White Paper Dynamic Services

Solutions Approaches to the Flexible Management of Modern IT Infrastructures.

Business flexibility T · · Systems · ·

Contents.

1 Introduction.

1.1 Definition of Terms.

One of the most important topics in the ICT industry in the next two years will be so-called “Dynamic Services”, a term that denotes the demand-based provision of IT resources. Though still in its early stages, this market is attracting a great deal of attention. While the press constantly reports about new offers and strategies, more and more users are taking a closer look at this new concept – one that could revolutionize both the IT and the communications industry.

The term Dynamic Services is not the only one that describes the new forms and options of use for IT and communications industry users. There are a few synonyms that all denote one and the same concept. In this context, the market analysts Gartner and Forrester speak of Data Center Outsourcing, Business Process Utility and Data Center Automation, while HP uses the term Utility Data Center, IBM refers to pay-per-use and on demand, and SAP prefers the term Adaptive Computing. There is clearly no agreement yet on a standard nomenclature. The terms on which everything is based are Utility Computing and the so-called Grid Computing.

The term Utility Computing derives from the public utilities industry. This effectively enables users to draw IT resources directly from the provider in much the same way that they draw electrical power, water or gas. In order to be able to provide IT resources in this form, a so-called grid is necessary. A grid is a group of computers, which are linked together in a kind of network and carry out processes together. Such a computer grid creates synergy effects, which result in a combined computing capacity that is many times greater than if each computer were working on its own. Moreover, the computer network need not be physically situated in a single location. It is conceivable, for example, to link computers running in far-flung locations literally anywhere in the world together to form a grid.

Though the idea behind Utility Computing is highly reminiscent of the utilities industry model (electrical power available at any time from the wall socket), its implementation is far more complex than the provision of electricity, for example.

1.2 Possible Components and Types of Dynamic Services.

The following components are required for the provision of Dynamic Services: network, server and storage, operating system and interface software (middleware), as well as back office applications. Generally speaking, the forms of provision can be classified into three different types:

- Insourced/In-house Private Utility. A company's own personnel purchases, installs and administers its own utility (infrastructure) for in-house, company-wide use in all subsidiaries, or procures services from a third-party provider for the design and/or implementation of the infrastructure (turnkey solution), but which is then administered in-house. This option is restricted to a single company. The systems are owned either by the company or the service provider.
- Managed Private Utility. This option is likewise restricted to a single company, but the administration of the infrastructure is handled by an external provider. The ownership of the systems varies according to the form of the contract.
- Public Utility. In this variant, several unrelated companies share a common infrastructure, which is provided and administered by a service provider. The infrastructure in this case is the property of the service provider.
  The trend is inevitably moving toward Public Utility, which, according to the analyst house IDC, is seen as the ideal form of architecture by far. The key features of this service can be characterized as follows:
  - The provision of computing capacity, which can consist of processor capacity, memory and network resources, takes place from an external location.
  - The IT infrastructure is largely or completely owned by the utility provider.
  - The pricing and compensation model is comparable with traditional leasing agreements, whereby the customer can pay for the services on a monthly basis.
  - Relocation of the critical and complex hardware systems and applications from the customer's facilities to a data center that provides the utility computing services.
  - Companies conclude contracts exclusively with one utility provider, instead of doing so with multiple hardware and software providers as in the past.
  - One essential element of the contract is the Service Level Agreement.

A demand-based provision of IT resources can generally be broken down into two aspects. First of all, of course, there is the provision of hardware of all kinds. Along with computing power, also known in the industry as CPU power, the provision of memory plays an important role. This first aspect describes the classic grid, which then creates the foundation for the second aspect. This second aspect describes the demand-based offering of software and applications that run on the provider's hardware. The package offering can be accessed and applied via the Internet on-demand.

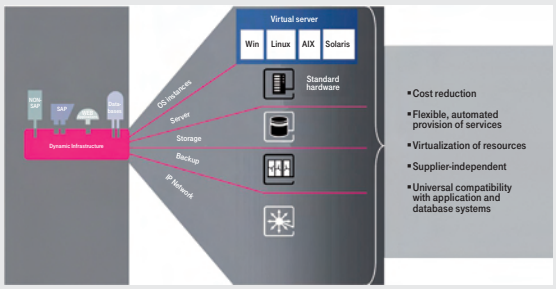

Figure 1: What is Dynamic Computing?
Source: T-Systems Enterprise Services GmbH – Business Development

1.3 Delimitation from Classic Outsourcing.

The Dynamic Services model bears certain similarities to classic Outsourcing as well as to Managed Services. The common denominator of these markets is the administration of the customer's infrastructure under contract from the customer, but there are important differences.

