

L01

zSeries Linux Planning: Where to begin?

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Agenda

- Get the right groups involved early on.
- Identify the Workload
- Identify your Applications
- Pick the Linux Distribution
- Properly Size the workload
- LPAR or VM
- Identify the Hardware requirements
- Determine Network Connections
- Determine Disk requirements
- Create a system diagram
- Create the project plan

Get the right groups involved up front

- Network
- Hardware
- IP Architects
- Administrators
- Talk to your network & storage admins: draw pictures
- Other Hardware, IOCP support
- Security, including network security
- System Administration

First you will need to identify the workload.

- Are you adding new workload?
- Are you going to replace existing servers?
- Is your goal Consolidation?

What applications do you want to run ?

Websphere Application Server, MQ, DB2,
Oracle, HTTP, SAMBA, Tivoli, Open Source

ISV Products

<http://www-1.ibm.com/servers/eserver/zseries/os/linux/apps/all.html>

<http://www-1.ibm.com/servers/eserver/zseries/solutions/s390da/linuxproduct.html>

IBM Linux software product matrix
can be downloaded from the following website:

<http://www-1.ibm.com/servers/eserver/zseries/os/linux/software.html>

ORACLE
TECHNOLOGY NETWORK

Certify - Certification Matrix: Oracle Database - Enterprise Edition on IBM Linux on System z (31 and 64 bit)

Server Certifications

OS	Product	Certified With	Version	Status	Addl. Info.	Components	Other
SLES-9	10gR2 64-bit	N/A	N/A	Certified	<u>Yes</u>	None	None
SLES-10	10gR2 64-bit	N/A	N/A	Certified	<u>Yes</u>	None	None
Red Hat Enterprise AS/ES 4	10gR2 64-bit	N/A	N/A	Certified	<u>Yes</u>	None	None
SuSE SLES9	10g 64-bit	N/A	N/A	Certified	<u>Yes</u>	None	None
SuSE SLES8	10g 64-bit	N/A	N/A	Certified	<u>Yes</u>	None	None

<http://www.oracle.com/technology/support/metalink/index.html>
8/22/07

Which LINUX Distribution supports the applications you have selected?

SUSE, Red Hat, ?

Do you already have a relationship with either of these distributions?

Do you already have a skills base in one or both?

** Selecting a Linux Distribution, Mark Post, SHARE Feb. 2007
<http://linuxvm.org/present/SHARE108/S9232mp.pdf>

Properly Size the workload

If replacing existing servers, you will need to determine the performance of your existing workload?

Work with the IBM SIZE390 folks to determine what the requirements will be for z/Linux?

(size390 support can be reached thru Techline or Partnerline)

LPAR mode or z/VM?

Can I fit everything in one Linux system? (LPAR ?)

Do I need to run more than one Linux System?

VM or Multiple LPAR's?

Determine your Hardware Requirements.

Supported IBM processor

(G5 or later for 31bit, 64bit requires zSeries),

Processor Memory,

(512M recommended for install, can be cut/reduced after the install if not needed)

Console Support,

(3270 session required for initial install, HMC 3270 session can be used)

Network Connectivity,

(OSA, vSwitch, Hipersockets, Guest LAN)

Determine your Hardware Requirements. Continued

Standalone Installation Server

(Linux requires an Installation Server which is used to mount the Linux distribution CD's, it is recommended that you use a Linux or Unix server. There must be a TCPIP network connection to the OSA you will be using for Linux),

Tape Drive

(VM or Linux ramdisk load),

HMC with Load from CD option,

(Can be used to load the ramdisk if loading into LPAR)

DASD to support installation.

(ECKD or FCP)

Determine Network Connectivity

Involve your Network and Security groups early in the game. They will need to help you with your network resources, Firewalls, Routing, IP Address's

How are you going to connect your Linux system to the network?
(VM VSwitch, Guest LAN, Hipersockets LAN, Dedicated OSA ports)

Disk Requirements

Determine the type of disk you will be using.

