

IBM Enterprise2013 z/VSE Hints & Tips



Enterprise2013

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Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.
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Agenda

- Internal Attention Routine commands *
- Problem Management Tools
- Turbo Dispatcher
- CICS/VSE – CICS TS
- z/VSE 5.1 Migration
- News, events, documentation, ...

* Internal Attention Routine commands/parameters and output may change dependent on system requirements.
The output can not be considered as an interface.



DEBUG – to trace system events

- Useful for problem determination
 - In some cases mandatory to identify a problem
- DEBUG facility writes system information into DEBUG areas
 - 3 DEBUG areas are allocated in SVA(31 bit) storage
 - DEBUG facility switches to next DEBUG area during abnormal task termination
- DEBUG hooks (mainly in Supervisor) generate the system information
- DEBUG
 - uses DEBUG areas in wrap around mode
 - overhead depends on workload
 - performs additional consistency checks
- Activate DEBUG, whenever you assume a system failure
- DEBUG command syntax described in Supervisor Diagnosis Reference Manual (DRM)
 - ibm.com/vse/documentation



DEBUG – to trace system events

- **DEBUG command**
 - DEBUG ON,[nnnk] - activate tracing, “nnk” DEBUG area size
 - DUBUG OFF - stop DEBUG trace temporarily
 - DEBUG END - stop tracing and free allocated areas
 - DEBUG - query tracing status
 - DEBUG TRACE=REGS,TASK - activate register and task entry trace
 - DEBUG TRACE=NOINT,NOSIO - deactivate interrupt and start I/O trace
 - DEBUG TRACE=ALL,NOSVC - activate all traces, except SVC trace
 - DEBUG TRACE=NONE,DISP - deactivate all traces, but activate dispatcher trace
 - DEBUG pid - activate tracing for specific partitions (pid = SYSLOG is)
 - DEBUG SHOW[,e] - display DEBUG entries, e = event entry
Attention ! may flood the console



DEBUG – to trace system events ...

- DEBUG trace entries
 - Layout may change between releases dependent on system requirements
 - Trace entry events
 - Program check (EEEE00IC – IC = interruption code)
 - Display registers (EEEE0200)
 - Dispatcher exit (EEE0300)
 - I/O interrupt (EEEE0400)
 - I/O (EEEE0500)
 - External interrupt (EEEE0600)
 - Dispatcher entry (EEEE0700)
 - Supervisor call (EEEE0800)
 - Task cancel (EEEE0900)
 - Swap debug area (EEEE0A00)
 - Display data (EEEE0B00)
 - Monitor call (EEEE0Fnn – nn = monitor call class)



DEBUG – to trace system events ...

```
V7FE42A60 → EEEE0700 04002000 80086F90 01F61400 *.....?..6..*
V7FE42A70 C878F30D C0085493 00000000 00000000 *H.3....l.....*
V7FE42A80 0000C6F2 01E5CF10 002A7000 0005FB8C *..F2.V.....*
V7FE42A90 01F600B0 00000000 02000000 00000002 *.6.....*
V7FE42AA0 → EEEE0300 07BD1000 8352B740 01F60800 *.....c..6..*
V7FE42AB0 C878F30D C0085793 00000000 00259500 *H.3....l.....n.*
V7FE42AC0 40000000 0339B018 0339B000 8352B6DA *.....c...*
V7FE42AD0 033A2000 00000038 00000001 0339C000 *.....*
V7FE42AE0 002A2188 033A2310 0339D048 00000001 *...h.....*
V7FE42AF0 033A2310 002A2140 00046C0A 8352B6C2 *.....%.c..B*
V7FE42B00 → EEEE0800 07BD2000 80046C0C 01F60880 *.....%..6..*
V7FE42B10 C878F30D C0086393 00000000 00020013 *H.3....l.....*
V7FE42B20 8352B6C2 00000001 002A2188 033A2310 *c..B.....h...*
V7FE42B30 → EEEE0C00 04001000 8005A7E4 01F60480 *.....xU.6..*
V7FE42B40 C878F30D C0098E13 00000000 00000000 *H.3.....*
V7FE42B50 C6E5C9E2 00000004 00000120 7FE28C60 *FVIS....."S.-*
V7FE42B60 8004B42A 00000000 00000000 00000000 *.....*
V7FE42B70 → EEEE0700 04002000 80086F90 01F61400 *.....?..6..*
V7FE42B80 C878F30D C009C993 00000000 00000000 *H.3...Il.....*
V7FE42B90 0000C6F2 01E5CF10 002A7000 0005FB8C *..F2.V.....*
V7FE42BA0 01F600B0 00000000 02000000 00000002 *.6.....*
```



DEBUG – to trace system events ...

- Switch DEBUG OFF before DEBUG SHOW
- DUMP DEBUG,cuu to print the current DEBUG area

```
debug
AR 0015 DEBUG OFF
AR 0015 TRACE=PCK,TEST,REGS,TASK,INT,SIO,EXT,DISP,SVC,TERM,SWCH,DATA,USER
AR 0015 TRACE=TDTR
```

```
debug show
AR 0015 DISP                                TIME=13:41:12.785304 GMT

      PSW=04000000 80086F90  TID=0020  RID=14  TDST=80  CPU=0000
      LTID=0000    PID=AR----  A(TIB)=00062580
      RTID=0020   PIK=0000   HOLD=0000  A(SCB)=00000000
      PCEF=0000   DLAY=00    TIBF=40010000 CNCL=000000

AR 0015 REGS                                TIME=13:41:12.785305 GMT

      PSW=04002000 000167BA  TID=0020  RID=14  TDST=80  CPU=0000
      REG 0 = C5E7E3F0 400169DC 00069888 0008D420
      REG 4 = 0008BF80 000601C0 00015970 0004CC40
      REG 8 = 00062580 0004CCC0 00069618 00015150
      REG 12 = 00002000 80083918 8001598E 00016798

AR 0015 DISP                                TIME=13:41:12.785305 GMT

      PSW=04000000 80086F90  TID=0020  RID=14  TDST=80  CPU=0000
```



DEBUG STOP – compares and stops

- Compares given data at the DEBUG event and stops, if data matches
 - System enters hardwait state (PSW = 0000EEEE)
 - Use restart feature or SYSTEM RESTART (on z/VM)
 - Operands are equal (EQ), not equal (NE), low (LO), high (HI)
- Be careful when using DEBUG STOP, you may see time-outs after restart

```
debug stop,4b504,4,EQ,FE12ABCD  
AR 0015 1I40I  READY
```

```
debug stop,F4,5ac00c.1,ne,00,or,180.4,hi,0004abc0  
AR 0015 1I40I  READY
```

```
debug stop,F4,5ac00c.1,ne,00,and,180.4,hi,0004abc0  
AR 0015 1I40I  READY
```

```
debug stop,47b.1,eq,21  
AR 0015 1I40I  READY
```

```
d pswg  
PSW = 00020000 80000000 00000000 0000EEEE
```



