

Netfinity *White Paper*

Netfinity Technology Center

Rack Storage Expansion Enclosure Planning Guide

Abstract

This paper is designed for use by Pre-Sales technical marketing representatives. This includes IBM and Dealer Technical Professionals.

The objective is to assist you in planning, installing, configuring, and ordering IBM Netfinity Rack solutions. Heavy emphasis is placed on planning. This paper is meant to be a supplement the 'IBM 9306 Model 900 Netfinity Rack - Planning and Installation' guide that ships with the Netfinity EX10 Rack Storage Expansion Enclosure and the ConfigPro configurator used to create a rack system configuration.

The 'IBM9306 Model 900 Netfinity Rack - Planning and Installation Guide' can be ordered separately from the 9306-900 Netfinity Rack.

The IBM Netfinity Rack configurator can be obtained from either:

- <http://www.partner.us.pc.ibm.com> for business partners, or
- Dial (U.S.) 800-426-9371 to access the IBM BBS



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Description of the 9306-900 Netfinity RACK

The IBM Netfinity Rack Enclosure is an industry standard (EIA-310-D Type A) 19-inch rack enclosure. It provides the power and scalability necessary to control multiple IBM PC Servers and equipment for a true enterprise networking solution.

The 9306 Netfinity Rack offers extreme flexibility. There are a wide assortment of options and since the rack conforms to EIA standards, you are also able to incorporate third party rack options that you may already be using.

The Netfinity Rack ships pre-assembled with front and rear doors attached and includes the anti-tip brackets. Side panels are an option, as well as equipment mounting supports. The base configuration also includes a bag of 30 bolts and cage nuts to add any existing rack equipment you may have.

The Netfinity Rack is 42U in height. Each U is equivalent to 1.75-inches, and they are labeled on the front and rear of the enclosure for easy leveling and positioning of equipment. There is also room on the sides of the enclosure to mount two 1U devices on each side, giving a total of 4U more storage. This space can be used for the PDU's (Power Distribution Units) or the Console Selector Switch if a Monitor Compartment is not used.

Options for the Netfinity Rack

The 9306-900 Netfinity Rack offers a wide set of options offering complete flexibility in designing an Enterprise Networking solution:

Option Description	Part Number	Rack Space	Comments
Single Slide Shelf	94G5461	2U to 15U	This option can also be used on OEM 19" racks. Max weight capacity is 176 lbs.
Fixed Shelf	94G7442	2U to 10U	Max weight capacity is 100 lbs.
Network Products Mounting Kit	85H6735	1U to 5U	Used for IBM selected switches, hubs, and routers.
Keyboard Tray	94G7443	1U to 2U	Includes 8 ft mouse and keyboard extension cable
Monitor Compartment	94G7444	4U to 10U	Also holds Console Selector Switch in back.
Side Panel Kit	94G6669		2 locking side panels.
Blank Filler Panel Kit	94G6670	1U, 3U, 5U	Includes two 1U, one 3U, and one 5U panel with nuts and bolts.
Rack Attachment Kit	94G7446	-	Bolts, brackets, and trim pieces to attach 2 racks together. Up to 8 racks can be connected in a suite.
Console Server Selector Switch	94G7445	1U	Mounts behind Monitor Compartment or in enclosure sidewalls. Connects 8 servers or can be tiered to support 64 servers.
Console Cable set - 12 ft	94G7447	-	Keyboard, mouse, monitor extension cables. Connects servers to switch or secondary switch to primary switch.
100-120VPDU	94G6666	1U	Has eight NEMA 5-15R outlets, 12a
200-240V PDU	94G7450	1U	Has ten IEC 320-C13 outlets, 16a
Power Cable A14	94G6667	-	14ft C13 to 5-15P
Power Cable B14	94G6668	-	14ft C19 to 5-15P
Power Cable C12	94G7448	-	12ft C13 to C14
Power Cable D12	94G7449	-	12ft C19 to C14
APC Smart-UPS 1400RMB	94G6674	3U	Six 5-15R outlets
APC Smart-UPS 3000RMB	94G6676	3U	Eight 5-15R outlets

- **Single Slide Shelf**

This is a heavy duty sliding shelf used for tower based PC Server systems. It supports one system per shelf and can also be used with many EIA compliant 19" racks.

