

BreezeCOM and Floware unite



AlvariBase

The All-In-One Solution



Introduction

Broadband Wireless Access is becoming the last mile solution of choice for many service providers targeting business as well as residential customers. With wireless, minimal capital expenditures are required to reach many customers and begin service, providing a quick path to profitability. BWA architectures are scalable, allowing demand based build-out. A wireless network can be deployed in parallel with the existing infrastructure, or as a complete infrastructure for emerging operators. Broadband wireless access technologies are, today, mature and field-proven, providing the optimal choice for operators seeking cost-savings and rapid deployment.

While service providers often begin a business by addressing a subset of the available market, with a selected service offering, market conditions often demand an extension of customer base and capabilities. Service providers need to ensure that the Broadband Wireless Access solution they choose is flexible enough in cost and functionality to enable a shift or expansion in target market and offered services.

This document introduces AlvariBase - an all-in-one solution for addressing multiple market segments and applications from a single Broadband Wireless Access base station.

Broadband Wireless Access Services

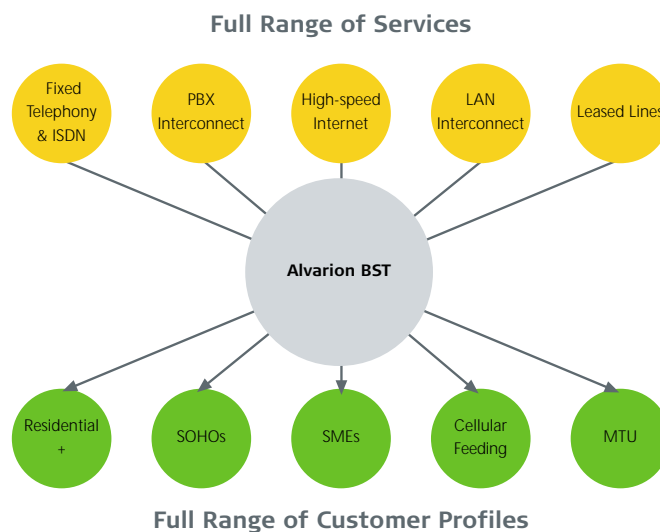


Figure 1 - AlvariBase: Multiple Services to the Full Range of Customers

When choosing to deploy a Broadband Wireless Access service, operators must choose the services they can offer their potential customers. Services that can be provided include circuit switched telephony services such as fixed line telephony, ISDN and PBX interconnect, data services such as Internet access, LAN interconnect and leased lines. Broadband transport and access systems that deliver these services fall into two major categories: Cell-based (e.g. ATM and packet based (e.g. IP).

Cell based systems are designed to support a mix of circuit switched and packet-based services with built-in QoS mechanisms. Such solutions can simultaneously carry telephony traffic (also known as TDM voice) as well as packet based legacy data and IP services. Such cell-based systems may employ packet-

optimized concentration at the same time. As an example, a cell-based system can simultaneously carry PABX to PSTN TDM traffic, enterprise remote site Frame Relay traffic and Internet traffic.

Packet-based systems deliver all possible IP services, such as Internet Access, VPN and Voice over IP (VoIP). QoS mechanisms are typically included in such systems to allow competitive service offering as well as efficient handling of VoIP traffic.

Packet-based systems use statistical multiplexing, and typically allow lower cost equipment. The price-cost equation of both cell-based and IP-based systems is based on the possible prices that can be charged for the delivered services versus the cost of the access equipment. Circuit switched, TDM based services are typically more expensive than IP services. Not surprisingly, the CPE cost of a cell-based system is typically higher than the cost of an IP-based CPE.

Most Broadband Wireless Access equipment is optimized for one of the abovementioned categories: cell or packet. With cell-based equipment, the emphasis is on meeting carrier-class standards, while maintaining cost-effectiveness and throughput efficiency. With IP services, the focus is on creating a low cost, highly functional solution, allowing a service provider to build a profitable business model based on lower revenue from each customer.

