



Need Space? How to Start Planning Now for Migration to EAV

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Session Objectives

- Brief Review
- Update on new Feature / Function
- Migrating to EAVs

Review

Why is EAV needed

- **Problem:**

- Running out of z/OS addressable disk storage limited by the four-digit device number
 - Rapid data growth on the z/OS platform driving limit
 - Business Resilience solutions for continuous availability also drives this limit

- **Solution:**

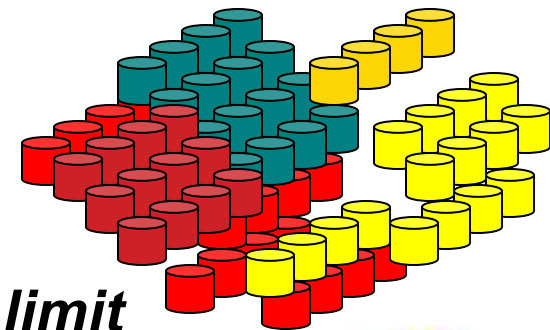
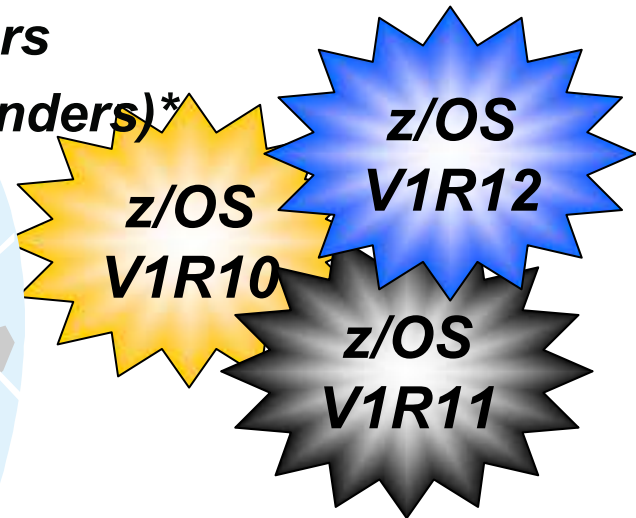
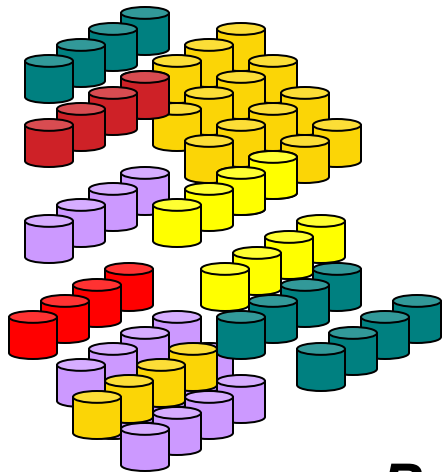
- Defining larger volumes by increasing the number of cylinders beyond 65,520
 - New track address format
 - *28 bit cylinder track address (CCCCcccH)*
 - Space managed in multi-cylinder units
 - *Cylinder-managed space (EAS)*

- **Benefit:**

- Increase z/OS addressable disk storage
 - z/OS V1R12 completed the major function by supporting additional data set types as EAS eligible.
- Allows for management of smaller number of volumes
- Dynamic Volume Expansion simplifies growth

What is an EAV

- What is an Extended Address Volume (EAV)?
 - *A volume with more than 65,520 cylinders*
 - *Size limited to 223 GB (262,668 Max cylinders)**
 - *Supported in z/OS V1R10 and higher*

