

Cloning and Provisioning z/VM LPARs



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James Vincent
Velocity Software, Inc
<https://www.velocitysoftware.com>



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**

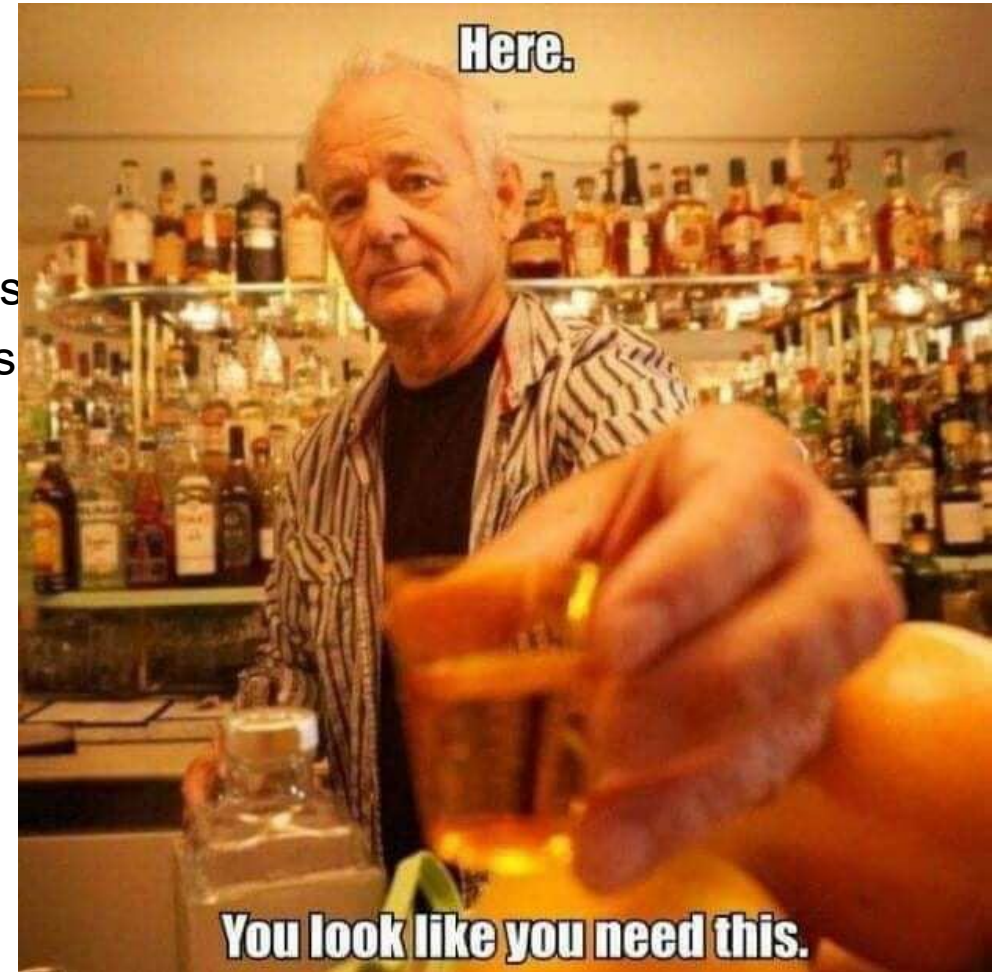


Considerations

- **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

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

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

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:**

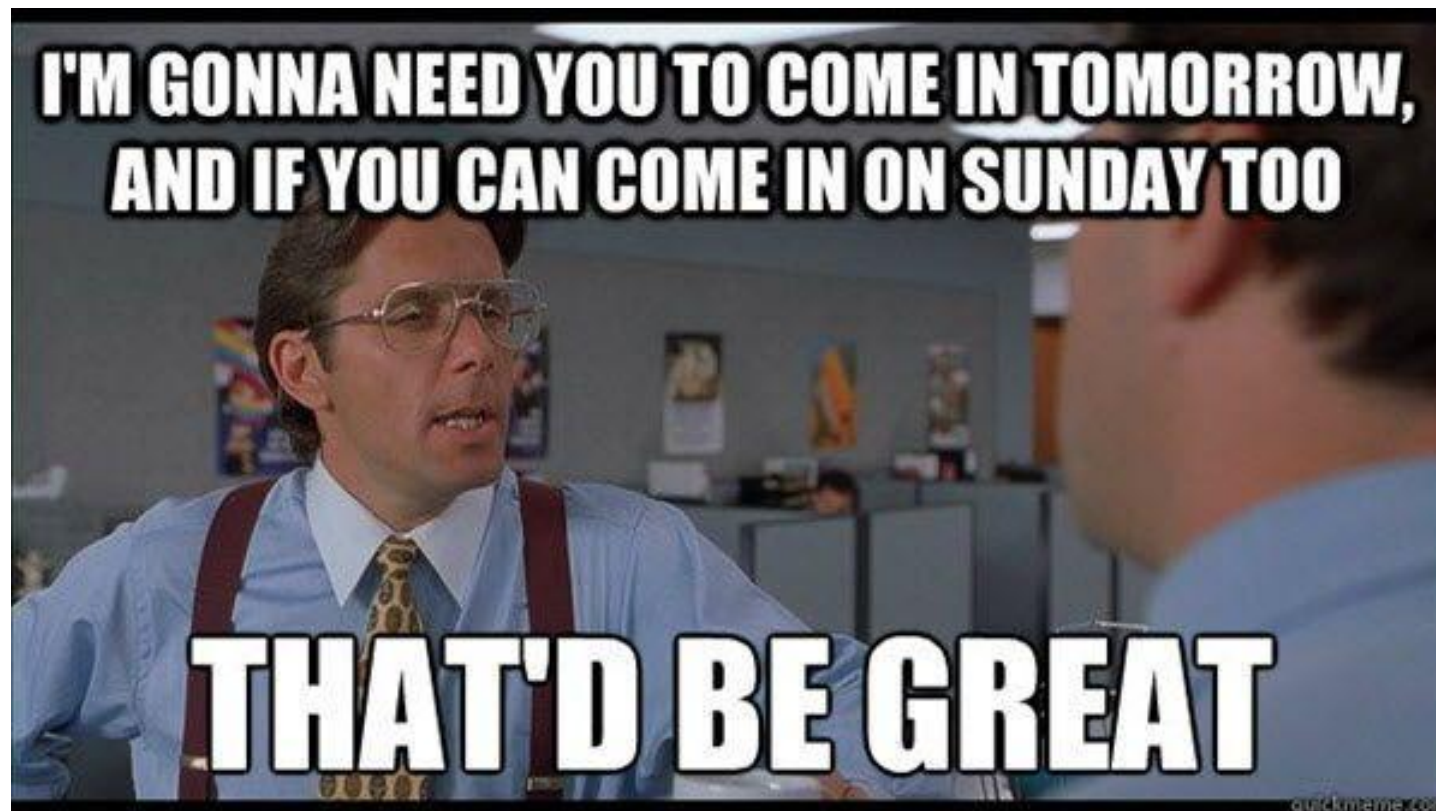
```
USER LPARBASE ILOVEVM * * G
INCLUDE USERPROF
COMMAND SPOOL CONS TO * CLASS A NAME &USERID CONSOLE
COMMAND DEFINE NIC 0600 TYPE QDIO
COMMAND COUPLE 0600 TO SYSTEM VSI10NET
COMMAND SET VSWITCH VSI10NET GRANT &USERID
IPL CMS PARM AUTOCR
STORAGE 256M
MAXSTORAGE 256M
OPTION TODENABLE
MACHINE ESA 64
CPU 00 BASE
CONSOLE 0020 3215 T
SPECIAL 0700 3270
SPECIAL 0701 3270
SPECIAL 0702 3270
```

