



BVS
dynamic Tape Management System

PG SOFTWARE



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BVS (in German: Band Verwaltungs System) is a dynamic tape management system for IBM operating Systems VSE/ESA and VM/ESA. It controls all tape processing and offers the following advantages:

- **avoidance of overwriting of protected datasets**
- **comfortable tape processing**
- **optimal usage of tape material and units**

BVS has a central catalog which can be accessed by any number of virtual or real cpus.

If you backup your data to cartridges and want to have...

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- safety, comfort and efficiency while administrating your data
- optimal usage of your cartridges
- effective usage of IBM 3590 units
- units occupied between open and close only
- tape-disk independence
- automatic vaulting with slot assignment
- one central catalog for VSE and CMS tape datasets
- one or more robot systems
- the prerequisites for EDP automation (operatorless nightshift)
- easy implementation
- no need of index cards and labels for your tape datasets
- an online help for error messages
- an interface for scheduling systems
- the possibility to write unlabeled tape files as labeled tape files

...then...

- **absolute data security**
- **dynamic operation**
- **efficiency**
- **flexible maintenance functions**
- **extensive comfort**
- **flexible robot system support**
- **usefull utility programs**
- **low introduction costs**
- **system integrity**
- **profitable relation between price and efficiency**
-

The most important advantages of BVS

Data Security with BVS

BVS ensures that the correct data set is read and no unexpired data set will be overwritten. All data sets are recorded in a central catalog. Data sets are protected by their expiration date and/or by number of generations. There are no longer uncontrolled tape data sets in the system.

All modifications to the BVS catalog are logged in a log data set to provide maximum security for the catalog.

BVS records data set and volume specific informations in its catalog. For data sets, the data set name, the generation and version number, creation date/time, expiration date and the volume serial number are retained. For each reel or cartridge, the data set written on it, the vault identification and the density are stored.

All reels and cartridges are identified by their unique volume serial number (VOL1 label). As no stickers are necessary, nobody can see which data is stored on which medium.

Dynamic Operation of BVS

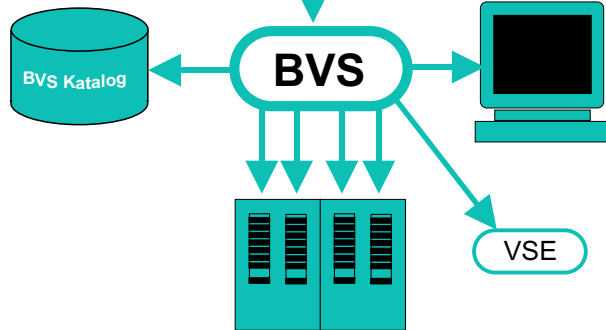
The fact, that a data set is opened, is sufficient for BVS to become active.

For input data sets, BVS usually looks for the latest generation of the data set specified in the label field of the TLBL statement. For output data sets, BVS looks for an expired reel mounted on any unit. If the required or free reel or cartridge is not found, the operator is requested to mount it resp. onel. After a user defined time interval, BVS resumes the search for the reel.

As BVS does not need any manual specifications in its catalog, there is also a very flexible handling of multifiles, allowing the utilization of the maximum capacity of cartridges. There is no fixed or predefined sequence of multifiles.

Execution of a Program with Tape Input/Output

```
// JOB IN OR OUT  
// TLBL OUTFILE,'CUSTOMER',2005/365  
// TLBL INFILE,'CUSTOMER'  
// EXEC PROG
```



Operatorless operation: for input files BVS looks automatically for the appropriate cartridge. For output files BVS looks for a free cartridge. If the required cartridge is not found BVS issues a message (without waiting for an operator response) and resumes searching after a predefined time.

The TLBL statement must be coded only with the DTF filename and a unique file-id. For output files additionally an expiration date must be supplied. An assignment is usually not necessary.

Finally, BVS passes control to the regular VSE tape open processing.

