Query Management Facility™

Introducing QMF

Version 7

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> **Note!**
>
> Before using this information and the product it supports, be sure to read the general information under
> "Appendix. Notices" on page 41.

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You can order manuals either through an IBM representative or by calling 1-800-879-2755 in the United States or any of its territories.

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The QMF library

Chapter 1. Overview of QMF

IBM® Query Management Facility (QMF) is a tightly integrated, powerful, and reliable tool that performs query and reporting for IBM's DB2® relational database Management System Family. It offers an easy-to-learn, interactive interface. Users with little or no data processing experience can easily retrieve, create, update, insert, or delete data that is stored in DB2.

QMF offers a total solution that includes accessing large amounts of data and sharing central repositories of queries and enterprise reports. It also allows you to implement tightly-controlled, distributed, or client/server solutions. In addition, you can use QMF to publish reports to the World Wide Web that you can view with your favorite web browser.

As companies have taken advantage of the productivity benefits offered through QMF they have identified the need for performance management tools within the QMF environment. QMF HPO for OS/390 is provided to enhance performance management and to facilitate the administration of QMF. This set of integrated performance tools consists of three features: QMF HPO/Manager, QMF HPO/Compiler and QMF for Windows®.

With QMF for Windows you can reuse existing QMF host objects (queries, forms and procedures) or create new objects from the Windows environment. You can also integrate query results with a variety of Windows desktop tools, such as spreadsheets and desktop databases.

QMF runs on the OS/390®, VM and VSE platforms. QMF for Windows runs on Windows 95, 98, NT and Windows 2000.

Data Access

Using QMF, users can access a wide variety of data sources, including operational or warehouse data from many platforms: DB2 for OS/390, MVS™, VM, VSE, and Windows. Via IBM DataJoiner, you can access non-relational data, such as IMS™ and VSAM, as well as data from other vendor platforms.

Performance, Administration, and Control

Database administrators can use the QMF High Performance Option (HPO) feature as an all-in-one tool to:

- Control resource usage
- Manage QMF objects

- Track object usage
- Delete obsolete objects
- Compile queries and reports into COBOL programs for improved performance

QMF HPO makes your database information a valuable, well-managed part of your company's assets.

QMF HPO

QMF HPO consists of three major components:
- QMF HPO/Manager
- QMF HPO/Compiler
- QMF for Windows

QMF HPO/Manager
The QMF HPO/Manager consists of a group of functions that improves governing and object management capabilities, including a preemptive governor to analyze QMF queries. The governing capabilities allow you to establish controls that protect production applications, while delivering "on demand" information. Many governing parameters are included. They include the following:
- Scheduling by time of day or day of week
- Maximum number of rows to fetch
- Allowing and disallowing SQL verbs and QMF commands
- Controlling resource consumption based on the use of QMF commands and SQL statements

QMF HPO/Compiler
The QMF HPO/Compiler lets you convert queries and reports into efficient programs in OS/VS COBOL or COBOL II. This reduces:
- CPU consumption
- DB2 catalog contention
- DB2 Optimizer overhead
- Security concerns because converted programs use static Structured Query Language (SQL) in place of dynamic SQL

QMF for Windows
For customers with DB2 databases of many sizes, QMF for Windows provides a Windows-based, point-and-click query tool.

With QMF for Windows, you can perform ad hoc queries or automate DB2 queries by using existing QMF queries and forms. You can also integrate the results into a favorite Windows OLE 2 desktop tool, such as a Lotus 1–2–3 or Microsoft® Excel spreadsheet.

QMF for Windows includes a robust Windows-based API to automate database querying, updating, and report distribution tasks, so you can centralize control over resource consumption.

QMF for Windows also provides support for key functions such as the following:
- TCP/IP
- Static SQL
- Creating and editing QMF forms and procedures
- Full-screen table editor for updating enterprise data

Application Development

Application developers can use QMF or QMF for Windows to prototype and build applications rapidly. Application programmers who write programs that use QMF or QMF for Windows can easily measure the benefits. Benefits can include higher productivity, increased efficiency, and lower costs that can result in increased business opportunities.

QMF for Windows Try and Buy

When you purchase and install DB2, you can choose to install QMF for Windows Version 7 for a trial period. QMF for Windows can be downloaded as a 60-Day try & buy from the QMF web site: www.ibm.com/qmf.

Chapter 2. What's New in QMF Version 7

QMF Version 7 provides new capabilities for the workstation environment and enhancements for the mainframe to help you access and present mission-critical data better than ever before.

Beginning with Version 6 and continuing with Version 7, QMF, QMF HPO, and QMF for Windows are features of DB2 on the S/390 platforms.

QMF Version 7 Enhancements

QMF Version 7 includes enhancements for data distributed data across the enterprise, for DB2 feature integration, and for ease of use. New features and support include:

DB2 Access and Connectivity

Distributed access to the entire DB2 family of server products is now available with the addition of support for:

- DB2 for VSE DRDA Remote Unit of Work Application Requester
- DB2 for AS/400 server, Version 4.4

DB2 Integration

DB2 features are now easily exploited with the addition of:

- Fully integrated support for the ROWID datatype
- Limited support for the LOB datatypes in the Table Editor, Prompted Query and, and the DRAW SQL Query. LOB lengths are restricted to a 32K byte maximum. SQL functions are introduced to cast LOB columns into character columns.
- Date and time edit codes (TD and TT) that adjust their report formatting characteristics automatically based on changes in the date or time format of the database system.
- Cross platform DRDA package binding that provides additional install and maintenance options for QMF on VM, VSE, and OS/390®

Usability

QMF ease of use is enhanced with the introduction of:

- New defaults for QMF commands that understand the current context. Working with the PROC, QUERY or FORM on the screen is easier with the RUN, SAVE, PRINT, EDIT, EXPORT, RESET, and CONVERT commands.

