

NEW TRENDS IN INTERNET TECHNOLOGIES

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Abstract: This paper is a review of several new promising trends in Internet technologies. This review starts with analysis of computer evolution and analysis of trends, needs and usage in the following years. Application Service Providers (ASP) are the most promising technology in the next years due to the modularization and miniaturization and also due to the extensive mobile usage.

Keywords: Application Service Providers, Internet Service Providers

1. Computer evolution

We begin this article analysis with the term “computer”. In the beginning the computer was **a device for computing!** Later the computer start to be a tool for faster achieving the results and solving the problems in everyday business. Now (2000-2001) the computer mostly is a device and tool **for information browsing** instead of a device or a tool for computing. Looking for the new promising technologies, besides this paradigm we conclude that the computer in the near future is going to be once again a computing device. In this case, normally everyone asks himself the following question:

2. Are we getting back to the future?

The following questions naturally come in a row: Will the computer be a device to sell computing as a service, and where is the future?

Lets analyze how was the computer granularity evolution. In the beginning there were (dinosaurs) mainframes. Later there were the microcomputers. Then the personal computers came. Are we going to mobile and personal digital assistants in year 200x? Where is the limit of computer granularity?

In the same manner lets analyze the operating system evolution. In the beginning they were single user. Then they were multi-user & multiprogramming. Then

they timeshared the processing time. Then they start to use Internet as a tool to get more and more information.

According to this analysis we conclude with the question what was the role of PCs? They educated generations and generations of home and office users. Now everyday life activities depend on PCs as a tool and everyday life activities depend on PCs as a information portal via Internet.

Lets see who made profit out of this technology. Or lets ask who makes benefits now (2001) and who is going to make it in near future?

In the beginning those who sell PCs. Later those who sell network hardware and solutions. Now those who sell information. In very near future those who sell computing and information as service.

Lets analyze what made this paradigm possible. One of the greatest technology innovations was the introduction of Internet with a very big role in everyday life. Internet has become the world's largest data and computing service delivery infrastructure. However we must say that two Internet services made its popularity. **E-Mail** was the first global computer and communication service that made interest about computers. **World Wide Web** was the second great technology that enabled more and more Internet technologies like e-Commerce, e-Government, e-Learning and e-Business. In this case Web browsers have become universal graphical user interface and universal tool for navigation and concept of future operating system interface.

3. State of the art

Following the previous analysis we ask ourselves what do we expect from computers in 2001?

Information is the biggest part of the computer activity. The second part is to consider the computer as a tool for navigation and communication and the last part is to conclude that we still base our needs to local computing.

In the near future we will expect from our computer more and more information, more and more sophisticated mobile communication tools. But what happens with computing. Due to small size and usage in motion we will expect **computing services**.

The following are the reasons to bring back the computer to be a computing device: excessive need for mobility and communication; excessive need for information and computing while being mobile. Since it is very expensive to build small and powerful systems for computing and therefore we will ask for service.

Normally, one should ask himself are we getting centralized? Somehow! For example, a good navigation system with satellites is very expensive. A company

with a lot of transportation vehicles can ask for service rather than build own system of computing. Another example is while being mobile you need a lot of information not stored in local memory. Therefore it is good to have the information centralized in a good communication system.

But how the producers and sellers see the near future?

In the beginning there were **PCs**. Later communication HW came. Later Internet Providers came. Later Content Providers came. In near future we expect Application Service Providers (ASP).

What is an application service provider (ASP)? Although the term is widely recognized, it is still used with many different and sometimes conflicting meanings. Would-be ASPs range from software developers to Internet service providers, from web portals to application outsourcers. Yet there is a common denominator that links every example. All of them provide computing, in real time, from a remote data center. From that starting point, it is possible to go on to define individual species and subspecies, reflecting the nuances between different classes within the overall genus. Taking commercially-driven business ASPs as our model, a lot of papers sketch out some of the main groupings. [2,5]

4. ASP model (Application Service Provider)

ASP model uses Internet or other networks to provide online application services on a **rental basis** commercially delivering computing as a service. Fig. 1 shows market projections for ASP development.

We define the term of killer application given by L.Downes and C.Mui [1]. A **killer app** is a new good or service that establishes an entirely new category and, by being first, dominates it, returning several hundred percent on the initial investment. According to our previous analysis we can say that e-Mail and WWW are killer applications. The question is to see if ASP will be a killer application in the near future?

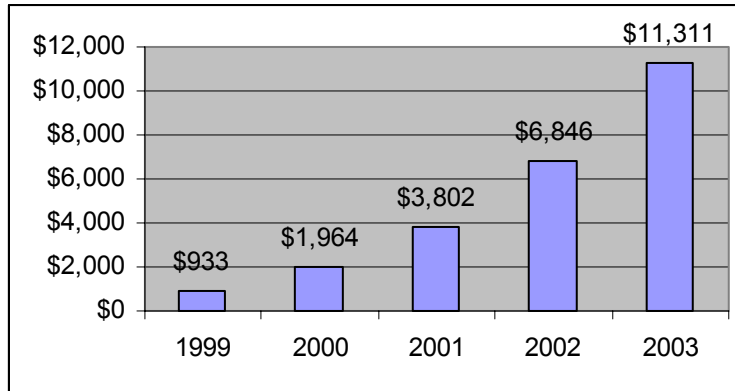


Figure 1: Market projections (\$ millions) for ASP (Source: Forrester Research)

Lets note some reasons why we believe ASP is a killer application. As first reason we note the high up-front cost of a packaged software license; the lack of in-house IT human resources to install and maintain the software; the high cost of building and maintaining the IT infrastructure necessary to support the application.

