

WHITE PAPER

Virtualization for Small Businesses

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Melanie Posey
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SITUATION OVERVIEW

Small Businesses and the Demands of a Web-enabled World

In many ways, small businesses don't get the attention they require (and deserve) from the IT world. On a per-company basis, their annual IT spending is typically measured in thousands rather than tens of hundreds of thousands, making them uninteresting prospects for the big IT companies, absent substantial volume. Small businesses face many of the same challenges of their larger counterparts, such as product/service development and innovation, competitive marketing and positioning, and customer support and interaction. They also face issues surrounding provisioning and maintenance of IT/ application environments for geographically dispersed communities of employees, customers, partners, and suppliers. Unlike large enterprises, small businesses lack the financial and personnel resources to run the infrastructure and run the business. As more and more business functions migrate online, small businesses face the additional challenge of taking their IT infrastructure and applications to the Web. Yet, small businesses often do not command the same level of attention from IT vendors and service providers as their larger counterparts, particularly when it comes to IT products and services tailored to their specific needs.

However, small businesses do have options – one of which is IT infrastructure solutions that leverage virtualization technologies tailored to small business requirements and budgets.

Virtualization Demystified

The concept of virtualization – the creation of isolated environments abstracted from a larger pool of computing and/or software resources – has been around for decades. It dates back to the 1960s with IBM's development of the mainframe operating system, which allowed multiple applications to share the same computing infrastructure. Fast forward about 40 years and we're now in the Web computing age. Applications are no longer hard-coded into operating systems, and server hardware can be partitioned to provide independent containers for the applications of one (or many) users.

Virtualization has generated considerable buzz in the IT world over the past few years and is now making the transition from the early adopter stage to mainstream market acceptance. There are a number of different techniques that achieve the end-state of virtualization (such as dedicated computing resources on shared physical hardware) and different applications for the technology, but discussions about virtualization typically revolve around large enterprise concerns such as data center centralization and server consolidation. Yet virtualization is not just for large businesses, nor is it necessarily synonymous with complex, expensive solutions.

There are different types of virtualization geared toward different types of applications and users. With hardware emulation, the approach used by enterprise-oriented virtualization vendors, partitions server resources to create multiple stand-alone virtual machines that can run their own instances of diverse guest operating systems. This technique requires virtualization of every aspect of the server and the kernel to provide complete simulated computing environments for the guest operating systems and the associated applications. However, this approach may very well be overkill for small businesses that do not have significant amounts of underutilized physical server hardware and/or highly distributed data center networks. In addition, hardware emulation, as well as para-virtualization are heavyweight techniques with high overhead. They limit the scalability, flexibility, and cost savings that small businesses need.

Operating system-level virtualization is another variation of virtualization technology. This method enables the creation of multiple, functionally isolated application environments on a single physical server through modification of the base operating system on a common kernel and the use of shared (rather than emulated) hardware resources. This type of virtualization is particularly well suited to small business requirements. Applications include homogeneous operating system and server consolidation, high-availability business continuity, disaster recovery, and simplified IT management. Small businesses can take a do-it-yourself approach to operating system-level virtualization using commercial or open source technology, however, there is a simpler way to get on the path to virtualization. Third-party service providers are also leveraging this technology to create hosted virtualization solutions for small businesses, enabling them to purchase virtualization capabilities rather than building (and managing them) on their own.

The Benefits of a Technology Partnering Approach to IT Infrastructure

Because virtualization and the use of third-party service providers are closely linked, it's useful to examine the benefits of these services. Using a service provider rather than building and managing infrastructure in-house is, in its own way, an example of the virtualization approach in the sense that various types of applications (such as Web sites, e-mail systems, and databases) live and interact on infrastructure housed and managed in an Internet data center by an external service provider. The resulting functionality – e-commerce, CRM, messaging, etc. – is then delivered as a service over the IP network.

By using a service provider for VPS, small businesses can leverage the economies of scale, skill and scope of a specialist who has already made the investments required to develop a core competency in managing infrastructure. External service providers can extend the benefits of their data centers, networks, equipment, monitoring capabilities, security expertise, and experience across many customers, thus reducing each customer's TCO. Specific benefits of the service provider option include the following:

- ☒ **Cost savings.** The cost elements of Web site/IT infrastructure involve not only upfront expenditures on hardware and software but also the cost of IT staff for deployment, operation, and maintenance. In addition, there are post-deployment costs related to change management, fueled by shifting business objectives and technology evolution.

