Message Queuing Systems

Sara Bouchenak[1], Noël de Palma[2]
[1]Department of Computer Science, University of Grenoble I — INRIA, Grenoble, France
[2]Department of Computer Science, INPG — INRIA, Grenoble, France

Synonyms

Message-oriented middleware (MOM); Message-oriented systems; Messaging systems; Queuing systems

Definition

A message is an information sent by a sender process to a receiver process. A message queue is a mechanism that allows a sender process and a receiver process to exchange messages; the sender posts a message in the queue, and the receiver retrieves the message from the queue. A message queuing system provides a mean to build distributed systems, where distributed processes communicate through messages exchanged via queues.

Main Text

A message queuing system provides several facilities, such as creating messages, creating queues, initializing sender and receiver processes, and providing a means to send and receive messages.

First of all, a message queuing system provides a facility to build a message and fill it with data. Properties may be associated with a message, such as the message size, the message expiration time and the message priority.

A message queuing system also provides facilities to create a queue and, optionally, to associate parameters with a queue, such as the queue length (i.e., the maximum number of messages a queue may hold), the queue topics (i.e., the types of messages the queues may contain), etc.

The senders and receivers of messages may communicate in a synchronous way or in an asynchronous way. With a synchronous communication protocol, a receiver waits for a message from a sender, i.e., it blocks until the message arrives. Whereas with an asynchronous communication protocol, the receiver continues executing and is notified of the reception of a message when this one arrives.

Furthermore, the destination of a message may be specified either explicitly or implicitly. In the explicit mode, the sender specifies the queue to which the message is sent. While in the implicit mode, the sender specifies a topic to which a message is sent, and the message queuing system is responsible of automatically finding the queues that correspond to that topic before sending the message to these queues.

Several message queuing systems are proposed, some are proprietary and others are open source. Oracle proposes Advanced Queuing for Oracle databases [5], Skype has Skytools PgQ for PostgreSQL databases [7], IBM provides WebSphere MQ, Microsoft has MSMQ [2], and Sun Microsystems defines Java Message Service (JMS) as a specification of a Java standard for message queuing systems [4]. Open source message queuing systems include ActiveMQ [1], JBoss Messaging [3], and JORAM [6].

Cross-reference

► Adaptive Middleware for Message Queuing Systems

Recommended Reading

1. The Apache Software Foundation. Apache ActiveMQ, 2008. http://activemq.apache.org/.
2. IBM. WebSphere MQ, 2008. http://www-306.ibm.com/software/integration/wmq/.
3. JBoss. JBoss Messaging, 2008. http://labs.jboss.com/jbossmessaging/.
4. Sun Microsystems. Java Message Service (JMS), 2008. http://java.sun.com/products/jms/.
5. Oracle. Oracle9i Application Developer's Guide – Advanced Queuing, 2008. http://download.oracle.com/docs/cd/B10500_01/appdev.920/a96587/toc.htm.
6. ScalAgent. JORAM: Java Open Reliable Asynchronous Messaging, 2008. http://joram.objectweb.org/.
7. Skype. SkyTools PgQ, 2008. https://developer.skype.com/SkypeGarage/DbProjects/SkyTools.