



Planning Guide



IBM NetBAY Rack



Planning Guide

Note: Before using this information and the product it supports, be sure to read the general information in Appendix C, "Notices" on page 37.

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information**
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας
(safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się
z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

All caution and danger statements in this documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in the *IBM NetBAY Rack Safety Information* book.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in the *IBM NetBAY Rack Safety Information* book under statement 1.

Be sure to read all caution and danger statements in this documentation before performing the instructions. Read any additional safety information that comes with your server or optional device before you install the device.

Statement 1:



CAUTION:

To ensure safety, all configurations of the rack cabinet must be certified by a nationally recognized testing laboratory in order to verify compliance with country-specific safety regulations. This process ensures that the end product remains safe for the operator and service personnel under normal and foreseeable misuse conditions.

Statement 2:



DANGER

- **Always lower the leveling pads on the rack cabinet.**
- **Always install stabilizer brackets on the rack cabinet.**
- **Always install servers and optional devices starting from the bottom of the rack cabinet.**
- **Always install the heaviest devices in the bottom of the rack cabinet.**

Statement 3:



DANGER

- Do not extend more than one sliding device at a time.
- The maximum allowable weight for devices on slide rails is 80 kg (176 lb). Do not install sliding devices that exceed this weight.

Statement 4:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet.
- Connect to properly wired outlets any equipment that will be attached to this product.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.

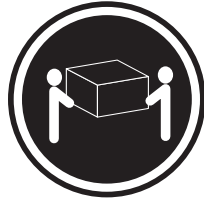
To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

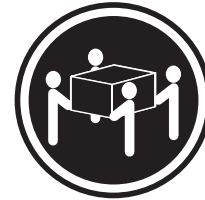
Statement 5:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 6:



CAUTION:
Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

Statement 8:



DANGER

- Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.
- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.
- Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.

Statement 10:



CAUTION:

Removing components from the upper positions in the Enterprise Rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must do the following:
 - Remove all devices in the 32U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 2030 mm (30 x 80 in.)
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet.
- Do not use a ramp inclined at more than ten degrees.
- Once the rack cabinet is in the new location, do the following:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.

If a long distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.

Statement 11:



CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must do the following:
 - Remove all devices in the 22U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 22U level.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 2083 mm (30 x 82 in.)
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet.
- Do not use a ramp inclined at more than ten degrees.
- Once the rack cabinet is in the new location, do the following:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.

If a long distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off of the pallet and strap the rack cabinet to the pallet.

Chapter 1. Introduction

This documentation contains information that will help you plan for your IBM® NetBAY™ Rack cabinet and optional device installation. Always refer to the documentation that comes with your server or optional device, as well as the documentation that comes with the rack cabinet for detailed installation instructions. If unpacking instructions come with the rack cabinet, refer to the unpacking instructions for how to unpack and locate the rack cabinet.

Note: The illustrations in this documentation might differ slightly from your hardware.

NetBAY11 Rack cabinets

The NetBAY11 Rack cabinet comes with a front door installed. The side panels are non-removable and there is no rear door. The NetBAY11 Rack cabinet has the following dimensions:

Height	Width	Depth
61.1 cm (24 in.)	51.8 cm (20.4 in.)	87.3 cm (34.4 in.)

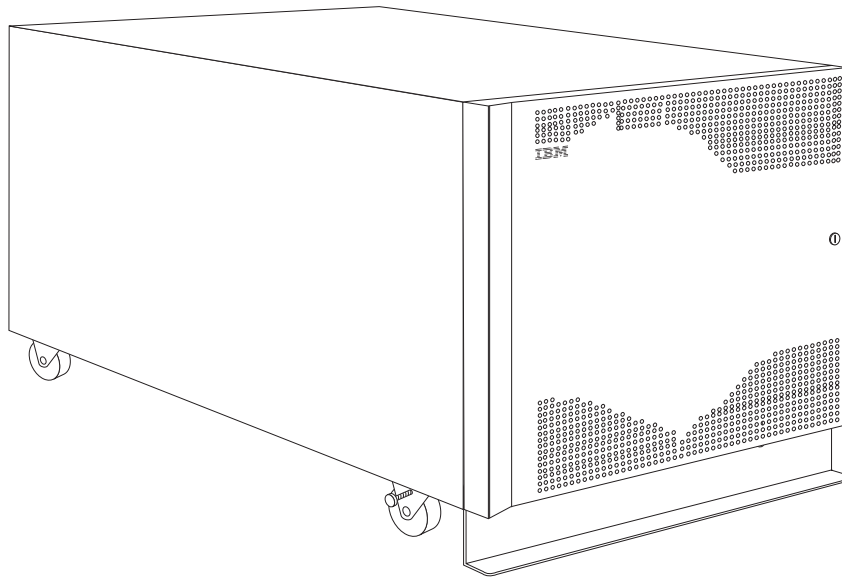


Figure 1. NetBAY11 Rack cabinet

NetBAY25 Rack cabinets

The NetBAY25 Rack cabinet comes with a front door, a rear door, and side panels installed and has the following dimensions:

Height	Width	Depth
136 cm (53.5 in.)	60 cm (23.6 in.)	100 cm (39.4 in.)

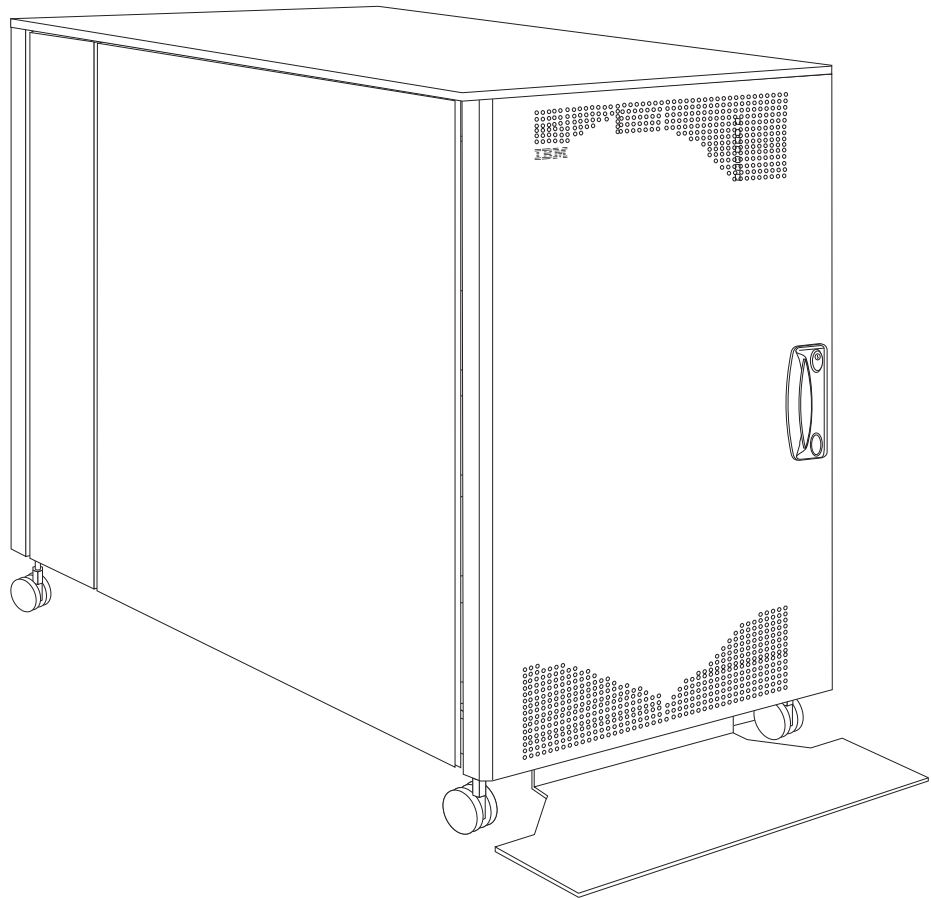


Figure 2. NetBAY25 Rack cabinet

NetBAY42 Rack cabinets

The primary NetBAY42 Rack cabinet comes with a front door, a rear door, and side panels installed. You will need one primary rack cabinet per suite. The expansion NetBAY42 Rack cabinet comes without side panels, and includes the required hardware for attaching rack cabinets together to form a suite. Both rack cabinets have the following dimensions:

Height	Width	Depth
208 cm (81.8 in.)	60 cm (23.6 in.)	100 cm (39.4 in.)

