



# **SUSE LINUX Enterprise Server**

ARCHITECTURE-SPECIFIC INFORMATION

2. Edition 2004

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This book has been printed on 100 % chlorine-free bleached paper.

# Contents

<b>1</b>	<b>Preparation</b>	<b>3</b>
1.1	Preparing an Installation on an IBM iSeries System . . . . .	3
1.1.1	Notes . . . . .	4
1.1.2	Necessary Steps Concerning OS/400 . . . . .	5
1.1.3	Client for the Operation of the Installation Software . .	12
1.1.4	Establishing a Network installation Source . . . . .	19
1.1.5	IPL: Starting the NWSD (WRKCFGSTS *NWS) . . . . .	21
1.2	Preparing for the Installation on an IBM pSeries System . . . .	23
1.2.1	Setting Up a Network Installation Source . . . . .	23
1.2.2	Special Features of IBM pSeries p670 and p690 . . . . .	23
1.2.3	Hard Disk Space . . . . .	24
1.2.4	Preparing the System for Booting from CD-ROM . . .	24
1.2.5	Bootting from the CD-ROM Drive . . . . .	25
1.3	Preparing an Intallation on IBM JS20 Blades . . . . .	26
1.3.1	Creating a Network Installation Source . . . . .	27
1.3.2	Hard Disk Storage Space . . . . .	27
1.3.3	Notes and Information . . . . .	27
1.3.4	Preparing the System for Boot-Up . . . . .	27

<b>2</b>	<b>Booting Linux</b>	<b>31</b>
2.1	Boot Configuration of IBM pSeries . . . . .	32
2.1.1	Booting (Only IBM pSeries) . . . . .	32
2.2	Booting Linux on an iSeries System . . . . .	32
2.2.1	Stream File from the IFS . . . . .	33
2.2.2	Stream File from a Virtual Disk . . . . .	33
2.2.3	Kernel Slots . . . . .	33
2.3	Booting Linux on a pSeries System . . . . .	35
2.3.1	Using the zImage on the PReP Partition . . . . .	35
2.3.2	Booting with yaboot . . . . .	35
2.4	Booting Linux on JS20 Blades . . . . .	37
2.5	Updating the Kernel . . . . .	37

# Preface

## About this Manual

This manual describes the needed steps for installing SUSE LINUX Enterprise Server on IBM iSeries and pSeries systems. It contains all necessary information from the preparation of the installation on OS/400 or the firmware to the actual installation of SUSE LINUX Enterprise Server.

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

## 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 OS/400, and the preparation of the pSeries firmware.

## Target Group

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

- Use of OS/400 or the pSeries firmware.

- Knowledge of the hardware environment of the IBM iSeries or pSeries system, especially of the network environment.
- Basic Linux and Unix skills.

## Acknowledgement

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 iSeries and pSeries project at IBM and SUSE LINUX. Many thanks to:

- The developers at SUSE LINUX and IBM
- The testers at SUSE LINUX
- All beta testers and editors at IBM

Nuremberg, May 1, 2004

Your SUSE LINUX Team

# Preparation

This chapter describes the preparatory steps that must be taken before the actual installation.

The installation can be controlled via a VNC client (see the respective chapter in the Administration Guide). The installation procedure depends on the system you use. There is a section about the installation on IBM iSeries systems ( 1.1), on IBM pSeries systems ( 1.2 on page 23), and on IBM JS20 Blades ( 1.3 on page 26).

## 1.1 Preparing an Installation on an IBM iSeries System

An iSeries system must be prepared on the OS/400 side before installing SUSE LINUX. This section describes the installation with a built-in CD ROM drive.

### Note

The steps in this section are especially written for the installation on iSeries systems running IBM OS/400 V5R1. They can also be performed on IBM OS/400 V5R2. Additional options only available to OS/400 V5R2 are described in the book *Linux in a guest partition* available at <http://publib.boulder.ibm.com/series/v5r2/ic2924/info/rzalm/rzalmlinuxkickoff.htm>

### Note

Please note that the support portal often features articles on common problems. This portal can be accessed from the website <http://portal.suse.de>.

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

## 1.1.1 Notes

### Introductory Notes

- The iSeries site is located at <http://www.ibm.com/servers/eserver/series/linux/>
- The IBM Linux on iSeries Redbook: <http://www.redbooks.ibm.com/pubs/pdfs/redbooks/sg246232.pdf>
- The iSeries on Linux system guide: <http://www.ibm.com/servers/eserver/series/linux/pdfs/guide.pdf>
- Linux in a guest partition: <http://publib.boulder.ibm.com/series/v5r2/ic2924/info/rzalm/rzalmlinuxkickoff.htm>
- Information on Linux on LPARs: <http://publib.boulder.ibm.com/pubs/html/as400/v5r1/ic2924/info/rzalm/rzalmlinuxkickoff.htm>
- Mailing lists:
  - ▷ `linuxppc-ieseries` (to participate, send an e-mail with subscribe `linuxppc-ieseries` in the message body to `Majordomo@lists.linuxppc.org`)
  - ▷ `linuxppc64-dev` (to participate, send an e-mail with subscribe `linuxppc64-dev` in the message body to `Majordomo@lists.linuxppc.org`)

The following links are interesting for the maintenance of an installation:

- The SUSE LINUX portal [https://portal.suse.com/PM/page/login.pm?portal\\_language=de](https://portal.suse.com/PM/page/login.pm?portal_language=de) The portal is an effective help tool for assisting customers in solving problems. A corresponding article will be published every time should SUSE discover that a special case could lead to serious problems. The Portal can be searched by keyword like for example PPC or POWER.



