

# Migration and Hints & Tips with z/VSE 6.2

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Ingolf Salm - [salm@de.ibm.com](mailto:salm@de.ibm.com)  
IBM Germany

Ingolf's z/VSE blog: <https://www.ibm.com/developerworks/mydeveloperworks/blogs/yse/>

## Upgrade – General considerations

- Hardware upgrade can be any changes on the hardware infrastructure, such as processors, I/O, network, crypto cards, disks, ...
- Software upgrade can be upgrade to new SPE / release / version via Fast Service Upgrade (FSU) or initial installation
- Upgrade tasks:
  - Collect reference data
  - Backup your data and system
  - Obtain required software license and updates from vendors
- Recommendation: do not upgrade to a new processor and release in one step

# Processor upgrade

## Tasks before the upgrade

- Collect reference data
  - Measure and collect most important workload parameters  
e.g. performance, I/O activity / timings, CPU / elapsed time, console logs, etc.
- Check the Preventive Service Planning (PSP) bucket
  - PSP describes service requirements for the new processor  
e.g. PTFs IOCP, EREP, HLASM, z/VSE base PTFs for toleration and exploitation
  - PSP buckets: <http://www14.software.ibm.com/webapp/set2/psearch/search?domain=psp>
- Obtain new software licenses, if products have dependencies on the CPU id
- Install required z/VSE, z/VM and vendor PTFs

## Processor upgrade ...

### Tasks before the upgrade ...

- Review / update your z/VSE definitions, e.g.
  - Stop sub-capacity pricing data collection (CMT) before you upgrade
  - Save your CMT files
  - If you use a \$ASIPROC.PROC, add the new CPU id.
  - If you use DASD sharing, initialize the lock file at first IPL
  
- Review / update z/VM definitions
  - Verify, if the z/VM release is supported on the new processor
  - Review definitions of guest systems
  
- Review / upgrade vendor definitions
  - Update vendor software before the upgrade, if required
  - Verify license requirements

## Processor upgrade ...

- Processor upgrade:
  - Generate the IOCDS for the new processor
  - Define the LPARs
  - Configure the terminal sessions, if you use the OSA-Express Integrated Console Controller
  - Configure your OSA-Express devices (e.g. CHPID type OSE for SNA or TCP/IP)
  - Verify your settings in a test environment before going into production
  
- Disk / tape upgrade
  - Check the PSP bucket for the device
  - Install required PTFs, if any
  - Upgrade to the new devices
  
- Concurrent microcode upgrade for IBM System Storage (tape / disk)
  - Recommendation: shutdown your system, upgrade to new device, re-ipl

## Processor upgrade ...

- Recommendation: Upgrade to new hardware and z/VSE release
  - Avoid an upgrade to new hardware and software in one step
    1. Upgrade to new hardware first and run workload in production for some time
      - Verify performance characteristics
    2. Upgrade to new z/VSE release
- Consider Architectural Level Set (ALS)
  - z/VSE V5 ALS – z9 and higher
  - z/VSE 6.1 ALS – z10 and higher
  - z/VSE 6.2 ALS – z114 / z196 and higher
  
  - z/VM 6.4 – z114 / z196 and higher
- See the z/VSE hardware and release status information for more details  
<https://www.ibm.com/it-infrastructure/z/zvse-resources>

## Backup your system and data

- Backups should be performed regularly, ... and verify your backups
  
- Backup utilities
  - „Flashcopy“
  - „ICKDSF PPRC“
  - z/VM DDR
  - VSE/Fastcopy
  - VSE/VSAM IDCAMS
  - Librarian backup
  - VSE/POWER POFFLOAD
  - VTAPE (e.g. via Tivoli Storage Manager - IBM Spectrum Protect)
  - ISV tools
  - ...
  
- Ensure that data is consistent
  - E.g. shutdown partitions that access data, before Fastcopy
  - VSE/VSAM catalog and data space

## Upgrade to IBM z14 or z14 ZR1

- z14 and z14 ZR1 start IPL in z/Architecture mode, no longer in ESA/390 mode
  - VSE/ESA releases and z/VSE 3.1 can not IPL on z14 and z14 ZR1
  - z/VSE Version 4 releases can only IPL in z/VM 6.4 guests, not in LPAR
  - z/VSE 5.1 need to be on the latest PTF level (UD54170)
  - z/VSE 5.2 and z/VSE Version 6 can run on z14 and z14 ZR1
    - Should be on latest PTF level
  
- z/VSE PSP for z14 ZR1: Upgrade 3907DEVICE, Subset 3907/ZVSE  
[http://www-01.ibm.com/support/docview.wss?uid=isq1\\_3907DEVICE\\_3907-ZVSE](http://www-01.ibm.com/support/docview.wss?uid=isq1_3907DEVICE_3907-ZVSE)
  
- z/VM PSP for z14 ZR1: Upgrade 3907DEVICE, Subset 3907/ZVM  
[http://www-01.ibm.com/support/docview.wss?uid=isq1\\_3907DEVICE\\_3907-ZVM](http://www-01.ibm.com/support/docview.wss?uid=isq1_3907DEVICE_3907-ZVM)



