Application Service Provisioning
- Current State and Partnership Strategies

Päivi Kallio

VTT Electronics, Embedded Software
P.O. Box 1100
FIN-90571 Oulu, Finland
Paivi.Kallio@vtt.fi

Abstract: The European Application Service Provisioning (ASP) market is estimated to grow to USD 8.2 billion in 2003. Application Service Providers are companies that provision software applications over the Internet. The ASP will change traditional software businesses by turning software applications from products to services.

This study researched the state of the current software business, ASP and the ability of Finnish software companies to gain partners in the international ASP competition based on the situation in November 2000. The current state of ASP business was examined by researching literature and four Finnish software companies that make use or are going to make use of ASP in the future.

Because the concept of ASP is new, the amount of previous researches concerning ASP is very limited. The current state of software companies in this research is based on a study made by Forsell and Nukari in 1999 and on an international research of 100 software firms made by Harvard Business School in 1999.

In this research it was found out that Finnish ASPs seek value added service and technology partners on the basis of their quality and trustworthiness. The partners co-operate in marketing, support and research. The current ASP market is fast changing, fast growing, immature and uncertain, but the faith in it is very strong. Finnish companies regard finding competent partners difficult because of the still immature market. Technology and security do not prevent the widespread use of ASP. The keys to success in the ASP market are co-operation with qualified partners, specializing in existing strengths, and qualitative and secure software products.

1. Introduction

Characteristic of the recent IT business is high speed and US dominance. The growth of the Internet, acceptance of Java, lack of talented IT people and high speed of development are moving the software business towards a new direction where applications are outsourced and used over network [An00c, 2-3]. The companies that outsource applications are called Application Service Providers (ASPs):

> "An Application Service Provider (ASP) is any organization or third-party that provisions software applications over the Internet" by hosting and managing the applications and coordinating their ongoing support, maintenance and upgrades. (modified from [An99a])

The European ASP market is estimated to reach its top-level in 2003 [An00e]. The concept of ASP has emerged only recently and therefore scientific researches about the subject do not exist yet. Most pieces of the related work handled in this research are therefore survey type publications.

Walton [Wa00] has researched whether customers using ASP were satisfied with the ASP applications. According to Walton, satisfaction level was greatest for the ASP-based personal/desktop productivity applications. In 1999, IDC researched 1000 IT companies [To00] and found out that the biggest driver in adopting ASP services was the lack of IT-talent. According to IDC, only 40 percent of the IT professionals and 50 percent of the corporate executives knew the term ASP. In 2000 Sonera researched 300 companies to find out what companies respect in ASP service providers. According to Sonera's study the provided service has to be secure, easy, fast and cheap to implement, and available when needed. [Ma00]

This paper seeks answers to two questions: what is the current state of ASP business and how do the searched software companies find their future in the ASP business by examining literature and by interviewing representatives of four Finnish software companies. Of the researched companies one provides software for information security, one office and business solutions, and two enterprise solutions. Three of the researched companies already use ASP as a marketing-channel and the fourth one has intention to do so in the near future. The companies were selected on the basis of their involvement with the ASP business. The views of the researched companies were examined by using a qualitative research method that is based on a verbal analysis of the research objects. The researched companies were sent a list of questions that they were expected to answer.

The second chapter of this research deals with trends and partnership in software business and its potential development areas. The third chapter presents the basics of ASP by discussing the most essential features of ASP. The fourth chapter presents four Finnish ASP companies and their strategies and views concerning ASP. The last chapter summarizes the results of the research and discusses how software companies could compete in the international ASP market.

2.   Analysis and trends of the current state of software business

First software products for the mass-markets were developed in the 1950s. Today changing platforms, new environments and tough competition of skilled workers are a challenge for all the participants of the software markets. Because of the tough competition, the life cycle of the software products has become shorter and they are advertised even before any single line of code has been written. [Ho99] According to Forsell and Nukari (1999), in the future the strategic decisions of the Finnish software companies will be most influenced by the lack of personnel, globalization, development of technology and increased importance of the Internet.

