

IBM Flex System Manager

IBM Redbooks Product Guide

IBM® Flex System™ Manager (FSM) is a systems management appliance that drives efficiency and cost savings in the data center. IBM Flex System Manager provides a pre-integrated and virtualized management environment across servers, storage, and networking that is easily managed from a single interface. A single focus point for seamless multichassis management provides an instant and resource-oriented view of chassis and chassis resources for both IBM System x® and IBM Power Systems™ compute nodes. You can reduce the number of interfaces, steps, and clicks it takes to manage IT resources, intelligently manage and deploy workloads based on resource availability and predefined policies, and manage events and alerts to increase system availability and reduce downtime while reducing operational costs.

The IBM Flex System Manager management appliance is shown in the following figure.



Figure 1. IBM Flex System Manager management appliance

Did you know?

IBM Flex System, a new category of computing and the next generation of Smarter Computing, offers intelligent workload deployment and management for maximum business agility. This chassis delivers high-speed performance complete with integrated servers, storage, and networking for multi-chassis management in data center compute environments. Furthermore, its flexible design can meet the needs of varying workloads with independently scalable IT resource pools for higher utilization and lower cost per workload. While increased security and resiliency protect vital information and promote maximum uptime, the integrated, easy-to-use management system reduces setup time and complexity, providing a quicker path to return on investment (ROI).

IBM Flex System gives forward-thinking companies a way to completely rethink deployment and management of their IT environments; it offers an opportunity to evolve to a more open, agile, and integrated computing system that is dynamically managed from a single vantage point to simultaneously maximize efficiency and innovation.

Key features

IBM Flex System Manager is designed to help you get the most out of your IBM PureFlex System while automating repetitive tasks. IBM Flex System Manager can reduce the number of manual navigational steps for typical management tasks. From simplified system setup procedures with wizards and built-in expertise to consolidated monitoring for all of your physical and virtual resources (compute, storage, and networking), IBM Flex System Manager provides core management functionality along with automation so you can focus your efforts on business innovation.

IBM Flex System Manager has the following key features:

- Optimizing your workload management through built-in expertise

With a workload-optimized approach, you can decrease infrastructure costs and improve service levels. You can create and modify system pools using virtual workloads, make dynamic virtual workload adjustments, and move workloads within system pools, resulting in an optimized virtual environment with increased resilience to cope with planned or unplanned down time. A system pool is a group of virtualized system components that are managed as a single entity, allowing you to manage the pools with the simplicity of managing a single system, which is an essential capability for moving to cloud computing and a dynamic infrastructure.

- Managing all of your resources with one solution

Beginning with deployment through maintenance, upgrades, and problem resolution, IBM Flex System Manager is designed to provide all of the key management functions for your integrated IT resources from a single, easy to use interface. From your office or remotely through a secure connection, you can manage your compute, storage, network and virtualized resources.

- Compute

Auto discovery and setup wizards make deploying compute nodes quick and easy using the IBM Flex System Manager. After it is deployed, IBM Flex System Manager provides real-time updates for compute node “health” summaries. With the ability to define performance thresholds to trigger alerts, you can automate responses to potential problems help keep your critical business applications running at peak performance. IBM Flex System Manager can detect many problems with essential system resources and recover automatically. IBM Flex System Manager can also perform trend analysis to forecast and prevent future problems that otherwise might lead to expensive system outages.

- Storage

IBM Flex System Manager helps you address storage management challenges from device deployment and through the data life cycle. Storage deployment capabilities in the IBM Flex System Manager include storage device discovery and simple logical and physical device configuration from a single interface. IBM Flex System Manager can provide physical and logical storage topology views and can show relationships between storage and server resources, giving you the ability to track key resources based on their business usage. Provisioning capabilities include image management for simple virtual machine creation, deployment and cloning. You can also manage storage system pools for data life cycle management and storage placement based on business policies.

- Networking

Networking resources allow your virtualized compute and storage resources to communicate and function in the cloud. IBM Flex System Manager delivers end-to-end network management for your PureFlex System from a single tool. IBM Flex System Manager supports automated network discovery to speed deployments. It also offers a graphical view of the network from the integrated user interface. Network resources are pooled and virtualized. With logical network profiles, you can quickly and easily specify the network connectivity characteristics of a virtual machine.

IBM Flex System Manager supports automatic provisioning and simple movements of virtual LANs for virtual machines. You can manage MAC addresses for virtual network interface cards. IBM Flex System Manager provides detailed network usage and performance statistics for virtual machines and physical compute nodes so you can track valuable network resources and manage them based on your business needs.

