IBM® i integration with BladeCenter® and System x®

IBM i IXA and IXS Solution Guide

Last updated: 2 February 2012

2 February 2012
This edition applies to version 5, release 4, modification 0 of IBM i (product number 5722-SS1) and to all subsequent releases and modifications until otherwise indicated in new editions.

Table of Contents

1 Introduction

1.1 What's new

10 May 2011

The initial version of this guide, which consolidates information that was previously documented in several IBM i integration with BladeCenter and System x Web pages:

- Integrated xSeries Adapter (IXA)
- System x models supported with IXA
- Integrated xSeries Server (IXS)
- Web pages related to IXS models
- IXA install read me first
- IXS install read me first
- Various Web pages related to tape and optical device support
- Various Web pages related to migration
- Various frequently asked questions (FAQs) related to IXA and IXS

1.2 How to use this guide

1.2.1 Chapter overview

Chapter	Purpose
IXA and IXS solution support matrices (page 8)	Use this chapter to understand the capabilities that the IBM i IXA and IXS solutions provide, including features that vary based on: • The IBM i release. • The System x server model that is used. • The integrated server operating system that is installed. • Other factors. Use this information to help you choose a supported hardware and software configuration that is appropriate for your needs.
Concepts (page 31)	Use this chapter to gain a deeper understanding of selected concepts for the IBM i IXA and IXS solutions. Concepts described in this chapter are referenced in other chapters of this document, so you can refer back to this information as needed.
IXA install read me first (page 35)	Review this section to ensure a successful installation of Windows® or Linux® on your System x model that is attached to the IBM i system via the Integrated xSeries Adapter (IXA).
IXS install read me first (page 41)	Review this section to ensure a successful installation of Windows or Linux on your Integrated xSeries Server (IXS).
Additional topics (page 45)	This chapter contains various topics related to the IBM i IXA and IXS solutions.

1.2.2 Use this guide in soft copy form, rather than hard copy (printed)

This guide is intended to be used in **soft copy** form, rather than in **hard copy** (printed) form for a couple of key reasons:

1. **There are many hyperlinks between parts of this document.**

   For example, some tasks in this guide link to associated reference information in this guide.

   Note: Hyperlinks to another location in this document are shown with **bold** highlighting.
   Here is an example link to the **IXA install read me first** section.

2. **There are many hyperlinks to information outside of this document.**

   For example, various installation tasks link to external Web sites that are needed to complete the tasks, such as Web sites that provide the latest firmware to download.

   Note: Hyperlinks to an external Web page or PDF are shown with blue underline highlighting.
   Here is an example link to the IBM i PTFs Web page.

1.2.3 Common notation used throughout this guide

The following sections show common notation that is used throughout this guide.

1.2.3.1 IBM i (i5/OS) and machine code version combinations

The notation shown below is used in cases where it is necessary to distinguish which IBM i and machine code version combinations a particular feature or task applies to.

Notation	IBM i (i5/OS)		Machine Code	
	Product	**Version**	**Product**	**Version**
i 5.4	5722-SS1	V5R4M0	5722-999	V5R4M0 *or later*
i 6.1	5761-SS1	V6R1M0	5761-999	V6R1M0 *or later*
i 7.1	5770-SS1	V7R1M0	5770-999	V7R1M0 *or later*
All	All of the above IBM i and machine code version combinations.			

2 IXA and IXS solution support matrices

2.1 Integrated Server Operating System (Server OS) Versions

OS Type Notation	Server OS Notation	Server OS Versions	IBM i		
			i 7.1	i 6.1	i 5.4
Windows	**WIN2003**	Any of the following 32-bit x86 Microsoft Windows Server 2003 versions: • Windows Server 2003 R2 Standard • Windows Server 2003 R2 Enterprise • Windows Server 2003 Standard **plus** Service Pack 1 (SP1) or later • Windows Server 2003 Enterprise **plus** Service Pack 1 (SP1) or later • Windows Server 2003 Web **plus** Service Pack 1 (SP1) or later	✔	✔	✔
	WIN2000	Microsoft Windows 2000 Server	✔	✔	✔
		Microsoft Windows 2000 Advanced Server			
Linux	**SLES9**	SUSE LINUX Enterprise Server 9 for x86			✔
	SLES8	SUSE LINUX Enterprise Server 8 for x86			✔
	RHEL4	Red Hat Enterprise Linux 4 Advanced Server (AS) for i386			✔
		Red Hat Enterprise Linux 4 Enterprise Server (ES) for i386			
	RHEL3	Red Hat Enterprise Linux 3 Advanced Server (AS) for i386			✔
		Red Hat Enterprise Linux 3 Enterprise Server (ES) for i386			

2.1.1 Microsoft service packs

IBM tests Windows operating system service packs on integrated servers shortly after they are released by Microsoft.

Note: When a new service pack for the operating system is released by Microsoft, the prior operating system service pack will continue to be supported for use with integrated servers for a minimum of 6 months. After that time, IBM might withdraw support for the prior operating system service pack on integrated servers.

The specific operating system service packs that are currently supported for each Windows version are listed below.

Server OS	Service Packs
WIN2003	**SP2:** IBM is supporting Microsoft Windows Server 2003 Service pack 2 (SP2) on the IXS and System x models attached via the IXA. **Note:** Since SP2 includes the SP1 security changes, additional configuration is required to enable SP2 on integrated Windows servers. See **Windows Server 2003 Service Pack 1** for details.
	SP1: IBM is supporting Microsoft Windows Server 2003 Service pack 1 (SP1) on the IXS and System x models attached via the IXA. **Note:** Additional configuration is required to enable SP1 on integrated Windows servers. See **Windows Server 2003 Service Pack 1** for details.
WIN2000	**SP4:** IBM is supporting Windows 2000 Service Pack 4 (SP4) on the IXS and System x models attached via the IXA.

2.1.2 Microsoft Windows Server Logo Designations

The IXS and IXA have received the "Designed for Windows" or "Supported" logo designations for various Windows server versions. See the table below for details.

Integrated Server Product	Type	Feature Codes	Logo Designations for each Server OS	
			WIN2003	WIN2000
IXA Model 200	2689-002	1519-200	Designed for Windows	Designed for Windows
IXA Model 100	2689-001	1519-100	Designed for Windows	Designed for Windows
2.0 GHz Pentium® M IXS	4812-001	4811 4812 4813 9813	Designed for Windows	Designed for Windows
2.0 GHz Xeon™ IXS	2892-002	4710 4810 9710	Supported	Designed for Windows
1.6 GHz IXS	2892-001	2792 2892	Supported	Designed for Windows

To see the Microsoft logo status of the various IXS and IXA models, go to the Microsoft Windows Server Catalog page. Then do a search on "**integrated xSeries**".

2.1.3 Linux kernels tested on IXS/IXA

Linux running on an Integrated xSeries Server (IXS) or a System x model that is attached to the IBM i system with an Integrated xSeries Adapter (IXA) has been tested with various 32-bit x86 Linux kernel versions.

The following table lists the latest 32-bit x86 Linux kernels that have been tested for each Linux distribution.

Linux Distribution	Latest tested kernels (rpm version)
RHEL3	2.4.21-40.EL 2.4.21-40.ELsmp
RHEL4	2.6.9-34.EL 2.6.9-34.ELsmp
SLES8	k_deflt-2.4.21-306 k_psmp-2.4.21-306
SLES9	kernel-default-2.6.5-7.252 kernel-smp-2.6.5-7.252

Note: Once the initial Linux server installation is complete, you can update the 32-bit x86 Linux kernel to one of the tested kernel versions using the procedure described in the **Installing a tested Linux kernel on an IXS/IXA server** section.

2.2 IBM i products and options

IBM i Product Description	IBM i	Product[1] or Option	Server OS	
			Windows	Linux
IBM i (i5/OS)	All	57xx-SS1	✔	✔
Extended Base Support	All	57xx-SS1 option 1	✔	✔
Online Information	All	57xx-SS1 option 2	✔	✔
Extended Base Directory Support (Includes IBM Systems Director Navigator for i Web GUI)	i 7.1 i 6.1	57xx-SS1 option 3	✔	✔
Host Servers	All	57xx-SS1 option 12	✔	✔
Integrated Server Support	All	57xx-SS1 option 29	✔	✔
IBM TCP/IP Connectivity Utilities for i[2]	All	57xx-TC1	✔	✔
IBM i5/OS Integration for Linux® on xSeries[2]	i 5.4	5722-LSV		✔
IBM System i Access for Windows (Includes System i Navigator client GUI)	i 7.1[3] i 6.1[3] i 5.4	57xx-XE1	✔	✔

Notes:

[1] The specific **57xx** product IDs for each IBM i release are: **5770** for **i 7.1**, **5761** for **i 6.1**, and **5722** for **i 5.4**.

[2] No charge licensed program product (LPP).

[3] System i Navigator is optional for i 7.1 and i 6.1. Note that some Integrated Server Administration GUI tasks are available in the IBM Systems Director Navigator for i Web GUI, but are **not** in the System i Navigator client GUI.

2.3 Latest IBM i integration service packs for IXA and IXS

Server OS	IBM i	Service pack PTF	CUM Package	Date
WIN2003	i 7.1	None		
WIN2003	i 6.1	SI40442	None	24 September 2010
WIN2003 and WIN2000	i 5.4	SI28014	C7282540	24 July 2007
Linux	i 5.4	SI25139	None	22 September 2006

2.4 Integrated xSeries Adapter (IXA) models

IBM supports direct attachment of SMP IBM System x models via the System i High Speed Link (RIO/HSL) bus to the IBM i system. This implementation uses an Integrated xSeries Adapter for iSeries (IXA) and provides systems management and disk consolidation features.

Note: The Integrated xSeries Adapter has been withdrawn from Marketing as of July, 2008.

There are two models of the Integrated xSeries Adapter (IXA). These two IXA models provide the same function, but they are designed to work with different System x models.

The IXA model feature codes are:

Feature Code	Description
1519-100	For x3950, x3850 and other servers.
1519-200	For x346 and x236 servers.

Both of these IXA models are 64-bit, 66 MHz PCI adapters. They connect to the IBM i system using High Speed Link (RIO/HSL) and System Power Control Network (SPCN) cables.

See the **System x server models supported with IXA** section for information on server models and operating systems that are supported with each IXA model.

Related information:

- System x server models supported with IXA
- Hot spare support for integrated servers

2.4.1 Feature codes for IXA models and related cables

Feature Code	Power Servers	Type-model Numbers	Description
1519-100 [1]	520, 550, 570, 595, i270, i520, i525, i550, i570, i595, i800, i810, i820, i825, i830, i840, i870, i890	2689-001	Integrated xSeries Adapter [2]
1519-200 [1]	520, 550, 570, 595, i270, i520, i525, i550, i570, i595, i800, i810, i820, i825, i830, i840, i870, i890	2689-002	Integrated xSeries Adapter [2]
1460	i270, i800, i810, i820, i825, i830, i840	0343	3 meter copper HSL cable [3]
1461	i270, i800, i810, i820, i825, i830, i840	0361	6 meter copper HSL cable [3]
1462	i820, i825, i830, i840	0368	15 meter copper HSL cable [3]
1474	520, 550, 570, 595, i520, i525, i550, i570, i595, i870, i890	1474	6 meter HSL to HSL-2 cable [3]
1475	520, 550, 570, 595, i520, i525, i550, i570, i595, i870, i890	1475	15 meter HSL to HSL-2 cable [3]
1463	520, 550, 570, 595, i270, i520, i525, i550, i570, i595, i800, i810, i820, i825, i830, i840, i870, i890	9206	2 meter SPCN cable
1464	520, 550, 570, 595, i270, i520, i525, i550, i570, i595, i800, i810, i820, i825, i830, i840, i870, i890	9219	6 meter SPCN cable
1465	520, 550, 570, 595, i270, i520, i525, i550, i570, i595, i800, i810, i820, i825, i830, i840, i870, i890	9213	15 meter SPCN cable
1466	520, 550, 570, 595, i270, i520, i525, i550, i570, i595, i800, i810, i820, i825, i830, i840, i870, i890	9214	30 meter SPCN cable

Notes:

[1] In the IBM i Configurator, the 0092 feature code will take you back to order the RIO/HSL and SPCN cables.

[2] The Integrated xSeries Adapter comes with a RS485 cable, SPCN doubler cable, installation instructions and System x model ordering information.

[3] The IXA-attached System x model will require 2 RIO/HSL cables if it is the only server in a loop. Only 1 RIO/HSL cable is required if the server is being added to an existing loop. The IXA uses HSL cable connectors (not HSL-2 cable connectors). Therefore, if other towers in the HSL loop use HSL-2 cables, you will need HSL to HSL-2 cables to connect the IXA into the HSL loop.

Related information:

- System x server models supported with IXA
- Hot spare support for integrated servers

2.4.2 Power server support for IXAs

Power Server	Number of RIO/HSL Loops	Maximum IXA per Loop	Maximum IXA Servers [1]
Power 520 Express - 9407-M15	0	0	0
Power 520 Express - 9408-M25	1	8	8
Power 550 Express - 9409-M50	2	6	12
Power 570 - 9117-MMA		6	
Power 595 - 9119-FHA		6	
iSeries 270	1	2	2
System i 520	1	8	8
System i 525	1	8	8
System i 550	2	8	16
System i 570 1/2-way	1	8	8
System i 570 1/4-way	2	8	16
System i 570 2/4-way	2	8	16
System i 570 1/8-way	4	8	32
System i 570 2/8-way	4	8	32
System i 570 4/8-way	4	8	32
System i 570 5/8-way	4	8	32
System i 570 9/12-way	6	8	48
System i 570 2/16-way	8	8	57
System i 570 4/16-way	8	8	57
System i 570 8/16-way	8	8	57
System i 570 13/16-way	8	8	57
System i 595 2/16-way	7	8	48
System i 595 8/16-way	6	8	48
System i 595 4/32-way	15	8	57
System i 595 16/32-way	12	8	57
System i 595 32/64-way	31	8	57
iSeries 800	1	3	3
iSeries 810	1	7	7
iSeries 820	1	8	8
iSeries 825	3	8 [2]	18
iSeries 830	4	8 [3]	16
iSeries 840	8	8	60
iSeries 870	8	8	60
iSeries 890	14	8	60

Notes:

[1] Each System x model that is integrated with the IBM i platform will consume resources on the IBM i platform. The actual number of System x models that an IBM i platform can support will depend on the available IBM i resources and the applications on the System x models. See **Integrated BladeCenter and System x Performance** chapter in the IBM i Performance Capabilities Reference for i 6.1 to determine the IBM i platform impact of integrating System x models using IXAs.

[2] For model 825, the maximum is 5 for RIO/HSL loops 1 and 2.

[3] For model 830, the maximum is 1 for RIO/HSL loop 1.

Related information:

- System x server models supported with IXA
- Hot spare support for integrated servers

2.5 System x server models supported with IXA

Note: All of the following server models have been withdrawn from Marketing.