- Added flexibility and control of command options that accept quoted strings. There are now more ways to specify the string, and increased lengths are offered. Featured options are COMMENT for the SAVE and IMPORT commands, TEXT for the MESSAGE command, and FROM for the CICS command (transaction data).
- Direct navigation to the QMF Home panel using the SHOW command
- Online help upgrades to keep you informed and productive. These include upgraded command syntax diagrams that are more task focused. Using standard syntax format, defaults and abbreviations are clearly shown and definitions, descriptions, and examples are included. Help from the Home panel is maximized to present more information, while Help from panels other than the Home panel automatically adjust their size to use more space on larger terminals.

QMF HPO Version 7

QMF HPO Version 7 enhancements include:

- Enhanced tracking of QMF objects to support very large numbers of simultaneous QMF users
- Preemptive governing of QMF processes based on estimated ASU time
- Preemptive governing of QMF batch processes by the QMF HPO/Manager
- Binding of programs generated by QMF HPO/Compiler into packages in addition to or instead of plans

QMF for Windows Version 7 Enhancements

QMF for Windows Version 7 enhancements include:

User interface

- QMF for Windows now natively supports multiple display options for query results, including aggregation, grouping, and formatting, all available via drag-and-drop and right-click menus
- Resulting display options can be converted to QMF form definitions
- An enhanced object list window, with a Windows-style tree control, allows more intuitive navigation and location of QMF objects
- Job schedules (by calendar, time of day, and more) may now be created from within QMF for Windows
- Java-based querying from a browser is available with Java® servlet support

- QMF Report Center (previously a separate download named ″Personal Portal″) now ships with QMF for Windows as an optional install
- Option to use DB2 Forms (if installed) is available when the QMF for Windows Table Editor is invoked
- More command icons available to customize the toolbar
- DB2 passwords can now be ″remembered″ when running on Windows NT
- Query results may be sorted on more than one non-contiguous column, and by day-of-week or month-of-year order
- QMF for Windows objects are now integrated with the Data Warehouse Center object library

Database connectivity for distributed applications
- Support for stored procedures that return multiple results sets via the CLI interface
- Large object support
- Enhanced support for DB2 for OS/390® data sharing
- Display of CLI-specific information when there is a CLI connection to the server
- New trace options include CLI, TCP/IP, embedded SQL, SQLAM, REXX, CPI-C, and DDM

QMF host support
- All types of QMF host procedures are now supported, including procedures with REXX logic
- A new docking toolbar is available for entering and issuing single QMF commands
- Form Conditions and Form Column Definitions are now supported
- The RESET GLOBAL command is now supported
- PF keys are now defined to match QMF host

National language support
- 19 language translations, now including Belgian French, Canadian French, Portuguese, Swiss Italian, Arabic (with bidi support), and Traditional Chinese
- UNICODE

For more information about the QMF Family of integrated tools, go to the following QMF web site:

```
http://www.ibm.com/qmf
```

The information at this web site includes a QMF Family demo and a QMF for Windows try and buy.

Chapter 3. QMF Gives You Broad Data Access

Your organization's relational databases contain a wealth of information. Decision makers, at every level of the organization, usually need to access a variety of data sources to make important day-to-day decisions quickly.

Thousands of companies across many industries have based their business intelligence on QMF. That's because QMF lets you create and share mission-critical business knowledge throughout the enterprise and deploy robust, reliable business intelligence on nearly any scale you choose. Access any DB2 data or beyond with DB2 DataJoiner®, and integrate with Windows desktop tools or the Web. QMF's multi-platform options help you get the most out of your investment no matter where your data is stored. It doesn't matter whether your data is operational or informational (data warehouse or datamart).
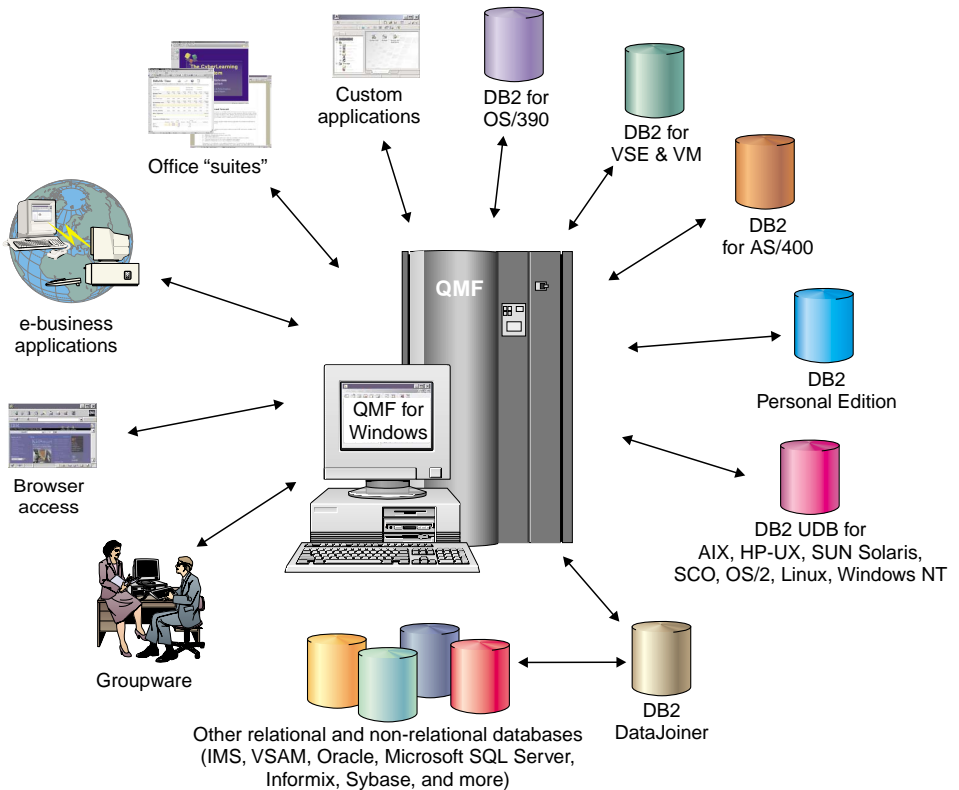
Chapter 4. QMF Provides Results in Four Easy Steps

QMF gets the data you need from a relational database and presents it in an effective report or chart. As shown in the illustration below, data access and presentation are as easy as 1–2–3 with QMF objects. After you format your data as desired, you can browse or print it.

