

Fujitsu Technology Solutions

*5 BS20SD (BS2000/OSD)
*5 Version 7.0B
*5 May 2009

Release Notice

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1 General

This Release Notice is a summary of the major extensions, dependencies and operating information with respect to the delivery components of the BS2000/OSD-BC V7.0 *) package that are contained in the following technical delivery units:

'BS2GA.APACHE V7.0', 'BS2GA.BS2OSD V7.0',
'BS2GA.CRTE-BAS V7.0', 'BS2GA.DSSM V7.0', 'BS2GA.IMON V7.0',
'BS2GA.JENV V7.0', 'BS2GA.LLMAM V7.0', 'BS2GA.PLAM V7.0',
'BS2GA.POSIX V7.0', 'BS2GA.SDF V7.0', 'BS2GA.SIR V7.0',
'BS2GA.SPOOL V7.0', 'BS2GA.STRT V7.0', 'BS2GA.WTOSD V7.0'

*5 The release level is that of May 2009. Changes in this correction
*5 are marked with *5.

This Release Notice is supplied as a file in uppercase/lowercase. Customers will receive an updated version of this file should any subsequent changes be made. To print this file, use:

/PRINT-DOCUMENT FROM-FILE=SYSFGM.BS2OSD.070.E,
DOC-FORMAT=*TEXT(LINE-SPACING=*BY-EBCDIC-CONTROL) (English)

This Release Notice is also available online under
<http://manuals.ts.fujitsu.com/mainframes.html>.

*5 In addition, the following Release Notices of the technical
delivery units that are shipped with BS2000/OSD-BC V7.0B must
also be noted when using the product:

*3 SYSFGM.APACHE.022.E
*3 SYSFGM.BS2ZIP.012.E
*1 SYSFGM.CRTE-BAS.017.E
*5 SYSFGM.IMON.031.E
*5 SYSFGM.JENV.051.E
SYSFGM.POSIX-BC.070.E
SYSFGM.SDF.046.E
SYSFGM.SIR.160.E
*5 SYSFGM.SPOOL.049.E
SYSFGM.STRT.160.E
SYSFGM.WEBTRANS-OSD.071.D E

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not entitle readers to assume that these names/designations
may be used without restriction.

The Release Notice SYSFGM.BS2XC.030.E must also be noted for SX Servers.

If one or more previous versions are skipped when this product version is used, the information from the Release Notices (and README files) of the previous versions must be noted.

*5 Modified Release Notice structure

*5 Up to now a separate Release Notice was provided for the release
*5 units BINDER, BLSSERV, PTHREADS and RMS and for the technical
*5 delivery units DSSM and LLMAM.
*5 These Release Notices will no longer be created in future;
*5 functional changes in the respective components are described in
*5 this Release Notice.

1.1 Ordering

BS2000/OSD-BC V7.0 can be ordered from your local distributors and is subject to the general terms and conditions of the software product use and service agreement.

1.2 Delivery

The BS2000/OSD-BC V7.0 files are supplied via SOLIS.

BS2000/OSD-BC V7.0 delivery components

The following release units (RU) of the technical delivery units (DU) are part of the delivery scope of BS2000/OSD-BC V7.0:

<u>DU / RU</u>	<u>Version</u>	<u>Comment</u>
<u>BS2GA.APACHE</u>		
*3 APACHE	2.2A	
*3 PERL	5.8A	
*3 TOMCAT	5.5A	
<u>BS2GA.BS2OSD</u>		
*5 ACS	16.0B	
*5 ADAM	16.0B	
*5 AIDSYS	16.0B	
*5 AIDSYSA	16.0B	
*5 ANITA	17.0A	
ASE	1.0A	
ASSEMBH-GEN	1.2C	
*5 ASTI	2.0A	

*5	BINDER	2.5A	
	BLSSEC	15.0A	
*5	BLSSERV	2.7A	
*5	BS2CP	16.0B	
*5	BS2000-EXEC	16.0B	
	BUILDER	1.0A	
*5	C-TPR-LZS	2.5A	
*5	CALENDAR	16.0B	
*5	CALENDAR-TU	16.0B	
*5	CAPRI	2.0A	
*5	CCOPY	6.0B	
*5	COSMOS-BC	16.0B	
*5	CPR	16.0B	
*5	DAMP	4.6A	Utility program
*5	DCADITO	16.0B	Utility program
*5	DIV	16.0B	
*5	DIVTRAC	16.0B	
*5	DLMUSER	14.0D	
*5	DPAGE	16.0B	Utility program
	DWS	11.0A	
*5	ELFE	16.0B	Utility program
*5	ELSA	1.7A	Utility program
*5	FASTPAM	16.0B	
*5	FITC	6.0B	
*5	GCF	1.6B	
*5	GET-TIME	16.0B	
*5	GSMAN	16.0B	
*5	GSVOL	1.3B	
*5	HELGA	16.0B	Utility program
*5	IDIAS	16.0B	
*5	INIT	16.0B	Utility program
*5	IOFCOPY	14.0B	Utility program
*5	IOGEN	16.0B	Utility program
*5	IORM	7.0B	
*5	IOTRACE	16.0B	Utility program
*5	JITSYS	4.0B	
*5	JMP	2.0B	Utility program
*5	JMU	14.0B	Utility program
*5	JOBSCHED	16.0B	Utility program
*5	JPOPT	2.5B	
*5	LMSCONV	3.4A	Utility program
*5	LNM	14.0B	
*5	MIP	16.0B	
*5	MSCFANC	16.0B	
*5	MSGMAKER	1.2B	
*5	NDMDAMP	16.0B	
*5	NKISAM	16.0B	
*5	NKISTRAC	16.0B	Utility program
*5	NKS	16.0B	
*5	NKV	16.0B	
*5	NLMERVE	16.0B	Utility program
*5	PAMCONV	12.1B	Utility program
*5	PAMINT	7.0B	
*5	PASSWORD	16.0A	Utility program
*5	PRSC	1.0A	Utility program
*5	PTHREADS	1.1A	
*5	PVSREN	3.0C	Utility program
*5	RESLOG	1.4B	
	RMS	7.1E	Utility program

*5	SANCHECK	2.0A	Utility program
*5	SCDM	7.0B	Utility program
*5	SHOW-FILE	16.0B	
	SMI	1.0A	
*5	SMPGEN-S	16.0B	Utility program
*5	SMPGEN-U	16.0B	
	SPACEPRO	1.0A	
*5	SPCCNTRL	15.0C	Utility program
*5	STATUS	15.2A	
*5	SRPMNUC	16.0B	
*5	SYSFILE	16.0C	
*5	TANGBAS	1.4B	
*5	TANGRAM	1.4B	
*5	TPCOMP2	16.0B	Utility program
*5	TPRLAM	16.0B	
	TSOSLNK	21.0E	Utility program
*5	TULAM	16.0B	
	UTM-SM2	16.0A	
*5	VOLIN	16.0B	Utility program
*5	WARTOPT	16.0B	

BS2GA.CRTE-BAS

*5	CRTE-BAS	1.7C	
*5	CRTE-BASYS	1.7C	
*5	CRTE-MSG	1.7C	
*5	POSIX-HEADER	1.7C	

BS2GA.DSSM

*5	DSSM	4.3A	
*5	ROSI	16.0B	Utility program
	SSCM	2.3B	Utility program

BS2GA.IMON

*5	IMON	3.1A	
*5	IMON-BAS	3.1A	
*5	IMON-GPN	3.1A	
*5	IMON-SIC	3.1A	

BS2GA.JENV

*5	JENV	5.1B	
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BS2GA.LLMAM

*5	LLMAM	3.4A	
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BS2GA.PLAM

*5	PLAM	3.5B	
*5	PMLOG	3.5B	
*5	PMSYS160	3.5B	

BS2GA.POSIX

*5	POSIX-ADDON-LIB	2.1A30
*5	POSIX-BC	7.0A41
*5	POSIX-NSL	7.0A41
*5	POSIX-SH	7.0A41
*5	POSIX-SOCKETS	7.0A41
*5	POSPRRTS	1.4A00

BS2GA.SDF

	DISPLAY	1.0B
*5	FHS-TPR	8.3A
	SDF	4.6A
	SDF-CONV	3.0B
*5	SDF-I	4.1B
*5	SDF-P-BASYS	2.5A
	SDF-PAR	1.1A
	SDF-SFC	3.1A
	SDF-SRV	3.0C
	SDF-U	4.1F
	VAS	2.3B

BS2GA.SIR

	SIR	16.0A
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BS2GA.SPOOL

*5	BS2ZIP	1.2B
*5	PRMMAN	1.4A
	PRMPRES	1.2A
*5	SNRTP	2.0A
*5	SPCONV	1.2A
*5	SPOOL	4.9A
*5	SPOOLSYS	2.3A
*5	SPSERVE	2.9B
*5	SPSRVMAN	2.4A

BS2GA.STRT

*5	IPL	16.0B
*5	SLED	16.0B
*5	STRT	16.0B

BS2GA.WTOSD

	WEBTRANS-OSD	7.1A
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You will find the delivery components for the separate release units listed in the SOLIS2 delivery cover letter together with the current file and volume characteristics.

1.3 Documentation

The following documentation is available for BS2GA.BS20SD V7.0 and the technical delivery components below:

BS2GA.DSSM V7.0, BS2GA.IMON V7.0, BS2GA.LLMAM V7.0,
 BS2GA.PLAM V7.0, BS2GA.POSIX V7.0, BS2GA.SDF.V7.0
 BS2GA.SIR.V7.0, BS2GA.STRT V7.0

Core documentation

TITLE	ORDER NUMBER	GERMAN	ENGLISH
ADAM	U 3563-J-Z125-5		-5-76 *
BINDER	U 9557-J-Z125-4		-4-76 *
*5 Binder Loader Starter (BLSSERV)	U 5137-J-Z125-7		-7-76
CALENDAR	U23372-J-Z125-1		-1-76 *
Files and Volumes			
Larger than 32GB	U41253-J-Z125-1		-1-76 *
Diagnostics Handbook	U 5663-J-Z125-8		-8-76
Utility Programs	U 4303-J-Z125-9		-9-76
Introductory Guide to DMS	U 4237-J-Z125-9		-9-76
DMS Macro Calls	U 4250-J-Z125-8		-8-76 *
IMON Installation Monitor	U21926-J-Z125-5		-5-76 *
Commands Volumes 1-5	U41651-J-Z125-1		-1-76
Commands Volume 6: Output in S Variables and SDF-P-BASYS	U23165-J-Z125-6		-6-76
Executive Macros	U 3291-J-Z125-12		-12-76
Migration Guide	U21630-J-Z125-7		-7-76
MSGMAKER V1.2A	U23715-J-Z125-2		-2-76 *
Performance Handbook	U 1794-J-Z125-12		-12-76 ¹⁾
POSIX Basics for Users and			
*5 System Administrators	U22795-J-Z125-6		-6-76
*5 POSIX Commands	U22794-J-Z125-6		-6-76
POSIX SOCKETS/XTI	U26110-J-Z125-3		-3-76
*5 POSIX BS2000 filesystem bs2fs	U22794-J-Z125-1		-1-76
SDF V4.5 Introductory Guide to the Dialog Interface	U 2339-J-Z125-8		-8-76 *
SDF V4.5 SDF Administration	U 2622-J-Z125-10		-10-76*
SDF-CONV V3.0A	U 6540-J-Z125-3		-3-76 *
Systems Support	U 2417-J-Z125-16		-16-76
System Exits	U 3619-J-Z125-7		-7-76 *
System Managed Storage	U25174-J-Z125-3		-3-76 *
System Installation	U 2505-J-Z125-17		-17-76
System Messages Volumes 1-3	U41652-J-Z125-1		-1-76
Commands Ready Reference	U23378-J-Z125-6		-6-76
Computer Center Ready Reference			
Volume 1	U 370-J-Z125-16		-16-76
Volume 2	U23908-J-Z125-6		-6-76
Subsystem Management (DSSM/SSCM)	U23166-J-Z125-3		-3-76 *
Unicode in BS2000/OSD			
Overview Manual	U41646-J-Z125-1		-1-76

The manuals marked with * have not been revised for BS2000/OSD-BC V7.0.