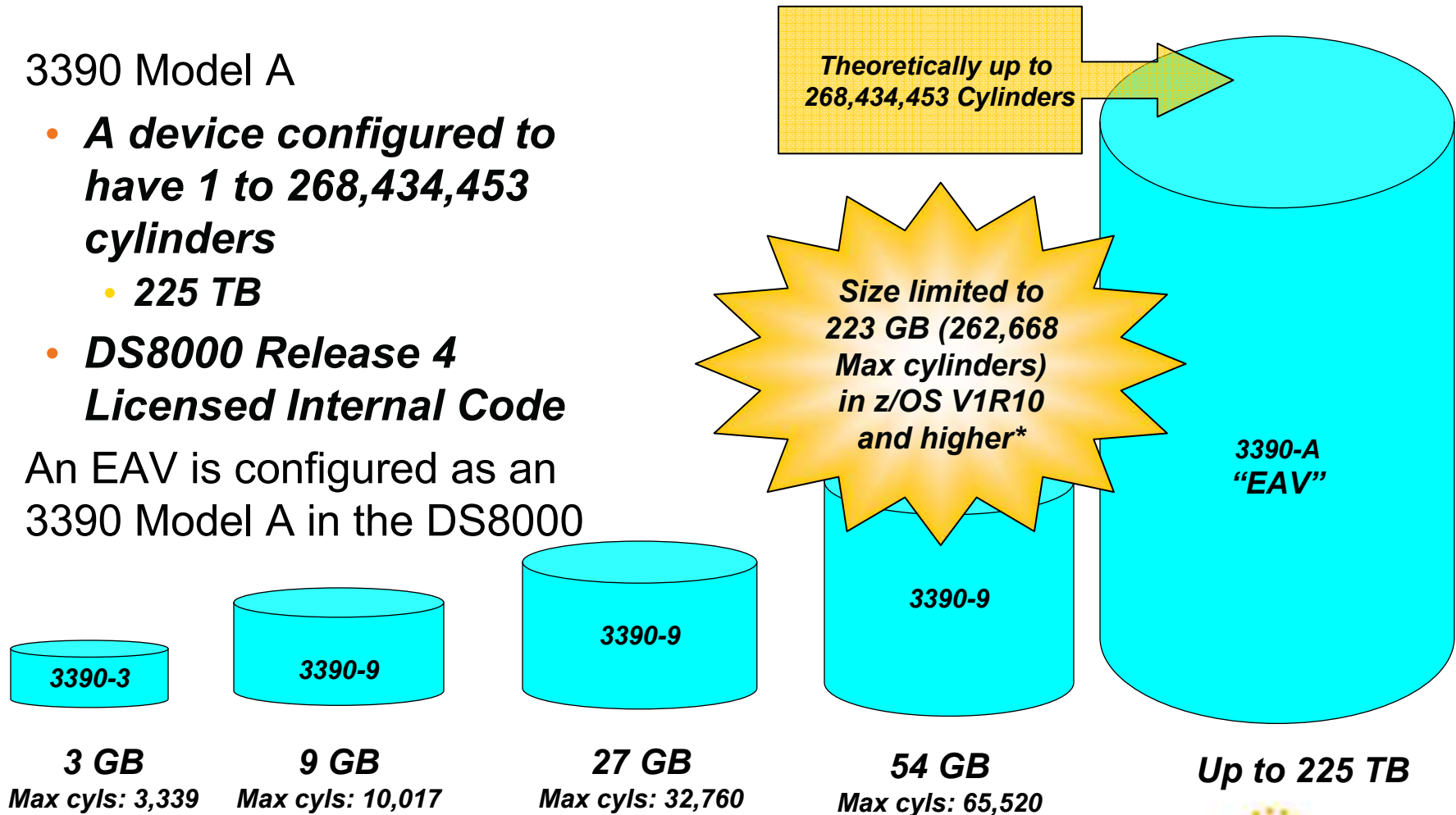


Breaking the 65,520 cylinder limit

**Current maximum size*

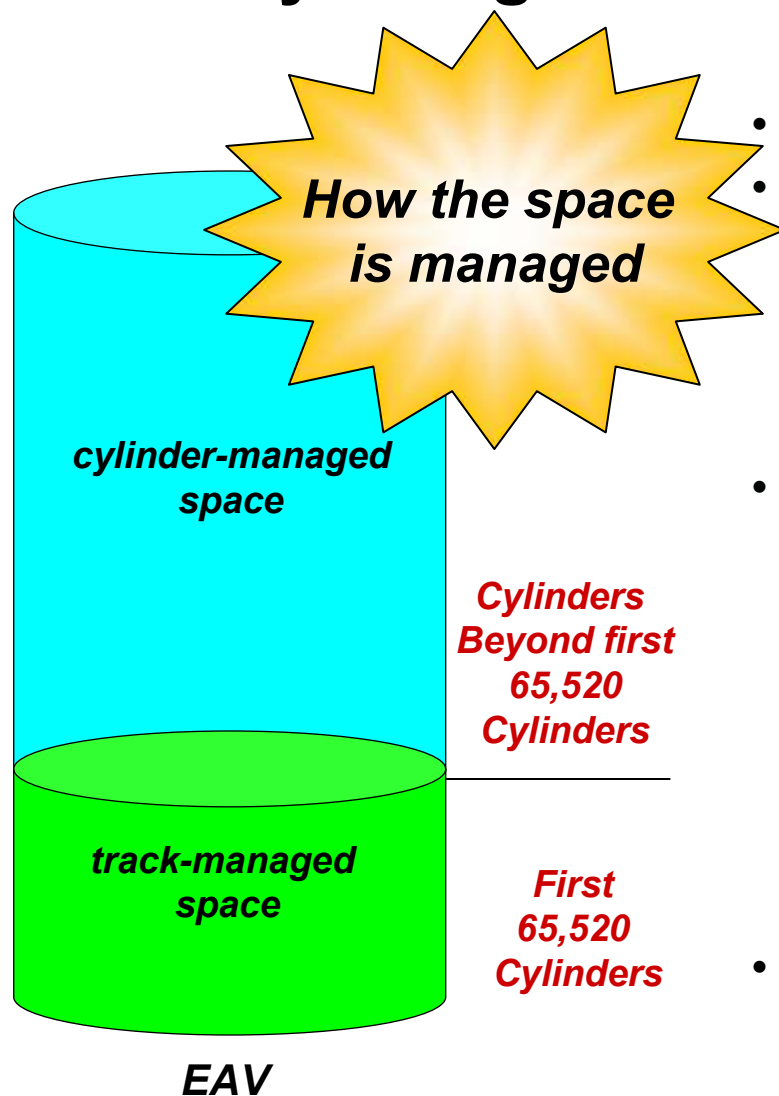
DS8000 Support

- 3390 Model A
 - *A device configured to have 1 to 268,434,453 cylinders*
 - *225 TB*
 - *DS8000 Release 4 Licensed Internal Code*
- An EAV is configured as an 3390 Model A in the DS8000



*Current maximum size

EAV Key Design Points



- Maintains 3390 track format
- **Track-managed space:** the area on an EAV located within the first 65,520 cylinders
 - Space is allocated in track and cylinder units
 - Storage for “small” data sets
- **Cylinder-managed space:** the area on an EAV located above the first 65,520 cylinders
 - Space is allocated in **multicylinder units**
 - A fixed unit of disk space that is larger than a cylinder. Currently on an EAV it is 21 cylinders
 - System may round space requests up
 - Storage for “large” data sets
- Track-managed space comparable to same space on non-EAVs

EAV Key Design Points cont.

