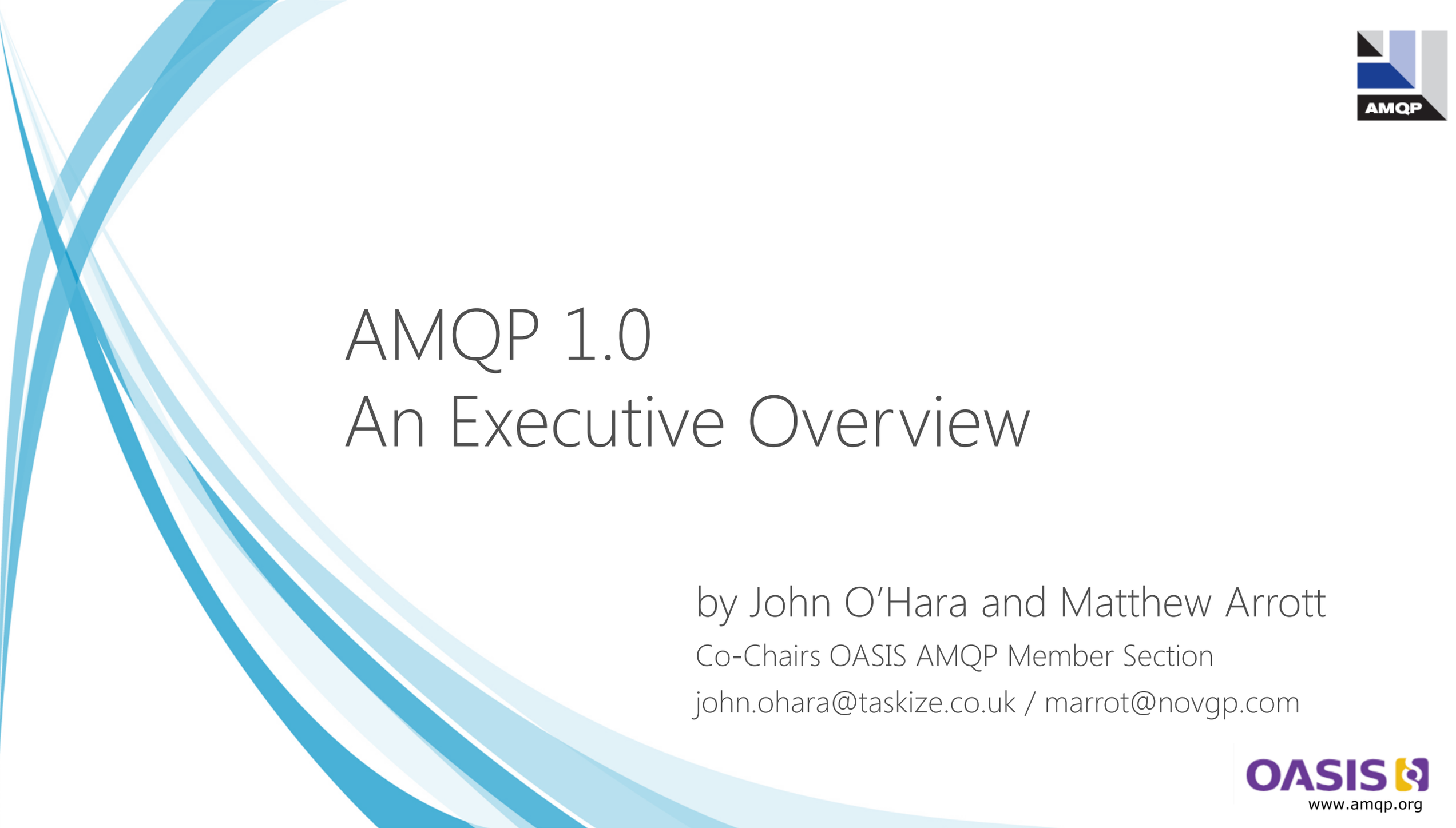

AMQP 1.0
An Executive Overview

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Agenda

Introduction to messaging

The case for AMQP

What is AMQP 1.0?

Comparison to HTTP

AMQP 1.0 implementations

Summary

OASIS AMQP 1.0 Standard released

Software users and vendors can invest in AMQP 1.0 knowing it's a stable, well-supported protocol standard

Aviation

SITA

Financial Services

Bank of America, N.A.

Barclays Bank Plc

Credit Suisse

Deutsche Börse

Goldman Sachs

JPMorgan Chase Bank, N.A.

Government

US Dept. of Homeland Security

Technology

Axway Software

Cisco Systems

Flame Computing Enterprises

HCL Technologies Ltd

Huawei Technologies

IIT Software GmbH

INETCO Systems Limited

Kaazing Corporation, N.A.

Microsoft Corporation

Mitre Corporation

Primeton Technologies

Progress Software

Red Hat Inc.

Software AG

Solace Systems Inc.

StormMQ Ltd.

Tervela Inc.

Thales e-Security

TWIST Process Innovations

VMware, Inc.

WS02 Inc.

The Business Case

Business value

'As they shift toward an integrated digital business model, most companies move through four stages: ad-hoc solutions, digital business processes, cohesive digital platform, digital business model'

accenture

How to Transform the Business Model, 2012

- Businesses need to efficiently exchange information within and between enterprises
- What is needed is a data exchange protocol that **directly addresses** business requirements
- This capability must be **ubiquitous** and unencumbered to encourage sustained investment
- A protocol that is based around **units-of-work** (messages) allows business interactions to be elevated **above technical details**

Government value

Standardization of AMQP will accelerate its adoption

Progressing towards ISO status to further enhance commitment rates

Committed to longevity

Governments are among the largest consumers of IT products and services

- Citizens demand these are both efficient & integrated

AMQP for Integrated Modular Government IT

- Connect organizations nationally and internationally
- AMQP connectivity can facilitate deep co-operation and enable right-sized sourcing of IT contracts
- Already deployed by government projects

Proprietary messaging protocols

Difficult to connect across organizations

Requires partners to negotiate to use the same vendor

Difficult to port applications

Requires re-coding all applications

Difficult to integrate

Application level bridges to adapt messages and formats

Restricted platform support

Limited to whatever vendor provides

AMQP 1.0

Advanced Message Queuing Protocol

Open, standard messaging protocol

Enables cross-platform apps to be built using brokers, libraries and frameworks from different vendors. Incorporates and standardizes two decades of messaging experience.

Features

Efficient – compact and easily processed

Reliable – fire-and-forget to reliable, exactly-once delivery

Portable data representation – cross-platform, full-fidelity exchange

Flexible – peer-peer, client-broker, and broker-broker topologies

Internet-scale – connects diverse networks

Industry backing for AMQP 1.0

'A platform independent and vendor neutral protocol like AMQP removes hurdles in advancing interoperability of message-oriented middleware technologies…'
Prasad Yendluri, VP & Deputy CTO, SoftwareAG

'Standardizing AMQP and combining it with WebSocket technology is an excellent strategy when building an event driven architecture…'
John Fallows, CTO and Co-Founder, Kaazing

