

# IBM System Storage Multilevel Grid Access Manager IBM Storage and Server Legacy Interoperability Matrix

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## Hardware Support Policy

This policy determines the length of time we will test a given piece of hardware with new levels of GAM code:

- o Hardware interoperability introduced in any release of GAM will remain current and be tested for software upgrades for all new releases of GAM for at least three years. For example, hardware which first appears in this interoperability matrix in January 2007 will be tested for all releases of GAM in 2007, 2008, and 2009. Hardware that is still shipping and current will continue to be tested beyond this commitment.
- o Hardware interoperability will be supported at the last tested software level, until the hardware's end of support date –or– Bycast's end of support for that software level or interoperability of that software level with the level of grid software the customer is running on other nodes. What this means is that a piece of hardware introduced in GAM version n which we do not test in GAM version n+3 (three releases after GAM version n) will nevertheless be supported running GAM n+2 for as long as Bycast supports GAM n+2, and there is still underlying hardware support available for the device.
- o NOTE: Bycast currently supports interoperability of different software levels in the same grid only during an upgrade.

For example:

2007 = GAM n = hardware XYZ introduced

2008 = GAM n+1 = hardware XYZ retested, customer can upgrade GAM SW on existing HW

2009 = GAM n+2 = hardware XYZ retested, customer can upgrade GAM SW on existing HW

2010 = GAM n+3 = hardware XYZ NOT retested, but customer can continue to run on GAM n+2 SW on hardware XYZ for as long as GAM n+2 SW is supported by Bycast and hardware XYZ is supported by the hardware supplier.

So if hardware XYZ was purchased in 2007 it would be supported on the latest GAM software version until GAM n+3 becomes generally available in 2010, and beyond that for as long as GAM n+2 software is supported by Bycast. Devices like tape are not directly supported by GAM; rather they fall under TSM's SW support cycle and GAM merely talks to TSM. Nevertheless, longer-lived devices GAM does directly talk to would continue to be tested with new releases as long as they are shipping and current.

## **IBM BladeCenter Configurations**

## **BladeCenter Chassis**

### **BladeCenter Hardware/Firmware**

#### BladeCenter H Chassis

2 Multi-switch Interconnect Module for IBM BladeCenter

#### Ethernet Connectivity Options

Server Connectivity Module for IBM BladeCenter

Cisco Systems Intelligent GbE Switch Module for IBM BladeCenter

Cisco Systems Fiber Intelligent Gigabit Ethernet Switch Module

2 modules requires for all configurations

2 additional modules (total of 4) are required any of the following node types will be installed in the chassis:

Admin Node

Admin/Gateway Node

Archive Node (only if node is communication with a TSM/SSAM server not on the grid network)

Gateway Node - Distributed

Gateway Node - High Availability

Gateway Node - Redundant

VMware Multiple Redundant Gateway Node

1 additional module (total of 5) are required if there will be a High Availability Gateway Node installed in the chassis

#### Fibre Channel Connectivity Options

2 Brocade 4GB SAN Switch Module for IBM BladeCenter

2 Cisco Systems 4GB Fibre Channel Switch Module

2 QLogic 4GB Fibre Channel Switch Module for IBM BladeCenter

NOTE - the switch modules installed in the chassis must be a Vendor match to any external switch they will be connected to

NOTE - a sufficient number of SFPs are required for connection of external storage and/or ISLs

#### 4 Power Supply Modules

2 IBM BladeCenter KVM/Advanced Management Module

Advanced Management Module Firmware	v2.50c
Brocade 4GB SAN Switch Module Firmware	v6.1.1d
Cisco Systems 4GB SAN Switch Module Firmware	v3.3.2
QLogic 4GB SAN Switch Module Firmware	v5.5.2.08
Server Connectivity Module Firmware	v1.1.3.0
Cisco Systems Intelligent GbE Switch Module	v12.2-50.SE1
Cisco Systems Fibre Intelligent Gigabit Ethernet Switch Module	v12.2-50.SE1

#### IBM BladeCenter H Chassis

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000020&familyind=5297403&typeind=5297408&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## **Admin Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1

### **Blade Hardware/Firmware**

The Admin node is supported when installed on the IBM BladeCenter HS21 with the minimum configuration below.