# Concurrent microcode upgrade of IBM System Storage

- Please consult your device documentation.
- Recommendation for IBM Disk Storage:
  - **(E)CKD disks:** z/VSE **strongly** recommends to shutdown the z/VSE system prior to the microcode upgrade for local disks, and also if remote disks are coupled via PPRC.
  - **FCP-attached SCSI disks:** z/VSE does not support concurrent microcode upgrade for FCP-attached SCSI disks.
  - That is, please shutdown the z/VSE system(s), do the upgrade and-re-IPL the z/VSE system(s). This includes all dependent z/VSE systems (e.g. systems that use the same lock file).
- Recommendation for IBM Tape Storage:
  - z/VSE with the latest service level supports concurrent microcode upgrade for IBM Tape Storage. z/VSE recommends to take the tape units offline (z/VSE OFFLINE command) prior to the microcode upgrade or use the next maintenance window. Once the upgrade completed, take the tape units online again (z/VSE ONLINE command). Please check with your software vendors (e.g. tape management systems), if they support concurrent microcode upgrade.

## Migration from coax-attached to ICC printers

- Printer sessions can be defined to OSA-Express Integrated Console Controller (OSA ICC)
  - OSA-ICC is integrate in z9 and higher (CHPID type OSC)
  - Supports TN3270E and non-SNA DFT
  - No terminal controller required for local terminals
  
- You may use the IUI dialog (as administrator) to configure a OSA-ICC attached printer
  - Select 2 - Resource Definition, now you are on panel "Resource Definition"
  - Select 4 - Hardware Configuration and IPL, the you are on the corresponding panel
  - Select 1 - Configure Hardware, then you are on "Hardware Configuration: Unit Address List"
  - Press PF6 to add a new address, you are on "Hardware Configuration: Add a device"
  - Enter the address(es) of the device and enter a "?" in line "Device name"
  - Press enter, you are prompted for device name, next is panel "Hardware Configuration: Device Group"
  - Select 1 - Local non SNA (Terminals/PCs), you are on "Selection list: Devices"
  - On the bottom of the list you see DSC printers, select e.g DSCPRT
  - Press enter, you are on "Hardware Configuration: Non-SNA Terminal List"
  - Press PF5 to process the device to be added, back on panel "Hardware configuration: Unit address list"
  - Press PF5 to process (prepare to update IPL, CICS / VTAM definitions),  
you are on "Hardware Configuration: Catalog startup members"
  - Press enter to prepare update job, you are on "Job disposition" panel
  - press enter to submit job  
(press enter again, if you have an ICCF member with job name, or change job name and press enter)

## Multi-Version Measurement (MVM)

- MVM replaces the Migration Pricing Option (MPO) and Single Version Charging (SVC)
- No time limits for running multiple eligible versions of a software program on the same machine
  - VSE/ESA V1 / V2, z/VSE 3.1, z/VSE V4, z/VSE V5, z/VSE V6, in any combination
- E.g. systems with zELC, AEWLC and MWLC pricing are eligible for MVM.
- MVM only possible for versions within same machine. Multiple machines can not be combined.
- MVM web page: <https://www.ibm.com/it-infrastructure/z/software/pricing-multi-version-measurement>
- Full-capacity clients:
  - No additional requirements
  - Need to request MVM, except SVC systems
  - If one non-subcapacity Version on machine,  
you will be billed at the highest version price as full capacity.

## Multi-Version Measurement (MVM) ... & SCRT

- Sub-capacity clients

- Pay for the combined MSUs (concurrent peak) at the latest version price.

- Sub-Capacity Reporting Tool (SCRT) requirement:

- Latest SCRT tool (Java)
      - Command line interface
      - Java-version, 32- and 64-bit Java supported on Windows & Linux
      - Download: <https://www.ibm.com/it-infrastructure/z/software/pricing-tools>
    - Sample on how to automate the SCRT process (data transfer, REXX tool)  
[ftp://public.dhe.ibm.com/eserver/zseries/zos/vse/pdf3/zVSE\\_Samples.pdf](ftp://public.dhe.ibm.com/eserver/zseries/zos/vse/pdf3/zVSE_Samples.pdf)
    - White paper “Using SCRT with z/VSE – Best Practices”  
[https://www.ibm.com/support/knowledgecenter/SSB27H\\_6.2.0/technical\\_articles\\_and\\_whitepapers.html](https://www.ibm.com/support/knowledgecenter/SSB27H_6.2.0/technical_articles_and_whitepapers.html)