Multifile processing

BVS supports different procedures for multi-file processing:

- 1) tape output data sets can be written immediately one after the other. For example, at the end of a job stream, all modified disk data sets may be backed up to one cartridge.
- 2) a tape file can be written to a cartridge which holds a certain "prime dataset" (1st dataset of a multi file volume). Assumed, an output is written daily to the same cartridge, at the end of the month all data sets can be read from this volume.
- 3) tape output to a so called "Multi-File-Chain". This means grouping data sets simply by specifying a special VOLSER in the TLBL statement. This VOLSER is used to group different data sets onto one medium.
- 4) tape output can be written to any cartridge which is positioned behind the end of its last multi-file. This is very useful for the operatorless night-shift as all cartridges are filled completely with data. This technique can even be activated by setting

a global BVS option. All tape files are then written as multifiles without any changes in the JCL. When reading such a dataset, only the label must be specified in the TLBL statement, since BVS knows on which volume the data set resides.

The latter procedure is also useful when using IBM 3590 tape units (Magstar) to make the best usage of the high capacity of these cartridges.

Efficiency of BVS

When using BVS there is no need of manual actions. Maintaining index cards, sticking labels onto reels and cartridges is a source of errors and a reason to re-run jobs.

BVS allows the usage of tape and cartridge units in all partitions and on all virtual and real machines. Assignments, attaches and detaches are handled by BVS. Additionally, the units are only occupied between open and close during the actual reading or writing of a tape data set.

Tape files can be assigned to a disk without any program modifications.

BVS allows the reblocking of tape data sets, either for specific or for all data sets created under control of BVS.

Maintenance Functions in BVS

All information concerning data sets and volumes may be retrieved at any time from the central BVS catalog. There are batch programs and online transactions, either from CICS or VM/CMS. The operator can display the BVS catalog informations on the VSE console.

Extensive Comfort in BVS

By specifications in the TLBL statement, it is possible to define rewind and unload options independently of the program.

BVS marks successfully read data sets by a so called 'process flag'. This allows a variable number of data sets to be read by one DTF in the program



and one or multiple TLBL statements in the JCL. Depending on the number of generations to be read, BVS itself performs the necessary opens.

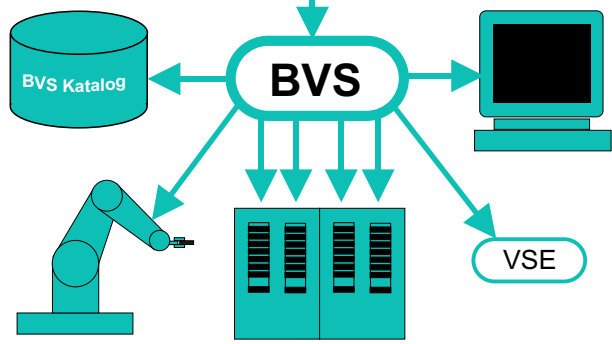
All assignments (ASSGN statements in VSE, attach and detach in VM) are automatically handled by BVS.

Vaulting of data sets for security reasons is supervised by BVS. All volumes removed from the EDP center receive a unique location number for fast and easy retrieval in the vault.

BVS offers a read interface for its catalog. For example, scheduling systems can get informations which volumes are needed for the workload of the current day (interface for HS5000 APM is available).

Tape Processing with a Robot System

```
// JOB IN OR OUT  
// TLBL OUTFILE,'CUSTOMER',4,VAULTR  
// TLBL INFILE,'CUSTOMER'  
// EXEC PROG
```



When a robot system is available BVS needs in advance informations about the robot system, the cartridges and the units controlled by it.

For input datasets, BVS knows if a cartridge is served by the robot system.

For output files, only the user decides if the robot system should be used. The user has to specify the value VAULTx in the volser field of the TLBL statement. BVS searches a free cartridge in its catalog, a free tape unit accessible by the robot system and requests the mount of the volume.

Finally, BVS passed control to the regular VSE tape open routine.