System x models supported with IXA model 1519-100											
System x Server	Type-Model	Number of Processors	Speed of Processors	Notes	Server OS[22]					
					WIN2003	WIN2000	SLES9	SLES8	RHEL4	RHEL3
x3950	8872-7Ry	2-4	2.67 GHz	1, 4, 17, 18 and 21	✔	✔				
	8872-8Ry	2-4	3.00 GHz	1, 4, 17, 18 and 21	✔	✔				
	8872-AC1	1-4	All	1, 17, 18 and 21	✔	✔				
	8878-1Ry	2-4	2.50 GHz	1, 4, 17, 18 and 21	✔	✔				
	8878-2Ry	2-4	3.00 GHz	1, 4, 17, 18 and 21	✔	✔				
	8878-3Ry	2-4	3.16 GHz	1, 4, 17, 18 and 21	✔	✔				
	8878-4Ry	2-4	3.30 GHz	1, 4, 17, 18 and 21	✔	✔				
	8878-AC1	1-4	All	1, 4, 17, 18 and 21	✔	✔				
x3850	8863-1Sy	1-4	3.16 GHz	1, 11, 17, 18 and 21	✔	✔				
	8863-2Sy	1-4	3.60 GHz	1, 11, 17, 18 and 21	✔	✔				
	8863-3Sy	1-4	2.67 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8863-4Sy	1-4	3.00 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8863-E8y	2-4	3.60 GHz	1, 11, 17, 18 and 21	✔	✔				
	8863-E9y	1-4	3.16 GHz	1, 11, 17, 18 and 21	✔	✔				
	8863-EAy	4	2.67 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8863-AC1	1-4	All	1, 11, 17, 18 and 21	✔	✔				
	8863-MC1	1-4	All	1, 11, 17, 18 and 21	✔	✔				
	8864-1Ry	1-4	2.50 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8864-2Ry	2-4	3.00 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8864-3Ry	2-4	3.16 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8864-4Ry	2-4	3.30 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8864-E1y	1-4	2.50 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8864-E2y	2-4	2.50 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8864-E3y	4	3.16 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8864-AC1	1-4	All	1, 4, 11, 17, 18 and 21	✔	✔				
	8864-MC1	1-4	All	1, 4, 11, 17, 18 and 21	✔	✔				
x460	8872-1Ry	2-4	2.83 GHz	1, 17, 18, 19 and 21	✔	✔				
	8872-2Ry	2-4	3.00 GHz	1, 17, 18, 19 and 21	✔	✔				
	8872-3Ry	2-4	3.33 GHz	1, 17, 18, 19 and 21	✔	✔				
	8872-5Ry	2-4	2.67 GHz	1, 4, 17, 18, 19 and 21	✔	✔				
	8872-6Ry	2-4	3.00 GHz	1, 4, 17, 18, 19 and 21	✔	✔				
x445	8870-1RX	2, 4 or 8	2.0 GHz	1, 2, 3 and 9	✔	✔	✔	✔	✔	✔
	8870-2RX	2, 4 or 8	2.5 GHz	1, 2, 3 and 9	✔	✔	✔	✔	✔	✔
	8870-4RX	4 or 8	2.8 GHz	1, 2, 3 and 9	✔	✔	✔	✔	✔	✔
	8870-3RY	2 or 4	3.0 GHz	1, 2, 3 and 9	✔	✔	✔	✔	✔	✔
	8870-4RY	4	3.0 GHz	1, 2, 3 and 9	✔	✔	✔	✔	✔	✔
	8870-12X	2, 4 or 8	2.2 GHz	1, 3 and 9	✔	✔	✔	✔	✔	✔
	8870-22X	2, 4 or 8	2.7 GHz	1, 3 and 9	✔	✔	✔	✔	✔	✔
	8870-42X	4 or 8	3.0 GHz	1, 3 and 9	✔	✔	✔	✔	✔	✔
	8870-3EX	2 or 4	3.0 GHz	1, 3 and 9	✔	✔	✔	✔	✔	✔

System x models supported with IXA model 1519-100											
System x Server	Type-Model	Number of Processors	Speed of Processors	Notes	Server OS[22]					
					WIN2003	WIN2000	SLES9	SLES8	RHEL4	RHEL3
	8870-4EX	4	3.0 GHz	1, 3 and 9	✔	✔	✔	✔	✔	✔
x440	8687-1RX	2-8	1.4 GHz	1, 2, 3 and 8	✔	✔		✔		✔
	8687-2RX	2-8	1.5 GHz	1, 2, 3 and 8	✔	✔		✔		✔
	8687-3RX	2-8	1.6 GHz	1, 2, 3 and 8	✔	✔		✔		✔
	8687-4RX	2-8	1.5 GHz	1, 2, 3 and 8	✔	✔		✔		✔
	8687-5RX	2-8	1.9 GHz	1, 2, 3 and 8	✔	✔		✔		✔
	8687-6RX	4-8	1.9 GHz	1, 2, 3 and 8	✔	✔		✔		✔
	8687-7RX	4-8	2.0 GHz	1, 2, 3 and 8	✔	✔		✔		✔
	8687-3RY	2-8	2.4 GHz	1, 2, 3 and 8	✔	✔		✔		✔
	8687-4RY	4-8	2.4 GHz	1, 2, 3 and 8	✔	✔		✔		✔
x366	8863-1Ry	1-4	3.16 GHz	1, 11, 17, 18 and 21	✔	✔				
	8863-2Ry	1-4	3.66 GHz	1, 11, 17, 18 and 21	✔	✔				
	8863-3Ry	1-4	2.67 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8863-4Ry	1-4	3.00 GHz	1, 4, 11, 17, 18 and 21	✔	✔				
	8863-E5y	2-4	3.66 GHz	1, 11, 14, 17, 18 and 21	✔	✔				
	8863-E6y	1-4	3.66 GHz	1, 11, 14, 17, 18 and 21	✔	✔				
	8863-E7y	4	3.66 GHz	1, 11, 14, 17, 18 and 21	✔	✔				
x365	8861-1RX	1-4	2.0 GHz	1	✔	✔	✔	✔	✔	✔
	8861-4RX	1-4	2.2 GHz	1	✔	✔	✔	✔	✔	✔
	8862-1RX	1-4	2.0 GHz	1	✔	✔	✔	✔	✔	✔
	8862-2RX	2-4	2.5 GHz	1	✔	✔	✔	✔	✔	✔
	8862-3RX	2-4	2.8 GHz	1	✔	✔	✔	✔	✔	✔
	8862-4RX	1-4	2.2 GHz	1	✔	✔	✔	✔	✔	✔
	8862-5RX	2-4	2.7 GHz	1	✔	✔	✔	✔	✔	✔
	8862-6RX	1-4	3.0 GHz	1	✔	✔	✔	✔	✔	✔
x360	8686-1RX	1-4	1.4 GHz	1, 2 and 5	✔	✔	✔	✔		✔
	8686-2RX	2-4	1.5 GHz	1, 2 and 5	✔	✔	✔	✔		✔
	8686-3RX	2-4	1.6 GHz	1, 2 and 5	✔	✔	✔	✔		✔
	8686-4RX	1-4	1.4 GHz	1 and 2	✔	✔	✔	✔		✔
	8686-5RX	2-4	1.5 GHz	1 and 2	✔	✔	✔	✔		✔
	8686-6RX	2-4	1.6 GHz	1 and 2	✔	✔	✔	✔		✔
	8686-7RX	1-4	1.5 GHz	1 and 2	✔	✔	✔	✔		✔
	8686-8RX	2-4	1.9 GHz	1 and 2	✔	✔	✔	✔		✔
	8686-9RX	2-4	2.0 GHz	1 and 2	✔	✔	✔	✔		✔
	8686-2RY	2-4	1.5 GHz	1, 2 and 5	✔	✔	✔	✔		✔
	8686-3RY	2-4	1.6 GHz	1, 2 and 5	✔	✔	✔	✔		✔
	8686-1RQ	1-4	2.0 GHz	1 and 2	✔	✔	✔	✔		✔
	8686-2RQ	2-4	2.5 GHz	1 and 2	✔	✔	✔	✔		✔
	8686-3RQ	2-4	2.8 GHz	1 and 2	✔	✔	✔	✔		✔
	8686-1SQ	2-4	2.0 GHz	1 and 2	✔	✔	✔	✔		✔
x255	8685-1RX	1-4	1.4 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-11X	1-4	1.4 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-2RX	1-4	1.5 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-21X	1-4	1.5 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-3RX	1-4	1.6 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-31X	1-4	1.6 GHz	1 and 7	✔	✔	✔	✔	✔	✔

System x models supported with IXA model 1519-100											
System x Server	Type-Model	Number of Processors	Speed of Processors	Notes	Server OS[22]					
					WIN2003	WIN2000	SLES9	SLES8	RHEL4	RHEL3
	8685-4RX	1-4	1.5 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-41X	1-4	1.5 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-5RX	1-4	1.9 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-51X	1-4	1.9 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-6RX	1-4	2.0 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-61X	1-4	2.0 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-7RX	1-4	2.0 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-71X	1-4	2.0 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-8RX	1-4	2.5 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-81X	1-4	2.5 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-9RX	1-4	2.8 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-91X	1-4	2.8 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-72X	2-4	2.0 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-A1X	1-4	2.2 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-ARX	1-4	2.2 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-B1X	1-4	2.7 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-BRX	1-4	2.7 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-C1X	1-4	3.0 GHz	1 and 7	✔	✔	✔	✔	✔	✔
	8685-CRX	1-4	3.0 GHz	1 and 7	✔	✔	✔	✔	✔	✔
x235	8671-11X	1-2	1.8 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-1AX	1-2	1.8 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-21X	1-2	2.0 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-2AX	1-2	2.0 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-31X	1-2	2.2 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-3AX	1-2	2.2 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-41X	1-2	2.4 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-4AX	1-2	2.4 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-61X	1-2	2.67 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-6AX	1-2	2.67 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-71X	1-2	2.8 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-7AX	1-2	2.8 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-81X	1-2	3.06 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-8AX	1-2	3.06 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-G1X	1-2	3.2 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-GAX	1-2	3.2 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-K1X	1-2	2.66 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-KAX	1-2	2.66 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-L1X	1-2	2.8 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-LAX	1-2	2.8 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-M1X	1-2	3.06 GHz	1 and 7	✔	✔	✔	✔		✔
	8671-MAX	1-2	3.06 GHz	1 and 7	✔	✔	✔	✔		✔
x350	8682-4AX	1-4	700 MHz	1 and 6	✔	✔				
	8682-5AX	1-4	700 MHz	1 and 6	✔	✔				
	8682-6RY	1-4	900 MHz	1 and 6	✔	✔				
x250	8665-6RY	1-4	700 MHz	1	✔	✔				
	8665-61Y	1-4	700 MHz	1	✔	✔				

System x models supported with IXA model 1519-100											
System x Server	Type-Model	Number of Processors	Speed of Processors	Notes	Server OS[22]					
					WIN2003	WIN2000	SLES9	SLES8	RHEL4	RHEL3
	8665-7RY	1-4	700 MHz	1	✔	✔				
	8665-71Y	1-4	700 MHz	1	✔	✔				
	8665-8RY	1-4	900 MHz	1	✔	✔				
	8665-81Y	1-4	900 MHz	1	✔	✔				
Netfinity® server configs.	Netfinity 7100	1-4	550 and 700 MHz	1	✔	✔				
	Netfinity 7600	1-4	550 and 700 MHz	1	✔	✔				

System x models supported with IXA model 1519-200											
System x Server	Type-Model	US Part Number	Number of Processors	Speed of Processors	Notes	Server OS[22]					
						WIN2003	WIN2000	SLES9	SLES8	RHEL4	RHEL3
x346	8840-01Y	884001U	1-2	2.8 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-11Y	884011U	1-2	3.0 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-21Y	884021U	1-2	3.2 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-22Y	884022U	1 (2 max)	3.2 GHz	1, 13 and 16	✔	✔	✔	✔	✔	✔
	8840-31Y	884031U	1-2	3.4 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-32Y	884032U	1 (2 max)	3.4 GHz	1, 13, 14 and 16	✔	✔	✔	✔	✔	✔
	8840-41Y	884041U	1-2	3.6 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-42Y	884042U	2	3.6 GHz	1, 13, 14 and 16	✔	✔	✔	✔	✔	✔
	8840-15Y	884015U	1-2	3.0 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-16Y	884016U	1 (2 max)	3.0 GHz	1, 13, 14 and 16	✔	✔	✔	✔	✔	✔
	8840-25Y	884025U	1-2	3.2 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-35Y	884035U	1-2	3.4 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-36Y	884036U	1 (2 max)	3.4 GHz	1, 13, 14 and 16	✔	✔	✔	✔	✔	✔
	8840-45Y	884045U	1-2	3.6 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-05Y	884005U	1-2	2.8 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-55Y	884055U	1-2	3.8 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-0RY	88400RU	1-2	2.8 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-1RY	88401RU	1-2	3.0 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-1SY	88401SU	1-2	3.0 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-2RY	88402RU	1-2	3.2 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-3RY	88403RU	1-2	3.4 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-3SY	88403SU	1-2	3.4 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-4RY	88404RU	1-2	3.6 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-5RY	88405RU	1-2	3.8 GHz	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-D1Y	8840D1U	1-2	2.8 GHz	1, 4, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-DRY	8840DRU	1-2	2.8 GHz	1, 4, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-AC1	8840AC1	1-2	All	1, 11 and 16	✔	✔	✔	✔	✔	✔
	8840-MC1	8840MC1	1-2	All	1, 11 and 16	✔	✔	✔	✔	✔	✔

System x models supported with IXA model 1519-200												
System x Server	Type-Model	US Part Number	Number of Processors	Speed of Processors	Notes	Server OS[22]						
						WIN2003	WIN2000	SLES9	SLES8	RHEL4	RHEL3
x236	8841-01Y	884101U	1-2	2.8 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-11Y	884111U	1-2	3.0 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-21Y	884121U	1-2	3.2 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-31Y	884131U	1-2	3.4 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-32Y	884132U	1 (2 max)	3.4 GHz	1, 2, 13, 14, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-41Y	884141U	1-2	3.6 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-15Y	884115U	1-2	3.0 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-16Y	884116U	1 (2 max)	3.0 GHz	1, 2, 13, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-25Y	884125U	1-2	3.2 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-35Y	884135U	1-2	3.4 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-45Y	884145U	1-2	3.6 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-05Y	884105U	1-2	2.8 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-55Y	884155U	1-2	3.8 GHz	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-0RY	88410RU	1-2	2.8 GHz	1, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-1RY	88411RU	1-2	3.0 GHz	1, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-1SY	88411SU	1-2	3.0 GHz	1, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-2RY	88412RU	1-2	3.2 GHz	1, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-3RY	88413RU	1-2	3.4 GHz	1, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-4RY	88414RU	1-2	3.6 GHz	1, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-5RY	88415RU	1-2	3.8 GHz	1, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-AC1	8841AC1	1-2	All	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔
	8841-MC1	8841MC1	1-2	All	1, 2, 11, 15, 16 and 20	✔	✔	✔	✔	✔	✔

Notes for the two tables above:

Note 1: With the Integrated xSeries Adapter configuration, all the disk drives for the System x model are under the control of IBM i. There is no disk in the System x model. When ordering System x models, do not order internal or external System x controlled disk or disk controller adapters. Any disk drives and disk controller adapters that may be installed in the System x model need to be removed before the IXA installation process is started.

Note 2: IXA requires interconnect cables for System x models x236, x360, x440 and x445. To connect the Integrated xSeries Adapter to the System x service processor on the x236, x360, x440 and x445, interconnect cables are required. The interconnect cables provide the conversion from the RJ45 cable provided with the IXA to the RJ14 connector on the System x service processor.

