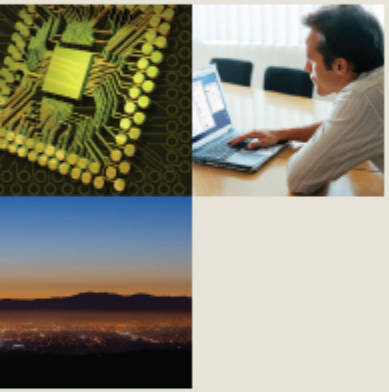

Installing a Novell SLES 10 Starter System without a Net(work)

Session 9287
13:30 Thursday, August 14, 2008
SHARE – San Jose, CA

Contact: Mike.Walter – Hewitt.com
847.771.9212

Disclaimer

(you expected something else?)

SHARE
Technology · Connections · Results

- This is only the second time this session has been presented…
  - someone "moved my cheese" ("SUSE Linux Enterprise Server 10 SP2 Starter System for IBM System z Multilingual" came out May 2008).
  - time is included for lots of questions and a live demo (wireless network permitting)
- This session will probably re-appear with significant changes/improvements at the next SHARE (it did time)…
  - After other "old timers", ***and YOU***, chip in ideas, tell me what I've done wrong), what I should do differently, and what else I should be doing!
  - "**SHARE**, it's not an acronym – *it's what we **DO***!"

Mandatory "Brag Sheet"
or: "Why should we listen to *him*?"

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Technology · Connections · Results

- Started as a "Teleprocessing Operator" in Feb. 1972
  - Thus, in Data Processing for over 30 years!
- VM-exclusive (mostly) since 1978 (30+ years of VM!)
  - (VM 370 Release 5 Program Level Change 6)
- Installed VM at Hewitt Associates in 1984
- Chaired CAVMEN for 6+ years
- Member of SHARE VM Technical Steering Committee since August 1997
- According to envelopes of various mailings: CIO; Partner-In-Charge; and Chief Cook, Manager of VoiceMail Systems
- VERY much … a Linux "newbie"!

Agenda

- Why use it? What does it do? What does it NOT do?
- How the “Novell SUSE Linux Enterprise Server Starter System for System z” … came to life
- How long does it take to download from Novell and upload to a running z/VM system? (YMMV)
- Things learned to even get the Starter System downloaded (properly)
- How difficult was it to actually install?
- Creating the NOVSTART userid
- Install a full-service server (e.g. NOVCLNT1) from the Starter System server (NOVSTART)

Agenda – Live demo ?

- If the wireless network permits
  - Unpacking the 150 disk (small enough for a live example)
  - Configuring the “NETWORK PARMS” file
  - Booting the first time
  - Correcting the inevitable “NETWORK PARMS” typo
    - Oh, you mean RTFM ***before*** starting!!??
    - What else? “Common Problems and Solutions” (way back on page 34)
  - PING the Start (Installation) System! “Das boot”- Wir sind gut!!
  - Install a new (full service) server from NOVSTART
  - Exploring … as time permits

How the “Novell SUSE Linux Enterprise Server Starter System for System z” … came to life.

- As best I can reconstruct the timeline now …
  - May 2003 - Hewitt considered its first Linux for System z “Proof of Concept” (POC).
  - May 2004 - Requested an SLES evaluation copy.
  - June 2004 - Defined a Linux z/VM userid.
- Our Internet Security group is (justifiably) paranoid.
  - Would not permit a workstation CD drive connection to mainframes.

Why use it? What does it do?

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  - For starters: when you are not permitted to open a port between a PC with a Novell SLES Install DVD loaded, and the target VM system (thus, the need to install without a network).
  - Gets SLES installed “in a hurry” without much Linux experience.
- What does it do?
  - “The SUSE Linux Enterprise Server Starter System for System z is a **pre-built installation server** for SUSE Linux Enterprise Server for System z that can be installed on your z/VM system using CMS tools, **eliminating the need for coordinating access to a separate Linux or Unix system elsewhere on your network** and minimizing the impact of network-based installation on your internal and external networks.” (Pasted from the “Installation Guide”, highlighting mine)
  - Permits quick installation of full-service servers without DVD access.
  - Acts as a zLinux “rescue” system (by booting the IPL decks from the virtual reader).
    Source: Sine Nomine
  - Can be used for upgrades as well as new installs by identifying the root partition, shutting down the old system, and using the starter system as the boot system. Tell it where the old root is, and it should go into upgrade mode.
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What does it NOT do?

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  - "The starter system image has been highly customized for **use as an installation server** for other SUSE Linux Enterprise Server for System z based Linux servers running in virtual machines. The starter system is **NOT suitable for general use** and you should not attempt to use it for any other purpose." (Pasted from the "Installation Guide", highlighting mine)
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Laborious security circumvention:

- One of our IBM reps visited another customer running a SLES VM.
- The customer shutdown their SLES FTP server, DDR dumping its minidisks to tape.
- Our IBM rep returned the tapes to us.
- We DDR restored the minidisks you our DASD, bringing the SLES FTP guest server up in under 30 minutes.
- The SLES installation CDs were mounted on a grid server (running Linux) connected to one of our z/OS systems.
- The CDs were mounted to USS on that z/OS system.
- The CDs were connected to the NFS (Network File System).
- The SLES virtual machine running under z/VM on a completely separate System z connected to NFS.
- The SLES virtual machine mounted the CDs and proceeded with an FTP installation from the CDs.

