



Fujitsu Siemens Computers

S E S A M / S Q L - S e r v e r Enterprise Edition V5.0A
S E S A M / S Q L - S e r v e r Standard Edition V5.0A
S E S A M / S Q L - D C N V5.0A
S E S A M / S Q L - L I N K V5.0A

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R E L E A S E N O T I C E

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RELEASE NOTICE SESAM/SQL-Server / -DCN / -LINK V5.0A

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1 General

This Release Notice is a summary of the major extensions, dependencies and operating information with respect to:

SESAM/SQL-Server Enterprise Edition	(BS2000/OSD) V5.0
SESAM/SQL-Server Standard Edition	(BS2000/OSD) V5.0
SESAM/SQL-DCN	(BS2000/OSD) V5.0
SESAM/SQL-LINK	(BS2000/OSD) V5.0

SESAM/SQL-Server is a relational database system for the BS2000/OSD(*) operating system.
SESAM/SQL-Server V5.0 is the successor version to SESAM/SQL-Server V4.0 (*).

The main innovation in SESAM/SQL V5.0 is the support of UNICODE capability when storing, searching and managing UNICODE data in the SESAM/SQL database system.

This version also contains the following functional topics:

- Hard-coding of, changed DBH options
- DALOG number overflow
- System accesses made dynamic
- Support for longer I/O transfer sizes (max 160 KB) for copying database files from disk to disk (i.e. with COPY, RECOVER, Create REPLICATION, Reorg).

SESAM/SQL-Server V5.0 is offered in two variants:

1. SESAM/SQL-Server Enterprise Edition (SES/SQL-EE)
This variant contains a multitasking database handler (DBH) that can be operated with up to 16 DBH tasks.
2. SESAM/SQL-Server Standard Edition (SES/SQL-SE)
This delivery variant is provided for those customers that do not require a DBH with multitasking capabilities and contains a single-task DBH system.

In the following sections, the term SESAM/SQL-Server is used where it is irrelevant which variant is used. SESAM/SQL designates the product family, including

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Fujitsu Siemens Computers GmbH.

The use of names, trademarks, etc. in this Release Notice does not entitle readers to assume that these names may be used without restriction by anyone; often the names are protected by law or contract, even if not indicated here.

SESAM/SQL-DCN and SESAM/SQL-LINK.

SESAM/SQL-DCN is an add-on product to the database system SESAM/SQL-Server and makes distributed database processing possible.

SESAM/SQL-LINK is also an add-on product for /390 hardware. It can be used if databases are to be processed exclusively by one program. The database handler then runs in the address space of the program concerned.

The contents of the Release Notice have been modified with respect to the level of the general release for delivery. *1
*1
*1

It corresponds to correction level V5.0A10 from October 2007. *1
*1

Modifications to the Release Notice since the release of SESAM/SQL-Server V5.0A are marked in the margin as follows: *1
*1
*1

Change level	Margin marking	
V5.0A10	*1	*1

This Release Notice is supplied as a file in uppercase and lowercase. Customers will receive an updated version of this file if any changes are made. To print this file use:

```
/PRINT-DOCUMENT FROM-FILE=SYSFGM.SESAM-SQL.050.E, -  
/ DOC-FORM=*TEXT(LINE-SPACING=BY-EBCDIC-CONTR)
```

All BS2000 product Release Notices are available in the Internet. This one is available under the following URL:

http://manuals.fujitsu-siemens.com/fgm/fgm_us.htm *1

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

1.1 Ordering

SESAM/SQL-Server V5.0, SESAM/SQL-LINK V5.0 (only /390-Hardware) and SESAM/SQL-DCN V5.0 can be ordered from your local distributors.

SESAM/SQL-Link is not available for SX hardware.

These products are subject to the general terms and conditions of the software product use and service agreement.

1.2 Delivery

The SESAM/SQL-Server V5.0, SESAM/SQL-LINK V5.0 and SESAM/SQL-DCN V5.0 files are supplied via SOLIS.

The current file and volume characteristics are listed in the SOLIS2 delivery cover letter.

The table below shows the release units that are supplied with the different delivery units.

The previously separate product lines for /390 and SX hardware have been discontinued with this version. Just one product line is offered that can be used with either hardware line.

An appropriate comment is made in the "Release Unit" column for products that are only used on one of the hardware lines.

Product (delivery unit)	Release Unit
-----	-----
SESAM/SQL-Server V5.0 Enterprise Edition (SES/SQL-EE)	SES-SQL-EE SES-SQL-SE SESAM-SQL (SESDBA V5.0) * (ODBC-DEMO-SES V3.7) **
-----	-----
SESAM/SQL-Server V5.0 Standard Edition (SES/SQL-SE)	SES-SQL-SE SESAM-SQL (SESDBA V5.0) * (ODBC-DEMO-SES V3.7) **
-----	-----
SESAM/SQL-LINK V5.0 Linked-in variant (SES/SQL-LK)	SES-SQL-LK (only usable for /390 hardware)
-----	-----
SESAM/SQL-DCN V5.0 Add-on for distributed processing (SES/SQL-DCN)	SES-SQL-DCN
-----	-----

(*) The release unit SESDBA comprises the server and client software for the JDBC interface to SESAM/SQL. Please note the separate Release Notice for this release unit.

(**) The release unit ODBC-DEMO-SES is not part of SESAM/SQL, but rather comprises a demo version of the ODBC driver ODBC Rocket (client and server part) of gfs Gesellschaft fuer Informationssysteme mbH & Co. KG, Hamburg. This allows transparent access to SESAM/SQL databases from a PC via the ODBC interface. For further information, refer to the ODBC-DEMO-SES Release Notice and the website:

<http://www.odbc-rocket.de>

Either delivery unit SES/SQL-SE or SES/SQL-EE is also required in order to use the SES/SQL-LK and SES/SQL-DCN delivery units.

The delivery (grouped according to release units) comprises the files shown in the table below.

Hardware-dependent files are marked as such with a note. If the delivery unit contains hardware-specific files, the SOLIS/IMON delivery and installation procedure ensures that only the files that are suitable for the hardware are taken over into the system.

The names of the release unit and the delivery unit match, i.e. the name of the release unit is also the name of the delivery unit.

Release Unit SES-SQL-EE (Enterprise Edition):

The following delivery component is only required on /390 hardware:

SYSLNK.SES-SQL-EE.050	SESAM module library with the modules that are only required for the independent DBH in the Enterprise Edition
-----------------------	----------------------------------------------------------------------------------------------------------------

The following delivery component is only required on SX hardware (SPARC64):

SPULNK.SES-SQL-EE.050	see SYSLNK.SES-SQL-EE.050
-----------------------	---------------------------

Release Unit SES-SQL-SE (Standard Edition):

The following delivery component is only required on /390 hardware:

SYSLNK.SES-SQL-SE.050	SESAM module library with the modules that are only required for the independent DBH in the Standard Edition
-----------------------	--------------------------------------------------------------------------------------------------------------

The following delivery component is only required on SX-Hardware (SPARC64):

SPULNK.SES-SQL-SE.050	see SYSLNK.SES-SQL-SE.050
-----------------------	---------------------------

Release Unit SES-SQL-LK (linked-in variant):

This release unit is only available on /390 hardware.

