IBM

Licensed Program
Specifications

IBM® DATABASE 2™ SERVER
for VSE & VM
Version 7 Release 5
Program Number 5697-F42

The IBM DATABASE 2 SERVER for VSE & VM (DB2 Server for VSE & VM) licensed program is a relational database management system with integrated query and report writing facilities.

The IBM DATABASE 2 SERVER for VSE & VM Licensed program uses Structured Query Language (SQL) for data access and control in interactive and non-interactive Virtual Machine (VM) computing environments, and online, interactive and batch computing in Virtual Storage Extended (VSE) environments.

SQL is much the same wherever it is used:

- At a terminal with the DB2 Server for VSE & VM Interactive SQL (ISQL) facility

- In a command file for the Database Services (DBS) utility

- Embedded in an application program coded in COBOL, FORTRAN, PL/I, C, Assembler, or, in a VM environment, the REXX language.

DB2 Server for VSE & VM Version 7 Release 5 supports a superset of the Structured Query Language as defined by the Federal Information Processing Standard (FIPS) 127-1, which includes:

- ANSI X.3.135-1989 (without the Integrity Enhancement feature)
- ANSI X.3.168-1989
- ISO 9075-1989 (without the Integrity Enhancement feature)

Note: These are supported for Full SQL conformance to level 2 of the SQL standard, without the

optional integrity enhancement feature, through interactive and embedded SQL. FIPS Flagger support is provided for embedded SQL.

The DB2 Server for VSE & VM application server operates in one virtual machine or partition, providing services to other virtual machines or partitions. Note that if stored procedures are used, the stored procedure servers are in separate virtual machines or partitions.

Facilities available to all environments are:

- A high-level language for use by query users, programmers and administrators

- Concurrent data access from multiple users and programs

- Data recovery:

  – From a database archive, or a log archive, or both; and from a duplexed log

  – Recovery of tables, dbspaces and storage pools from a Data Restore feature archive and DB2 Server for VSE & VM logs and log archives.

  – Dynamic backout of uncommitted data changes on an abnormal end of a program

  – Restart recovery if the database or the system ends abnormally. Uncommitted data changes are backed out automatically.

- Data security and user authorization to data and programs

- Referential integrity
- Dynamic administration functions for data definition and installation, program installation and security administration
- Database utilities
- DataPropagator™ Capture support

With z/VSE™ running as a guest operating system under z/VM®, Guest Sharing can be used to access DB2 Server for VM data.

The DB2 Server for VSE & VM licensed program supports the Remote Unit of Work (RUOW) application server and application requester functions of Distributed Relational Database Architecture™ (DRDA®) in the VM and VSE environments.

The DB2 Server for VSE & VM licensed program supports the Distributed Unit of Work (DUOW) application server functions of Distributed Relational Database Architecture (DRDA) in the VM and VSE environments. DB2 Server for VM in the z/VM environment with APPC/VM VTAM® Support (AVS), CMS Coordinated Resource Recovery (CRR) and VTAM provides DUOW application server functions. DB2 Server for VSE in the z/VSE environment with CICS/VSE® or CICS® Transaction Server® and VTAM provides DUOW Application Server functions. The supported releases of the following application requesters can request data from a DB2 Server for VM & VSE application server using Distributed Unit of Work:

- IBM DB2® Universal Database for Linux UNIX and Windows®,
- IBM DB2 Universal Database® for z/OS®
- IBM DB2 Universal Database for iSeries®
- any other database management system that implements the DRDA distributed unit of work application requester facilities.

Any of these database management systems can serve data to a DB2 Server for VSE & VM application requester.

DB2 Server for VSE batch and online CICS applications can access multiple DB2 Server for VSE application servers. The customer can configure up to 36 database partitions in a z/VSE system.

31-bit support is provided for all z/VM systems and for z/VSE Version 3 Release 1, and later.

For VM users, VM Data Spaces Support (VMDSS) for the DB2 Server for VM licensed program has been included in the base product. Data Spaces Support is designed to improve the performance of the database by exploiting VM Data Spaces introduced in VM/ESA release 1.1.

