
Linux VPS

Technical Overview

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Introduction

Important: The information about all Linux Virtual Private Server (*Linux VPS*) plans, including Starter, Basic, Pro, and Pro Plus, is presented in a way to enable you to determine which plan best suits the needs of your administrators, customers, clients, and vendors. In general, the content of the Linux VPS documentation library, will apply to the usage and administration of the features of your account. However, in particular, there will be some features of your account which may differ.

This document provides a technical overview of Linux VPS. It describes how your account provides a private, protected, and fully isolated area. Although this document does not provide the detailed, technical instructions of a user's guide, it does provide descriptive technical information regarding operating system-level virtualization and the features of your account. This technical overview also includes descriptions of how resources are managed on your account and how FairShare Technology provides your account with a distinct advantage over other solutions. All of this information is placed in the context of the caveats required of any technical document concerning any Internet or network technology.

Acknowledgments

This technical overview document is based on information provided by the the Web host's product management, product development, customer support, and training teams. Your Linux VPS account utilizes open-source technologies and applications that have grown out of development, testing, and revision conducted by open-source communities such as the Apache Software Foundation, the Fedora Project, the Free Software Foundation, the GNU Project (and many others).

Overview of the Documentation Library

The Linux VPS documentation library is included, at no cost, as a feature of your account. The following print-ready, Web documents are available in multiple formats for your unrestricted use:

- *Linux VPS Firewall Supplement*
- *Linux VPS Getting Started Guide*
- *Linux VPS Release Notes*
- *Linux VPS User's Guide*

There are also Website resources such as new feature supplements, migration guides, Frequently-Asked Questions (FAQ), and Web articles.

Purpose of this Document

The purpose of this document is to provide descriptive, introductory information regarding your Linux VPS account. It describes, rather than instructs you, about the features of Linux VPS. Refer to the Linux VPS documentation library to find out how to get started and use the security, isolation, and privacy your account provides.

Navigating this Document

This document includes the following sections:

- “Overview of Linux VPS” on page three.
- “How Linux VPS Provides Privacy and Protection” on page four.
- “Resource Management and FairShare Technology” on page nine.
- “Vinstall Utilities Library” on page ten.
- “Linux VPS Resource Allocation” on page 12.
- “How to Best Utilize Your Plan” on page 14.
- “Caveats” on page 17.

Overview of Linux VPS

This section provides you with a quick introduction of and context for Linux and Red Hat Enterprise Linux (RHEL), the Linux Command Library, and how you might utilize the features of the operating system (sometimes referred to as *platform*).

GNU/Linux is a UNIX-Like Operating System

Linux (sometimes referred to as GNU/Linux or a Linux-based GNU system) is a UNIX-like operating system. Linux is distributed under the terms of the GNU General Public License as published by the Free Software Foundation. Your Linux VPS account utilizes RHEL, a widely implemented corporate Linux standard.

Red Hat and Linux VPS

RHEL is based on open standards and is derived from the Red Hat-sponsored and the community-supported, open source project named *Fedora*. To locate more information about RHEL and the Fedora project, refer to the following Websites:

- <http://www.redhat.com>
- <http://fedora.redhat.com>

The RHEL operating system provides support for a Storage Area Networks (SAN), GNU Compiler Collection (GCC), and the Red Hat package manager (RPM). As you perform configuration, administration and trouble-shooting tasks, apply your previous knowledge of open-source software applications. Your account provides services in a way that assures the account functions as a stand-alone server, independent from any other account. The account supports specific processes, applications, users, and files. Utilize root access and grant access to any ports. The account supports multiple users and provides you with access to all logs. Data backups, server security and software updates are updated by means of server software updates which often do not require your intervention. Your account is a hosting environment which provides you with an approximation of your own virtual machine. Each account has its own complete directory structure and set of dedicated applications such as Web server and mail server. Your account can be remotely rebooted without affecting any other accounts served by the physical hardware. Your account is compliant with server monitoring software applications. Configure your account to support multiple users with shell, Web, File Transfer Protocol (FTP) and/or email privileges. The RHEL operating system provides a compatible base for operating- system level server virtualization, implementation of a *skel* package, and copy-on-write optimization.

Linux Man Pages

Your account also supports your access to Linux Manual Pages (or *Man Pages*) which provides information about the full command set supported by your account. Man pages also provide information about system calls, library calls, special files, as well as file formats and conventions.