#### Base Options

30mm High Density Dual or Quad Core Base

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter

QLogic 4GB Fibre Channel Expansion Card (CFFv) for IBM BladeCenter

2 IBM Server Blade 73GB SAS 15k 2.5 inch SFF NHS, configured as 1 RAID 1 array

2 300GB 15k FC or SAS HDDs, configured as a RAID 1 array on supported external storage for Audit Logs and the NMS DB

LSI 1064e SAS Controller Firmware	v1.41 or later
LSI 1064e SAS Controller Driver	v4.16.80.01 or later
IBM BladeCenter HS21 BMC	v1.19 or later
IBM BladeCenter HS21 BIOS	v1.18 or later
IBM BladeCenter HS21 Diagnostics	v1.08 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Firmware	v1.49 or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Driver	SLES10 SP1 distribution driver or later
IBM SAS Hard drive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM BladeCenter HS21

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=500020&familyind=5316512&typeind=5316515&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

Appendix C  
Appendix D



## **Admin/Gateway Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Blade Hardware/Firmware**

The Admin/Gateway node is supported when installed on the IBM BladeCenter HS21 with the minimum configuration below.

#### Base Options

30mm High Density Dual or Quad Core Base

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 - 2.66GHz

#### 4GB RAM

QLogic 4GB Fibre Channel Expansion Card (CFFv) for IBM BladeCenter

IBM BladeCenter Storage and I/O Expansion Blade

IBM ServeRAID-8K SAS Controller

2 IBM Storage and I/O Blade 73GB SAS 15k 2.5 inch SFF HS, configured as 1 RAID 1 array

2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter

2 300GB 15k FC or SAS HDD, configured as a RAID 1 array on supported external storage for Audit Logs and the NMS DB

2 300GB 15k FC or SAS HDD, configured as a RAID 1 array on supported external storage for the FSG Cache

IBM ServeRAID 8k SAS Controller Firmware	v5.2.0-15429 or later
IBM ServeRAID 8k SAS Controller Driver	v1.1.5.2451 or later
LSI 1064e SAS Controller Firmware	v1.41 or later
LSI 1064e SAS Controller Driver	v4.16.80.01 or later
IBM BladeCenter HS21 BMC	v1.19 or later
IBM BladeCenter HS21 BIOS	v1.18 or later
IBM BladeCenter HS21 Diagnostics	v1.08 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Firmware	v1.49 or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Driver	SLES10 SP1 distribution driver or later
IBM SAS Hard drive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM BladeCenter HS21

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000020&familyind=5316512&typeind=5316515&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

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## **Archive Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM TSM/SSAM Client Software	v5.5 or v6.1

### **Blade Hardware/Firmware**

The Archive node is supported when installed on the IBM BladeCenter HS21 with the minimum configuration below.

#### Base Options

30mm High Density Dual or Quad Core Base

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter (only required if node is communicating with a TSM/SSAM server not on the grid network)

2 IBM Server Blade 73GB SAS 15k 2.5 inch SFF NHS, configured as 1 RAID 1 array

LSI 1064e SAS Controller Firmware	v1.41 or later
LSI 1064e SAS Controller Driver	v4.16.80.01 or later
IBM BladeCenter HS21 BMC	v1.19 or later
IBM BladeCenter HS21 BIOS	v1.18 or later
IBM BladeCenter HS21 Diagnostics	v1.08 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Firmware	v1.49 or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Driver	SLES10 SP1 distribution driver or later
IBM SAS Hard drive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM BladeCenter HS21

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000020&familyind=5316512&typeind=5316515&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## Storage Options

IBM TSM Server	v5.5 or later
IBM SSAM	v5.5 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage DR550 and DR550 Express

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/supportresources?brandind=5000028&familyind=5329490&taskind=1>

## **Archive Node / TSM Server**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
ServeRAID Storage Manager	v9.00
IBM TSM/SSAM Client Software	v5.5 or v6.1
IBM TSM/SSAM Server Software	v5.5

### **Blade Hardware/Firmware**

The Archive node/TSM server is supported when installed on the IBM BladeCenter HS21 with the minimum configuration below.

#### Base Options

30mm High Density Dual or Quad Core Base

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

QLogic 4GB Fibre Channel Expansion Card (CFFv) for IBM BladeCenter (for external disk attachment)

2 IBM Server Blade 73GB SAS 15k 2.5 inch SFF NHS, configured as 1 RAID 1 array (only needed when configuring without the Storage and I/O Expansion Blade)

To support attachment to tape, the following is required

#### IBM BladeCenter Storage and I/O Expansion Blade

QLogic 4GB Fibre Channel Expansion Card (CFFv) for IBM BladeCenter (installed in the Expansion Blade and in addition to the card required above)

#### IBM ServeRAID-8K SAS Controller

2 IBM Storage and I/O Blade 73GB SAS 15k 2.5 inch SFF HS, configured as 1 RAID 1 array (only needed when configuring with the Storage and I/O Expansion Blade)

2 300GB 15k FC or SAS HDD, configured as a RAID 1 array on supported external storage for the TSM DB and Recovery Log

2 300GB 15k FC or SAS HDD, configured as a RAID 1 array on supported external storage for the TSM Disk Pool

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM ServerAID 8k SAS Controller Firmware	v5.2.0–15429 or later
IBM ServerAID 8k SAS Controller Driver	v1.1.5.2451 or later
LSI 1064e SAS Controller Firmware	v1.41 or later
LSI 1064e SAS Controller Driver	v4.16.80.01 or later
IBM BladeCenter HS21 BMC	v1.19 or later
IBM BladeCenter HS21 BIOS	v1.18 or later
IBM BladeCenter HS21 Diagnostics	v1.08 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Firmware	v1.49 or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Driver	SLES10 SP1 distribution driver or later
IBM SAS Hard drive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM BladeCenter HS21

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000020&familyind=5316512&typeind=5316515&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## Storage Options

Refer to the following appendices for supported storage attachment options.