The Interconnect Cables required are included in the xSeries Advanced Systems Management Interconnect Cable Kit, Part Number 03K9309.

This part is required for each x236, x360, x440 and x445 server that will attach to the IBM i platform via the IXA. For more information on the interconnect cables please refer to Appendix F, Systems Management Overview, in the **Configuration and Options Guide (COG) - IBM BladeCenter and System x** at http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=SCOD-3ZVQ5W. These

Notes for the two tables above:

interconnect cables are included with new orders of the IXA (1519-100 and 1519-200).

Note 3: The IXA does not support System x models with more than 8 processors. The IXA does not support Microsoft Windows 2000 Server Datacenter Edition nor Windows Server 2003 Datacenter Edition.

Note 4: These models have dual-core processors.

Note 5: The identified x360 models require a firmware update. Please contact Bruce Powers at bpowers@us.ibm.com for further information.

Note 6: Do not apply BIOS version 1.08 to xSeries model 350. It will prevent the installation of Windows through the IXA.

Note 7: The Remote Supervisor Adapter (RSA) must be ordered and installed for the x255 and x235 when the IXA card is used. Two versions of the RSA are available for use with the IXA:

- RSA I (P/N 09N7585)
- RSA II (P/N 39Y9566)
  Note: When using an RSA II and installing the Windows server using the IBM i Install Windows Server (INSWNTSVR) command *BASIC installation type, ServerGuide™ version 7.1 or later must be used.

For more information on the RSA please refer to Appendix F, Systems Management Overview, in the **Configuration and Options Guide (COG) - IBM BladeCenter and System x** at http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=SCOD-3ZVQ5Whttp://www.pc.ibm.com/us/eserver/xseries/library/configtools.html.

Note 8: The x440 with 8 processors requires Hardware Abstract Layer (HAL) version 1.6D for Windows 2000. The x440 custom HAL is available on the IBM Support web site at //www.ibm.com/support/docview.wss?rs=0&context=SP00HE0&uid=psg1MIGR-42325

Note 9: All models of the x445 require a custom Hardware Abstract Layer (HAL) to install.

- Installation of the x445 custom HAL is automatic when installing Windows using ServerGuide 7.1 or later.
- Installation of the x445 custom HAL requires some special setup when installing Windows using the IBM i Install Windows Server (INSWNTSVR) command *FULL installation type.
  See **xSeries 445 custom HAL setup** for details.

Note 11: The Remote Supervisor Adapter II SlimLine option (P/N 39Y9566 or 73P9341) must be ordered and installed when the IXA is used with this model. For more information on the RSA II SlimLine please refer to the **Configuration and Options Guide (COG) - IBM BladeCenter and System x** at http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=SCOD-3ZVQ5W.

Note 13: This model includes a Remote Supervisor Adapter II SlimLine option (P/N 39Y9566 or 73P9341). For more information on the RSA II SlimLine please refer to the IBM eServer xSeries and BladeCenter Configuration and Options guide at http://www.pc.ibm.com/us/eserver/xseries/library/configtools.html.

Note 14: This model includes redundant power.

Note 15: When using a System x model 236, the IXA model 1519-200 card cable kit (part 97P4638) needs to be at EC level H86012.

Notes for the two tables above:

Note 16: When installing SLES8 on a System x model 346 or 236, the planar SCSI support must be temporarily disabled during the installation of the server. Otherwise, message "Loading kernel modules for hard disk controllers" appears on the screen and then the Linux installation hangs.

To disable the planar SCSI support, the customer must boot the x346 or x236 to **Setup** and go to the **Devices and I/O Ports** menu. From that menu, set the **Planar SCSI** option to **Disabled**. Then save the BIOS settings and exit setup. After the server installation is complete, the **Planar SCSI** support can be re-enabled, if needed.

Note 17: This model requires the use of a special RS-485 cable P/N 01R1484. This cable is included with IXA 1519-100 card/cable kit at P/N 39J2400 (EC level H86427 or later).

Note 18: The IBM System x models listed on this page have different model numbers, depending on which geographic region they are sold in. See the System x geographic model variants section to determine the System x model number for your geographic region.

Note 19: This model can be expanded up to an 8 processor configuration by adding an MXE-460 chassis (model number 8874-1Ry). In this configuration, only one IXA is required and it must be installed in the x460 chassis. The IXA is not supported in an MXE-460 chassis. Refer to x460 documentation for any additional requirements for attaching an MXE-460.

Note 20: When using a System x model 236, do not flash the RSA II firmware to version 1.02. RSA II firmware version 1.02 (build name NREP10A) does not work with the IXA on a System x model 236. Use another RSA II firmware version, such as version 1.01 (build name NREP09A). See Remote Supervisor Adapter II Firmware update (Packet files) - IBM eServer xSeries 236.

Note 21: These models do **not** have a diskette drive. If any of the BIOS or firmware updates that you download for these models are provided as bootable diskette images, then you will need to attach a **USB diskette drive** to the system in order to install them.

Note 22: Server operating system (OS) support also varies based on the IBM i version that is used.

IBM i	Server OS					
	WIN2003	WIN2000	SLES9	SLES8	RHEL4	RHEL3
i 7.1	✔	✔				
i 6.1	✔	✔				
i 5.4	✔	✔	✔	✔	✔	✔

Refer to the **Server OS** notation on page **8** for the specific list of OS versions that correspond to the abbreviations shown in this table.

Related information:

- Integrated xSeries Adapter (IXA) models
- System x geographic model variants
- Hot spare support for integrated servers

2.5.1 System x geographic model variants

The IBM System x (xSeries) models listed in the **System x server models supported with IXA** section have different model numbers, depending on which geographic region they are sold in.

In the **System x server models supported with IXA** section, the model numbers are shown using the notation "tttt-xxy", where "tttt" is the machine type, "xx" is the fixed portion of the model number and "y" is the portion of the model number that varies by geographic region.

For example, one of the x366 models is shown as "8863-2Ry". In this example, the "8863-2R" portion of the model number is common for all geographic regions, while the "y" suffix of the model number varies by geographic region.

The table below shows the model number suffix that is used for each geographic region for selected System x models. In this table, the "xx" portion of the model number is fixed and will match the value that is shown in the **System x server models supported with IXA** section.

For example, the x366 model variant shown below for the United States is "xxU". When combined with the "8863-2Ry" information in the **System x server models supported with IXA** section, the complete United States model number for this example would be "8863-2RU".

System x geographic model variants	
Geographic Region	**x3950 x3850 x366 x460**
United States	xxU
EMEA	xxG
Hong Kong, Singapore, Brunei, Malaysia	xxA
Hong Kong, Singapore, Brunei, Malaysia, Mynmar (Burma) - (Traditional Chinese)	xxB
PRC (Simple Chinese)	xxC
PRC (Traditional Chinese)	xxD
Japan (Japanese)	xxJ
Korea (Korean)	xxK
Korea (English)	xxR
PRC (English)	xxN
Taiwan (Traditional Chinese)	xxJ
Taiwan, Thailand, Philippines (English)	xxW

Related information:

- System x server models supported with IXA

2.6 Integrated xSeries Server (IXS) models

The Integrated xSeries Server (IXS) is a unique product that puts the power of a System x model on a single card that can be plugged into your Power server.

Note: All Integrated xSeries Server models have been withdrawn from Marketing as of July, 2008.

Feature Codes Type-Model	Processor	Hardware Specifications		Hot Spare and Migration[1]	Server OS[2]		
					WIN2003	WIN2000	RHEL3
4811 4812 4813 9812 9813 4812-001	2.0 GHz Intel Pentium M	Cache	2 MB of on-chip L2 cache	4812-001	✔	✔	✔
		Bus	400 MHz front side bus				
		Memory	Up to 2GB; 512 MB, 1 GB ECC PC1590 DDR available				
		Video	ATI Radeon 7000-M video controller with 16 MB of video RAM				
		LAN Adapters	Built in dual-port 10/100/1000 Mbps Ethernet				
		Device Options	2 x USB version 1.1 ports				
4710 9710 4810 2892-002	2.0 GHz Intel Xeon™	Cache	512 KB of on-chip L2 cache	2892-002, 2892-001	✔	✔	✔
		Bus	400 MHz front side bus				
		Memory	Up to 4GB; 512 MB, 1 GB ECC PC1600 DDR available				
		Video	ATI Radeon 7000-M video controller with 8 MB of video RAM				
		LAN Adapters	Built in 10/100 Mbps Ethernet 1-3 additional adapters: - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (optical) - 4/16/100 Mbps Token-Ring				
		Device Options	4 x USB version 1.1 ports				
2792 9792 2892 2892-001	1.6 GHz Intel Xeon	Cache	512 KB of on-chip L2 cache	2892-002, 2892-001	✔	✔	✔
		Bus	400 MHz front side bus				
		Memory	Up to 4GB; 512 MB, 1 GB ECC PC1600 DDR available				
		Video	Asiliant M69000 video controller with 2 MB of video RAM				
		LAN Adapters	Built in 10/100 Mbps Ethernet 1-3 additional adapters: - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (optical) - 4/16/100 Mbps Token-Ring				
		Device Options	4 x USB version 1.1 ports				

Feature Codes Type-Model	Processor	Hardware Specifications		Hot Spare and Migration[1]	Server OS[2]		
					WIN2003	WIN2000	RHEL3
2799 2899 2890-003	1.0 GHz Intel Pentium III	Cache	256K of on-chip L2 cache	2890-003, 2890-002, 2890-001	✔	✔	
		Bus	100 MHz front side bus				
		Memory	Up to 4GB (max 3712MB addressable) 128MB, 256MB, 1GB ECC SDRAMs available				
		Video	S3 Savage4 video adapter with 32 MB of video RAM				
		LAN Adapters	1-3 - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (optical) - 4/16/100 Mbps Token-Ring				
		Device Options	2 x USB ports				
2791 2891 2890-002	850 MHz Intel Pentium III	Cache	256K of on-chip L2 cache	2890-003, 2890-002, 2890-001	✔	✔	
		Bus	100 MHz front side bus				
		Memory	Up to 4GB (max 3712MB addressable) 128MB, 256MB, 1GB ECC SDRAMs available				
		Video	S3 Savage4 video adapter with 32 MB of video RAM				
		LAN Adapters	1-3 - 10/100 Mbps Ethernet - 1 Gbps Ethernet - 4/16/100 Mbps Token-Ring				
		Device Options	2 x USB ports				
2790 2890 2890-001	700 MHz Intel Pentium III	Cache	256K of on-chip L2 cache	2890-003, 2890-002, 2890-001	✔	✔	
		Bus	100 MHz front side bus				
		Memory	Up to 4GB (max 3712MB addressable) 128MB, 256MB, 1GB ECC SDRAMs available				
		Video	S3 Savage4 video adapter with 32 MB of video RAM				
		LAN Adapters	1-3 - 10/100 Mbps Ethernet - 1 Gbps Ethernet - 4/16/100 Mbps Token-Ring				
		Device Options	2 x USB ports				

Notes:

[1] **Hardware migration** and upgrading from one type of server hardware to another type follow the same rules as hot sparing from one type of server hardware to another type. See **Hot spare support for integrated servers** for more information.

[2] Refer to the **Server OS** notation on page **8** for the specific list of OS versions that correspond to the abbreviations shown in this table. **RHEL3** is only supported on **i 5.4**.

Related information:

- Power server support for IXSs
- Hot spare support for integrated servers

2.6.1 Power server support for IXSs

Power Server	Total IXS [1]	Total IXS in Main CEC [2]	IXS Feature Codes
Power 520 Express - 9407-M15	0	0	None
Power 520 Express - 9408-M25	12	0	4812, 4813
Power 550 Express - 9409-M50	24	0	4812, 4813
Power 570 - 9117-MMA		0	4812, 4813
Power 595 - 9119-FHA		0	4812, 4813
System i 250	2	1	2866
System i 270	3	1	4810, 2892, 2899, 2891, 2890
System i 520	18	1 (only feature 4811)	4811, 4812, 4813, 4810, 2892, 2899, 2891, 2890
System i 525	18	1 (only feature 4811)	4811, 4812, 4813, 4810, 2892, 2899, 2891, 2890
System i 550	36	1 (only feature 4812)	4812, 4813, 9812, 9813, 4810, 2892, 2899, 2891, 2890
System i 570 1/2-way	18	1 (only feature 4813)	4812, 4813, 9812, 9813, 4810, 2892, 2899, 2891, 2890
System i 570 1/4-way	36	0	4812, 4813, 9812, 9813
System i 570 2/4-way	36	1 (only feature 4813)	4812, 4813, 9812, 9813, 4810, 2892, 2899, 2891, 2890
System i 570 1/8-way	48	0	4812, 4813, 9812, 9813
System i 570 2/8-way	48	0	4812, 4813, 9812, 9813
System i 570 4/8-way	48	2 (only feature 4813)	4812, 4813, 9812, 9813, 4810, 2892, 2899, 2891, 2890
System i 570 5/8-way	48	2 (only feature 4813)	4812, 4813, 9812, 9813, 4810, 2892, 2899, 2891, 2890
System i 570 9/12-way	48	3 (only feature 4813)	4812, 4813, 9812, 9813, 4810, 2892, 2899, 2891, 2890
System i 570 2/16-way	48	0	4812, 4813, 9812, 9813
System i 570 4/16-way	48	0	4812, 4813, 9812, 9813
System i 570 8/16-way	48	4 (only feature 4813)	4812, 4813, 9812, 9813, 4810, 2892, 2899, 2891, 2890
System i 570 13/16-way	48	4 (only feature 4813)	4812, 4813, 9812, 9813, 4810, 2892, 2899, 2891, 2890
System i 595	60	2	4812, 4813, 4810, 2892, 2899, 2891, 2890
iSeries 800	4	1	4812, 4810, 2892, 2899, 2891, 2890
iSeries 810	13	1	4812, 4810, 2892, 2899, 2891, 2890
iSeries 820	12	2	4710, 2792, 2799, 2791, 2790 [3]
iSeries 825	36	1	4812, 4710, 9710, 2792, 9792, 2799, 2791, 2790 [3]
iSeries 830	28	2	4710, 2792, 2799, 2791, 2790 [3]
iSeries 840	32	2	4710, 2792, 2799, 2791, 2790 [3]
iSeries 870	48	2	4812, 4710, 9710, 2792, 9792, 2799, 2791, 2790 [3]
iSeries 890	48	2	4812, 4710, 9710, 2792, 9792, 2799, 2791, 2790 [3]
iSeries SB2	2	2	4710, 2792, 2799, 2791, 2790 [3]
iSeries SB3	2	2	4710, 2792, 2799, 2791, 2790 [3]

Notes:

[1] Each IXS that is integrated with the IBM i platform will consume resources on the IBM i platform. The actual number of IXSs that an IBM i platform can support will depend on the available IBM i resources and the applications on the IXSs. See **Integrated BladeCenter and System x Performance** chapter in the IBM i Performance Capabilities Reference for i 6.1 to determine the IBM i platform impact of integrating IXSs.

[2] The Total IXS in Main CEC number denotes how many IXSs can be installed in the main system unit. Installing the maximum number of IXSs may require one or more expansion towers.

[3] Earlier Integrated Netfinity Server models are attachable via Migration Towers.