How Linux VPS Provides Privacy and Protection

Your Linux VPS provides a private and protected area that operates as an independent server. Each Linux VPS appears to be and behaves as if it is a stand-alone physical server offering excellent security, performance, and flexibility.

Operating system-level server virtualization creates isolated, secure virtual environments on a single physical server. Server virtualization enables better server utilization and ensures applications do not conflict. Each account performs and executes as a stand-alone server can. You can reboot your Linux VPS account independently as well as have and assign account root access, users, IP addresses, memory, processes, files, applications, system libraries and configuration files.

Among the alternatives to operating-system-level server virtualization you might consider are the following:

- **Hardware Emulation** – Also referred to as *virtual machine* technology, hardware emulation has the advantage of enabling you to run almost an operating system, such as RHEL, without extensive modification. However, the technology enables your account to operate only at low densities with low levels of scalability. Management tasks can be slow to take effect and complex to apply. All of these factors lead to a lower level of performance than you might require.
- **Para-virtualization** – This server technology enables you to run multiple, modified operating systems while a virtual machine monitor manages how server resources are shared between accounts. This server technology provides better performance than hardware emulation. However, the operating systems must be modified, the resource allocation is static, and there is limited scalability.

Your Linux VPS behaves as a stand-alone Linux server. It has standard startup scripts and software from multiple vendors can operate in the account without modification. Change any configuration file and install additional software. The file system, the processes, Interprocess Communication (IPC) mechanisms, and `sysctl` variables are always fully isolated from any other account. Processes which belong to your account are scheduled for execution on all available processing power.

Your Linux VPS includes its own IP address. The network traffic of your account is isolated from all other accounts. Traffic snooping is not possible. Manipulate your accounts routing table using advanced routing features.

Resource management controls the amount of resources available to your account. This enables the quality of service to meet the service level agreements associated with your account. The operating system-level server virtualization also provides performance and resource isolation which protects your account from denial of service attacks.

The isolated environment of the Linux VPS is established by creating a server sandbox. Each Linux VPS has its own complete directory structure, a virtual file system, its own set of independent applications (Web server, mail server.); a security policy that limits one Linux VPS from interfering with, or even seeing, another Linux VPS; and advanced resource management, which controls how system resources are shared among Linux VPS accounts.

- **Functional Isolation** – Each Linux VPS (and the applications that run on it) are configured independently. Customers have full administrative control, including the ability to install, customize, and run almost any custom or off-the-shelf application. Additionally, customers have complete control of their Linux VPS configuration and settings.
- **Fault Isolation** – Similar to separate physical servers, a fault in one application running within a Linux VPS account does not affect any applications running on other Linux VPS accounts on the same physical server.

- **Performance Isolation** – FairShare Technology manages how each Linux VPS uses system resources like Central Processing Unit (CPU), memory, and network, which protects each Linux VPS from the misbehavior of others on the same server.

Operating System-Level Virtualization Features

The software architecture of operating system-level virtualization is different from the traditional virtual machines architecture because it always runs the same Operating System (OS) kernel as the host system. It does this while continuing to enable multiple Linux distributions in individual Linux VPS accounts.

This single-kernel implementation technology enables running Linux VPS accounts with a near-zero overhead. This way, operating system-level virtualization Linux VPS accounts offer an order of magnitude higher efficiency and manageability than traditional virtualization technologies.

Operating System-Level Virtualization

From the point of view of applications as well as Linux VPS users, each Linux VPS is an independent system. This independence is provided by a virtualization layer in the kernel of the host operating system which is an operating system installed on the hardware node (HN), a computer where the operating system-level virtualization is installed for hosting Linux VPS accounts.

Note: Only a small portion of the CPU resources is spent on virtualization (approximately one or two percent). The main features of the virtualization layer implemented in operating system-level virtualization are the following:

- Any Linux VPS looks and behaves like a regular Linux system. It has standard startup scripts; software from vendors can run inside a Linux VPS without operating system-level virtualization-specific modifications or adjustment.
- A user can change a configuration file and install additional software. Some reasonable exceptions to the configurable aspects of Linux VPS include hardware, mount points, and network settings.
- Linux VPS accounts are completely isolated from each other (file system, processes, Inter Process Communication (IPC), `sysctl` variables).
- Processes belonging to a Linux VPS are scheduled for execution on all available CPUs. Consequently, Linux VPS accounts are not bound to only one CPU and can use all available CPU power.

