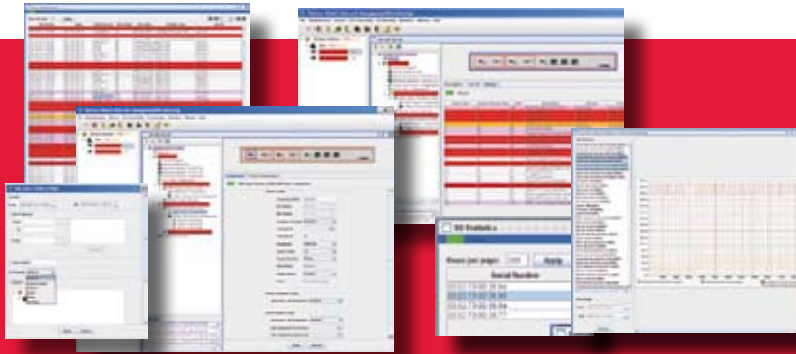# Constellation Management System
EION Wireless Management System

MANAGING WIRELESS NETWORK ACCESS SERVICES

The EION network management system, Constellation, provides full TMN architecture. The implementation is a three - tier architecture, based on SNMP v2, RMI, Java, JDBC and other open interfaces. This provides simple integration of Constellation into existing management and billing systems of the service providers or adaptation to the specific requirements of the environment.

Service provisioning is an important aspect for every network service provider. The Constellation provisioning system offers the ability to provide a broad portfolio of access services in a large scale deployment, suitable for residential and enterprise customers alike.

PRODUCT FEATURES

- Carrier-class Network Management and Service provisioning System

- Support for bulk management services enables large scale service deployment and management of WiMAX and StarPlus networks

- Fault management for detection of network problems and service outages

- Configuration management for centralized configuration of network elements

- Performance management for tracking network usage, network element performance and QoS

- Security management for controlling access to network elements and other resources

- Regional organization of network elements in geographical or logical domains for more efficient visualization and presentation

- Flexible three-tier architecture for optimal deployment

- Open interfaces enable NBI integration

CONSTELLATION MANAGEMENT SYSTEM

CONSTELLATION MANAGEMENT SYSTEM

EION Constellation network management system is a three-tier distributed client/server network management and provisioning system. In this architecture, all the data processing is implemented by the middle tier servers. All the data, gathered by Constellation is stored in a relational management/provisioning database. Data contained in the database is available to other applications via NBI RMI interfaces. The managed information is structured according to different MIB tables, standard as well as proprietary MIBs.
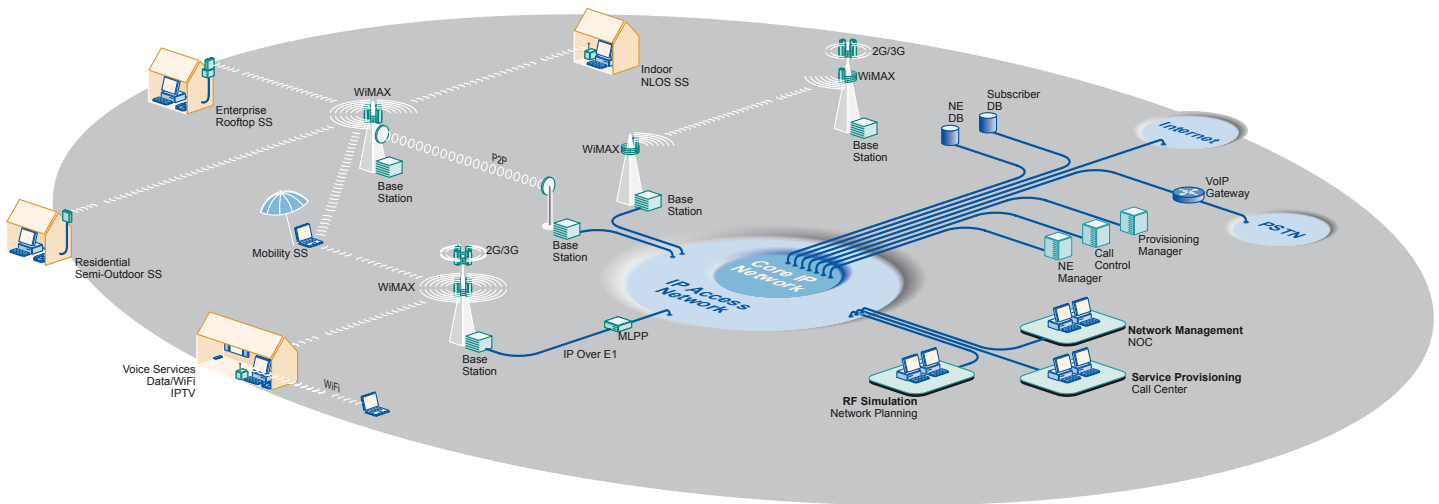
CONSTELLATION APPLICATION SERVERS

