

Management Briefing

We make sure



Dynamic Data Center™:

The direct link between business needs and IT requirements



Contents

2	Current situation
4	Dynamic Data Center™
6	The way into the future
7	Dynamic IT Solutions
12	Dynamic Data Center™: Technology and approaches
14	Portfolio of services
16	Outlook
16	Summary

Current situation

Challenges

IT decision-makers have always had to reconcile many different needs and requirements. However, concerns such as high availability, good network performance and adequate storage capacity are for the most part taken for granted today, but other equally important issues have taken their place:

- Today, we expect a modern IT infrastructure to have the flexibility and versatility it takes to adapt to changes in business conditions as they occur. For example, we expect to be able to expand ongoing business activities or integrate new business units "on the fly". We also expect existing IT infrastructures to be able to support new services and business processes without any major effort or investment, e.g., in the ideal case simply through allocation of available resources. The underlying assumption is that fast response to changes in business needs will translate into a competitive advantage in the marketplace. At the same time, IT activities are undergoing transformation and becoming profit centers instead of cost centers.
- High cost pressure dictates the necessity to make better use of available resources. And that in turn calls for greater efficiency and assignment of costs as a function of services used. Utilization of hardware to 10 to 20 percent of capacity—which is the case with many Windows® and Linux® servers, to mention one example—is no longer acceptable. The old axiom "one application—one server" is a technological hurdle that has to be overcome.
- And, finally, users—employees and customers—now expect IT to deliver what they've been promised for years—tools that make them more efficient and their work simpler and easier. In addition, today's users are no longer willing to accept downtime or system faults.

Outsourcing has become a buzzword for good services and low costs. However, the downside to outsourcing is that it becomes nearly impossible to influence and control IT operations, which means that IT management is left with far fewer options when it comes to taking active measures to improve business processes. This is a critical issue since the rapid pace of development in the area of IT technology for the application and infrastructure environments makes it necessary to integrate innovations into current operations as they become available. After all, this is the only way IT can add to the value of a company's core business processes and IT services and thereby enhance the company's ability to compete in the marketplace. However, whether this will result in a positive return on investment (ROI) always has to be determined as a function of each individual case. More and more IT managers are today coming to realize that they are no longer able to fulfill all of these requirements by simply making changes in existing IT structures. In many cases radical change is necessary.

Service-oriented architecture (SOA)

"... service-oriented architecture expresses a business-driven approach to software architecture that supports integrating the business as a set of linked, repeatable business tasks, or services. Services are self-contained, reusable software modules with well-defined interfaces and are independent of applications and the computing platforms on which they run. SOA helps users build composite applications, which are applications that draw upon functionality from multiple sources within and beyond the enterprise to support horizontal business processes. SOA helps businesses innovate by ensuring that IT systems can adapt quickly, easily and economically to support rapidly changing business needs." (Source: Wikipedia)

What is described here in rather technical language simply involves an approach to system architecture (at the service/user level!) that makes it possible to adapt to change.

However, if we go just a level deeper, we quickly find that the use of service-oriented architecture also inevitably entails change at the level of the physical infrastructure. Legacy hardware configurations that have been acquired over the years and are closely linked with specific applications are completely unsuitable for supporting dynamic software and service concepts.

- ☐ Organic growth results in increased complexity. This is illustrated by the fact that more than three-quarters of the time of data center personnel goes to keep existing infrastructures up and running.
- ☐ Dedicated resources preclude flexible use of hardware components to accommodate changes in needs, and such resources are often used to only 10 to 20 percent of installed capacity.
- ☐ Manual changes and adjustments to accommodate new needs are extremely risk-intensive and require an immense planning effort. Such changes also frequently necessitate unacceptable downtime.



The dilemma: What does it take to eliminate complexity and reduce the number of servers in the data center to cut costs and at the same time implement a modern infrastructure to support service-oriented software architecture?

Dynamic Data Center

The strategic basis

In order to meet the needs described in the last chapter, it's important to start out by examining the IT infrastructure as a function of a company's core activities. For any company, IT should be primarily a means to an end. The ultimate goal is to provide optimum support for business processes, which generally have nothing to do with IT, and this support should be dynamic since these business processes are in a constant state of flux due to the impact of many external factors (market conditions, competition, legislation, etc.). In order to achieve this, it is necessary to combine a management concept for service-oriented alignment of the IT infrastructure with business processes and the system architecture required to deliver the desired services. As a result, the following priorities apply in the context of the realignment of a data center infrastructure:

- Elimination of the need for expensive buffer capacity through dynamic allocation of available resources as a function of demand.
- Elimination of static, dedicated silo structures.
- Deployment of a dynamic platform for service-oriented software architecture.

Dynamic Data Center

The transition from a traditional, silo-based n-tier data center to an agile, adaptable infrastructure involves two key technologies.

