

IBM @server zSeries
Introduction
January 2002

Linux for zSeries
Linux for S/390
Frequently asked Questions

Worldwide



Linux FAQ_PACKAGE

Linux for zSeries

Question:

What is Linux[®] for zSeries[™]?

Answer:

Linux for zSeries is the 64-bit version of Linux for S/390[®] running on the IBM[®] eServer zSeries 900 architecture.

Question:

Can I run Linux for S/390 on zSeries?

Answer:

Yes, but only in 31-bit mode. You will need the 64-bit version of Linux for S/390 to take advantage of the zSeries architecture.

Question:

What are the components of Linux for zSeries?

Answer:

Linux for zSeries contains a 64-bit version of the kernel, the key device drivers, the compiler (gcc) and the Runtime library (glibc). There will be support for 64-bit real and virtual. Using Linux for zSeries, customers will be able to use main storage above the 2 GB line.

Question:

Where can I get Linux for zSeries?

Answer:

There are two ways to obtain Linux:

Commercial distributions:

Commercial distributions of Linux for zSeries are available from Red Hat, SuSE and Turbolinux. Commercially available Linux distributions include the Linux operating system enabled for specific hardware platforms, an assortment of device drivers, routines for installation, and value add programs like Web servers and shells. Typically these distributions are delivered to customers over the Internet or packaged on a physical deliverable such as a compact disk.

Build your own Linux for zSeries system:

You can build your own Linux for zSeries system by going to the IBM developerWorks Web site and downloading the modifications to Linux that enable it for zSeries. These are the patches of the Linux packages like binutils, gcc, and others. The developerWorks Web site can be found at: oss.software.ibm.com/developerworks/opensource/linux390/index.shtml

You would then obtain the other components of Linux for zSeries from other sources.

Question:

If I run my Linux for S/390 application on zSeries and then migrate to a Linux version in 64-bit mode, do I need to recompile or change the source code?

Answer:

Yes. You need to recompile an application to take advantage of the 64-bit code.

Question:

What other enhancements are in Linux for zSeries?

Answer:

The IBM @server zSeries now supports HiperSockets™. HiperSockets provides high-speed memory-to-memory TCP/IP communication across partitions. This allows TCP/IP traffic to travel between partitions at memory speed rather than network speed. This "network in the box" minimizes network latency and maximizes bandwidth capabilities between Linux for zSeries and z/OS™ images. This enables optimized e-business and ERP solutions within a single CEC.

Question:

Will zSeries run a multi-CPU Linux solution?

Answer:

Today Linux for zSeries can only run on a single system. However, customers can run tens or hundreds, if not thousands of Linux images on a single zSeries for less than it might cost to run them on PCS. Using both HiperSockets and z/VM™ virtualization technology, customers have the flexibility of multi-Linux systems with the cost effectiveness of a single footprint.

Question:

Has IBM changed its Web serving strategy for OS/390® and z/OS with the introduction of Linux for S/390 and Linux for zSeries?

Answer:

Customers can choose to run their Web server under Linux, under z/OS or under both. It will depend on the type of application they are building. The functionality of WebSphere® under z/OS and its ability to run in a Parallel Sysplex® environment must be balanced with the simplicity of running a simple Web server under Linux.

Question:

Can Linux for zSeries use the hardware Crypto?

Answer:

No. But work is underway now to provide this support

IRD

Question:

What are the enhancements to IRD in z/OS V1R2?

Answer:

In z/OS V1R2 LPAR CPU Weight management is now also available for non-z/OS images, for example, Linux for zSeries, Linux for S/390 or z/VM.

Question:

How does the IRD capability perform dynamic assignment of CPU resources to non-z/OS partitions like Linux?

Answer:

LPAR CPU Management is the function within the Intelligent Resource Director that allows dynamic adjustment of CPU resources across logical partitions in the same LPAR cluster. To dynamically assign CPU resources to a shared Linux partition, an LPAR cluster must be defined, and the Linux partition must be associated with this cluster. As with any other partition, the Linux partition is assigned an "LPAR weight," which corresponds to the percentage of overall processing power that's guaranteed to the work in that partition. WLM will then dynamically balance these weights to best meet the goals of the work in the partitions. The Linux work is given a goal and business importance in the WLM service definition—this goal is assessed in comparison to all the workloads being managed. If the CPU requirement for the Linux partition increases causing it to miss its goal and the Linux work has a higher business importance than other workloads in the LPAR cluster, then additional CPU resources will be directed to the Linux LPAR.

This capability for non-z/OS partitions is available only with z/OS V1.2.

Linux for S/390 Gigabit Ethernet Support

Question:

What does Gigabit Ethernet support in Linux for S/390 mean?