4. Browse/Print formatted data

3. Customize the format of the data

2. Database obtains the answer set

1. Build and save your question

Report

Form

Data

Chart

Query

Web
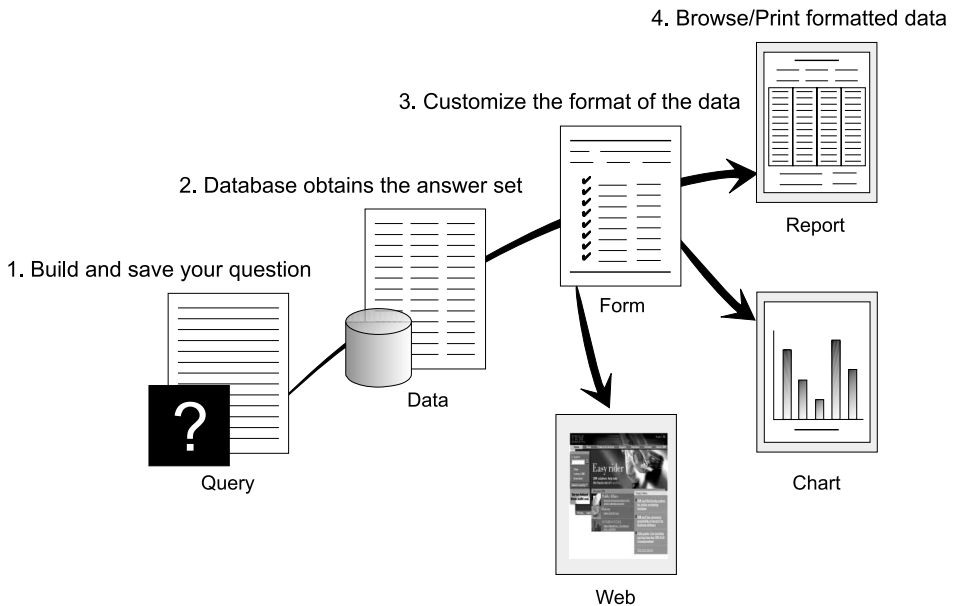
(1) When you need information from your database, build and save your question in a QMF query. Your query acts as a request to the database to get specific information. (2) QMF sends the query to the database in structured query language (SQL), and the database creates the answer set. (3) QMF uses a default report format so you can see the results quickly. To see the data in a more tailored format, you can use various form specifications to customize your report. (4) You can then browse, print, chart, or export the formatted results. Or, you can include it in your own custom application.

Chapter 5. QMF Offers Different Query Styles

QMF offers three different query styles for users with different skill levels:

Prompted Query

An easy-to-use query method that prompts you for the necessary information while building a query. The illustration below shows a partial QMF prompted query.

Prompted Query is designed for the beginner and occasional QMF user who wants to build a query but does not know SQL. You do not need to worry about getting syntax or table and column names exactly right. QMF guides you through the steps you need and checks to ensure that the statement you build is valid.

As you build prompted queries, you can use the Show SQL function key from the Prompted Query panel to see the equivalent of your prompted query in SQL. Show SQL is an easy way to learn SQL. In addition, you can build a prompted query and convert it to SQL with the QMF CONVERT command. After you convert a prompted query to SQL, you can choose to add additional SQL capabilities.

```
PROMPTED QUERY                                  MODIFIED  LINE   1
                        +-------------------------------------------+
  Tables:               |                Row Conditions             |
    Q.STAFF             |                                           |
                        | Begin a condition by selecting one column,|
  Columns:              | or by entering an expression or function. |
    NAME                |                               1 to 8 of 8 |
    DEPT                |      *   Q.STAFF                           |
    JOB                 |      2.   ID                               |
    SALARY              |      3.   NAME                             |
    COMM                |      4.   DEPT                             |
                        |      5.   JOB                              |
  Row Conditions:       |      6.   YEARS                            |
  > If...               |      7.   SALARY                           |
                        |      8.   COMM                             |
  *** END ***           |                                           |
                        |   Expression (A+B, and so forth)...       |
                        +-------------------------------------------+
                        | F1=Help  F5=Describe  F7=Backward         |
                        | F8=Forward  F12=Cancel                    |
                        +-------------------------------------------+
```

Structured Query Language (SQL)

A language that describes your requests for data in the database.

SQL statements consist of verbs and clauses that describe aspects of the data request in more detail. If you are already familiar with SQL, QMF makes it easy for you to issue SQL statements straight to the

database by using the SQL Query panel. You can issue any dynamic SQL statement from the query panel. The DRAW command helps by displaying model or prototype SELECT, INSERT, or UPDATE queries. You can build on these queries if you do not know the exact syntax of an SQL statement.

The illustrations below show a simple and a more complex SQL query.

Simple SQL Query

```
SQL Query                              MODIFIED  LINE   1

 SELECT NAME, YEARS, SALARY
   FROM Q.STAFF
   ORDER BY NAME
```

Complex SQL Query

```
SQL Query                              MODIFIED  LINE   1

 (SELECT ID, NAME, SALARY
    FROM Q.STAFF
    WHERE SALARY>12000
UNION ALL
SELECT ID, NAME, SALARY
    FROM Q.STAFF
    WHERE DEPT=38)
UNION
SELECT ID, NAME, SALARY
    FROM Q.STAFF
    WHERE JOB='SALES'
```

Query-By-Example (QBE)

A graphical method to query, update, delete, or insert data. The illustration below represents Query-By-Example.

