Software Architecture
软件体系结构

Lecture 11: SOA and Web Services

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Lecture 9: SOA and Web Services

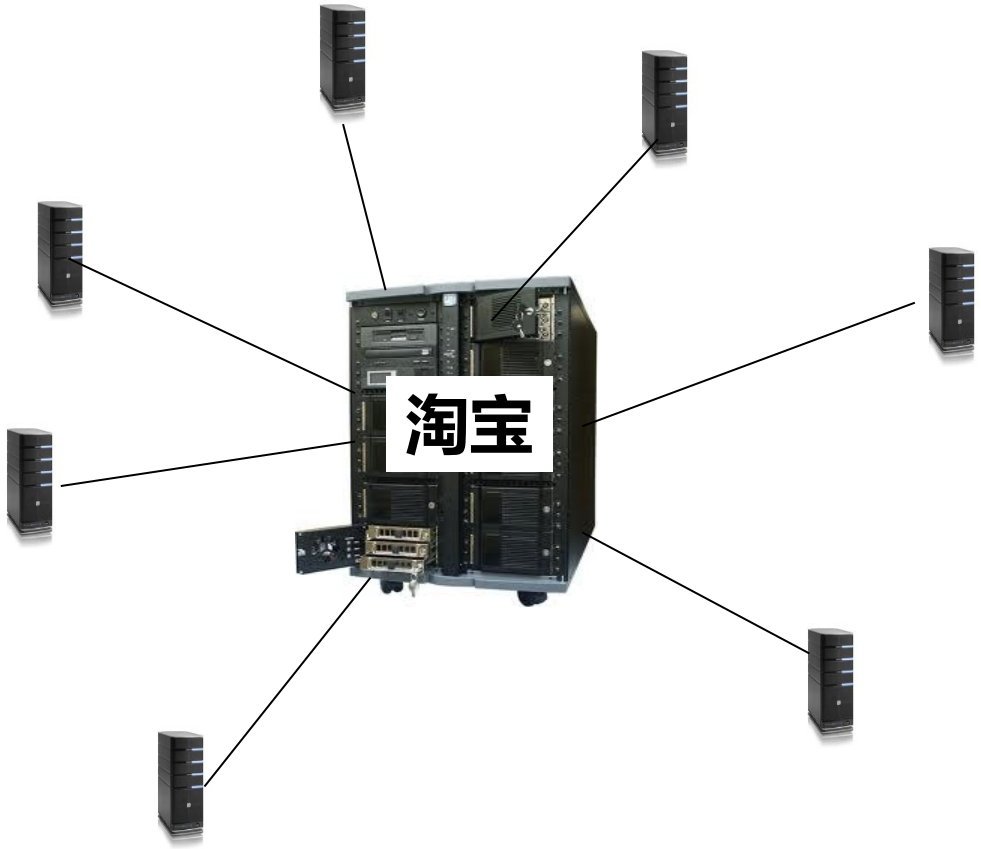
Contents:

Introduction

1. Introduction

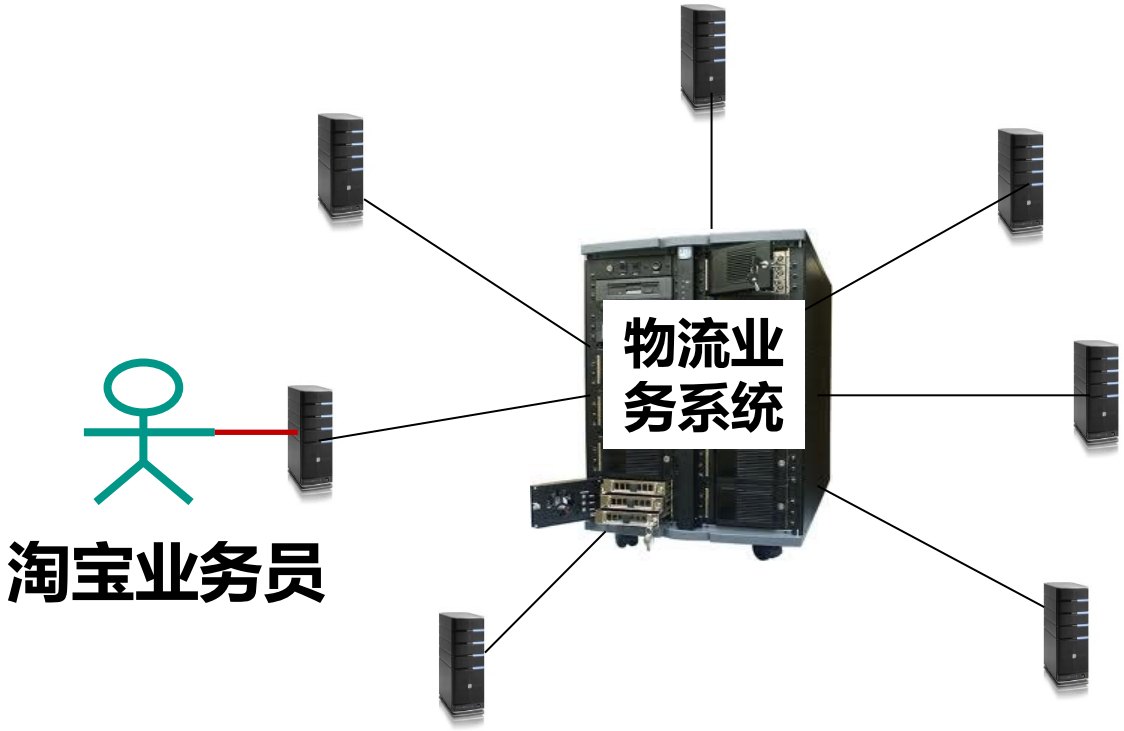
- 互联网上运行的电子商务应用系统，例如电子商务平台淘宝，物流公司的物流业务系统，网站，有很多个人用户，如下图所示。

