Cloning and Provisioning z/VM LPARs

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P R O V E N   P E R F O R M A N C E

Overview

- **Based on a Customer Story**
  - Worked with people in different countries, like Indonesia, Philippines, Texas
  - Requirements were plentiful and changed a *few* times
  - The solution had to be solid and done quickly
    - No pressure. None at all.
- **Agenga:**
  - Why clone / provision z/VM? Or LPAR z/VMs for that matter?!
    - Single z/VM LPARs, not SSI
  - What are some of the key things to consider?
  - Do it all manually or do it efficiently?
  - How to go from 'base' to full system builds
    - zPRO will be discussed because it's the best product to do this!

Why Clone / Provision z/VM

- ## Sandbox systems
  - Building a z/VM 2nd level system for testing or training
  - New Systems Programmers or even people just learning VM basics
  - Use it, change it, mess it up, delete it, make another...

- ## Expanding z/VM hosting of Linux on Z
  - Additional LPARs needed for business needs
    - New CPCs/CECs that need new z/VM LPARs built *quickly*
    - When you don't need one or two built, but dozens
      - Or, *way more than that!*

What's the big deal?!

Cloning is usually *very* easy

Provisioning ("personalizing" the environment)
## not so much

Considerations

- **There is usually a long list... (this is very condensed!)**
  - Personality of new system
    - System name
    - DASD volume names
    - Networking
      - IP / masking / gateway
      - VMLAN MACPREFIX
    - SFS CRR server LUNAME
    - (re)Build directory for DIRMAINT
    - RACF DB sharing
    - VM/SES system inventory system name

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Considerations / Challenges

- **DIRMAINT & System Affinity (SYSAFFIN) mode**
  - **Uugh!**
    - All new z/VM systems share the CP Directory s
    - Added a twist to building / managing resources
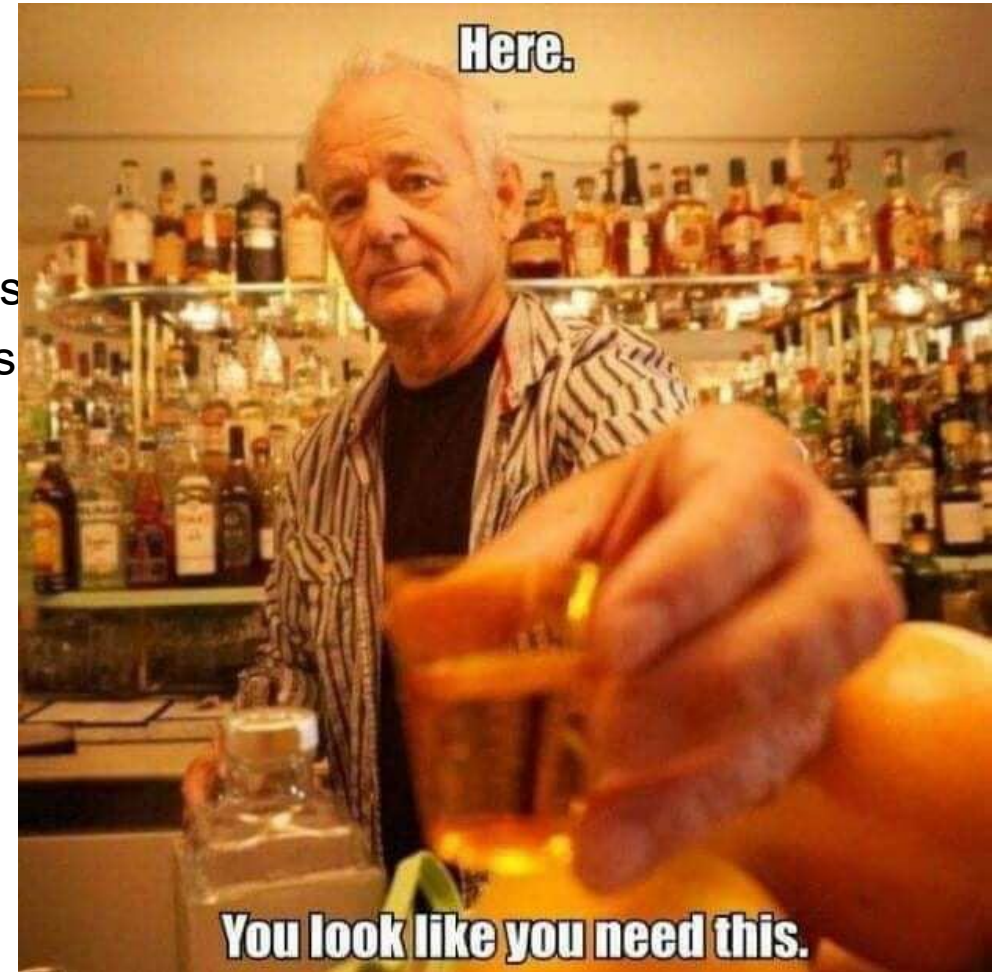
Considerations / Challenges

