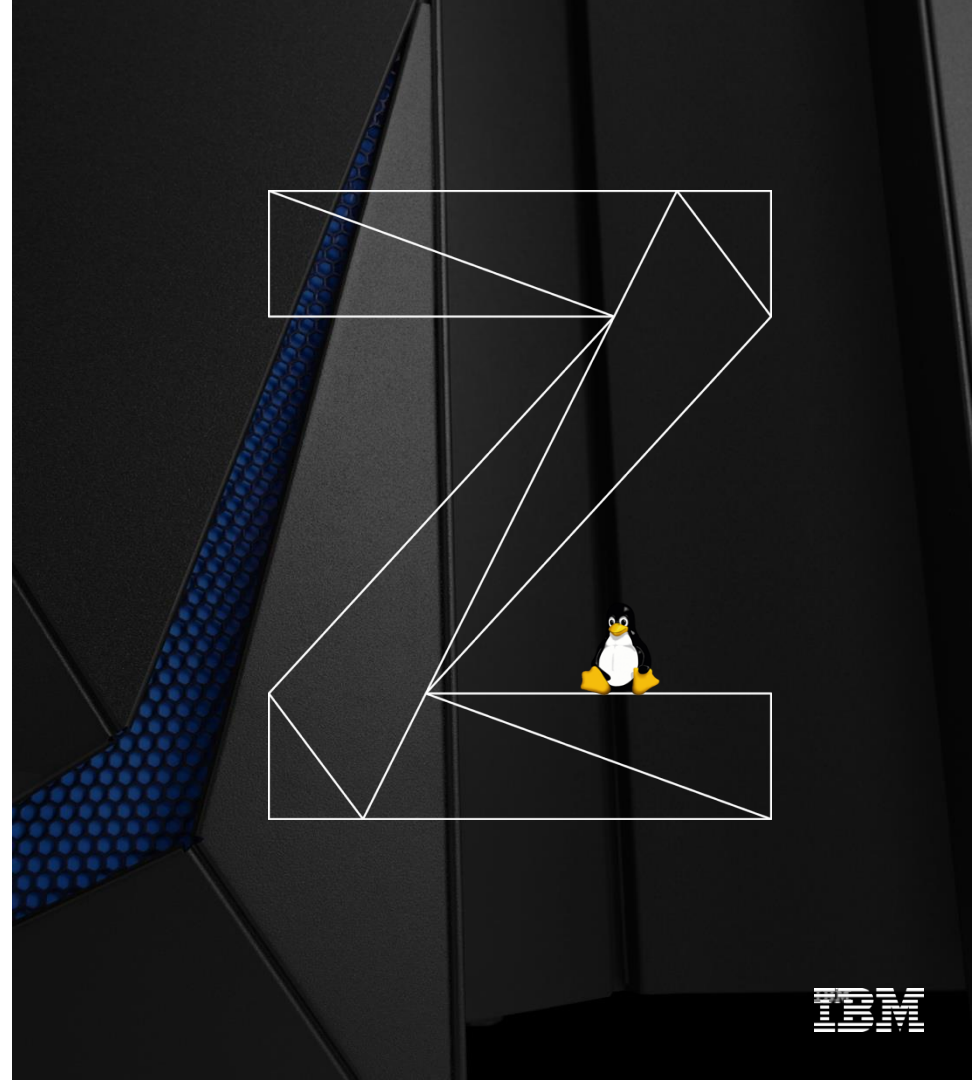


z/VM Problem Determination and Data Collection

—

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z/VM CP Level 2 Support & Development



Thanks to

- Emily Hugenbruch
Original Author

- Tim Reynolds

- Dan Griffith
- Steve Wilkins

- Tim Greer

- Brian Wade

What to do when things go wrong

- Determine what is *actually* wrong.
 - What you see might just be a symptom of a larger problem
 - Sometimes, you must work systemically through a problem to find the root.
- Example: Ping timeout
 - Is the Linux guest up?
 - Is networking at the Linux guest level working?
 - Can you log on to the Linux guest, or is it hung?
 - If you can't log on to Linux, can you log on to the z/VM userid?
 - If you can't log on to the z/VM userid, can you log on to any userid on that system?
 - If you can't log into any z/VM userid on that system, are other LPARs impacted?

What to do when things go wrong

Ping timeout – networking problem

- The Linux guest is up, and I can log on to the z/VM userid
 - Try ip to look at the networking configuration
 - Check TCPIP/SSL server logs
- If that's okay, look the next level down, are devices attached?
 - Look at the virtual NICs
 - Investigate the VSWITCH
- If that's all okay, ask your networking people
 - Is it on the right subnet?
 - Were there hardware issues?