...continued →

```
LINK JSV2LVA 191 191 RR
LINK ZADMIN 0391 0391 RR
* RES
MDISK: 320 SOURCE: JSVSVR18 320 GROUP:NEWLPAR
* SPOOL/PAGE
MDISK: 321 SOURCE: JSVSVR18 321 GROUP:NEWLPAR
* COM
MDISK: 323 SOURCE: JSVSVR18 323 GROUP:NEWLPAR
* REL
MDISK: 324 SOURCE: JSVSVR18 324 GROUP:NEWLPAR
```

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...

The screenshot displays the Velocity Software zPRO Enterprise Cloud Management interface. At the top, the header includes the Velocity Software logo, the text "zPRO Enterprise Cloud Management VSIVM4 (DemoSYS4)", and a timer indicating "You have 43.8 minutes remaining". On the right side of the header, there is a "JAMES Settings" button. Below the header, a navigation menu on the left lists various options: "SCreate a New VM LPAR", "Administration", "Create Servers", "Customers", "Gold Images", "Kubernetes", "Reports", "Scheduler", "Server Management", "View Resources", "z/VM Administration", "zPRO Users", and "zVRM Management". The main area of the interface is a light green background. A modal dialog box titled "\$Create a New VM LPAR - VSIVM4" is open in the center. This dialog contains four input fields: "New Guest Userid" with the value "JSVLPAR", "New DASD Prefix Qnn" with the value "Q01", "MAC Prefix 02nnnn" with the value "020021", and "IP Address" with the value "10.170.72.11". At the bottom of the dialog is a "Process Request" button. Above the dialog, there are control buttons: "Auto Arrange", "Refresh All", "Minimize All", and "Close All". On the right side of the interface, there is a "VSI Complex CMH" section with a "Pause" button and a "DemoSYS4" status indicator.

You get a request...

The screenshot displays the Velocity Software zPRO Enterprise Cloud Management interface for VSIVM4 (DemoSYS4). The top navigation bar includes the Velocity Software logo, the system name, and a timer showing 43.9 minutes remaining. A sidebar on the left lists navigation options such as Administration, Create Servers, Customers, Gold Images, Kubernetes, Reports, Scheduler, Server Management, View Resources, zVM Administration, zPRO Users, and zVRM Management. The main workspace contains several windows:

- \$Create a New VM LPAR - VSIVM4**: A form window with fields for New Guest Userid (JSVLPAR), New DASD Prefix Qnn (Q01), MAC Prefix 02nnnn (020021), and IP Address (10.170.72.11). A green notification bar at the bottom of this window states "VSIVM4 - Guest JSVLPAR creation started WorkUnit 331CTXXZ".
- Refreshing the Job Queue**: A window displaying job completion status: "JSVLPAR - CLONE Completed 18 Jun 2024 13:30:04" and "LPARPOST Completed Successfully". Below this, four disk creation tasks are listed as successful: "Disk 0320 - Create ended successfully", "Disk 0321 - Create ended successfully", "Disk 0323 - Create ended successfully", and "Disk 0324 - Create ended successfully".
- zPRO notifications**: A notification window showing two messages: "13:30:28 VSIVM4: Guest JSVLPAR creation started WorkUnit 331CTXXZ" and "13:30:25 \$Create a New VM LPAR request submitted to - VSIVM4".

Additional interface elements include a top toolbar with "Auto Arrange", "Refresh All", "Minimize All", and "Close All" buttons, and a right sidebar with "JAMES Settings" and "VSI Complex CMH" controls.

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
- **Each system can now be IPL'd 1st level**
 - 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
or: maggie@velocitysoftware.com

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