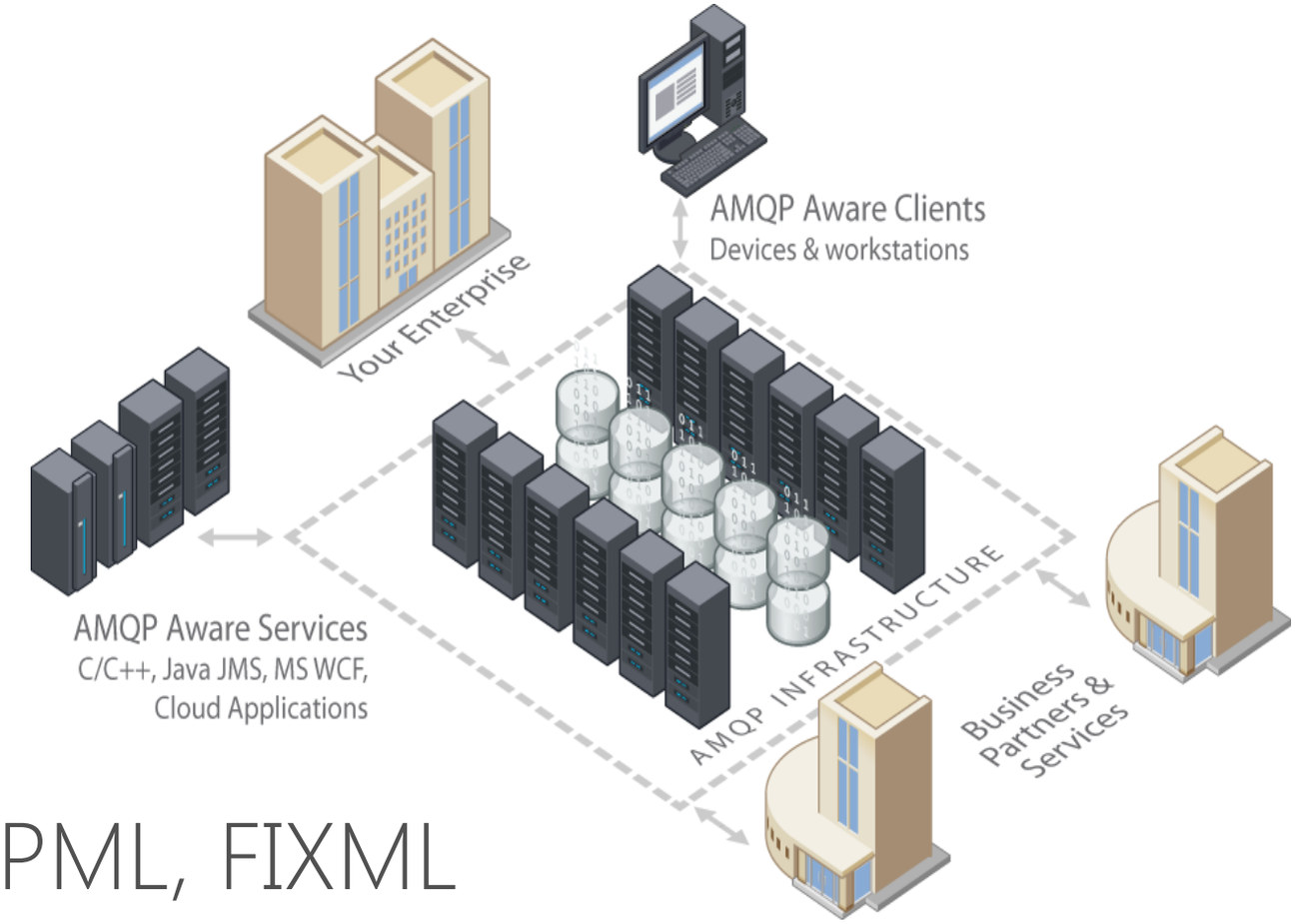
'As an open and interoperable messaging protocol that can scale from mobile clients to the cloud… we look forward to working with the community to promote AMQP-based interoperability and innovation.'
Scott Guthrie, Corporate VP, Server & Tools Business Division, Microsoft

'Standard transports enable lower cost business integration and messaging… we anticipate both AMQP's wide adoption by messaging servers…integration products.'
Alexis Richardson, Senior Director, VMware

'AMQP 1.0 represents a significant improvement in the messaging arena and we expect to continue to support it in our products to meet customer needs.'
Mark Little, Vice President, Middleware Engineering, Red Hat

User view of AMQP 1.0

- Applicability
- Reliability
- Interoperability
- Ubiquity
- Secure Investment



Transport for business messaging, e.g. ISO20022, FPML, FIXML and others…

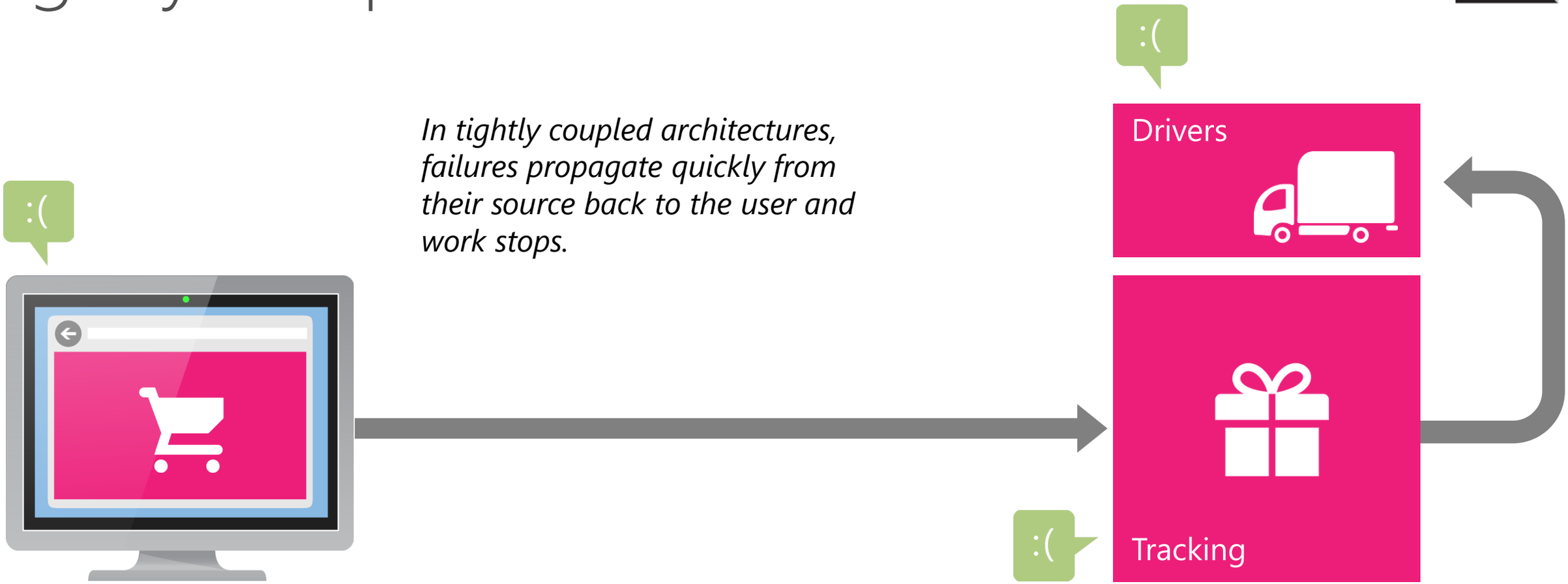
The Capability

AMQP is for MOM

‘Message-Oriented Middleware allows application modules to be distributed over heterogeneous platforms and reduces the complexity of developing applications that span multiple operating systems …’

Tightly Coupled

In tightly coupled architectures, failures propagate quickly from their source back to the user and work stops.