- Virtualization

The basic virtualization functions in the IBM Flex System Manager begin with the ability to create and manage virtual servers from pooled resources. IBM Flex System Manager takes this capability further through the application of built-in expertise to make provisioning and deployment of virtual machines fast and easy. After virtual machines are deployed, the virtualization features of IBM Flex System Manager are designed to help you manage these virtualized resources efficiently. Automation features such as dynamic virtual machine placement, automated optimization, and resource balancing simplify virtualization management. IBM Flex System Manager also helps you keep your virtual machines up and running with support for nondisruptive updates, virtual machine mobility, and a range of other resilience features.

Part number information

The IBM Flex System Manager appliance is based on an x86 compute node that comes with preloaded management software. The software contains a set of components that are responsible for performing certain management functions. These components must be activated using the available IBM Feature on Demand (FoD) software entitlement licenses, and they are licensed on a per-chassis basis, that is, you need one license for each chassis you plan to manage. The management node comes standard without any entitlement licenses, so you must purchase a license to enable the required FSM functionality.

The part number to order the management node is shown in the following table.

Table 1. Part numbers for ordering the management node

Description	Part number
IBM Flex System Manager Node	8731A1x*

* x in the Part number represents a country-specific letter (for example, the EMEA part number is 8731A1G, and the US part number is 8731A1U). Ask your local IBM representative for specifics.

The FSM management nodes are shipped with the following items:

- Documentation CD
- Environmental Notices CD
- Registration Flyer
- Statement of Limited Warranty
- Important Notices

The IBM FSM Manager Node has the following fixed hardware specifications:

- One Intel Xeon Processor E5-2650 8C 2.0 GHz 20 MB Cache 1600 MHz 95 W
- 32 GB of memory with eight 4 GB (1x4 GB, 1Rx4, 1.35 V) PC3L-10600 CL9 ECC DDR3 1333 MHz LP RDIMMs
- Integrated LSI SAS2004 RAID controller
- Two IBM 200 GB SATA 1.8" MLC SSD configured in a RAID 1
- One IBM 1 TB 7.2 K 6 Gbps NL SATA 2.5" SFF HS HDD
- Dual-port 10 Gb Ethernet Emulex BladeEngine 3 (BE3) network controller for data network connections
- Dual-port Broadcom 5718 network controller for internal chassis management network connections
- Integrated Management Module II (IMM2)

The FSM Manager Node ships with a preinstalled software management stack based on RHEV-H.

The part numbers to order FoD software entitlement licenses are shown in Table 2 (for United States, Canada, Asia Pacific, and Japan) and Table 3 (for Latin America and Europe/Middle East/Africa). The part numbers for the same features are different across geographies. Ask your local IBM representative for specifics.

Table 2. Part numbers for ordering Feature on Demand entitlement licenses (United States, Canada, Asia Pacific, and Japan)

Description	Part number
Base feature set	
IBM Flex System Manager Per Managed Chassis with 1 Year SW S&S	90Y4217
IBM Flex System Manager Per Managed Chassis with 3 Year SW S&S	90Y4222
Advanced feature set*	
IBM Flex System Manager, Advanced Upgrade, Per Managed Chassis with 1 Year SW S&S	90Y4249
IBM Flex System Manager, Advanced Upgrade, Per Managed Chassis with 3 Year SW S&S	00D7554

* The Advanced Upgrade license requires the IBM Flex System Manager base license.

Table 3. Part numbers for ordering Feature on Demand entitlement licenses (Latin America and Europe/Middle East/Africa)

Description	Part number
Base feature set	
IBM Flex System Manager Per Managed Chassis with 1 Year SW S&S	95Y1174
IBM Flex System Manager Per Managed Chassis with 3 Year SW S&S	95Y1179
Advanced feature set*	
IBM Flex System Manager, Advanced Upgrade, Per Managed Chassis with 1 Year SW S&S	94Y9219
IBM Flex System Manager, Advanced Upgrade, Per Managed Chassis with 3 Year SW S&S	94Y9220

* The Advanced Upgrade license requires the IBM Flex System Manager base license.

