IBM MQSeries Workflow Version 3.2.2 Simplifies e-business

Overview

The MQSeries® Workflow Version 3.2.2 program features the key customer requirements to implement and execute business processes for e-business scenarios such as business-to-business solutions (B2B) or business-to-consumer (B2C) solutions. Also, it now supports Windows™ 2000. MQSeries Workflow provides the infrastructure your organization can trust and rely on to run the business processes that support your e-business engagement. With MQSeries Workflow, your organization will become an "Adaptive Enterprise," because MQSeries Workflow takes over the management of your business processes, while you concentrate on the core business.

MQSeries Workflow is the workflow solution of your choice because it:

- Scales from Windows NT™ up to OS/390® servers
- Supports the invocation of applications with or without human interaction on a huge number of different platforms
- Allows you to integrate all types of applications, even CICS® and IMS™ transactions as safe applications, and running on OS/390
- Exchanges data using XML
- Lets applications start processes, or processes start applications
- Relies on MQSeries Messaging for state-of-the-art communications
- Secures transaction safety
- Uses DB2 Universal Database® (UDB) as runtime database

MQSeries Workflow is used to design, document, execute, control, improve, and optimize the business processes; you can focus on the organization’s key objectives. After modeling your business processes with the MQSeries Workflow Builder, the MQSeries Workflow Runtime executes these processes by navigating through the workflow models.

Key Prerequisites

Version 3.2.2 will be available on:
- AIX®, HP-UX, Sun Solaris, OS/2®, Windows NT, or Windows 2000 for the servers
- AIX, HP-UX, Sun Solaris, OS/2, Windows NT, Windows 2000, or Windows 98/95 for the client APIs
- Windows NT, Windows 2000, or Windows 98/95 for the GUI clients

In addition, the MQSeries Workflow Server runs on OS/390.

Planned Availability Date

July 28, 2000

At a Glance

- Offers e-business workflow
- Improves accuracy of business processes through automation
- Provides easy-to-use samples for B2B integration
- Improves performance, customization, useability, and documentation
- Adds the Windows 2000 platform
- Supports new releases of Windows 98, Lotus Notes®, and Java™ Developer Kit (JDK)

For ordering, contact:
Your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL

Reference: YE001
Improved Quality, Useability, Documentation

As IBM regards the user in the center of all design and development considerations, the major goal of this new program level was to achieve a higher level of quality in all user-related aspects. For MQSeries Workflow Version 3.2.2, we have evaluated the long list of our key customer requirements, the result is a consistent balance of innovation and reliability.

Memory management has been improved in all components, and on all platforms. For runtime execution, performance has been increased.

IBM has expanded the test cycles on all MQSeries Workflow platforms. To further ease administrative handling, the Terminate API and others had been created, existing error messages have been updated to provide more accurate meaning, and new error messages have been added. The documentation has been revised for improved readability and faster user perception. Integration within the MQSeries family has been enhanced, and practical samples encourage your fast implementation of integration solutions. Administration information, installation, configuration (checker tool), and customization have been improved.

All server components are useable identically across platforms, so you are free in your options to migrate and grow your workflow applications horizontally and vertically. MQSeries Workflow exploits platform-specific features like S/390 Sysplex and HACMP on AIX.

Since IBM has come to market with this workflow solution, you have never received more power, code stability, serviceability, and over-all quality.

Workflow and e-business

With MQSeries Workflow Version 3.2.2, you can introduce e-business smoothly and exploit its benefits with ease and flexibility. Initially, MQSeries Workflow lets you attach to an existing application without changing it, because MQSeries Workflow can integrate its data and function and make it available for workflow. As you integrate more, you soon participate in e-business quickly and cost effectively as MQSeries Workflow manages your e-business.

Because MQSeries Workflow is scalable, you expand the number of users and applications more and more. Technically, you grow the number of distributed workstations that support these users and applications, or you transfer your running solutions to the OS/390 platform.

Once MQSeries Workflow is introduced appropriately, your organization can experience shorter cycle times and therefore run a higher volume without further investment. The automation of company business processes is intended to result in better service, higher productivity, and easier interaction between people and applications, and between different applications as well. Business Integration allows you to integrate totally different systems and applications via the business process without having to touch the logic of existing applications, or new applications. Business logic is kept separate, made clear, easy to follow, and easy to change.

Windows 2000 Support

MQSeries Workflow Version 3.2.2 is available on Windows 2000; in general, all functions and components supported by Windows NT, now run on Windows 2000.

Java Developer Kit 1.2

MQSeries Workflow Version 3.2.2 supports the JDK 1.2, but it does not exploit the features that are new in JDK 1.2.

Enhanced Performance

On all supported platforms, performance for Runtime Servers and Clients has been enhanced significantly so users yield better response time.

Sample Measurements

<table>
<thead>
<tr>
<th>Processor</th>
<th>Operating System</th>
<th>Performance (Activities/Hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-way S/390 G6 AIX</td>
<td>OS/390</td>
<td>Greater than 500,000</td>
</tr>
<tr>
<td>4-way RS/6000® F50 332 MHz</td>
<td>AIX</td>
<td>64,800</td>
</tr>
<tr>
<td>Dual Intel Pentium™ III</td>
<td>Windows NT</td>
<td>30,000</td>
</tr>
<tr>
<td>550 MHz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These are sample measurements. Actual performance figures may vary based on your workflow models and configuration.

Buildtime/Staff Resolution

In user-defined container fields ("People from container," "Member of roles from container"), you can now insert more than one role or person.

New Application Programming Interfaces

Several new administrative methods are available to work with process activities, for example the Terminate API to terminate running activities or to access input or output data of already finished activities.

Program Currency for MQSeries Workflow for OS/390

All these new features announced on workstations with this Version 3.2.2, will be available on all supported platforms. This includes the OS/390 platform where these new features come with a program temporary fix (PTF).

