Fine Point Technologies

White Paper – Benefits of the AdvancedTCA Specification in Residential Broadband Services

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Table of Contents

Introduction

Broadband residential services are growing, bandwidth is in greater demand, prices are being lowered, and competition is being created. The market is as alive and as competitive as ever. This has driven the need for a common standard hardware platform originally created for tier 1 Central Office (CO) environments and was partly driven by those tier 1 providers' in order to lower hardware costs by eliminating proprietary based hardware platforms for each application residing in the CO.

The benefits of this Advanced Telecom Computing Architecture (ATCA) and the software companies creating applications for it are being realized by all broadband providers rolling out internet service and services. This paper will describe the benefits of providing broadband residential internet / services on the Advanced Telecom Computing Architecture such as decreasing the time to market while as the same time decreasing the cost.

Broadband Internet Service Providers: the Landscape is Changing

Over the last several years, internet services have changed and continue to change. Demand for speed is increasing, the end user is demanding more bandwidth, more services, and of course all at a lower cost. New access technologies have come and gone, but some have stayed. Wireless services are allowing for less expensive ways to compete with the wired providers. Broadband over Powerline (BPL) could very well introduce a new competitor to the traditional wired service providers as well. New services are being introduced, such as Voice over IP (VoIP), increasing the need for bandwidth, not only on the last mile but across the infrastructure as a whole.

Those are just some of the examples of the changing landscape that is the broadband Internet Service Providers' (ISPs) world, but each example has three things in common, the increased costs to the service provider, increased time to market, and the increased chance of customer churn.

Advanced Telecom Computing Architecture

Advanced Telecom Computing Architecture (also know as AdvancedTCA or ATCA) is a set of hardware standards from the PCI Computer Manufacturers Group (PICMG) for the next generation of high-availability carrier grade communications equipment. The ATCA specification was released in late 2002 and involved over 100 members of PICMG in its standardization and is the first open industry specification for carrier grade equipment.

The goal of creating the standard was simple, to eliminate the proprietary platforms that exist and forcing equipment vendors to become interoperable with one another.

It also allows for OEMs to be less nervous to start new projects and allows equipment manufacturers and software development companies to reduce costs. Those reasons alone do many things, among them they reduce a service providers' time to market as well as reducing their product purchase costs.

Reduced Expenditures for Internet Service Providers

The main benefit to creating a common standard based hardware platform is decreased costs for service providers. A standard unified hardware platform creates competition. Competition and demand drives prices down. It really is that simple. With a standard unified platform creating competition and lower price points this type of Tier 1 equipment becomes very affordable for competitive service providers as well as for the Tier 1 providers it was created for.

Competitive and "Independent" service providers can roll out cutting edge technology and hardware at a 3rd the cost of the proprietary network equipment vendors' costs. Take the ServPoET BMS 1000 as an example which is a Broadband Residential Access Server (BRAS) specializing in Point to Point protocol over Ethernet (PPPoE). A provider can deploy a single unit capable of 72,000 simultaneous PPPoE based subscriber sessions (largest capacity for a BRAS) or the same unit with complete failover redundancy for 36,000 simultaneous subscribers for approx 3 or 6 dollars per subscriber, respectively instead of up to 15 or 30 dollars per subscriber with traditional network equipment providers' solutions.

Since costs are lowered for the hardware this also allows for smaller companies such as Fine Point Technologies to create Tier 1 level solutions on Tier 1 level equipment without the large investment needed to create proprietary hardware solutions. This allows competitive solutions vendors in to the same market space as the large network providers since the hardware playing field has been leveled. This creates application competition as well as the previously mentioned hardware competition, which also lowers the costs for the applications, not just the hardware.

Increased Application Availability

A standard such as ATCA addresses all the tier 1 central office requirements for hardware specifications, which means the only thing software vendors now need to concern themselves with is the application itself. Lower costs allow software vendors to realize new markets; it also gives them the ability to focus on creating new applications for existing markets that they may not have been able to afford on previous non standard hardware platforms.

In the software development space, different applications always have had different hardware requirements depending on their usage. In many cases the hardware cost prohibited selling that same application created for tier 1 environments to tier 2 and smaller service providers. With the reduced hardware costs afforded by AdvancedTCA the same exact applications with all the necessary hardware

requirements to run at the Tier 1 level, are now available to be offered to the Tier 2 and smaller markets without cost being the prohibiting factor.

The ability to decrease costs and realize more markets give software companies the ability to focus on creating new and innovative products that reduce the pains seen by ISPs all at a reduced cost to the service provider.

