

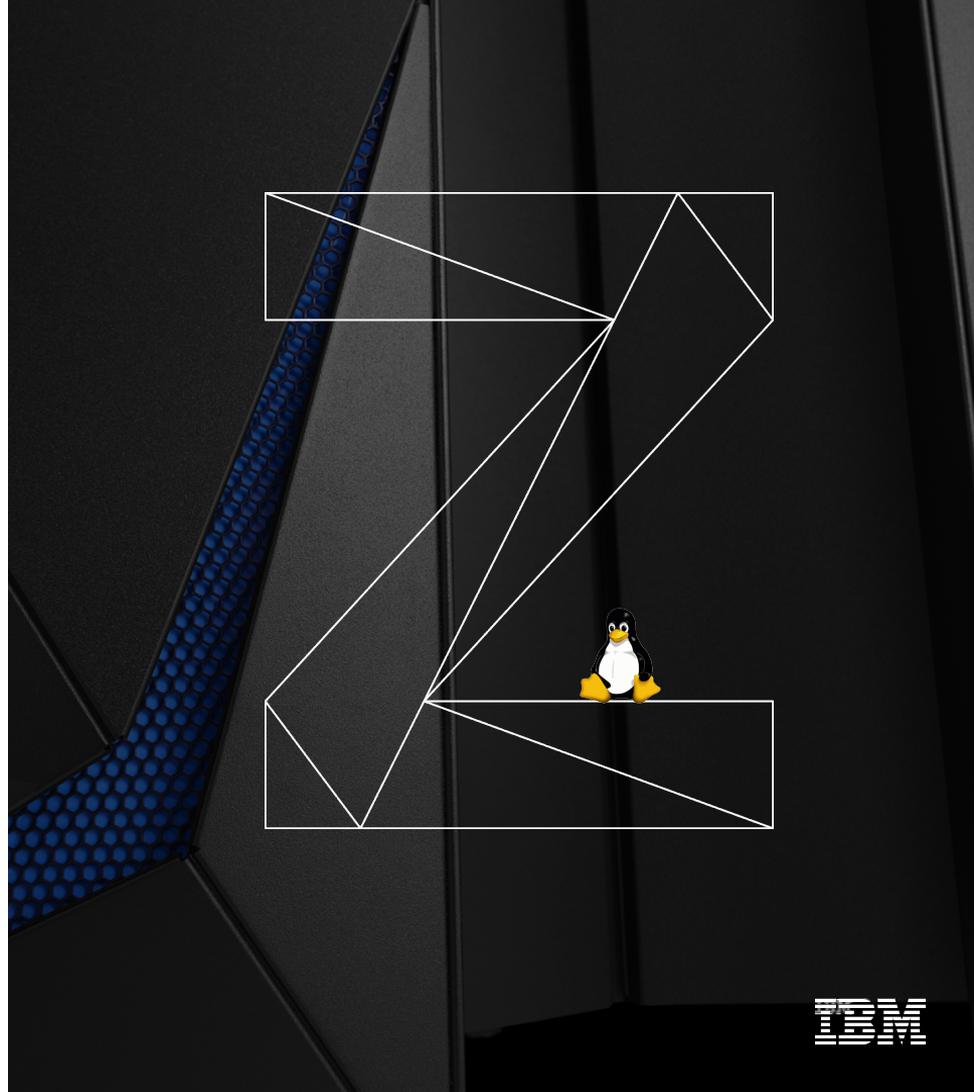
# z/VM Problem Determination and Data Collection Demo

z/VM Education Club

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# Thanks to

- Tim Reynolds

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- Brian Wade

## What to do when things go wrong

- Determine what is actually wrong
  - What you see might just be a symptom
- Example:
  - Ping timeout
  - Is the Linux guest up?
  - Is networking at the Linux guest level okay?
  - 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?

