Universidade do Minho
Departamento de Informática

Mestrado Integrado em Engenharia Informática

Gestão de Redes

Ficha de Trabalho Prático Nº1: Instalação e configuração do Net-SNMP

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Conteúdo

1 Introdução

O presente relatório, realizado no âmbito da unidade curricular de Gestão de Redes, destina-se a apresentar um conjunto de perguntas e respostas relacionadas diretamente com o *SNMP (Simple Network Management Protocol)*.

O principal objetivo deste trabalho pratico é a familiarização com a arquitetura *INMF (Internet-standard Network Management Framework)*, dando principal importância ao *SNMP* e às *MIBS (Management Information Bases)*.

O *SNMP* é um protocolo utilizado para facilitar a gestão e monitorização de dispositivos em redes IP tais como routers, computadores ou servidores. Uma *MIB* é um conjunto de dados organizados de forma hierárquica e que são acedidos principalmente pelo *SNMP*.

Para a realização do trabalho foi necessária a instalação do *NET-SNMP*, assim como a configuração e ativação de um agente na minha estação de trabalho.

Por fim, este relatório está dividido entre as questões formuladas no relatório bem como as respostas às mesmas e a conclusão onde abordo as competências adquiridas e maiores dificuldades.
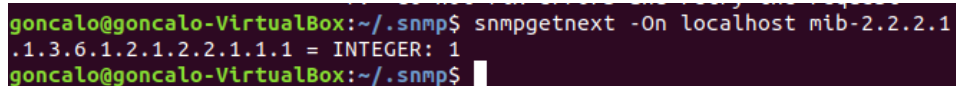
2 Questões

2.1 Questão

Questão 1: Qual o valor e significado da instância do objeto com o OID lexicograficamente a seguir a *mib-2.2.2.1.1* da sua estação de trabalho?

Resposta: Sempre que queremos saber o valor de uma instância de um objeto que se situa lexicograficamente a seguir a um outro objeto com o OID 'x' então utilizamos o comando *snmpgetnext* com o OID 'x'.

Neste caso o valor é 1 e representa o identificador da interface 1 (provavelmente loopback) na tabela.


```
goncalo@goncalo-VirtualBox:~/.snmp$ snmpgetnext -On localhost mib-2.2.2.1
.1.3.6.1.2.1.2.2.1.1.1 = INTEGER: 1
goncalo@goncalo-VirtualBox:~/.snmp$
```

Figura 1:

2.2 Questão 2

Questao: Usando o *SNMP* é possível calcular o número de pacotes IP com algum tipo de erro e que eram destinados ao seu sistema?

Resposta: Para a resposta a esta questão os OIDs utilizados foram *ipSystemStatsInHdrErrors* e *ipSystemStatsInAddrErrors* com as respetivas descrições.

"The number of input IP datagrams discarded due to errors in their IP headers, including version number mismatch, other format errors, hop count exceeded, errors discovered in processing their IP options, etc. Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ipSystemStatsDiscontinuityTime."

"The number of input IP datagrams discarded because the IP address in their IP headerdestination field was not a valid address to be received at this entity. This count includes invalid addresses (e.g., ::0). For entities that are not IP routers and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address. Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ipSystemStatsDiscontinuityTime."

Usando o snmpwalk no objeto *ipSystemStatsInHdrErrors* conseguimos saber o número de erros nos Headers dos datagramas IP. Estes erros podem ser de vários tipos como erros nos *checksums*, incompatibilidade na versão, erros de formato, ultrapassgem do *time-to-live*, etc.

Da mesma forma mas no objeto *ipSystemStatsInAddrErrors* conseguimos saber também o número de erros nos *Addresses*.

Figura 2:

2.3 Questão 3

Questao: Quais os processos que estão a correr no seu sistema (utilize o *SNMP* para obter a resposta)?

Resposta: Utilizando o comando snmpwalk que faz snmpgetnext sucessivos até atingir o fim do grupo.

Neste caso, para a obtenção de todos os nomes dos processos que estão atualmente em execução utilizou-se a mib com *OID 1.3.6.1.2.1.25.4.2.1.2* ou *hrSWRunName* que se encontra no módulo *HOST-RESOURCES-MIB* com a seguinte descrição.