Network Virtualization

The network virtualization layer isolates Linux VPS accounts from each other and from the physical network:

- Each Linux VPS has its own IP address.
- At all times, network traffic for one Linux VPS is isolated from the other Linux VPS accounts. In other words, Linux VPS accounts are protected from each other in the way that makes traffic snooping impossible.
- Software firewalls may be used inside a Linux VPS (the user can create rules limiting access to some services using the canonical `iptables` tool inside the Linux VPS). In other words, it is possible to set up firewall rules from inside a Linux VPS.
- Routing table manipulations and advanced routing features are supported for individual Linux VPS accounts. For example, setting different maximum transmission units (MTUs) for different destinations, specifying different source addresses for different destinations.

Resource Management

Resource management is important for Linux VPS. Utilization of the resources available on your account is considerably higher than that of typical computer system. Linux VPS resource management controls the amount of resources available to each Linux VPS accounts. The controlled resources include such parameters as CPU power, disk space, and a set of memory-related parameters. Resource management enables your account server to efficiently provide the following functions:

- Share available resources among individual accounts.
- Maintain a server's part in network Quality of Service (QoS).
- Isolate performance and resource isolation.
- Protect the server from Denial of Service (DoS) attacks.
- Collect usage information for system monitoring.

Skel Package

The Web host pre-configures each Linux VPS account with the following core services residing on the virtual private server account:

- Web – Hypertext Transfer Protocol (HTTP) and HTTPS.
- Email – Simple Mail Transfer Protocol (SMTP), Post Office Protocol (POP), and Internet Message Access Protocol (IMAP).
- File Transfer Protocol (FTP).
- Shell access tools – Telnet, Secure Shell (SSH), cron.

These core services are managed by the support staff, but can be configured by the customer to run according to their specific needs. The Web host will provide basic instructional support for configuring and using the core services, as well as maintaining the system functionality of these services free of charge. The Web host reserves the right to adjust VPS resources as required to preserve an optimal operating environment for all VPS customers.

By default your new Linux VPS account is pre-configured as a Web and email server. Your account begins as a copy-on-write (COW) image of a -tested, basic RHEL installation. However, you can configure your Linux VPS account to provide additional services

Copy-on-Write

Linux VPS technology utilizes a COW file system. The system is based on a COW image of a -tested, basic RHEL installation. Even as you and system administrators update and customize the account, your account continues to use central files maintained by the Web host. This ensures that your account has relatively unfettered access to as many system resources such as Random Access Memory (RAM). Over time, files which are unique to your own account and configuration might grow in size to suit your needs. However, nearly all of the files which ensure clean, speedy operations for your account will not do so. Further, system administrators will continue to easily and quickly manage updates to core services.

RPM

Your Linux VPS account supports RPM, an open packaging system for Linux and UNIX systems distributed under the terms of the GPL. The package maintains a database of installed packages and their files. This enables you to maintain and upgrade your account configurations and customizations with minimal risk of losing them as you do so.

Alternatives to Operating System-Level Virtualization

Linux VPS technology virtualizes servers on an operating system layer, including the kernel. The technology partitions a single physical server into multiple small computational partitions. From the point of view of its owner, each partition operates as though it is a physical server. This technology provides an advanced extension of the standard `chroot` mechanism.

The operating system-level architecture has low overhead that helps to maximize efficient use of server resources. Due to a single-kernel approach, this type of virtualization introduces only a negligible level of overhead and enables many more virtual private servers to run on a single physical server than the alternatives. Approaches such as VMware workstation virtual machine emulation, Xen machine para-virtualization, and/or User Mode Linux (UML) cannot achieve equal of density levels. This is due to the overhead required by multiple kernels. Operating system-level virtualization does not enable you to run different operating systems or kernels. But, it does enable different libraries and distributions of an operating system.

Using operating system-level virtualization may increase the response time of a Web server does increase as the numbers of virtual environments. However, response times are acceptable (under two seconds). In comparison, emulation and para-virtualization implementations can typically host fewer virtual environments per server.