## 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
- 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
  - Try from the green screen
  - You can't get a Linux login prompt
  - Guest is likely hung
  - Get a **SYSTEM RESTART** or use standalone dump (more on this in a bit)
    - You will need kdump configured in order for SYSTEM RESTART to work

## 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 not logged on

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

- I can get a logo screen and log on to another guest
- Log on to a class A guest (**OPERATOR**, **MAINT**, etc)
- Query the guest
  - Guest was logged off
    - Get the guest's console log
    - This assumes that you had **SPOOL CONS \* START** somewhere in the guest's directory entry/PROFILE EXEC
    - It's best to use tooling like Operations manager to manage your consoles, rely on spool only as a backup

## 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**

- From a class A userid

**SNAPDUMP PGMBKS ALL FRMTBL YES <- 7.1 only**

- This might result in a very large dump, especially on larger systems, but does give us the maximum amount of information

## What to do when things go wrong

### Collecting the dump

- Check your **SYSTEM CONFIG** `System_Userids` statement to see where dumps go (usually OPERATNS)

```
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
```

## 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 2019-06-27 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

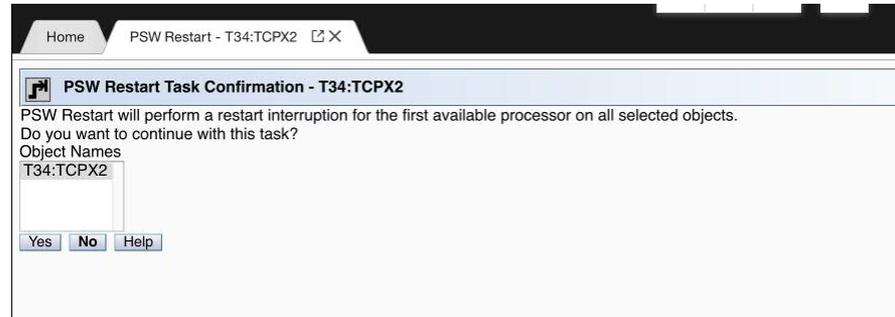
I can't log on to any z/VM userid

- 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
    - If ISFC links are down, may be able to restart them with **ACTIVATE ISLINK**

## What to do when things go wrong System is hung, HMC restart dump

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



- Note that this, unlike a SNAPDUMP will restart your system!

## 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 Processor	Represents one central processor
<input type="checkbox"/>	002		✔ Operating	Online	Central Processor	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!

## What to do when things go wrong

### Restart dump – 7.1 instructions

- Note that this, unlike a SNAPDUMP, will restart your system!
- PGMBKs and FRMTBL will be dumped or not dumped according to the DUMP settings
- So check DUMP settings now!!!!

```
q dump
```

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

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

## 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

- Time for a standalone dump!
- You need to have some media prepared for this BEFORE you have a problem
- See Chapter 11 of *CP Planning and Administration* for preparation steps
  - The SDINST EXEC usually 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 MAINT 400
    - SADU71 IMAGE
    - SSPJ71 IMAGE
    - SSPK71 IMAGE
    - SSPP71 IMAGE
  - Each dump device is an entire 3390 or SCSI LUN.

## What to do when things go wrong System is hung, 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 and erase any data that is in the Load Parameter field

The screenshot shows a dialog box titled "Load - T34:TCPX2". The dialog is divided into two main sections. The left section contains the following fields and options:

- CPC: T34
- Image: TCPX2
- Load type:  Standard load,  SCSI load,  SCSI dump
- Clear the main memory on this partition before loading it
- Store status
- Load address:
- Load parameter:
- Time-out value:  (with a dropdown arrow) and "60 to 600 seconds" text to the right.
- Worldwide port name:
- Logical unit number:
- Boot program selector:
- Boot record logical block address:
- Operating system specific load parameters:

The right section contains the radio button options for the load type. At the bottom of the dialog are four buttons: "OK", "Reset", "Cancel", and "Help".

# What to do when things go wrong

## Collecting the dump

### Log on to OPERATNS

```
att BE06-BE09 *
BE06-BE09 ATTACHED TO OPERATNS
Ready; T=0.01/0.01 12:01:28
  dumpld2 dasd
HCPDLD8237I TO operand not specified.  MDMPxxxx files will be created on A disk.
HCPDLD8278A 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	DUMPLD2		DUMP PAGES	DUMP	DUMP
TYPE	VDEV	VOL-ID	ON DEVICE	RDEV	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.
HCPDLD8210I 1 PRB00002 MDMPxxxx file(s) will be created on disk A
Continue - Y/N ?
```

```
Y
HCPDLD8213I Created PRB00002 MDMP0001 A
Ready; T=0.96/1.85 12:01:52
```

## 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 abend or snapdumps
  - Time considerations!
  - Space considerations!

