



Linux Installation Planning

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Agenda

- More Questions Than Answers
- First Things First
- Pick the Right Architecture
- Disk Storage Selection
- Application Selection
- Application Requirements
- File System Selection
- File System Layout



Agenda (2)

- Network Requirements
- Ongoing System Support
- Management Tools
- Data for Installation
- Questions (I'll also take questions as we go along unless time gets short)



More Questions Than Answers

- Every site is different.
- I'm not omniscient
- I'm going to give you questions to ask back at your job
- If you get answers for them, you're 90% of the way to succeeding



First Things First

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

- Doing anything else *might* get you fired



First Things First

- Installing Linux is *not* like installing z/OS or z/VM (hopefully you're not surprised)
- For mainframe installs, you will need an installation server
 - It's "best" if this is a Linux or UNIX system
- There must be a usable TCP/IP network connection between the installation server and your target system
 - This means end-to-end, through whatever firewalls, routers, bridges, WAN links, whatever
 - The SUSE Linux Enterprise Server Starter System helps with this, but you need z/VM.
 - See your IBM rep for a z/VM evaluation copy if you don't have it



Pick the Right Architecture

- Where are you going to be running Linux?
 - Distributed/Midrange box
 - In a System z LPAR
 - On z/VM
 - All three
- The decision of which platform depends on the type of workload to be run
 - Mainframes are not the best candidates for CPU-intensive workloads
 - Less true with z9 and z10, but still pretty expensive cycles
 - Very CPU-intensive work should be done on Intel or RISC platforms (this includes heavy program compilation)



Pick the Right Architecture

- Mainframe Linux is a good choice for:
 - Network services
 - I/O intensive work; consolidating low-use servers
 - Front-ending mainframe-resident databases and applications
 - Fast provisioning of test/development as well as production servers
 - Offloading expensive z/OS cycles
- How many Linux systems do you think you'll need?
 - For "just a few," LPAR may be a good choice. Remember to count all your test/development, QA, and fail-over systems.
 - z/VM is the best platform if you're going to have more than a *very small* number of Linux systems (and their workload characteristics are a good fit)



Disk Storage Selection

- What kind of disk/DASD devices are you going to be using?
 - Directly attached (FICON or ESCON)
 - SCSI over FCP
 - iSCSI
 - SAN
 - NAS
- SCSI over FCP gives better performance, and the SAN adapters are cheaper, but you might need additional adapters on the mainframe side. (Can be used for FICON or FCP, but not both at the same time.)
- Who do you need to work with to make that work correctly?



Application Selection

- What applications are you going to run?
 - Not everything that runs on Linux is available for Linux on System z. (Open Source included!)
 - Ask your ISVs to be specific; they may need to “get back to you.”
- All Open Source, all commercial, or a mixture?
- Keep your packages to a minimum
 - This can be a big time saver as you go forward, but it will cause short-term pain and aggravation
- Who needs to be involved in deciding?



Application Selection (2)

- What kind of system(s) are you going to be installing?
- Try to build standard templates
 - Web server
 - Web Application server
 - File/Print server
 - FTP server
 - Database server
 - Workstation
 - Router, Firewall, Proxy



Application Requirements

- What are the virtual/real storage requirements for the applications to be run?
 - Oracle can be a tremendous storage hog
 - But the per-processor licensing can give big savings on the mainframe
 - WebSphere is a well-known resource hog
 - Some companies have had to fall back to “plan B,” running Linux on Intel because they didn't do a good job of resource planning
 - Also can get big savings from per-processor licensing
- How much disk space is going to be needed?
 - This can drive the decision on SCSI versus ECKD
 - Aggregating 3390-#'s into multiple Terabyte file systems is a pain



Application Requirements (2)

- Does the application require no downtime, ever?
 - Linux for System z
 - High-availability clustering (HA)
 - Multiple mainframes
 - Multiple Intel/midrange boxes
 - Find someone who knows what they're doing
 - Coming (someday): Live Guest Migration on z/VM
 - VMWare VMMotion-like facility for System z



