ECONOMIC IMPLICATIONS OF AN ADVANCED OPERATIONAL SUPPORT SYSTEM

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Abstract

An Advanced Operational Support System (AOSS) offers Broadband Service Providers (BSPs) the means to activate (provision) multiple broadband services and streamline numerous tasks. This paper will review the benefits of AOSS while quantifying the cost savings, productivity gains, overall economic benefit, and compounded revenue that can be realized from its use.

Introduction

There are least five different areas impacted by AOSS that BSPs should consider when exploring such an investment. They include:

- *Time to Market:* The reduction in the time required to create and deploy new products and services as a result of an AOSS deployment.

- *Market Penetration & Scalability:* The increased installation capacity that results from an AOSS deployment and the ability to scale its performance in step with subscriber growth.

- *Operational Cost Savings:* The reduction in operating costs (e.g. labor, phone support, service calls, etc.) as a result of an AOSS deployment.

- *Future Proofing:* The ability to leverage/reuse the interfaces and functionality to grow the number of services (e.g. data, voice, video, gaming, etc.) supported by the AOSS.

- *Service Assurance:* The increase in service availability and reliability that results from an AOSS deployment.

Let's take a closer look at each area as well as the challenges and benefits they represent to the BSP.

Time to Market:

Too often in business, advances in technology drive product offerings. Companies acquire raw technology along with suggestions or hints from developers, vendors, and the media to create new products that they have been led to believe will sell.

Providing broadband services is one area where product offerings are excessively driven by technological advances. Many of these advances do not come in any order and, more often than not, BSPs seeking to benefit financially from these advances are faced with expensive re-fitting of their infrastructure. BSPs need to focus on meeting the needs of their customers rather than reacting to technological innovation.

An AOSS that is structured around a clear and identifiable business model enables BSPs to quickly bring new products to market. In this way, the business needs drive the technology requirements lessening the reliance on innovation while maximizing the return on existing capital investments. In other words, the business people say, "This

is what we need" to the technology people who then go about leveraging existing technology and readily accessible information about their infrastructure to build and maintain the highest quality of service.

Vendors supplying AOSS products address the needs of their customers by offering one of the following solutions:

Tightly Integrated Approach: A system of related components that have been designed (often from the ground up) to all work as a unit and provide superior functionality. These AOSS products offer the foundation for multiple service capability, reduced complexity, lower overall costs, and vast functionality in exchange for a single vendor dependency.

Component-Based Approach: A collection of individual components (or applications) that are assembled according to the needs of the customer to provide the required amount of functionality. These AOSS products permit the flexibility of somewhat interchangeable components (or reduced single vendor dependence) in exchange for higher overall costs (largely due to multi-vendor profitability requirements), more complexity, and less functionality.

While the benefits of the component-based approach are certainly important, the trend of all major AOSS vendors has been to bundle their provisioning applications together. They do this out of the need to offer full-functionality and a tightly integrated solution. Vendors still offering a component-based approach fail to match the functionality of the major vendors, as the best they are able to offer is mean functionality – only that functionality that works across all disparate components.

BSPs who do not seek a single vendor solution to their AOSS needs face a dying breed of vendors attempting to offer full-featured component-based systems. These component-based systems tend to be complex, expensive to maintain, and feature deprived. BSPs using them must take on outside consultants or develop unique integration experience among their employees to manage the complex blend of vendors required by such a system. These BSPs must also take steps to ensure these integration consultants or internal employees stay around for years to come if the resulting solution is to have any kind of shelf life. Troubleshooting between components quickly becomes burdensome and costly. In addition new features require coordination and help with integration among multiple companies resulting in long lead times and costly development. Even with acquired expertise and close relationships with all vendors, these solutions will always lack the functionality of tightly integrated solutions and find the road to new broadband service offerings slow and cumbersome. That is, unless BSPs deploying them become full-fledged development houses creating their own software. However, most BSPs want to keep subscriber and service focused so the distraction of internally designing, developing, and supporting software goes beyond their desired core competency.

