The Path to a Software-defined Data Center
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IT vendors of every description are talking about the software-defined data center these days, but it’s still just talk. The fully formed, highly automated, totally orchestrated software-defined data center that is the basis for shared, on-demand IT services isn’t here yet.

Even when this optimized environment finally arrives, it will be a work in progress—constantly evolving and improving like most broadly adopted IT solutions.

Still, you can begin the transformation to a software-defined data center today by assessing and optimizing your existing infrastructure investment. By doing so, you can get your team ready for rapid adoption while addressing new challenges and making the most of emerging opportunities.

The software-defined data center represents a fundamental shift that is taking place in data center design, implementation and management. It holds the promise of a hybrid cloud environment in which compute, network and storage capabilities are decoupled from hardware dependencies, completely flexible and scalable to meet the needs of business, as well as completely controlled by internal IT teams. When this happens, the data center will truly be the great strategic asset and source of competitive advantage that every organization wants. Long deployment times and the rigidity and inefficiencies of hardware-defined infrastructure will be relics of the past.

In SUSE’s vision for a software-defined data center, organizations will maximize the value and control of both cloud services and legacy systems, and automation will free IT staff from routine deployment and management tasks so they can focus on strategic initiatives. On-site and public cloud resources will function as a single, fully integrated system that treats networks, storage and servers as secure, infinitely scalable computing resource pools. Rapid delivery and management of business solutions will be ordinary everyday events in which workload infrastructure provision levels are precisely determined by each application’s requirements for performance, reliability and scalability.

This is a vision that’s pragmatic at its core—giving you the flexibility to choose the innovative technologies that meet your requirements for increasing efficiency and managing costs, without vendor lock-in.

SUSE has more than 20 years of expertise as a pioneer in Linux software distribution and support, as well as leadership in open-source, software-defined compute, storage and networking technologies. This gives us a strong position to help you transform your IT environment into the agile, high-performance, affordable and lower-risk software-defined data center of the future.

Open Source Leads the Way to a Software-defined Data Center

Key open source technologies for provisioning and managing compute, storage and networking resources are available today; they are ideal building blocks for software-defined data centers.
This makes sense when you consider the widespread adoption of Linux in enterprises and public and private clouds. It’s also a natural outgrowth of unrestricted access to open technologies that encourages their use and adoption by large communities of technologists. Clearly, the sharing of and collaboration on code inherent in the open source development model lends itself well to technical advancement and rapid innovation.

Today’s open source innovations can help you measurably improve service agility. You can build an internal infrastructure that has the flexibility to quickly provision resources based on the unique requirements for performance, availability and capacity of each application and every work group. Ideally this lets you: 1) leverage your existing investment in physical and virtualized systems; 2) select solutions from multiple suppliers; and 3) take a pragmatic approach that fits the way you implement and manage the lifecycle of your services.

There are several open source projects that have formed around core data center areas—projects that are hot today and clearly gaining momentum. These include:

OpenStack—a cloud operating system and set of software tools that control large pools of compute, storage, and networking resources throughout a data center, all managed through a dashboard that gives administrators control while empowering their users to provision resources through a web interface. OpenStack is backed by a community of thousands of individual members, as well as leading software development and hosting companies. According to Gartner analysts, by 2019, OpenStack enterprise deployments will grow tenfold, up from just hundreds of production deployments today, due to increased maturity and growing ecosystem support.*

Ceph—one of the leading open source distributed software storage platforms. Ceph stores data on a single distributed computer cluster and provides interfaces for object-, block- and file-level storage. It delivers excellent performance, reliability and scalability—all while providing maximum compatibility with legacy applications.

Docker—a Linux container technology that can support your Development and Operations requirements for fast, consistent application implementations. Docker is open source technology that automates the deployment of applications inside software containers. It provides an additional layer of abstraction and automation of OS-level virtualization on Linux. Using Docker and Linux containers is a great way to more quickly build, deploy and manage applications.

