In this presentation we demonstrate an install of z/VM. As the install forces us to make decisions, we discuss the various options and how particular choices affect the install and the eventual result.

Because an installation entails movement of a lot of files, which can take quite a bit of clock time, the presentation consists of two hands-on sessions. In the first, we discuss preparation for install, and then move through the steps of an actual install, up to the point of the mentioned movement of files. In the second session, we will complete the install, do some of the post-install set-up work, and look at the configuration that the install gives you.

This collection of slides is intended to be presented in parallel with an actual install. However, it is also intended to contain sufficient material to be useful without an accompanying demonstration.
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Be sure to read the notes, which include explanatory material, as well as the slides.
Install is mostly a sequence of steps that must be done in order. There is little you can do in parallel. The major divisions above are just one way to view the process. More generally, we do some stuff before the install, do the install, then do some stuff after the install.
When manually upgrading an existing system (eschewing UIP)

- SPXTAPE to save spool files
  - Better yet, announce that spool files will not be saved
- DDR existing COMMON, RELVOL, and RES
  - And save a copy of the USER DIRECTory so that you can DEFINE MDISK to get at what you forgot
- Save copies of files so you don’t need the DEFINE MDISK trick
- Understand what DASD you have accessible, plan how to avoid letting newly-installed system access by volume label the wrong DASD.

This slide is for the benefit of those who are choosing to do a fresh install rather than using Upgrade In Place, but will then be modifying the newly-installed systems to become the upgraded versions of previously existing systems.

Here are some of the files I found I wanted to use or refer to from the original system:

From PMAINT: SYSTEM CONFIG
From MAINT: USER DIRECT, SYSTEM NETID
From DIRMAINT: CONFIGxx DATADVH, EXTENT CONTROL, AUTHFOR CONTROL, DATAMOVE CONTROL, EXCLUDE CONTROL
From AUTOLOG1: PROFILE EXEC, other EXECs added
From TCPMAINT: PROFILE TCPIP, TCPIP DATA, SYSTEM DTCPARMS
From RSCS: PROFILE GCS, * RSCSCFG

In case you don’t understand the last bullet on the slide, here is a longer explanation. zVM picks up DASD by label unless you override, and if
multiple DASD with the same label are online, it will use the lowest-numbered DASD. An easy way to be sure the system grabs the correct DASD upon IPL is to add DEVICES OFFLINE_AT_IPL statements to SYSTEM CONFIG for the DASD you do not want it to grab. But the initial SYSTEM CONFIG from install will not have those OFFLINE_AT_IPL statements; you have to know and remember to put them there. Of course, if none of your DASD labels are identical, you won’t have a problem. But you can easily run into this problem if you are not careful, e.g. by doing multiple installs and accepting the default labels in each case.
We will use the 7.1.0 version of the Installation Guide, and be doing a 7.1.0 install. You can expect a few changes to install from release to release, but usually not many. If you are familiar with a 7.1.0 install, then install of a 6.4.0 system would feel familiar too. However, enough differences exist that it is important to use the text matching the level you are installing.
In my experience, the first choice (DVD in HMC) was simplest and easy to understand. But it was slow! It takes awhile to read data from the DVD and boot the VM system from it – plan on a nice long coffee break while waiting. The last (CMS minidisk) is the fastest, but you have to have already done the setup work to get files onto the minidisk.
Step 2: Review and Comply with Requirements

- These requirements are mostly easy to comply with
  – Do you have access to the DASD you will install to?
  – Do you have some workspace?
  – Do you have sufficient memory?
  – Do you have access to hardware and FTP server that you might use?
Step 3: Complete the Installation Worksheets

- This is the key step
- Much easier to gather this information before you are in the middle of an install
- This is where you make decisions such as your system names, so by doing it now you will have a little time to reconsider
- Later, once this data has been used, it is very inconvenient to change
# Traditional installation worksheets

Table 1: Traditional installation worksheet 1.

<table>
<thead>
<tr>
<th>Install To</th>
<th>Product</th>
<th>Install To</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>VIM</td>
<td>F</td>
<td>EBRM</td>
</tr>
<tr>
<td></td>
<td>PERFTX</td>
<td>F</td>
<td>RACF</td>
</tr>
<tr>
<td></td>
<td>TCPFIP</td>
<td>F</td>
<td>VTAMCSD</td>
</tr>
</tbody>
</table>

Default system language: AMEKG

DASD type: 3380-9

Volume size: 100GB

Common service filepool name: TCGVMPSFS

Installation Type:
- Non-SSM
- SSI

Number of Members: 2

SSM Cluster Name: TPGAB

* The system name you select should be considered a permanent name. Changing the system name after installation is a complicated process.