- Subcapacity eligible Monthly License Charge (MLC) programs

- <https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=ZSL03540USEN&>

## z/VSE Release / Version upgrade

- Planning tasks
  - Verify requirements for new release / version (see z/VSE Planning book for details)
    - e.g. required hardware (processor, installation medium)
  - Check PSP buckets
    - Upgrade ZVSE620, Subset BASEAPAR  
[http://www-01.ibm.com/support/docview.wss?uid=isa1\\_ZVSE620\\_BASEAPAR](http://www-01.ibm.com/support/docview.wss?uid=isa1_ZVSE620_BASEAPAR)
    - Upgrade ZVSE620, Subset OPT-APAR  
[http://www-01.ibm.com/support/docview.wss?uid=isa1\\_ZVSE620\\_OPT-APAR](http://www-01.ibm.com/support/docview.wss?uid=isa1_ZVSE620_OPT-APAR)
  - Check, if Recommend Service Level (RSL) available on z/VSE preventive service page  
<http://www-01.ibm.com/support/docview.wss?uid=isa3T1027465>
  - Get an MSHP retrace of your system (to get list of installed products and service levels)
  - Use the latest service level of your target release / version
  - Order z/VSE release and optional products from IBM Shopz  
[https://www-304.ibm.com/software/shopzseries/ShopzSeries\\_public.wss](https://www-304.ibm.com/software/shopzseries/ShopzSeries_public.wss)
  - Contact your vendors, if software updates are required
    - Update the vendor software before the FSU migration, if possible
  - Decide on a migration via Fast Service Upgrade (FSU) or initial installation
    - z/VSE Version 5 to Version 6 require an initial installation
    - z/VSE 6.1 to z/VSE 6.2 can be upgraded via initial installation or FSU

## z/VSE Release / Version upgrade

- Data migration
  - Use the utilities provided by the product / component
  - Migration from ECKD to SCSI, see paper z/VSE SCSI Support and Migration Options [https://www.ibm.com/support/knowledgecenter/SSB27H\\_6.2.0/technical\\_articles\\_and\\_whitepapers.html](https://www.ibm.com/support/knowledgecenter/SSB27H_6.2.0/technical_articles_and_whitepapers.html)
  - Initial installation:
    - Migrate batch environment (jobs, settings, procedures, ...)
    - Migrate your CICS environment (SIT, recompile CICS tables / exits, ...)
- Obtain software licenses for IBM and ISV products, if required
  - New z/VSE versions require new licenses
  - TCP/IP for z/VSE Version 2 and the corresponding GPS feature require new licenses
    - License need to be acquired via Shopz, before you get a new key
- Post migration tasks
  - Create a standalone dump tape or disk
- Detailed upgrade information in paper: z/VSE Release and Hardware Upgrade [https://www.ibm.com/support/knowledgecenter/SSB27H\\_6.2.0/technical\\_articles\\_and\\_whitepapers.html](https://www.ibm.com/support/knowledgecenter/SSB27H_6.2.0/technical_articles_and_whitepapers.html)

## CICS on z/VSE

- z/VSE 4.2 was the last release with 2 CICS releases
  - CICS/VSE 2.3 and CICS TS for VSE/ESA 1.1
- CICS/VSE 2.3
  - z/VSE 4,3: CICS/VSE can not be used with DL/I
  - Can not run on z/VSE Version 5 and Version 6
  - End of service since October 2012
- CICS TS for VSE/ESA 1.1
  - Can not run on z/VSE Version 6
  - End of service October 31, 2018
- CICS TS for z/VSE 2.1 for z/VSE 6.1
  - Latest release level to migrate DTSECTXN (transaction security into BSM Control File
  - Can not run on z/VSE Version 5 and z/VSE 6.2
  - End of service June 30, 2019
- CICS TS for z/VSE 2.2 for z/VSE 6.2
  - DTSECTXN not supported
  - Can not run on z/VSE Version 5 and z/VSE 6.1

## CICS Migration Documentation

- IBM Redbook: Migration to CICS TS for z/VSE  
<http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/sq248390.html?Open>
  
- CICS Migration Guide - Migration from CICS/VSE to CICS TS for z/VSE (VSE/ESA)
  - PDF Library on CICS TS for z/VSE Knowledge Center  
[https://www.ibm.com/support/knowledgecenter/en/SSECAB\\_2.2.0/welcome.html](https://www.ibm.com/support/knowledgecenter/en/SSECAB_2.2.0/welcome.html)
  
- CICS Enhancements Guide
  - PDF Library on z/VSE 6.2 Knowledge Center  
[https://www.ibm.com/support/knowledgecenter/en/SSB27H\\_6.2.0/pdfs\\_6.2.0\\_neu.html](https://www.ibm.com/support/knowledgecenter/en/SSB27H_6.2.0/pdfs_6.2.0_neu.html)



## z/VSE 6.2 Compatibility

- Architectural Level Set (ALS) to z114 / z196
- Tape delivery dropped with z/VSE 6.2
  - z/VSE will be delivered on DVD or electronically via Shopz
- z/VSE 6.2 can not be installed on 3380 disks (or 3390 in 3380 track compatibility mode)
  - 3380 disks still supported as data disks
- Upgrade to z/VSE 6.2 via initial installation or Fast Service Upgrade (FSU)
  - FSU from z/VSE 6.1 to z/VSE 6.2 only
  - FSU not supported from z/VSE V5 or if system disks are on 3380
  - z/VSE 6.2 upgrade will fail, if z/VSE not on z114 / z196 or higher