What to do when things go wrong

Ping timeout – networking problem

- The Linux guest is up, I think, but I can't log on to its userid.
 - Try from the green screen
 - You can't get a Linux login prompt
 - Guest is likely hung, if you can, get a **VMDUMP** or **SNAPDUMP** from another userid.
 - If entire system is hung, get a **PSW RESTART** or **Stand-Alone dump** (more on this in a bit)

What to do when things go wrong

Restarting guest

- Try to restart your guest with **FORCE** and **XAUTOLOG**
- **FORCE** will send a signal shutdown to Linux
- Linux will have some time to respond, but if it's hung, it probably can't!
- After an amount of time, (**QUERY SIGNAL SHUTDOWN** to see how long) the guest will be forced off.
- Depending on the severity of the problem, it might seem like the guest is still logged on!
 - **QUERY NAMES** might show it
 - **QUERY <userid>** might show “**LOGOFF/FORCE pending for user <userid>**”
 - This might be a temporary issue, perhaps a device attached to the guest is misbehaving. Or it might require an IPL to clear. (see next section)

What to do when things go wrong

Guest is hung

I can't log on to the z/VM userid

- Guest is still logged on, just hung at the z/VM level
- Get a **SNAPDUMP (non-disruptive* CP dump)**
- From a class A userid, issue **SNAPDUMP PGMBKS ALL FRMTBL YES**
- This might result in a very large dump, especially on larger systems, but does give us the maximum amount of information.
 - If your system cannot tolerate longer quiesce times, a default SNAPDUMP is still helpful.
 - You should always ensure you have enough dump space configured.
 - The amount of space required depends on the amount of real memory you have configured for your system and the type of DASD allocated for spooling. [z/VM: CP Planning and Administration](#) contains a table of suggested dump space allowances for various storage sizes and DASD types.

What to do when things go wrong

Collecting the dump

- Check your **SYSTEM CONFIG System_Usurids** statement to see where dumps go (usually OPERATNS by default)

```
DUMPLD2
```

```
HCPDL8237I TO operand not specified. MDMPxxxx files will be created on A disk.
```

```
Dump Found :
```

ORIGINID	FILE	CLASS	RECORDS	CPY	HOLD	DATE	TIME	NAME	TYPE	DIST	
SYSTEM	2496	D	SYS	00039081	001	NONE	10/29	11:59:35	CPDUMP	CPDUMP	SNP001

```
Continue - Y/N ?
```

```
y
```

```
A total of 1 file(s) (00039081 records each) will be created.
```

```
HCPDL8210I 1 PRB00001 MDMPxxxx file(s) will be created on disk A
```

```
Continue - Y/N ?
```

```
y
```

```
HCPDL8213I Created PRB00001 MDMP0001 A
```

```
Ready; T=0.71/2.40 12:00:07
```

SNAPDUMP Demonstration

```
15:16:05 USER DSC LOGOFF AS LXOCPB01 USERS = 31 FORCED BY OPERATOR
15:16:15 Q LXOCPB01
15:16:15 HCPCQU361E LOGOFF/FORCE pending for user LXOCPB01
15:16:15 Ready(00361); T=0.01/0.01 15:16:15
```

7

What to do when things go wrong

DUMPLD2 failed!!

- If the first attempt to load failed (maybe disk filled up), a second attempt will show no files available
- Likely in USER HOLD state from the attempted read

```
q rdr * all
```

ORIGINID	FILE	CLASS	RECORDS	CPY	HOLD	DATE	TIME	NAME	TYPE	
LGRLIN21	0010	V	DMP	00036313	001	USER	2024-06-27	05:01:46	VMDUMP	FILE

Ready; T=0.01/0.01 05:21:05

```
change rdr 10 nohold
```

```
0000001 FILE CHANGED
```

```
Ready; T=0.01/0.01 05:21:10
```

What to do when things go wrong

SSI is unstable

I can't log on to any z/VM userid

- If you can get a logo screen, but it hangs at logon, make sure to try an **IDENTITY** virtual machine
- If the SSI is in a bad state and members can't communicate, only **IDENTITY** virtual machines will be able to log on
 - Examples of **IDENTITY** virtual machines include: **MAINT, OPERATOR, OPERATNS**
 - Or log on to another member of the SSI and do a **QUERY SSI** to see the state.
 - What does **QUERY ISLINKS** say?
 - If ISFC links are down, may be able to restart them with **ACTIVATE ISLINK**
- Golden standard SSI diagnostics for z/VM Support:
 - **OPERATOR** logs and **SNAPDUMPs** from every active SSI member.
 - Sometimes, the member exhibiting the problem is just a victim! SSI has a lot of moving parts across the cluster.
 - Ideal to have data from all members to shoot the problem.

