

Linux for S/390

Installation - Part 2

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Agenda



- Continue from Part 1 which discussed Linux for S/390 installation and operational requirements and walked through installation of Marist binaries
- SuSE Beta 2 (6.4) installation
 - VM guest
 - LPAR
- A few administration and maintenance topics



Installing SuSE



Installing SuSE Beta 2 - VM Guest



- Virtual Machine Definition
 - A-disk (191) with at least 40 cylinders (3390)
 - Root file system mdisk, or dedicated dasd
 - At least 1000 cylinders (3390)
 - Swap partition mdisk, or dedicated dasd
 - 200 cylinders (3390) a good starting point
 - Network adapter
 - Real addresses, VCTCA (even/odd), or IUCV



Installing SuSE Beta 2 - VM Guest



- Installation media
 - CD-ROM
 - Workstation server required
 - Must support Rock Ridge CD-ROM extensions (long file name standard for iso9660 file systems)
 - ▶ Linux has necessary support
 - FTP server, or NFS server
 - User account with proper access permissions



Installing SuSE Beta 2 - VM Guest



- Logon to guest virtual machine
 - Format 191 mdisk
 - FTP files from SuSE Beta 2 CD-ROM to 191 mdisk
 - suse/images/vmrdr.ikr - upload binary F 80
 - suse/images/initrd - upload binary F 80
 - Create parm file using Xedit, or upload in ascii format /suse/images/parmline
 - ramdisk_size=32768 root=/dev/ram0 ro



Installing SuSE Beta 2 - VM Guest



- From VM guest virtual machine
 - Spool your punch to your reader
 - Punch the kernel, parm file and ram disk files in that order
 - IPL the virtual reader
 - Boot messages should stop with question asking if Linux is connected to a network
 - Respond based upon network hardware type



Installing SuSE Beta 2 - VM Guest



- For a virtual ctca connection you will need to supply
 - Full host name, IP address, Subnet mask, Peer IP address, DNS IP address, DNS search domain
- Perform remainder of install from telnet session
 - Telnet client needs to support at least vt220
 - Client needs to support at least 80x25 screen size



Installing SuSE Beta 2 - Common VM and LPAR



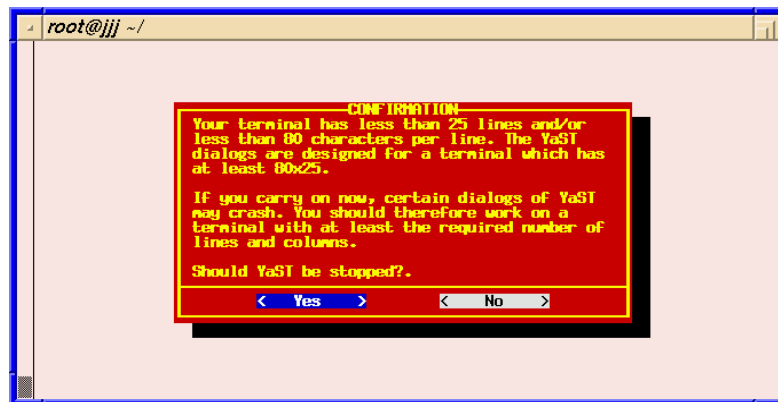
- Load dasd driver
 - insmod dasd dasd=xxxx,yyyy
 - xxxx = virtual address of root file system mdisk
 - yyyy = virtual address of swap partition mdisk
- Check to make sure TERM environment variable is correct
- Start YaST installation and maintenance tool



Installing SuSE Beta 2 - Common VM and LPAR



YaST error if screen size not 25 lines



Installing SuSE Beta 2 - Common VM and LPAR



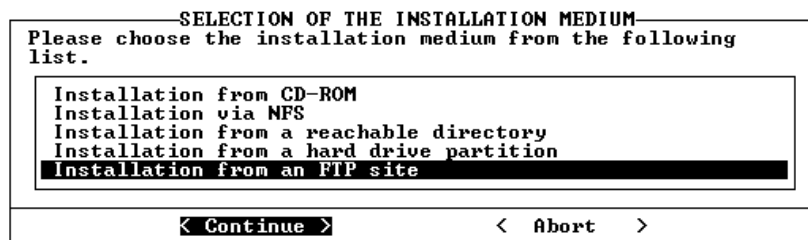
YaST language selection



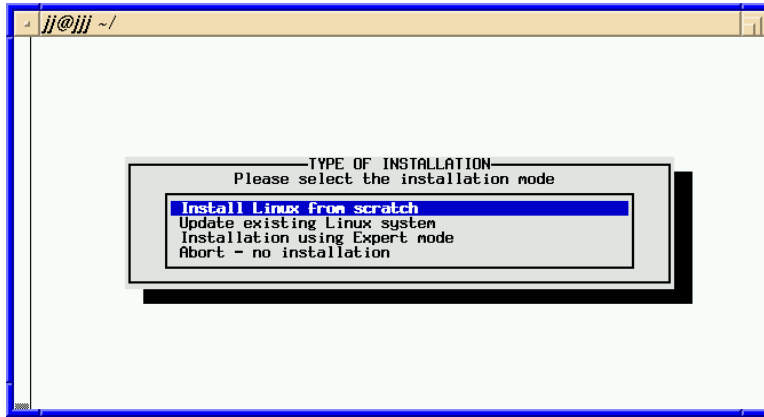
Installing SuSE Beta 2 - Common VM and LPAR