个人用户通过登录网站，进行购买商品的交易。



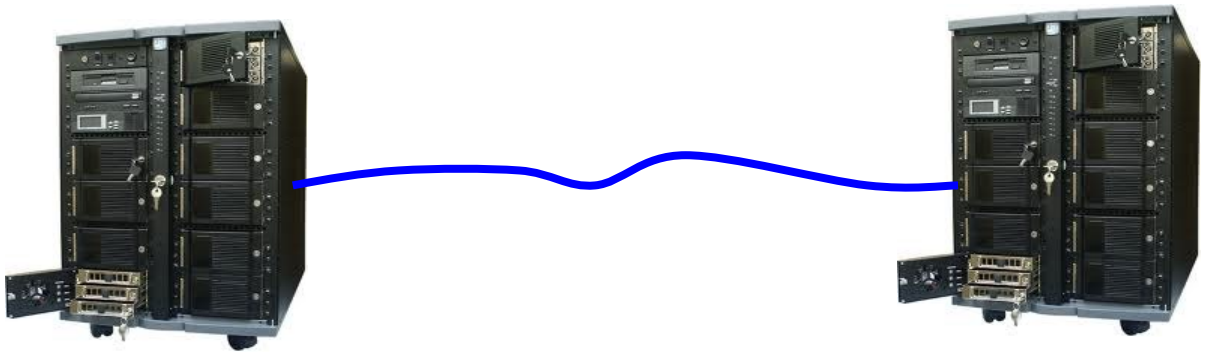
1. Introduction

淘宝的业务员们，作为个人用户通过登录物流网站，进行预定车队的业务。



1. Introduction

- **问题**：淘宝网站电子交易系统是否可以**动态地**查找发现某个物流业务系统，然后两个系统直接进行交易?



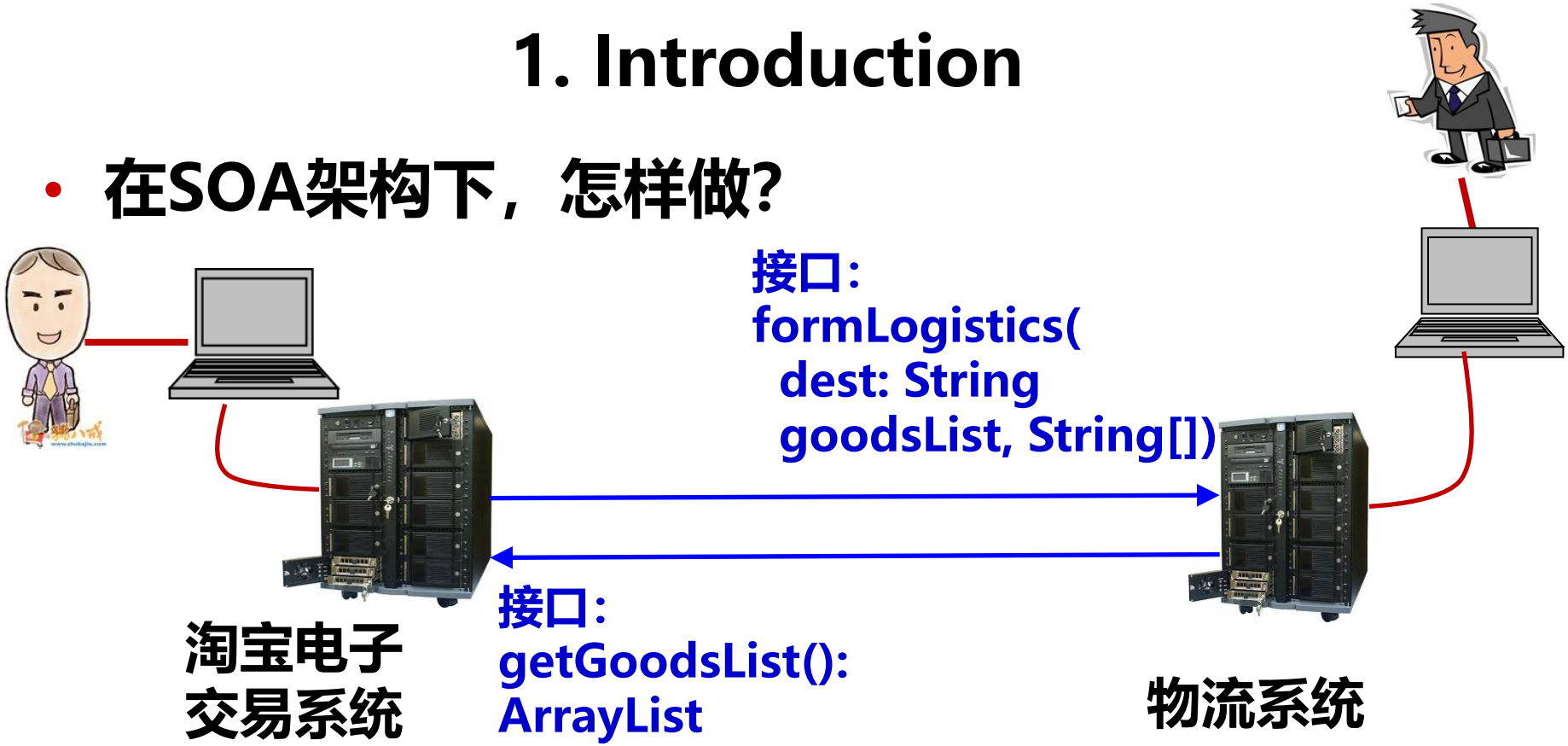
淘宝电子
交易系统

物流业务系统

- **回答**：当前情况下，不可以。需要SOA架构。

1. Introduction

- 在SOA架构下，怎样做?



