

z/VSE to z/OS Migration Experience

From a z/VSE Bigot's Perspective

- Customer Background
- Methods
- Source Conversion
- JCL Conversion
- Utility Conversion
- Operations Conversion
- Data Conversion
- Training
- Issues that were discovered sooner or later
- Discussion
- Wrap Up

- Manufacturer located in Mississippi and North Carolina
- Initial Configuration:
 - Z9 in MS running 4 z/OS LPARs (mix of 1.4 and 1.7) – 160mips
 - Z10 is NC running 5 VSE/ESA LPARs (1.5) – 70mips
 - Multiple AS/400s in different locations
- First major changes
 - Both CPUs and some AS/400s were relocated to PZG facilities in FL
- Second major changes
 - 3 of the VSE LPARs were slowly migrated off-platform
 - 2 VSE LPAR was merged into 1 VSE LPAR
 - All but one of the AS/400s located in FL were eliminated
 - All z/OS LPARs upgraded to 1.12 to allow them to run on a Z10
- Resulting Configuration:
 - Z9 in FL running 4 z/OS LPARs (all 1.12) – 150mips
 - Z10 in FL running 1 VSE/ESA LPAR (1.5) – 70mips

- Customer goal to cut costs
 - An os for each machine from IBM (\$\$)
 - Adabas for each machine (\$\$\$)
 - Similar Third-party software on both machines (\$\$\$)
 - Maintenance, floor space, HVAC costs (\$\$)
 - Operations (staff) costs (\$)
- Customer was concerned with older VSE/ESA
 - Out of Service
 - CICS/VS – CICS/TS conversion
- The decision was to take the money budgeted for upgrading the VSE and use it instead to migrate the one remaining VSE LPAR to z/OS
 - Unpopular with VSE programmers but there were only 3 left.
 - Popular with the z/OS programmers, but they were bigots against VSE

- ProZglobal does not market this conversion service to clients that we do not already have some other contractual relationship involving either operations or hosting
- What we experienced is what you may experience
- This was our first conversion of this type, but our people have strong skills in all areas so it went live without any significant problems
- This customer was already “on our floor” in Winter Haven, FL
 - We understood the existing system because we were actually operating it
 - Our operations knew how jobs needed to run and could see issues sometimes before they happened
- Being able to run new and old side-by-side was critical to the short timeline

- PZG has some advantages that helped us
 - We have spare, unused CPUs
 - We have spare, unused DS8xxxx units
 - We have spare tape/VTL devices
 - We built a replacement “data center” within our data center (same room as the production equipment)
 - z10 – 160 mips
 - DS88xx
 - Plan was to:
 - ✓ migrate the VSE to the replacement z10 and DASD
 - ✓ then migrate all the z/OS LPARs to the replacement z/10 and DASD
 - We have our own production z/VM running on z114
 - Co-located within the same room
 - Has an XEDIT based change control system
 - Has NJE connectivity with all other CPUs in the room
 - Has ability to submit compiles to multiple VSE or z/OS via RSCS or punch

- RPG
 - 680 programs
 - Transported to z/VM based source control system
 - Created XEDIT macro and driver REXX to make modifications
 - Changes just to the “H” and “F” cards.
 - RPG on z/OS is owned by the VSE group in Böblingen
 - ✓ Same on z/OS and VSE
 - ✓ One Addendum document for differences – SC33-6129-00
 - *Contact me if you want a PDF of this document*
 - Transported updated versions directly to new z/OS

- Assembler
 - 42 batch programs, 1 batch I-O subroutine
 - Transported to z/VM based source control system
 - Found some programs with last change date in 70's still being used
 - Most were using ISAM I-O subroutines for which there was no source
 - Some few were using VSAM I-O subroutines with similar names as the ISAM
 - Created XEDIT macro and driver REXX to make modifications
 - First just changed the ISAM usage to VSAM
 - ✓ Manually changed.
 - ✓ Re-exported to VSE where programmers tested and moved to production
 - Next, used XEDIT macros to scan and convert all the os specific macros
 - We found that many z/OS macros generated larger code so we started seeing base register addressability problems
 - ✓ We changed some of these macros to generate a BAL and inserted the original macro in a new base-reg segment

- Assembler
 - During initial testing we found that JES2 NOPs the CNTRL macro
 - Used XEDIT macros to convert all PUTs to printers to call internal subroutine (inserted by Xedit) so that lines could be counted and page overflow processing generated
 - Some macros required new BAL sections because they used functions available in VSE that were not available in zOS (PUT to Console being one example)
 - The customer had converted one of their z/OS LPARs from VSE to z/OS a long time in the past, including converting the I-O routines from VSE to z/OS
 - I-O source was acquired from that z/OS LPAR and loaded into the new LPAR
 - ✓ We did update them as they did stupid stuff in the error recovery code

- Cobol
 - Transported to z/VM based source control system
 - Biggest issue was Cobol/vs to Cobol/LE.
 - Created XEDIT macro and driver REXX to make modifications
 - CICS code was not much of an issue as they did not use BLL cell style code
 - If using more complex CICS code, look at the IBM CCCA product
 - Last I knew, it was about \$25k

- Natural
 - Natural is the language of all current and recent development
 - Natural source was just transported directly from VSE to z/OS using SAG utilities
 - Natural is the same on z/OS as it is on VSE

