

Unit 1 Web services basics

- ❑ **WHAT ARE WEB SERVICES?**
- ❑ TYPES OF WEB SERVICES
- ❑ DISTRIBUTED COMPUTING INFRASTRUCTURE
- ❑ OVERVIEW OF XML
- ❑ SOAP
- ❑ BUILDING WEB SERVICES WITH JAX-WS
- ❑ REGISTERING AND DISCOVERING WEB SERVICES
- ❑ SERVICE ORIENTED ARCHITECTURE
- ❑ WEB SERVICES DEVELOPMENT LIFE CYCLE
- ❑ DEVELOPING AND CONSUMING SIMPLE WEB SERVICES ACROSS PLATFORM

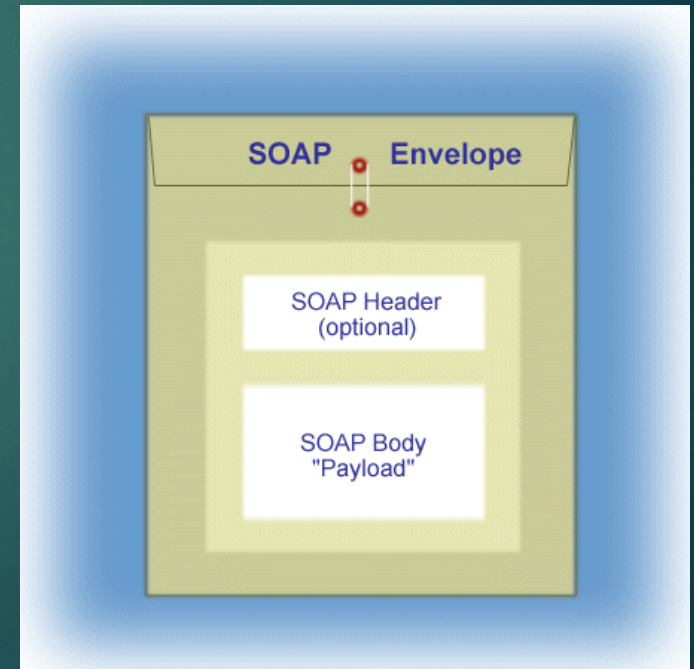
Web Service Components

- ▶ SOAP
- ▶ WSDL
- ▶ UDDI
- ▶ An application allows other applications to connect to it over the Web using SOAP
- ▶ This Web Service exposes its methods in a WSDL file
- ▶ The Web Service is published in a UDDI registry to allow other businesses to find it

SOAP

- ▶ Simple Object Access Protocol
- ▶ SOAP is designed to enable both client-server and synchronous interaction over the Web
- ▶ Web services communicate using W3C standard SOAP messages.
- ▶ SOAP formalizes the use of XML as a way to pass data (therefore can be Objects) from one process to another.
- ▶ Originally SOAP was based only on HTTP, but other transport protocols such as TCP are also allowed.

```
<env:Envelope
xmlns:env="http://www.w3.org/2001/12/soap-envelope">
  <env:Body>
    <ns:Order xmlns:ns="urn:it.uu.se:Students">
      <item>Bill</item>
      <item>Bob</item>
      <item>Tony</item>
    </ns:Students>
  </env:Body>
</env:Envelope>
```



