

SwiNOG-11

**Cable Management and
Provisioning Platform (KIM)**

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Introduction

Cable Management & Provisioning Platform

Problems

- ⇒ Different tools
- ⇒ Multiple user databases
- ⇒ Lack of consistency

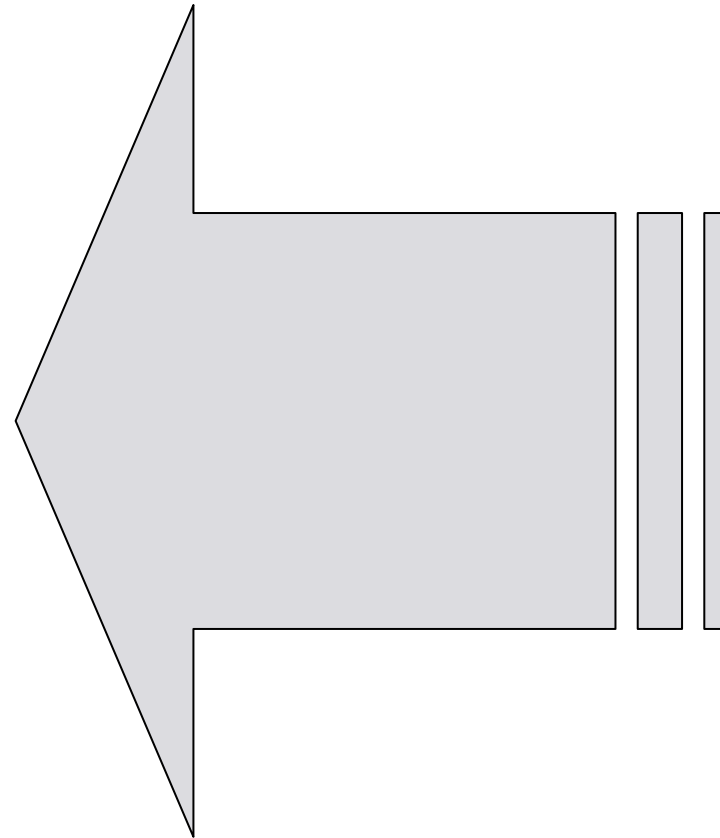
Cable Management & Provisioning Platform

One system to fit **all** our needs

: -)

What do we need ?

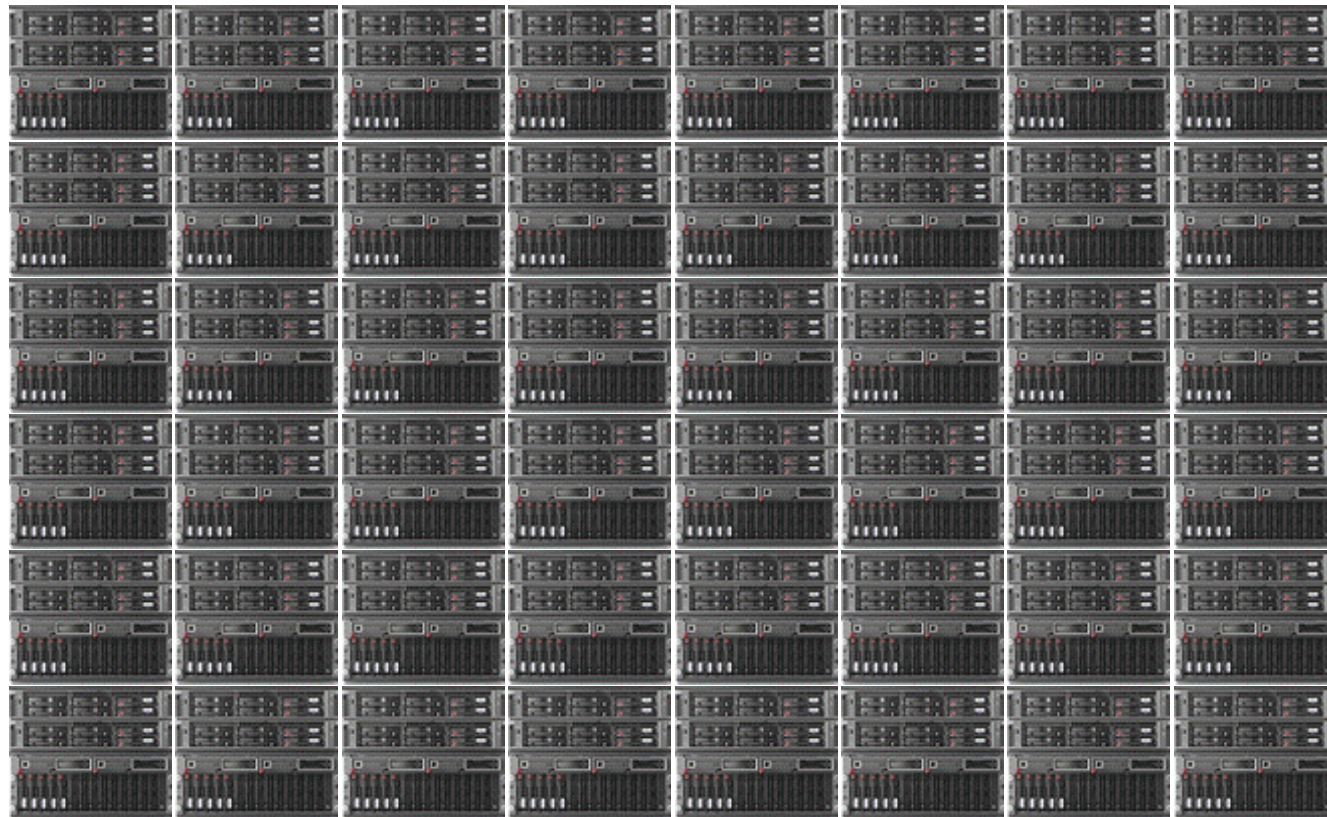
- **Provisioning**
- **Management**
- **Monitoring**
- **Billing**
- **Accounting**
- **User WebUI**
- **Admin WebUI**
- **Partner WebUI**
- **Abuse Management**



