Gestion d'un réseau informatique

SNMP
RMON
SMON

Jean-François L'haire

Gérer son réseau: INDISPENSABLE!!!!

- Mesurer le câblage à l'installation
- Mesurer l'atténuation globale d'une liaison optique
- Mesurer le taux d'erreur
- Connaître ses gros consommateurs
- Prévoir les goulets d'étranglement
- Être capable de réagir à une crise!

Mesure de la couche physique

- Par analyseur de paquets Ethernet
- Mesure du câblage
- Mesure de fibres optiques

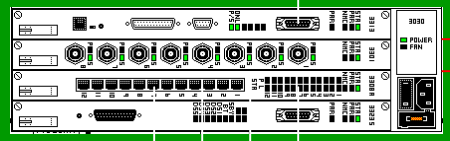
Management « In Band »

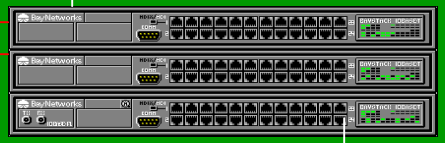
Le trafic de management passe par le réseau

Site B

Site A

FO





Station de management

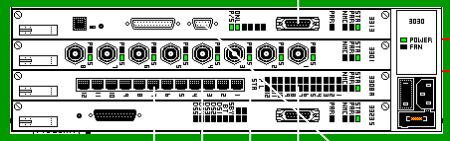
Management « Out of Band »

Aussi avec un PC et
un téléphone portable!

Site B

Site A

FO



Modem

Station de
management

Ping - ICMP

Host: eddie.mit.edu

Traceroute

Tracing route to target: 18.62.0.6

Hop:	IP Address:	Domain Name:	Roun
1	129.194.16.42	dg-bastions.unige.ch	55
2	129.194.4.40	xtrn-eth0.unige.ch	55
3	192.33.214.3	swige1.unige.ch	55
4	130.59.91.2	swiCE1.switch.ch	55
5	192.65.185.204	geneva3.Dante.net	55
6	192.77.157.1	Washington2.Dante.net	220
7	192.77.156.1	en-0.Washington-DC-cnss57.t3.ans.net	220
8	140.222.56.222	mf-0.cnss56.Washington-DC.t3.ans.net	165
9	140.222.32.1	t3-0.cnss32.New-York.t3.ans.net	110
10	140.222.48.1	t3-0.cnss48.Hartford.t3.ans.net	219
11	140.222.134.1	t3-0.enss134.t3.ans.net	165
12	192.233.33.1	w91-rtr-external-fddi.mit.edu	165
13	18.168.0.6	B24-RTR-FDDI.MIT.EDU	165
14	18.62.0.6	** eddie.mit.edu **	165

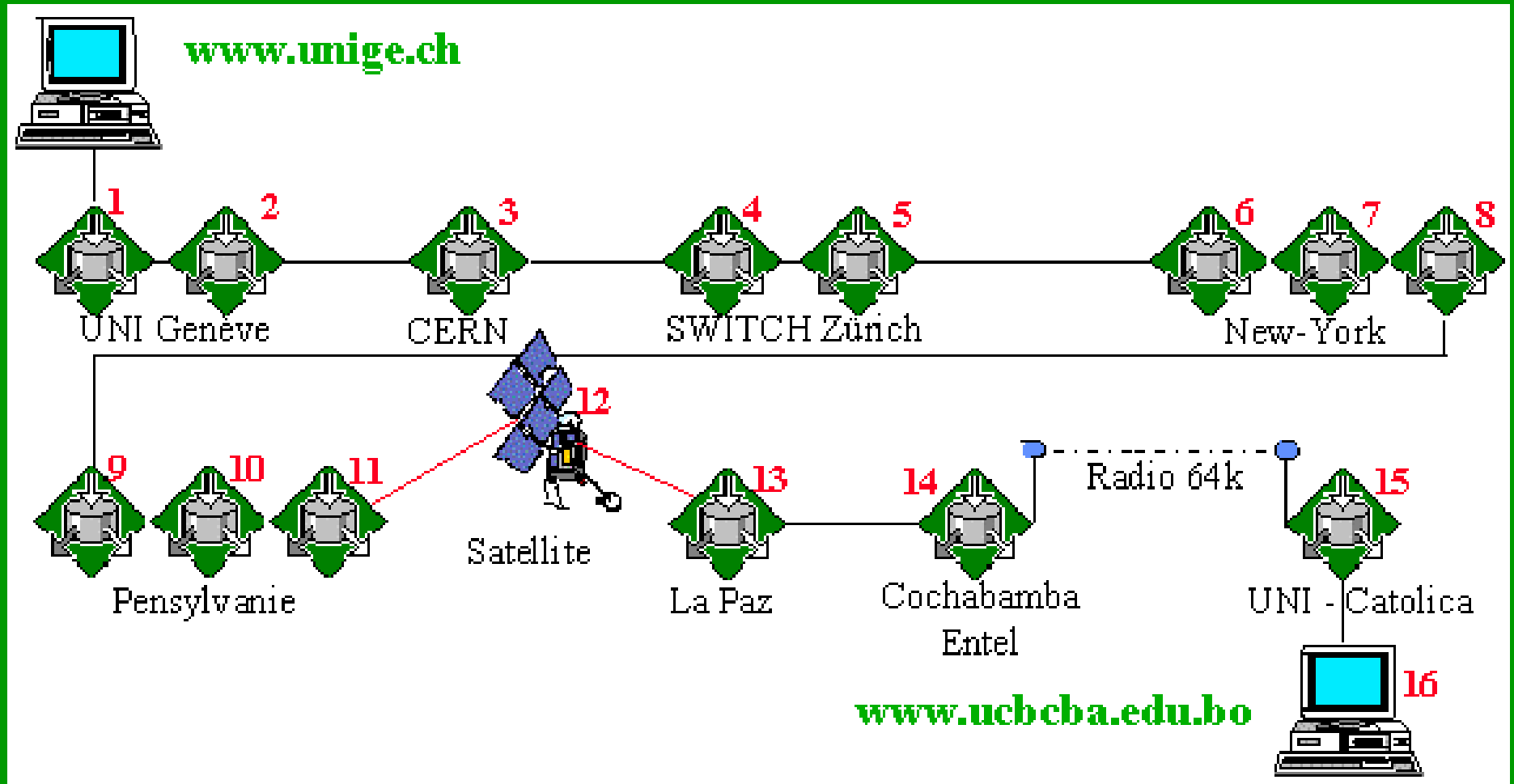
Target eddie.mit.edu reached.

Trace Route

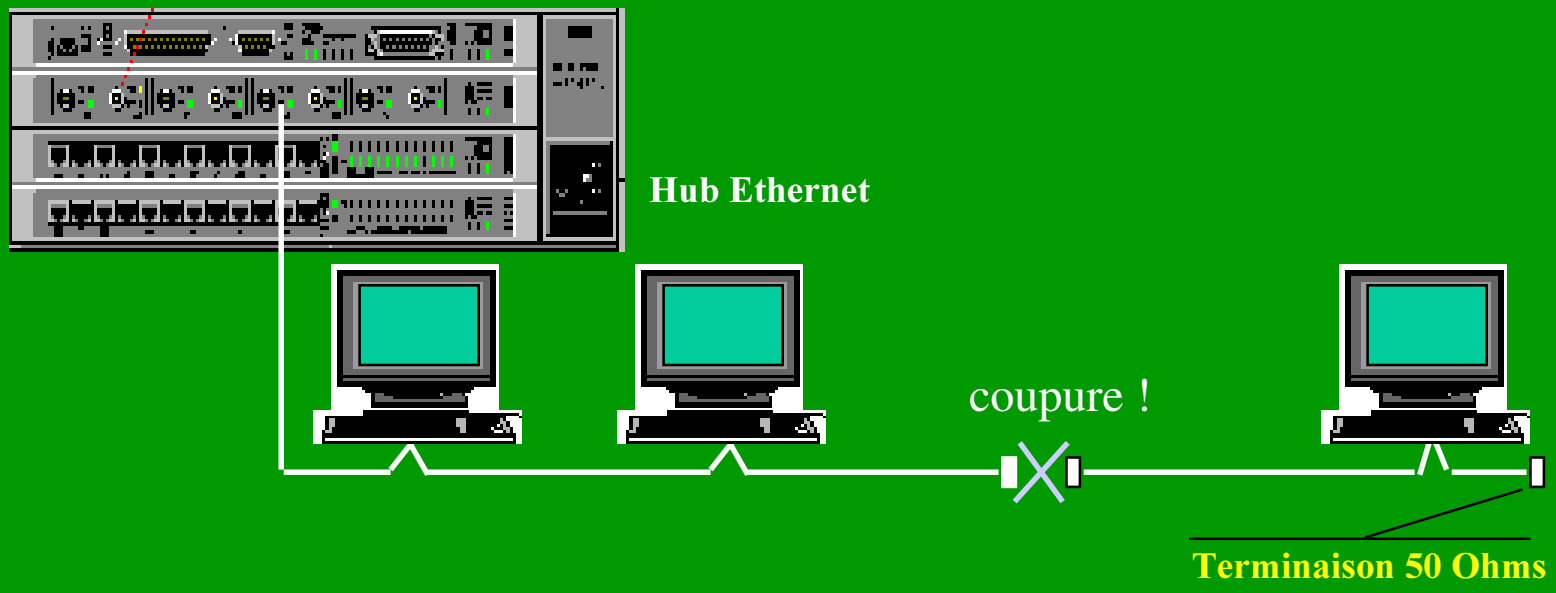
From www.unige.ch To ucbsun2.ucbcba.edu.bo.

```
traceroute: Warning: Multiple interfaces found; using 129.194.8.27
traceroute to ucbsun2.ucbcba.edu.bo (166.114.106.5), 40 hops max,
 1  129.194.8.1  0.824 ms  0.468 ms  0.564 ms
 2  192.33.214.3  1.440 ms  1.273 ms  1.403 ms
 3  130.59.33.45  2.549 ms  2.076 ms  2.635 ms
 4  212.1.192.169  3.189 ms  3.052 ms  3.579 ms
 5  212.1.194.14  4.357 ms  4.619 ms  4.643 ms
 6  195.206.67.122  11.739 ms  11.604 ms  12.345 ms
 7  195.22.205.235  12.497 ms  12.351 ms  11.911 ms
 8  195.22.192.134  25.500 ms  25.499 ms  25.806 ms
 9  195.22.205.250  28.636 ms  26.626 ms  25.181 ms
10  * * *
11  166.114.10.29  211.672 ms  211.443 ms  213.256 ms
12  166.114.254.14  218.878 ms  209.185 ms  212.579 ms
13  166.114.102.12  228.282 ms  225.045 ms  225.472 ms
14  166.114.106.1  239.619 ms  239.962 ms  243.017 ms
15  166.114.106.5  240.984 ms  250.368 ms  241.442 ms
```

