From middleware to web services

1 Middleware for system integration

RPC, Java RMI and Python PYRO

- Closely follow the traditional program development process that creased an application based on

    1. Program libraries integration
    2. Parameter passing

- Do not require developers to deal with socket programming when implementing programs that support remote communication

- Have a performance issue due to synchronous communication

COBRA

- Still follow the programming library approach

- Similar to Java RMI: provide object request broker (ORB) define the interface definition language (IDL)

- Integrate components developer by different programming languages

2 Message-Oriented Middleware (MOM)

- We need something more loosely coupled

- Communication using messages

- Messages stored in message queues

- Message servers decouple client and server

- Various assumptions about message content
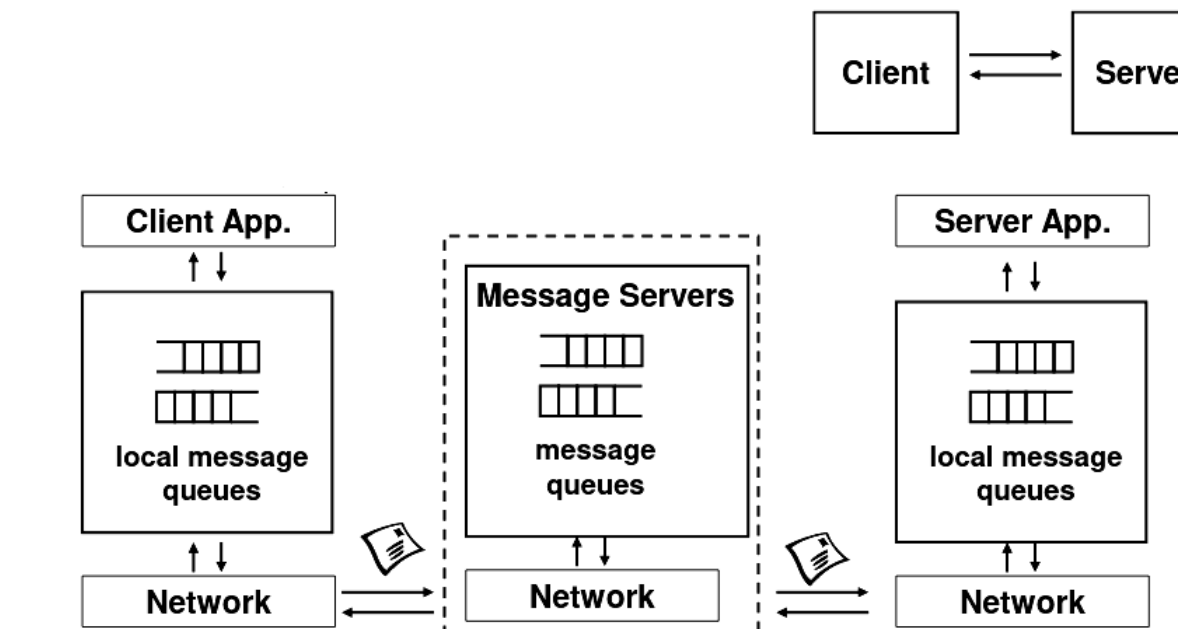
2.1   Properties of MOM

Asynchronous interaction

- Client and server are only loosely coupled

- Messages are queued

- Good for application integration

Support for reliable delivery service

- Keep queues in persistent storage

Processing of messages by intermediate message server(s)

- May do filtering, transforming, logging

- Networks of message servers

Natural for database integration

3   Java Message Service (JMS)

- API specification to access MOM implementations

- Two modes of operations

- Point to point

    – One to one communication

- Publish/subscribe

    – One to many communication

- JMS server implements JMS API

- JMS clients connect to JMS servers

- Java objects can be serialised to JMS messages

4   Web services

Use well known web standards for distributed computing
Communication

- Message content expressed in XML

- Simple Object Access Protocol (SOAP) - lightweight protocol for sync/async communication

Service description

- Web Services Description Language (WSDL) - interface description for web services

Service Discovery

- Universal Description Discovery and Integration (UDDI) - directory with web service description in WSDL
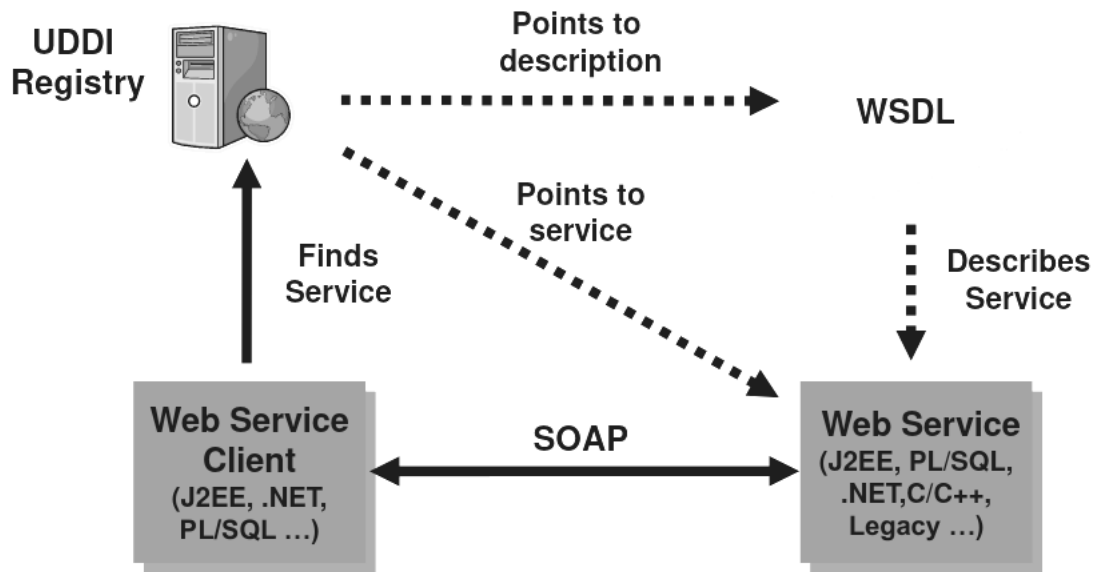
4.1   Attributed of Web-Services

Web based protocols - Web services based on HTTP are designed to work over the public internet. The use of HTTP for transport means these protocols can traverse firewalls,l and can work in a heterogeneous environment

Interoperability - SOAP defines a common standard that allows differing systems to interoperate

XML based - The Extensible Markup Language is a standard framework for creating machine readable documents

5   REST and JSON

REST

- An architectural style, treating the web as a resource centric application

- Each URL in a RESTful application represents a resource

JSON

- An open standard format that uses human readable text to transmit data objects consisting of attribute-value pairs

- Provide lightweight communication