*3 ¹⁾ The Performance Handbook for BS2000/OSD-BC V8.0 is available
 *3 since end of February 2008

The documentation is available as online manuals under <http://manuals.ts.fujitsu.com> or can be ordered at extra cost under <http://manualshop.ts.fujitsu.com/>.

The product Adobe Acrobat Reader is required to read or print the manuals in PDF format.

The documentation for the remaining technical delivery components is contained in their specific Release Notices. These Release Notices are also available online under <http://manuals.ts.fujitsu.com/mainframes.html>.

You will also require the hardware manuals for the hardware peripherals you are using.

The BS2000/OSD documentation is also available on CD-ROM in German and English under the title BS2000/OSD SoftBooks.

There may also be README files available for the manuals listed above. These files contain modifications and supplements for the manual applying to each relevant product. The names of these files are structured as follows:

SYSRME.<prod>.<vers>.D (file with German text)
SYSRME.<prod>.<vers>.E (file with English text)

When printing the files, you should enter the operand CONTR-CHAR=EBCDIC in the PRINT-FILE command

The README files listed below have been regenerated for BS2000/OSD-BC V7.0:

Filename	Relevant manual
*5 SYSRME.ASTI.020.E	
*5 SYSRME.BINDER.025.E	BINDER V2.3A
*5 SYSRME.CAPRI.020.E	
*5 SYSRME.DSSM.043.E	Subsystem Administration
*5 SYSRME.IMON.031.E	IMON Installationsmonitor
*5 SYSRME.PTHREADS.011.E	
*5 SYSRME.SANCHECK.020.E	Utility program

2 Software Extensions

Only the main extensions and enhancements over the previous version BS2000/OSD-BC V6.0 are described in the following sections.

2.1 TimeFinder/Snap and TimeFinder/Clone – support for new Symmetrix-DMX functions

EMC also offers the new Symmetrix internal replication functions TimeFinder/Snap (as of Enginuity-Version 5671) and TimeFinder/Clone for the new DMX storage systems, in addition to the SRDF and TimeFinder/Mirror (BCV) replication functions. SHC-OSD as of V6.0 is a software prerequisite for supporting TimeFinder/Snap and TimeFinder/Clone.

2.1.1 TimeFinder/Snap functions

TimeFinder/Snap allows drives to be quickly and efficiently saved and restored.

Save devices must be configured in Symmetrix for this.

All save devices together form the default save pool that is present just once. In addition to the default pool, further save pools can be set up in Symmetrix, that also consist of a set of save devices configured in Symmetrix.

These pools are assigned a name. This makes it possible to partition the save pools and assign specific save pools to volumes/subsets.

In addition to the save devices, so-called virtual devices must also be configured in Symmetrix. A virtual device consists of pointers that point to the original data. To use the snap function for a volume, these virtual devices must also be generated in the BS2000 IORSF.

Such a virtual device is assigned to a volume as a "snap unit" with the START-SNAP-SESSION command and activated for the application with ACTIVATE-SNAP.

The associated real save devices in Symmetrix are determined dynamically.

TimeFinder/Snap uses a delta set technology for saving. From the time of the snap, the first modification of a block causes the block to be written to the save device (copy-on-first-write technique) and the pointer in the virtual device is updated. Since only the original modified blocks are saved, the storage space required by the save pool is, in contrast to BCV, normally appreciably lower than that of the original disk. The actually required space depends on the number of modified blocks and the lifetime of the snap.

Another difference to BCV is that snap does not require a pre-run to create the copy.

A maximum of 15 snaps can currently be created for a disk/pubset on a DMX storage system.

With several consecutive snaps, only the originals of the modified blocks with regard to the previously latest state are saved.

To restore the original disk contents at the time of a snap, each difference block from the save pool is written back to the disk.

In addition to backing up and restoring disks, snaps can also be used as an input for tape backups or as free pubset copies for read accesses.

A snap session, e.g. assigning/releasing the device-pair or restoring the original contents, is controlled with SHC-OSD commands.

2.1.2 TimeFinder/Clone functions

TimeFinder/Clone can generally replace the current BCV mirror. TimeFinder/Clone requires the same disk space as the original disk. Like BCV, TimeFinder/Clone can make a complete copy of a disk. A clone-pair consists of an original unit and a clone unit that are managed in a so-called clone session. However, in contrast to BCV, a pre-run is not required since TimeFinder/Clone uses the copy-on-access technique. As soon as a write access is made to the original unit or a read access to the clone unit, the data (tracks) is copied to the clone unit.

The way in which the clone can be used is defined with options when the clone-pair is set up:

- A full copy is created. Restoring the original unit or restarting the clone session are only possible from complete copies.
- The clone unit is to be used as a free pubset copy. All data is copied from the original unit, however, the Symmetrix system does not notice the changed data. This means that it is not possible to restore the original unit or restart the clone session.
- Only a "SNAPSHOT" is created.

In contrast to BCV pairs, clone pairs do not have to be generated and stored in Symmetrix. Any suitable device in the same Symmetrix controller can be used for setting up a clone pair. After dissolving the pair relationship, the units of the (previous) pair can be freely used, new clone-pairs can, in particular, also be set up. The pubset copies (clones) can be used as free pubset copies and as inputs for tape backups.

A clone session is controlled as with a snap session by means of SHC-OSD commands.

2.2 Introducing snapsets for backup and restore

Backup/restore based on snapsets

The virtual copy of a pubset that can be used for a restoration consists of the simultaneously created snap disks for all volumes of the pubset, the so-called snapset. This snapset is not a fully adequate pubset copy, but rather a partial pubset mirror at the time of the snap, that can read from to restore single files, job variables or the complete pubset.

SHC-OSD as of V6.0 is a software requirement for supporting snapsets.

Snapsets are implemented as special pubsets based on the new function TimeFinder/snap. Addressing is via a pseudo notation derived from the original notation. A maximum of 15 snapsets can be administered for one pubset with the currently released Enginuity version. In BS2000/OSD-BC V7.0, 26 snaps are provided as an advance feature for future Enginuity versions. The information as to which snapsets belong to a pubset is stored locally on the pubset in its snapset catalog (\$TSOS.SYSCAT.SNAPSET).

When a pubset is imported, all snapsets available for this pubset are put into operation for read accesses.

Importing or write access by the user is not possible.

Snapsets are created and deleted by the administrator using the commands CREATE-SNAPSET and DELETE-SNAPSET. In shared pubset operation, the snapsets are set up on the master system. The snapsets can be used by all systems in shared pubset operation. SHC-OSD as of V6.0 must be started for this.

Snapsets can also be maintained in the target storage subsystem for disaster-protection scenarios.

The commands for administering snapsets and for backup/restore are available in the new SDF application area SNAPSET. The commands for creating/deleting snapsets and for restoring a pubset require the command privilege TSOS or HSMS ADMINISTRATION. The STD-PROCESSING privilege is sufficient for all other commands.

Synchronizing the volumes with restore pubset

Volume-based reconstruction of a pubset is only possible from the youngest snapset. The youngest snapset is copied back to the volumes of the pubset. The fact that the number of volumes in the original pubset may differ from the number of volumes in the snapset due to dynamically adding or deleting a volume, is taken into account..

Restoring to pubsets that have been reduced in size since the snapset was created is not possible.

Important note:

No DAB caches may be activated for pubsets that are to be backed up using snapsets. If a DAB cache exists before snapset operation is started, the CREATE-SNAPSET command is rejected. However, the command START-DAB is accepted if a snapset already exists.

2.3 Extensions in software products for supporting snap and clone

2.3.1 PVSREN

The two replication techniques TimeFinder/Clone and TimeFinder/Snap allow copies of a pubset to be separated. If a copy is to be used as an independent pubset in the same session as the original pubset, it must be renamed. This can be done in BS2000/OSD-BC V7.0 for SF and SM pubsets with the utility program PVSREN. The PVSREN CREATE-PUBSET-FROM-MIRROR statement has been extended in the MIRRORING-METHOD operand with the parameters *CLONE and *SNAP for this. When SM pubsets are renamed, the separate volume set must also be renamed. The new names of the volume sets are passed in a file. PVSREN can also optionally be used to adapt the user catalog and the IMON installation path to the new catalog ID. Only clone copies are suitable for pubsets that are to exist over a long term as independent pubsets. Free pubsets based on snap copies are intended for short-term use with predominantly read accesses.

Notes:

- For long-term use of the new pubsets, the S1 level should also be adapted to the new CATID with DIRCONV.
- For the S2 level, the migration archive must be copied and the relevant directories renamed.
- The catalog entries for tape files should be cleaned up to avoid inconsistencies caused by double references in both the new and the origin pubsets.

2.3.2 HSMS/ARCHIVE

The conventional tape backup of snapsets is supported with HSMS V8.0B. Files and job variables can be saved from a snapset into a backup archive.

Clones are backed up to tape as previously with the BCVs.

BCV and clones are not differentiated at the user interface of HSMS. To express the equality in the use of BCV or clone as disk copies, with HSMS V8.0B in the HSMS statement //BACKUP-FILES for the CONCURRENT-COPY=*YES operand the entry BY-ADD-MIRROR-UNIT is replaced by BY-ADDITIONAL-UNIT and the entry RESUME-MIRRORING is replaced by DISCARD-COPY. The previous entries are still supported for compatibility reasons.

The differentiation for BCV or clone is made in CCOPY. The clone-pair is activated internally, analogously to separating the BCV pair. This function requires an Engenuity version as of 5671.

Note:

With SHC-OSD V6.0, consecutive HSMS backups of clones increases the I/O load on the original device since, in contrast to with BCV, the actual data synchronization between the original device and the clone unit only takes place when the clone-pair is activated by HSMS. As of SHC-OSD V6.1, the same functionality as with BCV is fully available.

2.3.3 PLAM/LMS

PLAM V3.5A supports snapsets as a basic functionality for LMS V3.3B.

LMS as of V3.3B (correction level B62) allows library elements to be restored from snapsets.

2.3.4 SMPGEN

When creating SM pubsets from SF pubsets, SMPGEN checks whether snapsets exist for the SF pubsets. If they do, the SMPGEN statement is rejected.

2.3.5 VM2000 V9.0

The new VM privilege AUTO-SNAP-ASSIGNMENT has been introduced in VM2000 V9.0 for supporting snap units. This privilege allows the guest system to implicitly assign snap units for a snapset, independently of the ASSIGN-BY-GUEST privilege.

2.4 Consistent mirroring of SF and SM pubsets

The Symmetrix storage subsystems provide the mirror mechanisms BCV, SRDF, TimeFinder/Snap and TimeFinder/Clone, thus covering the different usage scenarios such as pubset backup and creating free pubset copies.

The same mirror type must thereby be used for all volumes of a pubset and all mirrors must be in the same operating state. For example, with BCV mirrors in the ESTABLISHED or SPLIT state.

This is assured for snapsets by SHC-OSD or NDM. The snap units are assigned to the respective original volume automatically at the time when the mirror is required as a backup archive.

For BCV and SRDF, the administrator must ensure the consistency of the mirror up to BS2000/OSD-BC V6.0B.

In BS2000/OSD-BC V7.0, the consistency test can optionally be performed when the SF or SM pubsets are put into operation, without any additional administrative measures being required:

- During the import processing of a pubset.

The IMPORT-PUBSET command has been extended by the operand CHECK-PUBSET-MIRRORS for this.

- When extending a pubset by one or more volumes.
The MODIFY-PUBSET-PROCESSING command VOLUME-ASSIGNMENT operand was also extended with the CHECK-PUBSET-MIRRORS parameter.
- By checking at any time with the CHECK-PUBSET-MIRRORS command.