Table 2: Traditional installation worksheet 2.

Would you like to have your system automatically configured to be managed by a SMAPI client for system management? Enter Y or N.

Keep the following in mind:
- If you enter Y, you should not attempt to manage your system in any other way.
- If you’d like to manage your own system, or use a purchased external security manager or a purchased directory manager, enter N.
This information on table 5 is used only during the install. The IP address is that of the FTP server with the DVD data. It is NOT the IP address for your system-to-be.
Table 6: Traditional installation worksheet 6 (3390 SSI Only).

After installation is complete, SSI will be IPLed:

- First-Level
- Second-Level

SSI Member Name(s) / SPL LPAR Name(s) or User ID Name(s):

<table>
<thead>
<tr>
<th>Slot Number</th>
<th>Member Name*</th>
<th>IPL LPAR/User ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TGRAEXA</td>
<td>TGRCRCA</td>
</tr>
<tr>
<td>2</td>
<td>TGRBHOP</td>
<td>TGRCRCA</td>
</tr>
<tr>
<td>3</td>
<td>TGRBHOP</td>
<td>TGRCRCA</td>
</tr>
</tbody>
</table>

* The member names you select should be considered permanent names. Changing a member name after installation is a complicated process.

Table 7: Traditional installation worksheet 7 (3390 SSI Only).

<table>
<thead>
<tr>
<th>Volume Type</th>
<th>Default Label</th>
<th>New Label</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMON</td>
<td>VMCOMH1</td>
<td>TGC572</td>
<td>C576</td>
</tr>
<tr>
<td>RELMOL</td>
<td>TGLS521</td>
<td>C576</td>
<td>C576</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume Type</th>
<th>Default Label</th>
<th>New Label</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>RES</td>
<td>M01RES</td>
<td>TGC572</td>
<td>C572</td>
</tr>
<tr>
<td>SPOOL</td>
<td>M01SPOOL</td>
<td>TGC574</td>
<td>C574</td>
</tr>
<tr>
<td>PAGE</td>
<td>M01PAGE</td>
<td>TGC577</td>
<td>C577</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume Type</th>
<th>Default Label</th>
<th>New Label</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>RES</td>
<td>M03RES</td>
<td>RES</td>
<td>M03RES</td>
</tr>
<tr>
<td>SPOOL</td>
<td>M03SPOOL</td>
<td>SPOOL</td>
<td>M03SPOOL</td>
</tr>
<tr>
<td>PAGE</td>
<td>M03PAGE</td>
<td>PAGE</td>
<td>M03PAGE</td>
</tr>
</tbody>
</table>

Note: You must not use any of IBM’s default volume labels for a volume other than the volume for which it is originally defined.
For a 2nd-level install, we don’t need Table 8, but this is what it would look like if we were installing 1st-level. The “Member n Address” is for specifying the PDVOL on the SAPL screen. The CTCs are for the required ISFC communication between each pair of SSI members.

### Table 8: Traditional installation worksheet 8 (SSI First-Level Configuration Only).

<table>
<thead>
<tr>
<th>Member 1 Address</th>
<th>Member 2 Address</th>
<th>Member 3 Address</th>
<th>Member 4 Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTC device addresses:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From: Member 1</td>
<td>N/A</td>
<td>From: Member 2</td>
<td></td>
</tr>
<tr>
<td>To: Member 1</td>
<td>A2A1, A2A2</td>
<td>To: Member 1</td>
<td>82A1, 82A2</td>
</tr>
<tr>
<td>To: Member 2</td>
<td></td>
<td>To: Member 2</td>
<td>N/A</td>
</tr>
<tr>
<td>To: Member 3</td>
<td></td>
<td>To: Member 3</td>
<td></td>
</tr>
<tr>
<td>To: Member 4</td>
<td></td>
<td>To: Member 4</td>
<td></td>
</tr>
<tr>
<td>From: Member 3</td>
<td></td>
<td>From: Member 4</td>
<td></td>
</tr>
<tr>
<td>To: Member 1</td>
<td></td>
<td>To: Member 2</td>
<td></td>
</tr>
<tr>
<td>To: Member 2</td>
<td></td>
<td>To: Member 2</td>
<td></td>
</tr>
<tr>
<td>To: Member 3</td>
<td>N/A</td>
<td>To: Member 3</td>
<td></td>
</tr>
<tr>
<td>To: Member 4</td>
<td></td>
<td>To: Member 4</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Here is a view of a Systems Management panel on the Hardware Management Console (HMC). The small section that has been circled is displayed bigger on the next slide.
This is a zoom-in of the previous picture. To install from a DVD, choose “Load from Removable Media or Server”.
…And here is the panel you then get. Select “Hardware Management Console CD/DVD-ROM” as shown if installing from DVD. If installing from an FTP server, select “FTP Server” and fill in the information.
Temporary disks work fine for 2222, 24CC, and 2CF0. Do note, however, that the type (3390 or FBA) must be the same as the type of DASD you are ultimately installing to.
Setting up the user for 2nd-level install