- Appendix C
- Appendix D
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## **Control Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Blade Hardware/Firmware**

The Control node is supported when installed on the IBM BladeCenter HS21 with the minimum configuration below.

#### Base Options

30mm High Density Dual or Quad Core Base

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

QLogic 4GB Fibre Channel Expansion Card (CFFv) for IBM BladeCenter

IBM BladeCenter Storage and I/O Expansion Blade

IBM ServeRAID-8K SAS Controller

2 IBM Storage and I/O Blade 73GB SAS 15k 2.5 inch SFF HS, configured as 1 RAID 1 array

4 300GB 15k FC or SAS HDD, configured as a RAID 10 array on supported external storage for the CMS DB

IBM ServeRAID 8k SAS Controller Firmware	v5.2.0-15429 or later
IBM ServeRAID 8k SAS Controller Driver	v1.1.5.2451 or later
LSI 1064e SAS Controller Firmware	v1.41 or later
LSI 1064e SAS Controller Driver	v4.16.80.01 or later
IBM BladeCenter HS21 BMC	v1.19 or later
IBM BladeCenter HS21 BIOS	v1.18 or later
IBM BladeCenter HS21 Diagnostics	v1.08 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Firmware	v1.49 or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Driver	SLES10 SP1 distribution driver or later
IBM SAS Hard drive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM BladeCenter HS21

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000020&familyind=5316512&typeind=5316515&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

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## **Control/Storage Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Blade Hardware/Firmware**

The Control/Storage node is supported when installed on the IBM BladeCenter HS21 with the minimum configuration below.

#### Base Options

30mm High Density Dual or Quad Core Base

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

QLogic 4GB Fibre Channel Expansion Card (CFFv) for IBM BladeCenter

IBM BladeCenter Storage and I/O Expansion Blade

IBM ServeRAID-8K SAS Controller

2 IBM Storage and I/O Blade 73GB SAS 15k 2.5 inch SFF HS, configured as 1 RAID 1 array

4 300GB 15k FC or SAS HDD, configured as a RAID 10 array on supported external storage for the CMS DB

IBM ServeRAID 8k SAS Controller Firmware	v5.2.0-15429 or later
IBM ServeRAID 8k SAS Controller Driver	v1.1.5.2451 or later
LSI 1064e SAS Controller Firmware	v1.41 or later
LSI 1064e SAS Controller Driver	v4.16.80.01 or later
IBM BladeCenter HS21 BMC	v1.19 or later
IBM BladeCenter HS21 BIOS	v1.18 or later
IBM BladeCenter HS21 Diagnostics	v1.08 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Firmware	v1.49 or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Driver	SLES10 SP1 distribution driver or later
IBM SAS Hard drive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM BladeCenter HS21

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=500020&familyind=5316512&typeind=5316515&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

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## **Gateway Node – High Availability**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1

### **Blade Hardware/Firmware**

The Gateway node is supported when installed on the IBM BladeCenter HS21 with the minimum configuration below.

#### Base Options

30mm High Density Dual or Quad Core Base

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter

QLogic 4GB Fibre Channel Expansion Card (CFFv) for IBM BladeCenter

2 IBM Server Blade 73GB SAS 15k 2.5 inch SFF NHS, configured as 1 RAID 1 array

4–12 300GB 15k FC or SAS HDD, configured as a RAID 10 array on supported external storage for FSG Cache

LSI 1064e SAS Controller Firmware	v1.41 or later
LSI 1064e SAS Controller Driver	v4.16.80.01 or later
IBM BladeCenter HS21 BMC	v1.19 or later
IBM BladeCenter HS21 BIOS	v1.18 or later
IBM BladeCenter HS21 Diagnostics	v1.08 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Firmware	v1.49 or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Driver	SLES10 SP1 distribution driver or later
IBM SAS Hard drive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM BladeCenter HS21

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000020&familyind=5316512&typeind=5316515&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

Appendix C  
Appendix D

## **Gateway Node - Redundant**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1

### **Blade Hardware/Firmware**

The Gateway node is supported when installed on the IBM BladeCenter HS21 with the minimum configuration below.