- **DIRMAINT & DASD pools**
  - Free volumes are XXnnnn in EXTENT CONTROL and on the system
    - Sometimes NOT on the system!
      - Had to account for vols DIRMAINT picked that may not be online
  - Cloning volumes from a GOLD image produces duplicate VOLIDs (0-END)
    - Re-labeling required for new VOLIDs
  - Requirement was to remove the allocated volumes from the GROUP and change the VOLIDs on the REGIONS in EXTENT CONTROL

Considerations / Challenges

- **New VOLIDs and System ID**
  - Updates needed to be done on the new system's files/disks BEFORE it IPLs
    - SYSTEM CONFIG
      - System Identifier
      - Gold image VOLIDs mapped/changed to new VOLIDs
    - CP DIRECTORY
      - System ID
      - Gold image VOLIDs mapped/changed to new VOLIDs
      - Write new directory image for the new guest
      - Build USER INPUT on DIRMAINT 1DF to rebuild
    - VMSERVR DMSPARMS
      - Set LUNAME to new System ID
      - Set up special PROFILE EXEC to rebuild, then put the original PROFILE EXEC back

Considerations / Challenges

- **TCPMAINT 198 disk**
  - TCPIP configuration file for IP and networking details
  - PW SRC file for SNMP

Manually vs Efficiently

- ## All these steps can be done manually
  - Even with diligence in following a check-box list of tasks, things will get missed or done incorrectly
  - One or two systems might be okay to do manually
  - More than that... Other than "job security", it is inefficient

- ## Use zPRO – Automate it!
  - zPRO can handle cloning and provisioning *anything* that runs as a guest
  - zPRO is extensible to fit your needs *easily*
  - zPRO will accommodate 0-END MDISKs – DIRMAINT won't
  - Set the clone process up once, and push the button N times to build what you need

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Gold Image Prep

- **Setting up the Gold Image**
  - Once a z/VM guest is built, a few things need to be modified to clone it well
- **Find / Map the MDISK where a base directory source file is**
  - Create a base directory file with &SYSID where the system ID should be
  - This base file is key to finding all the *other* MDISKS we need to update
  - The mapped MDISK is included in the post-process routine
  - Normally PMAINT 2CC – doesn't matter what disk

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Gold Image Prep

- **Update MAINTvrm (MAINT730)**
  - Default PROFILE EXEC doesn't allow for running other routines
    - assumes a CSM request (Centralized Service Management)
  - Small update to allow non-CSM things to run
  - Add a routine (SYSNETID EXEC) to 191 disk that will:
    - Update SYSTEM NETID
    - Resave CMS and ZCMS segments
    - Run VMFUPDAT SYSPINV process

Gold Image Prep

- **AUTOLOG2 PROFILE EXEC**
  - RACF needs to be up first – it starts AUTOLOG2
  - Add CP XAUTOLOG MAINT730 CMD EXEC SYSNETID to beginning of PROFILE
  - Check for MAINT730 to be logged off before continuing the rest

- **Velocity Software userids**
  - USERPROF EXEC added to ZSERVE and ZADMIN
  - Changes system ID and IP address in key config files