GETVIS - retrieve partition and system GETVIS information

- Use the GETVIS command e.g. to identify
 - areas of GETVIS shortage or
 - the subpool, where the GETVIS space wasn't freed
- Command described in "System Control Statements"
- Example
 - GETVIS SVA shows shortage on SVA(24 bit) storage
 - If VTAM buffers are allocated in SVA(24 bit)
 - Move them into SVA(31 bit) - set the VTAM startup parameter
 - If the SVA (31 bit) is short on storage too, Increase the SVA(31 bit)

```

getvis sva,all
AR 0015 GETVIS USAGE      SVA-24      SVA-ANY      SVA-24      SVA-ANY
AR 0015 AREA SIZE:       1,900K      34,256K
AR 0015 USED AREA:       796K        10,684K MAX. EVER USED:      828K        15,836K
AR 0015 FREE AREA:       1,104K      23,572K LARGEST FREE:       1,100K      17,348K
AR 0015 SUMMARY REPORT
AR 0015 SUBPOOL          REQUEST  <--SVA-24-AREA--  --SVA-ANY-AREA-->
AR 0015 Default                288K          176K
AR 0015 IJBMCB                  60K           0K
AR 0015 ISTSVF                   52K          312K
AR 0015 IPWPWR                   36K           0K
AR 0015 IJBFF300A0      SPACE          24K           0K
AR 0015 IPTIB                    20K           52K
AR 0015 INLSLD                   20K           0K
AR 0015 IINIT                    16K           96K
AR 0015 IJBHCF                   12K           0K
AR 0015 IJBFF200B0      SPACE           8K           0K
AR 0015 ISTSVP                    8K          276K
  
```



SIR – System Information Report

- Provides status information and monitoring capabilities
- Can help to identify
 - Latest service level
 - Processor configuration
 - system bottlenecks (resource shortage)
 - ...

```

sir ?
AR 0015      SIR  COMMAND HELP
AR 0015      SIR  (<RESET|SYS>)          RESET/DISPLAY SYSTEM INFORMATION
AR 0015      SIR  SMF( (,VSE)=<ON|OFF|cuu>) SUBSYSTEM MEASUREMENT DATA
AR 0015      SIR  MON(=<<id|ON(,NOSYM)>|OFF>(option)) MONITORING DATA
AR 0015      SIR  MIH( (,CUU)=<NNNNNN|ON|OFF>) DSPLY/ALTER MIH
AR 0015      SIR  VTAPEBUF(=<nnnK|nnM>)  DISPLAY/ALTER VTAPE BUF-SIZE
AR 0015      SIR  LIBR                    DISPLAY LIBRARIAN INFORMATION
AR 0015      SIR  CHPID(=chpid)           DISPLAY CHPID INFORMATION
AR 0015      SIR  VENDOR                  DISPLAY VENDOR PRODUCT INF
AR 0015      SIR  CRWMSG(=<ON|OFF>)       DSPLY/ALTER CRW MSG-REPORTING
AR 0015      SIR  VMCF(=<ON|OFF>)        DSPLY/ALTER VMCF INTERFACE
AR 0015      SIR  PMRMON(=<ON|OFF>)      PAGE MANAGER MONITORING DATA
AR 0015 1140I  READY

```



SIR – System Information Report

```

SYSTEM:      z/VSE                z/VSE 5.1                TURBO (01)                USER:  SYS
VM USER ID:LNXSALM1                TIME:  01:21:15
sir
AR 0015 CPUID   VM = 003B0BB220978000          VSE = FF3B0BB220978000
AR 0015 PROCESSOR = IBM 2097-726 51 (70BB251)  LPAR = SPB                No. = 0059
AR 0015 CPUs = 0003 (Ded.=0000 Shr.=0003)    Cap. = 11%
AR 0015 VM-SYSTEM = z/VM 6.1.0 (1301)        USERID = LNXSALM1 VMCF = ON
AR 0015 CPUs = 0006                            Cap. = 100%
AR 0015 PROC-MODE = z/Arch(64-BIT) IPL(007)    01:19:02                10/18/2013
AR 0015 SYSTEM = z/VSE 5.1.1                05/02/2012
AR 0015 VSE/AF 9.1.0                        DY47323                04/09/2012
AR 0015 VSE/POWER 9.1.0                    DY47302                04/12/2012
AR 0015 IPL-PROC = $IPLESA                JCL-PROC = $$JCL
AR 0015 SUPVR = $$A$SUPI                TURBO-DISPATCHER (B1) ACTIVE
AR 0015 SEC. MGR. = BASIC                HARDWARE COMPRESSION ENABLED
AR 0015 VIRTCPU = 0000:00:02.044          SECURITY = ONLINE
AR 0015 CPU-ADDR. = 0000(IPL) ACTIVE          CP = 0000:00:00.578
AR 0015 ACTIVE = 0000:00:01.144          WAIT = 0000:01:55.983
AR 0015 PARALLEL = 0000:00:00.289        SPIN = 0000:00:00.000
AR 0015 CPU-ADDR. = 0001                CPU INACTIVE NOT PREFIXED
AR 0015 CPU-ADDR. = 0002                CPU INACTIVE NOT PREFIXED
AR 0015 CPU-ADDR. = 0003                CPU INACTIVE NOT PREFIXED
AR 0015 CPU-ADDR. = 0004                CPU INACTIVE NOT PREFIXED
AR 0015 CPU-ADDR. = 0005                CPU INACTIVE NOT PREFIXED
AR 0015 CPU timings MEASUREMENT INTERVAL 0000:02:13.262
AR 0015 TASKS ATT.= 00015                HIGH-MARK = 00015        MAX = 00330
AR 0015 DYN.PARTS = 00000                HIGH-MARK = 00001        MAX = 00138
AR 0015 COPY-BLKS = 00015                HIGH-MARK = 00041        MAX = 01502
AR 0015 CHANQ USED= 00004                HIGH-MARK = 00011        MAX = 00080
AR 0015 LBL.-SEGM.= 00007                HIGH-MARK = 00007        MAX = 00717
AR 0015 LOCKS EXT.= 00000000613          LOCKS INT.= 00000005997
AR 0015 FAIL = 00000000014                FAIL = 00000000022
AR 0015 LOCK I/O = 00000000757          LOCK WRITE= 00000000012
AR 0015 1140I  READY

==>
1=HLP 2=CPY 3=END 4=RTN 5=DEL 6=DELS 7=RED 8=CONT 9=EXPL 10=HLD 11=PCUU 12=RTRV
ACT_MSG:  HOLDRUN                PAUSE:  01  SCROLL:  1                MODE:  CONSOLE

```



SIR Refresh Level

- z/VSE refresh level or SPLEVEL only changed after Fast Service Upgrade
 - SPLEVEL.PROC replaced