How the “Novell SUSE Linux Enterprise Server Starter System for System z” … came to life.

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- Time passes…
- May 2007 - Hewitt decides to attempt another Linux for System z (SLES) POC for a different application.
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- The same tedious mounting process is followed.
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- ***June 13, 2007*** - After hearing that we were not alone in the lengthy struggle to install Linux for System z, I describe the difficulties, delays, and security concerns on the IBMVM discussion list.
  - David Boyes of Sine Nomine Associates soon contacted me to discuss the issues.
  - David discussed the issues with IBM and Novell, convincing IBM to permit distribution of the CMSDDR tool, and Novell to contract with Sine Nomine Associates to develop, document, and support the lengthily-named, above-quoted Starter System.
- February 2007 - Mark Post at Novell had begun quietly working on a similar Starter System (great minds and all that…).

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- ***October, 2007 -*** David sent a draft copy of the new documentation to me.
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  - And also made available the lengthily titled, multi-syllabic:
    “SUSE Linux Enterprise Server 10 SP2 Starter System for IBM System z”
- ***May 2008*** - apparently getting an even better volume discount on letters, Novell announced the:
  “SUSE Linux Enterprise Server 10 SP2 Starter System for IBM System z Multilingual”.
- Now – and here we are!

Things learned to even get the Starter System downloaded (properly)

- Do *not* download with Microsoft Internet Explorer
  - At least not with IE Version 6; maybe Version 7 would be better
  - IE caused file download corruption which was not detectable
    - No reported download errors from Internet Explorer
    - No reported errors during FTP upload to VM
    - No reported errors reported during MD5 checksum verification on VM
    - MD5 checksums verified on VM matched those in the NOVELL web site
    - But when booting the NOVSTART server the first time, it never completed, instead ending with messages:
      request_module: runaway loop modprobe binfmt-feab (5 lines repeated)
    - Downloading the NOV151 disk using Firefox (but not yet the 150 disk) resulted in
      request_module: runaway loop modprobe binfmt-0000 (5 lines repeated)
- *Recommended:* use Mozilla Firefox
  - I eventually used Mozilla Firefox
  - NOVSTART Booted properly the very first time!

How long did it take to download from Novell and upload to a running z/VM system? (YMMV)

For the “SUSE Linux Enterprise Server 10 SP2 Starter System for IBM System z Multilingual”:

- At the office, using Firefox: approximately 2 ½ hours for all pieces,
- and then another 2 hours to FTP from the laptop to z/VM. (YMMV)

- **Firefox was 2 to 3 times faster than IE 6+**
  - **And the files were actually *GOOD!***

Things learned to even get the Starter System downloaded (properly)

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Technology · Connections · Results

- Novell recommends verifying the **MD5 checksums** of downloaded files, but the web site and Installation Guide make no recommendations about how to do that.

- Download and install the latest CMS Pipelines **RunTime Library** from:

  http://vm.marist.edu/~pipeline/

  Also download and install **PICKPIPE EXEC** from:

  http://www.vm.ibm.com/download/packages/

- To display the MD5 checksum on a file which has been FTPed to z/VM, on the z/VM system enter:
  - **PICKPIPE UPLEVEL (NOSEGMENT**
  - **PIPE < fn ft fm | DIGEST MD5 | SPECs 1-* C2X 1 | CONSole**

How difficult was it to actually install?

- After fighting past the download issue, it was a piece of cake for an experienced z/VM'er. (YMMV)
- Define the z/VM userid (NOVSTART) as specified in the manual and downloaded NOVSTART SAMPDIR. *If you have a Directory Manager product, by all means… use it!*
- Only if you have no Directory Manager (e.g. CA's VM:Secure, or IBM's DIRMAINT – both "priced products"; meaning "NOT free"):
  - Logon to MAINT
  - Run DISKMAP or DIRMAP to find free disk space cylinders as required in the Installation Guide
  - ***COPYFILE USER DIRECT fm BACKUP DIRECT fm (OLDDATE***
    (creating a backup copy, just in case…)
  - XEDIT USER DIRECT
  - Perhaps issue 'BOTtom' to get to the bottom of existing entries and add the new directory entry for NOVSTART.