QBE minimizes your keystrokes and saves you time when entering a query. Start by using the DRAW command. QMF presents the table and the column names for you. Then, simply enter a single letter beneath each column to indicate the action you want to perform on that column.

```
Q.STAFF | ID | NAME | DEPT | JOB | YEARS | SALARY | COMM |
--------+----+------+------+-----+-------+--------+------|
        | P. | P.   |      |     | P. _Y | P. _S  |      |
|          CONDITIONS         |
|-----------------------------|
| _Y = 10 AND _S > 20000      |
```

Chapter 6. QMF Creates Reports and Charts to Fit Many Business Needs

The ability to present your data effectively and quickly is just as crucial as being able to access it efficiently and reliably. Use QMF to present your data effectively in a wide variety of reports and charts. QMF provides extensive control over how you place or present your data.

Reports for Success

QMF enables *you* to determine what is important for your reports and provides you the capability to format it for display. A sample of a report that you can produce using the form function in QMF is shown below.

```
REPORT                                       LINE 1     POS 1


              <----------------- JOB ------------------>
              <-- CLERK -->  <--- MGR --->  <-- SALES -->  <-- TOTAL -->
                    SUM            SUM            SUM            SUM
      DEPT       SALARY         SALARY         SALARY         SALARY
      ------   -----------    -----------    -----------    -----------
        10                     $83,463.45                    $83,463.45
        15    $24,766.70       $20,659.80     $16,502.83     $61,929.33
        20    $27,757.35       $18,357.50     $18,171.25     $64,286.10
        38    $24,964.50       $17,506.75     $34,814.30     $77,285.55
        42    $22,014.50       $18,352.80     $18,001.75     $58,369.05
        51    $27,829.80       $21,150.00     $37,111.00     $86,090.80
        66    $10,988.00       $18,555.50     $56,532.70     $86,076.20
        84    $13,030.50       $19,818.00     $33,298.50     $66,147.00
              ===========    ===========    ===========    ===========
             $151,351.35      $217,863.80    $214,432.33    $583,647.48

                          COMPANY NAME
```

QMF has the functionality and flexibility to enable you to develop robust reports with clarity and impact.

Customized Reports

Creating custom reports with QMF is easy. You start with a template report that has default column headings and a tabular layout. You can tailor the default report easily using QMF forms that control different detail areas of the report.

With QMF forms, you can do the following:
- Group information into categories
- Generate summary columns
- Add page headings and footings

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- Change column headings
- Perform calculations on your data and display the results
- Display data as freeform text
- Put tabular (columnar) data from one row on more than one line
- Combine text lines with tabular data
- Produce address labels, form letters, and complex, detailed reports

When you make changes to a form, you can see the results immediately on the report without having to fetch information from the database repeatedly.

You can toggle back and forth between the form and the report and make changes to the form until it is just the way you want. Then, you can save the form for future use or as a prototype for creating other reports. Just save a new report under a new name.

QMF's user interface is easy to understand and use for formatting a report. The following example shows a typical report form.

Entry areas **A** through **J** correspond to the entry areas on the FORM.MAIN panel in QMF. If all the columns in the form are not visible on the panel, you can scroll forward and backward to see the ones you want.

```
FORM.MAIN                                        MODIFIED

COLUMNS:              Total Width of Report Columns: 23 + (N X 15)
              A                      B       C      D       E     F
NUM   COLUMN HEADING                USAGE   INDENT  WIDTH   EDIT  SEQ
---   ----------------------------  ------- ------  -----   ----- ---
  1   DEPT                          GROUP   2       6       L     1
  2   JOB                           ACROSS  2       5       C     2
  3   SALARY                        SUM     2       11      D2    3

  PAGE:      HEADING  ===>            G
             FOOTING  ===> COMPANY NAME
  FINAL:     TEXT     ===>            H
  BREAK1:    NEW PAGE FOR BREAK? ===> NO
             FOOTING  ===> DEPT. &2 TOTALS      I
  BREAK2:    NEW PAGE FOR BREAK? ===> NO
             FOOTING  ===>
  OPTIONS:   OUTLINE? ===> YES      DEFAULT BREAK TEXT? ===> NO       J

1=Help      2=Check     3=End     4=Show      5=Chart      6=Query
7=Backward  8=Forward   9=        10=Insert   11=Delete    12=Report
OK, FORM.MAIN is displayed.
COMMAND ===>                                       SCROLL ===> PAGE
```

QMF forms let you easily create and customize reports.

With these entry areas, you can do the following:

A   Assign column headings
B   Choose how to process columns
C   Adjust indentation of columns
D   Adjust width of columns

E Specify formatting of columns
F Change the sequence of columns
G Specify a heading and footing for the top and bottom of each page
H Specify the final text at the end of the report
I Enter footing text to use when the value in the control column changes
J Specify the formatting of repeated values within a control break

## Reports on the World Wide Web

You can specify HTML output for reports you create with QMF. This makes it possible to display your reports in an HTML V3.0 compatible web browser either in an intranet or on the World Wide Web. QMF adds an HTML header to your report and inserts the necessary HTML tags to display the report in its original QMF format in the web browser.