What to do when things go wrong

System is hung, HMC restart dump (PSW RESTART)

I can't log on to any z/VM userid

- Time for a PSW restart dump
- Go to the HMC
- Select your LPAR
- Recovery -> PSW Restart



- Same for DPM and Standard HMC interface(s).
- Note that this, unlike a SNAPDUMP will restart your system!
- Equivalent to a CP HARD ABEND dump in terms of data collected.

What to do when things go wrong

System is hung, SE restart dump

I can't log on to any z/VM userid

- Time for a PSW restart dump
- Go to the SE
- Select your LPAR
- Select a processor
- CP Toolbox -> PSW Restart

System Management > T34 > Partitions > TCPX2

Partition Resources

Select	Name / ID	Associated Channels	Status	State	Type	Description
<input type="checkbox"/>	Processors		⊗ Exceptions			All Processors of the Logical Partition
<input checked="" type="checkbox"/>	000		⊕ Operating	Online	Central Proce	Represents one central processor
<input type="checkbox"/>	002		⊕ Operating	Online	Central Proce	Represents one central processor

Tasks: 000

CP Details

Daily

CP Toolbox

- Display or Alter
- Interrupt
- Load Processor From File
- PSW Restart
- Start Processor
- Stop Processor
- Stop Processor on CP Address Match
- Store Status

- Note that this, unlike a SNAPDUMP will restart your system!
- Equivalent to a CP HARD ABEND dump in terms of data collected.

What to do when things go wrong

Restart dump

- Note that this, unlike a SNAPDUMP, will restart your system!
- Equivalent to a CP HARD ABEND dump in terms of data collected.
- PGMBKs and FRMTBL will be dumped or not dumped according to the DUMP settings
- So, check DUMP settings now!
- Default is no PGMBKS, and the FRMTBL will only be included in special cases where we believe it would be helpful.
- Recommendation is to keep both PGMBKs and FRMTBL at DEFAULT unless otherwise specified by IBM Support.

q dump

```
01: DASD BE26 dump unit CP IPL pages 337206 PGMBKs DEFAULT FRMTBL DEFAULT
```

```
Ready; T=0.01/0.01 05:00:07
```

PSW Restart demonstration!

```
14:07:56 id  
14:07:56 OPERATOR AT END4P04B VIA *      04/01/25 14:07:56 EDT      TUESDAY  
14:07:56 Ready; T=0.01/0.01 14:07:56
```

Q L _

MA c

RUNNING END4P04B

26/004

What to do when things go wrong

System is hung, Standalone dump

I can't log on to any z/VM userid, and PSW Restart dump is not working (very rare)

- Time for a standalone dump!
- **You need to have some media prepared for this BEFORE you have a problem**
- See Chapter 12 of *CP Planning and Administration* for preparation steps
 - The SDINST EXEC resides on MAINT 190
 - Userid you build on must have: at least 256 MB of virtual storage, virtual reader at device number 00C, a virtual punch at 00D, no Class N reader or punch spool files, a read/write 191 minidisk that is accessed as file mode A with at least ten 4K blocks of free space, and access to MAINT 400, which contains the following files:
 - SADU74 IMAGE
 - SSPJ74 IMAGE
 - SSPK74 IMAGE
 - SSPP74 IMAGE
 - Each dump device must be an entire 3390 or FCP SCSI LUN.

What to do when things go wrong System is hung, DPM-Enabled HMC Standalone dump

1. Navigate to the HMC/SE
2. **Stop the LPAR via the Stop All Processors function**
3. Select "Dump" under Recovery
 - Select Storage Group where your SADUMP volume resides
 - Select SADUMP Volume
 - Press "OK" to begin dumping.
 - Watch dump progress in the Operating System Messages Console.
 - When complete, Stop, then Start your LPAR using Daily Task menu.

IBM Hardware Management Console

Home Start - VMDEV-DANIEL1 X Dump - VMDEV-DANIEL1 X

Dump - VMDEV-DANIEL1

Steps to initiate Dump Partition

1. Load the needed dump application into a bootable volume with the size of 1 GiB of a shared storage group.
2. Attach the storage group with the dump volume to the partition you would like to initiate a dump.
3. Select in the table on the bottom the storage group and the volume with the dump application on it.

Boot Device

Storage Group Name	Type	Partitions	Shareable	Total Capacity	Description	Fulfillment State
<input type="radio"/> SG-FCP-14042--SHEKHTMAN1	FCP	1	Dedicated	1920.0 GiB	LPAR VMDEV-DANIEL1: FCP LUNs	Complete
<input checked="" type="radio"/> SG-FCP-14043--SHEKHTMAN2	FCP	1	Dedicated	48.0 GiB	LPAR VMDEV-DANIEL1: FCP LUN for SADump	Complete

Volume UUID	Capacity	Type	Description
<input checked="" type="radio"/> 600507680C82813D3800000000000305	24 GiB	Data	SADUMP
<input type="radio"/> 600507680C82813D3800000000000304	24 GiB	Data	