Since there is no announcement for MQSeries Workflow for OS/390, its version remains at Version 3.2.1.

IBM does not only transfer or "port" the MQSeries Workflow functions, but rather MQSeries Workflow exploits the specific features of the OS/390 platform:

- Workload Manager (WLM) allows you to balance the MQSeries Workflow load and to manage your MQSeries Workflow performance because you can:
  - Report the performance with RMF™
  - Define response time goals
  - Control execution dependent on load
  - Isolate workloads
- Parallel Sysplex® also supports load balancing and provides you high availability through clustering
• Resource Recovery Services (RRS) for transaction coordination
• IMS and CICS for applications controlled by MQSeries Workflow so that these applications run under the MQSeries Workflow transactions
• Security Server (RACF®) for invocation
• System Console for server administration
• Component Trace (CTRACE) for problem determination

### Supported Platforms

<table>
<thead>
<tr>
<th></th>
<th>OS/390</th>
<th>AIX</th>
<th>Solaris</th>
<th>OS/2</th>
<th>Windows NT+2000</th>
<th>Windows 98/95</th>
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</thead>
<tbody>
<tr>
<td>Buildtime</td>
<td></td>
<td></td>
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<td>Runtime Server</td>
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<tr>
<td>Program Execution</td>
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<td>Server</td>
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<tr>
<td>Program Execution</td>
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<tr>
<td>Agent</td>
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<tr>
<td>Client GUI</td>
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<tr>
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<td>Lotus Notes API</td>
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</tbody>
</table>

### Year 2000

This product is Year 2000 ready. When used in accordance with its associated documentation, it is capable of correctly processing, providing, and receiving date data within and between the twentieth and twenty-first centuries, provided that all products (for example, hardware, software, and firmware) used with the product properly exchange accurate date data with it.

The service end date for this Year-2000-ready product is June 30, 2002.

### Statement of Direction

IBM intends to provide workflow capabilities within the IBM Enterprise Information Portal, the IBM solution for corporate portal solution using MQSeries Workflow as the underlying Workflow technology.

In this Statement of Direction, IBM expresses current intentions and objectives. It is subject to change or withdrawal.

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Product Positioning

Integrating Your Business

MQSeries® Workflow has been designed specifically to the needs of production workflow and Business Integration. It automates and tracks process flows across multiple units of work, tying together disparate systems and their users, and routing data automatically from step to step. It gives you control and feedback on the execution of complete end-to-end business processes that span application boundaries, providing consistent process execution across customer access channels and backend application systems.

MQSeries Workflow encapsulates process logic, thereby enhancing e-business flexibility, and links process logic to application functions and human input. It ensures that your business and IT requests are being processed the way you want them, and gives you the flexibility to change process flows without IT involvement.

Adaptive Enterprises and Solutions — React Quickly to Process Changes: Workflow is now becoming a core element of IT infrastructures supporting adaptive businesses that can quickly respond to changing business needs, and a core element of new types of solution packages providing flexible multistep integration of multiple solution components.

e-business Needs Workflow Technology: Workflow delivers a state-aware, process-focused control service for e-business applications and users, processing customer requests through an e-business that often crosses enterprise boundaries. Repeatable, precise, and controlled process execution, even under high-volume circumstances, is a key need for e-business solutions that MQSeries Workflow can deliver.

Workflow Requires Enterprise Application Integration (EAI), and is a Part of EAI: Automating complete end-to-end business processes across application boundaries requires application integration in each step. The MQSeries Version 5.1 program is the worldwide market leader for message-oriented middleware, providing universal and reliable application connectivity and support for more than 35 platforms. MQSeries Integrator simplifies application integration, automating a message flow within an individual unit of work. MQSeries Workflow extends EAI since it supports:

- Multistep process flows and process states
- Parallel paths and joins across multiple units of work
- Notification of time expiration

Weaving Your e-business into Workflow

e-business is a huge opportunity for the development of new integrated solutions, and provides the ability to link virtually everyone everywhere on the globe. Speed-to-market and quick reaction to market changes are key in this environment. The ability of MQSeries Workflow to integrate existing and new application components on distributed platforms into business solutions enables this flexibility needed for e-business solutions and allows you to update individual workflow applications or the process model gradually as your business demands.

The user interface these solutions expose will be typically custom built, based on the customer’s Internet support technology like browsers, or preferred communication protocols, ORB, development environments, and Internet standards such as CGI, Java™, HTML, and XML. MQSeries Workflow supports the creation of such solutions via its Runtime API Libraries and its MQSeries Workflow Development Kit.

Customers have already successfully implemented such workflow-based solutions for the Internet, based on the FlowMark® and MQSeries Workflow client APIs.

Content Management

Document routing is a key function associated with document management. Many workflow integration projects involve the integration of at least one document management system, such as ImagePlus® VisualInfo™, via workflow process models into the overall business solution.

Document management products, such as ImagePlus VisualInfo, typically include built-in, internal workflow for basic sequential document routing functions. MQSeries Workflow can be used together with ImagePlus VisualInfo, gaining more flexible and advanced routing capabilities. Also, additional applications are integrated into the overall business process managed by MQSeries Workflow.

IBM EIP (Enterprise Information Portal) is a portfolio of Web-enabled products that include:

- Imaging
- Workflow
- COLD (computer output to laser disk) archiving
- Collaborative document management
- Internet connection components

The workflow management component will be MQSeries Workflow.

The IBM EIP strategy opens the door to the wealth of digital documents stored in systems across your organization by leveraging the power of network computing. This information can give you a complete picture of customer relationships, integrate project information from across your organization, or provide immediate access to the wide range of information needed to be agile in a competitive environment. Access is provided through familiar Web browsers, Lotus Notes® clients, and sophisticated production clients.
Workflow and Application Servers

Application servers, such as Component Broker, CICS®, Lotus® Domino™, and TXSeries™, are focused on enabling the building, deploying, and managing of business applications (for example, real-time business data access and update) according to particular styles of application programming. The application designer typically has responsibility and control over the application and data design choices, but works within this programming style (model or environment). Application servers also provide capability for integrating applications and data, as long as the specific programming style (model) is used. Application designers have leveraged this integration capability and will continue to do so.