"A textual description of this running piece of software, including the manufacturer, revision, and the name by which it is commonly known. If this software was installed locally, this should be the same string as used in the corresponding hrSWInstalledName."

Figura 3:

```
HOST-RESOURCES-MIB::hrSWRunName.1 = STRING: "systemd"
HOST-RESOURCES-MIB::hrSWRunName.2 = STRING: "kthreadd"
HOST-RESOURCES-MIB::hrSWRunName.3 = STRING: "rcu_gp"
HOST-RESOURCES-MIB::hrSWRunName.4 = STRING: "rcu_par_gp"
HOST-RESOURCES-MIB::hrSWRunName.6 = STRING: "kworker/0:0H-kblockd"
HOST-RESOURCES-MIB::hrSWRunName.9 = STRING: "mm_percpu_wq"
HOST-RESOURCES-MIB::hrSWRunName.10 = STRING: "ksoftirqd/0"
HOST-RESOURCES-MIB::hrSWRunName.11 = STRING: "rcu_sched"
HOST-RESOURCES-MIB::hrSWRunName.12 = STRING: "migration/0"
HOST-RESOURCES-MIB::hrSWRunName.13 = STRING: "idle_inject/0"
HOST-RESOURCES-MIB::hrSWRunName.14 = STRING: "cpuhp/0"
HOST-RESOURCES-MIB::hrSWRunName.15 = STRING: "cpuhp/1"
HOST-RESOURCES-MIB::hrSWRunName.16 = STRING: "idle_inject/1"
HOST-RESOURCES-MIB::hrSWRunName.17 = STRING: "migration/1"
HOST-RESOURCES-MIB::hrSWRunName.18 = STRING: "ksoftirqd/1"
HOST-RESOURCES-MIB::hrSWRunName.19 = STRING: "kworker/1:0-mm_percpu_wq"
HOST-RESOURCES-MIB::hrSWRunName.20 = STRING: "kworker/1:0H-kblockd"
HOST-RESOURCES-MIB::hrSWRunName.21 = STRING: "cpuhp/2"
HOST-RESOURCES-MIB::hrSWRunName.22 = STRING: "idle_inject/2"
HOST-RESOURCES-MIB::hrSWRunName.23 = STRING: "migration/2"
HOST-RESOURCES-MIB::hrSWRunName.24 = STRING: "ksoftirqd/2"
HOST-RESOURCES-MIB::hrSWRunName.25 = STRING: "kworker/2:0-events"
HOST-RESOURCES-MIB::hrSWRunName.26 = STRING: "kworker/2:0H-kblockd"
HOST-RESOURCES-MIB::hrSWRunName.27 = STRING: "cpuhp/3"
HOST-RESOURCES-MIB::hrSWRunName.28 = STRING: "idle_inject/3"
HOST-RESOURCES-MIB::hrSWRunName.29 = STRING: "migration/3"
HOST-RESOURCES-MIB::hrSWRunName.30 = STRING: "ksoftirqd/3"
HOST-RESOURCES-MIB::hrSWRunName.32 = STRING: "kworker/3:0H-kblockd"
HOST-RESOURCES-MIB::hrSWRunName.33 = STRING: "kdevtmpfs"
HOST-RESOURCES-MIB::hrSWRunName.34 = STRING: "netns"
HOST-RESOURCES-MIB::hrSWRunName.35 = STRING: "rcu_tasks_kthre"
HOST-RESOURCES-MIB::hrSWRunName.36 = STRING: "kauditd"
HOST-RESOURCES-MIB::hrSWRunName.37 = STRING: "khungtaskd"
HOST-RESOURCES-MIB::hrSWRunName.38 = STRING: "oom_reaper"
HOST-RESOURCES-MIB::hrSWRunName.39 = STRING: "writeback"
HOST-RESOURCES-MIB::hrSWRunName.40 = STRING: "kcompactd0"
HOST-RESOURCES-MIB::hrSWRunName.41 = STRING: "ksmd"
HOST-RESOURCES-MIB::hrSWRunName.42 = STRING: "khugepaged"
HOST-RESOURCES-MIB::hrSWRunName.89 = STRING: "kintegrityd"
HOST-RESOURCES-MIB::hrSWRunName.90 = STRING: "kblockd"
HOST-RESOURCES-MIB::hrSWRunName.91 = STRING: "blkcg_punt_bio"
HOST-RESOURCES-MIB::hrSWRunName.92 = STRING: "tpm_dev_wq"
HOST-RESOURCES-MIB::hrSWRunName.93 = STRING: "ata_sff"
HOST-RESOURCES-MIB::hrSWRunName.94 = STRING: "md"
HOST-RESOURCES-MIB::hrSWRunName.95 = STRING: "edac-poller"
HOST-RESOURCES-MIB::hrSWRunName.96 = STRING: "devfreq_wq"
```