- PSB buckets (Hiper PTFs), RSL or single PTF do not change the SIR refresh level

- VSE/AF and VS/POWER component levels modified by FSU, PSB bucket, RSL or PTF, if component is affected
 - VSE/AF shows the Supervisor (\$\$A\$\$SUPI) APAR level
 - VSE/POWER shows the APAR level of phase IPW\$\$DT

```

sir
AR 0015 CPUID YH = 003B0B8220978000          YSE = FF00001820978000
AR 0015 PROCESSOR = IBM 2097-729 51 (70B8251) LPAR = SPB          No. = 0059
AR 0015 CPUs = 0003 (Ded.=0000 Shr.=0003) Cap. = 10%
AR 0015 YH-SYSTEM = z/YH 6.1.0 (1301) USERID = ZYSE510 YHCF = ON
AR 0015 CPUs = 0001 Cap. = 33%
AR 0015 PROC-MODE = z/Arch(64-BIT) IPL(230) 23:47:55 EST 08/27/2013
AR 0015 SYSTEM = z/YSE 5.1.2 04/19/2013 <--- Refresh Level
AR 0015 VSE/AF 9.1.0 DY47436 02/12/2013 <--- Component Level AF
AR 0015 VSE/POWER 9.1.0 DY47382 04/12/2012 <--- Component Level POWER
AR 0015 IPL-PROC = $IPLESA JCL-PROC = $$JCL
AR 0015 SUPYR = $$A$$SUPI TURBO-DISPATCHER (81) ACTIVE
AR 0015 SEC. MGR. = BASIC HARDWARE COMPRESSION ENABLED
SECURITY = ONLINE
    
```



SIR – System Information Report

- SIR SMF

```

sir smf
AR 0015 DEVICE I/O-CNT QUEUED CONNECT DISCONN TOTAL
AR 0015 msec/SSCH msec/SSCH msec/SSCH msec/SSCH
AR 0015
AR 0015 46D 13605 0.169 0.317 0.002 0.489
AR 0015 46E 18855 0.146 0.177 0.005 0.329
AR 0015 970 40342 0.148 0.163 0.000 0.311
AR 0015 971 26089 0.150 0.166 0.000 0.317
AR 0015 972 12318 0.150 0.173 0.000 0.325
AR 0015 1I40I READY

```

- SIR PMRMON

```

sir pmrmon
AR 0015 PAGE MANAGER MONITORING REPORT
AR 0015 (BASED ON A 0000:00:21.879 INTERVAL)
AR 0015 IPFQ 31-BIT = 0 IPFQ 64-BIT = 0
AR 0015 PSQ 31-BIT = 484924 PSQ 64-BIT = 6746514
AR 0015 PF EXCH TOTAL = 16445 PF EXCH 31->64 = 16445
AR 0015 PF EXCH 64->31 = 0 PGFLT TOTAL = 179742
AR 0015 PGFLT PMGR = 176790 PGFLT USER = 2950
AR 0015 PGFLT IMM PO 31 = 2 PGFLT IMM PO 64 = 16446
AR 0015 SELCT ON PSQ 31 = 16447 SELCT ON PSQ 64 = 88394
AR 0015 SELC R=1 MAX 31 = 3 SELC R=1 MAX 64 = 6
AR 0015 RECLAIMS = 4193 NPSQ LOW = 0
AR 0015 PGOUT I/O TOTAL = 48444 PGIN I/O TOTAL = 0
AR 0015 PGOUT I/O UNC. = 13071 PGOUT I/O PRE. = 35373
AR 0015 LRA PGM CHECK = 0 TFIX 64-BIT FR = 0
AR 0015 HWM MB FRM-64 = 0 HWM MB FRM-31 = 0
AR 0015 MB FRM TFIX RPL = 0 MB FRM PGO RPL = 4
AR 0015 1I40I READY

```



STACK – Stack Attention Routine commands

- The STACK command can be used to
 - Abbreviate z/VSE commands
 - Suppress or change any z/VSE command
 - Prepare a sequence of commands and/or replies

```

stack MV|MAP &0|GETVIS &0|
AR 0015 1I40I  READY
stack show
AR 0015 VIS|GETVIS &0,ALL
AR 0015 MV|MAP &0|GETVIS &0|
AR 0015 1I40I  READY
mv bg
AR 0015 1I40I  READY
AR 0015 MAP BG
AR 0015  PARTITION:  BG          SPACE-GETVIS.....:  (N/A)
AR 0015  SPACE.....:  0          ALLOC (VIRTUAL)...:  6144K  ADDR:  400000
AR 0015  STATUS...:  VIRTUAL      SIZE.....:  1280K
AR 0015  POWER-JOB:  PAUSEBG
AR 0015  JOBNUMBER:  328          GETVIS.....:  4864K  ADDR:  540000
AR 0015  JOBNAME...:  PAUSEBG
AR 0015  PHASE.....:
AR 0015  TASKS....:  ANY          PFIX (BELOW) -LIMIT :  OK
AR 0015                                     -ACTUAL:  OK
AR 0015                                     PFIX (ABOVE) -LIMIT :  OK
AR 0015                                     -ACTUAL:  OK
AR 0015 1I40I  READY
AR 0015 GETVIS BG
AR 0015 GETVIS AREA FOR BG IS NOT INITIALIZED
AR 0015 1I40I  READY

```



TAPE – activate processing options for tape devices

- Activates special processing options for tape devices
 - Change tape unload processing
 - Change the information that is displayed on the “Load Display LED”
 - Change the Write Tape Mark (WTM) behavior

```
tape  
AR 0015 TAPE    RUN=OFF, UNL=UNL, DSPLY=VOL, WTM=SYNC
```



TIME – display or alter Time-Of-Day (TOD)

- TIME is functional equivalent to the IPL SET DATE command
 - Described in System Control Statements
- Be careful when using the TIME command to alter the TOD
 - The change may have impact on subsystems, vendor products and job accounting
 - Use it in test systems only, use the IPL SET DATE command for production
- Day-Light Saving time changes
 - Backward change most critical
 - Recommendation: use the IPL SET DATE command to adjust the local time

```
time                               09/23-15:42:46
AR 0015 TIME IS: 15:42:46 (GMT)      DATE 09/23/2011  FRIDAY  09/23-15:42:46
time zone=east/02/00                09/23-15:43:27
AR 0015 TIME and/or ZONE has been UPDATED 09/23-17:43:27
AR 0015 TIME IS: 17:43:27 (GMT + 2 H) DATE 09/23/2011  FRIDAY  09/23-17:43:27
```