The following delivery component is only required on /390 hardware:

SYSLNK.SES-SQL-LK.050 SESAM module library with the modules that are only required for the linked-in DBH

Release Unit SES-SQL-DCN (distributed processing add-on):

The following delivery components are only required on /390 hardware:

SYSLNK.SES-SQL-DCN.050 SESAM module library with the modules that are only required for SESAM/SQL-DCN

SYSSSC.SES-SQL-DCN.050.KOMMD Declaration for SESAM/SQL-DCN subsystem in class 3/4 memory for communication with distributed processing

The following delivery components are only required on SX hardware(SPARC64):

SPULNK.SES-SQL-DCN.050 see SYSLNK.SES-SQL-DCN.050

SPUSSC.SES-SQL-DCN.050.KOMMD Declaration for SESAM/SQL-DCN subsystem in class 3/4 memory for communication with distributed processing

Release Unit SESAM-SQL:

Contains the delivery components that are additionally delivered with both SES/SQL-EE and SES/SQL-SE product variants.

The following delivery components are required, regardless of the HSI:

SINLIB.SESAM-SQL.050.SNMP-SA Subagent library of SNMP for SESMON data

SIPLIB.SESAM-SQL.050.CLI Call Level Interface for applications with BLOBs or count field in dynamic SQL

SIPLIB.SESAM-SQL.050.MACUTM UTM macro library for SESAM/SQL-Server

SIPLIB.SESAM-SQL.050.MACUTM.1 UTM macro library for larger process memory

(see section 3.5.3)

SIPLIB.SESAM-SQL.050.SPEZ Library of special elements,
as follows

- i) Procedures for optional Reps for SESAM
 PRC.LMS.050.<rep>
 (see section 2.1)
- ii) STATUSGB.ASS Assembler sources for
 STATUSxx.ASS generating special language
 modules to output CALL-DML
 status messages when using
 SEDI61(L) and SEDI63(L)
- iii) SESFS50.ASS Conversion table for
 SECSORT sort sequence
- iv) SEZTXT.ASS Assembler sources with the
 texts for the job variables
 used by SESAM

SYSFHS.SESAM-SQL.050.MON.E Mask modules for the
 SESAM Monitor (English;
 there is no German version)

SYSFHS.SESAM-SQL.050.UTI.D Mask modules for the
 Utility Monitor (German)

SYSFHS.SESAM-SQL.050.UTI.E Mask modules for the
 Utility Monitor (English)

SYSMAN.SESAM-SQL.050.UTI.D Help texts for the Utility
 Monitor (German)

SYSMAN.SESAM-SQL.050.UTI.E Help texts for the Utility
 Monitor (English)

SYSMES.SESAM-SQL.050 Message file

SYSSDF.SESAM-SQL.050 SDF subsystem syntax file

SYSSDF.SESAM-SQL.050.USER SDF user syntax file

SYSDAT.SESAM-SQL.050.SP.D Memory requirement information
 and performance data
 (German)

SYSDAT.SESAM-SQL.050.SP.E Same in English

SYSSPR.SESAM-SQL.050.RUN-STA Procedure that implements the
 start commands of SESAM/SQL

SYSSPR.SESAM-SQL.050.RUN-CFG	Procedure that implements the CONNECT-SESAM-CONFIGURATION command to assign the global configuration file
SYSSPR.SESAM-SQL.050.RUN-MON	Procedure that starts SESAM Monitor to output information for the SNMP subagent of SESAM
SYSSPR.SESAM-SQL.050.RUN-AGT	Procedure that implements the commands for the SNMP subagent of SESAM/SQL
SIPANY.SESAM-SQL.050.MAN-DB	Library containing the sample database, including examples shown in the manual, and a ready-to-use BLOB application
SIPANY.SESAM-SQL.050.TOOLS	Documentation library for the shipped tools (SESDIAG, SEMSTAT, DSQL); procedures, sources, modules for compressed output of CATALOG information (INFOTAB); sample procedures (SESDBB...)
SYFSGM.SESAM-SQL.050.D	Release Notice (German)
SYFSGM.SESAM-SQL.050.E	Release Notice (English)
SYSRME.SESAM-SQL.050.D	README file (German) (only shipped if required)
SYSRME.SESAM-SQL.050.E	README file (English) (only shipped if required)

The following delivery components are only required on /390 hardware:

SYSLNK.SESAM-SQL.050	Module library with the modules required for all product variants
SYSSSC.SESAM-SQL.050.DBH	Declaration for SESDBH subsystem
SYSSSC.SESAM-SQL.050.KOM	Declaration for SESKOM subsystem (central component for communication in all tasks)
SYSSSC.SESAM-SQL.050.KOMOD	Declaration for SESKOMOD subsystem for communication without distributed processing
SYSSSC.SESAM-SQL.050.SQLRT	Declaration for SESSQLRT subsystem for SQL runtime

system

The following delivery components are only required on SX hardware (SPARC64):

SPULNK.SESAM-SQL.050	SESAM module library with the modules in SPARC code that are required for all product variants
SPUSSC.SESAM-SQL.050.DBH	Declaration for SESDBH subsystem
SPUSSC.SESAM-SQL.050.KOM	Declaration for SESKOM subsystem (central component for communication)
SPUSSC.SESAM-SQL.050.KOMOD	Declaration for SESKOMOD subsystem for communication without distributed processing
SPUSSC.SESAM-SQL.050.SQLRT	Declaration for SESSQLRT subsystem for SQL runtime system

The SESAM-SQL release unit includes a CD-ROM with the following contents:

- DBAccess client software and documentation (JDBC interface)
- Demo version of ODBC-Rocket from gfs Gesellschaft fuer Informationssysteme mbH & Co. KG, Hamburg with client and server software
- Product information (e.g. brief info on SESAM/SQL V5.0, Release Notices of earlier versions, Excel chart for calculating the required DBH address space, etc.)

1.3 Documentation

The documentation is available as online manuals under

<http://manuals.fujitsu-siemens.com/mainframes.html>

or can be ordered in printed form at extra cost under

<http://FSC-manualshop.com>

The following documentation is available for SESAM/SQL V5.0:

List of publications in English:

Manual	Order number
SESAM/SQL-Server V5.0A (BS2000/OSD) Core Manual	U22419-J-Z125-8-76
SESAM/SQL-Server V5.0A (BS2000/OSD) Database Operation	U22418-J-Z125-8-76
SESAM/SQL-Server V5.0A (BS2000/OSD) SQL Reference Manual Part 1 SQL Statements	U22420-J-Z125-8-76
SESAM/SQL-Server V5.0A (BS2000/OSD) SQL Reference Manual Part 2 Utilities	U22422-J-Z125-8-76
SESAM/SQL-Server V5.0A (BS2000/OSD) Utility Monitor	U22147-J-Z125-8-76
SESAM/SQL-Server V5.0A (BS2000/OSD) Messages	U22423-J-Z125-8-76
SESAM/SQL-Server V5.0A (BS2000/OSD) Performance Manual	U23535-J-Z125-7-76
SESAM/SQL-Server V5.0A (BS2000/OSD) Glossary and Master Index	U41055-J-Z125-5-76

The following manual is still valid:

Manual	Order number	Published
SESAM/SQL-Server V3.0A (BS2000/OSD) CALL-DML Applications	U1054-J-Z125-11-76	11/1999

You will also find the latest technical information on using SESAM/SQL-Server under the following Internet address:

http://www.fujitsu-siemens.de/products/bs2000/software/transaction_processing/database_systems/sesamsql.html

2 Software extensions

The main innovations with regard to the previous version V4.0 are summarized in the sections below. A tabular overview of these innovations is also included in the introduction section of the newly published manuals; this overview indicates the manual and section in which each change is described.