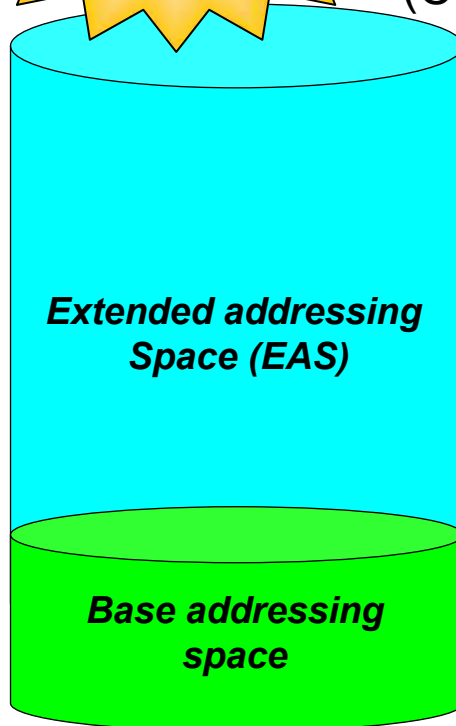
- **Base addressing space:** the area on an EAV located within the first 65,536 cylinders.
 - 16-bit cylinder addressing (CCHH)
 - Comparable to same addressing space on a non-EAV

How the space is addressed

Extended addressing space (EAS): the area on an EAV located above the first 65,536 cylinders.

- 28-bit cylinder addressing (CCCCccch)

The first 65,536 cylinders



Cylinders beyond first 65,536 cylinders

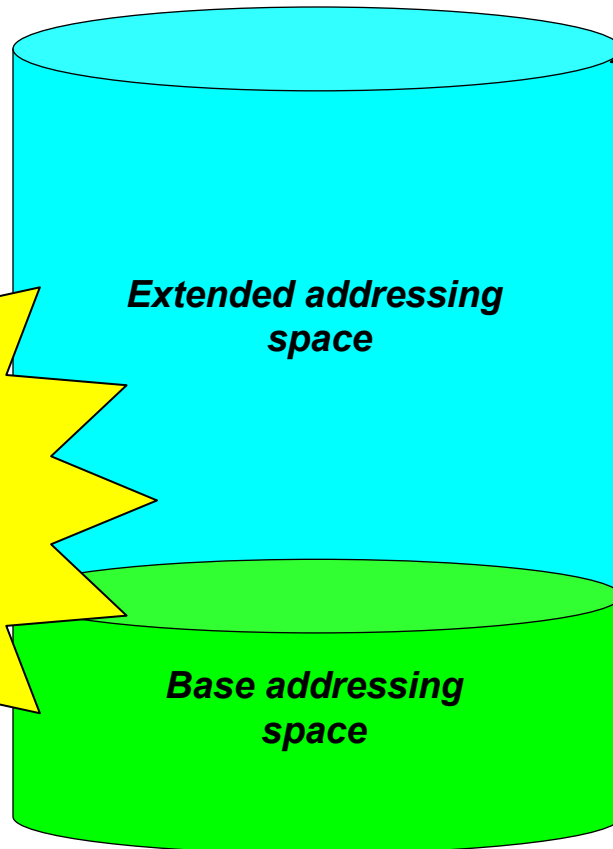
New track address format needed to access tracks in EAS

Access to EAS eligible data sets on EAV



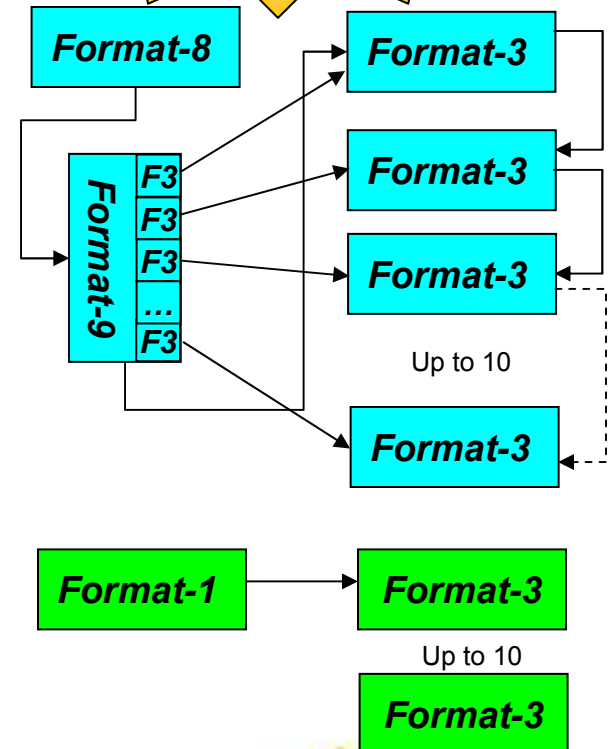
- EAS eligible data sets can reside anywhere on an EAV
 - Format 8/9 DSCBs

**As of z/OS V1R12
EAS eligible data
sets include VSAM,
Sequential, Direct,
and Partitioned**



EAV

New DSCB types provides a method of protecting existing programs from seeing an unexpected new track address format



EAS Eligible data set sets in z/OS

- **EAS Eligible:** A data set on an EAV that is eligible to have extents in the extended addressing space and described by extended attribute DSCBs (format 8/9)
- Can reside in track or cylinder-managed space
- SMS-managed or non-SMS managed
- Any data set type can reside in track-managed space
- Data set types supported
 - **VSAM data types (KSDS, RRDS, ESDS and linear)**
 - *This covers DB2, IMS, CICS, zFS and NFS*
 - *CA sizes: 1, 3, 5, 7, 9 and 15 tracks*
 - **Sequential (Extended Format)**
 - **Sequential (Basic and Large Format)**
 - **Direct (BDAM)**
 - **Partitioned (PDS, PDSE)**
 - **Catalog (VVDS and BCS)**



**V1R10
VSAM**



**V1R11
VSAM
EF SEQ**



**z/OS
V1R12
ALL**

Non-EAS eligible data set list

- A data set that may exist on an EAV but is not eligible to have extents (through create or extend) in the extended addressing space or have extended attribute DSCBs (format 8/9)
- The following data sets are not EAS eligible:
 - VSAM data sets with incompatible CA sizes
 - VTOC (continues to be restricted to within first 64K-1 tracks)
 - VTOC index
 - Page data sets
 - VSAM data sets with IMBED or KEYRANGE attributes
 - HFS file system
 - XRC Control, Master or Cluster non-VSAM data sets
 - *State data set EAS eligible in z/OS V1R12*
 - *Journal data set EAS eligible in z/OS V1R11 and V1R12*

