# SUSE Linux Enterprise Server

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# Architecture-Specific Information

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# Contents

# Preface

This manual describes the steps for installing SUSE® Linux Enterprise Server on IBM eServer i5 and eServer p5, pSeries, JS20/JS21 Blades, and iSeries systems. It contains all necessary information for the preparation of the installation of SUSE Linux Enterprise Server. The installation of SUSE Linux Enterprise Server is described in Chapter 3, *Installation with YaST* (↑Installation and Administration).

Whenever possible, this manual refers to relevant information sources and other documentation on the Internet and on your installed system. Detailed information about Linux device drivers and other technical details are covered in the IBM (online) documentation. Note the respective references.

# 1 Structure of This Manual

This manual provides information about the hardware and software requirements for successfully installing SUSE Linux Enterprise Server on your system, necessary steps on i5/OS, and the preparation of the eServer i5/p5 firmware, pSeries, JS20/JS21 Blades, and iSeries.

> **TIP: For More Information about SUSE Linux Enterprise Server on IBM POWER**
>
> Find a short introduction to SUSE Linux Enterprise Server on IBM POWER in the *Start-Up Guide* manual of which you received a printed copy. Find a detailed description of the installation procedure and the administration of SUSE Linux Enterprise Server in the *Installation and Administration* manual, which you can find in the local directory `/usr/share/doc/manual` or on the first installation medium in the directory `/docu`.

# 2 Target Group

Readers of this manual should have some experience in the following areas:

• Use of i5/OS or the pSeries firmware.

- Knowledge of the hardware environment of the IBM pSeries or iSeries system, especially of the network environment.

- Basic Linux and Unix skills.

# 3  Acknowledgments

The history of Linux is a success story of countless developers around the world who continue what Linus Torvalds once started as a one-man show. We sincerely appreciate their tireless commitment.

We would particularly like to thank all who are involved in the pSeries and iSeries project at IBM and SUSE. Many thanks to the developers at SUSE and IBM, the testers at SUSE, and all beta testers and editors at IBM.

# 1

# Requirements

## 1.1 Hardware Requirements

### 1.1.1 iSeries and i5 Models

***Table 1.1*** *Supported Models*

| | |
|---|---|
| iSeries models | i800, i810, i825, i870, i890 |
| eServer i5 and System i5 models | 510, 520, 550, 570, 570+, 590, 595 |

The systems in Table 1.1, "Supported Models" (page 7) were supported by SUSE® Linux Enterprise Server 9. They are no longer supported but should still run.

***Table 1.2*** *Unsupported Models*

| | |
|---|---|
| iSeries models | i270, i820, i830, i840 |

A standard installation requires at least 256 MB of RAM. An installation over VNC requires at least 448 MB of RAM. The installation of a standard system requires at least 1.8 GB of free hard disk space.

Refer to http://www-1.ibm.com/servers/eserver/iseries/linux/ pdfs/guide.pdf for a detailed list of all feature codes. An older version of this list

is also available at `http://penguinppc.org/ppc64/machines.php`. Up-to-date hardware information for Linux on System i5 is available at `http://www-03.ibm.com/servers/eserver/iseries/linux/servers.html`.

# 1.1.2 pSeries and p5 Models

These systems are operated with a PPC64 kernel.

***Table 1.3***     *Supported Models*

| | |
|---|---|
| pSeries models | p615, p630, p650, p655, p670, p690 |
| eServer p5, System p5, OpenPower, and ATX Server models | 505, 510, 520, 550, 560Q, 570, 570+, 575, 575+, 590, 595, 710, 720, 185 |
| ATX Workstation | 185 |

All POWER3 and RS64–based models that were supported by SUSE Linux Enterprise Server 9 are no longer supported, but should still run.

A standard installation requires at least 256 MB of RAM. An installation over VNC requires at least 448 MB of RAM. The installation of a standard system requires at least 1.8 GB of free hard disk space.

Up-to-date hardware information for Linux on System p5 is available by model from `http://www-03.ibm.com/systems/p/linux/`.

# 1.1.3 BladeCenter

BladeCenter JS20 except JS20 GA1 (model 8842-21X), BladeCenter JS20V, and BladeCenter JS21 are supported systems at the time of printing.

# 1.2 Software Requirements

## 1.2.1 IBM iSeries

Find up-to-date information about software requirements at http://www.ibm.com/servers/eserver/iseries/linux/reqs.html.

## 1.2.2 IBM eServer i5 and System i5

Find up-to-date firmware at http://www-912.ibm.com/eserver/support/fixes/fixcentral. Select *System i5 family* and *Server Firmware* to find your system model. Updates for the Hardware Management Console can also be selected from this page.

## 1.2.3 IBM pSeries, IBM eServer p5, System p5, OpenPower

Find up-to-date firmware at http://www-912.ibm.com/eserver/support/fixes/fixcentral. Select *UNIX servers* and *Hardware microcode and firmware* to find your system model. Updates for the Hardware Management Console can also be selected from this page.

## 1.2.4 JS20 Blade and JS21 Blade

Find up-to-date firmware for the BladeCenter at http://www-03.ibm.com/servers/eserver/support/bladecenter/allproducts/downloading.html.

# Preparation

# 2

This chapter describes the preparatory steps that must be taken before the actual installation. The installation procedure depends on the system used. See the following documentation:

- For IBM eServer i5/p5 Systems, see Section 2.1, "Preparing for Installation on IBM eServer i5/p5, System i5/p5, and OpenPower Models" (page 12)

- For IBM pSeries systems, see Section 2.2, "Preparing for Installation on an IBM pSeries Models" (page 19)

- For IBM JS20/JS21 Blades, see Section 2.3, "Preparing an Installation on IBM JS20/JS21 Blades" (page 24)

- For IBM iSeries systems, see Section 2.4, "Preparing an Installation on IBM iSeries Models" (page 28)

If SUSE® Linux Enterprise Server should be installed on a number of systems or partitions, it is recommended to create a network installation source. This eliminates the need to change CDs during the installation. The same source can also be used for the concurrent installation on several partitions or several systems. The configuration of a network installation source is described in Section 4.2.1, "Setting Up an Installation Server Using YaST" (Chapter 4, *Remote Installation*, ↑Installation and Administration). For eServer i5, System i5, and iSeries, a network installation source can be set up in a special partition. See Section 2.4.4, "Creating a Network Installation Source" (page 41) for iSeries.

The installation can be controlled with a VNC client. For more information about VNC, see Section 4.1.1, "Simple Remote Installation via VNC—Static Network Configuration" (Chapter 4, *Remote Installation*, ↑Installation and Administration).

To participate in the `linuxppc-dev` mailing list, sign up using the forms at `https://ozlabs.org/mailman/listinfo/linuxppc-dev`. The following links are interesting for the maintenance of an installation:

- `http://www.novell.com/suselinuxportal` is an effective help tool for assisting customers in solving problems. A corresponding article is published whenever SUSE discover that a special case could lead to serious problems. Search the portal using keywords like PPC or POWER.