2.1 Unicode support

The concept of Unicode support in SESAM/SQL allows Unicode characters to be used in the columns of a table and also considers coded character sets in a database, input/output files and user programs:

- The new data types NATIONAL CHARACTER and NATIONAL CHARACTER VARYING are supported in addition to the existing ones.
- As with the existing data types, the new ones are created and changed with CREATE/ALTER TABLE.
- National character strings are depicted with N (printable), NX (hexadecimal) or U& (printable and hexadecimal mixed).
- The new function TRANSLATE() converts an alphanumeric character string into a national one and vice versa.
- The utility functions IMPORT/EXPORT and LOAD/UNLOAD consider the coded character set of the database when loading and unloading.
- A coded character set can be specified with the IMPORT/EXPORT and LOAD/UNLOAD utility functions that is coded or converted as per the data for loading/unloading.
- Coded character sets are also considered in the connection modules of the DB handlers (see connection parameters for independent DBH or options for linked-in DBH).
- Unicode data is output in SESCOSP and SEDI70.

2.2 Utility functions

2.2.1 Changes due to the Unicode support

Extensions for Unicode support have been made to the CREATE CATALOG, ALTER CATALOG, LOAD/UNLOAD and IMPORT/EXPORT statements, specially for using coded character sets.

2.3 Utility Monitor

Extensions for Unicode support have been made in the following masks:

- ALC (ALTER CODE-TABLE),

- ALT (defining/modifying Unicode data types),
- CNF (displaying character set of configuration),
- CRC (specifying CODE_TABLE with check),
- CRT (defining Unicode data types),
- LOD (specifying a national character as termination),
- SNF (outputting the CODE_TABLE),
- SQL (outputting Unicode columns to terminal/file),
- UNL (specifying a national character as termination).

A new mask ALC13 has been implemented in the ALTER CATALOG function for supporting Unicode.

2.4 DBH options

A new sub-option CODED-CHARACTER-SET was added to the existing DBH option LINKED-IN-PARAMETERS for defining a character set with which the user program of a linked-in DBH is to work. The coded character set is required in the user program if the catalog works with a coded character set (new as of SESAM/SQL V5.0).

2.5 Administration

2.5.1 Administration statement

The administration statement SAVE-DBH-OPTIONS has been introduced (administration command OPT,SAVE) for saving the current values of the DBH options into a file for use in the next DBH session.

2.6 High availability

Overflow of the DA-LOG number will be considered in the future.

2.7 Support for new hardware or special BS2000 functions

2.7.1 Large I/O transfer sizes

Depending on the disk type, specific SESAM/SQL utilities can use transfer sizes between 64 KB and 160 KB (previously 32 KB). The extended I/O transfer size is used internally if SESAM copies disk files

- when creating a backup inventory onto disk
- when reading in a disk backup during

RECOVER
CREATE REPLICATION
REFRESH SPACE

- when copying a reorganized SPACE.

Using the large I/O transfer sizes appreciably reduces copying times for public disks. The previous I/O transfer sizes still apply for private disks.

2.8 Sample database

The sample database has been extended by fields and functions with Unicode.

2.9 Implemented Change Requests (CR)

No change requests have been implemented in this version. ***
CR no. Contents

2.10 Optional Reps

The optional Reps described here are contained in the library SIPLIB.SESAM-SQL.050.SPEZ as J elements with the name PRC.LMS.050.<rep>.

The Rep procedures also always contain 'UNREP functionality', i.e. each optionally activated Rep can also be cancelled. Details are given in the inline description of the individual Reps.

If an optional Rep is required, a target library is requested when the relevant Rep procedure is called. The user should note that the Rep must be loaded in the version-specific library SYSLNK.SESAM-SQL.050 or SPULNK.SESAM-SQL.050 and into any additional library used.

2.10.1 Rep: OPT.CATCACHE

This Rep is used to modify the size of the catalog cache.

Where:

C is the value of the DBH load option COLUMNS,
P is the value of the DBH load option PLANS,
F is a specific factor that has a default value of 2 and can be modified with this optional LMS Rep procedure.

The catalog cache then provides space for the metadata of exactly $F * C * P$ columns. If F has the value 0, the catalog cache is disabled.

2.10.2 Rep: OPT.COSSQLLN

This Rep modifies the maximum length of SQL string output in job logging.

The purpose of this Rep is to reduce the length in order to speed up writing the SQL strings to CO-LOG. A smaller length value can decrease SQL string output, thus reducing I/O operations.

2.10.3 Rep: OPT.DCN-ZEIT

Sending messages with DCAM may fail due to lack of memory. Two further send attempts are then made with a 100 msec delay between each attempt. If all attempts fail, transmission is deemed to have failed.

This optional LMS Rep procedure is used to set the number of transmission attempts for DCAM mode and the wait period between attempts.

When choosing the values, note that higher values for transmission attempts and wait times impair DBH performance.

Values outside the ranges specified below can lead to DBH malfunctions.

The defaults are as follows:

Default number of transmission attempts: 3
(can be changed within the range X'0001' and X'7FFF')

Default wait time
between two transmission attempts: 100 msec
(can be changed within the range X'0032' and X'03E8')

2.10.4 Rep: OPT.DOPPELDUMP

If a consistency check occurs several times in succession, the diagnostic documentation is usually created for the first occurrence only. This Rep is used to create the documentation for every consistency check.

Please consult your software service before using this Rep.

2.10.5 Rep: OPT.DRIVE60

This Rep causes DRIVE-TIAM applications in old style SESAM/SQL operation to be handled as TIAM applications and not as DCAM applications.

Starting multiple examples of such DRIVE-TIAM applications can thus no longer lead to status 2B/AG. If several concurrent DRIVE applications have the same user name in "PAR USER=" when DRIVE is started, they are rejected with status 2U/DR.

The "PAR USER=" specification as the application name is only transferred to the SESAM user ID if this Rep is activated

2.10.6 Rep: OPT.ESCALATION-MESSAGE

This Rep causes system message SES3207 or SES3208 to be output if a transaction lock of a record or index value to a table or index escalates.