If BSPs want to expand their number of service offerings but don't want to keep purchasing entirely new applications and equipment for each service offering, they need to lay down a framework on which they can build. This framework should not be an individual component of the system that BSPs must add other components to and then continually re-glue them to create new service offerings. Rather, a fully functioning framework should support all the basic aspects of AOSS – perhaps like those

described in Data Over Cable Service Interface Specification (DOCSIS). Equally important, but not addressed in DOCSIS, the framework should support interfaces to billing, troubleshooting and trouble ticketing, administration and management, etc. BSPs can use this framework to grow and expand their service offerings by merely reusing and/or expanding their existing AOSS system. Treating AOSS as a system also buys BSPs a lower incremental cost to enter new service offerings.

Deployments of entirely new systems can come with hidden costs such as the potential for impacting existing services that are fully deployed and operational. These deployments may well require lengthy and expensive risk assessments be completed and carefully reviewed before they can proceed. Fork lifting these entirely new systems into place also requires months of preparation, testing, integration, and field trials before they are ready for prime time.

Time to Market is a major consideration for BSPs exploring an AOSS investment. However, quantifying *Time to Market* can be difficult and subjective depending on the presence of any existing AOSS capability. Here are some things to consider when evaluating AOSS and *Time to Market*:

- *AOSS Installation and Deployment:* AOSS vendors vary on the time they require to install and deploy their AOSS. These times could range from 30 days to six months (or more). Since the start time can have a compound effect on your Return on Investment (ROI) moving forward, BSPs should keep this in mind.

- *New Service Rollout:* Non-AOSS supported new service rollout will generally take between six months to a year to complete - this figure could be less if minimal AOSS capability exists. An AOSS supported new service rollout may take between 60-90 days depending on amount of hardware that needs to be configured or added. As a result, AOSS empowers BSPs to offer new services in one-third to one-fourth the time it takes a non-AOSS BSP.

- *New Variation of Service Rollout:* This type of service rollout merely involves creating a new combination of service parameters to meet the needs of a different subscriber population. Non-AOSS BSPs would still take between 60 days and six months to complete. Note that completing this involves a number of organizations (e.g. sales, marketing, engineering, operations, field fulfillment, etc.). An AOSS supported rollout of this nature may take between two weeks and a month to complete with much of the effort focused on aspects other than technical (e.g. organization tasks such as training call centers, field fulfillment, marketing, etc.). As a result, AOSS empowers the BSP to offer a new service variation in one-fourth to one-sixth the time it takes a non-AOSS BSP.

- *Leverage Existing Deployed Hardware:* While this may be implied in the previous bullets on service rollouts, there are economic benefits to being able to simply reconfigure existing components to offer something entirely new to subscribers. The potential savings generated by this capability allows BSPs to prolong their investments in

new hardware while potentially creating alternative ways to meet subscriber requirements within the functional means of their existing distribution network and AOSS.

The impact that AOSS can have on a BSP's *Time to Market* can be a very subjective. Perhaps the easiest way to quantify this benefit is that AOSS enabled BSPs will reach their *Time to Market* an average of 13 weeks before non-AOSS enabled BSPs. In addition, the whole process will be cheaper and more precise.

Market Penetration & Scalability:

An ever-present fact in the business of providing new broadband services is the need to increase the number of subscribers. This is typically done through some type of installation process that, depending on the type of service, may include wiring, configuration, and/or provisioning. The size and scope of these activities depends on how well the service(s) was/were designed and built. Many broadband services require as little as a simple activation (which can be easily handled remotely) whereas others require much more, including skilled labor. The initial installation of broadband data as well as other similar services requires all three activities as well as skilled labor. The dependency on manual intervention with each installation has slowed the accumulation of these subscribers.

