



E14

VSE VTAPE

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IBM eServer zSeries

## VSE Virtual Tape – What's new?



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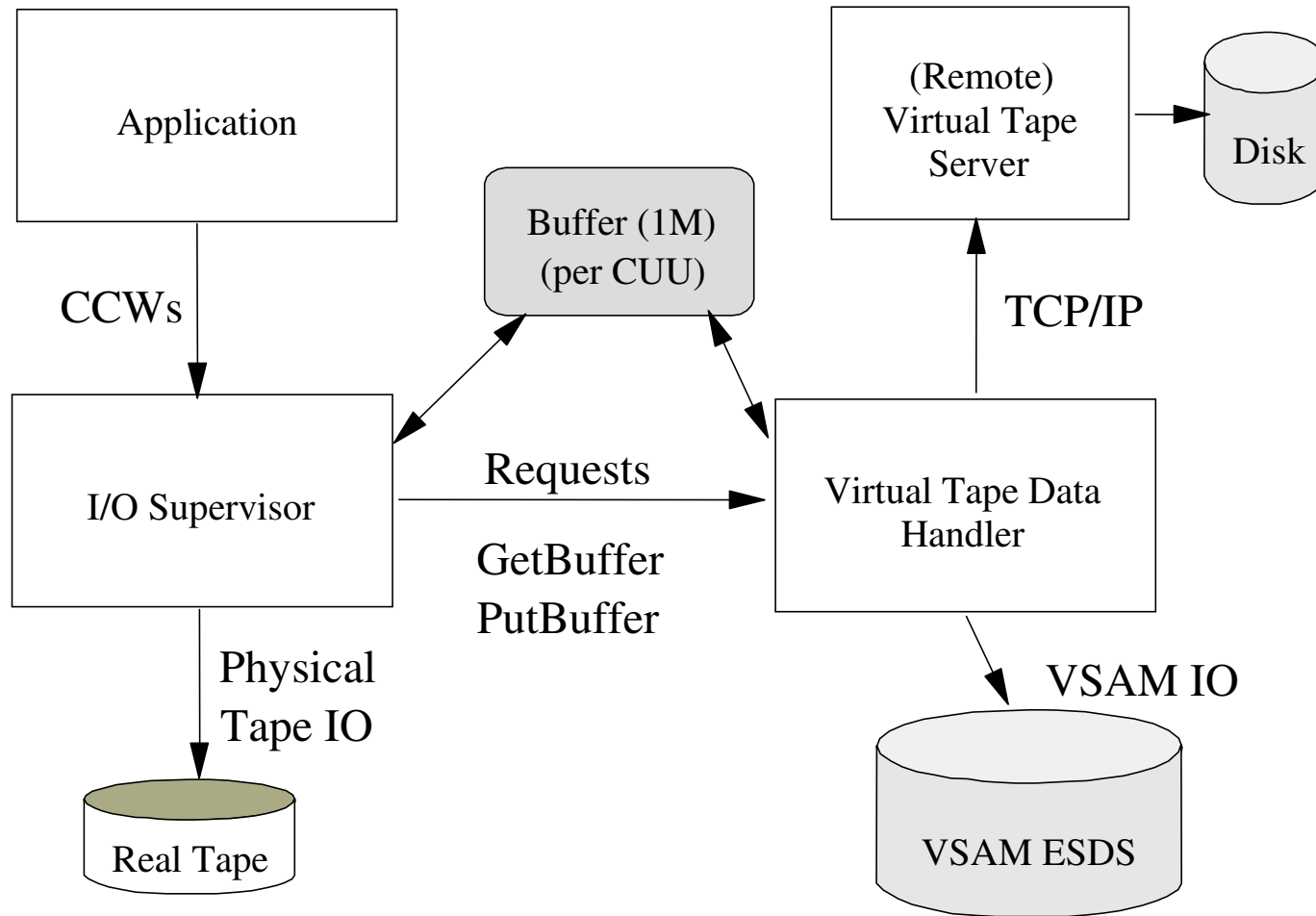
# Agenda

- **Overview**
- **VSAM and remote tape images**
- **News**
  - Zipped tape images
  - PTF tape simulation
  - Release actions on OPEN/CLOSE
  - FakeTape simulation
- **Usage Examples**
- **AWSTAPE format**
- **Transferring tape images**
- **VSAM Considerations**