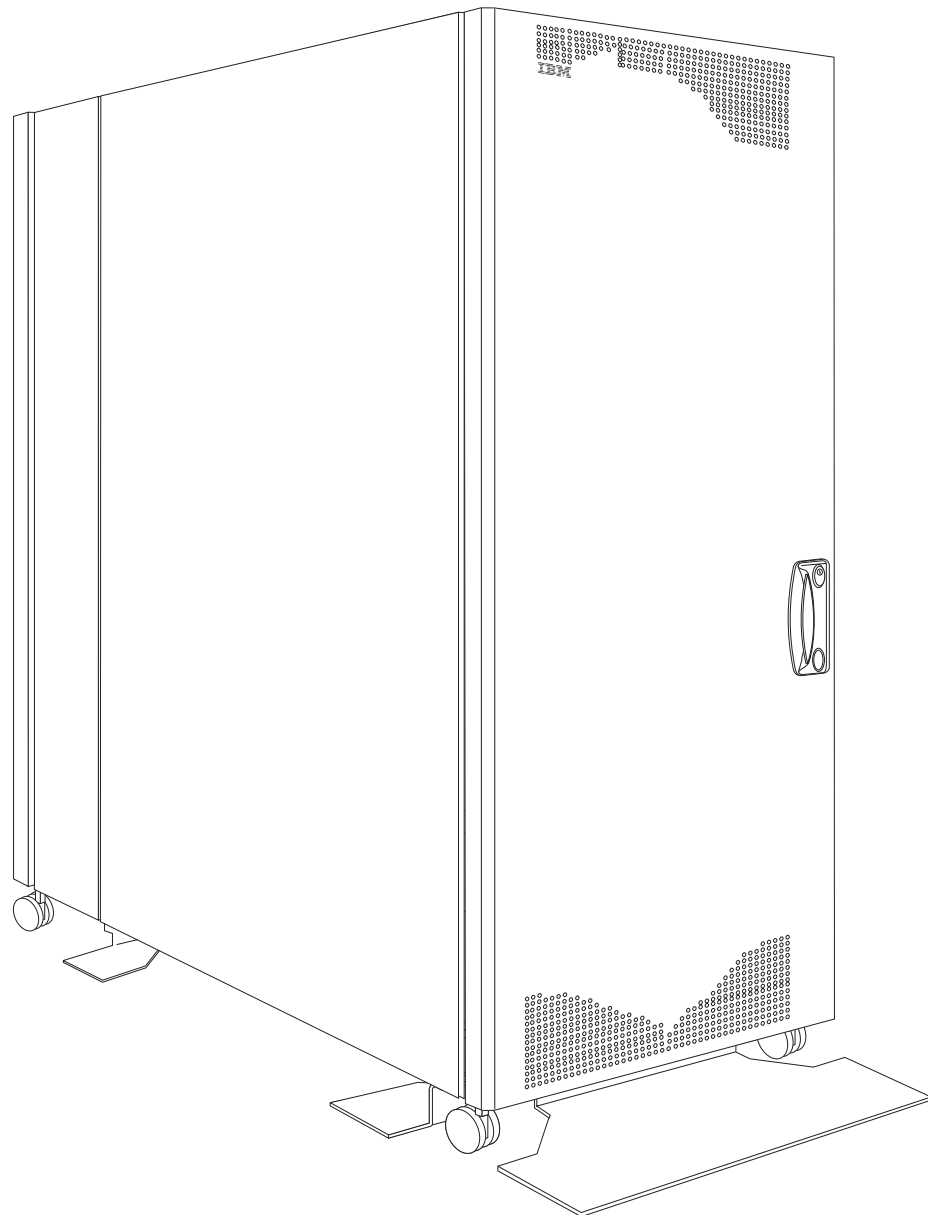


Figure 3. Primary NetBAY42 Rack cabinet

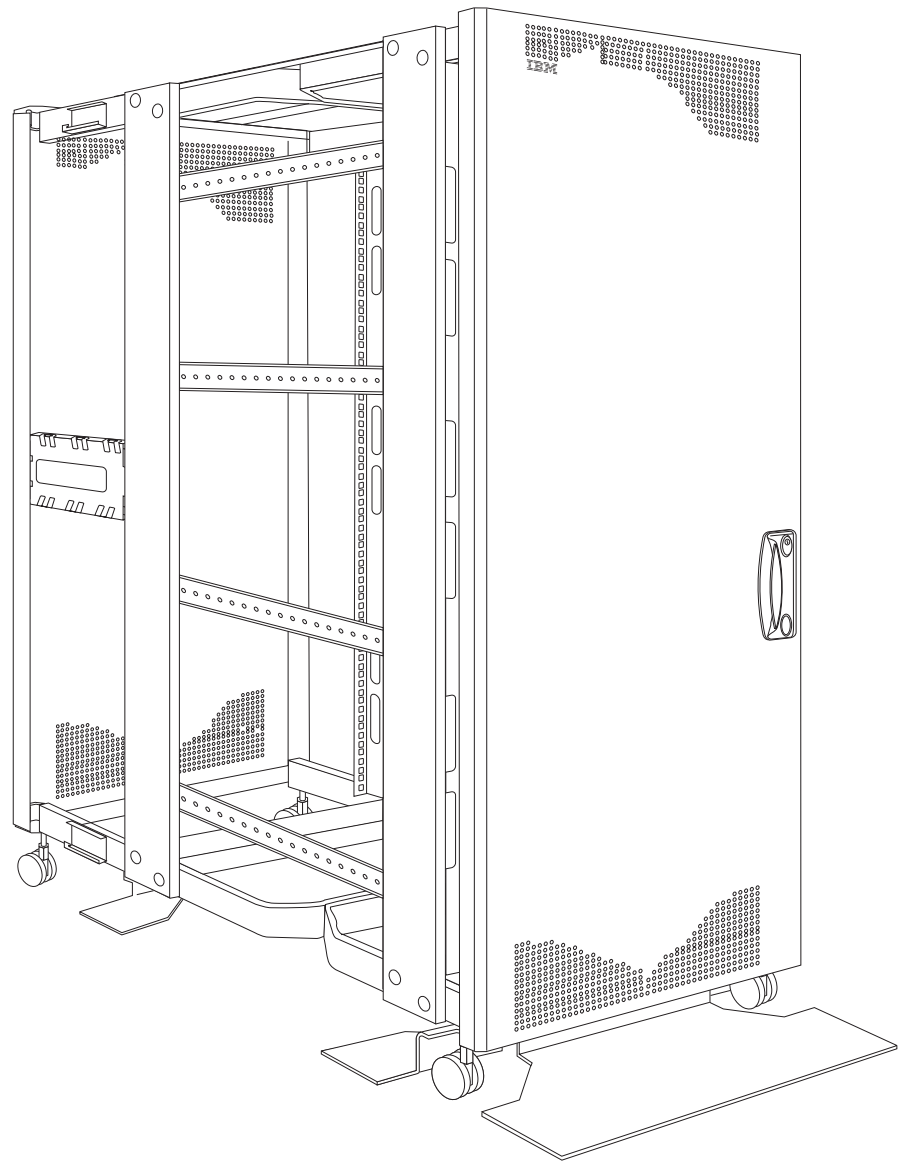


Figure 4. Expansion NetBAY42 Rack cabinet

NetBAY42 Enterprise Rack cabinets

The primary NetBAY42 Enterprise Rack cabinet comes with a front door, a rear door, and side panels installed. You will need one primary rack cabinet per suite. The expansion NetBAY42 Enterprise Rack cabinet comes without side panels, and includes the required hardware for attaching rack cabinets together to form a suite. Both rack cabinets have the following dimensions:

Height	Width	Depth
202 cm (79.5 in.)	65 cm (25.6 in.)	110 cm (43.3 in.)