The initial phase consists of eliminating the traditional assignment of physical resources to the applications they support, i.e., **virtualization** of resources. Consolidation of all hardware components (servers, storage devices and network) to form pools replaces n-tier architecture with a dynamic data center architecture that permits access to resources as a function of demand. In the ideal case, this means that any service can run on any system. This can be illustrated by looking at a simple example: Let's assume that an application running on a dual-processor system with a response time of half a second for ten concurrent users is operating within the limits prescribed in the corresponding service level agreements (SLA). When the number of users increases, the load the system has to handle also increases. The response time for each individual user then increases to one second, which represents significant deterioration in the service level. In the case of a Dynamic Data Center configuration, more server resources will be allocated to the application without any interruption of operation either by adding capacity from an additional server or by transferring the application itself to a more powerful server. That makes it possible to process the backlog faster, which will of course restore the response time to the prescribed limit as the load decreases.

In a second phase, the allocation of additional resources to a service (or deallocation when the total load decreases) is automated. Resources are therefore made available to meet demand as a function of a set of predefined rules. If the appropriate components are provided, it is also possible to automate assignment of the cost of services to the various users. Originally, **automation** scenarios were threshold-based, but this approach has subsequently been replaced by intelligent policy-based automation that permits interaction with service level management.

Benefits of Dynamic Data Center

The use of virtualization and automation concepts very quickly results in a series of major benefits:

- Better use of system resources: For example, Gartner estimates that virtualization technologies will make it possible to use 40 to 50 percent of x86 server capacity,¹ which is three times the 10 to 15 percent that experience has shown is achieved with dedicated servers.
- More flexible use of installed resources: IT can not only support changes in business processes but can also make it possible to handle short-term operational peak loads more effectively to make the enterprise or organization more agile and more competitive.
- Use of personnel to introduce innovations: Automation reduces the time required for routine operation and maintenance. That means personnel can be assigned to activities that make the enterprise more competitive and more productive.
- Easier compliance with SLAs: Fault situations can be rectified more quickly even if specialized personnel happen to be absent when a problem actually occurs.

Dynamic Data Center™ as a strategic option

A dynamic IT infrastructure makes it possible to tap into significant potential for optimization in terms of operational efficiency, flexibility and reliability and gives companies a real choice between outsourcing and the use of in-house resources. After all, if in-house operation can be significantly enhanced, outsourcing is no longer a patent recipe for preventing costs and complexity from getting out of hand. In addition, the existence of options that are truly viable puts a company in a stronger position vis-à-vis IT service providers and reduces dependency.

Like Mobility, Dynamic Data Center™ is a strategic pillar of the development activities of Fujitsu Siemens Computers. However, a dynamic IT infrastructure is an ideal state and not a product that can be bought off the shelf. Vendors and analysts agree that it will be a few years before companies start to use dynamic IT infrastructures that cut across the entire spectrum of their IT operations. Until then, however, it is important that companies start to align their planning and decision-making processes with respect to solutions and system architectures in order to anticipate the inevitable advent of dynamic IT infrastructure.



Dataport

Project

- Consolidation through server virtualization with VMware; 80 virtual machines with various Windows and Linux operating systems on five PRIMERGY industry-standard servers.

Results

- **Flexibility:** High-performance, adaptable operation of old applications as well as new ones; server availability in five to ten minutes; optimal distribution of load without interruption of service in two to five minutes.
- **Efficiency:** Lower ongoing maintenance and administrative expense, reduced investment, improvement in use of installed server capacity.

"The virtual infrastructure is economical, easy to administer and enables us to react to customer needs quickly." Mario Steinmeyer, Dept. Manager, Dataport



¹ Source: T. Bittman, Gartner, Real-Time Infrastructure: Let's Get Down to Business, November 2005

The way into the future

Only very few companies are in a position to create a new data center infrastructure from scratch. Most will have to find a way to migrate from their legacy n-tier architectures to dynamic IT infrastructures that keeps the required investment, effort and risks as low as possible. And that's precisely where the Dynamic Data Center™ strategy of Fujitsu Siemens Computers comes in. Our goal is to give our customers access to the products, solutions and services required to make the transition to the data center architecture of the future. If we take a closer look at the concepts involved in the virtualization and automation of data center resources and processes, it quickly becomes obvious that implementation is anything but easy. However, it is first necessary to address a series of problems:

- Applications behave differently. First of all, not all software providers offer products that comply with SOA criteria and support dynamic architectures.
- All areas within the data center are affected. The implementation of new infrastructure concepts makes it necessary to adapt servers, storage devices and network resources all at the same time.
- Only very few companies have the personnel resources required to examine and evaluate the many possible technologies, concepts and products available on the market and then make the right choice as a function of their specific requirements.
- Many technologies are new and users have had only limited experience with them, which significantly increases the risk of making the wrong decision.