## z/VSE 6.2 Compatibility ...

- CICS TS for z/VSE 2.2
  - Replaces CICS TS for z/VSE 2.1 (not supported on z/VSE 6.2)
  - SIT need to be recompiled
  - Recommendation: Recompile / relink CICS tables from earlier
  - TCPIP SERVICE need to be redefined
  
- CICS transactions no longer protected via DTSECTXN table
  - DTSECTXN table entries to be migrated to Basic Security Manager (BSM) control file
  
- IBM IPv6/VSE 1.3 replaces IBM IPv6/VSE 1.2 (not supported on z/VSE 6.2)
  
- IBM TCP/IP for z/VSE 2.2 replaces IBM TCP for z/VSE 2.1 (not supported on z/VSE 6.2)
  
- Starting with z/VSE V6.1, z/VSE is shipped as English version only.

## Upgrade to a supported z/VSE release

- Please upgrade to a supported z/VSE release
  - to get the latest software service, hardware exploitation and functionality
  - **planned end of service (eos) dates:**
    - z/VSE 5.2: October 31, 2018
    - z/VSE 6.1: June 30, 2019
  
- Currently supported releases: z/VSE 5.2, 6.1 and 6.2
  - **z/VSE 5.2** supports processors z9 and higher
    - Fast Service Upgrade (FSU) from z/VSE 4.3 / z/VSE 5.1 to z/VSE 5.2 supported
  - **z/VSE 6.1** requires an initial installation and supports z10 and higher
  - **z/VSE 6.2** supports z114 / z196 and higher
    - FSU from z/VSE 6.1 supported
  
- Multi-Version Measurement (MVM)
  - <https://www.ibm.com/it-infrastructure/z/software/pricing-multi-version-measurement>
  
- z/VSE release & hardware upgrade white paper available:
  - [https://www.ibm.com/support/knowledgecenter/SSB27H\\_6.2.0/technical\\_articles\\_and\\_whitepapers.html](https://www.ibm.com/support/knowledgecenter/SSB27H_6.2.0/technical_articles_and_whitepapers.html)
  
- CICS TS for z/VSE V2 migration aspects in CICS TS for z/VSE Enhancements Guide:
  - [https://www.ibm.com/support/knowledgecenter/SSB27H\\_6.2.0/pdfs\\_6.2.0\\_neu.html](https://www.ibm.com/support/knowledgecenter/SSB27H_6.2.0/pdfs_6.2.0_neu.html)

## z/VSE Service & Support

- Service and support web page on <http://www-01.ibm.com/support/docview.wss?uid=isa3T1027442>
- Hot service news shows important updates on our service and support web pages <http://www-01.ibm.com/support/docview.wss?uid=isa3T1027442#news>
- Preventive service: information on
  - Service refreshes
  - PSP buckets
  - Recommended Service Levels (RSLs)
  - Security and system integrity
- Corrective service
  - Latest APARs per z/VSE component
- z/VSE security and system integrity APARs
- CICS TS service status -> <http://www-01.ibm.com/support/docview.wss?uid=isa3T1027422>
- IBM Software Support Handbook: <https://www-304.ibm.com/support/customercare/sas/f/handbook/home.html>

## z/VSE Service & Support ...

- The z/VSE service team may ask for the following material for problem analysis
  - SIR command output
  - Console log
  - Information about hardware / system changes
    - Did the workload change ?
    - Were any new PTFs / products installed ?
    - Did the configuration change (new processor / devices) ?
  - Does the problem occur once or multiple times ? Is it reproducible ?
  - Does the problem occur on the test or production system ?
  
- Upload of customer data requires an IBM id
  - Since May 25, 2018, to meet legal requirements
  - Please see the Enhanced Customer Data Repository (ECuRep) web page  
<https://www-05.ibm.com/de/support/ecurep/index.html>
  
- Tape delivery in Shopz will be discontinued  
<http://www-03.ibm.com/support/techdocs/atmastr.nsf/WebIndex/FLASH10889>
  
- Please visit the z/VSE hot service news for details
  - <http://www-01.ibm.com/support/docview.wss?uid=isq3T1027442>

