Daphne's Operations Support System : Amber

The Amber Operations Support System (OSS) is a powerful and reliable system management solution that allows operators to easily manage industry-standard DOCSIS systems. Perfectly suited for all SNMP products, Amber is a low-cost, web-based application that excels in performance and flexibility.

Designed to be highly scaleable, a single Amber server can simultaneously manage multiple CMTS, thousands of cable modems, and an unlimited number of subscriber records stored in the database.

This leads to a highly adaptable, cost-effective solution that can accommodate current and future cable operator needs.
Amber implements client-server architecture. The Amber server is based on Linux, and the Amber client features an easy-to-use web application providing cable operators access to cable modems and CMTS units.

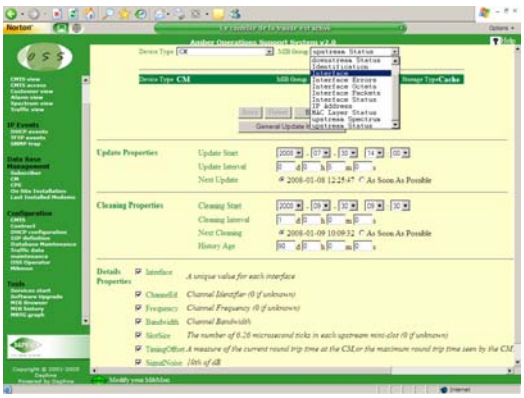
Daphne Amber Capabilities

The Amber management tools and software components features a full range of capabilities including:

- ***Complete web application environment*** *:*
  - *Database connection (MySQL, Oracle)*
  - *User authentication and session management*
  - *OSS users privileges*
  - *Dynamic page flow control and variables management*
  - *Powered by Daphne Application Server (DAS) &PHP*

- **Complete configuration management software which provides full *control* for :**
  - *Daphne's entire family of Data Over Cable systems (Topaz and Jade)*
  - *any DOCSIS-compliant system (CMs and CMTSs)*
  - *Any other SNMP system*

- **Complete DOCSIS *servers* range :**
  - *DHCP server*
  - *TOD server*
  - *TFTP server*
  - *SYSLOG server*
  - *SNMPTRAP server*
  - *SNMP Manager*
  - *MRT Manager*
  - *MIB Monitor*



- **Complete cable operators business support**:
  - *Subscriber Provisioning*
  - *Contract Management: Amber provides cable operators a comprehensive control over various bandwidth assignments. It permits choosing from several profiles for each business or residential subscriber.*
  - *Modems Stock Management*
  - *Configuration File Builder*
  - *On site installation support*
  - *Modem software upgrade tools*

- **Network Monitoring & alarm system**
  - Spectrum view
  - *Rf parameters , MAC parameters surveillance*
  - *Network usage monitoring*
  - *Customer view*
  - *Monthly and daily Traffic*
  - *Alarm view*

- **Complete *service* and support**

Real-Time Network Monitoring Software for DOCSIS Systems

- *Incorporates MIBMON and web server*
- *Viewable from any web browser*
- *Easy to use, easy to read displays*
- *Subscriber-level monitoring pinpoints problems*
- *Receive alarm notification via pager or email*

BENEFITS

- *Helps track down problems quickly*
- *Allows operators to be proactive, not reactive*
- *Diagnostics minimize truck rolls, support costs*
- *Network utilization trend graphs*

THE NEED FOR NETWORK MONITORING

Troubleshooting and managing a cable-modem network can be a complex task, with many variables at the subscriber level.

The bus topology network means that problems with a subscriber's equipment can affect every subscriber on that cable segment. Being able to isolate problems quickly is the key to providing reliable service.

AMBER is designed to help cable operators be *proactive* as well as reactive. By examining network trends such as error rates, packet utilization and broadcast rates, and pinpointing faulty modems, operators can isolate and resolve problems before the subscriber notices.

AMBER can also be useful in measuring usage per subscriber.
High bandwidth users may be offered higher speed uplinks, offering increased revenue opportunities for cable operators.

WHAT IS AMBER?