As there is a single kernel which maintains all the partitions, isolation and resource management become critical. Without proper isolation security can be compromised, and without proper resource management an application from one partition can abuse resources and thus cause a denial of service (DoS) for other partitions. The following are examples of finite resources which must be controlled and limited on a per-partition basis:

- CPU time
- Disk space
- Network access
- RAM
- Shared memory
- Number of processes

Linux VPS technology provides a set of nine finite resources which are controlled and limited on a per-partition basis.

Overview of Alternatives

Following are alternatives to the Linux VPS technology. Each approaches, but does not match, the level of virtualization and robustness offered by Linux VPS:

- **Chroot** – A UNIX command-line program to be used for process management. The program enables you to run and tightly control different instances of the RHEL environment on a single system. These instances operate simultaneously and without an intervention such as rebooting. Although the utility offers file system isolation, it does not offer any of the other features of other alternatives. For more, refer to the man pages included with the RHEL (or other UNIX) operating system.
- **Linux VServer** – Open-source software distributed by the Linux-VServer Project (http://linux-vserver.org/Welcome_to_Linux-VServer.org) under the terms of the Gnu Public License (GPL). The software provides kernel-level virtualization for GNU/Linux systems by enabling multiple virtual units running on the same kernel.

- **FreeBSD Jail** – A utility provided by the FreeBSD operating system (<http://www.freebsd.org/>). The utility manipulates operating system `chroot` capabilities to provide discrete, secure partitions. For more, refer to the operating system man pages or, for details regarding the utility refer to Chapter Four of the *FreeBSD Architecture Handbook* (http://www.freebsd.org/doc/en_US.ISO8859-1/books/arch-handbook/jail.html).
- **Containers (or Zones)** –The Solaris Enterprise System (<http://www.sun.com/software/solaris/>) provides support for isolated, virtual environments within one physical server. These environments are referred to as *zones* or *containers*. For more, refer to the *Zones and Containers FAQ* located on the Open Solaris Website (<http://www.opensolaris.org/os/community/zones/faq/>).

Comprehensive Features Offered by Linux VPS

The alternatives offer some, but not all, of the features of Linux VPS. Only the Linux VPS implementation of operating system-level virtualization offers all of the following features:

- File System Isolation
- Disk Quotas
- Memory Limit
- CPU Quotas
- Network
- Isolation
- Partition check pointing
- Live migration

Resource Management and FairShare Technology

FairShare Technology is an innovative approach to Web hosting that promotes fair use of shared system resources like CPU, memory, and network resources. The technology enables customer Websites and applications to perform consistently. It does this by preventing any single Linux VPS from abusing shared resources. Each Linux VPS is provisioned with an allocation of its own disk space and processes. VPS controls usage of a number of resources including CPU, memory, and network.

Resource allocations and FairShare Technology are used to accomplish two specific goals:

- Prevent abuse by any single Linux VPS
- Differentiate the capacity of Linux VPS plans

A core principle of FairShare Technology is to enable each Linux VPS to access appropriate levels of resources while preventing any single Linux VPS from abusing those resources by using more than its fair share. Usage thresholds are put into place to prevent abuse. Available resources and the demand on those resources then regulate the performance of each Linux VPS account.

For example, during a low-activity period on the server, a Linux VPS could use as much CPU as it demands. However, at the point there is competition for that CPU resource, usage thresholds are applied and the Linux VPS plan type dictates access to available resources. Each Linux VPS is allocated its fair share, but the fair share of a Linux VPS Starter plan is less than that of a Linux VPS Basic plan.

Resource allocation and the implementation of FairShare Technology provide an important competitive advantage of the Linux VPS platform. The information significant to customers is that which will guide appropriate usage of each Linux VPS plan and possibly indicate when an upgrade to a larger Linux VPS plan is necessary.

The main goal of resource management in operating system-level virtualization is to provide Service Level Management or Quality of Service (QoS) for Linux VPS accounts. Resource management settings prevent serious impacts resulting from the resource over-usage (accidental or malicious) of any other Linux VPS accounts. Using resource management parameters for Quality of Service management also enables data center administrators to enforce fairness of resource usage among Linux VPS accounts and service quality for VPS accounts.