The TRIOLE™ process

When it comes to the deployment of dynamic architecture concepts, the trick is to make the migration path as simple as possible to keep risks and the investment in resources to an absolute minimum in order to achieve a fast return on investment. The TRIOLE™ process permits precisely that by using virtualization and automation technology to combine server, storage and network resources to create integrated Dynamic IT Solutions. Our basic idea: "One-time development—multiple deployment." Theoretically, every customer could of course use available technology to develop a custom solution, for example, for an SAP® environment. With predeveloped Dynamic IT Solutions, however, customers benefit from significantly lower costs, faster deployment and minimum implementation risks. After all, Dynamic IT Solutions from Fujitsu Siemens Computers are optimized, tested and certified for special application scenarios such as mySAP™ or Oracle® 10g. In addition, they have to comply with stringent quality control criteria, and the same applies to the hardware and software products used to put the solution into actual practice. A further advantage of Dynamic IT Solutions is that they guarantee seamless integration of future technology since they feature a clearly defined roadmap that even takes into account technology that is not yet ready for market.

We offer clearly defined, ready-to-use Dynamic IT Solutions that provide customers with hands-on benefits from the very first day of operation.

All in all, the Dynamic Data Center™ strategy is fundamentally different from the approach of other providers because Fujitsu Siemens Computers offers customers clearly defined, ready-to-use Dynamic IT Solutions that provide hands-on benefits from the very first day of operation. The bottom line: We deliver what we promise.

Integration of technology

In addition to servers and middleware products from Fujitsu Siemens Computers, complete solutions for dynamic IT infrastructures include various external modules such as storage systems, network components and application software. Dynamic IT Solutions from Fujitsu Siemens Computers also incorporate the results of intense collaboration with various leading vendors at the development level. For example, EMC and NetApp contribute expertise in the area of storage systems; Cisco and Brocade provide network technology; and software providers like Microsoft®, SAP and Oracle supply basic platforms for modern business applications. The added value of our Dynamic IT Solutions lies in the consistent integration of these many different modules, which is controlled by using the TRIOLE™ process. This makes it possible for us to combine our own know-how in the area of server technology and middleware with the enormous expertise of our technology partners in their respective areas of specialization. This process is supported by various competence centers that together with our Professional Services specialists also represent the decisive link that permits seamless integration of Dynamic IT Solutions into the infrastructures of our customers. This competence pool also includes a worldwide network of systems integrators, management consultants and service partners, which means we can provide our customers with optimal support that cuts across the entire IT area and covers everything from maintenance of physical hardware components to assistance when it comes to the deployment of business processes based on modern IT concepts.



Dutch Ministry of Economic Affairs

Project

□ FlexFrame™ for mySAP™ Business Suite for approximately 4,000 users.

Ministerie van Economische Zaken

Results

- **Efficiency:** Reduction of operating costs by approximately 60 percent.
- **Service quality:** Significant improvement due to reduction of planned and unplanned downtime.
- **Protection of investment:** Problem-free integration of new technology.

"FlexFrame is an innovation driver for our IT—it delivers high performance, open design, high availability and greater economy than conventional IT infrastructures. All in all, it's the ideal basis for mastering the challenges of the future." Rob Jalving, ICT Manager, Dutch Ministry of Economic Affairs



Customer story

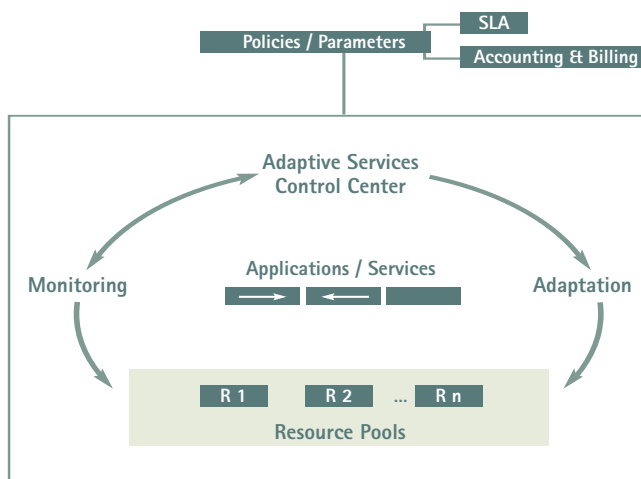
Dynamic IT Solutions

Core components

The Software Adaptive Services Control Center (ASCC™) is a core component of Dynamic IT Solutions designed to automate the allocation of resources. It is a system that monitors a pool of resources (physical or virtual servers that are allocated to a service) for compliance with a specific set of performance parameters. ASCC™ allocates and redeploys server capacity as a function of changes in demand. This involves three important logical interfaces:

- First of all, a service level is defined for the infrastructure in terms of parameters or threshold values (e. g., guaranteed response times). This generally involves the use of application-specific profiles.