## Overview

- **VSE Virtual Tape is part of VSE/ESA 2.6 or later releases**
  - NOT: Virtual Tape Server (VTS) Hardware
- **Emulates a tape with multiple tape files**
  - not just one tape file
- **Uses a tape image file instead of a physical tape**
- **Tape image file can reside in**
  - VSAM ESDS
  - Remote file (e.g. on a workstation)
- **Tape image file has AWSTAPE format**
  - known from P/390, R/390, Hercules, Flex-ES

# Overview - continued



## Overview - continued

- **A tape CUU can be switched to virtual**
  - VTAPE START,UNIT=cuu,LOC=ip or VSAM,FILE='filename'
  - VTAPE STOP,UNIT=cuu
- **Tape image file is opened at VTAPE START**
- **Tape image file is closed at VTAPE STOP**
- **Access to tape image can be**
  - READ - read only
  - WRITE - read and write (existing content is kept)
  - SCRATCH - read and write (content is cleared)

## Virtual Tape Data Handler Partition

- **Runs in a batch partition**
  - Dynamic class R per default
- **Accesses VSAM tape images**
- **Establishes TCP/IP connections to remote system**
- **Startup job TAPESRVR**
  - Skeleton SKVTASTJ in ICCF lib 59
- **Do not change the job name (TAPESRVR)**

```
* $$ JOB JNM=TAPESRVR,DISP=L,CLASS=R
* $$ LST CLASS=A,DISP=D
// JOB TAPESRVR START UP VSE TAPE SERVER
// LIBDEF *,SEARCH=(PRD2.CONFIG,PRD1.BASE,PRD2.SCEEBASE)
// ID USER=VCSRVR
// EXEC $VTMAIN,SIZE=$VTMAIN
/*
/&
* $$ EOJ
```



## VSAM tape images

- **A VSAM tape image resides in a VSAM ESDS Cluster**
- **Recommended file attributes**
  - CI size = 32768
  - Record Size = 32758 (32768-10)
  - REUSE = YES
  - Shareoption = 1
  - Records/Cylinder/Tracks depends on amount of data
- **Skeleton SKVTAPE in ICCF lib 59**
- **A label must exist in the standard labels**

## Remote tape images

- **A remote tape image resides in a file**
  - on the remote workstation's file system
- **The file is created automatically (if not existing)**
- **Filename (and path) are remote system dependent**
- **Be careful with uppercase translation of filename**
- **Remote systems can be**
  - Windows (95/98/NT/2000/ME/...)
  - Linux (on zSeries or Intel)
  - Unix (Aix, Sun, HP, ...)
  - Any Java capable platform

## News with VSE/ESA 2.7

- **With VSEE/SA 2.7 new remote tape image formats has been added (read only)**
  - Zipped AWSTAPE format
  - Binary PTF data
  - Zipped PTF data
  - Also available for VSE/ESA 2.6 via PTF)
- **DVCDN/DVCUP is no longer needed for VTAPE START/STOP**
- **Coming soon:**
  - Support for FakeTape format (known from FLEXES)

**Note:** "FLEXES" and "FakeTape" are trademarks of Fundamental Software, Inc.

## News with VSE/ESA 2.7 - zipped AWSTAPE format

- **To save disk space a AWSTAPE image can be zipped (PKZIP)**
  - one or more tape images in one ZIP file
- **To save download time**
  - Extended VTAPE START filename syntax
  - Allows to read directly from a zipped image
  - without unzipping it first

VTAPE START,UNIT=cuu,LOC=ip-addr,FILE='zip-file.zip!aws-file.aws'

Example: AWSTAPE image prod1.aws resides in ZIP file d:\images\products.zip

```
VTAPE START,UNIT=cuu,LOC=ip-addr,FILE=d:\images\products.zip!prod1.aws'
```