The IBM Flex System Manager base feature set offers the following functionality:

- Support for up to four managed chassis
- Support for up to 5,000 managed elements
- Auto-discovery of managed elements
- Overall health status
- Monitoring and availability
- Hardware management
- Security management
- Administration
- Network management (Network Control)
- Storage management (Storage Control)
- Virtual machine life cycle management (VMControl Express)
- I/O address management (IBM Fabric Manager)

The IBM Flex System Manager advanced feature set upgrade offers the following advanced features:

- Image management (VMControl Standard)
- Pool management (VMControl Enterprise)

Important: The advanced upgrade license requires the IBM Flex System Manager base license.

The part numbers for the Feature on Demand licenses include the following items:

- Feature on Demand Activation Flyer
- Upgrade activation key

Features and functions

The main features in IBM Flex System Manager are:

- Monitoring and problem determination
 - A real-time, multichassis view of hardware components with overlays for additional information.
 - Automatic detection of issues in your environment through an event setup that triggers alerts and actions.
 - Identification of changes that might impact availability.
 - Server resource utilization by virtual machine or across a rack of systems.
- Hardware management
 - Automated discovery of physical and virtual servers and interconnections, applications, and supported third-party networking.
 - Inventory of hardware components.
 - Chassis and hardware component views.
 - Hardware properties.
 - Component names/hardware identification numbers.
 - Firmware levels.
 - Utilization rates.

- Network management
 - Management of network switches from a variety of vendors.
 - Discovery, inventory, and status monitoring of switches.
 - Graphical network topology views.
 - Support for KVM, pHyp, VMware virtual switches, and physical switches.
 - VLAN configuration of switches.
 - Integration with server management.
 - Per-virtual machine network usage and performance statistics provided to VMControl.
 - Logical views of servers and network devices grouped by subnet and VLAN.

- Storage management
 - Discovery of physical and virtual storage devices.
 - Support for virtual images on local storage across multiple chassis.
 - Inventory of the physical storage configuration.
 - Health status and alerts.
 - Storage pool configuration.
 - Disk sparing and redundancy management.
 - Virtual volume management.
 - Support for virtual volume discovery, inventory, creation, modification, and deletion.

- Virtualization management (base feature set)
 - Support for VMware, Hyper-V, KVM, and IBM PowerVM®.
 - Creates virtual servers.
 - Edits virtual servers.
 - Manages virtual servers.
 - Relocates virtual servers.
 - Discovers virtual server, storage, and network resources and visualize the physical-to-virtual relationships.

- Virtualization management (advanced feature set)
 - Creates new image repositories for storing virtual appliances and discover existing image repositories in your environment.
 - Imports external, standards-based virtual appliance packages into your image repositories as virtual appliances.
 - Captures a running virtual server that is configured the way you want, complete with a guest operating system, running applications, and virtual server definition.
 - Imports virtual appliance packages that exist in the Open Virtualization Format (OVF) from the Internet or other external sources.
 - Deploys virtual appliances quickly to create new virtual servers that meet the demands of your ever-changing business needs.
 - Creates, captures, and manages workloads.
 - Creates server system pools, which enable you to consolidate your resources and workloads into distinct and manageable groups.
 - Deploys virtual appliances into server system pools.
 - Manages server system pools, including adding hosts or additional storage space and monitoring the health of the resources and the status of the workloads in them.
 - Groups storage systems together using storage system pools to increase resource utilization and automation.
 - Manages storage system pools by adding storage, editing the storage system pool policy, and monitoring the health of the storage resources.

- I/O address management
 - Manages assignments of Ethernet MAC and Fibre Channel WWN addresses.
 - Monitors the health of compute nodes, and automatically, without user intervention, replace a failed compute node from a designated pool of spare compute nodes.
 - Preassigns MAC addresses, WWN addresses, and storage boot targets for the compute nodes.
 - Creates addresses for compute nodes, saves the address profiles, and deploys the addresses to the slots in the same or different chassis.

- Additional features
 - Resource-oriented chassis map provides an instant graphical view of chassis resources, including nodes and I/O modules.
 - A fly-over provides an instant view of an individual server's (node) status and inventory.
 - A chassis map provides an inventory view of chassis components, a view of active status requiring administrative attention, and a compliance view of server (node) firmware.
 - Actions can be taken on nodes, such as working with server-related resources, showing and installing updates, submitting service requests, and launching into the remote access tools.
 - Remote console
 - Open video sessions and mount media, such as DVDs with software updates, to their servers from their local workstation.
 - Remote Keyboard, Video, and Mouse (KVM) connections.
 - Remote Virtual Media connections (mount CD/DVD/ISO/USB media).
 - Power operations against servers (Power On/Off/Restart).
 - Hardware detection and inventory creation
 - Firmware compliance and updates
 - Automatic detection of hardware failures
 - Provides alerts.
 - Takes corrective action.
 - Notifies IBM of problems to escalate problem determination.
 - Health status (such as processor utilization) on all hardware devices from a single chassis view.
 - Administrative capabilities, such as setting up users within profile groups, assigning security levels, and security governance.