The tough international competition and customers' search for one-stop-shopping has laid foundation on the co-operation of companies. To succeed, software companies seek value added and supporting partners. *Value added partners* increase the value that the customer experiences to gain from the use of software. Value added partners often leverage expertise to implement and help to sell applications. In the ASP business, value-added partners usually capture a recurring monthly payment per customer. [An00g]

Supporting partners of software companies do not directly add value to the company's software products, but provide the required basic technology and take care of some managerial tasks. These partners may have a rather crucial role as providers of network connectivity, security, and electronic data transfer. The ASP market requires, for example, partnering with companies that develop and manage data centers and offer application hosting services. [Ko00; An00g]

2.1   Strength and weakness of the Finnish software industry

The following SWOT-analysis is based on the research of Forsell and Nukari [FN99]. The purpose of the SWOT-analysis is to recognise internal strengths and weaknesses and external opportunities and threats. Analysed weaknesses should be removed or turned into strengths, external opportunities utilized, and threats minimized. Strength and weakness- analysis is an internal company exercise to gauge the ability to compete effectively. Opportunity and threat- analysis centers on competitors and on the external environment that affects a company's ability to compete effectively. The primary strength of SWOT-analysis is matching the specific internal and external factors and evaluating the multiple interrelationships involved. The main purpose of SWOT analysis is to find out the core competencies and to adapt effectively to the changing environment.

Finnish companies should concentrate on their strong areas (Table 1). Finnish software companies feel that finding the right distribution channels and partners is one of the main difficulties in entering the foreign markets. [ALT99] Effective partners fill companies'

gaps in technology, speed the time to market and allow the companies to focus on their key competencies.

Table 1. SWOT of sales and marketing (modified from [FN99]).

Strengths	Weaknesses
· Innovative products · Companies have only some core-products · Ability to use the Internet	· Not enough needs to internationalize
Opportunities	Threats
· The EU unifies	· Tougher competition · Commercial barriers outside the EU

The biggest weakness with regard to the software technology is the small domestic market (Table 2). The software technology of Finnish companies should be developed into an internationally acceptable level when entering the international market.

Table 2. SWOT of software technology (modified from [FN99]).

Strengths	Weaknesses
· Good infrastructure · Willingness and ability to use the most recent technology	· Not very much national, technological competition
Opportunities	Threats
· Networking and demand on mobile applications increase	· Changing standards

2.2   Development areas in the Finnish software industry

The following analysis of the potential development areas of the Finnish software industry is based on the results of a seminar arranged in 1999 [ALT99]. According to the attendants of this seminar, Finnish software companies should concentrate on nine areas of which the two most important ones are handled in this section, viz. software products for mobile environments and information security applications (Table 3. In addition, we address enterprise applications.

Table 3. Potential development areas in Finnish software business.

Strengths	Weaknesses
Mobile environments: (modified from [ALT99, 48] · Strong technological knowledge of mobile IT-business end encrypting-methods · Knowledge of mobile data equipment and WAP-services · Knowledge of technologies concerning high usability Security and enterprise applications (modified from [ALT99, 50]): · Industry is based on a modern vision of network environments · Positive attitude towards commercial information security business · Standard-models suited to all customers	Mobile environments: · No knowledge of standardization and business management & sales · Finnish working environment and paying methods differ from the internationally used ones Security and enterprise applications: · Few top-companies in the business · Small domestic market · Knowledge is split into small companies that compete against each other · The market already highly competed · Lack of talented IT-people · Different accounting standards in different countries
Opportunities	**Threats**
Mobile environments: · Development in this area is just beginning · Transfer from voice-services to data-services Security and enterprise applications: · Various needs and solutions · End-to-end-solutions with the co-operation of several companies · The market grows enormously fast · Large amount of companies in the business enables the birth of small, specialized companies · Sophisticated solutions to certain segments	Mobile environments: · Nokia hires all potential employees · High employment costs · Wrong strategies in internationalization Security and enterprise applications: · The companies too nationally focused · Hard to enter the global projects that are created with big money · Lack of top-companies in the business · Information needs differ according to the customer · The safety problems concerning personal and secret information

Finnish companies that produce software for mobile environments have good chances to survive because of their strong technological knowledge, but poor sales and business

management skills can prevent entering the international ASP market. In order to gain international success, the security applications business should be developed by creating standards, new technologies and component libraries. The companies should co-operate more to combine their products into functional entities.