- Find security alerts at `http://www.novell.com/linux/security/securitysupport.html`. SUSE also maintains two security-related mailing lists to which anyone may subscribe.

  - `suse-security` — General discussion of security regarding Linux and SUSE. All security alerts for SUSE Linux Enterprise Server are sent to this list.

  - `suse-security-announce` — The SUSE mailing list exclusively for security alerts.

# 2.1 Preparing for Installation on IBM eServer i5/p5, System i5/p5, and OpenPower Models

This section covers the preparatory steps for installing SUSE® Linux Enterprise Server on IBM eServer i5/p5 systems. It explains the installation from a built-in CD-ROM drive and over the network.

This section assumes you have set up your HMC and connected it to your system. Find more information about using the wizard to configure the HMC in "Configuring the HMC using the Guided Setup Wizard": `http://publib.boulder.ibm.com/infocenter/eserver/v1r3s/index.jsp?topic=/iphai/confighmcgs.htm`

### 2.1.1 Modern Features of IBM eServer i5/p5 Systems

IBM eServer i5/p5 systems offer the possibility to partition the system like on IBM iSeries systems. This enables the concurrent operation of up to 254 operating systems on one machine. These operating systems are installed in *LPARs* (logical partitions). One or several of these partitions can contain a SUSE Linux Enterprise Server environment.

To prepare an LPAR for SUSE Linux Enterprise Server, first configure the system over the *HMC*. Refer to the IBM documentation for details: `http://publib.boulder` `.ibm.com/infocenter/eserver/v1r3s/index.jsp?topic=/iphbi/` `iphbikickoff.htm`

### 2.1.2 Hard Disk Space

Make sure that you have sufficient hard disk space for installing SUSE Linux Enterprise Server. The standard system requires at least 4 GB of free hard disk space.

### 2.1.3 Assigning an Installation Device to an LPAR

SUSE Linux Enterprise Server can be installed from a CD-ROM or DVD drive or using a network installation source. Make the CD-ROM, DVD drive, or network device available to the LPAR to install.

*Figure 2.1*  *HMC: Server Management—Properties*
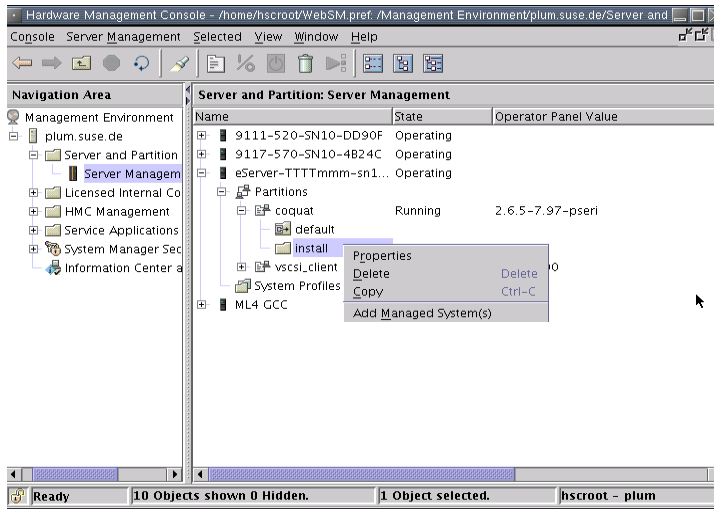


*Procedure 2.1*  *Assigning a CD-ROM or DVD Drive to an LPAR*

**1** Open the HMC application and go to *Server and Partition → Server Management*.

**2** From the available servers, expand the server and partition to install.

**3** Right-click the profile to use for installation and select *Properties*—see Figure 2.1, "HMC: Server Management—Properties" (page 14).

**4** In the *Logical Partition Profile Properties* dialog, select the *Physical I/O* tab.

**5** From *Managed system I/O devices*, select the *Other Mass Storage Controller* from the bus where it is installed. To assign this DVD drive to the partition, click *Add as required*.

The result should look like Figure 2.2, "HMC: Managed System I/O Devices" (page 15).

**Figure 2.2**   *HMC: Managed System I/O Devices*



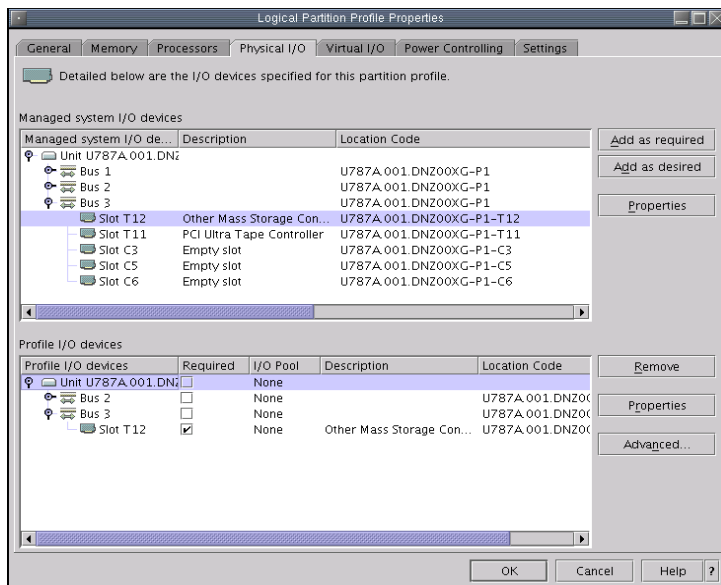Now insert the SUSE Linux Enterprise Server CD1 or DVD1 in the drive.

**Procedure 2.2**   *Assigning a Network Device to an LPAR*

**1** Open the HMC application and go to *Server and Partition → Server Management*.

**2** From the available servers, open the server and partition to install.

**3** Right-click the profile to use for installation and select *Properties*—see Figure 2.1, "HMC: Server Management—Properties" (page 14).

**4** In the *Logical Partition Profile Properties* dialog, select the *Physical I/O* tab.

**5** From *Managed system I/O devices*, select *PCI 10/100/1000Mbps Ethernet UTP 2-port* from the bus where it is installed. Then click *Add as required*.

If you plan to install using a virtual ethernet adapter, refer to the IBM documentation.

Create a network installation source if SUSE Linux Enterprise Server should be installed on a number of partitions. This eliminates the need to change CDs during installation. The same source can also be used for concurrent installation of various systems. The configuration of the network installation source is described in Section 4.2.1, "Setting Up an Installation Server Using YaST" (Chapter 4, *Remote Installation*, ↑Installation and Administration).

## 2.1.4 Starting the Installation

To start the installation, reboot the system. Right-click the profile name, select *Activate*, and press *OK* in the following dialog.

