IBM WebSphere MQ Low Latency Messaging V2.4 delivers enhanced management, monitoring, and networking

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At a glance

WebSphere® MQ Low Latency Messaging V2.4 offers the following new capabilities:

- Enhanced intelligent self-management capability with improved topic mapping including dynamic reception port provisioning, and support for highly available and distributed topic mapping coordination
- Enhanced persistent messaging extending the message store facility with support for late joining applications
- Consumability enhancements that provide the ability to dynamically change the number of acknowledgements expected for positively acknowledged multicast, increase the number of topics supported, and increase the number of tiers supported per-process
- Networking enhancements that continue to take advantage of emerging technologies and hardware acceleration including the ability use of both InfiniBand and IP networks in a single instance or topic, Multi-switch and Multi-subnet manager InfiniBand network failure/failover, native InfiniBand to Ethernet network routing
- Broader platform support with support on Solaris for message store and topic mapper facilities, Windows® and Solaris support for thread services, and HP-UX and Linux® for System z® support for Reliable Unicast Messaging (RUM)

Overview

WebSphere MQ Low Latency Messaging V2.4 delivers enhanced intelligent self management, monitoring and networking, and other new features to the high-volume, low-latency reliable messaging capabilities previously available. These new features can make WebSphere MQ Low Latency Messaging an even more attractive solution for trading firms, exchanges and other organizations that need assured delivery of high volumes of data with low latency.

Low Latency Messaging can help deliver a flexible, manageable messaging environment with a wide range of messaging quality of service options along with support for a highly-available, tiered, replicated environment.

WebSphere MQ Low Latency Messaging is a messaging transport that is highly optimized for the high-volume, low-latency requirements of Financial Markets firms. In these environments applications require extremely low (submillisecond) latency and high-message volumes (ranging from many thousands to millions of messages per second), with varying delivery styles and message qualities of service.
WebSphere MQ Low Latency Messaging can be used for high-speed delivery of market data, transactional data, reference data, and event data in or between front-, middle-, and back-office environments. Using the full IBM® Messaging portfolio, WebSphere MQ Low Latency Messaging can be integrated with classic WebSphere MQ for back-office applications requiring the highest levels of assured delivery.

Although initially designed to meet the high-speed and throughput requirements of financial services firms, WebSphere MQ Low Latency Messaging is suitable for use by other industries with similar requirements.

The unique high availability capabilities of WebSphere MQ Low Latency Messaging provided by Reliable and Consistent Message Streaming (RCMS) minimize outages and downtime even when using commodity hardware.

WebSphere MQ Low Latency Messaging is ideal for organizations that require:

- High messaging throughput and extremely low latency
- One-to-many multicast and point-to-point unicast messaging
- Support for User Datagram Protocol (UDP) and Transmission Control Protocol (TCP)
- Stream failover for high availability even when using commodity hardware
- Message traffic rate and congestion control
- A low latency message store for lightweight persistence
- Shared memory for inter-process communication
- A coordination manager for simplified topic provisioning
- Native InfiniBand support
- 10 GbE support
- Flexible, fine-grained message filtering
- Robust application and network statistics monitoring for internal and external latency

WebSphere MQ Low Latency Messaging is particularly suitable for financial markets use cases, including:

- Efficient market data distribution - Enables low latency communication to downstream applications that perform functions like trading, analytics and compliance. Congestion management software detects and actively manages congestion, offering memory buffer usage limits with notification; limits on data retransmission with notification; transmission rate limitation; and slow consumer policies.
- Reliable trade execution - Delivers highly reliable communication to the downstream execution infrastructure without performance degradation, with high availability and flexible message filtering for complex execution routing.
- Real-time market analytics - Offers robust message filtering to deliver relevant information to downstream applications that perform analytics and compliance.

WebSphere MQ Low Latency Messaging can be used as a key element of low latency solutions for financial firms or within other industries that require reliable, high-speed data delivery. The software is also embedded in WebSphere Front Office, a scalable, high-performance, low-latency market data delivery platform.

**Key prerequisites**

Refer to the Hardware requirements and Software requirements sections.

**Planned availability date**
June 4, 2010

• Electronic availability
• Media availability

Availability of programs with encryption algorithm in France is subject to French government approval.

Cryptography in this product is limited to password encryption, authentication or digital signature.

**Description**

WebSphere MQ Low Latency Messaging offers a reliable, high-speed, high-throughput transport for a broad range of messages that enables extremely low latency distribution of information. WebSphere MQ Low Latency Messaging is designed to address the needs of the front-, middle-, and back-offices of financial markets and for other industries with similar needs.