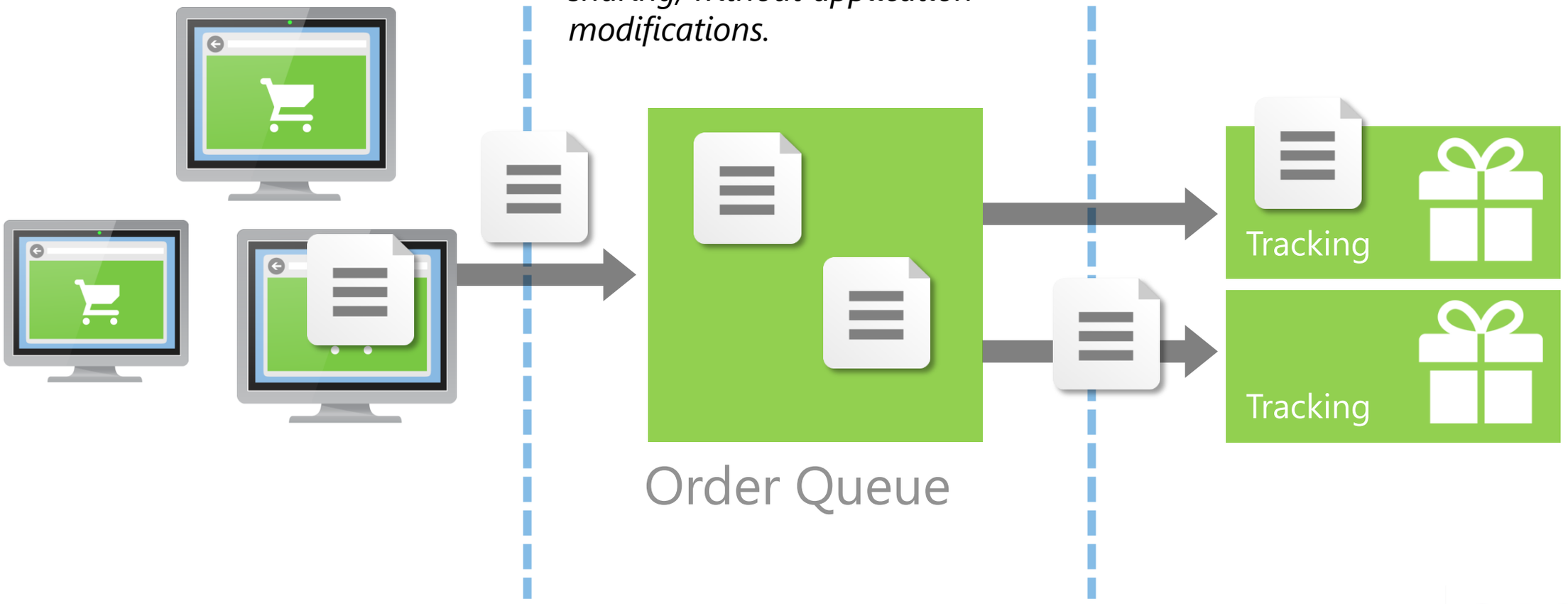


Loosely Coupled

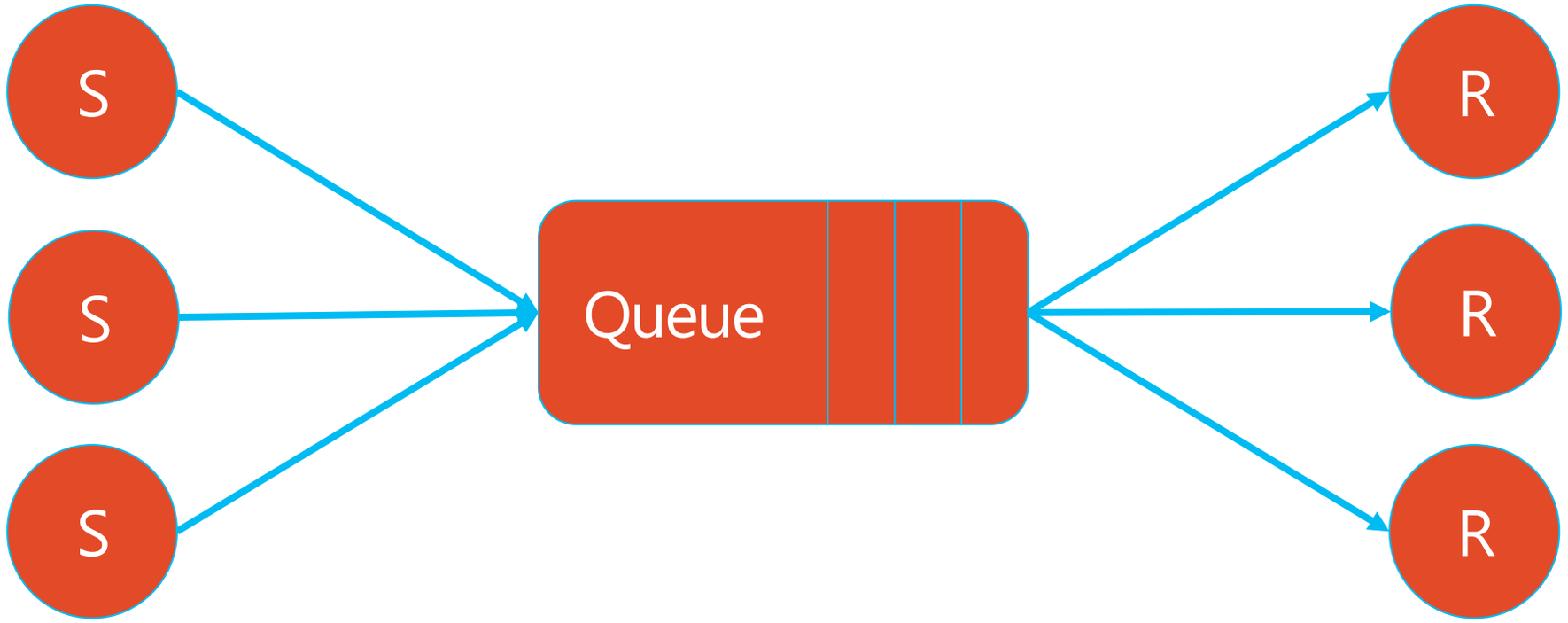
In loosely coupled architectures, failures are contained and users may continue to work. Queuing is an important tool for this approach.