#### Base Options

30mm High Density Dual or Quad Core Base

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter

QLogic 4GB Fibre Channel Expansion Card (CFFv) for IBM BladeCenter

2 IBM Server Blade 73GB SAS 15k 2.5 inch SFF NHS, configured as 1 RAID 1 array

4 300GB 15k FC or SAS HDD, configured as a RAID 10 array on supported external storage for FSG Cache

LSI 1064e SAS Controller Firmware	v1.41 or later
LSI 1064e SAS Controller Driver	v4.16.80.01 or later
IBM BladeCenter HS21 BMC	v1.19 or later
IBM BladeCenter HS21 BIOS	v1.18 or later
IBM BladeCenter HS21 Diagnostics	v1.08 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Firmware	v1.49 or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Driver	SLES10 SP1 distribution driver or later
IBM SAS Hard drive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM BladeCenter HS21

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000020&familyind=5316512&typeind=5316515&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

Appendix C  
Appendix D

## **Storage Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1

### **Blade Hardware/Firmware**

The Storage node is supported when installed on the IBM BladeCenter HS21 with the minimum configuration below.

#### Base Options

30mm High Density Dual or Quad Core Base

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

QLogic 4GB Fibre Channel Expansion Card (CFFv) for IBM BladeCenter

2 IBM Server Blade 73GB SAS 15k 2.5 inch SFF NHS, configured as 1 RAID 1 array

LSI 1064e SAS Controller Firmware	v1.41 or later
LSI 1064e SAS Controller Driver	v4.16.80.01 or later
IBM BladeCenter HS21 BMC	v1.19 or later
IBM BladeCenter HS21 BIOS	v1.18 or later
IBM BladeCenter HS21 Diagnostics	v1.08 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Firmware	v1.49 or later
QLogic 4GB Fibre Channel Expansion Card (CFFh) Driver	SLES10 SP1 distribution driver or later
IBM SAS Hard drive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM BladeCenter HS21

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000020&familyind=5316512&typeind=5316515&modelind=0&osind=0&psid=bm&continue.x=1&matrix=Y>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

Appendix C  
Appendix D  
Appendix E  
Appendix F  
Appendix G



## **IBM System X Configurations**

## **Admin Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Admin node is supported when installed on the IBM System X x3650 with the minimum configuration below.

#### Processor Options

- 1 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

#### Network Options

- 1 NetXtreme 1000 T Dual Port Ethernet Adapter – PCI-X
- 1 PRO/1000 PT Dual Port Server Adapter by Intel – PCI-E

6 73GB 15K 3.5 inch Hot-Swap SAS HDD, configured as three RAID 1 arrays  
Dual Power Supplies

#### Optional Supported Components

Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.10 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X x3650

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typeind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13>

## **Storage Options**

Not Applicable

## **Admin/Gateway Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Admin/Gateway node is supported when installed on the IBM System X x3650 with the minimum configuration below.

#### Processor Options

- 1 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

#### Network Options

- 1 NetXtreme 1000 T Dual Port Ethernet Adapter – PCI-X
- 1 PRO/1000 PT Dual Port Server Adapter by Intel – PCI-E
- 2 73GB 15K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 arrays
- 4 300GB 15K 3.5 inch Hot-Swap SAS HDD, configured as two RAID 1 array
- Dual Power Supplies

#### Optional Supported Components

- Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.10 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X x3650

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typeind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13>

## **Storage Options**

Not Applicable

## **Admin/Gateway/Control/Storage Node (GMAS-L only)**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Admin/Gateway/Control/Storage node is supported when installed on the IBM System X x3650 with the minimum configuration below.

#### Processor Options

- 2 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

Storage Adapter Card – refer to the Storage Options section below for specifics

1 PRO/1000 PT Dual Port Server Adapter by Intel – PCI-E

6 300GB 15K 3.5 inch Hot-Swap SAS HDD, configured as three RAID 1 arrays

Dual Power Supplies

#### Optional Supported Components

Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.10 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X x3650

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typeind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

Appendix A

Appendix B

## **Archive Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00
IBM TSM/SSAM Client Software	v5.5 or v6.1

### **Server Hardware/Firmware**

The Archive node is supported when installed on the IBM System X x3650 with the following minimum configuration:

#### Processor Options

- 2 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

Network Options (only required if node is communicating with a TSM/SSAM server not on the grid network)

- 1 NetXtreme 1000 T Dual Port Ethernet Adapter – PCI-X
- 1 PRO/1000 PT Dual Port Server Adapter by Intel – PCI-E

2 73GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 array

Dual Power Supplies

Or when installed on the IBM System X x3550 with the following minimum configuration:

#### Processor Options

- 2 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

Network Options (only required if node is communicating with a TSM/SSAM server not on the grid network)