Total: 2 Selected: 1

Total: 2 Selected: 1

What to do when things go wrong

System is hung, Standard HMC Standalone dump

1. Go to the HMC/SE
2. **Stop the system via the Stop All function**
3. Load the system, using Load Normal
 - check the Store Status function
 - IPL from the dump device
 - Do NOT use the CLEAR option
 - Erase any data that is in the Load Parameter field

The screenshot shows a dialog box titled "Load - T34:TCPX2". The "CPC:" field is set to "T34" and the "Image:" field is set to "TCPX2". Under "Load type", the "Standard load" radio button is selected, with "SCSI load" and "SCSI dump" also visible. There is a checkbox for "Clear the main memory on this partition before loading it" which is currently unchecked. The "Store status" checkbox is checked. The "Load address" field contains the hexadecimal value "0dddd". The "Load parameter" field is empty. The "Time-out value" is set to "60" seconds, with a note indicating the range is "60 to 600 seconds". Below these fields are input boxes for "Worldwide port name", "Logical unit number", "Boot program selector", and "Boot record logical block address", all of which are currently set to "0". A large text area for "Operating system specific load parameters" is empty. At the bottom of the dialog are buttons for "OK", "Reset", "Cancel", and "Help".

What to do when things go wrong

Collecting the standalone dump

Log on to OPERATNS

```
att BE06-BE09 *
BE06-BE09 ATTACHED TO OPERATNS
Ready; T=0.01/0.01 12:01:28
  dumpld2 dasd
HCPDL8237I TO operand not specified.  MDMPxxxx files will be created on A disk.
HCPDL8278A Enter virtual device number of first dump device.
  be06
DUMP ON BE06 WAS CREATED 2019-10-29 11:44:23
  TOTAL PAGES 59413  DUMPER RC 0
```

DASD TYPE	DUMPLD2 VDEV	VOL-ID	DUMP PAGES ON DEVICE	DUMP RDEV	DUMP RC
3390	BE06	SAD3A	59413	BE06	0
3390	BE07	SAD3B	0	BE07	0
3390	BE08	SAD3C	0	BE08	0
3390	BE09	SAD3D	0	BE09	0

```
A total of 1 file(s) (59413 records each) will be created.
HCPDL8210I 1 PRB00002 MDMPxxxx file(s) will be created on disk A
Continue - Y/N ?
  y
HCPDL8213I Created PRB00002 MDMP0001 A
Ready; T=0.96/1.85 12:01:52
```

Stand-Alone Dump Demonstration:

Home

Systems Management > P0007DE8

Partitions | Topology | Monitor

DANIEL

Select	Name	Status	Processors	Memory (GB)	Processor Utilization	Network Utilization	OS Name	Description
<input checked="" type="checkbox"/>	VMDEV-DANIEL1	Active	4	8.0	1 %	0 %	END4P04B	VM Development daniel.shehtman@ibm.com end4p04b.wsclab.en

Max Page Size: 500 | Total: 38 | Filtered: 1 | Selected: 1

Tasks: VMDEV-DANIEL1

Partition Details

Daily

- Grouping
- Operating System Messages
- Start
- Stop

Recovery

- Dump
- Integrated 3270 Console
- Integrated ASCII Console
- PSW Restart
- Start All Processors
- Stop All Processors

Operational Customization

- Customize Scheduled Operations

Configuration

- Delete Partition

Monitor

- Monitor System Events

What to do when things go wrong

System is hung, Standalone dump


- Standalone dump may dump everything; if CP memory is sufficiently damaged
 - Even guest memory!
 - Security considerations!
 - Even if it doesn't dump everything, it will dump the object directory, unlike HARD ABENDs or SNAPDUMPs
 - Time considerations!
 - Space considerations!