BVS allows classification of reels and volumes using the leftmost position of the volume serial number. Volumes belonging to a specified area (e.g., personnel department) may be handled differently from regular tapes.

Tape data sets may be written as DASD files without any program changes.

Online Display and Update in CICS and CMS

```

AUTOMATISCHE BANDVERWALTUNG - CMS INTERFACE          Vers:08.00
P=PROCSDD M=MAN.ADDED R=RENAMED E=EXPIRED D=GEN/DATE  CREATE  EXPIRE  1STVOL
FILE-ID      GEN VER FLG FSQ NG JOB NAME              CREATE  EXPIRE  1STVOL
- ABH..BUCHUNG..HBH 0003 01PMD 1    ABH230  89/004 19.32 89/034 001324
  0004 01 RE 1    ABH230  89/007 13.31 89/037 001335
- ABHSTM-SICH 0001 01 D    ABH260  86/021 10.19 88/041 001244
  0002 01 MC    ABH260  86/195 19.35 88/215 001257
  0003 01      ABH260  87/149 10.34 89/169 000839
  0004 01      ABH260  88/036 13.26 90/056 000327
- ABH20S-ABH20R 0804 01 1    ABH20SM 88/330 17.35 89/050 001009
  SEQ-FILE: 070S-070R          1129 01
  0826 01 1    ABH20SM 88/363 17.12 91/267 001021
  SEQ-FILE: 070S-070R          1151 01
  0848 01 1    ABH20SM 89/027 17.39 91/296 000932
  SEQ-FILE: 070S-070R          1173 01
  0852 01 1    ABH20SM 89/033 10.52 99/365 000782
  0859 01 E 1    ABH20ST 89/041 17.42 89/043 000122
  SEQ-FILE: 070S-070R          1184 01
  0860 01 1    ABH20ST 89/044 17.36 89/046 001291
  SEQ-FILE: 070S-070R          1185 01
  0861 01 1    ABH20ST 89/045 17.36 89/047 001216
Coll: S=Single / A=ADD / D=Delete/ R=Replace / N=Rename / or Ccmd in next Line
Command ==>: BVS 'ABH20S-ABH20R ',0861,02,G=01
  
```

```

AUTOMATISCHE BANDVERWALTUNG - CMS INTERFACE          Vers:08.00
VOLUME FILE-ID      GEN VER CREATE EXPIRE  PREC-V FOLL-V  CUU USAG S SLOT
- 001000 C35A-E24    0125 01 88/357 89/002 - - - 682 0069 12345
- 001001 E24-E30    0235 01 88/335 89/050 - - - 685 0070
- 001002 V115-V115R-V60U 0044 01 89/030 89/120 - - - 683 0253 D
- 001003 E38-E38-E38A 0417 01 88/343 89/008 - - - 680 0106
- 001004 KB030S-KB030R 1071 01 87/364 99/365 - - - 681 0020 D
- 001005 B90S-B90R 0069 01 88/343 88/343 - - - 680 0045
- 001006 BDP73M 0067 01 89/004 99/365 - - 000057 682 0026 D
- 001007 B48S-B48R 0131 01 88/348 89/343 - - 001008 680 0008 D
- 001008 B48S-B48R 0131 01 88/348 89/343 001007 - - 681 0008 D
- 001009 ABH20S-ABH20R 0804 01 88/330 89/050 - - - 683 0021 D
- 001010 BDP124-ARCHIV 82 0001 01 85/178 91/365 - - 000559 684 0012
- 001011 B48S-B48R 0110 01 88/005 88/365 - - 001012 683 0012 D
- 001012 B48S-B48R 0110 01 88/005 88/365 - - 684 0011 D
- 001013 B48-DASI-BAND 0024 01 83/318 99/365 000997 - - 381 0003 D
- 001014 BDP73B-BDP73R 3061 01 89/044 89/046 000991 - - 684 0334
- 001015 - - - - - - - - - 0145 D
- 001016 BDP73B-BDP73R 3059 01 89/041 89/043 000990 - - 681 0339
- 001017 BDP73B-BDP73R 3063 01 89/045 89/047 000989 - - 684 0332
- 001018 - - - - - - - - - 0135 D
Column 1: S=Single / A=ADD / D=Delete/ R=Replace / or Command in next Line
Command ==>: BVS V001019
  