Vinstall Utilities Library

Linux VPS accounts include a library of custom installation scripts (or *vinstall utilities*). These vinstall utilities greatly simplify the installation of programs and utilities by performing, in most cases, almost the entire configuration for you. Determining dependencies, default locations, and sometimes even upgrading and downgrading are executed for you by the vinstall utility. As of June 3, 2008, all Linux VPS plans include a library of vinstall utilities which include installations or configuration for the following:

Note: Because of memory requirements, Java applications are available for the Pro Plus plan only. For more see “Java Applications” on page 17.

- ant
- ClamAV
- CPX: Control Panel
- Dada Mail
- Dovecot
- Fml
- FormMail
- Java Development Kit (JDK)
- Java Run-time Environment (JRE)
- Mailman
- Majordomo
- Miva Empresa (virtual and non-virtual machine)
- Mod_perl
- Mod_python
- Mod_Ruby
- MySQL (4.x, 5.x)
- MySQL Check
- Open WebMail
- PHP: Hypertext Processor 5.x.x (default) and 4.x.x
- PhpMyAdmin
- PhpPgAdmin
- PostgreSQL
- Procmail
- Procmail-LDA
- PukiWiki
- Ruby on Rails
- System Quota Checker
- Sendmail (RBL)
- SpamAssassin
- SquirrelMail
- Swish-e

- Tcl
- Timezone
- Tomcat
- Urchin5
- Webalizer
- Webmin
- WordPress
- Zend Optimizer
- Zope

Linux VPS Resource Allocation

Note: If you compare Linux VPS resource allocations to those of FreeBSD VPS v3, you may notice what appears to be a difference in the memory limits between the two platforms. Please note that the two operating systems (RHEL and FreeBSD) use memory differently, the values are measured differently, and the FairShare technology used to shape memory usage is different on the two platforms. Additionally, the Web host has tuned the two operating systems to provide equivalent performance with our applications on each platform. In other words, even though actual values are different, the performance will be equivalent for equivalent plan types (Starter, Basic, Pro, Pro Plus) and configuration on each platform.

As mentioned previously, there are several Linux VPS plans, as in the following list:

- Starter
- Basic
- Pro
- Pro Plus

The plans utilize FairShare Technology as well as operating system-level virtualization to allocate server resources. There are six important aspects of the resource allocation described in this document, as follows:

- **Disk Space** – Determines the maximum number of gigabytes (GB) of data you can store on your Linux VPS account.
- **Total Processes** – Determines the maximum number of tasks (both active and inactive) on your Linux VPS account.
- **Total Open Files** – Determines a maximum number of files which the Linux VPS can open at a time.
- **CPU Priority** – Determines a maximum amount of time, relative to other plan types, the Linux VPS account can access the server hardware Central Processing Unit (CPU).
- **Memory** – Determines the total minimum number of megabytes (MB) of memory allocation that Linux VPS provides based on the physical resources of the server (that is, size of RAM and swap space). **Use this number for planning purposes.**
- **Maximum Memory** – Determines the maximum number of megabytes (MB) or gigabytes (GB) of memory allocation that Linux VPS provides based on the physical resources of the server (that is, size of RAM and swap space).

Resource parameters may be different in certain international datacenters. Please contact your account manager or visit your local support site for the resource allocations used in your datacenter.

The following table describes the resource allocations for each Linux VPS plan:

Table 1: Linux VPS Resource Allocations

Resource Allocations	Starter	Basic	Pro	Pro Plus
Disk Space	10 GB	20 GB	40 GB	60 GB
Total Processes	70	100	150	300
Total Open Files	2,000	4,000	8,000	16,000
CPU Priority	1	2 (or twice the priority of Starter)	4 (or quadruple the priority of Starter)	8 (or eight times the priority of Starter)
Memory	256 MB	384 MB	512 MB	768 MB
Maximum Memory *	512 MB	768 MB	1 GB	1.5 GB

* For Linux VPS, Maximum Memory works as the *Hard Limit*.

How to Best Utilize Your Plan

Once you have a sense of the resource allocations for your plan, you can begin to assess the needs you have and how to best-utilize your plan.

The Web host has over a decade of experience as a Web hosting provider. Over that time, approximately 500,000 business customers have chosen the Web host to provide solutions that actually solve real industry and technology problems. Based on this experience, we recommend the following guidelines for each of FreeBSD VPS v3 plans. The information in Table 2 is based on observations and analysis of how current customers actually utilize their plans. As such, it is not the kind of data that comes out of a laboratory setting or test environment. These are not limits or maximums. They are based on averages, not exceptions. In fact, your configuration and usage may lead to far better or more robust results than the information in this document suggests.