Overview

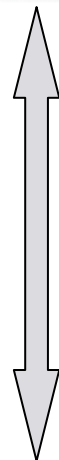
KIM (Kabel Internet Management) overview

We need servers A lot of servers

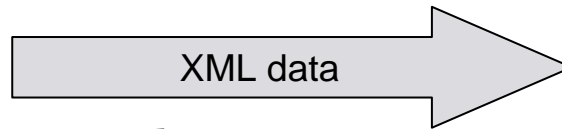


KIM (Kabel Internet Management) overview

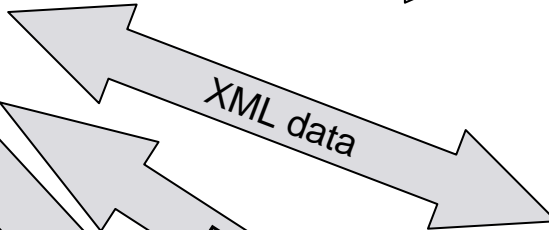
Central database
Applications servers



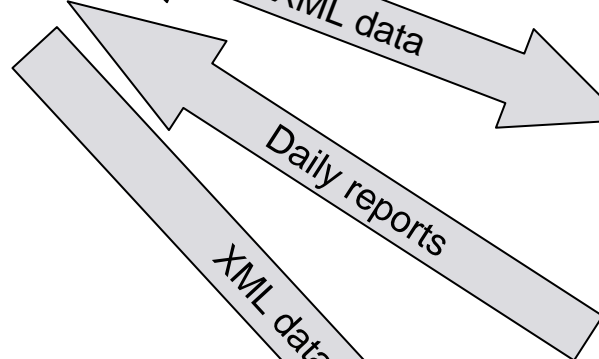
WebUI



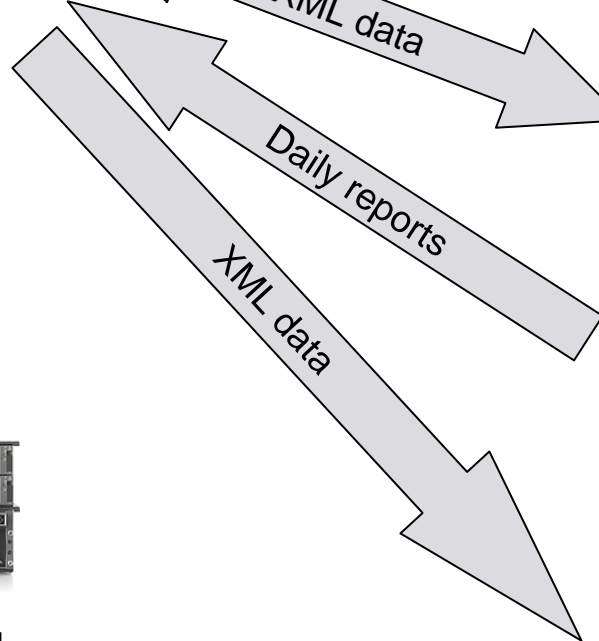
Provisioning DHCP/TFTP



Polling / Query Engine



Automatic Abuse Detector
Viruses / Trojans



Provisioning 2 (Dial / PPPoE)



Provisioning

DHCP Server

- ⇒ Running on two servers
- ⇒ Self written
- ⇒ XML over HTTPS Provisioned
- ⇒ Independent from any external database
 - ⇒ Local database in memory (and copy on disk)
- ⇒ Fully redundant (and load-balanced)
 - ⇒ Real time announcement of leases to each other
- ⇒ Security and features
 - ⇒ Workaround of certain client protocol mistakes
 - ⇒ Support of DHCP_VERIFY (Cisco Feature)
 - ⇒ User based fixed IP forced with Cable modem
 - ⇒ Enforcement of MAX-CPE
 - ⇒ Customization, provisioning of particular devices (VoIP box, Radio, etc..)

TFTP Server

- ⇒ Running on two servers
- ⇒ Self written
- ⇒ XML over HTTPS Provisioned
- ⇒ Independent from any external database
 - ⇒ Local database in memory (and copy on disk)
- ⇒ Fully redundant (and load-balanced)
- ⇒ Security and features
 - ⇒ “on the fly” generation of DOCSIS configuration file
 - ⇒ Mac address / IP verification
 - ⇒ Customization, provisioning of particular devices (VoIP box, Radio, etc..)