- Security alerts: <http://www.suse.com/us/support/security/index.html> SUSE also maintains two security-related mailing lists which anybody interested can subscribe to.
  - ▷ [suse-security@suse.com](mailto:suse-security@suse.com) — General discussion on security regarding Linux and SUSE. All security alerts for SUSE LINUX are sent to this list. In order to subscribe to this list, send an e-mail message to <mailto:suse-security-subscribe@suse.com>
  - ▷ [suse-security-announce@suse.com](mailto:suse-security-announce@suse.com) — The SUSE mailing list feeding exclusively security alerts. In order to subscribe to the list, send an e-mail message to <mailto:suse-security-announce-subscribe@suse.com>

## 1.1.2 Necessary Steps Concerning OS/400

The following section assists in the configuration of an iSeries system when installing SUSE LINUX.

Detailed reference information on how to create partitions for Linux is contained in the following documents:

- For OS/400 V5R1: <http://publib.boulder.ibm.com/pubs/html/as400/v5r1/ic2924/info/rzalm/rzalmlinuxkickoff.htm>
- For OS/400 V5R2: <http://publib.boulder.ibm.com/series/v5r2/ic2924/info/rzalm/rzalmlinuxkickoff.htm>

The redbook Linux on iSeries (SG24-6232-00) provides detailed information (<http://www.redbooks.ibm.com/pubs/pdfs/redbooks/sg246232.pdf>).

The configuration of a system on the OS/400 side requires an OS/400 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 OS/400 (like TN5250 on Linux or PCS or Client Access on Windows).

## Partitioning the System

A new system partition for SUSE LINUX needs to be created first.

Use main option number 5, 'Work with System Partitions', sub-option 5 'Create a new Partition' in the STRSST, or main option 3 -> 'Work with Partition Configuration', suboption 2 'Change Partition Processing Resources', should the partition already exist.

```

                                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
```

```

                                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
```

Set the values for Minimum / maximum number of processors and Minimum / maximum size of main storage within the given limits in order to prevent a system IPL.

## 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)** in order to start the process for creating a new partition.

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

- Run STRSST (Start System Service Tools) and select ⑤ ('Work with system partitions'), ③ ('Work with partition configuration') and assign the host partition for the guest -> option 13.

- Memory: It is required to declare a memory range for configuration in the LPAR (Logical Partition) This is the minimal and maximal amount of memory assigned to this LPAR without a primary IPL (Initial Program Load). More important than the configured amount is that the settings for the maximum amount should also reserve space for the Hardware Page Table (HPT).

Here is the formula for calculating the memory available to an LPAR:

Configured Memory — Maximum Memory of the LPAR configuration / 64

The result is rounded up to a multiple of 2.

Example: The maximum size shall 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 requirement for the installation: For a text-based installation, the LPAR needs to be assigned at least 256 MB.

An installation with VNC requires at least 448 MB.

## Creation of the Network Storage Space

SUSE LINUX needs to be assigned some storage space next. This can be done with the utility 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_____
```

Bottom

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

## Creation of the Network Server Description

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

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
```

Bottom

```
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this dis
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/SU910.001/ISERIES64' The statements made in section 1.1.4 on page 19 are valid for net-based installations.
- IPL parameters = 'vnc=1 vncpassword=suseinst'
- Text description = SUSE LINUX Enterprise Server
- Online at IPL = \*NO

Create Network Server Desc (CRTNWS)

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/SU910.001/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 the VNC. Please refer to table in *Installation and Administration*.

The IPL stream file can be queried from the OS/400 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. The storage space needs to be selected from the list first.

```

                                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

Opt  Name          Percent
    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   *UPDATE  1
  ___  TEST            0      1500             *OPEN   *UPDATE  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.

```

                                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 . . . . .   *NWS        Character value
Drive sequence number . . . . . *CALC        3-18, *CALC

                                Additional Parameters

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

```

Bottom

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

## Configuration of the Virtual Ethernet (System Tools)

The System Service Tools (STRSST) is used for configuring the Virtual Ethernet. Selecting (F5) ('Work with system partitions'), (F3) ('Work with partition configuration') and then hitting (F10), allows to change the Virtual Lan Configuration. Hitting (F9) shows all partitions (even the ones not yet linked).

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 Virtu  
F11=Display communication options F12=Cancel

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

## Further Steps

The instructions in the next section 1.1.3 explain how to configure a virtual console for operating the installation software.