ASP is shortly software delivered as a service. It is not only information retrieval and it follows the paradigm “Why Buy When You Can Rent?”.

Internet and component technologies have made it possible to produce huge numbers of reliable distributed software applications. These are the technologies that made ASP possible.

Essential ASP components are 1) Selective outsourcing; 2) Application hosting and 3) Browser based computing. [5]

4.1 Selective outsourcing

The concept of outsourcing is increasingly accepted in business today. Management gurus and investors alike emphasize the merits of concentrating on core competence, and of bringing in outside specialists to perform all non-essential functions. Within the IT landscape, evolution in technology has enabled outsourcing to become much more selective. Many businesses now outsource specific elements of their total IT infrastructure to an outside service provider, including the provision and operation of the data network, the monitoring of service levels experienced by users, and increasingly the provision of specific applications themselves. [4]

Instead of handing over their complete IT infrastructure to an outside provider, organizations have selectively outsourced specific parts of IT. Initially these were

base level infrastructure components such as data networking. Systems services such as desktop or network management came next. Then infrastructure applications such as messaging came. [2]

Fig.2 demonstrates the reasons for selective outsourcing. Now the practice has reached the top tier of the computing stack and embraces the user applications themselves. What the IT services industry knows as application outsourcing and application management is increasingly indistinguishable from what ASPs deliver. The ASP model adds fixed, per-user pricing, often levied in the form of a monthly subscription.

One of the reasons can be simplified by the following CEO statements. “I have 25 people in my company; I have to pay a systems administrator \$75,000 a year just to keep all the computers and my email system running.”

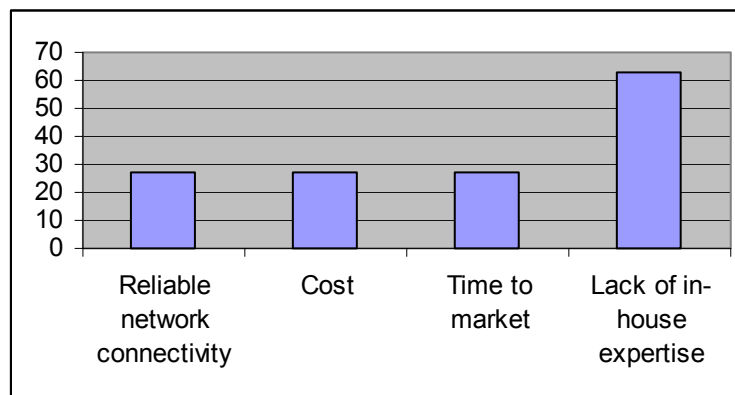


Figure 2: Reasons for Outsourcing Business Applications (Source: Forrester Research)

4.2 Application hosting

As web sites have become more and more sophisticated, what started out as the provision of web and mail servers to business customers has ended up as a highly sophisticated managed infrastructure offering. In the process, web hosting providers have turned into application service providers. In the enterprise market, hosting providers have been drawn into providing increasingly complex intranet, extranet and Internet servers for their customers, often taking care of the provision, implementation and management of the server rather than simply providing data center space. Today, such providers are responsible for complex, mission-critical e-commerce and e-business applications on behalf of their customers.

Internet service providers (ISPs) have always been ASPs to the extent that the provision of hosted mail and web servers is an application service. Over time, the

ISP industry has divided between those who provide access and connectivity services, and those who offer hosting services. The latter they become partially ASPs as they move into sophisticated e-commerce, messaging and other complex web hosting services, are effectively ASPs. They have been joined by a new class of application software vendor, which uses the hosted model to provide Internet-based applications and services. Although the Internet industry uses the term application hosting, it differs only in name from other forms of application services. [2]

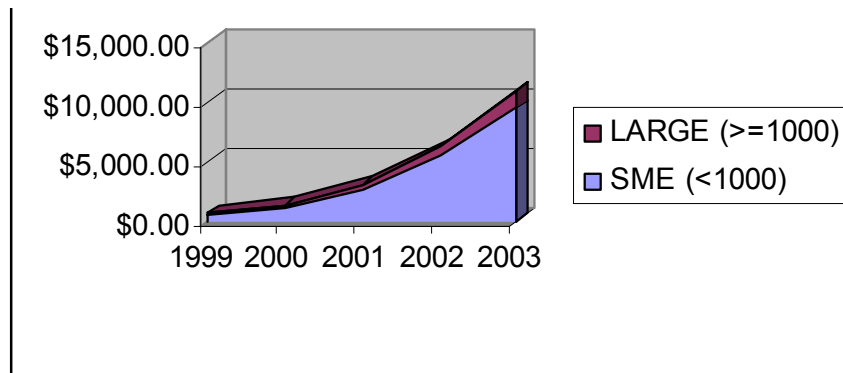


Figure 3: SME Domination of Application Hosting (Source: Forrester Research)

A new class of application software vendor, which uses the hosted model to provide Internet-based applications and services. Fig.3 presents the revenue of income for SME with less than 1000 employees and Large Enterprises with more than 1000 employees.