Seeking efficiencies is paramount when rolling out new services. New services create growth in subscriber installation/activation and require coordinated efforts between marketing, sales, and field fulfillment groups to more rapidly place these services in the hands of subscribers. Without efficiencies, growth of subscribers and profitability in the new services are slow to develop. Out of this need grew something known as "auto-provisioning". The concept of autoprovisioning was simple -- create a way to automatically activate/enroll subscribers on broadband the way the dialup industry does it. However, it did not completely work in practice and thus "Auto-Provisioning" has now branched off into a number of different installation options for broadband operators – each installation option requiring a varying degree of BSP involvement and automation. As a result, a whole spectrum of installation options has evolved for prospective subscribers ranging from totally subscriber driven installs (known as self-install) to the traditional BSP employee driven installs.

BSPs are extremely interested in exploring ways to speed and automate installations. However, many products on the market do not represent a complete AOSS because they have elected to address only certain aspects of the installation process (e.g. automating the computer configuration portion) – few take the approach of trying to streamline the installation as a whole or address multiple installation methods. As a result, the benefit from these products is minimized by the additional need to glue all these systems together to benefit only a single installation option. BSPs stand to substantially increase (between 20-40%) their installation capability by increasing the number of installation options. Augmenting their employee driven efforts to install new subscribers offers BSPs new ways to increase subscriber growth without hiring more employees. Here are some things to consider when evaluating AOSS and *Market Penetration*:

- *Multiple Installation Option Support:* Increasing the number of installation options that BSPs make available to their subscribers

distributes the responsibility of installing new subscribers. As a result, BSPs are not solely dependent on the their current number of installers to gain market share. Instead, this chore falls upon the technology (AOSS) as well as multiple BSP subscriber support organizations. By augmenting traditional BSP employee driven installs, BSPs can increase their install capacity by and average of 20 percent. This increase represents the additional install capacity realized through the addition of self-install (contributes a 5% increase in install capacity) and semi-manual installs (contributes a 15% increase in install capacity).

- *Enhanced Employee Driven Installs:* Introducing an AOSS provides a number of efficiencies to a BSP's existing employee driven installs. These efficiencies enable the BSP installer to streamline a number of ordinary tasks including streamlining verification of the subscriber's equipment meeting minimum specifications, provisioning, software installation, and operational checks. The result of these efficiencies results in an increase in install capacity by and average of 20 percent.

- *Packaging Support:* The ability to offer the same set of services over all markets or to have the flexibility to offer customized service offerings to targeted markets. Packaging support offers BSPs the ability to increase demand for services by tailoring services to subscribers, select markets, etc.

- *Compounded Revenue Effect:* The additional revenue generation that results from the increased installation capacity of AOSS that is realized over traditional BSP installation methods. Essentially AOSS creates opportunities to install more subscribers each year over traditional BSP installation methods. This surplus of installation capacity will generate revenue that can be above and beyond what would have other wise been possible using traditional BSP installation methods. This revenue can be compounded and saved or used to fund additional subscriber acquisition enhancement mechanisms.

Closely related to increasing the number of subscribers maintained by the BSP is the capacity of the BSP AOSS to grow/scale with the BSP needs. AOSS *Scalability* is not something that sticks out when evaluating an AOSS and unfortunately there is not any standardized means to measure it or compare one vendor's means of addressing this with another. Instead, it's a process of due diligence that must be completed for each vendor to ensure that their product/solution will indeed be able to support the numbers of subscribers that are being projected.

If the AOSS does not grow/scale with the BSP needs, it will ultimately limit future growth in the various services it supports. Here are some things to consider when evaluating AOSS and *Scalability*:

- *Consider its Composition:* Explore what makes up the AOSS, which parts are homegrown and which parts are third party, and consider the framework of the underlying code.

- *Review the Range of Solutions:* Determine how far each AOSS vendor can grow and determine which pieces get added/replicated/or reused (if any) as the AOSS is called upon to address increasingly larger numbers of subscribers.

The impact that AOSS can have on *Market Penetration* is very well understood. Depending on the capability of the AOSS the BSP should expect to see between a 20-40% increase in their installation capacity. What this means is that by installing an AOSS a BSP can increase their installation output by 20-40% (assuming demand is there) without bringing in additional install personnel.