Related information:

- Integrated xSeries Server (IXS) models
- Hardware options for IXS model 4812-001
- Hardware options for IXS models 2892-002 and 2892-001
- Hardware options for IXS models 2890-003, 2890-002, and 2890-001

2.6.2 Hardware options for IXS model 4812-001

Feature Code Type-Model	Power Servers	Description
0446	520, 550, 570, 595, i520, i525, i550, i570, i595, i800, i810, i825, i870, i890	512 MB Server Memory [1] (MES only)
0447	520, 550, 570, 595, i520, i525, i550, i570, i595, i800, i810, i825, i870, i890	1 GB Server Memory [1] (MES only)
9726	520, 550, 570, 595, i520, i525, i550, i570, i595, i800, i810, i825, i870, i890	Base 512 MB Server Memory [1] (Initial order only -- two added by default on 4811, 4812 and 4813)
8546	520, 550, 570, 595, i520, i525, i550, i570, i595, i800, i810, i825, i870, i890	Optional Base 1 GB Server Memory [1] (Initial order only)
9744 2844-001	520, 550, 570, 595, i520, i525, i550, i570, i595, i800, i810, i825, i870, i890	Base PCI IOP (Initial order only – added by default on 4811, 4812 and 4813)
7863	520, 550, 570, 595, i520, i525, i550, i570, i595	Blind swap cassette, Double (added by default on 4813)
0325	520, 550, 570, 595, i520, i525, i550, i570, i595, i800, i810, i825, i870, i890	IXS Extension Cable for Windows (default, but may be removed)

Notes:

[1] At least two identical memory features are required. All memory must be installed in identical pairs.

Related information:

- Integrated xSeries Server (IXS) models
- Power server support for IXSs

2.6.3 Hardware options for IXS models 2892-002 and 2892-001

Feature Code Type-Model	Power Servers	Description
0446	270, 520, 525, 550, 570[2], 595, 800, 810	512 MB Server Memory[1]
0447	270, 520, 525, 550, 570[2], 595, 800, 810	1 GB Server Memory[1]
0426	820, 825, 830, SB2, 840, SB3, 870, 890	512 MB Server Memory[1]
0427	820, 825, 830, SB2, 840, SB3, 870, 890	1 GB Server Memory[1]
2744 2744-001	270, 520, 525, 550, 570[2], 595, 800, 810, 820, 825, 830, SB2, 840, SB3, 870, 890	PCI 100/16/4 Mbps Token-Ring IOA
5700 5700-001	270, 520, 525, 550, 570[2], 595, 800, 810, 820, 825, 830, SB2, 840, SB3, 870, 890	Gigabit Ethernet IOA - optical interface
5701 5701-001	270, 520, 525, 550, 570[2], 595, 800, 810, 820, 825, 830, SB2, 840, SB3, 870, 890	1000/100/10 Mbps Ethernet IOA - UTP interface
0325	270, 520, 525, 550, 570[2], 595, 800, 810, 820, 825, 830, SB2, 840, SB3, 870, 890	IXS Extension Cable for Windows (default, but may be removed)

Notes:

[1] At least two identical memory features are required. All memory must be installed in identical pairs.

[2] Supported on POWER5 and POWER5+ models only.

Related information:

- Integrated xSeries Server (IXS) models
- Power server support for IXSs

2.6.4 Hardware options for IXS models 2890-003, 2890-002, and 2890-001

Feature Code Type-Model	Power Servers	Description
2895	270, 520, 550, 570, 595, 800, 810	128MB Server Memory [1]
2896	270, 520, 550, 570, 595, 800, 810	256MB Server Memory [1]
2897	270, 520, 550, 570, 595, 800, 810	1GB Server Memory [1]
2795	820, 825, 830, SB2, 840, SB3, 870, 890	128MB Server Memory [1]
2796	820, 825, 830, SB2, 840, SB3, 870, 890	256MB Server Memory [1]
2797	820, 825, 830, SB2, 840, SB3, 870, 890	1GB Server Memory [1]
2744 2744-001	270, 520, 550, 570, 595, 800, 810, 820, 825, 830, SB2, 840, SB3, 870, 890	PCI 100/16/4Mbps Token-Ring IOA [2]
4838 2838-001	270, 520, 550, 570, 595, 800, 810, 820, 825, 830, SB2, 840, SB3, 870, 890	PCI 100/10Mbps Ethernet IOA [2]
2743 2743-001	270, 520, 550, 570, 595, 800, 810, 820, 825, 830, SB2, 840, SB3, 870, 890	Gigabit Ethernet IOA - optical interface [2]
2760 2760-001	270, 520, 550, 570, 595, 800, 810, 820, 825, 830, SB2, 840, SB3, 870, 890	Gigabit Ethernet IOA - UTP interface [2]
0325	270, 520, 550, 570, 595, 800, 810, 820, 825, 830, SB2, 840, SB3, 870, 890	IXS Extension Cable for Windows (default, but may be removed)

Notes:

[1] At least one memory feature is required.

[2] At least one LAN IOA is required.

Related information:

- Integrated xSeries Server (IXS) models
- Power server support for IXSs

2.7 IBM i tape device access by IXS and IXA-attached integrated servers

IXS and IXA-attached System x servers can access tested IBM i tape devices as if they were local devices on those servers.

2.7.1 IBM i tape devices for IXS and IXA-attached Windows servers

The following table shows the IBM i tape devices and associated tape device driver versions that have been tested with the IBM i IXS and IXA solutions.

Important:

- Tape device drivers must be installed on Windows. The first choice for tape drivers is to use drivers approved by your backup application. If the backup application does not provide or recommend tape drivers, then use tape drivers appropriate for the type of tape drive you use. The **Third Party Tape Driver** column in the table below provides links to web sites for downloading drivers appropriate for the tape drive.

- IBM i tape devices and tape libraries that are not listed in the table are not supported with the IBM i IXS and IXA solutions.

- None of the tape devices can be used as a tape library in random access mode.

Tape Device Name and/or Type-Model	Tape Media	Server OS		ACL [1] Feature Supported	Third Party Tape Driver
		WIN2003	WIN2000		
Model: 3494-L12 3494-D12 Note: need 3590-B11, 3590-E11 or 3590-H11 tape drives.	See 3590-B11, 3590-E11 and 3590-H11 media	Yes	Yes	Yes	N/A
Name: IBM 3570-Bxx Model: 3570-B00	B format tapes	Yes	Yes	N/A	No
Name: IBM 3570-Bxx Model: 3570-B01 3570-B02 3570-B11 3570-B12 3570-B1A	B format tapes	Yes	Yes	Yes	No
Name: IBM 3570-Cxx Model: 3570-C00	C or C-XL format tapes	Yes	Yes	N/A	No
Name: IBM 3570-Cxx Model: 3570-C01 3570-C02 3570-C11 3570-C12 3570-C1A	C or C-XL format tapes	Yes	Yes	Yes	No
Name: IBM ULT3580-TD1[2] Model: 3580-001 3580-H11 3580-L11 3580-H13 3580-L13	LTO Ultrium	Yes	Yes	N/A	Yes[X]
Name: IBM ULT3580-TD2[2] Model: 3580-002 3580-H23 3580-L23	LTO Ultrium 2	Yes	Yes	N/A	Yes[X]
Name: IBM ULT3580-003[2] Model: 3580-003 3580-L33	LTO Ultrium 1 (r), Ultrium 2 (rw) or Ultrium 3 (rw)	Yes	Yes	N/A	Yes[X]

Tape Device Name and/or Type-Model	Tape Media	Server OS		ACL [1] Feature Supported	Third Party Tape Driver
		WIN2003	WIN2000		
Model:[2] 3581-H13 3581-L13 3581-H17 3581-L17	LTO Ultrium	Yes	Yes	Yes	Yes[X]
Model:[2] 3581-H23 3581-L23 3581-F28 3581-L28	LTO Ultrium or LTO Ultrium 2	Yes	Yes	Yes	Yes[X]
Model:[2] 3581-F38 3581-L38	LTO Ultrium 3	Yes	No	Yes	Yes[X]
Model:[2] 3582-L23	See tape device[3]	Yes	Yes	Yes	Yes
Model:[2] 3583-L18 3583-L36 3583-L72	See tape device[3]	Yes	Yes	Yes	Yes
Model:[2] 3584-L32 3584-D32 3584-L52 3584-D52	See tape device[3]	Yes	Yes	Yes	Yes
Name: IBM 3590-Bxx Model: 3590-B11 3590-B1A 3590-B21 3590-B2A	Magstar High Performance Data Cartridge	Yes	Yes	Yes	No
Name: IBM 03590E11 Model: 3590-E01 3590-E11 3590-E1A	Magstar Extended High Performance Data Cartridge	Yes	Yes	Yes	Yes[X]
Name: IBM 03590H11 Model: 3590-H11 3590-H1A	Magstar Extended High Performance Data Cartridge	Yes	Yes	Yes	Yes[X]
Name: IBM 0359201A Model: 3592-J1A	IBM Total-Storage Enterprise Tape Cartridge 3592	Yes	Yes	N/A	Yes[X]
Name: EXABYTE VXA-2 Model: 4685-001	V23 (VXA2) 80G	Yes	Yes	N/A	Yes[Y]
Name: IBM 6381-001 Model: 6381-001	DC9250 2.5G QIC	Yes	Yes	N/A	No
Name: IBM 6382-001 Model: 6382-001	SLR5 4G QIC	Yes	Yes	N/A	No
Name: IBM 6383-001 Model: 6383-001	MLR1 16G QIC	Yes	Yes	N/A	No
Name: TANDBERG SLR60 Model: 6384-001	SLR60 30G QIC	Yes	Yes	N/A	Yes[Y]
Name: TANDBERG MLR3 Model: 6386-001	MLR3 25G QIC	Yes	Yes	N/A	Yes[Y]
Name: TANDBERG SLR100 Model: 6387-001	SLR100 50G QIC	Yes	Yes	N/A	Yes[Y]
Name: EXABYTE EXB-85058HE-0000 Model: 6390-001	7G 8mm cartridge	Yes	Yes	N/A	Yes[Y]
Name: IBM 7208-002 Model: 7208-002	2.3G 8mm cartridge	Yes	Yes	N/A	No
Name: IBM 7208-012 Model: 7208-012	5G 8mm cartridge	Yes	Yes	N/A	No
Name: IBM 7208-222 Model: 7208-222	7G 8mm cartridge	Yes	Yes	N/A	No
Name: IBM 7208-234 Model: 7208-234	7G 8mm cartridge	Yes	Yes	N/A	No

Tape Device Name and/or Type-Model	Tape Media	Server OS		ACL [1] Feature Supported	Third Party Tape Driver
		WIN2003	WIN2000		
Name: EXABYTE EXB-8900MH 000105 Model: 7208-342	Mammoth	Yes	Yes	N/A	Yes[Y]
Name: EXABYTE Mammoth2 Model: 7208-345	Mammoth-2	Yes	Yes	N/A	Yes[Y]
Model: 9427-210 9427-211 9427-310 9427-311	8mm cartridge	Yes	Yes	Yes	No

Notes:

[1] **ACL**: Auto Cartridge Loader**:**

[2] With this device, you must **disable Windows Automatic Data Path Failover**. See Software Knowledge Base article Ultrium Tape Devices Not Recognized by Windows Computer Management for more information.

[3] This tape library can contain various types of tape devices. See the table rows for the tape devices that are used in the tape library to determine the tape media that can be used, the service pack PTFs that are required and device drivers that should be used with the tape device. **:**

[X] If a third party tape driver is used, choose an application-approved driver, if available. Otherwise use a driver from ftp://public.dhe.ibm.com/storage/devdrvr. **:**

[Y] If a third party tape driver is used, choose an application-approved driver, if available. Otherwise use a driver from http://www.tandbergdata.com.

Backup Application Support -- Several third party backup applications have been tested for use with integrated servers.

- In releases i 7.1, i 5.4 and i 6.1, the IBM i Integrated Server Support product is designed to work with the Microsoft Windows Backup tool for Windows Server 2003 and the Microsoft Windows Backup tool for Windows 2000.

- When using the IXS or System x models that are attached via the IXA, the IBM i Integrated Server Support product is designed to work with some versions and builds of VERITAS Backup Exec for Windows 2000. The IBM i Integrated Server Support product is designed to work with VERITAS Backup Exec version 9.1, build 4691 only when using third party tape device drivers.

  With respect to the IBM i Integrated Server Support product, the above information takes precedence over other information published by IBM regarding Windows or VERITAS Backup Exec.

- Attempting to run backup applications for which the IBM i Integrated Server Support product is not designed may yield unexpected results.

- The above information is provided AS IS without warranty of any kind.

2.7.2 IBM i tape devices for IXS and IXA-attached Linux servers

The following table shows the IBM i tape devices that have been tested with Linux servers on the IBM i IXS and IXA solutions.

Important:

- IBM i tape devices and tape libraries that are not listed in the table are not supported with IBM i IXS and IXA-attached Linux servers.
- You can use the default tape device drivers that are included in your Linux distribution or use drivers that are approved by your backup application.
- None of the tape devices can be used as a tape library in random access mode.

Tape Device Name and/or Type-Model	Tape Media	Auto Cartridge Loader (ACL) Feature Supported
Model: 3494-L12, 3494-D12 Note: need 3590-E11 tape drives.	See 3590-E11 media	Yes
Name: IBM 3570-Cxx Model: 3570-C00	C or C-XL format tapes	N/A
Name: IBM 3570-Cxx Model: 3570-C01, 3570-C02, 3570-C11, 3570-C12, 3570-C1A	C or C-XL format tapes	Yes
Name: IBM ULT3580-TD2 Model: 3580-002, 3580-H23, 3580-L23	LTO Ultrium 2	N/A
Model: 3581-H23, 3581-L23, 3581-F28, 3581-L28	LTO Ultrium or LTO Ultrium 2	Yes
Model: 3582-L23	LTO Ultrium or LTO Ultrium 2	Yes
Name: IBM 03590E11 Model: 3590-E01, 3590-E11, 3590-E1A	Magstar Extended High Performance Data Cartridge	Yes
Name: TANDBERG MLR3 Model: 6386-001	MLR3 25G QIC	N/A

3 Concepts

This section contains selected concepts for IXA and IXS servers. For additional concept information, refer to the Integrated server concepts section in the IBM i 6.1 Information Center.

3.1 IBM i management interfaces

You can manage IBM i integration features using GUI or CL command user interfaces.

User Interface	Description
IBM Systems Director Navigator for i (Web GUI)	The Web GUI provides convenient access to management tasks from supported Web browsers without requiring that the user install special software on their PC. The Web GUI is included with IBM i 6.1 and i 7.1. To launch the **IBM Systems Director Navigator for i** Web GUI, use URL: https://*Ibmihostname*:2005/ibm/console/logon.jsp where *Ibmihostname* is your IBM i system host name or IP address. **Note**: The Web GUI includes tasks that are not in the System i Navigator client GUI.
System i Navigator (Client GUI)	System i Navigator is a no-charge feature of System i Access for Windows. System i Access must be installed on a Windows PC, including at least the following System i Navigator components: • **Integrated Server Administration** In addition, the following System i Navigator components are recommended: • Basic Operations • Work Management • Configuration and Service • Network • Users and Groups System i Navigator is launched from the Windows PC that it is installed on.
IBM i control language (CL) commands	A set of IBM i CL commands is provided for integrated server management. The CL commands are included with IBM i.

3.2 Additional management interfaces

You can use non-IBM i user interfaces to help manage your integrated servers.