(Will you be using ECKD or will you be using FCP or a combination?)

Determine the amount of disk space required

(What Linux applications will you install? Will you do a full install or minium install, SUSE says 1.6G minimum and RedHat recommends 2G minimum, but if you select all of the packages, the disk space requirements can jump to 5G. So only select and install those packages you think you will need. Plan for growth, it is easier to configure the disk space at install instead of trying to expand it later on).

Which file system will you use?

(reiser,ext2,ext3,xfs,jfs....)

Determine your Mount points.

(If you know you will be installing a package that installs into the directory /opt, plan for it now.)

Determine SWAP space.

(Ideally your Linux machine will have enough memory so that swapping is a minimum,
http://www-128.ibm.com/developerworks/linux/linux390/perf/tuning_rec_database_swapping.html)

Disk Optimizing

(spread the disks over more than one rank, use several chipids and host bays. Will you need to create large logical volumes? LVM2 or EVMS, Striping)

Overview of a Linux install

Load from :

HMC CD (LPAR)
 Tape image (LPAR or VM)
 VM RDR (VM)

Linux install ramdisk is created and customized
 in system processor memory, includes a network connection.

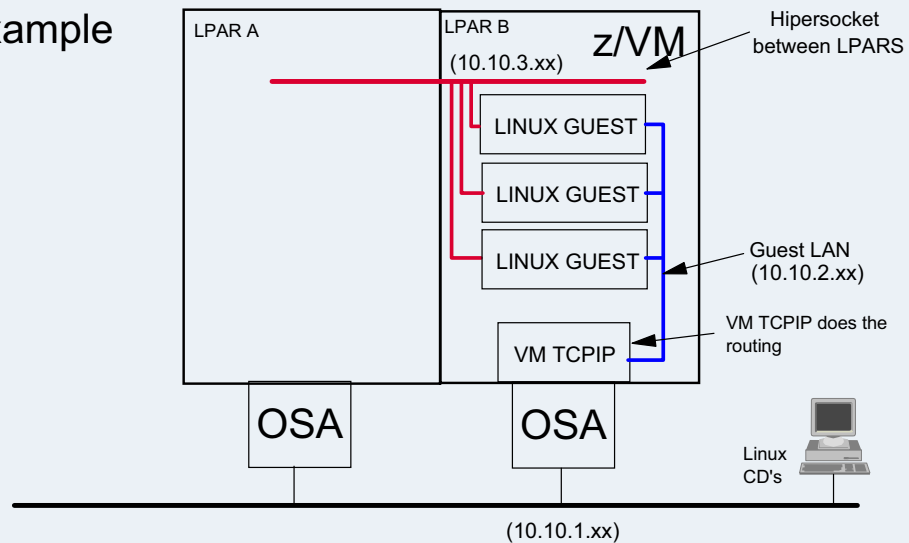
Connect to this ramdisk from an external workstation using ssh or VNC. This ramdisk is then used to access thru the network connection the Linux distribution CD's mounted on an external FTP or NFS server. Once the CD's are accessed the install is very similar to an install on a PC.