## News with VSE/ESA 2.7 - binary PTF data

- **Simulates a PTF tape (read only)**
  - can be directly installed with II Dialog 1423
- **Input data is a binary PTF stream**
  - PTF job stream with LRECL=80 (binary)
  - As downloadable from <http://techsupport.services.ibm.com/server/fixes>
  - PTF data can also reside in a ZIP file
- **Extended VTAPE START filename syntax**
  - File must have extension '.PTF'

```
VTAPE START,UNIT=cuu,LOC=ip-addr,FILE='ptf-file.ptf'
```

```
VTAPE START,UNIT=cuu,LOC=ip-addr,FILE='zip-file.zip!ptf-file.ptf'
```

## Coming soon – FakeTape tape images

- **FakeTape tape images are known from FLEXES**
  - Note: "FLEXES" and "FakeTape" are trademarks of Fundamental Software, Inc.
- **Allows to work with FakeTape tape images**
  - read FakeTape files
    - format is detected automatically
  - Create FakeTape files
    - File extension must be '.fkt' or '.faketape'
    - Otherwise AWSTAPE format is created
  - Also able to read zipped FakeTape files

## News with VSE/ESA 2.7 - release actions

- **Virtual Tape Server can release actions**
  - VTAPE START (open of tape image)
  - VTAPE STOP (close of tape image)
- **Can be used for tape management tools**
  - start backup of tape image
  - notify operators

VirtualTapeServer.properties

...

action=com.ibm.vse.vtape.DefaultAction

actionparam=open:open.bat close:close.bat

...

## News with VSE/ESA 2.7 - programming interfaces

- **Programming interface for tape image implementers**
  - Java interface TapeImage
  - Allows to implement own tape images
  - Tape image must be able to read/write tape records
- **Programming interface for Actions**
  - Java interface VirtualTapeAction
  - beforeOpen(...)
  - afterClose(...)
  - DefaultAction implementation is able to execute operating system commands
- **For more information please contact**
  - [vseesa@de.ibm.com](mailto:vseesa@de.ibm.com)



## Usage Example -Backup to CD-ROM

- **Step 1: Do a backup to a virtual tape**

```
// JOB BACKUP
DVCDN 480          <-- no longer needed with VSE/ESA 2.7
VTAPE START,UNIT=480,LOC=9.164.186.20,FILE='d:\backup.aws,
DVCUP 480          <-- no longer needed with VSE/ESA 2.7
MTC REW 480
MTC WTM,480
// EXEC LIBR
BACKUP LIB=PRD2 TAPE=480
/*
DVCDN 480          <-- no longer needed with VSE/ESA 2.7
VTAPE STOP,UNIT=480
DVCUP 480          <-- no longer needed with VSE/ESA 2.7
/&
```

- **2. Step: Copy (burn) d:\backup.aws to a CD-ROM**
- **3. Archive the CD-ROM**
- **4. Step: Restore directly from CD-ROM**

## Usage Example - Dump offload

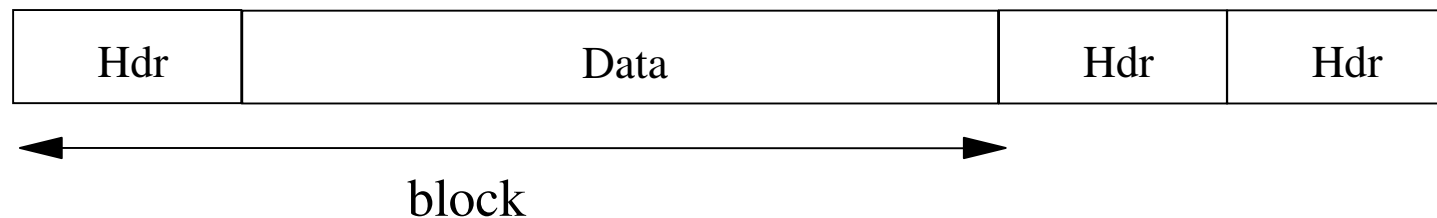
- **Create a (remote) virtual DUMP tape**
  - DUMP Fx, cuu
  - DUMP SVA, cuu
  - DUMP SUF, cuu
  - Offload function in IUI Dialog (Fastpath 43)
- **Send the tape image containing the DUMP to IBM for analysis**
  - Attach it to a e-mail
  - Put in onto IBM's FTP server