The Dynamic Services model, in contrast with Outsourcing, completely dispenses with the takeover of personnel. The infrastructure, which is also used on a common basis by multiple customers, is the property of the provider. The provision of the services is also carried out from the provider's location.

	1. Generation Traditional Outsourcing	**2. Generation** Managed Services	**3. Generation** Utility Computing/ Dynamic Services
Employment conditions	Service provider usually takes over the personnel from the IT department	Normally no takeover of personnel	No takeover of personnel
IT and network systems	Generally owned by the customer	Owned by the customer for the most part	Owned by the service provider
Common utilization of the infrastructure	No	To some extent	Completely
Location for provision of services	At the customer's site	At the service provider's site	At the service provider's site
Service Level Agreements	Customer-specific	Customer-specific or standardized	Standardized
Pricing structure	Customer-specific	Customer-specific or standardized	Standardized

Figure 2: Comparison of Outsourcing, Managed Services and Dynamic Services
Source: Based on IDC 2004; "Utility Computing in Germany from the Users' Perspective: Expectations, Trends and Strategies"

2 Challenges that Customers Face Today and Tomorrow.

2.1 User Value.

The demand-based provision of IT resources from the provider gives rise to completely new pricing models. The change of ownership of the IT infrastructure from the customer to the service provider enables the latter to build up and administer the infrastructure entirely on its own.

The common utilization of the infrastructure by multiple customers permits service providers to maximize their load, thereby achieving huge cost savings that can be passed on to the customers. The resulting rationalization effects lead to reduced costs for the customer while increasing their quality at the same time. In addition, giving up the IT infrastructure on the customer side eliminates high fixed costs, thereby tying up less capital and lowering TCOs (Total Costs of Ownership). This has had a positive impact on the business customers' balance sheet in numerous cases.

For the users, demand-based provision and use of IT resources has the advantage that they pay only for the services that they actually use. According to the analyst house Gartner, customers can expect to realize cost savings potential of up to 30% on their IT expenses with these new forms of use.

Another important aspect is that not only the IT infrastructure is transferred to the provider, but also its maintenance and the associated service. Service Level Agreements, which stipulate the provider's performance in terms of guaranteed response time, coverage, speed and costs, are a decisive factor in the new dynamic utilization models (Dynamic Services). This means the customer himself no longer has to be responsible for the maintenance of his IT system and now has a single contact to turn to whenever problems arise.

Dynamic Services providers favor integrated service packages that are independent of location. That means it no longer makes any difference whether the problem is software or hardware-related, nor whether the problem occurs at a user's branch office in Berlin or in Tokyo.

2.2 Pros and Cons from the User's Point of View.

The cost savings potential is certainly the most persuasive argument for users to switch to a dynamic utilization model. Unquestionably, the improved quality of the IT services is also worthy of note, as providers can exploit the aforementioned synergy effects that are created from the shared use and the resulting improved utilization. For this reason, they are in a position to offer the customer better technology at a lower price.

As a result of this, the IT systems used in this dynamic utilization model are more powerful and more effective than the systems used previously. Since the IT resources are provided on a demand basis, customers enjoy greater flexibility and adaptability to any peak loads that may occur.

By transferring responsibility for IT systems and their maintenance to the service provider, business customers can eliminate the costs of training their employees in IT maintenance, searching for suppliers, and implementation. In the medium to long term, customers are also in a position to cut their personnel costs considerably, because they only have to concentrate on the essential functions of the IT process.

Nevertheless, some users remain skeptical toward dynamic utilization models at the present time. When the infrastructure is transferred to the provider, the customer also loses the right to participate in decisions concerning the selection of the technology. Though the service provider has more powerful and more up-to-date technology, this is a point that is viewed with some skepticism.
Data security within an infrastructure used by several users, some of whom might even be competitors, is a sensitive subject. That is why they need to be reassured that their confidential data are protected against unauthorized access. Limited flexibility when it comes to changing providers is likewise viewed with skepticism, since customers in the dynamic utilization model obtain all services from a single source and the service providers' technologies are not always compatible.