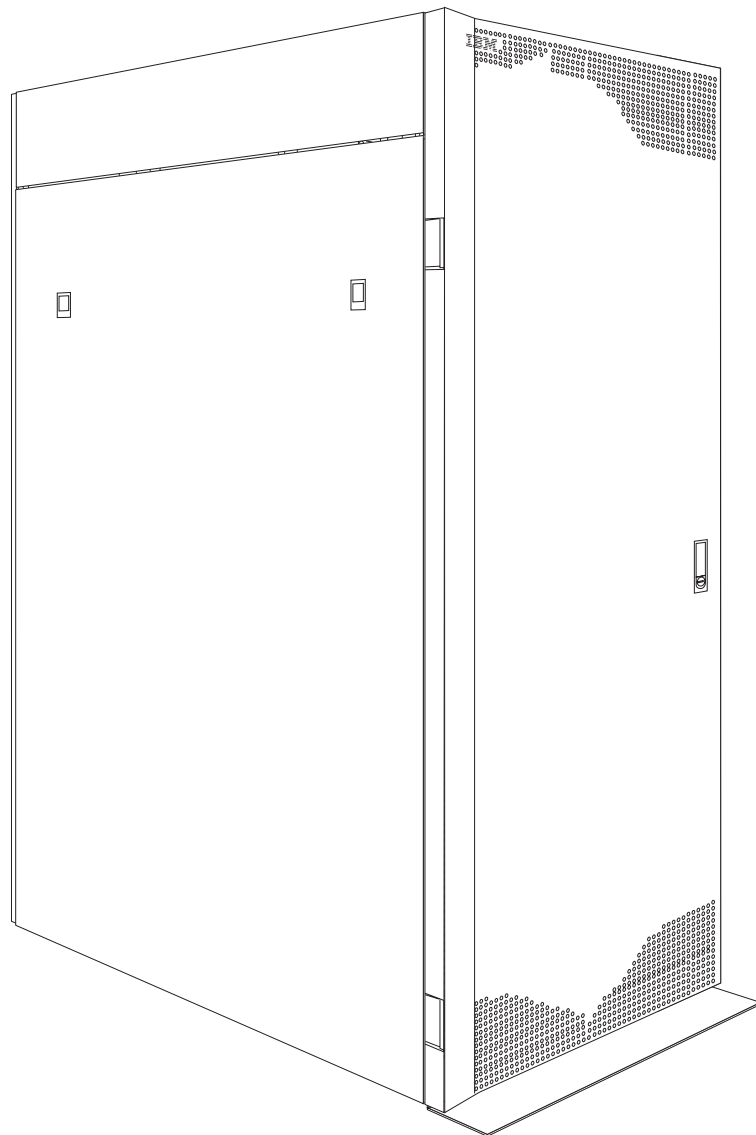


Figure 5. Primary NetBAY42 Enterprise Rack cabinet

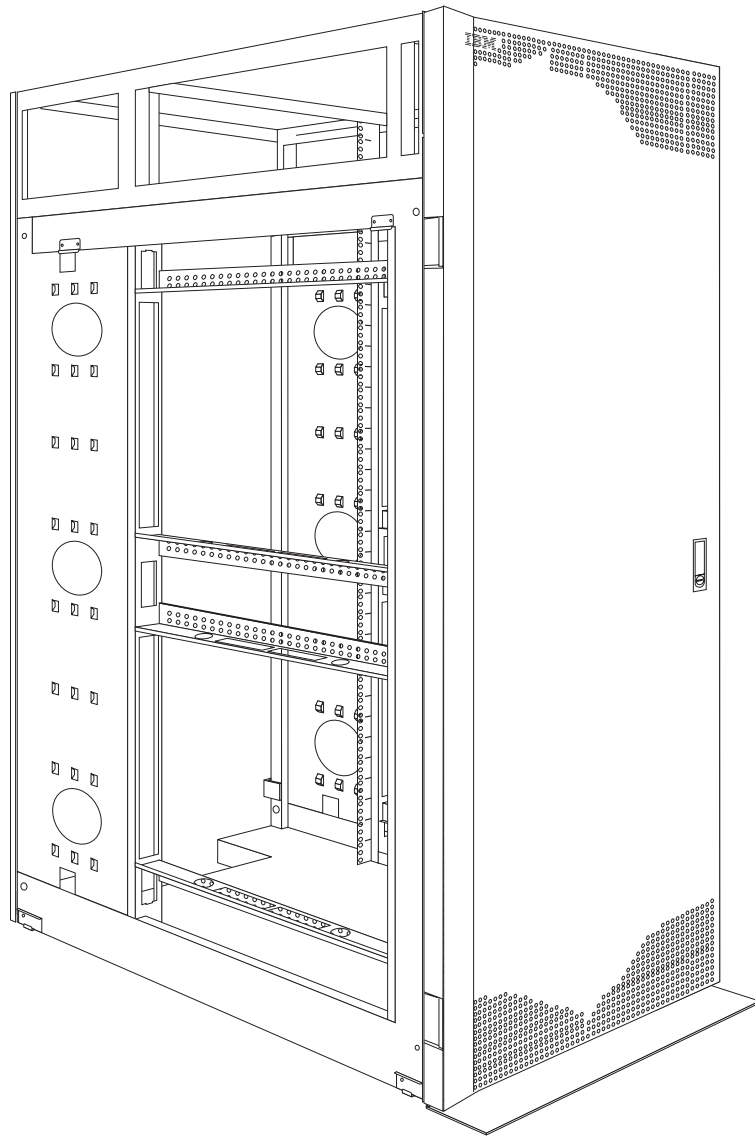


Figure 6. Expansion NetBAY42 Enterprise Rack cabinet

Chapter 2. Planning for your rack cabinet

A Rack Configurator program is available to help you plan your rack cabinet and optional device installation. Go to the IBM Web site <http://www.ibm.com/pc/us/eserver/xseries/library> and select **Configuration Tools** to find this program. This program provides an intuitive, graphical interface to help you configure the rack cabinet and optional devices. The Rack Configurator program also provides the following information about your rack cabinet:

- Weight and stability limits
- Thermal and heat calculations
- Power requirements
- Internal space dimensions
- External space requirements
- Human factors considerations

Statement 1:



CAUTION:

To ensure safety, all configurations of the rack cabinet must be certified by a nationally recognized testing laboratory in order to verify compliance with country-specific safety regulations. This process ensures that the end product remains safe for the operator and service personnel under normal and foreseeable misuse conditions.

In the Rack Configurator program, you can select components from the Component Catalog, and place them in the Configuration Workspace to create a configuration. The program also contains a parts list, specifications, and a top-view floor plan. With this information, you can then configure a single rack cabinet or a suite of rack cabinets.

Rack Configurator functions such as **AutoArrange**, **AutoConnect**, **Validate**, and **Build**, ensure proper placement of optional devices within the rack cabinet. The Rack Configurator program guides your connection of optional devices, helping you to select the appropriate cables for connections.

Defining rack cabinet physical dimensions and clearances

All NetBAY Rack cabinets are Electronic Industries Association (EIA) standard rack cabinets. See Table 1 for the dimensions and weights for the rack cabinets.

Note: The dimensions and weights shown are for the primary rack cabinets. Expansion rack cabinets, where applicable, have the same physical dimensions but weigh less because they do not have side panels.

Table 1. Rack cabinet physical dimensions and weights

	NetBAY11	NetBAY25
Dimensions	61.1 x 51.8 x 87.3 cm (24 x 20.4 x 34.4 in.)	136 x 60 x 100 cm (53.5 x 23.6 x 39.4 in.)
Empty weight	36 kg (80 lb)	93 kg (205 lb)
Loaded weight	216 kg (475 lb)	478 kg (1053 lb)

	NetBAY42	NetBAY42 Enterprise
Dimensions	208 x 60 x 100 cm (81.8 x 23.6 x 39.4 in.)	202 x 65 x 110 cm (79.5 x 25.6 x 43.3 in.)
Empty weight	135 kg (297 lb)	261 kg (575 lb)
Loaded weight	781 kg (1717 lb)	928 kg (2045 lb)

A rack cabinet requires a minimal operational clearance on all sides to ensure proper ventilation and access to open the front and rear doors. An extended service clearance provides easier access to the rack cabinet so that you can install and service optional devices.