The network Monitoring functions of AMBER are based MIBMON polling robot and web server which runs on the Linux platform. It offers a graphical, interactive interface to provide network alarms and statistics accessible from anywhere in the network.

It collects vital network statistics on key protocol attributes from the network using the SNMP standard, and presents them through standard web browsers such as Netscape Navigator, running on any operator workstation.

The browser interface eliminates the need for dedicated workstations and allows multiple operators to be logged in at different network locations.

AT-A-GLANCE DISPLAYS

AMBER uses bar graphs, dials and other easy to read displays to simplify operation.
For example, the color code are used to highlight subscribers or cable segments with problems, and green icons show normal operation. While the underlying statistics are available for analysis, the emphasis is on allowing operators with basic training to spot problems quickly. In addition, reports can be printed or exported to other applications.

USER INTERFACE

A single screen presents easily understood browsers and graphs that provide an instant snapshot of the network's status. From any browser, you have instant access to real-time statistics that present your network's utilization, packet rate, error rate, and broadcast rate as they happen. Built-in HELP provides on-line explanations of all functions.

HARDWARE REQUIREMENTS

The AMBER server is installed on a Linux Debian environment. A Pentium 1 GHz processor or equivalent, 128 MB RAM and 50 Gbytes hard disk space and an Ethernet or Fast Ethernet adapter capable of operating in promiscuous mode are required. Requirements for viewing station(s) are a Java capable web browser (e.g. Netscape or Internet Explorer).

MONITORING FUNCTIONS

In a general way, AMBER has a polling robot called the MIB Monitor. This tool is programmed in order to get information from CMTS MIB.

MIB monitor polling rate can be programmed. The data are put in the DB. The cleaning period, the polling rate and history duration can be programmed following the user choice.

The data presentation module can be reconfigured following the user requirements:

CMTS parameters "Direct presentation mode":

This mode presents the polled data on the classical browser giving all the polled information in the CMTS & in th CM.

The parameters will be present on each record of the browser can be defined by the user.

A special alarm view is accessible for RF parameters MIB.

Save boundaries	US Transmit Power		DS Receive Power		DS S/N Ratio	
Upper bound ->	58		20		40	
Lower bound ->	10		-10		32	
US	Total	Ok	Not Ok	Ok	Not Ok	Ok	Not Ok
2	2	2		1	1	2	
1	10	10		8	2	9	1
3	28	29		25	3	24	4
4	2	2		1	1	2	

MAC Adresse	IP Adresse	Up time ([d] h:m:s)	Lost Syncs	Reset Count	Upstream Tx Power (dBmV)	Downstream Rx Power (dBmV)	Downstream S/N Ratio (dB)	Last updated
00-02-b4-fe-02-f4	203.190.173.14	0:24:56	0	0	45.8	15.8	31.3	2005-09-22 22:06:34
00-02-b4-fe-03-08	203.190.173.36	2 days, 10:17:44	0	0	36	-16.7	31.9	2005-09-22 22:06:25

CMTS "Alarm synthesis presentation mode"

From the Alarm view link, it is possible to access of the first screen the CMTSs in alarm by color code (Critical and not critical).
The detailed alarm information will be presented by selection of the CMTS in alarm.

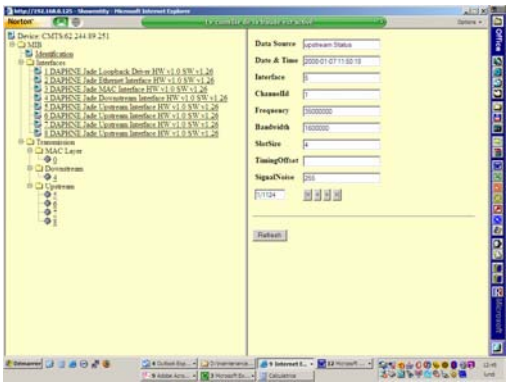
The status of the CMTS will be presented in a browser you can see the following parameters:

- CMTS STATUS
- ETHERNET TRAFFIC
- CARD STATUS
  - UPSTREAM STATUS /CARD
  - CPU LOAD UTILIZATION
  - DOWNSTREAM TRAFFIC
  - DOWNSTREAM SNR
- DOWNSTREAM RX LEVEL
- DOWNSTREAM TO
  UPSTREAM STATUS parameter
  UPSTREAM BANDWIDTH USAGE
  RECEIVER SNR
- MODEM TRANSMIT LEVEL
- UPSTREAM TO

Selecting the parameter in alarm will give the detailed information on alarm.

