

On the Radar: Pivotal RabbitMQ offers open source message-brokering

Managing messages in microservices architecture applications

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Summary

Catalyst

Messaging systems form the backbone and nerve system that link multiple technologies and applications. Having an open source, easy to adopt and use messaging system is therefore a widespread need. Messaging is a requirement when decoupling services for microservices architecture, or linking legacy technologies to applications built on more modern architectures such as cloud-native development. Pivotal supports a very broad range of open source projects including Pivotal Cloud Foundry, RabbitMQ, the Java Spring framework, Greenplum, and more. Its flagship product, Pivotal Cloud Foundry, includes RabbitMQ and is now a commonly used component. With RabbitMQ, Pivotal provides a messaging system that supports operability, with good administrative control by operators, safety policies, and security and compliance support. Pivotal provides RabbitMQ as an integrated service for both on-premises and cloud-hosted installations of Pivotal Cloud Foundry, offering both shared and dedicated-broker models. Pivotal places a strong emphasis on supporting Java and .NET applications with RabbitMQ, and a wide range of community language clients is also available. RabbitMQ was first released to the open source community 10 years ago, and today it is popular for microservices-based cloud-native development.

Key messages

- Pivotal RabbitMQ provides support for multiple open-standard messaging protocols and patterns.
- It includes extensive client libraries and tooling ecosystems (20 programming languages, 100+ ecosystem projects) from an active open source community.
- RabbitMQ offers enterprise-grade authentication, authorization, and security features.
- Commercial distributions and training are available from Pivotal as well as operational support to ease implementation in larger implementations.

Ovum view

RabbitMQ is a flexible tool that is widely deployed in the market as an open source message broker. It decouples apps and services, to enable asynchronous communication. It manages queues that serve as buffers between applications and services running in different locations, and supports applications built in different languages and applications that need to scale. RabbitMQ is a key component for providing communications in many deployed microservices architecture (MSA) applications. It is also used to help when decomposing monolithic applications into smaller modules and microservices. RabbitMQ enables the independent scaling of application components and the communication between them. It can be used for routing or load balancing, and is very popular for crossing language barriers and generational barriers between technologies and platforms. Decoupled messaging has become a requirement when supporting MSA, and RabbitMQ's domain-specific messaging approach is a good fit for cloud-native development.

Recommendations for enterprises

Why put RabbitMQ on your radar?

Pivotal is well positioned to offer a comprehensive platform for microservices, cloud native and event-driven applications. Pivotal's customers are typically enterprises looking to refresh their software infrastructure platforms, such as Websphere and WebLogic, for example.

RabbitMQ technology suits organizations of all sizes because it is easy to both federate and scale applications built on it. RabbitMQ broker can be used for smaller projects, such as by small teams responsible for developing a microservice, and it can also be integrated and communicate with other brokers in other parts of an architecture, forming a federated network of brokers. This means it is powerful and resilient but much easier than a massive message bus system, something frequently demanded by some of the larger enterprise service bus (ESB) users.

RabbitMQ will also be a good fit for users that need to support multiple operating systems. RabbitMQ rides on an Erlang-based runtime that is portable across many operating systems, much as Java applications ride on the JVM.

Key market opportunities for the use of RabbitMQ are increasing with the rise of cloud-based microservice architectures and the explosion of IoT applications. Both of these application areas drive significant adoption of messaging technologies, and both are well-suited to RabbitMQ.

