

Estudo e Desenvolvimento de Analisadores Estatísticos para Especificações de SLA

Trabalho de Formatura Supervisionado

Gabriel Henrique Pugliese

Orientador: Manoel Marcilio Sanches
Instituto de Matemática e Estatística
Universidade de São Paulo

15 de novembro de 2009

Introdução

- SLA - Service Level Agreement
- Monitoração
- Protocolo SNMP

Arquitetura

- Linguagem escolhida
- Softwares utilizados
- Funcionamento
- Screenshots

Conclusão

- Futuro

SLA - Service Level Agreement

Garante em uma rede de computadores:

- ▶ Disponibilidade.

SLA - Service Level Agreement

Garante em uma rede de computadores:

- ▶ Disponibilidade.
- ▶ Performance.

SLA - Service Level Agreement

Garante em uma rede de computadores:

- ▶ Disponibilidade.
- ▶ Performance.
- ▶ Previsão e precaução de erros, etc.

Monitoração - Nagios

Host Status Totals

Up	Down	Unreachable	Pending
15	0	0	0
All Problems: All Types: 17			

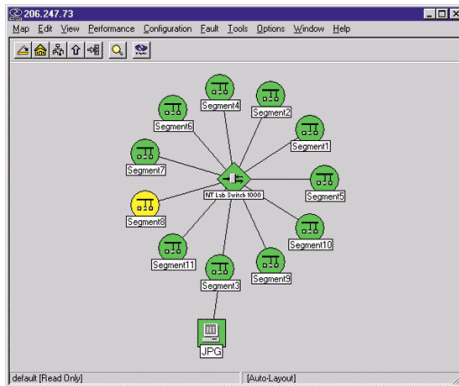
Service Status Totals

OK	Warning	Unknown	Critical	Pending
25	1	0	0	0
All Problems: All Types: 25				

Service Status Details For All Hosts

Host	Service	Status	Last Check	Duration	Attempt	Status Information
net	Database.C	OK	2004-07-06 11:10:19	2043h 7m 26s	1/0	CL: total: 3.91 Gb - used: 2.62 Gb (67%) - free: 1.28 Gb (33%) D: total: 29.90 Gb - used: 26.78 Gb (89%) - free: 3.20 Gb (11%)
	FTP	OK	2004-07-06 11:14:13	2043h 7m 20s	3/0	HTTP ok: HTTP/1.1 200 OK - 0.027 second response time
	MS_Exchange	OK	2004-07-06 11:20:41	2043h 10m 5s	1/0	All services are running
	SMTP	OK	2004-07-06 11:20:30	2043h 5m 13s	1/0	SMTP OK - 0 second response time
usdn	Database.C	WARNING	2004-07-06 11:19:45	0d 22h 2m 24s	1/0	CL: total: 39.06 Gb - used: 8.01 Gb (21%) - free: 31.05 Gb (79%)
	MySQL	OK	2004-07-06 11:18:01	0d 22h 29m 13s	1/0	11
	MySQL	OK	2004-07-06 11:21:30	0d 0h 31m 24s	1/0	RING OK - Packet loss = 0%, RTA = 36.37 ms
nauds	RING	OK	2004-07-06 11:20:21	180d 8h 33m 3s	1/0	RING OK - Packet loss = 0%, RTA = 1.36 ms
brnet1	RING	OK	2004-07-06 11:21:21	66d 22h 30m 57s	1/0	RING OK - Packet loss = 0%, RTA = 6.10 ms
	External	OK	2004-07-06 11:20:20	63d 18h 45m 23s	1/0	OK: rate@4250 Mbps OK: rate@OUT@286 kbps
brnet2	RING	CRITICAL	2004-04-20 12:38:00	77d 20h 45m 1s	10/10	RING CRITICAL - Packet loss = 100%
	External	PENDING	2004-04-20 12:38:00	77d 20h 45m 1s	10/10	check_snmp_counter: ERROR: using get-if-request: No response from remote host: 92.219.98.190
usnet	Database.C	OK	2004-07-06 11:15:46	77d 1h 13m 47s	1/0	CL: total: 4.60 Gb - used: 2.99 Gb (65%) - free: 1.61 Gb (35%)
	MS_Exchange	OK	2004-07-06 11:20:41	16d 1h 3m 7s	1/0	E: total: 4.00 Gb - used: 1.46 Gb (36%) - free: 2.54 Gb (64%)
	MS_Exchange	OK	2004-07-06 11:21:41	61d 22h 57m 53s	1/0	All services are running
	SMTP	OK	2004-07-06 11:21:41	61d 22h 57m 57s	1/0	All services are running
	SMTP	OK	2004-07-06 11:21:43	61d 22h 59m 4s	1/0	SMTP OK - 0 second response time
	SMTP	OK	2004-07-06 11:21:43	61d 22h 59m 4s	1/0	SMTP OK - 0 second response time
net	FTP	OK	2004-07-06 11:21:46	22d 2h 15m 17s	1/0	HTTP ok: HTTP/1.1 200 OK - 0.016 second response time
	SMTP	OK	2004-07-06 11:21:31	22d 1h 2m 16s	1/0	SMTP OK - 0 second response time

