

IBM @server Cluster 1300



The IBM @server Cluster 1300 with primary and expansion racks

Highlights

- ***Reduces time and resources necessary to deploy Linux® clusters***
- ***Provides single point-of-control to simplify management and enhance cluster availability***
- ***Offers a highly scalable solution for high-performance or commercial computing workloads and server consolidation***

Outstanding price/performance

Clustering has always offered significant price/performance advantages for many high-performance workloads. By harnessing low-cost servers and Open Source software, Linux clusters further extend those advantages.

Today, many organizations are building their own Linux clusters using commodity hardware, standard interconnects and networking technology, Open Source software and in-house or third-party applications. In doing so, they often discover that considerable resources must be dedicated to assemble, integrate, test, manage and support the cluster. As such, these organizations often experience many of the problems frequently encountered during product development.

Leveraging its extensive experience with clustered UNIX® computers, IBM has developed the IBM @server Cluster 1300 to address each of these challenges. Using advanced Intel® processor-based server nodes, proven cluster management software (Red Hat Linux from Red Hat, Inc.) and optional high-speed interconnects, the Cluster 1300 brings together the best of IBM and third-party technology. As a result, the installation of a Linux cluster is greatly accelerated and its support greatly simplified.

The Cluster 1300 is an ideal solution for industrial, governmental and educational organizations requiring excellent price/performance for handling High Performance Computing (HPC) workloads. It is also an excellent choice for applications such as Web serving and collaboration or any situation requiring horizontal scaling.

A comprehensive solution

Customers can order the Cluster 1300 as an integrated offering. It is easy to configure and helps businesses deploy applications rapidly. After the configuration is selected, IBM assembles and tests the cluster to ensure that the system performs as specified. A single serial number is assigned to the entire cluster with IBM acting as a single point-of-contact for all service-related issues.¹

By reducing time and resources for researching, assembling, integrating, testing and tuning a Linux cluster, the Cluster 1300 can help an organization speed time-to-production when deploying Linux applications. In addition, more servers can be added at any time to handle increasing workloads, consolidate more servers or add new applications.

IBM provides installation support for the Cluster 1300. For even higher levels of support, the optional SupportLine for Linux Clusters is staffed by experts who understand the entire cluster environment, not just individual components. This includes Linux, CSM for Linux and the General Parallel File System (GPFS) for Linux.

To further simplify the deployment effort, IBM can provide project management support to coordinate all aspects of delivery and installation, including hardware and software setup services. Attractive financing and leasing terms are also available.

High-performance cluster management

IBM offers Cluster Systems Management (CSM), which is advanced cluster management software that allows a cluster of Intel processor-based Linux systems to be managed from a single point-of-control. This simplifies the management of the cluster and enables it to scale up easily, thus helping to improve the efficiency of the system administrator. CSM includes an infrastructure that monitors both hardware and software events, triggering automated recovery action when appropriate. The highly reliable infrastructure and event

monitoring capabilities of CSM help ensure that problems are detected and resolved quickly, thereby enhancing availability of the cluster.

CSM for Linux is based on the architecture and design of the IBM Parallel System Support Programs for AIX® software product, which has been deployed on the IBM RS/6000® SP™ —one of the world's most popular supercomputers.

CSM contains several components designed to make managing a Linux cluster easier:

- **Distributed management server:**
provides a persistent repository of information about each node in the cluster, and maintains the status of each node.
- **Event response resource manager:**
provides the ability to run commands or scripts in response to user-defined events. A rich set of predefined conditions and responses are provided. Many resources can be monitored, including nodes, adapters, file systems and processes.

- Remote hardware control: *utilizes the integrated systems management processor in Cluster 1300 nodes. This enables the administrator to remotely reset or power the node on or off.*
- Configuration file management: *provides a repository for files that are common between the nodes. CSM will synchronize changes to configuration files across the cluster.*
- Distributed shell: *allows commands or scripts to be run remotely on all nodes in the cluster with options for combining output from multiple servers. Distributed command execution manager is an optional graphical user interface that integrates with the distributed shell, allowing easier management of nodes and node groups.*

CSM provides node grouping, which is a convenient way to apply different rules to subsets of servers in the cluster. This can be an important consideration when supporting the consolidation of multiple applications on the cluster.