Business Integration with MQSeries is a complementary family of products to the application server offerings, focusing on the heterogeneous integration of application programs, information sources, and business processes. Business integration does this integration without imposing a programming style (model) to the end points being integrated.

MQSeries Workflow is concerned with automating business processes across disparate heterogeneous business systems, and human activity. The business process elements being automated are autonomous.

Automation logic elements (scripts and process models) are themselves styles of business application programs with many of the same system design concerns (performance, availability, scale, and life cycle) as traditional business applications.

The workflow application designer has control over the logic of sequencing between business process steps, but not over the steps themselves.

- Lotus Domino and Notes™ also provide workflow capability for homogeneous Domino and Notes environments. MQSeries Workflow can interface with this Lotus workflow capability, and assists in providing workflow automation across a heterogeneous environment.
- ActiveX and JavaBeans are popular component models, exploited by many application developers today. Such application components typically provide the interfaces needed for integration into a workflow client. MQSeries Workflow is well-suited to integrate application components via a workflow model, and supports the integration of ActiveX components with the ActiveX controls development kit.
- ERP systems are packaged applications that promise many of the benefits of integrated workflow-based solutions. They also face many of the same problems solved by workflow management systems: most of them are still monolithic applications, and some ERP vendors have started efforts to break the components of their system into pieces that can be released more independently, and they are providing tools to simplify the introduction time for their system. Some ERP systems internally use a workflow component.
- MQSeries Workflow can provide workflow automation beyond ERP systems, integrating other applications within and across enterprises, as needed to build additional business solutions. For this integration, MQSeries Workflow can interface with ERP systems through either of the following, dependent on the concrete scenarios and ERP modules to be supported:
  - The external interfaces of that ERP system’s clients or servers
  - The integration support provided for a particular ERP system by an MQSeries bridge or MQSeries Integrator Application Templates. For a list of ERP systems supported by MQSeries and MQSeries Integrator, refer to:


In general MQSeries Workflow enables integration of heterogeneous applications, information sources, and business processes via predefined workflow models.

Systems Management

Workflow in production requires effective system management procedures, specifically for network monitoring, troubleshooting, and backup of workflow and application data.

MQSeries Workflow provides command line system management interfaces, for example, to start and stop the system via the MQSeries Workflow administration utility. It supports standard system management interfaces, for example, it runs as NT service and supports SMS installation.

In addition, MQSeries and DB2® tools apply to manage the workflow software stack, together with tools that support the operating system, the network protocols, and the applications. For example, ADSTAR® Distributed Storage Manager (ADSM) is a solution for backup and archival of workflow data stored in MQSeries and DB2 Universal Database® (UDB.)

Customers also use MQSeries Workflow to automate systems management processes triggering Tivoli® TME 10™ activities, for example. Refer to Redbook ZZ81-0405, Integrating Change Management into Business Processes, for more details on possible solutions in this area, which include the automation of the ordering process for hardware and software in an organization, combined with automated software distribution via a systems management tool.

Complying to Standards

Workflow Management Coalition: The definition of standards for workflow management systems is driven by the Workflow Management Coalition (WfMC). This is a group of companies whose aim is to develop specifications that allow different workflow management products to interoperate with each other. In addition, the WfMC supports related workflow specifications with appropriate standard bodies, such as OMG, as a base for wider deployment of workflow interfaces in the context of object-oriented and Internet-based development efforts. For more information visit Web sites:

http://www.aiim.org/wfmc

http://www.omg.org

MQSeries Workflow is designed according to the WfMC reference model. The referring APIs are available, based on this modular architecture.

As a sponsor of the WfMC, IBM also continues to be a major contributor to future standard development.
**XML**: Originally intended as a universal data syntax for document processing and exchange, XML (eXtensible Mark Up Language) as proposed by the World Wide Web Consortium (W3C), is now gaining worldwide acceptance for application software integration. It is perceived as an open standard that impacts an ever growing number of software from various application areas.

MQSeries Workflow uses XML to accomplish integration with the other MQSeries family members or with customer applications.

### Services Support and Solutions Offerings

IBM is committed to working with industry vendors to define interfaces for higher-value functions, APIs, tools, and management functions for Business Integration. IBM also provides partnering opportunities for solution providers and system integrators (SIs). IBM works with several partners to make available complementary solutions, applications, tools, and system management and monitoring offerings.

SIs are able to assist customers with their implementation and integration.

IBM Competency Centers work jointly with Business Partners to provide all kinds of services to satisfy the MQSeries Workflow customers.

### SupportPacs

IBM makes available, for a fee, this new category of add-on programs sourced worldwide by IBM software engineers active in support of the field.

For detailed information about SupportPacs, visit Web site:


**Web Client SupportPac** provides an HTTP interface to the MQSeries Workflow Java APIs. It is implemented as a Java Servlet and comes with a sample browser-based runtime client interface that can easily be customized. Besides HTML templates, Java Server Pages (JSPs) can be used also to render the result pages. For Internet scenarios, the Web Client allows for anonymous starts to Workflow processes without being logged on to MQSeries Workflow.

The new Version 2.0 of the Web Client allows you to add custom HTML commands, has improved usability, and JSP support. It also provides a process monitor that requires Java Developer Kit (JDK) 1.2 on the server. The browser does not have to be Java-enabled.