SOAP MESSAGES

envelope

header

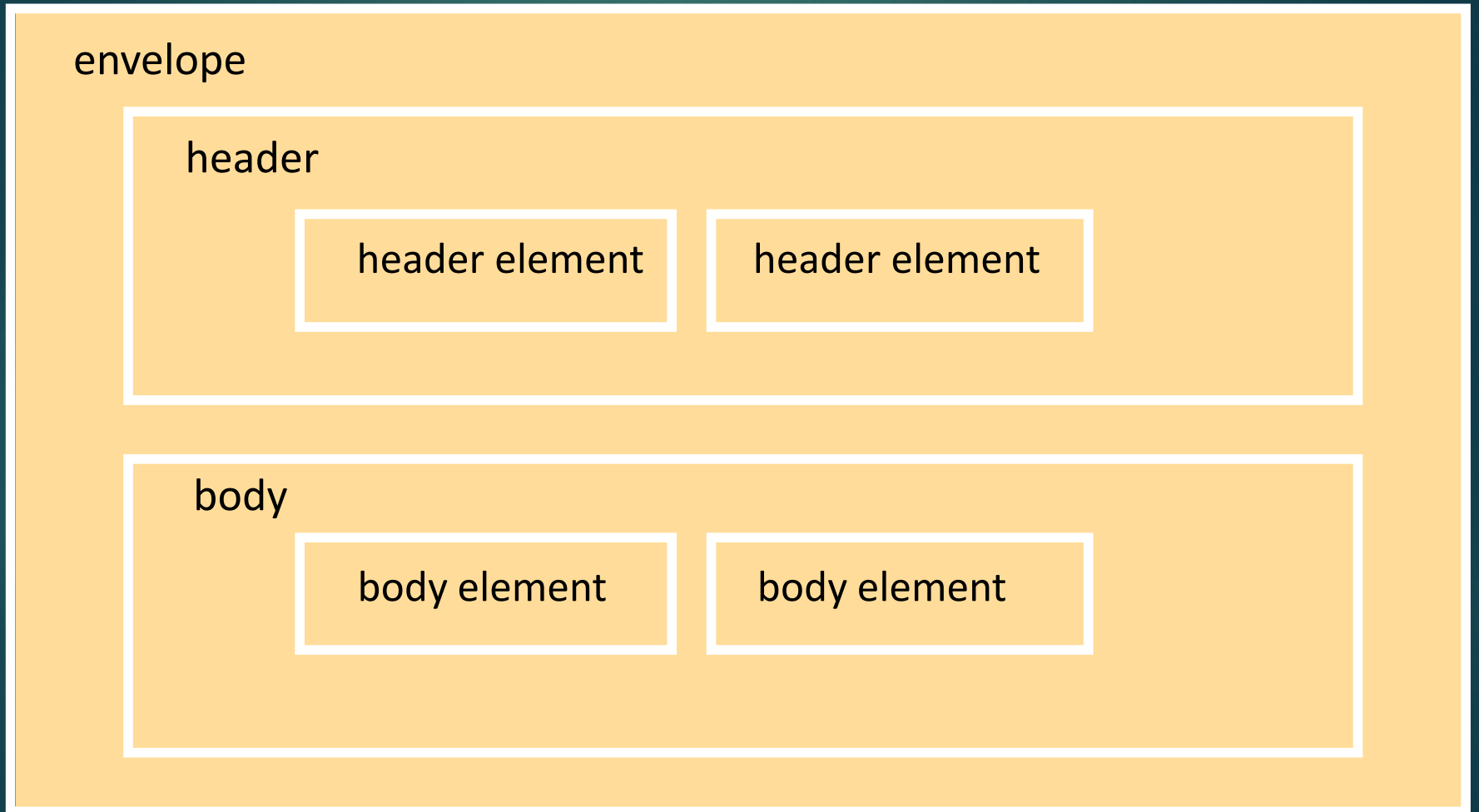
header element

header element

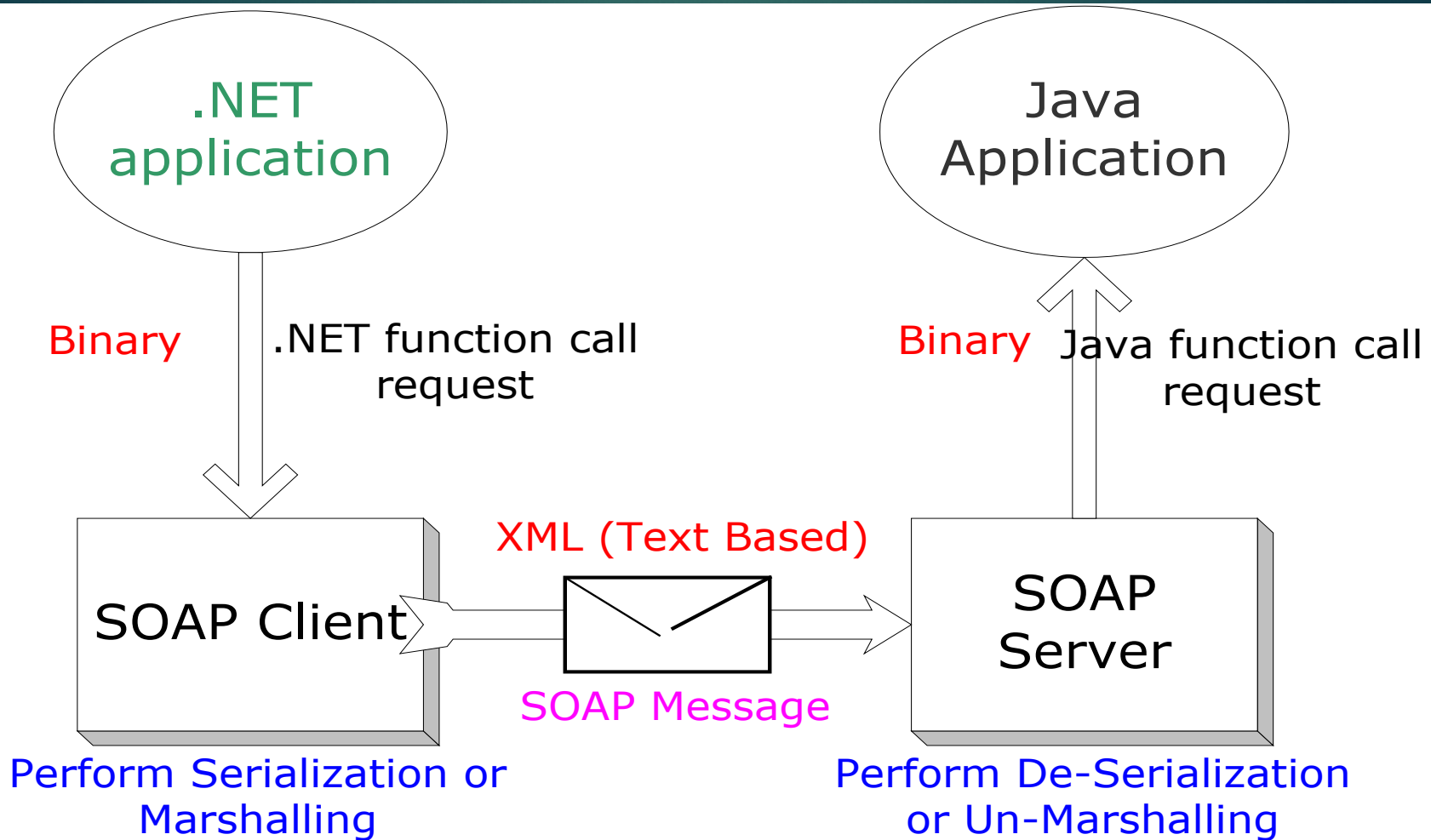
body

body element

body element



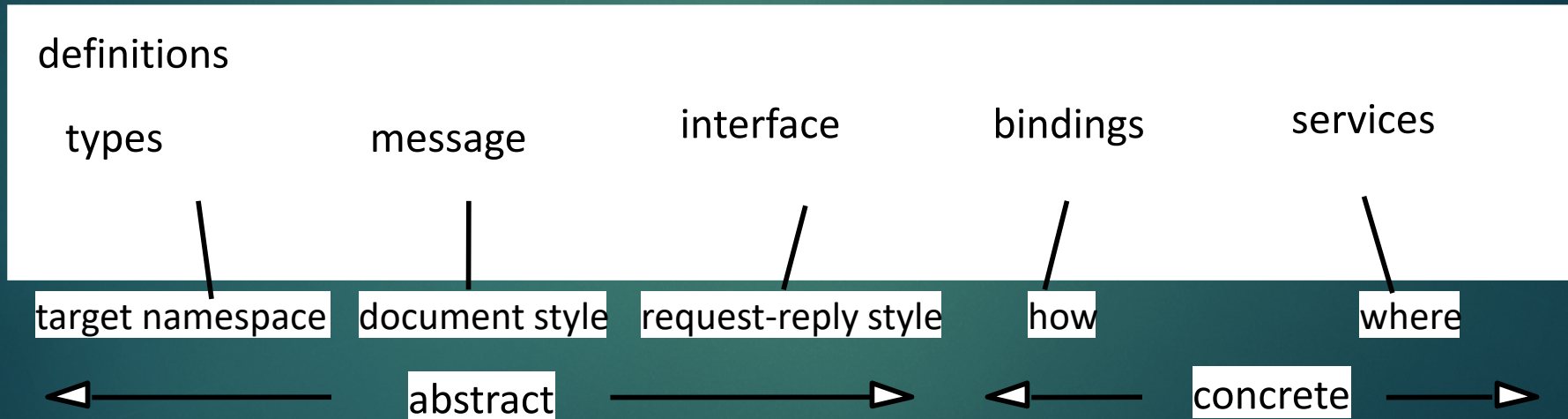
Transport of SOAP Messages



Service Descriptions and IDL for Web Services

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- ▶ Interface definitions are needed for clients to communicate with services.
- ▶ *Service description* specifies two characteristics – how the message are to be communicated and the URI of service.
- ▶ Web Services Description Language (WSDL)