- 1 NetXtreme 1000 T Dual Port Ethernet Adapter – PCI-X
- 1 PRO/1000 PT Dual Port Server Adapter by Intel – PCI-E

2 73GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 array

Dual Power Supplies

#### Optional Supported Components

- Remote Supervisor Adapter II



IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
IBM System X x3550 BMC	v1.43 or later
IBM System X x3550 BIOS	v1.15 or later
IBM System X x3550 Diagnostics	v1.06 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware (x3650)	v1.10 or later
Remote Supervisor Adapter II (RSA II) Firmware (x3550)	v1.13 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System X x3650

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typeind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13>

IBM System X x3550

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310498&typeind=5310804&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=12&continue.y=19>

## Storage Options

IBM TSM Server	v5.5 or later
IBM SSAM	v5.5 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

## **Archive Node / TSM Server**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00
IBM TSM/SSAM Client Software	v5.5 or v6.1
IBM TSM/SSAM Server Software	v5.5 or v6.1

### **Server Hardware/Firmware**

The Archive node / TSM Server is supported when installed on the IBM System X x3650 with the following minimum configuration:

#### Processor Options

- 2 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

Storage Adapter Card – refer to the Storage Options section below for specifics

- 2 73GB 15K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 array
  - 4 300GB 15K 3.5 inch Hot-Swap SAS HDD, configured as two RAID 1 arrays
- Dual Power Supplies

#### Optional Supported Components

- Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.10 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System X x3650

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typeind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13>

## Storage Options

Refer to the following appendices for supported storage attachment options.

Appendix B<sup>1</sup>  
Appendix C<sup>1</sup>  
Appendix D<sup>1</sup>  
Appendix E<sup>1</sup>  
Appendix F<sup>1</sup>  
Appendix G<sup>1</sup>  
Appendix H

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<sup>1</sup> Addition of external disk storage is a custom configuration for this node and individualized configuration instructions will need to be requested.

## **Control Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Control node is supported when installed on the IBM System X x3650 with the minimum configuration below.

#### Processor Options

- 2 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

- 2 73GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 array
  - 4 300GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 10 array
- Dual Power Supplies

#### Optional Supported Components

- Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.10 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System X x3650

[https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typ\\_eind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13](https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typ_eind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13)

## **Storage Options**

Not Applicable

## **Control/Storage Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Control/Storage node is supported when installed on the IBM System X x3650 with the minimum configuration below.

#### Processor Options

- 2 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

Storage Adapter Card – refer to the Storage Options section below for specifics

- 2 73GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 array
  - 4 300GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 10 array
- Dual Power Supplies

#### Optional Supported Components

- Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.10 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X x3650

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typeind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

Appendix A  
Appendix B  
Appendix C  
Appendix D  
Appendix E  
Appendix F  
Appendix G

## **Gateway Node – High Availability**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Gateway node is supported when installed on the IBM System X x3650 with the minimum configuration below.

#### Processor Options

- 1 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

#### Network Options

- 2 NetXtreme 1h000 T Dual Port Ethernet Adapter – PCI-X
  - 2 PRO/1000 PT Dual Port Server Adapter by Intel – PCI-E
  - 2 73GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 array
  - 4 300GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 10 array
- Dual Power Supplies

#### Optional Supported Components

- Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.10 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links



IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X x3650

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typeind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13>

## **Storage Options**

Not Applicable

## **Gateway Node with External Disk for Cache – High Availability**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Gateway node is supported when installed on the IBM System X x3550 with the minimum configuration below.

#### Processor Options

1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

4GB RAM

IBM ServeRAID-8K SAS Controller

#### Network Options

1 PRO/1000 PT Quad Port Server Adapter by Intel – PCI-E

Storage Adapter Card – refer to the Storage Options section below for specifics

2 73GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 array

Dual Power Supplies

#### Optional Supported Components

Remote Supervisor Adapter II

4-12 300GB 15k SAS HDD, configured as a RAID 10 array on supported external storage for the FSG Cache

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3550 BMC	v1.43 or later
IBM System X x3550 BIOS	v1.15 or later
IBM System X x3550 Diagnostics	v1.06 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.13 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X x3550

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310498&typeind=5310804&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=12&continue.y=19>

## **Storage Options**

Appendix B  
Appendix C  
Appendix D

## **Gateway Node - Redundant**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Gateway node is supported when installed on the IBM System X x3650 with the minimum configuration below.

#### Processor Options

- 1 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

IBM ServeRAID-8K SAS Controller

#### Network Options

- 1 NetXtreme 1000 T Dual Port Ethernet Adapter – PCI-X
  - 1 PRO/1000 PT Dual Port Server Adapter by Intel – PCI-E
  - 2 73GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 array
  - 4 300GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 10 array
- Dual Power Supplies

#### Optional Supported Components

Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.10 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X x3650

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typeind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13>

## **Storage Options**

Not Applicable

## **Gateway/Control/Storage Node (GMAS-L only)**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Gateway/Control/Storage node is supported when installed on the IBM System X x3650 with the minimum configuration below.