**XML and Integration Samples SupportPac** makes available new samples to demonstrate the broad range of software scenarios the MQSeries family can support with XML. The base are the two different XML interfaces MQSeries Workflow provides:

1. **Call in** (a requester sends an XML message to MQSeries Workflow)
   
   MQSeries Integrator or an application program sends a message to trigger a Workflow process, thus providing a message interface to the Workflow program.

2. **Call out** (MQSeries Workflow sends an XML message to an application)
   
   A Workflow process issues an activity implementation as a message in XML format that is put into any MQSeries Version 5.1 queue then into a user-defined program execution server (UPES).

Through the XML interface, the integration with the other members of the MQSeries family and other software applications is accomplished.

These samples will be made available in a SupportPac, free of charge, that includes:

- MQSeries Workflow XML message specification for the message repository of MQSeries Integrator
- Sample MQSeries Integrator message flow definitions
- Sample MQSeries Workflow process definitions
- Documentation of the samples

**Performance** figures derived by this new program will be made available from time to time as a SupportPac (such as, MPW1).

### Workflow Competency Center Services

These centers provide you additional, customized offerings for a fee:

- **Solutions Assurance**: Validates all product components and services against customer’s expectations.

- **Installation Support**: Installs and configures MQSeries Workflow and prerequisites in heterogeneous customer environments.

- **Migration Support**: Assists customers to upgrade from FlowMark and previous releases of MQSeries Workflow to this current offering:
  - Buildtime process models
  - Runtime-data process instances

- **Application Implementation**: Offers development of customized programs requiring:
  - ActiveX exploitation: To customize the standard client, and to build customer-based work lists and other process-related applications on Microsoft™ clients.
  - Lotus Notes integration: To customize Lotus Notes clients.
  - Implementation of a Java Internet client: To develop a Workflow Internet application using the Workflow Java beans APIs (customization and full support for a fee).

- **Generic API Test and Prototyping Tools**: Test and tune MQSeries Workflow applications, and evaluate their behavior. When writing application programs for APIs in C, Java, ActiveX, and VisualBasic, these tools provide instant feedback, and help developers in testing and training. The prototyping facility allows for:
  - Rapid definition of API scenarios
  - Load simulation on servers and clients
  - Easy performance measurements

**Workflow Development** serves you to generate process models for MQSeries Workflow with the assistance of skilled workflow engineers.

**High Availability Cluster Multi-Processing** maximizes system availability ("uptime"). IBM provides services for:

- Installation
- Configuration
- Customization
- Testing
- Tuning
Proof of Concept serves as a commitment between new customers or prospects and IBM to support a statement of work. In most cases it includes a proposal to implement a workflow solution that solves the customer’s business needs. The typical duration will range from two to four weeks. The customer and IBM will jointly define the requirements. Both sides provide the resources to ensure success.

Education Support

IBM Learning Services, selected IBM Business Partners, and authorized Training Partners offer public, scheduled classes comprising of basic concepts and hands-on training about all aspects of MQSeries Workflow. A modular curriculum features:

- Modeling
- Installation
- Administration
- API programming for different categories (container APIs, work list handler APIs), and languages (ActiveX, Java)

Ask your IBM representative or Business Partner for details and enrollment. Visit these Web sites for information:

Subject: education

http://www.ibm.com/services/learning

http://www-3.software.ibm.com/services/learning

To focus your individual education needs, customized classes can be arranged. Send your request to:

workflow@ibmde
or
workflow@de.ibm.com

Call IBM Education and Training at 800-IBM-TEACH (426-8322) for catalogs, schedules, and enrollments.

Services designed to assist you in the installation and implementation of MQSeries Workflow in your organization are also available.

Offering Information

Product Information is available through Offering Information (OITOOL) at:

http://www.ibm.com/wwoi

Technical Information

Hardware Requirements: The specifications are recommended numbers for a two-tier configuration (database and server reside on the same system).

Buildtime

- A personal computer with an Intel-based processor architecture is required (for example, Pentium™ 300 MHz, or higher).
- Screen: Resolution 1024 x 768 (recommended), 432 mm (17 inch), measured diagonally, or larger.
- One of these operating environments:
  - Windows™ 2000, and for Buildtime database: DB2 Enterprise Edition Version 6.1; or Microsoft JetEngine
  - Windows NT™ Workstation V4.0 (Service Pack 6a required), and for Buildtime database: IBM DB2 Enterprise Edition Version 5.0, or 5.2, or 6.1; or Microsoft JetEngine
  - Windows 98, and for Buildtime database (stand-alone or as client): DB2 Personal Edition Version 5.0, or 5.2, or 6.1; or Microsoft JetEngine
  - Windows 95, Service Pack 1 or OSR2 is required, and for Buildtime database (stand-alone or as client): DB2 Personal Edition Version 5.0, or 5.2, or 6.1; or Microsoft JetEngine

All databases are included in MQSeries Workflow Version 3.2.2.
### General Recommendations

- When setting up your servers, for performance and safety reasons, keep DB2 data and log files (table spaces) on separate disks.
- The number and size of process models and process instances residing in the runtime database, as well as the number of clients concurrently attached to the server, heavily influence the demand for main memory and hard disk space.
- For systems not used for production (for example, development/test/demo systems) less main memory may be sufficient.

### Servers for Windows 2000

A personal computer with an Intel-based processor architecture, for example, Pentium with 200 MHz, or higher, is required.

For test or demo purposes, a ThinkPad® or portable personal computer is acceptable.

### Operative Environment Main Memory Hard Disk

<table>
<thead>
<tr>
<th>Windows 2000</th>
<th>256 MB</th>
<th>2 GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Microsoft Windows 2000</td>
<td></td>
</tr>
<tr>
<td>MQSeries for Windows NT, Version 5.1 (included)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB2 UDB for Windows NT, Version 6.1 (included)</td>
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<td></td>
</tr>
</tbody>
</table>

### Clients for Windows 2000

A personal computer with Intel-based processor architecture capable of running the operating system and 64 MB of main memory are recommended.