Trace Route


www.unige.ch
1
2
3
4
5
6
7
8
UNI Genève
CERN
SWITCH Zürich
New-York
12
9
10
11
13
14
Radio 64k
15
Satellite
Pensylvanie
La Paz
Cochabamba
Entel
UNI - Catolica
www.ucbcba.edu.bo
16

Problème classique..



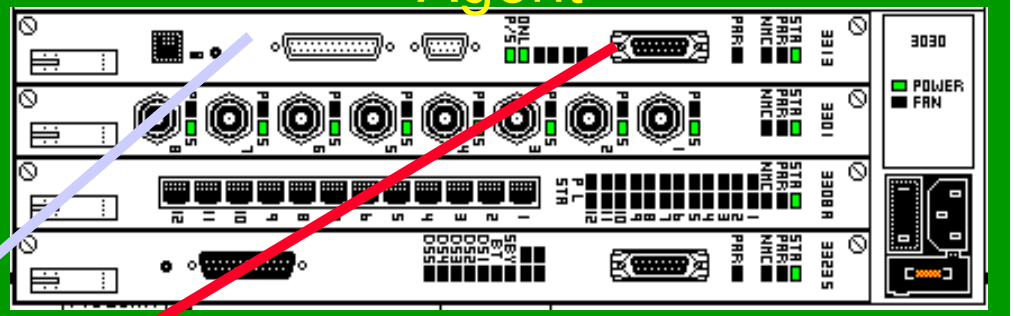
Segment Ethernet desservant un groupe de bureaux

SNMP
Simple Network Management Protocol

- Dialogue entre une station de contrôle et un noeud du réseau
- Permet de connaître l'état d'un appareil
- Gestion des événements exceptionnels
- Mesures de trafic à distance
- Configuration d'appareils à distance

Requêtes SNMP

Agent



GET , SET

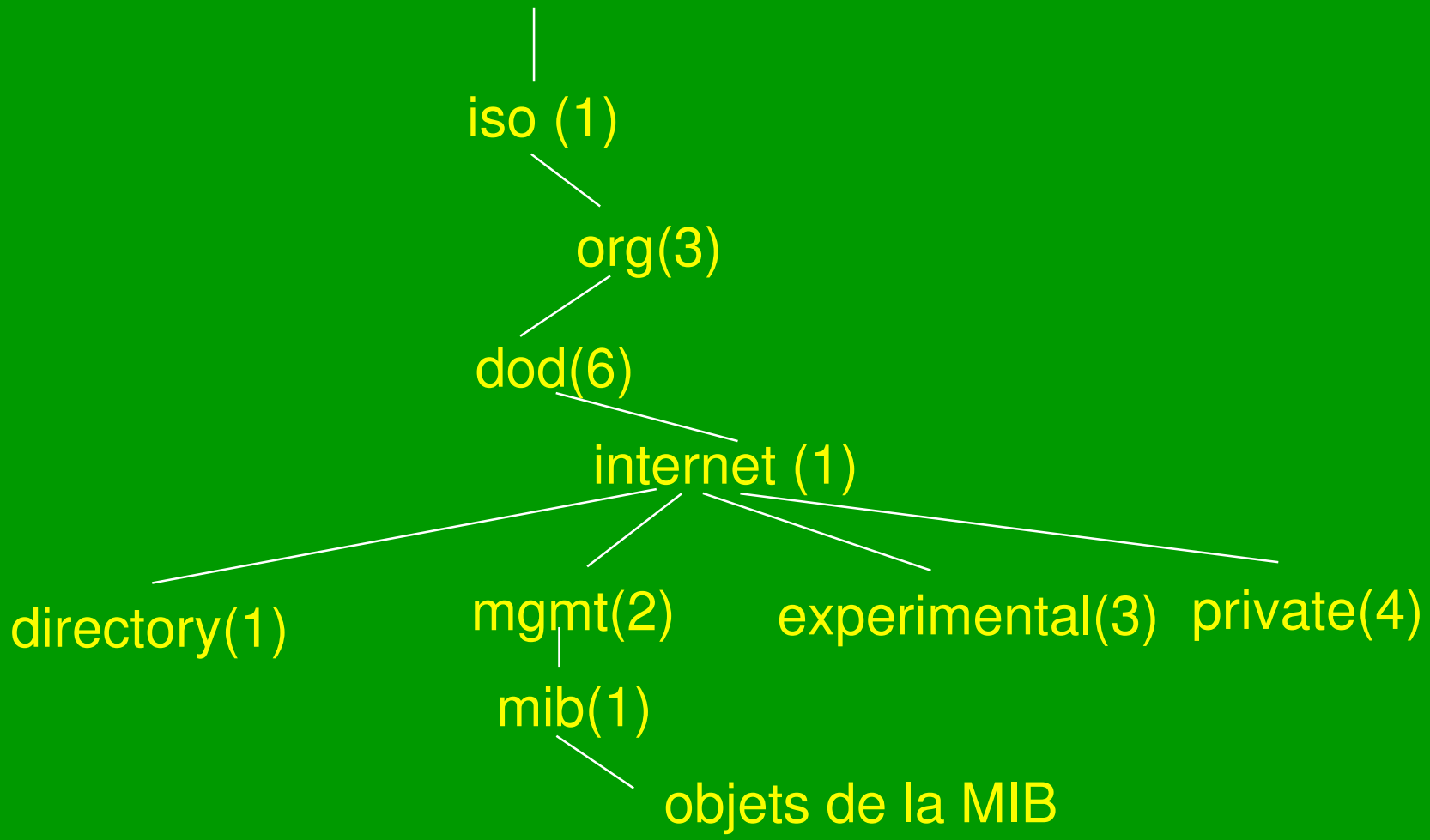
TRAP

Station de management

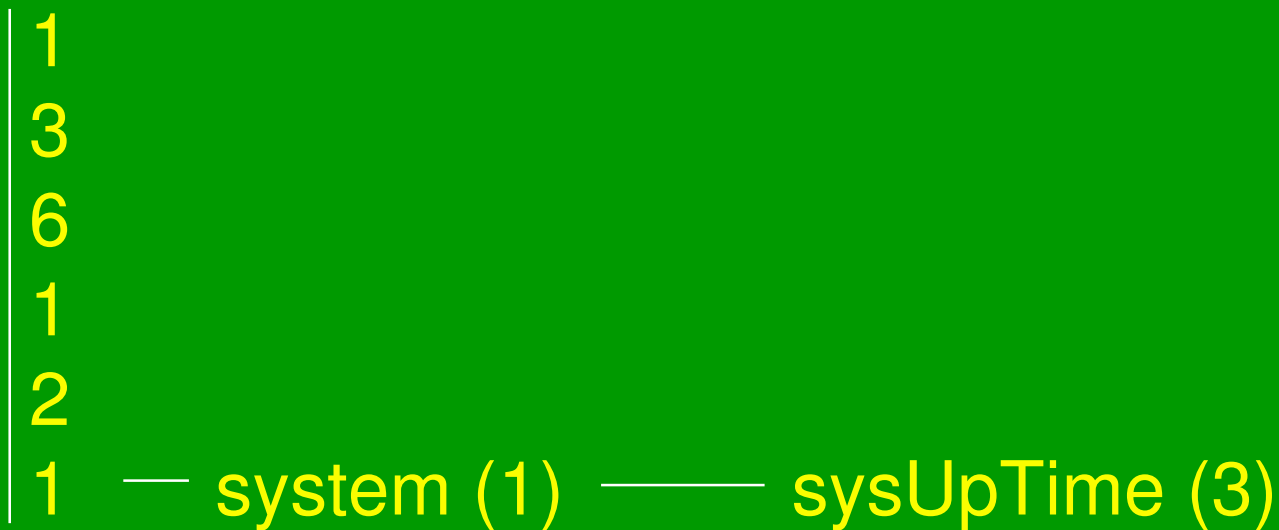
Le protocole SNMP:

- get (var [,var, ...]) requête de lecture de 'var' qui déclenche une réponse de l'agent SNMP concerné
- get-next (var [,var, ...]) retourne en plus le nom de la variable suivante
- set (var,val, [, var, val, ...]) modifie la valeur de la variable
- trap (code) code envoyé à la station en cas d'événement extraordinaire

Object Identifier - OI



Object Identifier : exemple



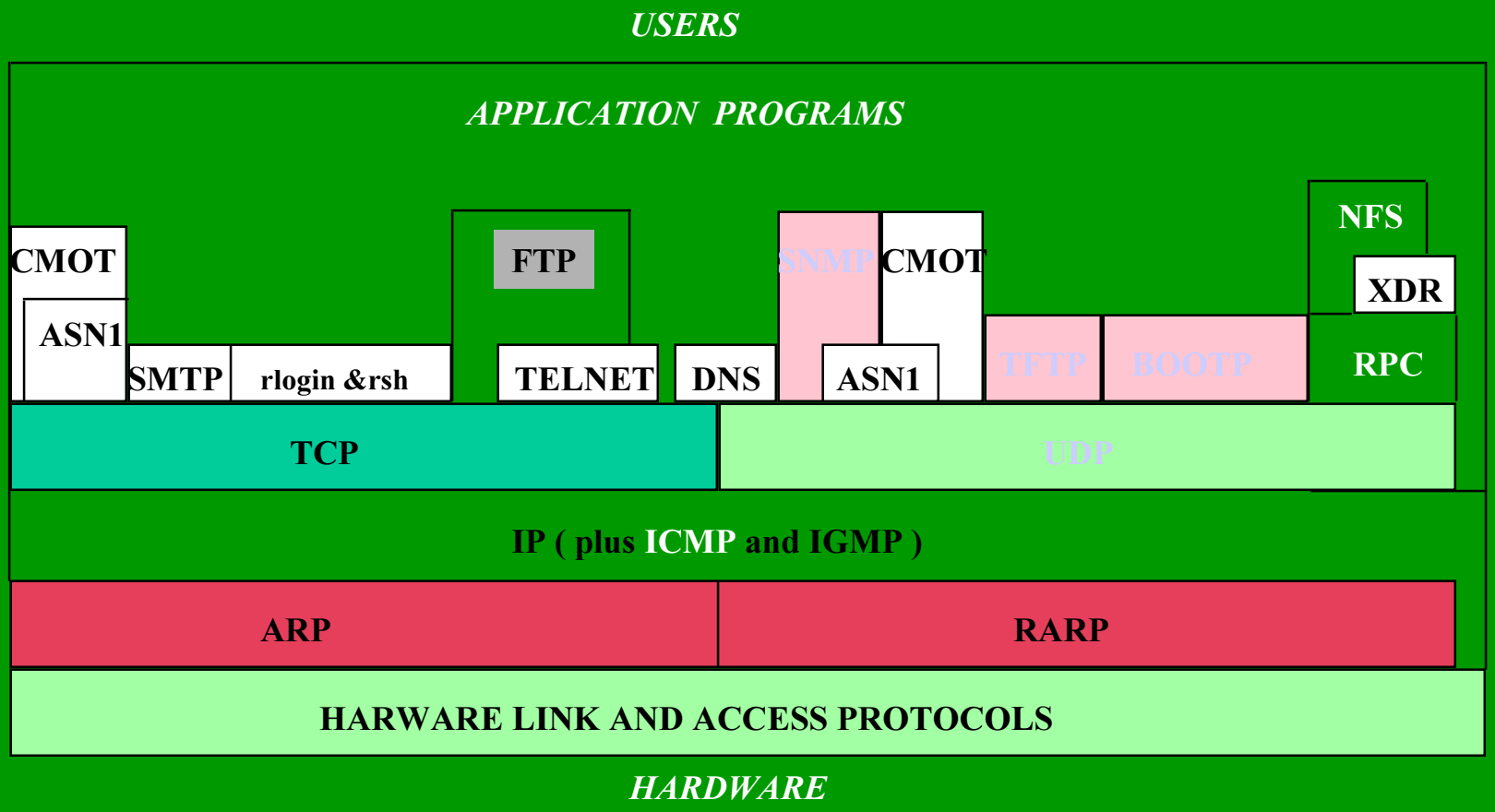
1.3.6.1.2.1.1.3

Temps en 1/100 s depuis le démarrage du système

MIB
Management Information Base

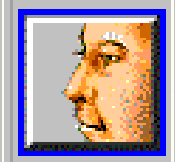
- La MIB est l'ensemble des variables permettant de définir l'état d'un noeud
- Composée:
  D'une partie standard, commune à tous les noeuds
  D'une partie optionnelle permettant d'exprimer la spécificité d'un noeud