File System Selection

- What kind of file system should you use?
 - Red Hat only ships ext2 & ext3, so not a consideration there
- Common file system types
 - ext2 (not recommended, due to lack of journaling)
 - ext3 (will be the default in SLES 11)
 - reiserfs (currently is the default, but not a lot of maintainers)
 - XFS
 - JFS (Deprecated in SLES10)
- Unless you have specific needs, ext3 is a good default
 - It's not the best at any workload, but it's decent with all of them



File System Layout

/ (root)

/bin

/boot *

/dev

/etc

/home

/lib, lib64

/mnt

/opt

/proc

/root (Not to be confused with / root)

/sbin

/srv

/sys

/tmp

/usr

/var



File System Layout

- How are you going to lay out your file systems?
 - May want to do a “trial” install first to see how much space is needed in which file systems
- What are you going to be using for backup and restore?
 - Does this need to work with current facilities, including tape libraries?
 - What additional software will be required?



Sample File System Layout

```
# df -h
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/dasda1	388M	119M	250M	33%	/
/dev/dasda2	97M	4.2M	88M	5%	/home
/dev/dasda3	74M	21M	50M	30%	/opt
/dev/dasdc1	1.2G	1.1G	100M	92%	/srv
/dev/dasdb1	291M	17M	260M	6%	/tmp
/dev/dasdb2	1.2G	915M	183M	84%	/usr
/dev/dasdb3	245M	69M	164M	30%	/var



Network Requirements

- How is this system going to be connected to your existing network?
 - OSAs
 - Some other kind of hardware?
 - For z/VM guests, seriously look at VSWITCH and Guest LANs.
- For Linux on System z, are you going to be using any internal networking within the same box?
 - HiperSockets to talk to z/OS (or z/VSE or z/TPF)
 - HiperSockets to talk to Linux Guests on another z/VM LPAR?
 - Use OSAs to forward traffic without going outside the box?
- Are you going to have enough network traffic to require link aggregation? (Available in z/VM 5.3)



Network Requirements

- Will your backup data be going across the network?
 - Don't use your primary network interfaces
- How are you going to be doing routing?
 - Static
 - Dynamic (RIP, RIP2, OSPF, BGP)?
- Is this system going to be exposed to the Internet?
 - How is it going to be protected?
 - Firewalls, etc.
 - Intrusion Detection Systems (IDS)
- Layer 2 requirements?
 - Non-IP traffic, such as IPX
 - DHCP
 - You may have others



Ongoing System Support

- Who is going to be administering the Linux system after installation?
 - Midrange support
 - Midrange security
 - Mainframe support (if Linux on System z)
 - Some combination? (probably best)



System Management Tools

- What system management tools will you be using?
 - What are you using for your existing platforms?
 - Will those be applicable to the Linux systems?
 - Are they also available for Linux on System z?
 - Again, don't assume anything
- Will Open Source health-checkers be sufficient?
 - Hobbit
 - Big Brother
 - Nagios
 - Etc.



Data for Installation

- For most Linux on System z platforms, most of the following values can be specified in the installation kernel “parmfile”
 - This means you won’t have to type them in during installation
 - Very handy on the 2nd, 3rd, 4th, etc. installs
 - What, you thought you were going to do this once and be done?
- Fully Qualified Domain Name, e.g., linuxtest.novell.com
 - You may be asked to supply this in two parts: hostname and domain
- For VM Installs
 - VM userid of your system
 - VM password
 - VSWITCH or Guest LAN name(s)



Data for Installation

- Network interface type, and driver
- Network mask (255.255.?.?)
- Broadcast address (likely not needed)
- IP Network address (likely not needed)
- MTU size
- Domain name search list
- OSA port name (if on old microcode or old installer requires it)



Data for Installation

- IP Addresses
 - Your system (the system being installed)
 - DNS Server(s)
 - FTP/HTTP/NFS/SMB Installation Server
 - Default gateway
 - CTC/IUCV "peer" (essentially a default gateway)



Data for Installation

- Device Numbers
 - DASD
 - CTC/ESCON virtual or real (uses 2)
 - OSA card, virtual or real (uses 3)
 - HiperSocket, virtual or real (uses 3)
 - FCP adapter for SCSI disks

- WWPN/LUN for SCSI

Questions?