Answer:

The Gigabit Ethernet driver in Linux for S/390 supports the functions of the Gigabit Ethernet card. This driver supports the IPv4 protocol, delivering the advantages of more rapid communication across a network. This improvement may be between virtual Linux instances on a single machine (either in LPAR mode, or virtual mode) communicating across a network, or a Linux for S/390 instance communicating with another physical machine across a network.

IBM S/390 Integrated Facility for Linux

Question:

Can I buy a machine that is made up entirely of IBM S/390 Integrated Facility for Linux engines and no traditional engines, and if not, why not?

Answer:

No. The IBM S/390 Integrated Facility for Linux is an orderable feature on certain existing models of the 9672 Parallel Enterprise Server Generation 5 and 6, on model H30 and H50 of the S/390 Multiprise® 3000 server and the new zSeries. All eligible Multiprise 3000, G5/G6 and zSeries server models have at least one S/390 traditional engine, or "Central Processor," as part of this offering. At the present time, IBM has no server models that do not provide at least one S/390 Central Processor, within the Multiprise 3000, G5/G6 and the zSeries product family.

Question:

Is the IBM S/390 Integrated Facility available on zSeries?

Answer:

Yes.

Question:

Is the IBM S/390 Integrated Facility available on Multiprise 3000?

Answer:

Yes, on the models H30 and H50.

z/VM and Linux

Question:

What is z/VM?

Answer:

z/VM is an IBM product that builds on the virtualization technology found in VM/ESA® and provides advanced support for IBM's new zSeries processor family, including support for the 64-bit z/Architecture™.

z/VM V4 can run in 31-bit or 64-bit mode on zSeries. It also runs in 31-bit mode on the following IBM processors:

- All models of the S/390 Parallel Enterprise Server™ Generation 5 and 6
- All models of the S/390 Multiprise 3000

Question:

What release of VM can I run Linux under on zSeries?

Answer:

Linux for S/390 and Linux for zSeries can both run under the z/VM product. Running Linux for zSeries on z/VM requires that z/VM be running in 64-bit mode. Linux for S/390 can run under a 31-bit or 64-bit mode z/VM system. When in 64-bit mode, z/VM can address greater than 2 GB of real memory in support of a large number of 32-bit Linux for S/390 images. VM/ESA only runs in 31-bit mode on zSeries.

Question:

What z/VM function was announced on October 4, 2001?

Answer:

On October 4, 2001, z/VM V4R2 was announced. z/VM V4R2 is the follow-on release to z/VM V4R1, announced earlier this year. With virtualization technology as a foundation, z/VM V4R2 offers new function and technology for customers who want to exploit IBM Virtual Machine (VM) capabilities on the mainframe. Virtualization technology allows customers to virtualize processor, communications, storage and I/O resources to help reduce the overhead of planning, purchasing and installing new hardware to support new workloads. z/VM V4 also offers an ideal platform for consolidating Linux workloads on a single zSeries 900 or S/390 server. Priced on a per-engine basis, z/VM V4 supports IBM Integrated Facility for Linux (IFL) processor features for Linux-based workloads and standard engines for all other zSeries 900 and S/390 workloads. z/VM continues to build on Innovative IBM @server platforms with New Tools and Application Flexibility which help lower costs, improve efficiency and expedite e-business transformation. z/VM V4R2 will be orderable starting October 4, 2001.

Question:

Why is z/VM so vital in the area of system virtualization?

Answer:

Businesses choosing z/VM not only benefit from the reliability of the zSeries hardware, but also superior VM server virtualization technology and the extraordinary business value VM provides by allowing test and development work to take place on the same hardware and software as production workloads. This "multiple server in a box" solution optimizes resources, staff, and capabilities to provide one of the most powerful, reliable and flexible solutions available. A few examples of the advantages that z/VM with virtualization technology and zSeries provide are:

- z/VM based server solutions can provide significant Total Cost of Ownership (TCO) savings in the following areas:
- Deploying virtual servers may reduce the need for new hardware resulting in savings to purchase, install and configure new hardware
- Fewer hardware servers occupy less space resulting in savings on raised floor requirements and costs for heating, air conditioning and electricity
- New images can be created in seconds, reducing the cost and time associated with planning for new business opportunities
- Sharing operating systems and application code between virtual servers provides for ease of maintenance and may result in software, system management and staffing cost savings
- z/VM provides tools to help reduce requirements for additional software for systems management, accounting and billing
- Network costs may be lowered by virtual server communication such as Inter-User Communication Vehicle (IUCV) or HiperSockets

HiperSockets function allows virtual machines and/or logical partitions to communicate internally over the memory bus using the new internal-queued-direct (IQD) channel type in the z900.