Monitoração - NNM



Protocolo SNMP

Arquitetura básica:

- ▶ Agente.

Protocolo SNMP

Arquitetura básica:

- ▶ Agente.
- ▶ Gerente.

SNMP Request x SNMP Trap

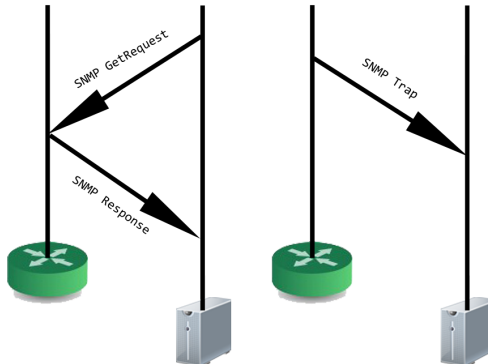


Figura: Roteador(Agente) e servidor(Gerente) interagindo.

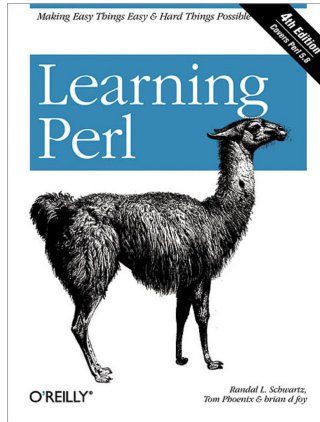
Exemplo de SNMP Trap

```

traps.txt - Notepad
File Edit Format View Help
denied all 127.0.0.47(C)(Ethernet 3/5 0015.1753.e928) -> 108.122.0.0(), 1 event(s)"
06-10-2009 11:20 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.104(C)(Ethernet 3/5 0030.482e.fb82) -> 108.122.0.0(), 1 event(s)"
06-10-2009 11:21 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:21 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:21 from core-reitoria.uspnet.usp.br (143.107.1.3) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-b
denied udp 0.0.0.0(bootpc)(Ethernet 13/4 001e.cfd2.f981) -> 255.255.255.255(bootps), 11 event(s)"
06-10-2009 11:21 from core-reitoria.uspnet.usp.br (143.107.1.3) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-
lgc denied udp 0.0.0.0(bootpc)(Ethernet 13/3 0013.021e.ba67) -> 255.255.255.255(bootps), 27 event(s)"
06-10-2009 11:21 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:21 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:21 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.19(C)(Ethernet 3/5 0015.1753.e928) -> 108.122.0.0(), 7 event(s)"
06-10-2009 11:21 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.225(C)(Ethernet 3/5 0030.482e.fb82) -> 108.122.0.0(), 6 event(s)"
06-10-2009 11:21 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.206(C)(Ethernet 3/5 0030.482e.fb82) -> 108.122.0.0(), 6 event(s)"
06-10-2009 11:21 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.161(C)(Ethernet 3/5 0015.1753.e928) -> 108.122.0.0(), 6 event(s)"
06-10-2009 11:21 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.71(C)(Ethernet 3/5 0015.1717.5c04) -> 108.122.0.0(), 4 event(s)"
06-10-2009 11:21 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.22(C)(Ethernet 3/5 0015.1753.e928) -> 108.122.0.0(), 1 event(s)"
06-10-2009 11:22 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.62(C)(Ethernet 3/5 0030.482e.fb82) -> 108.122.0.0(), 1 event(s)"
06-10-2009 11:22 from core-reitoria.uspnet.usp.br (143.107.1.3) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-f
Fusp denied udp 0.0.0.0(bootpc)(Ethernet 9/17 001e.0b83.e979) -> 255.255.255.255(bootps), 1 event(s)"
06-10-2009 11:22 from core-fea.uspnet.usp.br (143.107.27.1) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fea
denied 2 189.8.14.19(C)(Ethernet 2/28 0030.4f50.c13f) -> 224.0.0.1(), 2 event(s)"
06-10-2009 11:22 from core-fea.uspnet.usp.br (143.107.27.1) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fea
denied 2 189.8.14.19(C)(Ethernet 2/28 0030.4f50.c13f) -> 224.0.0.1(), 1 event(s)"