Multiple Vendors & Applications with Reduced Real Estate

With a common hardware platform and the announcement that many companies that would not necessary have been known as application providers announcing their support for AdvancedTCA and their release of AdvancedTCA applications the realization is now that a Service Provider can have one AdvancedTCA Chassis running multiple different applications simultaneously. A 19" ATCA chassis has slots available for 12 Single Board Computers (SBC) which can technically be 12 separate applications, and in some cases one SBC could be running multiple simultaneous applications depending on their functions, bandwidth, Central Processing Unit (CPU), and memory demands.

Fine Point Technologies for example offers two completely separate targeted applications both available on the ATCA platform. The PPPoE termination solution previously mentioned that acts as a residential access concentrator as well as a DSL Forum Standards based TR-069 solution called CWMP Device Manager that offers the ability to manage, support and fulfill CPE devices over the Internet. In this example both completely separate targeted solutions can run in the same ATCA chassis on the same exact hardware platform, not only reducing costs for hardware but also reducing rack space needed.

Scalability & Time to Market

With the creation of this standards based hardware all service providers can purchase the chassis and add capacity and applications as they grow. As previously mentioned a 19" ATCA chassis has slots available for 12 Single Board Computers (SBCs). If a service provider realizes the growth potential of not just their customer base but also applications and uses for the ATCA platform they can start with the chassis and only a few applications running on a few SBCs and as new capacity is needed or as new applications are created they can purchase just the SBCs and applications as they grow.

For example a service provider with 12,000 subscribers could use a BRAS application that was for example, 6,000 subscribers per blade; with full redundancy for the 12,000 subscribers the provider would still have 8 SBC slots empty and available. As their subscriber base grows they can simply add SBCs to increase capacity and redundancy by simply purchasing the Network Operating System (NOS)

pre-installed on a new Single Board Computer (SBC). Not only does this reduce the time to market, but also expansion costs for new and current applications since the Chassis, Power, Base Fabric Switches, Chassis Management Modules have already been purchased, installed, configured and tested.

Reliability, Availability, and Serviceability

Reliability, availability and serviceability are not just the application's responsibility but also the responsibility of the hardware itself. Reliability means features that help avoid and detect faults. Availability is the amount of time a device is actually operating as a percentage of total time it should be operating. Availability features allow the system to stay operational even when faults do occur. Serviceability can be defined as the various methods used to easily diagnose the system when problems do arise. Early detection of faults can decrease or avoid system downtime.

In the case of the AdvancedTCA hardware we can look at the many features within the AdvancedTCA specification that do address all 3, reliability, availability, and serviceability such as the Shelf Management System (SMS) which is part of the AdvancedTCA specification from PICMG. The SMS watches over the basic health of the system, reports anomalies and can take corrective action when needed. Dual Base Fabric Switches are available in order to provide the redundant backplane data communication across all applications installed on SBCs as well as for the SMS units. Also we can look at the dual redundant -48 VDC power distribution which is also part of the official specification, making for complete and redundant power handling standard with an AdvancedTCA chassis and its applications.

Increased Profitability

AdvancedTCA decreases costs and increases product availability as explained previously. When costs are reduced and applications are created more time can be focused on providing next generation services, for example Voice over IP (VoIP), or investigating new applications that reduce call center volume or at least decrease call resolution time. The ability to focus on next generation services allows Service Providers to distinctly position themselves in the market place. When a service provider can make a distinct and different marketing push in the industry they can increase their customer base.

Focusing on new applications that reduce call center volume or at least decrease call resolution time, such as the Subscriber Self Repair Solution from Fine Point Technologies, decreases churn of the existing customer base. When a service provider increases their customer base, and decreases churn, they do one very important thing: Increase Their Profitability!

Conclusion

Though the industry is evolving and competition is increasing the AdvancedTCA hardware standard created by PICMG offers service providers the items needed to excel ahead of the market demands and their competition.

Reduced hardware and application costs, increased product availability, reduced real estate, increased scalability, reduced time to market, increased reliability, increased availability, increased serviceability, and increased profitability are more than enough reasons to rollout applications on the ATCA hardware platform, but imagine the following scenario:

> A small “mom & pop” independent provider, (such as a rural wireless provider) being able to afford the same innovative, next generation, cutting edge technology solutions as their Tier 1 competitor. AdvancedTCA starts to make that imagined situation a reality and brings the innovation of the internet to more people across the globe.