- Operating System: Microsoft Windows 2000
- MQSeries for Windows NT, Version 5.1 client (included)
- For the development of programs using the MQSeries Workflow APIs, one of:
  - Microsoft Visual C++ Version 6.0 (MQSeries Workflow client APIs for C and C++, FlowMark 2.3 compatibility workflow client API for C++, FlowMark 2.3 compatibility C language API)
  - VisualAge® C++ for Windows NT, Version 4.0 (MQSeries Workflow client APIs for C and C++, FlowMark 2.3 compatibility C language API)
  - Microsoft VisualBasic for Windows, Version 6.0 (FlowMark 2.3 compatibility VisualBasic language API)
  - JDK 1.1.8, 1.2 (MQSeries Workflow client APIs for Java)

### Servers for AIX

- An RS/6000® uniprocessor, SMP, or SP™ machine as supported by AIX is required.
- Screen: A dedicated graphical display is not necessary. The system console is sufficient.

### Operative Environment Main Memory Hard Disk

<table>
<thead>
<tr>
<th>RS/6000</th>
<th>512 MB</th>
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<tbody>
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<td>Operating System</td>
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<tr>
<td>MQSeries for AIX, Version 5.1 (included)</td>
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<tr>
<td>DB2 UDB for AIX, Version 5.0, 5.2, or 6.1 (included)</td>
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<tr>
<td>In a high-availability environment:</td>
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</tbody>
</table>
  - AIX Version 4.3.1 with HACMP Version 4.2.2 |
  - AIX Version 4.3.2 or 4.3.3 with HACMP Version 4.3.1 |

### Clients for AIX

A workstation capable of running the operating system.

- Operating System: AIX Version 4.2, or later; or 4.3.1, or 4.3.2, or 4.3.3
- MQSeries for AIX, Version 5.1 client (included)
- For the development of programs using the MQSeries Workflow APIs, one of:
  - IBM C for AIX, Version 3.0 or 5.0 (FlowMark 2.3 compatibility C language API)
  - C Set ++® for AIX, Version 3.1.4 (MQSeries Workflow client APIs for C and C++, FlowMark 2.3 compatibility workflow client API for C++)
  - VisualAge C++ Professional for AIX, Version 4.0
  - JDK 1.1.6, 1.1.7, 1.1.8, or 1.2 (MQSeries Workflow client APIs for Java)

### Servers for HP-UX

An HP 9000 workstation is required.

- Screen: A dedicated graphical display is not necessary. The system console is sufficient.

### Operative Environment Main Memory Hard Disk

<table>
<thead>
<tr>
<th>HP 9000</th>
<th>512 MB</th>
<th>2 GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>HP-UX Version 10.20</td>
<td></td>
</tr>
<tr>
<td>MQSeries for AIX, Version 5.1 (included)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB2 UDB for HP-UX, Version 5.1, or 6.1 (included)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Note:** Make sure you have sufficient swap space.
Clients for HP-UX: A workstation capable of running the operating system.

- Operating System: HP-UX Version 10.20
- For the development of programs using the MQSeries Workflow APIs:
  - HP C/ANSI C Developer’s Bundle for HP-UX, V10.20 (S700)
  - HP C++ for HP-UX, V10.20 (S700)

Servers for Sun Solaris

- A Sun workstation with SPARC processor architecture is required.
- Screen: A dedicated graphical display is not necessary. The system console is sufficient.

<table>
<thead>
<tr>
<th>Operating Environment</th>
<th>Main Memory</th>
<th>Hard Disk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun SPARC</td>
<td>512 MB</td>
<td>2 GB</td>
</tr>
</tbody>
</table>

- Operating System: Sun Solaris Version 7
- MQSeries for Sun Solaris, Version 5.1 (included)
- DB2 UDB for Sun Solaris, Version 5.2 or 6.1 (included)

Clients for Sun Solaris: A workstation capable of running the operating system.

- Operating System: Sun Solaris Version 7
- MQSeries for Sun Solaris, Version 5.1 client (included)
- For the development of programs using the MQSeries Workflow APIs:
  - Sun Workshop Professional C/SPARC Version 5.0
  - Sun Workshop Professional C++/SPARC Version 5.0
  - JDK 1.1.6, 1.1.7, 1.1.8, or 1.2 (MQSeries Workflow client APIs for Java)

Servers for OS/2®: A personal computer supported by OS/2 with an Intel-based processor architecture, for example, Pentium 200 MHz, is required.

<table>
<thead>
<tr>
<th>Operating Environment</th>
<th>Main Memory</th>
<th>Hard Disk</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS/2 Warp Server Version 4</td>
<td>256 MB</td>
<td>2 GB</td>
</tr>
<tr>
<td>OS/2 Warp Version 4</td>
<td>256 MB</td>
<td>2 GB</td>
</tr>
</tbody>
</table>

- Operating System: OS/2 Warp Version 4 or Warp Server Version 4
- MQSeries for OS/2, Version 5.1 (included)
- DB2 UDB for OS/2, Version 5.0, or 5.2, or 6.1 (included)

Clients for OS/2: A personal computer capable of running the operating system and at least 32 MB of main memory are recommended.

- Operating System: OS/2 Warp Version 4
- MQSeries for OS/2, Version 5.1 client (included)
- For the development of programs using the MQSeries Workflow APIs, one of:
  - VisualAge C++ Version 3.0, or 4.0 (MQSeries Workflow client APIs for C and C++, FlowMark 2.3 compatibility workflow client API for C++, FlowMark 2.3 compatibility C language API)
  - VisualAge C++ Version 3.5 or 4.0 (MQSeries Workflow client APIs for C and C++, FlowMark 2.3 compatibility C language API)
  - Microsoft Visual Basic Version 5.0 or 6.0 (FlowMark 2.3 compatibility VisualBasic language API)
  - JDK 1.1.6, 1.1.7, 1.1.8, or 1.2 (MQSeries Workflow client APIs for Java)

- For the development of programs using the MQSeries Workflow ActiveX Controls:
  - Microsoft Visual Basic Version 6.0

- For the MQSeries Workflow client for Lotus Notes:
  - Lotus Notes Release 5

- For an MQSeries Workflow standard client, no additional prerequisites are required.