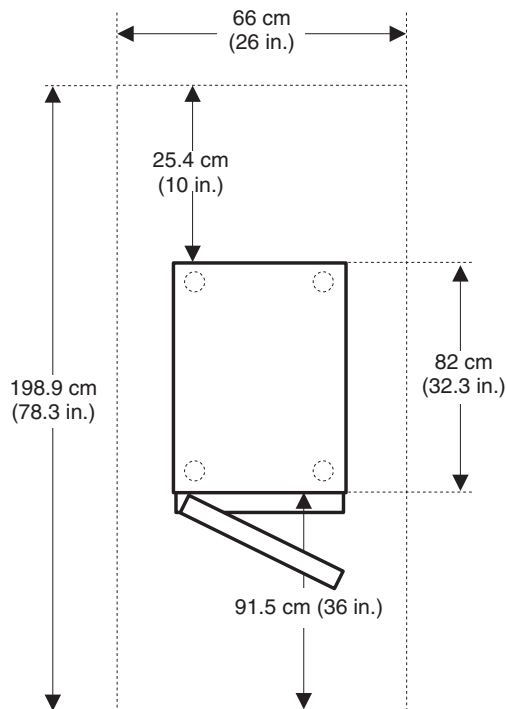


Figure 7. Providing service and operational clearance for the NetBAY11 Rack cabinet

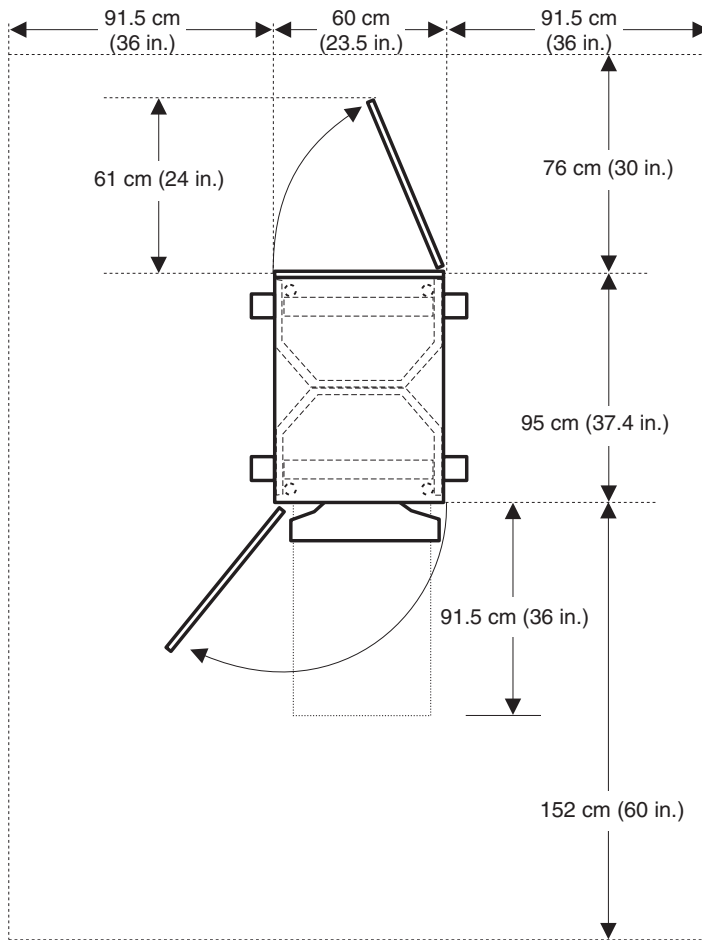


Figure 8. Providing service clearance for the NetBAY25 and NetBAY42 Rack cabinets

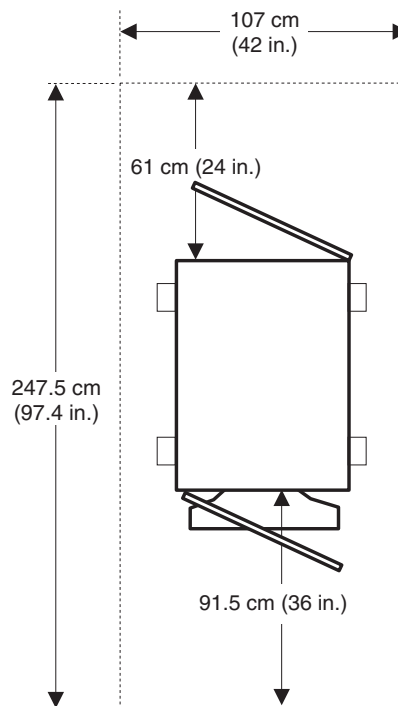


Figure 9. Providing operational clearance for the NetBAY25 and NetBAY42 Rack cabinets

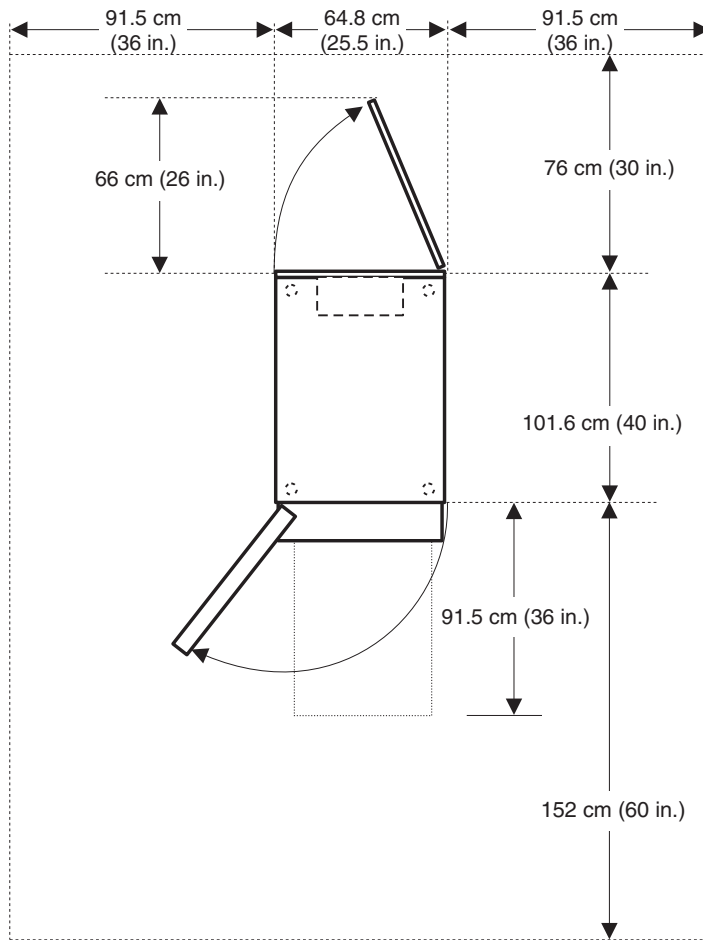


Figure 10. Providing service clearance for the NetBAY42 Enterprise Rack cabinet

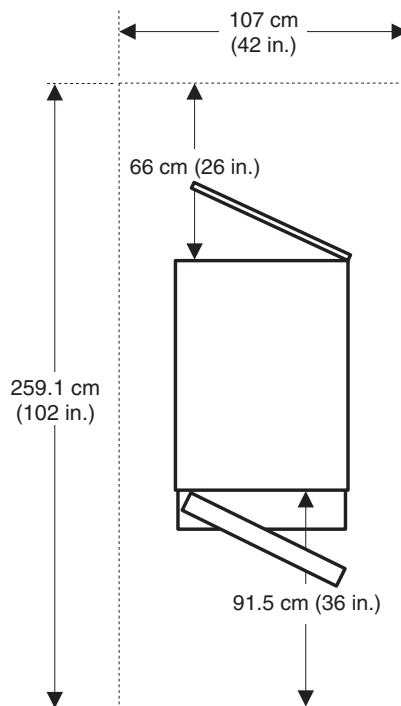


Figure 11. Providing operational clearance for the NetBAY42 Enterprise Rack cabinet

When you attach primary and expansion rack cabinets together to form a suite of rack cabinets, you must leave 152 cm (60 in.) between suites in the same room. Ensure that the fronts, or rears, of rack cabinet suites face each other. This provides proper ventilation and allows access to install and service optional devices.