Charts for Success

Using QMF with IBM's Graphical Data Display Manager (GDDM) and GDDM's Interactive Chart Utility (ICU), you can choose from this wide variety of charts and graphs for presenting your data:

- Bar
- Pie
- Line
- Tower
- Polar
- Histogram
- Surface
- Scatter

Following is a sample of a chart that you can define and produce using QMF. *QMF and GDDM ICU provide clear, precise charts.*
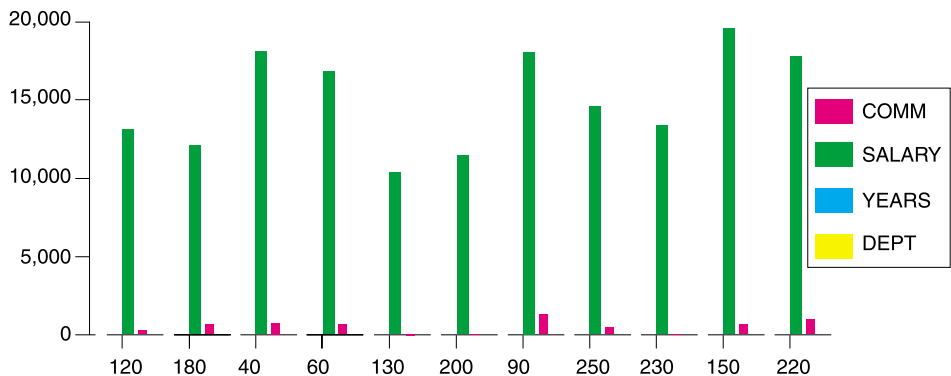
Chapter 7. QMF Extends its Power to Your Applications

QMF provides two interfaces, a command interface and a callable interface, that allow you to seamlessly integrate the powerful functions of QMF into your existing applications.

QMF offers you a high level of versatility in terms of integrating QMF with your applications. You can build sophisticated application suites by using the callable interface and a variety of supported programming languages.

The Command Interface

QMF provides a command interface to integrate QMF functions into applications you develop. The QMF command interface allows you to use QMF services from an Interactive System Productivity Facility (ISPF) dialog.

Using the QMF command interface with ISPF, you can seamlessly integrate QMF functions within ISPF dialogs so users see only ISPF menus.

The Callable Interface

The callable interface offers you the ability to integrate QMF functions by using different programming languages or ISPF. The languages you can use include COBOL, PL/I, REXX, C, RPG, and Assembler H.

Using REXX in QMF

For more robust programming needs, use QMF with the simple yet versatile and powerful REXX programming language. QMF supports REXX in both the OS/390 and VM environments. REXX is an interpreted programming language that runs immediately without the need for compilation and is directly available from within QMF forms and procedures. Outside QMF, applications written in REXX can use QMF's query and report-writing function through the callable interface.

QMF does not need to be running when a REXX program is started. Through the callable interface, a REXX program can initiate a QMF session. By directing QMF commands to QMF for execution, a REXX program can run queries, create reports, export and import data, or start an interactive table editing session with QMF's Table Editor. A REXX program can end the QMF session and continue processing the information. Using the callable interface, you can also start an application while you are running QMF. Your application can run QMF commands, queries, or procedures and retrieve the

results. For example, your application can generate a letter to each employee that is based on a combination of job type and years of service.

Creating QMF Procedures

There are two ways to write QMF procedures to run a series of instructions. Linear procedures contain only QMF commands; procedures with logic use the full power of REXX within the QMF environment.

Following is an example of a QMF procedure that contains REXX statements. *It is easy to build a REXX procedure by using QMF!*

```
PROC       MODIFIED LINE 1

/* This procedure checks to see what day it is.  If it's
   Monday, it runs a query and prints a report.  If it
   isn't, a message is displayed informing the user.   */
signal on error
if date('w') = 'Monday' then
  do
    "RUN QUERY MYQUERY (FORM = MYFORM"
    "PRINT REPORT"
    "MESSAGE (TEXT='OK, MONDAY report has been created and sent to printer.'"
  end
else
  do
    "MESSAGE (TEXT='Sorry, it is not Monday.  Report cannot be created.'"
  end
exit 0   /*Exit without errors */
error:
  "MESSAGE (TEXT = '"dsq_message_text"'"
  exit 8  /*Exit with error condition*/
*** END ***
```

You can create procedures with logic that include any REXX command or function and make calls to the operating system or other available environments. In a procedure with logic, you can perform conditional logic, make calculations, or pass commands back to the host environment. You can even include both QMF and REXX variables, so you can change the behavior of your procedure without rewriting it. You just assign new values to the variables by using global variable values, by entering values from the RUN command when the procedure is started, or by prompting the user for input values using REXX Say and Pull statements.

The QMF procedure object helps you automate common tasks or tasks you perform frequently. A QMF procedure can contain many different QMF commands. You can run all of the commands in sequence by simply issuing the RUN PROC command.

Users can even be prompted for variable data while running a procedure to customize the results with very little effort.

Suppose that you need the same type of information or report each week. You can create and save a procedure that uses saved queries, forms, and procedures repeatedly. Or, you can substitute variables to make variations for different results.

The more queries, forms, and reports that you can automate in QMF, the more time you save.

To make things even easier and increase productivity, you can customize a function key to run a procedure with a keystroke.

QMF provides a special procedure that is called a system initialization procedure that allows you to run commands or define global variables when QMF starts up. This allows you to customize default values that QMF uses and run commands or other procedures automatically. You can include any QMF command in the system initialization procedure.

Customizing QMF Commands and Function Keys

QMF supplies several aids that simplify application development. Within applications you develop using QMF, you can customize the QMF command set and function keys to suit the needs of your application users.

Because QMF stores user preferences in a profile for each user, you can customize commands and function keys for individual users.

QMF's powerful command synonym function allows you to rename QMF commands and even create your own installation-specific commands that suit your specific needs. You may have several different types of printers in your installation, and each time you need to print a report or chart, you need to specify the printer name, the length and width of the page, and other parameters that tell the printer what to do with the input. Using QMF, you can create a smart command synonym called PRINT that invokes the proper printing application and routes the output to the appropriate printer with the appropriate page size and parameters.