The parameter "ESCALATION-MESSAGE=*UNCHANGED" causes the setting of the Rep to remain unchanged.

The parameter "ESCALATION-MESSAGE=FALSE" disables output of the MSG7 message.

The parameter "ESCALATION-MESSAGE=TRUE" enables output of the MSG7 message.

Since the frequency of an escalation during a SESAM session cannot be predicted, use of this Rep can give rise to a large number of SES3207 and SES3208 messages.

Please make sure you consult your software service before using this Rep!

2.10.7 Rep: OPT.JOPTGRENZE

This optional LMS Rep procedure can be used to modify the algorithm for optimizing CALL-DML join processing.

The limit defines the gap between 'nested loop' and 'merge' join. The limit can also be reduced by the SI length of the join attribute, since this length defines the size of a join record in the join values CD.

The default for this limit is:

Default value of limit used: 16 (X'00000010')
(can be changed within the range X'00000001' and X'00007FFF')

2.10.8 Rep: OPT.LOCK-V1

This Rep sets the lock behavior to match the behavior in SESAM/SQL V1.*.

2.10.9 Rep: OPT.NORTSTRACE

In SESAM/SQL V3.0A a small trace buffer was set up in SQL-RTS to aid error diagnosis. Approximately 400 bytes are needed in UTM process memory for this trace buffer.

This will have no effect on most applications. However, if an application (in a version < SESAM/SQL V3.0) used the UTM process memory up to the last 400 bytes, an out-of-memory condition may occur. In this case, the trace can be disabled with this Rep.

2.10.10 Rep: OPT.RPTC

In SESDCN this Rep prevents an INTR RESET, which refers to a transaction that is in the state "external PTC", from being rejected with message SEN2012; the INTR RESET is executed instead.

2.10.11 Rep: OPT.SCVINAKT

This Rep influences the release of resources from a user to the system-wide memory management.

Resources are released if a statement ends with CLOSE SCAN or CLOSE CURSOR. They are initially administered in a user-specific chain and may be reused by the chain.

If the chain contains more than "n" scans and their resources, the resources are returned to the system-wide management. The limit "n" can be influenced by this Rep. If "n" is set high, the resource requirement (memory in this case) is higher.

If "n" is set low, the path length of a statement is longer and, with high parallelism, serializing conflicts may occur in memory management.

2.10.12 Rep: OPT.SIGNCODE-F

By default, x'C' is the code for a positive sign in COBOL output variables of data types NUMERIC and DECIMAL. In some earlier versions, x'F' was used for a positive sign.

This optional LMS Rep procedure can be used to restore the old behavior of SQL programs.

If it is used on the module library from which SQL programs load SESAM/SQL modules, output variables of the data types NUMERIC and DECIMAL in these SQL programs are assigned the old sign code x'F' if a value is positive.

2.10.13 Rep: OPT.SONDEROPEN

As of V3.0, certain special open IDs are no longer supported. This optional Rep enables special open IDs to be used again.

2.10.14 Rep: OPT.STATUS97

This optional LMS Rep procedure allows query range length field checks to be disabled.

2.10.15 Rep: OPT.SYSDUMP

If a DBH task is terminated with any P error, this Rep can be used to generate a system dump instead of a user dump for better diagnosis.

System dump generation is enabled with the parameter "-SYSDUMP=TRUE".

System dump generation is disabled with the parameter "-SYSDUMP=FALSE".

Please consult system diagnosis before using this Rep. Please also make sure you note the following information!

- To be able to create a system dump, the user ID in which the DBH is started must have at least the test privilege READ-PRIVILEGE=3 in the user catalog.
- If a DBH task is terminated, all other DBH tasks of the multitasking DBH are also stopped.

2.10.16 Rep: OPT.TEMPVIEW

Temporary views are no longer supported since SESAM/SQL V3.1 and should be replaced with static views.

This Rep enables temporary views to be used again.

3 Technical information

New and enhanced software functions are described in chapter 2.

3.1 Resource requirements

SESAM/SQL-Server V5.0 can be used on systems with at least 64 MB main memory.

The maximum user address space of the DBH process ID in the home pubset user catalog should be large enough to prevent messages relating to an address space bottleneck during the session.

The minimum size should be 64 MB on /390 hardware and 96 MB on SX hardware (SPARC64 product line). However, depending on application, a much larger user address space may be required.

When the 64-bit variant is used, the DBH requires up to 10% more address space.

To estimate the address space required by the DBH as a function of the user-specific DBH options, the supplied CD-ROM contains an EXCEL chart with the following name in the 'produktinfo' directory

SYSDAT.SESAM-SQL.050.SP.D.xls

More information on resource requirements is provided in the document SYSDAT.SESAM-SQL.050.SP.E. This file also contains information on the memory requirements of SESAM/SQL-DCN V5.0 and information on the performance of SESAM/SQL V5.0.

3.2 Hardware configuration

SESAM/SQL-Server V5.0 runs on the following hardware architectures:

Hardware architecture	System type	Comments
/390	All S systems	No 64-bit addressing on S110, S115, S130, S135, S150 and S160
SX	All SX systems	

3.3 Software configuration

SESAM/SQL-Server V5.0 is compatible with the listed versions of the following software products:

The operating system version required depends on the hardware architecture:

BS2000/OSD-BC as of V 6.0B with correction package 2/2006
(release M12/2006)
OSD/XC as of V 2.0A with correction package D62
(release M12/2006)

Other software required for production operation:

CRTE as of V 2.6A requires CRTE-BAS of
correction package KP2/2006 (/390)
or D62 (SPARC)
EDT as of V 16.6B05 EDT V17.0A is required for Unicode
support. The SESAM/SQL Utility
Monitor always uses the EDT
available in the system as a
subroutine (loaded dynamically).
LMS as of V 3.3A
SORT as of V 7.8B SORT V7.9A is required for Unicode
support in the applications
TIAM as of V13.1A
XHCS as of V2.0A required for Unicode support by
SESAM/SQL

Optional software products for specific functions:

ADILOS as of V 6.4C
ARCHIVE as of V 7.0B (for tape backup)
COBOL85 as of V 2.3A
or COBOL2000 as of V1.2A (see below *1)
DRIVE as of V 3.1A10
ESQL-COBOL as of V 2.0A as of correction level April 2001;
ESQL-COBOL V3.0A is required for
Unicode support
HSMS as of V 7.0A for CCOPY and open BCV files
(see below *2)
INFPLAN as of V 5.3B
JV as of V14.0A
ONETSERV as of V 3.0A (openNet Server)
openFT as of V10.0 (processes UTFE and UTF16 files,
older versions also run but without
Unicode support)
openUTM as of V 5.2A
SDF-P as of V 2.3A for supplied tool procedures
SECOS as of V 5.0B (see below *3)
SESAM-KLDS as of V 3.1D
SSC-BS2 as of V 6.0A for SNMP management with RDBMS-MIB
TOM-REF as of V 3.0B

- (*1) ESQL-COBOL V3.0A and COBOL2000 V1.4A are required for Unicode support in the COBOL applications that access SESAM/SQL V5.0A databases.