Radius (Dial / PPPoE)

- ⇒ FreeRadius
- ⇒ XML over HTTPS Provisioned
- ⇒ Independent from any external database
 - ⇒ Local MySQL database
- ⇒ PPPoE
 - ⇒ Fixed IP / IP ranges routing (keep mobility / ease of migrations)
- ⇒ Dial
 - ⇒ Backup link (Fixed IP / IP ranges routing)
 - ⇒ Stay online at your “Chalet” ;)

Polling

Recurrent Polling

- ⇒ Self written
- ⇒ XML over HTTPS Provisioned
- ⇒ Independent from any external database
 - ⇒ Local MySQL database
- ⇒ Retrieval of Broadband Access Routers counters (5min interval)
 - ⇒ traffic (packets – bytes)
 - ⇒ power levels
 - ⇒ signal to noise
 - ⇒ errors
 - ⇒ etc ...
- ⇒ Retrieval of Cable Modem values (min 24 hours)
 - ⇒ Modem capabilities

Realtime/On-demand queries

- ⇒ Self written
- ⇒ XML over HTTPS Provisioned
- ⇒ Independent from any external database
 - ⇒ Local MySQL database
- ⇒ Cisco & Terayon commands
 - ⇒ “show cable modem xxxx.xxxx.xxxx qos”
 - ⇒ “show cable modem xxxx.xxxx.xxxx phy”
 - ⇒ “show arp esn xx:xx:xx:xx:xx:xx”
 - ⇒ etc ..
- ⇒ Modem capabilities
 - ⇒ Validation of DOCSIS certificates with openssl
 - ⇒ Control of software version
- ⇒ Cable modem software upgrade

Abuse Detection

„default route sniffer“

- ⇒ Sniffing of “default route”
 - ⇒ source IP, destination port, protocol and port
- ⇒ Daily report of top 10 users
- ⇒ Sample report:

⇒ Global

Packets	IP Address
264367 (18.58%)	97.88.121.84
117654 (8.27%)	97.88.97.66
27742 (1.95%)	97.88.96.12