- Secondly, the infrastructure is permanently monitored for compliance with the respective parameters or threshold values. It is possible to use general parameters for monitoring purposes, such as the CPU load or the response time of a server as well as application-specific components designed for direct monitoring of applications or services.
- ASCC™ can initiate corrective action in the event of any deviation from specified parameters. For example, this can involve booting additional servers or using RemoteDeploy to load servers with software and assign them to a group of resources allocated to a specific service.



ASCC™ can use reporting functionality to transmit information on the use of available capacity or the allocation of resources to services to appropriate modules for evaluation. The combination of ASCC™ with the accounting and billing modules of the CA Unicenter Systems Management Suite represents one example. In the future, ASCC™ will be used for automation purposes in many Dynamic IT Solutions of Fujitsu Siemens Computers and is already a permanent part of the FlexFrame™ for Oracle solution.

FlexFrame for Oracle

The first Dynamic IT solution for application and database services under Oracle makes optimal use of the grid computing capability of Oracle 10g and reduces cost-intensive IT infrastructures that have grown organically over time to the necessary minimum. A dynamic infrastructure is ideal for consolidation projects in the Oracle environment. For example, dynamic allocation or deallocation of application services and the possibility of fast, automatic transfer to other resources in the event of a system outage result in significantly better service quality. High availability is thus achieved without the use of expensive hot standby cluster environments. Flexible use of resources, simple management, high availability, problem-free scalability and low-risk implementation with a complete pretested solution—all that can combine to reduce operation costs by up to 60 percent and at the same time improve performance of business-critical applications. This impressive potential for improvement can be tapped into by using the innovative overall concept behind the dynamic IT solution:

- Radically simplified, flexible infrastructure for custom and standard applications that use the database and application server grid technology of Oracle 10g.
- Intelligent virtualization and automation for optimal use of server resources, performance on demand, simple lifecycle management and policy-based service levels in combination with significantly lower administrative expense.
- Integrated high availability without hot standby cluster environment.
- Simple and fast scalability.
- Integration of market-leading software and industry-standard hardware systems.

FlexFrame for mySAP™ Business Suite

FlexFrame for mySAP Business Suite is a virtualized server and storage infrastructure that makes it possible to operate any mySAP application on any server. The first Adaptive Computing infrastructure within the SAP® NetWeaver™ technology platform results in noticeable simplification of mySAP environments and significantly increases the use of installed server capacity. The combination of virtualization and intelligent automation also permits significant enhancement of the operation of mySAP environments, since management becomes simpler and more flexible. FlexFrame for mySAP Business Suite also offers inherent high availability that does away with the need for conventional cluster solutions. Over 100 customers worldwide have already used our infrastructure solutions to make their SAP operations more flexible, economical and future-safe.

- Flexibility: Consistently high service quality for users, automated compensation for peak loads, high application availability.
- Economy: Drastic reduction in Total Cost of Ownership—documented reductions of up to 60 percent depending on the specific situation.
- Future-safe: FlexFrame for mySAP Business Suite can be easily expanded and is designed to permit integration of future technologies, which reduces the need to invest in new hardware.

PRIMERGY BladeFrame

Consistent simplification and virtualization make PRIMERGY BladeFrame a unique dynamic server solution for business-critical applications that permits quick recovery of applications and resources in the event of an outage. In addition, industry-standard technology for applications on Windows, Linux and Solaris™ supports expansion to up to 24 computer nodes.

University of Rostock

Project

- Virtualized PRIMERGY BladeFrame server pool for consolidation of the server infrastructure and operation of numerous centralized services on Windows®, Linux® and Solaris™ for approximately 17,000 users.

Results

- **Efficiency:** Lower administrative expense, better use of resources, reduction in investment and operating costs.
- **Service quality:** Minimal time required to deploy new applications, shorter response times, high availability easily maintained with no additional expense.

"At the present time one of the best server virtualization concepts on the market."

Dr.-Ing. Christa Radloff, Head of University Data Center, University of Rostock



Customer story

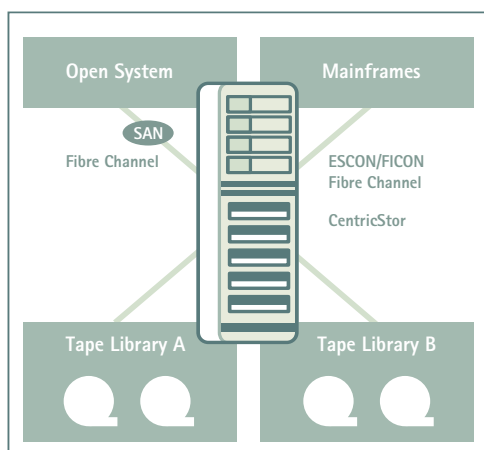
Whereas dynamic solutions based on the FlexFrame™ concept are developed for clearly defined application scenarios, PRIMERGY BladeFrame is a new type of dynamic enterprise server solution intended to handle a broader range of enterprise applications. PRIMERGY BladeFrame does away with the conventional practice of using dedicated servers for application and operating system software and separate integration of these servers into company-wide network and storage architectures. Such complex infrastructures are replaced by using a flexible server pool in which the individual computer nodes (1 to 4 CPUs) are reduced to processor and memory resources (so-called stateless servers) and share virtual software-mapped I/O-interfaces as LAN/SAN switches. Integrated virtualization software makes it possible to use a pool of resources to define "virtual servers" at any given time. The necessary application and operating system software is loaded and started by image transfer. As a result, entire