## Usage Example - PTF install

- **Order one ore more PTFs at <http://techsupport.services.ibm.com/server/fixes>**
  - You will get a e-Mail containing a FTP link
  - Download the file containing the PTF(s)
    - e.g. eptf5375.bin
  - Rename it to eptf5375.ptf
- **Setup a virtual tape**
  - Pointing to the downloaded PTF data
- **Apply the PTF(s) as usual**
  - Use PTF Apply Dialog 1423
  - Indirect apply is also possible

## AWSTAPE Format

Known from P/390, R/390, Hercules, FleX-ES



### Header (6 bytes)

Block Size (2 bytes, little endian)

Prev Size(2 bytes, little endian)

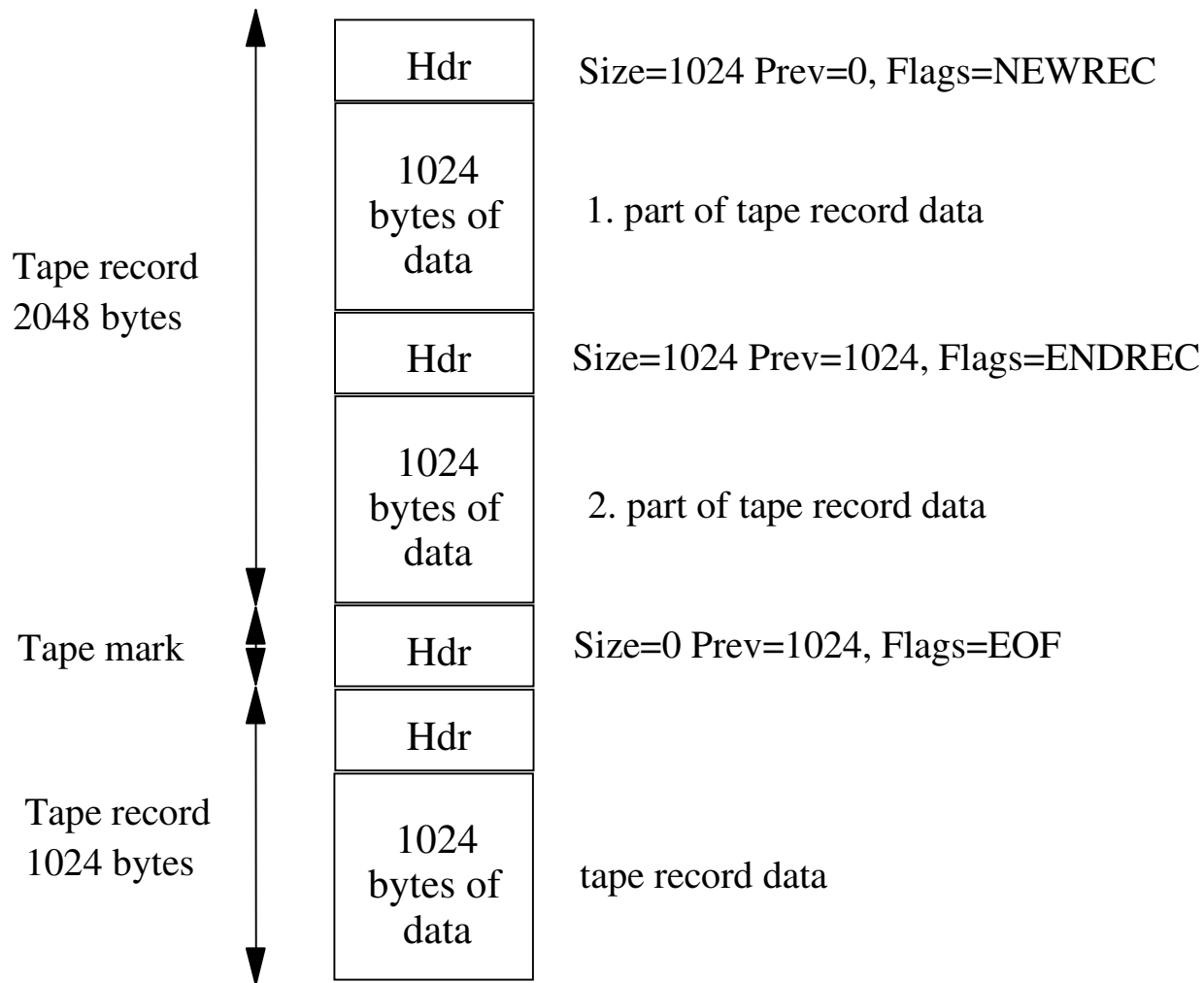
Flags (2 bytes)