Creating the NOVSTART userid

An example:

```
USER NOVSTART password 512M 1E G 64 ON OFF OFF
*UI=MAINT, Novell Linux SLES10 SP2 "Starter/Rescue System"
 ACCOUNT OVERHEAD 93S0
 CPU 0
*CPU 1       ( Removed 20080214 per IBMVM discussion of same date )
 MACHINE XA 2
 IPL  CMS     PARM AUTOCR
 IUCV ANY
 OPTION MAX 2048
 OPTION SVMSTAT
 CONSOLE 009 3215 C
 SPOOL 00C 2540 READER *
 SPOOL 00D 2540 PUNCH B
 SPOOL 00E 1403 P
```

Creating the NOVSTART userid

LINK MAINT 190 190 RR
LINK MAINT 19D 19D RR
LINK MAINT 19E 19E RR
SPECIAL 0340 HIPER 3 SYSTEM POLAR

MDISK 0191 3390 begcyl 00005 volser MR rpw wmw <mpw>
MDISK 019F 3390 begcyl 00050 volser MR rpw wpw <mpw>

MDISK 0150 3390 begcyl 03283 volser MR ALL wpw <mpw>
MINIOPT NOMDC

MDISK 0151 3390 begcyl 03338 volser MR ALL wpw <mpw>
MINIOPT NOMDC

MDISK 0F00 3390 begcyl 03338 volser MR rpw wpw <mpw>
MINIOPT NOMDC

Creating the NOVSTART userid

- Only if you have no Directory Manager **product** **(continued) …**
  - From the XEDIT command line after adding NOVSTART to the "USER DIRECT", enter: FFILE
  - **Very important:**
    - Run DISKMAP and or DIRMAP, then XEDIT the resulting files, *hint:*
      FILELIST (TODAY
      - *examine all disk "OVERLAP" records (generally "BAD" things unless done for a very specific reason).*
        Another hint:
        ALL /OVERLAP/
  - As long as there are no unintended disk "OVERLAP"s, enter the command: DIRECTXA
  - Remember that you have a "BACKUP DIRECT fm" in case of errors.

NOVSTART boots, now what?

- This special Starter System has been designed so its first boot will read the “NETWORK PARMS A” file (which you edited with XEDIT before you had any Linux editors available), automatically reconfigure the Linux network to match, and automatically reboot using those parms.
  - If you make a mistake, jump a page ahead to "Recovering from a Damaged or Misconfigured Network Configuration”. (I did, too)
- “Log in to the starter system as root from a SSH client such as PuTTY or another Linux system using the SSH command”.
  - Unstated: **SSH defaults to: port 22**
  - From another Linux server, one would enter something like:
    - ssh **–p 22** root@nnn.nnn.nnn.nnn

Install a full-service server (e.g. NOVCLNT1) from the Starter System server (NOVSTART)

- Follow “Starting the Install Process” documentation

Steps in *green italics* are documented in the manual -- the rest we had to figure out and may change based upon your site requirements.

  - *Using the “CLIENT SAMPDIR” downloaded from Novell, create a new userid (NOVCLNT1 in this demo) in the USER DIRECT (or using your ESM)*
  - *Logon NOVCLNT1*
    - *Format the 191 disk*
    - *Copy the PROFILE EXEC from NOVSTART 19F*
    - *Access the NOVSTART19F disk (with SLES EXEC and SWAPGEN EXEC)*
    - *Type: SLES*

Install a full-service server (e.g. NOVCLNT1) from the Starter System server (NOVSTART)

- Respond to install prompts with (in our demo):
  - *4 - Start Installation of System*
  - *1 - Start Installation or Update*
  - *2 - Network*
  - *1 - FTP install network protocol (our choice)*
  - *2 - Hipersocket LAN connection (our choice)*
    - *0.0.0340, 0.0.0341, 0.0.0342 – three prompts for NIC addresses*
  - 2 - No DHCP
  - nnn.nnn.nnn.nnn - Your new client server's IP address (NOVCLNT1 in this demo)
  - 255.255.255.0 – Netmask
  - nnn.nnn.nnn.nnn - Gateway's IP address (NOVCLNT1 in this demo)
  - nnn.nnn.nnn.nnn - Name server' IP address (NOVCLNT1 in this demo)
  - nnn.nnn.nnn.nnn - FTP server's IP address (NOVSTART in this demo)
  - 2 - Anonymous FTP
  - 2 - No HTTP proxy
  - */ - the FTP server directory*

Install a full-service server (e.g. NOVCLNT1) from the Starter System server (NOVSTART)

- Respond to install prompts with (in our demo): (continued)…
  - *At this point the following appears on the new server console:*
    **** login using 'ssh -X root@192.168.230.231' ****
    **** run 'yast' to start the installation ****
  - No joy for us. From another running SLES server, we needed to:
    - Turn off X11forwarding in our SSH emulator
    - login using: ssh –p 22 root@nnn.nnn.nnn.nnn (the new client IP address; NOVCLNT1 in this demo)
  - *Begin the full-service server SLES 10 SP2 installation, by entering: yast*

- At this point, you're on your own. YaST is YaST is YaST, with every site requiring a different local installation specification.

- But…
  - *you have not used an existing Unix or Linux system for the installation.*
  - *you have not used a production network except for the FTP to z/VM.*
  - *You did not require lots of Linux expertise to get this far.*
  - *Now you finally need SSH access to the guest on which YaST is running.*

Live demo ?