#### Processor Options

- 2 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

IBM ServeRAID-8K SAS Controller

#### Network Options

- 1 PRO/1000 PT Dual Port Server Adapter by Intel – PCI-E

Storage Adapter Card – refer to the Storage Options section below for specifics

6 300GB 15K 3.5 inch Hot-Swap SAS HDD, configured as three RAID 1 arrays

Dual Power Supplies

#### Optional Supported Components

Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3650 BMC	v1.47 or later
IBM System X x3650 BIOS	v1.15 or later
IBM System X x3650 Diagnostics	v1.11 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.10 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X x3650

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310494&typeind=5310895&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=16&continue.y=13>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

Appendix A

Appendix B

## **Storage Node**

### **Software**

SUSE Linux Enterprise Server 10 SP1 Kernel	2.6.16.46-0.12
IBM System Storage Multilevel Grid Access Manager Software	v2.1.3_8.1.0
Bycast Enablement Layer Software	v3.5.0
IBM System Storage Multilevel Grid Access Manager Software Service Pack	v2.1.3.2_8.1.2
Bycast Enablement Layer Software Service Pack	v3.5.2
IBM Director Common Agent	6.1
IBM ServeRAID Level 1 Agent for IBM Director	v9.00
IBM Director Level 2 Agent	5.20.02
IBM ServeRAID Extension for IBM Director	v9.00
ServeRAID Storage Manager	v9.00

### **Server Hardware/Firmware**

The Storage node is supported when installed on the IBM System X x3550 with the minimum configuration below.

#### Processor Options

- 1 Dual-Core Intel Xeon Processor 5140 – 2.33GHz
- 1 Quad-Core Intel Xeon Processor E5430 – 2.66GHz

#### 4GB RAM

#### IBM ServeRAID-8K SAS Controller

Storage Adapter Card – refer to the Storage Options section below for specifics

2 73GB 10K 3.5 inch Hot-Swap SAS HDD, configured as one RAID 1 array

Dual Power Supplies

#### Optional Supported Components

Remote Supervisor Adapter II

IBM System X ServeRAID 8k Firmware	v5.2.0-15429 or later
IBM System X ServeRAID 8k Driver	1.1.5-2451 or later
IBM System X x3550 BMC	v1.43 or later
IBM System X x3550 BIOS	v1.15 or later
IBM System X x3550 Diagnostics	v1.06 or later
Broadcom NIC Firmware	v2.1.0a or later
Broadcom NIC Driver	v1.8.2b or later
Remote Supervisor Adapter II (RSA II) Firmware	v1.13 or later
Remote Supervisor Adapter II (RSA II) Daemon	v1.46 or later
IBM SAS Harddrive Update	v1.05 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links



IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System X x3550

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310498&typeind=5310804&modelind=0&osind=0&brandind=5000008&taskind=2&matrix=Y&psid=sp&continue.x=12&continue.y=19>

## **Storage Options**

Refer to the following appendices for supported storage attachment options.

Appendix A  
Appendix B  
Appendix C  
Appendix D  
Appendix E  
Appendix F  
Appendix G

## Appendix A – IBM System Storage EXP3000 Storage Option

### IBM System Storage EXP3000

Storage Adapter Options – IBM System X servers only  
1 LSI Logic MegaRAID 8480 SAS Controller  
1 IBM ServeRAID MR10M

LSI Logic MegaRAID 8480 SAS Controller Firmware	7.0.1-0064 or later
LSI Logic MegaRAID 8480 SAS Controller Driver	00.00.03.23 or later
IBM ServeRAID MR10M Firmware	11.0.1-0014 or later
IBM ServeRAID MR10M Driver	00.00.03.23 or later
IBM System Storage EXP3000 ESM Firmware/Update Program	v1.93 or later / v1.4
MegaRAID Storage Manager	2.91 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

LSI Logic MegaRAID 8480 SAS Controller

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-65478&brandind=5000008>

IBM System X ServeRAID Controllers

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/docdisplay?Indocid=SERV-RAID&brandind=5000008>

IBM System Storage EXP3000

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?brandind=5000028&familyind=5329845&osind=0&oldbrand=5000028&oldfamily=5348409&oldtype=0&taskind=2&matrix=Y&psid=dm>

## Appendix B – IBM System Storage DS3200 Storage Option

### IBM System Storage DS3200

Storage Adapter Options – IBM System X servers only

- 1 IBM SAS HBA Controller (for single controller configurations)
- 2 IBM SAS HBA Controllers (for dual controller configurations)