⇒ Per user

First packet: 2005-10-16 17:03:27
Last packet: 2005-10-16 20:49:43

Packets	Protocol/Port (description)
27712 (99.78%)	udp/137 (netbios-ns)
30 (0.11%)	icmp

Screenshots!! ;-)

„Powersearch“

QuickLine > QuickLine Management Console 2005 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <https://my.quickline.com/main.aspx?cntrl=lan/cntrlPowerSearch> Go Links >>

LAN Programme Tools Hilfe lan.pg 17.10.2005 Version 2.1.0

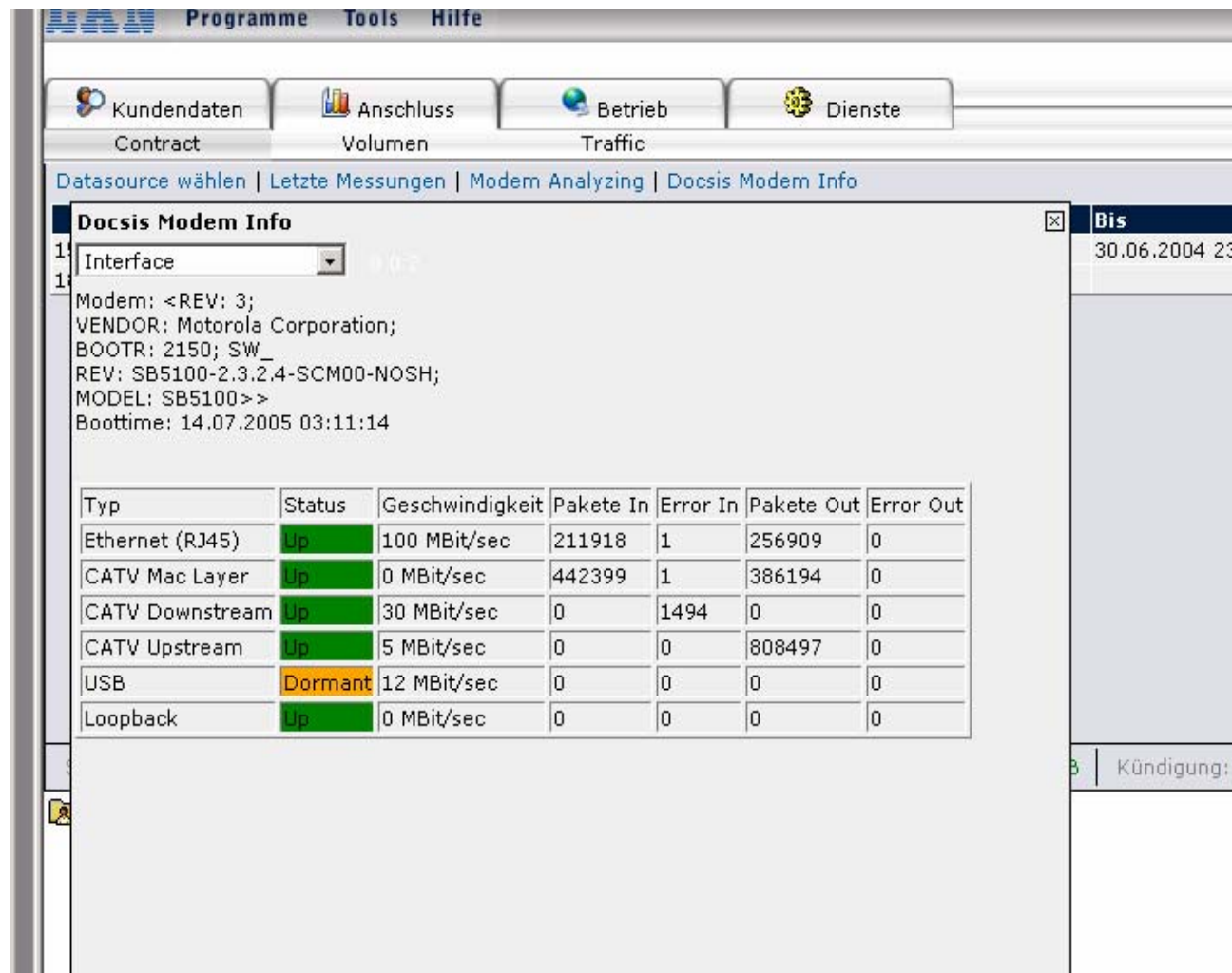
QMC Power Search

Email Search	Phone Search	MAC Search	IP Search	Log Search
Email Adresse <input type="text"/>	Beliebige Nummer <input type="text"/>	MAC Adresse <input type="text"/>	IP <input type="text" value="55.12"/>	Suchbegriff <input type="text"/>
Domain <input type="text" value=""/>			Datum <input type="text" value="17.10.2005"/> <input type="text" value="15:32"/>	
<input type="button" value="Suchen"/>	<input type="button" value="Suchen"/>	<input type="button" value="Suchen"/>	<input type="button" value="Suchen"/>	<input type="button" value="Suchen"/>

Ziehen Sie die Spalte, nach welcher Sie gruppieren möchten, hier hin!

Kunden Nr.	Partner	Partner #	Name	Vorname	Strasse	Nr.	PLZ	Ort	Node	Node
1952	IB Langenthal	14251		Simon		26	4900	Langenthal	N4/	34

„Cable Modem Interfaces“



The screenshot shows a web-based network management interface. At the top, there are navigation tabs: 'Kundendaten' (Contract), 'Anschluss' (Volumen), 'Betrieb' (Traffic), and 'Dienste'. Below these, there are links for 'Datasource wählen', 'Letzte Messungen', 'Modem Analyzing', and 'Docsis Modem Info'. The main content area is titled 'Docsis Modem Info' and contains the following text:

```

Interface
Modem: <REV: 3;
VENDOR: Motorola Corporation;
BOOTR: 2150; SW_