All extensions of ESQL-COBOL V3.0A that do not require Unicode support can be used with COBOL2000 V1.3A.

Refer to the COBOL2000 Release Notice for restrictions on using functions beyond the scope of COBOL85.

- (*2) The service tasks of SESAM/SQL-Server wait synchronously at the HSMS interface for the end of a backup or restore run. The HSMS administrator must therefore adjust the BATCH-EXEC-TIME parameter to the expected duration of these runs by means of the //MODIFY-HSMS-PARAMETERS statement.

- (*3) SECOS is required for the following functions:

- Using DMS co-ownership;
- SAT logging of SESAM events;
- Creating SESAM backups using BY_ADD_MIRROR_UNIT or BY_SRDF_TARGET if the DBH does not run under either the TSOS or SYSHSMS ID.

Please also refer to the Release Notices of the above software products for further information on software configuration.

3.4 Product installation

SESAM/SQL must be installed using the IMON Installation Monitor. The installation information in the delivery letter and the product manual must be observed, in addition to the information in this Release Notice.

The following activities must be completed before running IMON:

- All applications of the DBH to be upgraded must first be terminated correctly before updating to SESAM/SQL-Server V5.0.
- After that the DBH must be terminated correctly with

```
//STOP-DBH UTM-SESSION-INFO=*DELETE (in SESADM) or  
/INFORM-PROGRAM MSG='STOP,DELETE', ...
```

(UTM-SESSION-INFO=*KEEP or MSG='STOP,KEEP' is not sufficient!). Any loaded shared modules or subsystems of the previous version need not be unloaded.

- If present, SESAM/SQL-DCN must also be terminated correctly with

```
//STOP-DCN                               (in SESADM)   or
/INFORM-PROGRAM MSG='STOP', ...
```

See section 3.5.2 for cross-version communication.

- The transaction backup files TA-LOG1, TA-LOG2 and WA-LOG and also the SESDCN logging file SESDLG of the old version must be deleted.
- When upgrading from V2.2, V3.0 or V4.0, the file with the load options must be checked for incompatibilities and must be modified if necessary.

After completing these activities, the product can be installed using IMON. The required input and the installation process are described in the IMON manual. The installation ID for all delivery units is freely selectable. IMON installs SESAM/SQL completely in executable form.

The module library is installed on /390 hardware under the name SYSLNK.SESAM-SQL.050 but on SX hardware under the name SPULNK.SESAM-SQL.050. We therefore strongly recommend that you use the SESAM start commands.

The following steps must be carried out after successful product installation using IMON:

1. If the customer does not use the SESAM start commands, the file names for the

```
SESAM message file      (SYSMES.)
SESAM-SDF syntax file  (SYSSDF.)
SESAM module library   (SYSLNK. or SPULNK.)
FHS module libraries for SESMON and SESUTI
                        (SYSFHS.)
help texts for SESUTI  (SYSMAN.)
```

must be modified in the procedures used in order to reflect the new names (see also section 1.2).

2. If the customer wants to use a different name for the SESAM/SQL module library, the library created must be copied or renamed using BS2000 resources. If necessary, this library must then be assigned in procedures using the link name SESAMOML with the BS2000 command

```
/ADD-FILE-LINK LINK-NAME = SESAMOML,
                FILE-NAME = <modlib>
```

or as a TASKLIB with the BS2000 command

```
/SET-TASKLIB LIBRARY = <modlib>
```

The standard name SYSLNK.SESAM-SQL.050 or SPULNK.SESAM-SQL.050 is also used in other files:

- (1) By default, the SYSSSC files are shipped to use the name

\$.SYSLNK.SESAM-SQL.050

for the reload library if it cannot be found using IMON-GPN.

Similarly, the standard name

\$.SPULNK.SESAM-SQL.050

is defined in the SPUSSC files.

- (2) In the listed optional REP procedures (see section 2.1), the name of the SESAM/SQL module library is queried using a parameter. The customer must specify the valid name here.

3. The message file SYSMES.SESAM-SQL.050 and the subsystem syntax file SYSSDF.SESAM-SQL.050 are activated by default when installation is performed using IMON.

If parallel operation of two SESAM/SQL versions on the same system is desired, it must be ensured that each product version takes its messages from the matching message file. The start commands of SESAM/SQL therefore assign the appropriate message file locally for each task, if this is necessary.

When application programs are to be started or when the start commands are not used, the appropriate message file must be assigned with the following command (e.g. in a user LOGON procedure):

```
/MODIFY-MSG-FILE-ASSIGNMENT
  ADD-FILE = <user-id>.SYSMES.SESAM-SQL.<version>,
  SCOPE = *TASK
```

where <user-id> = storage ID of the SESAM message file
<version> = version 'nnn' of the product

A user syntax file with the name SYSSDF.SESAM-SQL.050.USER is shipped for custom use. It contains the SDF statements of the SESAM/SQL programs. The file must be used if the IMON Installation Monitor was not used or if the subsystem syntax file is not activated.

Assignment is made using:

```
/MODIFY-SDF-OPTIONS
  SYNTAX-FILE = *ADD (
  ADD-NAME =
  <user-id>.SYSSDF.SESAM-SQL.<version>.USER )
```

The SESAM/SQL V5.0 start commands make this assignment automatically. However, the start commands themselves are always defined by the subsystem syntax file. Con-

sequently, the subsystem syntax file must be activated if the 'global configuration file' functionality is to be used with the /CONNECT-SESAM-CONFIGURATION command.

4. If necessary, the subsystems can be started by SESAM/SQL V5.0 on completion of installation.

3.5 Product use

3.5.1 Notes on upgrading to SESAM/SQL V5.0

The following notes apply for upgrading from SESAM/SQL V4.0A, V3x or V2x (referred to as the previous version below). When upgrading from V3x or earlier, please also refer to the Release Notices of V4.0 and, if applicable, V3x.

When an upgrade is made to SESAM/SQL V5.0, generally more than one version of SESAM/SQL will be installed on a system for a certain changeover period. It is therefore important to always start the SESAM programs of the correct version. If Version 5.0 of the SESAM-DBH is started inadvertently, the specified catalog spaces are migrated immediately (see section 3.5.1.1) and can therefore no longer be processed by the previous version. We therefore strongly recommend using the SESAM start commands together with the VERSION operand

```
/START-SESAM-<program> VERSION = <version>
```

or the BS2000 command

```
/SELECT-PRODUCT-VERSION PRODUCT = SESAM-SQL,  
                           VERSION = <version>
```

The version can be supplied, for example, from a central job variable.

DBH sessions of older versions must be terminated correctly with STOP-DBH UTM-SESSION-INFO = *DELETE (SESADM statement). This requires that all DBH and openUTM sessions involved are terminated in a transaction-free state.

The TA-LOG and WA-LOG files of the previous version must then be deleted.