Use the screen console or connect to a serial console as described in the IBM documentation. One simple way to start a serial console is to open a VTerm while activating the partition. To do this, activate *Open a terminal window or console session* in the *Activate Logical Partition* dialog.

Enter the system firmware by pressing F1 or 1 when using a serial console or a virtual console during the system check when the system is rebooted:

```
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
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        1 = SMS Menu                        5 = Default Boot List
        8 = Open Firmware Prompt            6 = Stored Boot List


     memory      keyboard      network      scsi      speaker
```

Press F1 or 1 while the SCSI devices are checked. Select *5. Select Boot Options* to enter the boot options dialog:

```
Version SF220_004
SMS 1.5 (c) Copyright IBM Corp. 2000,2003 All rights reserved.
-------------------------------------------------------------------
Main Menu
 1.  Select Language
 2.  Setup Remote IPL (Initial Program Load)
 3.  Change SCSI Settings
```

```
   4.   Select Console
   5.   Select Boot Options


-------------------------------------------------------------------
Navigation Keys:

                                  X = eXit System Management Services
-------------------------------------------------------------------
Type the number of the menu item and press Enter or select Navigation
                                                            Key:5
```

Select *1. Select Install/Boot Device* to set the *Install Device*. Go to *7. List all Devices* to see the list of available devices:

```
Version SF220_011
SMS 1.5 (c) Copyright IBM Corp. 2000,2003 All rights reserved.
-----------------------------------------------------------------------------
Select Device
Device   Current  Device
Number   Position Name
 1.        -       Virtual Ethernet
                   ( loc=U9111.520.10D3CCC-V1-C3-T1 )
 2.        -       Ethernet
                   ( loc=U787A.001.DNZ00XG-P1-T5 )
 3.        -       Ethernet
                   ( loc=U787A.001.DNZ00XG-P1-T6 )
 4.        -       IDE CD-ROM
                   ( loc=U787A.001.DNZ00XG-P4-D3 )
 5.        1       SCSI 73407 MB Harddisk
                   ( loc=U787A.001.DNZ00XG-P1-T10-L8-L0 )


-----------------------------------------------------------------------------
Navigation keys:
M = return to Main Menu
ESC key = return to previous screen    X = eXit System Management Services
-----------------------------------------------------------------------------
Type the number of the menu item and press Enter or select Navigation Key:
```

# 2.1.5  Booting from the CD-ROM Drive

Select the CD-ROM drive (4 in this example):

```
SMS 1.5 (c) Copyright IBM Corp. 2000,2003 All rights reserved.
-----------------------------------------------------------------------------
Select Task

IDE CD-ROM
    ( loc=U787A.001.DNZ00XG-P4-D3 )
```

```
   1.   Information
   2.   Normal Mode Boot
   3.   Service Mode Boot




    -------------------------------------------------------------------------
    Navigation keys:
    M = return to Main Menu
    ESC key = return to previous screen    X = eXit System Management Services
    -------------------------------------------------------------------------
    Type the number of the menu item and press Enter or select Navigation Key:
```

Choose *2. Normal Mode Boot* to install from this device. On the next screen, confirm
with *1. Yes* to exit *System Management Services* and boot from the device.

The system reads from the CD-ROM drive and the yaboot utility starts:

```
Elapsed time since release of system processors: 9808 mins 37 secs

Config file read, 148 bytes


  Welcome to SuSE Linux (SLES9)!

  Use  "install"    to boot the pSeries 64bit kernel
  Use  "install32"  to boot the 32bit RS/6000 kernel

  You can pass the option "noinitrd"  to skip the installer.
  Example: install noinitrd root=/dev/sda4

Welcome to yaboot version 1.3.11.SuSE
Enter "help" to get some basic usage information
boot:
```

Select *install* from the menu and press ⌷Enter⌷. On IBM eServer i5/p5 systems, you only
boot the 64-bit kernel.

To read the installation data from a network install source rather than continuing the
installation from the CD-ROM (see
), append the option `manual` to the name of the kernel
(`install`).

For an installation over VNC, append the parameters `vnc=1` and
`vncpassword=`*password* to the name of the kernel (`install`). Read more about

VNC in Section 4.1.1, "Simple Remote Installation via VNC—Static Network Configuration" (Chapter 4, *Remote Installation*, ↑Installation and Administration).

## 2.1.6 Booting from the Network Source

Select an ethernet device that has access to the installation source (2 in this example).

## 2.1.7 Additional Steps

Proceed as described in Chapter 3, *Installation with YaST* (↑Installation and Administration) to begin installing the software with linuxrc and YaST.

# 2.2 Preparing for Installation on an IBM pSeries Models

This section covers the preparatory steps for installing SUSE® Linux Enterprise Server on pSeries systems. It explains the installation from a built-in CD-ROM drive or a network source.

## 2.2.1 Special Features of IBM pSeries p630, p655, p670, and p690

IBM p630, p655, p670, and p690 systems offer the possibility to statically partition the system similarly to eServer p5/System p5 (which is described in Section 2.1, "Preparing for Installation on IBM eServer i5/p5, System i5/p5, and OpenPower Models" (page 12)). This enables the concurrent operation of up to 16 operating systems on one machine. These operating systems are installed in *LPARs* (logical partitions). One or several of these partitions can contain a SUSE Linux Enterprise Server environment.

To prepare an LPAR for SUSE Linux Enterprise Server, first configure the system over the *HMC*. Refer to the Redbook *IBM eServer pSeries 690 System Handbook* (SG24-7040-00) for details (`http://www.redbooks.ibm.com/redbooks/SG247040/`).

Important notes regarding the configuration:

- The recommended maximum number of processors for a SUSE Linux Enterprise Server LPAR is eight, because the kernel can only manage eight processors effectively.

- For the installation, select *SMS* as the boot mode for the respective partition.

- The *HMC* terminal used for the input during the installation is a VT320 emulation. This emulation can lead to strange effects with some applications. If possible, use an XTerm for communicating with the LPAR.

## 2.2.2 Hard Disk Space

Make sure that you have sufficient hard disk space for installing SUSE Linux Enterprise Server. The use of a separate hard disk is recommended.

SUSE Linux also supports installing to Fibre Channel–attached storage. Before beginning installation, the Fibre Channel Host Bus Adapter (FCHBA), SAN fabric, and storage system must each be configured to provide access from the FCHBA through the SAN Fabric to target logical units (LUNs) on the storage system.

SAN storage devices, if properly configured, are listed among existing hard disks on your system. *Create Custom Partitioning Setup* opens the dialog, as described in Section 3.7.1, "Partitioning" (Chapter 3, *Installation with YaST*, ↑Installation and Administration).

For more information, see http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en_US/index.htm?info/iphai/confighmcgs.htm.