## Some useful system commands, tools, system information, ...

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

## 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  VTAPBUF(=<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:  LNXSALM1                z/VSE 6.2                TURBO (01)                USER:  SYS
VM USER ID:LNXSALM1                TIME:  13:44:32
sir sys
AR 0015 CPUID   VM = 00337FD728278000                VSE = FF337FD728278000
AR 0015 PROCESSOR = IBM 2827-760 84 (47FD784) LPAR = SPB                No. = 0051
AR 0015          CPUs = 0003 (Ded.=0000 Shr.=0003) Cap. = 05%
AR 0015 VM-SYSTEM = z/VM 6.4.0 (1801) USERID = LNXSALM1 VMCF = ON
AR 0015          CPUs = 0002                Cap. = 66%
AR 0015 PROC-MODE = z/Arch(64-BIT) IPL(005) 13:43:55 06/22/2018
AR 0015 SYSTEM   = z/VSE 6.2.0 10/05/2017
AR 0015          VSE/AF 9.4.0 GA-LEVEL 08/24/2017
AR 0015          VSE/POWER 9.4.0 GA-LEVEL 12/01/2017
AR 0015 IPL-PROC = $IPLESA JCL-PROC = $$JCL
AR 0015 SUPVR    = $$$A$SUPI TURBO-DISPATCHER (B2) ACTIVE
AR 0015                                     HARDWARE COMPRESSION ENABLED
AR 0015 SEC. MGR. = BASIC SECURITY = ONLINE
AR 0015 11401  READY

```



## 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 VSE/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 (70B0251) 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 YNCF = 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 YSE/AF 9.1.0 DY47436 02/12/2013 <--- Component Level AF
AR 0015 YSE/POWER 9.1.0 DY47302 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 HARDWARE COMPRESSION ENABLED
AR 0015 SEC. MGR. = BASIC 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 1140I READY

```

---

**sir smf,zhpf,178**

```

(16.0) AR 0015 ZHPF I/O REQUEST STATISTICS
(16.1) AR 0015 CUU OVERALL ZHPF REJECTED
(16.2) AR 0015 178 BASE 29 0 0
(16.3) AR 0015 91FC ALIAS 0 0 0
(16.3) AR 0015 91FD ALIAS 0 0 0
(16.3) AR 0015 91FE ALIAS 0 0 0
(16.3) AR 0015 91FF ALIAS 1109 865 0

```

## SIR – System Information Report \*

- 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 P0 31  =          2      PGFLT IMM P0 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

```

## 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
  - 8) begin with 1)
  
- Monitored data can be retrieved from VSE Console
  
- 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 ...

- QUERY TD – Query Turbo Dispatcher information, monitor CPU and elapsed time

