A reliable & flexible communication network lies at the heart of successful electrical grid operations. A comprehensive management system can ensure this reliability and flexibility by providing accurate realtime status information, the ability to analyse network disturbances quickly and fast reconfiguration of routes as required.

FOXMAN-UN, one of the elements in ABB’s comprehensive NMS suite, is a powerful tool set providing all the essentials of a Network Management System, such as network status, alarm notification and enhanced circuit provisioning functionality.

The graphical user interface presents the deployed network on many different levels, from an overview of the entire network down to equipment ports. Detailed status information can also be retrieved directly from alarm list entries.

Special views, such as Synchronisation Status, support the configuration and maintenance of your communication network, while context-sensitive menus, an intuitive operating concept, and an online help system, make FOXMAN-UN easy to use.

FOXMAN-UN is a modular system, generally used for networks having more than 10 elements. It can be expanded to manage networks with up to 5,000 elements, and offers features for access and backbone networks.
Overview of your communication network is essential for fast reaction times and highest availability

Configuration management
FOXMAN-UN automatically discovers the communication network for network elements that have recently been inserted. At the same time, their position, type, cross connection tables, interface parameters, etc. are uploaded into the FOXMAN-UN database and can be displayed on the screen. FOX515 networks can also be configured without direct connection to the system. Entire networks with FOX515 network elements, their interconnections (sections, paths), their geographical positions, all their parameter settings and cross connection tables, etc. can be prepared offline for download to the FOX515 when the networks are installed.

Graphical network management
FOXMAN-UN supports a graphical and hierarchical representation of the network. There are no limits on the number of hierarchical levels, and any number of customer-specific background bitmaps may be selected. Different domains can be created which controls access for specific users to corresponding parts of the communication network.
Various tools help you to keep an eye on your network

Fault management
The fault management capabilities of FOXMAN-UN reduce the effects of errors on the service quality by means of functions for alarming, error retrieval, and testing. The alarms in all network elements (e.g. loss of signal, loss of synchronization, loss of frame, etc.) are continuously supervised to detect state changes.

FOXMAN-UN supports five different alarm severity levels according to the TMN standards; the severity of individual alarms may be modified by the operator.

Fault management — shelf view

Fault management — alarm list

Network elements and sections are displayed in different colors, according to their alarm state. If an alarm is detected, the color of the icon is changed.

The operator can get more information about the alarms by clicking on the icon. Alarms can be traced down to the smallest replaceable unit (e.g. card), and further down to channel/subunit level.

Security management
The FOXMAN-UN security management ensures that unauthorized persons do not have access to data and functions of the system by providing configurable, fine grained access control features for individual user accounts, and network partitioning.

Network partitioning functionality is fully supported by FOXMAN-UN. This means that communication networks can be segmented into several independent partitions with access to each partition restricted to a defined group of operators.

Management of various ABB communication equipment
Various ABB communication equipment has been integrated into FOXMAN-UN which allows it’s use as an overall management system, supervising your communication network consisting of different network element types, including different technologies such as optical fibres or power line carrier communication. The diagram “FOXMAN-UN managed equipment” gives an overview of ABB equipment which can presently be managed by FOXMAN-UN. Third party devices can be integrated using the SNMP southbound interface.
Management of teleprotection system

ABB’s FOX515 equipment has integrated interfaces for protection applications of power lines. Those modules provide interface ports which comply with the specific application requirements in terms of security, dependability and channel availability.

Integrated supervision of teleprotection system

Management of this functionality is integrated in FOXMAN-UN – this means one system to manage both telecommunication and teleprotection. The advantages of this situation are many, not least being enhanced availability due to fast reaction times, and minimization of operational and maintenance effort. Application specific data such as trip counters, channel delay time measurements based on loop tests, event records with time synchronization, and channel performance of teleprotection channels which is supervised by means of error counters, is readily available from the graphic interface. Having all this information at your fingertips enables rapid analysis of fault location.

Performance management

Performance management supervises the quality of individual data channels in a network. If predefined threshold levels are exceeded, alarms will be activated. This facilitates the task of the network operator to provide a high service quality to the subscriber and to constantly supervise it. As a rule, the performance data in the network elements is measured and calculated according to the ITU-T G.826 standard. This feature is available for FOX515/512 and FOX660.

Synchronization view

Synchronization of network elements and how the clock information is propagated through the network, determines the integrity of information transmission through the network. To ensure that this operates correctly, FOXMAN-UN provides the synchronization view, an overview showing paths and dependencies, i.e. a synchronization map.