Customizing Other QMF Functions

The ability to customize does not stop at commands and function keys. You can do the following:

- Change edit codes to format data
- Use the MESSAGE command to define a message that appears on a QMF object panel when your application ends
- Use ISPF, GDDM, or another panel manager to do the following:

- – Create application panels that run complex queries and produce customized reports
- – Create panels that prompt the user for necessary information, such as date and type of report wanted, so that a user with very limited knowledge of QMF can easily use QMF's query and report writing facilities
- – Create panels to provide your application with online help that is similar to the help that is provided by QMF

QMF provides a default governor exit routine that limits processor use for a query, as well as the number of rows that are returned from the database. You can replace this default governor exit routine with your own customized routines to control resource utilization or gather QMF usage information. You can use the QMF HPO/Manager feature for a sophisticated system that includes the following:

- An object manager and governor to track and control QMF session activity
- An online monitor that tracks QMF activities in real time
- A query analyzer
- A preemptive governor

Using Variables in Queries and Forms

Variables allow you to produce a variety of reports with the same form. A query can also use variables to retrieve or change different data each time the same query is run.

A variable is a symbolic name that represents values in a query, form, or procedure. QMF offers two types of variables: *Substitution variables* and *global variables.* You can use both types of variables in queries, forms, and both types of procedures.

Substitution variables keep their values only for the duration of a command; global variables keep their values for the duration of a QMF session.

Chapter 8. QMF's Table Editor Makes Database Updates Easy

Using the QMF interactive Table Editor, you can easily search the database for information and add or update data in the database. The Table Editor has three modes: SEARCH, ADD, or CHANGE.

The Table Editor enables quick searching, adding, deleting, and updating of rows in any accessible table without requiring you to write a unique application. The Table Editor also supports default column values when a default is available. The following is a representative panel.

The QMF Table Editor lets you make database changes easily.

```
ADD                USERID.PERS

                                            1 to 7 of 7
ACCTNO. . . . . . . . (_15002__)
COMPANY . . . . . . . (_S & J Supply Co._____)
STREET. . . . . . . . (_948 C Street_____)
CITY. . . . . . . . . (_Boston_____)
STATE . . . . . . . . (_MA_)
ZIP . . . . . . . . . (_06000__)
NOTES . . . . . . . . (_-_____>
```

Editing data is as easy as typing over the values on the Table Editor panel. Confirmation panels help ensure security and integrity by prompting the user before making updates final. For extra security, you can also use column-level authorization to control exactly which columns of a table a user can view or change.

In QMF for Windows, you can edit a table at a database server by making changes to cells displayed in query results. QMF for Windows determines the table to edit from the SQL text for the query. You can update the results of most queries that you can run with QMF for Windows.

Chapter 9. QMF Provides User Profiles and Online Help

QMF allows you to do the following:
- Personalize both your QMF profile and your system initialization procedure
- Display online help

Personalizing Your QMF Profile and Your System Initialization Procedure

As a QMF user, you can personalize your own QMF profile with individual preferences for working with QMF. For example, you can choose whether you want QMF to convert all input to uppercase letters, and you can specify which language, SQL, QBE, or PROMPTED, you want to use. You can also specify a printer name with print parameters for printing reports and charts. You can change the preferences in your profile as often as you want.

In addition to the QMF profile, QMF provides a system initialization procedure to allow system administrators to set QMF global variables and run QMF commands at start up. You can override the global settings that are defined in this procedure at any time.

Using Help

The online help provided from any QMF panel provides information to support every aspect of QMF.

From the main help menu, you can choose topics such as *What's New, Learning about QMF, QMF Commands*, and much more. There is no need for lengthy and expensive training. A new user can simply use *Learning about QMF* as a training tool to get up and running quickly, or as a reference at any time during a QMF session.

QMF also provides messages and help for SQL codes. The help for these messages includes both an explanation of the message and a recommended user response.

Chapter 10. QMF Provides Performance and Administration Features

To keep your ad hoc query and reporting environment running smoothly, QMF supports your performance management needs and provides features that help you manage and control your QMF query environment.

QMF's governor exit controls the number of rows returned from the database and, in the TSO and CMS environments, the amount of processor time a query can use.

The QMF High Performance Option (HPO) for OS/390 feature builds on QMF's performance and QMF control capabilities. QMF HPO includes these three components:
- QMF HPO/Manager
- QMF HPO/Compiler
- QMF for Windows

QMF for Windows manages your queries from the Windows environment, while QMF HPO/Manager controls queries from the QMF host environment. Together they provide comprehensive governing over QMF tasks submitted in OS/390 and Windows environments.

QMF HPO/Manager

QMF HPO/Manager is a family of utilities for managing and administering QMF. The QMF HPO/Manager comprises these integrated components:
- Governor Module
- Activity Log
- Online Facilities

Governor Module

Completely replaces the QMF sample governor and is the direct interface into QMF processing for the QMF HPO/Manager. This enhanced governor module is more than a QMF governor because it services the following facilities:

Object Manager

Tracks QMF session activity. It records information about the commands and objects and writes this information directly to the Activity Log.

Have you ever wanted to know which QMF queries refer to a specific column name before you drop that column from the table? Or, which QMF queries refer to a specific table before you alter that table? Now you can produce lists of QMF objects that are based on the content of the object. Object Manager has a new list filter that allows you to locate queries that contain references to specific table names, column names, SQL verbs, and so on. Object Manager supports the migration and copying of objects from and to QMF Version 7. Specifically, it recognizes and handles the new columns in the OBJECT_DIRECTORY appropriately.

All Q.PROFILES environment values are supported, including CICS/MVS® and CICS/VSE® and CMS.

Governor

Controls QMF session activity. It obtains thresholds and controls from resource groups in the same way as the QMF sample governor, but provides a much wider and more flexible set of controls. These controls enforce proper use of resources in QMF sessions.

Monitor

Supplies a real-time user interface to QMF session activity information. It accepts administrator commands and passes them to the Governor Module.

Query Analyzer

Provides preemptive governing capabilities. It traps queries before DB2 processes them, and estimates their resource consumption. Query Analyzer can cancel queries that it judges to be too intensive.