a) 淘宝业务员登录淘宝电子交易系统，调用物流系统的接口，组织物流；或者

b) 物流公司业务员登录物流系统，调用淘宝电子交易系统获得当日订单，然后帮助组织物流。

Back

SOA Software Architecture

2. SOA Software Architecture

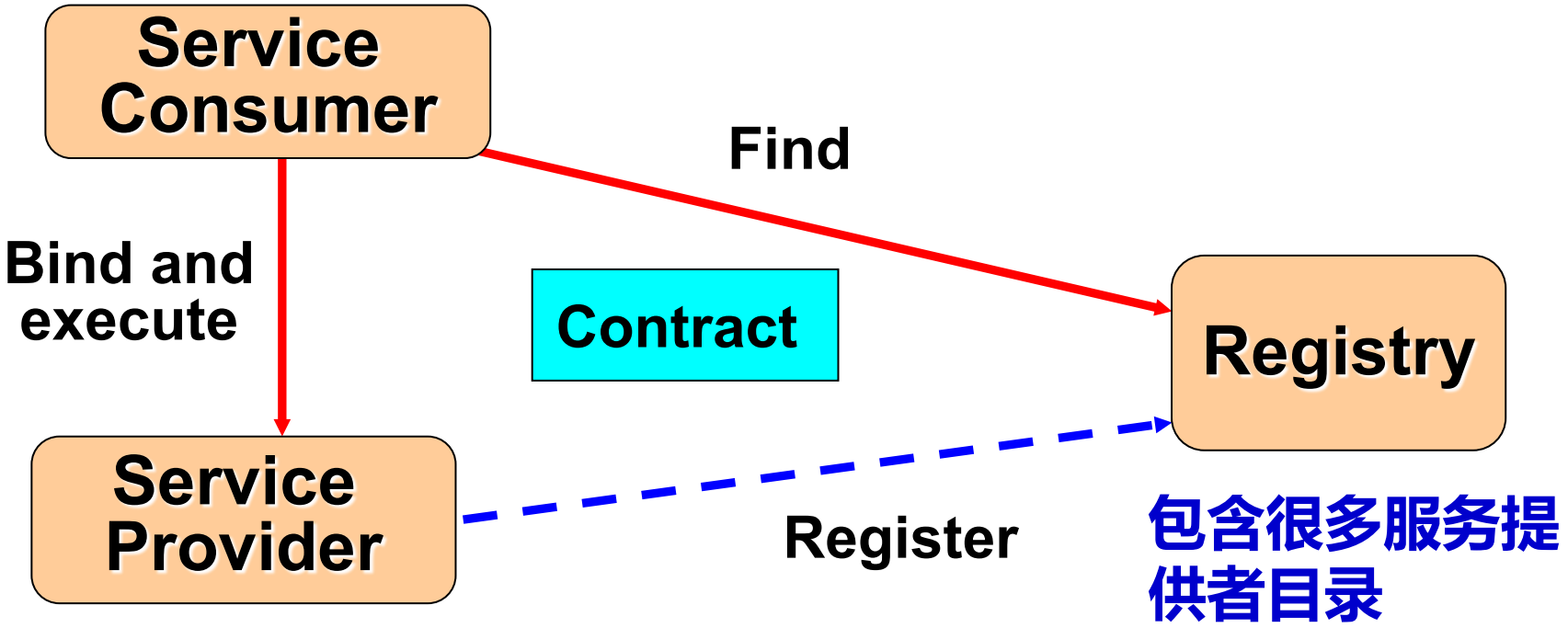
- SOA Entities (SOA实体):
  1. Service Consumer (服务消费者)
  2. Service Provider (服务提供者)
  3. Service Registry （服务注册）
  4. Service Contract （服务合同）
  5. Service Proxy (服务代理)

- SOA架构的基本思想：关于动态查找服务，绑定，然后执行服务的模型。

2. SOA Software Architecture

SOA 工作机制 (Working Mechanism of SOA)

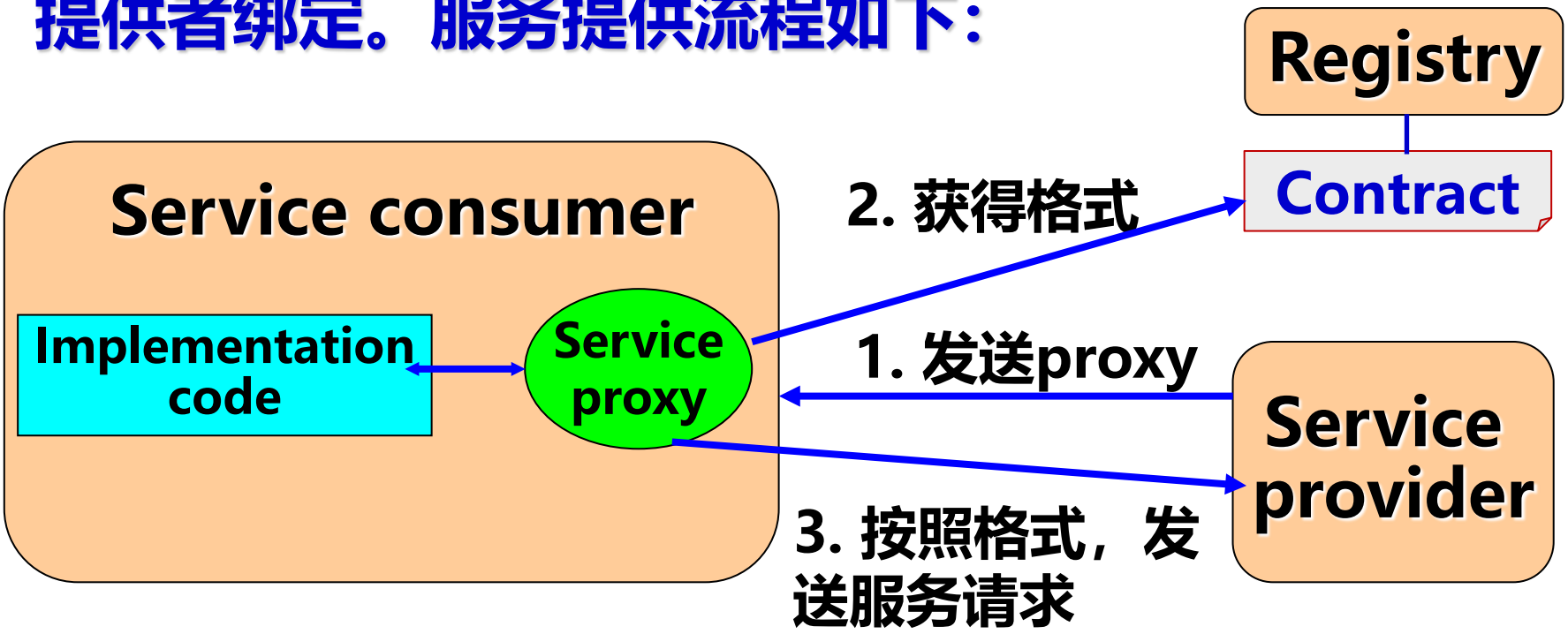
- SOA uses "find, bind, and execute" paradigm in figure below.