User Interface	Description
IBM Systems Director	IBM Systems Director, an integral component of IBM's Smarter Systems portfolio, provides systems management personnel with a single-point-of-control**,** helping reduce IT management complexity and cost. With IBM Systems Director, IT personnel are able to optimize compute and network resources, quickly respond to business requirements with greater delivery flexibility, and attain higher levels of

User Interface	Description
	services management with streamlined management of - physical, virtual, storage and network resources. **Note**: The IBM i Web GUI can be used from within the IBM Systems Director Web GUI. To access the IBM i Web GUI from within IBM Systems Director, navigate to an IBM i system and then select the **IBM i management** task for that system.
System x service processor Web interface	System x service processors (except for a System x BMC service processor) support a Web interface for performing server management tasks. This Web interface is launched by simply typing the System x service processor host name or IP address in your Web browser address field. Then you sign on to the Web interface and perform tasks as needed. **Note**: The IBM i Web GUI can also be used to launch the Web interface for a System x service processor. Simply select the **Launch Web console** task from the appropriate server, remote system configuration, or service processor configuration object in the IBM i Web GUI.

Related information:

- IBM Systems Director
- Launching the Web console for an integrated server
- Launching the Web console for a remote system
- Launching the Web console for a service processor

3.3 Software updates

There are several types of software and firmware updates for integrated servers.

Component	Description
IBM i, and related licensed products	Updates and fixes for the IBM i and related products that provide support for integrated servers are distributed in IBM i program temporary fixes (PTFs). Use the normal IBM i service mechanisms to get, load and apply the PTFs. **Note**: For each IBM i release, IBM provides a group PTF named **IBM i integration with BladeCenter and System x** that pulls together the required PTFs for the IXA and IXS solutions.
IBM i Integrated Server Support software that runs on the integrated server	The code fixes to the IBM i integration code that runs on Windows or Linux are in packages called **service packs**. Service packs are cumulative - the most recent service pack contains all the fixes from prior service packs in addition to new fixes. IBM distributes these service packs in IBM i PTFs. Use the normal IBM i service mechanisms to get, load and apply the service pack PTF on IBM i. Then, you must install or synchronize that service pack from IBM i to the integrated server. When you synchronize an integrated server, there are four things that can happen: 1. If IBM i has been upgraded to a new release, for example, from i 6.1 to i 7.1, the integration software for the new release replaces that of the old release on the integrated server. 2. If a new IBM i Integrated Server Support service pack PTF has been installed

Component	Description
	on IBM i, it is copied over to the integrated server. 3. If an IBM i Integrated Server Support service pack PTF has been removed from IBM i, it is removed from the integrated server as well, and replaced with the integration software currently existing in IBM i. 4. If the IBM i integration software and integrated server integration software are at the same level, the synchronization operation can still be performed. This allows for recovery of a deleted or damaged integration software file on the integrated server. In all cases the integrated server is brought to the same level of integration software which exists in IBM i. **Note**: The service packs for the IBM i Integrated Server Support software are separate from the updates for the server operating system itself, which you must get from the operating system provider (for example, get a Windows Server 2003 service pack from Microsoft).
System x updates	Before installing an integrated server that is attached using an IXA, you must update the firmware for the System x hardware.
Integrated server operating system	The operating system that is installed on the integrated server might have updates periodically. Apply any operating system updates using the normal procedures for the operating system.

Related information:
- IBM i products and options
- Installing IBM i integration service packs
- IBM i PTFs
- Service packs

3.4 IBM i tape and optical devices shared with integrated servers

Integrated servers can use tested IBM i tape and optical devices. The IBM i devices can be used by the integrated server as if they were local devices on the server for such tasks as installing applications and backing up data.

A particular IBM i device can be used only by IBM i or one integrated server at a time.

- In order for the integrated server to use a particular IBM i device, the device must be locked from the integrated server using a device locking utility that is provided by IBM i Integrated Server Support.

- Likewise, when the integrated server is done using a particular IBM i device, the device locking utility must be used to unlock the device so that it is available for use by IBM i or other integrated servers.

For more information, see Sharing devices between i5/OS and integrated servers.

Attention: A subset of IBM i tape devices are supported for use with various Windows or Linux versions. See the support matrices in the **IBM i tape device access by IXS and IXA-attached integrated servers** section and subsections for details.

Related information:
- IBM i tape device access by IXS and IXA-attached integrated servers
- Microsoft Windows Batch Commands for Controlling Devices

3.5 Hot spare support for integrated servers

If your integrated server hardware fails, you can quickly configure your integrated server to use replacement hardware with your existing virtual storage.

IBM i Integrated Server Support and storage virtualization provide innovative options that can enhance the reliability and recoverability of the integrated server environment. Hot spare hardware provides a way to quickly recover from certain types of hardware failures. This can reduce the server downtime from hours or days to minutes.

If the System x, IXA or IXS hardware fails, you can quickly and easily switch the integrated server configuration to hot spare System x, IXA or IXS hardware. Hot spare support also adds flexibility by enabling one spare server to be used to protect multiple production servers. This may reduce the overall number of servers needed to provide increased availability.

Server hardware compatibility: Switching a Windows or Linux server from one set of server hardware to another is like migrating the Windows or Linux system drive from one PC to a second PC. Differences in the required hardware abstraction layer (HAL), the server firmware (BIOS) level, or the devices that are installed on the two PCs can cause problems with the migration. During the initial boot of Windows or Linux on the second PC, hardware differences are detected and are handled in one of several ways:

- Some can be automatically handled using plug and play.
- Others might require manual intervention. For example a new device driver might need to be installed.
- If the hardware differences are great enough, they could prevent the second PC from booting. For example, the two PCs might require incompatible versions of the HAL.

These same hardware compatibility considerations apply when hot sparing between IXS and IXA-attached System x servers. In order for the hot spare migration to work successfully, the hardware configurations of the two servers must be closely matched.

Integrated xSeries Adapter (IXA) and System x model hot spare: In order to use hot spare between IXA-attached System x models, it is strongly recommended that the two System x models be the same type. For example, an x236 can be a hot spare for another x236. In addition, the System x models should have a similar configuration of PCI adapters, etc.

Integrated xSeries Server (IXS) hot spare: In order to use hot spare between IXS servers, they should be compatible types and they should have a comparable configuration of LAN adapters, etc. The **Integrated xSeries Server (IXS) models** section gives the specific IXS hot spare configurations that are supported.

Windows Server 2003 activation: Each time a Windows Server 2003 server's storage spaces are switched to another hot spare server, Windows Activation might be triggered. There are a limited number of free activations per license key. If activation is triggered enough times, this may require a phone call to Microsoft in order to re-activate. Volume licenses of Windows Server 2003 can help in this case, since there is no activation.

Related information:

- Using hot spare hardware

4 IXA install read me first

Review the following items to ensure a successful installation of Windows® or Linux® on your System x™ model that is attached to the IBM i via the Integrated xSeries Adapter (IXA).

1) Review the System x server models supported with IXA section.

Follow any instructions stated in the notes listed in the **Notes** column for the System x model that you are using.

2) Follow the latest IXA hardware install instructions

Use the latest Integrated xSeries Adapter (IXA) document to install the IXA in the System x model.

Note: The process for installing an IXA in a System x model is the same for all IBM i releases. The above document contains the most recent IXA install information and covers System x models that can be attached to the IBM i platform via the IXA.

Also see the IXA Installation Problem Determination Guide (PDF, 405KB). Contains a set of problem determination procedures for diagnosing potential problems encountered while installing a new Integrated xSeries Adapter in a System x model and attempting to attach it to your IBM i.

3) Follow these instructions if your System x model is listed below:

Model	Instructions
x366	The following **minimum** code levels are required: BIOS v1.07: level 45A RSA2 v1 06: level 30C BMC v1.18: level 34A CPLD v1.03: level 10A Diags v1.03: level 20A If the above flashes are not applied, then the amber light for a log entry is on.
x255, x235	The Remote Supervisor Adapter must be ordered and installed for these models when the IXA card is used. See **Note 7** in the **System x server models supported with IXA** section.
x236	Do not flash the RSA II firmware to version 1.02. See **Note 20** in the **System x server models supported with IXA** section.
x346, x236	If installing SLES8, disable the planar SCSI support. See **Note 16** in the **System x server models supported with IXA** section.
x360, x440	IXA Requires interconnect cables for these models. See **Note 2** in the **System x server models supported with IXA** section.
x350	Do not apply BIOS version 1.08 to xSeries model 350.

4) Route SPCN and RIO/HSL cables to prevent electrical interference

It is important to route SPCN and HSL cables at least 6 inches away from any AC power cords when attaching System x severs via the IXA. It is also important to route these cables away from other potential sources of electrical interference such as power supplies, florescent lights and uninterruptible power supplies.

5) Load required IBM i PTFs

Several IBM i PTFs are required when attaching System x models via the IXA. See IBM i PTFs.

6) Review Server operating system support information

See the **System x server models supported with IXA** for more information about which server operating systems are supported with each System x model.

7) Review Server operating system installation considerations

Server OS	Considerations
Windows	If you plan to install Windows Server 2003 Service Pack 1 on your IXA-attached System x model, see **Windows Server 2003 Service Pack 1** for more information. Note that you can use install media that contains service pack 1 already integrated with the Windows Server 2003 install image. Here are a few of the options available to do this: • Obtain a Windows Server 2003 R2 CD, which has Service Pack 1 built-in. • Obtain a Windows Server 2003 CD with Service Pack 1 already integrated. This can be obtained through various channels such as Microsoft Developer Network (MSDN®). • Create an integrated install image. To do this, follow the instructions in the **Integrating a service pack with Windows Server 2003** section. If you are going to do a "full" (non-ServerGuide) install, then you can also copy the Windows Server install image to an i5/OS Integrated File System (IFS) directory. See **Creating a Windows Server 2003 install CD image in IFS**. The IFS directory is used on the Windows source directory (WNTSRCDIR) parameter when running the INSWNTSVR command. **Install Windows servers using ServerGuide™, if possible** It is recommended that you install Windows using the Install Windows Server (INSWNTSVR) command with the install type *BASIC option for your System x models attached with an Integrated xSeries Adapter. The *BASIC install type requires the ServerGuide install program, which is available on CD. ServerGuide will configure hardware specifically for your System x model as well as assist in the installation of the Windows operating system. **Notes:** 1. The latest ServerGuide version can be obtained from the following web page: http://www.ibm.com/systems/management/serverguide/sub.html 2. Only ServerGuide version 7.1 or later is supported. 3. When using ServerGuide 7.1 and ServerGuide 7.2, the system drive partition is required to be 16GB or less.
Linux	**Attention:** The Linux distributors may require special instructions for the installation on supported System x models. You must follow these special instructions. Check the hardware certification list as described below for any special instructions. • For **Red Hat**: http://hardware.redhat.com/ On this page you will see a **Quick Search** text field. Input your System x or BladeCenter model and click **Search**. You will see the associated Red Hat Enterprise Linux version listed. Click on your specific model to see details on the certification summary and details. In the details under Platform, **i386** means 32-bit and **x86_64** means 64-bit version of the operating system.

	• For **SUSE**: http://developer.novell.com/yessearch/Search.jsp On this page input the following and click **Search**: **Keywords**: Input your System x model **Company**: IBM **Product**: SUSE LINUX Enterprise Server 8 for x86 or SUSE LINUX Enterprise Server 9 for x86 The **x86** means the 32-bit version of the operating system. Your model should be listed. Click on the **Bulletin** number to see configurations and requirements for install.

8) Follow the IBM i Windows or Linux server installation documentation

For more information on installing Windows or Linux on the IXA, see one of the following:

Server OS	Instructions
Windows	Follow the Windows installation section in the Information Center for i 6.1 or i 5.4. **Note:** If you will install Windows Server 2003 **Release 2 (R2)**, note that R2 licensing uses **"per user/per device**" terminology, rather than the equivalent "per seat" terminology that was used for base Windows Server 2003 licensing. If you are using "per user/per device" licensing for R2, then you should specify the "per seat" (*PERSEAT) option on the License mode (LICMODE) parameter of the INSWNTSVR command.
Linux	For **i 5.4**: Follow the installation-related sections of the Linux on an integrated xSeries solution topic in the Information Center. **Note:** In i 6.1 and later, installation of Linux on IXA-attached servers is **not** supported.

9) Check if Windows is reporting all of the installed memory

If your server has 4 GB or more of memory installed, but not all of it is being reported by Windows, see FAQ When 4 GB or more of memory is installed, why does Windows report less memory than is actually installed?

10) Keep the IBM i integration code up to date

The IBM i integration code on the Windows or Linux server needs to be updated periodically to provide the latest fixes. In addition, after the Linux operating system is updated using any distribution update method, the IBM i integration code needs to be refreshed. Fixes are provided via IBM i service pack PTFs that are installed on the server. See the Service packs page for the latest IBM i integration service pack PTFs that are available.

See **Installing IBM i integration service packs** for information on how to install the service packs (or refresh the IBM i Integrated Server Support software) on your integrated System x server.

Related information:

- System x server models supported with IXA
- Integrated Server Operating System (Server OS) Versions

4.1 xSeries 445 custom HAL setup

xSeries 445 servers require the installation of a custom Hardware Abstract Layer (HAL) supplied by IBM when installing Windows 2000 or Windows Server 2003. This is the case when the xSeries server is connected to a System i high-speed link (HSL) loop using an Integrated xSeries Adapter (IXA).

Installation of the x445 custom HAL requires some special setup when installing Windows using the IBM i Install Windows Server (INSWNTSVR) command 'full' installation type (*FULL on the INSTYPE parameter). This section describes the special setup that is required.

Note: Installation of the x445 custom HAL is automatic when installing Windows using ServerGuide™ 7.1 or later, so the setup described on this section is not required when using ServerGuide. Use the INSWNTSVR command 'basic' installation type (*BASIC on the INSTYPE parameter) to start a ServerGuide install.

Prior to running the INSWNTSVR command, you must configure the installation to automatically install the x445 custom HAL during the Windows installation. You do this by utilizing the IBM i integration configuration file utilities, as described in the steps below.

Step 1: Download the x445 custom HAL to IFS

The x445 custom HAL is available on the IBM Support web site at http://www.ibm.com/support/. Go to the downloads page and search on "x445 HAL". Go to the HAL download page that corresponds to the version of Windows that you will be installing on the x445 server. Download and extract the x445 custom HAL files to a PC. Then copy files halx44n.dll, halx44n.cat and halx44n.inf to the following i5/OS IFS directory:

```
\QIBM\ProdData\NTAP\Install\Image\Option02\I386\$OEM$\TEXTMODE
```

using either an i5/OS NetServer share created with write access or by using a binary FTP transfer.

Note: Do not copy the `txtsetup.oem` file to the TEXTMODE directory. This file is overlaid by the INSWNTSVR command and is modified in at a later step.

Step 2: Create a configuration file

A configuration file is used to modify the unattend.txt and txtsetup.oem files to install the x445 custom HAL during the install of Windows on the x445 server.

First, create a configuration file using the Create Source Physical File (CRTSRCPF) command. At the IBM i command line, type:

```
CRTSRCPF FILE(QGPL/HALX445) TEXT('Install custom x445 HAL')
```

and press **Enter**.

Next, use an available editor to add file members UNATTEND and TXTSETUP to the HALX445 file. These members will merge the required x445 custom HAL information with the IBM i Integrated Server Support drivers for a customized unattended install. For example, to use the Work with Members using PDM (WRKMBRPDM) command to add the UNATTEND member, type the following command at the IBM i command line:

```
WRKMBRPDM FILE(QGPL/HALX445) MBR(UNATTEND)
```

and press **Enter**.