LOCK display and trace

- The Attention Routine LOCK command displays and traces LOCK/UNLOCK events
- LOCK SHOW[=pid][resource name] to display lock resources
 - pid = SYSLOG id
- LOCK TRACE to activate the trace
- LOCK TRACE[=pid][,resource name] to trace all, a partition and/or a specific resource

```
lock show=f2
AR 0025 LOCKTAB ENTRY
V0006F7D0      . . . . . 7FFA0A80 00000000 C4E3E2E5 *      "3 0      DTSV*
V0006F7E0      C5C3E3C2 40404040 11800001 0006F7F4 *ECTB      0      74*
V0006F7F0      0006F7B4
                *      7@      *
AR 0025 OWNER ELEMENT
V7FFA0A80      00000000 01F40000 00011000 00000000 *      4      *
AR 0025 LOCKTAB ENTRY
V7FFA0FE0      0006F844 00000000 E5C4D6E2 D9C5E200 *      8à      VDOSRES *
V7FFA0FF0      00000000 04C00000 7FFA0FC0 0006F814 *      {      "3 { 8 *
AR 0025 OWNER ELEMENT
V0006F840      . . . . . 7FFA0EF0 00200001 00000000 *      "3 0      *
V0006F850      00000000
                *      *      *
```



Problem management tools

- ABEND / system dump
 - Amount of dump data dependent on JCL OPTIONS
- DUMP command
 - Attention Routine command
- Stand-alone dump (program)
 - Create a stand-alone dump tape for the release you have in production
 - Have standalone dump tapes ready, just in case you need it
 - Always “STORE STATUS” before you take a standalone dump
- SDAID
 - To trace application programs and system events
- Interactive trace
 - // EXEC <program>,TRACE to trace applications
- DEBUG
- z/VM CP TRACE command



IUI Problem handling dialogs

```
IESADMSL.IESEPROB          PROBLEM HANDLING          APPLID: DBDCCICS
Enter the number of your selection and press the ENTER key:

  1  Online Problem Determination
  2  Inspect Message Log
  3  Storage Dump Management
  4  Inspect Dump Management Output
  5  Retrace History File
  6  Dump Program Utilities

PF1=HELP          3=END          4=RETURN          6=ESCAPE(U)
                  9=Escape(m)

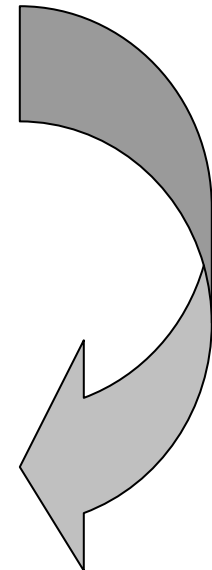
==> Path: 4
```

```
IESADMSL.IESEDUMP          DUMP PROGRAM UTILITIES    APPLID: DBDCCICS
Enter the number of your selection and press the ENTER key:

  1  Create Standalone Dump Program on Tape
  2  Create Standalone Dump Program on Disk
  3  Remove Standalone Dump Program from Disk
  4  Scan Dump Files on Tape
  5  Scan Dump Files on Disk
  6  Print IPL Diagnostics
  7  Format ICCF Dump Data
  8  Print SDAID Tape
  9  Print Standalone Dump

PF1=HELP          3=END          4=RETURN          6=ESCAPE(U)
                  9=Escape(m)

==> Path: 46
```



z/VSE Downloads



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Connectors

Tools

Samples

- ↓ [BSM Cross Reference Tool](#)
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Recent additions and updates:

- ↓ [z/VSE Installed Software Report Tool](#) (updated 09/2013)
- ↓ [z/VSE CPU Monitor Tool](#) (updated 09/2013)
- ↓ [LE/VSE CEETRACE Feature V1.2.0B](#) (updated 08/2013 for z/VSE V5.1)
- ↓ [LE/VSE CEETRACE Feature V1.1.2b](#) (updated 05/2013 for z/VSE V4.3)
- ↓ [LE/VSE Control Center V3.0](#) (updated 12/2011 for z/VSE V5.1)
- ↓ [VSE ZIP Programming Interface \(API\)](#) (new 11/2011)
- ↓ [VSE ANT Tasks](#) (updated 11/2010)
- ↓ [LDAP Query Callable Module](#) (new 10/2010)

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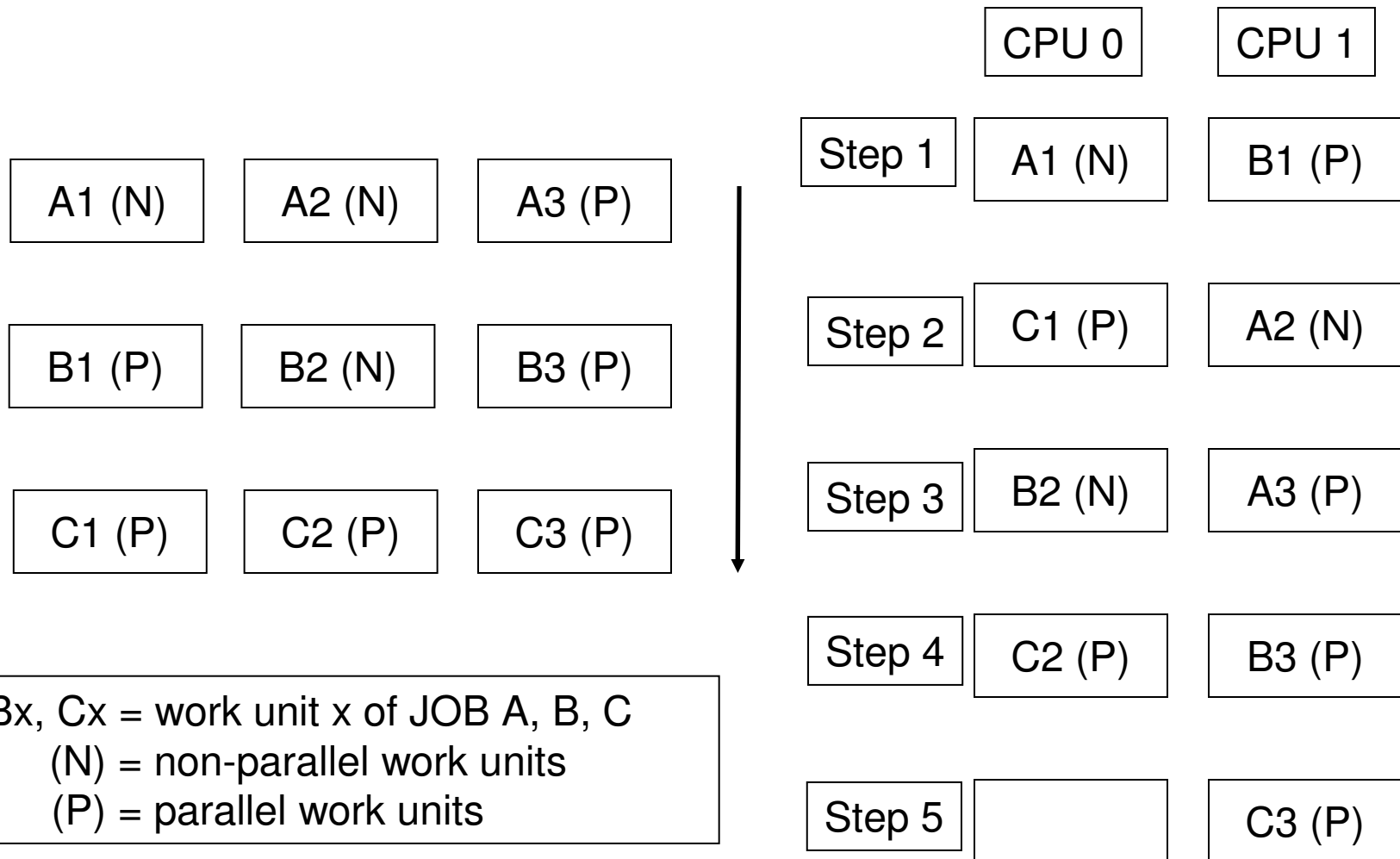
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Turbo Dispatcher ...