When selecting a Broadband Wireless Access vendor, the choice is often between a cell-based solution or a packet-based solution. This choice locks the service provider into a set of services, and requires a change of vendors to support a shift to the second class.

AlvariBase eliminates the need to make this choice and prevents service set lock-in. With AlvariBase Operators can install an infrastructure that supports the full range of carrier-class TDM and inexpensive packet-based services, by implementing a transport architecture that includes both cell-based and packet-based techniques.

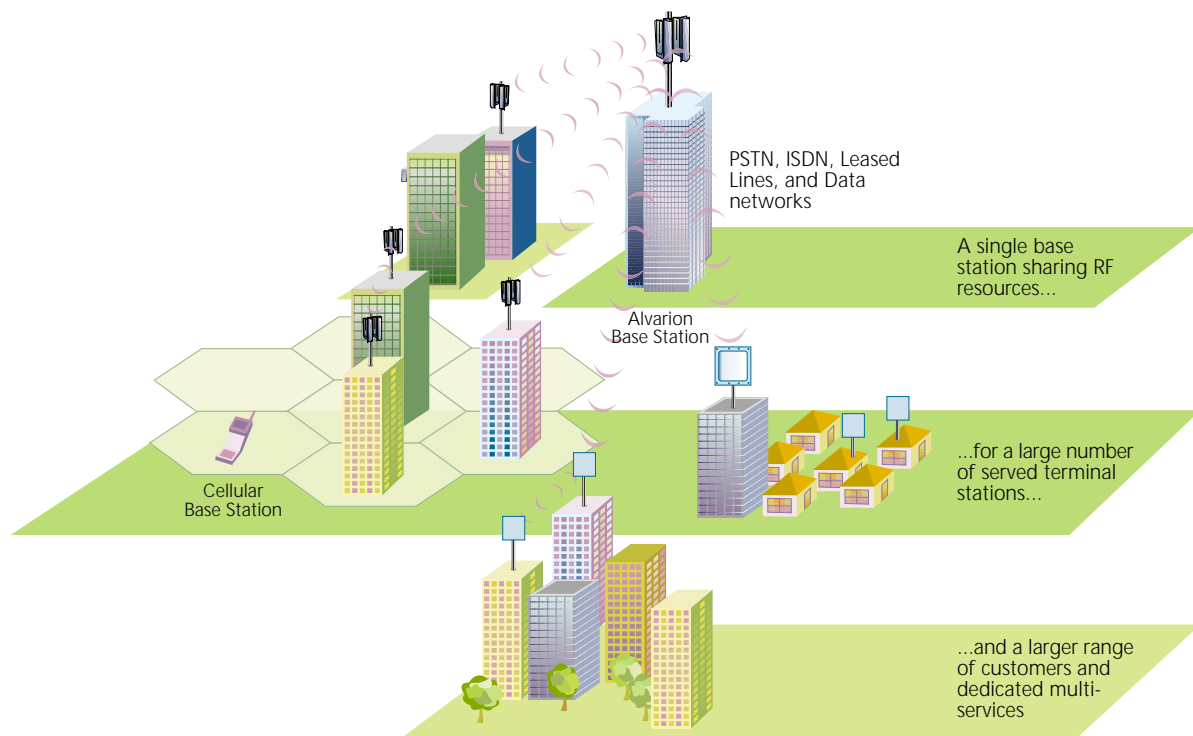


Figure 2 - AlvariBase - Multiple Customer Types from a Single Infrastructure



Target Market Evolution

For Broadband Wireless Access service providers, the choice of target market is a key strategic decision. When initially developing a business plan for a new service, service providers will choose to address one or more specific market segment. Each market segment has different sales cycles, provisioning and service feature requirements.

The chosen segment may be residential telephony and Internet access, requiring near line-of-sight operation and easily installed CPEs. It may be businesses requiring PBX private line and PSTN connectivity, as well as Internet access. It might also be branch offices needing to connect their data network to the central corporate site.