Network management integration

The IBM Flex System Manager management node has two types of interfaces that can be configured. The Eth0 interface (two 1 Gb Ethernet management ports) and the IMM2 network interface are connected to the basic Layer 2 switch integrated into the FSM hardware. The integrated switch is connected to the Chassis Management Module (CMM) through the chassis internal management network. The CMM is connected to a top-of-rack switch that effectively extends the chassis management network outside of the chassis and provides a central connection point for all Enterprise Chassis hardware to be managed by the IBM Flex System Manager management software. These connections are referred to as the management network. The management network is shown in the following figure.

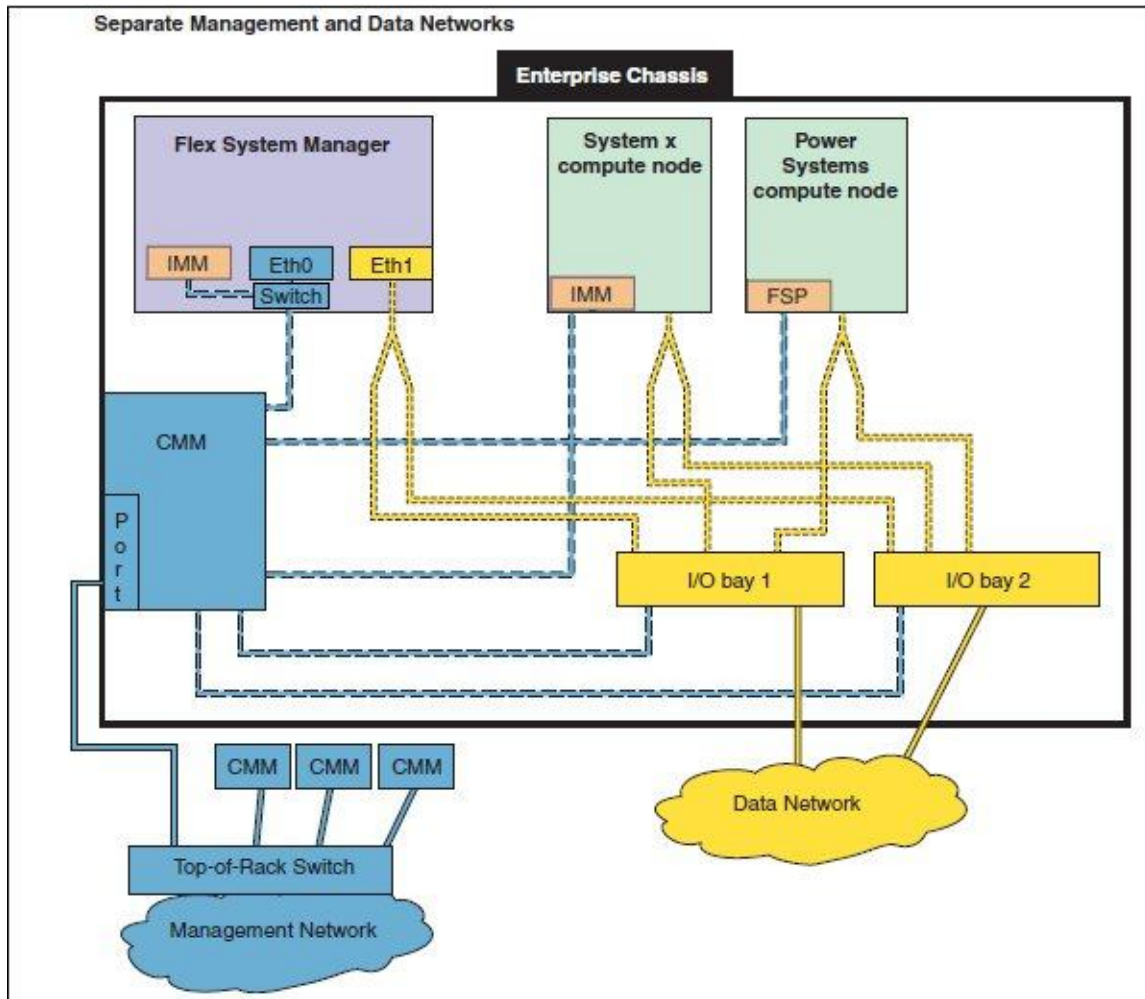


Figure 2. IBM Flex System Manager internal management network connections

The management network is used to complete management-related functions for the various endpoints that are managed by the IBM Flex System Manager management software, such as other Enterprise Chassis and compute nodes. During initialization, the management software discovers any Enterprise Chassis on the management network. The management node console can be connected to the management network or to the data network.