- If the wireless network permits
  - Unpacking the 150 disk (small enough for a live example)
  - Configuring the “NETWORK PARMS” file
  - Booting the first time
  - Correcting the inevitable “NETWORK PARMS” typo
    - Oh, you mean RTFM ***before*** starting!!??
    - What else? “Common Problems and Solutions” (near the end of the manual)
  - PING! … “Das boot” - Wir sind gut!!
  - Exploring … as time permits

“How to Report Problems With the Starter System” (page 36)

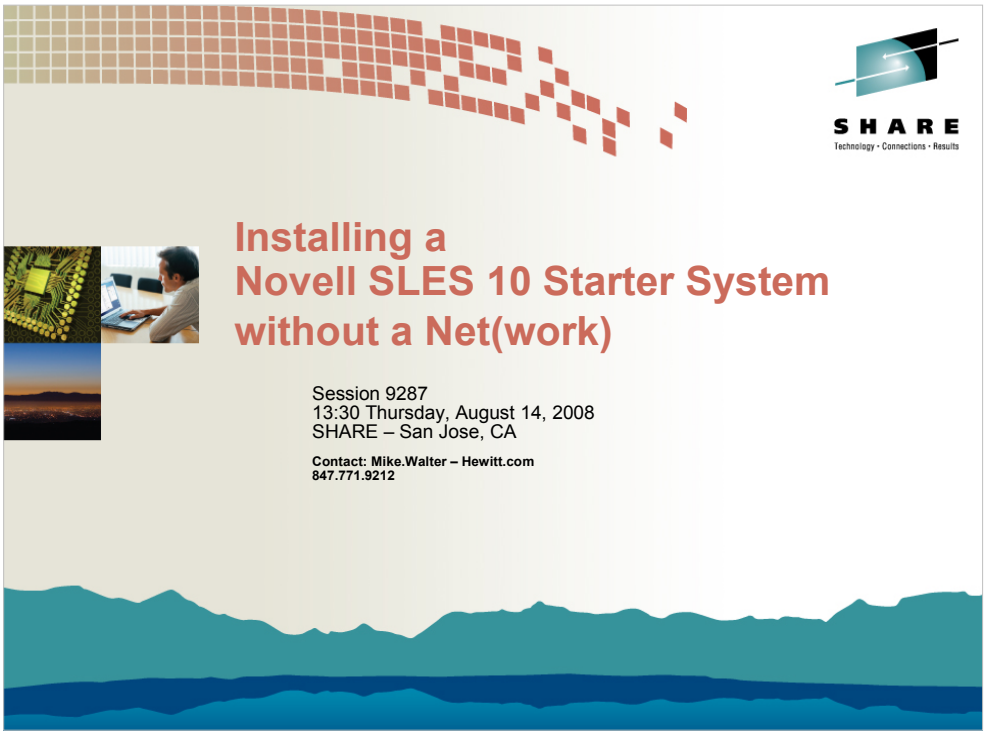
- Gather doc as requested
- Submit as directed
- ***Don’t be shy.*** It’s new. It can improve.
  - ***You can help*** yourself and the next “newbie” on the block

Session Wrap-up

- Questions?
  - Later…about session materials, or in general:

    Mike Walter
    Hewitt Associates LLC
    847.771.9212
    Mike.Walter -- hewitt.com

- ***Please***, fill in the **bubbles** on your Session Evaluation Form ***COMPLETELY*** in **DARK BLUE** or **BLACK** ink.
- Help make this session better! – ***write your comments on the back of your form.***



Warning: This is a "first time" presentation of this material.

Before we start, Survey time! Number of people:

___ New to IBM processors?

___ Experienced with z/VM (or predecessors)?

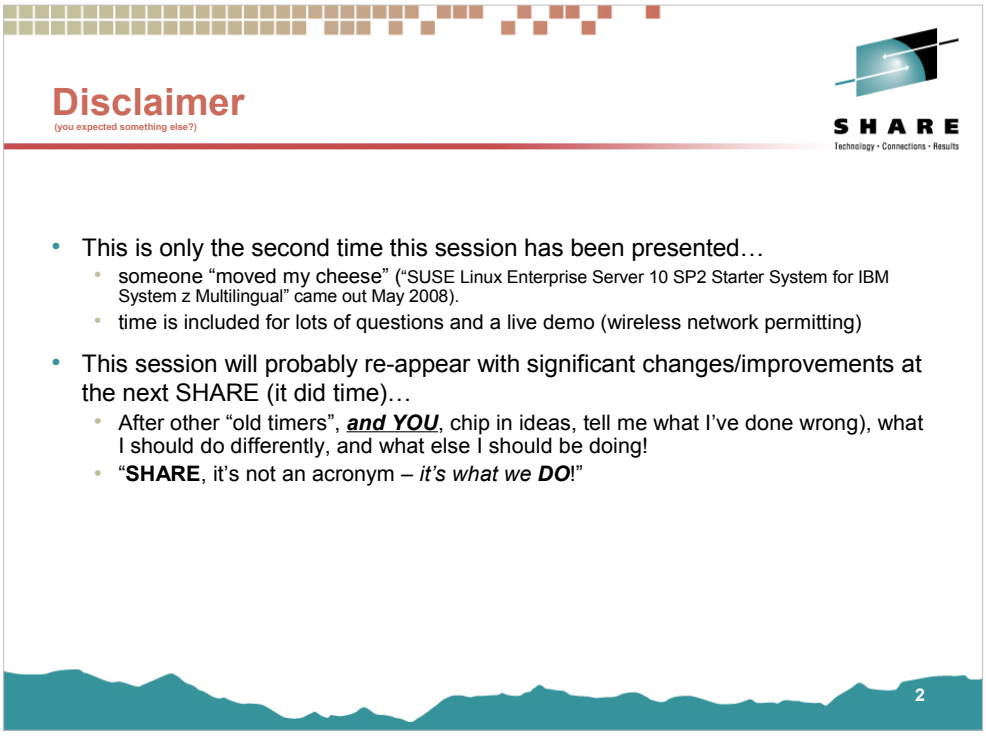
___ Experienced with z/OS?