installations can be put into production in a matter of minutes. Upon termination of the application, the resources are reallocated to the pool for dynamic allocation to other applications when needed. PRIMERGY BladeFrame not only permits very quick deployment of new applications but also offers a series of important benefits:

- Fast, flexible allocation and reallocation of server capacity
- Massive reduction of capital expenditure and administrative expense since the entire SAN/LAN/computing infrastructure is virtualized in the form of software
- Guaranteed flexibility through high availability of business-critical applications without complex, costly clusters. Outage protection concepts can also be implemented for entire data centers easier than ever before.

CentricStor

The CentricStor Virtual Tape Appliance offers virtual tape technology for mainframe and open system environments with Unix and Windows that supports simple and efficient disk-to-disk-to-tape (D2D2T) backup.



Today, the volume of data we live and work with is increasing exponentially because of the way we communicate, use knowledge and network systems with one another. As a result, storage devices and media are nearing the limits of their capacity. With the CentricStor Virtual Tape Appliance, Fujitsu Siemens Computers offers a solution for tape virtualization that uses virtual tape drives to make many high-performance backup and storage resources permanently available to all systems in a storage area network. CentricStor offers practically unlimited virtual resources, uniform system interfaces and high availability.

Open architecture: CentricStor is platform-independent and can be simply and transparently integrated into existing IT landscapes. Applications are also not affected by migration to new tape technology. Universal connectivity permits concurrent access to storage media by different

servers and applications without the need for a physical tape drive for each individual system. CentricStor features maximum throughput for backups and fast recovery of data in the event of a catastrophe for mainframe and open system environments or NAS solutions. Standardized functional units and an intelligent internal communication concept also permit maximum scalability and simple administration.

Johannes R. Weichelt GmbH

Project

- Modernization of data center infrastructure, including installation of CentricStor Virtual Tape Appliance.

Results

- **Efficiency:** Reduction of 90 percent in personnel expense and 50 percent in required floor space.
 - **Service quality:** Significant improvement through automated operation and significantly better backup.
- "Automated operation allowed us to achieve a significant reduction in overall operating costs. This was coupled with significant improvement in throughput and performance and—thanks to CentricStor—ultra-fast backup." Peter Schirmer, Managing Director, Johannes R. Weichelt GmbH Informationssysteme und Service

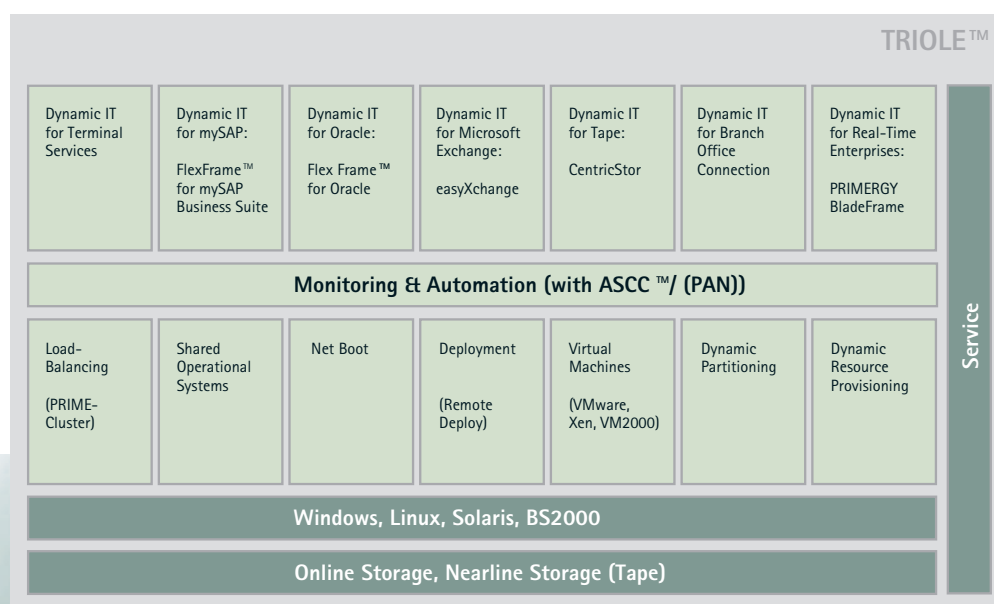


Other Dynamic IT Solutions

The four Dynamic IT Solutions described in the last chapter are good examples of concrete solutions for companies from the areas of homogeneous application scenarios (Oracle application and database server), heterogeneous business-critical applications (PRIMERGY BladeFrame) and data storage and backup.