### 1.1.3 Client for the Operation of the Installation Software

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

#### Supported Terminals

*Table 1.1: Supported Terminal Emulators*

Operating System	Terminal	Support
Linux	Linux Konsole	fully supported
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 recommended
Windows	Telnet client in Windows XP	not recommended
AIX	aix xterm	not supported

#### Note

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

#### Note

When installing from a Windows machine, the freely available telnet client PuTTY should be used in all cases. The rest of this section will describe in more detail the configuration and the operation of PuTTY.



The telnet client shipped with Windows 98 is not supported. The telnet clients shipped with Windows 2000 and Windows XP can be used while offering only a restricted usage of the installation software.

`cxterm` 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`. Since this is however not possible during installation, an altogether different platform should be used.

When operating the Linux terminal multiplexer `screen` it is recommended to adjust the setting for `background-color-erase` since the background would otherwise be displayed black instead of reflecting the color indicated by the installation software. To achieve this, the entry `defbceon` is inserted in the file `~/ .screenrc`. In order to change this setting for just one single window, the keystroke combination `(Ctrl) + (A) + :bce` can be entered.

## Configuration of PuTTY

PuTTY is a freely available telnet and ssh client for Windows with excellent properties. `putty.exe` is located in the directory `dosutils` on CD 1. It is also available at <http://www.chiark.greenend.org.uk/~sgtatham/putty/latest/putty.exe>

CD 1 can be read by any Windows system. The application consists of just one executable file. No installation steps are necessary except for copying the file `dosutils/putty/putty.exe` to the hard disk of your system.

The comprehensive documentation can be read at <http://www.chiark.greenend.org.uk/~sgtatham/putty/>

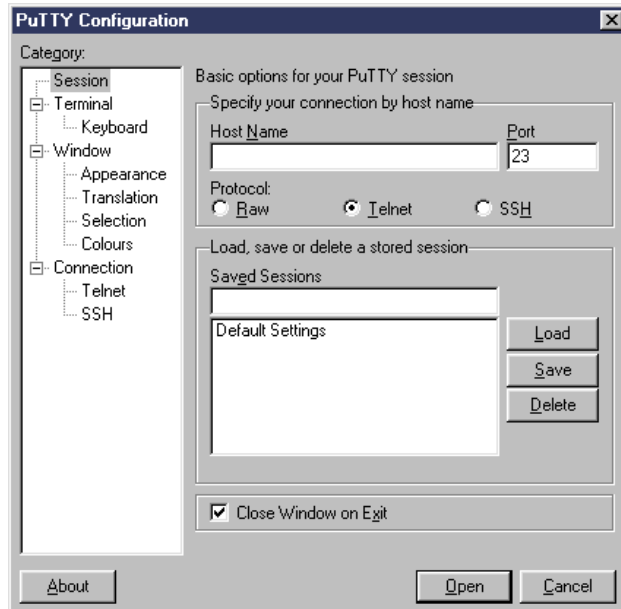
It is sensible to create a session profile from the configuration dialog for accessing the virtual console with PuTTY in order to make its handling easier. This is described as follows:

It is recommended to adopt the following settings:

- A larger font size (the standard type is very small).
- Set the font type to `Courier New` instead of `Courier`. This results in a correct rendering of `linert`. `Fixedsys` can also be used.
- Increase the window size to z. B. 40x100 (standard is 24x80)
- Open a session on every available host in order to access port 2301 of the host.

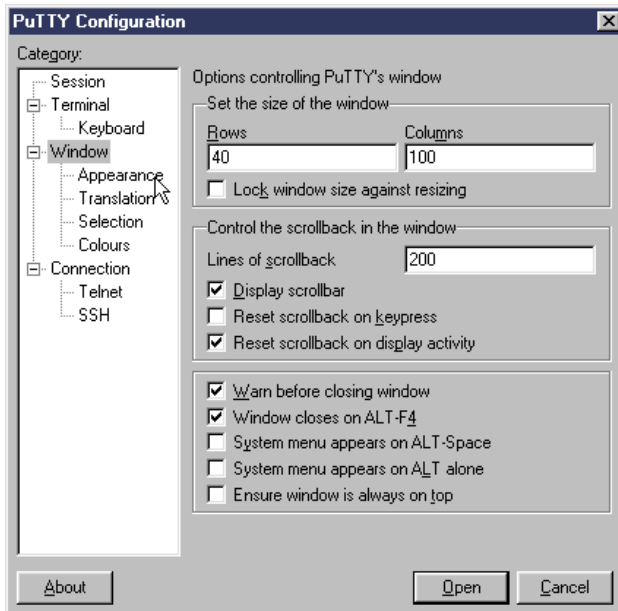
- Save the session profile with an appropriate name (z. B. the hostname of your iSeries system). Also provide the access port 2301 of your iSeries system.

Start PuTTY. A dialog appears as shown in figure 1.1.