___ Experienced with z/VSE?

___ Experienced with z/TPF?

___ Experienced with "Linux for System z"?

___ Experienced with Linux on other platforms?



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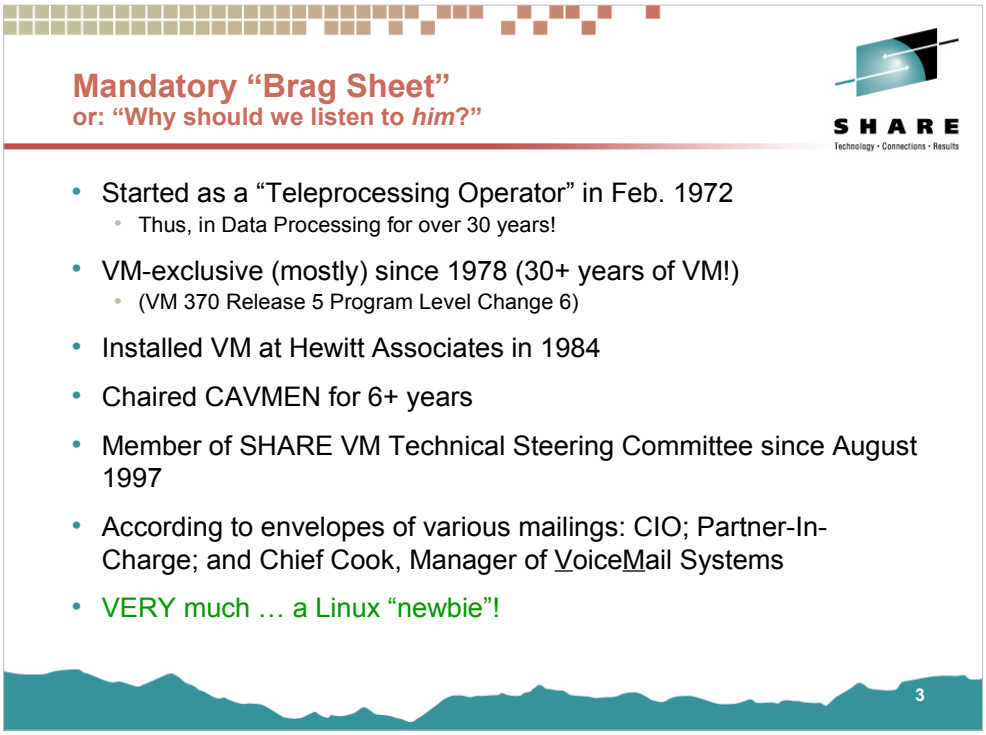
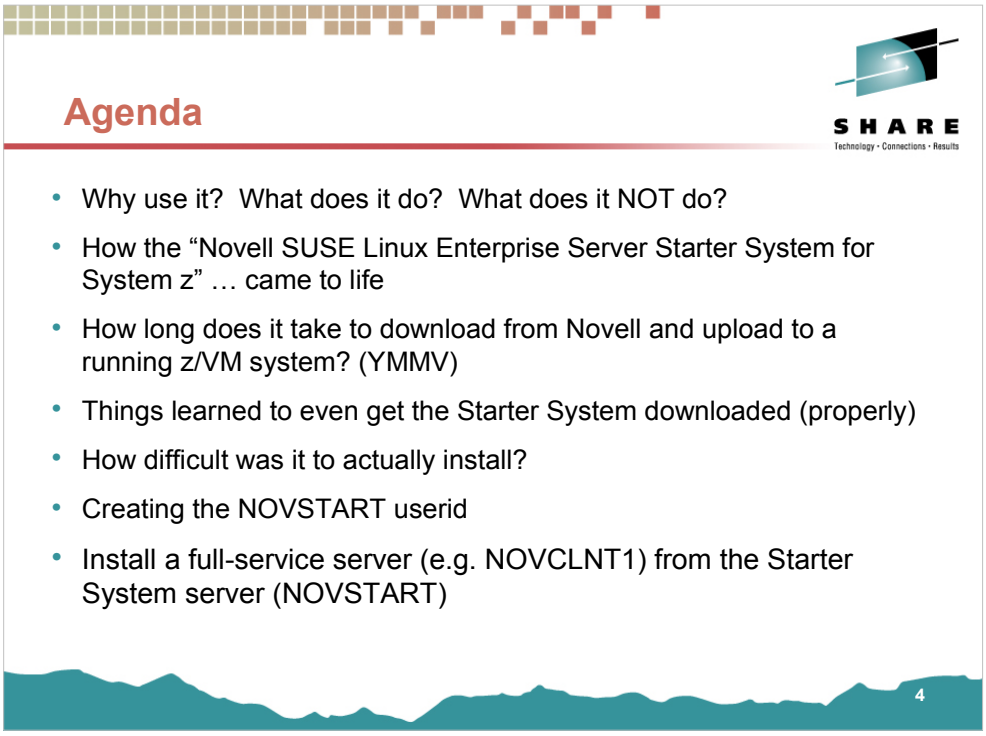


CAVMEN = Chicago Area VM Enthusiasts.