For VM users, the DB2 Server for VM REXX Interface (RXSQL) is an optional, chargeable DB2 Server for VM feature designed to provide an interface between REXX and a DB2 Server for VM database. RXSQL allows a programmer to access all the system resources available in Conversational Monitor System (CMS) and Control Program (CP), and use the database at the same time.

For VM and VSE users, Data Restore is an optional, chargeable feature that provides customers with many new archive and recovery options designed to help achieve continuous operation. Highlights include:

- Table Level Recovery while maintaining the indexes, referential integrity, views, authorizations, comments and labels
- Forward Log Recovery with Point in Time recovery
- Dual BACKUP to TAPE, DISK, or both
- Storage Pool Level Recovery
- Incremental Archive and Restore

For VM and VSE users, Control Center is an optional, chargeable feature that provides customers with a comprehensive set of database administration tools. Highlights include:

- Group authorization
- Dbspace analysis and reorganization
- Job scheduling

For VM and VSE users, Query Management Facility (QMF™) and QMF for Windows are optional, chargeable features that provide customers with a tightly integrated, powerful, and reliable query and reporting tool set for IBM's DB2 relational database management systems family. Users with little or no data processing experience can easily retrieve, create, update, insert, or delete data that is stored in DB2.

QMF provides:

- Three methods for data retrieval and manipulation: Structured Query Language

(SQL), Prompted Query, and Query-By-Example (QBE).

- A Table Editor that allows you to make changes to the database without having to write a query.

- Report formatting in a variety of simple or complex reports, including report calculations for advanced reporting.

- Charts and Graphs using the Graphical Data Display Manager (GDDM®) Interactive Chart Utility (ICU).

- Linear procedures, which contain only QMF commands, or procedures with logic, which incorporate programming logic of the Restructured Extended Executor (REXX) language.

- An application programming interface (API) that supports a variety of languages.

- A command interface that allows ISPF application programs to pass commands to QMF.

- The ability to embed QMF commands in procedures, EXECs, and program modules.

- Customization of QMF functions to suit your specific needs, such as the ability to define synonyms for the base set of QMF commands, redefine the labels and settings for most QMF function keys, and tailor resource control and report formatting, through edit codes.

- System resource control and a sample governor exit routine, which you can use as-is or modify for your own purposes.

- QMF uses the security features of the VM, and VSE operating systems and of the DB2 database systems.

- QMF takes advantage of remote-unit-of-work (RUOW) support provided by DB2 Server for VSE & VM, DB2 Server for OS/390, DB2 Parallel Edition for AIX®, DB2 for Common Server, and DB2 Universal Database, if QMF Version 7 has been properly set up at all locations using this support.

- QMF for VM is available in 14 different languages. QMF for VSE is available in 12 different languages. English is provided with the base product, and other languages are available as optional features. QMF also supports the double-byte character set for data entry, processing, display, and printing.

  QMF for Windows provides:

  – A multi-purpose, multi-database query engine that provides a comprehensive user environment for formulating and sharing business reports

  – A robust Windows-based application programming interface (API) for automating database querying, updating, and report distribution tasks,

  – Centralized control over database resource consumption

  – Access to and execution of QMF queries on all DB2 platforms including DB2 UDB for AS/400 from Windows operating system environment

  – The ability to view query results on the workstation or integrate those results with various Windows desktop tools such as spreadsheets

  – Java®-based query for submitting queries to DB2 through a browser

  – Query execution governed using the limits and schedules assigned to a particular user group.

- QMF for Windows supports 19 different languages for VM, and VSE, and is DBCS and unicode enabled.

Specified Operating Environment

"Year 2000 Readiness"

This IBM Program, when used in accordance with its associated documentation, is capable of correctly processing, providing, and/or receiving date data within and between the twentieth and twenty-first century, provided that all products (for example, hardware, software, and firmware) used with this IBM Program properly exchange accurate date data with it.

Machine Requirements

Processors: The DB2 Server for VM & VSE licensed program requires a processor that is supported by z/VM or z/VSE. The processor must support conditional swapping and extended floating point.

The processors must have sufficient real storage to satisfy the combined requirements of the operating system and support programs. The config-

3

uration must include sufficient I/O devices to support the requirements for system output, systems residence, and system data sets.