Clients for Windows NT: A personal computer with an Intel-based processor architecture capable of running the operating system and 64 MB of main memory are recommended.

- Operating System: Microsoft Windows NT Workstation or Server Version 4.0; Service Pack 6a is required.
- MQSeries for Windows NT, Version 5.1 client (included.)
- IBM DB2 UDB for Windows NT, Version 5.0, or 5.2, or Version 6.1 (included.)

Clients for Windows NT: A personal computer with an Intel-based processor capability capable of running the operating system and 48 MB of main memory are recommended.

- Operating System: Microsoft Windows NT Workstation Version 4.0; Service Pack 6a is required.
- MQSeries for Windows NT, Version 5.1 client (included.)
- For the development of programs using the MQSeries Workflow APIs, one of:
  - Microsoft Visual C++ Version 5.0 or 6.0 (MQSeries Workflow client APIs for C and C++, FlowMark 2.3 compatibility workflow client API for C++, FlowMark 2.3 compatibility C language API)
  - VisualAge C++ Version 3.5 or 4.0 (MQSeries Workflow client APIs for C and C++, FlowMark 2.3 compatibility C language API)
  - Microsoft Visual Basic Version 5.0 or 6.0 (FlowMark 2.3 compatibility VisualBasic language API)
  - JDK 1.1.6, 1.1.7, 1.1.8, or 1.2 (MQSeries Workflow client APIs for Java)

- For the development of programs using the MQSeries Workflow ActiveX Controls:
  - Microsoft Visual Basic Version 6.0

- For the MQSeries Workflow client for Lotus Notes:
  - Lotus Notes Release 5

- For an MQSeries Workflow standard client, no additional prerequisites are required.

Clients for Windows 98 or Windows 95: A personal computer capable of running the operating system and 48 MB of main memory are recommended.

- Operating System: Microsoft Windows 98; for Windows 95 Service Pack 1 or OEM Service Release 2 is required.
- MQSeries for Windows 98 or Windows 95, Version 5.1 client (included.)
- IBM REXX (included in OS/2, FlowMark 2.3 compatibility REXX language API)
- JDK 1.1.6, 1.1.7, 1.1.8, or 1.2 (MQSeries Workflow client APIs for Java)

For the MQSeries Workflow Client for Lotus Notes:

- Lotus Notes Release 4.5 (Hebrew is not supported)
• For the development of programs using the MQSeries Workflow APIs, one of:
  - Microsoft Visual C++ Version 6.0 (MQSeries Workflow client APIs for C and C++, FlowMark 2.3 compatible workflow client API for C++, FlowMark 2.3 compatibility C language API)
  - VisualAge C++ Version 3.5 or 4.0 (MQSeries Workflow client APIs for C and C++, FlowMark 2.3 compatibility C language API)
  - Microsoft VisualBasic Version 6.0 (FlowMark 2.3 compatibility VisualBasic language API)
• For the development of programs using the MQSeries Workflow ActiveX Controls:
  - Microsoft VisualBasic Version 6.0
• For the MQSeries Workflow client for Lotus Notes:
  - Lotus Notes Release 5
• For an MQSeries Workflow standard client, no additional prerequisites are required.

Compatibility: Process models created under FlowMark Version 2.3 can be imported to MQSeries Workflow Version 3.2.2. Applications developed under FlowMark Version 2.3 can be recompiled and relinked as long as MQSeries Workflow Version 3.2.2 supports the programming languages affected.

Limitations: To plan for optimum performance and capacity and for possible limitations, contact your IBM representative or Business Partner for a Solution Assurance review with a Workflow Competency Center expert.

Performance Considerations: The performance of MQSeries Workflow Version 3.2.2 depends heavily on:
  • Usage characteristics of the process models and organization definitions
  • Average and maximum size of work lists
  • Capacity and utilization of the MQSeries Workflow and database server machines
  • Speed and memory size of the server and client machines
  • Transmission speed and load of the communication channels

To increase the number of users sharing the same processes, consider the use of multiple workflow servers sharing the same database.

Contact your IBM representative or Business Partner for a Solutions Assurance review of your specific implementation of MQSeries Workflow Version 3.2.2.

Planning Information

Installation and Maintenance: On all workstations platforms, you can install MQSeries Workflow Version 3.2.2 from the CD-ROM.

Communication Protocols: The components of MQSeries Workflow communicate with each other via MQSeries Workflow Version 5.1 and DB2 UDB Version 6 that support the following protocols:
  • TCP/IP
  • IPX/SPX
  • NetBIOS
  • APPC (SNA LU6.2)

For the actual status, visit these Web sites:
  http://www.software.ibm.com/ts/mqseries/
  http://www.software.ibm.com/data/db2/db6/

Customer Responsibilities: The customer is responsible for:
  • Assigning a systems administrator knowledgeable in MQSeries and DB2 UDB who has responsibility for planning, installing, maintaining, and administering an MQSeries Workflow installation in production
  • Implementing the management procedures for an effective operation
  • Providing sufficient hardware resources if MQSeries Workflow Version 3.2.2 is used in production
  • Following the Readme file at installation
  • Checking for latest software updates on Web site:
    http://www.ibm.com/software/ts/mqseries/support/fixes

Ask IBM or Business Partners to obtain assistance with customized services offerings.

Licensing and Pricing Definition: MQSeries Workflow implements a scalable and versatile pricing structure to reflect runtime use on a wide range of server machines, as well as different end-user involvement (for example, an anonymous Internet user starting new processes, versus employees processing work items assigned to them).