Interdépendance des protocoles de TCP/IP

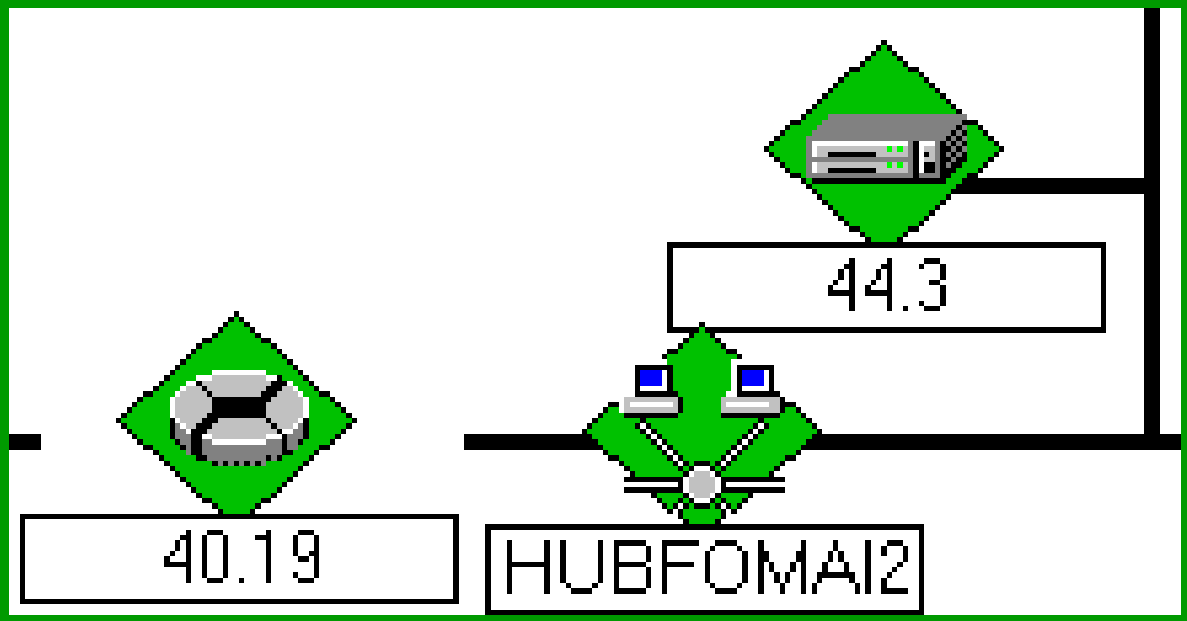


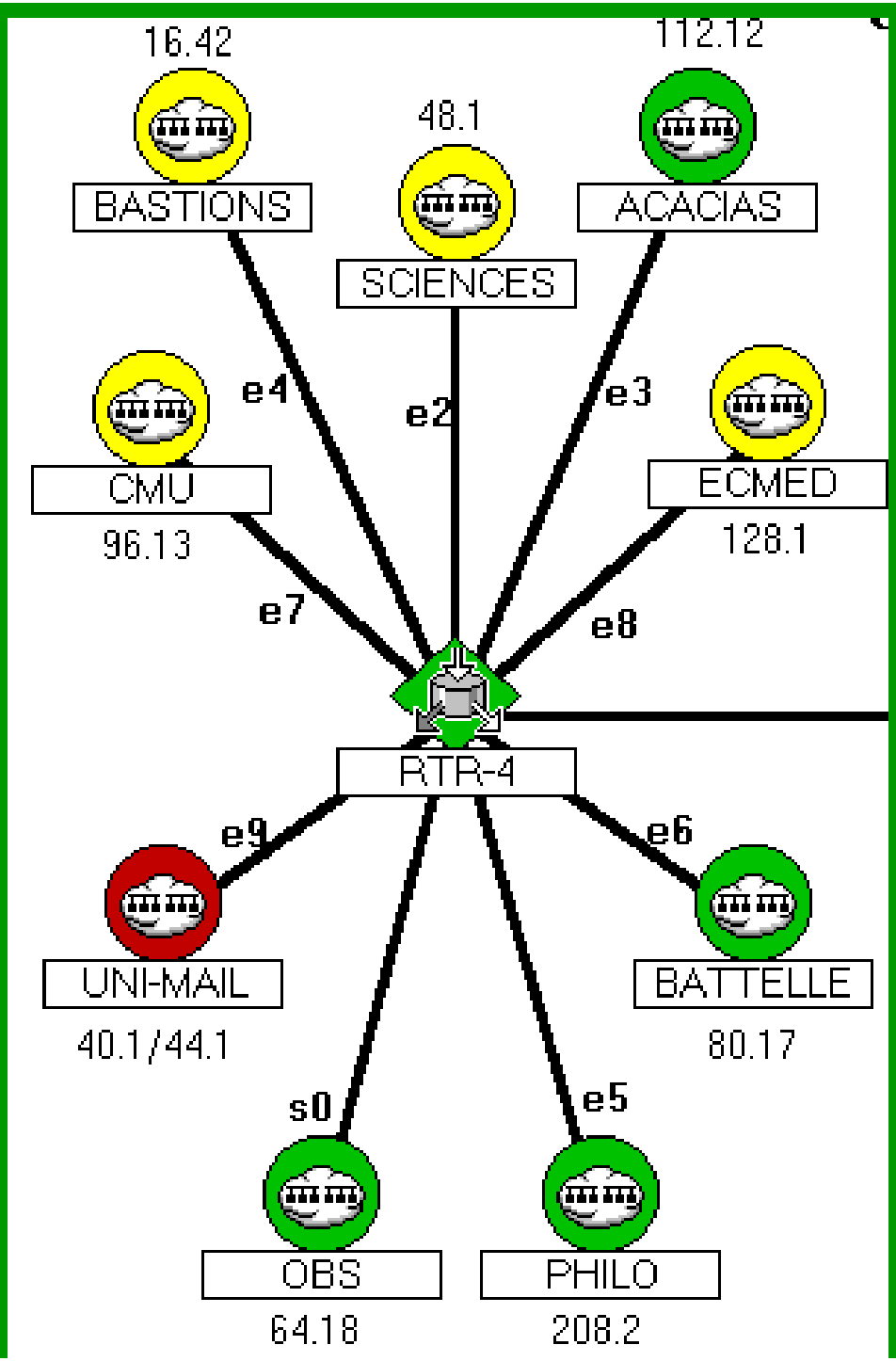
"WebManage"

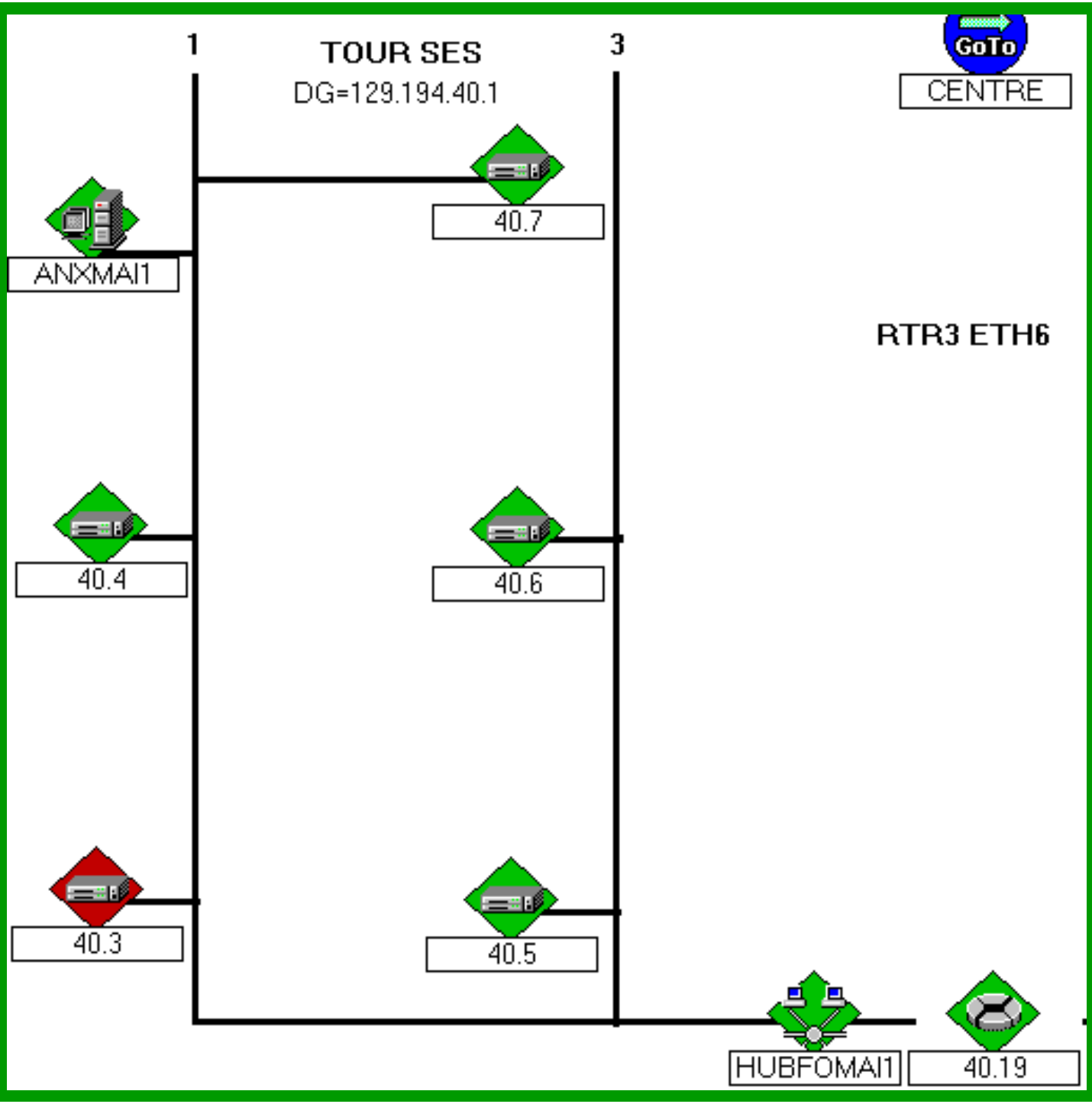
TribeLink	Name: TL8unige1 System: 2.1.3b1 Uptime: 2d, 2:03:04 IP addr: 129.194.16.18