If differences occur, messages from the commands can be used to identify the volumes concerned and appropriate measures can be initiated.

2.5 Pubset provisioning (SPACEPRO)

The new product SPACEPRO monitors the saturation of pubsets and when a settable threshold is reached, automatically extends the pubset concerned with a suitable volume from a free pool.

The free pool consists of one or more pool pubsets and must be provided by the system administrator. It can be made available to multiple BS2000 systems.

Pubsets that are extended autonomously by SPACEPRO from the free pool are called SPACEPRO pubsets.

The SPACEPRO pubsets are defined via the SPACEPRO options with which a SPACEPRO pubset is assigned just one pool pubset and the automatic extension conditions, e.g. SATURATION-LEVEL, are defined (command: MODIFY-PUBSET-SPACEPRO-OPTIONS). A newly created pubset is by default not assigned a pool pubset.

The volumes of the pool pubsets must have an allocator block applied to ensure problem-free removal of the volume from the pool pubset in case of extension (operand ALLOCATION-ON-VOLUME=*NOT-ALLOWED in the commands MOVE-SPACEPRO-DISK or MODIFY-PUBSET-RESTRICTIONS).

Synchronization between the BS2000 systems is performed by exclusive import of the pool pubsets.

A pool pubset cannot simultaneously be a SPACEPRO pubset.

The pool pubset can be either an SF or an SM pubset and must be made up of disks whose physical characteristics match those of the SPACEPRO pubset. The relevant physical characteristics are, e.g. disk formatting (CKD, FBA) or the disk box. In the case of extensions, the physical characteristics are dynamically determined and the logical characteristics can be adapted accordingly (e.g. with VOLIN).

A pool pubset can have several SPACEPRO pubsets assigned to it.

Monitoring is activated with the START-SPACEPRO-MONITOR command and stopped again with STOP-SPACEPRO-MONITOR.

The products PROP-XT and JV are required for monitoring with the SPACEPRO monitor.

A PROP-XT application records the saturation messages and, if the threshold is exceeded, automatically extends the pubset via SDF-P procedures.

The monitoring can also be performed by the INSPECTOR of openSM2 as an alternative to the SPACEPRO monitor. To do this, rules for the measurement parameters PUBSATL and/or PUBALLOC are defined and the system administrator provides an SDF-P procedure in BS2000 for handling the SM2 events.

For the automatic extension of pubsets, SPACEPRO includes an S procedure REPORT-SM2-EVENT in the SYSLNK.SPACEPRO.010 library that can be called in the SDF P procedure with the supplied parameters for the measurement parameter, the measurement value and the CATID of the pubset.

If the conditions for the extension are fulfilled for a pubset, the assigned pool pubset is imported exclusively and a suitable volume is determined according to the operating parameters of the pubset to be extended.

The volume is removed from the pool pubset with MODIFY-PUBSET-PROCESSING, suitably formatted with VOLIN and integrated into the pubset to be extended with MODIFY-PUBSET-PROCESSING. The pool pubset is subsequently exported and thus also available again for other BS2000 systems.

VM2000 V9.0 supports the assignment of pubsets to the guest systems for online Provisioning under VM2000. When reconfiguring a pubset (MODIFY-PUBSET-PROCESSING), the type of assignment and the ASSIGN-BY-GUEST attribute for the implicit assignment are adapted automatically for the volume concerned.

This assignment is also retained for the subsequent VM2000 sessions and the command file with the device assignments for the guest system does not have to be adapted.

The conditions for the pubset extension are checked via the files :catid:\$TSOS.SYSDAT.SPACEPRO.OPTIONS and :catid:\$TSOS.SYSDAT.SPACEPRO.HISTORY, that contain the timestamps of the pubset extensions.

Both files should also be included in the backup.

The locks required for the extension are implemented via the two job variables

:catid:\$TSOS.SYSLCK.SPACEPRO.OPTION and

:catid:\$TSOS.SYSLCK.SPACEPRO.HOST

that are created for each pubset.

SPACEPRO is administered via commands. There are commands available for starting/stopping the monitoring, for setting up SPACEPRO pubsets and for providing information.

Notes:

- If a SPACEPRO pubset is to be excluded temporarily from the monitoring, only the entry *NONE for the pool pubset is required and the remaining options remain preserved.
- The manually callable function MOVE-SPACEPRO-DISK is provided for reducing a pubset. However, this requires extensive I/O resources and should therefore only be executed during low load periods. The command requires the product SPACEOPT since files may have to be moved to other volumes.
- Regardless of the definition as SPACEPRO or pool pubset, the command MOVE-SPACEPRO-DISK can be used for moving volumes between pubsets or for extending pubsets.

- SPACEPRO does not support pubsets that are mirrored with DRV nor pubsets comprising GS volumes.

SPACEPRO is described in the Systems Support Manual. Refer to the Release Notice SYSFGM.SM2-TOOLS.075.E for detailed information on the SM2 INSPECTOR.

2.6 Autonomous, dynamic control of I/O resources (IORM)

The new utility program IORM facilitates autonomous, dynamic control of the I/O resources, devices, controllers, channels (type S and type FC) and paths. Both S and SX servers are supported in native and in VM2000 operation.

The following functions are implemented:

- IOPT: I/O priority control for tasks with competing access to one device (I/O Priority Handling for Tasks)
- DPAV: Dynamic I/O load distribution for S server disks on the FC channel (Dynamic Parallel Access Volume)
- DDAL: Optimized load distribution in CentricStor operation (Dynamic Device Allocation)
- IOLVM: Limiting of I/O throughput for single VM2000 guest systems (I/O-Limit for Virtual Machines)
- TCOM: Adapting the compression for LTO devices (Tape Compression)

The IOPT, DPAV and IOLVM functions control disks, the DDAL and the TCOM functions control tape devices.

The IORM subsystem links itself into the BS2000 I/O system and collects I/O data to determine the I/O resources utilization. IORM also periodically checks whether intervention in the I/O operation is required.

The values set for intervention such as thresholds, selection of devices to be monitored or I/O priorities can be passed to IORM in the form of a parameter file or in dialog.

IORM has a HELP function that outputs all permitted statements together with their syntax.

2.6.1 I/O priority control for tasks (IOPT)

I/O-intensive but relatively unimportant applications can obstruct other, more important applications if the I/Os are on the same device or on devices on the same controller, path, port or channel.

Three I/O priorities, low, medium and high, were therefore introduced for IORM that can assign the task categories with the new IO-PRIORITY parameter of the MODIFY-TASK-CATEGORIES command. The settings are passed on to IOPT by PRIOR.

The current I/O priority setting is displayed with the command `SHOW-SYSTEM-STATUS INFORMATION=*CATEGORY`. The default for the `IO-PRIORITY` parameter is `*NONE`. If this value is retained, the priorities can alternatively be set via `IORM` statements. A further dynamic can be set with the "automatic category change" mechanism under `PCS`.

If the `IOPT` function is activated in `IORM` (`IOPT_SET_ON=YES` statement), `IORM` applies brakes to the tasks with low and medium priorities by assigning time penalties if these tasks hinder tasks with higher priorities. `IORM` does not affect tasks with I/O priority high. I/Os via `FDDRL`, `ARCHIVE`, `VOLIN` or `PAGING` are also not braked.

The devices that are to be affected by the I/O priorities can be set with the `IOPT_DEV_ADD` statement. The devices for less important applications are also to be defined here if they can indirectly hinder important applications, e.g. via common channels.

2.6.2 Dynamic I/O load distribution for disks on the FC channel of the S server (DPAV)

Only one I/O can be executed at any particular time on a disk. If several applications with a large number of I/Os use the same disk, this can lead to high wait times.

Until now, static PAV (Parallel Access Volume) has been used on S servers since BS2000/OSD-BC V5.0 to alleviate this problem. The function allows multiple concurrent accesses to one logical device.

With PAV, several device addresses (alias devices) are assigned to one logical (base) device on the same controller, thus allowing multiple I/O orders to be started concurrently via the base and alias devices.

PAV on the FC channel is a pure software solution that can be operated without intervening in the Symmetrix controller. To do this, BS2000 uses the fact that disks on the FC channel can still accept I/O orders if an I/O is already active. Static PAV assigns the alias devices statically to the base device and therefore requires predictive planning of device utilization.

Dynamic PAV (`IORM DPAV` function) assigns the alias devices autonomously to the volumes that would profit most from them. For devices connected via type FC, `DPAV` switches an alias device from the current base device to another base device by dynamically changing the I/O configuration. In VM2000 operation, `DPAV` must be activated for each guest system in which `DPAV` is to be active.

Note:

START-VM cannot be used during dynamic I/O reconfiguration on S servers while operating under VM2000. When using the IORM DPAV function, dynamic I/O reconfiguration can be called at any time, thus disrupting START-VM.

For this reason, as of VM2000 V9.0 with START-VM and active dynamic I/O reconfiguration, the system waits a maximum of 15 seconds for the I/O reconfiguration to be completed. If the I/O reconfiguration takes longer, START-VM is rejected.

The following restrictions apply when using HIPLEX AF under VM2000 < V9.0:

- If the "warm standby" scenario is used, the DPAV function must be deactivated on all virtual machines of the standby system.
- When monitoring the guest system with VM2000 resources via the live monitor while using DPAV, RESTART-AFTER-STOP=*NO must be set in the ADD-VM2000-MONITORED-SYSTEM statement.

2.6.3 Optimized load distribution in CentricStor operation (DDAL)

If several tapes are in use simultaneously in a CentricStor, this may cause an adverse load distribution since the devices are simply selected one after the other, regardless of the number of active devices on different ICPs (Integrated Channel Processor). In BS2000/OSD-BC V7.0, the device selection is optimized by the device management noting the number of active devices per ICP and taking this into account for device selection. A prerequisite for this is the setting *BY-CONTROLLER in the NEXT-TAPE-MOUNT operand of the MODIFY-MOUNT-PARAMETER command.

However, the device management only knows the device configuration in the local system.

The IORM DDAL function optimizes the device selection on all guest systems in VM2000 operation. IORM must be in used in the monitor system and on all guest systems for this. IORM keeps a counter of the device configuration for each controller and makes this global configuration counter available to the local device management.

2.6.4 Limiting the I/O inclusion of single VM2000 guest systems (IOLVM)

Less important guest systems that have intensive I/O activity, can severely impede other, much more important guest systems that use the same I/O resources.

The IORM IOLVM function can detect such conflict situations and intervene predictively. To do this, IORM continuously collects the utilization values for all known I/O devices, checks the settings for IOLVM and intervenes in the control if necessary. IOLVM only considers disk devices. As with the IOPT function, FDDRL, ARCHIVE, VOLIN and PAGING I/Os are not braked.

The I/O limits in % for a guest system are defined in VM2000 V8.0 with the IORM IOVLM_xxx=n statement, where xxx identifies the guest system.

As of VM2000 V9.0, the limits are defined with the VM2000 command CREATE-VM or MODIFY-VM-ATTRIBUTES.

2.6.5 Adapting the compression of LTO devices (TCOM)

To ensure high performance data backup to LTO tapes, a minimum data rate must be maintained to keep the tapes continuously streaming. This minimum data rate is sometimes only achieved if the compression is disabled on the device. However, this reduces the net tape capacity accordingly.

By default, the compression is always enabled in BS2000/OSD-BC V7.0, even if IORM is not used.

The compression can be fully disabled with the TCOM function. TCOM can also dynamically enable/disable the compression according to the data rate. The compression is disabled if the data rate is sufficient for tape streaming without compression but not with it.

2.7 Extended peripherals support: LTO-3 MTC devices

In BS2000/OSD-BC V7.0, LTO device type LTO-3 is supported in addition to the previously supported LTO-1 and LTO-2 types. The LTO-3 types also have a new tape cartridge with a capacity of 400 GB (uncompressed).

The LTO-3 devices are intended for use on the FC channel of SX and S servers.