Activity Log

Provides a repository for QMF session activity and QMF object usage information. The Governor Module writes directly to the Activity Log data sets. You must run a batch job periodically to copy the Activity Log data sets to the Activity Log tables. You can use the Activity Log JCL function to create the JCL to run this batch job.

Online Facilities

Help organize and simplify the administration and management of QMF HPO. You can review and manipulate QMF objects by using the Object Manager online facilities. Two types of actions are supported: Those that operate on one object and those that can operate on a set of objects.

The QMF HPO/Manager helps you isolate production applications from query and reporting activities. A session activity list (shown below) gives administrators essential facts about database activity, the number of rows that are fetched, and processor time consumption.

QMF HPO/Manager puts you in control.

```
DB2A -- Session Activity List --------------------------------ROW 1 TO 5 OF 5
COMMAND ===>                                        SCROLL ===> CSR
RAAM018I--monitor data refreshed
Valid Actions Are...
B  Browse SQL Text
C  Cancel Current Action
rows that are fetched
TSOID : VNDRSTRW
Mode  : ONLINE                                                        C S
                     QMF Object  Object                               A Q
A Date     Time     Act Owner    Name                  Rows    CPU    N L
- -------- -------- --- -------- ----------------- ---------- ----------- - -
  96/09/02 07:47:52 BEG                                    0            0
  96/09/02 07:47:52 RUN VNDRSTRW MODELING                  0            0
  96/09/02 07:48:01 *** VNDRSTRW MODELING                100 00 00 00 23 0 Y
  96/09/02 07:48:01 *** VNDRSTRW MODELING               1733 00 00 03 69 0
  96/09/02 07:48:01 *** VNDRSTRW MODELING               3330 00:00:07:20 0
****************************** BOTTOM OF DATA ******************************
```

Using the QMF HPO/Manager session activity list, QMF administrators can easily browse the SQL text associated with a query or cancel an active QMF command with database activity.

QMF HPO/Compiler

QMF HPO/Compiler is a family of system utilities for generating, preparing, and running report programs for QMF. The QMF HPO/Compiler feature:

- Reduces resource contention by optimizing resource-intensive queries, forms, and procedures.
- Converts dynamic SQL to static SQL, which helps reduce DB2 catalog contention and DB2 optimization overhead. The compiled applications run faster and more efficiently, lowering your production costs.
- Converts queries, reports, and procedures into efficient OS/VS COBOL and VS COBOL II programs, generating structured, stand-alone, documented source code that is easy to modify and portable to other platforms. Using a COBOL precompiler, you can run the program on a personal workstation for use with DB2 Common Server or other OS/2-based database management systems.

The QMF HPO/Compiler contains these integrated components:
- Program Generator
- End User Facility

Program Generator

Used by programmers to convert QMF reports (queries, forms, and procedures) into compiled programs. In addition, this facility can automatically register report programs with the End User Facility.

CICS programs are completely pseudo-conversational. They appear to the user as a continuous conversation, but actually consist of multiple tasks. As with TSO programs, you can generate two types of CICS programs:
- Display programs
- Print programs

End User Facility

Used by end users to run the compiled report programs. When programs are generated and prepared for running, they are automatically registered with the End User Facility. After programs are registered, the nontechnical user interface makes it easy to list, locate, and process reports.

After selecting a report, the end user is prompted to supply any run-time variable values. If the report is to run in batch mode, JCL is automatically generated and optionally submitted. Otherwise, the interactive report is run online in the appropriate environment, TSO or CICS.

QMF for Windows

QMF for Windows is a component of QMF HPO. You can also order it as a QMF feature for OS/390, VM, or VSE, or as a direct feature of DB2 for OS/390.

QMF for Windows Benefits

QMF for Windows provides benefits for the user, the developer, the database administrator, and the enterprise.

For users
- Point-and-click your way to robust business reports
- Publish reports to the Web
- Automate tasks with QMF procedures
- Integrate data with favorite Windows applications, such as spreadsheets and analysis tools
- Launch QMF for Windows from within Lotus® 1-2-3® and Microsoft Excel
- Query multiple database servers simultaneously
- Export data easily to desktop databases
- Use query results to create DB2 tables

- Create new or edit DB2 data directly in the Table Editor
- Share reports, queries, and forms among all the QMF end-user platforms: Windows, OS/390, MVS, VM, or VSE
- Experience outstanding data throughput and reliability at your Windows desktop

For administrators

- Maintain comprehensive governing control over database resource consumption and user actions
- Automatically limit runaway queries, database updates, access to specific database servers, rows fetched, and much more
- Schedule governing limits by user group and time of day / day of week
- Maintain existing DB2 security and authorizations
- Connect users to multiple DB2 database platforms without database gateways, middleware, or ODBC drivers
- Access heterogeneous data through IBM's DataJoiner
- Get up and running in minutes with native support for TCP/IP connectivity in DB2 Version 5 or later
- Extend advanced database techniques like static SQL and uncommitted read to Windows
- Reduce TSO, CMS, and CICS host logons
- Give users the flexibility of supporting their other favorite Windows tools
- Use the QMF for Windows API to leverage desktop development tools (such as application macros, Visual Basic™, Powerbuilder, and more)
- Rapidly build robust custom applications - Easily place QMF capabilities, commands, and host QMF objects in the hands of Windows-based users
- Add additional users any time through server-based licensing

For the enterprise

- Year 2000 ready
- Quickly extend QMF investment to new user environments
- Establish an enterprise-wide standard for operational reporting with a multi-platform product family
- Provide controlled, enterprise-wide access to DB2 S/390® and DB2 UDB workstation platforms (and many other enterprise databases when using IBM's DataJoiner)

- Distribute mission-critical DB2 capabilities to desktops throughout the enterprise - Leverage high-performance DRDA® architecture that supports:
- Centralized administration and control
  - Local or remote 16- and 32-bit Windows clients
  - Large-scale report publishing to Web servers
  - TCP/IP or SNA environments for DB2 S/390 and DB2 UDB workstation database platforms

# Chapter 11. QMF Accommodates Your International Business Needs

QMF can accommodate business needs distributed all over the world. There are 19 languages from which you can choose (see the map below). The number of national languages you can select depends on the platform under which you are running QMF. Each language is a separately-orderable feature called a National Language Feature, or NLF. An NLF enables users to enter QMF commands, view help and other information, and perform QMF tasks in a language other than English.