Question:

What are some of the z/VM Linux features that promote ease of use and application flexibility?

Answer:

z/VM and Linux for zSeries solutions deliver a powerful and flexible alternative to traditional "Server Farm" solutions. z/VM application flexibility allows customers to:

- Consolidate discrete Linux server images onto a single zSeries server
- Dynamically allocate system resources across multiple server applications as demand requires
- Deploy new Linux server images in seconds or minutes
- Quickly build Linux virtual servers or tailor your Linux application development environment
- Deploy 32- and 64-bit applications running concurrently on a single zSeries 900
- Share software among many servers providing ease of maintenance
- Easily define virtual network environments without complex physical connections

In addition, z/VM provides improved scalability for Symmetric Multiprocessor (SMP) configurations and support for the IBM Integrated Facility for Linux (IFL) and standard engines.

Question:

What are some of the new systems and resource management tools and capabilities in z/VM V4R2?

Answer:

z/VM V4 includes separately priced, pre-installed system management features (RTM, PRF, DirMaint) which enable you to track and manage multiple images from one location. With z/VM systems management tools, you can also facilitate dynamic deployment of virtual servers as required, enable dynamic reallocation of resources according to workload demands and allocate resources based on customer defined workload priorities. z/VM along with z/OS provide complementary workload management functionality. This functionality allows VM management tools to manage virtual images within z/VM providing workload capacity and capping capability along with dynamic I/O configuration while IRD on z/OS manages processor capacity in standard engines across Logical Partitions (LPAR) which provides resource utilization that is trackable by the server for tuning and billing purposes. Together the system management capabilities of z/VM and z/OS provide you with maximum control of system resources. z/VM also supports Capacity Upgrade on Demand (CUoD) for immediate nondisruptive deployment of hardware upgrades on zSeries 900 and Parallel Enterprise Server G5 and G6.

IBM Solutions

Question:

What are the available solutions/products to run on Linux for S/390?

Answer:

Solutions are available to support the two major themes: Business Integration and Server Consolidation

Available IBM products for **Business Integration Solutions:**

- WebSphere family
 - IBM WebSphere Application Server Advanced Edition V3.5
 - WebSphere Commerce Suite V5.1
 - WebSphere Personalization Version V3.5
 - WebSphere Host-On-Demand Version 5.0.3
- Data management
 - DB2 Universal Database™ Enterprise Edition Version 7.2
 - DB2 Intelligent Miner™ Scoring Version 7.2
 - DB2® Net Search Extender Version 7.2
- Connectors
 - CICS® Transaction Gateway V4.0
 - DB2 Connect™ Unlimited Edition Version 2
 - DB2 Connect Web Starter Kit Version 7.2
 - MQSeries® Client for Linux for S/390 V5.2
 - IMS™ Connect
- VSE/ESA™ e-business Connectors
- Tivoli®
 - Tivoli Storage Manager Linux for zSeries and S/390 Client Version 4.2

Server Consolidation Solutions:

Most popular scenarios are the consolidation of infrastructure and distributed application servers, e.g.

- Simple Web serving with Apache
- File/Print serving with Samba
- e-mail/collaboration with Sendmail or Bynari

Question:

Will IBM maintain a list of Independent Software Vendor (ISV) products that are being offered for Linux on zSeries?

Answer:

Yes. You can access a list of Independent Software Developer products available for Linux on S/390 at the following URL:

ibm.com/servers/eserver/zseries/solutions/s390da/linuxproduct.html

Question:

Will IBM maintain a list of Open Source products that are being offered for IFL engines?

Answer:

The following Web site provides a good overview on Open Source products available for Linux on S/390 can be found at the following URL:

linux.s390.org (-> Download, -> Browse RPM database)

IBM Middleware for Linux on zSeries

Question:

Which IBM middleware is available for Linux for S/390?

Answer:

The following IBM middleware is available today to run on Linux for S/390

Connectors

- DB2 Connect, Version 7.1
- MQSeries client, Version 5.2
- CICS Transaction Gateway, Version 4.0
- IMS Connect, Version 7

WebSphere Family

- WebSphere Application Server Advanced Edition, 3.5
- Including Java Development Kit, Version 1.2.2 & JIT
- WebSphere Personalization, Version 3.5
- WebSphere Commerce Suite, Version 5.1
- WebSphere Host on Demand, Version 5.0.3

Data Management

- DB2 Universal Database, Version 7.2
- DB2 Intelligent Miner Scoring, Version 7.1
- DB2 Net Search Extender, Version 7.2

Tivoli

- Tivoli Storage Manager Client 4.2
- Tivoli Enterprise Console 3.7.1
- Tivoli Software Distribution 4.0
- Tivoli Distributed Monitoring 4.1
- Tivoli Workload Scheduler 8.1

Question:

Where can I get additional information on IBM middleware for Linux on zSeries?