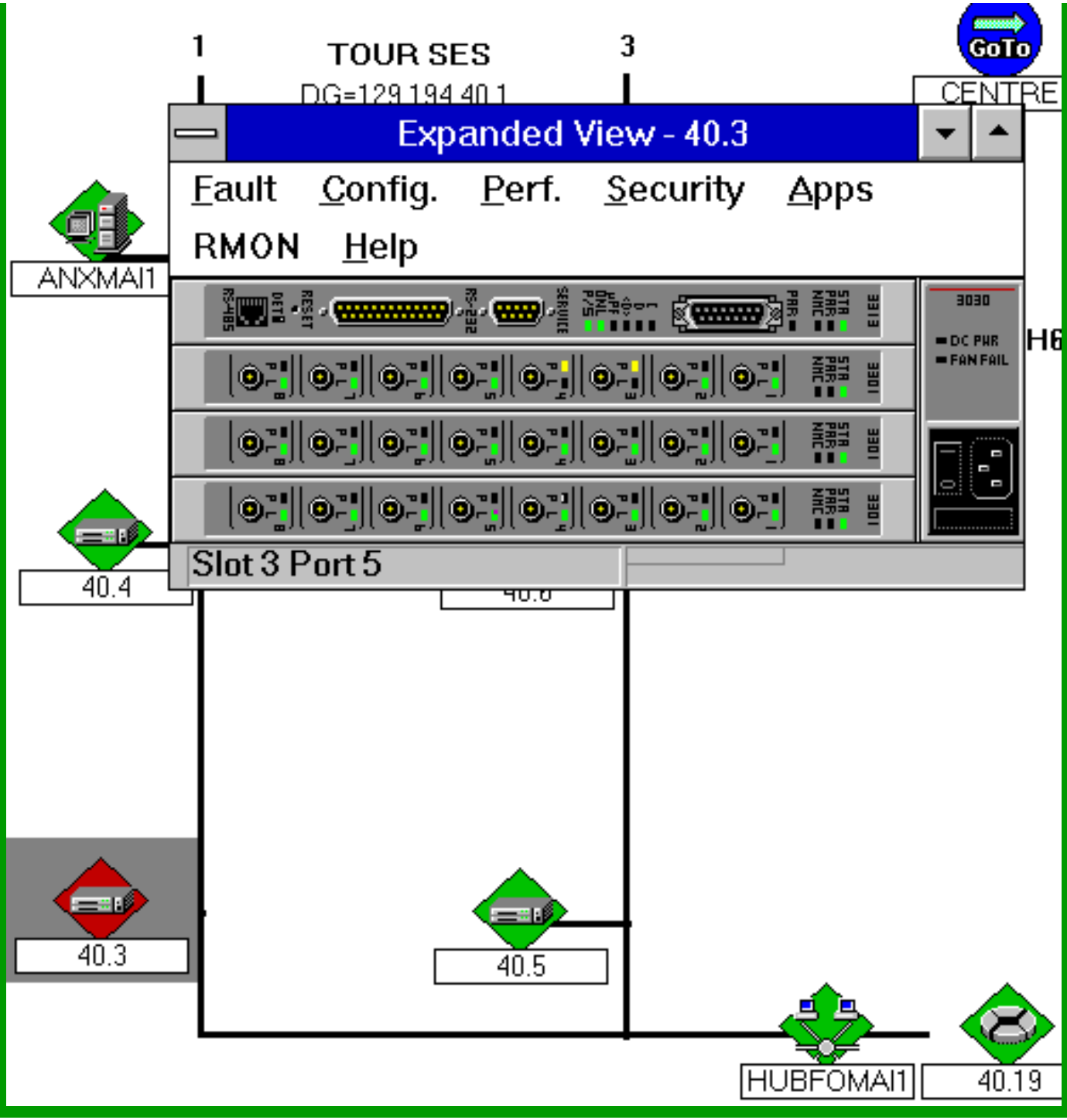
Port	Port Info	Acct	Account Info
1	Recv: 1958 packets, 137842 bytes Xmit: 1391 packets, 434190 bytes Errs: 0 frame, 0 parity, 0 overrun		Name: rappaz IP/PPP: 129.194.16.93 AT/PPP: disabled Connected: 0d, 0:12:41
2	Recv: 174 packets, 13655 bytes Xmit: 222 packets, 95671 bytes Errs: 0 frame, 0 parity, 0 overrun		Name: mizrahi IP/PPP: 129.194.16.94 AT/PPP: 16.2 Connected: 0d, 0:02:00
3	Recv: 0 packets, 18 bytes Xmit: 0 packets, 36 bytes Errs: 0 frame, 0 parity, 0 overrun	None	
4	Recv: 0 packets, 18 bytes Xmit: 0 packets, 36 bytes Errs: 0 frame, 0 parity, 0 overrun	None	

Représentation par icône




16.42
BASTIONS
48.1
SCIENCES
112.12
ACACIAS
CMU
96.13
ECMED
128.1
e4
e2
e3
e7
e8
RTR-4
e9
e6
UNI-MAIL
40.1/44.1
BATTELLE
80.17
s0
e5
OBS
64.18
PHILO
208.2


1
TOUR SES
DG=129.194.40.1
3
GoTo
CENTRE
40.7
ANXMAI1
RTR3 ETH6
40.4
40.6
40.3
40.5
HUBFOMAI1
40.19


1
TOUR SES
DG=129.194.40.1
3
GoTo
CENTRE
Expanded View - 40.3
Fault
Config.
Perf.
Security
Apps
RMON
Help
ANXMAI1
3030
DC PWR
FAN FAIL
H6
40.4
Slot 3 Port 5
40.3
40.5
HUBFOMAI1
40.19

Set Thresholds

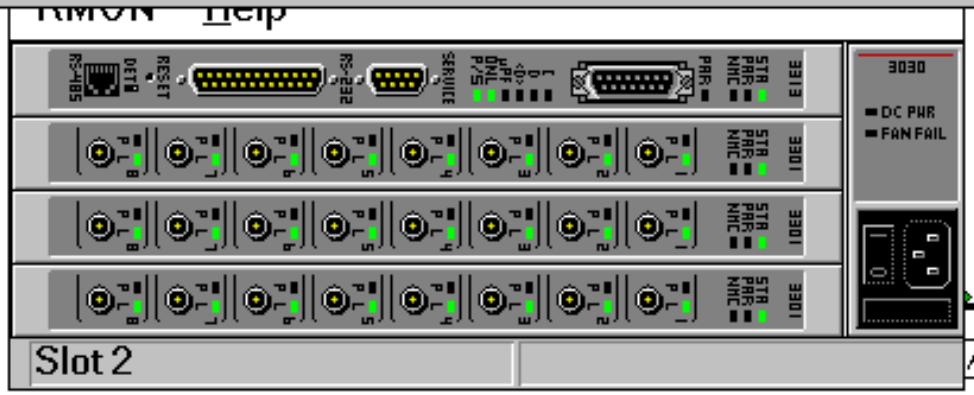
Concentrator 129.194.40.6 threshold settings

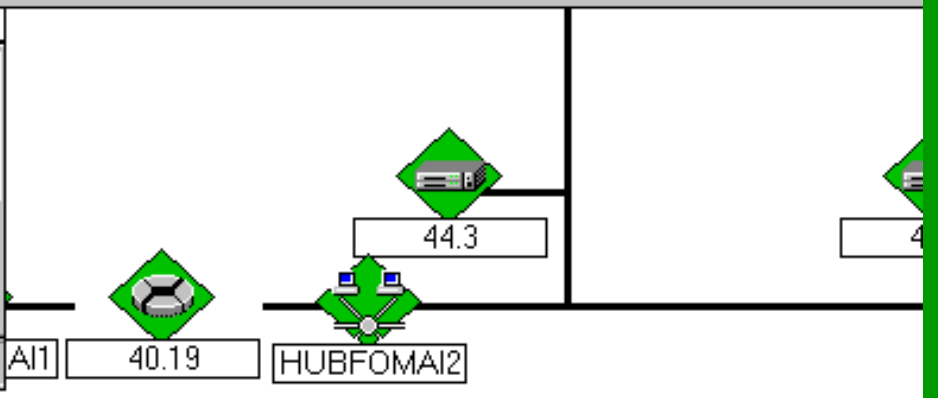
Target	Type	Condition	Value	Action	Duration
concentrator	bad packets	>units	20	warning	20

Add | Replace | Delete | Delete All

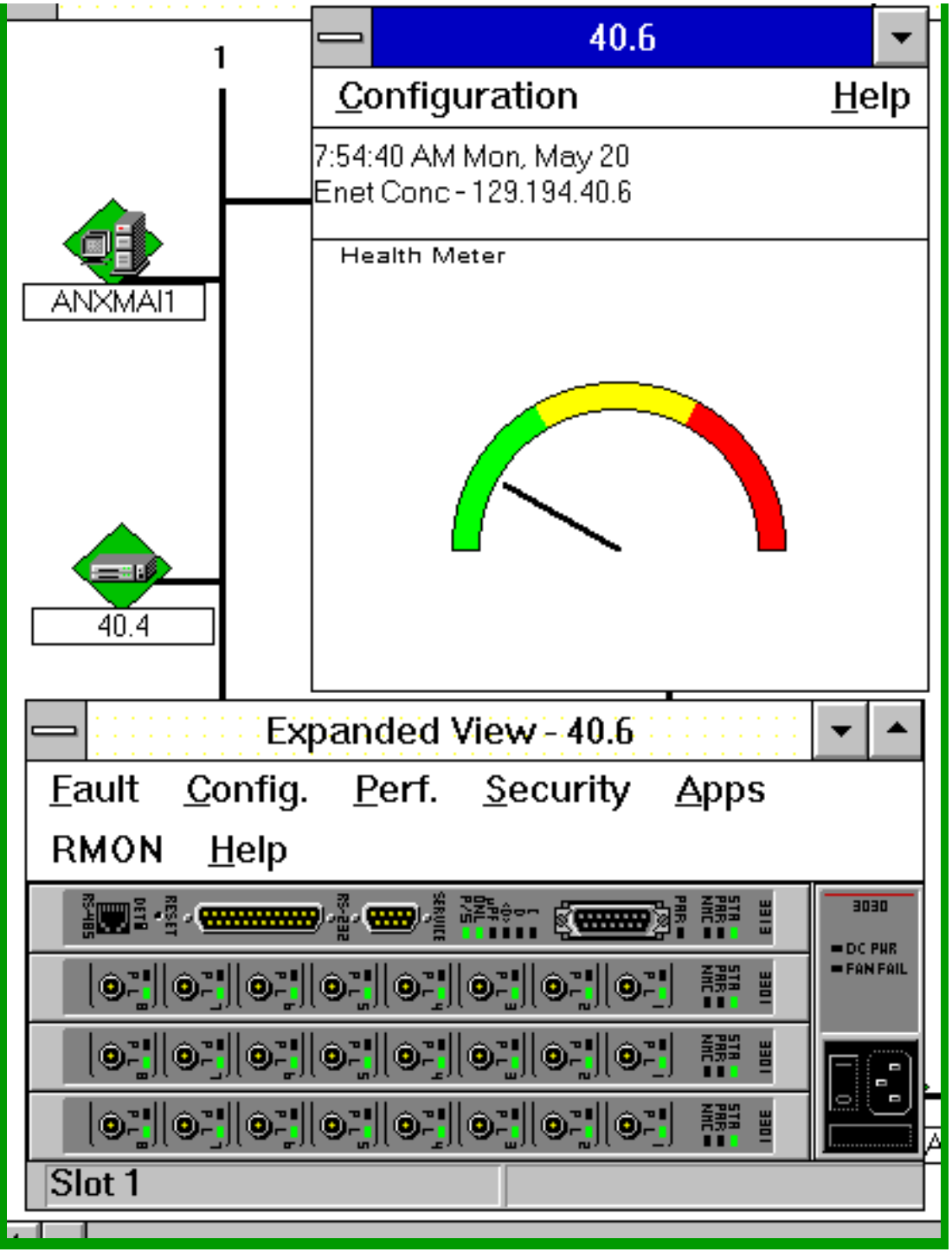
	Target	Type	Condition	Value	Action	Duration
+	concentrator	bad packets	>units	20	warning	