Some service providers may choose to address many market segments, aiming for broad penetration into the potential customer base. Other service providers may initially choose a narrow focused market segment, aiming to dominate one niche, before moving on to the next.

Service providers choosing a broad market penetration strategy have, in the past, faced challenges in finding a solution that can address the entire market - from high end residential through SOHO and small business, all the way up to medium sized businesses and corporate branch offices. No Broadband Wireless Access solution could provide, at the same time, low cost IP connectivity alongside carrier-class corporate voice and data solutions. The introduction of AlvariBase changes the BWA rules. Now a service provider can provide the entire range of BWA services - from Internet access through leased lines and PBX connectivity - to the entire addressable market, from a single infrastructure.

A narrow market focused service provider chooses the technology and, subsequently, the products to be used in deployment according to the needs of the application. For example, if businesses with circuit switched and IP services are the focus, Alvarion's WALKair is typically the choice. If smaller businesses or customers of a more residential type, requiring only Internet access and POTS telephony are the target, then BreezeACCESS is chosen.

When choosing to expand or shift the target market from the original customer base, this service provider must ensure that the equipment in place meets the cost and functional requirements of the new market, or can be enhanced to do so. Most BWA equipment is focused on the provision of specific services to a set of target customers. Not every BWA solution fits every customer. Thus, addressing new customers can often mean installing a completely new BWA infrastructure, including new base station indoor equipment, radios and antennas.

Not so with AlvariBase - Alvarion's solution for addressing multiple markets with a single infrastructure. AlvariBase allows operators to install a Broadband Wireless Access infrastructure that is flexible enough to allow shifts in customer profiles and service offerings. AlvariBase allows service providers to choose the CPE most appropriate to each customer's needs, minimizing operational expenses by allowing for combined network and radio planning, unified site acquisition and civil engineering efforts.

The AlvariBase Solution

AlvariBase is the best of Alvarion's WALKair and BreezeACCESS. WALKair and BreezeACCESS solutions are the industry's most comprehensive set of Broadband Wireless Access Solutions. BreezeACCESS systems deliver fast packet data and high quality Voice over IP telephony services, making BWA deployment quick, simple and cost-effective. They provide IP and POTS services to businesses and residences, with near line of sight operation and easily installed CPEs. WALKair systems deliver carrier are based on cell transport and deliver class TDM services as well as highly efficient IP connectivity.

Bringing together the best of both Alvarion solutions, AlvariBase allows operators unprecedented flexibility in the choice of customers addressed and services provided. AlvariBase is a solution that enables operators to create a BWA system that provides the advantages of both WALKair and BreezeACCESS using a single infrastructure.

Figure 3 shows the design of the AlvariBase solution. The AlvariBase base station consists of WALKair Base Station Basic Units (BS-BU), a WALKair IF-MUX and BreezeACCESS base station shelf (BS-SH), with modified Access Units, which provide a WALKair IF interface output. The BS-BUs and Access Units are connected to the IF-MUX using a short intermediate frequency (IF) cable. The IF-MUX connects to a single outdoor unit (RFU) and antenna, which can support up to eight BS-BU and/or Access Units. AlvariBase allows the same outdoor units (RFU) and antenna to be used by the WALKair BS-BU and BreezeACCESS BS-SH. The result is that BreezeACCESS or WALKair carriers can be added to the base station, without the need to add outdoor units or antennas. No outdoor work needs to be done to add a BreezeACCESS or WALKair carrier to the base station.