A minimum data rate of 40 MB/sec (uncompressed) and 80 MB/sec (compressed) is required to ensure that the LTO-3 tapes stream continuously. This in turn requires suitably fast disk peripherals and the use of HSMS/ARCHIVE V8.0B or FDDRL V16.0. These new versions of the BS2000 backup products parallelize the disk accesses by using PAV (Parallel Access Volume) on S servers and RSC on SX servers.

If the minimum data rate is not reached with the existing disk configuration, the compression, that is enabled by default, can be disabled with the new TCOM function of the I/O resource manager IORM.

2.8 Improved SAN support (SANCHECK function)

Since the introduction of the fibre channel, the FC connection technology SAN (Storage Area Network) is being used increasingly for connecting Symmetrix storage subsystems and magnetic tape devices (CentricStor and LTO). The previous control functions in BS2000/OSD only allow a limited view of the actually present peripherals and their connections. If problems occur when mounting devices or during operation, the cause is often very difficult to find, e.g. the INOP message from a device may be caused by connection malfunction anywhere in the SAN, but it may also be due to a generation or wiring error.

The new SANCHECK function supports detecting generation errors with S and SX servers as well as localizing error conditions in a SAN.

Generation errors in BS2000, wiring errors or faulty zoning settings are detected by comparing the path generated in BS2000 to a device with the connections actually present in the SAN.

Possible generation errors are, e.g. wrong specification of the controller WWPN (World Wide Port Number).

With errors in I/O operation, the error information on the path between the channel and controller/device and to the FC switch or fabric is output, thus allowing the error to be localized.

The SANCHECK function is called with the START-SANCHECK command. The command requires the TSOS command privilege or OPERATING or SERVICE.

SANCHECK offers the two statements SHOW-SAN-PATH and SHOW-SAN-CONFIGURATION.

The SAN configuration data is determined with the first command execution. The data is then used for subsequent call accesses unless a data update is explicitly requested.

*5 SANCHECK requires the POSIX subsystem.

*5 BS2000/OSD-BC V7.0B provides the new SANCHECK version V2.0, which
*5 no more needs SNMP-LIGHT or SBA-BS2 in order to discover the SAN
*5 configuration data.

Note:

With SX servers up to and including SX150, only path and zoning information can be shown because the X2000 V3.0 carrier system does not support reading out the BS2000 disk configuration. It is therefore not possible to check the disk configuration against the physical wiring.

*5 This function will be offered for SX servers SX160 and SX100-D
*5 with X2000 V4.0.

2.9 Extended support of System Managed Storage (SMS)

System Managed Storage (SMS) in BS2000/OSD allows the storage administrator to define a hierarchic storage system consisting of an online processing level (S0) and a migration level (S1) on disk or tape.

2.9.1 Moving files on the online processing level

In addition to the fast FC disks, FibreCAT storage systems on SX servers also support the slower, cheaper ATA and SATA disks.

For the new DMX-3 storage systems, EMC offers "Tiered Storage" within a box in the form of disks with different rotation speeds, in particular also low-cost FC disks (LC-FC).

BS2000/OSD supports both disk types as normal disks. It is possible to integrate the SATA disks into SMS/HSMS on the online processing level by defining special storage classes, the S1 level is used by HSMS. Assigning a file to such a storage class causes synchronous storage of the file on a suitable volume set on the online processing level.

Note:

Due to the performance differences, single feature pubsets and SM volume sets should be made up uniformly of either SATA/LC-FC disks or standard disks. The system does not check this.

2.9.2 Extended support for storage classes in PVSREN

One or more volume sets can be assigned to the storage classes of SM pubsets via volume set lists. Files to which a storage class is assigned are then stored with preference on a volume set from this list. The volume set lists catalog \$TSOS.SYSCAT.VSETLIST therefore contains one or more catalog IDs of volume sets. With PVSREN V3.0, when a volume set is renamed the change is also made in the catalog of the volume set lists, thereby retaining the settings made for the storage classes.

When replicating an SM pubset, selection can be made via the answerable message PVR0207 whether the settings for the storage classes of the origin pubset are to be taken over and thus also renaming performed in the catalog of the volume set lists. The migration archive is also copied during replication and adapted to the new catalog ID. However, this is only possible for SF pubsets if a pubset-specific migration archive exists, whereas for SM pubsets, the migration archive is always on the pubset.

2.10 Parallelizing the tape monitor task

The tape monitor is the main as well as the most performance-critical instance for scheduling mounting processes and monitoring the online security of magnetic tape cartridges (MTC). If this task is, e.g. blocked by I/O errors, no mounting or demounting takes place and the information service for system level products such as MAREN is also heavily delayed. The I/O activities of the tape monitor are shifted into other process carriers to avoid such blockages.

2.11 Extended support for character sets and codes

By default, BS2000/OSD uses the 7 bit EBCDIC character set EDF03IRV with 95 printable characters and 65 control characters in the system. The designation 7 bit has established itself since the reproducible characters available correspond to the ASCII 7 bit character set although 8 bits are used for coding.

Via the XHCS (Extended Host Code Support) subsystem, BS2000/OSD supports both the 7 bit and 8 bit character sets that encompass 128 or 256 characters respectively. This allows BS2000/OSD to display all languages that are defined in the international code tables as per ISO 8859.

The concept of "coded character sets" (CCS) that defines the character coding in a file is used to depict the different character sets and codes. The programs get the information about the character sets from XHCS and do not have to store it themselves. Regardless of the input source, XHCS identifies the character sets via their character set names, the so-called CCS name, and makes them available in the form of tables.

2.11.1 CCS default settings and conversion from 7 bit to 8 bit character set

By default, BS2000/OSD uses the 7 bit EBCDIC character set EDF03IRV.

The class 2 option HOSTCODE=<CCS name> can be used to define a different, specific 8 bit EBCDIC code instead of EDF03IRV for the complete BS2000/OSD system. Code definition via the CCS name is possible for separate IDs and pubsets.

The default value for inputs on the terminal to TIAM, UTM and DCAM applications can be modified globally via the VTSU-B parameter file SYSPAR.VTSU-B.<vers>. Once the appropriate parameters are set, the character set of the home pubset for this ID apply. This is done for a single process with the command MODIFY-TERMINAL-OPTIONS CODED-CHARACTER-SET=*8BIT-DEFAULT.

If data is converted from a 7 bit character set to an 8 bit one, the converted data must be distinguishable from the unconverted data. As of BS2000/OSD-BC V7.0, a new system behavior will therefore be introduced with which the default value of the CCS name of a file is determined.

Note:

ISO8859-x variants should not be used as a system or user character set since all programs in BS2000 assume that the data is provided with a so-called invariant EBCDIC core.

Previous behavior:

Up to BS2000/OSD-BC V6.0B, the BS2000 system always assigns the default *NONE for the CCS name of the file (CCS-Name=*NONE). If a different character set is used, the file attribute CCS-NAME must be specified explicitly.

Changed behavior:

The CODED-CHARACTER-SET operand of the two commands CREATE-FILE and MODIFY-FILE-ATTRIBUTES has been extended by the parameter *USER-DEFAULT that defines the default character set for the ID concerned.

If it is not EDF03IRV, when a new file is now created the CCS name of the user entry of the destination pubset is taken over as the CCS name of the file. As previously, the file does not receive an entry for the CCS name (CCS-Name = *NONE) if EDF03IRV is in the user entry. The file attribute CCS-NAME is included in the transfer when copying, saving and restoring files.

The behavior of LMS has also been changed analogously when new elements are added. If a CCS name is not explicitly specified, they are assigned the CCS name of the library.

There is therefore no change if the default system character set is used. If an 8 bit character set is selected, the code is clearly specified on the file and library element level via the CCS name. However, explicit specification of the character set always has priority.

You will find further information on converting from 7 bit to 8 bit character sets in the white paper under

*5 http://sp.ts.fujitsu.com/dmsp/docs/wp_zeichensatz-bs2000_de.pdf

2.11.2 Support for Unicode in BS2000/OSD via XHCS-SYS

Due to new EU directives, the previously supported character sets are no longer sufficient in the medium term. As of BS2000/OSD-BC V6.0B (correction level B62), support for Unicode supplements the EBCDIC character sets previously available in BS2000/OSD systems with the additional characters required in the European language theater. This is done by using selected Unicode code points in addition to the previous EBCDIC variants.

Unicode is an international standard in which a digital code is defined for each character of all known languages over the long term. You will find information on Unicode in the Internet under <http://www.unicode.org/>.

The basis for the Unicode support in BS2000/OSD is extensions in the XHCS-SYS V2.0 subsystem, the central source of information about the coded character sets available in the system.

*5 XHCS-SYS V2.0 is a component part of openNetServer as of V3.2.

In addition to the previously supported 8 bit ISO codes ISO8859-1/2/3/4/5/7/9/15 and the EBCDIC codes belonging to them, XHCS-SYS V2.0 also supports the Unicode formats UTF-8, UTF-16 (2 byte, BS2000) and UTF-E in BS2000, that follows UTF-EBCDIC from IBM. XHCS-SYS V2.0 also includes conversion tables from the supported 8 bit ISO codes to Unicode and vice versa. In addition to the characters supported in these ISO codes, XHCS-SYS supports around 70 further characters from the Unicode character set, e.g. special characters such as those used in public administrations.

Using Unicode in the system

To support using Unicode in BS2000/OSD systems, the character sets used in the system are extended by additional characters and a programming and runtime environment are provided to extend existing applications with Unicode fields. It is thereby assumed that only a few fields, mainly name and address fields, have to be converted to Unicode.

The Unicode support is provided on the basis of the existing products. Unicode-based characters are allowed for texts to be processed but not for field or container names. The product-specific rules for commands and object names remain as they were.

Further preparations must be made for using Unicode beyond updating the system base, the system level applications and the programming environment.

These include:

- All data/files must be brought into a defined, consistent state.
- The CCS (Coded Character Sets) names of all data must be consistent since the CCS name is a central component for handling the data.
- Applications must be extended by the additional Unicode fields that have to be processed.

The UTF codes (Unicode Transformation Format) UTF-8, UTF-16 (2 Byte) and UTF-E that follows UTF-EBCDIC from IBM are supported in BS2000/OSD.

2.11.3 Support for Unicode by the software products

The software environment required for supporting the Unicode functionality is provided in BS2000/OSD-BC V6.0 and V7.0.

The support encompasses the following functional areas:

- Programming (COBOL2000, ESQL-COBOL, IFG/FHS, AID).
- *5 - Data storage (SESAM/SQL, ORACLE, UDS/SQL V2.5).
- Data processing (EDT, SORT, PERCON).
- Data I/O to terminals, printers and file transfer
- *1 (VTSU, MT9750, WebTransactions, FHS, RSO, Spool, openFT).

Unicode-specific extensions have been implemented in the above products.

The different variants of the NATIONAL data type are supported for the programming environment in COBOL2000 V1.4 and ESQL-COBOL V3.0 and its use is permitted as a host variable in SQL statements. CRTE V2.6 allows the procedural use of this data. IFG V8.3 and FHS V8.3 allows separate format fields to be identified for Unicode.

With appropriate support by COBOL, AID V3.2 offers symbolic debugging of data type UTF-16.

- *5 In the database systems SESAM/SQL V5.0, Oracle 10g and UDS/SQL
- *5 V2.5, Unicode characters can be stored and processed with SQL resources using the new data types NCHAR and NVARCHAR.

XHCS-SYS provides SORT V7.9 with the sorting tables required for processing data. PERCON V2.9 is correspondingly extended for standardizing diacritical characters and converting files. Files with Unicode code sets can be processed as of EDT V17.0.

The EBCDIC variant of UTF-8 (UTF-E) is supported by the terminal emulation MT9750 V7.0 and VTSU-B V13.2 for input/output. VTSU-B V13.2 is a component part of openNetServer V3.2.

