELATED -j ACCEPT
8 -A INPUT -p icmp -j ACCEPT
9 -A INPUT -i lo -j ACCEPT
10 -A INPUT -m state --state NEW -m tcp -p tcp --dport 22 -j ACCEPT
11 -A INPUT -m state --state NEW -m udp -p udp --dport 161 -j ACCEPT
12 -A INPUT -m state --state NEW -m udp -p udp --dport 162 -j ACCEPT
13 -A INPUT -j REJECT --reject-with icmp-host-prohibited
14 -A FORWARD -j REJECT --reject-with icmp-host-prohibited
15 COMMIT
```

重启 iptables 服务：

service iptables restart

或者

/etc/init.d/iptables restart

2、windows 下安装 net-snmp

网址：http://sourceforge.net/projects/net-snmp/files/

下载路径：http://hivelocity.dl.sourceforge.net/project/net-snmp/net-snmp%20binaries/5.5.1-binaries/net-snmp-5.5.1-1.x86.exe

网上有比较详细的教程，我这里就不在赘述了，

具体参考这里：http://www.cnblogs.com/VRS_technology/archive/2010/08/12/1798191.html

关键点：在路径（软件安装路径）\etc\snmp\下，添加文件 snmpd.conf（我的做法是将上文中 linux 下的 snmpd.conf 文件直接 copy 过来）。

二、用 python 扩展 snmp

在 snmpd.conf 文件里面有通过 bash 扩展的例子，如图所示：

```
379 ##############################################################################
380 # Extensible sections.
381 #
382
383 # This alleviates the multiple line output problem found in the
384 # previous executable mib by placing each mib in its own mib table:
385
386 # Run a shell script containing:
387 #
388 # #!/bin/sh
389 # echo hello world
390 # echo hi there
391 # exit 35
392 #
393 # Note:  this has been specifically commented out to prevent
394 # accidental security holes due to someone else on your system writing
395 # a /tmp/shtest before you do.  Uncomment to use it.
396 #
397 # exec .1.3.6.1.4.1.2021.50 shelltest /bin/sh /tmp/shtest
398
399 # % snmpwalk -v 1 localhost -c public .1.3.6.1.4.1.2021.50
400 # enterprises.ucdavis.50.1.1 = 1
401 # enterprises.ucdavis.50.2.1 = "shelltest"
402 # enterprises.ucdavis.50.3.1 = "/bin/sh /tmp/shtest"
403 # enterprises.ucdavis.50.100.1 = 35
404 # enterprises.ucdavis.50.101.1 = "hello world."
405 # enterprises.ucdavis.50.101.2 = "hi there."
406 # enterprises.ucdavis.50.102.1 = 0
407
```

我的版本是 5.5，不知道为什么，虽然配置文件里面给的是用 exec，但我发现这里要用 extend 来进行。

bash 配置：

extend .1.3.6.1.4.1.23456.51 shelltest2 /bin/sh /tmp/test1.sh

python 配置：

extend .1.3.6.1.4.1.23456.52 pythontest /usr/bin/python /tmp/test1.py

```
394 # accidental security holes due to someone else on your system writing
395 # a /tmp/shtest before you do.  Uncomment to use it.
396 #
397 # exec .1.3.6.1.4.1.2021.50 shelltest /bin/sh /tmp/shtest
398 exec .1.3.6.1.4.1.23456.50 shelltest /bin/sh /tmp/test1.sh
399 extend .1.3.6.1.4.1.23456.51 shelltest2 /bin/sh /tmp/test1.sh
400 extend .1.3.6.1.4.1.23456.52 pythontest /usr/bin/python /tmp/test1.py
401
402 # % snmpwalk -v 1 localhost -c public .1.3.6.1.4.1.2021.50
```

test1.sh 内容如下：

#! /bin/sh

echo "123"

exit 22

test1.py 内容如下：

#! /usr/bin/python

print "just a test"

重启 snmpd 服务：

service snmpd restart

snmpwalk 访问：

snmpwalk -v 1 -c public localhost .1.3.6.1.4.1.23456.50.4.1

snmpwalk -v 1 -c public localhost .1.3.6.1.4.1.23456.51.4.1

snmpwalk -v 1 -c public localhost .1.3.6.1.4.1.23456.52.4.1

执行效果

```
[root@localhost ~]# snmpwalk -v 1 -c public localhost .1.3.6.1.4.1.23456.50.4.1
[root@localhost ~]# snmpwalk -v 1 -c public localhost .1.3.6.1.4.1.23456.51.4.1
SNMPv2-SMI::enterprises.23456.51.4.1.2.10.115.104.101.108.108.116.101.115.116.50.1 = STRING: "123"
[root@localhost ~]# snmpwalk -v 1 -c public localhost .1.3.6.1.4.1.23456.52.4.1
SNMPv2-SMI::enterprises.23456.52.4.1.2.10.112.121.116.104.111.110.116.101.115.116.1 = STRING: "just a test"
[root@localhost ~]#
```

从图中可以看出通过 extend 配置的两个都执行成功了。

如果出现以下错误，则关闭 selinux：

STRING: "/usr/bin/python: can't open file '/tmp/test1.py': [Errno 13] Permission denied"

附：

查看 selinux 状态： getenforce

临时关闭 selinux（不需要重启）： setenforce 0

永久关闭 selinux（需要重启）：

vi /etc/selinux/config

将 SELINUX=enforcing 更改为 SELINUX=disable，如图所示：

```
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
#SELINUX=enforcing
SELINUX=disable
# SELINUXTYPE= can take one of these two values:
#     targeted - Targeted processes are protected,
#     mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

三、实现自定义服务状态监控

这个其实就是第二部分里面的东西，单独列出来主要是为了引入一个跨平台的服务器状态监控的 python 模块：psutil

psutil 是用来获取正在运行的进程信息和系统的 CPU 和内存的利用率的（支持 Linux, OS X, FreeBSD 和 Windows 系统）。

网址：https://github.com/elventear/psutil

python 代码（getCpuUsage.py）：

```
#! /usr/bin/python
import psutil
print psutil.cpu_percent()
```

snmpd.conf 配置:

extend .1.3.6.1.4.1.23456.60 getCpuUsage /usr/bin/python /tmp/getCpuUsage.py