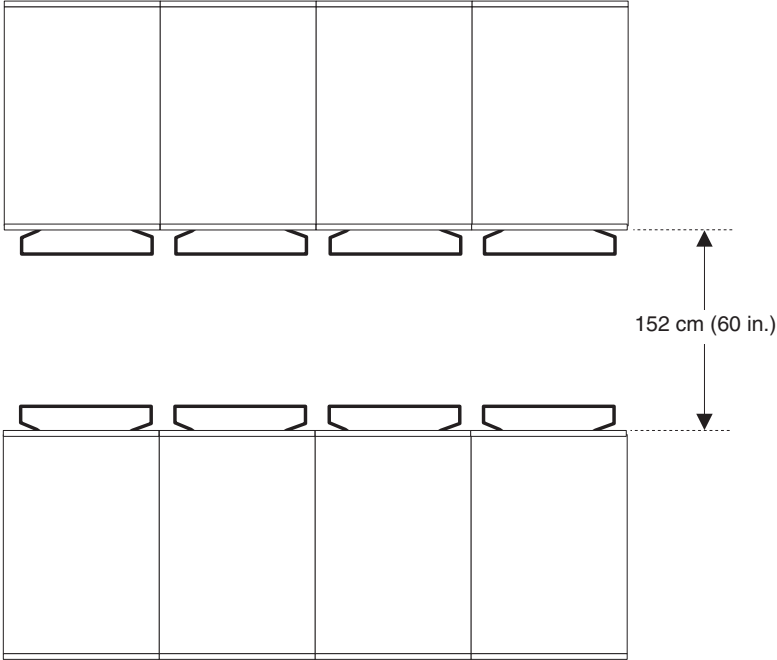


Figure 12. Leaving space between rack cabinet suites

The internal dimensions of the rack cabinets conform to the EIA standard *EIA-310-D Cabinets, Racks, Panels, and Associated Equipment (1992)*. See Figure 13 for rack cabinet internal dimensions.

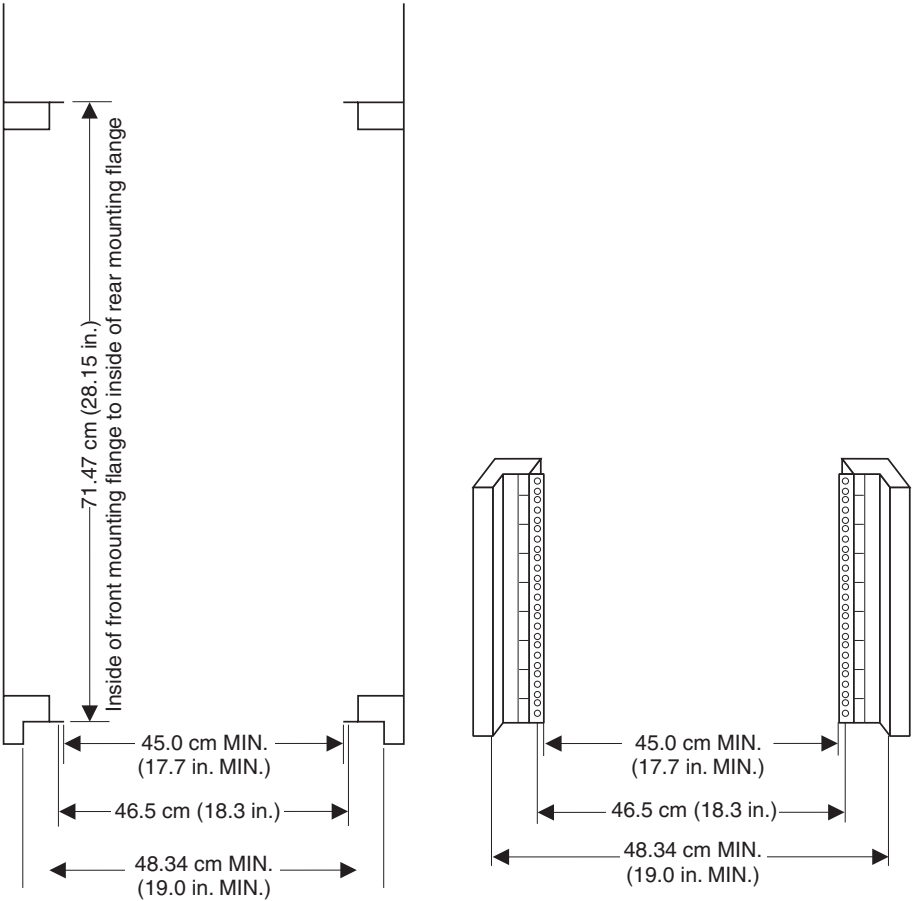


Figure 13. Measuring inside of the rack cabinet

All vertical rack cabinet measurements are given in rack units (U), where 1U is equal to 4.45 cm (1.75 in.). The U levels are marked on labels on the front and rear mounting flanges inside of the rack cabinet, as shown in Figure 14.

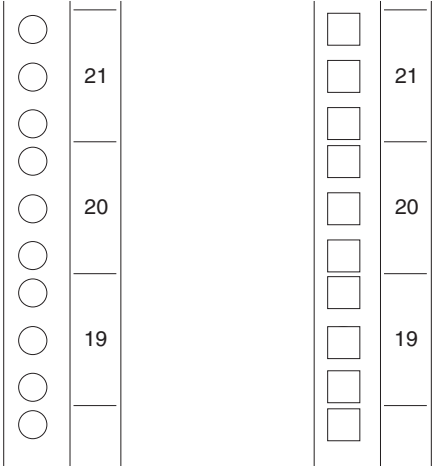


Figure 14. Measuring U levels within rack cabinets

Defining rack cabinet electrical requirements

The rack cabinet does not require electricity, but the servers and optional devices that you install inside of a rack cabinet do require connection to properly wired and grounded electrical outlets. An electrician might need to assist you with planning for electrical requirements, such as:

- Each rack cabinet, except the NetBAY11, requires at least one uninterruptible power supply (UPS) or power distribution unit (PDU) for servers and optional devices that you install in the rack cabinet.
- Each PDU or UPS requires a separate ac power branch circuit.

Note: The NetBAY Front-End PDU provides three separate branch circuits that you can connect to more than one NetBAY Rack PDU or NetBAY Server PDU.

- The input voltage-selection switch on each device that you install in the rack cabinet must match the output voltage on the UPS or PDU.
- Power cords must match electrical outlets at the location where you install the rack cabinet.

Review the following safety information as you plan for your rack cabinet:

Statement 8:



DANGER

- **Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.**
- **Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.**
- **Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.**
- **Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.**

Defining rack cabinet optional device limitations

As you prepare for the installation of the rack cabinet, be aware of the physical limitations of the rack cabinet. This is especially important if you plan to install non-IBM equipment in the rack cabinet.

Attention: The weight of devices that you install on the four corner posts of the rack cabinet must not exceed 20 kg (44.1 lb) per U level; no more than 7.5 kg (16.5 lb) per U level, with at least one mounting fastener, can be applied to any single corner post. Cantilevered devices must not exceed 5 kg (11 lb) per U level.

The rack cabinet has been tested under certain conditions for stability and safety. Ensure that the rack cabinet and optional devices you install meet the following requirements:

Statement 2:



DANGER

- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- Always install servers and optional devices starting from the bottom of the rack cabinet.
- Always install the heaviest devices in the bottom of the rack cabinet.

Statement 3:



DANGER

- Do not extend more than one sliding device at a time.
- The maximum allowable weight for devices on slide rails is 80 kg (176 lb). Do not install sliding devices that exceed this weight.

Chapter 3. Preparing a location for the rack cabinet

Before you unpack or install a rack cabinet, be sure that you:

- Understand the rack cabinet specifications and requirements
- Prepare a layout for the rack cabinet or suite of rack cabinets
- Prepare the physical site (location) where you will install the rack cabinet
- Read the unpacking instructions and *Installation Guide* that come with the rack cabinet

Physical site planning includes determining the:

- Floor area that is required by the equipment
- Floor-load capacity
- Space that is needed for future expansion
- Location of columns or other unmovable building structures
- Power and environmental requirements

Create a floor plan to check for clearance problems. Make a full-scale template, if needed, of the rack cabinet and carry it along the access route to check for potential clearance problems through doorways and passageways, around corners, and in elevators.

Note: Some rack cabinets might have removable parts that can be temporarily removed so that the rack cabinet can be moved through some nonstandard doorways, if required. Refer to the *Installation Guide* that comes with your rack cabinet for additional information.

Remember to provide space for storage cabinets, card files, desks, communication facilities, daily storage of tapes, and other supplies.