Use the following mounting plate kits for IBM PC Servers and options:

IBM Servers	Mounting Plate	Rack Space
PC Server 320,330	94G4996	15U
PC Server 520,720 and 3518 Expansion Enclosure	94G4997	15U
PS/2 Server 85, 95	94G4995	13U

- **Fixed Shelf**

Dimensions are 17.3" wide by 26.1" deep. It can be used for miscellaneous options or storage.

- **Network Products Mounting Kit**

Used to mount IBM Networking products:

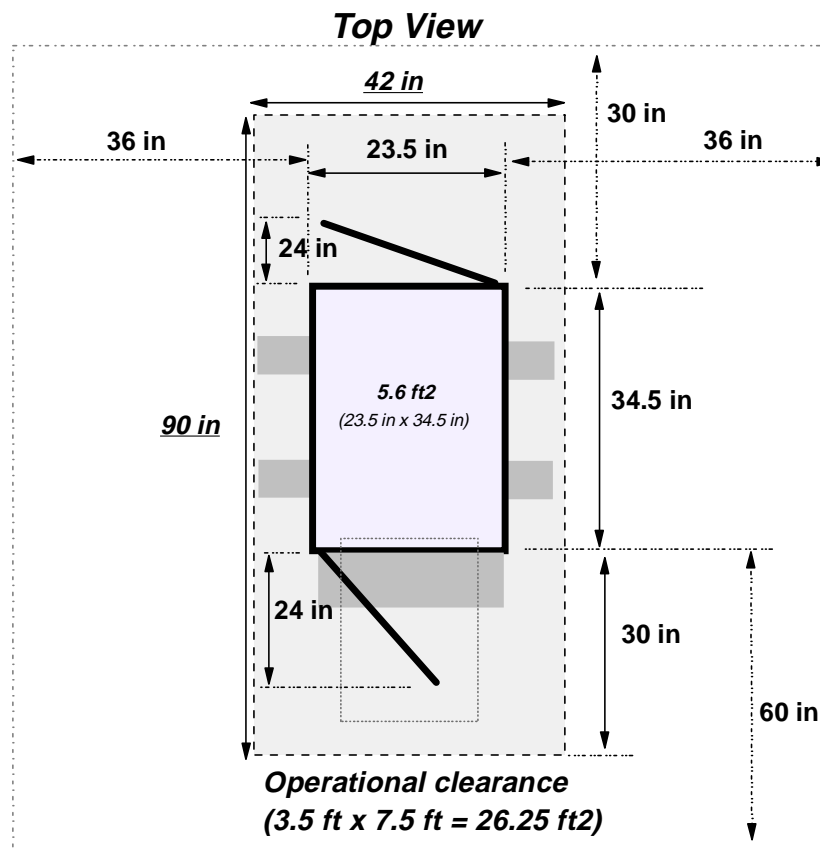
Networking Product	Part Number	Rack Space
Ethernet Switch	8271-108,216	2U
Token-Ring Switch	8272-108,216	2U
Nways LAN Switch	8270-800	5U
ATM Switch	8285-00B	3U
Token-Ring Hub	8238	2U
Multi-Protocol Router	2210-12x,x4x	1U,2U
Ethernet Hub	8237-001, 002, 003	2U
T-R Controlled Access Unit	8230-04A, 04P	2U

- **Keyboard Tray**

The keyboard tray holds the keyboard and mouse. The tray may be necessary because most keyboards are too large to fit between the mounting flanges of an EIA 19-inch rack which is approximately 17.5 inches. Since the keyboard tray has been designed to handle a wide range of keyboards with sizes exceeding width limitations. Therefore, the keyboard must be turned to be stored in the tray.

If the keyboard is less than 1.5 inches high at its highest point, it can go in the tray using 1U of rack space; larger keyboards such as the IBM Enhanced Keyboard with the TrackPoint II) require 2U of space minimum.