New capabilities now available in WebSphere MQ Low Latency Messaging V2.4 include:

**Enhanced Intelligent self-management**

Intelligent self-management is offered through a topic mapping service introduced in V2.3. This service provides centralized management of topic mapping rules by automatically configuring topics transport destination details to help make it easier for developers to create applications that can take advantage of Low Latency Messaging capabilities. In this V2.4 update the topic mapping service is further enhanced with dynamic reception port provisioning providing the ability to add or remove network and shared memory reception ports dynamically. In addition the topic mapping service is enhanced to extend its mapping capabilities to topic transport protocol, shared memory and topic receive ports.

**Enhanced Message Store**

Assured delivery is an enhancement to the Low Latency Message Store that was announced in V2.2 (for details, refer to Software Announcement ZP09-0144, dated May 4, 2009). This capability enables applications to confirm that messages have been written to disk or other non-volatile storage. In this V2.4 update, the message store facility is enhanced with support for late joining applications enabling these to request the replay of messages sent before joining the topics. The delivery of old and new messages is now transparent to late joining applications.

**Consumability enhancements**

This V2.4 update provides consumability enhancements that provide the ability to dynamically change the number of acknowledgements expected for positively acknowledged multi-cast, increase the number of topics supported, and increase the number of tiers supported per-process.

Wait-N ACK support ensures a Reliable Multicast Messaging (RMM) transmitter receives an acknowledgement (ACK) for a packet from a specified number (n) of different receivers before it can remove the packet from the streams history queue. With this V2.4 update developers now have the flexibility to dynamically adjust the number (n) of different receivers from which a given Reliable Multicast Messaging (RMM) transmitter must receive positive acknowledgement (ACK) before it will remove a packet from the stream's history queue.

**Leveraged networking technologies**

This V2.4 update provides expanded support for emerging networking technologies and hardware acceleration by enabling combined use of all supported transport protocols (native InfiniBand, 10GbE, traditional IP and shared memory) in a single
Low Latency Messaging application instance and ability to allow a topic map to specify multiple protocols in a single instance.

**Enhanced high availability**

WebSphere MQ Low Latency Messaging enables highly available messaging through its Reliable and Consistent Message Streaming (RCMS) capability. RCMS provides a layer of high availability and consistent ordered delivery using the high-performance transport fabric offered by WebSphere MQ Low Latency Messaging. RCMS utilizes Reliable Multicast Messaging (RMM), which provides high delivery performance, reliability, late joiner support, congestion and traffic control.

RCMS defines the concept of a tier, which consists of a group of components (tier members) that are replicas of each other. Each replica executes the application logic as if it were the only component. RCMS connects the tier members and ensures availability in the case of a failure. The application can define the level of redundancy it wants to use; with X tier members running, up to X-1 members can fail and the application will continue to function. RCMS detects component failure and migrates the data stream to a backup member without message loss.

This V2.4 update doubles the per-process tier limit for RCMS increasing this from 5 to 10. In addition, enhancements to high availability support for the coordination manager enables it to automatically synchronize topic mapping configuration across multiple topic mappers to create a set of highly available topic mappers.

**Accessibility by people with disabilities**

A US Section 508 Voluntary Product Accessibility Template (VPAT) can be requested via the IBM Web site


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**Offering Information**

Product information is available via the Offering Information Web site

http://www.ibm.com/common/ssi

Also, visit the Passport Advantage® Web site

http://www.ibm.com/software/passportadvantage
Publications

No publications are shipped with this product.

The IBM Publications Center

http://www.ibm.com/shop/publications/order

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. Payment options for orders are via credit card (in the U.S.) or customer number for 20 countries. A large number of publications are available online in various file formats, and they can all be downloaded by all countries.

Technical information

Specified operating environment

Hardware requirements

Minimum requirements are listed. The actual requirements for your system may be greater depending on the complexity of your specific environment, latency, throughput, and data requirements.

Additional hardware that may be required based on capacity requirements:

- CPUs (processors or multicore processors)
- Memory
- Servers (for added capacity or redundancy)
- Disks

Gigabit network adapters and routers are required for high-speed transport. Native InfiniBand and IP over InfiniBand are also supported.