With node grouping, administrative commands can be applied to individual nodes, the entire cluster as a unit, or to a specific group of nodes defined by the administrator.

By providing a single point-of-control for a cluster, CSM can dramatically simplify total systems management, thereby enabling a cost-effective approach to server consolidation solutions. By allowing scripts to run in response to common occurrences, CSM can help increase cluster availability.

Advanced server technology

The Cluster 1300 is based on exclusive X-Architecture™ technology from IBM, which incorporates some of the availability features of the IBM @server zSeries™ 900 server and the scalability features of IBM @server pSeries™ systems. As such, Cluster 1300 industry standard Intel processor-based servers are designed to provide enterprise-inspired power, scalability, control and service at very attractive prices.

Cluster 1300 nodes include unique Cable Chaining Technology, which is designed to significantly reduce the number of cables needed in each system, thereby helping to speed upgrades while lowering costs. In addition, an integrated systems management processor enables CSM to remotely manage the system nodes for enhanced server productivity.

Through the use of CSM commands, system administrators can specify which events to monitor and actions to take in the event of memory, processor, hard drive, fan or power issues. As a result, these commands help achieve peak performance and system availability.

Standard configurations of the Cluster 1300 include a management node, four to 128 cluster nodes and up to eight storage nodes that provide shared file storage. A special order process is available for organizations requiring larger or other non-standard configurations. All nodes run Red Hat Linux.

Additionally, there are two special single frame solutions available offering a smaller footprint and lower cost. One of these solutions scales from four to eight nodes while the other is a fixed 16-node configuration.

Each Cluster 1300 also includes a management Ethernet VLAN for secure internode communications, a cluster Ethernet VLAN for application internode communication and a terminal server network, which allows for remote console capability.

Feature	Benefit
Fully integrated, tested and supported by IBM	<ul style="list-style-type: none"> • Provides proven configuration with a single point-of-contact for continuing support • Can speed the time-to-production of high-performance Linux applications • Simplifies and speeds upgrades
Advanced IBM @server hardware	<ul style="list-style-type: none"> • Unique X-Architecture delivers the most powerful, scalable and reliable Intel processor-based servers in the industry
Industry leading components	<ul style="list-style-type: none"> • Provide a greater choice in configuration • Help keep costs down without sacrificing quality or performance
Single point-of-control with CSM for Linux	<ul style="list-style-type: none"> • Dramatically simplifies total systems management • Enables cost-effective server consolidation solutions
General Parallel File System (GPFS)	<ul style="list-style-type: none"> • Offers enhanced performance through concurrent access to files from multiple nodes

The cluster comes standard with one 10/100 Mbps Ethernet switch, supporting up to 48 connections.

Cluster nodes can be configured with either single or dual Intel Pentium® III processors, with 128MB to 4GB of memory. Each cluster node has either one or two SCSI disk drives for a total of 18GB to 147.8GB of disk storage per node. The management node also has dual Intel Pentium III processors, from 256MB to 4GB of memory, up to six 18GB, 36GB or 72GB hard drives and the appropriate adapter cards for cluster management.

Additional disk storage is available through the use of optional storage nodes, which allow additional file system storage to be configured. For increased capacity, these nodes can be configured to support externally

attached Fibre Channel RAID storage subsystems. For high availability, they can be configured to provide redundant paths to all data. While the standard configuration supports up to eight storage nodes, larger data storage configurations are available by special order.

A minimum of one Keyboard/Video/Mouse (KVM) switch is required with the system. Remote console support is provided through the terminal server.

Expanding possibilities

The Cluster 1300 offers a number of optional components to meet the specific computing requirements of different organizations, including a choice of interconnect technologies. In addition to standard 10/100 Mbps Ethernet, organizations can select Myrinet 2000—scalable interconnect technology from Myricom, Inc.

Myrinet is a cost-effective, high-performance packet communication and switching technology that has been widely used in Linux operating system-based clusters. It is particularly well suited for high-performance or high-availability clustering.

Companies can also take advantage of GPFS for Linux. GPFS is a high-performance, scalable shared-disk file system that is designed to provide fast data access from all nodes in a Linux cluster environment. Parallel applications running across multiple nodes of the cluster as well as serial applications running on a single node can readily access shared files using standard UNIX file system interfaces. Furthermore, GPFS can be configured for failover from both disk and server malfunctions.