- **Monitor Compartment**



Service clearance (8 ft x 10.4 ft = 83 ft²)

The monitor compartment holds both the monitor and the switch. Allocate enough space in the rack for the height of the monitor selected. See the following table for monitor model number, number of units required, size screen, and casing color.

Monitor Model Number	Number of Units Required	Screen Size	Color of monitor casing
G72 - 6547 01X	10U	17"	White
G42, G51, G82	9U		
4707 - EO1	6U	9"	
G70 - 6544-433	10U	17"	Black
G50 - 6543-333	9U	15"	Black
G52 - 6546-40N	9U	15"	Gray

Planning for the 9306-900 Installation

When planning for the rack there are several items that need to be taken into consideration. They include:

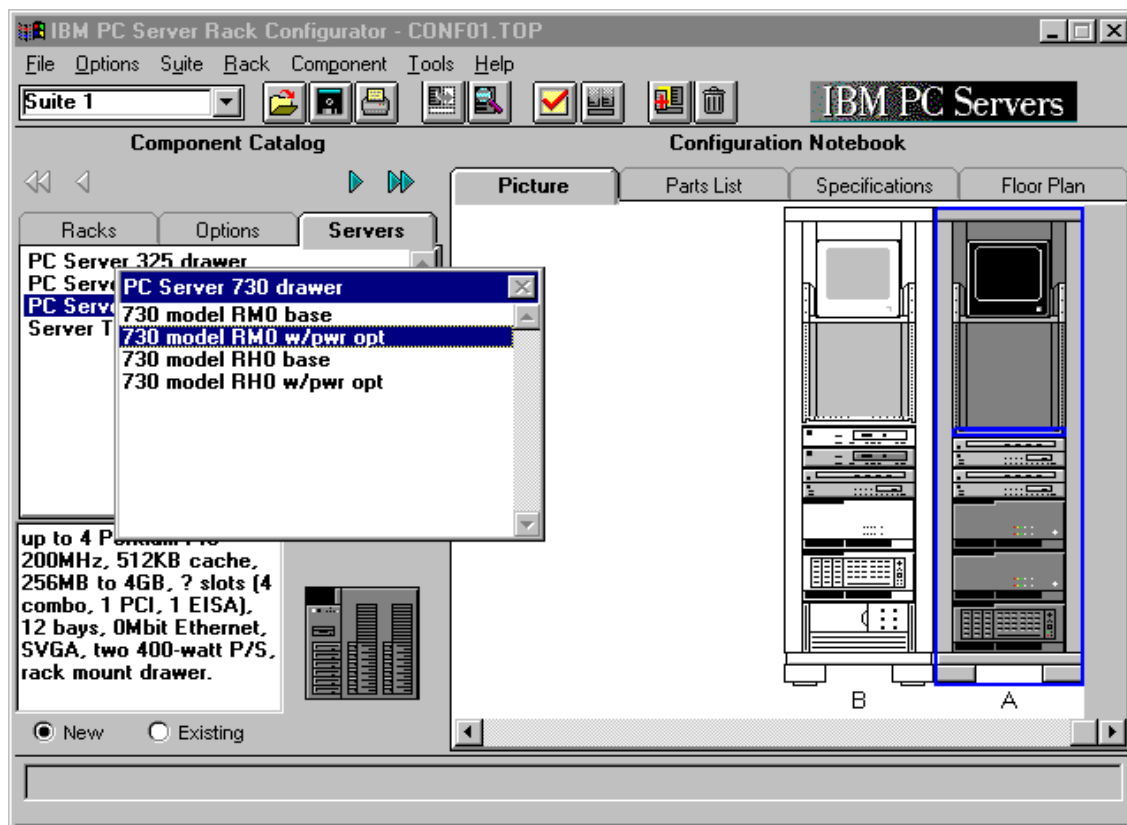
- General Planning
- Space Requirements
- Cabling Requirements
- Layout of components in the rack expansion enclosure
- Power Requirements

General Planning

The best source of pre-sales planning for Netfinity Rack configuration is the IBM PC Server Rack Configurator program. It is a Windows based program that will configure and validate IBM PC Server Rack solutions. This application is available from:

- <http://www.us.pc.ibm.com/products/server/rackconf.html>.