As a client/server program, licensing and charging apply differently to the server and client level.

Processor-Based Charges: The charge for runtime servers and databases depends on the capacity and quantity of processors or machines. These are assigned to tiers associated with a certain number of Capacity Units (CUs). The higher the tier and the greater the number of processors or machines, the more CUs are required. The customer must purchase CU Authorizations to use runtime servers or databases of the program on each machine and machine upgrade.

The program package includes two CU Authorizations; additional CU Authorizations must be purchased for the customer to be authorized to use MQSeries Workflow runtime servers or databases on processors or machines that represent a greater number of CUs.
A CU has no direct relationship to machine capability; it is a charging-authorization term only. Additional CUs are required as you increase the number of processors. This list is not exhaustive and does not attempt to cover the many processors or machines currently available. Many of the machines listed will have fewer processors than their supported maximum. The CU authorizations will need to be updated as new CPUs are added to existing machines.

Registered Users: A Registered User for MQSeries Workflow is any person who has the ability to connect, directly or indirectly, to an MQSeries Workflow server and works with MQSeries Workflow work items (for example, query, start, check out, check in, and transfer) in a runtime environment.

While the number of Registered Users covers the number of defined people who can work with work items assigned by an MQSeries Workflow server, the number of all server CUs covers all other tasks that users can perform, such as process start, program execution, checking the status of a process, or checking if MQSeries Workflow starts completely automated processes. In these cases, Registered Users are not applicable because the actual number of people may be unknown (for example, everybody on the Internet or intranet might be a potential user) or zero (in the case of fully automated workflows).

Examples

- Standard example

A company has installed one MQSeries Workflow server on a machine with four processors. There are four hundred employees working with MQSeries Workflow. Some of these are actually sharing a user ID. Each of these employees processes his or her user ID-related work list. Some of these might also start new processes.

This results in the need to purchase licenses for 400 Registered Users (that many people are working with work items although the number of user IDs might be less than 400). For the servers, the company has to purchase six CU authorizations for the server machine.

- Intranet example

A company has installed one MQSeries Workflow server on an SMP machine. MQSeries Workflow processes are started and monitored by an unknown number of employees via the intranet and a gateway at the company’s Web server (using MQSeries Workflow APIs). Two hundred employees participate at the resulting workflow (this may be via browsers and the intranet or via standard runtime clients) and process the various work items.

This results in the need to purchase authorizations for 200 Registered Users (that many people are actually working with work items). This number remains the same if the 200 users are connected to the server through a kind of gateway concentrator that reduces the actual number of physical logons to the server. For the servers, the company has to purchase authorizations for four CUs for the SMP machine. There is no need to purchase any Registered User authorizations for those employees who are working via the intranet, but do not work with work items, only start or monitor processes.

- Internet example

A company has installed MQSeries Workflow server components on four different uniprocessor machines. One machine is used just as a database server, the other three machines host other server components connected to this database server. MQSeries Workflow processes are started by an unknown number of customers via the Internet and a gateway at the company’s Web server (using MQ Series APIs). Six hundred employees participate in the resulting workflow and process the various work items.

This results in the need to purchase licenses for 600 Registered Users (that many people are actually working with work items). For the servers, the company has to purchase two CU authorizations for each of the four uniprocessor machines (in total eight CUs for all machines). There is no need to purchase any Registered User authorization for the customers working via the Internet as these customers do not work with work items, but just start processes.

Installability: Before you can install the MQSeries Workflow Version 3.2.2 program, you must install MQSeries Version 5.1 and DB2 UDB Version 6 programs. The program code for both is available from the MQSeries Workflow program package. To prepare for their smooth installation, have handy the installation instructions or the latest release of the installation manuals. Make sure you have downloaded the latest fixes, service, and maintenance information.

Packaging

Program Package on Workstations: Whereas MQSeries Version 5.1 offers multiple program packages, that is, one package per each server platform, MQSeries Workflow Version 3.2.2 is available as one family program package, containing all product components for all supported workstation operating environments. It includes:

- International Program License Agreement (IPLA) booklet and pointer sheet
- One Proof of Entitlement (PoE) for two MQSeries Workflow server Capacity Units
- One PoE for one MQSeries Workflow Registered User
- A leaflet specifying the publications available on the Internet
- Six MQSeries Workflow Version 3.2.2 manuals in U.S. English only:
  - Concepts and Architecture
  - Getting Started with Buildtime
  - Getting Started with Runtime
- Installation Guide
- Administration Guide
- Programming Guide
- List of Workstation Server Processor Groups
- Service Statement
- License Information
- Customer Registration Card
- CD-ROM #1 containing the MQSeries Workflow Version 3.2.2 program code for Intel platforms for all national language versions supported
- CD-ROM #2 containing the MQSeries Workflow Version 3.2.2 program code for UNIX® platforms for all national language versions supported
- One CD-ROM containing the MQSeries Workflow Version 3.2.2 softcopy documentation for all national language versions supported
- One CD-ROM offering a self-running video about MQSeries Workflow (equal to Marketing CD-ROM GK2T-0169-02)
- Six CD-ROMs containing the MQSeries Version 5.1 program code
- Ten CD-ROMs containing the IBM DB2 UDB Version 6 program code

This program when downloaded from a Web site, contains the applicable IBM license agreement, and License Information (LI), if appropriate, and will be presented for acceptance at the time of installation of the program. The license and LI will be stored in a directory for future reference.

Security, Auditability, and Control

The security and auditability features are:

- Access to MQSeries Workflow program and data files is protected via local operating system security mechanisms.
- User authentication is provided by means of an MQSeries Workflow user ID and password. Passwords are not transmitted over the line, neither at user logon nor when users change their passwords. No clear text password is stored in the MQSeries Workflow server databases.