*Figure 1.1: Starting PuTTY for the First Time*

1. Select 'Window' and change the windows size to z. B. 40x100 by entering the values into the fields for 'rows' and 'columns' as shown in figure 1.2
2. Select 'Appearance' and then select the button 'Change' (shown in figure 1.3).
3. Select a font type (as shown in figure 1.4). Courier new, size 10 (points) is recommended. Should the font type not be available, select Fixedsys, size 12.
4. Select 'OK' to save the font type settings. Please note that it is possible that another font than the selected one is displayed. This appears to be an error in PuTTY (compare with figure 1.5).



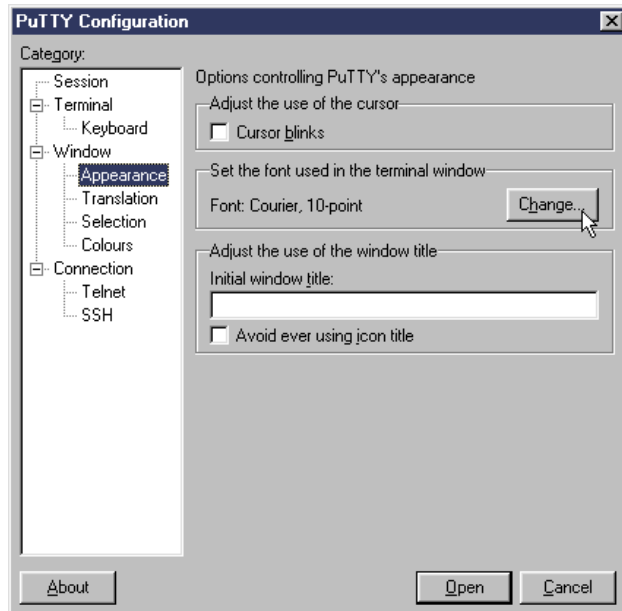
*Figure 1.2: Changing the Window Size in PuTTY*

5. Select 'Session'. The dialog reappears in its original form.
6. Enter the host name as shown in figure 1.6) to connect PuTTY with the host iSeries.
7. Enter 2301 in the field for 'Port'.
8. Enter a name for the session in the field 'Saved Sessions', z. B. iSeries virtual console.
9. Select 'Save' as shown in figure 1.7).

Once the session has been configured, the connection to the virtual console can be activated by selecting the session from the list and confirming with 'Open'.

### Recognizing the Virtual Console Terminal

One aspect needs to be observed when accessing the virtual iSeries console with telnet. It is of significance during installation as well as subsequent



*Figure 1.3: The Font Selection Dialog in PuTTY*

accesses to the system.

The OS/400 telnet server offers the possibility to maintain several concurrent connections to a Linux console.

Linux probes the telnet client in order to attain the best operability. The following settings are especially probed:

- 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 probing is performed during the startup phase of the installation software as well as on subsequent logons on the installed system.

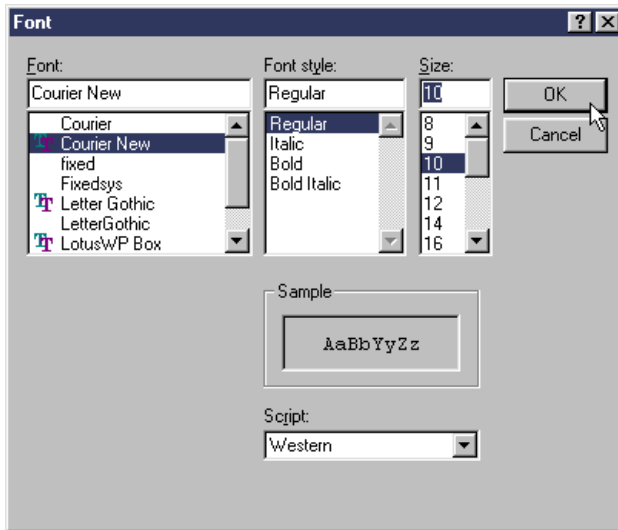


Figure 1.4: Changing the Font Type

## Note

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

## Note

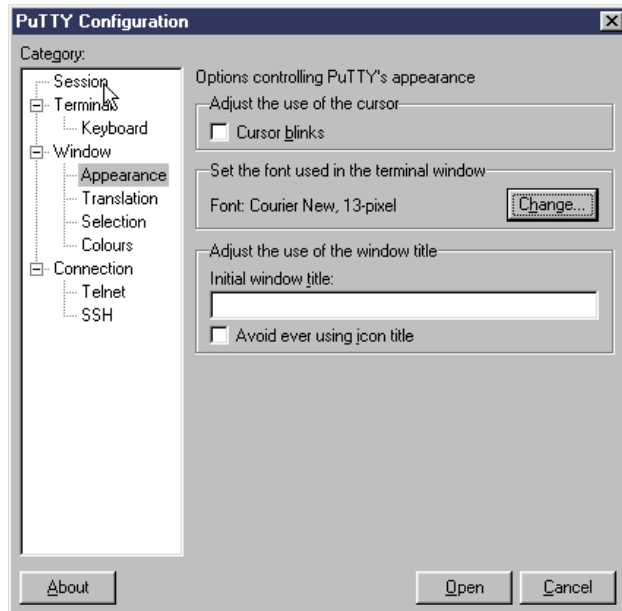
## Forcing a Terminal Initialisation

The terminal detection and initialisation can also be forced manually on an installed system. The command `initviocons` serves this purpose.