EATTR Data Set Attribute



EATTR is a new data set attribute to specify whether extended attributes can be created for a data set

- **Used to override system-determined EAS eligibility**
- NO - No extended attributes
 - Data set *cannot* have extended attributes (Format 8 and 9 DSCBs) or optionally reside in EAS.
 - Default behavior for non-VSAM data sets in z/OS V1R11 and higher.
 - In z/OS V1R10 in the absence of EATTR this is equivalent to what the system uses for non-VSAM.
- OPT - Extended attributes are optional
 - Data set *can* have extended attributes and *can* optionally reside in EAS.
 - Default behavior for VSAM data sets in z/OS V1R11 and higher.
 - In z/OS V1R10 in the absence of EATTR this is equivalent to what the system uses for VSAM.
- Specifiable in AMS DEFINE CLUSTER and ALLOCATE, JCL, dynamic allocation, data class and ISPF



How To Access extended attribute DSCBs

- Code EADSCB=OK to access extended attribute data set control blocks (DSCBs)
 - EADSCB=OK indicates that program understands 28-bit cylinder numbers and format 8 and 9 DSCBs.
 - OBTAIN (CAMLST), CVAFDIR, CVAFFILT, CVAFSEQ, DCBE (open for EXCP processing, open VTOC), CVAFDSM
 - Not specifying EADSCB=OK will cause these services to fail
 - Keyword on 1.10 programs ignored on pre 1.10 systems & on volumes not supporting extended attribute DSCBs
 - Recommendation: code keyword on all invocations

Not all applications can access EAS eligible data sets!

Use the tracking facility to assist in finding programs

EADSCB=OK keyword must be specified to access EAV VTOC records!

New Feature/Function

1 TB EAVs*

- **z/OS V1.13 builds on existing EAV functionality and is planned to support larger extended address volumes (EAVs), up to 1 TB per volume (Maximum of 1,182,006 cylinders)**
 - Also planned for z/OS R12 with PTFs
- Will require:
 - IBM System Storage DS8700 or DS8800 series
 - New DS8000 licensed machine code
- This enhanced support is intended to continue to relieve storage constraints while helping you simplify storage management by providing the ability to manage fewer, larger volumes as opposed to many small volumes.
- Availability is planned for 4Q11

* All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Migrating to EAVs

Planning Steps

- Review
 - IBM publications
 - Start with z/OS V1R10+ DFSMS Using the New Functions
 - Migration to EAV considerations
 - EAV migration tracking facility output
- Configure EAV on your DS8000
- Add EAV to your storage group/pools
- Specify EATTR=OPT|NO for data sets, as appropriate, to override system default for EAS eligibility
 - Specifiable in AMS DEFINE CLUSTER and ALLOCATE, JCL, dynamic allocation, data class and ISPF
- Enable the use of EAV in your system
 - IGDSMSxx PARMLIB member
 - USEEAV(YES|**NO**)
 - *YES, new allocations on EAV are allowed*
 - BreakPointValue (0-65520)
 - *Preferred allocation placement (based on cylinders) in track- vs cylinder-managed space*
 - *Also, avail at Storage Group level*
- Migrate data

Migration to EAV considerations

- Upgrade system service calls that read DSCBs, read free space or attempt to OPEN the VTOC or a VSAM data set with EXCP access
- OBTAIN, CVAFDIR, CVAFDSM, CVAFVSM, CVAFSEQ, CVAFFILT, OPEN to VTOC, OPEN EXCP
 - Add EADSCB=OK to indicate support for format 8 DSCBs and 28-bit cylinder numbers that may be present in extent descriptors and free space
- Optionally upgrade system service calls to use new information that describes an EAV
- LSPACE, DEVTYPE, IDCAMS DCOLLECT
- Upgrade programs that parse formatted output that has changed with EAV
- IEHLIST LISTVTOC, IDCAMS LISTCAT, IDCAMS LISTDATA PINNED
- Utilize SMF records to identify programs that may need to be changed
- Upgrade programs that utilize changed SMF records or access the VVDS to support 28-bit cylinder
- Upgrade programs that process the VTOC index to support the larger sized space map records

Migration to EAV considerations – SMF Records



- SMF Type 14/15 (non-VSAM data set EOV or close)
 - A new flag, SMF14EADSCB, indicates whether a program specified EADSCB=OK on the DCBE macro
 - Specific migration aid in z/OS V1R10 to identify programs that open the VTOC or VSAM data sets with EXCP (MACRF=E)
 - In z/OS V1R10 or later this data set may have a format 8 DSCB
 - *IBM recommends that you upgrade the program to handle 28-bit cylinder numbers and code EADSCB=OK*
 - A new flag, SMF14EXCPBAM, indicates that a program used a non-EXCP OPEN DCB (BSAM, QSAM, BPAM) and issued EXCP or XDAP
 - When SMF14EADSCB is off, it identifies programs that may need to be upgraded to handle 28-bit cylinder numbers and have EADSCB=OK coded

Note: Use TRKADDR macro to upgrade programs



Migration to EAV considerations – SMF Records (cont)



- SMF Type 19 (volume statistics)
 - LSPACE statistics recorded. Expanded with track-managed free space stats and total volume/track-managed space sizes
- SMF Type 60, 61, 64, 65, 66 (various VSAM events)
 - Each of these SMF records contains a copy of a catalog record for a VSAM data set. They may contain extent descriptors with cylinder numbers greater than 65535.
- SMF Type 74, subtype 1 (RMF device activity)
 - New device capacity field saved