Loosely Coupled

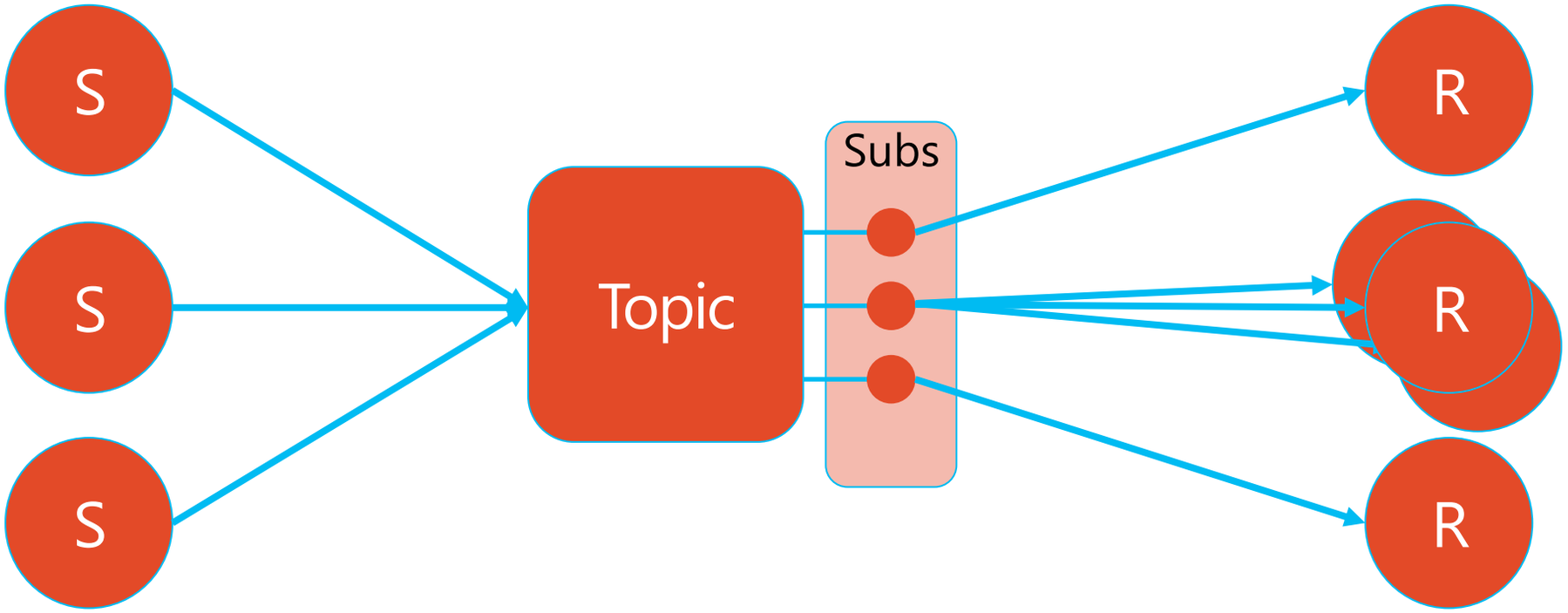
Queuing also facilitates orderly scaling to handle increased demands through work-load sharing; without application modifications.



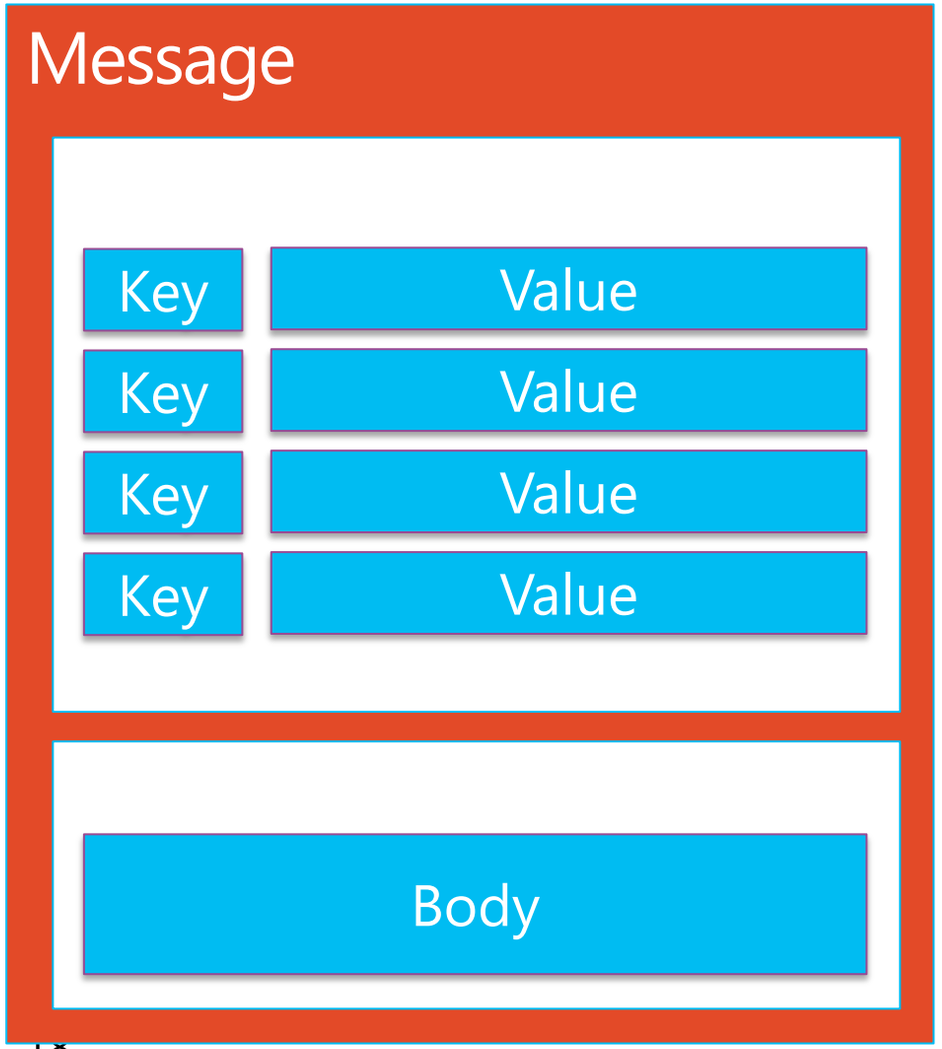
Messaging concepts: queuing



Messaging concepts: pub/sub



Messaging concepts: message



Properties

Key/value pairs exposed to the broker

Subscription rules can filter based on properties

Body

Opaque payload not exposed to the broker

Can be used for encrypted data

The Technology

Features

OASIS AMQP 1.0 standardises **transfer of responsibility** between entities and enables **information routing**

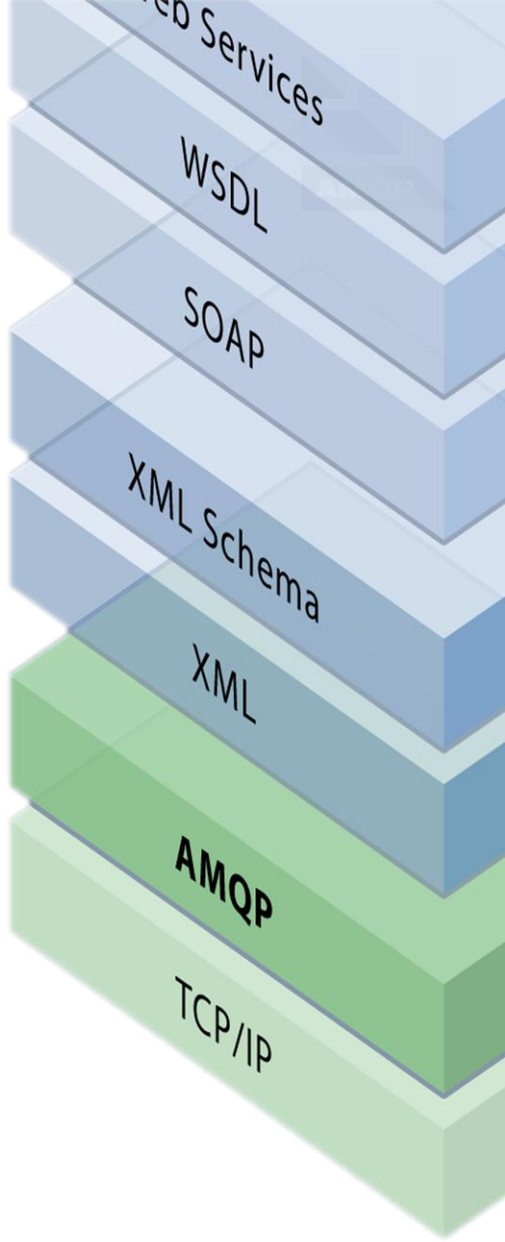
- Foundation for layered services

AMQP 1.0 innovation – **predicated links**

- Links control what information flows
- Links are to messaging as SQL was to databases

These capabilities are the basis for more effective business flows on the Internet

- Add business semantics with ISO20022, FpML, FIXML, etc.