- ☒ **Expertise on-demand.** Small businesses can leverage a service provider's ongoing investments in the latest technologies, and operational and process skills, to adapt to new business requirements on an as-needed basis, and transform raw technology into comprehensive small business infrastructure solutions.

- ☒ **Performance improvements.** Companies are delivering more and more business value through their Web-based infrastructures. Therefore, performance of these platforms is vital. Small businesses that leverage the expertise of service providers eliminate the expense and hassle of investing (and re-investing) in the infrastructure needed to ensure the continued reliability, scalability, security, and overall performance of their businesses.

Technology Benefits of VPS

VPS or hosted virtualization solutions are well suited to the technology requirements of small businesses, essentially providing a fully managed computing infrastructure service that includes operating system and core applications support. Hosting service providers use operating system -level virtualization to offer a middle-ground solution that bridges the gap between shared hosting (resource constraints, limited programming flexibility, and security issues) and dedicated server hosting (a more expensive solution that requires considerable systems administration expertise). With VPS, users have dedicated copies of the operating system and a reserved (and sometimes burstable) allocation of system resources. With dedicated access to a defined bucket of resources (larger than what's typically available from a shared hosting plan), users receive stable environments for the development, testing, and execution of a variety of business applications, including Web sites/e-commerce, messaging and collaboration, file serving, and online storage/backup, to name a few. Each VPS instance can be run independently of the others on the same physical hardware, and users have administrative control of only their specific "slices" of the server resource. This means that the isolated application execution environments enabled by VPS protects users from adverse effects of faulty scripts running in the environments of other VPS users on the same hardware.

The benefits of virtualized hosting environments are not limited simply to gaining access to more computing resources than shared hosting at a price point well below fully loaded dedicated server hosting. VPS gives small businesses the flexibility they need to handle the demands of growth and support increasingly complex Web applications. With root access and partitioned application containers, VPS users have their own directory structures and file systems, as well as a dedicated set of core services (e.g., Web/mail/FTP servers, Web development tools, shell access functionality, and multimedia applications). This facilitates the installation, configuration and execution of packaged and open source applications, with access to many of these offered through the virtualized hosting providers' software libraries and enhanced through easy-to-use installation and version-control tools. Furthermore, VPS users have the freedom to install and run their own custom applications or other third-party commercial software on their VPS infrastructures. As a result, small businesses can use VPS as a dynamic platform for the support of key internal and external initiatives.

For small businesses with high-volume Web sites, VPS offers stability and continuity of operations by providing the computing resources needed to keep the site running optimally without running the risk of shared hosting "abuse." It also insulates them against the wrath of the hosting provider for commandeering not only other users' disk space and bandwidth, but also memory and CPU cycles, thus degrading performance for the other users on that server. Users with complex e-commerce sites or processing intensive back-end database applications benefit from VPS by being able to run their business processes and add new functionality, limited only by the parameters of their contracted resource allotments. Small business IT administrators and Web developers can use VPS to test and troubleshoot applications in a secure, sandboxed environment before releasing them for use by employees and customers.

Virtualized hosting has been around for more than a decade, but recent ease-of-use improvements have expanded the universe of users who can benefit from the technology beyond extremely tech-savvy IT types. While a certain level of familiarity with system administration functions and Unix/Linux is required, VPS automates many otherwise manual or self-managed tasks such as software updates and patches, package management/software distribution, and storage/backup. In addition, control panels provide visibility into the VPS applications and resources, as well as point-and-click capabilities for application installation, VPS reboots, mail setup, and other administrative tasks. VPS is now an increasingly automated virtual infrastructure platform that simplifies systems administration processes, freeing up small business users' often stretched IT and management resources to focus on the actual business functions rather than the server infrastructure.

In a nutshell, the technology benefits of VPS are as follows:

- ☒ **Isolation and control.** Each VPS is its own self-contained application execution domain, giving users the freedom and control needed to run the applications that the business requires.

- ☒ **Security.** What happens in your own environment stays in your own environment, thus providing insulation from problems occurring in other VPS users' environments. Security at the system and network level is assured through independent files systems and IP addresses.