Multiprocessing considerations

- VSE workload can exploit up to 3 CPUs
- One partition can only exploit the power of one CPU
- A lower non-parallel share value will allow a better multiprocessor exploitation.
- Try to minimize the number of CPUs to run your workload
 - A faster single CPU is better instead of adding CPUs
 - To reduce the multiprocessor overhead



How to monitor the Turbo Dispatcher

- System Activity Dialog
 - IUI dialog (host based): shows numbers of active CPUs, CPU utilization, non-parallel share, SHARE values, etc.

- z/VSE Console display
 - shows that TD is active and number of active CPUs

- z/VSE command: QUERY TD

- z/VSE CPU Monitor Tool

- Performance monitor from vendor, e.g.
 - Explore from CA
 - TMON from ASG



How to monitor the Turbo Dispatcher

- System Activity Dialog (361)

```

IESADMDA          DISPLAY SYSTEM ACTIVITY          15 Seconds  10:24:06
*--- SYSTEM (CPUs: 1 / 0) ---* *----- CICS : DBDCCICS -----*
| CPU      : 12%   I/O/Sec: 1   | | No. Tasks:      Per Second :   |
| Pages In : 0     Per Sec: *   | | Dispatchable:   Suspended  :   |
| Pages Out: 0     Per Sec: *   | | Curr. Active:   MXT reached:  |
*-----* *-----*
Priority: Z, X, Y, S, R, P, C, BG=FA=F9=F8=F6=F5=F4, F2, F7, FB, F3, F1

  ID S JOB NAME      PHASE NAME      ELAPSED      CPU TIME      OVERHEAD      %CPU      I/O
  F1 1 POWSTART      IPWPOWER      00:05:02     .03           .03           3,172
  F3 3 VTAMSTRT      ISTINCVT      00:05:01     .03           .02           2,715
  FB 8 SECSESV      BSTPSTS      00:05:02     .01           .00           369
  F7 7 <=WAITING FOR WORK=> .00           .00           2
  
```

- z/VSE Console display

```

SYSTEM:  z/VSE          z/VSE 4.3          TURBO (03)          USER:  SYS
VM USER ID: SALMTEST          TIME:  12:46:08
BG-0000 // PAUSE
F2 0501 4228I FILE IESPRB      OPEN  ERROR X'76' (118) CAT=VSESPUC
      (OPND1-5 ) WARNING:FILE WAS NOT CLOSED ON A PREVIOUS OUTPUT-OPEN
sysdef td,stopq=1
F2 0501 4228I FILE IESPRB      OPEN  ERROR X'72' (114) CAT=VSESPUC
      (OPNPR-40) WARNING:CATALOG CHECKER DETECTED IRREGULARITIES
  
```



How to monitor the Turbo Dispatcher

- SIR Attention Routine Command (no additional CPU started)

```

sir
AR 0015 CPUID   VM = 003B0B8220978000          VSE = FF3B0B8220978000
AR 0015 PROCESSOR = IBM 2097-722 51 (70B8251) LPAR = SPB          No. = 0059
AR 0015          CPUs = 0003 (Ded.=0000 Shr.=0003) Cap. = 13%
AR 0015 VM-SYSTEM = z/VM      6.1.0 (1101)   USERID = SALMTEST VMCF = ON
AR 0015          CPUs = 0006                      Cap. = 100%
AR 0015 PROC-MODE = z/Arch(64-BIT) IPL(007)   09:38:50      09/23/2011
AR 0015 SYSTEM   = z/VSE      4.3.0 GA      09/29/2010
AR 0015          VSE/AF      8.3.0          GA-LEVEL      08/20/2010
AR 0015          VSE/POWER   8.3.0          DY-BASE         08/20/2010
AR 0015 IPL-PROC = $IPLESA          JCL-PROC = $$JCL
AR 0015 SUPVR   = $$A$SUPI          TURBO-DISPATCHER (71) ACTIVE
AR 0015          HARDWARE COMPRESSION ENABLED
AR 0015 SEC. MGR. = BASIC          SECURITY = ONLINE
AR 0015 VIRTCPU  = 0000:00:02.216    CP = 0000:00:00.528
AR 0015 CPU-ADDR. = 0000 (IPL)      ACTIVE
AR 0015 ACTIVE   = 0000:00:01.624    WAIT = 0000:14:54.896
AR 0015 PARALLEL= 0000:00:00.358    SPIN = 0000:00:00.000
AR 0015 CPU-ADDR. = 0001          CPU INACTIVE NOT PREFIXED
AR 0015 CPU-ADDR. = 0002          CPU INACTIVE NOT PREFIXED
AR 0015 CPU-ADDR. = 0003          CPU INACTIVE NOT PREFIXED
AR 0015 CPU-ADDR. = 0004          CPU INACTIVE NOT PREFIXED
AR 0015 CPU-ADDR. = 0005          CPU INACTIVE NOT PREFIXED