Types of z/VM failures

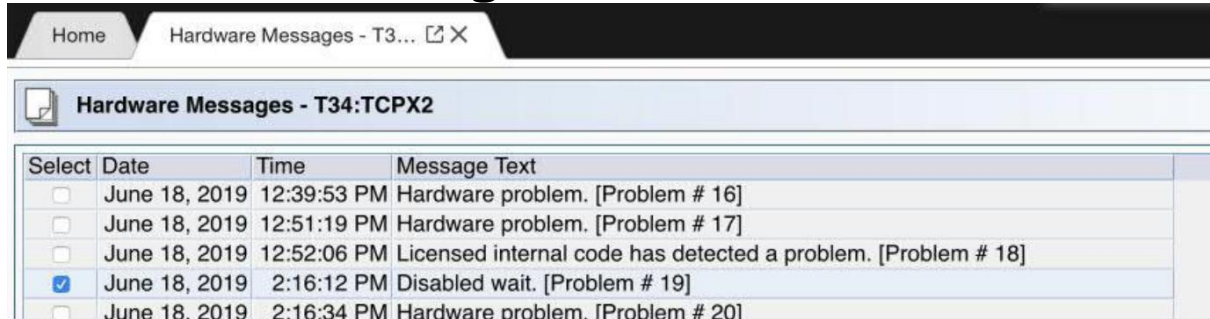
- CP does not often fail but that does not mean that you should not be ready for an event
 - CP Abends – When CP discovers an unrecoverable error and Dumps
 - Hard - system dumps all of CP storage and restarts
 - PGMBKs and FRMTBL may or may not be dumped, depending on settings and type of dump
 - Soft - system dumps some pertinent information and continues to run
 - Simultaneous Soft ABENDs will cause a HARD ABEND dump.
 - **SET ABEND SNAPDUMP** to make soft abends take a snapdump
 - **SET ABEND HARD** to make soft abends into hard ones
 - Not recommended for production!
 - **SET ABEND OFF** to turn off soft abends
- It is possible to not have enough space for a dump!
 - Use the DUMP option on CP_Owned statement to reserve SPOOL volumes for DUMP space
 - Watch out for warning messages that CP was unable to allocate dump space
 - Use **SET DUMP** to not dump PGMBKs or FRMTBL
 - This might not have all the information we need in the dump.
 - [z/VM: CP Planning and Administration](#) contains a table of suggested dump space allowances for various storage sizes and DASD types.

Things that can happen to you

Wait states

- z/VM will usually restart after a problem, but in rare cases it can't
- You will see the LPAR is down on the HMC/SE: 

- Check the hardware messages:



Select	Date	Time	Message Text
<input type="checkbox"/>	June 18, 2019	12:39:53 PM	Hardware problem. [Problem # 16]
<input type="checkbox"/>	June 18, 2019	12:51:19 PM	Hardware problem. [Problem # 17]
<input type="checkbox"/>	June 18, 2019	12:52:06 PM	Licensed internal code has detected a problem. [Problem # 18]
<input checked="" type="checkbox"/>	June 18, 2019	2:16:12 PM	Disabled wait. [Problem # 19]
<input type="checkbox"/>	June 18, 2019	2:16:34 PM	Hardware problem. [Problem # 20]

- Look for a disabled wait (keep in mind these are messages for the whole CEC)
- Might take a minute or two to refresh the HMC, so be patient!

Things that can happen to you

Wait states

- Look up this number as HCPxxxxW
 - Always look up your wait states before getting a standalone dump!
 - Some are easy to fix problems!

```
HCP1010W The operator's console could not be found.
```

```
Explanation: The indicated disabled wait state PSW is loaded when an operational operator's console cannot be found.
```

```
If you were running in virtual mode, CONMODE was not set to 3270.
```

```
System Action: The system enters a disabled wait state (wait state code = 1010). If using the Stand-Alone Program Loader (SAPL), all registers contain the values held at the time the wait state was entered. Register 2 contains the console device address.
```

```
Operator Response: There is probably a hardware malfunction. Notify your system support personnel. Verify the OPERATOR_CONSOLE statement in the system configuration file properly define the system consoles.
```

This one means your Load Parameter was bad!

Things you need to do

Prepare for z/VM Failures

- Learn how to process a CP dump
 - DUMpload or DUMPLD2 utility
 - DUMPLD2 enables you to create a multi-file dump, which is easier to transfer to IBM
- Collect the OPERATOR's console from the time of failure
- Practice moving files to and from z/VM
- Nearly every problem diagnosis starts with the same questions:
 - Description?
 - Release and service level?
 - What Changed (Workload, Service, HW, ...) ??? Peel back all layers of the onion!

What could go wrong?

System & Server Performance

- Slow response times
- Applications crashing
- User Hangs
- System hangs
- Just about anything!
 - Depending on what's slowed down, symptoms might be wildly different

What to do when things go wrong

Collecting monitor data

- First, monitor needs a place to put data – the MONDCSS segment

- Check **QUERY NSS** to make sure it's there

```
*NSS      0003 NSS  R  0001 08/21 13:11:27 MONDCSS  DCSS      MAINT
```

- If not, create this from MAINT:
 - **CP DEFSEG MONDCSS A000-BFFF SC RSTD**
 - **CP SAVESEG MONDCSS**

What to do when things go wrong

Collecting monitor data

- Make sure you're collecting the correct information:
 - **QUERY MONITOR**
- If not, enable/disable different domains, recommended:
 - **CP MONITOR EVENT ENABLE ALL**
 - **CP MONITOR EVENT DISABLE SEEKS ALL**
 - **CP MONITOR EVENT DISABLE SCHEDULER ALL**
 - **CP MONITOR SAMPLE ENABLE ALL**
- If settings are not what you expect, adjust
 - **CP MONITOR SAMPLE CONFIG SIZE 3072**
 - **CP MONITOR SAMPLE RATE 1 SEC**
 - **CP MONITOR SAMPLE INTERVAL 1 MIN**
- Start monitor generation
 - **CP MONITOR START PARTITION 2048**

What to do when things go wrong

Collecting monitor data

- From userid MONWRITE, start monitor data collection:
 - `MONWRITE MONDCSS *MONITOR DISK MYDATA MONDATA B`
- You will need a REALLY large disk for this!
- Stop monitor data collection:
 - `MONWSTOP`

- Send monitor data through an open support case.