There are several best-use metrics to consider, as follows:

- **Monthly Cumulative Bandwidth** – The amount of data passed through the server network connection during a month.
- **Stream Rate** – The amount of data, measured in kilobytes or megabytes per second (*KB/sec* or *MB/sec*), passed through the server network connection.
- **Number of Websites** – The number of Websites (also referred to as *sub-hosts* and/or *virtual hosts*) supported by your server account.
- **Number of Website hits** (per day) – The number of instances when your Website content is viewed by visitors. Typically, *hits* are not the same as downloads, dynamic, or other types of requests which require processing.
- **Number of Users** (including email accounts) – The number of user accounts supported by your account.
- **Total Emails Sent and Received** (per day) – The number of emails processed (sent and received) by your server account during a day.
- **Mailing List Size** – The total, cumulative size (or *volume*) of mailing list recipients your server processes each day.

Table 2: Usage Guidelines for Linux VPS Plans

Usage Guidelines	Starter	Basic	Pro	Pro Plus
Monthly Cumulative Bandwidth	80 GB	120 GB	180 GB	200 GB
Stream Rate (per second)	128 KB/sec	256 KB/sec	512 KB/sec	1 MB/sec
Number of Websites	5	10	20	40
Number of Website hits (per day)	15,000	30,000	60,000	120,000
Number of Users (including email accounts)	10	15	30	60
Total Emails Sent and Received (per day)	5,000	10,000	20,000	40,000
Mailing List Size	5,000	10,000	20,000	40,000

Uses for Linux VPS plans vary widely from customer to customer, of course. Some of the basic functions, such as posting Web pages and communicating by email, are installed in the default configuration of your server. There are add-on features, such as e-commerce, which are offered for an additional fee. And there are applications and suites which you can install by means of vinstall utilities designed by our engineers to anticipate the scripts, packages, modules, and other resources the application or suite will require. Beyond that, you can install, run, and develop many other applications and suites by means of the Red Hat Package Manager (RPM). No matter what your plans are, it is important that you refer to these suggested best utilization guidelines in order to plan ahead for the needs of your organization.

Following are some of the anticipated uses for Linux VPS plans:

- **Websites** – Websites (also *website* or *Websites*) are collections of text, images, videos and/or other content that your server hosts for the purpose of publicizing your organization. Alternatively, Websites can facilitate tasks and communication within your organization. The default, installed configuration of your server includes the Web server software you need to get you started.
- **Email** – Emails are electronically delivered messages which your server processes so that individuals in your organization can communicate with others, either within in your organization, or to anyone with a valid email address. Images, videos and/or other content may be embedded in the messages or sent as attachments to the emails. The default, installed configuration of your server includes the email services you need to get started.
- **E-Commerce** – Most plans can facilitate Web-based sales transactions (or e-commerce) with the speed, efficiency, and reliability your customers have come to expect. E-Commerce enables your customers to respond to the compelling information. E-commerce is available as an add-on, fee-based option for your server.
- **Databases** – You can organize, retrieve, and report information stored in the databases operated by your server. You can add a database application packages to your server by using available vinstall utilities.
- **Dynamic Applications** – The Pro and Pro Plus plans are able to process, deliver, and utilize dynamic applications (also referred to as modules and/r packages). Typically, this means that you can give life to the content your customers see and, possibly, anticipate their needs. You can install many dynamic applications by means of vinstall utilities supported by your server.
- **Multimedia Development suites** – The Pro Plus plan can provide a robust, scalable development environment for creating (not just processing) multimedia applications. You can install many of the open-source components by means of vinstall utilities supported by your server.
- **Enterprise Development Suites** – The Pro Plus plans can provide a robust, scalable development environment for customizing applications specific to your enterprise. You can install many of the open-source components means of vinstall utilities supported by your server.
- **Java Applications and Java Development Kit (JDK)** – The Pro Plus plan can provide a robust, scalable development and, more importantly, a processing environment for JDK and Java applications. You can install many of the open-source components by means of vinstall install utilities supported by your server. See “Java Applications” on page 17.