## 2.2.3 Setting Up the Installation Source

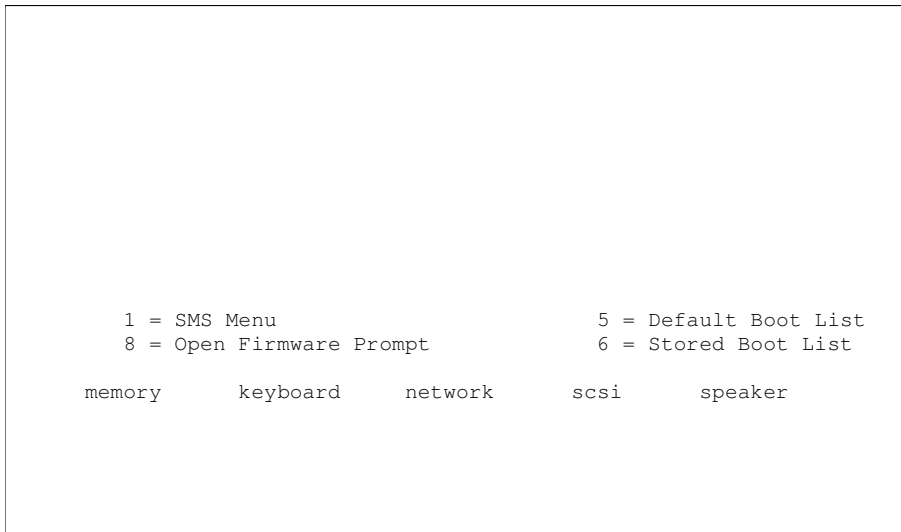If you plan to install from CD-ROM, insert CD1 in the drive. In LPAR mode, the partition to install must have the CD-ROM in its partition profile. Create a network installation source if SUSE Linux Enterprise Server should be installed over a number of partitions. This eliminates the need to change CDs during installation. The same source can also be used for concurrent installation of various systems. The configuration of

the network installation source is described in Section 4.2.1, "Setting Up an Installation Server Using YaST" (Chapter 4, *Remote Installation*, ↑Installation and Administration).

# 2.2.4  Starting the Installation

To start the installation, reboot the system. Then enter the system firmware by pressing [F1] or [1] when using the serial console during the system check when the system is rebooted. See Figure 2.3, "Entering the System Firmware" (page 21).

*Figure 2.3*    *Entering the System Firmware*

```
       1 = SMS Menu                        5 = Default Boot List
       8 = Open Firmware Prompt            6 = Stored Boot List

    memory       keyboard      network      scsi      speaker
```

Press [F1] or [1] while the SCSI devices are checked. Select *6 MultiBoot* to enter the *Multiboot* dialog. See Figure 2.4, "Multiboot Dialog" (page 22)

***Figure 2.4***   *Multiboot Dialog*

```
Version M2P01113
(c) Copyright IBM Corp. 2000  All rights reserved.
-----------------------------------------------------------------------
Multiboot

1  Select Software
2  Software Default
3  Select Install Device
4  Select Boot Devices
5  OK Prompt
6  Multiboot Startup <ON>




                                                      .------.
                                                      |X=Exit|
                                                      `------'
===>3


```

Select 3 to set the install device. A list of available devices is displayed. See Figure 2.5, "Installing the Operating System" (page 22).

***Figure 2.5***   *Installing the Operating System*

```
Install Operating System

Device Device
Number Name
1       Diskette
2       SCSI Tape id=0 ( slot=50322f5a )
3       SCSI CD-ROM id=1 ( slot=50322f5a )
4       Ethernet  ( Integrated )
5       SysKonnect PCI FDDI Adapter  ( slot=4 )
6       Ethernet  ( slot=2 )
7               None





                                                      .------.
                                                      |X=Exit|
                                                      `------'
===>3
```

# 2.2.5 Booting from the CD-ROM Drive

Select the respective CD-ROM drive (3 in this example). The system reads from the CD-ROM drive and displays the *identstring*.

```
->1   SUSE Linux SLES-9 (PPC)<-
```

After you select ⎡1⎤, the yaboot utility is started.

```
Welcome to SuSE Linux Enterprise 10 (PPC)!

  Type  "install"  to start the YaST installer on this CD/DVD
  Type  "slp"      to start the YaST install via network
  Type  "rescue"   to start the rescue system on this CD/DVD
```

Select *install* from the menu and press ⎡Enter⎤. Alternatively, just press ⎡Enter⎤ to start the installer, the default option.

To install from a network source (see Section 2.2.3, "Setting Up the Installation Source" (page 20)), append `manual` to the kernel to `install`. For an installation over VNC, append the parameters `vnc=1` and `vncpassword=password` to `install`. Read more about VNC in Section 4.1.1, "Simple Remote Installation via VNC—Static Network Configuration" (Chapter 4, *Remote Installation*, ↑Installation and Administration).

In LPAR mode, the partition to install must have the CD-ROM in its partition profile.

If yaboot cannot be started, launch the loading process manually:

- Select OK from SMS and the firmware prompt appears.

- Check the alias list of the available devices: `0> devalias`.

- Enter the *boot string* with the required alias (in this example: `cdrom`).

  To boot a ppc64 kernel:

  ```
  0> boot cdrom;,\suseboot\inst64
  ```

  To boot a ppc32 kernel:

  ```
  0> boot cdrom;,\suseboot\inst32
  ```

## 2.2.6 Booting from the Network Source

Select an ethernet device that has access to the installation source (6 in this example).

## 2.2.7 Additional Steps

Proceed as described in Chapter 3, *Installation with YaST* (↑Installation and Administration) to begin installing the software with linuxrc and YaST.

# 2.3 Preparing an Installation on IBM JS20/JS21 Blades

This section describes the preparatory steps for the installation of SUSE® Linux Enterprise Server on JS20/JS21 Blades. It covers installation using the CD-ROM drive of the BladeCenter and using the network.

## 2.3.1 Creating a Network Installation Source

Create a network installation source if SUSE Linux Enterprise Server should be installed over a number of partitions. This provides the advantage that no CDs need to be changed during installation. The same source can also be used for the concurrent installation of various systems. Configuration of a network installation source is described in Section 4.2.1, "Setting Up an Installation Server Using YaST" (Chapter 4, *Remote Installation*, ↑Installation and Administration).

## 2.3.2 Hard Disk Storage Space

Ensure that enough hard disk storage space is available for the installation of SUSE Linux Enterprise Server. It is recommended to use a dedicated hard disk.

## 2.3.3 Notes and Information

Introductory Information:

- JS20/JS21 Blades Site: http://www-03.ibm.com/servers/eserver/bladecenter/literature/

# 2.3.4 Preparing the System for Boot

## Preparing to Boot from the CD-ROM Drive

Perform the steps described in this section if an installation from CD-ROM is desired.

Assign the CD-ROM drive to the Blade chosen for installation by connecting with a Web browser to a BladeCenter Management Module then logging in. After login, select the function *Remote Control* in the menu *Blade Tasks* then activate *Start Remote Control*. Assign the CD-ROM drive to the desired blade in the menu *Change Media Tray Owner* of the new window.