The “Find-bind-execute" Paradigm

2. SOA Software Architecture

现在假设服务消费者已经和服务提供者绑定。服务提供流程如下：



Consumer 给Provider发送请求的过程

Back

Web Services

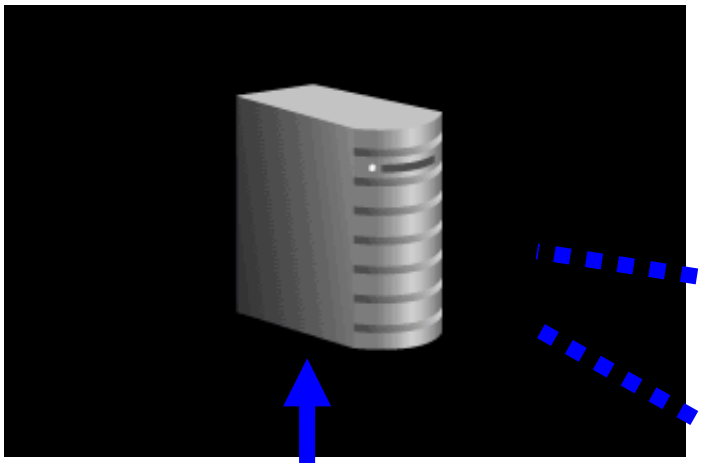
3. Web Services

- **Web services的定义**
- **Web services 是基于web的企业应用，使用**
- **Web services are Web-based enterprise applications that use**
  - **1) open, 开放的**
  - **2) XML-based standards and transport protocols to exchange data with calling clients. 基于XML标准的传输协议，以交换数据**

- **Note: Web services implements concepts of SOA;**
- **Java supports Web services.**

3. Web Services

描述和发现服务 UDDI



Points to description

服务描述

Points to service

WSDL

1）Finds Service
发现服务

服务消费者

Web Service Client
(J2EE, .NET, PL/SQL …)

SOAP

2）Invokes with XML Messages
调用服务

Web Service
(J2EE, PL/SQL, .NET,C/C++, Legacy …)

服务提供者

3. Web Services

- WSDL stands for Web Services Description Language (网络服务描述语言)
  - WSDL is an XML document
  - WSDL is used to describe Web services
  - WSDL specifies
    - the location of the service, and
    - the operations (or methods) the service exposes.

WSDL:
- 给出服务地址
- 给出服务操作

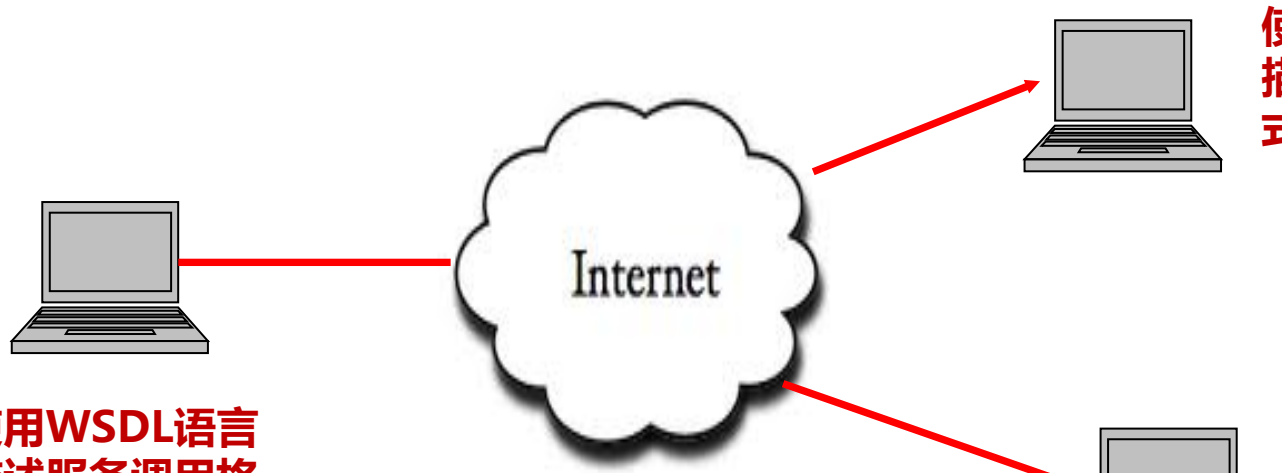
3. Web Services

- **UDDI：是描述、发现、集成Web Service的技术**
  Enterprise Universal Description, Discovery, and Integration (UDDI) Services
- **Enterprise UDDI Services helps companies organize and catalog Web services and other programmatic resources.**