- **Gold Image is DONE**

Post-Clone Routine

- **The post-clone routine will customize key parts of the new system**
  - Read the guest's CP Directory from the host system
  - Find all the 0-END MDISKS and capture the VOLSERs
    - Make sure the volumes are online and attached to the system (grrr DIRMAINT)
  - Relabel the volumes to match the new guest's prefix
  - Obtain and modify EXTENT CONTROL and tell DIRMAINT to reload it

  - Map the MDISK where the base directory file is on the new system
  - Read the base directory and find all MDISKs needed to update
  - Map those to the guest's CP Directory on the host system
  - Add temp MDISKS and update the directory
    - Now the routine can CP LINK and modify the contents of the guest system's userids

Post-Clone Routine

- **The post-clone routine continues...**
  - Change the old/base VOLSERs to the new VOLSERs in the base directory
  - CP LINK the MAINT 123 disk we found in the base directory
  - Write the new object directory for the guest

  - LINK/ACCESS key disks and update the key files mentioned prior
    - The CP LINK is to a temp MDISK in the guest's host directory

  - Remove the temp MDISKS from the guest's host directory

  - Post-Clone Processing is DONE

zPRO bits

- **DIRMODEL to request build:**

```
FormType DIALOG
Title Create a New VM LPAR
FIELD LPARID TYPE STRING LABEL "New Guest Userid" VALUE(JSVLPAR) REQUIRED LENGTH 8
FIELD PFX TYPE STRING LABEL "New DASD Prefix Qnn"  VALUE(Q01) REQUIRED LENGTH 3
FIELD MACPRE TYPE STRING LABEL "MAC Prefix 02nnnn" VALUE(020021) REQUIRED LENGTH 6
FIELD IPADDR TYPE IP LABEL "IP Address" VALUE(10.170.72.11) REQUIRED
Call COPYUSER LPARBASE &lparid.
%SET_IP FALSE
%POST_PROC LPARPOST &lparid. &pfx. &ipaddr. &macpre.
```

zPRO bits

- **GOLDDEF file of Gold Image:**

```
USER LPARBASE ILOVEVM * * G                          LINK JSV2LVA 191 191 RR
INCLUDE USERPROF                                     LINK ZADMIN 0391 0391 RR
COMMAND SPOOL CONS TO * CLASS A NAME &USERID CONSOLE * RES
COMMAND DEFINE NIC 0600 TYPE QDIO                    MDISK: 320 SOURCE: JSVSVR18 320 GROUP:NEWLPAR
COMMAND COUPLE 0600 TO SYSTEM VSI10NET               * SPOOL/PAGE
COMMAND SET VSWITCH VSI10NET GRANT &USERID           MDISK: 321 SOURCE: JSVSVR18 321 GROUP:NEWLPAR
IPL CMS PARM AUTOCR                                  * COM
STORAGE 256M                                         MDISK: 323 SOURCE: JSVSVR18 323 GROUP:NEWLPAR
MAXSTORAGE 256M                                      * REL
OPTION TODENABLE                                     MDISK: 324 SOURCE: JSVSVR18 324 GROUP:NEWLPAR
MACHINE ESA 64
CPU 00 BASE
CONSOLE 0020 3215 T
SPECIAL 0700 3270
SPECIAL 0701 3270
SPECIAL 0702 3270

...continued →
```

You get a request...