Then set up the CD-ROM drive as a boot device. Do this by selecting *Blade Tasks* then *Configuration* while in the BladeCenter Management Module. Then select the JS20/JS21 Blade in the section *Boot Sequence*. Set the entry for *1st Device* on the page for *Blade Boot Sequence* to *CDROM*.

Put CD 1 in the CD-ROM drive and restart the blade.

## Preparing to Boot from the Network

Perform the steps as described in this section if an installation over the network is desired.

Connect to the BladeCenter Management Module using a Web browser and log in. Set the boot device to the network by accessing the *Configuration* menu from the *Blade Tasks* page. Then select the JS20/JS21 Blade in the section *Boot Sequence* and set *1st Boot Device* to *Network — BOOTP* on *Blade Boot Sequence*.

## Rebooting and Connecting to the Console of the JS20/JS21 Blade

Reboot the JS20/JS21 Blade from the item *Power/Restart* of the *Blade Tasks* menu in the BladeCenter Management Module. A table appears, showing the power status of

the blades in the *Pwr* column. Mark the check box of the desired blade and restart it with *Power On Blade*.

Connect to the BladeCenter with the command telnet *bladecenter* and log in.

```
username: user
password: ********
system>
```

The command env -T system:blade[*bay number*] determines for which JS20/JS21 Blade the subsequent commands are intended. The blades installed in the BladeCenter are listed by calling list -l 3.

```
system> list -l 3
system
        mm[1]      primary
        power[1]
        power[2]
        power[3]
        power[4]
        blower[1]
        blower[2]
        switch[1]
        switch[3]
        blade[1]
                sp
                cpu[1]
                cpu[2]
        blade[3]
                sp
        blade[4]
                sp
        blade[6]
                sp
        blade[8]
                sp
                cpu[1]
                cpu[2]
        blade[9]
                sp
                cpu[1]
                cpu[2]
        blade[10]
                sp
        blade[11]
                sp
        blade[13]
                sp
        mt
system>
```

The *command target* is then determined. To work, for example, with blade number 9, enter env -T system:blade[9]. Connect with the console of the JS20/JS21 Blade over *Serial over LAN (SOL)* with the command console.

```
system> env -T system:blade[9]
OK
system:blade[9]> console
```

## Starting the Installation

The SUSE Linux Enterprise Server boot loader starts after the system check has completed.

```
Config file read, 149 bytes


  Welcome to SuSE Linux (SLES-9)!

  Use  "install"     to boot the pSeries 64bit kernel
  Use  "install32"   to boot the 32bit RS/6000 kernel

  You can pass the option "noinitrd"  to skip the installer.
  Example: install noinitrd root=/dev/sda4

Welcome to yaboot version 1.3.11.SuSE
Enter "help" to get some basic usage information
boot:
```

Select *install* from the menu and press ⌷Enter⌷.

In the case of an installation over VNC, append the parameters vnc=1 and vncpassword=*password* to the command line for the kernel (install).

## Additional Steps

Proceed as described in Chapter 3, *Installation with YaST* (↑Installation and Administration) to begin installing the software with linuxrc and YaST.

# 2.4 Preparing an Installation on IBM iSeries Models

An iSeries system must be prepared on the i5/OS side before installing SUSE® Linux Enterprise Server. This section describes the installation with a built-in CD ROM drive.

---

**TIP**

The steps in this section are especially written for installation on iSeries systems running IBM i5/OS V5R3. They can also be performed on IBM i5/OS V5R4 and V5R2. Additional options only available to i5/OS V5R2 are described in *Linux in a guest partition* available at http://publib.boulder.ibm.com/infocenter/iseries/v5r4/index.jsp?topic=/rzalm/rzalmlinuxkickoff.htm.

---

The support portal often features articles about common problems. Access this portal at http://www.novell.com/suselinuxportal.

This chapter was compiled in close cooperation with Christopher Abbey, James Srebbing, Jay S. Bryant, and Brent Baude.

## 2.4.1 Resources

Introductory Resources

- The iSeries site located at http://www.ibm.com/servers/eserver/iseries/linux/

- The IBM Linux on iSeries Redbook: http://publib-b.boulder.ibm.com/Redbooks.nsf/RedbookAbstracts/sg246232.html

- The iSeries on Linux system guide: http://www.ibm.com/servers/eserver/iseries/linux/pdfs/guide.pdf

- Linux in a guest partition: http://publib.boulder.ibm.com/infocenter/iseries/v5r4/index.jsp?topic=/rzalm/rzalmlinuxkickoff.htm

- Information about Linux on LPARs: `http://publib.boulder.ibm.com/iseries/v5r1/ic2924/index.htm?info/rzalm/rzalmlinuxkickoff.htm`

# 2.4.2 Necessary Steps Concerning i5/OS

The following section assists in the configuration of an iSeries system when installing SUSE Linux Enterprise Server. Detailed reference information about how to create partitions for Linux is contained in the following documents:

- For i5/OS V5R2: `http://publib.boulder.ibm.com/iseries/v5r2/ic2924/index.htm?info/rzalm/rzalmlinuxkickoff.htm`

- For i5/OS V5R3: `http://publib.boulder.ibm.com/iseries/v5r3/ic2924/index.htm?info/rzalm/rzalmlinuxkickoff.htm`

The Redbook *Linux on iSeries* (SG24-6232-00) provides detailed information (`http://publib-b.boulder.ibm.com/Redbooks.nsf/RedbookAbstracts/sg246232.html`).

The configuration of a system on the i5/OS side requires an i5/OS system access with `*SERVICE` permissions and authority to access `SST`. A `DST` password for creation of a console user is also required. A 5250 terminal or a 5250 emulation package is required to be able to connect to i5/OS (like TN5250 on Linux or PCS or Client Access on Windows).

## Partitioning the System

Create a new system partition for SUSE Linux Enterprise Server first. Use the main option number 5 *Work with System Partitions*, suboption 5 *Create a new Partition* in `STRSST`. Use the main option 3 *Work with Partition Configuration*, suboption 2 *Change Partition Processing Resources* if the partition already exists.