Figura 4:

```
HOST-RESOURCES-MIB::hrSWRunName.97 = STRING: "watchdogd"
HOST-RESOURCES-MIB::hrSWRunName.98 = STRING: "kworker/3:1-events"
HOST-RESOURCES-MIB::hrSWRunName.99 = STRING: "kworker/u8:1-events_unbound"
HOST-RESOURCES-MIB::hrSWRunName.103 = STRING: "kswapd0"
HOST-RESOURCES-MIB::hrSWRunName.104 = STRING: "ecryptfs-kthrea"
HOST-RESOURCES-MIB::hrSWRunName.106 = STRING: "kthrotld"
HOST-RESOURCES-MIB::hrSWRunName.107 = STRING: "acpi_thermal_pm"
HOST-RESOURCES-MIB::hrSWRunName.108 = STRING: "scsi_eh_0"
HOST-RESOURCES-MIB::hrSWRunName.109 = STRING: "scsi_tmf_0"
HOST-RESOURCES-MIB::hrSWRunName.110 = STRING: "scsi_eh_1"
HOST-RESOURCES-MIB::hrSWRunName.111 = STRING: "scsi_tmf_1"
HOST-RESOURCES-MIB::hrSWRunName.113 = STRING: "vfio-irqfd-clea"
HOST-RESOURCES-MIB::hrSWRunName.114 = STRING: "kworker/u8:3-events_unbound"
HOST-RESOURCES-MIB::hrSWRunName.115 = STRING: "ipv6_addrconf"
HOST-RESOURCES-MIB::hrSWRunName.124 = STRING: "kstrp"
HOST-RESOURCES-MIB::hrSWRunName.127 = STRING: "kworker/u9:0"
HOST-RESOURCES-MIB::hrSWRunName.140 = STRING: "charger_manager"
HOST-RESOURCES-MIB::hrSWRunName.141 = STRING: "kworker/3:1H-kblockd"
HOST-RESOURCES-MIB::hrSWRunName.199 = STRING: "scsi_eh_2"
HOST-RESOURCES-MIB::hrSWRunName.200 = STRING: "scsi_tmf_2"
HOST-RESOURCES-MIB::hrSWRunName.201 = STRING: "kworker/0:4-cgroup_destroy"
HOST-RESOURCES-MIB::hrSWRunName.203 = STRING: "kworker/2:1H-kblockd"
HOST-RESOURCES-MIB::hrSWRunName.204 = STRING: "kworker/0:1H-kblockd"
HOST-RESOURCES-MIB::hrSWRunName.206 = STRING: "kworker/3:2-cgroup_destroy"
HOST-RESOURCES-MIB::hrSWRunName.207 = STRING: "kworker/1:2-cgroup_destroy"
HOST-RESOURCES-MIB::hrSWRunName.227 = STRING: "kworker/1:1H-kblockd"
HOST-RESOURCES-MIB::hrSWRunName.228 = STRING: "jbd2/sda1-8"
HOST-RESOURCES-MIB::hrSWRunName.229 = STRING: "ext4-rsv-conver"
HOST-RESOURCES-MIB::hrSWRunName.268 = STRING: "systemd-journal"
HOST-RESOURCES-MIB::hrSWRunName.290 = STRING: "systemd-udevd"
HOST-RESOURCES-MIB::hrSWRunName.292 = STRING: "loop0"
HOST-RESOURCES-MIB::hrSWRunName.295 = STRING: "loop1"
HOST-RESOURCES-MIB::hrSWRunName.297 = STRING: "loop2"
HOST-RESOURCES-MIB::hrSWRunName.299 = STRING: "loop3"
HOST-RESOURCES-MIB::hrSWRunName.301 = STRING: "loop4"
HOST-RESOURCES-MIB::hrSWRunName.303 = STRING: "loop5"
HOST-RESOURCES-MIB::hrSWRunName.305 = STRING: "loop6"
HOST-RESOURCES-MIB::hrSWRunName.307 = STRING: "loop7"
HOST-RESOURCES-MIB::hrSWRunName.310 = STRING: "loop8"
HOST-RESOURCES-MIB::hrSWRunName.318 = STRING: "loop9"
HOST-RESOURCES-MIB::hrSWRunName.320 = STRING: "loop10"
HOST-RESOURCES-MIB::hrSWRunName.321 = STRING: "loop11"
HOST-RESOURCES-MIB::hrSWRunName.323 = STRING: "loop12"
HOST-RESOURCES-MIB::hrSWRunName.326 = STRING: "loop13"
HOST-RESOURCES-MIB::hrSWRunName.328 = STRING: "loop14"
HOST-RESOURCES-MIB::hrSWRunName.330 = STRING: "loop15"
```