- **It is Friday afternoon and your boss says "This project requires 18 new LPARs. We need them by Monday."**
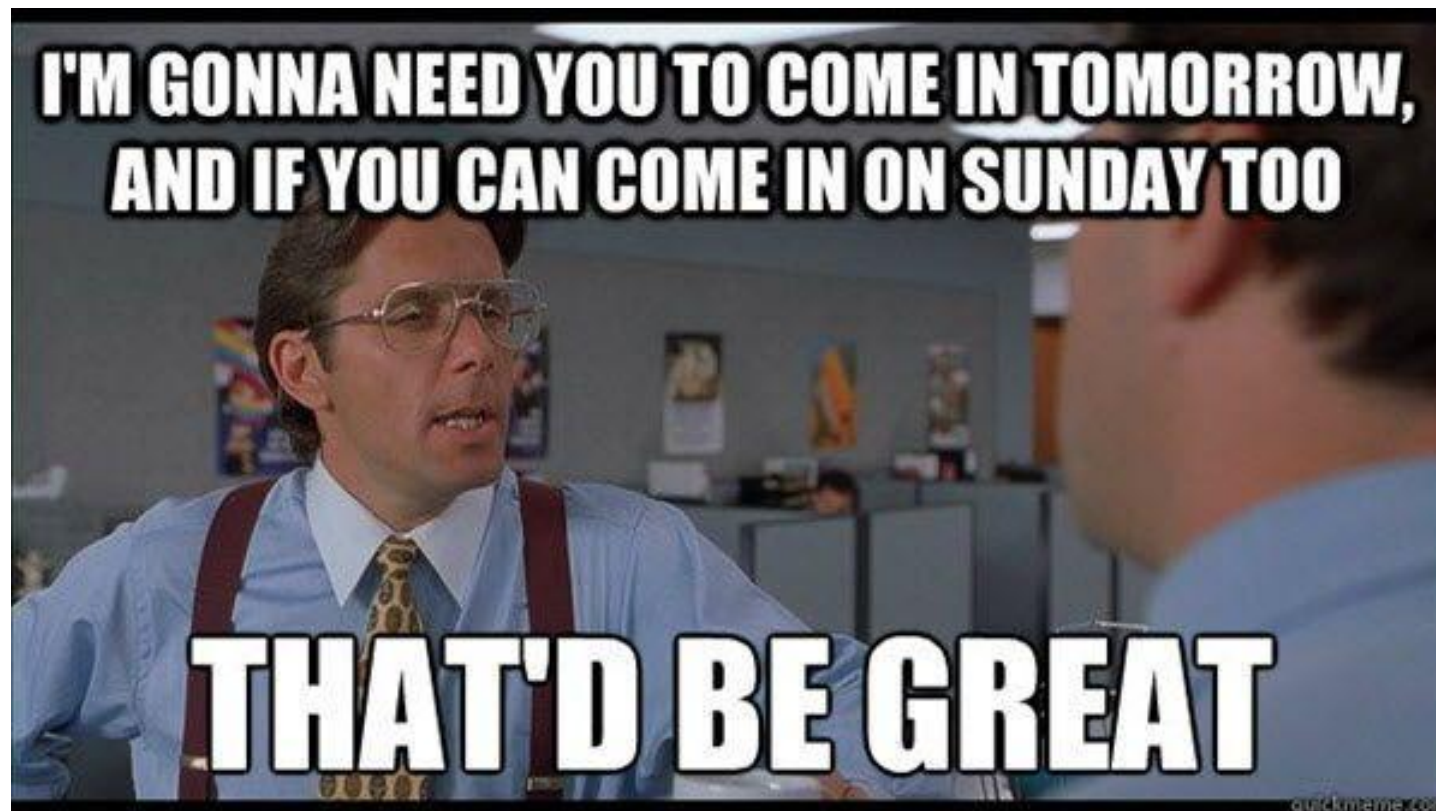
You get a request...

- **First, ask for a bonus for all hard work you will do to make the project successful**
- **Then logon to zPRO...**

You get a request...

You get a request...

You get a request...

- **YMMV but...**
- **Time to complete a brand new, fully personalized z/VM system**
  - Less than 40 seconds using zPRO
- **In about 20 minutes, your weekend just completely freed up**
  - And your boss looks good because the project just reduced their timeline
- **<u>Each system can now be IPL'd 1st level</u>**
  - Once system is 1st level, clean up virtual guest entry via zPRO

Summary

- **Yes, you can clone z/VM LPARs!**
- **Think through what it takes to personalize a system**
  - Your requirements may differ, but the concepts are likely the same as presented
- **zPRO makes it really, really easy**
  - Automating the processes saves time and ensures things get done consistently
  - Push-button Easy
- **Velocity Software helps make it all succeed for you**
  - And saves your weekends too!

Questions / Comments?

Providing software and services to assist customers in optimizing the z/VM platform!

Contact: **info@velocitysoftware.com**

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zPRO Demo Site: https://demo.velocitysoftware.com/zpro/
Metal to Cloud in Two Days: https://velocitysoftware.com/MetaltoCloud