IBM @server Cluster 1300 at a glance

Node Type	7082-342 management/storage node (3U)	7081-330 cluster node (1U)
Processor	1.26 or 1.4 GHz Pentium III; 2-way management node 1- or 2-way storage node	1.13, 1.26 or 1.4 GHz Pentium III, 1- or 2-way
L2 cache	512KB	512KB
RAM memory	No base memory	No base memory
Disk/media bays	Three	Two
Expansion slots	Five PCI	Two PCI
Adapters	Integrated Ultra3 SCSI and Ethernet (10/100 Mbps)	Integrated Ultra3 SCSI and Ethernet (10/100 Mbps)
System connectivity Communications	One 10/100 Mbps Ethernet switch standard Internal V90 modem (provided for most countries)	Two 10/100 Mbps Ethernet switches standard
System expansion		
RAM	4GB	4GB
Internal storage	6x72GB	2x72GB
System connectivity	Additional 10/100 Mbps Ethernet, Gigabit Ethernet, Myrinet 2000	
Adapters	Gigabit Ethernet SX Myrinet 133 MHz 10/100 Mbps Ethernet FAST500 Host adapter Server RAID 4LX	Gigabit Ethernet SX Myrinet 133 MHz Server RAID 4LX
Operating system	Red Hat Linux 7.1 or 7.2	Red Hat Linux 7.1 or 7.2
Systems mgt. software	CSM for Linux* Version 1.2	CSM for Linux* Version 1.2
System dimensions		
36U primary or expansion rack	68" H x 25.5" W x 43.3" D (1727.2 mm x 647.7 mm x 1099.8 mm), 535 lbs (242.7 kg)	
Management/storage node	5.25" H x 16.3" W x 26" D (133.3 mm x 414 mm x 660.4 mm), 62 lbs (28.1 kg)	
Cluster node	1.72" H x 17.3" W x 25.7" D (43.7 mm x 439.4 mm x 652.8 mm), 28.4 lbs (12.8 kg)	
Scalability	One management node is required with a minimum of 4 and a maximum of 128 cluster nodes.* Additionally, up to 8 storage nodes can be configured. Therefore, the minimum configuration includes 5 nodes (1 management node and 4 cluster nodes). The maximum configuration would include 137 nodes (1 management node, 128 cluster nodes and 8 storage nodes). Larger configurations are available via a special bid process.	
Services	Installation service included. SupportLine for Linux Clusters available as an optional service offering.	
Warranty	Basic limited warranty on IBM components: three years, next business day, on-site support. Enhanced warranty plans available. Non-IBM components are covered under their manufacturer's warranties.	

* CSM for Linux is also supported on the IBM @server xSeries™ models 330 and 342. Scalability to 256 cluster nodes is supported.

In short, GPFS for Linux offers world class performance, scalability and availability for file systems. It scales with the size of the Linux cluster while providing NFS export capabilities outside the cluster.

Other optional cluster components include IBM FASTT200 storage subsystems with the FASTT EXP500 expansion unit. Fiber Array Storage Technology provides highly reliable data storage for business-critical applications that require high-speed transfer and large amounts of data.

Summary

Creating a computing infrastructure is an exercise in balancing price and performance to deliver the appropriate solution for any given task.

For some high-performance workloads, the most appropriate solution is clustering. By harnessing the power of many servers in parallel, it's possible to solve computationally intense problems with an excellent price/performance ratio. Clustering can also be an excellent approach for consolidating multiple workloads, which can provide enhanced manageability and high availability.

The advent of Linux has made it possible to build powerful clustered systems using affordable, Intel

processor-based hardware. It also allows organizations to tap into the growing skill base and contributions of the Open Source community.

The IBM @server Cluster 1300 is designed to provide a pre-configured, pre-installed and pre-tested solution that greatly simplifies and speeds deployment of a Linux cluster. IBM provides a single point-of-contact for the entire cluster, not just individual components, thus reducing risk for deployment of a Linux cluster solution.¹

For any organization looking for the economic advantages of deploying a Linux cluster, but concerned about the time and technical resources necessary, the Cluster 1300 is the right choice.

For more information

To learn more about the IBM @server Cluster 1300, contact your IBM marketing representative or IBM Business Partner or visit the following Web sites:

ibm.com/eserver/clusters

ibm.com/ibmlink/usalets&parms=H_101-339



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