Figura 5:

Figura 6:

```
HOST-RESOURCES-MIB::hrSWRunName.1414 = STRING: "pulseaudio"
HOST-RESOURCES-MIB::hrSWRunName.1415 = STRING: "rtkit-daemon"
HOST-RESOURCES-MIB::hrSWRunName.1438 = STRING: "kworker/0:5-mm_percpu_wq"
HOST-RESOURCES-MIB::hrSWRunName.1440 = STRING: "ibus-daemon"
HOST-RESOURCES-MIB::hrSWRunName.1443 = STRING: "xdg-permission-"
HOST-RESOURCES-MIB::hrSWRunName.1445 = STRING: "ibus-dconf"
HOST-RESOURCES-MIB::hrSWRunName.1447 = STRING: "ibus-x11"
HOST-RESOURCES-MIB::hrSWRunName.1454 = STRING: "ibus-portal"
HOST-RESOURCES-MIB::hrSWRunName.1463 = STRING: "gnome-shell-cal"
HOST-RESOURCES-MIB::hrSWRunName.1469 = STRING: "evolution-sourc"
HOST-RESOURCES-MIB::hrSWRunName.1474 = STRING: "boltd"
HOST-RESOURCES-MIB::hrSWRunName.1476 = STRING: "dconf-service"
HOST-RESOURCES-MIB::hrSWRunName.1485 = STRING: "gvfs-udisks2-vo"
HOST-RESOURCES-MIB::hrSWRunName.1489 = STRING: "gvfs-mtp-volume"
HOST-RESOURCES-MIB::hrSWRunName.1493 = STRING: "gvfs-gphoto2-vo"
HOST-RESOURCES-MIB::hrSWRunName.1496 = STRING: "goa-daemon"
HOST-RESOURCES-MIB::hrSWRunName.1500 = STRING: "gvfs-goa-volume"
HOST-RESOURCES-MIB::hrSWRunName.1511 = STRING: "goa-identity-se"
HOST-RESOURCES-MIB::hrSWRunName.1517 = STRING: "gvfs-afc-volume"
HOST-RESOURCES-MIB::hrSWRunName.1523 = STRING: "packagekitd"
HOST-RESOURCES-MIB::hrSWRunName.1525 = STRING: "gsd-power"
HOST-RESOURCES-MIB::hrSWRunName.1527 = STRING: "gsd-print-notif"
HOST-RESOURCES-MIB::hrSWRunName.1528 = STRING: "gsd-rfkill"
HOST-RESOURCES-MIB::hrSWRunName.1531 = STRING: "gsd-screensaver"
HOST-RESOURCES-MIB::hrSWRunName.1537 = STRING: "gsd-sharing"
HOST-RESOURCES-MIB::hrSWRunName.1545 = STRING: "gsd-smartcard"
HOST-RESOURCES-MIB::hrSWRunName.1548 = STRING: "gsd-xsettings"
HOST-RESOURCES-MIB::hrSWRunName.1549 = STRING: "gsd-wacom"
HOST-RESOURCES-MIB::hrSWRunName.1555 = STRING: "gsd-sound"
HOST-RESOURCES-MIB::hrSWRunName.1565 = STRING: "gsd-a11y-settin"
HOST-RESOURCES-MIB::hrSWRunName.1566 = STRING: "gsd-clipboard"
HOST-RESOURCES-MIB::hrSWRunName.1569 = STRING: "gsd-datetime"
HOST-RESOURCES-MIB::hrSWRunName.1572 = STRING: "gsd-housekeepin"
HOST-RESOURCES-MIB::hrSWRunName.1573 = STRING: "gsd-color"
HOST-RESOURCES-MIB::hrSWRunName.1581 = STRING: "gsd-media-keys"
HOST-RESOURCES-MIB::hrSWRunName.1583 = STRING: "gsd-mouse"
HOST-RESOURCES-MIB::hrSWRunName.1587 = STRING: "gsd-keyboard"
HOST-RESOURCES-MIB::hrSWRunName.1601 = STRING: "gsd-printer"
HOST-RESOURCES-MIB::hrSWRunName.1622 = STRING: "evolution-calen"
HOST-RESOURCES-MIB::hrSWRunName.1630 = STRING: "gsd-disk-utilit"
HOST-RESOURCES-MIB::hrSWRunName.1631 = STRING: "colord"
HOST-RESOURCES-MIB::hrSWRunName.1632 = STRING: "nautilus-deskto"
HOST-RESOURCES-MIB::hrSWRunName.1658 = STRING: "gvfsd-trash"
HOST-RESOURCES-MIB::hrSWRunName.1675 = STRING: "evolution-calen"
HOST-RESOURCES-MIB::hrSWRunName.1694 = STRING: "evolution-addre"
HOST-RESOURCES-MIB::hrSWRunName.1703 = STRING: "evolution-addre"
```