Alarm threshold value can be programmed. For the critical alarms, the action can be selected as to send a E-MAil to build a report etc.

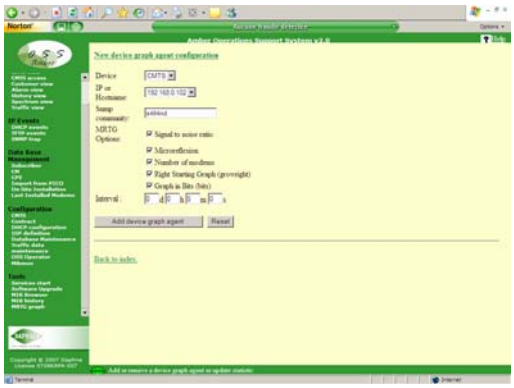
CMTS parameters MIB tree presentation mode



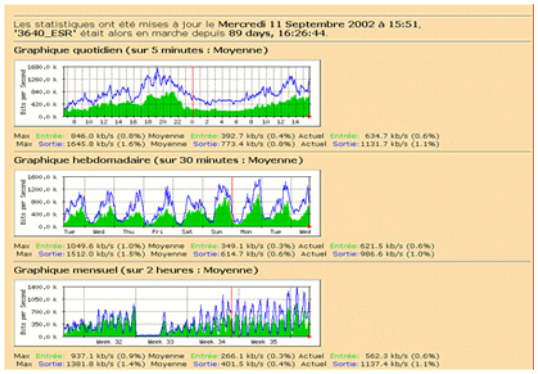
CMTS MRTG Graphs

For each CMTS the following information are presented o the on the MRTG graphs, with the possibility to programme the polling rates and the parameters to be polled:

- Ethernet traffic
- DS traffic
- Upstream traffic
- Signal to noise ratio
- Micro reflections

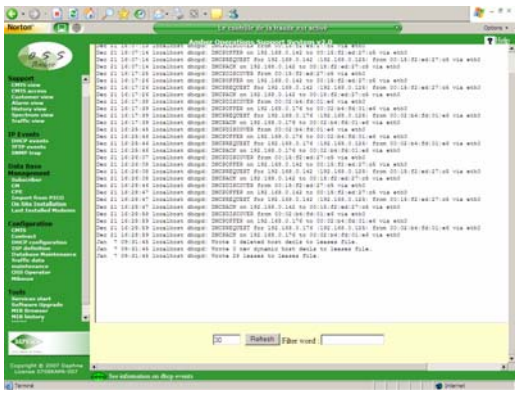


The information for each parameter can be presented yearly, monthly and daily.



IP events

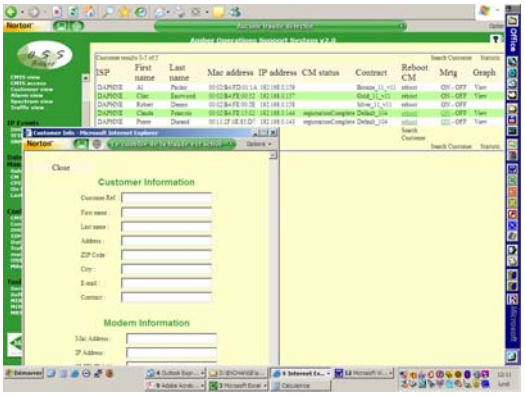
AMBER allows the possibility to brows all IP events or selected IP events;



