

# IoT Networking

# Extensible Messaging and Presence Protocol (XMPP)

## Introduction

**XMPP – Extensible Messaging and Presence Protocol.**

A communication protocol for **message-oriented middleware** based on XML (Extensible Markup Language).

Real-time exchange of structured data.

It is an open standard protocol.

# Extensible Messaging and Presence Protocol (XMPP)

## Introduction

XMPP uses a **client-server architecture**.

As the model is **decentralized**, no central server is required.

XMPP provides for the **discovery of services** residing locally or across a network, and the **availability information** of these services.

Well-suited for cloud computing where virtual machines, networks, and firewalls would otherwise present obstacles to alternative service discovery and presence-based solutions.

Open means to support machine-to-machine or peer-to-peer communications across a diverse set of networks.

# Extensible Messaging and Presence Protocol (XMPP)

## Highlights

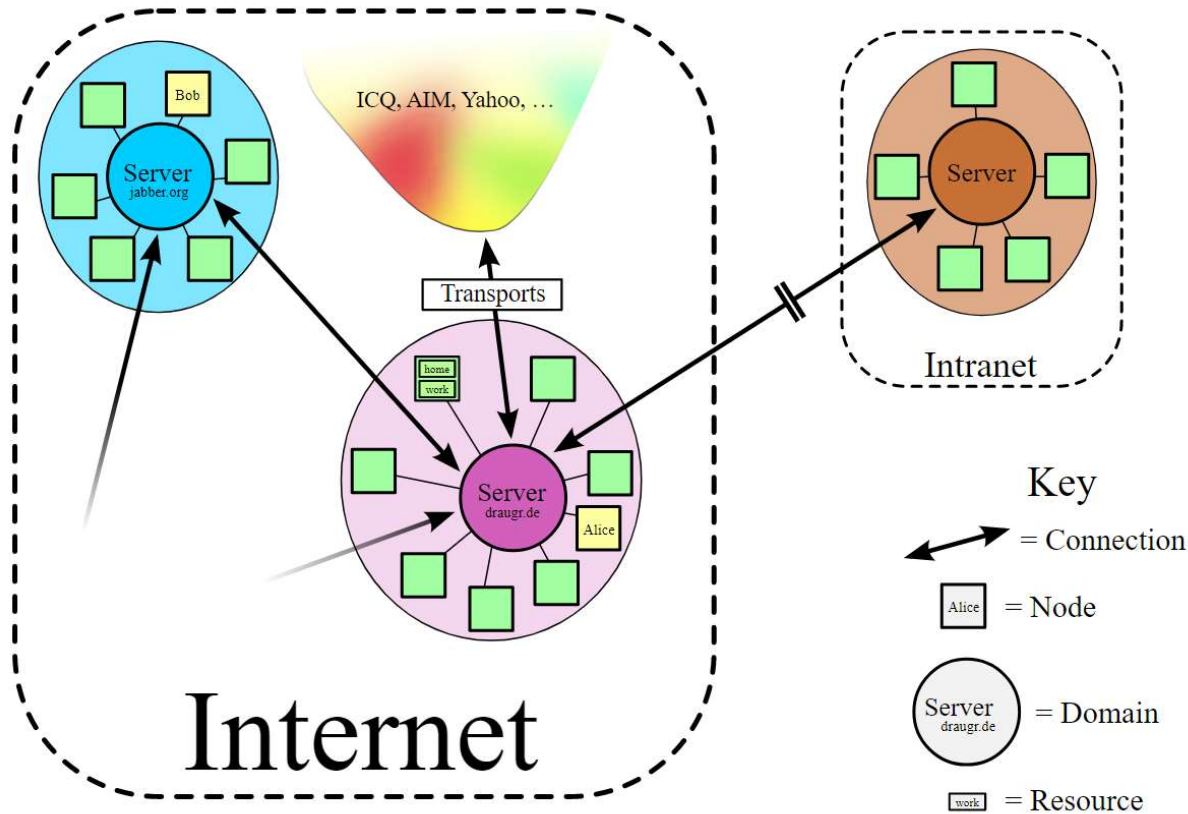
Decentralization – No central server; anyone can run their own XMPP server.

Open standards – No royalties or granted permissions are required to implement these specifications

Security – Authentication, encryption, etc.