Constellation application server has two main roles; it contains business logic for configuring the SNMP agents in network elements and business logic for accessing the data from the database. NMS application server consists of two loosely coupled components, NMS Service provider and NMS Storage server.

NMS Service Provider: Constellation clients communicate with the service provider via HTTP and RMI. It performs all the database lookups on the behalf of NMS clients and formats the data for proper presentation.

NMS Storage Server: NMS Storage server is independent from other components in the Constellation network management system architecture. Modular design of the NMS storage server provides two main functions:

* Periodical gathering (polling) and permanent storage of statistics data, retrieved from SNMP agents

* Interception of traps, generated by SNMP agents.

CONSTELLATION CLIENT

The NMS client is used for performing all the network management tasks. NMS client never accesses the data store, it communicates with the application server, which performs all the database lookups on the behalf of the NMS client and formats the data for proper presentation. Data export from Constellation client is available in XML format.

DATABASE (STORAGE)

All the data, gathered during the network management process is stored in the relational database. Constellation network management system provides support for ORACLE and MySQL RDBMS systems on Windows and Solaris operating systems.

CONSTELLATION MANAGEMENT SYSTEM

FAULT MANAGEMENT

NMS fault management processes all the events, generated by EION network elements on two levels, at the Network level and at the Network element level. At the Network level, alarms may be filtered according to different criteria (source, region, alarm severity) and exported for offline viewing/processing. At the network element level, alarms may be disabled, alarm thresholds may be adjusted, alarm history may be accessed etc for the for the selected network element. NMS alarming manager also supports alarm propagation in the region tree, cumulative alarm display and color coding.
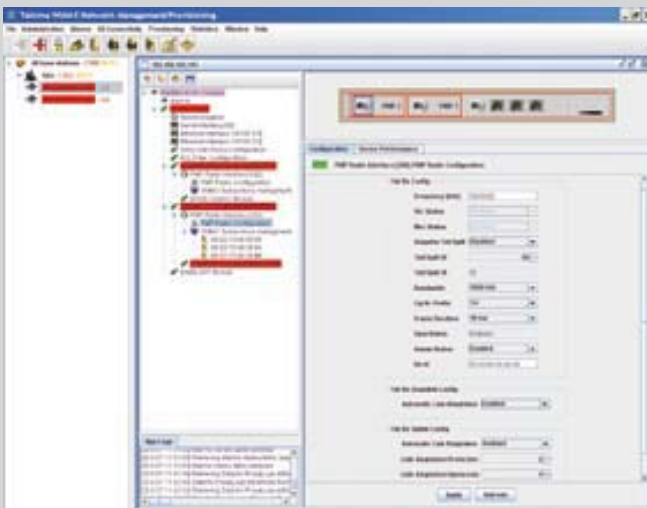
CONFIGURATION MANAGEMENT

NMS configuration management addresses configuration of network elements in three main areas, the IDU configuration (physical interfaces, inventory, synchronization). ODU configuration (radio parameters, frame parameters) and the Subscriber station configuration (adaptive link monitoring), as well as other global settings for the access network operation.