```

SYSTEM:  LNXSALM1          z/VSE 6.2          TURBO (01)          USER:  SYS
VM USER ID:LNXSALM1          TIME:  12:57:34
query td,internal
AR 0015  CPU    STATUS    SPIN_TIME    NP_TIME  TOTAL_TIME  NP/TOT    DISP_ENTR
AR 0015   00    ACTIVE      0           434       568    0.764     229553
AR 0015   01    INACTIVE
AR 0015
AR 0015  TOTAL          0           434       568    0.764     229553
AR 0015
AR 0015                NP/TOT: 0.764          SPIN/ (SPIN+TOT): 0.000
AR 0015  OVERALL UTILIZATION:  1%          NP UTILIZATION:  0%
AR 0015
AR 0015  CPU BALANCING:          NOT ACTIVATED
AR 0015
AR 0015  ELAPSED TIME SINCE LAST RESET:          50752
AR 0015  NUMBER OF SVC'S SINCE LAST RESET:      177848
AR 0015 1140I  READY

```

## CPU Balancing

- 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
  
- 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



# z/VSE Downloads

<https://www.ibm.com/it-infrastructure/z/zvse-downloads>

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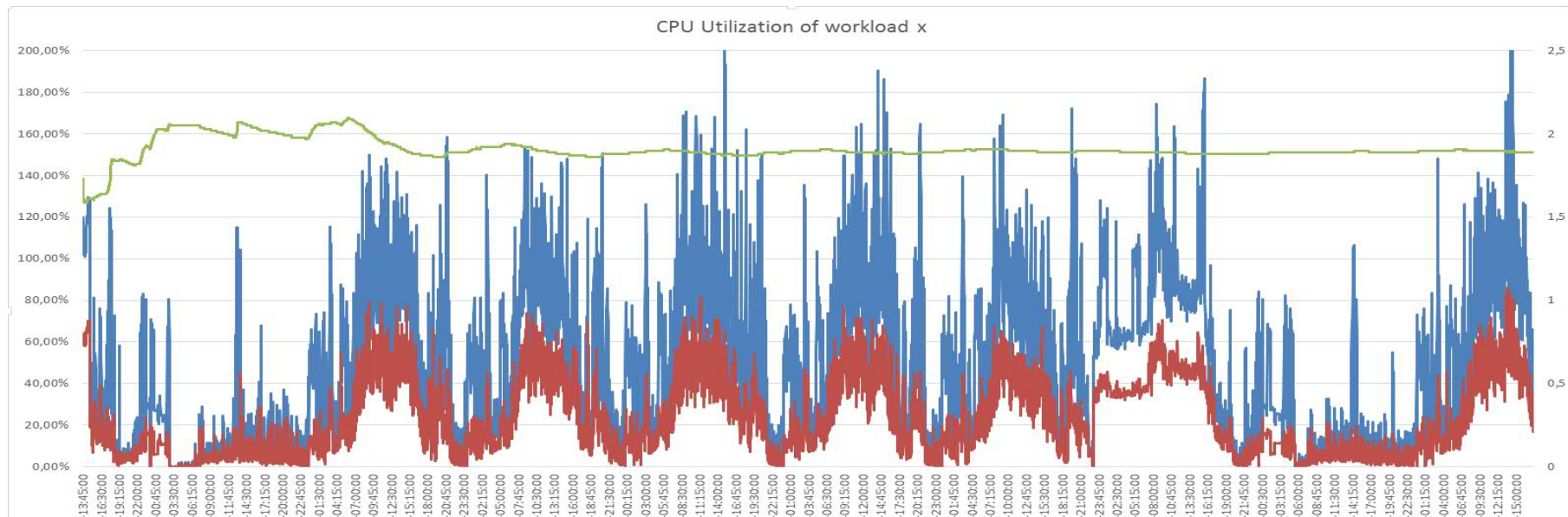
- VSE Virtual Tape Server (updated 02/2018 for APAR PI92815)
- VSAM Redirector Server (updated 12/2017 for z/VSE V6.2 GA)

### Troubleshooting tools

<p><b>z/VSE CPU Monitor Tool (as-is)</b></p> <p>Helps customers measure the CPU utilization of their z/VSE system over a period of time.</p>	<p><b>IP trace tool (as-is)</b></p> <p>Reads IP packet traces captured with TCP/IP for z/VSE and converts them into the CAP trace format.</p>	<p><b>Multi Instant Logic Analyzer4VSAM (as-is)</b></p> <p>Provides extent analysis, space map analysis, HALRBA/HUSRBA analysis, capacity analysis and data space analysis.</p>
--	---	---

## How to get the CPU utilization of a workload

- The z/VSE CPU monitoring tool (CPUMON) can be used to get the CPU utilization.
  - CPUMON can be downloaded from the z/VSE web pages.  
<https://www.ibm.com/it-infrastructure/z/zvse-downloads>
  - CPUMON may run for a day or more and measures in e.g. minute intervals.
  - The monitored data can be loaded into a spreadsheet. A line chart can show workload peaks.
- 
- Use CPUMON to understand the CPU requirements of your workload.
  - Run CPUMON before you upgrade your hardware or z/VSE release and save the data. You may compare that data with data from your new environment.



## z/VSE Downloads ...

- To gather information before z/VSE upgrades
  - z/VSE CPU Monitor Tool
    - Measures the CPU utilization of their z/VSE system over a period of time.
  - Installed Software Report Tool
    - Generates a z/VSE Installed Software Report used for IBM ShopZ.
  - VSE Health Checker
    - System diagnosis utility to retrieve, display, and analyze performance relevant data from a z/VSE system.
  
- More z/VSE Downloads: <https://www.ibm.com/it-infrastructure/z/zvse-downloads>

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**News, z/VSE status, Documentation , ...**

## z/VSE 6.2 Hints & Tips

- z/VSE 6.2 Hints & Tips can be downloaded from z/VSE Technical Articles and Whitepapers [https://www.ibm.com/support/knowledgecenter/en/SSB27H\\_6.2.0/technical\\_articles\\_and\\_whitepapers.html](https://www.ibm.com/support/knowledgecenter/en/SSB27H_6.2.0/technical_articles_and_whitepapers.html)
- Some chapters reworked and new information added
  - Examples of new information
    - “Activate TCP/IP messages in the Online Message File” on page 279
    - “CICS TS CSD Migration” on page 284
    - “DFHCSDUP Utility” on page 307
    - “Apply PTF from the internet” on page 309
    - “Transferring Tape Image Files to virtual Tape” on page 310