FHS V8.3 can output messages coded in UTF-E. Inputs in Unicode fields are converted field-specifically to EBCDIC or UTF-16 before transfer to the applications.

*1 RSO V3.5 supports network printers with UTF-8 capability and
*1 accepts print files with UTF-8, UTF-16 and UTF-E coding.
In the local spool, files can be printed on OCE high performance printers in UTF-16 format.
DMS and POSIX files can be transferred in the Unicode formats UTF-8 and UTF-16 in BS2000 with openFT V10.0.

Note:

The size of all files remains unchanged. Since UTF-16 occupies 2 bytes per character, a SAM record can only contain 16000 characters and not 32000 characters as previously. The same applies analogously for the database fields NCHAR and NVCHAR.

You will find detailed information on Unicode support in the Release Notices of the separate products.

2.12 New ASTI Subsystem

ASTI (Assistant for Service Task Integration) is implemented as a subsystem and provides support for the system developer when developing client / server applications. ASTI takes over the communication between client and server by forwarding the orders placed by the client to the server, receiving the feedback messages and managing both in internal ASTI wait queues. A server application must be started via ASTI to allow it to be managed by ASTI. It is also possible to specify for client orders whether recovery measures are to be initiated for the orders concerned if the server terminates prematurely.
The ASTI functions are made available to the developer via a macro interface.

ASTI is part of the BS2000/OSD basic configuration and is initially only released for internal use by BS2000 products. The first user of ASTI is the product interNet Services V3.2. The ASTI subsystem is started automatically when the system is booted.

*5 You will find a detailed description of ASTI in the file
SYSRME.ASTI.020.E.

2.13 New functions in POSIX A39

Dynamic modification of POSIX tuning parameters

The control parameters for the POSIX system kernel are stored in the POSIX parameter file (SYSSSI.POSIX-BC.<version>). Changes to this parameter file only take effect after the POSIX subsystem is restarted.

As of POSIX A39, some selected POSIX tuning parameters can be modified dynamically using the new privileged shell command `usp`. If the modified values are also to be valid for the next POSIX session, they must be entered in the SYSSSI file.

The following tuning parameters can be modified dynamically:

FORCEDTERM	Forces termination of the subsystem.
HDSTNI	Number of server tasks for asynchronous I/Os.
HDPTNI	Maximum number of mounted local file systems.
HEAPSZ	Maximum possible value for <code>brk()</code> system call.
MAXIMERC	Maximum number of seconds for terminating rc scripts.
MAXUP	Maximum number of processes per user.
NPROC	Maximum number of processes in complete system.
NOTTY	Maximum number of ttys.
NOSTTY	Maximum number of sttys.
DBLPOOL	Size of the global program cache in MB for the <code>posdbl</code> command.

Extensions to the POSIX installation program

The POSIX installation program `START-POSIX-INSTALLATION` has been extended by the following functions for automated installation (batch mode):

- Installation errors are recorded in the logging file `/var/sadm/pkg/insterr`.
- The feedback of a command return code (MAINCODE, SUBCODE1, SUBCODE2) and triggering the SPIN-OFF mechanism within procedures are supported via the new SDF ERROR-HANDLING operand.

Extensions to the `mmap()` function

- As of POSIX A39, the `mmap()` function also supports files mounted via NFS.
- `mmap` also supports mapping `/dev/zero` for increasing performance and reducing the porting effort of JAVA versions.

You will find detailed information about all innovations to POSIX A39 in the Release Notice `SYSFGM.POSIX-BC.070.E`.

2.14 New system diagnostic tools

The two new diagnostic tools Auxiliary SERSLOG Extensions (ASE) and System Hooks facilitate system diagnosis for internal problems during productive operation.

2.14.1 Auxiliary SERSLOG Extensions (ASE)

The Auxiliary SERSLOG Extensions (ASE) are implemented in the ASE subsystem and represent an automated extension to the SERSLOG events. With ASE, SERSLOG events can be monitored and actions can be triggered when they occur. Both single record types and complete message classes can be monitored. It is also possible to set boundary conditions for the actions, such as frequency of the SERSLOG events.

Possible actions are:

- Message output to the console.
- Teleservice call.
- Logging into an internal buffer.

The SERSLOG events to be monitored by ASE, the thresholds and the actions are defined via commands.

ASE is a global system resource. Each user that has the TSOS privilege required for command execution can also execute any ASE command.

The diagnostic function ASE is described in the Diagnostic Manual.

2.14.2 System hooks for internal system diagnosis

The new diagnostic function System Hooks (SH) has been introduced in BS2000/OSD-BC V7.0 for internal use. System hooks are privileged test points in the system address space and are used as a test aid in TPR (Task Privileged) and SIH (System Interrupt Handling).

The system hooks are administered exclusively via system commands. There are commands for setting, modifying, deleting and displaying system hooks.

The use of system hooks is controlled via a multi-level privilege concept:

- Command privilege: The TSOS command privilege is required for executing a command.
- Class 2 parameter SYSTH00K: System hooks can only be set or modified if SYSTH00K='YES' is set.
This parameter cannot be modified dynamically.

System hooks are a global system resource, i.e. any authorized user can execute any SH command.

Note:

In addition to the extended diagnostic capabilities, system hooks also contain the risk of a system crash in critical paths since they modify the interrupted context.

2.15 Increase in reconfigurable work memory on the SX160 under VM2000

- *2 In BS2000/OSD-BC V7.0, the reconfigurable part of the real
*2 memory has been notably enlarged for the SX servers with effect
*2 from SX160 and X2000 V4.0.
- *2 Under VM2000, the work memory of a guest system can be enlarged
*2 during operations or reduced to a minimum work memory which has
*2 to remain available to the guest system during entire system
*2 operations. Data is in this memory area which cannot be moved
*2 to other areas.
*2 For disaster recovery scenarios with standby systems under
*2 VM2000, which are implemented if the productive system fails, the
*2 work memory and the minimum work memory of the standby system
*2 should be kept as small as possible and the real memory should
*2 remain available to the other VM guest systems. However, the
*2 standby system must be assigned a minimum real main memory
*2 matching the size of the productive system's work memory.
*2 In this type of scenario, a small work memory minimum is
*2 advisable for all VM guest systems as the systems should
*2 generally be upheld even after the handover of tasks to the
*2 standby system.
- *2 As major elements of the work memory, such as big pages for JIT
*2 compiles, are moved to areas above the work memory minimum, the
*2 reconfigurable part of the memory is notably increased and the
*2 distribution of system-spanning resources is optimized without
*2 terminating the system.
- *2 The work memory minimum is reduced via the following measures:
*2 - The previous minimum limit for work memory was the amount of
*2 big pages required for JIT compiles under high load, which is
*2 approximately 40% of the memory size. This limit is lifted with
*2 BS2000/OSD-BC V7.0.
*2 - New big pages can now be created with the increased work
*2 memory. This was previously only possible by increasing the
*2 memory minimum.
*2 - Big pages assigned by local JIT compiles can be released, if,
*2 for example, the main memory is full or work memory is reduced.
*2 The system thus automatically adapts itself to the work memory
*2 size when providing big pages.

2.16 New functions in BS2000/OSD V7.0A with Correction Package 1/2008

2.16.1 Support for new Hardware

*3 In 2007, December release was given for the DMX-4 series
*3 Symmetrix disk subsystems with microcode e5772 for connection to
*3 BS2000/OSD via type FC channel and via type S channel. For
*3 BS2000/OSD-BC V7.0A correction package 2/2007 (release 2007,
*3 November) is required. The SHC-OSD V6.1 subsystem serves for
*3 controlling the Symmetrix functions. At least correction level
*3 V6.1A01 (release 2007, December) is required.

2.16.2 Extensions in Software products

*3 APACHE V2.2

*3 With APACHE V2.2, the migration to the APACHE HTTP Server 2.2.8
*3 of the Apache Software Foundation is complete, with support for
*3 PHP V5.2, PERL V5.8 and TOMCAT V5.5 instead of JSERV/JSP.
*3 APACHE(BS2000/OSD) V2.2 includes support for the SSL (Secure
*3 Socket Layer) protocol for secure transfer of documents and data
*3 over the internet.

*3 The Release Notice SYSFGM.APACHE.022.E provides detailed
*3 information.

*3 BS2ZIP V1.2

*3 BS2ZIP V1.2 offers amongst others the following functional
*3 enhancements:

- *3 - The output of the BS2ZIP SHOW-FILE-ATTRIBUTES statement can be
*3 moved into S-variables to exploit in SDF-P procedures.
- *3 - The files within the ZIP container can be protected by a
*3 container-associated crypto password.
- *3 - In BS2ZIP V1.2 the new statement CONVERT-ZIP-CONTAINER is
*3 integrated to convert a BS2ZIP PAM file in a SAM file that can be
*3 managed by openFT.
- *3 - The PLAM-LIB indicator is set when a PLAM library is extracted
*3 from a BS2ZIP container.

*3 Detailed information on the extensions provides the Release
*3 Notice SYSFGM.BS2ZIP.012.E

2.17 New functions in BS2000/OSD V7.0B with Correction Package 1/2009

2.17.1 Source correction version BS2000/OSD-BC V7.0B

*5 As a consequence of the transition from Fujitsu Siemens Computers
*5 to Fujitsu Technology Solutions, for all BS2000 products, that
*5 shall be sold furthermore, must be performed a so-called
*5 rebranding, for example changed Copyright messages at program
*5 start.

2.17.2 New functions in POSIX A41

*5 In addition to supporting BS2000/OSD-BC V8.0, POSIX A41 also
*5 offers transparent access to BS2000 files from within POSIX as an
*5 essential new function using existing POSIX interfaces. This is
*5 made possible via another new file system type, bs2fs.

*5 This entails the files or a number of files from a BS2000 user in
*5 POSIX being mounted in the position specified in the mount
*5 command. In order to process the files using POSIX resources,
*5 they are copied for the user as required (copy on demand) into a
*5 ufs container file system, available for this purpose only, and
*5 the file in the BS2000 disabled for the user. The POSIX user can
*5 now execute read and write operations on the file. When closing,
*5 the file is copied back to the BS2000 and deleted in the
*5 container.

*5 The file system bs2fs provides powerful POSIX commands for the
*5 BS2000 files, such as the search function "grep" that is used for
*5 searching through files for specific patterns, or "make" which
*5 permits the creation of programs or program systems.
*5 Procedures, which previously necessitated swapping between BS2000
*5 and POSIX, can now be replaced by pure POSIX scripts. The bs2fs
*5 file system also simplifies the provision of BS2000 files in the
*5 web.

2.17.3 Extensions in DSSSM V4.3

*5 DSSM (Dynamic Subsystem Management) is the central instance in
*5 the BS2000/OSD-BC and is used for the dynamic management of
*5 subsystems.

*5 DSSM V4.3 includes the following extensions:

*5 - The REMOVE-SUBSYSTEM command also supports subsystems declared
*5 with MEMORY-CLASS=*BY-SLICE.

*5 - On SX servers, the size specification is checked when a
*5 subsystem is loaded which has been declared with "*BY-SLICE".
*5 If odd values are detected, the size is automatically increased
*5 by 1.

*5 For subsystems loaded during start-up, corrections are documented
*5 with the new message ESM0345.

*5 No message is output if the subsystem is activated using
*5 ADD-SUBSYSTEM TYPE=*NEW-SUBSYSTEM,.

*5 The command MODIFY-SUBSYSTEM-PARAMETER checks the size
*5 specification and, if necessary, makes the correction without
*5 issuing a message.

- *5 - The command RELEASE-SUBSYSTEM-SPACE has been extended by the
- *5 operand MEMORY-TYPE.

- *5 - On systems with BLSSEC, DSSM supports the message BLS0540 when
- *5 loading subsystems. In this case, BLS supplies a return code and
- *5 DSSM terminates the subsystem abnormally.