PERFORMANCE MANAGEMENT

Performance collection module (PCM) enables storage, processing and presentation of network usage data. PCM database is implemented as a.rrd (round robin) database. Polling of network elements for performance data is performed 15 min intervals. Depending on the type of data collection, each sample may represent instantaneous or averaged value of the measured data. Measured data includes packet counters, sector usage parameter and radio interface parameters.

CONSTELLATION MANAGEMENT SYSTEM
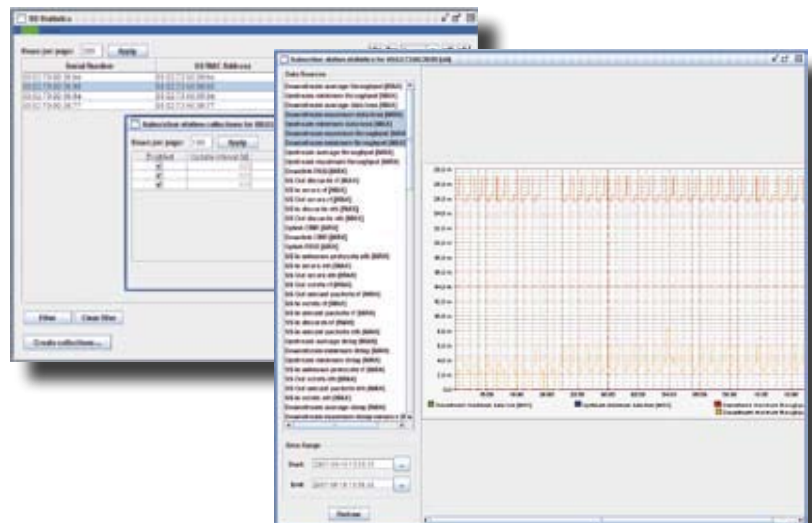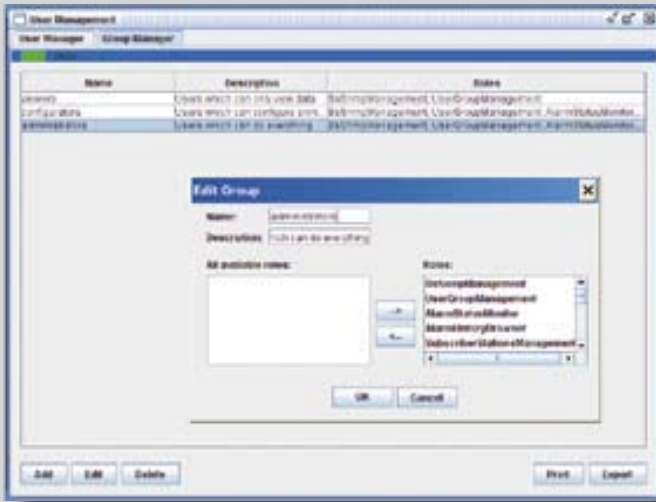
SECURITY MANAGEMENT

NMS implement security on different layers, such as authentication with several levels of authorization, assigned to different users or user groups, based on their roles and privileges. All management related activities are logged for security reasons. All the users of the Constellation Management System are required to login, before they are allowed to use the system.

BULK MANAGEMENT OPERATIONS SUPPORT

Managing large scale wireless networks may be a time consuming process. In order to facilitate this, Constellation supports bulk management tasks, such as changing Subscriber station SNMP community strings or upgrading Base station image.
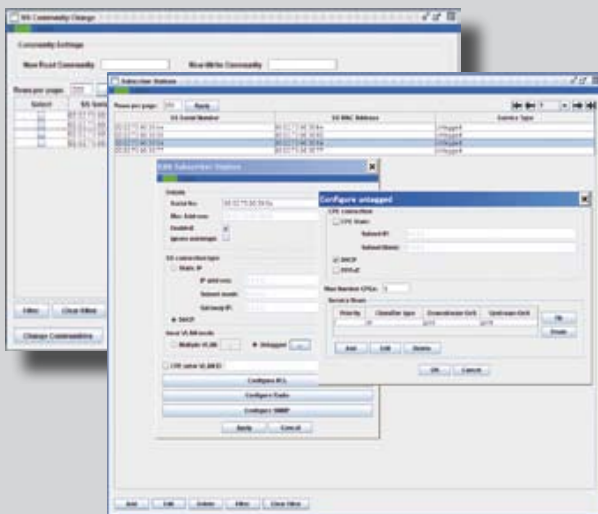
SERVICE PROVISIONING