Next, add the following lines to the **UNATTEND** member in file HALX445.

```
SETDEFAULTS TARGETFILE ='UNATTEND.TXT', TARGETDIR ='D:\'

ADDCONFIG VAR =
  'Computertype',ADDWHEN ='NEVER',DELETEWHEN ='ALWAYS'
ADDCONFIG ADDSTR =
  'Computertype =
    "IBM eServer xSeries 440/445 (Windows 2000 HAL)",OEM',
 UNIQUE ='YES',
 FILESEARCHSTR ='%FPA_L_BRACKET%Unattended%FPA_R_BRACKET%',
 FILESEARCHPOS ='AFTER'

ADDCONFIG ADDSTR ='halx44n.dll',
 UNIQUE ='YES',
 FILESEARCHSTR ='%FPA_L_BRACKET%OEMBootFiles%FPA_R_BRACKET%',
 FILESEARCHPOS ='AFTER'
```

Note: The text shown in **color** must match the description supplied in the HAL's txtsetup.oem file and will depend on the HAL revision, server family and Windows version supported. Browse the txtsetup.oem file supplied with the HAL and update the configuration file accordingly. The following are two example HAL descriptions:

```
"IBM eServer xSeries 440/445 (Windows 2000 HAL)"
"IBM eServer xSeries 440/445 (Windows Server 2003 HAL)"
```

Next, add the following lines to the **TXTSETUP** member in file HALX445.

```
SETDEFAULTS TARGETFILE ='TXTSETUP.OEM',
 TARGETDIR ='D:\I386\$OEM$\TEXTMODE\GEN2'

ADDCONFIG ADDSTR ='disk1 = "IBM x440\x445 HAL",\disk1.tag,\',
 UNIQUE ='YES',
 FILESEARCHSTR ='%FPA_L_BRACKET%Disks%FPA_R_BRACKET%',
 FILESEARCHPOS ='AFTER'

ADDCONFIG ADDSTR ='%FPA_L_BRACKET%computer%FPA_R_BRACKET%',
 UNIQUE ='YES',
 FILESEARCHSTR ='%FPA_L_BRACKET%scsi%FPA_R_BRACKET%',
 FILESEARCHPOS ='BEFORE'

ADDCONFIG ADDSTR =
  'ibmhal_mp="IBM eServer xSeries 440/445 (Windows 2000 HAL)"',
 UNIQUE ='YES',
 FILESEARCHSTR ='%FPA_L_BRACKET%computer%FPA_R_BRACKET%',
 FILESEARCHPOS ='AFTER'

ADDCONFIG ADDSTR =
    '%FPA_L_BRACKET%Files.computer.ibmhal_mp%FPA_R_BRACKET%',
 UNIQUE ='YES',
 FILESEARCHSTR ='%FPA_L_BRACKET%Config.QVNDSCSI%FPA_R_BRACKET%',
 FILESEARCHPOS ='BEFORE'

ADDCONFIG ADDSTR ='inf=disk1,halx44n.inf',
 UNIQUE ='YES',
 FILESEARCHSTR =
    '%FPA_L_BRACKET%Files.computer.ibmhal_mp%FPA_R_BRACKET%',
 FILESEARCHPOS ='AFTER'
```

```
ADDCONFIG ADDSTR ='catalog = disk1,halx44n.cat',
 UNIQUE ='YES',
 FILESEARCHSTR =
    '%FPA_L_BRACKET%Files.computer.ibmhal_mp%FPA_R_BRACKET%',
 FILESEARCHPOS ='AFTER'

ADDCONFIG ADDSTR ='hal = disk1,halx44n.dll',
 UNIQUE ='YES',
 FILESEARCHSTR =
    '%FPA_L_BRACKET%Files.computer.ibmhal_mp%FPA_R_BRACKET%',
 FILESEARCHPOS ='AFTER'
```

Note: The text shown in **color** must match the description supplied in the HAL's txtsetup.oem file and will depend on the HAL revision, server family and Windows version supported. Use the same HAL description that was used in the UNATTEND member.

Step 3: Use the configuration file on INSWNTSVR

When you install the server using the Install Windows Server (INSWNTSVR) command, specify the configuration file created above on the configuration file (CFGFILE) parameter. For example:

```
CFGFILE(QGPL/HALX445)
```

This will cause the unattend.txt and txtsetup.oem files to be modified during the install so that the x445 custom HAL is installed on the x445 server.

Note: Specifying the CFGFILE parameter on the INSWNTSVR command will also set the CFGFILE parameter in the Network Server Description (NWSD) object for the server. After the install of Windows on the x445 server is complete, the HALX445 configuration file no longer needs to be set in the NWSD object. To remove it from the NWSD, run the following command after the install is finished:

```
CHGNWSD NWSD(nwsdname) CFGFILE(*NONE)
```

5 IXS install read me first

Review the following items to ensure a successful installation of Windows or Linux on your Integrated xSeries Server (IXS).

1) Follow the latest IXS hardware install instructions

Use the latest IBM System i™ PCI adapter installation instructions to install the IXS in the IBM i platform.

- For IBM® System i5™ models or eServer™ i5 models, use the PCI adapter topic in the System p5 and i5, eServer p5 and i5 and OpenPower™ **PCI adapters** document.
- For pre-eServer i5 models, use the iSeries PCI Card (PDF, 3.4MB) document.

2) Load required IBM i PTFs

Several IBM i PTFs are required when using the IXS. See IBM i PTFs.

Also see //www-912.ibm.com/e_dir/eserverprereq.nsf for a list of the software prerequisites which are required to use the IXS card.

3) Review Server operating system support information

See the **Integrated xSeries Server (IXS) models** section for more information about which server operating systems are supported with each IXS model.

4) Review Windows Server installation considerations

If you plan to install Windows Server 2003 Service Pack 1 on your IXS, see **Windows Server 2003 Service Pack 1** for more information.

Note that you can use install media that contains service pack 1 already integrated with the Windows Server 2003 install image. Here are a few of the options available to do this:

- Obtain a Windows Server 2003 R2 CD, which has Service Pack 1 built-in.
- Obtain a Windows Server 2003 CD with Service Pack 1 already integrated. This can be obtained through various channels such as Microsoft Developer Network (MSDN).
- Create an integrated install image. To do this, follow the instructions in the **Integrating a service pack with Windows Server 2003** section.

You can also copy the Windows Server install image to an i5/OS Integrated File System (IFS) directory. See **Creating a Windows Server 2003 install CD image in IFS**. The IFS directory is used on the *Windows source directory* (WNTSRCDIR) parameter when running the INSWNTSVR command.

5) Follow the IBM i Windows or Linux server installation documentation

For more information on installing Windows or Linux on the IXS, see one of the following:

Server OS	Instructions
Windows	Follow the Windows installation section in the Information Center for i 6.1 or i 5.4. **Note:** If you will install Windows Server 2003 **Release 2 (R2)**, note that R2 licensing uses **"per user/per device**" terminology, rather than the equivalent "per seat" terminology that was used for base Windows Server 2003 licensing. If you are using "per user/per device" licensing for R2, then you should specify the "per seat" (*PERSEAT) option on the License mode (LICMODE) parameter of the INSWNTSVR command.
Linux	For **i 5.4**: Follow the installation-related sections of the Linux on an integrated xSeries solution topic in the Information Center. **Note:** In i 6.1 and later, installation of Linux on IXS servers is **not** supported.

6) Verify 2892 10/100 Mbps Ethernet adapter compatibility with your network

The 10/100 Mbps Ethernet port on the 2892 Integrated xSeries Server does not support direct connection to certain 10 Mbps hubs and routers that lack "auto-polarity" functionality. If you are having difficulty getting your 2892 10/100 port to work at all with a 10 Mbps hub or router, check its specifications for "auto-polarity" support. Also, see if your 2892 10/100 port works with other devices.

7) Additional video setup required for 2892-002 and 4812-001 IXS

If you are installing Windows on a 2892-002 (2.0 GHz Xeon) or 4812-001 (2.0 GHz Pentium M) IXS, the following setup is required for optimal video functionality:

- If you are installing Windows Server 2003, adjust the display properties hardware acceleration.
- If you are installing Windows 2000 Server, install the ATI video drivers.

See the **Video setup for 2892-002 and 4812-001 IXS** section for more information on performing the above procedures.

8) Disable "Turn off Monitor" setting on 2892-001 IXS

If you are installing Windows 2000 on a 2892-001 (1.6 GHz) IXS, see the **1.6 GHz IXS video alert** section for more information.

9) Check if Windows is reporting all of the installed memory

If your server has 4 GB or more of memory installed, but not all of it is being reported by Windows, see FAQ When 4 GB or more of memory is installed, why does Windows report less memory than is actually installed?

10) Keep the IBM i integration code up to date

The IBM i integration code on the Windows or Linux server needs to be updated periodically to provide the latest fixes. In addition, after the Linux operating system is updated using any distribution update method, the IBM i integration code needs to be refreshed. Fixes are provided via IBM i service pack

PTFs that are installed on the server. See the Service packs page for the latest IBM i integration service pack PTFs that are available.

See **Installing IBM i integration service packs** for information on how to install the service packs (or refresh the IBM i Integrated Server Support software) on your integrated server.

Related information:

- Integrated xSeries Server (IXS) models
- Integrated Server Operating System (Server OS) Versions
- Video setup for 2892-002 and 4812-001 IXS
- 1.6 GHz IXS video alert

5.1 1.6 GHz IXS video alert

Problem description:

The video image may not properly return after the Windows server console display wakes from low power mode on an Integrated xSeries Server (IXS) type 2892-001 (1.6 GHz) running the Windows 2000 Server or Windows 2000 Advanced Server operating systems.

The display is typically blank when this problem occurs, but in rare cases a corrupted video image may be observed. The video chip manufacturer is aware of the problem and is working to understand the cause.

Circumvention:

This problem can be avoided by disabling the display power setting that turns off the monitor after a period of keyboard/mouse inactivity.

To do this:

1. On the Windows server console, start the **Display Properties** application on the **Control Panel**.
2. Click on the **Screen Saver** tab.
3. On the **Screen Saver** page, click on the **Power** button to open the **Power Options** dialog box.
4. On the **Power Options** dialog box choose **Never** from the drop down list that is labeled **Turn off Monitor:**.
5. Then click on the **Ok** button to close the **Power Options** dialog box.
6. Finally, click on the **Ok** button to close the **Display Properties** application.

Related information:

- IXS install read me first
- Integrated xSeries Server (IXS) models

5.2 Video setup for 2892-002 and 4812-001 IXS

When using the following IXS models, additional software and/or video setup is required:
- 2.0 GHz Xeon IXS, type-model 2892-002, feature codes 4710, 4810 and 9710
- 2.0 GHz Pentium M IXS, type-model 4812-001, feature codes 4811, 4812, 4813, 9812 and 9813

Follow the instructions for your Windows server version in the following table:

Server OS	Instructions
WIN2003	Adjusting the hardware acceleration for Windows Server 2003 on the 2892-002 or 4812-001 Integrated xSeries Server is required for optimal video performance. To adjust the hardware acceleration, do the following: 1. From the Windows **Start** menu, click **Settings -> Control Panel -> Display**. 2. On the **Display Properties** panel, click the **Settings** tab. 3. Click **Advanced**. 4. Click the **Troubleshoot** tab. 5. Adjust the **Hardware Acceleration** slider as desired. 6. Click **Apply**. 7. Click **OK**. 8. Click **OK** again to accept the change.
WIN2000	The 2892-002 and 4812-001 Integrated xSeries Servers include an ATI Radeon 7000M video chip. The required drivers are not included in the Windows 2000 distribution CD. You will need to install the ATI video display driver on the Windows server to take full advantage of the ATI video chip capabilities. To install the ATI video driver, follow these steps: 1. **Install Windows 2000 service pack 4 or later:** Windows 2000 service pack 4 is a prerequisite for the latest ATI Video Driver. 2. **Install DirectX version 8.1 or later:** Windows 2000 ships with DirectX 7.0 but DirectX version 8.1 or later is required for the ATI video drivers and must be installed prior to installing the ATI video drivers. 3. **Install the ATI video driver:** Follow these steps to get the latest driver from the ATI web site: • Visit http://www.ati.com/support/driver.html • Select **Windows 2000**, **Graphic Driver**, **RADEON Family** • Follow the instructions to install the video driver.

Related information:
- IXS install read me first
- Integrated xSeries Server (IXS) models
- Integrated Server Operating System (Server OS) Versions

6 Additional topics

This chapter contains various topics related to the IBM i iSCSI solution.

6.1 Installing IBM i integration service packs

Once the integrated server support service pack PTF is installed on IBM i, it must then be installed or synchronized on each integrated server as follows:

Server OS	IBM i	Service Pack Installation Methods
Windows	All	**Updating the integration software running on Microsoft Windows**
Linux	i 5.4	**Updating the integration software running on Linux**

Related information:

-
- Software updates
- IBM i PTFs
- Service packs

6.1.1 Determining the integration software level

Do these steps from the IBM i GUI to display the service level for the integrated server support software on the integrated server:

1. Select **Integrated Server Administration** from the **Web GUI** or **System i Navigator**.
2. Select **Servers**.
3. Select **Properties** from the context menu of the integrated Windows server you want to synchronize.
4. Click the **Software** tab. The software levels are displayed there.

Tip: If you want to use a CL command, see:

- Work with NWS Status (WRKNWSSTS)

Related information:

- Software updates
- Installing IBM i integration service packs
- IBM i PTFs
- Service packs

6.1.2 Updating the integration software running on Microsoft Windows

Once an integrated Windows server service pack PTF is installed on IBM i, you must then install it on each integrated Windows server using one of the methods in the following sections.

Attention: Before beginning the installation, end any applications that are running and make sure that no users are logged on to the integrated server. If you fail to end applications, you risk data loss because the integrated server might require a restart after completing the installation.

Note: Updating the integration software requires that IBM i NetServer is set up. The user who performs the update must also have sufficient authority to copy the updates to the integrated Windows server. See Installing and configuring IBM i NetServer in the Information Center.

6.1.2.1 Updating the integration software: Windows server console

Do these steps on the integrated Windows server console to update the integrated server support software on the integrated Windows server:

1. i 7.1: Click **Start** > **All Programs** > **IBM i** > **IBM i Integrated Server Support**
   i 6.1 or 5.4: Click **Start** > **All Programs** > **IBM iSeries** > **IBM iSeries Integrated Server Support**

2. Expand **Integrated Server Support**

3. Expand the network server description name.

4. Select **Software Level**. The Integrated Server Support software level on IBM i and on the integrated Windows server is shown.

5. Click **Synchronize** to bring the Integrated Server Support software on Windows to the same level as on IBM i.

If the installation is performed successfully, a confirmation message appears. When the synchronization process is complete, the server automatically reboots to apply the updates, if necessary.

Note: If you log on to the integrated Windows server console as an administrator and there is a software level mismatch, you are automatically prompted to synchronize the software.

Tip: If you want to use a character based command, see **Updating the integration software: lvlsync**.

Related information:

- Software updates
- Installing IBM i integration service packs
- IBM i PTFs
- Service packs

6.1.2.1.1 Updating the integration software: lvlsync

You can use the `lvlsync` command to update the integration software that is installed on the Windows server.