- We put some of our execs that we use to view monitor data out on the VM Downloads page:
<https://www.vm.ibm.com/download/packages/>

What you need to do:

Keep track of System & Server Performance



Other Material

- Simple monitor instructions
<http://www.vm.ibm.com/devpages/bkw/monsimp.html>
- CP Planning and Administration manual – Estimation
<https://www.vm.ibm.com/library/730pdfs/73627100.pdf>
- Tivoli OMEGAMON XE on z/VM and Linux
<https://www.ibm.com/uk-en/marketplace/omegamon-on-zvm-and-linux>
- Redbook - The Virtualization Cookbook for IBM z/VM 7.2
<http://www.redbooks.ibm.com/redbooks/pdfs/sg248147.pdf>
- z/VM: Performance Toolkit Guide Manual
<https://www.vm.ibm.com/library/730pdfs/73630200.pdf>
- z/VM: Performance Data Pump
<https://www.ibm.com/docs/en/zvm/7.3?topic=performance-zvm-data-pump>

What could go wrong

System Security Policy

- Users might not have access to things they should
 - Example: user not in LOGONBY list
- Users could get access to things they shouldn't
 - Example: User BOB can link MAINT's disk and see the full directory (this could be catastrophic if Bob is a bad actor)
- Users could accidentally crash the system or pieces of it
 - Example: Thought I issued SHUTDOWN second level, but I really issued SHUTDOWN first level

What you need to do

System Security Policy

System Security is very broad and means different things to different enterprises

- Passwords, Rules, Access Control, Granularity ...
- External Security Manager (e.g. RACF/VM)
 - NOTE: Adding an ESM to an existing SSI cluster is difficult. It is possible to do this after implementation of an SSI, but inconvenient
- ESMs provide password encryption

Common Criteria Certification by z/VM

- A fully defined system
- It may be too much for you, but it gives good ideas

Other Material

- z/VM 7.3: Secure Configuration Guide Manual
https://www.ibm.com/docs/en/SSB27U_7.3.0/pdf/hcps0_v7r3.pdf
- Latest z/VM Security Certifications found at: <https://www.vm.ibm.com/security/news.html>



What you need to do:

Storage Configuration (FICON DASD and FCP SCSI)

Have a plan or work toward a plan for your storage configuration

- Current needs and growth
- Types of Storage

Storage Allocation and Maintenance

- Allocation (Standardization on Size and Device numbers) across LPARS
- Settings and Error reporting
- Duplicate VOLSER issues
- Cylinder zero is special sometimes (1-END Minidisk to protect the VOLSER and allocation)
- Advanced Configurations (e.g. GDPS)



What you need to do:

Storage Configuration (FICON DASD and FCP SCSI)

Other Material

- CP Planning and Administration Manual

<https://www.vm.ibm.com/library/730pdfs/73627100.pdf>

- GDPS References and description page

<https://www.ibm.com/products/gdps>



What you need to do

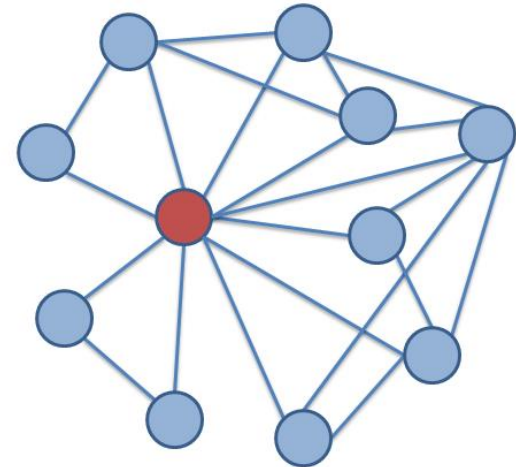
A Planned Network Configuration

Your physical and logical network for z/VM is key to nearly everything

- Server and Application Connectivity
- Transaction time and Perceptions
- Robustness – Built-in failover
- VSwitch and VSwitch Link aggregation is preferred
 - Lower CPU costs
 - Operates in Ethernet (Layer 2) or IP modes (Layer 3)
 - Supports port isolation
 - Supports link aggregation
- Involve your network team!! This is really a must

Other Material

- [z/VM: Connectivity Manual](#) **
- [z/VM: Getting Started with Linux on System z](#) **
- Linux on System z Tuning Hints and Tips for Networking – <https://www.ibm.com/docs/en/linux-on-systems?topic=archive-tuning-hints-tips>



What you need to do:

BACKUP of z/VM and Server data

Sometime and for some reason you will need to restore data on your system.
Plan on this from the beginning

- Storage Failures
- Application failures
- Acts of God. Natural Disasters. Solar Flares. Anything.