3. Web Services

- SOAP stands for Simple Object Access Protocol (简单对象访问)
- SOAP is a simple XML-based protocol to let applications exchange information over HTTP. (使得许多应用之间利用HTTP协议传递信息)

每个互联网上运行的软件系统都可以封装成web service



使用WSDL语言描述服务调用格式，暴露出可以调用的服务。

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Back

Comparison of the Internet related Software Architectures

Comparison of the Internet related Software Architectures

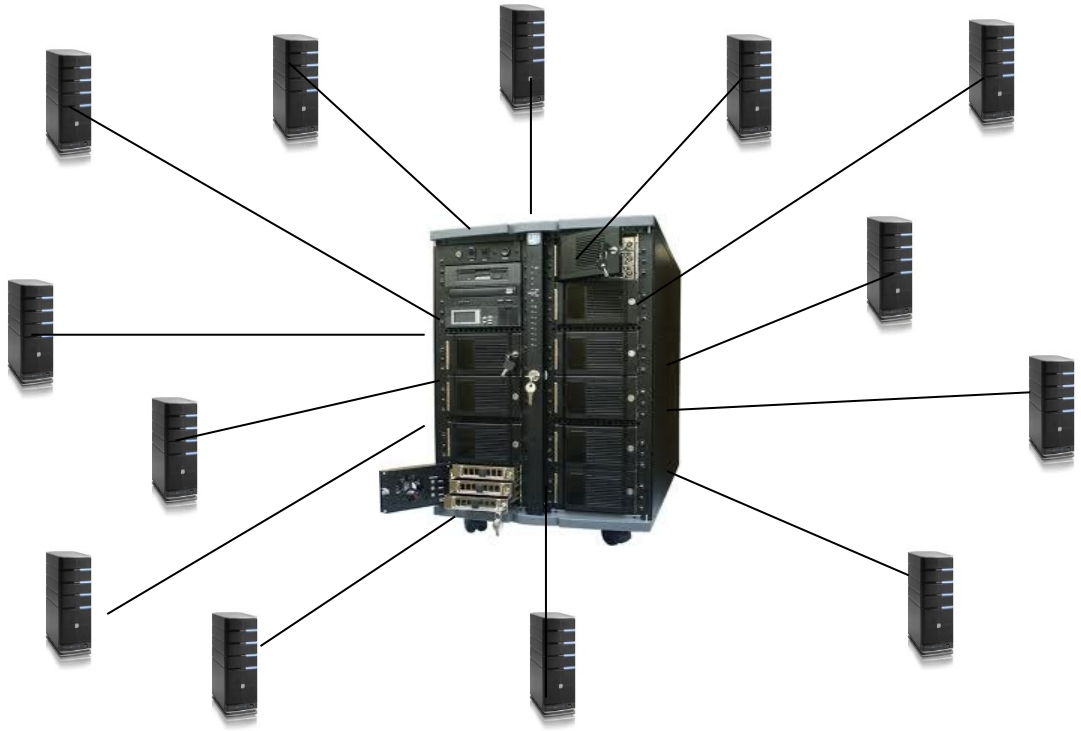
Similarity: all the architectures below

1. **Client/Server Architecture**
2. **P2P Architecture**
3. **Grid Computing Architecture**
4. **Cloud computing**
5. **SOA Architecture (web services)**

are about sharing resources.

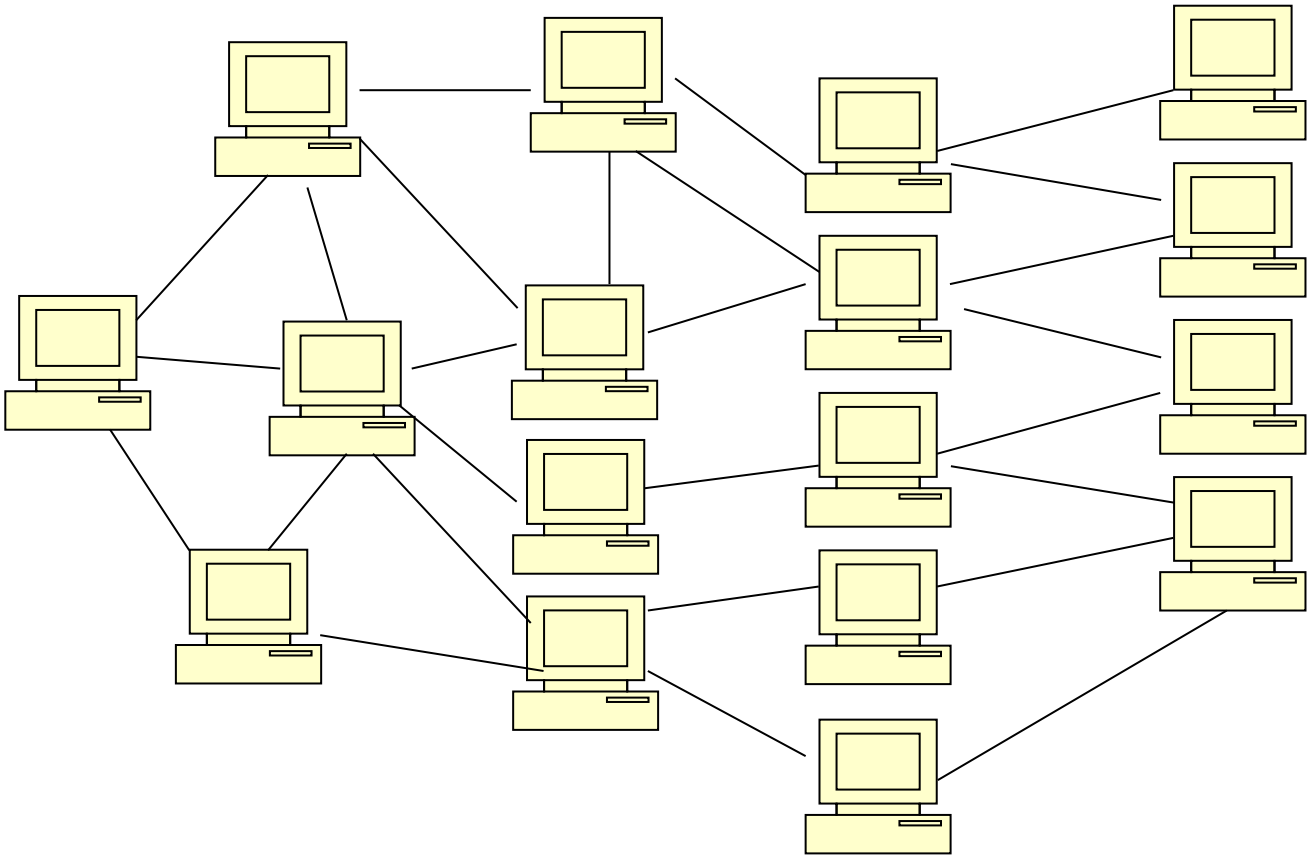
Comparison of the Internet related Software Architectures