AMQP and HTTP compared

Complimentary protocols, not competitors

AMQP alongside HTTP on the Internet

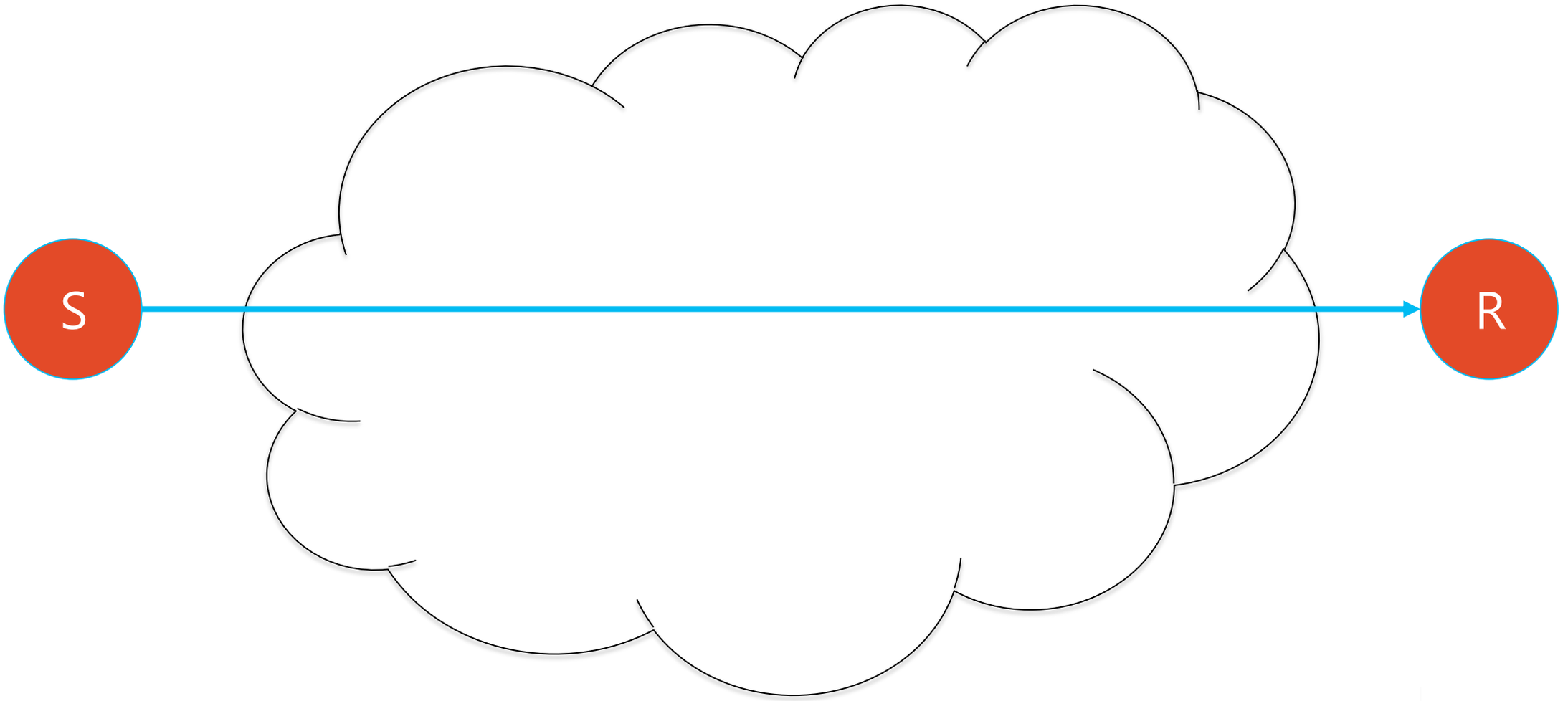
- AMQP for pub/sub and transactions
- HTTP for request/response

Goal for native AMQP support in browsers

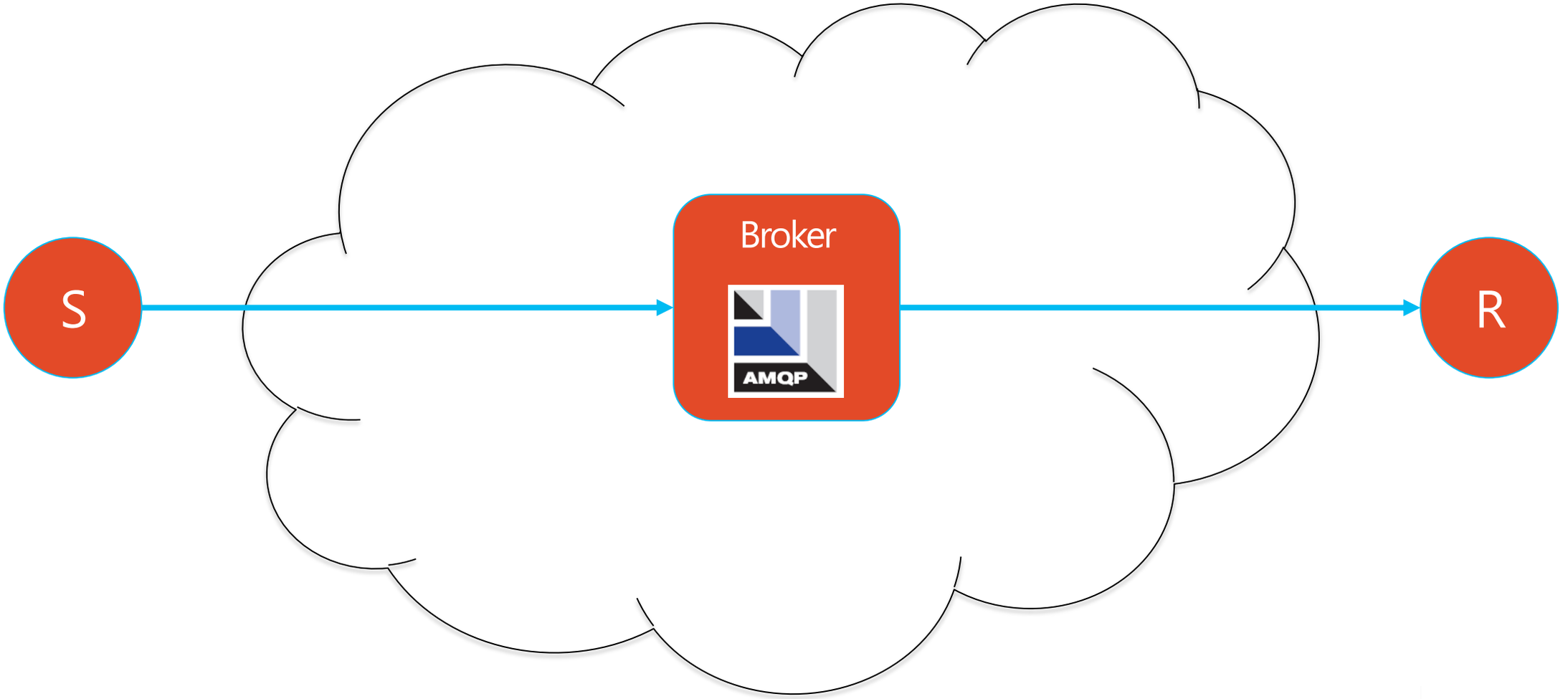
- with transition via Javascript clients