- ☒ **Stability.** Each VPS receives its own allotment of disk space and processes. In addition, some VPS offerings incorporate system resource management techniques that ensure equitable allocations of resources shared by all of the VPS containers on a single physical server. This means that Web sites and applications run at full speed and users get what they're paying for. As an added bonus, some service providers, generally offer users some scope to burst above their resource allocation, depending on the plan selected and/or the level of overall activity on the physical server on which the VPS is hosted.

- ☒ **Flexibility.** VPS can support a number of small business applications, including e-commerce Web sites, video streaming, e-mail and collaboration services, reseller hosting, and software-as-a-service business models.

There are numerous technology benefits to VPS, but it is important to keep in mind that VPS is a convenient middle-ground between shared and dedicated hosting – as such, there are some limitations. While VPS can support wide ranges and various combinations of open source applications, it cannot support high-end application platforms such as WebSphere and WebLogic or some high-end programming languages. At some point, the level of complexity and/or type of applications may require a migration to dedicated server hosting. However, for many small businesses VPS offers an appropriate compromise between low-end cookie cutter shared hosting and unmanaged server hardware leasing.

Business Benefits of VPS

The technology benefits of VPS, combined with third-party provider service management , yields a number of business-related benefits for small business users. A key advantage, applicable to all types of users, is the convenience of a turnkey solution that offloads the financial and personnel costs of server management from the business to the service provider. This IT extension function offers IT support for much of the server and system-related tasks that small businesses may not have the dedicated in-house IT personnel to perform on a consistent basis. For those small businesses that do have dedicated IT personnel, VPS takes one thing – direct responsibility for server management – off the table. This frees up time for more business-critical matters such as application development, customization, and customer issues.

Virtualization's broader business benefit is the flexibility it provides. Small businesses can avoid the inherent limitations of shared hosting and the management hassles of dedicated servers and still retain control of business-critical processes such as user account management, permissions, and Web site functionality. Small businesses with relatively straightforward internal infrastructure requirements can leverage VPS to handle these in a more cost- and time-efficient manner. As Web presence evolves from a nice-to-have to a must-have element of marketing, sales and distribution, customer service, and communications strategies, small businesses can leverage

virtualized tools to customize their Web sites without having to worry about the underlying system infrastructure. For Web-centric companies whose core competency is the delivery of applications and business functionality over the Internet (and not necessarily IT), VPS provides a standard, repeatable, and scalable infrastructure foundation for the activities that generate revenue for the company – whether this is ecommerce, application development, or Web design/hosting .

VPS is especially suited for companies with technology-oriented business models. Hosting service providers, value-added resellers, Web developers/designers, and application vendors exploring the software-as-a-service delivery model can take advantage of a shared kernel/OS framework to enable single-tenant applications to run and be consumed in multi-tenant environments. With VPS, service providers have environments that allow for custom configuration to meet their own requirements, and/or those of their customers, in a framework that makes the overall system stable and easy to manage, maintain, and upgrade. Furthermore, service providers (as well as small businesses generally) use VPS as the keystone of a larger ecosystem in which partners, suppliers, customers and employees can leverage common infrastructure to house, run, and manage "communities" of applications and/or business relationships.

What a Small Business Should Look for in a VPS Service Provider

Making the decision to use VPS and a hosting service provider is only part of the process. The next stage involves selecting the right hosting service provider. A key factor is how well a service provider delivers on the overall value proposition of externally-managed hosting – i.e., expanding the range of resources available to sustain and enhance the performance of Web site or Web applications infrastructure. In addition, there are consideration factors specific to VPS feature functionality, options, and pricing.

VPS-specific checklist items include the following:

- ☒ **Price and pricing structure.** This is a critical factor in the technology and service provider selection process. However, small businesses need to be sure that the universe of options under consideration is truly comparable. The prices of VPS plans vary widely from provider to provider, and low-end unmanaged dedicated server offers often come in at a price point similar to higher-end VPS plans. For this reason, prospective buyers must examine which features and capabilities are included in the base price and which are available only as add-ons that carry an extra monthly charge. Typically, "all-inclusive" VPS plans include generous computing resource allocations, a broad range of tools and utilities, and service provider management/technical support.
- ☒ **Choice and flexibility.** A top-notch service provider will offer a range of supported operating systems, including Windows, Linux, FreeBSD, etc., and core services software. It will also offer a broad library of applications and integrated installation tools as well as service plans that serve a broad range of small business customer requirements.