OK | Cancel

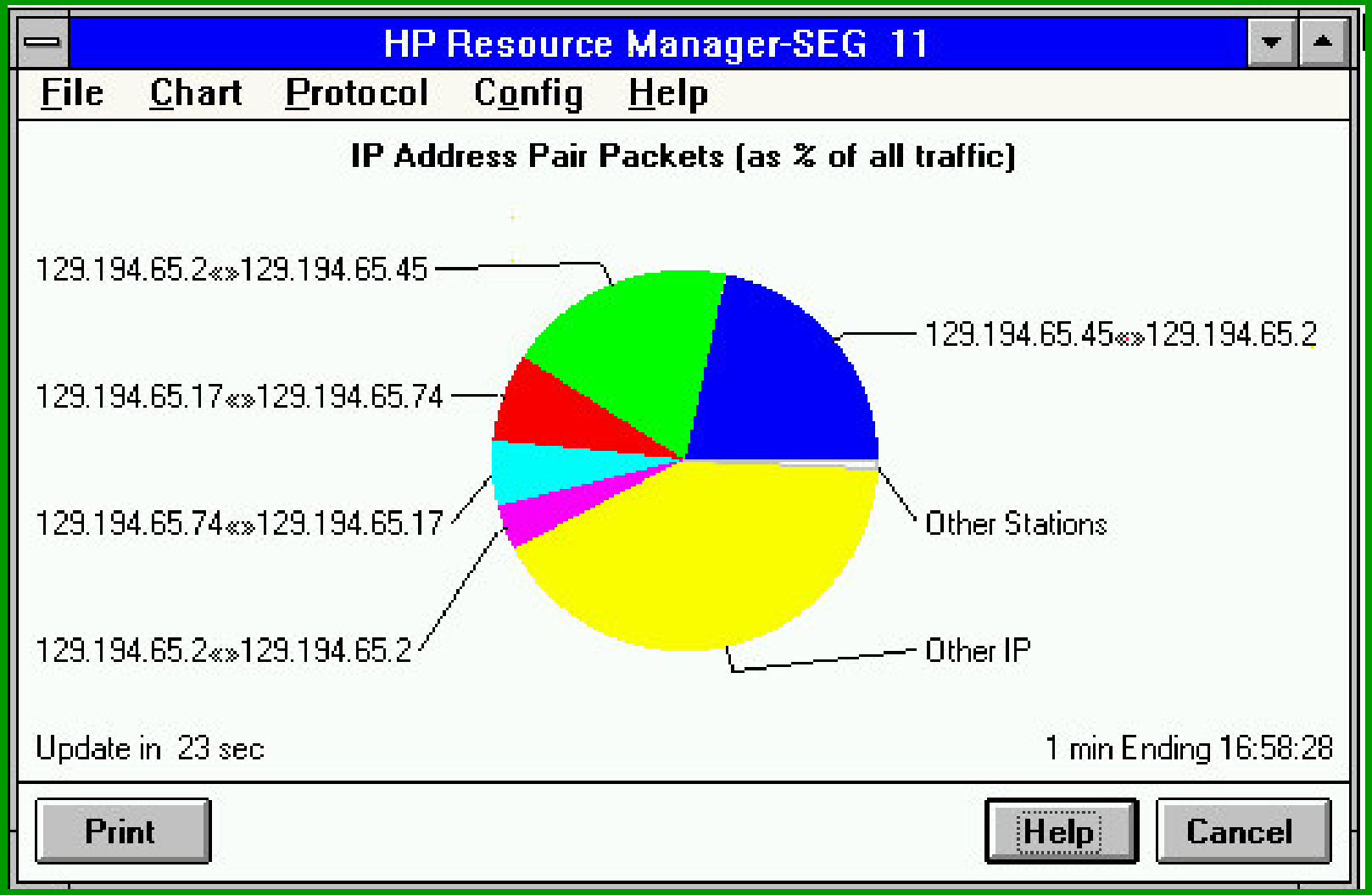




"Health Meter"

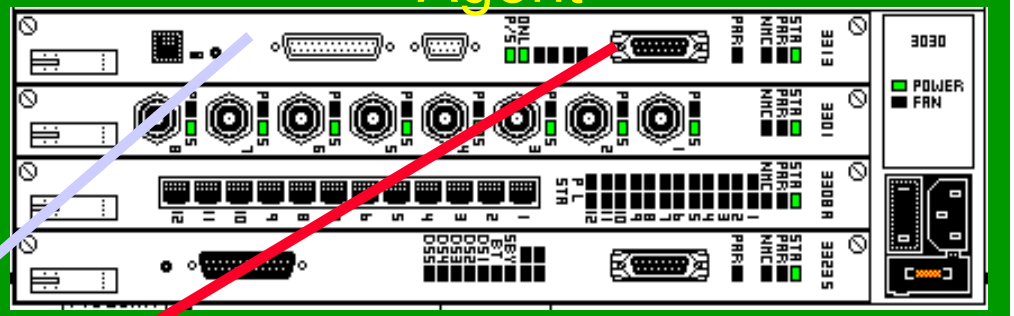


HP Resource Manager



Téléchargement de la configuration

Agent



TFTP ou BOOTP

Dowload

Station de management

RMON versus SMON

Analyse par échantillonnage!

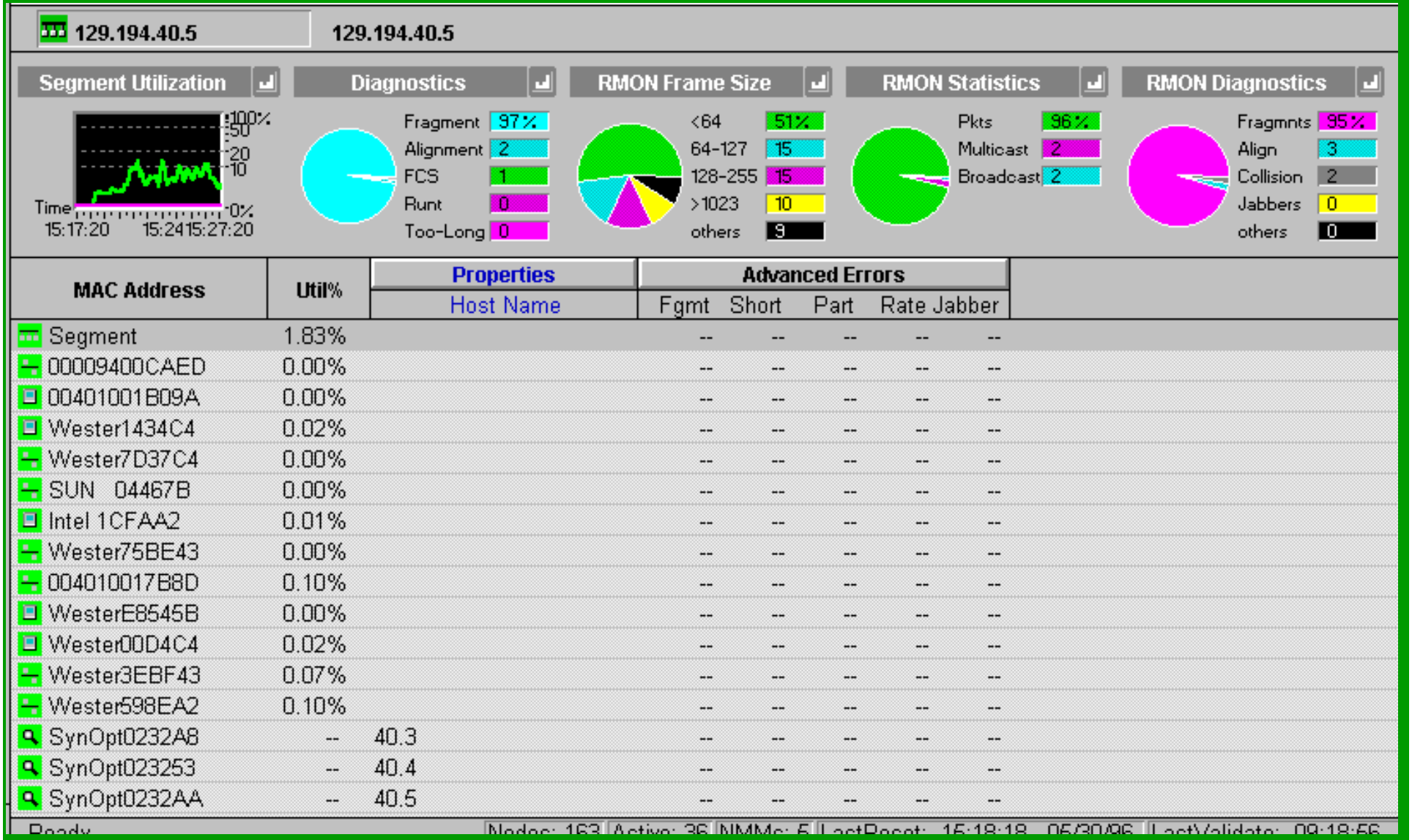
RMON

- Sonde connectée au réseau permettant d'analyser les paquets transmis sur des segments de réseaux
- Niveau 2

