Deploying WiMAX Now

Migration Guidelines from an 802.16-2004 to an 802.16e-2005 Network

Solution Paper

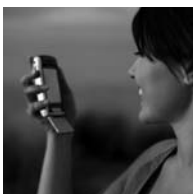**Deploying WiMAX Now**
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Introduction

Service providers are facing an increasingly pressing decision about implementing a WiMAX network: should they invest in IEEE 802.16-2004 WiMAX today or wait for 802.16e-2005 WiMAX? What are the costs and benefits of each approach or better yet, is it possible to do both?

With the most WiMAX networks deployed worldwide and helping to lead the WiMAX standards process from the beginning, Alvarion is uniquely positioned to assist service providers in determining their own WiMAX network strategy. Offering its WiMAX Certified™ BreezeMAX™ system since 2004, Alvarion has helped numerous operators establish 802.16-2004-based WiMAX networks to gain valuable market share, revenues and WiMAX experience. And with the announcement of its end-to-end 802.16e-2005 solution, Alvarion can combine its carrier-class, field proven WiMAX products with a carefully crafted network strategy to quickly migrate the network to add 802.16e-2005 at the appropriate time and for a relatively low cost.

So carriers can benefit today from a field-proven WiMAX solution that will offer mobile applications over time as an 'all-in-one' system supporting 802.16-2004 and 802.16e-2005 standards, FDD and TDD technologies—all in a single box.

Executive Summary

Alvarion's WiMAX solutions strategy enables service providers to gain immediate value from operating a WiMAX network today, while having a quick, easy, and inexpensive way to later upgrade their networks to 802.16e-2005. In the short term, service providers adopt 802.16-2004 WiMAX to capture valuable market share, revenues, and WiMAX experience. Later, when they are ready to upgrade to 802.16e-2005, they can do so with minimal cost and service-related inconvenience to end users.

Migration from 802.16-2004 to 802.16e technology requires a network upgrade that also includes the integration of additional core network elements, such as home agents, ASN gateways, and others are also required, so to constitute a fully mobile WiMAX network a number of complementary steps must be taken.

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Any migration process involves both base stations and customer premises equipment (CPEs), and also introduces new elements into the network, Alvarion focused on three criteria when crafting its migration strategy:

- Maximum investment protection with limited additional investment required,
- Minimum service-affecting implications,
- Minimal end user involvement.

Complying with the above criteria, Alvarion's migration strategy has two major elements:

- CPEs that support both 802.16-2004 WiMAX and 802.16e-2005 WiMAX including the ability to switch between the two, activated by a command from the management station through the base station.
- A carefully crafted process designed to both upgrade and adapt the rest of the network in minimal time to its final structure as an 802.16e-2005.

Build Your 802.16-2004 WiMAX Network Today, Migrate When You Want

Some operators may hesitate to build an IEEE 802.16-2004 network now, rather than waiting for a fully stable 802.16e-2005 network to save on migration costs and resources.

However, numerous operators—over 200 deployments worldwide and counting—have concluded that building Alvarion WiMAX networks today is their best WiMAX strategy. Their reasons are straightforward:

- **Generate Immediate Revenues, Market Share**
  Leveraging Alvarion's market leadership and field-proven, off-the-shelf equipment from know-how gained in more than 150 countries, service providers know they can quickly and easily deploy a revenue-generating WiMAX network today. They see the benefits of competing now with new entrants and new technologies in the market including others doing 802.16e-2005, 3G, etc.
- **Painless Migration**
  With the right migration plan, service providers view the costs of network migration to 802.16e as considerably smaller than perceived given almost no cost to migrate existing CPEs, minimal changes to existing base stations, and the seamless coexistence of new CPEs and base stations. When taking into account the differential market share gained by early entry to the market, migration costs are considered negligible.

Alvarion's Migration Strategy

Alvarion's migration strategy focuses on software changes with minimal hardware updates required. After achieving an operational 802.16-2004 network, service providers can decide—based on market demand—when and what part of their networks should be migrated to 802.16e-2005.