2.3 Drivers and Obstacles.

Transferring their entire IT operations outside permits business customers to concentrate on their core competencies again. This applies to costs on the one hand, and to workforce structure and utilization on the other. And that, in turn, enables the company to adopt a leaner, more efficient structure. By transferring IT-related issues outside, the individual employee is once again able to concentrate on his or her actual tasks. This focus on the core business combined with the more modern technology offered by the providers leads to major increases in efficiency. Along with this, dynamic utilization models facilitate compliance with number of statutory requirements. The Basel II Accord, which stipulates more stringent criteria for the bank rating of companies applying for credit, is tied to key data such as TCO (Total Cost of Ownership), i.e., capital costs and ROI (Return on Investment). The new dynamic utilization models have a positive effect on both parameters, because IT investment costs are minimized. This aspect is of particular interest to medium-sized companies.
The dynamic utilization model also facilitates compliance with two other statutory requirements, the Principles of Data Access and Auditing of Digital Documents (GDPdU) and the §§ 257 – 262 of the German Commercial Code (HGB), which regulate records, data retention obligations and time limits. In order to store business data securely and maintain access to them on demand in accordance with these requirements, an expanding IT infrastructure is necessary above all in terms of memory, which the Dynamic Services provider can offer the customer without costly implementation. In addition, the complexity of IT projects such as the expansion or updating of the infrastructure or the implementation of new services incurs increasing investment costs. These, too, are eliminated in a dynamic utilization model. The following aspects explain the initial hesitation on the part of the users. The most important element is the customers' trust vis-à-vis the service providers and their performance. Above all, customers are highly skeptical when it comes to the security of sensitive data. Overcoming this skepticism will represent the biggest challenge for the service providers in the future. Many outsourcing contracts have been signed in recent years, some of which feature long expiration terms and heavy investment by the customers. Some customers might have trouble withdrawing from existing outsourcing contracts prematurely.
Some customers view the transfer of their entire IT system and services to the provider as a loss of competence in the IT sector because it puts them in a dependent relationship with the service providers to a certain degree. In the long term, only a few of the company's own employees are working in the IT area. For the same reason, it can also be very difficult to convince the customers' in-house IT departments of the merits of dynamic utilization concepts. The Dynamic Services providers' goal is to provide the service without taking over any personnel. In the early phase, however, some providers are forced to take over some of the personnel in order to win over the in-house IT departments and to be able to place Dynamic Services in the medium term.

2.4 Expectations and Requirements of Dynamic Services.

2.4.1 Industry Focus.

Fraunhofer Enterprise Grids identified five key industries, which are particularly well suited for the use of dynamic utilization models. This suitability stems, on the one hand, from their strong need for the aforementioned services, and from the fact that they already possess the best technical and organizational preconditions necessary to implement Dynamic Services rapidly and cost-effectively on the other.

Automotive and Machine Construction:
The need to improve the flow of data and the cooperation between manufacturers and suppliers is particularly strong in the automobile industry and machine construction sectors. For this reason, it is important here to be able to share and exchange the dynamic structure of virtual organizations based on specific timeframes, certain persons and limited resources. This permits users to carry out the modeling, simulation and optimization of production processes together and to pool development data in a rational manner and in a secure environment.

Figure 3: Automobile industry production process
Source: Festo AG & Co. KG

Finance:
High computing capacity is needed in the finance sector due to various requirements of the IT applications, ranging, for example, from back office processes or market data analyses to Monte Carlo simulation. According to the most recent report of the financial analysts TABB Group, the market for Dynamic Services in the finance sector will expand from $88 million to $1.2 billion by 2010. This includes an expected $660 million in software expenditures. At the present time, the solutions for this area are being developed mainly by small, innovative companies.

Figure 4: Banking metropolis Frankfurt am Main
Source: www.google.com

Pharmaceuticals:

The development of new drugs is a time-consuming process and demands a large number of steps and computing processes. Entire work processes in pharmaceutical research can be supported by Dynamic Services.

One example of an application of the PharmaGrid solution takes the following form: via the application-tailored PharmaGrid portal, the user can define computer-intensive jobs and feed them with the required input data. The PharmaGrid server automatically breaks down the input data into suitable sub-tasks, which can be distributed to free PCs within the computer pool and processed there in parallel. The results of the intermediate computations are subsequently recombined and made available to the user via the portal.