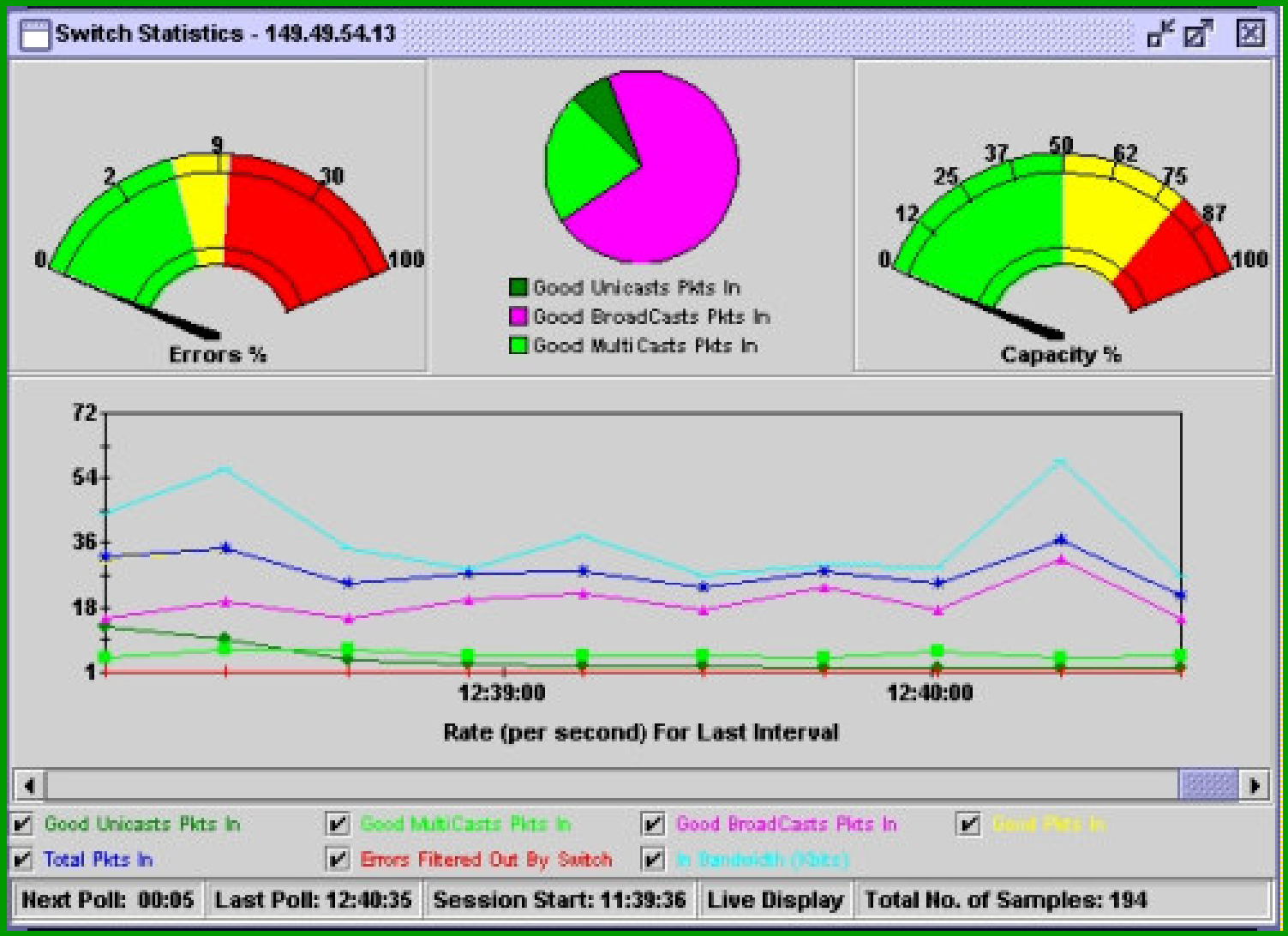
SMON

- Sonde embarquée sur les switchs pour analyser les différents segments
- Niveaux 2 et 3
- Analyse d'historique