Meetings are still hosted at Hewitt Associates, Lincolnshire, IL



Keeping me honest, the abstract for this session from the SHARE Scheduler:

Session Number: 9287
Session Title: Installing a Novell SLES 10 Starter System without a Net(work)
Day - Time: Thursday, August 14, 2008, 1:30 PM - 2:30 PM
Location: San Jose McEnery Convention Center, Room D
Program: Linux & VM**Project:**Linux Project
Track:
Classification: Technical
Speaker: Mike Walter, *Hewitt Associates*

Abstract:

Multiple customers wishing to install Linux on System z have been frustrated by their own network firewall security rules preventing access from a z/VM mainframe to a CD-drive from which to load a Linux installation CD. Other customers have been frustrated by difficulties coordinating access to a separate Linux or UNIX systems elsewhere on their site network. Still others fear the 'newness' of the Linux environment, not knowing how to answer installation questions.

This session will feature a live demonstration of a new Novell SLES 10 Starter System installation which requires nothing more than an existing z/VM system with a working 'FTPSERVE' server (supplied with z/VM), and a PC with internet access with which to download files from Novell.

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15

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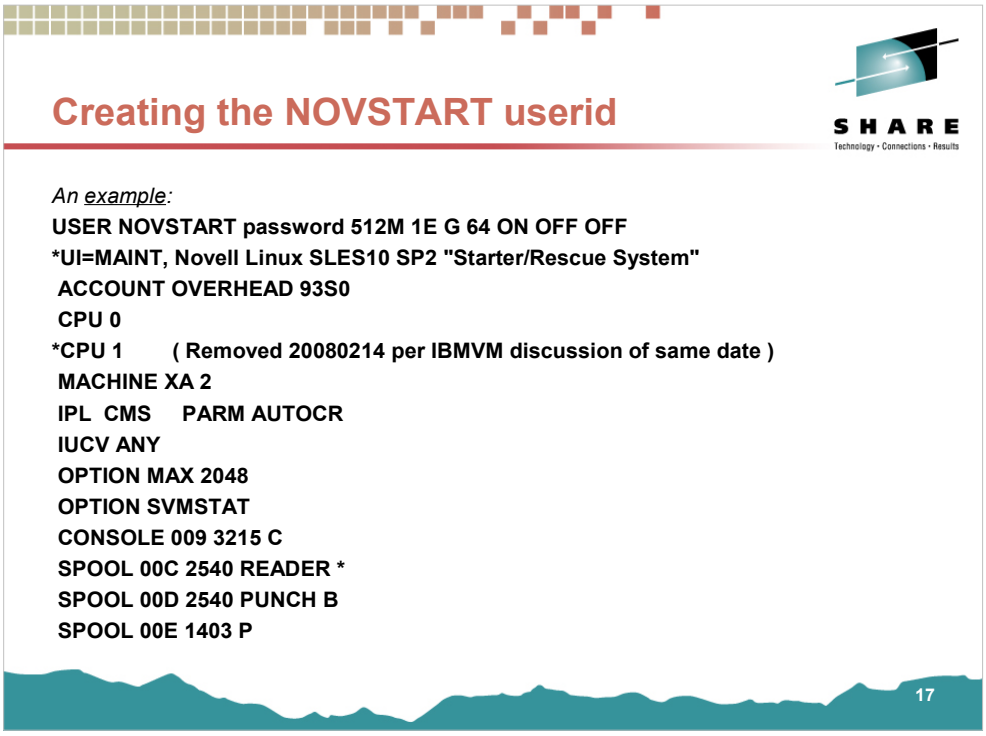
  - XEDIT USER DIRECT
  - Perhaps issue 'BOTtom' to get to the bottom of existing entries and add the new directory entry for NOVSTART.