REV: SB5100-2.3.2.4-SCM00-NOSH;
MODEL: SB5100>>
Boottime: 14.07.2005 03:11:14
    
```

Below the text is a table with the following data:

Typ	Status	Geschwindigkeit	Pakete In	Error In	Pakete Out	Error Out
Ethernet (RJ45)	Up	100 MBit/sec	211918	1	256909	0
CATV Mac Layer	Up	0 MBit/sec	442399	1	386194	0
CATV Downstream	Up	30 MBit/sec	0	1494	0	0
CATV Upstream	Up	5 MBit/sec	0	0	808497	0
USB	Dormant	12 MBit/sec	0	0	0	0
Loopback	Up	0 MBit/sec	0	0	0	0

On the right side of the interface, there is a 'Bis' field with the value '30.06.2004 23:'. At the bottom right, there is a 'Kündigung: M' field.

„Comparing users on the same HF node“

LAN Programme Tools Hilfe lan.pg 17.10.2005 Version 2.1.0

Kundendaten Anschluss Betrieb Dienste
Contract Volumen Traffic

Net Builder Auswertung

Die Tabelle zeigt alle Kunden am gewählten Strang im NetBuilder mit ihren letzten Messwerten. Haben Sie die Option "+ Graph" mit einem Wert ausgewählt, wird ein Graph mit den Werten der letzten 30 Stunden in einer separaten Spalte dargestellt.

Name	Vorname	Ort	Node	Graph	HE SNR	HE TX	HE RX	CM RX	CM SNR	CM TX
	Hansruedi	Aedermannsdorf	V8_... 139 / 14	 Messpunkte: 360	30.8 dB	-	-0.5 dBmV	-3.2 dBmV	34.0 dB	45.0 dBmV
	Bruno	Aedermannsdorf	V8_... 139 / 14	 Messpunkte: 360	30.7 dB	-	-0.2 dBmV	-3.0 dBmV	35.5 dB	52.3 dBmV
	Bruno	Aedermannsdorf	V8_... 139 / 14	 Messpunkte: 360	31.1 dB	-	0.2 dBmV	-6.0 dBmV	35.7 dB	52.3 dBmV
	Werner	Aedermannsdorf	V8_... 139 / 14		-	-	-	-	-	-

„Command line output“

Address https://my.quickline.com/main.aspx?cntrl=lan/cntrlUserDetails_Details&intUserID=100000424

LAN Programme Tools Hilfe

Kundendaten Anschluss Betrieb Dienste
 Contract Volumen Traffic

[Dat source wählen](#) | [Letzte Messungen](#) | [Modem Analyzing](#) | [Docsis Modem Info](#)