The IBM Flex System Manager management node Eth1 interface (two 10 Gb Ethernet ports) must be connected to the chassis switch modules that are installed in I/O bay 1 or bay 2. This setup is referred to as the data network. You can configure a switch module in bay 1 or bay 2 to map Eth1 to one of its external Ethernet ports, as you would configure the other nodes in the chassis that are connected to the external network. The data network is used by applications and operating systems and can support data transfer rates up to 10 Gbps if a chassis switch module that is capable of 10 Gbps is installed.

One of the key functions that the data network supports is discovery of operating systems on the various network endpoints. Discovery of operating systems by the IBM Flex System Manager is required to support software updates on an endpoint such as a compute node. The IBM Flex System Manager Checking and Updating Compute Nodes wizard assists you in discovering operating systems as part of the initial setup.

Supported agents, hardware, operating systems, and tasks

IBM Flex System Manager provides four tiers of agents for managed systems. For each managed system, you need to choose the tier that provides the amount and level of capabilities that you need for that managed system. Depending on the type of managed system and the management tasks you need to perform, you can choose the level of agent capabilities that best fits your needs. IBM Flex System Manager has four agent tiers:

- Agentless in-band
Managed systems without any IBM Flex System Manager software installed. IBM Flex System Manager communicates with the managed system through the operating system.
- Agentless out-of-band
Managed systems without any IBM Flex System Manager software installed. IBM Flex System Manager communicates with the managed system through something other than the operating system, such as a service processor or a hardware management console.
- Platform Agent
Managed systems with Platform Agent installed. IBM Flex System Manager communicates with the managed system through the Platform Agent.
- Common Agent
Managed systems with Common Agent installed. IBM Flex System Manager communicates with the managed system through the Common Agent.

The following table lists the agent tier support for the IBM Flex System Manager managed compute nodes. Managed nodes include x240 compute nodes supporting Windows, Linux, and VMware, and p260 and p460 compute nodes supporting IBM AIX®, IBM i, and Linux.

Table 4. Agent tier support by management system type

Managed system type	Agentless in-band	Agentless out-of-band	Platform Agent	Common Agent
Compute nodes running AIX	Yes	Yes	No	Yes
Compute nodes running IBM i	Yes	Yes	Yes	Yes
Compute nodes running Linux	No	Yes	Yes	Yes
Compute nodes running Linux and supporting SSH	Yes	Yes	Yes	Yes
Compute nodes running Windows	No	Yes	Yes	Yes
Compute nodes running Windows and supporting SSH or DCOM	Yes	Yes	Yes	Yes
Compute nodes running VMware	Yes	Yes	Yes	Yes
Other managed resources supporting SSH or SNMP	Yes	Yes	No	No

The following table summarizes the management tasks supported by the compute nodes (depending on agent tier).

Table 5. Compute node management tasks support by agent tier

Management task	Agentless in-band	Agentless out-of-band	Platform Agent	Common Agent
Command Automation	No	No	No	Yes
Hardware alerts	No	Yes	Yes	Yes
Platform alerts	No	No	Yes	Yes
Health and status monitoring	No	No	Yes	Yes
File Transfer	No	No	No	Yes
Inventory (hardware)	No	Yes	Yes	Yes
Inventory (software)	Yes	No	Yes	Yes
Problems (hardware status)	No	Yes	Yes	Yes
Process Management	No	No	No	Yes
Power Management	No	Yes	No	Yes
Remote Control	No	Yes	No	No
Remote Command Line	Yes	No	Yes	Yes
Resource Monitors	No	No	Yes	Yes
Update Manager	No	No	Yes	Yes

The following table shows supported virtualization environments and their management tasks.