WSDL

- ▶ WSDL has a well-defined XML vocabulary to answer the following questions regarding the web service involved:
- ▶ What does the service do?
 - ▶ Both in machine and human-readable forms
- ▶ What language does the service speak?
 - ▶ The format/data structure of the message exchanged
- ▶ How does the client talk to the service?
 - ▶ HTTP/SMTP/FTP
- ▶ Where is the location of the web service?
 - ▶ The access point (URL)

WSDL – INTERFACE

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Name

	Client	Server	Delivery	Fault message
In-Out	Request	Reply		may replace Reply
In-Only	Request			no fault message
Robust In-Only	Request		guaranteed	may be sent
Out-In	Reply	Request		may replace Reply
Out-Only		Request		no fault message
Robust Out-Only		Request	guaranteed	may send fault

Message exchange

WSDL – CONCRETE PART

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- ▶ Binding (choice of protocols) and Service (choice of endpoint or sever address):

binding

name = "ShapeListBinding"
type = "tns:ShapeList "

soap:binding transport = URI
for schemas for soap/http
style= "rpc"

operation

name=" newShape "

input

soap:body
encoding, namespace

output

soap:body
encoding, namespace

soap:operation

soapAction

service

name = " MyShapeListService "

endpoint

name = " ShapeListPort "
binding = " tns:ShapeListBinding "

soap:address

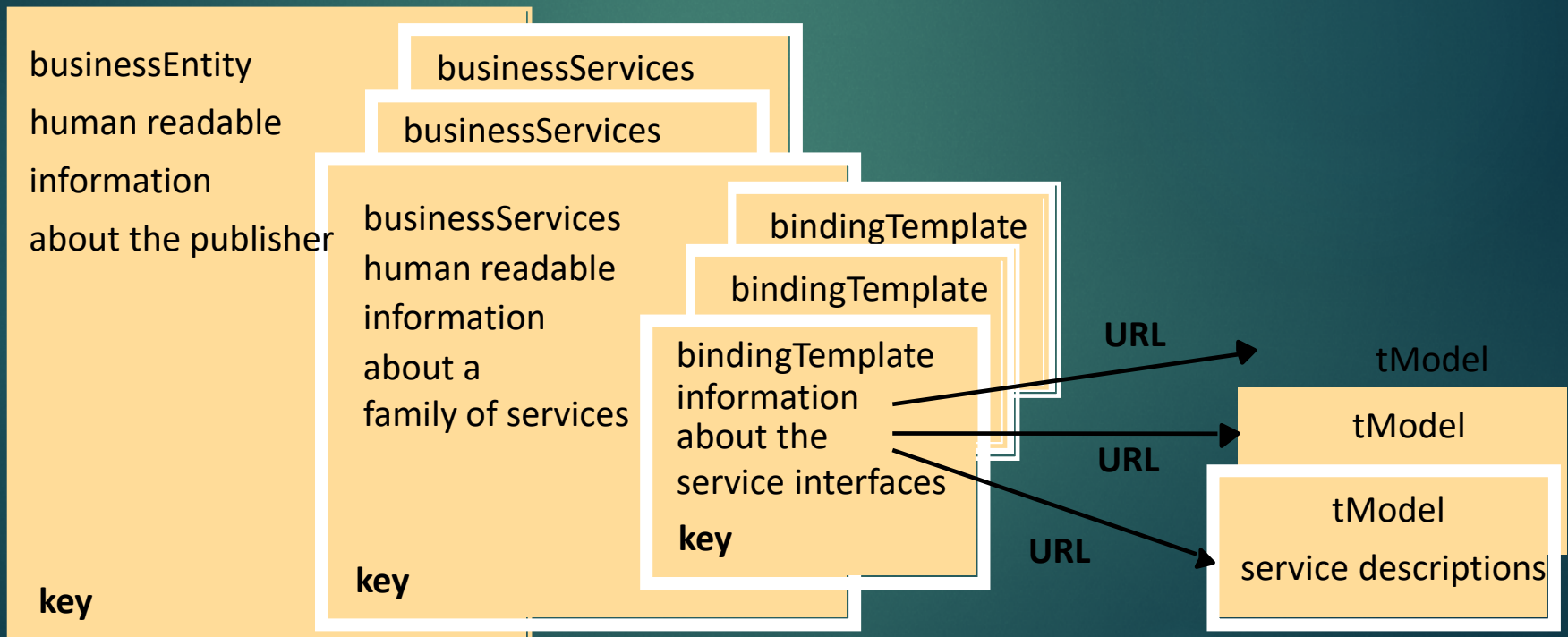
location = service URI

the service URI is:

“http://localhost:8080/ShapeList-jaxrpc/ShapeList”

A DIRECTORY SERVICE FOR USE WITH WEB SERVICES

- ▶ UDDI – Universal Description, Discovery, and Integration Service
- ▶ Data structures allow human-readable information access

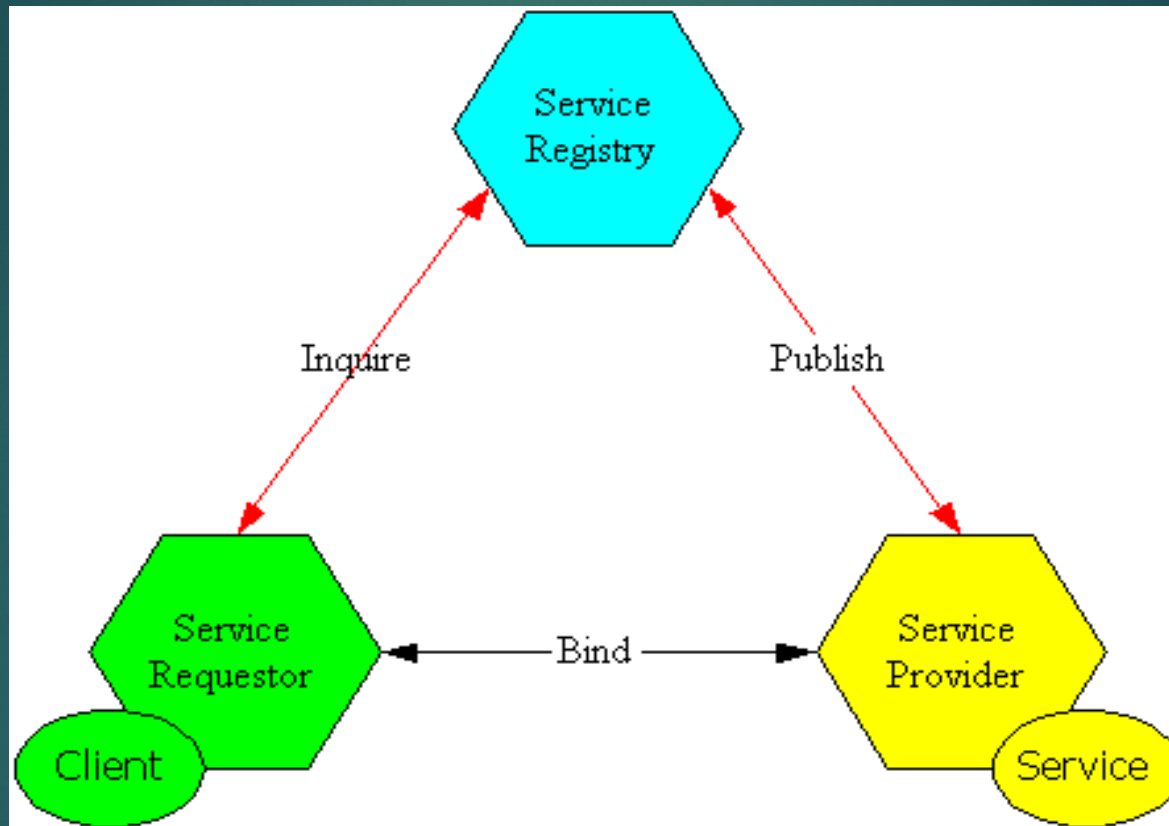


A DIRECTORY SERVICE FOR USE WITH WEB SERVICES

- ▶ Lookup
 - ▶ UDDI provides an API for looking up services based on 2 sets of query operation: *get_xxx*, *find_xxx*.
 - ▶ UDDI provides a notify/subscribe interface
- ▶ Publication
 - ▶ UDDI provides an interface for publishing and updating information about web services.
- ▶ Registries
 - ▶ UDDI service is based on replicated data stored in registries

UDDI

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UDDI defines a way to **publish** and **discover** information about Web services