2.17.4 ELSA V1.7 / PRSC V1.0

- *5 The TDS V4.0 program is no more needed as of BS2000/OSD-BC V7.0B.
- *5 The components ELSA V1.7 and PRSC V1.0 that were formerly part of
- *5 TDS V4.0 are now part of BS2000/OSD-BC V7.0B.
- *5 ELSA is the reporting program for hardware error logging and SVP
- *5 logging.
- *5 PRSC (Periodical Remote Service Check) is a service application,
- *5 in order to check the remote serviceability from the customer
- *5 server.

2.18 Implemented change requests / extended commands

2.18.1 Behavior of the SNAP task with disk storage bottlenecks

Previously, disk storage bottlenecks (message DMS0541) caused the SNAP task to terminate and it could not be restarted during operation.

As of BS2000/OSD-BC V7.0, the SNAP task is no longer terminated and an asynchronous question (NSP2007) is output to the console.

2.18.2 Increased maximum value for the address space limit

The maximum value for the address space limit of an ID has been increased from 32 MB to 2147483647 MB. As a result of this, the use of data spaces by applications such as SESAM V4.0 is no longer limited by the address space.

2.18.3 Assigning a MONJV for an active job

To monitor applications with a MONJV, it was previously necessary to assign the MONJV when the application was started.

In BS2000/OSD-BC V7.0, the system administrator can use the command MODIFY-JOB-OPTIONS to assign an MONJV to monitor a running job. This makes it possible to activate monitoring for an application without having to terminate the application first.

2.18.4 BLSSERV V2.7

- *5 The number of memory pools, in which the user can save shared
- *5 code with the macro ASHARE, was previously restricted for each
- *5 user ID to 8 per application area (ENAMP-Operand SCOPE). With
- *5 BLSSERV V2.7, the maximum number of useable memory pools has now
- *5 been increased from 8 to 16 per application area.

2.18.5 Extended commands

CREATE-FILE / CREATE-FILE-GROUP

The CODED-CHARACTER-SET operand has been extended by the parameter USER-DEFAULT which is simultaneously also the new default value.

If this entry is not EDF03IRV, when a file is created the CCS entry of the ID is taken over into the CCS name of the file. If EDF03IRV is entered for the ID, the file is assigned the CCS name *NONE, as previously.

New LMS elements are analogously assigned the CCS name of the library if no other value is specified.

IMPORT-PUBSET / MODIFY-PUBSET-PROCESSING

The two commands have been extended by the CHECK-PUBSET-MIRROR operand. This makes it possible to make an automatic consistency check of BCV and SRDF mirrors when a pubset is put into operation.

MODIFY-FILE-ATTRIBUTES / MODIFY-FILE-GROUP-ATTRIBUTES

The CODED-CHARACTER-SET operand was extended by the parameter USER-DEFAULT.

The default value remains as previously *UNCHANGED.

MODIFY-TASK-CATEGORIES

The command was extended by the IO-PRIORITY parameter for controlling the IOPT function of the new IORM subsystem.

This parameter can be used to assign the task categories DIALOG, BATCH and TP the I/O priority HIGH, MED or LOW.

The default value is *NONE.

SET-PUBSET-ATTRIBUTES

The command SET-PUBSET-ATTRIBUTES has been extended by the parameter SNAPSET-LIMIT=<1...26>.

This parameter defines the number of snapsets required for backing up the pubset with the new TimeFinder/Snap function. For SF pubsets, the number is stored in the SVL of the pubres and for SM pubsets in the volres of the control volume set. The snapset limit cannot be reduced.

SHOW-USER-STATUS

With SHOW-USER-STATUS, the name of the job class can be specified as a new selection criterion via the JOB-CLASS-NAME parameter.

Only the jobs of the ID in the specified job class are then displayed. By default, all jobs of the ID are displayed.

3 Technical information

3.1 Resource requirements

With respect to BS2000/OSD-BC V6.0, using BS2000/OSD-BC V7.0 requires approximately 1% more CPU performance.

Main memory requirements / Increased main memory requirements:

The recommended minimum main memory requirement for using BS2000/OSD-BC V7.0 depends on the model of the business server and has not changed with respect to BS2000/OSD-BC V6.0. The values from the Performance Handbook (section: Recommended values for S and SX servers) can be taken for previously released servers.

Consult your regional service representative for recommendations for the new S165 and S200 servers.

The additional static requirement compared with BS2000/OSD-BC V6.0 is 3 MB. The additional dynamic requirement is approximately 10 KB per task, depending on the size of the user space allocated.

Before changing versions, you should clarify any additional installation-related resource requirements with your regional service.

Disk storage space:

You will find the disk storage space required by the SOLIS2 delivery for BS2000/OSD-BC V7.0 in the SOLIS2 delivery letter. In addition, you must also plan in the space required for the system files (PAGING area, TSOSCAT, CONSLOGs, SERSLOGs, etc.).

3.2 Software configuration

The following SOLIS correction levels are required in the source version for BS2000/OSD-BC V7.0:

*2 BS2000/OSD-BC V6.0 (as of correction level B71) or

*2 BS2000/OSD-BC V5.0 (as of correction level C71)

To run a BS2000/OSD-BC V7.0 guest system under VM2000 V8.0 at least the SOLIS correction level A61 is requested.

If systems running BS2000/OSD-BC V6.0 or V5.0 are operated in parallel, this correction level must also be used on these systems.

When using BS2000/OSD-BC V7.0, new versions of many of the system level software products must also be used. The following table shows the versions required for use under BS2000/OSD V7.0.

Further information is also available online under

*5 http://sp.ts.fujitsu.com/dmsp/docs/wp_bs2000-osd-bc_v7_de.pdf
and in English under

*5 http://sp.ts.fujitsu.com/dmsp/docs/wp_bs2000-osd-bc_v7.pdf

	<u>Product</u>	<u>Version</u>
	ADIL0S	V6.4
*5	AID	V3.1/V3.2/V3.4
*5	ARCHIVE	V8.0/V9.0
	ASSEMBH	V1.2
*5	AVAS/AVAS-SV	V7.0/V8.0
*3	C/C++	V3.1/V3.2
	COBOL85	V2.3
*5	COBOL2000	V1.3/V1.4/V1.5
	COLUMBUS85	V1.0
	COSMOS	V16.0
*1	CRTE	V2.6/V2.7
	DAB	V9.1
*5	Distributed Print Services	V1.1/V1.2
	DRIVE	V3.1
	DRIVE/WINDOWS	V2.1
*5	DRV	V3.1/V3.2
*3	EDT	V16.6/V17.0
*3	ESQL-COBOL	V2.0/V3.0
*5	FDDRL	V16.0/V17.0
*5	FDDRL-OS	V16.0/V17.0
	FHS	V8.2/V8.3
	FMS	V2.4
	FOR1	V2.2
	GOLEM	V9.2
*5	HIPLEX AF	V3.2/V3.3
	HIPLEX MSCF	V5.0
*5	HSMS	V8.0/V9.0
*5	HSMS-SV	V8.0/V9.0
	IFG	V8.1/V8.3
*5	interNet Services	V3.1/V3.2/V3.3
*5	JV	V14.0/V15.0
	LEASY	V6.1/V6.2
*5	LMS	V3.3/V3.4
*5	MAREN	V11.0/V12.0
	NFS	V3.0
	OMNIS	V8.4
	OMNIS-MENU	V3.4
	OMNIS-PROP	V3.2
*5	openCRYPT-SERV	V1.2/V1.3
	openFT	V9.0/V10.0
	openFT-AC	V9.0/V10.0
	openFT-CR	V9.0/V10.0
	openFT-FTAM	V9.0/V10.0
	openFT-FTP	V9.0/V10.0
*5	openNet Server	V3.2/V3.3
	openUTM	V5.2/V5.3
	openUTM-D	V5.2/V5.3
	openUTM-CRYPT	V5.2/V5.3
	openSM2	V7.0
	ORACLE	9i / 10g Release 2
*5	OSS	V4.0/V4.1
	PASCAL-XT	V2.2
	PASSAT	V6.2
	PLI1	V4.2
	PCS	V2.8

	<u>Product</u>	<u>Version</u>
	PERCON	V2.9
	PROP-TPM	V3.0
*5	PROP-XT	V1.2/V1.3
*5	RAV	V5.0/V5.1
	RFA	V16.0
	ROBAR	V5.0/V6.0
	ROBAR-CLUSTER	V2.0
	RPG3/RPG3-XT	V4.0
*5	RSO	V3.4/V3.5/V3.6
*5	SBA-BS2	V6.1/V6.2
	SCA	V16.0
*5	SCCA-BS2	V1.0/V1.1/V2.0
	SDF-A	V4.1
*5	SDF-P	V2.3/V2.4/V2.5
*5	SECOS	V5.1/V5.2
	SESAM-KLDS	V3.1
*5	SESAM/SQL-Server	V3.2/V4.0/V5.0/V6.0
*5	SESAM/SQL-DCN	V3.2/V4.0/V5.0/V6.0
*5	SESAM/SQL-LINK	V3.2/V4.0/V5.0/V6.0
*5	SHC-OSD	V6.0/V6.1/V7.0
	SORT	V7.9
	SPACEOPT	V4.0
	SSA-OUTM-BS2	V5.0
	SSA-SM2-BS2	V5.0
	SSC-BS2	V6.0
	TASKDATE	V16.0
*5	TIAM	V13.1/V13.2
	TOMDOORS-M	V5.0
	TOM-DOC	V3.2
	TOM-GEN	V2.1
	TOM-REF	V3.0
	TOM-TI	V3.0
*2	UDS-D	V2.4/V2.5
*2	UDS/SQL	V2.4/V2.5
	UDS-IQS	V4.0
	VM2000	V8.0/V9.0 (for S-Server und SX-Server)
	VTSU-X29	V1.5
	WEBTRANS-UTM	V7.1

*3 At least the correction levels of the SOLIS delivery release from 19.05.2008 is required on the products of the software configuration.

*2 Note: BLSSERV V2.6 is the software prerequisite for running POSIX
 *2 applications produced with the POSIX Shared Library libdl.a,
 *2 which is delivered within correction package 2/2007.

3.3 Product installation

Installation of BS2000/OSD-BC V7.0 must be carried out with the IMON installation monitor. At least IMON V2.9 is required for installation.

- *5 IMON V2.9, V3.0 or V3.1 must be installed beforehand if it is not already installed on the system.

The installation information provided in the delivery cover letter and in the manual or Release Notice for each relevant product should be noted.

The inputs required and the IMON installation procedure are described in the IMON manual (and any available README file).

Innovations in IMON V3.0

With IMON V3.0, delivery units that are parked on a key-formatted pubset can be installed on a non-key-formatted pubset.

Previously, the statement GENERATE-IDF displayed all delivery units. Only the installed delivery units are now offered in the dialog.

As of IMON V3.0, the TASKLIB and MACROLIB can also be installed under a default user ID (DEFLUID system parameter) other than TSOS. The parameter ZVDEFSUP in the IMON parameter file must be set to "Y" for this.

Important note: if the parameter ZVDEFSUP is set to "Y", the two files \$TSOS.TASKLIB and \$TSOS.MACROLIB must be copied under the default user ID and deleted from under \$TSOS before the next IMON installation.

In addition, IMON V3.0 also contains advance features for future hardware platforms and BS2000/OSD-BC versions.

*5 Innovations in IMON V3.1

- *5 The decisive new feature of IMON V3.1 is the support of the new
- *5 SQ series Business Server SQ100.

CRTE-BASYS:

- *1 The subsystem CRTEBASY of the product CRTE-BASYS V1.7 is available as a runtime environment for BS2000-internal applications. This subsystem should only be preloaded if this is recommended in the Release Notice of another installed product. By default the subsystem is loaded in upper class 4 memory. As an alternative, the subsystem can also be loaded below 16 MB in class 4 memory using the SYSSSC file with the extension LOW (SYSSSC.CRTE-BASYS.017.LOW) if there is enough space available there.
- *1

In addition, IMON copies the IC@RTSXS, IC@STLNK and IC@ULINK modules from the SYSLNK.CRTE-BASYS.017.CLIB library to CLIB. If no \$.CLIB file exists on the source system it is created by IMON. This \$.CLIB can be used for programs which were compiled with C V2.0 or earlier.