    - “How to define and use auxiliary trace file B” on page 314
    - Information related to z/VSE 6.2

## z/VSE Resources - status

- z/VSE release on <https://www.ibm.com/it-infrastructure/z/zvse-resources>
  - Supported z/VSE release, PDF includes supported hardware
    - z/VSE adapters and crypto
    - IBM storage
    - IBM Z servers

### Supported z/VSE releases

Version.Release	Date available	Withdrawal from Marketing effective (1)	Withdrawal from Service effective	Minimum z/VM level (2)
→ <a href="#">z/VSE V6.2</a>	12/01/2017 <a href="#">Announcement</a>	TBD	TBD	z/VM V5.4
→ <a href="#">z/VSE V6.1</a>	11/27/2015 <a href="#">Announcement</a>	12/01/2017 <a href="#">Announcement</a>	06/30/2019 <a href="#">Announcement</a>	z/VM V5.4
→ <a href="#">z/VSE V5.2</a>	04/25/2014 <a href="#">Announcement</a>	03/13/2017 <a href="#">Announcement</a>	10/31/2018 <a href="#">Announcement</a>	z/VM V5.4

## z/VSE Resources -status ...

<b>z/VSE server support</b>			
<b>IBM z Systems, IBM System z, zSeries and S/390 Server</b>	<b>z/VSE V6.2</b>	<b>z/VSE V6.1</b>	<b>z/VSE V5.2</b>
IBM z14 ZR1 (1)	Yes	Yes	Yes (4)
IBM z14 (1)	Yes	Yes	Yes (4)
IBM z13s (1)	Yes	Yes	Yes
IBM z13 (1)	Yes	Yes	Yes
IBM zEnterprise BC12 (1)	Yes	Yes	Yes
IBM zEnterprise EC12 (1)	Yes	Yes	Yes
IBM zEnterprise 114	Yes	Yes	Yes
IBM zEnterprise 196	Yes	Yes	Yes
IBM zEnterprise BladeCenter Extension (zBX) - IEDN Support	Yes (2,3)	Yes (2,3)	Yes (2,3)
IBM System z10 BC	No	Yes	Yes
IBM System z10 EC	No	Yes	Yes
IBM System z9 EC (formerly z9-109)	No	No	Yes
IBM System z9 BC	No	No	Yes
zSeries 990, 890	No	No	No
zSeries 900, 800	No	No	No
S/390 Parallel Enterprise Server G5/G6	No	No	No
S/390 Multiprise 3000	No	No	No

## z/VSE Resources - status ...

- z/VSE unsupported releases on <https://www.ibm.com/it-infrastructure/z/zvse-resources>
  - Supported z/VSE release, PDF includes supported hardware

### Unsupported releases may run on these servers at user's risk

IBM z Systems, IBM System z, zSeries and S/390 Server	z/VSE V5.1 (1)	z/VSE V4.1, V4.2 and V4.3 (1)	z/VSE V3.1 (1, 5)	VSE/ESA V2.7 and V2.6 (1)	VSE/ESA V2.5 (1)	VSE/ESA V2.4 (1)	VSE/ESA V2.3 (1)
IBM z14 ZR1 (7)	Yes (8)	LPAR: No z/VM: Yes (6, 9)	No	No	No	No	No
IBM z14 (7)	Yes (8)	LPAR: No z/VM: Yes (6, 9)	No	No	No	No	No
IBM z13s (7)	Yes	Yes (6)	Yes (4)	Yes (4)	No (2)	No (2)	No (2)
IBM z13 (7)	Yes	Yes (6)	Yes (4)	Yes (4)	No (2)	No (2)	No (2)
IBM zEnterprise BC12 (7)	Yes	Yes (6)	Yes (4)	Yes (4)	No (2)	No (2)	No (2)
IBM zEnterprise EC12 (7)	Yes	Yes (6)	Yes (4)	Yes (4)	No (2)	No (2)	No (2)
IBM zEnterprise 114	Yes	Yes (6)	Yes (4)	Yes (4)	No (2)	No (2)	No (2)
IBM zEnterprise 196	Yes	Yes (6)	Yes (4)	Yes (4)	No (2)	No (2)	No (2)
IBM System z10 EC	Yes	Yes (6)	Yes (6)	Yes (4)	Yes (4)	No (2)	No (2)
IBM System z10 BC	Yes	Yes	Yes (4)	Yes (4)	No (2)	No (2)	No (2)
IBM System z9 EC (formerly z9-109)	Yes	Yes	Yes (4)	Yes (4)	No (2)	No (2)	No (2)
IBM System z9 BC	Yes	Yes	Yes (4)	Yes (4)	No (2)	No (2)	No (2)



## Documentation related to z/VSE

- z/VSE Collection Kit
  - Available for download in IBM Publication Center  
<https://www-05.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>
  - Electronic only, not on physical DVD
  - z/VSE 6.2 Collection Kit: SK3T-8348-15
  
- Documentation of z/VSE releases - z/VSE Internet Library on  
<http://www.ibm.com/systems/z/os/zos/bkserv/vse.html>
  
- z/VSE Knowledge Center:  
[http://www.ibm.com/support/knowledgecenter/SSB27H/zvse\\_welcome.html](http://www.ibm.com/support/knowledgecenter/SSB27H/zvse_welcome.html)
  - Link to PDF library (z/VSE documentation)
  
- CICS TS for z/VSE Knowledge Center:  
<https://www.ibm.com/support/knowledgecenter/SSEECAB>