Wann immer Sie die Größe des Terminals während einer Sitzung ändern, sollten sie mit dem Befehl `initviocons` das Terminal neu initialisieren.

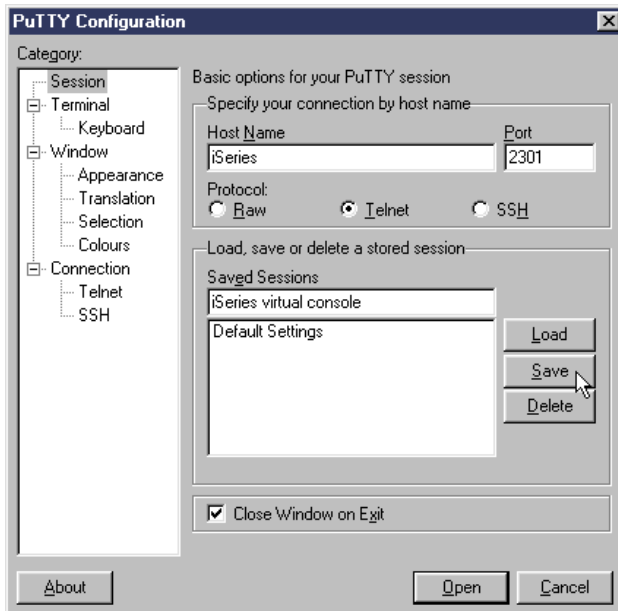
## Troubleshooting Terminal Problems

- The keystroke combination `(Ctrl) + (L)` is generally applied for redrawing the screen. This is useful should it look odd or broken.
- `linuxrc` displays broken lineart. This is a known problem which is not related to the terminal application.



*Figure 1.5: A New Font for PuTTY*

- A terminal which was once connected when an installation aborted (e.g. by a sudden shutdown of the LPAR) could possibly be badly configured upon reconnection. A fresh application window should be opened in this case.
- Should the backspace key not work in the KDE console `konsole`, change the settings for the 'keyboard' in the menu 'Settings' to `xterm` or `linux console`.
- The backspace key might not work properly in VT100 fallback mode. This depends on the settings of the telnet client. This key can often be replaced with the keystroke `(Ctrl) + (H)`.
- Should the backspace key not work, one of the following keystrokes can be attempted:
  - ▷ `(Ctrl) + (H)`
  - ▷ `(Ctrl) + (?)`



*Figure 1.6: Creating a PuTTY Session*

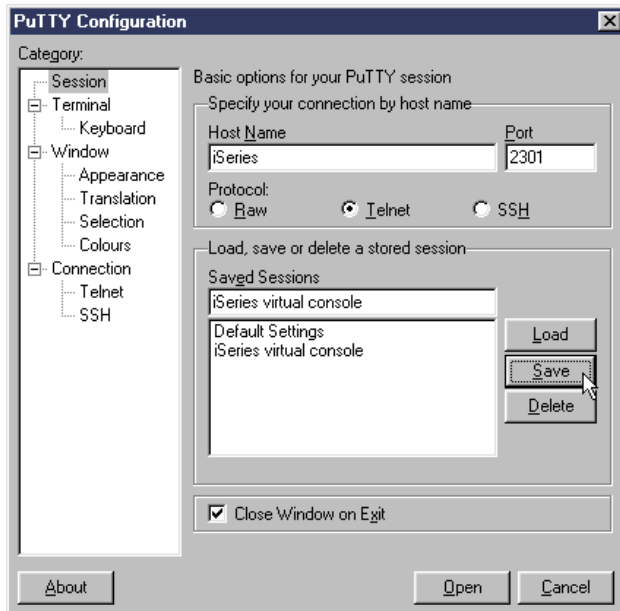
- ▷ **(Ctrl) + (backspace)**
- ▷ **(delete)** (concurrently with the key **(←)**)
- ▷ **(Ctrl) + (D)** (concurrently with the key **(←)**)

### 1.1.4 Establishing a Network installation Source

A network installation source should be established if SUSE LINUX is supposed to 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.

The network service is provided by copying the content of the installation CDs into individual directories of a host running an NFS server. Any CD can z. B. be copied on an existing SUSE LINUX system with the following command:

```
cp -a /mnt/cdrom /suse-share/
```



*Figure 1.7: Saving a PuTTY Session*

The directory must then be renamed (z. B. to CD1):

```
mv /suse-share/cdrom /suse-share/CD1
```

Repeat this procedure for the other CDs. The directory /suse-share/ is then shared over NFS by releasing the directory.

The file ISERES64 still needs to be copied for the installation source to the OS/400 NFS by 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 in addition possible to pass parameters for VNC. Refer to table in the *Installation and Administration*.

### Further Steps

The kernel is now started (IPL) in the following section 1.1.5.