Entering the command `lvlsync` at an integrated Windows server console command prompt will cause the integrated server to synchronize.

When the synchronization process is complete, the server automatically reboots to apply the updates, if necessary.

Note: If you run `lvlsync` from within a program, the following `lvlsync` error codes are provided:

Error Code	Error Description
0	No errors
1	Must be an administrator to run lvlsync
2	Release level on integrated Windows server higher than on IBM i
3	Service pack level on integrated server higher than on IBM i
4	Cannot install release from IBM i - language files not on IBM i
5	Syntax not valid
6	Cannot access service pack information on IBM i
7	Cannot map network drive
8	Cannot access service pack information in registry
9	Cannot open qvnacfg.txt file
10	No service pack installed on IBM i
11	NWSD not found
13	NWSD not active
20	No service pack available on IBM i
21	Cannot start InstallShield application
31	Unexpected error while starting lvlsync
44	Unexpected error during lvlsync

Related information:

- Software updates
- Installing IBM i integration service packs
- IBM i PTFs
- Service packs

6.1.2.2 Updating the integration software: IBM i GUI

Do these steps from the IBM i GUI to update the integrated server support software on the integrated Windows server:

1. Select **Integrated Server Administration** from the Web GUI or System i Navigator.

2. Select **Servers**.

3. Select **Synchronize Software** from the context menu of the integrated Windows server you want to synchronize.

4. Click **Synchronize** to confirm the action. A progress page is shown.

When the synchronization process is complete, the server automatically reboots to apply the updates, if necessary.

Related information:
- Software updates
- Installing IBM i integration service packs
- IBM i PTFs
- Service packs

6.1.2.3 Updating the integration software: remote command

A key use of the `lvlsync` command-line program is that it allows you to synchronize an integrated server by remotely submitting a command. This functionality would be useful if you, for example, wanted to write an IBM i CL program to periodically synchronize your integrated Windows servers.

Here is a simple procedure to synchronize an integrated server by remotely submitting the `lvlsync` command from the IBM i character-based interface:

1. At the IBM i character-based interface, type `SBMNWSCMD` and press **F4**.

2. Enter `lvlsync` in the **Command** field.

3. Enter the NWSD name of your integrated server in the **Server** field.

4. Press **Enter** several times to submit the `lvlsync` command to the Window server.

When the synchronization process is complete, the server automatically reboots to apply the updates, if necessary.

Related information:
- Software updates
- Installing IBM i integration service packs
- Updating the integration software: lvlsync
- IBM i PTFs
- Service packs

6.1.3 Updating the integration software running on Linux

Once an integrated Linux server service pack PTF is installed on IBM i, you must then install it on each integrated Linux server.

Attention: Before beginning the installation, end any applications that are running and make sure that no users are logged on to the integrated server. If you fail to end applications, you risk data loss because the integrated server might require a restart after completing the installation.

Attention: Linux distributions have methods to update the software (that is, online update, update CD-ROMs, etc.). If a Linux distribution's update includes a kernel update, we recommend that you back up your server prior to applying the update. Immediately after applying the Linux distribution's update, you must run the **`ixsupdt`** command. This is to ensure that the latest IBM i Linux integration drivers are available for the updated kernel. See **Linux kernels tested on IXS/IXA** for the list of kernels supported by the Linux integration drivers.

Note: Updating the integration software requires that IBM i NetServer is set up. The user who performs the update must also have sufficient authority to copy the updates to the integrated server. See Installing and configuring IBM i NetServer in the Information Center.

Do these steps on the Linux server console to update the integrated server support software:

1. Log in to Linux as either the **root** user or a user with root authority, and start a terminal session.

2. At the command prompt, type the **`ixsupdt`** command and press **Enter**. The syntax is:

   `ixsupdt` *`userid`* [*`address`*]

   where:
   - *`userid`* is an IBM i user profile
   - *address* is an optional IP address or host name of the hosting IBM i partition.
     Note: Specifying an address allows you to change the IP address or host name that is used for the hosting IBM i partition.

   Linux integration support needs this data in order to set up a connection to exchange administrative information with IBM i. It is important that you specify a valid IP address, or host name that is registered in the local DNS.

3. The command prompts for the specified IBM i user's password.
   Type in the password and press **Enter** to start the synchronization process.

Note: If the kernel has been updated, a reboot is required to run with the updated kernel.

Related information:
- Software updates
- Installing IBM i integration service packs
- IBM i PTFs
- Service packs

6.2 Using hot spare hardware

If there is a problem with your integrated server hardware, you can change your IBM i configuration objects to point to new hardware.

Use these steps to switch to hot spare integrated server hardware:

1. Select **Integrated Server Administration** from the **Web GUI** or **System i Navigator**.
2. Select **Servers**.
3. If the server for which you want to swap hardware is not already shut down:
   a. Select the **Shut Down** action for the server.
   b. Click **Shut Down** on the confirmation panel.
4. Change the server configuration to point to the hot spare server hardware.
   a. Select the **Properties** action for the server.
   b. Select the **System** tab and select the **Resource name and type** for the hot spare IXA or IXS.
   c. Click **OK**.
5. Select the **Start** action for the server.

Related information:

- Hot spare support for integrated servers
- Work with Configuration Status (WRKCFGSTS) (use WRKCFGSTS *NWS)
- Vary Configuration (VRYCFG)
- Change Network Server Desc (CHGNWSD)

6.3 Additional integrated Windows server topics

Use these tasks to manage integrated servers running Windows Server.

6.3.1 Formatting storage for Windows servers

Do these steps to format virtual storage for an integrated server with the Windows operating system.

1. On the integrated Windows server console, select **Start** > **All Programs** > **Administrative Tools** > **Computer Management**.
2. Double-click **Storage**.
3. Double-click **Disk Management**.
4. To create a new partition, right-click the unallocated space on the basic disk where you want to create the partition, and then click **New Partition**.
5. Follow the prompts to format the new drive.
    a. Specify the storage space name for the volume label.
    b. Select the file system you specified when you created the virtual storage.
    c. Select the quick format for a storage space that has just been created. It has already been low level formatted by IBM i when it was allocated.

6.3.2 Expanding a system disk for an integrated Windows server

To expand an integrated Windows server system disk, unlink the disk from the integrated server, expand the disk, and then relink the disk to the server.

Attention: You should back up your system drive before you expand it. For more information about using the `DISKPART` utility, see the Microsoft Web page and search for "`DISKPART`".

To expand a system drive, do the following steps.

1. Shut down the server. See Stopping integrated servers..
2. Unlink the system drive disk from the server. See Unlinking virtual storage.
3. Change the size of the disk. See Expanding virtual storage.
4. Link the disk to a temporary server network server description as a data disk. See Linking virtual storage to integrated servers.
5. Start the temporary server. See Starting integrated servers.
6. On the temporary server Windows console, extend the partition of the disk using the `DISKPART` utility.
7. Shut down the temporary server. See Stopping integrated servers.
8. Unlink the disk from the temporary server. See Unlinking virtual storage.
9. Link the expanded disk to the original server as the system disk. See Linking virtual storage to integrated servers.
10. Start the original server. See Starting integrated servers.

6.3.3 Firewall considerations for Windows servers

This section addresses using an IXS or IXA-attached Windows server as a firewall to protect your internal network.

There are also some special considerations when using the **Windows Firewall** function that was introduced with Windows Server 2003 Service Pack 1 (SP1) to protect the Windows server itself. See **Windows Server 2003 Service Pack 1** for more information.

Note: The Windows Server 2003 SP1 security changes are also included in later Windows Server 2003 service packs (for example, SP2) and in later Windows Server versions such as Windows Server 2003 R2 and Windows Server 2008. The SP1 considerations listed below also apply to later Windows Server versions.

Hardware:

In order to use an integrated Windows server as a firewall, at least two LAN adapters are required on the server; one for the secure subnet and the other for the perimeter or public network.

Hardening:

If you choose to harden your firewall system, there are a few considerations to keep in mind. Hardening your system turns off the **Workstation** and **Server** services. These services are used by some of the IBM i Integrated Server Support code, so the following restrictions apply on a hardened system:

1. When you install an IBM i Integrated Server Support service pack, you must temporarily turn on the **Workstation** service.

    a) Go to the **Services** icon on your Windows server.

    b) Look for the **Workstation** service. If it is disabled, highlight it and click on the **Startup** button. Change the **Startup Type** to **Manual**.

    c) Highlight the **Workstation** service and click on the **Start** button if it is not already started.

    d) Install the IBM i Integrated Server Support service pack.

    e) When the service pack installation has completed, you can go back to **Services**, click the **Startup** button for the **Workstation** service and change the **Startup Type** back to **Disabled**.

2. When using the Web GUI or System i Navigator GUI to view the server properties, or option 5 of the Work with Network Server Status (WRKNWSSTS) command, the following field restrictions apply:

    a) The Windows Domain name will be blank.

    b) The Server description text will be blank.

3. User enrollment to the local server is still allowed, but user enrollment to the primary domain of the server is not allowed.

4. A 5-minute delay has been added to wait for the **Server** service to start, and a 5-minute delay to wait for the **Workstation** service to start.[1] If you have hardened your firewall system and plan to leave the **Workstation** and **Server** service turned off, you can shorten these waits. To do so:

   a) Run `regedt32.exe` on your Windows system. [2]

   b) Open the key: `HKEY_LOCAL_MACHINE\SOFTWARE\IBM\AS400NT\UserAdmin`

   c) Double-click the **ServerWait** value and change it from 300 seconds to 2 seconds.

   d) Double-click the **WorkstationWait** value and change it from 300 seconds to 2 seconds.

5. If you wish to run Submit Network Server Command (SBMNWSCMD) or do a Windows file level backup from IBM i, you will need to start the **Server** and **Workstation** services on your Windows server.

Notes:

[1] If you choose to leave the two 5-minute delays, remember to do a shutdown of the Windows server prior to doing a vary off from IBM i if you vary it off immediately (within 10 minutes) after varying it on.

[2] Be careful when editing the Windows registry as it can damage your system if you edit the wrong key. You should back up your server prior to editing the registry.

See Chapter 8 of Redbook SG24-5643 - AS/400 Mail: Multiple SMTP Domains Behind a Firewall (PDF, 6.2MB) for more information regarding setting up an integrated server to support a Windows firewall.

6.3.4 Windows Server 2003 topics

The following sub-sections contain topics that are unique to Windows Server 2003.

6.3.4.1 Integrating a service pack with Windows Server 2003

This section describes how to create an integrated install image that contains Microsoft Windows Server 2003 with Service Pack 1 (SP1) or later applied. The integrated install image can be used when installing the integrated server from IBM i.

To create an integrated install image, use the instructions in the **Microsoft TechNet** article titled Windows Server 2003 Service Pack 2 Installation and Deployment Guide. Detailed instructions for integrating the service pack are found in section:

> **The Integrated Installation** > *Scenario 1: Creating an integrated installation*.

Notes:

- Use the instructions for 32-bit versions of Windows Server 2003.
- In the commands shown in the TechNet article, *Drive:* is a mapped network drive where the integrated install image will be stored. *LLL* in the install file name (for example, WindowsServer2003-KB889101-SP1-x86-*LLL*.exe for SP1) is the language version (for example, ENU for English) of the service pack to integrate with the base Windows Server 2003 install image.
- If your service pack CD image does not contain the required install file referenced in the TechNet article, then you need to download the appropriate version of the install file from the Microsoft Windows Server 2003 Downloads web page. Download the service pack version that is used for installing on multiple servers.
- It is also possible to integrate additional updates besides the service pack into the install image. See the **Microsoft TechNet** article titled Installing and Deploying Updates for Microsoft Windows Server 2003 for details.

Save the resulting integrated install image one of the following ways:

1. Burn the integrated install image onto a CD. The CD is used in the IBM i optical drive when installing the server (for example, using the INSWNTSVR command).
2. Store an ISO file containing the integrated install image in the IBM i Integrated File System (IFS). Then create a virtual optical device on IBM i and mount the ISO image in the virtual optical device.
3. Copy the integrated install image to an IBM i Integrated File System (IFS) directory. See **Creating a Windows Server 2003 install CD image in IFS**. The IFS directory is used on the *Windows source directory* (WNTSRCDIR) parameter when running the INSWNTSVR command.

   Note: This method does **NOT** work with the **Create Server** Web GUI task.

6.3.4.2 Windows Server 2003 Service Pack 1

Microsoft Windows Server 2003 Service Pack 1 (SP1) introduced some security changes that affect how the server interacts with network connections. For example, SP1 provides the Windows Firewall.

Note: The Windows Server 2003 SP1 security changes are also included in later Windows Server 2003 service packs (for example, SP2) and in later Windows Server versions (for example, Windows Server 2003 R2). The SP1 considerations listed below also apply to Windows servers with that software installed.

The IBM i integration support for Windows uses a private point-to-point (PTP) virtual Ethernet LAN to communicate between IBM i and Windows to perform various integration functions such as user enrollment, file level backup, serviceability, remote command, etc. The security changes introduced by SP1 affect these integration functions. When using SP1 on an integrated Windows server, follow the instructions below to allow the IBM i integration support to communicate over the private PTP virtual Ethernet LAN.

Included in Windows Server 2003 Service pack 1 is a software firewall, called Windows Firewall. This feature is not installed by default, but can be turned on by the customer after they have applied Service Pack 1 to their server. If enabled, the default configuration is to block all incoming connections on all network interfaces on the Server. Leaving the firewall in this configuration will prevent essential IBM i integration services (like user enrollment, file level backup, serviceability, remote command, etc.) from connecting to IBM i.

If the Windows Firewall is used, **it must be disabled for the entire Virtual Ethernet PTP interface.**

Note: Since there are only two systems connected to the Virtual Ethernet PTP LAN (the IBM i logical partition and the Windows server), it is inherently secure by design. The Virtual Ethernet PTP LAN should not be bridged or routed to other LANs, so no traffic but the IBM i integration functions flow on this LAN.

Here is a link to the Microsoft web site that describes how to disable the firewall for a specific interface/connection: Turn Windows Firewall On or Off for a Specific Connection.

Here is a link to the Microsoft web site which describes the Windows Firewall in General: Windows Firewall Operations Guide.

6.3.4.3 Creating a Windows Server 2003 install CD image in IFS

As an alternative to using a physical installation CD, you can install Windows Server 2003 on an integrated server using an image of the CD located somewhere in the IBM i Integrated File System (IFS). This method requires that the Windows source directory (WNTSRCDIR) parameter of the Install Windows Server (INSWNTSVR) command is used to point to the appropriate IFS directory instead of using an optical device.

This method has several advantages:

- There is no need to load the install media in the IBM i optical drive.
- The installation using an IFS source directory is relatively quick compared to using a CD.

- This method may be useful if you intend to create multiple Windows Server installations on a single IBM i logical partition simultaneously.

- You can send an image of the installation CD to a remote location.

- An IFS copy of the installation media can be used to slipstream a Microsoft service pack with the install media (see **Integrating a service pack with Windows Server 2003**). This can be useful when a Microsoft service pack is required for the installation drivers or security fixes are desired immediately for the new installation.

The following steps use IBM i NetServer to define a shared folder in IFS. The shared folder is used to store the install CD image, which can then be used to install Windows Server 2003.