3. Application Service Provisioning

The flourishing amount of ASP companies has raised the question, if the hundreds of companies calling themselves ASPs really are ASPs, because some ASPs offer full-service from end-to-end while others just produce the software applications. Figure 1 illustrates the dynamics that has been fueling the growth of the ASP market.

Technological development has enabled the birth of ASP, and the lack of IT-staff and willingness to save costs and receive new customers are fueling it (Figure 1). In practice, ASP may remarkably change the way software industry works. The applications may no longer be physically installed to PCs but used via browsers. ASP's main difference compared to the traditional sales of software is its service-character. Services are produced and consumed simultaneously, and the customer takes part in the consumption process [Gr90]. ASP forces the companies to customize their services and to focus on the customer service and network reliability [Yu00].
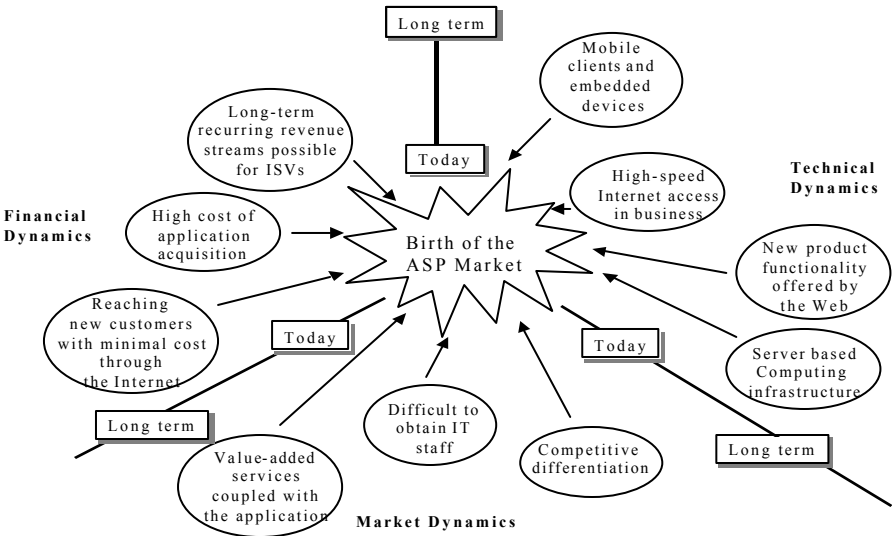

Figure 1: Dynamics fueling the ASP Market (modified from [An00f]).

The best information sources of ASP industry are the three non-commercial Internet-portals formed to serve the needs of ASP community: the ASP Island (http://www.aspisland.com), the ASPstreet.com (http://www.aspstreet.com) and the ASPnews.com (http://www.aspnews.com).

3.1 ASP business model

ASP will change the traditional way to perceive value chains. In the ASP model the value chain consists of value-added and supporting services. Every company can offer various services and thus participate in one or several stages of the value chain. The various companies participating the value chain are categorized according to Cherry Tree & Co. [An99b] in the following way:

- · Independent Software Vendors (ISVs).
  An ISV develops software applications that can be run on various operating system platforms.
- · Telecoms
  The telecoms provide telecommunications services and operations and can leverage both the needed infrastructures and operational capabilities [Ge00, 9].
- · IT Service Providers
  IT service providers offer value-added services.
- · "Pure" ASP
  The "pure" ASPs partner with the ISVs performing the implementation and integration and providing connectivity and support. The "pure" ASPs act as an end-to-end-solution provider for customers. [An99b, 3]
- · Internet Service Providers (ISPs)
  The ISP provides access to the Internet.
- · Value Added Resellers (VARs)
  The VAR operates between producers and end-users by performing system integration, consulting and product enhancement. [An00c]

Most of the current ASPs are either ISPs or ISVs. In this paper ASP means all the companies belonging to the ASP value chain.

