

BreezeCOM and Floware unite



Network Management Solutions for Service Providers



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1. Introduction

Broadband Wireless Access (BWA) is an exceptional last-mile access solution for Service Providers. BWA offers Service Providers total freedom from the limited reach of landline infrastructures, while providing increased bandwidth flexibility and service differentiation.

In order to fully harness the advantages of a specific network technology, as well as sustain low operating costs and generate revenues, the Service Provider is required to monitor, maintain and provision the network at a considerably high level of quality and intensity.

Alvarion, the leading provider in the BWA arena, offers Service Providers a comprehensive suite of network management solutions (NMS) that incorporate our vast know-how in broadband wireless access technology and reflect our years of experience with viable BWA deployments in the field. We provide a centralized and customized network management solution that fits the Service Provider's needs for managing an Alvarion-based BWA network. In addition to enabling low operating costs, the NMS suite facilitates the provision of diversified services to a provider's customer base.

Beyond standard network management applications, Service Providers often require a Manager-of-Managers to oversee their entire operation, which may include the infrastructure, access network and service provisioning elements. For carriers such as these, Alvarion provides northbound interfaces so that the Service Provider may integrate the management capabilities of the Alvarion NMS product with an overall network management system.

This white paper describes the positioning of the Alvarion NMS solutions within the Service Provider's NMS environment and provides an overview of the solution's primary features and its singular benefits to the Service Provider.

2. Service Providers and Network Management

The foundation upon which a Service Provider's Network Management Solution is based relies on the well-known standard definition of network management functions. These are: Fault, Configuration, Accounting, Performance and Security management (commonly known as FCAPS). The network management model is commonly illustrated by the following Telecommunication Management Network (TMN) pyramid (Figure 1). Naturally, functions such as customer management, which include trouble-ticketing functions, as well as business management that relates to further business logic such as customer registration, are functions that the Service Provider has already implemented for the other technologies.



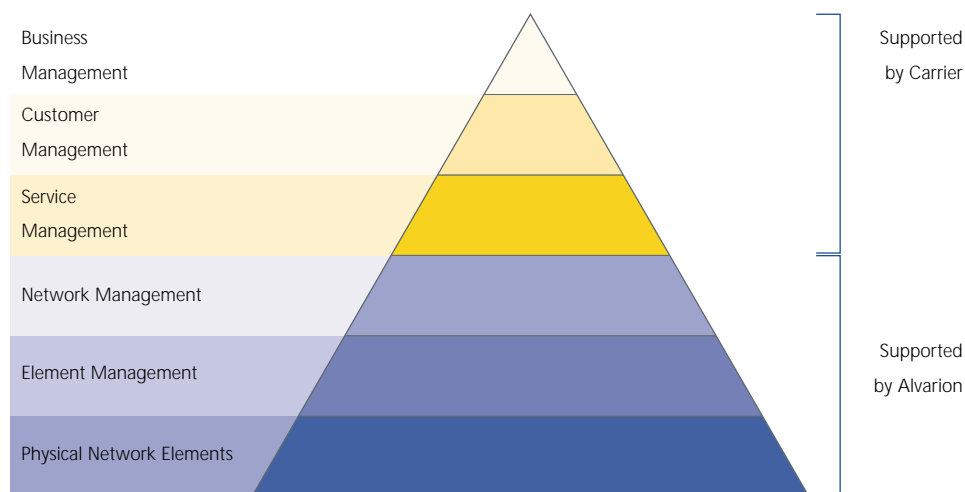


Figure 1: TMN Model Pyramid

In this instance, an integration of the BWA vendor-related functions into the Customer and Business management layers is required. The sheer necessity of a Service Provider for a network management solution originates from the fact that large networks cannot simultaneously achieve high performance operating levels and relatively low maintenance costs unless a professional and advanced network management solution is provided. Moreover, as the number of technologies that a Service Provider introduces into the network grows and with it, the need to dynamically change the equipment configuration based on customer needs (i.e., Service Level Agreements), it is vital to have a vendor-specific Network Management Solution for each technology, in addition to the overall integrative network management solution of the Service Provider. Only in this manner can the Service Provider maximize the diversity of technologies and the large volumes of data that need to be processed. By working according to the model in Figure 1, the Service Provider can manage many technologies via their vendor-specific NMS/EMS and integrate them under the roof of the upper layer management tool that is often referred to as Manager of Managers. By working according to the model presented in Figure 1 and integrating different EMS/NMS with a Manager of Managers, the Service Provider can considerably cut down development and customization efforts of building its NMS suite of solutions. Currently, this approach is widely adopted by Service Providers.

3. Alvarion's Network Management Solutions

Alvarion's suite of Network Management solutions for Service Providers include extensive state-of-the-art NMS solutions that provide the Service Provider with feature-rich functionality, as described in the following sections.

Alvarion's NMS products

Alvarion offers the following Network Management products:

- WALKnet - A network management solution for WALKair based networks.
- BreezeMANAGE - A network management solution for BreezeACCESS based networks.

Via the topology function, it is also possible to obtain a view of the base unit chassis. This type of map provides the ability to view a sector topology and monitor alarms that are visualized via the LEDs of the equipment (see Figure 3).