The compatibility library SYSLNK.ILCS is also installed with CRTE-BASYS.

If a default user ID other than TSOS is used (DEFLUID system parameter), it should be noted that during installation of CRTE-BASYS not all libraries are automatically installed under the default user ID. When installation with IMON is completed, the \$TSOS.CLIB file must be copied to \$<default_user_ID>.CLIB.

PLAM

The SYSLNK.PMLOG.035 library must be available under the default user ID (\$.).

If the default user ID is not TSOS, \$.SYSLNK.PMLOG.035 must be copied to \$TSOS.PLAMLIB, if products explicitly require the file \$TSOS.PLAMLIB.

PCA

The PCA subsystem is no longer supported as of BS2000/OSD-BC V7.0. PCA must be deinstalled before updating to BS2000/OSD-BC V7.0.

3.4 Product use

All conversion activities for BS2000/OSD-BC V7.0 are described in the manual BS2000/OSD-BC V7.0 Migration Guide.

A version change to BS2000/OSD-BC V7.0 is possible on the basis of BS2000 versions OSD-BC V5.0 and V6.0. A first-time installation of BS2000/OSD-BC V7.0 must be made for all earlier BS2000 versions. Configurations with V5.0 and V6.0 are possible with a shared pubset network using MSCF as of HIPLEX MSCF V3.0 and openNet Server V3.0.

For availability reasons, you are strongly advised not to perform an update installation on the active home pubset!

Certain hardware requirements must be fulfilled for a first-time installation: The installed hardware configuration must be a superset of the minimum configuration, i.e. it must include at least one business server with input/output system and operator terminal with associated service processor, plus one tape controller and disk controller with one tape device and two disk devices respectively.

Note: The CD drive of the SKP 3970-xx is supported as a tape device (device with type code E8) for reading CDs. This makes the CD usable as a data media for software deliveries.

Only a two character tape mnemonic is allowed for the CD drive of the SKP 3970-xx.

This function is only offered as of hardware basis PRIMERGY 470 and as of SINIX-2000-Z V8.1A K818.4 and BS2000/OSD-BC V5.0C or PRIMERGY TX300-S3 with LINUX-based operating system.

You will find further information on using emulated tape devices on S and SX servers under

*5 http://sp.ts.fujitsu.com/dmsp/docs/wp_emulated-tapes.pdf

CALENDAR:

The public holiday file (file for managing public holidays) must be generated by systems support from the sample file \$TSOS.SYSDAT.CALENDAR.160.HOLIDAY or from an old public holiday file:

```
/COPY-FILE FROM-FILE=$TSOS.SYSDAT.CALENDAR.160.HOLIDAY,  
TO-FILE=$TSOS.SYSDAT.CALENDAR.HOLIDAY,PROTECTION=*SAME
```

File protection attributes:

Files with protection attributes intended to prevent deletion are deleted without these protection attributes being taken into consideration if a FREE-FOR-DELETION date was assigned and this has expired (since BS2000/OSD-BC V3.0).

DEFLUID user ID and subsystems:

When upgrading subsystems whose start time is defined as 'BEFORE-SYSTEM-READY' you should make sure that all files required for starting these subsystems are available under \$TSOS on the home pubset:

SYSLNK, (SPMLNK, SPULNK), SYSREP, possibly also SYSMES, SYSSDF and SYSSSI or SYSPAR.

The user ID for loading and starting programs, procedures etc. that can be set via the class 2 system parameter 'DEFLUID' is not supported for these subsystems.

MSGMAKER:

Files can be exchanged or included using either /COPY-MSG-FILES or /MERGE-MSG-FILES.

For performance reasons, large numbers of messages should be processed with MERGE-MSG-FILES. This command is not listed when MSGMAKER is started. However, by entering '?' in the 'command' field of the screen mask you can switch to guided dialog. The call can also be made via the batch interface. You must make sure that the output file is always empty.

BCAM memory values:

The values for the maximum size of the resident and paging memory for data transfers are calculated by BCAM at startup from the size of the system memory (BS2000 MEMSIZE system value). The relevant RESMEM and PAGMEM parameters should not generally be specified in the BCAM DCSTART, DCOPT and BCMOD commands, but should retain their values set by BCAM.

Memory monitoring can be activated with the BCAM BCMON command (RECORD=(RES-MEMORY,PAG-MEMORY)) and this allows detection of whether the current values reach the limits.

Any adjustments to the memory values should only be made in agreement with the responsible first level support.

*5 SIR

*5 A SIR version is generally coupled to a specific BS2000 version, which means that the following is always valid:

*5 Operating version <= target version.

*5 This also means that a downgrade is not possible. With a downgrade, the user must either retain a bootstrap disk from the old version, or he must use the offline initial installation procedure for BS2000/OSD V6.0.

*5 STRT
*5 Since STRT V16.0, the file IPL-CONF is partitioned dynamically.
*5 This permits several start-up configurations to be stored in this
*5 file by various systems. The data format in the IPL-CONF file has
*5 become incompatible and is the reason why any IPL-CONF file
*5 existing on the IPL disk cannot be used from a version lower than
*5 BS2000/OSD-BC V7.0.

Parameter service:

The following class 2 system parameters have been supplemented:

- SYSTHOOK

The availability of the commands for the system hooks can be restricted with this parameter. It can assume the two values "YES" or "NO".

The following class 2 system parameters have been discontinued:

- ORAAPUID

The following class 2 system parameters have been changed:

- none

Changes to parameter sets:

- none

System generation:

It is not necessary to generate the software for BS2000/OSD-BC V7.0. The organization program SYSPRG.BS2.160 is part of the release unit BS2000-EXEC.

The utility program UGEN is no longer supplied.

The product IOGEN has been used for generating the I/O configuration data since BS2000/OSD V5.0B.

As of IOGEN V15.0A, tape devices with DVC type CC (LT0-U2) can be generated and as of IOGEN V15B, tape devices with DVC type CD (LT0-U3).

System address space:

The limitation to system address space by the selected SYSSIZE has been eliminated since BS2000/OSD-BC V5.0. The system also uses less address space by moving internal tables into data spaces.

3.5 Obsolete functions (and those to be discontinued)

The following functions are no longer supported as of this version:

- PCA subsystem

PCA was used for controlling the disk subsystem caches of disk controllers 3421 and 3860 that are no longer supported since BS2000/OSD-BC V5.0. PCA also supplied the measurement values for Symmetrix disks connected via ESCOM to the measurement program PFA in openSM2.

Note: PCA must be deinstalled when updating to BS2000/OSD-BC V7.0.

- Symmetrix reports of the openSM2 measurement program PFA

Due to PCA being discontinued, the Symmetrix reports of the measurement program PFA in openSM2 V7.0 can no longer be output. The Symmetrix reports of the measurement program STORAGE-SYSTEM are available as a replacement with data about disks that are connected via ESCON or FC. The information on openSM2 is supplied by the software product SHC-OSD.

- Software product Tape Library System (TLS)

The product TLS is no longer available as of BS2000/OSD-BC V7.0. It is required for controlling the MTC archive systems 3594-L10 and 3594-L12 that are no longer supported as of this version.

- Software product CRHP2AFP

As of SPOOL V4.8, the program is no longer part of the delivery scope. CRHP2AFP converts HP print resources into APA print resources. The function is covered redundantly by the OCE tool TRANSCON.

- *4 - Software product Desk2000

*4 Desk2000 will no more be delivered with BS2000/OSD-BC V6.0. The
*4 BS2000 PC desktop Desk2000 was realized with an outdated client
*4 server architecture and increasingly found less approval because
*4 of the just punctually supported BS2000 user interface. Thus the
*4 product will no longer be continued.
*5 Existing customers that formerly received the Desk2000 CD can
*5 continue to use the tools, but they will not maintained actively.
*5 E.g. Windows XP is the last Microsoft platform that the Desk2000
*5 CD was qualified for. It was no more qualified for Windows Vista.
*5 That means e.g. in particular, that also existing customers
*5 should move from the Doors Basic 9759 Terminal Emulation to the
*5 MT9750 emulation in the medium term.

*5 - SNMP-LIGHT
*5 SNMP-LIGHT will no more be delivered with BS2000/OSD-BC V7.0B.
*5 Instead of using SNMP-LIGHT, SNMP testing can be enabled by a
*5 trial version of the BS2000 SNMP basic agent (product SBA-BS2).
*5 BS2000/OSD-BC V7.0B provides the new SANCHECK version V2.0, which
*5 no more needs SNMP-LIGHT in order to discover the SAN
*5 configuration data.

- RAID display in MRSCAT and NDM

Present-day storage systems generally provide RAID protection. The output "RAID-PUBSET" of the SHOW-MASTER-CATALOG-ENTRY (STAM) and SHOW-PUBSET-CONFIGURATION commands to SYSOUT or into the S variable RAID-PUBSET or PUBSET.RAID is discontinued since it is based on old interfaces from before the EMC Symmetrix systems were introduced. RAID-PUBSET is never displayed at this interface for Symmetrix FBA disks and FibreCAT CX systems, regardless of their RAID setting. NO or FALSE is therefore always output for RAID in BS2000/OSD-BC V7.0.

The output "RAID5-SPARE" of the NDM SHOW-DEVICE-STATUS, SHOW-DISK-STATUS and SHOW-RESOURCE-ALLOCATION commands is also discontinued. It was introduced for the IBM RAMAC systems with Chelan disks but does not supply any meaningful information for Symmetrix systems.

The command SHOW-SYMMETRIX-DEVICE-CONFIGURATION displays information on RAID for the FBA and CKD disks of the Symmetrix systems. There is currently no function in BS2000 for displaying the RAID level of FibreCAT CX systems.

The following function is supported for the last time in this version:

- none -

3.5.1 Obsolete macros

- none -

3.5.2 Obsolete commands

- none -

3.6 Incompatibilities to BS2000/OSD-BC V6.0

- none -

3.7 Restrictions

- Unicode

Files with Unicode character sets cannot be processed in versions earlier than BS2000/OSD-BC V6.0B (correction level B62).

- Snapsets

1. Snapsets may currently not be used for backing up the active home pubset.
2. The oldest snapsets are not automatically deleted when the saturation limit of the save pool used is exceeded.
3. Indirect Execution of snapset commands with EXECUTE-CMD: Snapset commands differentiate between upper and lower case. SDF converts lower to upper case during command execution with EXECUTE-CMD.

For the snapset identification (datatype: name_with_low) lower case letters are used. The execution of snapset commands with EXECUTE-CMD is therefore acknowledged with the messages DMS13D5 respectively with DMS0622 if the snapset identification is set explicitly. Thus the output of SHOW-SNAPSET-CONFIGURATION into an OPS variable is not possible. The same problem exists with REPEAT-CMD or REPEAT-STMT if substitution is not used.

Workaround:

Output of the command SHOW-SNAPSET-CONFIGURATION must be linked into a structured variable with ASSIGN-STREAM SYSINF,TO=*VARIABLE(VARIABLE-NAME=<varname>). The link is released with ASSIGN-STREAM SYSINF,TO=*DUMMY.

- HIPLEX AF under VM2000

START-VM is not possible during dynamic I/O reconfiguration changes on S servers running under VM2000.

Optional use of the IORM DPAV function allows the dynamic I/O reconfiguration to be called at any time, thus disrupting START-VM.

As of VM2000 V9.0, with START-VM and active dynamic I/O reconfiguration the system waits a maximum of 15 seconds for termination of the I/O reconfiguration. If the I/O reconfiguration takes longer, START-VM is rejected.