Migration to EAV considerations

- VTOC index
 - Index block size increased from 2048 bytes to 8192 bytes for devices with cylinder-managed space
 - Default index size computed by ICKDSF – may not be 15 tracks
- VVDS
 - VVDS (VSAM volume data set) contains extent descriptors for VSAM data sets
 - VVR (VVDS record)
 - *May contain 28-bit cylinder numbers*
 - No interfaces provided to access the VVDS directly
 - *Programs that access the extents in the VVR record must ensure that they support 28-bit cylinder numbers*
 - *Use TRKADDR macro*

Migration Considerations - EATTR



- Possible to share EAVs with pre-z/OS V1R12 systems *until* explicit action is taken to begin allowing non-VSAM data sets to reside in the EAS of an EAV
 - Applies to basic and large sequential, partitioned and direct data sets (EATTR will default to NO for non-VSAM data sets)
 - **A non-VSAM data set allocated with extended attribute DSCBs on z/OS V1R12 will not be able to be opened on pre z/OS V1R12 systems**
- EATTR specifiable for non-EAS eligible data sets
 - EATTR=OPT could have been specified on pre z/OS V1R12 system and ignored
 - In z/OS V1R12 the EATTR=OPT setting will come into affect
 - Be certain application can handle extended attribute DSCBs and 28-bit cylinder numbers



Migration considerations



- z/OS V1R12 introduces support for sequential (basic, large), partitioned (PDS/PDSE), Catalogs, and BDAM data sets in the extended addressing space (EAS)
 - On systems with V1R11 or lower, any attempt to open one of these types of non-VSAM data sets created on z/OS V1R12, will fail with existing abend IEC144I 313-0C
 - Prior to z/OS V1R12 system, if the next data set in the concatenation is one of these types of non-VSAM data sets created in z/OS V1R12, then EOVS will fail with new abend IEC023I 237-24.
 - Starting with z/OS V1R12, attempts to open EAV supported non-VSAM data sets will succeed with standard BSAM, BPAM and QSAM access
 - Can no longer rely on open abend
 - Data set extents in DEB may contain 28-bit cylinder numbers
 - ***Programs need to be changed to support 28-bit cylinder addressing***
 - EXCP access still requires EADSCB=OK and will continue to get the open abend if EADSCB=OK is not specified on the DCBE macro

Migration considerations



■ Tracking Facility

- Finds programs that need changing without the use of an EAV
- When run from z/OS V1R12 the tracking facility will report instances for basic and large sequential, partitioned and direct data sets where EADSCB=OK has not be specified on system services
 - See speaker notes for a list of system services
- If the 'error' instances are not upgraded the invocation of the service will fail on an EAV
- DFSMS will provide migration assistance through this facility
 - Evaluating results through documented email address
 - Advised use of the exclude list to avoid seeing known problems
- Refer to APAR II13752

Configure an EAV – New volume

- Create new EAV
 - Use DS8000 Storage Manager or DSCCLI to define a 3390 Model A
 - *3390 Model A selectable in the DS8000 Storage Manager*
 - *Not a new device type, not defined in HCD*
 - *From 1 to more than 65520 cylinders*
- Use ICKDSF INIT to initialize the volume

Configure an EAV - Existing volume

- Expand an existing volume on DS8000 with dynamic volume expansion (DVE)
 - Use DS8000 Storage Manager or DSCLI to expand existing volume
 - Any existing 3390 volume can be expanded
 - *Converted to 3390 Model A*
 - *Capacity in same extent pool must be available*
 - *Expand to any size*
 - Volume remains online and accessible to applications without moving data
 - Reduces complexity of moving data to larger volumes
 - *No need for target volume being available*
 - Copy services relationships must first be withdrawn
 - Use ICKDSF REFORMAT REFVTOC to update VTOC and VTOC index to access new cylinders - non disruptive

Configure an EAV - Existing volume cont.

- Can take advantage of Dynamic VTOC Refresh
 - Enabled with F DEVMAN,ENABLE(REFVTOC)
 - Queried with F DEVMAN,REPORT
- On DVE, the system will detect the size change and automatically invoke the reformat command to rebuild/refresh the vtoc/index to take advantage of the newly acquired cylinders. All systems in the sysplex will be updated with the new size based on an ENF signal
 - HSM listens to the signal to update its structures
 - CVAF calls SMS directly to update its structures

Data Migration

- Verify with the tracking facility that applications and vendor software would work with an EAV
- Add EAVs to SMS storage groups, storage pools/esoteric, update ACS routines
- Specify EATTR option as appropriate
- Determine BPV and allocation/migration thresholds
- Enable use of EAV with USEEAV(YES) in IGDSMSxx parmlib
- Verify applications and vendor software work with EAV

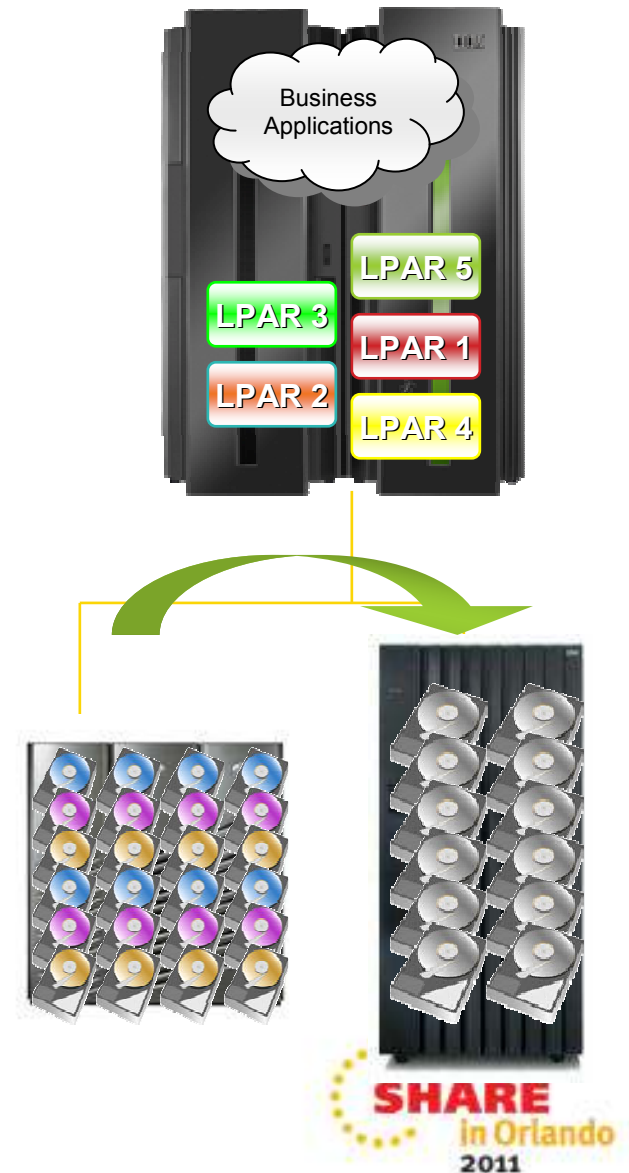
Data Migration cont.