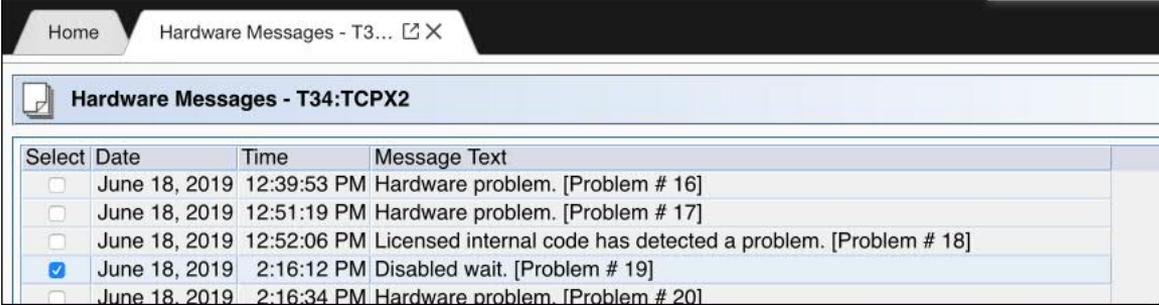
## Types of z/VM failures

- 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's storage and restarts
      - PGMBKs and frame table may or may not be dumped, depending on settings and type of dump
    - Soft - system dumps some pertinent information and continues to run
      - Can **SET ABEND SNAPDUMP** to make soft abends take a snapdump
      - Can **SET ABEND HARD** to make soft abends into hard ones
        - Not recommended for production!!!
- 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, then

## 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:



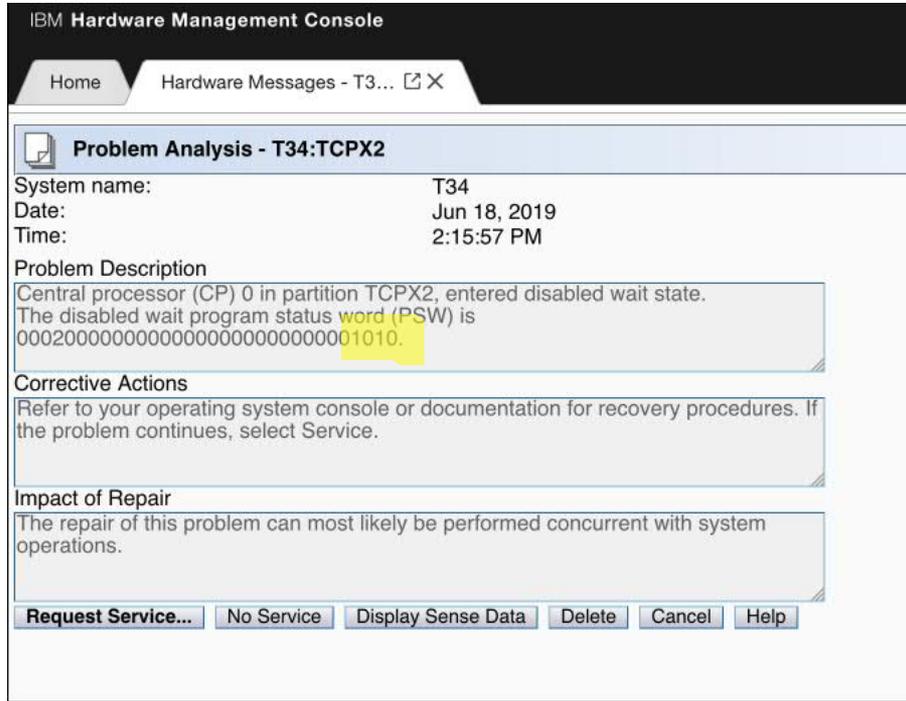
Select	Date	Time	Message Text
<input type="checkbox"/>	June 18, 2019	12:39:53 PM	Hardware problem. [Problem # 16]
<input type="checkbox"/>	June 18, 2019	12:51:19 PM	Hardware problem. [Problem # 17]
<input type="checkbox"/>	June 18, 2019	12:52:06 PM	Licensed internal code has detected a problem. [Problem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

You will see the disabled wait PSW. We care about the last part of this:



The screenshot displays the IBM Hardware Management Console interface. At the top, there are tabs for 'Home' and 'Hardware Messages - T3...'. Below this, a section titled 'Problem Analysis - T34:TCPX2' contains the following information:

- System name: T34
- Date: Jun 18, 2019
- Time: 2:15:57 PM

**Problem Description**  
Central processor (CP) 0 in partition TCPX2, entered disabled wait state. The disabled wait program status word (PSW) is 0002000000000000000000000000000001010.