Building the Foundation for a Software-defined Data Center
A key aspect of any software-defined data center is cross-platform deployment of the system resources for applications

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* Gartner, How to Succeed in Your OpenStack Deployment, Donna Scott, Arun Chandrasekaran, February 20, 2015.
that lines of business depend on to drive revenue and gain a competitive advantage. OpenStack provides the means to control system resource pools and automate provisioning of those resources. Although OpenStack is designed largely for facilitating private and public clouds, SUSE uses it to deliver software-defined data center orchestration in its private cloud infrastructure solution, SUSE® OpenStack Cloud. In addition to delivering exceptional agility, scalability and efficiency in mixed hypervisor (Xen, KVM, Microsoft Hyper-V, and VMware ESXi) environments, SUSE OpenStack Cloud is the easiest and fastest OpenStack-based private cloud solution to deploy.

For IT teams, it’s a constant struggle to deliver services across multiple platforms in a timely manner. Docker provides a standard for simplicity and agility when deploying applications in Linux containers. The low overhead and layered image system of Docker containers increases the density of application deployment. By eliminating the need for a guest OS, Docker containers can have two-to-three times the number of virtual environments of a regular VM. This benefits you in building a software-defined data center because you can reduce costs by running more virtual environments on your existing hardware platforms. Docker is fully supported in the latest release of SUSE Linux Enterprise Server 12 for production environments and is the only Linux distribution to support Docker containers on x86-64, IBM Power Systems and IBM z Systems hardware. SUSE’s implementation includes a secure private registry with a graphic user interface to manage application containers.

Another challenge for IT teams face is the exploding data volumes that are making storage costs difficult to contain. Ceph is the foundation for SUSE Enterprise Storage™, the resilient, highly scalable software-based storage solution that enables organizations to build cost-efficient storage using commodity, off-the-shelf servers and disk drives. For many SUSE customers, this software-defined approach, which emphasizes hardware choice, openness and flexibility, is a welcome departure from the more rigid systems that have defined the storage market thus far. These attributes, combined with the self-managing and self-healing of storage server clusters, make SUSE Enterprise Storage ideal for software-defined data centers. SUSE Enterprise Storage is fully integrated with SUSE OpenStack Cloud orchestration.

The Advantage of SUSE Solutions and Support
SUSE can help you to increase the agility of your IT operations in supporting of your business operations. We focus on delivering practical, smart innovations for companies with mixed IT environments. Our technical expertise is devoted to making sure that the best open source technologies work well with your existing IT investments in order to help you optimize your mixed environment. Of course, there are other companies that provide software solutions for a software-defined data center, but we believe that partnering with other technology providers gives you the best opportunity to select, deliver and manage the software applications that work best for your business operations and IT requirements. What’s more, there’s no lock-in to proprietary solutions or to “open source” software distributions that are no longer truly open because they are built on a single vendor’s proprietary technologies.

SUSE actively contributes to the advancement of open source projects while hardening the code from these projects and incorporating them into our commercially available and supported software products. The leading open source solutions cited above are supported in our most recent Linux platform, SUSE Linux Enterprise 12. What’s more, SUSE Manager can make it easier for you to manage these new implementations alongside your existing infrastructure. SUSE Manager allows customers to reduce the inherent complexity of managing multiple Linux distributions across a broad set of hardware architectures and virtual and cloud environments. It also provides seamless system patching and provisioning with a single, centralized solution.

Whether you’re building private clouds within your own firewall, leasing IT resources from public cloud service providers or using a combination of both, software-defined infrastructure is better suited than traditional hardware-defined infrastructure for bringing about a shared, on-demand IT services environment.

Today’s private clouds, public clouds, virtualized services and bare metal resources are all stepping stones on the path to the software-defined data center. The challenge is to make smart choices given the available options—choices that fit into your existing operations with little or no disruption while efficiently and cost-effectively leading you to a fully software-defined future.
At SUSE, we enhance our products to maximize service delivery efficiency while minimizing system downtime and its impact on your business operations. What’s more, our multivendor partnering approach doesn’t limit your options or lead to vendor lock-in. And if you ever have a problem with our software, we provide outstanding technical support and service offerings that help you deliver critical updates and new features on a schedule that suits your operations.

**Getting from Where You Are to Where You Want to Be**

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Realizing the software-defined data center of the future requires a diligent journey of many steps. Those steps include gaining the agility and control you need today and making smooth, advantageous transitions as your requirements change. SUSE can help, all along the way.