Answer:

The following Web site is a good source for more information on IBM software running on Linux for zSeries and S/390:

ibm.com/cgi-bin/software/track3.cgi?file=/software/is/mp/linux/software/index.html&S_TACT=__S_TACT__&S_CMP=__S_CMP__

Support for Linux for zSeries and Linux for S/390

Question:

What type of support and services will be available for Linux for zSeries and Linux for S/390?

Answer:

IBM will provide the following support and services for Linux for zSeries and Linux for S/390:

- Operational Support Services - Support Line for the Linux operating system, which provides remote technical support for either the SuSE or Turbolinux generally available distributions on supported processors
- IBM service offerings for infrastructure, application implementation and customized offerings

For more information, please visit: ibm.com/linux/support

Question:

From which companies, IBM or the distributors, can I buy support services for Linux for S/390? Do I have a choice?

Answer:

Yes. You can choose whom you wish to provide support services for Linux. IBM IGS will be offering Operational Support Service - Support Line, Linux for S/390. You will have to contact the Linux for S/390 Linux distribution partners (SuSE or Turbolinux) to see what offering will be made available from the Linux distribution partner.

Question:

Exactly which components of Linux for S/390 are covered by an IBM Support Line contract? Does it include all IBM supplied device drivers, both Open Source and OCO?

Answer:

IBM will support IBM device drivers as available in the Linux for S/390 distributions from SuSE and Turbolinux whether OCO or open source.

Education for Linux for S/390

Question:

What kind of education is available for Linux for S/390?

Answer:

IBM Learning Services provides Linux education and provides a 3 day implementation workshop for Linux for S/390, focusing on distributions, installation, administration, security and more.

For more information on IBM Learning Services courses on Linux go to:

ibm.com/services/learning/spotlight/linux.html

Linux and VSE/ESA

Question:

What advantages does Linux on zSeries bring to VSE/ESA customers?

Answer:

VSE customers see two major benefits: First is new applications choices. A very large number of applications are available, or planned, for Linux on zSeries. Most of those applications are not available on VSE itself. For example, VSE customers have expressed interest in WebSphere Application Server or SAMBA under Linux on zSeries. Second is an opportunity to consolidate servers and platforms onto the same S/390 or zSeries server that's also used for their VSE (and z/VM) workload. The average VSE customer has several different kinds of servers in addition to S/390 or zSeries. Linux on zSeries gives them a new option to reduce cost, leverage skills, streamline operations, enhance availability, and improve scalability. In addition, Linux on zSeries running on Integrated Facility for Linux (IFL) engines under z/VM is a compelling value.

Question:

What's the best way for VSE customers to leverage Linux on zSeries?

Answer:

Many VSE customers may decide to implement major new applications under Linux on zSeries. That's because tools such as WebSphere and Java™ give them capabilities that aren't available for VSE alone. At the same time, most customers want to retain those robust, proven applications that are key to the success of their business. Existing VSE applications often represent a substantial investment in code, data, skills, and business processes that may be quite costly and risky to replace.

Question:

How can customers exploit the strengths of both VSE and Linux on zSeries?

Answer:

The key is interoperability. VSE/ESA Version 2 Release 6 provides e-business connectors based on IBM's Application Framework for e-business. VSE/ESA V2R6 was designed with interoperability in mind. VSE e-business connectors consist of server code that runs under VSE, plus Java beans that run under Linux on zSeries (or any Java-capable client such as OS/390, Microsoft® Windows NT®/Windows 2000®, AIX®, etc.). The objective of these connectors is easy access to VSE resources such as VSE/VSAM files, DL/I databases, VSE/POWER, VSE/ICCF, VSE Librarian, and VSE consoles. For example, using beans provided by VSE/ESA V2R6, a Java programmer writing portions of an application for Linux on zSeries can access VSAM files without detailed knowledge of VSE. VSE/ESA V2R6 also introduced a new connector called the VSE/VSAM redirector. The redirector function allows VSE to act as a client as well as a server. For example, using the redirector, VSE/VSAM applications can transparently access data on Linux of zSeries.

Complementary IBM middleware provides additional interoperability. For example, MQSeries enables standardized, secure communication between applications running in VSE and Linux for S/390. DB2 Connect enables Linux on zSeries applications to access production data stored in DB2 (DB2 Server for VSE Version 7) databases on VSE. VSE/ESA V2R6 adds TCP/IP support for CICS External Call Interface. That allows, for example, VSE customers who run CICS Transaction Gateway under Linux for zSeries to access CICS Transaction Server for VSE/ESA resources using the ECI interface.



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