**Corrective Actions**  
Refer to your operating system console or documentation for recovery procedures. If the problem continues, select Service.

**Impact of Repair**  
The repair of this problem can most likely be performed concurrent with system operations.

At the bottom of the console, there are several buttons: 'Request Service...', 'No Service', 'Display Sense Data', 'Delete', 'Cancel', and 'Help'.

## 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, ...) ???

## 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      0011 NSS  R  0001 2011-10-07 11:18:12 MONDCSS  DCSS      MAINT620
```

- 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**
  
- Please don't send us your monitor data directly!!! Please open a case for this! We <3 GDPR!
  
- 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  
<http://www.vm.ibm.com/library/710pdfs/71627102.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 6.3, RHEL 6.4, and SLES 11 SP3 – Section 23.3.1 <http://www.redbooks.ibm.com/redbooks/pdfs/sg248147.pdf>
- z/VM: Performance Toolkit Guide Manual  
<http://www.vm.ibm.com/library/710pdfs/71630201.pdf>



## What could go wrong

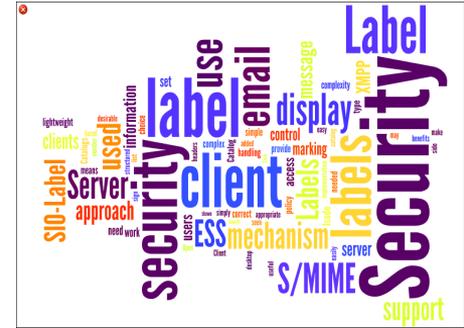
### *System Security Policy*

- 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 also be catastrophic)
  
- 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: Secure Configuration Guide Manual
  - VM V6.4 Achieves Common Criteria Certification <http://www.vm.ibm.com/security/>



## 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 \*\*
- EREP in System Operations Manual \*\*
- GDPS References and description page –  
<http://www-03.ibm.com/systems/z/advantages/gdps/>



## What you need to do

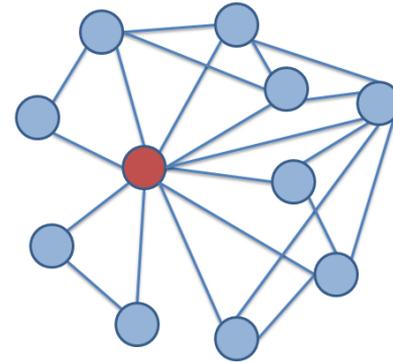
### *A Planned Network Configuration*

#### ● 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/support/knowledgecenter/finonibm/liaag/tuning/tuning.htm>



## 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
- ...

### ● 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 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
- 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

- Consider not only how much page space you have, but also how fast



## 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



## “Top 10” things you need to know and do

### *Capture Important Console logs*

- Other Material
  - The basics on gathering a Console log in the z/VM Diagnosis guide at: <https://www.vm.ibm.com/library/710pdfs/71628001.pdf>
  - 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*

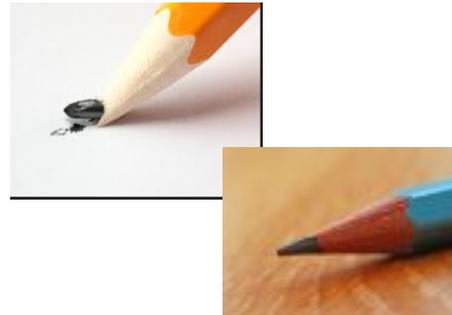
- You could not have a new resource because it was defined incorrectly
- You could lose access to an old resource because its definition got corrupted
- Your system could not IPL



## 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 (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
- 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>
  - RSU Buckets and other maintenance is still Important
    - <http://www14.software.ibm.com/webapp/set2/psearch/search?domain=psp>



## 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