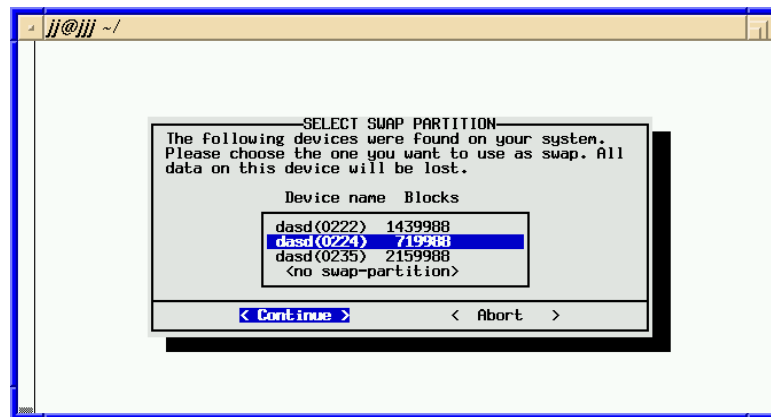
We used an FTP site



Installing SuSE Beta 2 - Common VM and LPAR



Installing SuSE Beta 2 - Common VM and LPAR



Installing SuSE Beta 2 - Common VM and LPAR



Specify how to use the available DASD

```
jj@jjj ~/  
CREATING FILESYSTEMS  
Current list of the filesystems on the existing hard drives:  
Device name  Blocks  Inodes  Format  FsType  Mount point  Partition  
-----  
dasd(0222)  1439988  8192   No     ext2    S390 DASD  
dasd(0235)  2159988  8192   No     ext2    S390 DASD  
  
F1=Help      F3=Change type  F4=Mount point  
F5=Expert menu  F6=Format      F7=Read Fstab  
  
< Continue >      < Abort >
```



Installing SuSE Beta 2 - Common VM and LPAR



Result of pressing F4

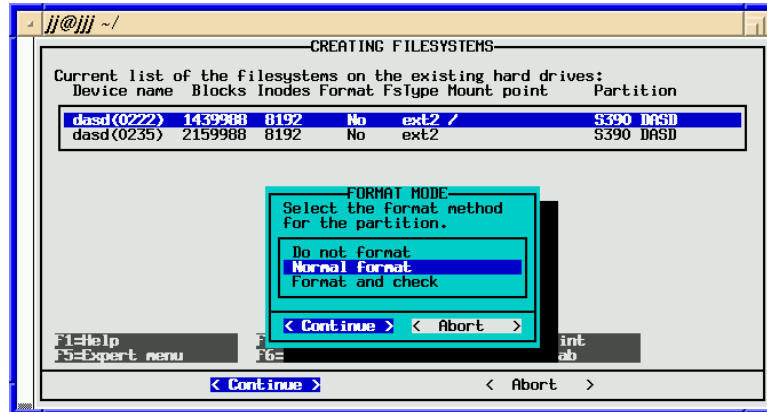
```
jj@jjj ~/  
CREATING FILESYSTEMS  
Current list of the filesystems on the existing hard drives:  
Device name  Blocks  Inodes  Format  FsType  Mount point  Partition  
-----  
dasd(0222)  1439988  8192   No     ext2    S390 DASD  
dasd(0235)  2159988  8192   No     ext2    S390 DASD  
  
Please select the mount point from the list or  
enter your own mount point.  
  
/boot  
/usr  
/var  
/opt  
/hone  
<No entry>  
<Other entry>  
  
F1=Help      F3=Change type  F4=Mount point  
F5=Expert menu  F6=Format      F7=Read Fstab  
  
< Continue >      < Abort >
```