**Figure 2.6**  *Creating a New Partition*

```
                        Create New Partition
                                                  System:   SUSE1
Complete blanks, press Enter.

 Partition identifier and name  . . . . . . . .  3__   GINGER__

 Number of available system processors  . . . :  1
 Number of partition processors . . . . . . . .  1__
 Minimum / maximum number of processors ... . .  0__ / 1__
 Use shared processor pool  . . . . . . . . . .  2  1=Yes, 2=No

 Size of available system main storage (MB) . :  256      / 44
 Size of partition main storage (MB)  . . . . .  256___
 Minimum / maximum size of main storage (MB)  .  0___ / 752___



F3=Exit   F9=Exclude limits   F10=Work with shared processor pool
F11=Display partition processing configuration   F12=Cancel
```

**Figure 2.7**  *Changing Partition Processing Resources*

```
                  Change Partition Processing Resources
                                                  System:   SUSE1
Type changes, press Enter.

 Partition identifier and name  ... . . . . . :  3    GINGER

 Current / available number of processors ...:  1   / 0
 New number of processors .... . . . . . . . .  1__
 Use shared processor pool  ... . . . . . . .   2  1=Yes, 2=No

 Current / available size of main storage (MB) :  256   / 44
 New size of main storage (MB)  ... . . . . .   256___



F3=Exit   F9=Include limits   F10=Work with shared processor pool
F11=Display partition processing configuration   F12=Cancel
```

Try to plan your minimum and maximum values for the processor (*Minimum / maximum number of processors*) and main storage (*Minimum / maximum size of main storage*) accurately because changing these values requires a primary partition IPL.

**Figure 2.8**   *Changing Partition Processing Resources*

```
                  Change Partition Processing Resources
                                                    System:   SUSE1
 Type changes, press Enter.

  Partition identifier and name  . . . . . . . . :  3    GINGER

  Current / available number of processors .. . . :  1   / 0
  New number of processors .. . . . . . . . . . .   1__
  Minimum / maximum number of processors .. . . .   0__ / 1__
  Use shared processor pool  .. . . . . . . . . .   2  1=Yes, 2=No

  Current / available size of main storage (MB) :  256     / 44
  New size of main storage (MB)  . . . . . . . .   256___
  Minimum / maximum size of main storage (MB)  ..  0___ / 752___



 F3=Exit   F9=Exclude limits   F10=Work with shared processor pool
 F11=Display partition processing configuration   F12=Cancel
```

Confirm the changes with Enter to start the process for creating a new partition.

An IPL is required after creating a new partition.

## Configurating the Virtual Ethernet (System Tools)

Use *System Service Tools* (STRSST) to configure the *Virtual Ethernet*. Select F5 (*Work with system partitions*), F3 (*Work with partition configuration*), then F10 to change the virtual LAN configuration. Pressing F9 shows all partitions, even the ones not yet linked.

**Figure 2.9** *Working with the Virtual LAN Configuration*

```
                  Work with Virtual LAN Configuration
                                                  System:   SUSE1
Type options, press Enter.
  2=Change

    Par            -------------Virtual LAN Identifiers--------------
Opt ID  Name      0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15
 _      0 PRIMARY  1  .  .  .  .  .  .  .  .  .  .   .   .   .   .   .
 _      1 PEPPER   1  .  .  .  .  .  .  .  .  .  .   .   .   .   .   .
 _      2 CURRY    1  .  .  .  .  .  .  .  .  .  .   .   .   .   .   .
 _      3 GINGER   1  .  .  .  .  .  .  .  .  .  .   .   .   .   .   .




'1' Indicates LAN in use.  '.' Indicates LAN not in use.
F3=Exit                          F9=Show only partitions using Virt
F11=Display communication options   F12=Cancel

```

**Figure 2.10** *Changing the Virtual LAN Configuration*

```
                  Change Virtual LAN Configuration
                                                  System:   SUSE1
  Partition identifier . . . . . . . . . . . . . :  3
  Partition name . . . . . . . . . . . . . . . . :  GINGER

Type changes, press Enter.
  1=Yes   2=No

  -------------------Virtual LAN Identifiers-------------------
  0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
  1   2   2   2   2   2   2   2   2   2   2   2   2   2   2   2




F3=Exit   F12=Cancel

```

# Partitioning Tips—Processors, Memory, NWSDs, and LPARs

- Run STRSST (Start System Service Tools) and select ⑤ (*Work with system partitions*), then ③ (*Work with partition configuration*), and assign the host partition for the guest by entering `13` in the field next to the partition name.

- Declare a memory range for configuration in the LPAR (Logical Partition). This is the minimum and maximum amount of memory assigned to this LPAR without a primary IPL (Initial Program Load). The settings for the maximum amount should also reserve space for the `Hardware Page Table (HPT)`. However, having too large of a maximum memory would cause a larger hardware page table to be allocated from the partition's memory, reducing the amount Linux can use.

    To calculate the memory available to an LPAR, use this formula:

    ("Configured Memory" minus "Maximum Memory of the LPAR Configuration") divided by 64

    The result is rounded up to a multiple of 2.

    Example: The maximum size should be 248 MB. Assuming 1/64 of this value to be taken up by the HPT, the result of 3.875 MB is rounded up to the value of 4 MB.

- Minimum memory requirements must be met. For a text-based installation, assign the LPAR at least 256 MB. An installation with VNC requires at least 448 MB.

# Assigning Network Storage Space

Next, assign SUSE Linux Enterprise Server some storage space. Do this with the utility CRTNWSSTG.

*Figure 2.11*   *Creating NWS Storage Space (CRTNWSSTG)*

```
                    Create NWS Storage Space (CRTNWSSTG)

Type choices, press Enter.

Network server storage space.. > GINGER0_    Name
Size.. . . . . . . . . . . . .   9000___   *CALC, 1-64000 megabytes
From storage space.. . . . . .   *NONE___    Name, *NONE
Format.. . . . . . . . . . . .   *open___    *NTFS, *FAT,*FAT32,*OPEN
Auxiliary storage pool ID  . . .   1___        1-99
Text 'description' . . . . . . .   ginger_root_disk_____



                                                           Botto
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this di
F24=More keys
Creating NWS storage space GINGER0: 32 of 9000 megabytes complete.


```

# Creating the Network Server Description

The *Network Server Description* combines the individual configuration settings to one object.

*Figure 2.12*  *Creating a Network Server Description (CRTNWSD)*

```
                    Create Network Server Desc (CRTNWSD)

Type choices, press Enter.

Network server description . . .   ginger__      Name
Resource name  . . . . . . . . .   *NONE___     Name, *NONE
Network server type  . . . . . .   *guest__    *WINDOWSNT, *GUEST




                                                               Botto
F3=Exit    F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this di
F24=More keys
Parameter NWSD required.



```

Change the following settings:

- NWSD name

- Network server type = *GUEST

- Partition = *enter the partition name here*

- Code page = 437

- IPL source = *STMF

- IPL stream file = '/QOPT/SU90.001/ISERIES64'. SU90.001 is the disk label of
  the boot CD. To find out the disk label, insert the CD and enter DSPLNK QOPT
  at a command prompt. For Service Pack 2, for example, the parameter is
  /QOPT/SU90SP2.001/ISERIES64.

  The statements made in
are valid for network-based installations.