IPL your new Linux native system
 or VM guest from DASD

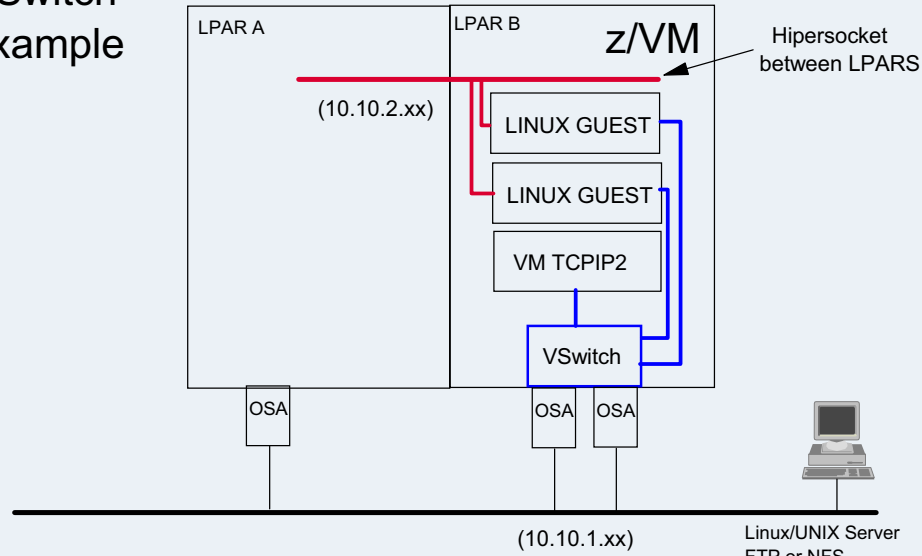
Sample System Layouts

**** Draw a picture of what your system layout will look like !
It doesn't have to be fancy to begin with, a napkin and a pencil
can give you a starting point !*

Guest LAN example



VSwitch example



For many Linux on z Series installations, most of the following values can be specified in the installation kernel “parmfile”.

This means you won't have to type the information everytime you load a server. This can save alot of time and also saves on the typo's.

If you ommit any required information the process will prompt you.

Parmfile examples

SUSE Linux Enterprise Server 10, Preparation manual, Appendix A2
(limited to 10 lines)

```
00000 *** Top of File ***
00001 ramdisk_size=65536 root=/dev/ram1 ro init=/linuxrc TERM=dumb""
00002 Manual=0
00003 HostIP=9.60.xx.xx Gateway=9.60.xx.xx Nameserver=9.xx.xx.xx
00004 InstNetDev=osa Netmask=255.255.255.128 Broadcast=9.60.xx.xxx
00005 OsaInterface=eth OsaMedium=qdio Layer2=0 ReadChannel=0.0.2700
00006 WriteChannel=0.0.2701 DataChannel=0.0.2702 Portname=JNS
00007 Install=ftp://9.60.xx.xx/ftp/suse/sles10x/sp1/CD1
00008 Username=xxxxxxx Password=xxxxxxx UseVNC=1 VNCPasswd=xxxxxxx
00009 *** End of File ***
```

RedHat Enterprise Linux 5 Parmfile

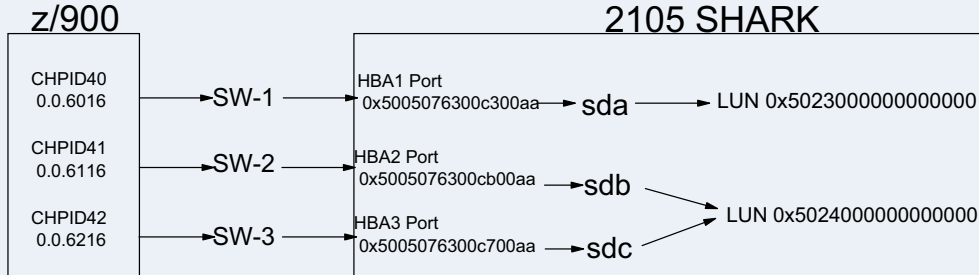
Red Hat Enterprise Linux Installation Guide, chapter 19
(<http://www.redhat.com/docs/manuals/enterprise/>)

rh5.parm (32 parameter limit)