Installing SuSE Beta 2 - Common VM and LPAR



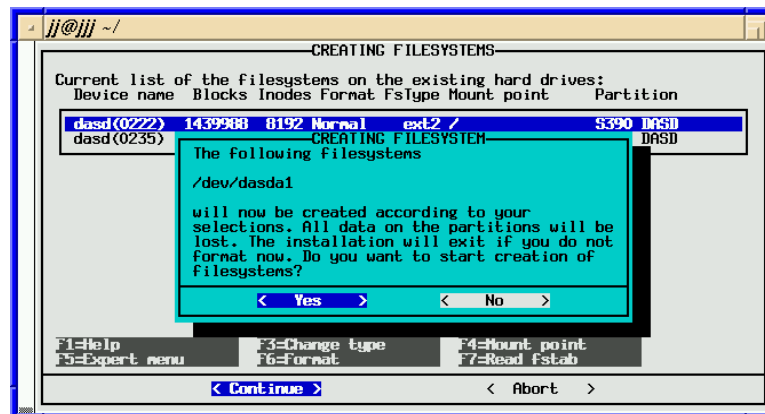
Result of pressing F6



Installing SuSE Beta 2 - Common VM and LPAR



Result of selecting continue



Installing SuSE Beta 2 - Common VM and LPAR



Enter information for ftp and press f10

```
FTP Settings                               YaST Version 1.06b -- (c) 1994-2000 SuSE GmbH
FTP Server [Name:IP] :9.82.56.190          :
Server directory    :/mnt/suse            :
[ ] Use Proxy?      :                     :
Proxy [Name:IP]     :<no proxy>          :
[X] Default FTP Port? :21                 :
Port [Number]       :21                   :
[ ] Anonymous FTP?  :                     :
Login               :richard              :
Password            :*****              :
Timeout [Seconds]   :60                   :
Local tmp directory :/mnt/var/tmp         :
```



Installing SuSE Beta 2 - Common VM and LPAR



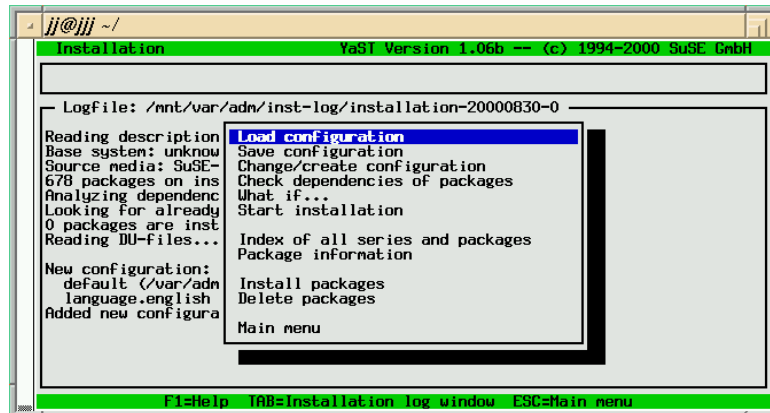
```
jj@jjj ~/~
Reading description files...
Base system: unknown
Source media: SuSE-Linux-US-S390 6.4.0-0
678 packages on installation medium...
Analyzing dependencies of packages...
Looking for already installed packages...
0 packages are installed...
Reading DU-Files...
```



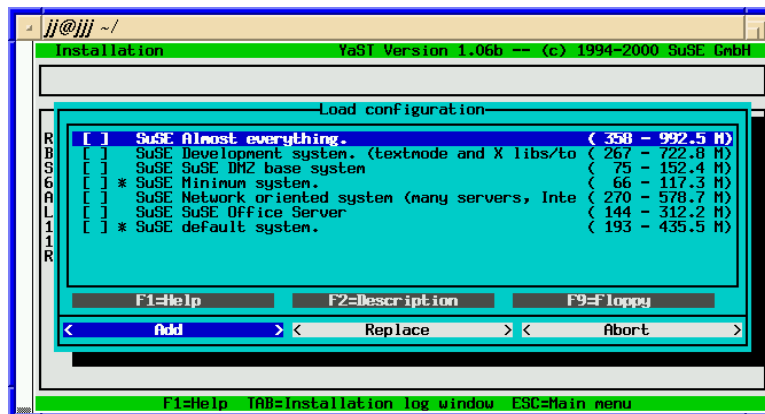
Installing SuSE Beta 2 - Common VM and LPAR



Specify which configuration to install



Installing SuSE Beta 2 - Common VM and LPAR



Installing SuSE Beta 2 - Common VM and LPAR



Let YaST try to resolve dependencies

```
~#@||| ~/
Series selection YaST Version 1.06b -- (c) 1994-2000 SuSE GmbH
Unsatisfied dependencies
pyinglib (d):
[EXCL]
*pyth_tk1 d
pyth_tk1 (d):
[EXCL]
*pyinglib d
xdelta (ap):
[AND]
glib gra
-----
Packages which will be selected by <AUTO>
glib gra
< Continue > < AUTO > < Abort >
```



Installing SuSE Beta 2 - Common VM and LPAR



SuSE states press Continue here

```
~#@||| ~/
Series selection YaST Version 1.06b -- (c) 1994-2000 SuSE GmbH
Unsatisfied dependencies
Search for installed or ready to be installed packages whose dependencies
are NOT given!...
pyinglib (d):
[EXCL]
*pyth_tk1 d
pyth_tk1 (d):
[EXCL]
*pyinglib d
-----
There are no dependencies which could be resolved automatically.
< Continue > < AUTO > < Abort >
```