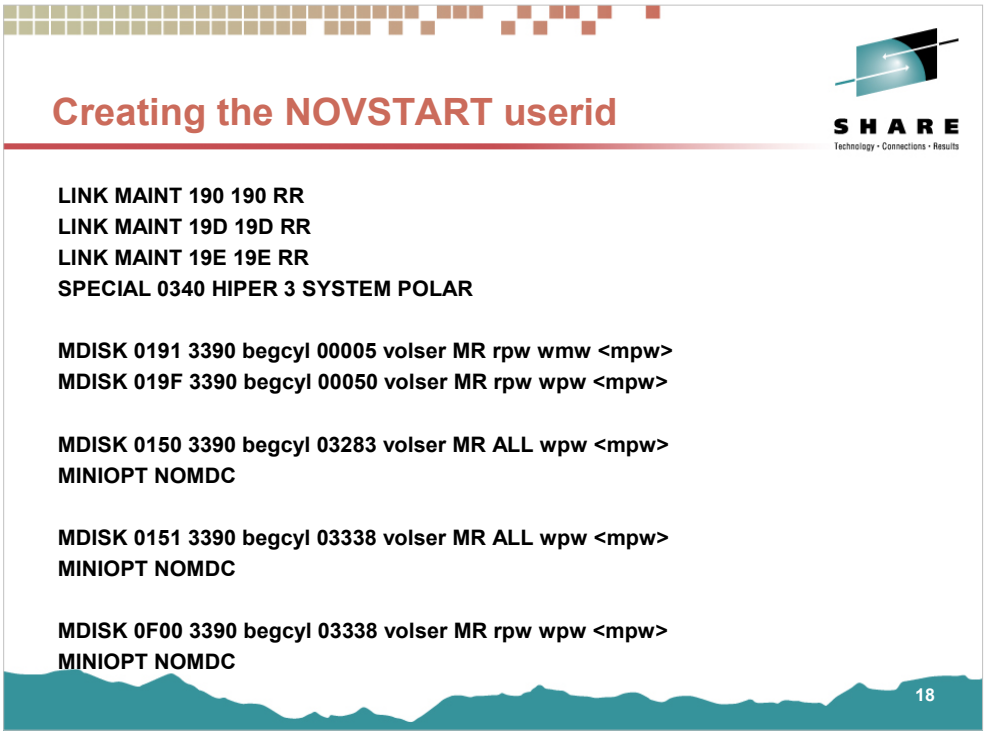
*Replace lowercase characters with *your* specifications.*

z/VM document conventions usually include:
-UPPERCASE as required arguments
- lowercase as user-specified arguments and mixed-case as minimum abbreviations

(E.g. CP SPool CONsole STArt could be abbreviated down to: CP SP CON STA)

The directory statements on the this slide are pretty standard for most virtual machines.

The second CPU was commented out per the IBMVM discussion list suggestions on February 14, 2008. Other P.O.C. servers are running fine at Hewitt without it – although very lightly loaded.

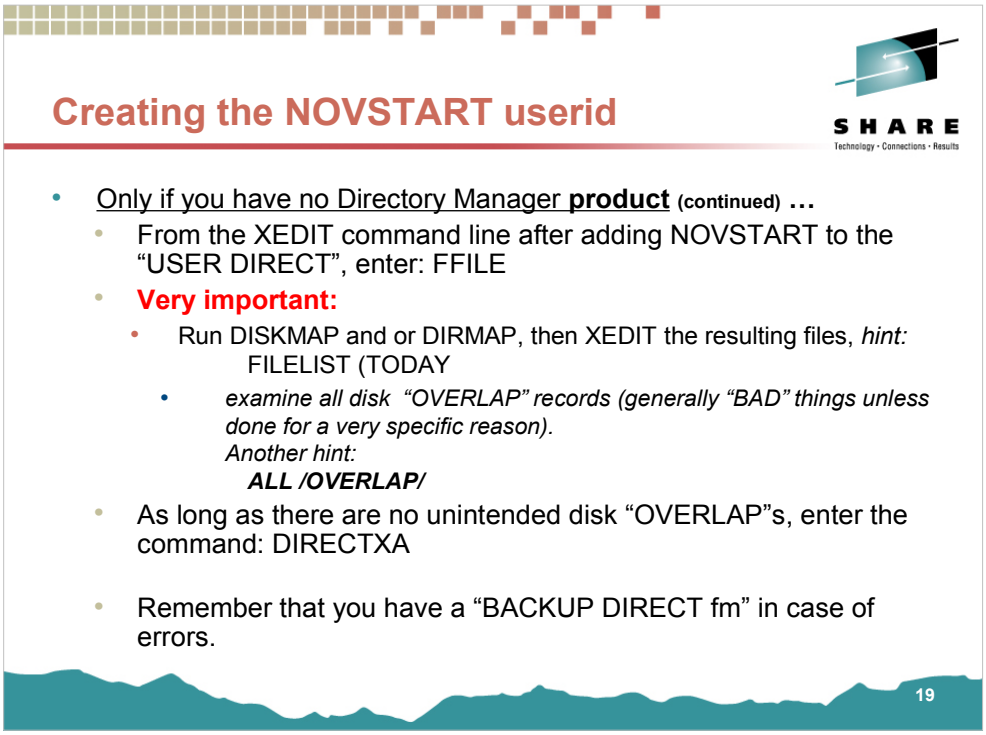


The LINK statements are standard for virtual machines, but the SPECIAL statement is unique for this NOVSTART guest.

The MDISK statements define the specific continuous cylinders (on z/VM called a “minidisk”, or “MDISK”), or in PC and Linux vernacular “partition” of 3390 disk space defined for each of the virtual disks required for NOVSTART. In PC terms, think of each as a hard drive partition.