Main task of the Service provisioning is Subscriber station service profile creation. Subscriber stations may be provisioned to operate in any of the supported modes, suitable for residential as well as enterprise customers. Currently supported modes of operation include NAT operation (1:N and N:N static), single VLAN untagged operation (with a wide array of options for packet classification for transmission on any of the available service flows) and multiple VLAN tagged operation of CPE devices. Subscriber station and CPE IP address assignment is also very flexible with both DHCP assigned and static IP provisioned modes supported. For even more flexibility in deployment, QinQ double VLAN tagging operation may be provisioned.

CONSTELLATION MANAGEMENT SYSTEM

SPECIFICATIONS - SUBSCRIBER STATION SERVICE PROVISIONING

Subscriber Station Provisioning	Possibility to assign outer VLAN tag for QinQ operation in any of the supported modes
	Different modes of IP address assignment for Subscriber station • Static IP • DHCP operation
	Enable/disable Subscriber station
	Provision each Subscriber station based on its MAC address
	Per Subscriber station • Configuration of radio access interface • Configuration of access control lists • Configuration of SNMP parameters

Management Support for Different Modes of Operation	**Multiple VLAN Operation** Transparent mode of operation Up to three SF with up to three VLAN ID as classifier per SF Subscriber station performs VLAN tagging for single VLAN case
	Untagged Operation Different mode of IP address assignment for CPEs • Static IP operation • DHCP operation • PPPoE operation Possibility to limit the number of CPEs, connected to a Subscriber station Possibility to classify packets for transmission on the service flow based on • TOS field setting • VCI string • CPE MAC address • IP subnet
	NAT operation 1:N NAT operation • DHCP assigned global IP address • Statically configured IP address N:N static NAT operation • Possibility to configure static IP address mappings

Service Profile Management	Creation of ACLs for uplink and downlink directions
	Configuration of radio profile parameters
	Creation of independent service flows for uplink and downlink directions
	Supported classes of service in SF creation (WiMAX) • BE • nrt-PS
	QoS/SLA management

CONSTELLATION MANAGEMENT SYSTEM

SPECIFICATIONS - NETWORK MANAGEMENT

Fault Management	Receiving and logging of network events (traps, alarms)
	Processing of NE alarm tables
	Operator notification
	Color coding of alarms based on severity
	Filtering of events and alarms based on different criteria • IP address • Date • Severity • Region
	Presentation of events and alarms
	Disabling/suppression of alarms
	Indication of alarm severity level
	Historical event queries
	Propagation of alarms in the region tree
	Configuration of thresholds for threshold based alarms
Configuration Management	Configuration of network devices • IDU configuration • ODU configuration
	Storing configuration settings in RDBMS
	Auto-discovery of network equipment
	Inventory management
	Support for bulk management tasks • Bulk upgrade of Base station image • Bulk change of Subscriber station community strings
Performance Management	Periodic polling of network element for performance data in 15' intervals
	Storage of collected data in the database
	Wireless and network interface performance data • Packet counters for uplink/downlink • Radio interface parameters
	Two different types of performance collection data • Measurement collection (instantaneous values only for a predefined period of time) • Statistics collection (1h averages and instantaneous values for a predefined number of samples)
	Presentation of performance data (graph)
Security Management	Controlling access to network resources
	Authentication and authorization of users
	User and user groups database with security parameters management
	Assignment/management of authorization levels
	Assignment of roles
	Monitoring user activities
	Logging user activities
Inventory	HW revision information • Carrier board • PMP modules • ODU unit
	SW version information

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