def t3390 24cc cyl 10
DASD 24CC DEFINED
Ready; T=0.01/0.01 15:00:38
def t3390 2cf0 cyl 120
DASD 2CF0 DEFINED
Ready; T=0.01/0.01 15:00:52
Setting up the user for 2\textsuperscript{nd}-level install

listfile instpipe module *
DMSLST002E File not found
Ready(00028); T=0.01/0.01
link maint 193 193 rr
Ready; T=0.01/0.01
acc 193 t
DMSACP723I T (193) R/O
Ready; T=0.01/0.01
instpipe
Ready; T=0.01/0.01
This step always trips me up because I cut-and-paste from the book. I remember to fill in the host, userid, password and directory, but I usually forget to update the word after “–f” and the word before “2222”.

Notice also the timestamps. It doesn’t always take this long – I immediately re-ran it and it took only 73 seconds. So there is a lesson here: if it hasn’t reported failure, let it keep going.

You may see the “TCPIP DATA * not found” message, which means exactly what it says. Since the FTP works fine taking the defaults, lacking a TCPIP DATA file is not a problem. (What could possibly be a problem is if there was a TCPIP DATA file and it was in some way bad.) The important message here is the last one “ECKDREST: WROTE …, RC=0”.

Ready; T=0.06/0.08 14:31:37

pipe ftpget -h 9.60.14.91 -u installaccess -p ??? -d 710/ckd_ga_7101/CPDVD -v BEF
-DVDEOF -f CKD222* |UNPACK| eckdrest 2222

DMSRXS1408W File TCPIP DATA * not found
ECKDREST: WROTE 150 TRACKS ON 2222, RC=0
Ready; T=0.47/0.68 14:38:51
Install set up (continued)

ipl cms
z/VM V7.1.0  2018-07-20 16:09
Ready; T=0.01/0.01
acc 2222 c
Ready; T=0.01/0.01
listfile instpipe module *
INSTPIPE MODULE  C1
Ready; T=0.01/0.01
dvdprime dasdtype (server

<Uh-oh. That last command was incorrect.>
Even if you have done many installs, you are likely to make little mistakes like this. Don’t get rattled by an error. The first things to check if you have been using cut-and-paste are, maybe the paste failed to include everything, or maybe you forgot to fill in some parameter. In this case, I forgot to fill in the “dasdtype”.
Notice again that these are the credentials for the FTP server, not your prospective VM system. Press F5 when you have filled in everything correctly.
Having mashed F5, wait a few minutes for the 24CC disk to be populated.
**INSTPLAN – finally time to define new system**

pipe cms q disk | chop 45 | cons

<table>
<thead>
<tr>
<th>LABEL</th>
<th>VDEV</th>
<th>M</th>
<th>STAT</th>
<th>CYL</th>
<th>TYPE</th>
<th>BLKSZ</th>
<th>FILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGR191</td>
<td>191</td>
<td>A</td>
<td>R/W</td>
<td>10</td>
<td>3390</td>
<td>4096</td>
<td>38</td>
</tr>
<tr>
<td>MNT4CC</td>
<td>24CC</td>
<td>C</td>
<td>R/W</td>
<td>10</td>
<td>3390</td>
<td>4096</td>
<td>93</td>
</tr>
<tr>
<td>MNT190</td>
<td>190</td>
<td>S</td>
<td>R/O</td>
<td>207</td>
<td>3390</td>
<td>4096</td>
<td>695</td>
</tr>
<tr>
<td>MNT19E</td>
<td>19E</td>
<td>Y/S</td>
<td>R/O</td>
<td>500</td>
<td>3390</td>
<td>4096</td>
<td>1156</td>
</tr>
</tbody>
</table>