```

Dataset Display

Volume Display

Robot System Support in BVS

BVS supports all robot systems currently available on the market. Up to 4 systems may be operated by BVS concurrently. By specifications, BVS must be informed which cartridges and which units are accessed by which robot system. This allows a specific support for each robot system. Additionally, BVS ensures a balanced utilization of units and cartridges to get balanced wear and tear.

Utilities in BVS

BVS has several utilities. For example

- a program to initialize cartridges and to add the volser to the BVS catalog. Overwriting of protected volumes and assignment of duplicate volsers is avoided. When installing a robot system, the volumes of this system can be initialized automatically.
- An I/O optimized tape file copy program is available. It also allows copying all sequence files by specifying only the TLBL statement for the 1st data set.. Additionally, this program allows copying of data sets which hold tapemarks within its data (e.g., IDCAMS Backups).

```
AUTOMATISCHE BANDVERWALTUNG - CMS INTERFACE          Vers:08.00
  File - ADD - Function

FILE-ID: # _____ GENERATION: ____ VERSION: ____

Mandatory Parameters:                                for sequence files only:
PROG: _____ (Programm-Name)                    PRIMEID: _____ (Id)
CRT:  _____ (Creation-Date)                    PRIMEGEN: _____ (Generation)
TIME: _____ (Creation Time)                   PRIMEVERS: ____ (Version)
EXP:  _____ (Expiration-Date)
DENS: _____ (Density 800/1600/
        6250/CASS)
VOLUME(s): _____

Optional Parameters:
BLKCNT: _____ (Block-Counter)                   NGEN: ____ (Nbr Generations)
BLKSIZE: ____ K (Block-Size)                        PROCESS: N (Process-Flag N/Y)
CPU: _____ (CPU-Ser-Nbr)                       USER: _____ (User Information)
DATEPRI: N (Date-Priority N/Y)

Fill in mandatory (and optional) Parameters or enter a new Command
Command ==>: BVS
```

Dataset Add Mask

Implementation of BVS

The concept of BVS allows most of the users to start processing under control of BVS without changing their existing job control. The only prerequisites are unique labels in the TLBL statements and unique volume serial numbers (VOL1) in the system. For unlabeled tape files, BVS offers the dynamic conversion of these files into labeled files without any program changes.

Retention periods and desired number of generations can be set as permanent options in BVS, avoiding any JCL changes. For existing tape

```

// JOB BVSMANT ALLGEMEINE BVSMANT FUNKTIONEN      DATE 31/07/93,CLOCK 12/37/26
// EXEC BVSMANT
// VAULT MAXVOL=500,ASSUME=CASS,VAULTSEQ=*PK
TI TEST.FILE.1
TI OUTP.FILE.1
END

* AUTOMATISCHE BANDVERWATTUNG * VAULT PROCESSING REPORT          (VAULT) 31/07/93      PAGE 1
* MASCHINENFABRIK MEIER      * AKTIENGESELLSCHAFT              *          12.37.35
SEQUENTIAL TAPE MOVE REPORT (SORTED ACCORDING TO FILE-IDS)
VOLUME 004713 OLD STOCK 3 (SLOT 0004) NEW STOCK P (SLOT 0001) FILE-ID: TEST.FILE.1 VL=0060/01
VOLUME C05044 OLD STOCK 4 (SLOT 0004) NEW STOCK K (SLOT 0001) FILE-ID: TEST.FILE.1 VL=0019/01
VOLUME 111111 OLD STOCK 4 (SLOT 0005) NEW STOCK * (SLOT - ) FILE-ID: TEST.FILE.1 VL=0012/01
. . .

* AUTOMATISCHE BANDVERWATTUNG * VAULT PROCESSING REPORT          (VAULT) 31/07/93      PAGE 2
* TEST VERSION INFOSOFT      * PASSWORT GESETZT BIS 12/94      *          12.37.35
TAPES TO BE REMOVED FROM STOCK 3 (SORTED BY VOLSER)
VOLUME 004713 (SLOT 0004) TRANSFER TO STOCK P (SLOT 0001)
. . .

TAPES TO BE REMOVED FROM STOCK 4 (SORTED BY VOLSER)
VOLUME C05044 (SLOT 0004) TRANSFER TO STOCK K (SLOT 0001)
VOLUME 111111 (SLOT 0005) TRANSFER TO STOCK * (SLOT - )

BVSSI RETURN CODE OF FUNCTION VAULT IS 0