Capability	HTTP	AMQP
Get	●	●
Caching	●	○
Put	●	○
Post	●	●
Delete	●	○
Content filtering	○	●
Typed headers	○	●
Resumeable transfers	●	●
Transactions	○	●
SSL/TLS	●	●
Kerberos	●	●
SASL	○	●
Symetric Protocol	○	●
Socket Multiplexing	○	●
Out-of-order messaging/acks	○	●
Server initiated transfers	○	●
Single packet send	●	●
Store-and-forward	○	●
Publish-and-subscribe	○	●
Defined Error Recovery	○	●
Well defined addresses	●	●
Content based routing	○	●
Client Prefetch	○	●
Selective Acknowledgement	○	●
Credit-based flow control	○	●

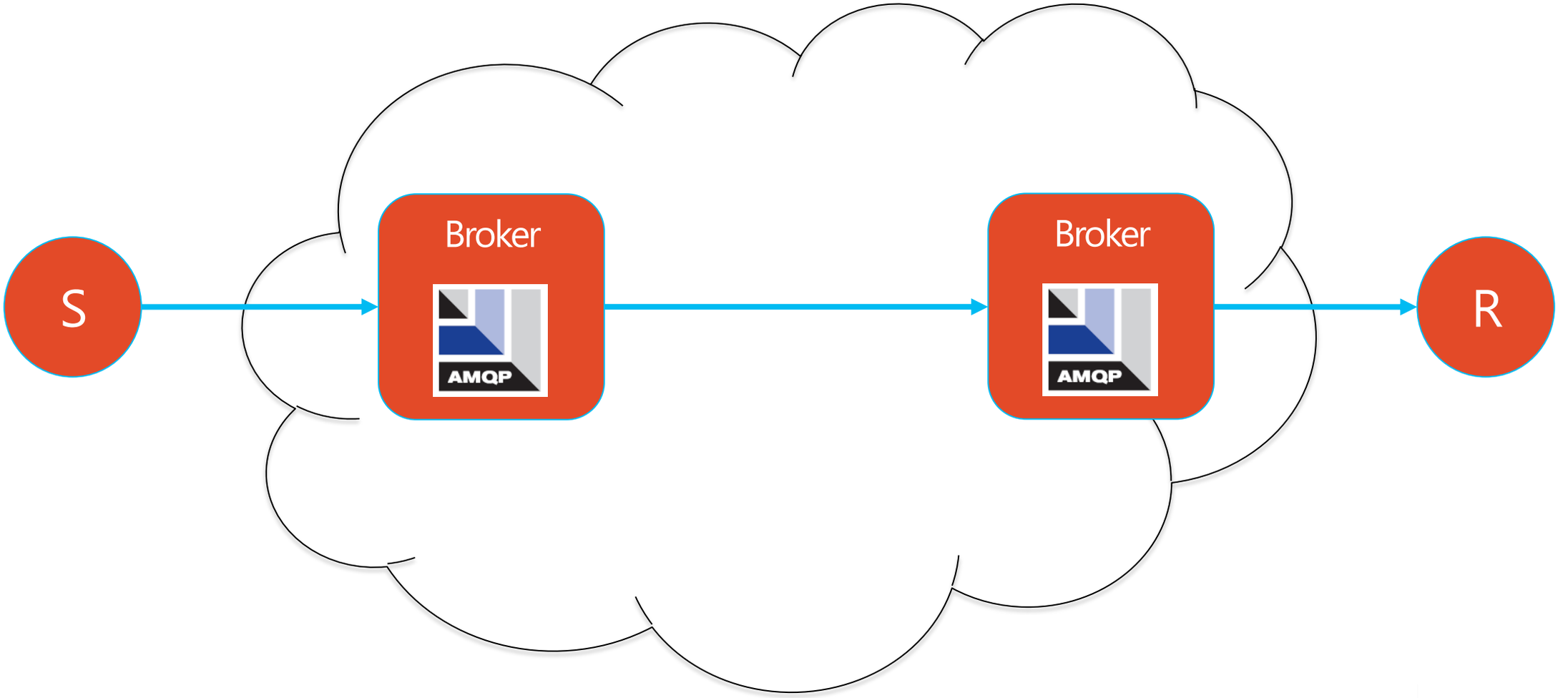
Flexible topologies



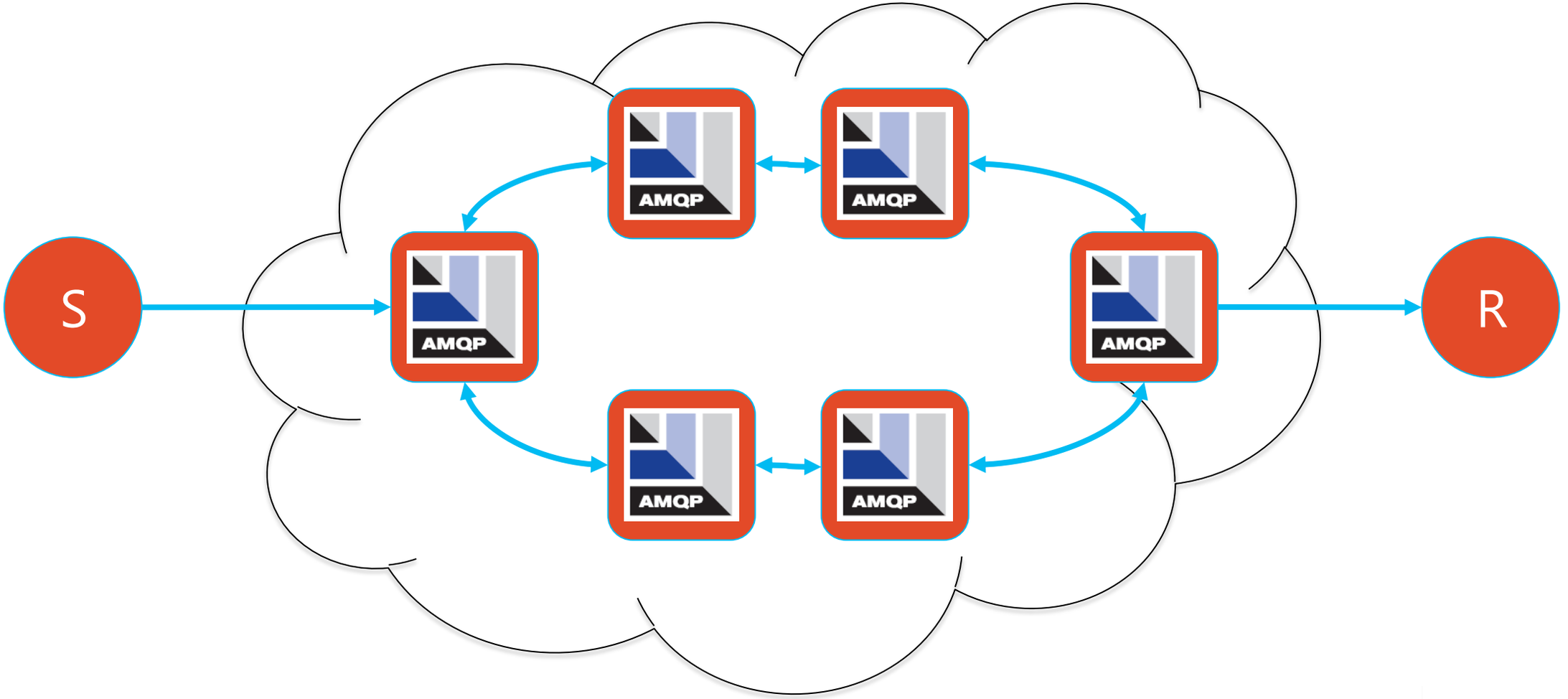
Flexible topologies



Flexible topologies



Flexible topologies



The Products

Apache Qpid

Open Source AMQP Messaging

Brokers and Client libraries supporting AMQP

Java Broker

Supports all versions of AMQP, including AMQP 1.0 since 0.18

JMS Client

Java JMS client which works with any AMQP 1.0 compliant service

C++ Broker

AMQP 1.0 support in next release (scheduled for later this month)

Home of Proton toolkit library

Apache Qpid Proton

Proton is toolkit for speaking AMQP, including:

The AMQP Messenger API, a simple but powerful interface to send and receive messages over AMQP
The AMQP Protocol Engine, a succinct encapsulation of the full AMQP protocol machinery

Proton is designed for maximum embeddability:

Minimal dependencies
Minimal assumptions about threading model

Proton is designed to scale up and down:

Transparently supports both simple peer to peer messaging and complex globally federated topologies

Proton is multi-lingual:

Designed for easy language bindings
Includes full fidelity data exchange: maps, lists, data structures, ...