3.5.1.1 Migrating the databases

The following points must be observed when upgrading from a previous version to SESAM/SQL V5.0:

- Neither a restart, synchronization with openUTM nor a media recovery are possible across the version upgrade.
- The catalogs are migrated into the management structures during version upgrading. The catalog spaces are migrated implicitly to SESAM/SQL V5.0 with the first SESAM/SQL V5.0 DBH access.

You should therefore proceed as follows when upgrading versions:

- The catalog and user spaces must be intact to be able to migrate to SESAM/SQL V5.0, i.e. they must be free of errors and must not be in the check, copy, recover pending or load running state.

It is advisable to perform a backup in the previous version prior to migration. This can be used in an emergency.

- Installation is performed as described in section 3.4.
- Existing TA and WA-LOG files from the previous version must be deleted.
- Start the DBH of SESAM/SQL V5.0.
- The first DBH access of SESAM/SQL V5.0 to a catalog or user space automatically triggers migration. Migration of the catalog space is performed during session initialization for all catalogs listed in the DBC (SQL Database Catalog). A prerequisite is that the catalogs are mounted with ACCESS=ADMIN; ACCESS=WRITE or ACCESS=READ will cause access to a catalog of the previous version to fail.
- Migration to SESAM/SQL V5.0 interrupts logical data backup because backups and logging files of a previous version cannot be used for media recovery in SESAM/SQL V5.0. For this reason, migrated spaces for which logging is agreed are automatically set to the "copy pending" state,

It is therefore recommended to use the utility statement

```
COPY CATALOG ... OFFLINE
```

for first access with SESAM/SQL V5.0 to a catalog of a previous version as this migrates all spaces of the catalog in one run as well as creating the necessary backup copies of these spaces. You can subsequently work with all spaces of the catalog without problems.

It is also possible to first back up only the catalog space using the statement

```
COPY CATALOG_SPACE ... OFFLINE
```

The user spaces can then be backed up using

```
COPY ... ONLINE
```

or other suitable means (e.g. external copy). An external copy must be initiated with the command

```
PREPARE-FOREIGN-COPY
```

and completed with the command

END-FOREIGN-COPY

After the first backup has been made with V5.0, the no longer required recovery unit entries in the CAT-REC file and in the catalog metadata should be deleted.

3.5.1.2 Backup inventories

Backup inventories are not migrated. A backup from V4.0, V3.x or V2.x can be mounted in a V5.0 DBH session for reading.

A reset to a V4.0, V3.x or v2.x backup is possible using

```
RECOVER SPACE ... TO ...
```

In this case, it is not the backup that is migrated but the space that is created when loaded. The space is set to the "copy pending" state and must then be saved.

Resetting of a catalog to a V4.0, V3.2 or V3.1 backup with

```
RECOVER CATALOG ... TO ...
```

is also possible. However, the reset must be made in several steps:

1. Reset the catalog space with

```
RECOVER CATALOG_SPACE ... TO ...
```

This migrates the loaded catalog space.

2. Back up the catalog space with

```
COPY CATALOG_SPACE
```

3. Reset the spaces with

```
RECOVER SPACESET ...
```

specifying the time stamp of the catalog backup to which a reset is to be made. It is also possible to reset individual spaces, if only these are needed. In this case, the loaded spaces are migrated.

4. Back up the spaces in the log since these spaces are in the "copy pending" state as a result of migration.

3.5.1.3 Conversion notes for SESAM/SQL-DCN

DCN sessions of older versions must be terminated correctly with STOP-DCN (SESADM statement). This requires that all DBH and openUTM sessions involved are terminated in a transaction-free state.

The SESDLG file of the previous version must then be deleted.

3.5.1.4 Conversion notes when using virtual hosts

When virtual hosts are used with SESAM/SQL V5.0, the name of the application is:

SES050c

(where c is the configuration name).

Take account of this in the \$.SYSDAT.BCAM.APPLICATIONS file. Refer also to section 8.3 in the "Database Operation" manual.

3.5.1.5 Converting user programs

CALL-DML and SQL user programs need not be specially compiled or linked. It is sufficient to assign the module library of SESAM/SQL V5.0.

openUTM applications then only need be regenerated and linked. If the connection module SESUTMC is reloaded from a module library defined in the generation.

In this context, please note an enhancement of openUTM: It is possible to specify the reload library using a "logical ID" for IMON installation in the KDCDEF DATABASE LIB=... control statement. The connection module SESUTMC is then loaded dynamically from the SESAM/SQL module library defined by IMON. This is usually the library with the highest version number. If, alternatively, an older version is to be used, it must be selected explicitly using the BS2000 command

```
/SELECT-PRODUCT-VERSION PRODUCT = SESAM-SQL,  
                           VERSION = <version>
```

3.5.1.6 Reverse migration

Reverse migration to a previous version is only possible with the support of your customer service. This is because several advance checks and manual interventions are required to ensure that reverse migration functions correctly.

3.5.2 Cross-version communication and parallel operation with

SESAM/SQL SESAM/SQL-Server V5.0 only functions locally with SESAM/SQL-DCN V5.0; all DBHs and DCNs in a configuration must have the same version.

Cross-version communication is only possible across configurations with SESAM/SQL-DCN. If both configurations are on the same system, they must have different configuration IDs.

1. SESAM/SQL user programs with a connection module \geq V3.1 can communicate with a SESAM/SQL-DBH V5.0 by means of SESAM/SQL-DCN. Since a SESAM/SQL user program connection with a version $<$ V5.0 does not know the

connection module parameter CCSN, it is handled in the V5.0 DBH as if CCSN=*NONE were specified, i.e. the user program can only process a catalog for which "_NONE_" is agreed as the code table.

2. SESAM/SQL user programs with a V5.0 connection module can communicate with a SESAM/SQL DBH as of V3.1. The DBH does not check the CCSN for communication of a user program that has a V5.0 SESAM module library assigned with a DBH that has a version < V5.0.

Cross-version communication requires the following correction levels of the earlier versions:

- SESAM/SQL V3.1B82 (E07/06)
- SESAM/SQL V3.2A70 (E07/06)
- SESAM/SQL V4.0A10 (M08/06)

Earlier correction levels and versions before SESAM/SQL V3.1B cannot work across versions together with SESAM/SQL V5.0A.

The maximum size of the communication buffer may not exceed 32 KB for cross-version communication between V5.0 and V3.1. The maximum size is limited to 64 KB for cross-version communication between V5.0 and V4.0 or V3.2.

Programs of SESAM/SQL V5.0 can be started with start commands, even if the subsystem syntax file of a previous version is active. These commands access the user syntax file SYSSDF.SESAM-SQL.050.USER.

3.5.3 Using larger process memory with openUTM

As of a process memory size of 128 KB (specified in the KDCDEF control statement MAX VGMSIZE), it is recommended to use the KDCDB macros in the SIPLIB.SESAM-SQL.050.MACUTM.1 library.

3.5.4 User ID of the HSMS archive

If HSMS is used for tape backup, the HSMS archive may be located under a different user ID than that of the DBH if the user ID of the DBH is co-owner of the HSMS archive and HSMS as of V6.0 is used.