- ☒ **Hardware specifications.** Since service providers constantly upgrade their hardware to keep up with technological advances, what physical resource allocations are currently available? What is the effective VPS load per host server? This may play an important role in determining the overall performance of your Web sites and Web applications.
- ☒ **Virtualization technology.** What is the underlying technology powering the service provider's VPS offerings – open source, a packaged commercial solution, or an internally developed solution? This issue is important because it can affect how quickly technology enhancements and improvements are made available to VPS customers.
- ☒ **Ease-of-use.** VPS has evolved from a hosting solution targeted primarily at tech-savvy users to one that now requires only a moderate level of technical expertise. Small businesses need to ensure that a service provider offers step-by-step instructions for basic set-up and common project-oriented tasks. In addition, a top-notch service provider will have a highly automated system to handle operating system and core Web services, patches, and updates. Other important ease-of-use issues include the feature functionality of the control panel and the availability of pre-configured installers for key applications and utilities.
- ☒ **Service-level agreements (SLAs).** Companies look to service providers to deliver reliable and performance-oriented infrastructure. A service provider's SLAs serve as a key proof of concept. The SLA should set expectations from the start, by providing uptime and availability definitions, solution components covered by the agreement, and penalties and remedies in the event of noncompliance.

Other more general service provider selection factors include the following:

- ☒ **Stability.** Consideration criteria should include not only financial stability and outlook of the service provider, but also length, breadth, and depth of experience in the hosting business, and current customer assessments of their experiences with the service provider. The service provider you choose will be supporting your applications infrastructure: be sure that the provider is financially viable and committed to making the investments needed to stay ahead of the pack with regard to technology, operations, and customer service.
- ☒ **Operations and support.** Service providers should have established methodologies for the implementation and support of customers' Web sites and application infrastructures, including processes and procedures for server testing and configuration, maintenance, change management, and problem resolution. Businesses should look into whether the service provider involves customers in the process by offering an online portal for network and account management.
- ☒ **Scalability.** Business strategies and objectives change and evolve. A service provider's infrastructure and services must keep up with your requirements. If your growth plans require additional computing and storage resources, different operating systems, or backup and recovery arrangements, your service provider has to give you what you need when you need it. Part of the service provider's job is to supply Web infrastructure platforms that meet today's needs and to anticipate customer needs going forward.

- ☒ **Data center and network infrastructure.** When choosing a service provider, businesses should consider location, physical security (both access control and surveillance), and availability of redundant power, cooling, and fire suppression systems. On the network side, businesses should ask about aggregate bandwidth capacity from the data center to the Internet, public and private peering relationships, network monitoring, intrusion detection and prevention, and back-end connectivity options.

- ☒ **Security.** The physical aspects of security (i.e., data center access and surveillance) are important, but companies also need to examine service providers' systems-oriented and network-embedded security capabilities. Security also encompasses process and procedures: rigorous, well-defined service delivery methodologies provide an important first line of defense for customers' hosted Internet infrastructures.

VIRTUALIZATION FOR EVERYONE

The benefits of VPS for small businesses extend beyond merely getting more computing resources than are available from shared hosting and the opportunity to obtain these at a price point well below dedicated server hosting. VPS gives small businesses the infrastructure power and performance traditionally accessible to only companies with large IT budgets and in-house staff. With the foundation of powerful, secure, and scalable infrastructure platforms, small businesses gain the flexibility and the control needed to focus on the applications that run the business, control costs, and generate revenue. Armed with application-related tools and utilities, small businesses can bridge the gap between limited resources and grand ambitions by using the marketing, distribution, and collaboration power of the Internet to extend and expand business opportunities.

For some small businesses, VPS provides a long-term solution to server access and management issues. For others, VPS may simply be a convenient place to start, offering a flexible migration path to more advanced Web applications that require higher-level hosting solutions. Small businesses have a range of choices for hosting infrastructure technology: partnering with an experienced service provider offers small businesses an attractive way to leverage the benefits of virtualization.

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