- Volume level operations
 - Copy data with TDMF
 - DFSMSdss physical copy
 - PPRC migration manager
 - DFSMS Copy Services Global Mirror, Metro Mirror, Global Copy, Flash Copy (also known as PPRC, PPRC-XD)
- Data set level operations
 - SMS storage group policies to direct new allocations to volumes
 - Move data with zDMF
 - DFSMSdss logical data set copy
 - Move data with DFSMSHsm

IBM Data Mobility Services – Softek TDMF z/OS*

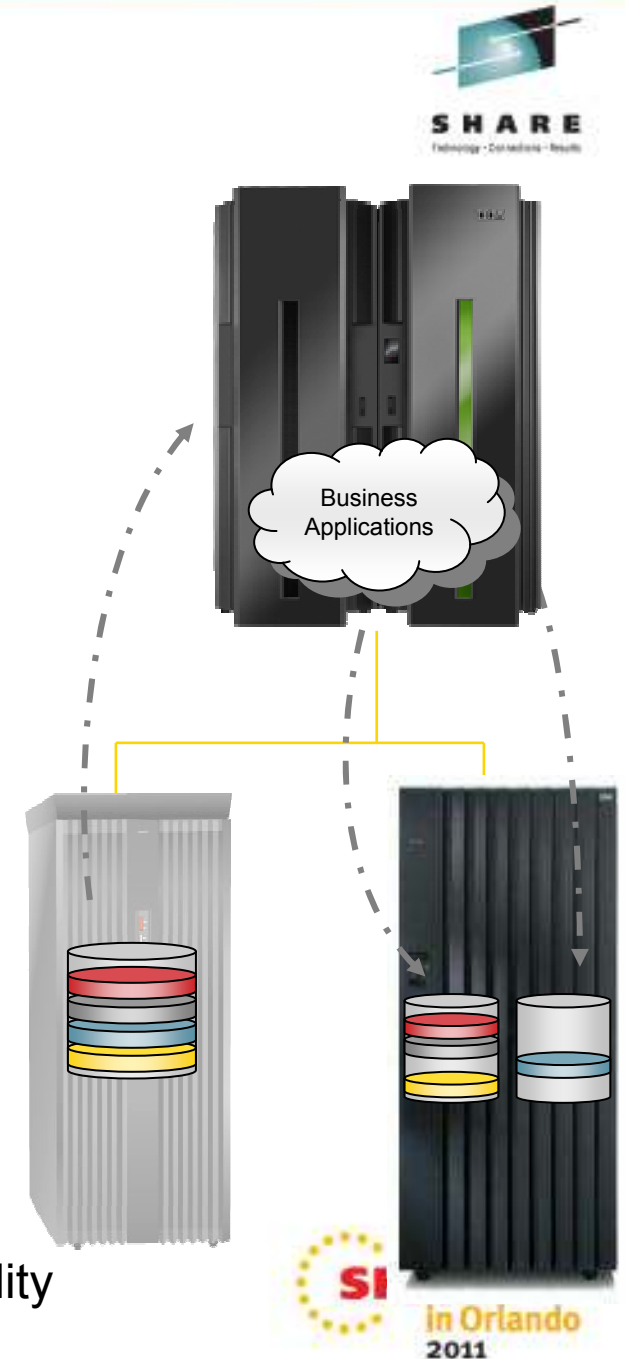


- Dynamic, nondisruptive Swap migrations
 - Transparent cutover to new storage without application outage
 - Source data is always available
- Local or global movement
 - TCP/IP or channel extenders (for global)
- No additional hardware or software required
- Extremely scalable
 - One or more concurrent sessions can be executed
- Flexible pacing, copy and group options reduces application impact and increases manageability
- Supports –
 - DS8000 and Extended Address Volumes (EAV)



IBM Data Mobility Services – Softek zDMF*

- Host-based software to migrate datasets across major hardware vendors and different disk capacities with minimal disruption to applications in z/OS environments
- Streamlines the pre-migration process
- Supports compliance initiatives
 - Protected environments
 - Mirrored vs. non-mirrored
- Relocation of persistently allocated data sets while in use
- Supports –
 - DS8000 and Extended Address Volumes (EAV)
- Group datasets for easier management of large migrations



*z/OS Dataset Mobility Facility



Extended Address Volumes (EAV) Migration Service

- GTS Service - Data migration for EAV Enablement 6950-94Y
- z/OS customers are experiencing high data growth rates & need to store and access progressively larger amounts of data without impact to the business.
- IBM storage consultant will perform a service to successfully migrate data from volumes under 54GB to volumes larger than 54GB.
- The service will help customers move data non-disruptively at a dataset level leveraging Softek TDMF z/OS and zDMF assets.
- The Service is based on the current service – Data Migration for System Z Data