Sufficient direct-access storage must be available to satisfy the user information storage requirements and can consist of any direct-access facility supported by the system configuration and the programming system.

DASD or Tape: DB2 Server for VSE & VM and all features can access all storage devices supported by the operating system and the supported databases.

Data Communication Devices: QMF can display on all terminals supported by GDDM.

Storage: The following are the minimum requirements suitable for preliminary sizings. For details, see the manual *DB2 Server for VM Program Directory*, or *DB2 Server for VSE Program Directory*, and other manuals in the DB2 Server for VM or the DB2 Server for VSE libraries.

Virtual Storage:

The virtual storage requirements are dependent on various configuration and workload parameters, including the number of users and their usage patterns, the number and size of databases, and the number and complexity of applications. The following estimates of virtual storage requirements are provided for general guidance. Storage requirements might vary with your environment

For VM systems, the recommended minimum size of an DB2 Server for VM database virtual machine running a starter database with default parameters, is:

- 8 megabytes without DRDA installed
- 10 megabytes with DRDA installed

QMF for VM must be in a discontiguous shared segment (DCSS). All QMF modules (in a 31-bit shared segment) require approximately 3MB storage. User storage required to run QMF is approximately 0.5 to 1MB. Additional storage is required for other applications. For example, when running a standard CMS environment with ISPF and GDDM, approximately 6MB total is needed.

The QMF DCSS may be located above 16.0MB. If the user generates complex reports or uses CMS

EXECs to run other functions within a QMF session, more storage may be required. Graphics (for example, CHART) requires additional storage.

For VSE systems, the recommended minimum size of the DB2 Server for VSE partition, running a starter data base with default parameters, is:

- 9 megabytes without DRDA installed plus 204 KB times the maximum number of concurrently active users
- 15 megabytes with DRDA installed

For a QMF for VSE system running in a CICS environment, the minimum acceptable partition size is 18.0MB, regardless of the number of users. The recommended size for a system with up to 20 QMF users is 24.0MB. For systems with more than 20 QMF users, the partition size should be increased by 0.5MB to 1.0MB for each additional user, to execute queries and produce reports. Some users might require more or less storage, depending on the amount of data requested and the QMF formatting options used for the report. The IBM book *Installing and Managing QMF on VSE/ESA* helps you calculate direct access storage device (DASD) storage and virtual storage requirements.

For VM and VSE systems, an additional 2 megabytes is required during the installation process if you are installing Help text.

QMF for Windows V7R2 feature hardware requirements are those required to run the Windows software, as described in the Prerequisite Software section that follows.

The QMF for Windows feature requires approximately 10MB of free disk space on each Windows workstation, and about the same memory as needed by a typical Windows suite application.

QMF for Windows host hardware requirements are those required to run the supported DB2 platforms.

Devices Supported:

For VM,

- The DB2 Server for VM licensed program supports devices supported by VM through CMS and CP facilities.
- ISQL uses system product functions to support

IBM 3270-type terminals or compatible display devices.

- The DB2 Server for VM product supports any system printer or workstation printer supported by VM or Remote Spooling Communications Subsystem (RSCS) Networking.

- One tape drive is required for installation. The database is installed through the standard z/VM installation and service tool VMSES/E.

- If DB2 Server for VM database or log archiving is used during operation, a tape drive is required. Log archiving can also use Direct Access Storage Devices (DASD). If DB2 Server for VM tracing is used, either a tape drive or DASD is required.

- If Data Restore BACKUP is used, a tape drive or Direct Access Storage Devices (DASD) is required.

For VSE,

- The DB2 Server for VSE program product supports devices supported by VSE through VSE/VSAM data management facilities and SAM for the Database Services utility program.

- The DB2 Server for VSE product uses CICS/VSE or CICS Transaction Server to provide terminal support for online applications. ISQL uses CICS/VSE or CICS Transaction Server terminal control to support IBM 3270-type terminals or compatible display devices.

- The application server also supports any system printer or workstation printer supported by CICS/VSE or CICS Transaction Server.

- One tape drive is required for installation. The database is installed through the standard Maintain System History Program (MSHP).

- If DB2 Server for VSE database or log archiving is used during operation, a tape drive is required. If DB2 Server for VSE tracing is used, either a tape drive or DASD is required. If DB2 Server for VSE accounting is used, either a tape drive or a DASD is required.