## 1.1.5 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 with attention.

```

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

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

```

Watch the virtual console. linuxrc will appear in the case of a network or VNC installation and will request the user to make a few set-up 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 be loaded.
3. Select 'Load ppc\_iseries modules' and load the appropriate network module.
4. Select 'Back' and then 'Start Installation / Installed System'.
5. Select the installation source. Three options are available:
  - (a) *CD ROM* This offers to install from an internal CD ROM drive. Before the system accesses the CD ROM, the network parameters for the installation over VNC are requested for input.
  - (b) *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. The path to the NFS share needs also to be entered.
  - (c) *Hard disk* This is sensible when the installation files are available on another hard disk. Enter the device name including the partition name and the path to the installation files (z. B. /dev/sdb1 and /suse). Before the system accesses the hard disk, the network parameters for the installation over VNC are requested for input.

A requester window will then appear, indicating to start the VNC client. (refer to 1.1).

### *Example 1.1: 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 our example) and enter the VNC password (suseinst in our example). The graphical interface of VNC appears and YaST2 follows a few seconds later.

### **Further Steps**

Proceed reading in the *Installation and Administration* to start the installation of the software.

## 1.2 Preparing for the Installation on an IBM pSeries System

This section covers the preparatory steps for installing SUSE LINUX on pSeries systems. It explains the installation from a built-in CD-ROM drive and over the network.

### 1.2.1 Setting Up a Network Installation Source

If you plan to install SUSE LINUX on multiple partitions, you should set up a network installation source. One of the advantages of this approach is that you do not need to change the CDs during the installation. Moreover, you can use this source for the simultaneous installation of several systems. The configuration of the network installation source is described in section *Creating a Central Installation Server* of the Administrationshandbuch.

### 1.2.2 Special Features of IBM pSeries p670 and p690

IBM p670 and p690 systems offer the possibility to partition the system like on IBM iSeries systems. 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 environment.

To prepare a LPAR for SUSE LINUX, you must first configure the system over the *HMC*. Refer to the redbook *IBM @server pSeries 690 System Handbook* (SG24-7040-00) for details.

Important notes regarding the configuration:

- The recommended maximum number of processors for a SUSE LINUX LPAR is 8, as the kernel can only manage 8 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.

### 1.2.3 Hard Disk Space

Make sure you have sufficient hard disk space for installing SUSE LINUX. The use of a separate hard disk is recommended.

### 1.2.4 Preparing the System for Booting from CD-ROM

Insert CD1 in the CD-ROM drive and reboot the system. Enter the system firmware by pressing (F1) or (1) when using the serial console during the system check when the system is rebooted.

```
memory      keyboard  network    scsi       speaker
```

Press (F1) or (1) while the SCSI devices are being checked.

The 'Multiboot' dialog will be displayed:

```
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 in order to set the *Install Device*.

A list of available devices will be displayed:

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         SysKconnect PCI FDDI Adapter ( slot=4 )
6         Ethernet ( slot=2 )
7         None
```

```
-----
|X=Exit|
-----
```

==>3

Select the respective CD-ROM drive (3 in this example).

The system will read from the CD-ROM drive and display the identstring an.

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

## 1.2.5 Booting from the CD-ROM Drive

After you select ①, the yaboot utility will be started.

```
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)`. To install on a 32-bit system, enter `install32` and press `(Enter)`.

To install from a network source (see 1.2.1 on page 23), append `manual` to the kernel you want to install (`install` or `install32`).

For an installation over VNC, append the parameters `vnc=1` and `vncpassword=` to the kernel (`install` or `install32`). Read more about VNC in section *Installation over VNC* the manual *Administrationshandbuch*.

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

- During the hardware check, press `(F8)` or `(8)`. The firmware prompt will appear.
- 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;install
```

To boot a `ppc32` kernel:

```
0> boot cdrom;install32
```

### Further Steps

Proceed as described in the chapters *Special Installation Variations* and *Installing with YaST2* of the manual *Administrationshandbuch* in order to begin installing the software with `linuxrc` and `YaST2`.

## 1.3 Preparing an Intallation on IBM JS20 Blades

This section describes the preparatory steps for the installation of SUSE LINUX on JS 20 Blades. It comprises the installation using the CDRROM drive of the BladeCenter as well as over the network.

### 1.3.1 Creating a Network Installation Source

A network installation source should be created if an installation of SUSE LINUX is planned over many partitions. This offers the advantage that no CDs need to be changed during the installation process. This source can furthermore be used for the concurrent installation of multiple systems. The creation of a network installation source is described in section *Creating a Central Installation Server*

### 1.3.2 Hard Disk Storage Space

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

### 1.3.3 Notes and Information

Introductory Information:

- JS 20 Blades Site: `FIXME:LinktoIBM-Documentation`

### 1.3.4 Preparing the System for Boot-Up

#### Preparing to Boot From the CDROM Drive

Perform the steps as described in this section if an installation from CDROM is desired.

Assign the CDROM drive to the JS 20 Blade targeted for installation. This is done by connecting with a web browser to a BladeCenter Management Module and then logging in. Upon successful log-in, select the function 'Remote Control' in the menu 'Blade Tasks' and then activate 'Start Remote Control'. The CDROM drive is assigned to the desired Blade in the menu 'Change Media Tray Owner' of the new window.