3.1.1 Entering the ASP market

One of the main problems for an ASP in entering the ASP market is to decide whether to invest in own data center and whether to sell the products directly or indirectly.

Generally, it is not recommended to build one's own data center for the following reasons:

- · It requires plenty of funding and expertise.
- · Experienced engineers and developers can focus on core-businesses.
- · The ASPs can fill the future data storage requirements with lesser costs.

·   As experience about hosting increases, the companies can take advantage of it. [La00]

The combination of indirect and direct sales (hybrid) is suited best to selling moderately complex or sophisticated applications. Indirect sale is suitable for ISVs selling sophisticated applications.

3.1.2   A SWOT-analysis of ASP

The SWOT of ASP is analysed based on the information referred to in the tables 4 and 5. ASP increases the amount of potential customers especially in selling expensive ERP-applications to SMEs (Table 4). The SMEs have an interest to use ASP especially because of its cheapness and faster entry to the market. The juridical aspects of the ASP - that are defined in the Service Level Agreements (SLAs).

Table 4. SWOT of ASP sales and marketing.

Strengths	Weaknesses
· A commonly used platform increases the amount of potential customers · The telecom operators become less dependent on the commodity market [An00b]	· The ASP based products are unlikely to offer advanced features to power users [BL00] · Arranging contacts and contracts with different operators is not easy [Ko00]
Opportunities	**Threats**
· Eliminating distribution channels [Be96] · The departments and offices of larger companies a potential new market [An00f, 10] · Getting new SME-customers [An00f] · Gaining credibility by partnering with well-known companies · Faster entry to the market without direct sales forces · Provisioning an ERP-application is cheaper than buying [Gl99]	· Companies find it risky to entrust the corporate data outside its walls [Sc00] · Some service firms feel that ASP threatens their implementation business [Ge00]

The network bandwidth has now reached an affordable price and as IP-networks and system buses will be developed for operational use, there should be no more technological barriers in the way of widespread ASP use (Table 5).

Table 5. SWOT of ASP technology.

Strengths	Weaknesses
· Improves security, because the leading ASPs will provide auditing capabilities [Ge00] · The bandwidth necessary to ASP has reached an affordable price [An00f] · The Java technology-based applications can be delivered already now [An00a]	· The networks using Internet Protocol suffer from reliability problems [Ge00] · Implementing the ERP systems requires expertise and understanding of the customer's business processes [Sl00] · Re-architecting applications to meet the Web-requirements and integrating them with existing programs
Opportunities	**Threats**
· The mobile applications, where devices do not have the required storage [BL00]	· Many ERP-applications do not survive the access of tens of thousands of users simultaneously [Ge00] · The server-backup in case of failure · The system bus can create a bottleneck when using ASPs [An99c]

At the moment, a serious threat to the ASP industry cause the security questions and synchronizing the ASP-services in the enterprise as different ASP-providers update their applications at different times.