Ready; T=0.01/0.01 15:38:11

instplan traditional
This panel is a straightforward copy from worksheet Table 1. The only difference is I decided to use the given value for the DASD size.
Would you like to have your system automatically configured to be managed by a SMAPI client for system management? Enter Y or N.
This is a straightforward copy of worksheet Table 6.
If it doesn’t look right, don’t be afraid to press N. When you re-run INSTPLAN TRADITIONAL, it will remember the answers you previously gave.
This is a straightforward copy of worksheet Table 7. If the DASD is all already CPFMTXA formatted, you can save some install time by not having it re-done. But formatting doesn’t take that long nowadays, so if in doubt, choose to format.
Yay! We are all set up.
Check to verify that we have write access to the DASD we will be installing to. In this case, that is C590-C597.
Type INSTALL, press ENTER, and we’re off and running!
The fastest install would be if you were using the CMS minidisk based procedure, and the DASD you are installing to did not need formatting.
This slide intentionally left blank.
Here is what has been happening while we were at intermission.

```
INSTALL continues...

install
IUGIIS8490I Now formatting volume: C590 (1 of 8)
IUGIIS8490I Now formatting volume: C591 (2 of 8)
IUGIIS8490I Now formatting volume: C592 (3 of 8)
IUGIIS8490I Now formatting volume: C593 (4 of 8)
IUGIIS8490I Now formatting volume: C594 (5 of 8)
IUGIIS8490I Now formatting volume: C595 (6 of 8)
IUGIIS8490I Now formatting volume: C596 (7 of 8)
IUGIIS8490I Now formatting volume: C597 (8 of 8)
...```
Here is more of what was happening while we were at intermission.

INSTALL continues…

... 
IUGIIS8380I Restoring IIS to TGC590, TGC591, TGC592, and TGC593
IUGIIS8341I Load of the system IIS to COMMON volume has completed successfully
IUGIIS8341I Load of the system IIS to RELEASE volume has completed successfully
IUGIIS8341I Load of the system IIS to MEMBER RES volume has completed successfully

...
Whoa! We had an error! What apparently happened is we have a noisy FTP connection. INSTALL reacts by restarting from its latest milestone. INSTALL keeps track of how far it has progressed, so restarts don’t have to go all the way back to the beginning. If there are too many errors and it gives up, you can still restart by again reissuing INSTALL.
Despite the reported error, we recovered and are still going. Note that we haven’t needed to type anything since typing “INSTALL”. 
INSTALL continues...

...  
IUGIIS8490I Now allocating volume: C597 (PAGING)  
IUGIIS8341I Writing ownership TDGAB NOSYS to C590 TGC590 has completed successfully  
IUGIIS8341I Writing ownership TDGAB AACHOO to C592 TGC592 has completed successfully  
IUGIIS8341I Writing ownership TDGAB AACHOO to C593 TGC593 has completed successfully  
IUGIIS8341I Writing ownership TDGAB AACHOO to C594 TGC594 has completed successfully  
...
Hmm… We saw ownership writing complete successfully for the COMMON volume and member 1’s volumes, but no mention of member 2’s volumes. What is going on? INSTALL is going to completely install to member 1, then take care of member 2.

The loading of just disk 1 may take many minutes, but don’t worry. MAINT CF1 is one of the bigger minidisks to be loaded, so the total time will not be 240 times the time required for it. But still, loading 240 minidisks takes some time. Don’t expect to sit there watching – find something else to do while you wait.
Wake up! The install has finished. If you were watching, the things that happened after 240 minidisks were loaded included IPLing the first SSI member, creating some NSSes on it, setting up the service filepool, shutting down member 1, then IPLing member 2 and also building the NSSes.