06-10-2009 11:22 from core-reitoria.uspnet.usp.br (143.107.1.3) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-
ffffchavos denied udp 0.0.0.0(bootpc)(Ethernet 13/5 000f.eaa3.6509) -> 255.255.255.255(bootps), 1 event(s)"
06-10-2009 11:22 from core-reitoria.uspnet.usp.br (143.107.1.3) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-
bbm denied udp 0.0.0.0(bootpc)(Ethernet 13/4 001e.cfd2.f981) -> 255.255.255.255(bootps), 1 event(s)"
06-10-2009 11:22 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:22 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:22 from core-reitoria.uspnet.usp.br (143.107.1.3) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-
Favest denied udp 0.0.0.0(bootpc)(Ethernet 13/6 0006.8aeb.1840) -> 255.255.255.255(bootps), 6 event(s)"
06-10-2009 11:22 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:22 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:22 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:22 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.167(C)(Ethernet 3/5 0030.482e.fb82) -> 108.122.0.0(), 6 event(s)"
06-10-2009 11:23 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:23 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:23 from core-fe.uspnet.usp.br (143.107.41.121) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-fe
denied all 127.0.0.198(C)(Ethernet 3/5 0030.482e.fb82) -> 108.122.0.0(), 1 event(s)"
06-10-2009 11:23 from core-fo.uspnet.usp.br (143.107.23.1) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-
transporte denied udp 0.0.0.0(bootpc)(Ethernet 3/9 0019.e0f7.7697) -> 255.255.255.255(bootps), 8 event(s)"
06-10-2009 11:23 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:23 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:23 from core-bru.uspnet.usp.br (143.107.24.1)
06-10-2009 11:23 from core-reitoria.uspnet.usp.br (143.107.1.3) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-
transporte denied udp 0.0.0.0(bootpc)(Ethernet 3/9 0019.e0f7.7697) -> 255.255.255.255(bootps), 1 event(s)"
06-10-2009 11:23 from core-reitoria.uspnet.usp.br (143.107.1.3) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-
mac denied udp 0.0.0.0(bootpc)(Ethernet 9/12 0019.e0f7.76a6) -> 255.255.255.255(bootps), 8 event(s)"
06-10-2009 11:23 from core-reitoria.uspnet.usp.br (143.107.1.3) SNMPv2-SMI::enterprises.1991.1.1.2.1.44.0 = STRING: "list acl-
ce denied udp 0.0.0.0(bootpc)(Ethernet 2/3 0016.763c.3abf) -> 255.255.255.255(bootps), 4 event(s)"
06-10-2009 11:23 from pix.uspnet.usp.br (0.0.0.0) DISMAN-EVENT-MIB::sysUpTimeInstance = TIMETICKS(260998/55) 30 days,
ifIndex=55, SNMPv2-MIB::snmpIfAdminDown = 0, ifIndex=55, SNMPv2-MIB::snmpIfLinkUp = 0, ifIndex=55, ifIndex=77 = NTINDEX: 77, if
MIB::ifDescr.77 = STRING: GiabitEthernet1/17, If-MIB::ifAlias.77 = STRING:

```

Perl com Orientação a Objetos



Programas utilizados

Softwares utilizados no Linux Debian:

- ▶ snmptrapd.