3.2   Application hosting architecture and security aspects

An ASP solution has technically seen three participants: application specialists, ASPs, and network service providers (NSPs). Figure 2 illustrates the basic structure of ASP.
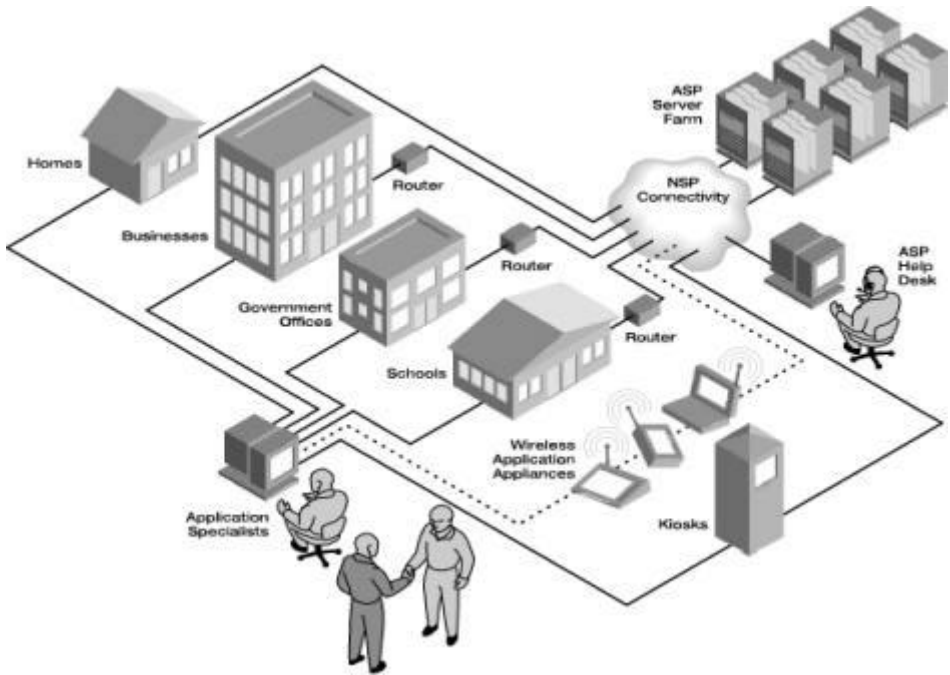
Figure 2: Technical structure of ASP [An00g].

Application specialists provide value-added application development, customization and consulting services and NSPs provide bandwidth and network connectivity services. The applications developed by applications specialists are used via routers by businesses, schools, homes etc. The ASP server farm functions as storage of the information. The applications can also be used directly through wireless devices. Because most participants of the ASP business do not have resources to invest large sums in the infrastructure, they rely on hosting providers to deliver the applications. Hosting can be realised in three different ways:

· Co-location hosting
  ASP owns the servers, but places them in an infrastructure provider's facility.
· Managed hosting
  The hosting provider owns and manages the servers.
· Pure application hosting
  The infrastructure provider provides the network and data-center layers on behalf of the ASPs. [Ka00]

The outsourcing of applications raises the question about the security management that includes security policy, security organization and physical, technical and procedural security measures . The purpose of security management is to guarantee a certain defined security level and ensure continuity and minimize the damage from security breaches like changing or deleting data. [An00d].

Using the Public Key Infrastructure (PKI), Secure Sockets Layer (SSL) and Virtual Private Networks (VPN) prevents technically possible security breaches. The PKI is a standard for using digital certificates in authentication. The SSL generates a unique encryption key for each session. The VPN technology uses a tunneling protocol that enables setting up a private data network over the Public Internet. [An00d]. The service environment should be in a physically safe place and protected with firewalls. The servers should be often virus-checked and the critical components duplicated. Using procedures for intrusions and the personnel background checks are effective ways to prevent an illegal use of applications. [La00] The hosting companies can prevent application service interruptions by having multiple servers in different locations [Go00]. Figure 3 presents a secure ASP network design.
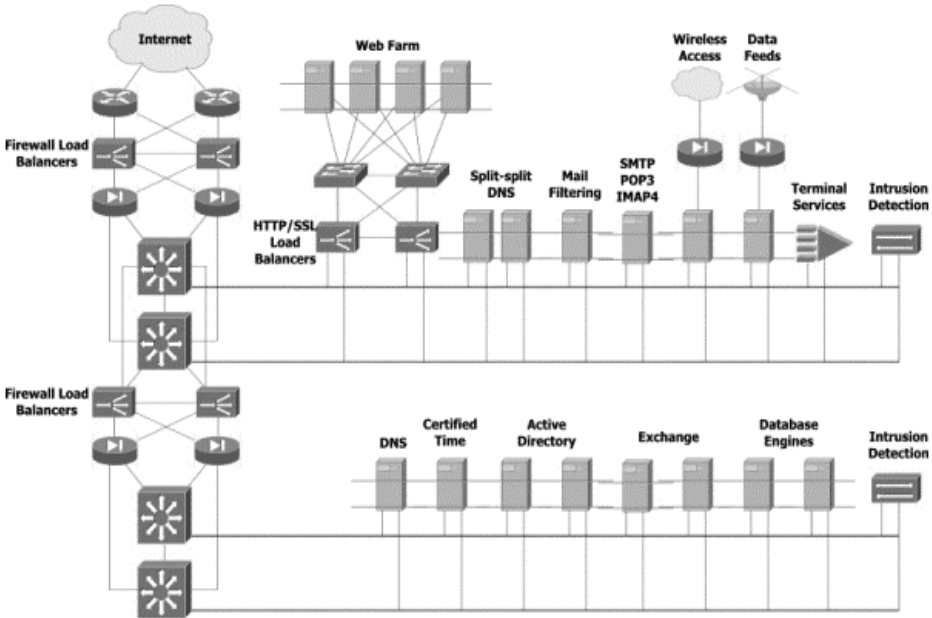