Through optimal integration of modern IT concepts and technology, Fujitsu Siemens Computers can offer a portfolio of Dynamic IT Solutions that extend well beyond these scenarios and cover virtually all conceivable applications. This is illustrated by the overview provided below.

The many technologies and products shown in this overview also make obvious a special benefit of Dynamic IT Solutions: Fujitsu Siemens Computers chooses the optimal systems and software components for each individual solution as well as appropriate integration concepts and then tests and certifies these solutions and fully guarantees quality after deployment. This includes services required for planning customer-specific solutions, including installation, operation and maintenance, as well as ongoing enhancement of existing solutions with the most recent technologies and software versions available. Detailed information on technologies, solutions and services is available in the form of white papers. As a result, the following chapter provides only a brief presentation of the technologies and possible approaches that make up the Dynamic Data Center™ strategy as well as an overview of Dynamic Data Center™ services.

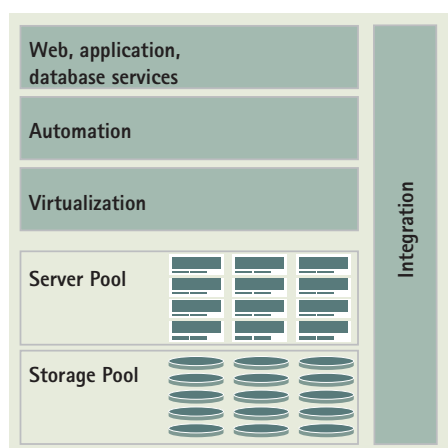


Dynamic Data Center™: Technology and approaches

As was mentioned above, Dynamic IT Solutions essentially build on two key IT concepts—virtualization and automation. The technologies employed and the way they are intelligently integrated into Dynamic IT Solutions are explained below.

Basic architecture

Unlike the conventional n-tier model, which is based on the use of an IT infrastructure that consists of various tiers—from the front end to application and database servers and storage systems— Dynamic Data Center focuses on services. That means the service an application makes available to users is what is most important. In order to maintain a predefined service level, automation and virtualization



technology is used to allocate the resources required for a given service at any given time from a pool of resources. The resources in the pool are not permanently assigned to a specific application but are available to be used for any of many different applications. This can be illustrated by looking at an example: If too many users start to use a company's e-mail-system all at once at 9:00 a.m., the resources—in this case two 4-CPU servers—will be used to full capacity. At 1:00 a.m., however, these permanently allocated resources are virtually unused, but they still cost money—to acquire them in the first place and to operate them thereafter. If no servers are permanently assigned to e-mail-service, the situation is completely different:

Two 4-CPU servers can be used to handle peak demand first thing in the morning but only a virtual 1-CPU server need be in operation at night. That means the use of resources is significantly enhanced and the most important criterion is fulfilled: E-mail service with optimal response time is available

at all times—for 3,000 concurrent users during the day and for the five employees who suffer from insomnia during the wee hours of the morning.

Virtualization

The primary goal of any virtualization technology is to do away with the permanent assignment of physical resources to the applications they support. Virtualization is not a new concept, but it was for a long time used only for large mainframes. Fujitsu Siemens Computers has been involved in virtualization technology for mainframes for over 20 years. Several approaches to virtualization exist in the area of server and storage technology:

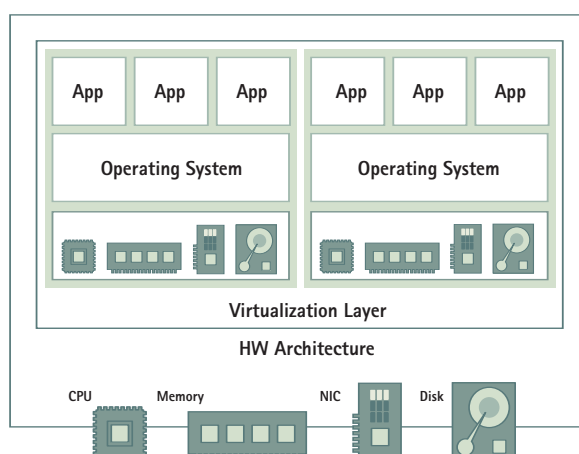
- Dynamic provisioning of servers as a function of the demand for specific services is a variant that is primarily used in the case of server farms. This involves cloning and booting master disk images (including operating system and preconfigured applications) from a central storage system to the required number of servers. When the total load drops, the information on the server disks can be deleted and the systems made available for other services. RemoteDeploy is a Fujitsu Siemens Computers tool that is used for this purpose.