```



How to monitor the Turbo Dispatcher

- SIR Attention Routine Command (additional CPUs started)

```

sir
AR 0015 CPUID    VM = 003B0B8220978000          VSE = FF3B0B8220978000
AR 0015 PROCESSOR = IBM 2097-722 51 (70B8251)  LPAR = SPB          No. = 0059
AR 0015          CPUs = 0003 (Ded.=0000 Shr.=0003) Cap. = 13%
AR 0015 VM-SYSTEM = z/VM      6.1.0    (1101)    USERID = SALMTEST VMCF = ON
AR 0015          CPUs = 0003          Cap. = 100%
AR 0015 PROC-MODE = z/Arch (64-BIT)  IPL (007)    12:45:15    09/23/2011
AR 0015 SYSTEM   = z/VSE          4.3.0 GA      09/29/2010
AR 0015          VSE/AF          8.3.0      GA-LEVEL    08/20/2010
AR 0015          VSE/POWER       8.3.0      DY-BASE     08/20/2010
AR 0015 IPL-PROC = $IPLESA          JCL-PROC = $$JCL
AR 0015 SUPVR    = $$$SUP I          TURBO-DISPATCHER (71) ACTIVE
AR 0015          HARDWARE COMPRESSION ENABLED
AR 0015 SEC. MGR. = BASIC            SECURITY = ONLINE
AR 0015 VIRTCPU  = 0000:00:04.619    CP = 0000:00:01.002
AR 0015 CPU-ADDR. = 0000 (IPL)      ACTIVE
AR 0015 ACTIVE   = 0000:00:00.784    WAIT = 0000:04:34.718
AR 0015 PARALLEL= 0000:00:00.738    SPIN = 0000:00:00.000
AR 0015 CPU-ADDR. = 0001          ACTIVE
AR 0015 ACTIVE   = 0000:00:00.000    WAIT = 0000:04:00.692
AR 0015 PARALLEL= 0000:00:00.000    SPIN = 0000:00:00.000
AR 0015 CPU-ADDR. = 0002          ACTIVE
AR 0015 ACTIVE   = 0000:00:00.619    WAIT = 0000:04:34.892
AR 0015 PARALLEL= 0000:00:00.601    SPIN = 0000:00:00.000
AR 0015 CPU timings MEASUREMENT INTERVAL 0000:04:36.610

```



How to monitor the Turbo Dispatcher

- SIR MON Attention Routine Command
 - Can help to analyze performance problems
 - Provides counters for
 - SVCs
 - Fast (107) SVCs and function codes
 - TD Service SVCs and function codes
 - MVS SVCs
 - Program Call codes
 - Bound conditions
 - TD performance (15 counters)



How to monitor the Turbo Dispatcher

- SIR MON Attention Routine Command ...

```

sir mon
AR 0015
                MONITORING REPORT
AR 0015          (BASED ON A 0000:00:16.680 INTERVAL)
AR 0015          SVC SUMMARY REPORT
AR 0015 EXCP      =          53  WAIT      =          38  SETIME      =          17
AR 0015 SVC-0D    =          57  SYSIO     =        37949  EXIT IT     =          34
AR 0015 SETIME    =          15  WAITM     =          18  COMREG     =          20
AR 0015 GETIME    =           1  POST      =          26  SVC-31     =          11
AR 0015 TTIMER    =           3  SVC-35     =         109  GETVIS     =          88
AR 0015 FREEVIS   =          69  CDLOAD    =           1  SECTVAL    =           5
AR 0015 FASTSVC   =         579  (UN) LOCK =           2  SVC-75     =          65
AR 0015 PRODID    =           2  SVC-83     =         200  SVC-84     =         147
AR 0015
                SVC-X'6B' DETAIL REPORT
AR 0015    FC-02 =          25    FC-03 =          78    FC-06 =         109
AR 0015    FC-08 =          26    FC-09 =         100    FC-0A =          76
AR 0015    FC-0D =          16    FC-0E =         192    FC-4F =           1
AR 0015    FC-67 =           1    FC-73 =          60    FC-86 =          22
AR 0015    FC-90 =          62    FC-96 =           7    FC-9F =         156
AR 0015    FC-B6 =          16
AR 0015
                SVC-X'75' DETAIL REPORT
AR 0015    FC-98 =          57    FC-9C =           8
AR 0015
                MVS-SVC'S DETAIL REPORT
AR 0015 SVC-01    =          79  SVC-02    =          43  SVC-22    =           2
AR 0015 SVC-2E    =           2  SVC-2F    =          23  SVC-6B    =         141
AR 0015 SVC-77    =          57

```



How to monitor the Turbo Dispatcher

- How to gather monitored information:
 - 1) SIR MON=ON - starts monitoring
 - 2) SYSDEF TD,RESETCNT - resets TD counters
 - 3) <monitor interval - e.g. 1 hour at peak>
 - 4) SIR MON=OFF - stops monitoring
 - 5) QUERY TD - displays CPU counters
 - 6) SIR MON - displays SVC counters
 - 7) To start next interval begin with 1)

- Monitored data can be retrieved from VSE Console



CPU Balancing

- Introduced with z/VSE 4.2
- When CPU balancing is activated, the z/VSE Turbo Dispatcher will only use CPUs required for the current workload
- Can be activated and deactivated via AR/JCL command
 - SYSDEF TD,INT=0 to deactivate, default
 - SYSDEF TD,INT=nn (=1..99) to activate and “nn” interval in seconds, after which the CPU utilization is inspected
- Threshold can be defined after which an additional CPU is activated
 - SYSDEF TD,THR=nn (10..99) in percent, default: 50



z/VSE 4.2: CPU Balancing ...

- CPU balancing via stop or quiesce process
 - SYSDEF TD,INT=nn,STOP - the stop process to be used
 - May provide performance improvements for z/VM guests (z/VM 5.4 or higher)
 - SYSDEF TD,INT=nn,STOPQ - the quiesce process to be use, default

- QUERY TD shows current settings

- CPU balancing may reduce multiprocessing overhead



CPU Balancing ...

Retrieve CPU time values: QUERY TD

```

query td
AR 0015 CPU STATUS SPIN_TIME NP_TIME TOTAL_TIME NP/TOT
AR 0015 00 ACTIVE 0 63715 96636 0.659
AR 0015 01 ACTIVE 0 13668 22614 0.604
AR 0015 02 INACTIVE 210 23692 34187 0.693
AR 0015 -----
AR 0015 TOTAL 210 101075 153437 0.658
AR 0015
AR 0015 NP/TOT: 0.658 SPIN/(SPIN+TOT): 0.001
AR 0015 OVERALL UTILIZATION: 80% NP UTILIZATION: 53%
AR 0015
AR 0015 CPU BALANCING (STOP): INT: 9 SECONDS THR: 50%
AR 0015
AR 0015 ELAPSED TIME SINCE LAST RESET: 190550
AR 0015 1I40I READY

```

TOTAL_TIME = CPU time used by workload
 NP_TIME = non-parallel CPU time, contained in TOTAL_TIME
 SPIN_TIME = CPU time needed to wait for a non-parallel work unit
 All above values given in milliseconds.

NP/TOT = ratio NP_TIME / TOTAL_TIME = non-parallel share
 SPIN/(SPIN+TOT) = spin time ratio



CICS on z/VSE

- Two different CICS products on z/VSE:
 - CICS/VSE 2.3
 - In service for about 17 years
 - End-of-Support (EOS) since October 2012
 - z/VSE 4.2: last release that includes CICS/VSE in z/VSE package
 - z/VSE 4.3: CICS/VSE access to DL/I does not work
 - z/VSE 5.1: CICS/VSE not supported (will not run on z/VSE 5.1)
 - CICS TS for VSE/ESA 1.1.1
 - In service for more than 10 years
 - Migration target for CICS/VSE
 - Recommendation: If your are still running applications on CICS/VSE, migrate them to CICS TS prior to the migration to z/VSE 4.3 or z/VSE 5.1



CICS/VSE to CICS TS for VSE/ESA Migration

- The best description of how to do this can be found in the Redbooks:
 - SG24-5595
 - SG24-5624
 - SG24-5997

- Although these publications are old, they are still very relevant.