```

data sets, BVS has an implementation program to include these data sets into its catalog..

The conversion of catalogs of other tape management systems into a BVS catalog is supported.

The unique BVS dynamic requires no predefinitions in the BVS catalog. Thus, the whole tape processing is controlled by BVS immediately after installation.

System Integrity by BVS

BVS doesn't change any IBM phases. TLBL statements remain in IBM format. The BVS catalog can be used by user applications or other software. An appropriate read interface is available in BVS.

Maintenance and Development of BVS

BVS is developed and maintained in Germany. All documentation is available in English and German.



* AUTOMATISCHE BANDVERWALTUNG		* F I L E - R E P O R T		(FILESORT) 01/02/93		PAGE 2						
* MASCHINENFABRIK MEIER		* AKTIENGESELLSCHAFT		11.55.53								
FILE-ID	GEN VER	FLG FN	NGN	JOB	USER	CPU	CREATED AT	EXPIRE	BS	BLOCKS	S	VOLUMES
ABHA00-260-390	0006 01	001		ABH260		5	09.08.90 11.14	05.05.93		20234	D	C05348
	0007 01	001		ABH260		5	12.03.91 12.18	06.12.93		9945	D	C04140, C04100, C03205, C03145, C03319
ABHA00S-ABH200R	0017 01	E 001		ABH200		5	07.01.91 19.15	06.02.91		782		001234
	0018 01	E 001		ABH200		5	07.01.92 14.24	06.02.92		1249		001223
ABH20S-ABH2OR	1854 01	E 001		ABH2OST		5	26.01.93 17.34	28.01.93		1288		C05103
		002		070S-070R		2166	01 (26.01.93 17.37	28.01.93				C05103)
		003		B100S-B100R		1565	01 (26.01.93 17.38	28.01.93				C05103)
	1855 01	E 001		ABH2OST		5	27.01.93 17.33	29.01.93		1288		C05374
		002		070S-070R		2167	01 (27.01.93 17.37	29.01.93				C05374)
		003		B100S-B100R		1566	01 (27.01.93 17.37	29.01.93				C05374)
	1857 01	001		ABH20SM -		5	29.01.93 17.35	25.10.95		1289		C05711
		002		070S-070R		2169	01 (29.01.93 17.38	25.10.95				C05711)
		003		B100SM-B100RM		0071	01 (29.01.93 17.38	25.10.95				C05711)
064S-074R	0011 01	E 001		074S		5	07.01.93 15.53	27.01.93		75		C05624
070S-070R	2166 01	E 002		070S		5	26.01.93 17.37	28.01.93		57		C05103
		PRIME: ABH20S-ABH2OR		1854 01								
	2167 01	E 002		070S		5	27.01.93 17.37	29.01.93		57		C05374
		PRIME: ABH20S-ABH2OR		1855 01								