Creating a floor plan

To be sure that you have enough space for the rack cabinet or suite of rack cabinets, create a floor plan before installing any rack cabinets. You might need to prepare and analyze several plans before choosing a final one. If you install more than one rack cabinet in more than one installation stage, prepare a separate plan for each installation stage. Consider the following when you prepare each plan:

- Flow of work and personnel within the area
- Operator access to units, as required
- If the placement will be on a raised floor:
 - Positioning over a cooling register
 - Leaving the bottom of the rack cabinet open to facilitate cooling
- If the placement will not be on a raised floor:
 - Maximum cable lengths
 - Need for cable guards, ramps, or other similar items to protect equipment and personnel
- Location of any planned safety equipment
- Future expansion

Begin with an accurate drawing of the installation area (blueprints and floor plans are appropriate). Be sure to include the following in your floor plan:

- Service clearances that are required for each rack cabinet or suite of rack cabinets
- If the placement will be on a raised floor:
 - Things that might obstruct cable routing
 - The height of the raised floor
- If the placement will not be on a raised floor:
 - The placement of cables to minimize obstruction
 - The amount of cable that is required. (If the cable is routed indirectly between rack cabinets, such as along walls or suspended from the ceiling, additional cable might be required.)
- Location of:
 - Power receptacles
 - Air conditioning equipment and controls (Air conditioning outlets should be located between fronts of facing suites of rack cabinets. Exhausts in the ceilings should be located between rears of rack suites.)
 - File cabinets, desks, and other office equipment
 - Room emergency power-off controls
 - All entrances, exits, windows, columns, and pillars

Review the final floor plan to ensure that cable lengths are not too long and that the rack cabinets have enough clearance. Refer to the *Installation Guide* that comes with your rack cabinet for additional information.

Moving a NetBAY11 Rack cabinet

The fully populated NetBAY11 Rack cabinet has been evaluated and found to meet UL-1950, CSA-950, and IEC-950 stability test standards. Because these standards apply only to a rack cabinet in an installed location, IBM enforces additional standards to ensure stability when rolling the rack cabinet on its casters. See Table 2 for empty and fully populated rack cabinet weights.

Table 2. NetBAY11 Rack cabinet weights

	Weight
Empty	36 kg (80 lb)
Populated	218 kg (480 lb)

Before you move a rack cabinet, ensure that there is no stabilizer bracket installed on the rack cabinet. When you move a rack cabinet, adhere to the following standards:

Statement 8:



DANGER

- **Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.**
- **Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.**
- **Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.**
- **Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.**

Moving a NetBAY25 or NetBAY42 Rack cabinet

Fully populated NetBAY25 and NetBAY42 Rack cabinets have been evaluated and found to meet UL-1950, CSA-950, and IEC-950 stability test standards. Because these standards apply only to a rack cabinet in an installed location, IBM enforces additional standards to ensure stability when rolling the rack cabinet on its casters. See Table 3 for empty and fully populated rack cabinet weights.

Table 3. NetBAY25 and NetBAY42 Rack cabinet weights

	NetBAY25	Primary NetBAY42	Expansion NetBAY42
Empty	93 kg (205 lb)	135 kg (297 lb)	104 kg (229 lb)
Populated	478 kg (1053 lb)	781 kg (1717 lb)	750 kg (1649 lb)

When you move a rack cabinet, adhere to the following standards:

Statement 8:



DANGER

- **Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.**
- **Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.**
- **Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.**
- **Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.**

Statement 11:



CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must do the following:
 - Remove all devices in the 22U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 22U level.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 2083 mm (30 x 82 in.)
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet.
- Do not use a ramp inclined at more than ten degrees.
- Once the rack cabinet is in the new location, do the following:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.

If a long distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off of the pallet and strap the rack cabinet to the pallet.

Moving a NetBAY42 Enterprise Rack cabinet

The fully populated NetBAY42 Enterprise Rack cabinet has been evaluated and found to meet UL-1950, CSA-950, and IEC-950 stability test standards. Because these standards apply only to a rack cabinet in an installed location, IBM enforces additional standards to ensure stability when rolling the rack cabinet on its casters. See Table 4 for empty and fully populated rack cabinet weights.

Table 4. NetBAY42 Enterprise Rack cabinet weights

	Primary NetBAY42 Enterprise	Expansion NetBAY42 Enterprise
Empty	261 kg (575 lb)	234 kg (515 lb)
Populated	928 kg (2045 lb)	901 kg (1986 lb)

When you move a rack cabinet, adhere to the following standards:

Statement 8:



DANGER

- **Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.**
- **Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.**
- **Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.**
- **Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.**

Statement 10:



CAUTION:

Removing components from the upper positions in the Enterprise Rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must do the following:
 - Remove all devices in the 32U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 2030 mm (30 x 80 in.)
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet.
- Do not use a ramp inclined at more than ten degrees.
- Once the rack cabinet is in the new location, do the following:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.

If a long distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.

Chapter 4. Installing optional devices

There are many servers and optional devices that you can install in your rack cabinet. Always read the documentation that comes with your server or optional device for detailed installation instructions.

Note: You can install many optional devices using the general instructions provided in the rack cabinet *Installation Guide*. Some devices might require the detailed installation information contained in the documentation that comes with the optional device.