This results in the following restrictions when using HIPLEX AF under VM2000 < V9.0:

1. If the "Warm-Standby" scenario is used, the DPAV function must be disabled on all virtual machines of the standby system.
2. When monitoring guest systems with the live monitor using VM2000 resources and simultaneous use of DPAV, the setting RESTART-AFTER-STOP=*NO must be selected in the statement ADD-VM2000-MONITORED-SYSTEM.

3.8 Procedure in the event of errors

General information on generating error documents

To successfully diagnose and eliminate software problems, error documents must be generated or saved to the extent required and at the earliest possible time. As far as possible, documents for the software problems should be provided in file form so that they can be processed with diagnostic tools.

In the case of reproducible errors you should describe exactly how the error can be reproduced. If possible, you should provide procedures, enter jobs, execution logs etc. so that the error condition can be reproduced.

Information on the system environment

In addition to the error documents, the following general information is important for error diagnosis:

- Operating system version number and correction level of BS2000/OSD-BC (loader version and any modifications in BS2000).
- Version numbers of any subsystems, OSD-BC version-independent products or TU programs contributing to the problem together with their correction levels or REP files.
- Information as to which system exits were active.
- Information on the connected hardware peripherals.

Document types

If an error occurs, the following documents will be required depending on the error condition:

- SLED (following a system crash)
- SNAPFILE
- SYSTEMDUMP (following a system dump message)
- SYSOUT/SYSLST logs
- STARTUP parameter files
- USERDUMP
- Diagnostic dump (IDIAS call: CREATE-SYSTEM-DUMP <tsn>)
- SERSLOG file
- CONSLOG file
- SYSTEMREPPFILE
- Rep files of any subsystems involved and separate products
- HERSFILE and possibly IOTRACE for input/output problems or device error messages

User documents

Depending on the error boundary conditions, the following documents will be required:

User files, tapes, procedures, job streams (including job class information), programs (source listing, load module and libraries, execution log for the process, printer logs, as far as possible in file form).

In the case of functional errors complete information on all commands, program inputs etc. is essential.

Documents needed for special problems

For performance problems and problems in task management:

- Possibly COSMOS listing or tape or SM2 reports.

For job management problems:

- SHOW-JOB-CLASS or SHOW-JOB-STREAM listing
- Compiler listing from your own scheduler
- SJMSFILE
- SYSTEM-JOBPOOL
- Entry in the user catalog of the user IDs affected
- In exceptional cases: diagnostic dump instead of SLED
- SCHEDLOG file

For problems in the binder loader system:

- If the error can be reproduced: libraries involved and phase
- For SHARE problems: console log and dump of entire class 4 memory
- For ELDE problems: phase

For SYSFILE management problems:

- procedures/enter jobs in file form
- SYSOUT or SYSLST log

For NDM problems:

- NDMDAMP (PRODAMP procedure, see 'Diagnostics Manual': DAMP)
- CONSLOG file

For BCAM problems:

- Activate all DCM traces with /DCDIAG DCM.,MODE=SAVE and after reproducing the error, save the generated trace files S.DCTRAC.* with /DCDIAG DCM.,MODE=CLOSE or submit the diagnostic information to main memory with /DCDIAG DCM.,MODE=HOLD and evaluate it with ASTRID

For problems at the hardware and software interface:

- HERSFILE
- Hardware and software configuration
- Possibly IOTRACE listing

For tape problems:

- If possible you should send in the original tape for Error diagnosis, otherwise you should at least provide A listing of all tape labels and the first data blocks
- SYSOUT log and CONSLOG file

For SPD problems:

- Dump of the VTOC area
- NDMDAMP
- CONSLOG files of all systems involved

For IORM problems:

- IORM dump
- CONSLOG file

If problems occur with the IORM DPAV, DDAL or IOLVM functions, under VM operation these documents are required from both the guest and the monitor system.

Final note:

The above description does not contain any information on generating documents in conjunction with using BS2000 tracers. Please consult the reference manuals of the relevant tracers for this.

4 Hardware support

4.1 Central units

4.1.1 Changed support

The following business servers are supported in BS2000/OSD-BC V7.0. A prerequisite for using BS2000/OSD V7.0 on SX servers is the hardware abstraction layer X2000 V3.0 based on Solaris V8 as the carrier system.

	Business Server S110	
	Business Server S115	
	Business Server S120	
	Business Server S130	
	Business Server S135	
	Business Server S140	
	Business Server S145	
	Business Server S150	
	Business Server S155	
	Business Server S160	
	Business Server S165	(release: 2nd quarter/07)
	Business Server S170	
	Business Server S180	
	Business Server S190	
	Business Server S200	(release: 2nd quarter/07)
	Business Server SX100	
*2	Business Server SX100D	
	Business Server SX130	
	Business Server SX140	
	Business Server SX150	
*2	Business Server SX160	

The following versions of the HCP (Hardware Control Program) at least are required for using BS2000/OSD-BC V7.0.

	- E05L01A-03R+008	for Business Server S110	
	- E20L02A-01N+011	for Business Server S115	
	- E45L01G-01R+008	for Business Server S120	*
	- E02L01F-02C+021	for Business Server S130	
	- E25L01G-02N+111	for Business Server S135 and S150	
	- E39L01G-02N+122	for Business Server S160	
	- E12L02S-02N+007	for Global Store SSU-3	
	- E40L01G-02Q+016	for Business Server S140 and S170	*
	- E14L01S-02Q+000	for Global Store SSU-4	
	- E60L02G-02E+120	for Business Server S145, S155, S180, S190	*
	- E16L02S-02E+011	for Global Store SSU-5	
*2	- E70L01G-01U+039	for Business Server S165 und S200	
*1	- E17L01S-01T+011	for Global Store SSU-6	

Notes:

If you want to use fibre channel, before using the HCP versions marked with *, a new generation with an IOGEN version as of V14.0C is mandatory (inhibition of I/O interface time monitoring).

The HCP version required for using BS2000/OSD-BC V7.0A can be obtained from your regional service.

4.1.2 Discontinued support

- none -

4.1.3 Extended support

- none -

4.2 Channels

4.2.1 Changed support

FC connections are supported by the following business servers with F-CON capability via the type FC channel:

S120, S140, S145, S155, S165, S170, S180, S190, S200
(the IPL of FC is not possible on S120)

See the separate Release Notice SYSFGM.BS2XC.030.E for SX series business servers.

4.2.2 Discontinued support

- none -

4.3 FC switches

The following FC switches are supported by S servers:

Model name	Order number
Brocade SilkWorm 2400	PSFS-B081, PSFS-BE084
Brocade SilkWorm 2800	PSFS-B161
Brocade SilkWorm 3200	FCSW-8P2GB01
Brocade SilkWorm 3250	FCSW-8P2G3250
Brocade SilkWorm 3800	FCSW-16P2GB01
Brocade SilkWorm 3850	FCSW-16P2G3850
Brocade SilkWorm 3900	FCSW-32P2G3900
Brocade SilkWorm 4100	FCSWR-32P4100L, FCSWR-32P4100E FCSW-32P4116
Brocade SilkWorm 4900	FCSW-64P4932L, FCSW-64P4932E
*2 Brocade SilkWorm 5000	FCSW-24P5000L, FCSW-24P5000E
Brocade SilkWorm 6400	PSFS-B641
Brocade SilkWorm 12000	FCSW-32P2GB01, FCSW-64P2GB01 FCSW-128P2GB01
Brocade SilkWorm 24000	FCSW-128P24032
Brocade SilkWorm 200E	FCSWR-16P200EL, FCSW-16P200EL FCSWR-16P200EE, FCSW-16P200EE FCSWR-08P200EE, FCSW-8P200EE FCSWR-08P200EL, FCSW-8P200EL

*5	Brocade SilkWorm 300	FCSW-300L, FCSW-300E
*5		(8 – 24 Ports)
*5	Brocade SilkWorm 5100	FCSW-5100L, FCSW-5100E
*5		(24 – 40 Ports)
*5	Brocade SilkWorm 5300	FCSW-5300L, FCSW-5300E
*5		(48 – 80 Ports)
*5	Brocade SilkWorm 48000 Director	FCSW-48K
*5		(32 – 384 Ports)

*5 Notes: Brocade SilkWorm 300, 5100, 5300, 48000 require the 4
 *5 Gbit/sec SFPs (Small Formfactor Pluggable FCSFP-B-MM4G) for
 *5 operating.

See the separate Release Notice SYSFGM.BS2XC.030.E for SX series business servers.

4.4 Disk storage controllers

4.4.1 Changed support

No changes have been made to the support for disk controllers with respect to BS2000/OSD V6.0B. The following models of the Symmetrix controllers from EMC2 are supported in BS2000/OSD-BC V7.0:

	5330, 5430, 5630, 5700, 5830, 5930	up to Microcode 5267
	8230, 8430, 8530, 8730, 8830,	up to Microcode 5568
	DMX800, DMX801, DMX1000, DMX2000	as of Microcode 5669
	DMX3000	as of Microcode 5670
	DMX-3	as of Microcode 5771
*3	DMX-4	as of Microcode 5772

See the separate Release Notice SYSFGM.BS2XC.030.E for SX series business servers.

4.4.2 Discontinued support

- none -

4.5 Magnetic tape devices

4.5.1 Changed support

The following magnetic tape devices are supported in BS2000/OSD-BC V7.0 on S servers: the magnetic tape devices supported by SX servers are described in the Release Notice SYSFGM.BS2XC.030.E.

- MTC systems
 3588-M1, 3588-M2, 3588-GL
 3590-A10, 3590-A20 (controllers)
 3590-B20, 3590-B40 (drives)
 3590-C10, 3590-C11, 3590-C22 (units)
 3591-B1, 3591-B2, 3591-B3, 3591-B4,
 3591-B1A, 3591-B1GL, 3591-BU, 3591-EX

- MTC archive systems
 - 3560
 - AML/2
 - AML/E
 - AML/J
 - Scalar I2000, Scalar 10K with LT02,LT03, via channel type FC
 - Scalar 1000, Scalar 10K with 3590/3591, via SPCC, channel type S
 - Scalar i500 with LT0-3 via channel type FC
- CentricStor VTC (Virtual Tape Controller)
- CentricStor SBU (Smart Backup Unit)
- CentricStor VTA (Virtual Tape Appliance)
- All models VTA-xxxx

4.5.2 Discontinued support

The following is no longer supported in BS2000/OSD-BC V7.0:

- 3590-C1A, 3590-C2A units for the 3594 archive system
- The MTC archive systems 3594-L10, 3594-L12
- The magnetic tape device 3505 via SPCC
(as of BS2000/OSD-BC V6.0B)

4.6 Printers

4.6.1 Changed support

The following printers are supported in BS2000/OSD-BC V7.0:

- Fast / tape printers
- 3348-120x, 3349-120x
- The laser printers
- 3351-23, 3351-231
- 3353-23, 3353-231
- 2050-2x, 2050-1x
- 2075-2x, 2075-1x
- 2090-4, 2090-Lx, 2090-2
- 2140-4, 2140-2
- 2240-4, 2240-2
- PAGESTREAM 55, 75, 88, 110DC, 145, 158DC, 200DSC, 235, 350, 440, 470, 700, 880,
- Vario Print 5110, 5160
- Vario Stream 6100, 7000, 9210, 9220

4.7 Other peripherals

4.7.1 Changed support

The following are supported in BS2000/OSD V7.0:

- Terminals Time Server 3920
 ATOP 3925
 Radio clock 3919
- LAN channel connection HNC 91850 (channel type S)
 HNC 91851 (channel type S)
 HNC 91852 (channel type S)
 HNC 91853 (channel type S, FC)
- Encryption: openCrypt-BOX
- DUE pre-processor: 9681, 9686, 9688 and 9689
 with central unit connection controller
 ZAS-I 9631-6x

4.7.2 Discontinued support

The following are no longer supported since BS2000/OSD-BC V6.0B:

- DUE pre-processor 75009-4X, 75409-X
- Connection Director SCD 3950-4