Figura 7:

9

```
HOST-RESOURCES-MIB::hrSWRunName.1718 = STRING: "ibus-engine-sim"
HOST-RESOURCES-MIB::hrSWRunName.1742 = STRING: "gvfsd-metadata"
HOST-RESOURCES-MIB::hrSWRunName.1864 = STRING: "kworker/2:3-events"
HOST-RESOURCES-MIB::hrSWRunName.1915 = STRING: "update-notifier"
HOST-RESOURCES-MIB::hrSWRunName.1917 = STRING: "gnome-software"
HOST-RESOURCES-MIB::hrSWRunName.1940 = STRING: "fwupd"
HOST-RESOURCES-MIB::hrSWRunName.2073 = STRING: "deja-dup-monito"
HOST-RESOURCES-MIB::hrSWRunName.2112 = STRING: "firefox"
HOST-RESOURCES-MIB::hrSWRunName.2265 = STRING: "kworker/3:0-cgroup_destroy"
HOST-RESOURCES-MIB::hrSWRunName.2266 = STRING: "cupsd"
HOST-RESOURCES-MIB::hrSWRunName.2267 = STRING: "cups-browsed"
HOST-RESOURCES-MIB::hrSWRunName.2332 = STRING: "Privileged Cont"
HOST-RESOURCES-MIB::hrSWRunName.2359 = STRING: "Web Content"
HOST-RESOURCES-MIB::hrSWRunName.2411 = STRING: "WebExtensions"
HOST-RESOURCES-MIB::hrSWRunName.2460 = STRING: "Web Content"
HOST-RESOURCES-MIB::hrSWRunName.2505 = STRING: "Web Content"
HOST-RESOURCES-MIB::hrSWRunName.2553 = STRING: "kworker/u8:0"
HOST-RESOURCES-MIB::hrSWRunName.2601 = STRING: "gnome-terminal-"
HOST-RESOURCES-MIB::hrSWRunName.2611 = STRING: "bash"
HOST-RESOURCES-MIB::hrSWRunName.2619 = STRING: "snmpwalk"
```

Figura 8:

3   Conclusão

Com a realização deste trabalho prático adquiri conhecimentos sobre o funcionamento das MIBs e da utilidade do *NET-SNMP* que prevejo que venha a ser muito útil para o desenvolvimento dos próximos trabalhos.

Sendo esta uma fase ainda inicial penso ter cumprido os objetivos na totalidade e sinto-me preparado para os próximos trabalhos.