Highlights

Main features

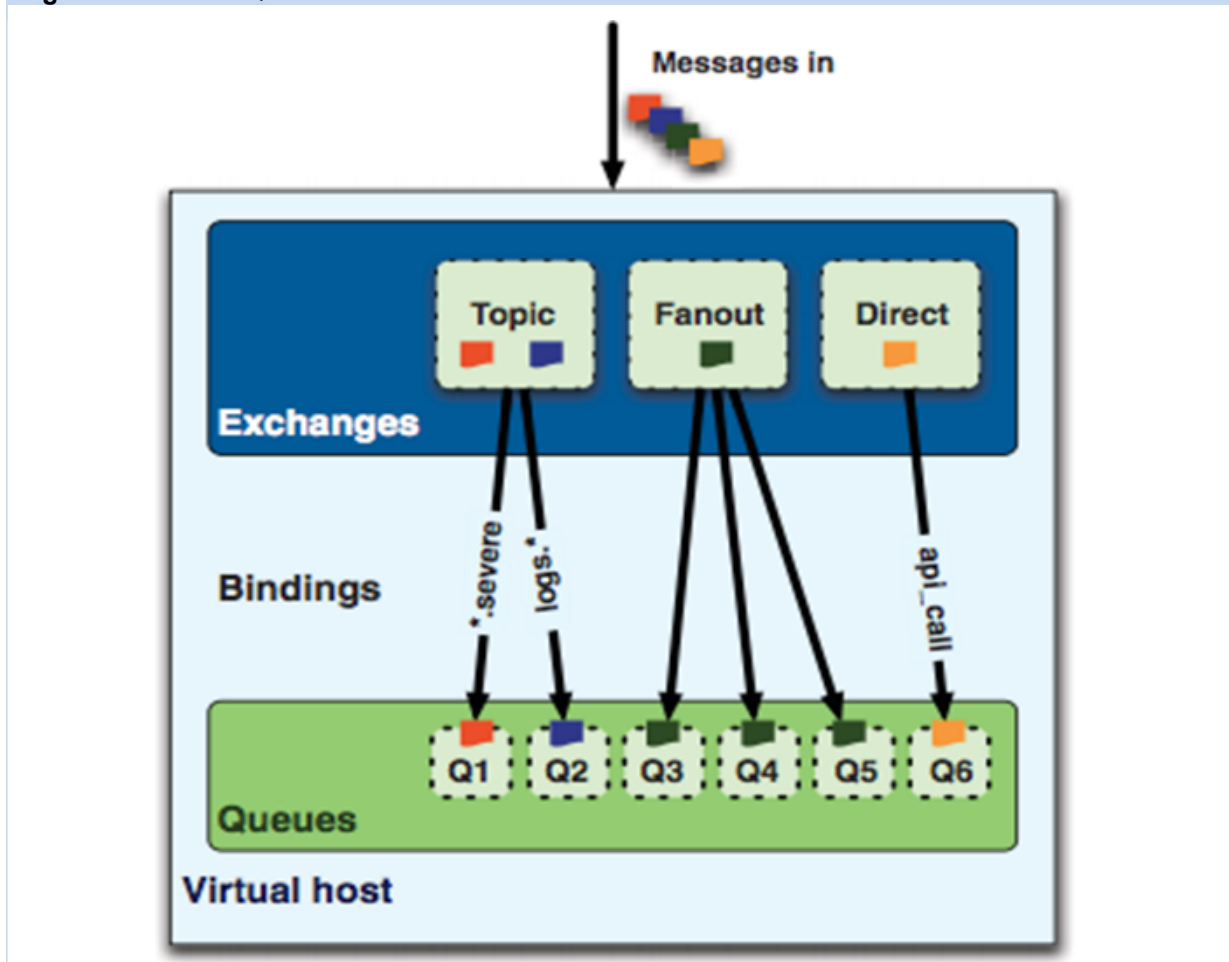
RabbitMQ is an open source message queuing system that implements multiple industry-standard messaging protocols to allow applications, microservices, and Internet-enabled IoT devices to communicate asynchronously with reliable message delivery. Cross-language and platform development is supported through client libraries for 20 programming languages as well as every major developer platform and many popular frameworks.

RabbitMQ scales out with multinode (cluster) deployments and as multiple integrated clusters, such as geographically distributed applications. RabbitMQ deployments can be configured for high message throughput and high availability.

For enterprise use cases, RabbitMQ includes a flexible authentication and authorization system that supports the leading enterprise authorization technologies, from username and passwords to LDAP and cryptographic certificates (OAuth2 compliance is under development). It allows for encrypted communications between applications nodes, and between nodes. Its lightweight footprint and ease of operation also make RabbitMQ particularly suitable for cloud deployment.

Architecture

Figure 1: RabbitMQ architecture



Source: Pivotal

RabbitMQ is a messaging broker (client/server) that can be deployed to implement common messaging patterns, such as message queuing, publish-subscribe, message routing, topical partitioning, and request-reply.

RabbitMQ is based on Erlang/OTP, an open source runtime for concurrent and distributed applications, originally developed by Ericsson. Client libraries communicate with RabbitMQ over standard messaging protocols based on TCP/IP. Supported protocols include AMQP 0.91, 0.9, 0.8, AMQP 1.0, STOMP, MQTT, JMS, and HTTP.