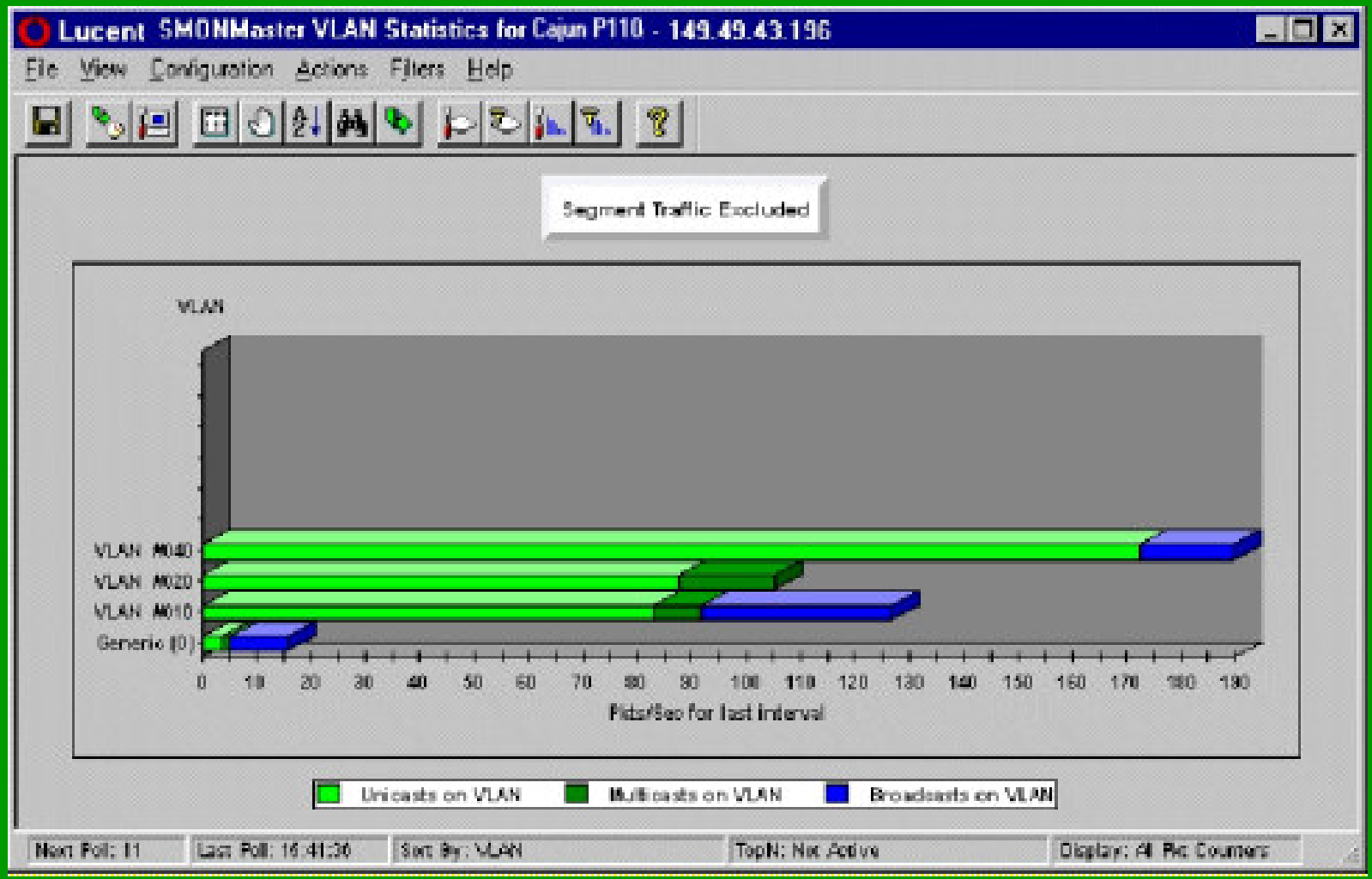
RMON


129.194.40.5
129.194.40.5
Segment Utilization
Diagnostics
RMON Frame Size
RMON Statistics
RMON Diagnostics
100%
50
20
10
0%
Time
15:17:20
15:24
15:27:20
Fragment 97%
Alignment 2
FCS 1
Runt 0
Too-Long 0
<64 51%
64-127 15
128-255 15
>1023 10
others 9
Pkts 96%
Multicast 2
Broadcast 2
Fragmnts 95%
Align 3
Collision 2
Jabbers 0
others 0
MAC Address
Util%
Properties
Host Name
Advanced Errors
Fgmt Short Part Rate Jabber
Segment 1.83%
00009400CAED 0.00%
00401001B09A 0.00%
Wester1434C4 0.02%
Wester7D37C4 0.00%
SUN 04467B 0.00%
Intel 1CFAA2 0.01%
Wester75BE43 0.00%
004010017B8D 0.10%
WesterE8545B 0.00%
Wester00D4C4 0.02%
Wester3EBF43 0.07%
Wester598EA2 0.10%
SynOpt0232A8 -- 40.3
SynOpt023253 -- 40.4
SynOpt0232AA -- 40.5
Ready

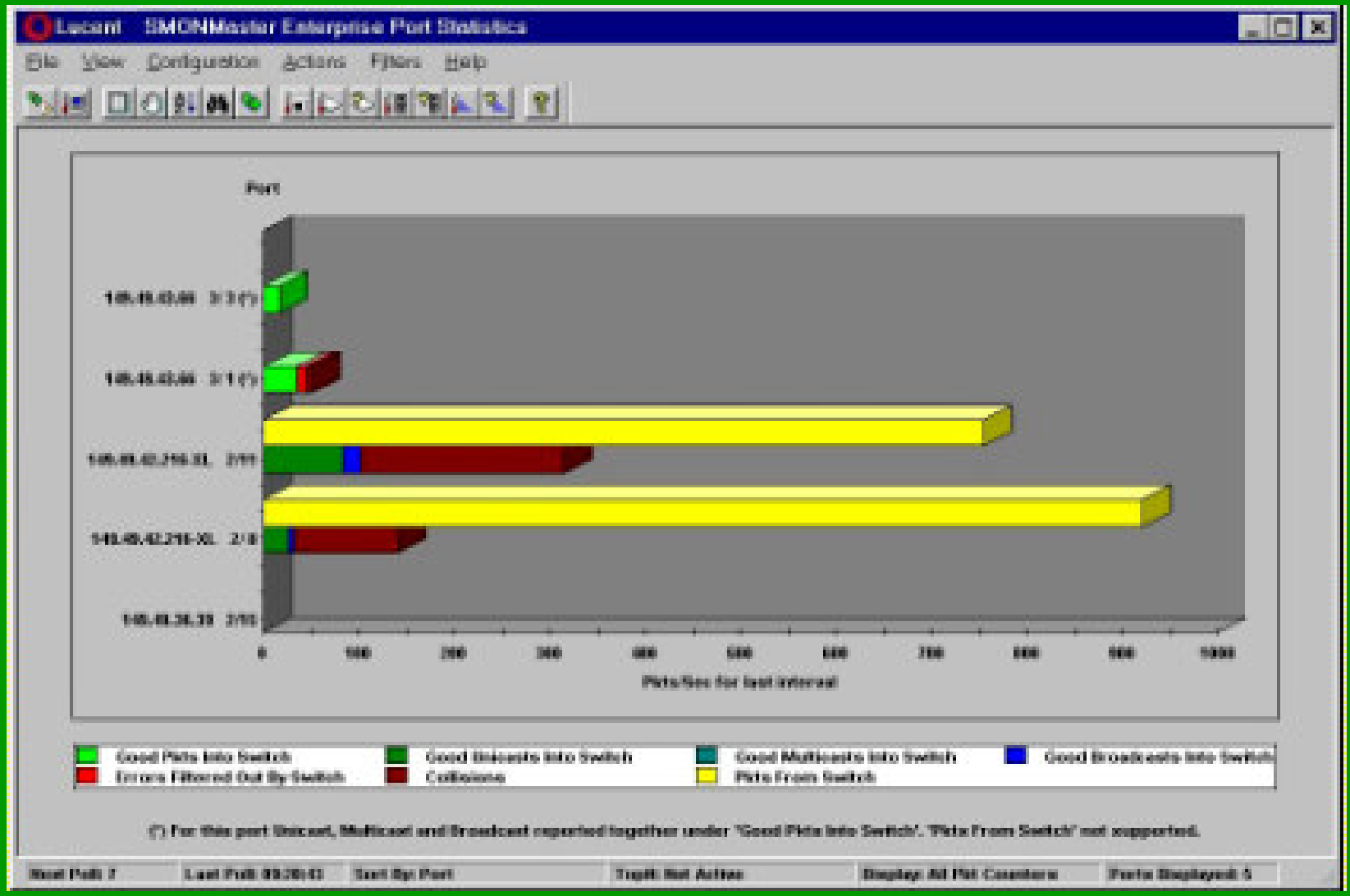
SMON - Switch Monitoring



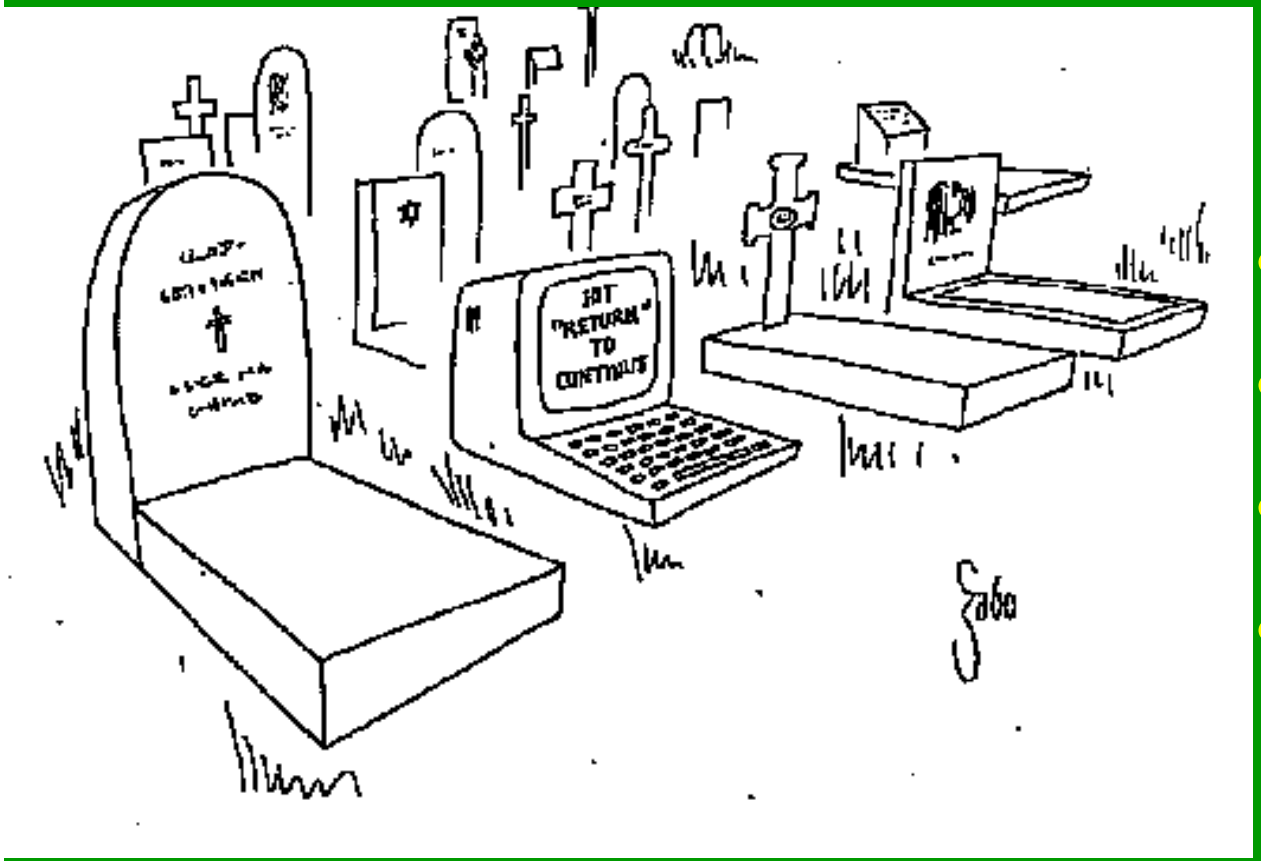
SMON - VLAN Monitoring



SMON - Ports statistics



Les "fossoyeurs" du réseau



- Backups
- Multimédia
- Les bricoleurs
- Les installateurs de programmes