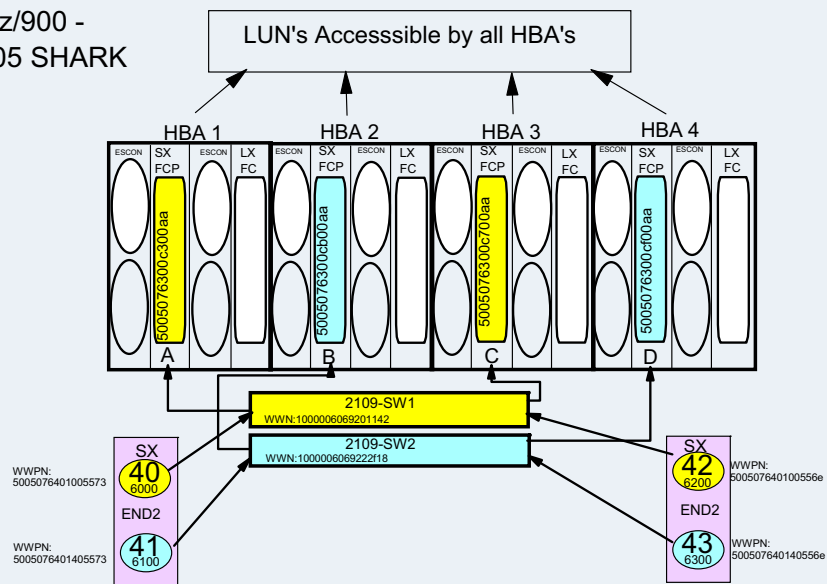
```
00000 *** Top of File ***
00001 root=/dev/ram0 ro ip=off ramdisk_size=40000
00002 CMSDASD=191 CMSCONFFILE=rh5fcp.conf
00003 vnc
00004 *** End of File ***
```

rh5fcp.conf

```
00000 *** Top of File ***
00001 DASD="999"
00002 FCP_1="0.0.6016 0x01 0x5005076300c300aa 0x1 5023000000000000"
00003 FCP_2="0.0.6116 0x01 0x5005076300cb00aa 0x1 5024000000000000"
00004 FCP_3="0.0.6216 0x01 0x5005076300c700aa 0x1 5024000000000000"
00005 HOSTNAME="jns3.endicott.ibm.com" NETTYPE="qeth" IPADDR="9.60.xx.xx"
00006 SUBCHANNELS="0.0.2708,0.0.2709,0.0.270A" PORTNAME="JNS"
00007 NETWORK="9.60.86.0" MTU="1500"
00008 NETMASK="255.255.255.128" BROADCAST="9.60.86.127" GATEWAY="9.60.86.1"
00009 DNS="9.0.3.1:9.0.2.11" SEARCHDNS="ibm.com:pok.ibm.com"
00010 *** End of File ***
```



z/900 -
2105 SHARK



Needed data for installation cont.

Fully Qualified Domain Name, e.g., us.ibm.com

For VM Installs

- VM userid of your system
- VM password
- VSWITCH or Guest LAN name(s)

Network Information

- Network interface type
- Network mask
- Broadcast address (may not be needed)
- IP Network address
- MTU size
- Domain name search list
- OSA portname (if on older microcode)

Needed data for installation cont.

IP Addresses

- Your system
- DNS Server(s)
- FTP/HTTP/NFS/SMB Server (installation server)
- Default gateway

Device Numbers

- DASD
- OSA card, virtual or real
- FCP adapter for SCSI disks

WWPN/LUN for SCSI

Now that you have identified what you want to accomplish, it is time to develop a Project Plan.

The following is an example Project Plan. You may find it helpful in developing your own Project Plan.

This project plan is available in a .doc file. Send a note to jnschnit@us.ibm.com and I will be happy to send it to you.

zSeries Linux Example Project Plan

Task	Owner	Start Date	End Date	Comments
Project Identification				
Identify Executive Sponsor				
Determine application or functionality to be tested				
POC Success Criteria				
Preliminary business case				
Determine skill sets required				
Organize a project team (establish roles)				
Identify education needs and schedule sessions				
Establish Status Update Calls (Weekly/Monthly)				
Application Information				
Provide current hardware information – for both POC and production requirements				
Get distributed server list from				
Determine IBM software stack required				
Determine ISV software stack required				*
Choose Linux distribution				
Architect Linux Environment				
Preliminary TCO				
Provide Sizing Results				
Determine Hardware Requirement				
Infrastructure Set Up				
Order hardware				
• IFL's / CP's				
• Memory				
• Channels				
• OSA				
• DASD				
• Other				
Order Software				
• Order z/VM software & features				
• Order IBM Middleware				
• Order Linux distribution				