CPE / IP History: Several search options

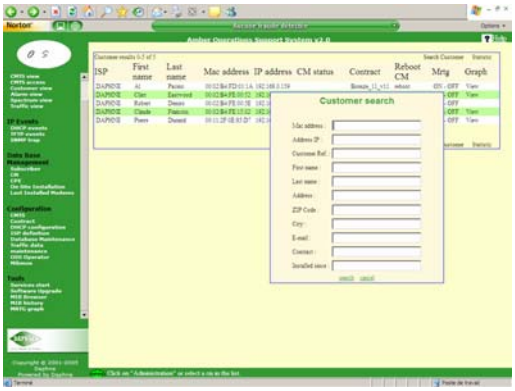
Customer View

AMBER has a customer status browser presenting all the necessary information concerning your customers and the modem status



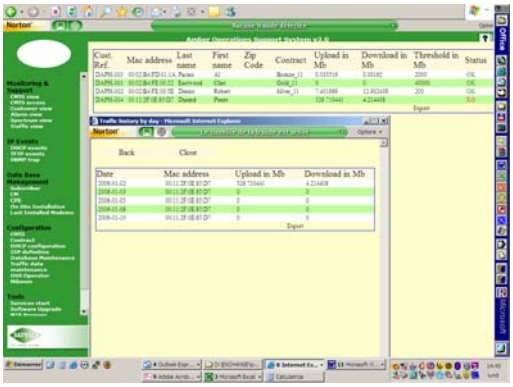
AMBER allows setting ON/OFF MRTG graph for each customer individually

Very extended research possibilities are included for the customer view services.



Customer traffic profile

In many time it is important to know daily and monthly profile of the customer traffic for billing or network upgrade purposes.
AMBER provides the possibility to monitor the daily, monthly and yearly traffic for your customers.



Provisioning for DOCSIS Systems

Integrated provisioning software reduces the costs and time-to market for triple-play or quad-play deployment.

The software removes the complexity of subscriber activation including the need to send a technician to the subscriber's home.

Standard Provisioning mode:
To fulfil provisioning, the broadband provider must assign an IP address and a device a configuration file to the modem, an IP address and a DNS server to the CPE device.

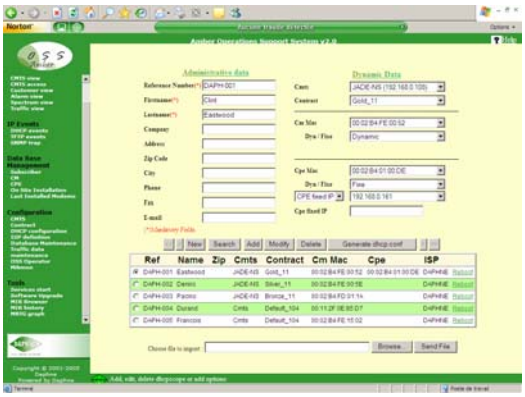
AMBER software provides by its original concept a very effective and fast provisioning method in 3 steps.

First the broadband provider defines different types of commercial contract using different service of classes.

In second step the IP architecture defining the subnet for cable modems, CPE and EMTA has to be configured once a time using DHCP configuration tools.

The third step is creating the subscriber.

AMBER provisioning function allows on one screen to create the subscriber data record with the necessary associations of the subscriber modem and service contract.



Finalise the operation by a demand of dhcp file generation

Semi Automatic Provisioning mode
This service is useful for to minimize the operator's effort in responding to personalized service requests.

When the subscriber switches on the CPE device, via a modem, which then asks the DHCP-based provisioning software at operator headquarters for and IP address and configuration information.

After associating an IP address with the modem's MAC address, the provisioning software's DHCP service sends back to the modem a temporary IP address and a configuration file authorizing a limited access to the operator's network.

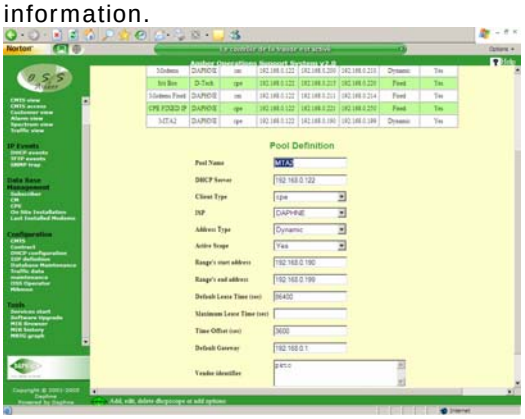
It is possible to include this subscriber data in the current customer DB and reconfigure the modem in a standard contract by redirecting the subscriber to a web site that facilitates service activation.