Operational Cost Savings:

Rarely does a newly installed broadband service meet the highest efficiencies possible. This only happens over time, as various details about a service are better understood. These efficiencies may well be organizational or procedural or both. Other efficiencies will have technical or operational communications dependencies – it is these efficiencies that can be addressed with AOSS.

BSPs who invest in an AOSS find that they are not just buying technology that can help them interface with equipment and other applications – they are also buying expertise. Each AOSS represents an accumulation of best practices obtained through years of exposure to BSPs' products, services, and personnel. These best practices can range from the addition of new technology that streamlines a particular task to complex associations and communications that can connect a number of different tasks eliminating some employee's responsibility.

BSPs who are just beginning to explore an AOSS investment or deploy a new broadband service find that they can be effectively catapulted into greater operational efficiency through deploying a new AOSS. This ultra efficient state allows BSP employees to worry less about technology and more about the most important thing – their subscribers. By streamlining tasks the employees are able to spend more time one-on-one with the subscriber – reinforcing their decision to choose the BSP over some other provider.

Here are some things to consider when evaluating AOSS and *Operation Cost Savings*:

- *Account maintenance:* This is an activity where information about the subscriber's account, devices, service, etc. can be modified. The modification performed includes add, modify, or delete and traditionally this has been done over the phone. AOSS allows a subset of these operations (those frequently asked by customers) to also be completed via the subscriber's personal computer. By augmenting call centers, BSPs can decrease their phone support costs by an average of nine percent.

- *Employee Training:* Since AOSS has the ability to automate a number of tasks associated with BSP field technician's work, the size and scope of the technician's duties at the customer residence can be reduced. In fact, this reduction in duties can even result in a change to the field technician skill level required for new services (e.g. voice and data). It is conceivable that through continued

advancements in AOSS that field technicians will require increasingly less specialized skills to install voice and data services. At that point, all installs will appear as standard video installs with the technician performing all the wiring and connections and then technology playing a key role in simplifying and completing the service specific tasks. In this way, BSPs can leverage the AOSS to lower their risk of training employees for their competitors while standardizing their install costs across multiple broadband services. AOSS is well on the way to achieving this goal while reducing the labor costs for installs.

- *Subscriber Education:* One of the keys to offloading calls into BSP call centers is a better-educated subscriber. Subscribers constantly seek information about changes to the service, service availability/performance, and how to do various tasks. AOSS can help augment BSP employee driven efforts to provide this information to subscribers by placing this information on line as well as on the subscriber's computer. With this information readily available a good percentage of subscribers can resolve problems independently. As a result, BSPs may see a reduction in call center information requests and potentially fewer service calls depending on how aggressively this area is approached by the BSP.

- *Service Calls:* BSPs track several service specific indicators that help them gauge how well each of their organizations are doing. One area of particular interest is service calls to new installs that happen within 30 days of the install. This particular service call is very costly to the BSP as it typically represents a poor quality initial install and can be detrimental to the subscriber's confidence in the overall service quality. While the reasons for these service calls may vary, they are due in large part to the lack of standardization of the install process. Each install is unique and handled by any one of several field technicians. Although all field technicians receive the same training, tools, and install the same service, their finished product (a completed install) varies from one installer to anther. These variances in the completeness and quality of the overall install occasionally show up when a service call is requested from a newly installed subscriber. When this happens the original installer may be advised on what (if anything) they did wrong. However, this feedback loop, that can include additional training for the field technician, is not a sure fix. The AOSS can help standardize installs by automating various steps the field technician takes regarding subscriber computer installation and configuration to ensure that all necessary steps are completed. If the field technician uses such a tool, their BSP employer can be assured that a portion of the install was completed the same as any other subscriber's computer. *Note: the wiring will remain a task that varies from one field technician and subscriber dwelling to another.* By standardizing subscriber installs, BSPs can decrease their service calls to newly installed subscribers by an average of 18 percent. *Also note that*

as service calls are reduced due to AOSS capability (which results in increased revenue and decreased costs) it creates a compound revenue impact.