- IPL parameters = 'vnc=1 vncpassword=suseinst'

- Text description = SUSE Linux Enterprise Server

- Online at IPL = *NO

*Figure 2.13*   *Creating a Network Server Description (CRTNWSD)*

```
                    Create Network Server Desc (CRTNWSD)

Type choices, press Enter.

Network server description ... > GINGER__      Name
Resource name  ... . . . . . .    *NONE____    Name, *NONE
Network server type ... . . . > *GUEST__     *WINDOWSNT, *GUEST
Online at IPL ... . . . . . . .    *NO           *YES, *NO
Vary on wait ... . . . . . . .    *NOWAIT       *NOWAIT, 1-15 minutes
Partition  ... . . . . . . . > GINGER__      Name
Code page ... . . . . . . . .    437__       *LNGVER,437,850,852,857
Server message queue ... . . .    *JOBLOG_    Name, *JOBLOG, *NONE
  Library ... . . . . . . . . .      ____    Name, *LIBL, *CURLIB
TCP/IP port configuration:        _
  Port ... . . . . . . . . . .    *NONE___    *NONE, *INTERNAL, 1,2,3
  Internet address ... . . . .    _____
  Subnet mask  ... . . . . . .    _____
  Maximum transmission unit ..    _____    Number
            + for more values _
TCP/IP local host name ... . .    *NWSD_____
TCP/IP local domain name ... .    *SYS_____
TCP/IP name server system  ...    *SYS_____
            + for more values  _____
Restricted device resources ..    *NONE___    Name, *NONE, *ALL...
            + for more values  ____
Synchronize date and time  ...    *TYPE        *TYPE, *YES, *NO
IPL source ... . . . . . . . > *STMF__    *NWSSTG, *PANEL, *STMF,A
IPL stream file  ... . . . . > '/QOPT/SU90.001/ISERIES64'_____
IPL parameters ... . . . . . .    'vnc=1 vncpassword=suseinst'__
Authority  ... . . . . . . . .    *LIBCRTAUT   Name, *LIBCRTAUT,*CHANGE
Text 'description' ... . . . > 'SUSE Linux Enterprise Server'_____

                                                            Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this dis
F24=More keys
```

It is possible to pass additional IPL parameters for VNC. Refer to Section 4.4, "Booting the Target System for Installation" (Chapter 4, *Remote Installation*, ↑Installation and Administration).

The IPL stream file can be queried from the i5/OS command line with the command DSPLNK('QOPT').

# Linking the Network Storage Space with the Network Server Description (WRKNWSSTG)

The newly created storage space needs to be linked with the `Server Description`. First select the `storage space` from the list.

**Figure 2.14**   *Work with Network Server Storage Spaces*

```
                  Work with Network Server Storage Spaces
                                                  System:    SUSE1
Type options, press Enter.
  1=Create   3=Copy   4=Delete   5=Display   6=Print   10=Add link
  11=Remove link

                   Percent
Opt   Name         Used      Size   Server   Drive   Format   Access     ASP
__    ____
__    CURRY0          0      2000   CURRY       1    *OPEN   *UPDATE       1
__    CURRY1          0      2000   CURRY       2    *OPEN   *UPDATE       1
10    GINGER0         0      9000                    *OPEN                 1
__    TEST            0      1500                    *OPEN                 1


                                                                     Bottom
Parameters or command
===> _____
F3=Exit    F4=Prompt    F5=Refresh    F6=Print list    F9=Retrieve
F11=Display text        F12=Cancel    F17=Position to
```

The link to the `Network Server Description` is then established.

*Figure 2.15*   *Adding the Network Server Storage Link (ADDNWSSTGL)*

```
                  Add Network Server Storage Link (ADDNWSSTGL)

Type choices, press Enter.

Network server storage space . . > GINGER0        Name
Network server description . . . > GINGER         Name
Drive letter . . . . . . . . . .   *FIRSTAVAIL    K-Z
Dynamic storage link . . . . . .   *yes           *NO, *YES
Network server type  . . . . . .   *NWSD          Character value
Drive sequence number  . . . . .   *CALC          3-18, *CALC

                          Additional Parameters

Access . . . . . . . . . . . . .   *UPDATE        *UPDATE, *READ



                                                                    Bott
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this di
 F24=More keys
```

## Additional Steps

The instructions in explain how to configure a virtual console for operating the installation software.

# 2.4.3  Client for the Operation of the Installation Software

This section describes the configuration of telnet access to the virtual console.

## Supported Terminals

*Table 2.1*   *Supported Terminal Emulators*

| Operating System | Terminal | Support |
|---|---|---|
| Linux | Linux console | Fully supported |

| Operating System | Terminal | Support |
|---|---|---|
| Linux | Standard Xterm | Fully supported |
| Linux | GNOME terminal | Fully supported |
| Linux | KDE terminal | Fully supported |
| Linux | screen | Fully supported |
| Windows | PuTTY | Fully supported |
| Windows | Telnet client in Windows 98 | Not supported |
| Windows | Telnet client in Windows 2000 | Not supported |
| Windows | Telnet client in Windows XP | Not supported |
| AIX | aix xterm | Not supported |

**IMPORTANT**

Using a fully supported terminal emulator makes all features of the installation software accessible, including key combinations and colors.

When installing from a Windows machine, the freely available telnet client PuTTY should be used in all cases. The configuration and operation of PuTTY is described as part of the documentation coming with the PuTTY (see /dosutils/putty on the installation medium or http://the.earth.li/~sgtatham/putty/0.58/htmldoc/). The telnet client shipped with Windows 98 is not supported. The telnet clients shipped with Windows 2000 and Windows XP can be used, but offers only a restricted usage of the installation software.

aixterm generally does not cooperate too well with Linux. A workaround solution is to start an xterm on AIX and set the terminal manually with TERM=vt100. Because this is not possible during installation, a different platform should be used.

When operating the Linux terminal multiplexer screen, it is recommended to adjust the setting for background-color-erase because the background would otherwise

be displayed black instead of reflecting the color indicated by the installation software. To achieve this, insert the following entry in the file ~/.screenrc:

```
defbce on
```

To change this setting for just one single window, use `Ctrl` + `A` `:`, enter bce, and press `Enter`.

## Recognizing the Virtual Console Terminal

When accessing the virtual iSeries console with telnet, Linux probes the telnet client to attain the best operability. The following settings are especially important:

- Is more than one connection active? (If yes, a warning is issued)

- What type of terminal is connecting?

- Is it a Windows-based terminal?

- What is the screen size?

This probe is performed during the start-up phase of the installation software as well as during logins to the installed system.

The i5/OS telnet server offers the possibility to maintain several concurrent connections to a Linux console.

### IMPORTANT

The probe fails if more than one session is connected, resulting in erroneous assumptions regarding terminal settings. Multiple concurrent connections should therefore be avoided.

## Forcing a Terminal Initialization

The terminal detection and initialization can also be forced manually on an installed system with the command initviocons. If you change the terminal size during a session, do not forget to initialize the terminal again with the command initviocons.

## Troubleshooting Terminal Problems

- `Ctrl` + `L` redraws the screen. This is useful if it looks odd or broken.