Installing SuSE Beta 2 - Common VM and LPAR



```
Installation YaST Version 1.06b -- (c) 1994-2000 SuSE GmbH

-----
Logfile:
New configuration:
Files (/mnt/var/tmp/9.82.56.198/mnt/suse/setup/descr/Allies.cel)
Added new configuration.

-----

Load configuration
Save configuration
Change/create configuration
Check dependencies of packages
What if...
Start installation
Index of all series and packages
Package information

Install packages
Delete packages

Main menu
```



Installing SuSE Beta 2 - Common VM and LPAR



```
~#@||| ~/
Installation YaST Version 1.06b -- (c) 1994-2000 SuSE GmbH

Installing package 5: base - 1.4 M - 189 packages remaining...

Logfile: /mnt/var/adm/inst-log/installation-20000830-0

CD 1:
aaa_base #####
Postinstall aaa_base...
Updating etc/rc.config...
Updating etc/passwd...unchanged
Updating etc/group...unchanged
Updating etc/shadow...modified
Updating etc/gshadow...modified
aaa_dir #####
aaa_skel #####
at #####
Postinstall at...
Updating etc/rc.config...
base #####

base - Some important GNU packages
```



Installing SuSE Beta 2 - Common VM and LPAR



After all packages installed

```
jj@jjj ~/  
Installation YaST Version 1.06b -- (c) 1994-2000 SuSE GmbH  
INSTALLATION COMPLETE. <TAB> brings you to the Installation log window.  
Logfile: /mnt/uar/adm/inst-log/installation-20000830-0  
sp #####  
sp_libs ##  
tcl ## Save configuration #####  
tix ## Change/create configuration #####  
tk ## Check dependencies of packages #####  
blt ## What if... #####  
itcl ## Start installation #####  
pyth_tk ## #####  
xaw3d ## Index of all series and packages #####  
xpm ## Package information #####  
xshared ## #####  
Totally installed: Install packages  
Delete packages  
Base system: SuSE-L Main menu  
INSTALLATION COMPLETE.  
F1=Help TAB=Installation log window ESC=Main menu
```



Installing SuSE Beta 2 - Common VM and LPAR

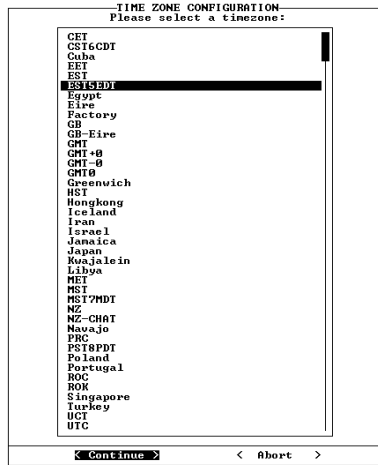


When exit to main menu

```
-----SELECT KERNEL-----  
Please select the appropriate kernel to boot your system.  
For additional information about the boot kernels use the help system  
<F1>. You may use F2 to change the destination path for the kernel. F3  
may be used to change the destination of the .config file.  
Kernel destination: /boot  
Destination of .config file: /usr/src/linux  
Default kernel for S/390 (with support for tape IPL)  
< Continue > < Abort >
```



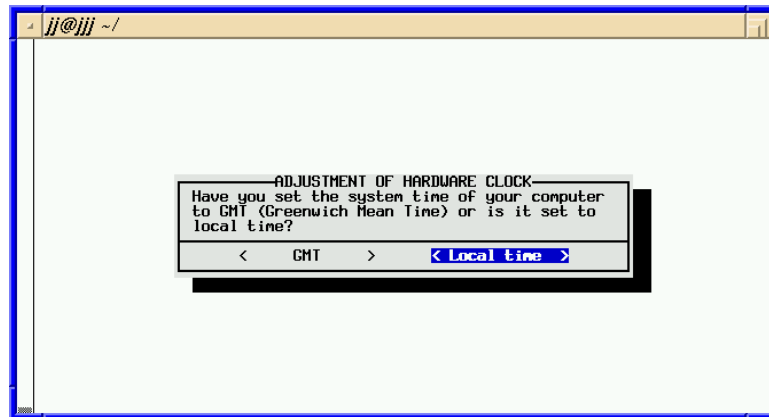
Installing SuSE Beta 2 - Common VM and LPAR