- If Data Restore BACKUP is used, a tape drive or Direct Access Storage Devices (DASD) is required.

Programming Requirements

Prerequisite products vary by operating system. This section shows the program requirements by operating environment. The *minimum* release level for each product is listed. Later releases that are available at announcement time are also supported unless stated otherwise.

Later releases that are not available at the announcement time are not supported, unless specifically stated otherwise.

The lists also show a *Program Products Required for Optional Functions* section to identify other program products you might need to use for certain functions. Consult the Licensed Program Specifications for each product shown for individual program requirements and prerequisites.

Prerequisite Software for VM: The following lists the program products with the minimum release levels required to support DB2 Server for VM, Version 7 Release 5:

- IBM z/VM (Program Number 5741-A05) Version 5 Release 2, or later

- DRDA-DUOW support requires APPC/VM VTAM Support (AVS), and Coordinated Resource Recovery (CRR) which are part of z/VM Version 5 Release 2, or later.

- DataPropagator Q Capture support requires C run-time library support provided by the appropriate level of the Language Environment for VM program product.

- DataPropagator Q Capture support requires MQ Series Client for z/VM support provided by the appropriate level of the VM program product.

- TCP/IP support requires TCP/IP for z/VM (5741-A05) Version 5 Release 2, or later and the C run-time library support provided by the appropriate level of the Language Environment® for VM (5688-198) program product.

- Stored procedures require the appropriate level of the Language Environment® for VM program product.

Prerequisite Software for QMF for VM: The following lists the additional program products with the minimum release levels required to support QMF for VM, Version 7 Release 2:

- GDDM/VMXA, Version 2 Release 3 (5684-007) or GDDM/VM, Version 3 Release 1.1 (5684-168)

The following lists the program products with the minimum release levels required to support optional functions for QMF for VM Version 7 Release 2:

- ISPF Version 3 Release 2 (5684-043)
- CHARTS (Interactive Chart Utility):

  GDDM — PGF (for GDDM/VMXA, Version 2 Release 3), Version 2 Release 1.1 (5668-812) or
  GDDM — PGF (for GDDM/VM, Version 3 Release 1.1), Version 2 Release 1.2 (5668-812)

- Callable Interface Programs using the callable interface can be written in:

  IBM C/370™ Compiler Version 2 (5688-187) and
  C/370 Library Version 2 (5688-188)

  IBM HLASM Version 1 (5696-234)

  VS COBOL II Compiler and Library Version 1 Release 4 (5688-023)

  VS COBOL II Compiler, Library and Debugging Facility Version 1 Release 4 (5668-958)

  AD/Cycle® COBOL/370™ Version 1 Release 1 (5688-197)

  IBM COBOL for MVS® and VM, Version 1 Release 2 (5688-197)

  AD/Cycle C/370 Compiler Version 1 Release 1 (5688-216)

  VS FORTRAN Version 2 Release 5 (5668-806)

  OS PL/I Version 2 (5668-909)

  IBM PL/I for MVS and VM, Version 1 Release 1.1 (5688-235)

  REXX (in z/VM) (REXX and the SAA® callable interface for FORTRAN are not supported in the QMF/CICS environment.)

IBM C/C++ for MVS/ESA™, Version 3 (5655-121) (with Language Environment for MVS and VM (MVS feature)).

- User Edit Routines can be written in:

  IBM HLASM Version 1 (5696-234)

  COBOL/370 Compiler and Library Version 1 Release 1 (5688-197)

  VS COBOL II Compiler and Library Version 1 Release 4 (5688-023)

  VS COBOL II Compiler, Library and Debugging Facility Version 1 Release 4 (5668-958)

  IBM COBOL for MVS and VM, Version 1 Release 2 (5688-197)

  OS PL/I Version 2 Release 3 (5668-909)

  IBM PL/I for MVS and VM, Version 1 Release 1.1 (5688-235)

- Governor Exit Routine:

  IBM HLASM Version 1 (5696-234)

Prerequisite Software for VSE: The following lists the program products with the minimum release levels required to support DB2 Server for VSE, Version 7 Release 5:

- Virtual Storage Extended/Enterprise Systems Architecture (Program Number 5690-VSE) Version 2 Release 6 Modification 3, or later

- As shipped, z/VSE consists of several base programs. DB2 Server for VSE makes use of the following base program that is shipped with z/VSE Version 3 Release 1, and later:

  – VSE/VSAM (part of VSE Central Functions Version 6 Release 6, or later)

- DataPropagator Q Capture support requires the Language Environment for z/VSE (5686-094) program product.