The impact that AOSS can have on *Operational Cost Savings* is mixed. Some aspects of the projected savings have been well researched and their numbers confirmed while other areas are still subjective. Depending on the capability of the AOSS as well as how aggressively the BSP pursues these efficiencies, the BSPs that forge ahead in this area should expect to see at least a 20% reduction in their overall support costs.

Future Proofing:

Investing in an AOSS should not be something done for a single service rollout. Rather, it is an act of planning for the future. Essentially, AOSS lays down a framework on which one can build a number of services. Similar to DOCSIS that builds upon former releases; so should the AOSS in providing an increasing number of services that effectively reuse as many existing components as possible. It represents the thinking of interfacing with all the necessary BSP service components (e.g. trouble ticketing, network operations, subscriber management systems, billing systems, network/hardware appliances, etc.) and then builds on top of these interfaces a strong, scalable, and reliable base that will support any number of additional services and functions.

To *Future Proof* means to create something that can endure and assimilate with changing BSP needs over time. This area is subjective only to the point that the BSP finds that offering a new service requires a completely new system. A completely new system involves purchasing and installing new hardware and software to run the system as well as all the other necessary components to operate it – network management software, troubleshooting software, training, billing interface software, etc. Since these would be entirely new applications, the impact on training as well as equipment/rack space would be significant. Instead, if this only required a new module of an existing, completely implemented system, the impact of change would be "manageable". All the training would be within an environment that is already familiar to the employees. Additionally, new services would generally not represent additional hardware but rather reuse that which is already deployed. One other aspect of trying to install a number of independent systems for each new service is that it places varied dependencies on existing applications maintained by the BSP (e.g. network management, trouble ticketing, billing, etc.). So if any of these systems became outdated, replacing the system might break one or more of the services dependent on the interface. Having fewer interfaces into these BSP applications reduces the risk that something will break during a transition.

The impact that AOSS can have on *Future Proofing* is subjective but only to the point where offering multiple services becomes a priority to the BSP. If the BSP does not feel a need to offer multiple services the need for an AOSS is minimal. However, since this is a priority for most BSPs, there is a need to justify the expense of investing in an AOSS in terms of the overall savings it could generate as well as the number of broadband services it can deliver.

Service Assurance:

Running a broadband service requires a high degree of technical expertise and most

importantly -- consistency. As BSPs provide service to an increasing number of subscriber dwellings, the pressure to maintain initial service quality and reliability requires substantial attention of BSP technical staff. The case where the BSP delivers an "always on" broadband service provides the most challenging aspect of maintaining performance and scalability.

The introduction of AOSS within this environment provides opportunities to tie previously autonomous systems together. The resulting tightly integrated system provides real-time information about various network devices with a particular focus on those directly used by subscribers (modem, media terminal adapter, set top box, computer, residential gateway, etc.). Unlike network management systems that oversee the health of fixed assets (such as routers, servers, etc.) within a network, the AOSS focuses its attention on the health of subscriber specific devices as well as the communications between network elements used by the AOSS. Subscriber specific devices fall out of the space network management systems can comfortably observe as they can change over time and the network management system is not the authoritative source for this information.

The impact that AOSS can have on *Service Assurance* varies between AOSS vendors and can be very subjective depending on the functionality provided. While it makes sense that BSP subscribers want to know when and why their service is unavailable, it is very difficult to provide a figure that justifies the savings a BSP should expect as a result of deploying any given AOSS. Regardless, the BSP should expect that an AOSS with built-in *Service Assurance* should provide operational efficiencies that extend beyond the capabilities of their network management system.

Conclusions:

Exploring the need for an AOSS is not just an exercise in determining what services are next in line to deploy and what components are available to assist in this deployment. AOSS is something that, after it is deployed, continues to grow along side the demand/need for additional services and variations of service.

The economic implications of deploying an AOSS reach areas of operations, field fulfillment, call centers, and even engineering. While some of the benefits of AOSS remain subjective, an increasing number of them have been thoroughly researched and verified in the field. In fact, a number of these benefits have been incorporated into ROI models that AOSS vendors are now circulating to BSPs in order to help them more fully comprehend the impact of introducing an AOSS.

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