Programas utilizados

Softwares utilizados no Linux Debian:

- ▶ snmptrapd.
- ▶ MySQL.

Programas utilizados

Softwares utilizados no Linux Debian:

- ▶ snmptrapd.
- ▶ MySQL.
- ▶ Apache.

Programas utilizados

Softwares utilizados no Linux Debian:

- ▶ snmptrapd.
- ▶ MySQL.
- ▶ Apache.
- ▶ Gnuplot.

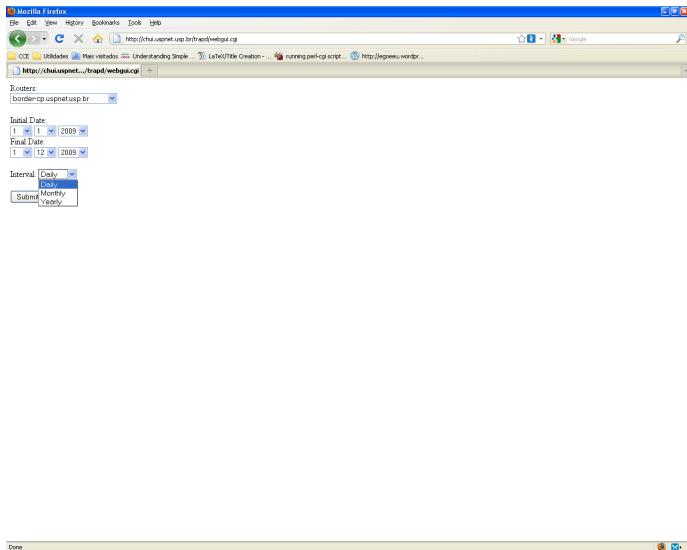
Funcionamento



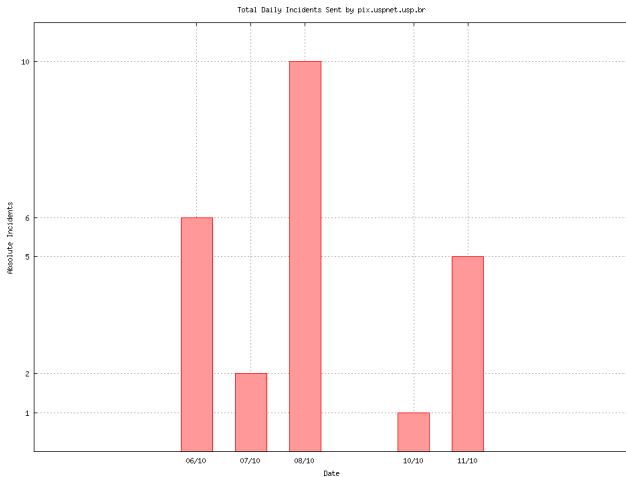
```

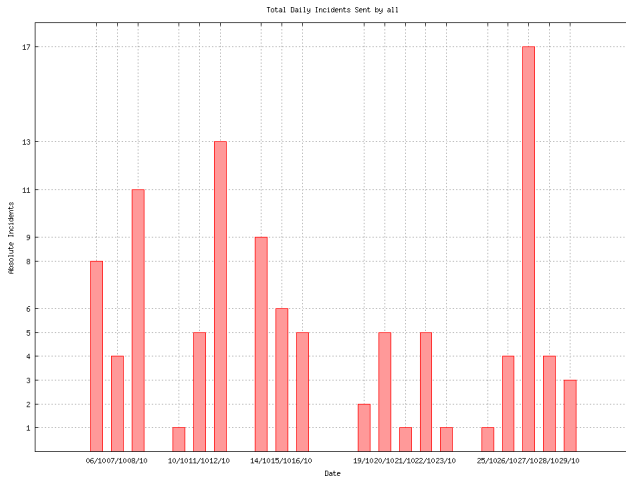
chassis/etc/trapd/bin# ./trapd.pl ./traps
06-10-2009 11:23 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - DOWN
06-10-2009 11:25 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - UP
06-10-2009 12:53 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - DOWN
06-10-2009 12:55 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - UP
06-10-2009 13:59 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - DOWN
06-10-2009 17:39 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - DOWN
06-10-2009 17:41 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - DOWN
06-10-2009 17:41 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - UP
06-10-2009 17:46 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - DOWN
06-10-2009 17:54 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - UP
06-10-2009 18:03 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - UP
06-10-2009 19:10 - 143.107.251.30 (143.107.251.30) - GigabitEthernet5/18 - THE SUPERCRITICA - DOWN
06-10-2009 20:00 - core-acusp.uspnet.usp.br (143.107.255.253) - FastEthernet3/21 - ANON_SISI CRITICA - DOWN
07-10-2009 10:04 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - DOWN
07-10-2009 10:06 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - UP
07-10-2009 11:21 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - DOWN
07-10-2009 11:22 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/17 - - UP
07-10-2009 19:50 - core-acusp.uspnet.usp.br (143.107.151.90) - FastEthernet4/9 - ECA JORNALISMO CRITICA - DOWN
07-10-2009 19:51 - core-acusp.uspnet.usp.br (143.107.255.253) - FastEthernet4/9 - ECA JORNALISMO CRITICA - DOWN
07-10-2009 19:51 - core-acusp.uspnet.usp.br (143.107.151.90) - FastEthernet4/9 - ECA JORNALISMO CRITICA - UP
08-10-2009 02:35 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - UP
08-10-2009 02:47 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/19 - Ger-EdgeCore - DOWN
08-10-2009 02:47 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - DOWN
08-10-2009 02:48 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - UP
08-10-2009 02:50 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - UP
08-10-2009 03:18 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - UP
08-10-2009 03:18 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - DOWN
08-10-2009 03:22 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/19 - Ger-EdgeCore - DOWN