- Processor: AMD or Intel® x86 architecture 32- or 64-bit, Solaris UltraSPARC, PowerPC® with Linux, Intel Itanium® IA64 processor with HP-UX, or IBM System z z9™ or z10 with Linux
- One processor, with a minimum speed of 2.0 GHz (dual processor or dual core recommended)
- Minimum 300 MB required free disk space for installation
- One or more of the following network adapters:
  - For Ethernet, 1 or 10 Gigabit Ethernet adapters
  - For InfiniBand, host channel adapters supported by OFED-1.3 or later
- For the Low Latency Message Store feature, enough disk space to hold the messages that are to be stored, and a fast enough disk system to support the rate of messages to be stored

Software requirements

Operating system requirements

For RMM and RUM over Ethernet, RCMS, and IPv6, one of the following operating system platforms:

- Red Hat Enterprise Linux 4 (x86 or x86-64)
- Red Hat Enterprise Linux 5 (x86, x86-64, ppc64, z9, or z10 ¹)
- Red Hat Enterprise MRG 1.1 (x86 or x86-64)
- SUSE Enterprise Linux 10 (x86, x86-64, z9, or z10 ¹)
- SUSE Enterprise Linux 11 (x86, x86-64, or ppc64)
- SUSE Linux Enterprise Real Time Extension 10 (x86, x86-64)
- Microsoft® Windows 7 (x86 or x64)
- Microsoft Windows XP SP2 and above (x86 or x64)
- Microsoft Windows Server 2003 SP1 and above (x86 or x64)
- Microsoft Windows Server 2003 R2 (x86 or x64)
- Microsoft Windows Vista (x86 or x64)
- Microsoft Windows Server 2008 (x86 or x64)
- Microsoft Windows Server 2008 R2 (x86 or x64)
- Solaris 10 UltraSPARC (32- or 64-bit)
- Solaris 10 (x86 or x86-64)
- HP-UX 11i v2

1. RCMS and IPv6 are not supported on Linux on System z.

2. RCMS, and IPv6 are not supported on HP-UX

For the Low Latency Coordination Manager and Low Latency Message Store one of the following operating system platforms:

- Red Hat Enterprise Linux 4 (x86 or x86-64)
- Red Hat Enterprise Linux 5 (x86, x86-64, or ppc64)
- Red Hat Enterprise MRG 1.1 (x86 or x86-64)
- SUSE Enterprise Linux 10 (x86 or x86-64)
- SUSE Enterprise Linux 11 (x86, x86-64, or ppc64)
- SUSE Linux Enterprise Real Time Extension 10 (x86, x86-64)
- Microsoft Windows XP SP2 and above (x86 or x64)
- Microsoft Windows 7 (x86 or x64)
- Microsoft Windows Server 2003 SP1 and above (x86 or x64)
- Microsoft Windows Vista (x86 or x64)
- Microsoft Windows Server 2008 (x86 or x64)
- Microsoft Windows Server 2008 R2 (x86 or x64)
- Solaris 10 UltraSPARC (32- or 64-bit)
- Solaris 10 (x86 or x86-64)

For RMM and RUM over Native InfiniBand, shared memory transport, and RCMS split brain feature, one of the following operating system platforms:

- Red Hat Enterprise Linux 4 (x86 or x86-64)
- Red Hat Enterprise Linux 5 (x86, x86-64, or ppc64)
- Red Hat Enterprise MRG 1.1 (x86 or x86-64)
- SUSE Linux Enterprise 10 (x86 or x86-64)
- SUSE Linux Enterprise 11 (x86, x86-64, or ppc64)
- SUSE Linux Enterprise Real Time Extension 10 (x86, x86-64)

Run-time requirements

- C and C++ applications -- Windows platform: Microsoft Visual C++ 2005 SP1 Redistributable Package (shipped)
- Java™ applications
  - Linux on x86 platform: IBM JRE 5.0 (shipped) or Sun Java SE 5 or 6
  - Linux on IBM system p or system z, or HP-UX: IBM JRE 5.0 (shipped)
  - Solaris platform Sun Java SE 5 or 6
- Windows platform
  -- IBM JRE 5.0 (shipped) or Sun Java SE 5 or 6
  -- Microsoft Visual C++ 2005 SP1 Redistributable Package (shipped)

- .NET applications -- Windows platform: Microsoft Visual C++ 2005 SP1 Redistributable Package (shipped), with a prerequisite of Microsoft.Net Framework 2.0