The current synchronization timing source information is collected from FOX515/512 network elements and shown as a graphical diagram (synchronization map).
Management functions: FCPS

- **Fault Management:**
  Alarms and status information from all NEs are continuously collected and stored in log files. Depending on the severity of alarms - critical, major, minor, warning - the related NE icon on the display will change its color dynamically; the same will occur with interconnecting links to neighboring stations/icons, if affected.

- **Configuration management:**
  NEs can be fully configured and reconfigured if operator has required access permissions.

- **Performance management:**
  Measuring of data channels performance as per ITU-T G.826.

- **Security management:**
  FOXMAN-UN’s strict access control protects against unauthorized access, allowing administrators to define access rights for each operator to different levels of control and ensure that every network intervention and its source is documented (logged).

### Distributed architecture

FOXMAN-UN is based on a client-server architecture, suitable for multiple independent, concurrent workstations. Each workstation can have individually assigned access rights for different levels of operators. Similarly, network views at different workstations may be limited to certain region(s) or to certain communication levels, e.g., access level, transport level. To increase the availability of the whole management system, a second system can be installed as stand-by. Main and stand-by systems can be located at the same site, or at geographically separated locations, in cold or hot stand-by configurations.

### Higher-level management interface

Installed in a heterogeneous network with different element management systems, FOXMAN-UN supports a standard SNMP (Simple Network Management Protocol) northbound interface to connect to higher-level management systems.

### Integration of 3rd party devices

FOXMAN-UN provides two possibilities for integration of 3rd party devices. Devices which provide an SNMP interface can be directly integrated into the FOXMAN-UN by using the SNMP south-bound interface. If the 3rd party device does not support an SNMP interface or “simple” alarm integration is enough, the alarm interface of the FOX515 (ALCAR) can be used. In such cases, integration in FOXMAN-UN would be via foreign object elements. Any 3rd party NE can be graphically presented on the network display of FOXMAN-UN and supervised accordingly. Alarm severity and text can be defined in the foreign object elements of FOXMAN-UN.
FOXMAN-UN — increases the availability and reduces the operational expenses of your communication network

Networking Package
Particularly in big networks, channel routing is a time consuming and failure sensitive task. The Networking Package provides a comprehensive software package which simplifies this task significantly. The Networking Package maintains a database of trails as currently configured in the network, and provides an easy procedure of configuration of new trails throughout the network, while preventing incomplete or faulty trail configurations.

The operator only needs to define the end points of a required data channel. The Networking Package will search for possible channel routings and create all the required cross connections. Beside this, it gives an overview of the programmed channels on your links and provides you with an actual status of your channel routing. This leads to shortened time to deliver data channels for new services, and subsequently reduced cost of operations.

Main advantages offered by the ABB FOXMAN-UN network management system

– Saves time and money
A user-friendly GUI (Graphical User Interface) is the most important factor in network management efficiency. In FOXMAN-UN, the GUI is updated online and always presents the latest status of the network, which can be called up at the click of a mouse, wrong configurations are detected immediately and even prevented from becoming active by internal system checks.

Thus, the operation and maintenance team can efficiently manage the whole network from a central point. Automatic backup functionality provides an easy and fast means of ensuring backup of your equipment configurations.

The FOXMAN-UN Networking Package provides (for a selection of NE-types) easy to use tools to enable the operator to establish transmission paths in the simplest possible way, saving time and effort. Operators can define criteria for alternative routing within the network, which, should the main path fail, will automatically activate the defined protection path.

– Integration of teleprotection and telecommunication
Teleprotection is one of the key applications of any electrical utility. ABB solutions offer specific interfaces for distance and differential protection. These can be supervised and configured using FOXMAN-UN, providing one configuration and management tool for all your communication equipment. This eases the supervision and maintenance of your combined protection and communication network significantly, and ensures maximum availability for your mission critical services.

– Clear view – even of complex networks
Using the straightforward GUI, the operator is given the power to define a hierarchical representation of the whole communication network, multi-view maps and network partitions as required. He can move easily by point-and-click and observe and manage each element across the entire assigned domain. This graphical network representation can be used as a central point of information to get a complete network overview, to deposit notes for other operators and to create annotations for specific network elements.

– Keeping an eye on the network
FOXMAN-UN makes it easy for the operator to supervise the overall network by monitoring not only performance, but also subscriber line status, sending alarms in case of network problems and initiating test loops if required. Having a constantly updated overview of the whole system and at the same time being able to look at detailed alarm and configuration data with a few mouse clicks, makes fault finding and trouble-shooting much faster.

Using the ABB FOXMAN-UN network management, ensures the overall performance of your network is improved. In critical situations your staff can react efficiently within seconds. This means a real increase in network availability.

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