- linuxrc displays broken line art. This is a known problem that is not related to the terminal application.

- A terminal connected when an installation aborted (for example, by a sudden shutdown of the LPAR) may be badly configured upon reconnection. A fresh application window should be opened in this case.

- If the `<—` key in the KDE program Konsole does not work, change the settings for the *Keyboard* in the *Settings* menu to xterm or linux console.

- The `<—` key might not work properly in VT100 fallback mode. This depends on the settings of the telnet client. If `<—` does not work, try using one of the following combinations:

  - `Ctrl` + `H`

  - `Ctrl` + `?`

  - `Ctrl` + `Backspace`

  - `Delete` + `←`

  - `Ctrl` + `D` + `←`

# 2.4.4  Creating a Network Installation Source

Create a network installation source if SUSE Linux Enterprise Server should be installed over a number of partitions. This eliminates the need to change CDs during installation. The same source can also be used for concurrent installation of various systems. The configuration of the network installation source is described in Section 4.2.1, "Setting Up an Installation Server Using YaST" (Chapter 4, *Remote Installation*, ↑Installation and Administration).

Copy the file `ISERIES64` from the installation source to the i5/OS IFS using FTP:

```
ftp iseries
(login)
```

```
ftp> cd /kernels
ftp> bin
ftp> put ISERIES64
ftp> bye
```

The installation can then be started as described before. Do not forget to change the
IPL Source before doing this:

```
IPL source . . . . . . . . . . . *STMF__ *SAME, *NWSSTG, *PANEL...
IPL stream file . . . . . . . . '/kernels/ISERIES64'_____
IPL parameters . . . . . . . . 'vnc=1 vncpassword=suseinst'__
```

It is additionally possible to pass parameters for VNC. Refer to the *Installation and
Administration* manual for information.

## Additional Steps

Start (IPL) the kernel as described in
.

# 2.4.5 IPL: Starting the NWSD (WRKCFGSTS *NWS)

Establish a connection to the virtual console with PuTTY or to telnetd port 2301 with
one of the supported terminals. Start the installation kernel (IPL) by activating Option
1 in the target NWSD. Watch the kernel messages on the virtual console carefully.

***Figure 2.16*** *Working with the Configuration Status*

```
                     Work with Configuration Status       SUSE1
                                              12/03/01  17:45:21
Position to  . . . . .   ____    Starting characters

Type options, press Enter.
  1=Vary on   2=Vary off   5=Work with job   8=Work with description
  9=Display mode status    13=Work with APPN status...

Opt  Description      Status                 ----------Job-----------
__   CINST            VARIED OFF
__   CURRY            ACTIVE
1_   GINGER           VARIED OFF
__   PEPPER           VARIED OFF
__   PEPPERI          ACTIVE
__   TEST             VARIED OFF


                                                           Botto
Parameters or command
===> _____
F3=Exit   F4=Prompt   F12=Cancel   F23=More options   F24=More keys
```

Watch the virtual console. linuxrc appears in the case of a network or VNC installation and requests the user to make a few choices.

The IPL of the file ISERIES64 starts linuxrc in the case of a network installation. The following steps are then necessary:

1.  Select the desired language in linuxrc.

2.  Select the *Kernel Modules (Hardware Drivers)* to load.

3.  Select *Load ppc_iseries modules* and load the appropriate network module.

4.  Select *Back* then *Start Installation or System*.

5.  Select the installation source. Three options are available:

    CD-ROM
        This offers to install from an internal CD-ROM drive. Before the system
        accesses the CD-ROM, enter the network parameters for the installation
        over VNC.

Network

> Allows the installation from an NFS share. The necessary network parameters are requested along with the hostname or IP address of the NFS server. Also enter the path to the NFS share.

Hard Disk

> Use this when the installation files are available on another hard disk. Enter the device name including the partition and the path to the installation files (for example, /dev/sdb1 and /suse). Before the system accesses the hard disk, the network parameters for the installation over VNC are requested for input.

You are then directed to start the VNC client. See Example 2.1, "The Installation over VNC Can Begin" (page 44).

*Example 2.1*  *The Installation over VNC Can Begin*

```
starting VNC server...
a log can be found in /tmp/vncserver.log ...
*** *** You can connect to 192.168.0.154, display :1 now ***
(When YaST2 is finished, close your VNC viewer and return to this
window.)
```

Start the VNC client with the displayed parameters (192.168.0.154:1 in this example) and enter the VNC password (suseinst in this example). The graphical interface of VNC appears and YaST starts a few seconds later.

## Additional Steps

Proceed with Chapter 3, *Installation with YaST* (↑Installation and Administration) to start the installation of the software.

# Appendix <span style="float:right">**A**</span>

## A.1  Editing the Built-In Kernel Command Line in a zImage

For kernels on POWER systems the `mkzimage_cmdline` utility adds kernel command line options to the kernel image. This options string is passed to the kernel, its contents overwriting the contents of `/options/boot-file`. This utility is available on all architectures, but it only works on POWER kernel images.

For more information, see the `mkzimage_cmdline` man page. For example, use the command as follows:

```
mkzimage_cmdline -a 1 \
-s 'install=nfs://192.168.0.20/inst_server/path vnc=1 vncpassword=password \
linuxrcstderr=/dev/console' /tftpboot/kernel_image
```

For a network installation, the install parameter is required.

### A.1.1  Specifying the Installation Source and YaST Interface

`Install=nfs://server/directory`
 Specify the location of the installation source to use. Possible protocols are `nfs`, `smb` (Samba/CIFS), `ftp`, and `http`.

If an `ftp` or `smb` URL is given, specify the user and password for installation. These parameters are optional and an anonymous or guest login is assumed if they are not given.

```
Username=<a user name>
Password=<a password>
```

For a Samba or CIFS installation, you can also specify the domain that should be used:

```
Workdomain=<a domain>
```

UseSSH=1 , UseVNC=1, Display_IP=192.168.42.42

Depending on which parameter you give, a remote X, SSH, or VNC server is used for installation. `UseSSH` enables SSH installation, `UseVNC` starts a VNC server on the installing machine, and `Display_IP` causes the installing system to try to connect to an X server at the given address. Only one of these parameters should be set at any time.

---

**IMPORTANT: X Authentication Mechanism**

Direct installation with the X Window System relies on a primitive authentication mechanism based on hostnames. This mechanism is disabled on current SUSE Linux Enterprise Server versions. Installation with SSH or VNC is preferred.

---

To allow a connection between YaST and the remote X server, run `xhost <IP address>` with the address of the installing machine on the remote machine.

For `VNC`, specify a password of six to eight characters to use for installation:

```
VNCPassword=<a password>
```

For `SSH`, specify a password of six to eight characters to use for installation:

```
SSHPassword=<a password>
```

## A.1.2  For More Information

Find alternative documentation for the setup of a network installation server and client on the first installation medium in /docu as PureNetworkInstall.HOWTO.