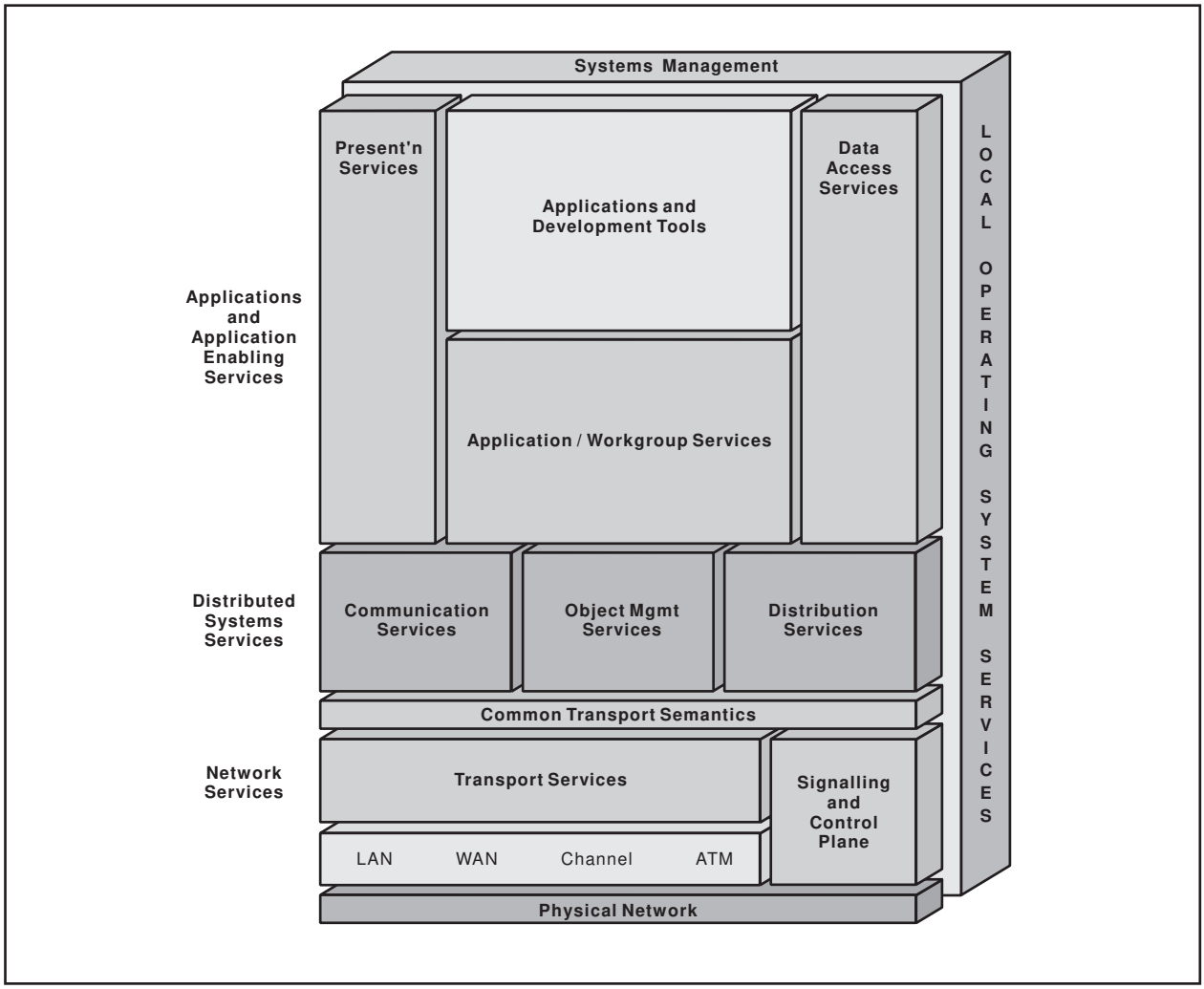
Open Blueprint

Event Services Resource Manager



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About This Paper

Open, distributed computing of all forms, including client/server and network computing, is the model that is driving the rapid evolution of information technology today. The Open Blueprint structure is IBM's industry-leading architectural framework for distributed computing in a multivendor, heterogeneous environment. This paper describes the Event Services resource manager component of the Open Blueprint and its relationships with other Open Blueprint components.