3.6 Obsolete functions (and those to be discontinued)

3.6.1 Switching/displaying the Utility Monitor trace level

The display and enable/disable options for the Utility Monitor trace level in the CNF utility mask are supported for the last time with SESAM/SQL V5.0A. As of the SESAM/SQL follow-up version, it will no longer be possible to enable/disable or display the trace level via the utility mask. The option of enab-

ling/disabling the trace level is still possible via the configuration file and remains unchanged.

Utility mask entry concerned (CNF mask):

- SEE-TRACE: 0 (0/1/2).

3.7 Incompatibilities

Apart from the restrictions described below, SESAM/SQL V5.0 is fully compatible with SESAM/SQL V4.0.

3.7.1 Replicates

Replicates are not migrated. SESAM/SQL V4.0 replicates cannot be processed in V5.0. Replicates must be recreated.

3.7.2 Backup files

Backup inventories are not migrated. Backup inventories from SESAM/SQL V2.x, V3.x and V4.0 can be mounted in V5.0 for reading.

3.7.3 Logging files

SESAM/SQL V4.0 logging files cannot be processed in V5.0. This concerns the following files:

- transaction backup files TA-LOG and WA-LOG,
- DCN backup file SESDLG,
- Logging files DA-LOG and CAT-LOG,
- backup inventories of the catalog and user spaces.

RECOVER [USING] based on a V4.0 backup is therefore not possible in V5.0.

The actions required when upgrading to SESAM/SQL V5.0 are described in section 3.5.1.

3.8 Restrictions

none

3.9 General information

The following sections do not describe changed behavior with respect to the previous version. They are intended to provide users with helpful information on using the product.

3.9.1 Upgrading to a later WebTA version

A WebTransactions (WebTA) solution was developed for the PC interfaces of the Utility Monitor, SESAM Monitor and SESADM application programs for SESAM/SQL. WebTA makes it possible to work with the SESAM application programs from the Internet or Intranet via a browser

The WebTA application, created for SESAM/SQL is based on Web-Transactions (OSD).

When upgrading from an earlier version of WebTransactions (OSD) to a more current version, the old version should be completely deinstalled before installing the new version. Please use the system deinstallation tool for deinstalling on a Windows platform.

There is no deinstallation tool available for the BS2000 and UNIX/Linux platforms. The following steps must be noted here:

1. Delete the old CGI modules:
The CGI modules of WebTransactions (OSD) are stored in the cgi-bin directory (e.g. /opt/apache/cgi-bin/). The WebTransactions (OSD) module names begin with "WT", i.e. WT* affects all modules.
2. Delete the old configuration environment:
The old configuration environment must be deleted since the new version also uses the same path. The configuration environment is stored in the "config" sub-directory of the WebTransactions installation (default: /opt/webtrans/config/). You must either rename the complete config directory (back up for fallback) or delete it.
3. Pool for the new version:
If you wish to retain the old pool for the application after the Web-Lab installation, you must also delete the relevant contents of the directories. We recommend either deleting the old pool in the Web-Lab environment and then recreating it with the same name or creating a new pool (with a new name) and using it for the SESAM application.

3.9.2 Sample database

The sample database AUFTRAGKUNDEN is included in the delivery scope of SESAM/SQL-Server. It is described in chapter 3 of the Core Manual. The library SIPANY.SESAM-SQL.050.MAN-DB contains all the components you need to try out the examples described in the manuals and to develop your own applications in an orderly environment.

A sample with statements in which Unicode is used can be found in the statement file INSTR.AUFTRAGKUNDEN.050.

3.9.3 JDBC-Server

The ini file of the JDBC server is read in just once when a server task is started. If server tasks are reused, any changes to the ini file generally have no effect on the current server session.

Reusing the server tasks greatly increases their lifetime. This should be taken into account when choosing the job class and assigning CPU time.

3.9.4 ESA/dataspaces on /390 and SX hardware

For technical reasons, the 64-bit variant does not support sharable code. There are therefore no 64-bit subsystems. However, only the SESDBH subsystem is affected because all other subsystems are used only in a 31-bit environment (SESDCN; SESKOMMD; communication in user program: SESKOMMD, SESKOMOD and SESSQLRT; others: SESKOM). The 31-bit subsystem SESDBH can be started in the 64-bit environment and does not result in errors because the subsystem is not used there. This should not be done because class 4 memory is then assigned unnecessarily.

3.9.5 Information on /START-PROGRAM

If the /START-PROGRAM command is used to start SESAM/SQL programs instead of the SESAM start commands, the command must always have the following form:

```
/START-PROGRAM FROM = *MODULE (
    LIBRARY = <sesam-library>,
    ELEMENT-OR-SYMBOL = <sesam-program>,
    PROGRAM-MODE = *ANY,
    RUN-MODE = *ADVANCED (
        ALTERNATE-LIBRARIES = *YES,
        UNRESOLVED-EXTRNS = *DELAY,
        LOAD-INFORMATION = *REFERENCES ) )
```

Before issuing this command, a suitable SESAM module library must be assigned using the following command:

```
/ADD-FILE-LINK LINK-NAME = SESAMOML,
    FILE-NAME = <sesam-library>
```

Before the SESAM Performance Monitor SESMON is started, you must also enter the following command:

```
/MODIFY-DBL-DEFAULT PRIORITY = *FORCED,
    SCOPE = *PROGRAM-CALLS (
        RESOLUTION = *PARAMETERS ( -
            MMODE-CHECK = *NO ) )
```

3.9.6 Using different correction delivery levels as a subsystem

As of SESAM/SQL V4.0, subsystems of different correction levels can be loaded in parallel.

The following must then be noted:

1. Installation must be performed using IMON and without generating the subsystem catalog.
2. The subsystems of SESAM (SESKOM, SESDBH, SESSQLRT, SESKOMOD and SESKOMMD) must be entered explicitly in the subsystem catalog. For this purpose, a new subsystem catalog must be created with SSCM. This is done using, for example, the following statements (see manual entitled "DSSM/SSCM, Subsystem Management in BS2000/OSD"):

```
/START-SSCM
//START-CATALOG-CREATION <subsystem-catalog>
//ADD-CATALOG-ENTRY
    FROM-FILE = $kenn.SYSSCC.SESAM-SQL.050.KOM      (*)
//CHECK-CATALOG
//SAVE-CATALOG
```

- (*) This statement adds SESKOM to the subsystem catalog. The other subsystems of SESAM-SQL (SESDBH, SESSQLRT and SESKOMOD) must be handled in the same way. If necessary, the same procedure must be adopted for the SESKOMMD subsystem of SES-SQL-DCN.

On SX systems, the subsystem declaration files have the prefix SPUSSC. They are therefore called:

```
SPUSSC.SESAM-SQL.050.KOM
```

3. This subsystem catalog must then be added to the catalog of dynamic subsystems in BS2000. This is done using the following command:

```
/ADD-SUBSYSTEM CATALOG = <subsystem-catalog>,
    TYPE = *NEW-SUBSYSTEMS
```

4. Finally, you can start the subsystems using the following command:

```
/START-SUBSYSTEM SUBSYSTEM = <subsystem>,
    VERSION = V5.0A00,
    VERSION-PARALLELISM = *COEXISTENCE-MODE
```

3.9.7 Tools for SESAM/SQL-Server V5.0

As with the previous version, various tools are shipped with SESAM/SQL V5.0. They are not part of the license and are not subject to maintenance.