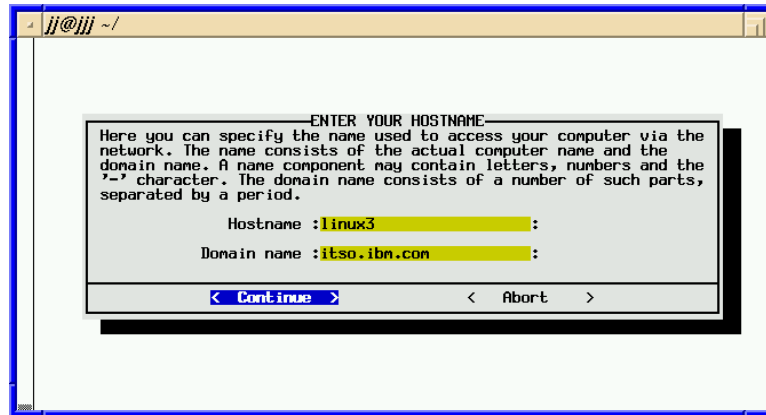
Installing SuSE Beta 2 - Common VM and LPAR



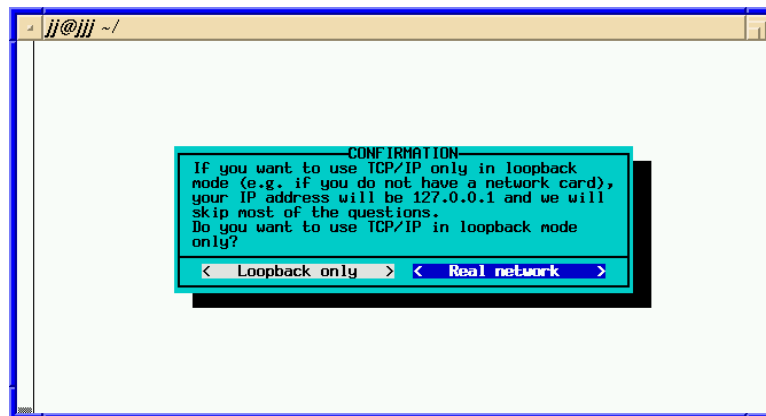
Answer does not seem to make a
difference under Beta 2



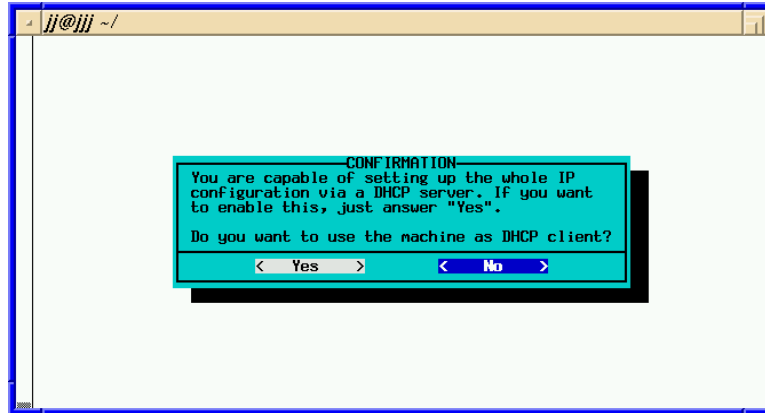
Installing SuSE Beta 2 - Common VM and LPAR



Installing SuSE Beta 2 - Common VM and LPAR



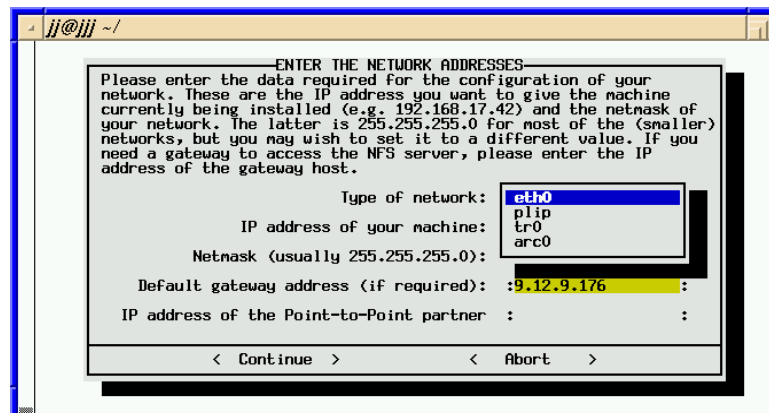
Installing SuSE Beta 2 - Common VM and LPAR



