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VIRUTALISATION IS NOT A GAME

Virtualisation technologies at a glance

Virtualisation has established itself as a key technology for corporate IT. It offers numerous advantages, as described in the following sections. Virtualisation centralises applications on just one or only a select group of servers, thereby making them a potential single point of failure. The technology simplifies the dynamic migration and reallocation of resources in order to support specific peak loads for individual applications, resulting in more efficient allocation of resources.

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Virtualisation: Practical tips for your company

Virtualised environments for enterprises

CHANCES

Why should enterprises consider a virtual environment? To address this question, reference can be made to the dynamic allocation of resources: in conventional environments, each application must have sufficient computing power to meet targeted service level agreements (SLAs) at maximum annual load. This requires a significant investment in computer resources which are seldom fully utilised.

Virtualisation eliminates this problem and thus creates a significant cost advantage for your business. For example, if a single application is used at full capacity at any given point in time, traditional hardware can be upgraded, but such a process requires time-consuming manual work. Furthermore, this upgrade would have to take place outside normal business hours and requires the application to be offline at the same time.

With a virtual environment, the service at full capacity can "borrow" resources from other instances that are temporarily not needed. In some cases, a virtual system can even be dynamically migrated between two servers via the existing network to respond to such peak loads. Of course, one should remember that the network is an essential prerequisite for virtualisation.

The network which connects the physical servers must be designed to be as fast and as fault tolerant as possible in order to achieve the desired performance. In the end, a significant level of planning and management will be required to design and operate a virtual environment successfully. A case-by-case analysis conducted by experienced partners helps to assess the opportunities and risks and thus determines the best way forward.

Network Function Virtualisation (NFV)

DEFINITION

Network function virtualisation is defined as hosting routers, firewalls and load balancers on generic virtual machines instead of physical hardware specifically designed for this purpose.

Virtualisation is the process of creating multiple virtual machines (**virtual machine**) on one or more physical servers (**infrastructure**) using software (**hypervisor**). These virtual machines can provide the same performance as the underlying physical server, but require far fewer computing resources. This allows multiple virtual machines, applications (**App A/B/C**) and operating systems (**Guest Operating System**) to run on a single server. This makes IT operations far more efficient and economical.

Virtual Machine

App A

Guest Operating System

Virtual Machine

App B

Guest Operating System

Virtual Machine

App C

Guest Operating System

Hypervisor

Infrastructure
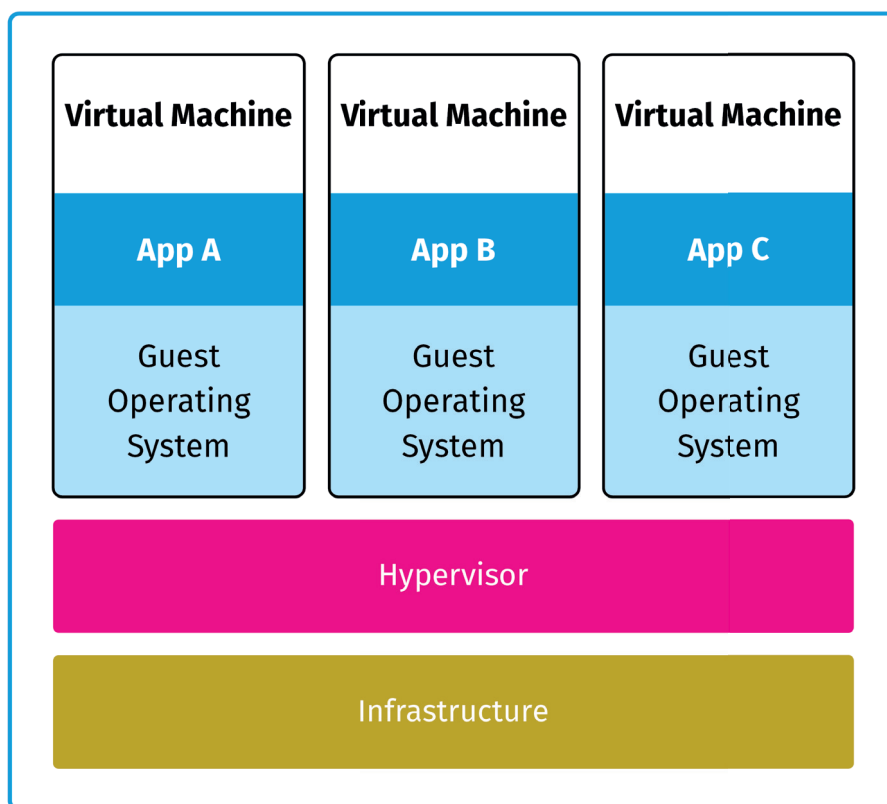
Your five advantages of Network Function Virtualisation