The CDROM drive then need to be set up as a boot device. This is accomplished by selecting 'Blade Tasks' and then 'Configuration' while in the BladeCenter Management Module, Then select the JS 20 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 CDROM 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. The boot device is set to the network by accessing the 'Configuration' menu from the page 'Blade Tasks'. Then select the JS 20 Blade in the section 'Boot Sequence' and set the item '1st Boot Device' to 'Network - BOOTP' on the page 'Blade Boot Sequence'.

## Rebooting and Connecting to the Console of the JS 20 Blade

The JS 20 Blade is rebooted 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 column labeled 'Pwr'. Mark the checkbox 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 JS 20 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. In order to work, for example, with blade number 9, enter `env -T system:blade[9]`. Connect with the console of the JS 20 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 bootloader 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 hit **(Enter)**.

In case of an installation over VNC the parameters `vnc=1` and `vncpassword=<password>` have to be appended to the command line for the kernel (install).

## Further Steps

Proceed with the chapters *Special Installation Variations* and *Installing with YaST2* of the manual *Installation and Administration* in order to start the installation with linuxrc and YaST2.

# Booting Linux

This chapter describes the procedure for booting an installed SUSE LINUX on iSeries and pSeries.

2.1	Boot Configuration of IBM pSeries . . . . .	32
2.2	Booting Linux on an iSeries System . . . . .	32
2.3	Booting Linux on a pSeries System . . . . .	35
2.4	Booting Linux on JS20 Blades . . . . .	37
2.5	Updating the Kernel . . . . .	37

## 2.1 Boot Configuration of IBM pSeries

### 2.1.1 Booting (Only IBM pSeries)

Here you can decide where to install the boot kernel and specify additional kernel parameters.

Initially, all options supported by your partition layout are selected. Most probably, the following three boot options are possible:

- A stream file (under 'iSeries stream file for \*STMF booting') is copied to the `/boot` directory of the installed system. This file can be copied to the IFS of the OS/400 system via FTP for booting with '\*STMF'.
- Another kernel is copied to a 0x41 PReP boot partition (under 'Choose 41 PReP boot partition'). (Note: This option is only possible if at least one PReP partition is available, not if the system is installed on a native DASD).
- A "rescue system" kernel is installed in slot A and a normal kernel in slot B.

Chose any combination of these boot methods by selecting and deselecting the respective buttons.

Additional kernel parameters can be specified in 'Kernel boot parameters'.

If you do not want to configure the boot process, select 'Do not configure bootloader'. In this case, YaST2 will skip the boot configuration.

Unless the administrator has sufficient knowledge about the boot process and the installation of new kernel versions, this setting should not be changed.

For information on the use of the installed kernel, refer to Chapter 2 on the preceding page.

## 2.2 Booting Linux on an iSeries System

The recommended method for halting an iSeries Linux partition is to stop the NWSD (`vary off`). Simply restart the NWSD to reboot the system (`vary on`).

Following the installation, the NWSD must be configured in order to be able to start the installed system. This can be done in three different ways:

## 2.2.1 Stream File from the IFS

Like in the boot process of the installation system, the IPL source can be a stream file — but this time only the kernel:

```
IPL source . . . . . *STMF__ *SAME, *NWSSTG, *PANEL...
IPL stream file . . . . ' /KERNELS/ISERIES64' _____
IPL parameters . . . . . 'root=/dev/hda3 noinitrd' _____
```

To boot an STMF kernel, you must first copy the kernel from the Linux system (/boot/vmlinux64) to OS/400. This can be done via FTP over the virtual network or over the normal network. If you decide to use the installation kernel ISERIES64, you must modify the IPL parameters (append noinitrd). Simply copy the ISERIES64 file from CD-ROM to the IFS.

## 2.2.2 Stream File from a Virtual Disk

The kernel can also be loaded from the first PReP partition of the first NWSSTG (virtual disk):

```
IPL source . . . . . *NWSSTG *SAME, *NWSSTG, *PANEL...
IPL stream file . . . . *NONE _____
IPL parameters . . . . . 'root=/dev/hda3' _____
```

## 2.2.3 Kernel Slots

Alternatively, the system can be booted from one of the two kernel slots (B in this example):

```
IPL source . . . . . B_____ *SAME, *NWSSTG, *PANEL...
IPL stream file . . . . *NONE _____
IPL parameters . . . . . *NONE _____
```

If you boot from slot A or B, the command line of the kernel will be read from the LPAR setting 'Work with Partition Configuration', option 14 of the SST. The command line is also accessible through the proc file system in Linux. The command line is located in /proc/iSeries/mf/A|B/cmdline. Use commands such as the following in order to change it:

```
echo 'root=/dev/hda3 single' > cmdline
```

The IPL parameters are ignored when booting from slot A or B.

**Selecting the Boot Method** One advantage of starting the IPL from a file in the IFS is that several NWSDs can use the same kernel. Systems that only use native I/O can be booted without NWS and are therefore less dependent on OS/400. If you use a different kernel, be sure to install the needed modules.