08-10-2009 03:23 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/19 - Ger-EdgeCore - UP
08-10-2009 03:26 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/19 - Ger-EdgeCore - DOWN
08-10-2009 15:03 - 143.107.151.157 (143.107.151.157) - GigabitEthernet2/25 - LIGACAO_RIO SUPERCRITICA - UP
08-10-2009 15:06 - 143.107.151.157 (143.107.151.157) - GigabitEthernet2/25 - LIGACAO_RIO SUPERCRITICA - DOWN
08-10-2009 15:11 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/10 - - DOWN
08-10-2009 15:11 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/10 - - UP
08-10-2009 15:21 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/10 - - UP
08-10-2009 15:20 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/10 - - DOWN
08-10-2009 15:20 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/2 - - DOWN
08-10-2009 15:28 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/10 - - DOWN
10-10-2009 15:47 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/3 - 3w-Telefonia-VTE - DOWN
10-10-2009 15:47 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet4/3 - 3w-Telefonia-VTE - UP
11-10-2009 13:31 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - DOWN
11-10-2009 13:32 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/2 - - UP
11-10-2009 13:40 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/2 - - UP
11-10-2009 13:41 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/2 - - DOWN
11-10-2009 13:55 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - UP
11-10-2009 14:01 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - UP
11-10-2009 14:08 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - DOWN
11-10-2009 14:11 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - UP
11-10-2009 15:09 - pdk.uspnet.usp.br (143.107.151.162) - GigabitEthernet3/1 - to_MAP(A) SUPERCRITICA - DOWN
12-10-2009 17:14 - border-cp.uspnet.usp.br (143.107.255.228) - GigabitEthernet3/17 - "Desencantamento de Switches" CRITICA - DOWN
12-10-2009 17:14 - border-cp.uspnet.usp.br (143.107.255.228) - GigabitEthernet3/17 - INT SUPERCRITICA - DOWN
12-10-2009 17:14 - border-cp.uspnet.usp.br (143.107.255.17) - GigabitEthernet3/18 - bandejas-remoto CRITICA - DOWN
12-10-2009 17:15 - border-cp.uspnet.usp.br (143.107.151.246) - GigabitEthernet3/13 - INT SUPERCRITICA - UP
12-10-2009 17:15 - border-cp.uspnet.usp.br (143.107.151.246) - GigabitEthernet3/13 - INT SUPERCRITICA - DOWN
12-10-2009 17:16 - border-cp.uspnet.usp.br (143.107.172.1) - GigabitEthernet3/17 - "Gerenciamento de Switches" CRITICA - UP
12-10-2009 17:16 - border-cp.uspnet.usp.br (143.107.255.234) - GigabitEthernet3/13 - INT SUPERCRITICA - DOWN
12-10-2009 17:16 - border-cp.uspnet.usp.br (143.107.255.228) - GigabitEthernet3/17 - "Desencantamento de Switches" CRITICA - DOWN

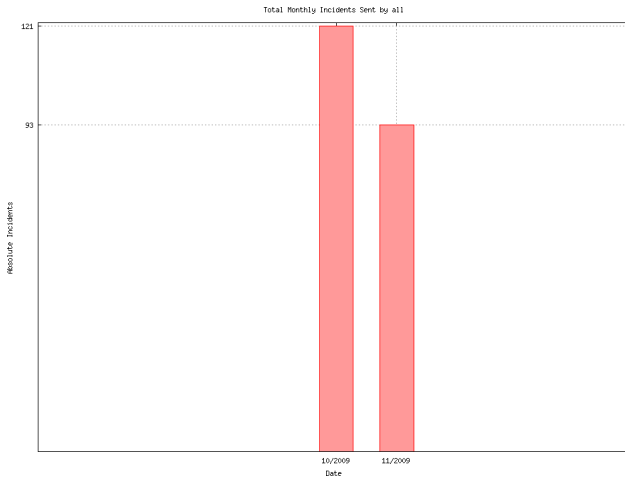
```