Installing SuSE Beta 2 - Common VM and LPAR



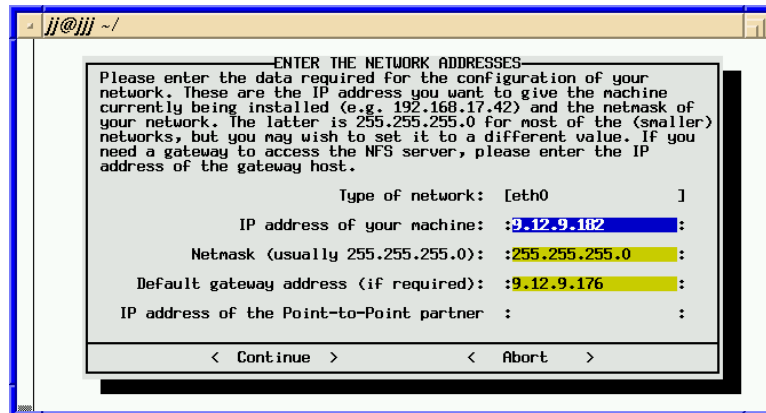
No selection for ctc, so use any device



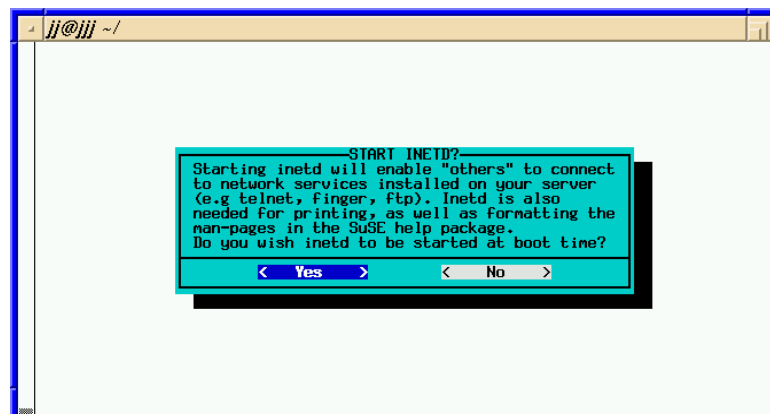
Installing SuSE Beta 2 - Common VM and LPAR



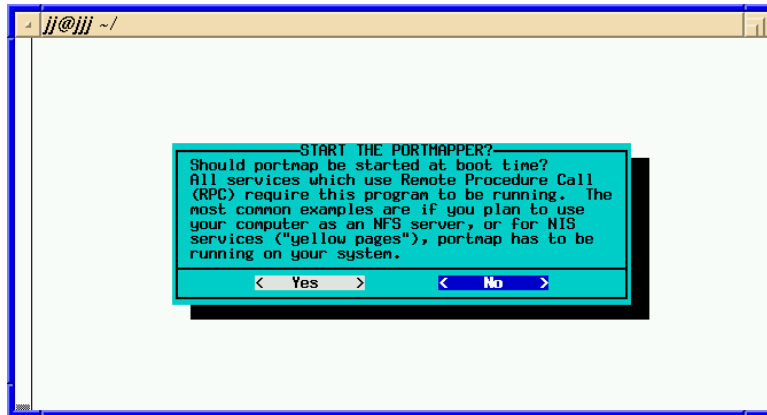
Fix network files after install completes



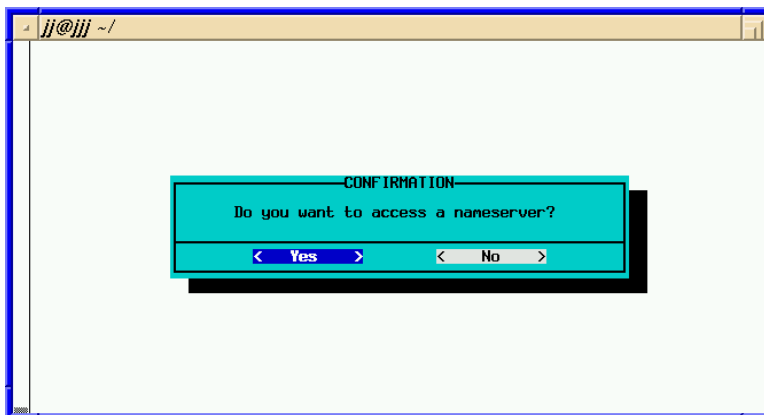
Installing SuSE Beta 2 - Common VM and LPAR



Installing SuSE Beta 2 - Common VM and LPAR



Installing SuSE Beta 2 - Common VM and LPAR



Installing SuSE Beta 2 - Common VM and LPAR



```
jj@jjj ~/  
-----NAMESEVER CONFIGURATION-----  
Please enter the IP address of your name server. You can add  
more domain name servers by modifying the file  
/etc/resolv.conf.  
IP-address list  
:9.12.2.7 :  
Domain list  
:itso.ibm.com :  
< Continue > < Abort >
```



Installing SuSE Beta 2 - Common VM and LPAR



Enter ctc0 and take all defaults

```
jj@jjj ~/  
-----SELECTION OF NETWORKING DEVICE-----  
Here you may select your networking device.  
Your selections will be written to /etc/modules.conf  
Network type :ctc0 :  
Networking device type [ <No network module> ]  
Module options  
: :  
[F3=select]  
< Continue > < Abort >
```