X'2000' ENDREC Start of tape record in block

X'4000' EOF Block is a tape mark

X'8000' NEWREC End of tape record in block

# AWSTAPE Format - continued



## Transferring tape images

- **Transfer tape images in binary**
  - From one workstation to another workstation
    - Network drive
    - File transfer
  - From a workstation to a VSAM ESDS cluster

```
ftp 9.164.186.20      - initiate FTP session
bin                  - transfer in binary
quote site lrecl 32758 - specify record size
quote site recfm v   - record format variable
put d:\backup.aws VSAM.TAPE.IMAGE - transfer the file
```

## VSAM Considerations

Tape data is reblocked into the VSAM records

Hdr	1. tape record		Hdr	2. tape record	
rest of 2. rec.		Hdr	3. tape record		Hdr 4. rec.
rest of 4. tape record			Hdr	Hdr	

Independent of VSAM record size

- Chose as large as possible (32758 bytes)

Independent of tape record sizes

- Up to 64K

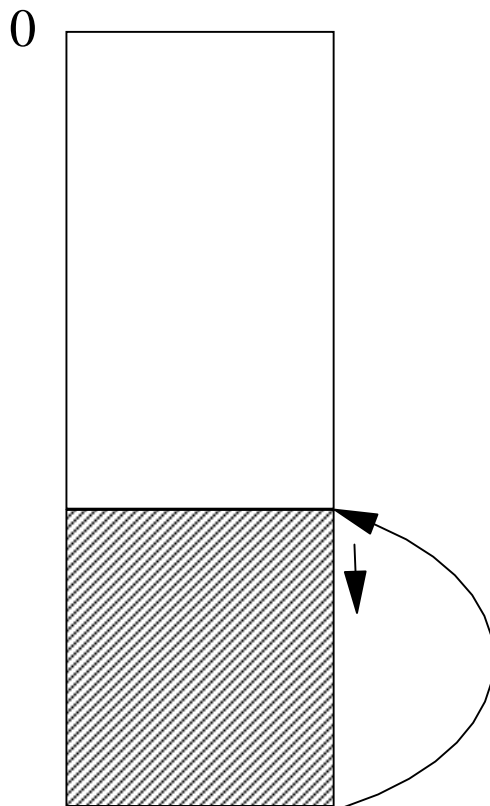
## VSAM Considerations - continued

- **No overwrite of existing data possible**
- **Only append to file possible**
- **But: rewrite from the beginning is possible**
  - Implicit reopen of the VSAM file with REUSE
- **Why?**
  - ESDS can not delete records
  - ESDS can update records
    - But cannot change length of records
    - This would be necessary to support AWSTAPE format