- RPG II support is now available CICS TS, but the programs are defined as Assembler.
 - On z/VSE 4.2 and higher – plus PTFs

- Macro-Level programs may run on CICS TS by installing OEM software.

- Some customers have left bits of redundant Macro-Level code in place, and this has caused abends, but can normally be removed very easily.

- Even a simple migration without exploiting any of the enhancements can significantly improve the amount of storage for 24-bit mode programs.



z/VSE Partitions - GETVIS Usage

- The z/VSE GETVIS command shows usage e.g. GETVIS F2:

AR 0015	GETVIS USAGE	F2-24	F2-ANY		F2-24	F2-ANY
AR 0015	AREA SIZE:	11,260K	51,196K			
AR 0015	USED AREA:	8,660K	37,428K	MAX. EVER USED:	11,260K	40,132K
AR 0015	FREE AREA:	2,600K	13,768K	LARGEST FREE:	2,572K	13,656K

- xx-24 is below 16MB, xx-ANY includes above **and** below 16MB; this is due to the way that GETVIS works.
- For CICS TS, the xx-24 MAX. EVER USED is always the same as the AREA SIZE because of the way that DSALIM is allocated; the customer must issue a GETVIS xx,RESET command after initialisation to get a representative high-water-mark.
- If you use "GETVIS xx,ALL" or "GETVIS xx,DETAIL", most CICS TS usage will be seen in the "IMVSnnn" subpools, where "nnn" is the z/OS subpool number; always use the total of all IMVSnnn subpools to check for leaks.
- Always make sure that you have several MB of GETVIS storage free above the 16MB line in case you need it.



CICS SVA-Eligible Phases

- Using the SVA saves CICS partition-level virtual storage, z/VSE real storage, and may improve the (cache) performance of z10 and zEnterprise processors.
- The CICS TS SIT must have SVA=YES to enable it to load an SVA-resident phase, and CSD-defined SVA-resident programs must have USESVACOPY(YES).
- Most CICS SVA-eligible nucleus phases (",SVA" on the link-edit PHASE statement) are **candidates** for loading into the SVA, i.e. the customer must decide whether or not to load them after the IPL - do not load CICS SVA-eligible phases if CICS/VSE and CICS TS are used in the same VSE system.
- Phases can be re-loaded if there is enough free space, and it is possible to "inactivate" the SVA-resident version of any phase providing it does not need to run in the SVA.
- The CICS phases that **must** be in the SVA are in the load list \$SVACICS.PHASE and are shown in the LIBR LISTDIR SDL output .
- If a PTF or a relief fix supplied by CICS L3 Service links a phase such as DFHIRP that must be resident in the SVA, a re-IPL is the only safe way to re-load it.



z/VSE Workload Management and CICS

- Make sure that CICS is at a high priority, but below DB2, TCP/IP and VTAM.
- It is not a good idea to use a high priority TCP/IP for FTP while CICS is active, there are several ways round doing that.
- If partition balancing is active for a CICS partition, set an MSECS value that is lower than the default of 976 milliseconds.
- Use z/VSE CPU Balancing to reduce the number of CPUs to the number that you need to support the actual workload at any one point in time, this can reduce the amount of cpu time that would be needed to do the same work with more cpus active.
- Make sure that you are up-to-date with both CICS TS and TCP/IP fixes



CICS TS – Problem Determination

- CICS TS Trace settings
 - To help CICS Service debug dumps, we need CICS TS trace set to level 1 for all components, that is SIT STNTR=1.
 - We also need a trace table size of at least 4MB, that is SIT TRTABSZ=4096; this is acquired from GETVIS-31 storage.
 - CETR can be used to modify trace options while CICS is active.
 - AP=1-2 and EI=1-2 can be useful for diagnosing application problems.

- z/VSE dump configuration
 - The CICS startup job must have a // LIBDEF DUMP,CATALOG=SYSDUMP.sublib active
 - For batch EXCI dumps always use // OPTION DUMP to be set in the JCL
 - For CICS, we need // OPTION SYSDUMPC in the JCL to avoid a CICS dump being printed.

- SDAID traces
 - The z/VSE Supervisor may issue SVCs on behalf of CICS, if you trace SVCs and only specify the partition AREA address, you will not see these SVCs traced.
 - Add ADDR=0:* to the TRACE SVC

- DEBUG traces
 - Can be useful to obscure CICS loops and system problems



CICS TS performance considerations

- Monitoring software in its own partition must always be at a higher priority.
- Avoid all unnecessary system and transaction dumps, they can stop all CICS processing while they are being taken.
- Function Shipping
 - expensive compared local VSAM file I/O, don't be surprised if it multiplies response times by a factor of 2 or more, this is normal.
- MRO / ISC
 - MRO uses less CPU time than ISC, although the customer may not notice much improvement in response times.
 - MRO and, to a much lesser extent, ISC CPU usage increases as z/VSE uses more CPUs – a "multiprocessor effect".
- Multiprocessing
 - z/VSE customers should use as few CPUs as possible to handle the workload, having more CPUs available than is needed costs CPU time.
 - CPU Balancing may help to reduce multiprocessor overhead



z/VSE 5.1 Migration Considerations

- Migrate to z/VSE 5.1.2 + Recommended Service Level (RSL) of September 2013
- VSE/VSAM
 - Migration of VSAM catalogs
 - Don't use Fastcopy to migrate VSAM catalogs
 - Flashcopy all VSAM volumes allocated to a VSAM catalog
 - Migrate all recoverable VSAM catalogs to standard VSAM catalogs
Before the migration to z/VSE 4.3 or z/VSE 5.1
PTF for “automatic” migration
- CICS/VSE
 - CICS Coexistence Environment removed
 - DL/I 1.12 replaces DL/I VSE 1.11 and DL/I DOS/VS 1.10
 - CICS/VSE 2.3
 - No DL/I support for CICS/VSE on z/VSE 4.3
 - No longer on base tapes
 - Not supported on z/VSE 5.1
 - End of service 10/31/2012
- See also Live Virtual Class on „z/VSE Release Migration Considerations”
 - Presentation is on <http://www-03.ibm.com/systems/z/os/zvse/education/#completed>