The tools are grouped together in the library
SIPANY.SESAM-SQL.050.TOOLS

You will find an overview in SIPANY-TOOLS-INH.TXT (type D) in this library.

Further tools are provided in the product-specific libraries:
SYSLNK.SESAM-SQL.050 or
SPULNK.SESAM-SQL.050

These tools (e.g. SESDIAG, SEUGCR, etc.), are shipped without a SESAM start command. They require components of the Common RunTime Environment CRTE for execution. The library \$.SYSLNK.CRTE must be made available for these tools when running them on /390 or SX hardware.

3.9.7.1 DSQL tool (DirectSQL)

The DSQL (DirectSQL) tool provides an easy way to enter SQL statements directly at the terminal for execution by SESAM/SQL. From the viewpoint of SESAM/SQL, DSQL is a normal SQL application that uses dynamic SQL to execute SQL statements entered by the user. All types of SQL statements (DML, DDL, SSL, Utility) that can be executed with EXECUTE IMMEDIATE are supported as are SELECT statements that are processed as dynamic cursors. The number of hits is displayed on the screen using the SHOW-FILE command.

The program and associated description are included in the library named SIPANY.SESAM-SQL.050.TOOLS.

3.9.7.2 SESAMDA tool (shows loaded DBHs and DCNs)

SESAMDA checks which DBHs and DCNs are loaded or which POOLs have been set up. After SESAMDA has been loaded, you can display an overview of its functions and commands by entering HILFE/HELP.

The program is located in module library SYSLNK.SESAM-SQL.050 or SPULNK.SESAM-SQL.050 (on SX hardware).

3.9.7.3 SEMSTAT tool (evaluates file outputs of SESMON)

SEMSTAT is used to evaluate the file outputs of the SESAM Performance Monitor SESMON. It not only supports creation of BS2000 files but also of ASCII files that can be further processed for purposes of graphical analysis using, for example, Microsoft Excel on a Windows PC. Refer to the description of SEMSTAT for details.

The program is located in module library SYSLNK.SESAM-SQL.050 or SPULNK.SESAM-SQL.050 (on SX hardware). The description is included as a PDF file in the produktinfo directory on the CD-ROM shipped with SESAM/SQL.

3.9.7.4 SESDIAG / SESDIAE tool (diagnostic tool)

SESDIAG is a diagnostic tool that supplies information on catalogs, spaces and blocks. It also lets you determine the space states.

SESDIAE is the SESDIAG tool with English text.

*1

The program is located in module library SYSLNK.SESAM-SQL.050 or SPULNK.SESAM-SQL.050 (on SX hardware). The description is included in the library named SIPANY.SESAM-SQL.050.TOOLS.

3.9.7.5 INFOTAB tool (information about a table)

INFOTAB provides general information on a table, the associated space, a list of attributes (columns) and a list of the SQL default values.

The program and associated description are included in the library named SIPANY.SESAM-SQL.050.TOOLS.

3.10 Procedure in the event of errors

3.10.1 General

To detect user errors, SESAM/SQL applications should be started with

```
/MODIFY-JOB-OPTIONS LOGGING=*PARAMETERS(LISTING=*YES)
```

To obtain the information needed for diagnostic purposes, you should always run SESAM/SQL-DBH and SESAM/SQL-DCN with

```
/MODIFY-TEST-OPTIONS DUMP=*YES
```

and log the session to a file. If the SESAM program components detect an error, a memory dump is created automatically.

The administrator should grant at least read privilege 3 for test and diagnostics to the DBH ID so that SESAM/SQL can also create system dumps for diagnostic purposes. The test privilege is set just once using the BS2000 command

```
/MODIFY-USER-ATTRIBUTES TEST-OPTIONS = *PARAMETERS (
                                READ-PRIVILEGE = 3 )
```

and remains stored in the user catalog.

If the DBH is loaded as a multitasking system, error information can also be generated in tasks other than those started by the administrator.

The information that needs to be saved if a consistency check occurs is described in the following manuals.

and SESAM/SQL-Server V5.0A Database Operation
SESAM/SQL-Server V5.0A Messages

To generate useful error information when DBH errors are suspected (e.g. illegal status, incorrect response, etc.), you can do the following:

- Set job switch 13 :
 - > Generates an automatic dump at the end of the DBH program.
- Turn traces on :
 - //SET-DBH-MSG-TRACE (SESADM statement)
 - or
 - /INFORM-PROGRAM MSG='TRACE=ON'
 - > Provides information on message transfer between the DBH and the user program (e.g. which statement is passed to the DBH).
 - //SET-DIAGNOSIS-DUMP-PARAMETER
DUMP=*ON(SELECT=*CALL-DML(STATE=xx))
 - or
 - /INFORM-PROGRAM MSG='SES,OPT,DIAG,STATUS=xx'
 - //SET-DIAGNOSIS-DUMP-PARAMETER
DUMP=*ON(SELECT=*SQL(SQLSTATE=yyyyy))
 - or
 - /INFORM-PROGRAM,MSG='SES,OPT,DIAG,SQLSTATE=yyyyy'
 - > Activates additional diagnostic functions in the program while the program is running. A dump is generated depending on the results achieved (e.g. when a specific state or SQLSTATES occurs). However, activating these functions greatly impairs runtime behavior.
 - DUMP=*OFF(SELECT=*CALL-DML) or
DUMP=*OFF(SELECT=*SQL)
turns the function off again.

Additional information may be needed for the service tasks used by SESAM/SQL-Server for specific jobs. The execution listing and a possible dump should then also be made available for the diagnosis.

In some cases, it may be necessary to analyze the execution plan of an SQL statement generated by SESAM/SQL-Server. A plan must first be generated and submitted for diagnosis using the pragma EXPLAIN.

Additional diagnostic information can be collected using SESMON or SESCOS traces.

Which specific information may be needed and how you create it is described in the manual entitled

SESAM/SQL-Server V5.0A Database Operation

The information generated must also be supplemented by an exact description of the error situation and information on whether and how the error can be reproduced.

All dumps and lists must be made available to your Support Center for diagnostic purposes.

Refer to the information in the Release Notices of the relevant products when errors are encountered in conjunction with openUTM, ESQ-L-COBOL, DRIVE, etc.

3.10.2 Procedure in the event of a defective CAT-REC file

If the CAT-REC file needed for a RECOVER is defective or is no longer available, you must contact your Support Center. The Support Center staff has the requisite knowledge to make a repair.

4 Hardware support

SESAM/SQL V5.0 runs on all business servers supported by BS2000/OSD-BC V6.0B or higher or OSD/XC V2.0 or higher. SESAM/SQL V5.0 runs in SPARC code on SX hardware. Refer to section 3.2.