The MINIOPT statement follows MDISK statements (where needed), in this case telling the z/VM Control Program (aka: kernel) NOMDC, which stands for NO MiniDisk Cache.

The Multi-write passwords are shown in brackets as a reminder that it is really better if you DO NOT include a multi-write password. Unless you are very, VERY certain that you know what you are doing, it simply serves as a way to shoot yourself in the foot. One day when you least expect it, and can least afford it, it **will** lead to file corruption. Consider it a means of providing One-Way Encryption.



Any disk overlap (other than ones specifically required for very special purposes) will one day, when you least expect it, and can least afford it, **will** lead to file corruption. Consider OVERLAPs as a means of providing another means of creating One-Way data Encryption.

NOVSTART boots, now what?

- This special Starter System has been designed so its first boot will read the “NETWORK PARMS A” file (which you edited with XEDIT before you had any Linux editors available), automatically reconfigure the Linux network to match, and automatically reboot using those parms.
  - If you make a mistake, jump a page ahead to "Recovering from a Damaged or Misconfigured Network Configuration”. (I did, too)
- “Log in to the starter system as root from a SSH client such as PuTTY or another Linux system using the SSH command”.
  - Unstated: **SSH defaults to: port 22**
  - From another Linux server, one would enter something like:
    - ssh **–p 22** root@nnn.nnn.nnn.nnn

Install a full-service server (e.g. NOVCLNT1) from the Starter System server (NOVSTART)

- Follow “Starting the Install Process” documentation

Steps in *green italics* are documented in the manual -- the rest we had to figure out and may change based upon your site requirements.

- *Using the “CLIENT SAMPDIR” downloaded from Novell, create a new userid (NOVCLNT1 in this demo) in the USER DIRECT (or using your ESM)*
- *Logon NOVCLNT1*
  - *Format the 191 disk*
  - *Copy the PROFILE EXEC from NOVSTART 19F*
  - *Access the NOVSTART19F disk (with SLES EXEC and SWAPGEN EXEC)*
  - *Type: SLES*

Install a full-service server (e.g. NOVCLNT1) from the Starter System server (NOVSTART)

- Respond to install prompts with (in our demo):
  - *4 - Start Installation of System*
  - *1 - Start Installation or Update*
  - *2 - Network*
  - *1 - FTP install network protocol (our choice)*
  - *2 - Hipersocket LAN connection (our choice)*
    - *0.0.0340, 0.0.0341, 0.0.0342 – three prompts for NIC addresses*
  - 2 - No DHCP
  - nnn.nnn.nnn.nnn - Your new client server's IP address (NOVCLNT1 in this demo)
  - 255.255.255.0 – Netmask
  - nnn.nnn.nnn.nnn - Gateway's IP address (NOVCLNT1 in this demo)
  - nnn.nnn.nnn.nnn - Name server' IP address (NOVCLNT1 in this demo)
  - nnn.nnn.nnn.nnn - FTP server's IP address (NOVSTART in this demo)
  - 2 - Anonymous FTP
  - 2 - No HTTP proxy
  - */ - the FTP server directory*

Install a full-service server (e.g. NOVCLNT1) from the Starter System server (NOVSTART)

- Respond to install prompts with (in our demo): (continued)…
  - *At this point the following appears on the new server console:*
    **** login using 'ssh -X root@192.168.230.231' ****
    **** run 'yast' to start the installation ****
  - No joy for us. From another running SLES server, we needed to:
    - Turn off X11forwarding in our SSH emulator
    - login using: ssh –p 22 root@nnn.nnn.nnn.nnn (the new client IP address; NOVCLNT1 in this demo)
  - *Begin the full-service server SLES 10 SP2 installation, by entering: yast*
- At this point, you're on your own. YaST is YaST is YaST, with every site requiring a different local installation specification.
- But…
  - *you have not used an existing Unix or Linux system for the installation.*
  - *you have not used a production network except for the FTP to z/VM.*
  - *You did not require lots of Linux expertise to get this far.*
  - *Now you finally need SSH access to the guest on which YaST is running.*

Live demo ?

- If the wireless network permits
  - Unpacking the 150 disk (small enough for a live example)
  - Configuring the “NETWORK PARMS” file
  - Booting the first time
  - Correcting the inevitable “NETWORK PARMS” typo
    - Oh, you mean RTFM ***before*** starting!!??
    - What else? “Common Problems and Solutions” (near the end of the manual)
  - PING! … “Das boot” - Wir sind gut!!
  - Exploring … as time permits

"How to Report Problems With the Starter System" (page 36)

- Gather doc as requested
- Submit as directed
- ***Don't be shy.*** It's new. It can improve.
  - ***You can help*** yourself and the next "newbie" on the block

Session Wrap-up

- Questions?
  - Later…about session materials, or in general:

    Mike Walter
    Hewitt Associates LLC
    847.771.9212
    Mike.Walter -- hewitt.com

- ***Please***, fill in the **bubbles** on your Session Evaluation Form ***COMPLETELY*** in **DARK BLUE** or **BLACK** ink.
- Help make this session better! – ***write your comments on the back of your form.***