Installing SuSE Beta 2 - Common VM and LPAR



```
jj@jjj ~/  
-----SENDMAIL CONFIGURATION-----  
Sendmail needs an configuration file (/etc/sendmail.cf) .  
You will probably find one of the configurations below suits your  
needs.  
If you have special requirements that these do not cover, you may  
create you own. Please have a look at /usr/share/sendmail, one of  
the pre-existing configurations may well fit your requirements.  
ATTENTION: If you plan to install your own modified sendmail.cf  
you should select the last item in the list and install the file  
yourself. Otherwise, SuSEconfig will copy the selected file to  
sendmail.cf and your changes get lost.  
  
Host with permanent network connection (SMTP).  
Single user machine without network connection  
Host with temporarily network connection (Modem or ISDN).  
Use UUCP to send mail  
Expert mode for sendmail configuration  
Do not install /etc/sendmail.cf  
  
< Continue >      < Abort >
```



Installing SuSE Beta 2 - Common VM and LPAR



This is the last screen from YaST, when
press Continue, return to shell prompt

```
jj@jjj ~/  
-----OUTPUT of SuSEconfig-----  
Started the SuSE-Configuration Tool.  ||  
Running in full featured mode.      ||  
Reading /mnt/etc/rc.config and updating the system... ||  
Installing new /etc/HOSTNAME         ||  
Installing new /etc/resolv.conf      ||  
Installing new /etc/nntpserver       ||  
Installing new /etc/news_mail_gateway ||  
Installing new /var/lib/news/mailname ||  
Installing new /var/lib/news/whoami  ||  
Installing new /etc/SuSEconfig/profile ||  
Installing new /etc/SuSEconfig/csh.cshrc ||  
  
< Continue >
```



Installing SuSE Beta 2 - VM Guest



- Cleanup network script for CTC type device
 - Mount /dev/dasda1 (may already be mounted)
 - Edit /etc/rc.config, or use YaST System administration --> Change configuration file
 - Make sure NETDEV_0 is ctc0
 - Update IFCONFIG_0 for pointopoint link

e.g. 9.82.82.40 pointopoint 9.82.82.30 netmask 255.255.255.0 mtu 1500 up

 - Unmount the /dev/dasda1 file system
- Re-ipl the guest from the just created dasd
 - Additional scripts will run completing the install



Installing SuSE Beta 2 - LPAR



- LPAR definition
 - Recommend two 3390 dasd
 - File system (3390-3)
 - Swap partition (single density more than enough)
 - Could use xstore for swap with xpram driver
 - At least 128M of central storage
 - Communication adapter
 - Tape drive if not using load from cd-rom



Installing SuSE Beta 2 - LPAR

- Installation media
 - CD-ROM
 - Same comments as VM guest install
 - Build tape to load initial kernel and ramdisk
 - suse/images/tapeipl.ikr - upload binary F 1024
 - suse/images/initrd - upload binary F 1024
 - suse/images/parmline - upload ascii (make F 1024)
 - Use Ditto or similar product to copy files to tape
 - tapeipl.ikr, parmline, initrd



Installing SuSE Beta 2 - LPAR

- Installation media (cont.)
 - Alternative to tape is hardware load from cd or server function
 - G5, G6 with microcode fix MCL025 EC 99918
 - Multiprise 3000 with microcode fixes MCL048 (EC F34643) and MCL087 (EC 34663)



Installing SuSE Beta 2 - LPAR

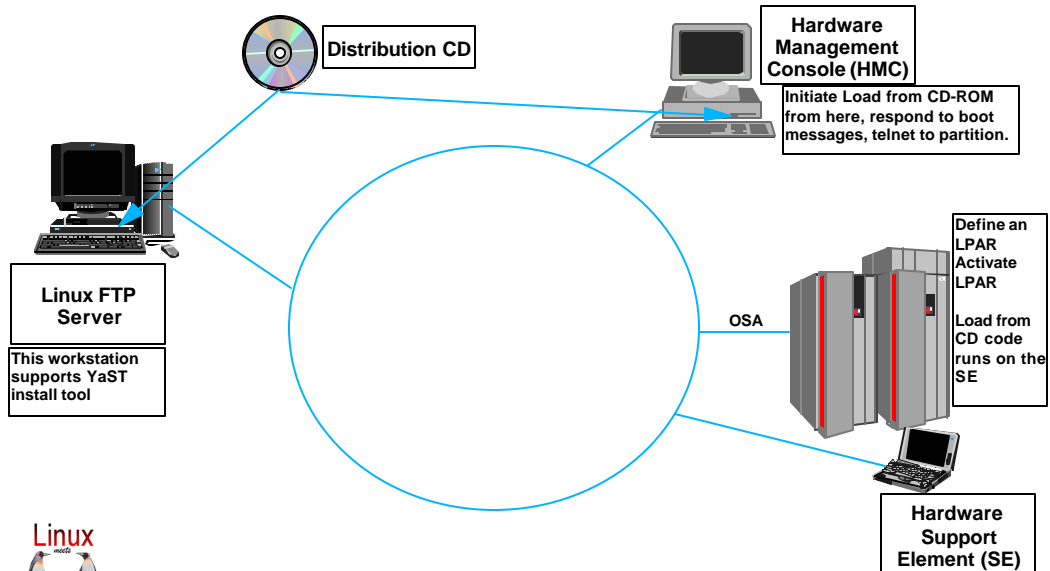


■ Notes for Load from CD-ROM

- Cannot use HMC CD-ROM as FTP server for Linux install
 - SuSE code requires Rock Ridge CD-ROM extensions which OS/2 Warp does not have
- Load from CD-ROM function supports loading from an FTP server
 - Must have TCP/IP stack on SE configured with default route, and perhaps other entries in routing table to connect with FTP server
 - Cannot use a RedHat Linux FTP server for initial "Load" function