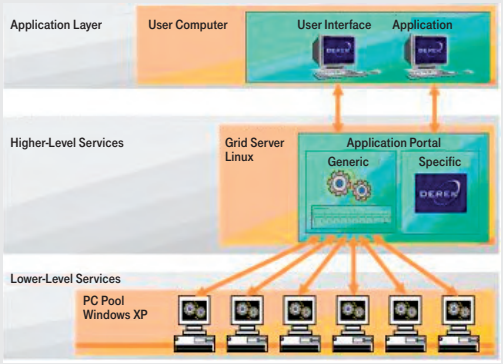

Figure 5: Architectural showcase PharmaGrid
Source: www.enterprisegrids.fraunhofer.de

Media:

The media sector is characterized by wide variety and fragmentation: a small number of major players (newspaper publishers, television broadcasters, film studios) are flanked by a large number of small and medium-sized companies such as production firms and specialized service providers. At the present time, however, digitally networked collaboration among these principals occurs only on a case-by-case basis – this clearly represents a promising application area for Dynamic Services. In this context, the film and television area, due to its high data volume requirements and the interactivity of the necessary access, presents particularly interesting challenges and is already demonstrating intense interest in Dynamic Services.

It is important for providers to adapt their offerings to the need and above all to focus on the industries, which are typically confronted with transient peak loads, as in the case with financial service providers or commerce.

2.4.2 Preferred Pricing Models.

The analyst house IDC surveyed potential customers about the new dynamic utilization models. The results revealed that a majority of those asked favor models that feature demand-based billing or so-called pay-per-use.

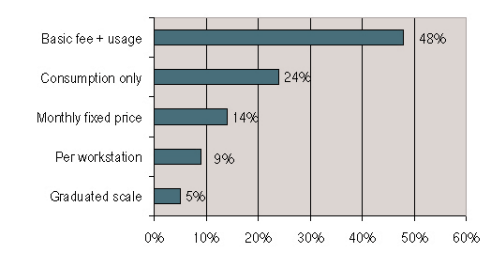

Figure 6: Preferred Pricing Models
Source: Based on IDC 2004; "Utility Computing in Germany from the Users' Perspective: Expectations, Trends and Strategies"

Gartner identified a trend in this direction among providers in 2006, whereby the latter continue to adapt to user requirements. In this context, the providers' pricing models can be broken down into the following billing units:

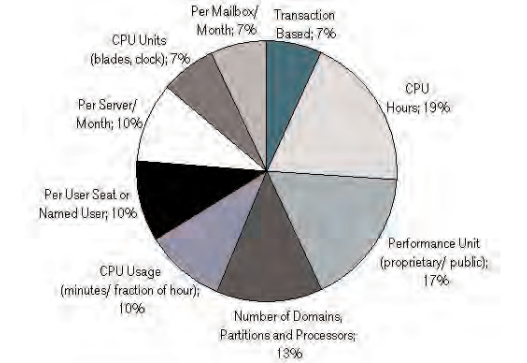

Figure 7: Infrastructure Utility Service and Pricing Units
Source: Based on Gartner 2006; "Pricing Poses a Major Challenge for Infrastructure Utility"

- 29% are based on CPU usage:
  - 19% CPU hours
  - 10% CPU use (minutes or time units)
- 30% present an extension of the traditional servers per month unit in a virtual environment (virtual servers per month):
  - 10% servers per month
  - 7% CPU units (blades, clock)
  - 13% number of domains, partitions and processors
- 24% offer aggregate, non-technical units such as users per month, mailboxes or mail servers per month or per business transaction:
  - 10% per workstation or named user
  - 7% mailboxes per month
  - 7% per work process

- 17% take the trouble to create new billing units:
  - 17% per performance unit

In fact, providers are already in a position to offer demand-based pricing models. They attract customers with incredible sounding prices; in North America, for instance, a CPU unit can be used for $1 per hour via a dynamic utilization model. The dynamic pricing model offering will grow considerably in the foreseeable future.

2.4.3 Usability of Applications.

In Section 1.2, a difference was drawn between hardware and applications in the dynamic utilization model. The demand-based provision of applications is known as Software-as-a-Service (SaaS).

Software-as-a-Service involves a model by means of which the customer makes use of the software via the Internet and can use the functionalities according to his own needs. This also determines the usage costs for the business. The costs for maintenance, change control and operation of the ICT systems on the provider side fall within the responsibility of the service provider.

SaaS users' IT infrastructure expenses are significantly lower. The service provider also covers the costs of administration and licensing, which he can distribute over a number of customers. What is important for business customers are the Service Level Agreements. This applies in the case of availability, for example, because the SaaS provider serves more than one customer. This can mean bottlenecks during updates, maintenance work, etc.