Table 6. Supported virtualization environments and management tasks

Virtualization environment Management task	AIX and Linux*	IBM i	VMware ESX	Microsoft Hyper-V	Linux KVM
Deploys virtual servers.	Yes	Yes	Yes	Yes	Yes
Deploys virtual farms.	No	No	Yes	No	Yes
Relocates virtual servers.	Yes	No	Yes	No	Yes
Imports virtual appliance packages.	Yes	Yes	No	No	Yes
Captures virtual servers.	Yes	Yes	No	No	Yes
Captures workloads.	Yes	Yes	No	No	Yes
Deploys virtual appliances.	Yes	Yes	No	No	Yes
Deploys workloads.	Yes	Yes	No	No	Yes
Deploys server system pools.	Yes	No	No	No	Yes
Deploys storage system pools.	Yes	No	No	No	No

* Linux on IBM Power Systems compute nodes

The following table shows supported I/O switches and their management tasks.

Table 7. Supported I/O switches and management tasks

Management task	I/O module	EN2092 1 Gb Ethernet	EN4093 10 Gb Ethernet	FC3171 8 Gb FC	FC5022 16 Gb FC
Discovery		Yes	Yes	Yes	Yes
Inventory		Yes	Yes	Yes	Yes
Monitoring		Yes	Yes	Yes	Yes
Alerts		Yes	Yes	Yes	Yes
Configuration		Yes	Yes	Yes	No

The following table shows supported storage systems and their management tasks.

Table 8. Supported storage systems and management tasks

Management task	Storage systems	V7000
Storage device discovery		Yes
Integrated physical and logical topology views		Yes
Show relationships between storage and server resources		Yes
Perform logical and physical configuration		Yes
View controller and volume status and to set notification alerts		Yes

Warranty and support

The IBM Flex System Manager Node has a 3-year, customer-replaceable unit (CRU) limited warranty. IBM Flex System Manager licenses include one year or three years of Software Subscription and Support. If a new release of an offering in this announcement is made generally available in IBM Passport Advantage® after the announcement of the offering in System x ordering systems, you may elect to take delivery of any release generally available for that offering during the product registration process.

Physical specifications

The approximate dimensions and weight of the node are as follows:

- Height: 56 mm (2.2 in.)
- Width: 216 mm (8.5 in.)
- Depth: 317 mm (12.5 in.)
- Weight: 7.1 kg (15.6 lb)

Operating environment

The FSM node is supported in the following environment:

- Temperature:
 - 10.0 - 35.0 degrees C (50 - 95 degrees F) (server on)
 - 0.0 - 60.0 degrees C (-32 - 140 degrees F) (server off)
- Relative humidity: 10% - 80%
- Maximum altitude: 3,048 m (10,000 ft.) at 28 degrees C. Decrease the maximum altitude by 1,000 ft. for every 1 degree C increase in ambient temperature up to 3,000 ft at 35 degrees C ambient.
- Declared noise level: 5.7 bels (idling)

Regulatory compliance

The FSM node conforms to the following standards:

- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- NOM-019
- Argentina IEC 60950-1
- Japan VCCI, Class A
- IEC 60950-1 (CB Certificate and CB Test Report)
- China CCC (GB4943-2001); (GB9254-2008, Class A); (GB17625.1-2003)
- Taiwan BSMI CNS13438, Class A; CNS14336
- Australia/New Zealand AS/NZS CISPR 22:2006, Class A
- Korea KN22, Class A, KN24
- Russia/GOST ME01, IEC 60950-1, GOST R 51318.22-99, GOST R 51318.24-99, GOST R 51317.3.2-2006, GOST R 51317.3.3-99
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1/IEC 60950-1, EK1-ITB2000)

Related publications

For more information, see the following IBM Flex System Manager product publication, available from the IBM Flex System Information Center:

<http://publib.boulder.ibm.com/infocenter/flexsys/information/index.jsp>

- *Installation and User's Guide*

Other documents:

- US Announcement Letter 112-068: IBM Flex System Manager Node
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS112-068>
- US Announcement Letter 212-088: IBM Flex System Manager
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS212-088>
- US Announcement Letter 212-105: IBM Fabric Manager
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS212-105>
- *IBM Flex System Enterprise Chassis Product Guide*
<http://www.redbooks.ibm.com/abstracts/tips0865.html>
- *IBM Flex System Products and Technology*, SG24-7984
<http://www.redbooks.ibm.com/abstracts/sg247984.html>
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<http://ibm.com/support>
- *Configuration and Option Guide*
<http://www.ibm.com/systems/xbc/cog/>

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