Dataset Report

* AUTOMATISCHE BANDVERWALTUNG		* V O L U M E - R E P O R T		(VOLSORT) 01/02/93		PAGE 67								
* MASCHINENFABRIK MEIER		* AKTIENGESELLSCHAFT		11.56.58										
VOLUME	CONTAINS	CREATED AT	EXPIRAT MO	PRECED	SUCCEED	CUU	USAGE	ST	SLOT	-----	LAST	ACCE		
SER-NR	FLG	FILE-ID	GEN VER	DATE	TIME	DATE	DE	VOLSER	VOLSER	COUNT	CK	JOB-NAME	PROGRAM	D
C05696	E	OPF1	0001 01	13.08.92	00.00	13.08.92	CA	-	-	FFF	26	U730	U730	24
C05697	E	K25B-K25B	0144 01	07.12.92	19.19	27.01.93	CA	-	-	573	23	K25B	K25	15
C05698	E	D0604-B08	0102 01	30.11.92	12.53	30.12.92	CA	-	-	570	29	B08	B08F	30
C05701		IPAS.INFO.POOLS	0012 01	18.12.90	08.12	31.12.99	CA	C05706	-	573	4			
C05702	E	R15S-R15R	0215 01	14.12.92	16.08	18.12.92	CA	-	-	572	24			
C05703		B77S-B77R	0095 01	21.01.93	20.21	16.01.94	CA	-	-	571	6			
C05704		C80S-72-C80R	0005 01	17.12.92	08.49	06.07.93	CA	-	-	570	19	C80R	C80R	15
C05705	E	R20-R20R	0117 01	22.12.92	15.59	28.12.92	CA	-	-	572	26			
C05706		IPAS.INFO.POOLS	0012 01	18.12.90	08.12	31.12.99	CA		C05701	573	14			
C05707	E	R80-R80K	0101 01	01.12.92	09.06	01.01.93	CA	-	-	571	14			
C05708	E	R26-R26-R27-R28	0194 01	01.12.92	11.33	21.01.93	CA	-	-	573	44	R26	R26	05

Volume Report

BVS/ESA - Base System including catalog maintenance by CICS

All cartridge datasets created under VSE/ESA are dynamically administrated by BVS and recorded in the central BVS catalog. CICS online transactions allow to display or update this catalog.

BVM - VM Support

This feature offers the following extensions

CMS tape management

all tape files to be read or written in CMS are maintained in the central BVS catalog.

dynamic Attach/Detach of tape units

the tape units needed are attached to the VSE or CMS machine without any operator intervention. This allows a flexible usage of units.

Display and Maintenance of the BVS catalog under CMS

same functions as under CICS. Switching between CICS and CMS is obsolete.

BVR - Robot System Support

This feature supports of up to 4 - even different - robot systems. BVS ensures, that the robot units are used in a wrap-around mode. Cartridges which have been used less are preferably mounted. This ensures a balanced wear and tear.

BVP - PC Interface

This feature allows the BVS catalog to be maintained by a PC with Windows or OS/2 in a graphical form. As the BVS host catalog is downloaded to the PC, the catalog is even available when the host system is not running. Previous versions of the catalog can be hold for revision usage paperless at the PC.