The Open Blueprint structure continues to accommodate advances in technology and incorporate emerging standards and protocols as information technology needs and capabilities evolve. For example, the structure now incorporates digital library, object-oriented and mobile technologies, and support for internet-enabled applications. Thus, this document is a snapshot at a particular point in time. The Open Blueprint structure will continue to evolve as new technologies emerge.

This paper is one in a series of papers available in the *Open Blueprint Technical Reference Library* collection, SBOF-8702 (hardcopy) or SK2T-2478 (CD-ROM). The intent of this technical library is to provide detailed information about each Open Blueprint component. The authors of these papers are the developers and designers directly responsible for the components, so you might observe differences in style, scope, and format between this paper and others.

Readers who are less familiar with a particular component can refer to the referenced materials to gain basic background knowledge not included in the papers. For a general technical overview of the Open Blueprint, see the *Open Blueprint Technical Overview*, GC23-3808.

Who Should Read This Paper

This paper is intended for audiences requiring technical detail about the Event Services Resource Manager in the Open Blueprint. These include:

- Customers who are planning technology or architecture investments
- Software vendors who are developing products to interoperate with other products that support the Open Blueprint
- Consultants and service providers who offer integration services to customers

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Contents

Open Blueprint Event Services Resource Manager 1
Open Blueprint Event Services Resource Manager 1
Characteristics 3
Relationship to Other Open Blueprint Resource Managers 4

Notices 5
Trademarks 5

Communicating Your Comments to IBM 7

Figures

1. Event Consumer and Supplier 1
2. Event Consumer, Supplier and Channel 2
3. Push Model 2
4. Pull Model 2
5. Push Event Channel 3
6. Pull Event Channel 3
7. Pull and Push with an Event Channel 3

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Open Blueprint Event Services Resource Manager

The Event Services resource manager allows a program to send information to another program. The Event service decouples the communication between the program generating the information and the program which deals with the information; that is, it decouples the communication between the program generating the event and the program which deals with the event. Examples of event-driven applications include:

- A stock-selling application might need to be invoked when the price of a particular stock has reached a certain price. The software tracking the stock prices only needs to know what stock market events are of interest. When it finds that a stock has reached its desired price it reports the event. A risk assessment application may then choose to buy or sell the stock.
- A systems administration tool is interested in knowing if a disk runs out of space. The software managing the disk is unaware of the existence of the systems administration tools; the software simply reports that the disk is full. When the disk runs out of space, the system administration tool opens a window to inform the user which disk has run out of space.

Open Blueprint Event Services Resource Manager

The Open Blueprint Event Services resource manager is an implementation of the Object Management Group (OMG) Event Services Specification. This specification defines the Event service in terms of consumer objects and supplier objects. Suppliers produce event data and consumers process event data. The event data is communicated between the suppliers and consumers by the Event service.

The Open Blueprint Event Services resource manager provides a framework for implementing the function. A robust, full capability Event service will be built on top of the Open Blueprint Messaging and Queuing resource manager and a lighter-weight version will be built using the distributed capabilities of the Open Blueprint Object Management Services.

There are two models of communication between suppliers and consumers, called the push model and the pull model. In the push model, the supplier initiates the transfer of the event data to the consumers. In the pull model, the consumers request the event data from the suppliers.

Consumers and suppliers may communicate directly using the Event service interfaces, or more usefully, an event channel may be inserted between them. The event channel is mapped onto a message queue and allows asynchronous communication between consumers and suppliers. The channel looks like a consumer to suppliers and a supplier to consumers and so it is both a consumer and supplier of events.