Benefits of Data Migration Service for EAV

- Migrate at the dataset level with no an application outage
- Move data from any storage vendors' equipment to IBM storage
- Consolidate Mod 3s, 9s, 27s, and 54s to DASD volumes above 54GBs
- Address daily performance issues at the dataset level
- Reclaim UCBs to extend system resources
- Predictable results
 - Lowers the risks associated with manual migrations



URLs

- z/OS main page: <http://www-03.ibm.com/systems/z/os/zos/>
- DFSMS tracking facility exclusion list data:
 - [IBM: z/OS downloads](http://www-03.ibm.com/servers/eserver/zseries/zos/downloads)
(www-03.ibm.com/servers/eserver/zseries/zos/downloads)
- Software developers support table:
 - [IBM: z/OS elements, features, and software products](http://www-03.ibm.com/systems/z/os/zos/software)
(www-03.ibm.com/systems/z/os/zos/software)

Questions

Appendix

Migration – DFSMS Tracking Facility



EAV migration assistance through use of the Tracking Facility

- Identify EAV exceptions by job, program name
 - Identify interfaces that access the VTOC and should be upgraded to have EADSCB=OK (Errors)
 - OBTAIN, CVAFDIR, CVAFDSM, CVAFVSM, CVAFSEQ, CVAFFILT, OPEN to VTOC, OPEN EXCP
 - Identify programs that may want to use new services (Informational)
 - LSPACE, DEVTYPE, IDCAMS DCOLLECT
 - Identify the possible improper use of returned information, like parsing 28-bit cylinder numbers in output as 16-bit cylinder numbers (Warning)
 - IEHLIST LISTVTOC, IDCAMS LISTCAT, IDCAMS LISTDATA PINNED



Migration - Starting/Stopping the Tracking Facility

Starting the tracking facility

```
14.32.26 SYSTEM1          setcon tracking=on
14.32.26 SYSTEM1          IEE712I SETCON    PROCESSING COMPLETE
14.32.41 SYSTEM1          setcon tracking=onwithabend
14.32.41 SYSTEM1          IEE712I SETCON    PROCESSING COMPLETE
```

ONWITHABEND:

Use this command to activate the tracking facility and cause violators to be ABENDED with ABEND code 077, reason code 0034

Entry is recorded in the LOGREC.

SLIP SET,ENABLE,ID=TRAK,COMP=077,REASON=34,ACTION=SVCD,END to obtain dump.

Stopping the tracking facility

```
14.37.22 SYSTEM1          setcon tracking=off
14.37.27 SYSTEM1          IEE712I SETCON    PROCESSING COMPLETE
```

Migration – Tracking Facility output



```
13.21.19 SYSTEM1          d opdata,tracking
13.21.19 SYSTEM1          CNZ1001I 13.21.19 TRACKING DISPLAY 831
STATUS=ON,ABEND NUM=15    MAX=1000 MEM=7T  EXCL=45    REJECT=0
----TRACKING INFORMATION---- -VALUE-- JOBNAME  PROGNAME+OFF-- ASID NUM
SMS-E:1 CVAFDIR STAT082    045201 CVAFJBN  CVAFPGM    756  28  4
SMS-E:1 CVAFDSM STAT082    045201 CVAFJBN  CVAFPGM    556  28  4
SMS-E:1 CVAFFILT STAT086    04560601 CVAFJBN  CVAFPGM    456  28  4
SMS-E:1 CVAFSEQ STAT082    045201 CVAFJBN  CVAFPGM    656  28  4
SMS-E:1 DADSM OBTAIN       C08001 OBTJBN  OBTPGM     856  28  4
SMS-E:1 DCB OPEN VSAM 113-44    01 OPENJBN  OPENPGM    256  28  4
SMS-E:1 DCB OPEN VTOC 113-48    01 OPENJBN  OPENPGM    356  28  4
SMS-I:3 DEVTYPE           02 DEVTJOB  DEVTPROG   CE5C   11  1
SMS-I:3 IDCAMS DCOLLECT       02 DCOLLECT  IDCAMS     1515  28  4
SMS-I:3 LSPACE EXPMSG=       8802 VTDS0IS1 VTDS0IS2   118  28  2
SMS-I:3 LSPACE MSG=         5002 ALLOCAS  IEFW21SD  4CE5C   11  2
SMS-I:3 LSPACE MSG=         9002 *MASTER* IEE70110  52F6   01  43
SMS-W:2 IDCAMS LISTDATA PINN    03 LISTDATX  IDCAMS     E48E   28  2
SMS-W:2 IDCAMS LISTCAT        03 LISTCAT   IDCAMS     956   28  4
SMS-W:2 IEHLIST LISTVTOC       03 LISTVTOC  IEHLIST    1056   28  4
```

TO REPORT THESE INSTANCES, SEND THIS MESSAGE VIA E-MAIL TO
CONSOLES@US.IBM.COM. FOR ADDITIONAL INFORMATION OR TO OBTAIN A CURRENT
EXCLUSION LIST, SEE APAR II13752.



Migration – DFSMS Tracking Facility Conventions



Tracking Information:

- SMS- to represent this as a DFSMS instance
- “E, W, or I” for error, warning or informational followed by a colon
- Numeric categorized reason for the recorded instance
- Remaining tracking information set to any EBCDIC value

Example: SMS-I:3 LSPACE MSG=

Categories numeric reason codes:

- 1 - EAV migration. **EADSCB=YES** keyword not specified on invoking function.
- 2 - EAV migration. **Formatted output display may contain 28-bit cylinder numbers.**
- 3 - EAV migration. **New function is available on invoking function.**

Other Categories can be defined as needed.