SaaS application areas include ERP and CRM, along with salary and wage accounting programs. SAP already offers SaaS; SAGE is almost ready for roll-out. Microsoft expects that 30% of their CRM users will use their Customer Relationship Management as SaaS users in the future. Oracle states that SaaS currently generates approx. 5% of sales, but predicts that it will be 50% in four to five years.

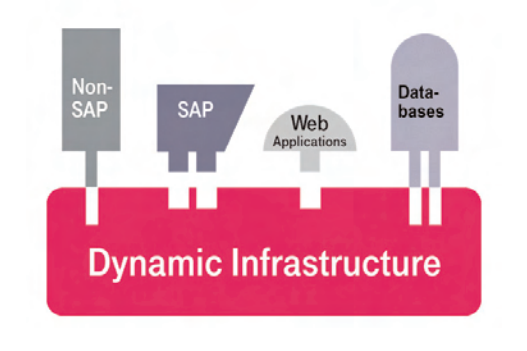

Figure 8: Dynamic Computing
Source: T-Systems Enterprise Services GmbH – Business Development

According to estimates by analysts, the SaaS market will grow significantly in the next few years. IDC expects sales in Europe to nearly double between 2005 and 2009 from $582 million to almost $1.08 billion. Overall, the worldwide SaaS market will grow to a volume of about $10.7 billion.

2.5 Challenges for Dynamic Services.

On the user side, one challenge stands out in particular: customer acceptance on the part of Dynamic Services users and the resulting trust in the service providers. In order to build this trust, providers have to master several tasks. They must ensure that the conditions expected by the customer such as data security and reliability – subjects already viewed with skepticism by customers in any case – as well as the necessary performance levels of their services are guaranteed. In addition, the service providers have to convince the customers that they have fulfilled these prerequisites and are also in a position to provide the services.

The new dynamic utilization forms represent a so-called one-to-many concept. In contrast with outsourcing, in which the provider offers a solution specifically for a given customer, this involves a standardized customer solution that can be offered to many customers at the same time. As opposed to outsourcing contracts, in which the contract is first signed and the services are obtained thereafter, a dynamic utilization concept forces the service provider to offer upstream service. The complete service comprising the infrastructure and the services offered must already be in place before even a single contract with a user has been signed; the providers carry the investment risk in this case. Moreover, it takes time to implement the infrastructure, and service providers have to consider this in their planning.

Successful projects with the service providers' reference customers will convince most potential users. But these reference customers can only be won if providers guarantee the necessary prerequisites and assure customers that the framework conditions will be met. The analysts at Gartner project that the increasing number of customers will cause the number of new customer acquisitions to grow not only absolutely, but also on a percent basis.

3 Implications.

3.1 Prospects.

Business customers can expect higher utilization flexibility from Dynamic Services; use of a dynamic utilization model will increase IT performance levels. Costs will be lower on the one hand and more predictable on the other. Dynamic Services customers do not need to concern themselves with maintenance or service issues, because all services are offered and supplied from a single provider, independent of the location. Project peaks will no longer represent a problem for IT in the future, because resources can be obtained on a demand basis and just-in-time.

3.2 Conclusion.

All in all, Dynamic Services represent an attractive utilization concept for both the user and the provider, because both sides can benefit. The one-to-many concept permits service providers to improve the utilization of their own resources, generating economies of scale that they can use and pass along to their customers.

Analysts accord steadily increasing weight to the market for dynamic utilization concepts. The market volume is expected to increase dramatically between now and 2012. Dynamic Services providers would be well advised to act quickly and position themselves on the dynamic utilization model market early. As soon as a few service providers have established themselves and promote their products with a growing number of reference customers, an increasing number of business customers will turn to this utilization concept. This might work to the detriment of previous concepts such as Managed Services and outsourcing contracts.

Glossary of Abbreviations.

CRM	Customer Relationship Management
CPU	Central Processing Unit
ERP	Enterprise Resource Planning
GDPdU	Grundsätze zum Datenzugriff und zur Prüfbarkeit digitaler Unterlagen (German Principles of Data Access and Auditing of Digital Documents)
HGB	Handelsgesetzbuch (German Commercial Code)
ICT	Information and Communication Technology
IU	Infrastructure Utility
ROI	Return on Investment
SaaS	Software-as-a-Service
TCO	Total Cost of Ownership

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