For applications that call QMF running from an NLF session, bilingual forms and bilingual commands are supported. This allows wider portability of forms and applications among the QMF national languages.

In a QMF NLF session, you can choose to save or export a form in either the language of the current QMF session or in English. A QMF session running in another national language can import a form that was saved in English. QMF translates the form into the presiding language of that session. QMF supports the double-byte character set.

Regardless of the presiding NLF language, you can issue QMF commands in English by setting the QMF command language global variable. This global variable acts as a switch that lets you issue commands either in the presiding language of the QMF session that you are running or in English.
QMF takes you around the world!
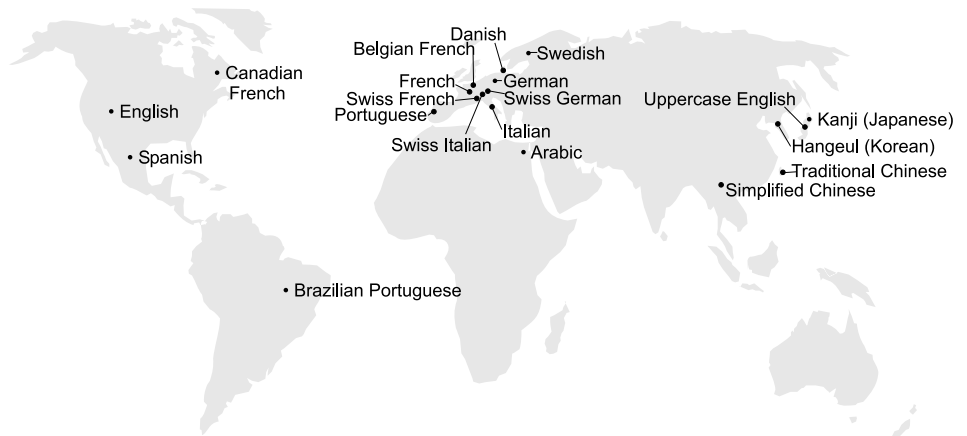
Chapter 12. Product Specifications

The following are minimum requirements for supporting QMF and its family of products. For further information, please contact your IBM representative or the IBM Support Service Center (toll-free) at 1-800-237-5511 in the United States or any of its territories.

Prerequisite Knowledge

The *Using QMF* book contains basic QMF information. You should understand the concepts in that guide before you use QMF. *Using QMF* contains the steps necessary to get started with QMF and the descriptions of how to use SQL queries. It also contains detailed scenarios that show how to build queries and forms step by step. In addition, it contains detailed information about Query-By-Example.

Machine Requirements

Server hardware requirements are the same as those required to run DB2 PE, DB2 Common Server, DataJoiner, or DB2 UDB.

Workstation hardware requirements are the same as those needed to run the Windows software as described in "Software Requirements" on page 38.

QMF for Windows for DB2 workstation databases requires approximately 10MB of free disk space on each Windows workstation, and about the same memory as needed by a typical Windows suite application.

DASD or Tape

QMF can access all storage devices that the operating system and DB2™ supports.

Data Communications Devices

QMF can display on all terminals that GDDM® supports.

Virtual Storage Considerations

Storage requirements vary depending on the operating environment. See the *QMF Licensed Program Specifications*, or consult your IBM representative for hardware and software requirements.

Software Requirements

Prerequisite products for supporting QMF vary by operating system. Your IBM representative can help you determine if you have the correct hardware and software to support QMF and related IBM products.

QMF for Windows runs on:
- Microsoft Windows 3.1
- Microsoft Windows for Workgroups 3.1 or 3.11
- Microsoft Windows 95 or Windows 98
- Microsoft Windows NT®
- Microsoft Windows 2000
- WIN-OS/2® environment under OS/2

Operating Environment for QMF HPO Features

The QMF HPO/Compiler for MVS runs only under TSO/ISPF, but generates programs that run under TSO/ISPF, batch, or CICS.

The QMF HPO/Manager for MVS runs only under TSO/ISPF (with the exception of the enhanced Governor Module supplied with the feature, which runs under TSO/ISPF, batch, or CICS). See your IBM representative for specific recommendations on using QMF HPO/Manager.

The 16–bit version of QMF for Windows runs in Microsoft's Windows 3.1 and Windows for Workgroups 3.1 or 3.11. The 32–bit version of QMF for Windows runs in Microsoft's Windows 95, Windows 98, and Windows NT 3.51 or 4.0.

The 16-bit version can run as a Win-OS/2 application under OS/2 Warp when communications options are installed. QMF for Windows 16–bit and 32–bit versions can connect from the Windows environments via TCP/IP to versions of DB2 that support native TCP/IP connectivity, such as DB2 V5 and the DB2 Universal Database® family. For versions of DB2 that do not provide native support for TCP/IP, additional SNA connectivity software products are required. See *Getting Started with QMF for Windows* for more information about the QMF for Windows operating system and its connectivity requirements.

Chapter 13. Customer Service and Technical Support

Central service for QMF and its features is provided through the IBM Support Service Center. The toll-free numbers are 1-800-237-5511 and 1-800-IBM-4YOU in the United States or any of its territories.

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Introducing QMF
Version 7

Publication No. GC27-0714-00

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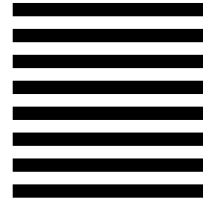
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