Secure competitive advantages

ADVANTAGE NO. 1

The use of such a solution offers multiple advantages for your business. Virtual routing can especially result in significant competitive advantages for users with branch offices in different locations or with lots of data being transferred. Instead of using hardware-based network routers and gateways, the usual functions are implemented in software. Subsequently, this software runs smoothly on a classic industrial server and offers advantages such as cost reduction and seamless system collaboration.

Immediate availability

ADVANTAGE NO. 2

Additionally, companies benefit from the immediate availability of such software-based network functionalities. This eliminates the traditional need to place orders, wait for shipments, and then perform installation and configuration. In most cases, administrative interventions will also no longer be necessary at the various locations. Ultimately, all of these factors will have a positive effect on flexibility and response times, as a virtual router removes the need for dedicated hardware to perform IP routing.

As a result, the virtual functions can easily be set up dynamically to adapt to individual requirements and allow for the transfer of such functions to a data center. In comparison to traditional routers, such solutions are far more powerful because the resources of the underlying virtual environment can be fully utilised.

Agility and flexibility

ADVANTAGE NO. 3

The virtualisation of network functions also offers possibilities beyond those of a virtual router. Both the agility and flexibility of virtual network devices are far greater than those of traditional appliances. Using network function virtualisation, companies can adapt very quickly to changing requirements and easily scale required capacities as necessary.

Pay-as-you-grow models

ADVANTAGE NO. 4

With such dynamics, network function virtualisation also supports so-called pay-as- you-grow models and can be particularly efficient and sustainable. It also reduces expenditures for hardware which solely serve traditional hosting purposes. By utilising network function virtualisation, companies can make use of standardised industrial servers where several virtual machines take over the function of the otherwise traditional hardware.

Technical innovations

ADVANTAGE NO. 5

Another central advantage is the exceptionally quick support for technological innovations. Virtualisation software is essentially based on so-called virtual appliances, i.e. pre-installed and configured applications. They are assembled in the virtual machine in conjunction with an operating system and can run on any server. This enables an accelerated implementation of new network services and thus makes a positive contribution to the utilisation of new market opportunities and technological functions.

Your way to a Dynamic Data Center (DDC)

Flexible efficiency

ADVANTAGE NO. 1

Traditional data centers have been undergoing a transformation process for quite some time. The aim of this change is to create new IT infrastructures that can cover all business requirements on an economic scale and thus bring business advantages to those companies that make use of them.

The infrastructures are designed in such a way that the underlying hardware and software layers can respond dynamically and thus more efficiently to changing needs for resource capacity by pooling all available IT resources. This pool offers flexible performance and therefore an easy allocation of resources according to the needs of individual business processes in real time.

Economies of scale

ADVANTAGE NO. 2

In terms of performance, there are further economies of scale. The flexible adaptation of resources guarantees much better response times and thus a higher availability of the business process as well as reliable adherence with service level agreements (SLAs).

The economic advantages of such a data center primarily come from the reduced demand for software and hardware components and the corresponding reductions in operating costs.

Investment security

ADVANTAGE NO. 3

A dynamic data center also offers long-term investment security because the individual parts of the infrastructure are standardised and can be administered with a higher degree of automation. A dynamic data center thus offers a much better cost structure for customers than traditional data centers do.

Benefits of virtual machines and VM-ware core competencies

Monitoring

THROUGH HYPERVISORS

Until now, the servers used by most enterprises have often not been fully utilised. As a result, they incur excess costs for cooling and electricity while wasting resources. In addition, problems often arise when legacy applications such as operating systems and applications have to be run on hardware that cannot support them due to missing drivers, for example. One solution for problems of this kind can be found in hypervisors which monitor the entire physical hardware.