How

- Backups of key data – File level backup (including to email) or Device level
- Don't backup unnecessary things (paging volumes, redundant SSI data, etc.)
- Being able to rebuild data
- Where to backup the data to is your choice
- Duplicate copies of data (Flash Copy, DDR)
- Consistent **USABLE** data. (with I/O Quiesced)
- **TEST YOUR BACKUPS!!!!**

CP Data

- SPXTAPE for Spool and System Data files
- DDR for CP Volumes (allocation maps etc.)



What you need to do:

BACKUP of z/VM and Server data

Other Material

- [z/VM: Getting Started with Linux on System z](#)
- Backup and Restore Manager for z/VM
- Tape Manager for z/VM
- SPXTAPE and DDR in the [CP Commands Manual](#)
- DFSMS/VM publications in the [VM Library](#) for Tape Handling
- Tivoli Storage Manager (now: IBM Spectrum Protect)
<https://www-01.ibm.com/support/docview.wss?uid=swg21239546#z%2FVM%20Hypervisor%20Guest>

What could go wrong?

Paging

z/VM generally expects to page, at least a little bit

Running out of paging space will cause a System Outage (PGT004 abend)

- Messages issued by default when CP at 90% & 100% also at 90% of spooling space in use as a last effort
- Set a paging warning threshold!
 - SET PAGING WARNING nnn%

Underpowered paging can cause issues too!

- Performance is important, backed up paging can back up other tasks too!

What you need to do:

Manage Paging space on the system

- Paging space is not optional
 - Running out of paging will cause a System Outage (PGT004 abend)
 - Messages issued by CP at 90% & 100% also at 90% of spooling space in use as a last effort
 - Often the messages come too late for avoidance actions
 - Monitoring over time will give you a good indication
 - Commands and Tooling to watch and monitor PAGE
 - QUERY ALLOC PAGE
 - SET PAGING WARNING nnn%
- Consider not only how much page space you have, but also your paging rates



What you need to do:

Manage Spooling space on the system

- Good – Periodic QUERY ALLOC SPOOL to see where the system is regarding SPOOL usage
 - Allocate Dedicated DUMP space
 - QUERY DUMP
- Better – Queries but also maintaining the history of usage so you can see trends
 - Run tools like SFPURGER & SPOOLPIG to determine more information
 - OMEGAMON will keep spool History
- Best – An automated solution like Operations Manager that will both visually provide the state but will notify you if some threshold has been exceeded
 - Operations Manager can also run SFPURGER on a schedule or when thresholds have been reached
 - Catch the problem as it is changing in real time.



What you need to do:

Manage Spooling space on the system

●Other Material

- CP Planning and Administration manual
- SFPURGER – CMS Commands and Utilities manual
- Operations Manager for z/VM -
<https://www.ibm.com/uk-en/marketplace/operations-manager-for-zvm>
- SPOOL PIG and others – z/VM Download Page
<https://www.vm.ibm.com/download/packages/>



What could go wrong

Losing messages

- Could miss a warning message, like running out of disk space
- Could miss the reason a guest went down or restarted
- Could miss an important system warning message, like running out of paging space
- Could miss a system error message, like connectivity was lost in the SSI, or there were errors on a channel



What you need to do

Capture Important Console logs

- Good – Ensure that Spooling of logs is enabled on all servers.
 - Spooling – Set up with COMMAND statement in users Directory Entry
 - Logging in a profile or server start-up
- Better – Monitor Spooling of logs on periodic basis.
 - Close/Purge oldest and open new Console Spool or log keeping newest.
 - EXECs that may use FOR command to remotely do this
- Best – An automated solution like Operations Manager will automatically save and manage server machine consoles and logs, and optionally notify you of critical events
 - Operations Manager VIEWCON tool allows for real time viewing of events that may also make management easier



Things you should know about

Capture Important Console logs

- Other Material
 - The basics on gathering a Console log in the z/VM Diagnosis guide at: <https://www.ibm.com/docs/en/zvm/7.3?topic=data-console-log>
 - Operations Manager for z/VM **