5种架构的共同之处



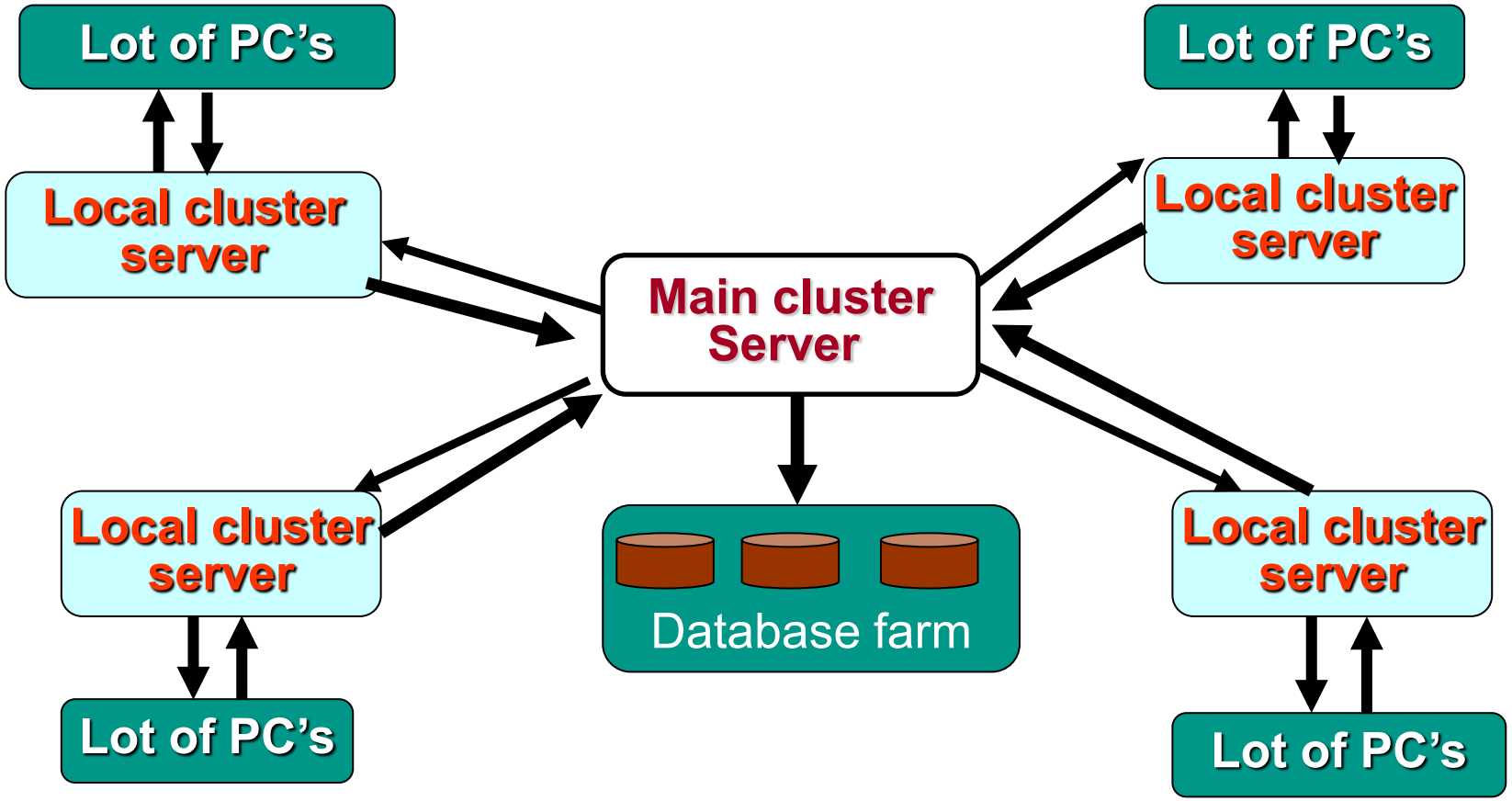
Client/Server Architecture: clients share resources from the server(s)，on the other hand, a client may be a resource contributor if the client uploads any resource to the server.