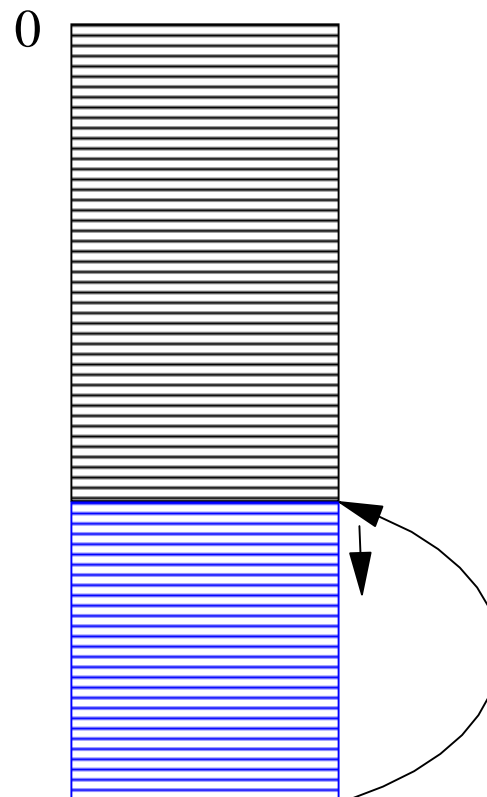


## VSAM Considerations - continued

Real tape



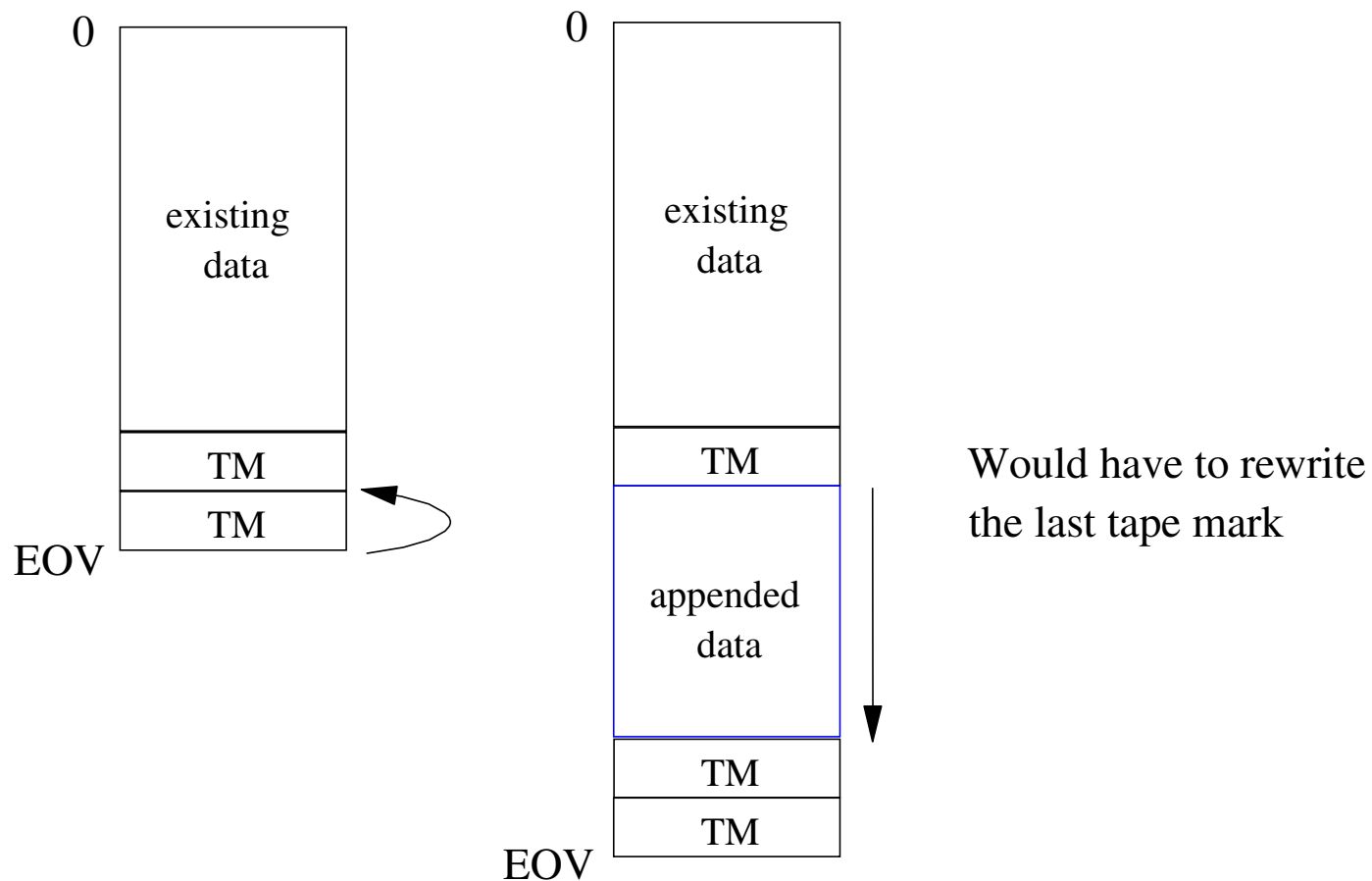
Virtual tape (ESDS file)



Would have to delete the records at the end of the tape image

# VSAM Considerations - continued

Special case: Append of data to a tape



## VSAM Considerations - Summary

- **Append of tape data is possible**
  - NOT after VTAPE STOP
- **Overwrite from the beginning is possible**
  - If defined with REUSE=YES

# Questions ?