The Rack Configurator has an easy to use drag & drop interface and lists all the options available for a complete rack solution.



Space Requirements

Proper clearance for the Netfinity Rack must be given to provide easy access for maintenance and upgrades.

The general guideline is to provide 30-inches clearance at the front and rear, and 9.5-inches on each side. This amount of clearance provides room for easy access to configure and use your rack equipment.

For maintenance and serviceability, you will need to increase this space to an area of 8-ft by 10.4-ft.

Cable Requirements

The thing to keep in mind here is cable lengths. This includes power, SCSI, mouse, keyboard, monitor, and any other system cables.

For example, you may have a system with a 6-ft power cord at the top of the Netfinity Rack and you have to connect it to the UPS that is at the bottom of the enclosure. The enclosure is 6-ft in height and if the connections were directly off the back of the devices, they would connect. But, the system is on a slide mount and when fully slide out it needs 3.5-ft more power cord. In addition, the UPS is recessed 1.5-ft from the back of the enclosure. So in this example, you will need a power cord that is at least 11-ft in length.

Component Layout

When laying out your Netfinity Rack keep the following guidelines in mind:

- Install the keyboard tray, monitor compartment, and shelves before installing any servers or power devices.
- Install the monitor and monitor compartment at the top of the rack.
- Connect rack suites together before installing any equipment in them.
- Keep the exhaust vents on the top of the rack clear.
- Route power cables through the bottom of the rack.
- Remove the front door from IBM PC Server 325 systems. The door may hinder in the cooling of the system.

Console Selector switches can also be tiered. This involves connecting the inputs of one switch to the outputs of 8 other switches, giving you control of 64 systems from one keyboard, monitor, and mouse. This allows you to fully populate a Netfinity Rack without worrying about space for the monitor and keyboard.

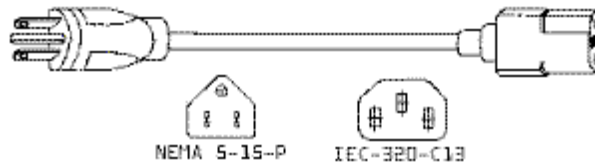
Power Requirements

Power to the rack can come from the PDU's or a UPS in the rack. A Netfinity RACK ENCLOSURE can be used without a PDU or UPS, but this makes it difficult for cable management.

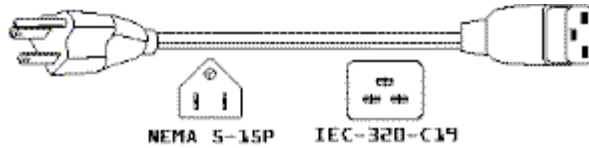
Keep in mind that when using the high-voltage PDU, the outlets are different than standard wall outlets and that each system must be set to 220 volt if it doesn't have an auto-switching power supply.

The following are diagrams of each of the power supply cord options:

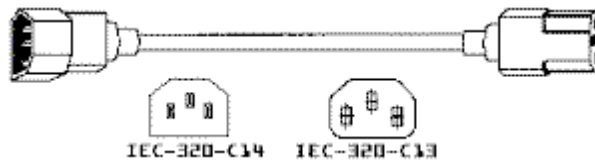
- A14 - C13 to 5-15P Cable , part number 94G6667



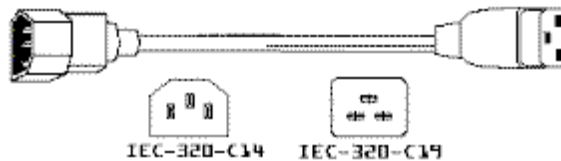
- B14 - C19 to 5-15P Cable , part number 94G6668



- C12 - C13 to C14 Cable, part number 94G7448



- D12 - C19 to C14 Cable, part number 94G7449



Part Number	Description
94G6667	14 ft intra rack power cord for standard hardware. Use with 100-120v.
94G6668	14 ft intra rack power cord for Netfinity 7000. Use with 100-120v.
94G7448	12 ft intra rack power cord for standard hardware. Use with 200-240v.
94G7449	12 ft intra rack power cord for Netfinity 7000 hardware. Use with 200-240v.