Incoming messages are received by exchanges that then route messages to queues partitioned by topics, fanned out to multiple queues, or via direct API calls. Receiving applications can pull individual messages from queues singularly or via subscription. Publisher and consumer acknowledgements are both supported.

RabbitMQ supports the clustering of multiple nodes to act as a single logical broker for high throughput. RabbitMQ queues can be mirrored across nodes in a cluster to provide high availability in the event of node failure. RabbitMQ clusters can be federated, linking exchanges and queues to implement more sophisticated message patterns, such as between geographically distant clusters.

Microservices architecture support

Decoupled messaging such as that offered by RabbitMQ is required to support MSA. RabbitMQ has been designed for easy adoption by developers and for use when ESBs are too heavy a solution. It is also offered as an online service by some of Pivotal's partners. Developers and administrators have several ways to consume RabbitMQ, including official RabbitMQ recipes for Chef, RabbitMQ installation methods through Puppet, and Cloud Foundry BOSH. There is also a popular Docker image of RabbitMQ available in the Docker Hub.

Background

Pivotal is software and services company based in San Francisco. Pivotal offerings include Pivotal Cloud Foundry, Pivotal Data Suite, Pivotal Labs, and Pivotal Data Science. In 2012 Pivotal was spun out of EMC and VMware with original investments from EMC, VMware, and GE. In 2016 the company announced a series C round led by Ford and Microsoft.

In 2014 Pivotal granted Cloud Foundry (the open source technology it developed, which also functions as the core of its flagship product Pivotal Cloud Foundry) to The Cloud Foundry Foundation, which is managed by the Linux Foundation.

The RabbitMQ work was initiated after the Advanced Message Queuing Protocol (AMQP) standard was established in 2004, defining a wire-level protocol built on TCP. In 2006 the founders of Rabbit Technologies implemented the AMQP protocol using the Erlang language, and RabbitMQ was launched to the open source community in 2007, making this its 10-year anniversary. Rabbit Technologies was acquired by VMware in 2010, became part of Pivotal in 2013, and was first released on Pivotal's Cloud Foundry in 2014.

Current position

Pivotal has more than 2,200 employees globally, with recent heavy expansion in EMEA and Asia-Pacific. RabbitMQ is the most widely used and deployed open source message queue broker, with thousands of companies using the technology including some of the largest companies, such as Ford, Bosch, and GM.

Pivotal's RabbitMQ implementation and distribution partners include Accenture, Pivotal, Dell/EMC Services, Accenture, and Capgemini. Technology partners include CloudAMQP (hosted).

In addition to the open source project, Pivotal offers RabbitMQ as part of two different product suites supporting multiple components:

- Pivotal App Suite (sold on a per-core subscription basis) supports the Pivotal-branded distribution or open source distribution of RabbitMQ.
- Pivotal Cloud Foundry Services Suite provides support for RabbitMQ as a service in Pivotal Cloud Foundry or Pivotal branded distribution outside of Pivotal Cloud Foundry.

Futures

Pivotal expects to offer further enhancements to RabbitMQ for very large-scale operations and throughput to further drive enterprise adoption. Additional features for enterprise administrators and service providers are planned to ensure safety and stability of "as-a-service" offerings and ease of maintenance. Pivotal will also support continued expansion of the ecosystem of libraries and developer tools. Key market opportunities lie in the rise of cloud-native MSA and IoT-related projects,

both of which are driving significant adoption of messaging technologies, and both of which are well-suited for RabbitMQ.

Data sheet

Key facts

Table 1: Data sheet: RabbitMQ

Product name	RabbitMQ for Pivotal Cloud Foundry	Product classification	Message-oriented middleware
Version number	3.6.7	Release date	Continual
Industries covered	All	Geographies covered	All
Relevant company sizes	All	Licensing options	Term, SaaS, CPU core or per-instance-based licensing
URL	rabbitmq-sales@pivotal.io	Routes to market	Direct enterprise sales force
Company headquarters	San Francisco, CA, US	Number of employees	2,200

Source: Pivotal



Source:

Appendix

On the Radar

On the Radar is a series of research notes about vendors bringing innovative ideas, products, or business models to their markets. Although On the Radar vendors may not be ready for prime time, they bear watching for their potential impact on markets and could be suitable for certain enterprise and public sector IT organizations.

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