- Almost all JCL was maintained in Condor libraries
- In the past, a JCL converter had been written by the customer to run under Condor, using the ECHO procedure language, which converted VSE JCL to z/OS JCL so it was updated and utilized by the programmers
- Issues:
 - *FORGET* everything you know about return code usage in JCL as z/OS does it all backwards
 - `//LKED EXEC PGM=HEWL,PARM='MAP,LET,LIST,XREF',COND=(8,LE,ASMCM)`
 - ✓ If 8 is less than or equal to the RC for the assembler step, then don't run this step
 - ✓ The COND= says when to *not* run the step
 - ✓ The EQ, LE, GE, LT, GT compares are backwards to what z/VSE does
 - JCL variables exist on z/OS, but they are somewhat different than on z/VSE
 - Procs and Steps are much more defined on zOS and must be understood
 - Output (SYSLST, etc) processing is much different on z/OS

- The customer has most of their programmer utilities written using the Condor procedure language ECHO which were update by the correct PZG staff member when requested and there is an operational need
- Many were no longer used and still contain VSE JCL within the procedure
- Backups and other “special” nightly jobs were copied from the z/OS LPARs or recreated as necessary by the PZG z/OS systems programmer
- Issues:
 - We found that the programmers relied so heavily on these ECHO procs that they did not know how to code basic IDCAMS or LIBR jobs

- The operations, including scheduling, is provided to the customer by PZG
- The z/OS LPARs use ASG-Zeke and Zack while VSE used FAQs
- The PZG z/OS lead Job Scheduler worked with the PZG z/VSE lead Job Scheduler and a completely new schedule was built on z/OS
- For the most part, the scheduling was a major rewrite

- Adabas data transportation was handled by SAG utilities using the common VTL
- Both VSAM and non-VSAM dataset were transported using IDCAMS REPRO
 - No IDCAMS BACKUP/RESTORE on z/OS
 - We had CA-Faver on both z/OS and z/VSE but found that it was “not that simple”
- Most daily ‘temporary’ backups on VSE were converted to z/OS disk based generation datasets
- Because the data still resided in the old DS8xxx and the old VSE z10 was available, none of the temporary backups were transported to the new z/OS since we could just fire-up the old box to get them if needed
- Many historical tapes created by VSE were left in the VTL as-is for the same reason
 - You may need to reload these to disk on VSE, transport the data to z/OS, then recreate a z/OS version of the tape
 - Historical tape conversion is a **MAJOR** issue since you don’t have another z/VSE LPAR running in your shop like we do

- Training was one of those conflict issues
- The programmers picked up the basics of z/OS JCL from the converter and now don't do anything different unless we tell them to
- Programmers used Condor on VSE instead of ICCF, FAQs, etc. so they continue to use Condor in z/OS for the same things
 - Including Console and JES2 queue access
- The programmers have learned TSO and SDSF “a little” but that is only when the function is not in Condor
- For the most part, the programmers continue to avoid TSO and SDSF as much as possible so they have received little formal training, and they are happy with that

- No matter what the z/OS people say, there are several things that z/VSE does that z/OS does not.
- VSAM Shareoption(4) *****DOES NOT WORK***** in z/OS but you can define the files with such and think you are safe, but you have just lit the fuse on a disaster
- JES2 is much different from Power and has many places where they do not fully emulate a device, such as in the CNTRL macro
- Generation Datasets are contrary to the VSE view and will cause problems during job restarts
 - To reference the same new generation dataset in the same job, use “(+1)”
 - To reference the same file after a mid-job restart, you have to use “(+0)”
 - The ‘current’ generation is not updated in the system until a job completes while Dynam and Epic update their database as soon as the file is closed
- Because we were merging two different CPUs into one, the run times for jobs were different and this affected the job scheduling setup
 - It only took a couple of days to adjust the times and pre-reqs within the scheduler

- Systems Programming challenges
 - Can you personally learn to manage the z/OS as well as your current z/VSE
- Operations challenges
- Programmers challenges
- Ongoing software costs
 - z/OS might not cost any more than z/VSE
 - Some third-party software is eliminated by items included in the z/OS base
 - IBM sells a lot of products that are only provided by third-parties on z/VSE
 - ✓ IBM tools are usually not as robust, but usually cheaper
 - It is easy to dramatically increase costs over z/VSE by choosing the wrong third-party software
- z/VM and z/OS guests
 - Why, or why not

- What are valid reasons to drive this conversion in your shop
 - Some things are just not available to z/VSE from any source

- Mainly because of the costs for Adabas on two different CPUs and paying for two OS's from IBM, the company recouped the cost of conversion within 6 months
 - You will not see this savings if you are not already multi-platform
- While several months discussion, including some research time, occurred prior to the conversion kick-off, this customer was converted in just **4 months**
 - We just had to duplicate an existing LPAR, not perform a full z/OS new install
 - A new install will add much time
 - Installing and learning the new third-party software will add time
 - We already had z/OS third-party software under contract in existing LPARs
 - You will need time to chose and acquire any third-party software
 - We suggest you use IBM products initially (sort, tape management, etc.) when such is available as you can always migrate to better tools once you understand the environment and what you really need to purchase
- All LPARs did run in a single z10 (160 mips) but night-time processing had to be staggered while daytime processing was not affected

- There are several ISVs that I would **not** trust with such a conversion
 - They will push you to buy the third-party software that makes them more money
 - They will walk out of your shop with a 'somewhat' functioning system then want more money to come back and make it work like it should

- The customer's programmers long for the old days of VSE and still talk about things they use to do easily but now are more trouble
- Within a year of the conversion, the customer actually sold all the divisions that originally ran z/OS and now only retains the one division that originally ran VSE
- A cost analysis of a conversion back to z/VSE was performed
 - There would be enough savings to justify a migration back to z/VSE, with one exception:
 - The cost of contract changes with SAG concerning Adabas and Natural make the migration back to z/VSE costly

Thank You

Tony Thigpen

tthigpen@prozglobal.com