Figure 1. Event Consumer and Supplier

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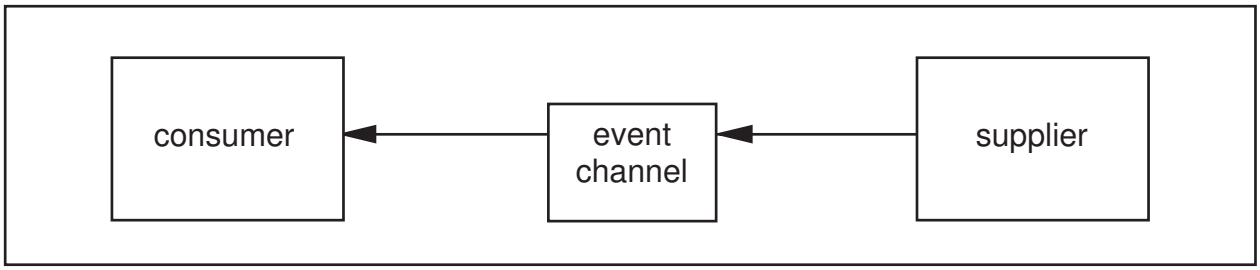

Figure 2. Event Consumer, Supplier and Channel

Push Model

When using the push model, suppliers push the event data by invoking the push operation of the consumer's PushConsumer interface. To set up a push-style communication the suppliers and consumers exchange information about how to invoke each other by exchanging PushSupplier and PushConsumer object references.

Figure 3. Push Model

Pull Model

When using the pull model, consumers pull the event data by invoking the pull operation of the supplier's PullSupplier interface. The consumer will wait until event data is available or the connection is closed. To set up a pull-style communication, the suppliers and consumers exchange information about how to invoke each other by exchanging PullSupplier and PullConsumer object references. See Figure 4 for an example of the pull model.

Figure 4. Pull Model

Event Channel

The event channel decouples the communication between the suppliers and consumers and provides asynchronous communication. The suppliers and the consumers communicate with the event channel synchronously but the event channel does not need to supply the event data to the consumer at the same time it receives it from the supplier.

Event channels can communicate with consumers and suppliers using either the push or pull model.

When using the push model, the supplier pushes the event data to the event channel. The event channel pushes the data to the consumer. See Figure 5 for an illustration of the push event channel.

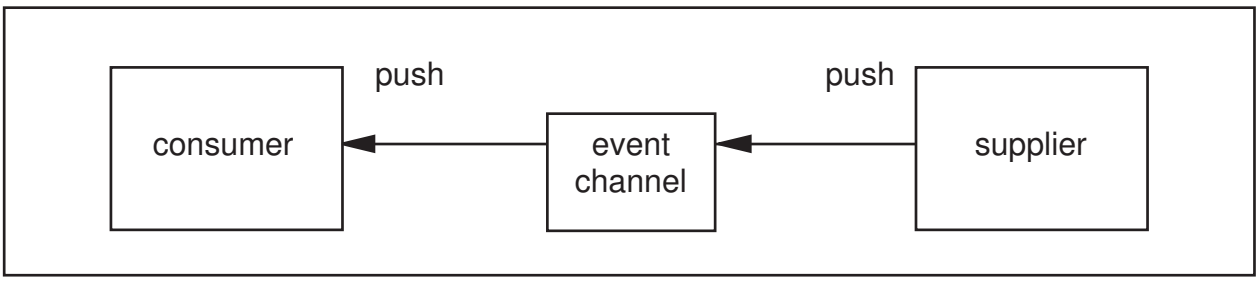

Figure 5. Push Event Channel

When using the pull model, the consumer pulls the event data from the event channel. The event channel pulls the data from the supplier. See Figure 6 for an illustration of the pull event channel.