This subject is covered in detail in the IBM redbook *Linux on iSeries* (SG24-6232-00) (<http://www.redbooks.ibm.com/redpieces/pdfs/sg246232.pdf>).

- An NWSD with a linked NWSSTG (Network Server Storage or virtual disk) can be booted from a PReP partition, one of the kernel slots, or a stream file.
- An NWSD without any linked NWSSTG but with a connected native disk can be booted from one of the kernel slots or a stream file.

If you created a PReP partition, YaST2 will have activated this partition and installed a kernel on it.

Even if you do not have any PReP partition for booting, YaST2 will always install the installation kernel in slot A and slot B. YaST2 places the `ISERIES64` kernel in slot A (see ?? on page ??). The default kernel (`/boot/vmlinux64`) is installed in slot B together with slot B. This ramdisk contains the `ibmsis` driver. The installation kernel should be viewed as a last resort in case booting is not possible from slot B.

*Recommendations:*

1. If you have a PReP boot partition, use it.
2. Select slot B if you do not have any virtual disk.
3. If you want all partitions to use the same kernel, select booting from stream files (\*STMF) and specify the path to `vmlinux`.

**Kernel parameters:** In the first and third case, the root partition must be passed to the kernel via the IPL parameters (here: `root=/dev/hda3`). In the second case, this is achieved by means of the command lines of the slots A and P (LPAR 'Work with Partition Configuration', option 14 in the SST). The command lines can also be accessed through the proc file system in Linux. These are located in `/proc/iSeries/mf/A|B/cmdline`; use commands such as the following to change them:

```
echo 'root=/dev/hda3 single' > cmdline
```

When booting from slot A or B, the IPL parameters are ignored.

By default, the kernel parameters in slot A are set to boot in the recovery mode. Following the installation, the slot A command line looks as follows: `start_shell manual=1 single`. If a system is started in the single-user mode, it can be switched to runlevel 3 with the command `init 3` (only `root` can log in to the system in single-user mode.)

## 2.3 Booting Linux on a pSeries System

There are two ways of booting SUSE LINUX on a IBM pSeries system:

- zImage on the PReP partition
- yaboot

### 2.3.1 Using the zImage on the PReP Partition

To use the PReP partition to boot Linux on the pSeries system, copy the kernel image directly to the partition:

```
dd if=/boot/vmlinuz of=/dev/sda1 bs=4096
```

In this example, `/dev/sda1` is the PReP partition.

Then check the boot configuration of the system firmware. Activate booting from the PReP partition in the firmware. Refer to the hardware documentation for details.

### 2.3.2 Booting with yaboot

yaboot gives you more flexibility in the boot process. With yaboot, you can

- Configure several kernels for booting
- Select one of the configured kernels during the boot process

- Pass additional parameters to the kernel

yaboot is controlled by the configuration file `/etc/yaboot.conf`. This file is generated by the file `/etc/lilo.conf`, which is identical to the file used on x86 systems.

The LILO configuration file is `/etc/lilo.conf`. In the following example file, `root` is `/dev/sda3`, and the boot loader is located in `/dev/sda1`:

*Example 2.1: Configuration File `/etc/lilo.conf`*

```
boot=/dev/sda1
default=linux
timeout=100

image = /boot/vmlinuz
        root = /dev/sda3
        label = linux
        append = "          # optional kernel parameters
image = /boot/vmlinuz.new
        root = /dev/sda3
        label = newlinux
        append = "          # optional kernel parameters
```

Adapt the individual entries in `/etc/lilo.conf` to match your system configuration.

Specify the correct partitions and partition numbers. The individual options have the following meanings:

- `boot=/dev/sda1`: Your boot partition
- `default=linux`: This configuration section is loaded if you press **(Return)** or after the `timeout` elapses.
- `image =`: Path to the kernel image.
- `root =`: Path to the root partition.
- `append = "`: Passes additional parameters to the kernel.
- `image =`: Appends additional kernels to the configuration, enabling you to make several kernels available for selection.

After adapting the file `/etc/lilo.conf`, launch the configuration with the command `lilo` in order to complete the boot configuration.



## 2.4 Booting Linux on JS20 Blades

pagina vacat.

## 2.5 Updating the Kernel

When new kernel RPMs become available, you must understand how an upgrade will affect the boot process. In general, the update consists of two steps: firstly, the installation of the kernel RPM, and secondly, the installation of the kernel on the boot medium (PReP, slot B, or STMF). If you boot from a PReP partition or from slot B, read the instructions in the `README` file enclosed with the kernel update.

For STMF, you must first install the kernel update RPM on the partition before you boot the kernel. This ensures that the kernel modules are up to date. Therefore, you should always install the modules before you boot the associated STMF kernel. Otherwise, many device drivers (e.g., network card drivers) existing in the form of modules will not work. Remember that the kernel update can impair the recovery mode in slot A. However, you can always boot the current `ISERIES64` kernel with the recovery command line in the IPL parameters.