**InfiniBand runtime requirements**

- OpenFabrics Enterprise Distribution (OFED) V1.3, or later

**Development system software requirements**

- C and C++ applications
  - Windows platform -- Microsoft Visual Studio 8.0 or 9.0 32- or 64-bit on one of the following:
    -- Microsoft Windows XP (SP2+), or
    -- Microsoft Windows 7, or
    -- Windows Server 2003 (SP1+), or
    -- Microsoft Windows Vista, or
    -- Microsoft Windows 2008
  - Linux platform
    -- GCC 3.4.3 or GCC 4.1.0 32- or 64-bit on Red Hat Enterprise Linux Advanced Server 4, or
    -- GCC 4.1.2 32- or 64-bit on Red Hat Enterprise Linux Server 5, or
    -- GCC 4.1.0 32- or 64-bit on SuSE Linux Enterprise Server 10, or
    -- GCC 4.3.2 32- or 64-bit on SuSE Linux Enterprise Server 11, or
    -- GCC 4.1.2 64-bit on SuSE Linux Enterprise Server 10 on IBM System p® or System z
    -- GCC 4.1.2 64-bit on Red Hat Enterprise Linux Server 5 on IBM System p or System z
  - InfiniBand runtime requirements
    -- OpenFabrics Enterprise Distribution (OFED) V1.3, or later
  - Solaris platform: Sun Studio 11 32- or 64-bit on Solaris 10 (SPARC)
  - HP/UX platform: HP C/aC++ for HP Integrity servers 32- or 64-bit on HP-UX 11i v2

- Java applications
  - Linux platform: IBM SDK for Java 5.0 (shipped) or Sun JDK 5 or 6
  - Windows platform: IBM SDK for Java 5.0 (shipped) or Sun JDK 5 or 6
  - Solaris platform: Sun JDK 5 or 6
  - HP/UX platform: IBM SDK for Java 5.0 (shipped)

- .NET applications -- Windows platform: Microsoft Visual Studio 8.0 or 9.0 and Microsoft .NET Framework 2.0

The program's specifications and specified operating environment information may be found in documentation accompanying the program, if available, such as a README file, or other information published by IBM, such as an announcement letter. Documentation and other program content may be supplied only in the English language.

**Performance considerations**

WebSphere MQ Low Latency Messaging is a scalable product. Performance depends on the complexity of the specific environment, volume of data traffic, and the data object size. The stated performance numbers are based on measurements using standard IBM benchmarks in a controlled environment. The actual throughput that any application will experience may vary depending upon considerations such as message size, transmission rate, hardware platform, and network configuration.
Therefore, no assurance can be given that an individual application will achieve the throughput or latency stated here.

Customers should conduct their own testing. For more detailed performance information, consult your IBM representative.

Planning information

Customer responsibilities

IBM Services are available to assist in the installation, design, implementation, and maintenance of WebSphere MQ Low Latency Messaging. The following skills are required for implementation of WebSphere MQ Low Latency Messaging:

- Networking
- C, Java, and/or .NET programming
- Thorough understanding of the WebSphere MQ Low Latency Messaging

Software Subscription and Support (also referred to as Software Maintenance) is included with licenses purchased through Passport Advantage and Passport Advantage Express. Product upgrades and technical support are provided by the Software Subscription and Support (also referred to as Software Maintenance) offering as described in the Agreements. Product upgrades provide the latest versions and releases to entitled software, and technical support provides voice and electronic access to IBM support organizations, worldwide.

IBM includes one year of Software Subscription and Support (also referred to as Software Maintenance) with each program license acquired. The initial period of Software Subscription and Support (also referred to as Software Maintenance) can be extended by the purchase of a renewal option, if available.

Packaging

WebSphere MQ Low Latency Messaging is distributed as a single package containing:

- Quick Start CD, which includes a readme file, quick start guide, and installation and configuration guide
- IBM program package on CD media

Security, auditability, and control

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

Global Technology Services

Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings for the efficient installation, implementation, or integration of this product.
Ordering information

For ordering information, consult your IBM representative or authorized IBM Business Partner, or visit


This product is only available via Passport Advantage. It is not available as shrinkwrap.