Flexibility – Supports interoperability

# Extensible Messaging and Presence Protocol (XMPP)



A simple XMPP network with the servers *jabber.org* and *draugr.de*. **Green** clients are **online**, **yellow** clients are **writing** each other and **small green subclients** are the **resources** of **one user**. The **brown** network is **not connected** to the internet. The server *draugr.de* is connected to other IM services (ICQ, AIM and yahoo) via *XMPP transports*.

# Extensible Messaging and Presence Protocol (XMPP)

- Every user on the network has a unique XMPP address, called JID (Jabber IDs)
- The JID is structured like an email address with a username and a domain name for the server where that user resides, separated by an at sign (@)

**alice**@**example.com**/**home**  
node domain resource

- Since a user may wish to log in from multiple locations, they may specify a resource. A resource identifies a particular client belonging to the user (for example home, work, or mobile).
- This may be included in the JID by appending a slash followed by the name of the resource.
- For example, the full JID of a user's mobile account could be **username@example.com/mobile.**



# Core XMPP Technologies

## Core

- information about the core XMPP technologies for XML streaming

## Jingle

- multimedia signalling for voice, video, file transfer

## Multi-user Chat

- flexible, multi-party communication

## PubSub

- alerts and notifications for data syndication

## BOSH

- HTTP binding for XMPP

eXtensible Markup Language (XML)

# XMPP Applications

Publish-subscribe systems

Signaling for VoIP

Video

File transfer

Gaming

Internet of Things applications

- Smart grid
- Social networking services

Voice over Internet Protocol (VoIP)



# Advanced Message Queuing Protocol (AMQP)

## Introduction

**Advanced Message Queuing Protocol.**

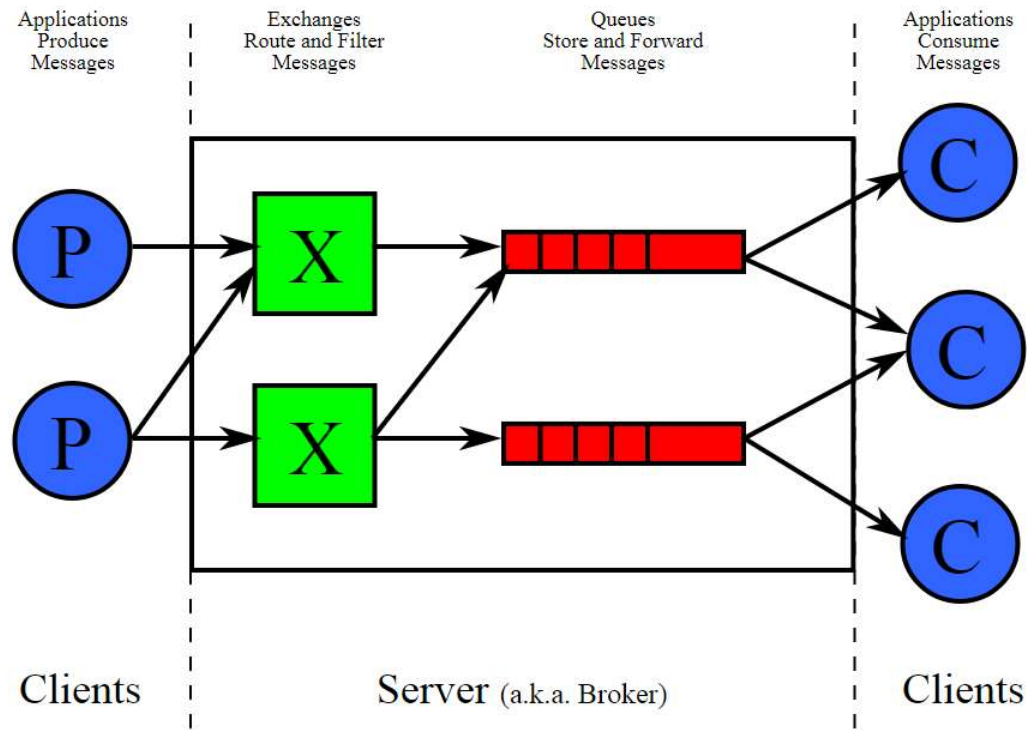
**Open standard for passing business messages** between applications or organizations.

Connects between systems and business processes.

It is a binary application layer protocol.

Basic unit of data is a *frame*.

ISO standard: **ISO/IEC 19464**



- The clients for example (P), have different sensors they produce different data. They produce different messages.
- So, these messages are sent to the different routers and filters in this manner which again can be buffered in a queue and with the intention of forwarding them again in the future.
- The forwarded data beyond the server are sent to other types of clients which are the consumers of these messages.