Microsoft Azure Service Bus

Unified set of messaging capabilities

Consistent management and observation capabilities

Service Bus Relay

Rich options for interconnecting apps across network boundaries

Service Bus Brokered Messaging

Queuing, publish/subscribe

Easily build hybrid apps

Available as PaaS & on-premise server

Supports AMQP 1.0

SwiftMQ

Commercial JMS messaging since 2000

Based on a federated router network

Provides High Availability

First AMQP 1.0 implementation

Available since January 2012

Full-featured inc. transactions & link recovery

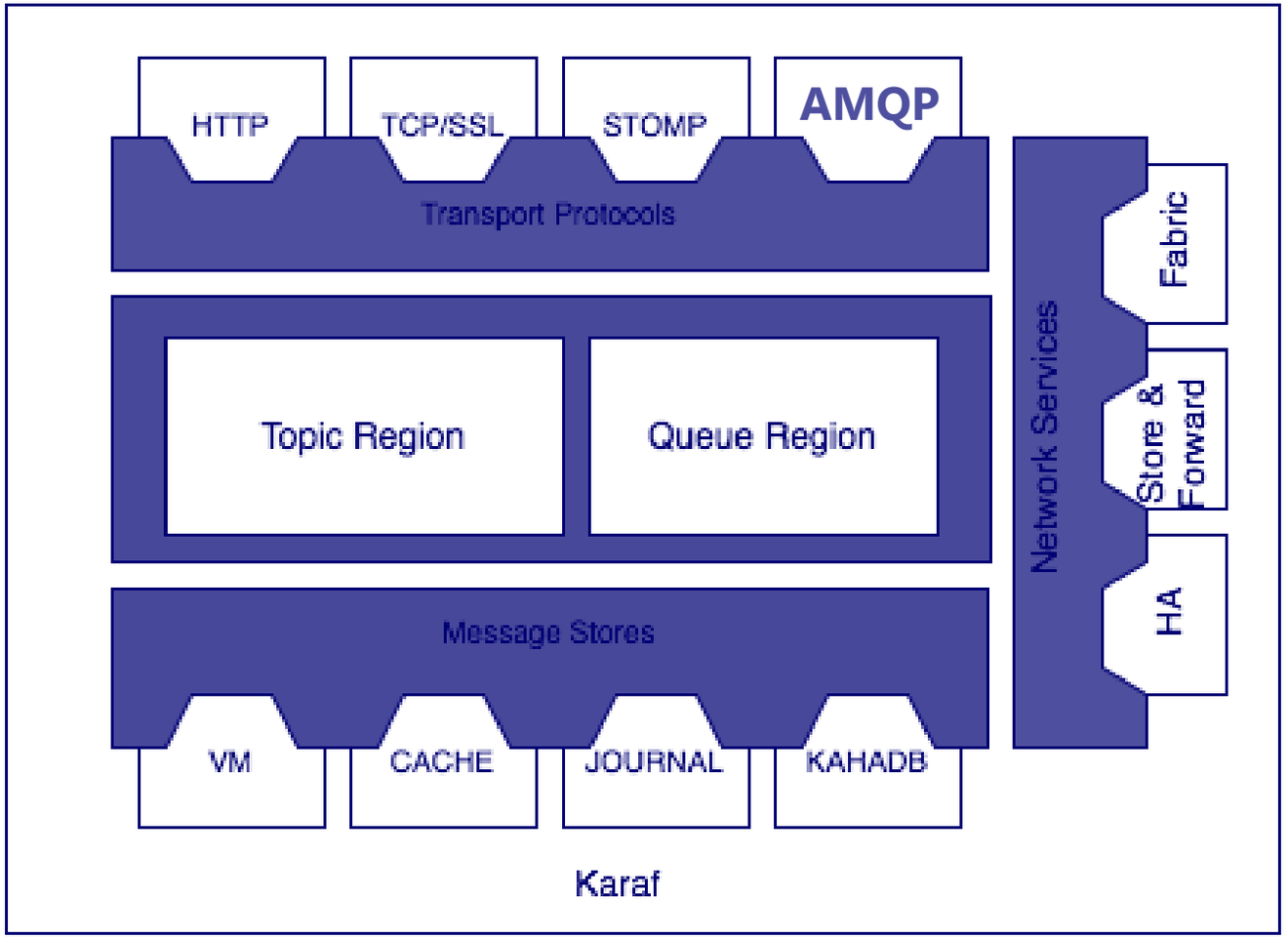
Fully integrated with JMS

Includes an AMQP bridge

Bridge between AMQP 1.0, AMQP 0.9.1 & JMS

Apache ActiveMQ

- Reliable Java broker
- Multi-protocol
- Multi-OS
- Small footprint
- Pluggable architecture allows protocols and features to be added or customized
- Coming soon AMQP 1.0!