Notice that we are left logged on to member 2. We will need to SHUTDOWN to get back to 1st-level. INSTALL has to leave you somewhere, this is just where they chose to. If installing to non-SSI or installing 1st-level, you will find yourself in slightly different circumstances. So it is important to be following the Installation Guide section applicable to your circumstances.
We will take a quick look at configuring.
Post-Install

- SYSTEM CONFIG has a tweak to ignore the LPAR/UserID we are on and IPL a specific SSI member. Remove it by running INSTSCID EXEC. (Below is an excerpt from SYSTEM CONFIG.)

  System_Identifier LPAR TGREERAAACHOO
  System_Identifier LPAR TGREERB BLBLUB
  /* System_Identifier LPAR @@LU-3 @@MEMSLOT3 */
  /* System_Identifier LPAR @@LU-4 @@MEMSLOT4 */

  System_Identifier * * BLBLUB
Post-Install

- Here is the SYSTEM CONFIG excerpt after invoking INSTSCID REMOVE:

  System_Identifier LPAR TGREERAAACHOO
  System_Identifier LPAR TGREERB BLUBLUB
  /* System_Identifier LPAR @@LU-3 @@MEMSLOT3 */
  /* System_Identifier LPAR @@LU-4 @@MEMSLOT4 */
  /* System_Identifier * * BLUBLUB */
Remember that, when IPLing a system from the SAPL screen, you can choose which SYSTEM CONFIG you will use. So making a backup copy is especially useful.
USER DIRECT

- The USER DIRECTory is on PMAINT 2CC, but both MAINT and MAINT710 have MR link to it.
- So from MAINT710 we can edit and make changes.
- MAINT710 also has MR link to MAINT 123, which is the system RES pack where the DRCT space is.
- So from MAINT710, after changing USER DIRECT we can issue DIRECTXA to put the changes into effect.
- It’s always a good idea to save a backup before changing USER DIRECT.
Running IPWIZARD

- Logon to MAINT710
- Access 193 E
- Run IPWIZARD
Running IPWIZARD

*** z/VM TCP/IP Configuration Wizard ***

The items that follow describe your z/VM host

User ID of VM TCP/IP Stack Virtual Machine: TCP1P

Host Name: AACH00
Domain Name: ENDICOTT.IBM.COM

Gateway IP Address: 9.6.56.1

DNS Addresses:
1) 9.8.130.50
2) 9.0.128.50
3)
To get this to work as shown, we’re going to have to DEF NIC 4000 TYPE QDIO on our 1st-level session. Presumably we would eventually couple 4000 to a VSWITCH.
1500 is maybe a little small for MTU, but it will work to get you started.
Running IPWIZARD

• On last panel, PF5 brings us to

DTCIPW/2508I DTCIPWIZ EXEC is attempting to create the necessary
DTCIPW/2508I configuration files
The TCP/IP stack (TCP/IP) must be restarted as part of this procedure. Would
you like to restart TCP/IP and continue?
Enter 0 (No), 1 (Yes)

• What happens if we say 0 (No)?
Running IPWIZARD

DTCIPW2502I Configuration files not created; operation cancelled by MAINT710

DTCIPW2502I TCP/IP has not been restarted

- And we return to the first panel, with the message

DTCIPW2512I Operation cancelled; configuration incomplete

- You can PF3 to quit. When you restart IPWIZARD, your input data will still be there.
Running IPWIZARD

- When we say YES, IPWIZARD creates PROFILE TCPIP and SYSTEM DTCPARMS on TCPMAINT 198.
- Based on our input, PROFILE TCPIP includes

DEVICE DEV@4000 OSD 4000
LINK OSA4000 QDIOETHERNET DEV@4000 PATHMTU MTU 1500 ETHERNET
HOME
9.6.56.92 255.255.255.128 OSA4000
DEFAULTNET 9.6.56.1 OSA4000 1500
START DEV@4000
Running IPWIZARD

- Based on our input, SYSTEM DTCPARMS consists of

  :nick.TCPIP   :type.server
     :class.stack
     :attach.4000-4002
1st-level directory information

- If you installed 2nd-level, as we have, you will want to update the 1st-level directory so that your SSI works properly.
- SHUTDOWN the 2nd-level system and then IPL CMS 1st-level.
- INSTALL put the file SSI2ND DIR-PROF on your A disk.
- SSI2ND DIR-PROF contains sample directory entries to be used 1st-level, as well as sample PROFILE EXECs.
For More Information …

Web sites:
- http://www.vm.ibm.com/library -- the online zVM Library
- http://www.vm.ibm.com/education -- presentations, classes and information

Via mailing lists:
- IBMTCP-L@VM.MARIST.EDU
- IBMVM@LISTSERV.UARK.EDU
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