- Dynamic partitioning is a special type of virtualization. It involves flexible allocation of resources to a service and is primarily used in high-end server systems. The use of XPAR on PRIMEPOWER systems under Solaris is an example.
- However, what was originally reserved for mainframes is now also available for industry-standard servers: server virtualization through the use of virtual machine (VM) concepts. VMware products, for example, have reached a level of quality that makes it possible to use standard server technology for virtual server environments even for business-critical scenarios without any problems. Many companies now insist on VM concepts in the IT area. Microsoft's announcement to the effect that it intends to integrate what is referred to as hypervisor technology into server operating systems in the future reflects this trend. In addition, Xen is a technology with enormous potential that is becoming established in the open source community. Fujitsu Siemens Computers plans to employ this technology in the future. Both VMware (with GSX servers) and Microsoft (with virtual servers) intend to make their current standard products for servers available at no cost, which clearly indicates that virtualization is becoming an important basic technology for future IT solutions.
- Virtualization concepts that permit logical separation of heterogeneous host systems and tape libraries also exist for tape storage.

In-depth treatment of the subject of virtualization would go beyond the scope of this paper. Since so much development work is now being invested in the use of virtual machine technology, in particular for server virtualization, those interested in this area are referred to the white papers and transparency presentations of Fujitsu Siemens Computers that deal specifically with this subject.

Automation

Server virtualization represents the initial step in the direction of a Dynamic Data Center environment. Automated allocation of available resources as a function of various load scenarios is also necessary to achieve dynamic operation. This calls for components that can interface with services and applications on the one hand, and on the other hand permit modification of resource allocation as a function of demand. Problem-free execution of all operations involved (control of physical resources, control of applications, allocation of resources, reconfiguration of network and storage connections) and communication with front-end components (accounting, billing, asset management, policy management, etc.) can be achieved only through the use of tools that feature optimal intercompatibility. Since the applications, middleware (including the above-mentioned administration tools), network, server hardware and storage systems have to be seamlessly integrated, it is advisable to have the individual modules tested and if necessary certified when they are embedded in a total solution designed to deliver the desired performance and functionality as described above in connection with the TRIOLE™ process.



Portfolio of services

As mentioned above, Fujitsu Siemens Computers provides customers with effective support when it comes to the development and deployment of custom optimization concepts with its portfolio of Dynamic Data Center™ services (DDC services). The special added value of our portfolio of services lies in the fact that we help our customers fine-tune their strategies for improving their IT operations on the one hand, and on the other hand deliver Dynamic IT Solutions that permit enhancement of IT infrastructures with minimum risk and short project lead times.

Planning custom concepts for IT optimization

In order to build up a service-driven IT infrastructure, it is necessary to start by adopting a new approach to the entire problem. Before undertaking any optimization measures, it is advisable to ask yourself: "What application(s) do I want to use?" That may sound simple, but it involves thorough examination of a host of underlying aspects. The key issue: To define the measures, methods and technologies required to achieve application availability at a predefined service level at optimal cost, taking into account fluctuations in requirements during operation. The Consulting Services of Fujitsu Siemens Computers let customers tap into an exhaustive source of experience and expertise in order to achieve the optimal trade-off between IT performance and IT requirements as a function of needs over the long term. Prior to the launch of any concrete infrastructure project, it is necessary to focus on the transformation of corporate strategy into IT. In addition to analysis of the ramifications of strategic goals for IT organization, infrastructure and processes, we show our customers how other companies have addressed similar challenges and outline the general approaches that come into question. It is also critically important to recognize the technical and financial effects of innovation early on. Our Business Transformation Services make these effects transparent, for example, by determining how much improvement can be expected from a given solution in terms of IT productivity and its impact on operating costs, and we can also determine the extent to which fixed costs can be advantageously converted into variable overheads. Finally, this array of services includes improvement of the stability of ongoing business operations and the ability of the IT department to handle changes in needs. The ROI Services of Fujitsu Siemens Computers represent an ideal set of tools for controlling the economic success of IT projects. They provide an important source of assistance during the initial decision-making process as well as during implementation of the chosen solution and actual production. As a result, our customers can decide very early on whether the investment in a Dynamic IT Solution can be justified in any given case. These services also permit in-depth evaluation of everything involved in the implementation of a project as well as precise control and management on the basis of key data for cost structures, cost projections and net return.

Consult	Design	Build	Operate	Maintain
Technical IT Infrastructure Services		Assured Delivery		
Customer Briefing		Hardware Installation		
Configuration & Sizing		Solution Implementation	Solution Services	
Solution Preview	Solution Specification	Upgrade Services	Go Live Services	
Inspection Services Tool-based Assessment	Migration Specification	Migration Services	Customer-specific Training	
Strategy Workshop	Inspection Services Tool-based Modeling	Inspection Services Tool-based Verification	Operational Services	
IT Infrastructure Assessment	Operational Specification	Operational Implementation	Hardware and Software Maintenance Services	
Solution Concept		Audit Services		
Project Management			Service Level Management	
Financial TCO and ROI Services				
ROI Estimate	ROI Predict		ROI Deliver	
TCO/ROI Evaluation				

Our modular portfolio of services guarantees quick, successful transfer of technology.