1. From the IBM i command line, create an IFS directory (folder) to hold CD images:

   ```
   MKDIR DIR('/cdimages')
   ```

2. From the IBM i command line, create a read/write share for the IFS directory (folder) created above:

   ```
   CALL QZLSADFS PARM(cdimages '/cdimages' x'00000009' x'00000000' 'CD
   images' x'00000002' x'ffffffff' x'00000000')
   ```

3. From a Windows PC command line, map a drive to the share created above:

   C:\> NET USE *x:* \\ *ibmihost*\cdimages
   where *x:* is the mapped drive letter and *ibmihost* is the name of the IBM i system.

4. From the Windows PC command line, create a directory (folder) to hold the Windows Server CD image:

   C:\> *x:*
   where *x:* is the mapped drive letter.

   X:\> mkdir *ws2003*
   where *ws2003* is the directory that will hold the CD image.

5. From the Windows PC, copy the i386 directory, its contents, and all subdirectories from the Windows Server 2003 CD-ROM to the mapped IFS drive/directory that was created above.

   For example, you could copy the i386 directory from the CD to directory
   x:\ws2003

   which would place the i386 directory and its contents in IFS directory
   /cdimages/ws2003

   You should end up with a /cdimages/ws2003/i386 directory with a bunch of files and directories under it.

6. You can then use the install CD image stored in IFS to install a Windows Server 2003 server. From the IBM i command line, perform a *FULL Windows install, specifying the above IFS directory in the INSWNTSVR command *Windows source directory* (WNTSRCDIR) parameter:

   ```
   INSWNTSVR INSTYPE(*FULL) WNTSRCDIR('/cdimages/ws2003') ...
   ```

6.3.4.4 Using the Windows Server 2003 Backup utility with integrated servers

You can use the Windows Server 2003 Backup utility and an IBM i tape drive to do backups from the integrated server.

You can use the Windows backup utility to save data to CD, DVDs or the virtual disks for the integrated server.

Integrated servers running Windows Server 2003 can also use tape or shared IBM i tape devices with the Windows backup utility.

To start the **Backup** utility:

1. On the integrated server console, click **Start**

2. Select **Accessories** > **System Tools** > **Backup**.

For information about backup or recovery by using LAN-connected mass storage devices, refer to your Windows server documentation from Microsoft.

6.3.4.5 Migrating IXS/IXA Windows Server 2003 to iSCSI

IBM Lab Services is offering a migration utility that can convert an Integrated xSeries Server (IXS) or Integrated xSeries Adapter (IXA) based Windows Server 2003 image to an iSCSI based image. The migration utility saves you from having to do a new Windows Server 2003 install, reinstalling your applications and reconfiguring your server back to its previous state.

If you are interesting in taking advantage of this utility, send an e-mail to intwin@us.ibm.com.

6.4 Additional integrated Linux server topics

6.4.1 Installing a tested Linux kernel on an IXS/IXA server

Linux running on an IXS or a System x model that is attached to the IBM i system with an IXA has been tested with the Linux kernel versions listed in the **Linux kernels tested on IXS/IXA** section.

Installations of Linux on an IXS or a System x model that is attached via an IXA have been tested with the install media available on CD for RHEL3, RHEL4, SLES8 and SLES9. Once the initial installation is complete, you can update the Linux kernel to one of the tested kernel versions using the procedure described below.

To update your server to one of the tested Linux kernels, you must do the following:

1. Apply the latest Linux integration PTFs. See IBM i PTFs for the latest list of PTFs that are required.

2. Apply the Linux distribution's kernel update. You may need to explicitly select one of the kernel versions listed in the **Linux kernels tested on IXS/IXA** section.

3. Run the **ixsupdt** utility on the Linux server. This step must be done immediately after applying the Linux distribution's kernel update and before the server is restarted.

4. Restart your server to run the new kernel.

6.4.2 Linux migration and upgrade scenarios

The following sections provide information on how to migrate or upgrade your integrated servers for various scenarios.

6.4.2.1 Migrating Linux servers from V5R2/V5R3 to i 5.4

Attention: A one-time migration of Linux servers that were created on V5R2 or V5R3 is required after upgrading IBM i to i 5.4.

In i5/OS V5R2 and V5R3, support for Linux on the integrated xSeries solutions was made available with a program temporary fix (PTF) to the IBM iSeries™ Integration for Windows Server (5722-WSV) product. The Linux support was an extension of the Windows support and used the IBM i infrastructure for Windows. Most notably, Linux servers used a Network Server Description (NWSD) type of *WINDOWSNT.

In IBM i 5.4, support for Linux on integrated servers has its own IBM i infrastructure. Most notably, in i 5.4 Linux servers have their own Linux NWSD type, which must be used. In addition, the 5722-WSV product has been replaced with product 5722-SS1 option 29 (Integrated Server Support) and Linux servers also require a new product, 5722-LSV (IBM i5/OS Integration for Linux on xSeries).

This web page describes the process required to migrate integrated Linux servers that were installed on V5R2 or V5R3 to the new IBM i 5.4 infrastructure for Linux. The migration process described below preserves your Linux disk drives, including the applications and data that are installed.

Note: In the IBM i commands in the sections below, the example Linux server NWSD name used is **mylinux** which has a system drive named **mylinux1** and an install drive named **mylinux2**. An example tape device with device description name **tap01** is also used. When performing the migration steps below, you need to replace these items with the ones that are appropriate for your environment.

6.4.2.1.1 Before upgrading i5/OS from V5R2 or V5R3 to IBM i 5.4

Perform these steps on your V5R2 or V5R3 IBM i system prior to upgrading it to i 5.4.

Note: Performing these steps allows the server to function temporarily after the IBM i upgrade to i 5.4 until the server is migrated to the new IBM i 5.4 infrastructure for Linux as described in the next section.

1. Apply the latest PTFs to your V5R2 or V5R3 IBM i system.

2. Apply the latest Linux integration fixes to your server.

   - Vary on your Linux server and sign on as 'root'.

   - Open a shell prompt and run the following command:

     ```
     ixsupdt
     ```

3. Vary off your Linux server.

6.4.2.1.2 After to upgrading IBM i from V5R2 or V5R3 to i 5.4

Perform these steps on your IBM i system after upgrading it to i 5.4.

Note: These steps are required to migrate the Linux server to use the new IBM i infrastructure for Linux. IBM will not provide service support for Linux servers that use the Windows based IBM i infrastructure for Linux on i 5.4.

Important: There must be **no** customer applications or data stored on the "install" drive (the second linked storage space, which is device **/mnt/sdb1** when viewed from Linux). The install drive is reserved for use by the Linux integration support and will be replaced during the following migration process. Any customer applications or data stored on the install drive will be lost during the migration, so you must move them to a different drive before continuing with this migration process.

1. Make sure the following i5/OS software is installed:

   - 5722-SS1 option 29: Integrated Server Support
   - 5722-LSV: IBM i5/OS Integration for Linux on xSeries

2. Apply the latest Linux integration PTFs to your IBM i system.
   See **Latest IBM i integration service packs for IXA and IXS**.

3. Run the following command and record the link information (link type, sequence and access) of all storage spaces associated with your Linux server:

   ```
   WRKNWSSTG NWSD(mylinux)
   ```

4. Run the following command to print the NWSD attributes:

   ```
   DSPNWSD NWSD(mylinux) OUTPUT(*PRINT)
   ```

   When you run the INSLNXSVR command in step 7, use this as a reference for the values to specify.

5. Back up the system drive storage space associated with your Linux server as follows:

   ```
   SAV DEV('/QSYS.LIB/tap01.DEVD') OBJ(('/QFPNWSSTG/mylinux1'))
   ```

   Note: In this example, storage space **mylinux1** is saved to tape. Alternatively, you could save the storage space to a save file or to a virtual tape. The SAV command in this step and the RST command in the restore step later on would then refer to the save file or virtual tape instead of the physical tape device description.

6. Delete your Linux server NWSD and associated objects. The easiest way to do this is to delete the Linux server with the following command:

   ```
   DLTWNTSVR NWSD(mylinux)
   ```

   Note: Make sure you have saved your Linux server's system drive storage space as described previously, since this command will delete it.

7. Run the INSLNXSVR command, using the original NWSD name to create a new NWSD and associated objects.

   Notes:
   - Use the minimum system storage space size of 1024 MB.
   - For an IXA-attached server, you can cancel the INSLNXSVR command when it prompts for the Linux CD. Your server will not vary on.
   - For an IXS server, vary off the server after the INSLNXSVR command completes.

Note: You do not need to complete the install on the Linux server console, since the server's system storage space will be replaced with the original system storage space as described below.

8. Unlink the newly created system storage space then delete it as follows:

   ```
   RMVNWSSTGL NWSSTG(mylinux1) NWSD(mylinux) RENUMBER(*NO)

   DLTNWSSTG NWSSTG(mylinux1)
   ```

   Note: You should **not** unlink and delete the server's new install storage space **mylinux2**.

9. Restore your Linux server's original system storage space then link it to the NWSD as follows:

   ```
   RST DEV('/QSYS.LIB/tap01.DEVD') OBJ(('/QFPNWSSTG/mylinux1')) ALWOBJDIF(*ALL)

   ADDNWSSTGL NWSSTG(mylinux1) NWSD(mylinux)
   ```

   Note: You should **not** restore and link the server's original install storage space **mylinux2**.

10. If necessary, use the ADDNWSSTGL command to link any additional storage spaces (except the install storage space **mylinux2**) that you originally had linked into your Linux server. Make sure that each storage space is linked with the same link type, sequence and access parameters as before. Otherwise your Linux server may not boot. See the information you recorded in step 3

above.

11. Vary on your Linux Server and sign on as 'root'.
12. Open a shell prompt and run the following command to complete the migration:

    ```
    /mnt/sdb1/install/ixssetup.sh
    ```

    Note: Your Linux server will automatically reboot.

6.5 Frequently Asked Questions (FAQs) for IXA and IXS

This section provides Frequently Asked Questions (FAQs) that are specific to the IXA and IXS solutions.

Note: Additional FAQs that apply to IXA and IXS can be found on the **FAQs** page of the **IBM i integration with BladeCenter and System x** Web site.

FAQ TOC
Is the IXS memory different from IBM i memory?
When 4 GB or more of memory is installed, why does Windows report less memory than is actually installed?
What is the Logo status of integrated server hardware on the Microsoft HCL?
Is VMware ESX supported on IXA-attached servers?
Are IXS/IXA supported in POWER7 servers?
How does the addition of IXA-attached System x models affect how may I/O Towers I can have on a RIO/HSL loop?
What System x models are supported for attachment via the IXA?
Is 64-bit Windows Server 2003 supported on IXA-attached servers?
How many virtual disk drives can I have?
What is the maximum disk capacity that I can attach to a single integrated server?
Can 2 network server descriptions (NWSDs) "share" a storage space (disk drive)?

Frequently Asked Questions (FAQs) for IXA and IXS
Is the IXS memory different from IBM i memory? Yes, they are separate. The Integrated xSeries Server (IXS) uses its own memory - the IXS can have up to 4 GB memory, depending on model.
When 4 GB or more of memory is installed, why does Windows report less memory than is actually installed? With Windows Server versions that use 32-bit addressing on PC/Intel (x86) architecture, most PCI devices can't have their address spaces mapped above the 4 GB limit, so PCI address space is allocated below 4 GB. This means that any machine with 4 GB or more of physical memory has some of its physical memory "overlaid" by the PCI address space. If the memory controller of the machine supports remapping the overlaid physical memory to an address above 4 GB and if the processor is capable of accessing memory above 4 GB and if the operating system supports memory above 4 GB, then all of the physical memory is still usable. If any of the above are not true, then the "overlaid" memory is not accessible and the operating system will report less physical memory than is actually installed. For example a Windows server with 4 GB of physical memory installed might report only 3.5 GB of memory. In the case of IXS hardware, only type-model 2892-001 and 2892-002 are capable of accessing memory addresses above 4 GB. In the case of Integrated xSeries Adapter (IXA) attached System x models, check your System x model processor and memory controller specifications to determine if the server can access memory addresses above 4 GB. (Most System x models are capable of accessing memory addresses above 4 GB.) The 32-bit x86 versions of Windows Server that support memory above 4 GB are Windows Server 2003 R2 Enterprise, Windows Server 2003 Enterprise and Windows 2000 Advanced Server.

Frequently Asked Questions (FAQs) for IXA and IXS

If your IXS, BladeCenter blade or System x model can access memory addresses above 4 GB and the Windows version you are using supports over 4 GB of memory, but Windows still reports less physical memory than is actually installed, see Microsoft web page Large memory support is available in Windows 2000 and Windows Server 2003 for information on how to configure Windows to address all of the physical memory that is available.

What is the Logo status of integrated server hardware on the Microsoft HCL?

See the **Microsoft Windows Server Logo Designations** section.

Is VMware ESX supported on IXA-attached servers?

No. VMware ESX Server is not supported on IXA-attached servers.

However, VMware **GSX** Server is a Windows application that can run on System x models that are attached to the IBM i system with Integrated xSeries Adapters.

Are IXS/IXA supported in POWER7 servers?

No. The IXS requires an associated IOP and the IXA requires an HSL connection. Neither IOPs nor HSLs are supported with POWER7 servers, so IXS and IXA are also not supported.

How does the addition of IXA-attached System x models affect how may I/O Towers I can have on a RIO/HSL loop?

The number of I/O Towers in a RIO/HSL loop is independent of the number of IXA-attached System x models in that loop. However, each IXA-attached System x model counts as an I/O tower in the RIO/HSL loop, so adding IXAs to a loop will decrease the number of non-IXA I/O towers that can exist in the RIO/HSL loop. See **Power server support for IXAs** for details.

What System x models are supported for attachment via the IXA?

See the **System x server models supported with IXA** section for details.

Is 64-bit Windows Server 2003 supported on IXA-attached servers?

No, only 32-bit versions of Windows Server 2003 are supported on System x servers that are attached via IXAs.

How many virtual disk drives can I have?

The number of virtual disk drives (storage spaces) supported with IXS and IXA-attached servers depends on the operating system that is running on the server.

- Up to 48 disk drives per Windows Server 2003 or Windows 2000 server when using Microsoft Clustering Service (MSCS).
- Up to 32 disk drives per Windows Server 2003 or Windows 2000 server (without MSCS).
- Up to 32 disk drives per Linux server.

What is the maximum disk capacity that I can attach to a single integrated server?

The system drive (C: on Windows servers) can be up to 1000 GB. The install drive (D: on Windows servers) can be up to 2047 MB. Each user defined disk drive can be up to 1000 GB.

The number of virtual disk drives (storage spaces) supported with IXS and IXA-attached servers depends on the operating system that is running on the server, so the maximum disk capacity is as follows:

- 47 TB for Windows Server 2003 or Windows 2000 server when using Microsoft Clustering

Service (MSCS) (46 user defined disk drives).

- 31 TB for Windows Server 2003 or Windows 2000 server, without MSCS (30 user defined disk drives).

- 31 TB for Linux servers (30 user defined disk drives).

Can 2 network server descriptions (NWSDs) "share" a storage space (disk drive)?

Yes: A Windows Server 2003 or Windows 2000 server running on an IXS or IXA-attached server can use Microsoft Clustering Service (MSCS) to share storage spaces among the servers in the cluster. Access to the shared storage spaces must follow the MSCS protocols.

Storage spaces cannot be shared among IXS or IXA-attached servers that are not using MSCS. For other configurations, if you need access to the data that is stored on a storage space from multiple servers, you can share the storage space over the network using standard network file sharing.

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