Figure 3: Secure ASP network design [An00d]

In Figure 3 the screening routers protect the firewalls and thus prohibit IP address spoofing attacks. A screening router has only two interfaces: one to the Internet and one to the external firewall. A classic demilitarized zone (DMZ) has two firewalls: internal and external. The external firewalls only permit traffic between Internet and the Demilitarized

Zone (DMZ). The internal firewalls protect the internal network from the DMZ. To eliminate sniffing attacks switches are used. The network interface in any machine on a switched network will see only those frames specifically addressed to it. Internet Protocol Security (IPSec) secures all communication between the DMZ and the internal network. Intrusion detection is used on both the DMZ and the internal network. The intrusion detection systems run on the servers and alert administrators when a particular computer has been compromised. This alert mechanism is important especially for computers containing valuable operational data. For high availability purposes most machines are also load-balanced by using Network Load Balancing Service (NLBS) that provides Web site administrators with a means to distribute the server load across a equivalently configured servers. [An00d]

4. State of ASP in Finnish software companies

The state of the ASP in Finnish software companies was researched by interviewing representatives of two companies and by sending a questionnaire to two other companies. The figures of table 6 reveal that there is a great potential to make big profits fast in the ASP market. Companies A, B and C are ISVs and ISPs, but company D operates along the whole ASP value chain, apart from operating as an ISV.

Table 6. Facts of the researched companies.

	Company A	Company B	Company C	Company D
Founded in	1982/90	1991	1988	2000
Turnover 1999 (in million FIM)	14.5	53.0	137.5	300.0 (estimated)
Employees	24	100	400	400
Customers in	Finland	20 countries	80 countries	Finland
Product for (Development areas)	HR-management	Business Intelligence	Security Solutions	Office and business solutions

4.1 Researched companies and their ASP strategies

In the following, the researched companies (A, B, C and D) and their strategies to compete and find partners in the ASP market are discussed in more details.

Company A provides a tool for surveying, developing and monitoring the pool of skills within an organisation. Company A is planning to start making use of ASP and as the potential *target for ASP marketing* the interviewed person sees recruiting-firms and companies that want to outsource their HR-management. According to the interviewed person ASP offers *opportunities* if the companies succeed in turning knowledge into a product and increases security.

Company B has offered its products to ASP customers since January 2000. For company B, the main intention to use ASP was to extend potential customer base to SMEs and companies with less IT capabilities and to make implementation faster and easier. Company B charges its ASP customers a basic fee plus a monthly fee based on usage.

At the moment, company B hosts the applications themselves, but they will outsource the hosting in the future. The interviewed person regards it important to find a hosting-provider whom the customers trust. The hosting providers offer, according to the interviewed person, only the hardware, but not the technical skills and support needed in the installation. The interviewed person believes in the security of ASP hosting and has strong faith in ASP in spite of its current weaknesses.

Company C provides powerful security solutions. Company C has resellers in 90 countries and it co-operates directly with major infrastructure vendors. Since 1999, Company C has provided a service delivery platform to ASPs that offer managed security services. Company C's ASP customers *pay* a fixed quarterly fee.