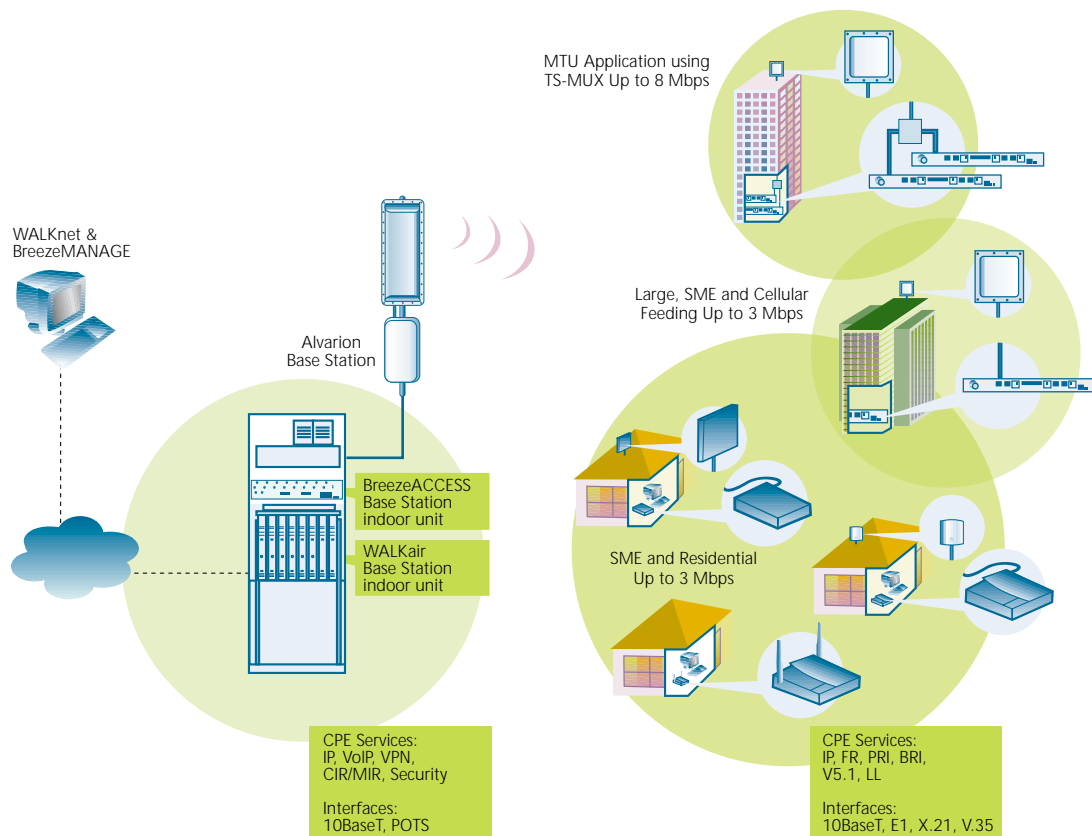


Figure 3 - AlvariBase Solution

The AlvariBase base station can be used with both BreezeACCESS and WALKair CPEs. This allows operators to provide a variety of services and address a full range of end users, from residential and SOHO, through SME, MDU and MTU from a single deployment, providing multiple service options, including Internet access, VPNs, Legacy TDM services and PBX connectivity. Any combination of A BreezeACCESS and WALKair system in up to eight carriers is possible with a single outdoor unit and antenna set.

AlvariBase Frequency Planning

AlvariBase operates by allocating separate frequency channels for BreezeACCESS and WALKair carriers. Up to 8 frequency channels can be supported by a single outdoor unit (RFU) and antenna set, corresponding to a base station sector. As with any point-to-multipoint radio system, careful radio planning must be performed in order to achieve effective radio frequency propagation, reduce interference and maximize total system throughput.

AlvariBase systems can be deployed in most commonly available 3.5 GHz Broadband Wireless Access frequency allocations, from 14 MHz and up and up.

Frequency Planning with 25 MHz Available Spectrum

As shown in figure 4, when a full 25 MHz of bandwidth is available, deployment can be achieved using six 1.75 MHz channels for BreezeACCESS carriers and eight 1.75 MHz channels for WALKair carriers.