- DataPropagator Q Capture support requires CICS/VSE Version 2 Release 3 (5686-026) and MQ Series for VSE Version 2 Release 1 MODIFICATION 2 plus PTF UQ88412.

Optional:

- As shipped, z/VSE consists of several base programs. DB2 Server for VSE may optionally use the following base programs that are

shipped with z/VSE Version 3 Release 1, and later:

- CICS Transaction Server (Version 1 Release 1 Modificaton 1, and later) is required to support:
  - Interactive users
  - CICS transactions
  - Remote Unit of Work (RUOW) application server and application requester functions of Distributed Relational Database Architecture (DRDA) over SNA.
  - Distributed Unit of Work (DUOW) application server function of Distributed Relational Database Architecture (DRDA) over SNA.
- VSE/POWER (part of VSE Central Functions Version 6 Release 6, or later) is required for online environments doing report writing through ISQL
- VSE/ICCF (part of VSE Central Functions Version 6 Release 6, or later) is required for an interactive program development environment.
- ACF/VTAM® for z/VSE (Version 4 Release 2, or later) is requi red to support:
  - Remote Unit of Work (RUOW) application server and application requester functions of Distributed Relational Database Architecture (DRDA) over SNA,
  - Distributed Unit of Work (DUOW) application server function of Distributed Relational Database Architecture (DRDA) over SNA,
- TCP/IP for z/VSE, Version 1.4 Application Pak B, or later, is required to support Remote Unit of Work (RUOW) application server and application requester functions of Distributed Relational Database Architecture (DRDA) over TCP/IP.
- LE for VSE, Version 1.4.2, or later, is required to enable password encryption support.

The DB2 Server for VSE & VM licensed program will work with these products, and subsequent releases and modification levels, unless otherwise stated.

Any level of COBOL, PL/I, C, or Assembler current with the operating system can be used.

The level of FORTRAN required is one supported by the VS FORTRAN compiler with the LANGLVL(77) option specified or defaulted.

The Control Center feature for VSE requires:

- The run-time library for the IBM COBOL FOR z/VSE Version 1.1.0 (5686-068), or later
- REXX/VSE (part of VSE Central Functions Version 6 Release 3, or later)
- LE for VSE, Version 1.4.2, or later

Prerequisite Software for QMF for VSE: The following lists the additional program products with the minimum release levels required to support QMF for z/VSE, Version 7 Release 2:

- GDDM/VSE, Version 3 Release 1.1 (5686-057)

The following lists the program products with the minimum release levels required to support optional functions for QMF for z/VSE, Version 7 Release 2:

- CHARTS (Interactive Chart Utility):

  GDDM—PGF (for GDDM Version 3 release 1.1), Version 2 Release 1.2 (5668-812)

  GDDM—PGF (for GDDM Version 2 release 3) Version 2 Release 1.1 (5668-812)

- Callable Interface Programs using the callable interface can be written in:

  IBM C/370 Compiler Version 2 (5688-187) and
  C/370 Library Version 2 (5688-188)

  IBM HLASM Version 1 (5696-234)

  VS COBOL II Compiler and Library Version 1 Release 4 (5688-023)

  COBOL for z/VSE, Version 1 Release 1 (5686-068)

  PL/1 for z/VSE, Version 1 Release 1 (5686-069)

- User Edit Routines can be written in:

  IBM HLASM Version 1 (5696-234)

  VS COBOL II Compiler and Library Version 1 Release 4 (5688-023)

  COBOL for z/VSE, Version 1 Release 1 (5686-068)

PL/1 for z/VSE, Version 1 Release 1
(5686-069)

- Governor Exit Routine:

    IBM HLASM Version 1 (5696-234)

QMF Product Limitations in the CICS Environment: Some functions provided by QMF are dependent on underlying system services and other program products that are available in VM/CMS but not in CICS. The following commands require ISPF and are not available in CICS:

    ISPF command synonym
    DPRE command synonym
    BATCH command synonym
    LAYOUT command synonym
    EXTRACT command
    QMF command interface

Existing QMF V3 programs must be relinked.