APARs

- z/VSE 5.1.2 + Recommended Service Level (RSL)
- z/VSE 5.1 DY47482 (z/VSE 4.3 DY47478) – LISTCAT enhancement
 - Fixes IDCAMS LISTCAT loop for large number of datasets residing on one volume (more than 5000 per volume)
 - Provides part of the output followed by an error message
- z/VSE 5.1 DY47471 – Improved stand-alone dump program
 - Addresses several problems
 - Requires rebuild of stand-alone dump program on disk and/or tape
 - For disk includes reformat of the IJSYSDU dump file
- RPG PTF UX00777 – RPG RELOAD(YES) on CICS TS for VSE/ESA
- CICS TS for VSE/ESA 1.1.1 fix list ->
<http://www-01.ibm.com/support/docview.wss?uid=swg27015142>
- Product Status of Independent Software Vendors (ISVs)
<http://www-01.ibm.com/support/docview.wss?uid=swg27015142>
- Hot z/VSE service news <http://www-03.ibm.com/systems/z/os/zvse/support/#news>



News related to z/VSE

- September: zBC12 GA
 - z/VSE Preventive Service Planning (PSP) bucket for details
 - ibm.com/vse -> About z/VSE Status -> z/VSE server support
 - OSA/SF configuration on HMC – OSA-Express 4S / 5S only
 - For CHPID type OSE

- July: z/VM 6.3 GA
- July: zBC12 announced
- July: z/VSE Collection Kit available
- July: IPv6/VSE decreased monthly workload license charges

- June: z/VSE 5.1.2 Recommended Service Level (RSL) available
- June: z/VSE 5.1.2, including z/VSE additional enhancements available
 - Now on DVD-ROM

- May: New z/VSE web page layout

- April: z/VM 6.1 end of service
- April: z/VSE 5.1 additional enhancements announced



z/VSE Events

- Conferences
 - IBM System z Technical University in Orlando, Florida – October 21 – 25, 2013
 - WAVV 2014 in Covington, KY – April 13 – 16, 2014
- Live Virtual Classes (LVCs)
 - Language Environment for z/VSE – News, Tips and Enhancements - October 24, 2013
- See <http://www-03.ibm.com/systems/z/os/zvse/education/> for details

Upcoming Live Virtual Classes

Language Environment for z/VSE - Pieces of News, Tips and Enhancements

This webcast will show of a recap of application run-time capabilities, discuss enhancements with z/VSE 5.1, complemented by "hands-on" advise for callable service use programming, environment independent application execution, 4083 abend handling and some tuning tips. Furthermore it will highlight the benefits available with optional feature and tools usage. The session will be given in two consecutive parts.

Speakers: Garry Hasler, IBM Australia and Wolfgang Bosch, IBM Germany

Date: Thursday, October 24, 2013



Documentation related to z/VSE


- z/VSE Collection Kit July 2013
 - Available for download in IBM Publication Center
 - Electronic only, not on physical DVD

- Documentation of z/VSE releases
 - z/VSE Internet Library on <http://www.ibm.com/systems/z/os/zos/bkserv/vse.html>

- IBM Redbooks
 - Redbook page with new IBM System z mainframe Redbooks
 - zEC12 / zBC12 Technical Guide, SG24-8049 / SG24-8138
 - IBM System z Connectivity Handbook, SG24-5444



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Enhanced Networking on IBM z/VSE

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Abstract

The importance of modern computer networks is steadily growing as increasing amounts of data are exchanged over company intranets and the Internet. Understanding current networking technologies and communication protocols available for the IBM® mainframe and System z® operating systems is essential for setting up your network infrastructure with z/VSE®. This IBM Redbooks® publication will help you install, tailor and configure new networking options for z/VSE available with TCP/IP for VSE/ESA, IPv6/VSE, and Linux Fast Path (LFP). We put a strong focus on network security and describe how the new OpenSSL-based SSL runtime component can be used to enhance the security of your business. This IBM Redbooks publication extends the information provided in Security on IBM z/VSE, SG24-7691.

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Abstract

This IBM® Redbooks® publication will show the power of System z® virtualization and flexibility in sharing resources in a flexible production environment. In this book, we outline the planning and setup of Linux on System z to move from a development or test environment into production. As an example, we use one LPAR with shared CPUs with memory for a production environment and another LPAR that shares some CPUs but also has a dedicated one for production. Running in z/VM® mode allows for virtualization of servers and based on z/VM shares, can prioritize and control their resources.

The size of the LPAR or z/VM resources depends on the workload and the applications running that workload. In this book, we examine a typical web server environment, JAVA applications and we discuss using a database management system, such as IBM DB2®.

Network decisions will be examined with regards to VSWITCH, shared OSA, Hipersockets and the Hiperpav, or FCP/SCSI attachment used in conjunction with an SVC storage controller along with performance and throughput expectations.

The intended audience for this IBM Redbooks publication is IT Architects responsible for planning production environments and IT Specialists responsible for implementation of production environments.

Profile

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WAVV 2013 Requirements

- WAVV201201 - VSE/Power control of TCPIP printers
- WAVV201302 - Allow AR DUMP command to direct dump output to disk
- WAVV201303 - ICSF (z/OS cryptographic services) full support
- WAVV201304 - Allow z/VSE to run without a real tape attached
- WAVV201305 - Provide Better Way To Retrieve Current APAR's/PTF's
- WAVV201306 - TCPIP printer support or alternative for CICS application printing



z/VSE Requirements

- You may submit requirements at conferences (WAVV, GSE, ...)
- ... or via our z/VSE requirements page:
 - <https://www-03.ibm.com/systems/z/os/zvse/contact/requirement.html>
- ... or you may enter **CICS Transaction Server** requirements via the
 - Request for Enhancement (RFE) database:
 - <http://www.ibm.com/developerworks/rfe/>
 - Please select the following for z/VSE-CICS requirements:
 - *Brand = WebSphere*
 - *Product family = Transaction Processing*
 - *Product = CICS Transaction Server*
 - *Component = Runtime or Explorer*
 - *Operating system = IBM z/VSE*



z/VSE in the internet

- z/VSE Homepage: www.ibm.com/vse
- z/VSE on Twitter: www.twitter.com/IBMzVSE
- Ingolf's z/VSE blog: www.ibm.com/developerworks/mydeveloperworks/blogs/vse/
- VSE-L discussion list: <https://groups.google.com/forum/?fromgroups#!forum/bit.listserv.vse-l>



More Information

- Hints and Tips for z/VSE 5.1:
 - <http://www.ibm.com/systems/z/os/zvse/documentation/#hints>
- 64 bit virtual information:
 - IBM z/VSE Extended Addressability, Version 5 Release 1
 - IBM z/VSE System Macro Reference, Version 5 Release 1
- CICS Explorer: <http://www.ibm.com/software/htp/cics/explorer/>
- IBM Redbooks:
 - Introduction to the New Mainframe: z/VSE Basics
<http://www.redbooks.ibm.com/abstracts/sg247436.html?Open>
 - Security on IBM z/VSE – updated
<http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/sg247691.html?Open>
 - z/VSE Using DB2 on Linux for System z
<http://www.redbooks.ibm.com/abstracts/sg247690.html?Open>
- Please contact z/VSE: <https://www-03.ibm.com/systems/z/os/zvse/contact/contact.html>
or me – Ingolf Salm – salm@de.ibm.com – for any questions