Product information

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Charge metrics definitions

Processor Value Unit (PVU)

A processor core is a functional unit within a computing device that interprets and executes instructions. A processor core consists of at least an instruction control unit and one or more arithmetic or logic unit. With multicore technology, each core is considered a processor. Not all processor cores require the same number of Processor Value Unit (PVU) entitlements. To calculate the number of PVU entitlements required, refer to the PVU table on the following Web site:


With full capacity licensing, a PoE must be acquired for the appropriate number of PVUs based on all activated processor cores available for use on the server.
**Client Device**

Client Device is a unit of measure by which the Program can be licensed. A Client Device is a single user computing device or special purpose sensor or telemetry device that requests the execution of or receives for execution a set of commands, procedures, or applications from or provides data to another computer system that is typically referred to as a server or is otherwise managed by the server. Multiple Client Devices may share access to a common server. A Client Device may have some processing capability or be programmable to allow a user to do work.

Examples include, but are not limited to actuators, appliances, automated teller machines, automatic meter readers, cash registers, disk drives, desktop computers, kiosks, notebook computers, personal digital assistant, point-of-sale terminals, sensors, smart meters, tape drives, and technical workstations.

Licensee must obtain entitlements for every Client Device which runs, provides data to, uses services provided by, or otherwise accesses the program and for every other computer or server on which the Program is installed.

**Passport Advantage program licenses**

**IBM WebSphere MQ Low Latency Messaging**

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**IBM WebSphere MQ Low Latency Messaging**

IBM WebSphere MQ Low Latency Message Store for Non-Production Environment
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IBM WebSphere MQ LL Message Store Non-Prod Env PVU Annual SW S&S Rnw1
IBM WebSphere MQ LL Message Store Non-Prod Env PVU SW S&S Reinstall 12 Mo

**IBM WebSphere MQ Low Latency Messaging**

IBM WebSphere MQ Low Latency Messaging for Non-Production Environment
IBM WebSphere MQ LLM Non-Prod Env Per Client Device Annual SW S&S Rnw1
IBM WebSphere MQ LLM Non-Prod Env Per Client Device Lic + SW S&S 12 Mo
IBM WebSphere MQ LLM Non-Prod Env Per Client Device SW S&S Reinstall 12 Mo
IBM WebSphere MQ LLM Non-Production Env PVU Annual SW S&S Rnw1
IBM WebSphere MQ LLM Non-Production Env PVU Lic + SW S&S 12 Mo
IBM WebSphere MQ LLM Non-Production Env PVU SW S&S Reinstall 12 Mo

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IBM WebSphere MQ Low Latency Messaging

IBM WebSphere MQ LLM for Linux on System z
Non-Production Environment

IBM WebSphere MQ LLM Linux on Syst z Non-Prod Env PVU E088ELL
Annual Sw S&S Rnwl
IBM WebSphere MQ LLM Linux on Syst z Non-Prod Env PVU D0B7VLL
Lic + Sw S&S 12 Mo
IBM WebSphere MQ LLM Linux on Syst z Non-Prod Env PVU D0B8VLL
Sw S&S Reinstate 12Mo

IBM WebSphere MQ Low Latency Messaging

IBM WebSphere MQ Low Latency Message Store
IBM WebSphere MQ LL Message Store (PVU) Annual Sw S&S E079VLL
Rnwl
IBM WebSphere MQ LL Message Store (PVU) Lic + Sw S&S 12 D09T7LL
Mo
IBM WebSphere MQ LL Message Store (PVU) Sw S&S D09T8LL
Reinstate 12 Mo

Passport Advantage customer: Media pack entitlement details

Customers with active maintenance or subscription for the products listed are entitled to receive the corresponding media pack.

IBM WebSphere MQ Low Latency Messaging V2.4.0

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Cross-platform products

Cross-platform product for use on System z

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**IBM WebSphere MQ Low Latency Messaging**

<table>
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<tr>
<th>Part description</th>
<th>Part number</th>
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<tr>
<td>IBM WebSphere MQ Low Latency Messaging</td>
<td>E079ULL</td>
</tr>
<tr>
<td>WebSphere MQ LLM Lx Sys z Processor Value Unit (PVU) Annual SW S&amp;S Rnw</td>
<td>D09TRLL</td>
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<tr>
<td>WebSphere MQ LLM Lx Sys z Processor Value Unit (PVU) Lic + SW S&amp;S 12 Mo</td>
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<td>WebSphere MQ LLM Lx Sys z Processor Value Unit (PVU) SW S&amp;S Reinstall 12 Mo</td>
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**License Information form number**

<table>
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<th>Program name</th>
<th>Program number</th>
<th>Form number</th>
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<tr>
<td>IBM WebSphere MQ Low Latency Messaging</td>
<td>5724-T21</td>
<td>L-AVIL-83L6QT</td>
</tr>
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**Product name**

IBM WebSphere MQ Low Latency Messaging

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