Deployment of IT innovations

In the presentation of the TRIOLE™ process above, we mentioned that we consistently apply the principle of "One-time development—multiple deployment". This is also reflected in our portfolio of services. It is completely based on standardized processes and instruments—from Consult to Maintain—and constantly enhanced at the international level. The reason for this is obvious: Innovation only pays off if a company can actually use it. Know-how that can be replicated anywhere in the world at any time combines with predefined Dynamic IT Solutions to help our customers achieve significant savings when it comes to introducing innovations. However, it is just as important to make a systematic effort to keep the risks involved in migration to a dynamic IT infrastructure to a minimum, to keep implementation time as short as possible and to obtain a high level of quality throughout the entire process. For example, DDC services make it possible to consolidate SAP infrastructures, including everything from planning to production start-up, within a period of a few weeks and permit a high level of efficiency from the initial design phase to completion. This is achieved through the use of instruments such as SystemInspection Services that are used to analyze and evaluate existing environments in order to take optimal advantage of the potential offered by consolidation and to ensure complete compliance with customer-specific performance requirements. The entire portfolio of services features a modular structure, covers the needs of any IT project and allows customers to opt for individual modules as a function of their specific situations. In the case of the consolidation of SAP infrastructures mentioned above, it often proves extremely useful to complement SystemInspection Services by other services such as Migration Services or Assured Delivery, which can reduce installation on site to a matter of a few hours.



Dexia Hypothekenbank AG

Project

- ☐ Phased implementation of Dynamic Data Center infrastructure: centralization of SAP system landscape with FlexFrame™ for mySAP™ Business Suite; migration of e-mail infrastructure to easyXchange; and seamless, uniform data storage and protection for Exchange, SAP, Oracle and Windows servers.

Results

- ☐ **Service quality:** Flexible allocation of resources to handle peak loads (e.g., monthly statements); improved availability of applications; avoidance of disruptions in productive operation through accelerated data protection
- ☐ **Efficiency:** Savings through uniform, virtually completely automated administration; seamless, uniform data storage and protection; optimal use of resources.
- ☐ **Protection of investment:** Through modular design with integrated, easily scalable components.

"The total solution meets our requirements in terms of availability and economy. It also became obvious that Dynamic IT Solutions create significant potential for synergistic effects."

Frank Plaster, IT Manager, Dexia Hypothekenbank AG



Outlook

Technology is always in a constant state of flux, which is why ongoing evaluation of new system components, application packages and integration software is always included in the development of Dynamic IT Solutions. It is already possible to identify various types of technology that will become more prevalent in the next few years. Virtualization with VMware represents an initial step in the direction of making applications and services independent of physical resources. For example, due to the benefits of using virtualization layers to provision resources, Microsoft has announced that it will be bringing out what is called a hypervisor for the future version of the Windows server operating system. However, the most likely prospect for a future de facto standard for the virtualization of system resources is apt to come from the open source community: Xen is a free virtual machine monitor that allows any system or operating system provider to offer different services on a single physical system with the optimal configuration for such purposes—and, to be sure, without having to obtain certification (often proprietary) of components for specific operating systems. Windows, various Linux distributions, UNIX derivatives and even mainframe applications will in the foreseeable future all run simultaneously on the same physical system. Although much development work and testing remain to be carried out before such scenarios will make their way into productive operation, it is already possible to imagine what kind of possibilities virtualization technology holds in store for the design of data center infrastructures in the future. Xen will also be an integral part of various Dynamic IT Solutions and enable Fujitsu Siemens Computers to offer constellations of hardware and operating systems that were never before considered possible.

Summary

Service-oriented architectures with the corresponding dynamic infrastructures have to some extent already become reality today. The number of available solution scenarios for different business requirements is steadily growing, as is the percentage of dynamic infrastructure components now being used by companies. It will be some time before Dynamic Data Center functionality and the transition to what is referred to as "utility computing" are fully realized, but the use of Dynamic IT Solutions already gives customers of Fujitsu Siemens Computers the security of knowing that they will be prepared to handle future requirements in terms of IT capability. The dynamic IT infrastructure of the future will permit predictive instead of retrospective responses to changes in business requirements. Components such as Adaptive Services Control Center (ASCC™) or complete solution scenarios such as FlexFrame™ or PRIMERGY BladeFrame will play a key role in the context of automated allocation of resources to support predictive IT architecture models. By permitting seamless integration of existing and future technologies, such dynamic infrastructure scenarios will give customers of Fujitsu Siemens Computers a choice of attractive options for the future.