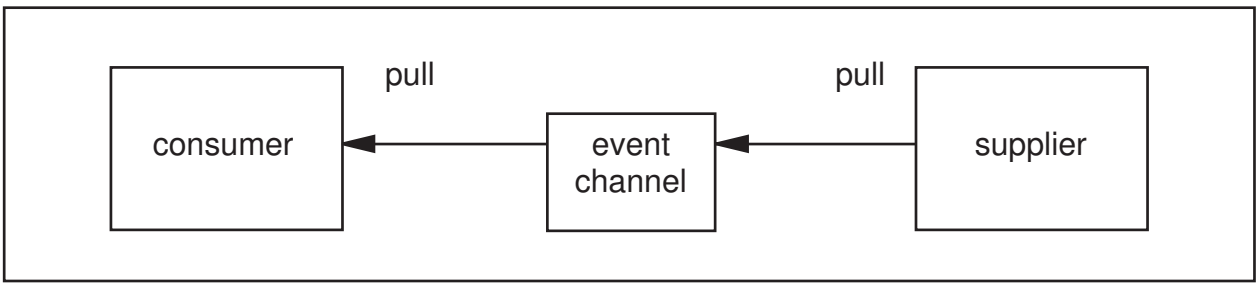

Figure 6. Pull Event Channel

It is also possible to use a different model between the consumer and the event channel and the supplier and the event channel, as shown in Figure 7.

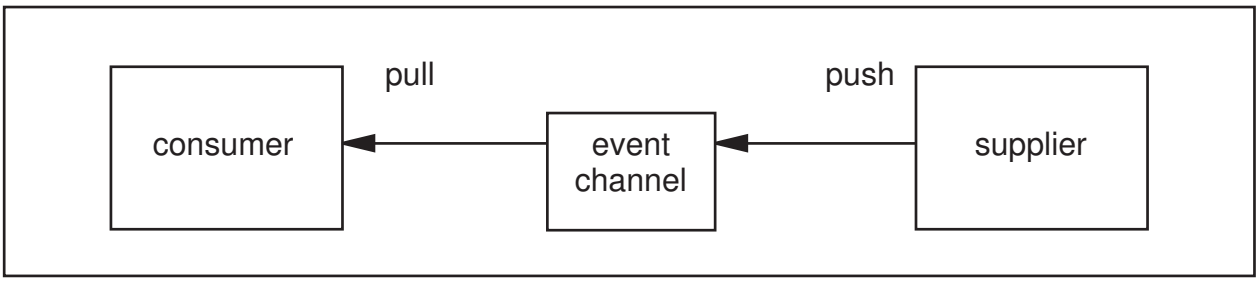

Figure 7. Pull and Push with an Event Channel

Characteristics

The OMG Event specification defines the syntax for Event service but not all the semantics. It is possible to have a number of implementations of the event service that provide differing class of service that would still meet the specification.

The Open Blueprint Event Services resource manager will store all events in the channel for delivery to consumers. The events may, optionally, be delivered to only one of the consumers or may be delivered to all of them. When a consumer first subscribes, it may choose to receive all the previous events or only the events generated since it subscribed.

Relationship to Other Open Blueprint Resource Managers

Event Services and Object Management Services

Event services exploits the Object Request Broker (distributed SOM), to access remote objects such as suppliers, consumers, and event channels. In this implementation, the consumer object actually interfaces with a supplier proxy object, and the supplier object actually interfaces with a consumer proxy object. Thus, the implementation directly uses distributed SOM proxy objects.

Event Services and Message Queuing

The Event Services resource manager event channel support is built on top of the Messaging and Queuing resource manager and gains much of its function from the Messaging and Queuing resource manager. The event channels are implemented as message queues with event data stored as messages on the queue.

Event services is a simplified interface to the Messaging and Queuing resource manager and provides a subset of the Message Queuing function.

Events are a one-way communication mechanism. The event supplier and the event consumer have a simple relationship and are very independent of each other. The event supplier makes event data available to any event consumer which might have an interest.

Message queuing is a more direct communication between cooperating programs. For example, when sending a message to a credit authorization program, you would expect to get a reply.

The message queuing functions available through Event services are:

- Asynchronous communication
- Assured delivery
- Location transparency
- Protocol transparency
- Connectionless communication
- Store and forward
- Security
- Session concentration

Refer to *Open Blueprint Messaging and Queuing Resource Manager* for a full description of the message queuing function.

Directory

The Event Services resource manager takes advantage of the Messaging and Queuing resource manager and Object service's use of the Directory service to allow consumers and suppliers to find the location of event channels in the network.

Security

The Event Services resource manager takes advantage of the authentication performed by either the local operating system or the Open Blueprint Security service to identify users. It also takes advantage of the Messaging and Queuing resource manager's and Object Management services' use of security to limit access to event channels.

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