Comparison of the Internet related Software Architectures



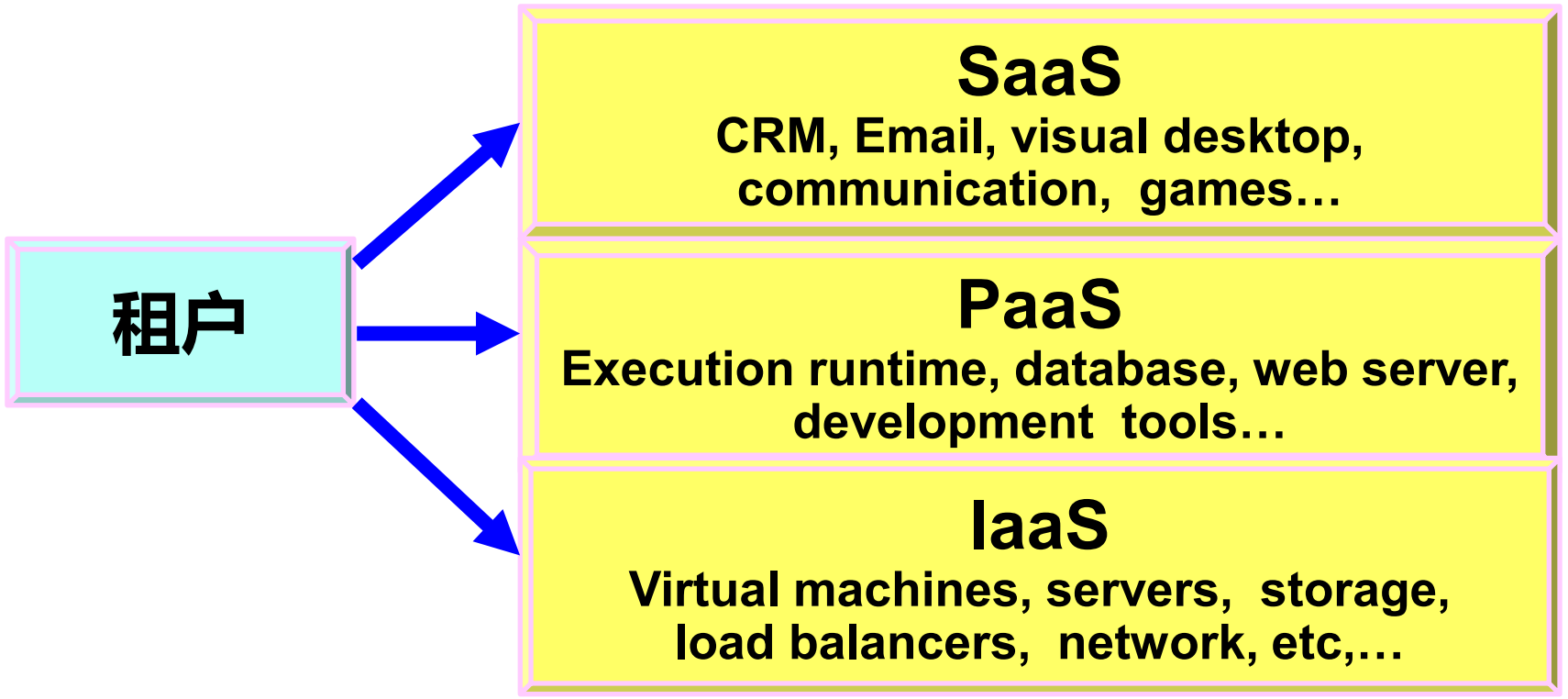
P2P Architecture: peer nodes share resources from each other. A peer is a server, if it provides services to a client, and a peer node is a client if it uses resources from another node.

Comparison of the Internet related Software Architectures



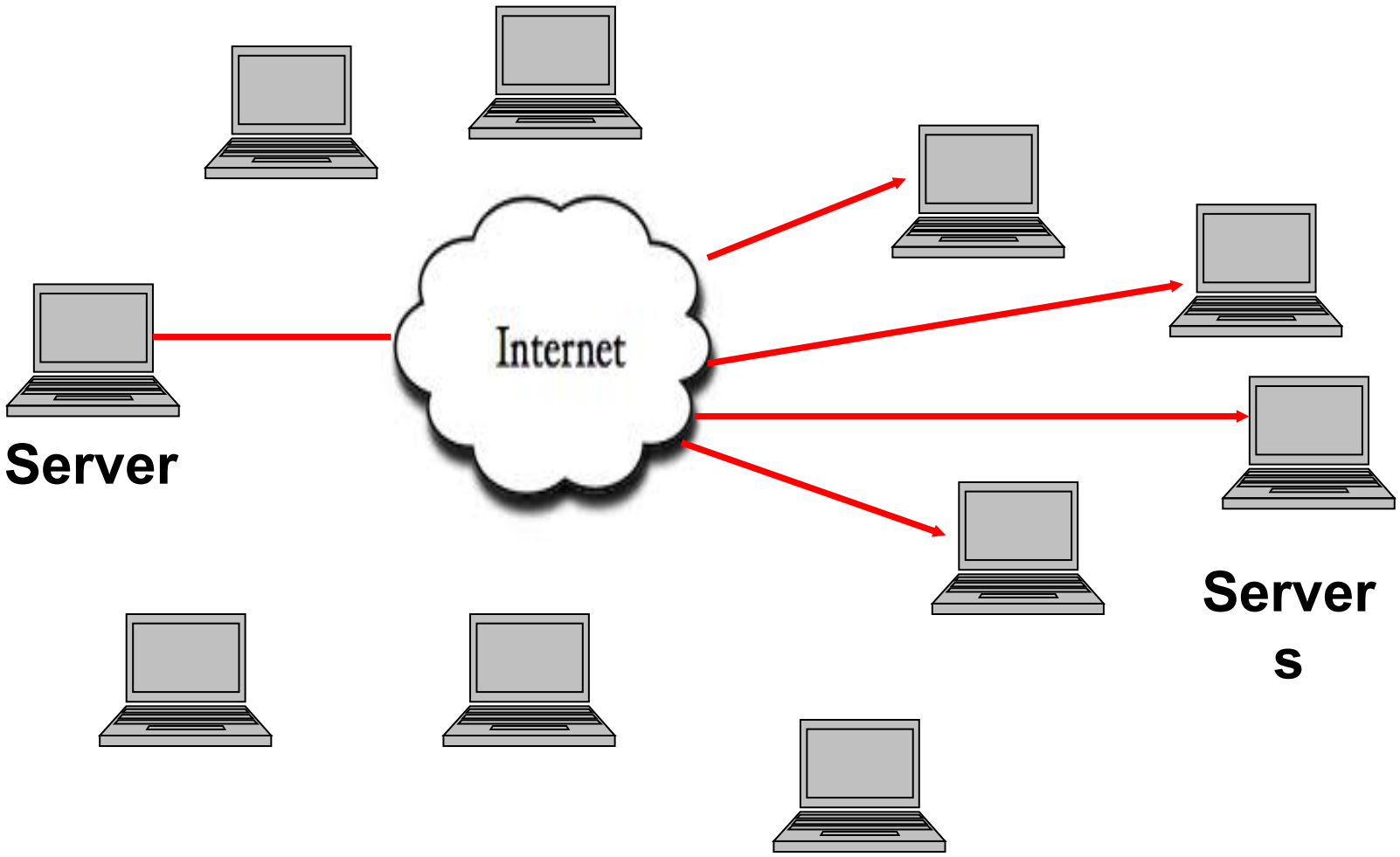
Grid computing: many grid users uses a grid, which integrates a lot of geographically disperses resources, including computing resources and data resources. In this sense, grid users share resources provided by a grid computing system.