date	time	status	interface
2009-10-06	11:23:00	down	GigabitEthernet4/17
2009-10-06	11:25:00	up	GigabitEthernet4/17
2009-10-06	12:53:00	down	GigabitEthernet4/17
2009-10-06	12:55:00	up	GigabitEthernet4/17
2009-10-06	12:59:00	down	GigabitEthernet4/17
2009-10-06	17:39:00	down	GigabitEthernet4/17
2009-10-06	17:41:00	down	GigabitEthernet4/17
2009-10-06	17:41:00	up	GigabitEthernet4/17
2009-10-06	17:46:00	down	GigabitEthernet4/17
2009-10-06	17:54:00	up	GigabitEthernet4/17
2009-10-06	18:03:00	up	GigabitEthernet4/17
2009-10-06	19:10:00	down	GigabitEthernet5/18
2009-10-06	20:00:00	down	FastEthernet3/23
2009-10-07	10:04:00	down	GigabitEthernet4/17
2009-10-07	10:06:00	up	GigabitEthernet4/17
2009-10-07	11:21:00	down	GigabitEthernet4/17
2009-10-07	11:22:00	up	GigabitEthernet4/17
2009-10-07	19:50:00	down	FastEthernet4/9
2009-10-07	19:51:00	down	FastEthernet4/9
2009-10-07	19:51:00	up	FastEthernet4/9
2009-10-08	02:35:00	up	GigabitEthernet3/1
2009-10-08	02:47:00	down	GigabitEthernet3/19
2009-10-08	02:47:00	down	GigabitEthernet3/1
2009-10-08	02:48:00	up	GigabitEthernet3/1
2009-10-08	02:50:00	down	GigabitEthernet3/1
2009-10-08	03:18:00	up	GigabitEthernet3/1
2009-10-08	03:18:00	down	GigabitEthernet3/1







Ações futuras

- ▶ Correções de bugs que possam ainda existir.

Ações futuras

- ▶ Correções de bugs que possam ainda existir.
- ▶ Melhorias nos gráficos.

Ações futuras

- ▶ Correções de bugs que possam ainda existir.
- ▶ Melhorias nos gráficos.
- ▶ Tratamento de mensagens de Trap diferentes.

Ações futuras

- ▶ Correções de bugs que possam ainda existir.
- ▶ Melhorias nos gráficos.
- ▶ Tratamento de mensagens de Trap diferentes.
- ▶ Abertura do código para a comunidade de monitoração de redes (SourceForge.net).

Dúvidas ?