IBM SAS HBA Controller Firmware	v2.62 or later
IBM SAS HBA Controller Driver	v4.16.80.01 or later
IBM System Storage DS3200 Firmware	07.35.41.02 or later
IBM System Storage DS3000 EXP3000 Firmware	v1.96 or later
IBM System Storage DS3000 RDAC <sup>2</sup>	v09.03.0C05.0030 or later
IBM System Storage DS3000 SAS/SATA Hard drive update	v4.5 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage DS3200

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000028&familyind=5348412&typeind=0&modelind=0&osind=0&psid=sr&continue.x=1&matrix=Y>

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<sup>2</sup> Only required when using a dual controller configuration

## Appendix C – IBM System Storage DS3400 Storage Option

### IBM System Storage DS3400

Storage Adapter Options – IBM System X servers only  
1 QLogic 4GB FC Dual Port PCIe HBA

QLogic 4GB FC Dual Port PCIe HBA Firmware	v1.69 or later
QLogic 4GB FC Dual Port PCIe HBA Driver	SLES10 SP1 distribution driver or later
IBM System Storage DS3400 Firmware	07.35.41.02 or later
IBM System Storage DS3000 EXP3000 Firmware	v1.96 or later
IBM System Storage DS3000 RDAC <sup>3</sup>	v09.03.0C05.0030 or later
IBM System Storage DS3000 SAS/SATA Hard drive update	v4.5 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage DS3400

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?brandind=5000028&familyind=5348409&osind=0&oldbrand=5000028&oldfamily=5356498&oldtype=0&taskind=2&matrix=Y&psid=dm>

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<sup>3</sup> Only required when using a dual controller configuration

## Appendix D – IBM System Storage DS4000 Storage Option

### IBM System Storage DS4200 Express

Storage Adapter Options – IBM System X servers only  
1 IBM System Storage DS4000 Dual Port FC4 HBA  
1 QLogic 4GB FC Dual Port PCIe HBA

IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Firmware	v1.69 or later <sup>4</sup>
IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Driver	SLES10 SP1 distribution driver or later
IBM System Storage DS4200 Firmware	07.36.17.00 or later
IBM System Storage DS4000 EXP420 Firmware	v1.62 or later
IBM System Storage DS4000 RDAC	v09.03.0C05.0042 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage DS4200 Express

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?brandind=5000028&familyind=5345919&osind=0&oldbrand=5000028&oldfamily=5329617&oldtype=0&taskind=2&matrix=Y&psid=dm>

### IBM System Storage DS4700 Express

Storage Adapter Options – IBM System X servers only  
1 IBM System Storage DS4000 Dual Port FC4 HBA  
1 QLogic 4GB FC Dual Port PCIe HBA

IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Firmware	v1.69 or later <sup>66</sup>
IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Driver	SLES10 SP1 distribution driver or later
IBM System Storage DS4700 Firmware	07.36.17.00 or later
IBM System Storage DS4000 EXP810 Firmware	v1.62 or later
IBM System Storage DS4000 RDAC	v09.03.0C05.0042 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

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<sup>4</sup> Refer to the `ibm_dd_ds4kcf_<driver_version>.txt` file for adapter settings

IBM System Storage Multilevel Grid Access Manager  
IBM Storage and Server Interoperability Matrix

IBM System Storage DS4700 Express

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?brandind=5000028&familyind=5329827&osind=0&oldbrand=5000028&oldfamily=5345919&oldtype=0&taskind=2&matrix=Y&psid=dm>

#### IBM System Storage DS4800 Midrange Disk System

Storage Adapter Options – IBM System X servers only  
1 IBM System Storage DS4000 Dual Port FC4 HBA  
1 QLogic 4GB FC Dual Port PCIe HBA

IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Firmware	v1.69 or later <sup>5</sup>
IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Driver	SLES10 SP1 distribution driver or later
IBM System Storage DS4800 Firmware	07.36.17.00 or later
IBM System Storage DS4000 EXP810 Firmware	v1.62 or later
IBM System Storage DS4000 RDAC	v09.03.0C05.0042 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage DS4800 Midrange Disk System

<https://www-304.ibm.com/systems/support/supportsite.wss/selectproduct?brandind=5000028&familyind=5329626&osind=0&oldbrand=5000028&oldfamily=5329827&oldtype=0&taskind=2&matrix=Y&psid=dm>

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<sup>5</sup> Refer to the `ibm_dd_ds4kcf_<driver_version>.txt` file for adapter settings

## Appendix E – IBM System Storage DS8000 Storage Option

### IBM System Storage DS8000

Storage Adapter Options – IBM System X servers only  
1 QLogic 4GB FC Dual Port PCIe HBA

IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Firmware	v1.69 or later <sup>6</sup>
IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Driver	SLES10 SP1 distribution driver or later
IBM System Storage DS8000 Code Level SLES10 SP1 Device Mapper Multipath driver	Bundle v62.42.xx.x or later SLES10 SP1 distribution version
Device Mapper Multipath Configuration file	v3.01 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage DS8100

<https://www-304.ibm.com/systems/support/supportsite.wss/mainselect?brandind=5000028&familyind=5329631&continue.x=10&continue.y=13&oldbrand=5000028&oldfamily=5329631&oldtype=0&taskind=1&psid=bm>

IBM System Storage DS8300

<https://www-304.ibm.com/systems/support/supportsite.wss/mainselect?brandind=5000028&familyind=5329633&continue.x=13&continue.y=13&oldbrand=5000028&oldfamily=5329633&oldtype=0&taskind=1&psid=bm>

Support Matrix for Linux DM–Multipath

[http://www-01.ibm.com/support/docview.wss?rs=540&context=ST52G7&dc=D430&uid=ssg1S4000107&loc=en\\_US&cs=utf-8&lang=en](http://www-01.ibm.com/support/docview.wss?rs=540&context=ST52G7&dc=D430&uid=ssg1S4000107&loc=en_US&cs=utf-8&lang=en)

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<sup>6</sup> Refer to the DS8000 Host Attachment Guide for adapter settings

## Appendix F – IBM System Storage SAN Volume Controller Storage Option

### IBM System Storage SAN Volume Controller

Storage Adapter Options – IBM System X servers only

- 1 IBM System Storage DS4000 Dual Port FC4 HBA
- 1 QLogic 4GB FC Dual Port PCIe HBA

IBM System Storage DS4000 Dual Port FC4 HBA / QLogic QLA2462 Firmware	v1.69 or later <sup>7</sup>
IBM System Storage DS4000 Dual Port FC4 HBA / QLogic QLA2462 Driver	SLES10 SP1 distribution driver or later
IBM System Storage SAN Volume Controller Code Level SLES10 SP1 Device Mapper Multipath driver	v4.3.1.7 or later SLES10 SP1 distribution version
Device Mapper Multipath Configuration file	v3.01 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM System Storage SAN Volume Controller

<https://www-304.ibm.com/systems/support/supportsite.wss/mainselect?brandind=5000033&familyind=5329743&continue.x=14&continue.y=14&oldbrand=5000033&oldfamily=5329743&oldtype=0&taskind=1&psid=bm>

Support Matrix for Linux DM–Multipath

[http://www-01.ibm.com/support/docview.wss?rs=540&context=ST52G7&dc=D430&uid=ssg1S4000107&loc=en\\_US&cs=utf-8&lang=en](http://www-01.ibm.com/support/docview.wss?rs=540&context=ST52G7&dc=D430&uid=ssg1S4000107&loc=en_US&cs=utf-8&lang=en)

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<sup>7</sup> Refer to the SVC Host attachment Guide for adapter settings



## Appendix G – IBM XIV Storage System Option

### IBM XIV Storage System

Storage Adapter Options – IBM System X servers only  
1 QLogic 4GB FC Dual Port PCIe HBA

IBM System Storage DS4000 Dual Port FC4 HBA / QLogic QLA2462 Firmware	v1.69 or later
IBM System Storage DS4000 Dual Port FC4 HBA / QLogic QLA2462 Driver	SLES10 SP1 distribution driver or later
IBM XIV Storage System Code Level SLES10 SP1 Device Mapper Multipath driver	v10.1 or later SLES10 SP1 distribution version

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

IBM XIV Storage System

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=1&brandind=500028&familyind=5368932&typeind=0&modelind=0&osind=0&psid=sr&continue.x=1>

## Appendix H – IBM System Storage Tape Storage Option

### IBM System Storage Tape

Any IBM tape option that utilizes the IBMtape driver and the IBMtapeutil utility. The drive and library codes need to be at the latest supported levels.

Storage Adapter Options – IBM System X servers only

- 1 IBM System Storage DS4000 Dual Port FC4 HBA
- 1 QLogic 4GB FC Dual Port PCIe HBA
- 1 IBM SAS HBA Controller

IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Firmware	v1.69 or later
IBM System Storage DS4000 Dual Port FC4 HBA / QLogic 4GB FC Dual Port PCIe HBA Driver	SLES10 SP1 distribution driver or later
IBM SAS HBA Controller Firmware	v2.62 or later
IBM SAS HBA Controller Driver	4.16.80.01 or later
IBM Tape Driver	v1.27.0 or later
IBMTapeutil	v1.5.1 or later

For the latest support levels of hardware and firmware and to download the appropriate drivers and firmware, please review the following links

### **IBM System Storage Tape Systems**

<http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?taskind=2&brandind=5000034&familyind=0&typeind=0&modelind=0&osind=0&psid=bm&continue.x=1>