Migration – Tracking Facility Exclusion List

Identify the exclusion list

```
13.45.02 SYSTEM1          set cnidtr=7t
13.45.02 SYSTEM1          IEE536I CNIDTR    VALUE 7T NOW IN EFFECT
```

The exclusion list prevents instances from being recorded. It is filtered based on the following:

- Tracking information mask, job name mask, program name mask

*	Jobname	Pgmname	*
* Tracking Information Mask	Mask	Mask	Comments (ignored) *
SMS-I:3 LSPACE*	*MASTER*	IEE70110	Switch SMF
SMS-I:3 LSPACE*	ALLOCAS	IEFW21SD	VARY DEVICE OFFLINE

Download latest 1.10 DFSMS tracking facility exclusion list data from:
www-03.ibm.com/servers/eserver/zseries/zos/downloads/

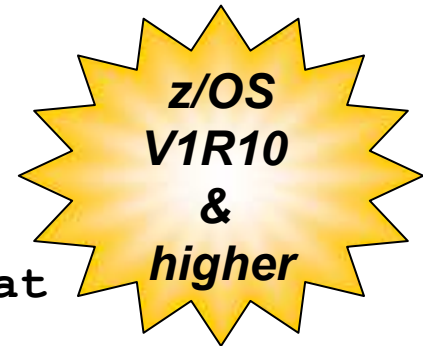
Software developers support table – EAV support information: [IBM: z/OS elements, features, and software products](http://www-03.ibm.com/systems/z/os/zos/software),
 (www-03.ibm.com/systems/z/os/zos/software)



Migration considerations

You can test the following bits in DFAFEAT8 in the DFA, mapped by IHADFA, to learn which data set types can be opened with format 8 DSCBs:

1... ..	DFAVSAMFOREAS	VSAM
.1... ..	DFASEQFOREAS	Basic & large format
	sequential	
..1.	DFAPDSEFOREAS	PDSE
...1	DFAPDSFOREAS	PDS
.... 1...	DFADIRFOREAS	Direct (BDAM)
.... .1..	DFAEFSEQFOREAS	Extended format
	sequential	
.... ..1.	DFAUNDEFFOREAS	No DSORG



- In V1R10, only the VSAM bit will be on (with PTF on V1R10).
- In V1R11, the VSAM and extended format sequential bits will be on.
- In V1R12, all the bits will be on.

Migration considerations



- EOV Like concatenation
 - With data sets with extended attribute DSCBs
 - EOV for EXCP processing requires EADSCB=OK to be specified on the DCBE macro to switch to a data set with extended attribute DSCBs. If EADSCB=OK is not specified, new abend IEC023I 237-28 will be issued.

IEC023I 237-28 During EOV concatenation, a Format 8 DSCB was read for a data set that was EAS eligible but EADSCB=OK on the DCBE macro was not specified

- OPEN
 - Since BDAM is eligible for EAS, an OPEN with DCB OPTCD=A (actual track addresses) of a BDAM data set described with extended attribute DSCBs will be failed with existing abend IEC142I 113-44 unless EADSCB=OK set on DCBE macro.



Migration considerations



- DFSMShsm
 - HSM owned volumes (migration/backup volumes) that are EAV or HSM owned data sets (Journal, Log, CDS backup, PDA) that are allocated with extended attribute DSCBs will not be able to be accessed on pre z/OS V1R12 systems
 - Existing support will detect these conditions.
 - Restrict these uses until all systems are at z/OS V1R12 or higher

Migration considerations



- XRC
 - Control, Master, and Cluster data sets if allocated with extended attribute DSCBs will cause these data sets to be inaccessible.
 - Because of size, little benefit is gained
 - Restrict their use to track-managed space
 - Journal data set can be allocated in EAS at z/OS V1R11 and higher
 - State data set may be allocated in EAS at z/OS V1R12 and higher.

Terminology

Note: Two sets of terms are to be used reference an EAV. One to describe how space is managed and the other to describe how the disk is addressed. The context of what is being described will dictate which terminology to use.

- **extended address volume (EAV)**. A volume with more than 65,520 cylinders. Only 3390 Model A devices can be an EAV.
- **track address**: A 32 bit number that identifies each track within a volume. It is in the format hexadecimal CCCcH, where CCC is the low order 16 bits of the cylinder number, c is the high order 12 bits of the cylinder number, and H is the four-bit track number. For compatibility with older programs, the c portion is hexadecimal 000 for tracks in the base addressing space.
- **extended addressing space (EAS)**. On an extended address volume, the cylinders whose addresses are equal to or greater than 65,536. These cylinder addresses are represented by 28-bit cylinder numbers.
- **base addressing space**. On an extended address volume, the cylinders whose addresses are below 65,536. These cylinder addresses are represented by 16-bit cylinder numbers or by 28-bit cylinder numbers whose high order 12 bits are zero.
- **multicylinder unit**. A fixed unit of disk space that is larger than a cylinder. Currently, on an EAV, a multicylinder unit is 21 cylinders and the number of the first cylinder in each multicylinder unit is a multiple of 21.
- **cylinder-managed space**. The space on the volume that is managed only in multicylinder units. Cylinder-managed space begins at cylinder address 65,520. Each data set occupies an integral multiple of multicylinder units. Space requests targeted for the cylinder-managed space will be rounded up to the next multicylinder unit. The cylinder-managed space exists only on EAV volumes.
- **track-managed space**. The space on a volume that is managed in tracks and cylinders. Track-managed space ends at cylinder address 65,519. Each data set occupies an integral multiple of tracks. Track-managed space also exists on all non-EAV volumes.
- **breakpoint value (BPV)**. When a disk space request is this size or more, the system prefers to use the cylinder-managed space for that extent. This applies to each request for primary or secondary space for data sets that are eligible for the cylinder-managed space. If not enough cylinder-managed space is available, then the system will use the track-managed space or will use both areas. The breakpoint value is expressed in cylinders. When the size of a disk space request is less than the breakpoint value, the system prefers to use the track-managed area and if enough space is not available there, then the system will use the cylinder-managed space or will use both areas.

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