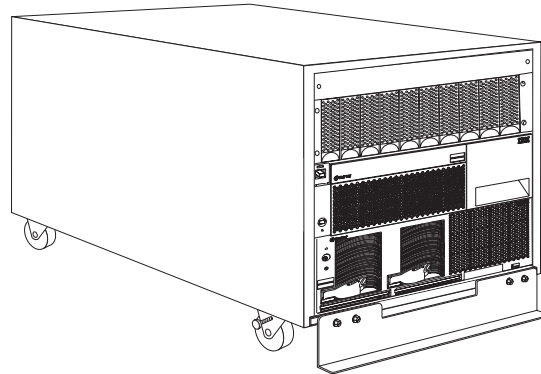


Figure 15. Installing optional devices in the NetBAY11 Rack cabinet

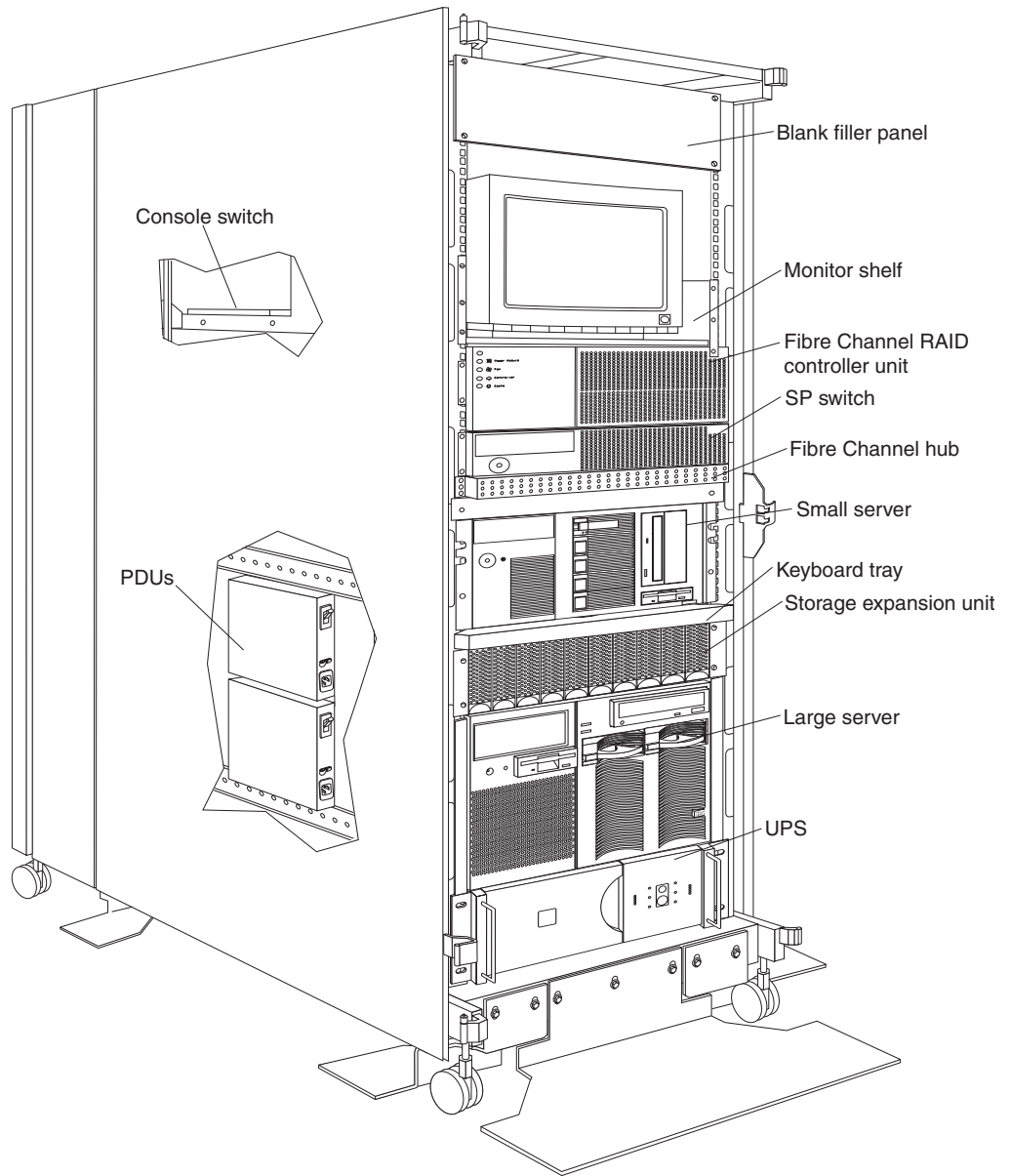


Figure 16. Installing optional devices in the NetBAY42 Rack cabinet

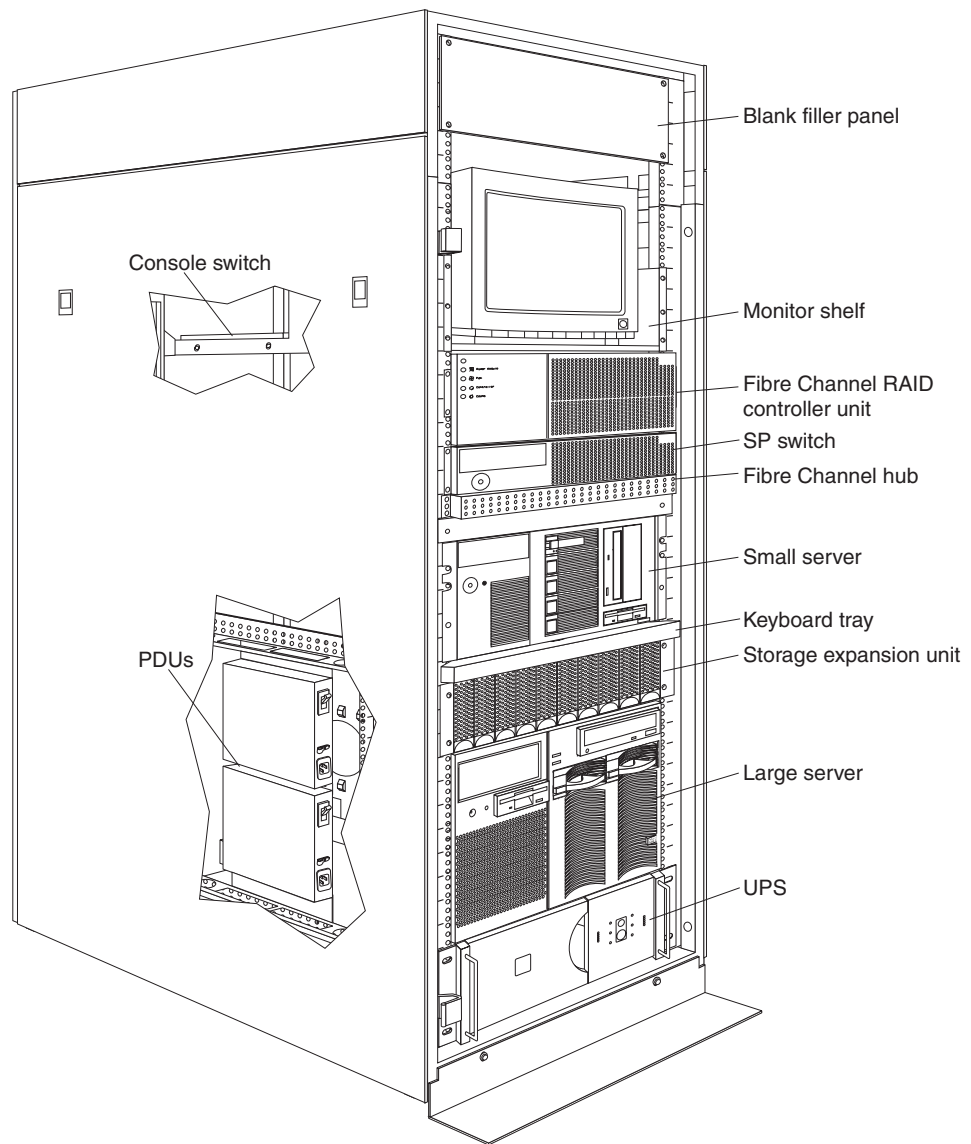


Figure 17. Installing optional devices in the NetBAY42 Enterprise Rack cabinet

Using the rack cabinet mounting flanges

When you install optional devices in the rack cabinet, secure the device or the rails for that device on rack mounting flanges. Some devices come with threaded rails or threaded bars for the rails. Other devices require that you use cage nuts or clip nuts to install them in the rack cabinet.

Note: NetBAY11, NetBAY25, and NetBAY42 Rack cabinets require cage nuts, while NetBAY42 Enterprise Rack cabinets require clip nuts.

Statement 2:



DANGER

- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- Always install servers and optional devices starting from the bottom of the rack cabinet.
- Always install the heaviest devices in the bottom of the rack cabinet.

Statement 3:



DANGER

- Do not extend more than one sliding device at a time.
- The maximum allowable weight for devices on slide rails is 80 kg (176 lb). Do not install sliding devices that exceed this weight.

Statement 4:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

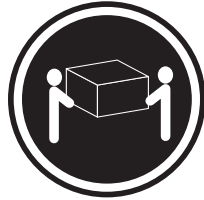
To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

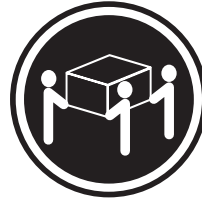
To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

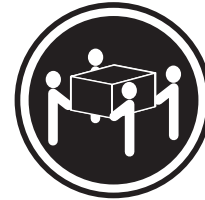
Statement 5:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 6:



CAUTION:
Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

Installing threaded rails or bars

You must install devices that have threaded holes or device rails that have threaded holes on the inside of the rack mounting flanges. You can, however, install devices or device rails that come with threaded bars on the inside or the outside of the rack mounting flanges. See the device documentation for detailed information on how to use threaded rails or bars.

Installing cage nuts

You must use cage nuts for all optional devices that do not have threaded holes. Cage nuts install on the inside of the rack mounting flanges with either the cage-nut-insertion tool or a flat-blade screwdriver. The cage-nut-insertion tool comes with the rack cabinet and some optional devices.

Note: Your rack cabinet comes with a supply of cage nuts that you can use to install optional devices. Most devices that require them will come with cage nuts.

Some devices might require that you install clip nuts on the rail instead of cage nuts on the rack mounting flanges. See the device documentation for information on when you must install the clip nuts.

Using the cage-nut-insertion tool:

Use the following procedure to install a cage nut with the cage-nut-insertion tool:

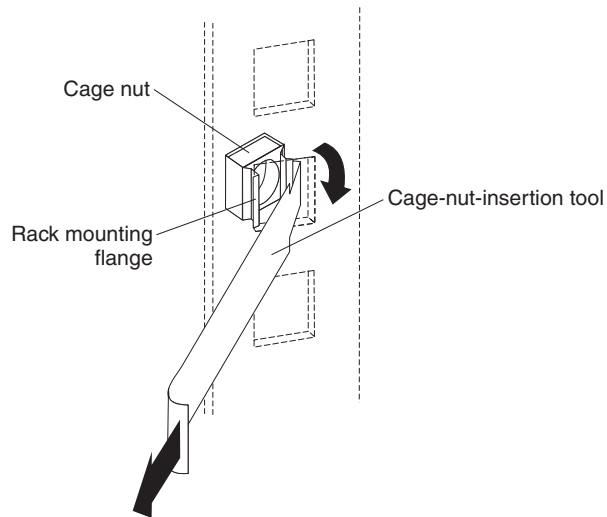


Figure 18. Installing cage nuts with the cage-nut-insertion tool

1. Determine the hole in which you want to install the cage nut.
2. From the inside of the rack mounting flange, insert one edge of the cage nut into the hole.
3. Push the tool through the hole and hook the other edge of the cage nut.
4. Pull the tool and the cage nut back through the hole to complete the installation of the cage nut.