Once the subscriber completes the request for service and billing information, on the service request application, the cable operator can make necessary check on the validity of the data and authorise the subscriber's to the required services class" according to the level of service they paid for.

Following this step the system prepare the right configuration file for the modem and organise the necessary operation to transmit it to the modem.

EMTA & SIP device provisioning
SIP-based MTAs and eMTAs playing a CPE role needs some special vendor specific information and learn the configuration file name through DHCP server.

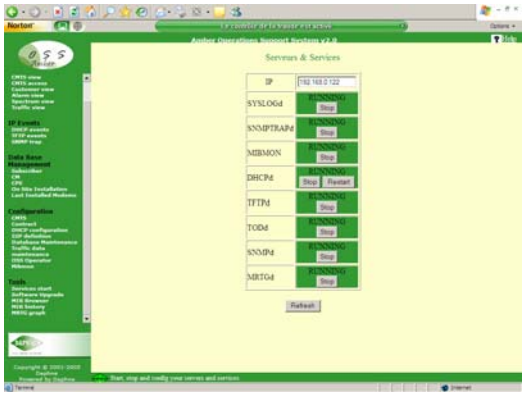
AMBER provisioning software allows to creation the MTA pools with related information.



Services

Service Panel:

AMBER software provides an elegant way to start and stop for the different services.



User Administration

The AMBER software provides the facilities to give the limited access to the different level of services

Database Maintenance services

AMBER software allows daily monthly pre-programmed automatic back up facilities.

Traffic data maintenance

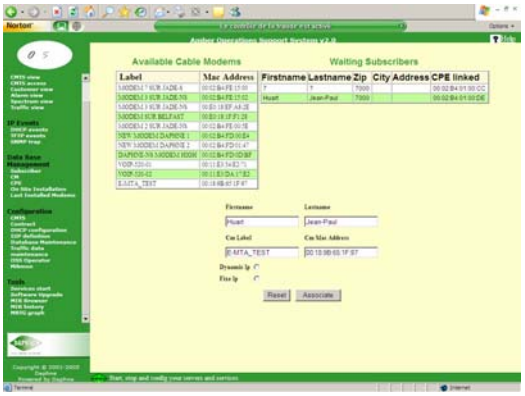
This service allows to export the traffic data to well defined machine using FTP services. It is also possible to define the polling rate of the traffic data storage

ALARMS LOGBOOK

AMBER will automatically sample traffic to determine alarm thresholds, or they can be set by the user. When thresholds are exceeded AMBER sounds the alarm and maintains a log.

ON site Installation services:

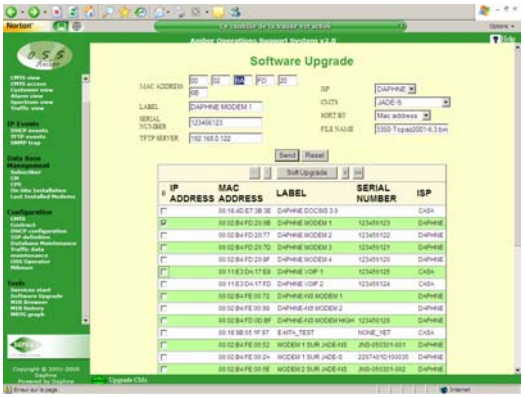
You can plan on site installation before sending your team on site?



AMBER software on site installation services will provides the possibility to execute planned services.

Modem Software up grade services

This service allows to plan the software up grades of a group of modems or an individual modem



SECURITY

Multiple levels of access can be defined with password control.

REPORTS AND TOOLS

AMBER includes many useful tools, such as:

- Standard reports or graphs that are easily printed or exported to other programs
- Remote “Ping” capabilities for IP • Detailed MIB statistics