VMware RabbitMQ

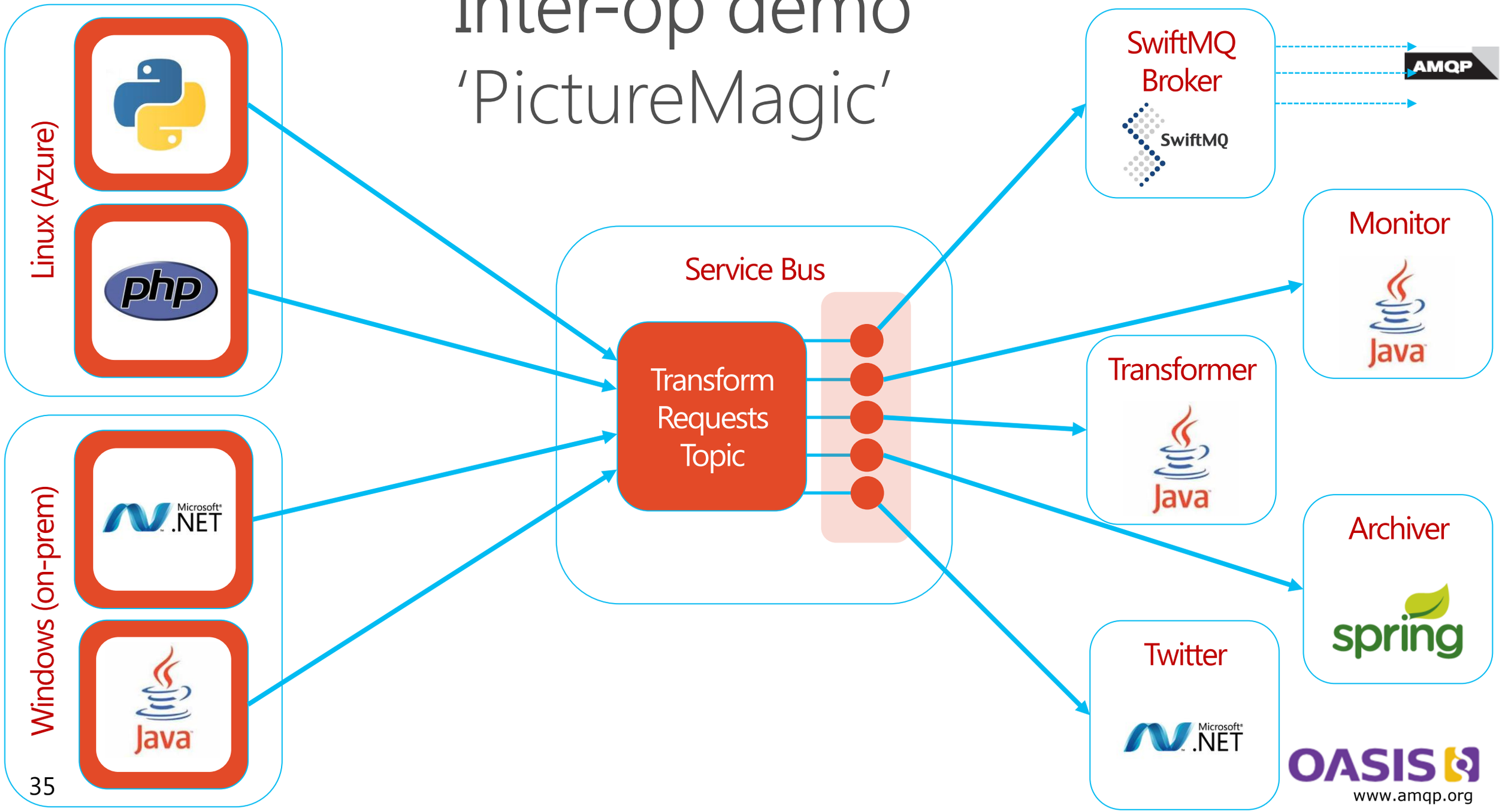
- Implemented in Erlang for exceptional scalability & robustness
- Multi-protocol broker engine
- Bridge between AMQP 1.0, AMQP 0.9.1, XMPP, Stomp and others
- Vibrant community
- Integrated with Spring

AMQP 1.0 client libraries

Language	Library
C#	Service Bus .NET Client Library
Java	Apache Qpid Java Message Service (JMS) client IIT SwiftMQ Java client
C	Apache Qpid Proton-C
PHP	Apache Qpid Proton-PHP
Python	Apache Qpid Proton-Python
Ruby	Apache Qpid Proton-Ruby (coming soon)
Perl	Apache Qpid Proton-Perl (coming soon)
JavaScript	Apache Qpid Proton-JavaScript (coming soon)

The Demonstration

Inter-op demo
‘PictureMagic’



OASIS
www.amqp.org

Summary

AMQP 1.0 is the OASIS Standard for messaging

Open, standard, efficient, flexible, reliable

Enables cross-platform messaging applications

Mix languages, operating systems and vendors

Business messages exchanged at full-fidelity

Brokers and clients available now:

Apache Qpid Proton, SwiftMQ, Azure Service Bus

Many more coming soon, inc. ActiveMQ, RabbitMQ

More information

AMQP Member Section at OASIS

http://www.amqp.org

Apache Qpid Java

http://qpid.apache.org/

Apache Qpid Proton

http://qpid.apache.org/proton/

Apache ActiveMQ

http://activemq.apache.org

VMware RabbitMQ

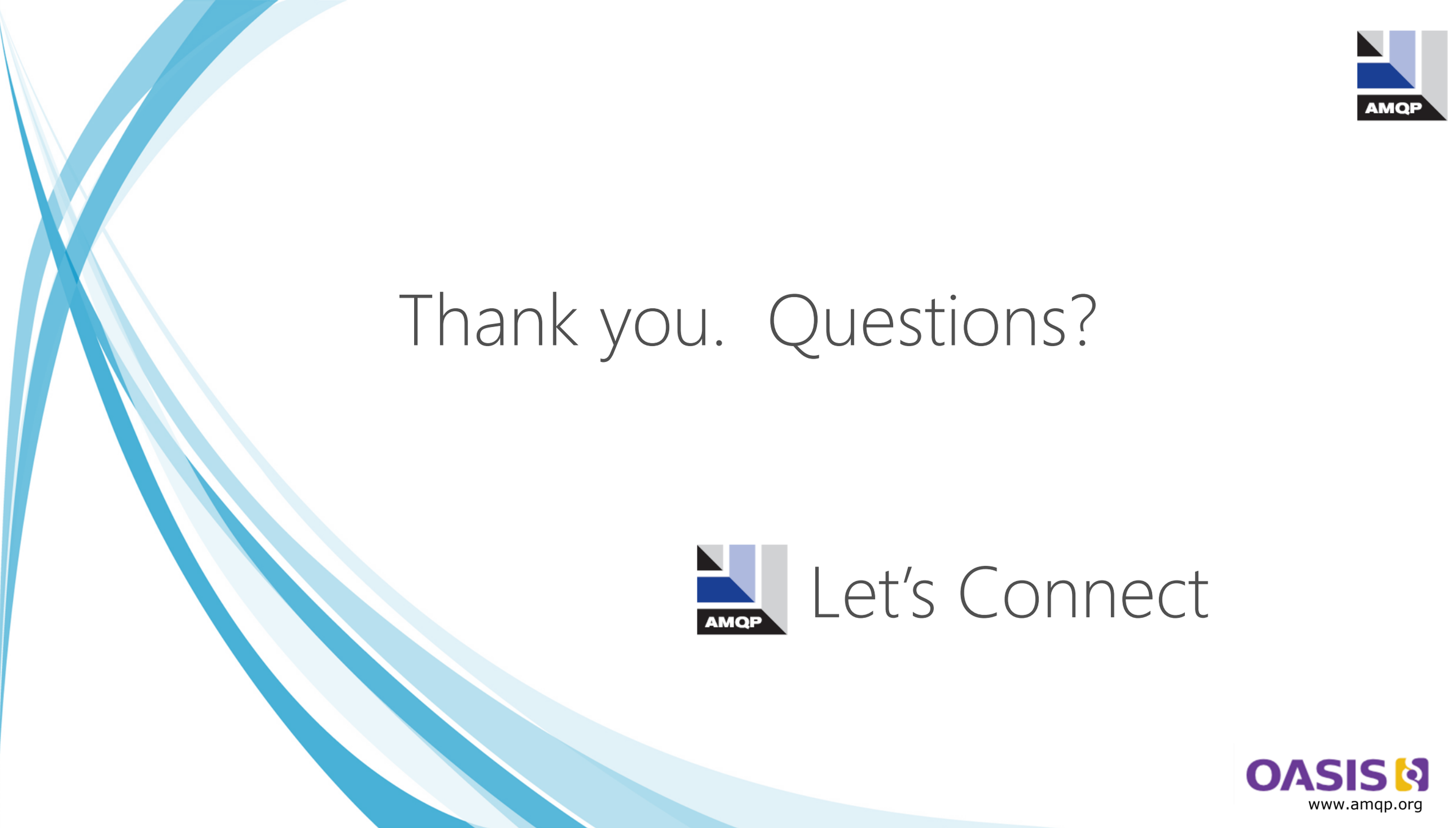
http://www.rabbitmq.com/

SwiftMQ

http://www.swiftmq.com

Microsoft Windows Azure Service Bus

https://www.windowsazure.com/en-us/develop/net/how-to-guides/service-bus-amqp-overview/



Thank you. Questions?

Let's Connect