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[https://www.ibm.com/support/knowledgecenter/SSB27H/zvse\\_welcome.html](https://www.ibm.com/support/knowledgecenter/SSB27H/zvse_welcome.html)

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## z/VSE Requirements

- You may submit requirements at conferences (GSE, zUniversity, VM Workshop, ...)
- **z/VSE** requirements via the Request for Enhancements (RFE) database:  
<http://www.ibm.com/developerworks/rfe/>
  - Please select the following for z/VSE requirements
    - *Brand = Servers and System Software*
    - *Product family = z Systems Software*
    - *Product = z/VSE*
    - *Component = General, z/VSE, VSE/AF, VSE/VSAM, VSE/POWER, VSE Unique Code, ...*
    - *Operating system = IBM z/VSE*
    - *Source = Share, IBM user group, IBM Conference, ..., Other*
- **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 = Servers and Systems Software*
    - *Product family = Transaction Processing*
    - *Product = CICS Transaction Server*
    - *Component = Runtime or Explorer*
    - *Operating system = IBM z/VSE*

## Documentation related to z/VSE ...

- IBM Redbooks - <http://www.redbooks.ibm.com/>
  - Redbook page with new / updated IBM z Systems mainframe Redbooks
    - zEC12 / zBC12 / z13 / z13s / z14 / z14 ZR1 Technical Guides
    - IBM System z Connectivity Handbook, SG24-5444
  - Introduction to the New Mainframe: z/VSE Basics  
<http://www.redbooks.ibm.com/abstracts/sq247436.html?Open>
  - Security on IBM z/VSE – updated  
<http://www.redbooks.ibm.com/abstracts/sq247691.html?Open>
  - z/VSE Using DB2 on Linux for System z  
<http://www.redbooks.ibm.com/abstracts/sq247690.html?Open>
  - Enhanced Networking on IBM z/VSE  
<http://www.redbooks.ibm.com/Redbooks.nsf/RedpieceAbstracts/sq248091.html?Open>
  - Migration to CICS TS for z/VSE  
<http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/sq248390.html?Open>

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<http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/sq248390.html?Open>

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<http://www.redbooks.ibm.com/abstracts/sg247691.html?Open>

## Documentation related to z/VSE ...

- Technical articles, white papers and Hints & Tips:  
[https://www.ibm.com/support/knowledgecenter/SSB27H\\_6.2.0/technical\\_articles\\_and\\_whitepapers.html](https://www.ibm.com/support/knowledgecenter/SSB27H_6.2.0/technical_articles_and_whitepapers.html)
  - Using SCRT (Java Version) with z/VSE – Best Practices
  - z/VSE release & hardware upgrade
  - z/VSE SCSI Support and Migration Options
  - z/VSE z/VM IP assist
  - Parallel Access Volume (PAV) white paper
  - ....
  - **New:** Hints and Tips for z/VSE 6.2:  
<http://www.ibm.com/systems/z/os/zvse/documentation/#hints>
  
- Sample code: Transfer SCRT89 records via the Host Transfer File
  - Link in PDF [ftp://public.dhe.ibm.com/eserver/zseries/zos/vse/pdf3/zVSE\\_Samples.pdf](ftp://public.dhe.ibm.com/eserver/zseries/zos/vse/pdf3/zVSE_Samples.pdf)





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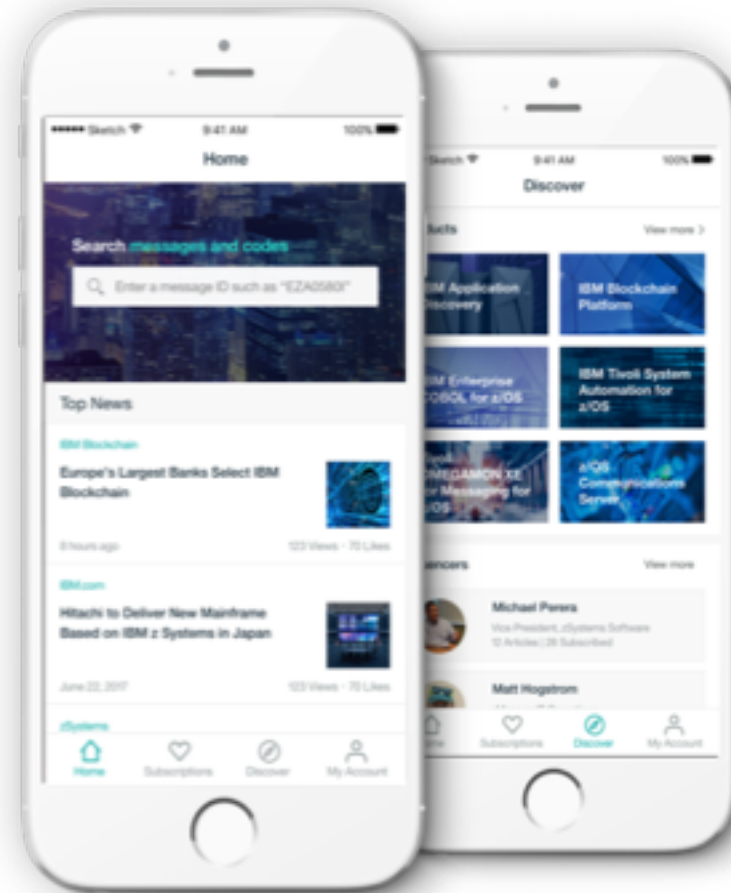
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## Session reference links

- z/VSE Homepage: [www.ibm.com/vse](http://www.ibm.com/vse)
  
- Ingolf's z/VSE blog: [www.ibm.com/developerworks/mydeveloperworks/blogs/vse/](http://www.ibm.com/developerworks/mydeveloperworks/blogs/vse/)  
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- z/VSE service and support: <http://www-01.ibm.com/support/docview.wss?uid=isa3T1027442>
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