Note: If a 6 ft. 200-240V power cord is required, order IBM part number 75H8444.

Power Distribution Units

IBM offers two PDU's. These units mount in the rack side wall of the Netfinity rack and are a:

- 100 - 120V 12a PDU, p/n 94G6666 with 8 NEMA 5-15R outlets, or a
- 200 - 240 V 16aPDU, p/n 94G7450 with 10 IEC 320-C13 outlets.

UPS

IBM offers two different UPSs. They are:

- 1400VA UPS
 - with 120V for US, Canada, and Latin America, p/n 94G6674, with 6 NEMA 5-15R outlets
 - with 200-240V for EMEA and AP, p/n 94G6675, with 4 NEMA 5-15R outlets
- 3000VA UPS
 - with 120V for US, Canada, and Latin America, p/n 94G6676, with 8 NEMA 5-15R outlets
 - with 200-240V for EMEA and AP, p/n 94G6677, with 8 NEMA 5-15R outlets

The 1400VA UPS is capable of handling one server, but the 3000VA UPS can handle up to three servers.

Department Server Rack Solution Examples

The IBM Netfinity Rack designed to provide an easily configurable solution for many different types of enterprise networking environments. One such example would be a remote branch office or a departmental server.

Using the 9306-900 rack and options, you are able to put everything needed in one place. With lockable doors, you can easily allow access to only those people that need it. With a rack system that can slide out on rails, or tower mounted on a slide shelf, upgrades and maintenance are made easier.

Single-Server Example

Let's look at one example departmental server. First you start with the 9306-900 Rack Mount Enclosure. Then to make a complete solution we need the following parts.

- IBM PC Server 325 Rack Mount 5U
- IBM PC Server 3519 Storage enclosure 5U
- APC 1400 UPS Rack Mount UPS 3U
- IBM G52 Monitor 9U
- IBM Ethernet switch 2U
- Console Selector Switch 1U
- Monitor Compartment
- Keyboard Tray 1U
- Side Panel Kit

The total space this will take is 26U. This will leave us with 17U of open space (the Console Selector Switch is mounted behind the Monitor Compartment, saving 1U), so we also need to include 2 Filler Panel Kits in this configuration.

The next thing to take into account is cable lengths. The UPS will supply all the power and is mounted at the bottom. The monitor is at the top and a 6 ft cord is not long enough to allow the UPS to be pulled out while connected. We will have to include an A14 cord in this configuration also.

Depending on where the 325 and 3519 are mounted, a 1 meter SCSI cable may not be long enough. In this case we would use a 3.0 meter or 4.3 meter cable. The 3519 has a built in SCSI Repeater so these cable lengths are supported.

After mounting everything in the Netfinity Rack, you now have an elegant solution that is easy to maintain, takes up less floor space, secure, easy to configure, and move around.

Multiple-Server Example

If you need to configure more than one rack, the configurator can handle rack suites too. If you needed to configure an enterprise server rack suite, with the following equipment:

- 3000VA ups (qty. 2)
- 8651-rmo (qty. 4)
- 9306 ZZZ keyboard tray
- 3520 xxx Tympani (qty. 6)

the rack configurator would supply all the details that you would need to order this configuration (including quantity of racks) and even gives you a summary of the rack suite.

A sample summary for the above configuration would be:

	Rack A Used/Max	Rack B Used/Max	Total Used/Max
Weight (kg)	505/499	397/499	902/998
Power (W)	5,200	3,200	8,400
Volt-Amps	4580/3000	3240/3000	7820/6000
Heat (Btu/hr)	17,732	10,912	28,644
Bays	0/0	0/3	0/3
EIA	40/42	42/42	82/84
Power Outlets	7/8	/8	11/16
Console Ports	2/0	2/0	4/0