What you need to do

Mainframe Social -

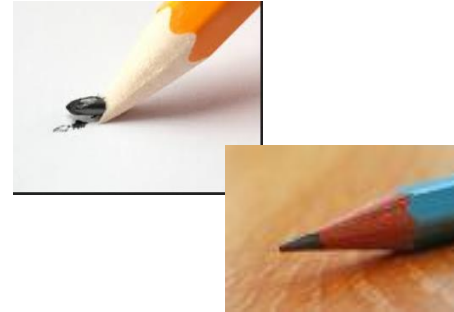
- **Be Social – This is not a full-time task but it really can help**
 - Watch what is being done by others
 - Contribute your own thoughts and ideas
 - Ask Questions
 - Walking around – Virtually or Physically
- **There are many avenues for material**
 - List Servers, Web groups (IBMVM and LINUX-390 LISTSERVs for questions, advice, lessons learned, answers, banter, etc.)
 - Available 24 / 7 / 365
 - Relatively low traffic, low spam, little bad advice
 - Friendly, helpful, potential for lasting contacts
- **Other Material**
 - VM Community
<http://www.vm.ibm.com/techinfo/forums.html>



What could go wrong

Changing SYSTEM CONFIG

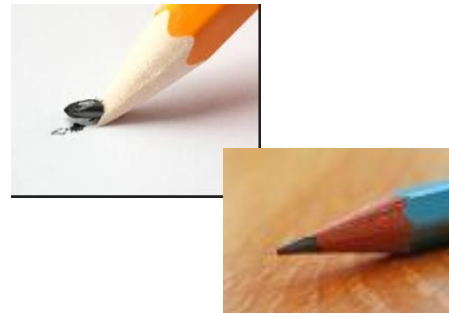
- You could not have a new resource because it was defined incorrectly
- You could lose access to an old resource because its definition got corrupted
- Your system could not IPL



What you need to do

Changing *SYSTEM CONFIG*

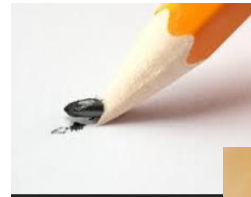
- Develop a process for changes and stick to it. Suggested steps:
 - Make a backup copy before changing anything. This backup can be used in an emergency from the SAPL panel. Save backup in a place you can access in an emergency
 - Have a peer review your changes
 - Without fail, run CPSYNTAX !!!
 - Available on the MAINT 193 minidisk
 - An easy way to avoid embarrassing mistakes at IPL or worse
 - Easy to run – Catches incorrect and unrecognized statements
 - Even Comment Changes
- Changes not effective until next IPL
(errors may not be discovered for months!)



What you need to do

Changing *SYSTEM CONFIG* – As safe as possible

- Start-up console logs may reveal errors or problems
 - Even if a server or application starts successfully there can be issues.
 - Error messages, Warnings & overrides should be reviewed
- Critical times for reviewing logs.
 - New Releases
 - Maintenance of server or application
 - Common Error messages that could be missed:
 - DASD Problems Duplicate VOLID or Offline
 - Spool Problems (e.g. NSS/DCSS ...)
 - CONFIG ERRORS
- Other Material
 - CPSYNTAX Described in the CP Commands Manual **
 - CP Planning and Administration manual **
 - CP Messages and Codes Manual **



What you need to do

Maintenance is not something that can wait forever

- Apply Recommended Service Upgrade (RSU):
 - Released Periodically (every 6 months give or take)
 - Contains cumulative service including all pre and co-requisites in a pre-built format
 - Includes service for all integrated components and pre-installed program products
 - Available on 3590 tape, DVD, or electronically (servlink envelope)
 - Includes service required by most customer installations
 - RSUs are proven, tested, and selective
 - Linear Service with z/VM 7.4!
- Monitor Hiper and Red Alert APARs
- Installing:
 - SERVICE
 - PUT2PROD
- Backing out:
 - SAPL – IPL from CPLOLD MODULE
 - VMSES/E - VMFREM



What you need to do

Maintenance is not something that can wait forever

- Other Material
 - RSU Page – as needed. See: <http://www.vm.ibm.com/service/rsu/>
 - Alert Page -- A great place to watch for the most important items.
To Subscribe: <http://www.vm.ibm.com/service/redalert/>
 - News -- <http://www.vm.ibm.com/service/news>



What you need to do

Change

- Review/Develop your long-term plan
 - What's coming in new hardware/software
 - What do you expect your workload to do over the next 3 months, 6 months, 1 year, 2 years?
 - What's nearing end of service
- Think about organizational changes, budget challenges, etc
- Talk to your IBM rep regularly

What you need to do

Change

- Review/Develop your Disaster Recovery (DR) strategy
 - DR is important in ALL environments
 - DR procedures must be adjusted for SSI members
 - DR site and Home site needs to be the same. A multi-member Home needs multi-member DR or use REPAIR MODE.
 - For desperate circumstances, there is the CLEARPDR IPL parameter on the SAPL panel
 - Some Planning now will help later
- Disaster is not well defined, but I am sure you will know when you experience one
 - TEST Your DR Plans



Questions?

Thanks for listening!