Modem Analyzing [X] Bis

1: show cable modem verbose Aktualisieren 30.06.200

```

MAC Address           : 000e.5c05.87dc
IP Address            : 10.20.132.127
Prim Sid              : 292
Interface             : CS/0/U2
sysDescr              :
2150; SW_REV: SB5100-2.3.2.4-SCM00-NOSH; MODEL: SB5100>>
Upstream Power       : 46.00 dBmU (SNR = 30.83 dBmU)
Downstream Power     : 0.00 dBmU (SNR = 35.00 dBmU)
Timing Offset        : 3731
Initial Timing Offset : 3731
Received Power       : 0.00
MAC Version           : DOC1.1
QoS Provisioned Mode : DOC1.1
Enable DOCSIS2.0 Mode : y
Phy Operating Mode   : tdma
Capabilities          : (Frag=y, Concat=y, PHS=y, Priv=BP1+)
Sid/Said Limit       : (Max Us Sids=4, Max Ds Sids=15)
Optional Filtering Support : (802.1P=N, 802.1Q=N)
Transmit Equalizer Support : (Taps/Symbol= 1, Num of Taps= 24)
Number of CPE IPs    : 0(Max CPE IPs = 16)
CFG Max-CPE          : 2
Flaps                 : 96(Sep 20 13:30:47)
Errors                : 1 CRCs, 0 HCSeS
Stn Mtn Failures     : 0 aborts, 4 exhausted
Total US Flows       : 1(1 active)
Total DS Flows       : 1(1 active)
Total US Data        : 132658 packets, 15815743 bytes
Total US Throughput  : 0 bits/sec, 0 packets/sec
Total DS Data        : 158705 packets, 131735277 bytes
Total DS Throughput  : 0 bits/sec, 0 packets/sec
Active Classifiers   : 0 (Max = NO LIMIT)
DSR/DSX messages    : permit all
Total Time Online    : 27d0h
  
```

Kündigu

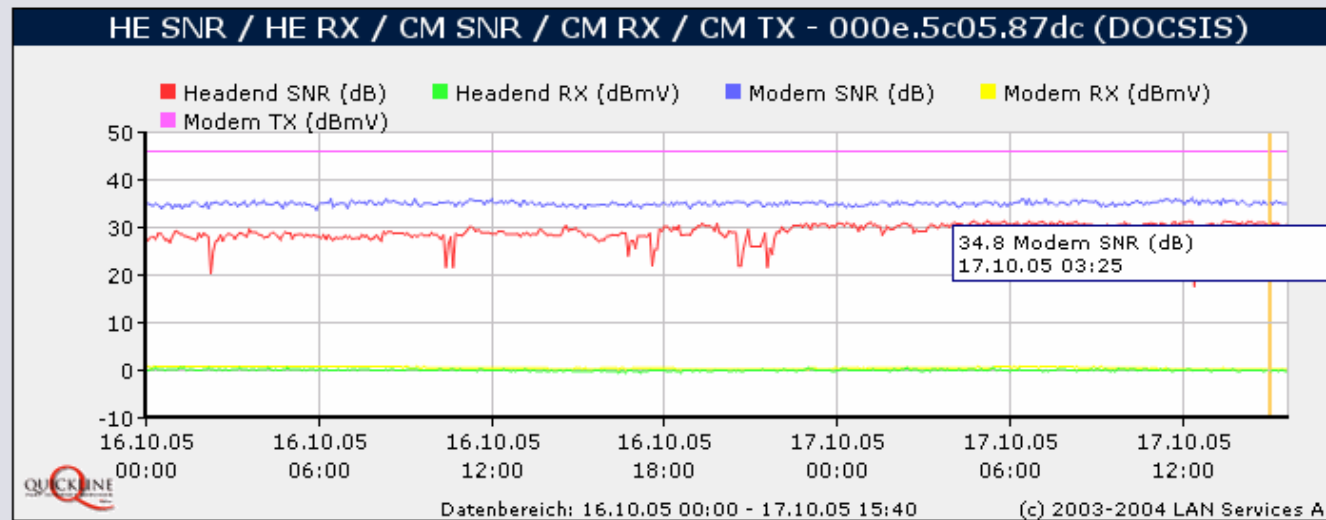
„Cable modem HF graphs“

Kundendaten | Anschluss | Betrieb | Dienste
Contract | Volumen | Traffic

Aktueller Contract

Abo: **300/100** Start: **01.07.2004** MAC: **000e.5c05.87dc (DOCSIS)** Modem **10.20** Verrechnen: Ja Nein
 IP:

[Datasource wählen](#) | [Letzte Messungen](#) | [Modem Analyzing](#) | [Docsis Modem Info](#)



	Modem	Von	Bis	Abo
15510	00:0e:5c:05:87:dc	09.02.2004 16:19:07	30.06.2004 23:59:59	Light GGS
18292	00:0e:5c:05:87:dc	01.07.2004 00:00:00		300/100

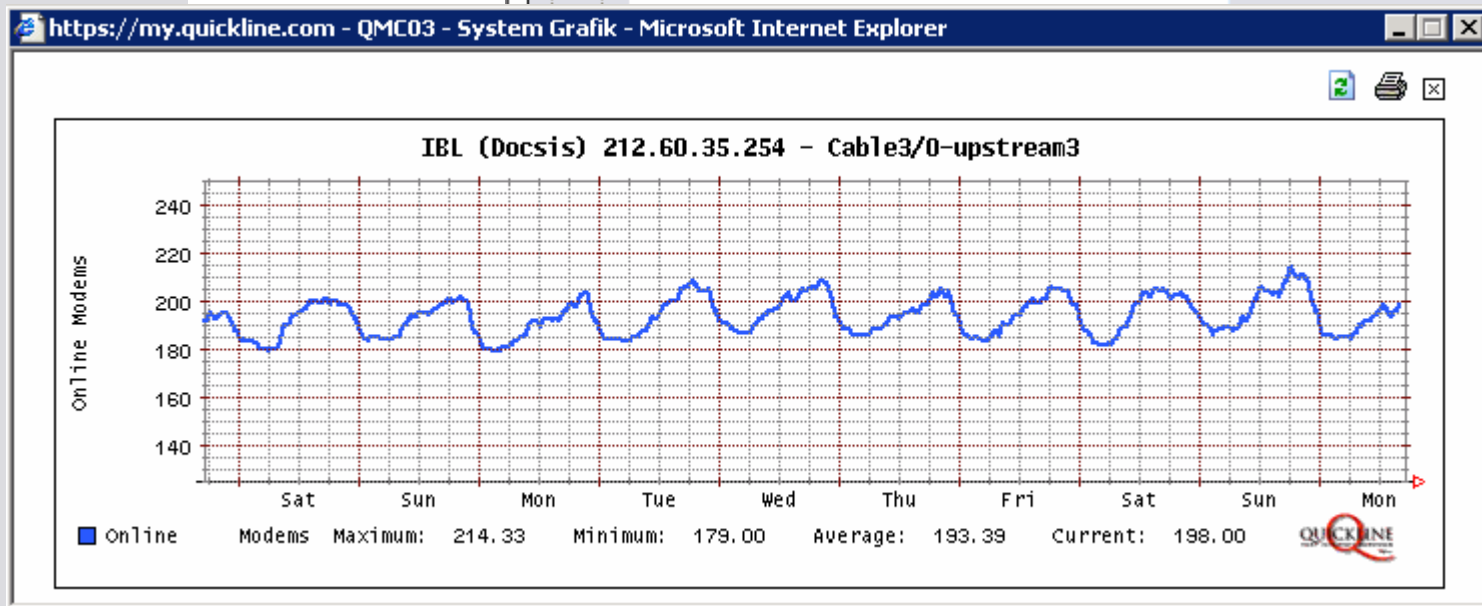
„Global Statistics“

Programme Tools Hilfe

Statistiken

- + 8 GBB Toffen (Terayon)
- 4 GGS Kontroller 1 (Docsis)

Typ	Docsis
Letzte Aktualisierung	0 Stunde(n), 10 Minute(n), 50 Sekunde(n)
System Uptime	10 Woche(n), 6 Tag(e), 11 Stunde(n)
System CPU	22 % *
System Temperature	26 C *
Modem Configured / Online	1732 / 1414 modems *



Ready.

Ready.

Questions !?

<http://www.quickline.com>

<http://www.lan.ch>