The following platform-specific options are also supported for logon:
- Windows NT unified logon supported.
- MQSeries Workflow client for Lotus Notes supports user authentication via Notes ID files and an automatic connection of that user to the workflow server.

- DB2 security applies for access control to MQSeries Workflow databases.
- MQSeries security applies for access control to MQSeries Workflow queues.
- Users must be authorized via FDL and MQSeries Workflow Buildtime to access to MQSeries Workflow resources, such as processes, and to administer the system.
- Auditing is provided via operating system security logs and MQSeries Workflow audit log.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Ordering Information

New Customers

To order, specify the program package part number and the appropriate number of CUs and registered users concerning your runtime environment.

All charges are one-time charges (OTCs.) The program package carries a fixed price. In addition there are two variable charge units that apply to your runtime environment:

- Processor-based charges for all processors or machines running MQSeries Workflow runtime servers and databases and
- Registered users

Two CUs and one registered user purchased with the program package or Passport Advantage entitle you for a free number of Buildtime users.

Existing Customers

These options apply for a customer who is licensed for MQSeries Workflow Version 3.2 (workstation program):

- Having purchased a license without Passport Advantage Subscription, the customer may order and receive a free upgrade.
- Having purchased a license with Passport Advantage Subscription, the customer will receive automatically this new Modification Level 2, or any new version, release, or modification level upon its availability.

The part numbers remain the same as announced under Version 3.2.0 on June 15, 1999.

Program Name | Part Number
--------------|--------------
MQSeries Workflow Version 3.2.2 | 22L4429
Program Package | 0780184
1 Capacity Unit | 0780185
1 Registered User | Passport Advantage

Passport Advantage

Description | Part Number
-------------|--------------
MQSeries Workflow Version 3.2.2 | BD8QHML
Media Package | BD8QIML
MQSeries Workflow Version 3.2.2 | Documentation Package
Documentation Package |
Upgrade Protection (Entitled Customers)

Passport Advantage Subscription

Migration Rules: A customer who has acquired Software Advantage Upgrade Protection for FlowMark Version 2.3 servers (50H0783) and a number of Registered Users (77H8301) is entitled to receive new server authorizations according to the number of installed FlowMark Version 2.3 servers and new Registered User authorizations acquired. For an entitled customer, these rules apply:

- The MQSeries Workflow program package is sent automatically to this customer shortly after availability.
- Per each Registered User of FlowMark Version 2.3, the customer will receive automatically one Registered User Authorization for MQSeries Workflow.
- Per each started multiple of one hundred FlowMark Version 2.3 Registered Users, the customer will receive automatically two server CU Authorizations for MQSeries Workflow.

Formula: Resulting number of CUs = 2 x ceiling (FlowMark Version 2.3 Registered Users/100)

Note: “Ceiling” represents a mathematical function returning the next higher whole integer number.

Program Package: Customers who have previously acquired Software Advantage Upgrade Protection, and have not migrated to the Passport Advantage Offering as shown in the table below, will receive automatically their program upgrade package shortly after availability.

Terms and Conditions

Licensing: IBM IPLA. PoE are required for all authorized use.

License Information Form Number: GI19-0003

Limited Warranty: Yes

Program Services: Program services will be available until June 30, 2002. The statement of service included with the program describes this service.

Money-Back Guarantee: Two-month, money-back guarantee

Copy and Use on Home/Portable Computer: Yes

Volume Orders (IVO): No

Passport Advantage Applies: Yes

Passport Advantage Subscription Applies: Yes

Usage Restriction: Yes

Restricted Usage of MQSeries: MQSeries Workflow contains a copy of IBM MQSeries you are only authorized to use in association with your licensed use of the MQSeries Workflow, to provide messaging for MQSeries Workflow. Any other use, specifically with custom messaging applications, is not permitted without a full separate MQSeries license. You may transfer the copy of MQSeries included with MQSeries Workflow, but only:

- To a person who at the same time takes over all the corresponding MQSeries Workflow materials from you, and accepts all these license terms and

- If you transfer all copies to such person, and do not retain any copies of such materials for your own or any other use

Restricted Usage of IBM UDB: MQSeries Workflow contains IBM DB2 UDB Version 6. You may use this program only in association with your licensed use of MQSeries Workflow, to provide the database management system (DBMS) for MQSeries Workflow. Any other use, specifically with custom database applications, is not permitted without a full separate DB2
UDB license. You may transfer the copy of IBM DB2 UDB Version 6 included with MQSeries Workflow, but only:

- To a person who at the same time takes over the corresponding MQSeries Workflow materials from you, and accepts all these license terms
- If you transfer all copies to such person, and do not retain any copies of such materials for your own or any other use

Support Line: Yes

AIX/UNIX Upgrade Protection Applies: No

Entitled Upgrade for Current AIX/UNIX Upgrade Protection Licensees: No

AS/400® Software Subscription Applies: No

Variable Charges Apply: No

Educational Allowance: Not applicable

### Charges

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Part Number</th>
<th>OTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MQSeries Workflow Version 3.2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Package U.S. English</td>
<td>22L4429</td>
<td>$15,200</td>
</tr>
<tr>
<td>1 Capacity Unit with Certificate</td>
<td>0780184</td>
<td>7,000</td>
</tr>
<tr>
<td>1 Registered User with Certificate</td>
<td>0780185</td>
<td>600</td>
</tr>
</tbody>
</table>

**Order Now**

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Phone: 800-IBM-CALL
Fax: 800-2IBM-FAX
Internet: ibm.direct@us.ibm.com
Mail: IBM Atlanta Sales Center

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P.O. Box 2690
Atlanta, GA 30301-2690

You can also contact your local IBM Business Partner or IBM representative. To identify them, call 800-IBM-4YOU.

**Note:** Shipments will begin after the planned availability date.

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