Taking into account cost minimization and the various migration strategies of other companies and technologies, Alvarion's migration strategy addresses both CPEs and base stations with the following considerations and elements:

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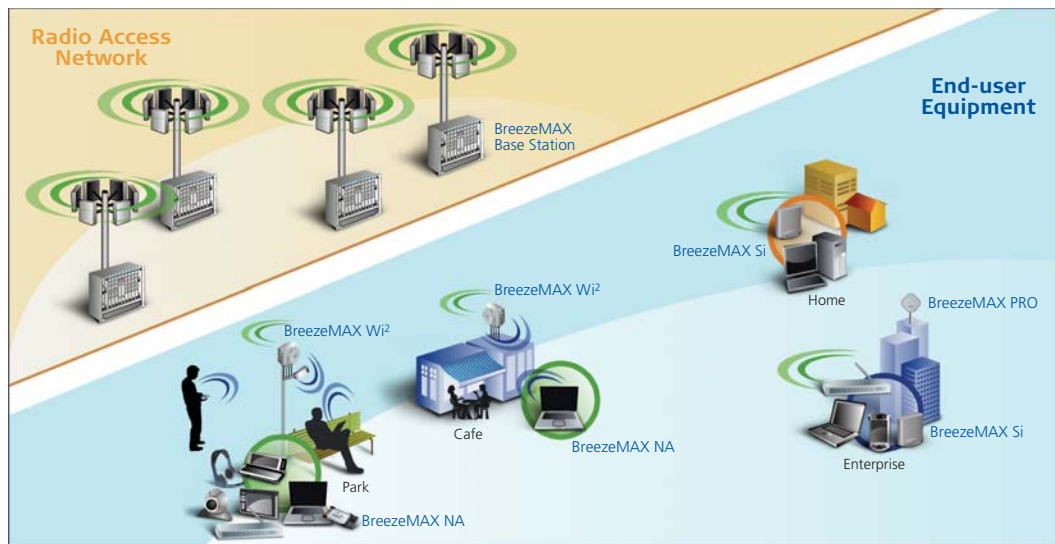
Alvarion's Personal Broadband
Today

Customer Premises Equipment

Since the number of CPEs in a network is typically 100s to 1000s of times the number of base stations, minimizing CPE migration costs is a critical factor in the migration business case. So Alvarion's use of Intel's dual mode base stations chipset—supporting both 802.16-2004 and 802.16e-2005 modes—in its CPEs enables a simple over-the-air software upgrade and command from the management system to automatically switch CPEs between modes.

And since Alvarion CPEs also support two version of CPE software, the complementary software required for the migration can be pre-downloaded to each CPE prior to rollout.

These capabilities not only minimize migration costs, but also enable operators to continue to acquire new subscribers during the migration process.

Base Station

To migrate the base stations, an 802.16e line card and radio are required along with some commands from the network management system. As this process affects whole groups of users, it should be carefully planned and done with advance warning to end users and during a low traffic period, and only once an operator decides to conduct a full migration to an 802.16e network. In this way, service providers can minimize capital expenditures while improving their ROI and revenues. Note that for migration, all new elements of the network required to offer mobile services—such as ASN gateways, home agents, and other systems—should be implemented and validated prior to rollout.

All migrations must also take into account the duplexing mode of the existing network, be it FDD or TDD. While the principles outlined above still apply, their planning and implementation are dependant on each specific network situation.

And once network migration is complete, the operator will have an Open WiMAX™ Architecture network enabling the use of best-of-breed systems from third parties.

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Overlay Network

Another possible migration strategy is to deploy an overlay network. This option needs to be carefully considered on a case by case basis, as numerous factors such as available bandwidth, geographical coverage, expected number of customers, possible additional costs, and other considerations will determine the cost-effectiveness of doing an overlay network.

Advantages of the Alvarion Migration Strategy

Alvarion's migration strategy has several distinct advantages:
- Requires no additional bandwidth
- Achieves all basic network requirements
- Secures investment and requires minimal associated costs of operators and end users
- Minimal service-affecting implications
- Requires minimal involvement of end users
- Preserves network flexibility supporting both 802.16-2004 and 802.16e-2005
- Enables portable and mobile CPEs to access different networks, air-interfaces
- Enables operators with dual WiMAX networks the ability to use a single CPE for all customers

Summary

Alvarion, the WiMAX market leader, offers both 802.16-2004 and 802.16e-2005 solutions and has a clear migration strategy from one standard to the other. Devised based on the requirements of current WiMAX operators worldwide who have decided that revenue and market share advantages outweigh the challenges of network migration, the strategy focuses on software upgrades for the CPEs in order to minimize cost. With a fast and efficient network transition, the migration strategy also protects operator investment.

In general, it seems clear that there is a distinct advantage to establishing an 802.16-2004 network today—to generate revenues, gain market share, and accumulate WiMAX experience—migrating later to an 802.16e-2005 network as market demands dictate.

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Get the benefits of WiMAX today and stay ahead of the competition tomorrow

Use Alvarion's migration strategy to move to 802.16e-2005

Get on the path to mobility NOW

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