Company C finds as the *strengths* of ASP:
>   +   Fast delivery channel
>   +   Economies of scale.

According to the company C there are still some *weaknesses* in the ASP market:
>   -   The technological immaturity of the ASP infrastructure
>   -   Compatibility of multi-vendor products
>   -   General change resistance of the companies.

Company D's range of services includes software for individuals and workgroups and various services for external and internal communication. Company D also provides infrastructure management services and hosts applications. Company D has offered ASP services since this year.

The biggest *strengths* of ASP are, according to company D:

>   +   Easy to budget costs and keep them low
>   +   Lower investment costs
>   +   The applications are easy to use anywhere, any time
>   +   Flexibility/ scalability.

4.2   ASP partnership in researched companies

The co-operation for creating and selling an ASP product is called partnership. This chapter handles the partnering-strategies of the researched companies based on their function in the ASP business.

Company A co-operates with small consulting companies and big IT- and consulting houses according to their competence. Company A has found its partners based on personal contacts, tips received from other partners, and mass marketing. Company A intends to increase the amount of its partners by partnering with consulting companies to outsource the customer support and big Finnish software companies to enter the international market.

Company B co-operates with focused consulting companies. Finding competent partners is according to the company B problematic, because the whole concept and market is new. In the future company B plans to partner with hosting companies and VARs that function in certain segments and already have a ready-made customer-base.

Company C has so far partnered with service providers. Good ASP partners are according to company C players that are in key markets, rapidly growing and innovative and financially stable and have solid business plan and require a standard product or almost standard product.

Company D offers other software companies ASP services and –hosting (end-to-end partnership). Company D has marketing, technology and sourcing partners. The goal of the co-operation is to create new business, operative models and innovative service concepts for the benefit of all parties involved.

5.   Summary

This research proved that the current ASP market is fast changing, fast growing, immature and uncertain. Many traditional ISVs sell their applications via the Web, but have not yet had more serious thoughts about ASP. The trust in the ASP market is strong and ASP should be taken as a serious challenger in the next years.

The ASP companies seek hosting-providers and value-added partners that increase their sales and complement their range of software products. The partners are selected carefully on the basis of their reputation, trustworthy and the quality of their products. The co-operation is regarded as a key to success in the ASP market.

The technology and security questions do not prevent the use of ASP according to the researched companies. It is still a question mark if a network and servers can handle the increasing amount of customers and use. Most of the researched companies are not interested in providing the hosting-services themselves or investing in data-centers. In the ASP market there is a shortage of consulting companies that would offer the technical skills and support needed in the implementation of hosted applications. The ASP enables a more effective, cheaper and easier use of both the traditional software and the large ERP-applications. By co-operation and networking, information becomes available to anyone, anywhere and at any time.

At what circumstances is it then reasonable to switch from traditional IT management to ASP and how should it be done? Using ASP is reasonable if the company:

- · Cannot afford IT-staff
- · Wants to concentrate on its core competencies instead of IT management
- · Grows rapidly and therefore needs flexibility.
- · Wants to eliminate distribution channels [Be96] and get new customers [An00f]
- · Wants to save money when provisioning expensive ERP-applications [Gl99]
- · Has a need to a short-term usage of a program

Before switching to ASP every company should make consider thoroughly:

1. Its incentives to use ASP.
2. Pros and cons of ASP.
3. The gained advantages compared to costs.
4. The company's function in the ASP market and the effect on partnership
5. The application hosted
   The chances to survive in the ASP business are much better if the products offered are qualitative and secure and are suited to several platforms.
6. Partnership strategies
7. Possible target market of ASP
8. Legal questions and security

A good way to get started with the ASP is to outsource one non-critical application. By initially outsourcing only one application, a company can become familiar with the difference between in-house and outsourced applications.

As this research area is very young, it leaves many opportunities for further research topics. As the ASP market matures it might be interesting to find out what kind of partnership-coalitions have been formed and how. And as a final research topic the basic question of the whole ASP ideology: Has the ASP actually changed the software industry and to what extent?

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