Access to virtual hardware

DISTRIBUTION OF RESOURCES

They also give legacy guest operating systems access to virtual hardware, thus allowing for a more efficient distribution and strategic management of server resources in the form of distributed resource scheduling. VMware, the market leader for virtualisation software solutions, enables its users to make optimal use of available server resources and efficiently provide new services and servers.

High availability service

AUTOMATED MIGRATION

In addition to lower maintenance costs, virtualisation solutions of this kind offer an extended life cycle for the underlying server infrastructures and greatly reduced system downtimes ensured by the free and flexible movement of virtual instances between ESX servers, which can take place during ongoing operations without any down time. The virtual machines are set up in a server farm and a defined resource pool in accordance to the current utilisation level of the respective server. These virtual machines can then be migrated automatically.

This ensures that each virtual machine always has full access to its allocated resources and that they can easily cover predefined service level agreements. The hypervisor monitors the availability of individual servers in a farm and starts virtual machines according to user-specific policies. This high availability service is the foundation for efficient disaster recovery scenarios.

Virtualied application environment

INCREASE IN EFFICIENCY

A virtualised application environment without a hypervisor provides users with additional operating system benefits such as the virtualisation of applications, where multiple virtualised applications share a single copy of an operating system. As a result, multiple services can run in parallel on a virtual server making the operation of these applications more efficient.

It is important, however, to note that a virtual environment entails potential risks, the most significant of which is security. Centralising many applications on a single system can lead to errors in the physical server and in the network connection. It is obvious that if the server crashes or the network connection slows down, all applications in the environment will be affected equally. Such problems create a need for software solutions that allow incremental backup or even full replication to allow affected systems to be restored quickly and easily. In addition, the underlying architecture imposes a greater load on the network to ensure smooth operation. Reliability and efficiency of the data network are therefore crucial prerequisites for the successful operation of virtual application environments.

Reasons to use virtualisation

Why virtualise?

ADVANTAGES

Besides improved server utilisation and the associated cost reduction, virtualisation offers further advantages for customers of data centers. Traditionally, the continuous availability of systems is very costly because the hardware for redundant systems is expensive. Traditional devices can also be costly because they do not help prevent down times or take too long to recover after such down time.

Virtualisation technologies such as VMware's vSphere extend the software-defined data center architecture to relevant networks and storage systems, thereby enabling fast and intuitive configuration like that of virtual machines. Software vendors such as Veeam also provide a platform for early detection and resolution of emerging system problems. This further optimises infrastructure capacities and allows users' individual availability requirements to be easily considered.

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Virtualisation solutions from firstcolo

VMware Virtualisation solutions

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In the area of VMware firstcolo offers its customers managed dedicated VMware clusters in addition to a separate resource pool on shared cluster systems. In the shared clusters, customers can manage a defined number of resources independently using the vCloud Director. The user can create and edit their own virtual machines depending on their required performance.

In contrast, the firstcolo center experts take over the entire management and administration of the infrastructure of a managed dedicated VMware cluster, so that the user can fully concentrate on their core business. The storage component of VMware is already included through vSAN and the entire cluster offer of the firstcolo data center consists of 100 percent SSD storage.

Proxmox Virtualisation solutions

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The range of Proxmox clusters offered by the firstcolo experts includes both managed and unmanaged clusters. The storage component is provided in the form of a triple redundant Ceph storage. The individual hypervisors and the Ceph storage are both operated in an internal private network and are directly connected to the Internet via the firstcolo network.

In order to realise an adequate level of redundancy, a typical cluster setup at firstcolo generally consists of at least three physical nodes. As with VMware, the entire Ceph storage also consists of 100 percent SSD storage to guarantee the highest performance. The storage volume is billed in a pay-as-you- grow model.

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firstcolo is your partner for data center and managed services

About firstcolo

As an IT infrastructure provider, firstcolo operates high-availability data centers at German and European server locations with the core competencies of colocation and cloud services, managed services and DDoS protection. Numerous companies from a wide range of industries rely on firstcolo and its secure, cost-effective and innovative solutions when designing and outsourcing their IT structures. The customer base primarily includes companies with above-average demands on service quality and IT security.

Further information on our services can be found at
 www.firstcolo.net.