Figure 3: Topology View and Chassis view via Alvarion's NMS

Fault Management

Fault Management is of primary importance for Service Providers. As base station build-out and CPE deployment increases, it is necessary to install a system capable of monitoring the alarms and events that occur across the entire network. Alvarion's devices provide an extensive set of alarms to assist the Service Provider in diagnosing and trouble-shooting the network. The set of possible alarms include power-up from reset, link quality degradation, change of association and more. When using HP Open View's Network Node Manager, alarm suppression and alarm correlation may be activated for some types of units to allow for filtering of successive alarms and related alarms. Alarm filtering and suppression are extremely important in order for the NOC staff to efficiently relate to service affecting alarms and disregard irrelevant alarms. Altogether, this results in the ability to operate the network with a small and relatively unskilled staff.

The WALKair system has a built-in BER meter to measure link performance. The BER meter operates in parallel to the data traffic and therefore does not interfere with normal network operation. The BER meter can measure Down-link BER or Up-link BER separately, or round trip loop BER. With WALKnet, the Service Provider can perform BER tests periodically and generate reports.

Alvarion realizes that the Service Provider may already have an existing NMS product for the other types of equipment that it utilizes and therefore the Alvarion equipment alarms may be sent to any Manager of Managers that the Service Provider uses for enabling a completely integrated management of alarms and faults.

Provisioning of Network equipment

Provisioning operations are required when installing Alvarion's NMS equipment, when defining or changing a customer service (e.g. VoIP enabling, increase of bandwidth, etc.) or when performing performance optimizations over the network.

Database Interface

Service Providers often maintain a database with equipment and customer records. The Alvarion NMS products smoothly integrate into this existing environment by providing a built-in ODBC interface from WALKnet to databases such as Oracle and Microsoft Access. The ODBC interface allows the Service Provider to maintain all the data in a unified database. As a result, the information of cells and sectors as well as performance data, which is collected by WALKnet, can be easily grouped into the Service Provider's existing information base for providing various reports and analysis.

Northbound Interface

It is essential for the Service Provider to be able to monitor all open alarms through an integrated user-interface and unified management processes. Alvarion enables the integration of the BreezeACCESS and WALKair alarms with any other SNMP-based network management product by providing alarm notifications via SNMP traps. Performance data is collected and stored in the Oracle database for another management application to retrieve and utilize.

Upcoming releases of Alvarion NMS products will include the capability to communicate with any Manager-of-Managers via a CORBA interface, which will be further enhanced to provide end-to-end service provisioning for advanced customer-on-demand service configurations in a multi-vendor network elements environment. Interchange of configuration data between the Alvarion NMS and the Manager-of-Managers will also be facilitated, thus providing the Service Provider with an overall network management solution.

Software Download to Alvarion network elements

Upgrading an entire BWA deployment with an updated software version is an issue of great import to Service Providers. They are often justifiably concerned with the potential hazards which may accompany the upgrade process, such as loss of service for unexpected periods of time and a huge workload on staff which results in increased expenses. Alvarion's NMS products alleviate the need for manually loading and activating new embedded software to network elements by enabling the downloading of an updated software version to numerous devices simultaneously. In addition, a report is generated to allow the Service Provider to keep a close eye on the progress and outcome of the software download operation. As a result, the software upgrade process becomes a rather simple task to manage and perform with minimal effect on service.

4. Summary

Like all networks, Broadband Wireless Access deployments require proper management in order for them to be installed, maintained and enhanced. While there are a number of general network management products in the market, there is no adequate solution for managing network elements of a specific technology other than by deploying and utilizing a network management product supplied by the equipment vendor. This issue is of even greater concern to substantial Service Providers who have to deal with a variety of technologies in a multi-vendor environment.

Alvarion provides Service Providers with a suite of network management solutions that are tailored both to Alvarion BWA technology, and to the Service Provider's needs.

These solutions integrate smoothly into the Service Provider's network management environment as described in Figure 1.

Alvarion's Network Management Solutions provide the following features and key benefits for the Service Provider:

- Centralized management of deployed network equipment results in a reduced staff volume and expense since all maintenance and provisioning operations can be conducted from a single site.
- NMS is tailored according to the specifications of BWA technology so that a large network can be operated and maintained with a small team of experts.
- Advanced Fault Management leverages the increase of revenues by minimizing equipment downtime.
- Easy-to-use Provisioning and Configuration Management provides the ability to remotely define classes of service to customer premises equipment (CPE), thus allowing an increase in the generation of revenues based on classes of service rather than by billing customers according to a fixed monthly fee (flat-rate billing).
- Enhanced set of performance characteristics and performance data management allow the Service Provider to locate cell overload and over-subscription problems before they occur, thus preventing service degradation to customers.
- Automated network software upgrade allows for easy and controlled network software upgrade. As a result, the software upgrade operation has a minimal effect on service availability. The Service Provider's customers are not aware of the operation and the revenue stream continues with minimal interruption.
- Integration of Alvarion's NMS solutions with the Service Provider's Manager of Managers offers smooth entry of the BWA operation into the service and business management layers; those layers are responsible for the revenue generation.
- Security measures in the Alvarion NMS products provide access restrictions to the NMS products which result in an increase in NOC security by allowing only authorized staff members to access the network management system. WALKair and BreezeACCESS products complement the security suite of features by allowing only authorized network managers to access them.
- Alvarion's NMS products are multi-platform: the Service Provider has the flexibility in choosing the desired operating system for the product (Windows NT or SUN Solaris).



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