Installing SuSE Beta 2 - LPAR



Installing SuSE Beta 2 - LPAR



- Activate LPAR
- From HMC
 - Insert distribution CD in CD-ROM drive
 - Logon to console application
 - Select "Defined CPCs"
 - Click on "Single Object Operations"
 - This establishes a session with a single CPC console (SE)



Installing SuSE Beta 2 - LPAR



- From the SE application
 - Select "Images"
 - Select the LPAR target for load
 - Click on "Load from CD-ROM or Server"
 - Select "Hardware Management Console CD-ROM" radio button
 - Enter /suse/images in the file location box
 - Select Linux.ins from choice box



Installing SuSE Beta 2 - LPAR

- Back on the HMC
 - Click on Operating System Messages
- Remove distribution CD from HMC CD-ROM
- Insert distribution CD into CD-ROM on Linux FTP server
- From Operating System Messages on HMC
 - Select type of network attachment
 - Continue as shown on previous "common" slides



Installing SuSE Beta 2 - LPAR

- Selection Of Network Device (YaST panel)
 - LCS module options:
 - noauto=1
 - devno_portno_pairs=0xYYYY,P
 - e.g. devno_portno_pairs=0x0A10,0



Administration and Maintenance



Kernel Maintenance



- YaST loads source from SuSE Beta 2 CD-ROM
 - Source tree in /usr/src/linux-2.2.16
 - Link created /usr/src/linux --> /usr/src/linux-2.2.16
 - .config file for current kernel in /boot
 - image.config
 - S/390 patches already applied
 - Follow standard kernel build sequence
 - make clean, make menuconfig, make dep, make image, make modules, make modules_install
 - Copy new kernel to /boot
 - Run silo to save new boot information



Ongoing System Administration



- SuSE, use YaST tool
 - Changes to installation such as default language, partition/filesystem associations
 - Installation of additional packages from SuSE CD-ROM
 - Changes to network configuration and services
 - Modify SuSE configuration file variables
 - Maintain users and groups



Backups



- No Linux for S/390 tape device driver
 - Native use of S/390 tape drives not possible yet
- Statement of direction for Tivoli client
- Customers using other creative methods to backup until tape and supported clients available
 - DDR of Linux DASD (if have VM/ESA)
 - Network based tar



Backups (cont.)



- Solution described on Linux-390 list
 - Use tar over ftp to store archive on another 390 operating system

```
#!/bin/sh
(  
date > /tmp/ftp.log  
ftp -nv 9.82.2.222 < /root/bin/tape.cntl >> /tmp/ftp.log 2>&1  
date >> /tmp/ftp.log  
) &
```

Shell script
named backup

```
user someuser somepw  
cd "MAINT.440"  
quote site FIXRECFM 4096  
bin  
put |'"tar -cvlf - /home'" home.tar  
bye
```

/root/bin/tape.cntl



Backups (cont.)



- Addition of find command can be used to select files for backup

```
find / -mtime -1 \! -type d -print >  
/root/filelist.daily
```

find command

```
user someuser somepw  
cd "MAINT.440"  
quote site FIXRECFM 4096  
bin  
put |'"tar -cv -T /root/filelist.daily -f -'"  
tar.files  
bye
```

New control file

- Use cron to schedule execution of commands at regular interval



Migration Considerations



- Keep your additions in separate partition
 - Update /etc/fstab to automatically mount your filesystems
- New version may replace root filesystem
 - Packages with make install function can easily move runtime components to new root filesystem
 - Keep copies of customized files
 - Manual operation for other packages



Rescue System



- Could use the HMC load from cd or server function
- Best to create a tape that can be ipled
 - Use same criteria as for initial installation
- Once tape is ipled
 - Use insmod to access dasd for root file system
 - Mount root file system
 - Repair damaged files, or resave old kernel with silo



Summary



- SuSE install begins similar to Marist install
 - Kernel, parm file, and ramdisk used to provide install environment
- Majority of SuSE install executed by YaST
 - Common in VM guest and LPAR environments
- YaST provides source and environment to build new kernel - however need for this should be rare
- Backup requires creative solution at present
- Installation planning should include planning for upgrade
- Install tape can be used as rescue system