4.3 Browser-based computing

Cheaper, more plentiful telecommunications have in turn encouraged the development of server-based computing architectures, which are designed for environments where client computers access centralized servers across a telecommunications link. In a server-based computing architecture, most of the data storage and application processing takes place on the central servers, while the client computers are mainly concerned with accepting instructions from the user and displaying the results. A welcome side-effect of server-based computing architectures it that they tend to be easier to manage and less wasteful of resources than PC-centric client-server approaches. The most widespread example of server-based computing is the worldwide web itself, in which central servers hold all the content and applications, while clients access them using a web browser. [4]

In the beginning Web sites offered only **static content**, mainly words and images. Today, information sites have become **portals** and they have added applications to create **dynamic, interactive experiences**. Meanwhile, a new generation of software vendors are bringing their applications to market as **web-based services**. These separate trends converge in the emergence of specialist **business-to-business portals** serving either specialist business needs or vertical industry markets. Sophisticated online applications alongside relevant content within a portal, catering to the specific needs of a special interest group. [2]

Although each of these separate strands emerges from different historic roots, each takes advantage of the same technology enablers to deliver applications from an online data center to a community of users. They are all converging on the same ASP model. As they do so, more and more of them become identified as ASPs, even though they may not originally have seen themselves in this light. The convergence is evident as subcategories such as application outsourcing and application server hosting, or hosted e-business services and net-based application vendors, develop significant overlaps. Some providers combine elements from all three strands. As the year progresses, the divisions will become increasingly blurred as the separate strands intertwine still further.

5. ASP channel

The ASP channel consists of: 1) Network service providers; 2) Infrastructure providers; 3) Software providers and 4) Solution providers.[5]

Network service providers are mainly concerned with basic communication; server center resources and value added IP services such as VPN, media streaming, firewalls and directory services). Communications include the physical connections, the routers that handle the IP traffic, and associated performance, reliability and security applications. Data center resources typically embrace the provision of space, protected electricity supplies, physical security and maintenance services. Value-added IP services include virtual private networking, network caching, streaming media and firewalls.

Infrastructure providers are commonly called ASP Infrastructure Provider (AIP). They are also concerned about utility storage; server hosting; operational resources such as call centers, finance, technical support, etc.; network and system management such as billing, accounts and support. Many ASP pioneers have gravitated towards this AIP role, sensing the opportunity to turn their early experience into a marketable commodity that can be packaged and sold as a solution to newcomers. They help vendors port existing client-server applications across to the ASP environment, often advising on the fine-tuning and re-

engineering required to enable them to run effectively from a shared, Internet-based data center.

Software Providers add vital ingredient that enables finished application service. They are mainly concerned about package adaptation or application server platforms. The software may be a ready-made, packaged application that is adapted for ASP delivery, or it may be specifically developed for the purpose. There are a number of application server platforms suitable for the creation of ASP offerings, although at present few offer a complete set of services for functions such as service deployment, subscriber management, support, service level management and billing.

Solution Providers are the final step in the chain. They are real true ASP and combine software and infrastructure ingredients with business and professional services to create a finished offering to present to the end customer. End users access them directly from a web site in order to achieve a finished goal, such as renting and building a simple e-commerce site, or performing a videoconferencing call. Sometimes, they may generate a physical result, for instance an online design application might allow users to create, specify and order printed business stationery.

6. Conclusion

ASP are serious candidates for next killer application. They are the most promising Internet based technology assuming mobile usage and miniaturization. The following are just few quotations and predictions:

“Within a few years, users will not want to install applications locally. Instead, they will access the applications they need, on demand, from online providers who will charge them by the second for the precise value of the specific features and resources they choose to use.” [3]

“Five years from now, if you’re a CEO with a head for business, you won’t be buying computers anymore. You won’t buy software either. You’ll rent all your resources from a service provider.” S.McNealy, CEO of Sun Microsystems [1]

7. References

1. ASP Island, “ASP (Application Service Provider): The Net’s Next Killer App”. <http://www.aspisland.com/trends/jcbradford> as seen on 24.12.2001.
2. Wainwright, P., “Anatomy of an ASP: Computing's new genus Defining the new genus”, ASP News, Jan.2000. <http://www.aspnews.com/premium/article> as seen on 24.12.2001.

3. Wainewright, P., "Futurelink: Building the information utility", ASP News, May.2000. <http://www.aspnews.com/premium/article> as seen on 24.12.2001.
4. Wainewright, P., "Interliant: ASP fusion for the enterprise", ASP News, Sep.1999. <http://www.aspnews.com/premium/article> as seen on 24.12.2001.
5. Tao, L., "Shifting paradigms with the Application Service Provider Model", IEEE Computer, Oct.2001, pp.32-39.