Using a flat-blade screwdriver:

Use the following procedure to install a cage nut with a flat-blade screwdriver:

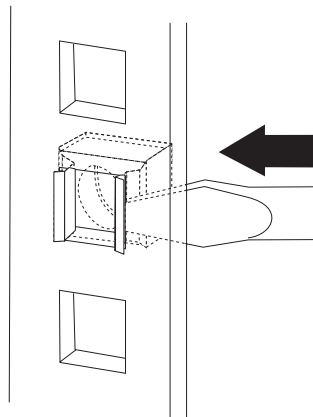


Figure 19. Installing cage nuts with a flat-blade screwdriver

1. Determine the hole in which you want to install the cage nut.
2. Hold the cage nut in one hand and compress the cage-nut clip with a flat-blade screwdriver.
3. With the clip compressed, push the edge of the cage nut fully into the hole from the inside of the rack mounting flange.
4. Release the screwdriver pressure on the clip to lock the cage nut into place.

Installing clip nuts

You must use clip nuts for all optional devices that do not have threaded holes. Clip nuts install on the rack mounting flanges as shown in Figure 20.

Note: Your rack cabinet comes with a supply of clip nuts that you can use to install optional devices. Most devices that require them will come with clip nuts.

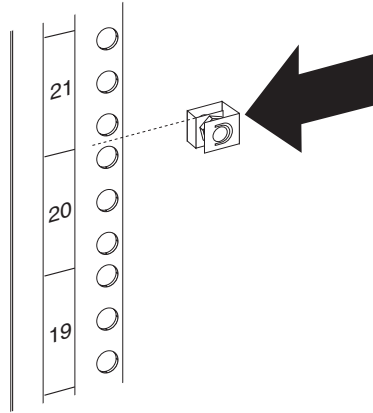


Figure 20. Installing clip nuts on the rack mounting flanges

Some devices might require that you install clip nuts on the rail instead of clip nuts on the rack mounting flanges. See the device documentation for information on when you must install the clip nuts.

Appendix A. Optional device specifications

This section contains specifications for power distribution units (PDUs) and console switches. Refer to the documentation that comes with your servers or optional devices for additional information.

NetBAY console switches

The following table contains the product specifications for the NetBAY 1x4 Console Switch and the NetBAY 2x8 Console Switch:

Table 5. NetBAY Console Switch specifications

	1x4 Console Switch	2x8 Console Switch
Height	4.3 cm (1.7 in.)	4.3 cm (1.7 in.)
Depth	20.3 cm (8.0 in.)	20.3 cm (8.0 in.)
Width	43.2 cm (17 in.)	43.2 cm (17 in.)
Weight	2.38 kg (5.25 lb)	2.59 kg (5.7 lb)
Rated voltage	100 – 240 V ac	100 – 240 V ac
Rated frequency	50 – 60 Hz	50 – 60 Hz
Rated input current	1.0 A maximum	1.0 A maximum
Operating temperature at 0–914 m (0–3000 ft)	10° – 35°C (50° – 95°F)	10° – 35°C (50° – 95°F)
Operating temperature at 914–2133 m (3000–7000 ft)	10° – 32°C (50° – 90°F)	10° – 32°C (50° – 90°F)
Operating humidity (non-condensing)	8% – 80%	8% – 80%
Video modes supported	VGA, SVGA, XGA	VGA, SVGA, XGA

NetBAY rack power distribution units

The following tables contain product specifications for the NetBAY Rack PDU, NetBAY Server PDU, and NetBAY Front-end PDU:

Table 6. NetBAY Rack PDU specifications

Height	43 mm (1.7 in.)
Width	192 mm (7.5 in.)
Depth	221 mm (8.7 in.)
Weight	1.5 kg (3.2 lb)
Operating temperature at 0–914 m (0–3000 ft)	10° – 35°C (50° – 95°F)
Operating temperature at 914–2133 m (3000–7000 ft)	10° – 32°C (50° – 90°F)
Operating humidity (non-condensing)	8% – 80%
Rated voltage	100 – 240 V ac, 15 A, single-phase
Rated frequency	50 – 60 Hz
Maximum power rating	3600 VA
Circuit breaker	Two-pole, 15 A with time-delay protection for up to 600 A input current without nuisance tripping.
Power inlet	IEC 320-C20 inlet rated at 16 A (VDE) / 20 A (UL/CSA)
Power outlets	Seven IEC 320-C13 outlets rated at 10 A (VDE) / 15 A (UL/CSA)

Table 7. NetBAY Server PDU specifications

Height	43 mm (1.7 in.)
Width	192 mm (7.5 in.)
Depth	221 mm (8.7 in.)
Weight	2.4 kg (5.4 lb)
Operating temperature at 0–914 m (0–3000 ft)	10° – 35°C (50° – 95°F)
Operating temperature at 914–2133 m (3000–7000 ft)	10° – 32°C (50° – 90°F)
Operating humidity (non-condensing)	8% – 80%
Rated voltage	100 – 127 V ac, 15 A, single-phase 200 – 240 V ac, 10 A, single-phase
Rated frequency	50 – 60 Hz
Maximum power rating	2400 VA
Power inlet	Two IEC 320-C20 inlets rated at 16 A (VDE) / 20 A (UL/CSA)
Transfer time	< 35 ms from main to backup power

Table 7. NetBAY Server PDU specifications (continued)

Power outlets	Four IEC 320-C13 outlets rated at 10 A (VDE) / 15 A (UL/CSA)
----------------------	--------------------------------------------------------------

Table 8. NetBAY Front-end PDU specifications

Height	43 mm (1.7 in.)
Width	192 mm (7.5 in.)
Depth	221 mm (8.7 in.)
Weight	1.6 kg (3.5 lb)
Operating temperature at 0–914 m (0–3000 ft)	10° – 35°C (50° – 95°F)
Operating temperature at 914–2133 m (3000–7000 ft)	10° – 32°C (50° – 90°F)
Operating humidity (non-condensing)	8% – 80%
Rated voltage	100 – 120 V ac, 30 A, single-phase 200 – 240 V ac, 30 A, single-phase 200 – 240 V ac, 32 A, single-phase 200 – 240 V ac, 30 A, three-phase 380 – 415 V ac, 32 A, three-phase
Rated frequency	50 – 60 Hz
Maximum power rating	4800-6000 VA
Power inlet	One fixed line cord
Power outlets	Three IEC 320-C19 outlets rated at 16 A (VDE) / 20 A (UL/CSA)

Appendix B. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your xSeries™ or IntelliStation® system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system.
- Go to the IBM Support Web site at <http://www.ibm.com/pc/support/> to check for technical information, hints, tips, and new device drivers.
- Use an IBM discussion forum on the IBM Web site to ask questions.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the publications that are provided with your system and software. The information that comes with your system also describes the diagnostic tests that you can perform. Most xSeries and IntelliStation systems, operating systems, and programs come with information that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the information for the operating system or program.

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, README files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/pc/support/> and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/pc/intellistation/>.

You can find service information for your IBM products, including supported options, at <http://www.ibm.com/pc/support/>. If you click **Profile** from the support page, you can create a customized support page. The support page has many sources of information and ways for you to solve problems, including:

- Diagnosing problems, using the IBM Online Assistant
- Downloading the latest device drivers and updates for your products
- Viewing Frequently Asked Questions (FAQ)
- Viewing hints and tips to help you solve problems
- Participating in IBM discussion forums
- Setting up e-mail notification of technical updates about your products

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with xSeries servers, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, go to <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, go to <http://www.ibm.com/services/>, or go to <http://www.ibm.com/planetwide/> for support telephone numbers.

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to <http://www.ibm.com/planetwide/> for support telephone numbers.

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

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Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

Maximum memory may require replacement of the standard memory with an optional memory module.

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