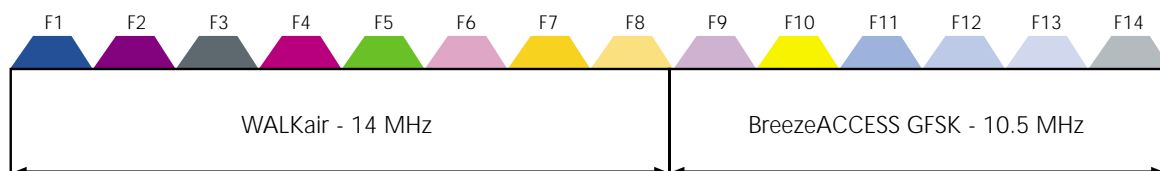


Figure 4 - AlvariBase Frequency Planning - 25 MHz

Figure 5 shows two options of how the carriers are deployed in a six-sector cell:

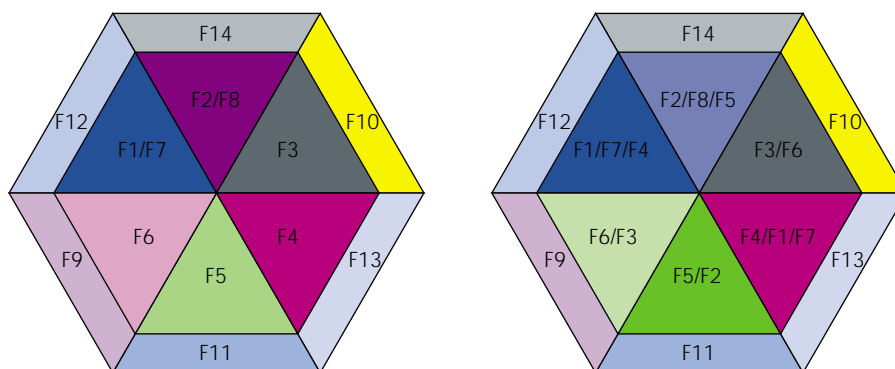


Figure 5 - AlvariBase Frequency Deployment - 25 MHz

In this deployment, one BreezeACCESS carrier is deployed per sector. In option I, there is one WALKair carrier per sector, with the exception of two sectors which have two carriers. In the more aggressive option II, half the sectors have two WALKair carriers, and the remaining half have three WALKair carriers. These scenarios take advantage of the WALKair systems reuse factor of 2, allowing each frequency to be re-used within a cell, so long as it is not re-used in adjacent sectors. With such a configuration, the total capacity of the system is:

Option I:

WALKair - 8 carriers x 4 Mbps = 32 Mbps of carrier-class data and voice

BreezeACCESS - 6 carriers x 3 Mbps = 18 Mbps of data and VoIP

Option II:

WALKair - 15 carriers x 4 Mbps = 60 Mbps of carrier-class data and voice

BreezeACCESS - 4 carriers x 3 Mbps = 12 Mbps of data and VoIP

Frequency Planning with 14 MHz Available Spectrum

As shown in figure 6, when only 14 MHz of bandwidth is available, deployment can be achieved using three 1.75 MHz channels for BreezeACCESS carriers and four 1.75 MHz channels for WALKair carriers. A guard channel is used to ward off interference.

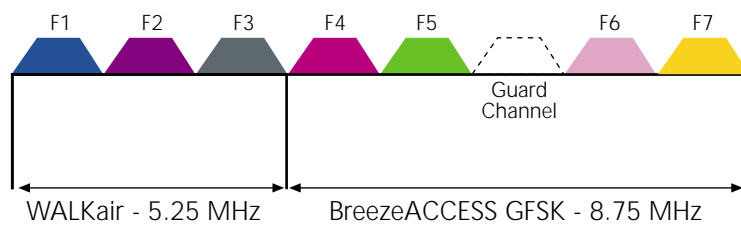


Figure 6 - AlvariBase Frequency Planning - 14 MHz

Figure 7 shows how the carriers are deployed in a four-sector cell:

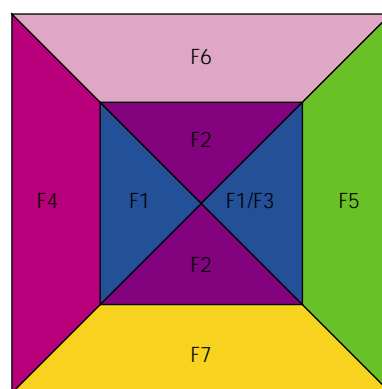


Figure 7 - AlvariBase Frequency Deployment - 14 MHz



In this deployment, one BreezeACCESS carrier is deployed per sector, along with one WALKair carrier per sector, with the exception of one sector, which has two WALKair carriers. This setup takes advantage of the WALKair systems reuse factor of 2, allowing each frequency to be re-used within a cell, so long as it is not re-used in adjacent sectors. With such a configuration, the total capacity of the system is:

WALKair: 5 carriers x 4 Mbps = 20 Mbps of carrier-class data and voice

BreezeACCESS: 4 carriers x 3 Mbps = 12 Mbps of data and VoIP

AlvariBase: The Quick Path to Profitability

Operators deploying Broadband Wireless Access system can address a narrow market segment with a specific set of services. Alternatively, operators may choose AlvariBase, and with an equivalent investment, address a wide market with multiple service options. With a narrow market, the potential revenue is relatively small, while with AlvariBase, the potential for revenue increases significantly.

Table 2, below, outlines a simplified business case of three imaginary operators, each targeting a specific market segment with a particular offering.

	Operator A	Operator B	Operator C
Target Customers	High end residential, SOHO	Small businesses	Medium sized businesses
Service Offered	Internet + 2 POTS	Internet, VPN + 8 POTS	Internet, VPN and E1
Monthly Revenue	Data: \$50 Voice: \$100 Total: \$150	Data: \$250 Voice: \$400 Total: \$650	Data: \$700 Voice: \$2,500 Total: \$3,200
Number of Customers in Market	10,000	5,000	3,000
Penetration Rate	20%*	10%*	10%*
Monthly Revenue from Data Services	2,000x\$50=\$100,000	500x\$250=\$125,000	300x\$700=\$210,000
Monthly Revenues from Voice Services	1,000x\$100=\$100,000	250x\$400=\$100,000	100x\$2,500=\$250,000
Total Monthly Revenues	\$200,000	\$225,000	\$460,000

Table 2 - Segment Operator Business Case

* Part of the customers require data only, part of them voice only and part of them data and voice

A single operator using AlvariBase to address all three markets would be able to leverage most of the capital and operational costs, while reaping the revenues of all three markets. Table 3, below, outlines a simplified business case of an imaginary operator addressing all three markets:

Integrated Operator			
Target Customers	High end residential, SOHO	Small businesses	Medium sized businesses
Service Offered	Internet + 2 POTS	Internet, VPN + 8 POTS	Internet, VPN and E1
Monthly Revenue	Data: \$50 Voice: \$100 Total: \$150	Data: \$250 Voice: \$400 Total: \$650	Data: \$700 Voice: \$2,500 Total: \$3,200
Customers in Market	10,000	5,000	3,000
Penetration Eate	20%*	10%*	10%*
Monthly Revenue from Data Services	1,500x\$50=\$75000	500x\$250=\$125,000	300x\$700=\$210,000
Monthly Revenues from Voice Services	1000x\$100=\$100,000	250x\$400=\$100,000	100x\$2500=\$250,000
Total Monthly Revenues:	\$200,000	\$225,000	\$460,000
Total Monthly Revenues from the Entire Market	\$885,000		

Table 3 - Broad Market Operator Business Case

* Part of the customers require data only, part of them voice only and part of them data and voice

As can be seen from the illustrations above, by using AlvariBase to widen the target market and service offering, revenues are increased by several factors. The additional revenues are generated without significantly increasing capital or operational expenses. Thus the return and investment period is decreased, and profitability increases.

Summary

Alvarion has introduced AlvariBase, in order to allow operators to generate increased revenues by widening their application offering and customer base with a single all-in-one solution. AlvariBase marries WALKair and BreezeACCESS, the market leading Broadband Wireless Access systems, allowing operators to deliver the service the customer wants, at the price they need. AlvariBase never leaves a potential customer un-served.





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