Comparison of the Internet related Software Architectures



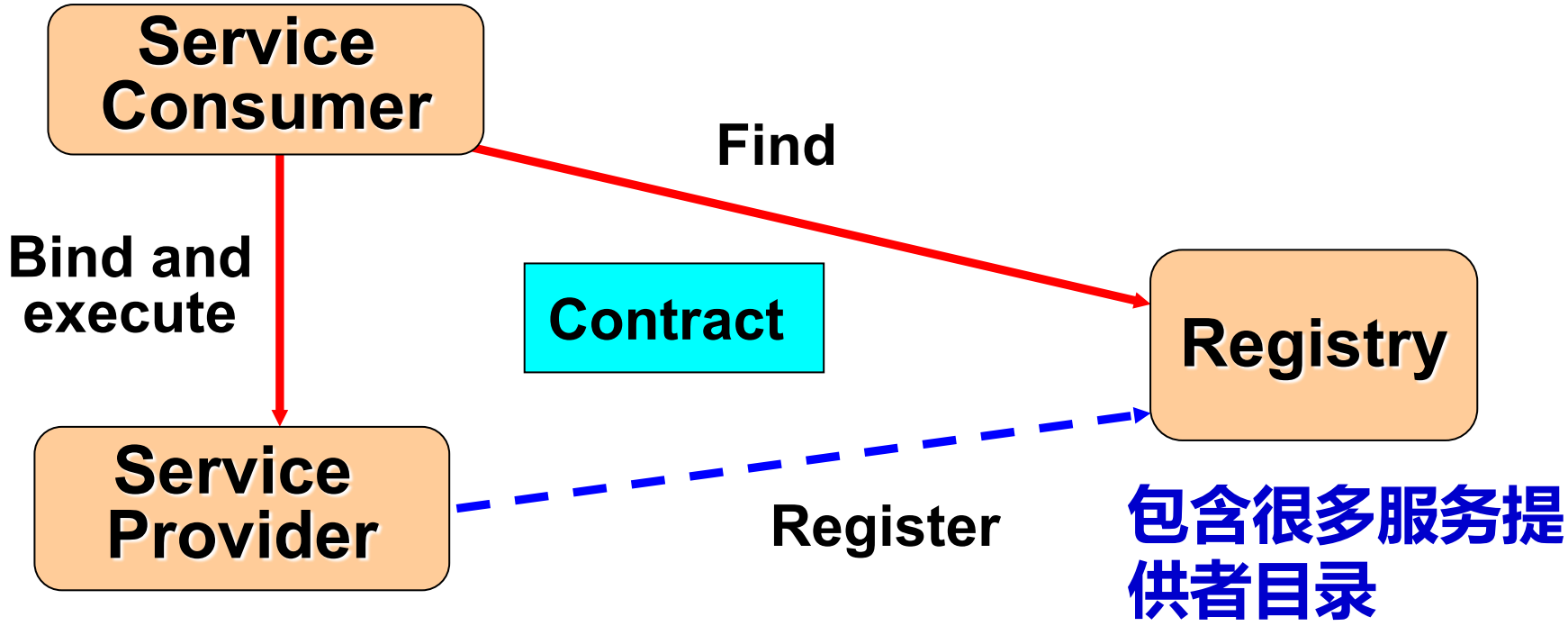
Cloud computing: many cloud service users rent services from cloud service provider, which uses the resources owned by the cloud service company to provide rental services to the users. In this sense: the users share resources provided by the cloud computing enterprise.

Comparison of the Internet related Software Architectures



SOA Architecture

Comparison of the Internet related Software Architectures



SOA architecture: a service consumer uses services provided by the service provider, by calling the provider's interface. On the internet, any software system can be a service provider as well as a service consumer. **In this sense, software systems share resources from each other.**

Comparison of the Internet related Software Architectures

5种架构的区别

架构	是否有中心服务器	资源共享方式	是否付费
Client/ server	有	资源共享由中心服务器提供	一般不付费，有的需付费
Grid computing	有中心服务器群	资源共享由网格系统提供	免费、付费
Cloud computing	有中心服务器群	资源共享由云提供商软件系统（以出租的方式）提供	免费、大多数付费
P2P	没有	资源共享由P2P网络的任何一个节点负责	通常免费
SOA	没有	由服务提供者提供，任何在线的软件系统都可以是服务提供者	通常免费

Back