Table 3 summarizes the suggested uses for Linux VPS plans:

Table 3: Suggested Uses for Linux VPS Plans

Uses	Starter	Basic	Pro	Pro Plus
Websites	✓	✓	✓	✓
Email	✓	✓	✓	✓
E-Commerce		✓ (lightweight only)	✓	✓
Databases		✓ (lightweight only)	✓	✓
Dynamic Applications			✓	✓
Multimedia Development Suites				✓
Enterprise Development Suites				✓
Java and JDK				✓

Caveats

All of the information in this document is based on the years of experience our product developers and system administrators can offer. Following are some of the caveats they want you to know as you interpret the best-utilization information included in this document.

Java Applications

Note: Java applications may be used on the Pro Plus plan only. This is because many Java applications consume significant CPU and memory resources and some may not be appropriate for use in the Linux VPS environment. Java applications on Linux VPS should be monitored and possibly restricted for use only on Websites with a low expected workload. In addition, some larger Java applications may not be suitable for use on Linux VPS even with low workloads. You must conduct sufficient performance testing of your Java application on a Linux VPS before relying on it for critical business needs. You must build contingency plans in case your Java application does not perform as expected; possible solutions may include:

- Extensive optimization of the Java application
- Moving the Java application to a dedicated server such as the Managed Private Server (MPS).
- Implementing an alternative solution to using Java. (For example, moving from Java to an optimized C program.)

There are a wide range of Java-based applications. Some are designed to handle multiple services and others focus on a smaller range of services. As an example, Zimbra (<http://www.zimbra.com/>) is open-source server and client software used to process email, group calendaring, and contacts. In addition, the software supports Web document management and authoring. The software offers a wide range of services, some of which duplicate applications included with the default configuration of the Pro Plus plan. The software offers these services by drawing on Java and its own, duplicate installation of Tomcat. These factors make the software better suited to a more powerful, dedicated server offering such as MPS.

Alternatively, JSP Wiki (<http://www.jspwiki.org/>) uses standard Java 2 Platform, Enterprise Edition (J2EE) components such as Java, servlets, and JSP. The software enables collaborative authoring for Websites (also called a *wiki*). The software enables visitors to collectively comment upon, add to, or remove from Web page content. The open-source software focuses on providing a singular, unique service. It does this by utilizing the Java components which are available for installation on the Pro Plus plan. JSP Wiki does not duplicate services which are also supported by Linux VPS, such as email.

JSP Wiki is an example of a Java-based application which is well-suited to the Pro Plus plan when put under low to moderate workloads. Results will vary by application, but a JSP Wiki installation running on the Pro Plus plan could potentially handle up to tens of thousands of wiki page views per day. Should hundreds of thousands of wiki page views per day be required, upgrading to a dedicated server such as a Managed Private Server (MPS) is recommended.

Interdependence

Some aspects of your plan's performance are interdependent. Resources are not dedicated to specific applications or tasks; you have a finite number of resources (as described in Table 1) for all of your tasks. The usage guidelines described in Table 2 should be applied with this in mind. For example, if you have a busy Website, your ability to process high volumes of email will be impaired. Or, as another example, there are not additional resources specifically

allocated for processing emails sent and received, performance depends on the total mailing list size (or *volume*). If, on an average day, mailing list activity is high, and you also expect a high volume emails sent and received, then you must take measures to schedule those activities or you might consider upgrading to a plan with sufficient resources for processing all of the emails sent and received, as well as for mailing list usage.

Sandboxes and Performance

Each Linux VPS operates in a sandboxed environment that protects, but does not always prevent, performance from being impacted by another Linux VPS accounts. All customers share some common server resources including CPU, memory, network, and disk space. Resource availability is not guaranteed.

For Informational Purposes Only

This information is provided for informational purposes only and must be recognized as providing perspective and data regarding best-utilization (as opposed to performance guarantees or service-level agreements). Operating system-level virtualization technology combined with sound server administration practices enable resources to adjust as required in order to preserve an optimal operating environment for all Linux VPS customers.

Fluctuations and Adjustments

Actual resource availability may fluctuate both above and below the values in this document. Ultimately, the demand on available resources will determine the performance of each Linux VPS plan. While this information may be helpful in gauging appropriate usage, it should not be the sole determinate in capacity planning. the Web host reserves the right to adjust Linux VPS resources as required. These adjustments preserve optimal operating environment for all Linux VPS accounts.