•				
•				
Order Supportline				
• Order IBM z/VM Supportline				
• Order Distribution Supportline				
Solution Design				
Perform Solution Assurance				
• Hardware SAR				
• z/VM / LINUX SAR				
z/VM Design				
• Design a z/VM structure for each LPAR (# of virtual machines, attributes of each virtual machines)				
• Design a z/VM network connectivity structure for each LPAR				
• If using multiple Linux virtual machines per LPAR, develop a cloning strategy				
Network Design				
• Design an overall network connectivity structure				
• Assign TCP/IP addresses for real and virtual networks				
• Prepare the I/O configuration				
Infrastructure Installation and Configuration				
Hardware				
• Install and define IFL LPAR				
• Install and assign memory				
• Install and assign channels				
• Install and configure OSA				
• Install and assign DASD				
Software				
• Install z/VM				
o Customize the z/VM environment for system administration				
o Customize the z/VM system for networking				
o Define initial Linux virtual machine (guest)				
o Customize initial Linux virtual machine for networking				

• Install Linux Distribution				
o Install Linux into initial Linux virtual machine				
o Code Linux networking parameters				
• Install additional software				
o IBM Middleware				
o ISV Software				
o Open Source Software				
Verify overall functionality of initial z/VM LPAR and initial Linux virtual machine				
Create additional LPARs and Linux virtual machines as required				
Verify network connectivity between LPARs and Linux virtual machines				
Verify additional infrastructure functionality is in place				
Sign off that infrastructure is ready for next phase				
Application Migration and Testing				
Install or migrate first application or major function				
Plan test runs without impacting production (tape library?)				
Initial functional testing				
Security testing				
Load test				
Backup/recovery testing				
Verify completion of Proof of Concept				
Document findings				
Review Success Criteria				
Finalize TCO				
Finalize Business Case				
Report back on results				
Go/No-Go for Production Recommendation				

Project Resources

Project Teams	Title	Email	Work Phone	Area of Interest
Business Partner and/or IBM Resources				
Customer Resources				
Project Manager				
Network				
Security				
Operations				
Systems Programming				
Applications Programming				
Distributed Processing				

Business Partners and IBM Reps, You Must Do a Systems Assurance !

*All Linux and Open Source software installs on any IBM platform require a Systems Assurance.

It is the responsibility of the IBM Rep or BP to schedule the SAR.

*All Linux installations involving an IFL engine require a Systems Assurance.

*When an IFL is involved the BP can request an IBM Quality Assurer be assigned to coordinate the SAR by contacting Partnerline.

*IBM contact Techline or open a SAR request at the following website:

<http://dalnotes1.sl.dfw.ibm.com/atss/techxpress.nsf/request?OpenForm>

Websites <http://linuxvm.org/>

Whitepapers

<http://www-1.ibm.com/servers/eserver/zseries/os/linux/library/>

Technical Papers

http://www-1.ibm.com/servers/eserver/zseries/library/literature/reference.html#cat_1

Redbooks

<http://www.redbooks.ibm.com/>

Distribution websites

<http://www.suse.com/us/index.html>

<http://www.redhat.com/>

<http://www.debian.org/>

<http://www.slack390.org/>

IBM Developerworks

<http://www-128.ibm.com/developerworks/linux/linux390>

Linux Documentation Project

<http://en.tldp.org/>

z/VM Softcopy Manuals

<http://www.vm.ibm.com/pubs/>

Marist Linux Listserv

Linux-390 <http://www2.marist.edu/htbin/wlindex?linux-390>

Thanks

Questions

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