These functions depend on REXX and are not supported by QMF in CICS:

- Report calculations
- Conditional formatting
- Column definition
- Procedures with logic

Other products not available in CICS:

- Document Interface

The EDIT PROC and EDIT QUERY commands are not available in CICS. However, it is possible to edit procedures and queries using the DISPLAY command with QMF.

QMF for Windows: Host software requirements are those required to run DB2 Server for VSE & VM.

Note: A single license of QMF for Windows feature of DB2 Server for VSE & VM allows access to an unlimited number of host and workstation databases, and provides for an unlimited number of clients.

QMF for Windows runs on 32-bit operating systems as follows:

- Microsoft® Windows 95

- Microsoft Windows 98
- Microsoft Windows NT®
- Microsoft Windows 2000
- Microsoft Windows XP

QMF for Windows can connect to DB2 for OS/390 Version 5, or later, through native TCP/IP, or to the SNA environments of that or other DB2 versions.

QMF for Windows CLI connectivity allows access to DB2 Personal Edition and requires the DB2 Universal Database Version 5.2 client. When connecting through CLI, you cannot run a DB2 stored procedure that returns multiple result sets, or bind static SQL.

For SNA connectivity, QMF for Windows requires an SNA/CPI-C product on each Windows client. These products are the interface between QMF for Windows and the APPC verb set used by the SNA environment to manage server/requester relationships.

QMF for Windows can install spreadsheet add-in buttons and menu commands for direct access from within Microsoft Excel Version 7, Microsoft Excel 97 or Microsoft Excel 2000.

The Java SQL query support provided with QMF for Windows requires an application server product that supports the Java servlet standard. Following is a list of supported application server products, although products not on this list that provide Java servlet support should also work. In addition, a JDBC driver providing connectivity to any of the database products supported by QMF for Windows is required on the application server platform. (Such a driver is included with the supported database products.)

For TCP/IP connectivity, QMF for Windows must be able to establish a TCP connection from the Windows workstation to the remote host and remote port (the port on which DB2 is listening). This can be established with many 32-bit WinSock products, including those provided with Windows 95, Windows 98, Windows NT, and Windows 2000. QMF for Windows requires a WinSock 1.1 interface to the installed TCP protocol stack.

Licensed Program Materials Availability

Restricted materials - Yes.

This licensed program is available with source licensed program materials for some modules designated as "RESTRICTED MATERIALS OF IBM." In addition, some modules are available without source licensed program materials. These modules are available in object code. The remaining modules are available with source licensed program material.

Additional Terms and Conditions

Licensing

This program is licensed under the conditions of the IBM Customer Agreement.

Supplemental Terms

Designated Machine Identification

Designated Machine Identification Required: Yes

Activation Key

- DB2 Server for VSE, Version 7 Release 5 when installed under z/VSE Version 3 Release 1, or later, has to be activated by entering an activation key, which is provided when DB2 Server for VSE, Version 7 Release 5 is ordered.

Testing period

- Basic license: None.
- DSLO License: None.
- 90-day trial period for users on z/VSE Version 2 Release 6 or higher.

Installation/Location License

- Not applicable. A separate license is required for each designated machine on which the licensed program materials will be used.

Usage Restrictions

- DB2 Server for VSE, Version 7 Release 5 uses an access/usage protection method that requires a key to enable the software function:

  The DB2 activation key will always be generated and delivered automatically from IBM whenever an order is placed for DB2 Server for VSE & VM, Version 7 Release 5.

In exceptional cases (off-line situations), it may be necessary to contact the IBM Registration Center by telephone, FAX, PROFS, mail or E-mail as appropriate. Please note, the IBM Registration Center cannot handle product/license orders. You may contact them only if you already have a license for DB2 Server for VSE & VM, Version 7 Release 5.

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For countries not listed above, please use
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LATIN AMERICA

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