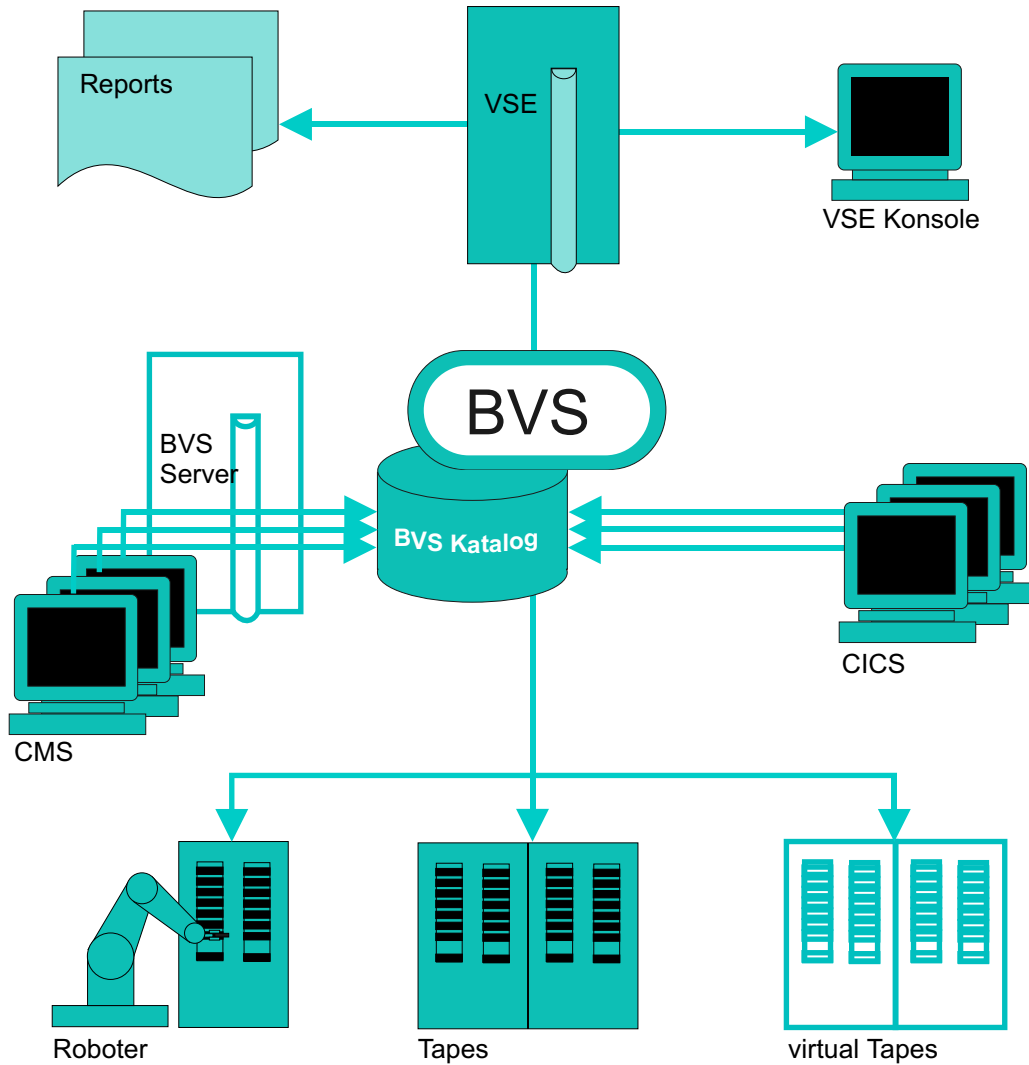
XTF - Tape Pooling System

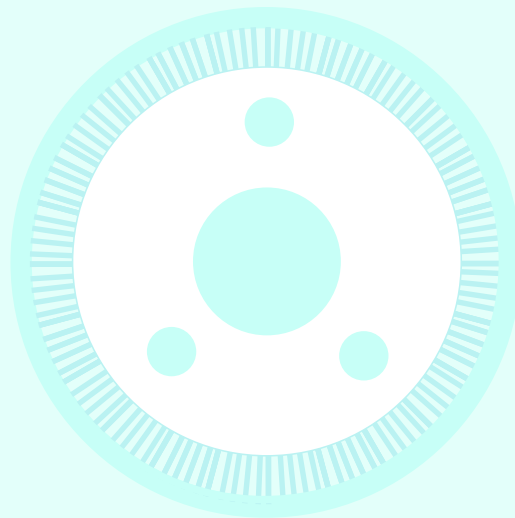
Up to 64 tape units are virtually available to any VSE machine and solve the real tape unit constraint. XTF writes (pools) all data written to these units to one or more real cartridges. From the view of BVS, real and virtual units are treated in like manner and maintained in its catalog.

TSF - Tape Simulation Facility

Simulation of tape units. Virtual cartridges are hold as regular CMS members and may be edited by the standard CMS editor.

BVS and its Components





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