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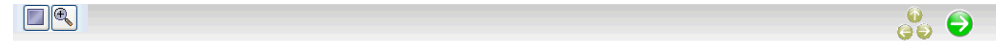
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Distributed Applications - Verteilte Anwendungen

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[Overview](#)
[Introduction](#)
[Architecture of distributed systems](#)
[Remote Invocation \(RPC/RMI\)](#)
[Basic mechanisms for distributed applications](#)
[Web Services](#)
[Design of distributed applications](#)
[Distributed file service](#)
[Distributed Shared Memory](#)
[Object-based Distributed Systems](#)
[Summary](#)

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Web services provide a standard means of communication among distributed software applications based on the Web technology. Standardization by the W3C community.

[Motivation - Example](#)

[Service Oriented Architecture - SOA](#)

[Web Services - Characteristics](#)

[Web Services Architecture](#)

[Simple Object Access Protocol \(SOAP\)](#)

[Web Services Description Language \(WSDL\)](#)

[Universal Description, Discovery, and Integration \(UDDI\)](#)

[REST](#)

[Web Service Composition](#)

[Adopting Web Services](#)

[Mashups](#)



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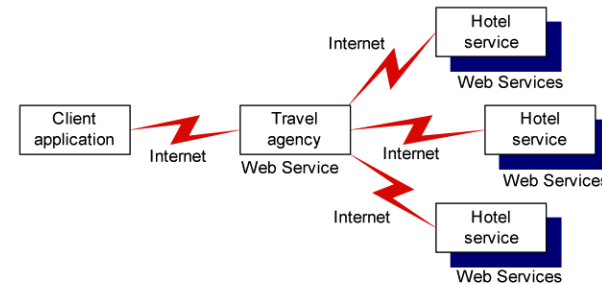
Today, we normally use Web browsers to interact with Web sites

browser names document via URL

request and reply messages encoded in HTML, using HTTP as communication protocol

Web Services generalize this model so that computers can talk to other computers.

Use of Web Services in a distributed travel arrangement application



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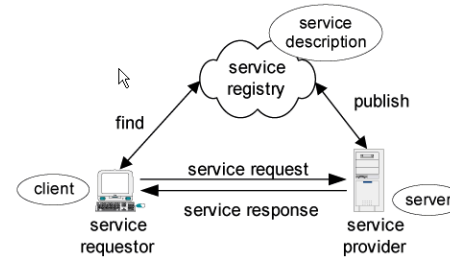
[REST](#)

[Web Service Composition](#)

[Adopting Web Services](#)

[Mashups](#)

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service is a well defined, self contained function

does not depend on context or state of other services

manages its own data

coarse granularity

communication between services

for data passing and for coordinating activities

focus is on the design of service interface

[SOA vs. Component based Architecture](#)

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SOA differs from today's component-based architectures in the following respects:

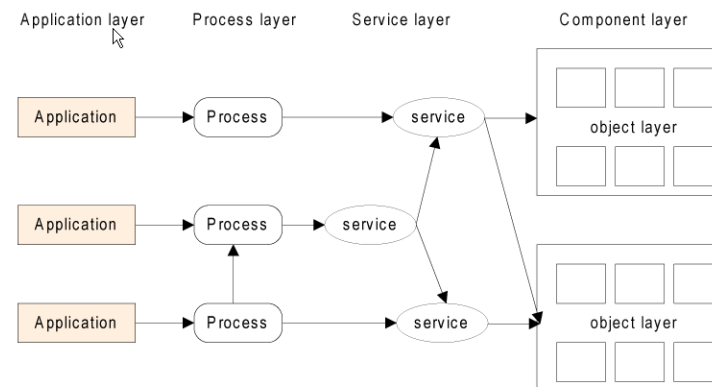
component-based	SOA
tight integration	loose horizontal integration
code-oriented development	process-oriented development
technical complexity of the IT infrastructure	interoperable architecture for business and IT
build to last	build to change

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Focus is on business processes of enterprises:

Mapping of business processes to services



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The adoption within organizations depends on a variety of issues:

Supporting Issues

- interoperable networked applications
- easier exchange of distributed data
- easier access of enterprise wide data
- availability of external services
- cross-organizational computing
- reduced maintenance cost
- small effects on existing operational systems

Restraining Issues

- different formats and semantics of data sources
- security issues due to network access
- standards are evolving and some are not fixed
- lack of understanding

The **Enterprise Services Bus (ESB)** refers to both a software architecture and a class of software products used for the realization of SOA.

messaging middleware that provides interoperability between enterprise applications via XML, Web Services interfaces and standardized rule-based routing of documents.

Mule is an Open Source ESB.

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SOA evolved from component-based architectures. SOA is a collection services with a loose coupling and dynamic binding between services

Characteristics

Layered Approach

Adopting Service Oriented Architecture (SOA)

SOA blueprints initiative: define the requirements for a reference example that highlights the best SOA practices.

web services are an approach of building a SOA based on Web technologies

encapsulation of application components in web services

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Web Services Architecture

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Mashups

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Web Services

can live anywhere in the network

are described using a service-description language which

is in formal XML notation

covers all the details necessary to interact with the service (message formats for operations, transport protocols and location)

hides the implementation details of the service

are published to a registry of services

are available through its declared API and invocation mechanism

provide an entry point accessing local/remote services

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A Web Service is a standardized way of integrating Web-based applications.

Informal Definition

Integration

allows integration of application functionality

within organizations

between business partners across organizational boundaries

Features of Web Services

Potential of Web Services

Web Services - Distributed Objects

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specific features of Web Services

programmable: WS are accessed via a programmable interface

self descriptive: meta data describe the WS.

encapsulation: self contained application component.

loosely coupled: communication via message passing using platform-independent and language-neutral protocols.

location transparent: access to WS from different locations via network communication.

protocol transparent: WS is based on Internet protocol suite; operation may support several protocols, e.g. HTTP, SMTP.

composition: several WS may be combined into a new WS.

Web services are software components which enable loosely coupled, component-oriented, cross-technology application implementations.

Web Services are document-centric

communication is by sending documents from the server and back.

most properties are associated with the document itself, and not the service.

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