# AMQP Features



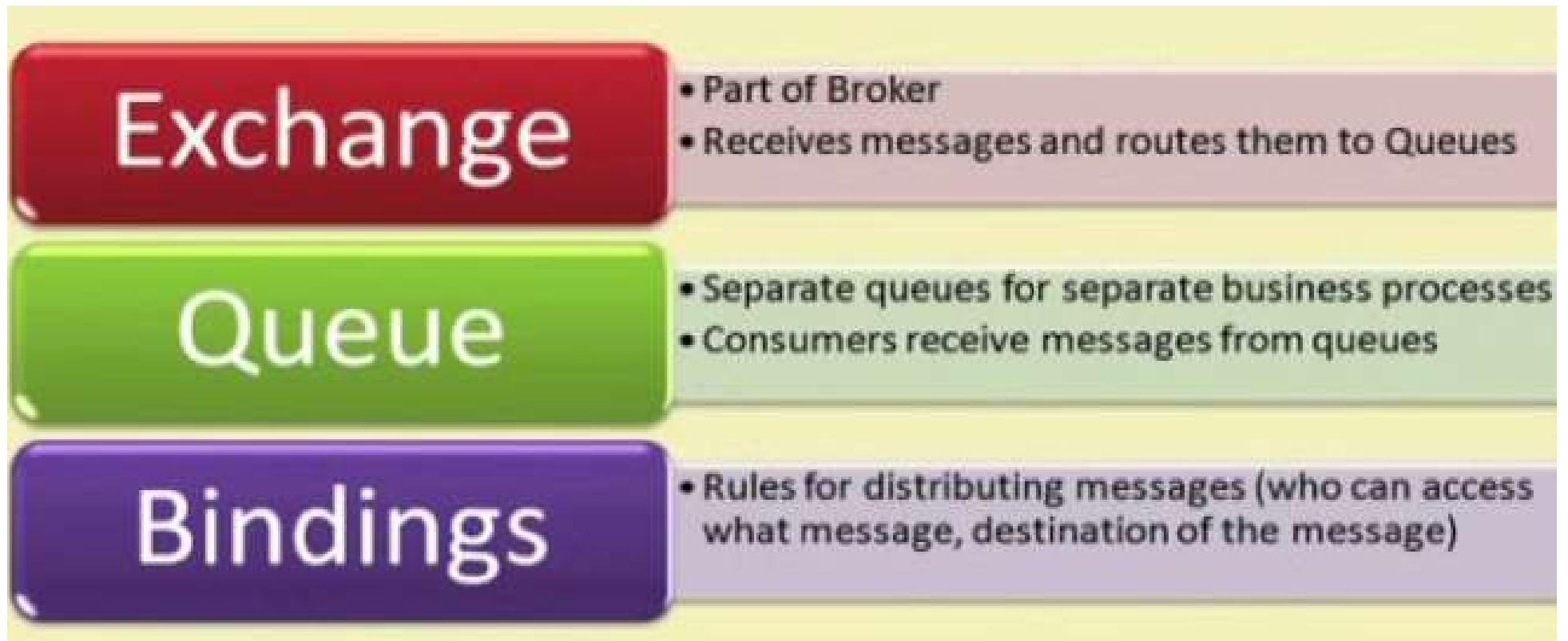
- Interoperability, are basically referring to interoperability of not only devices, but also the protocols, algorithms messages and so on.
- Next feature is routing of messages, queuing of messages, which follows an open standard based on ISO.

# AMQP Frame types

Nine AMQP frame types are defined that are used to initiate, coordinate, and tear down the transfer of messages between two peers:

- Open (connection open)
- Begin (session open)
- Attach (initiate new link)
- Transfer (for sending actual messages)
- Flow (controls message flow rate)
- Disposition (Informs the changes in state of transfer)
- Detach (terminate the link)
- End (session close)
- Close (connection close)

# AMQP Components



# AMQP Applications

- ✓ Monitoring and global update sharing.
- ✓ Connecting different systems and processes to talk to each other.
- ✓ Allowing servers to respond to immediate requests quickly and delegate time consuming tasks for later processing.
- ✓ Distributing a message to multiple recipients for consumption.
- ✓ Enabling offline clients to fetch data at a later time.
- ✓ Introducing fully asynchronous functionality for systems.
- ✓ Increasing reliability and uptime of application deployments.



Thank you