



: Web Service Definition Language (WSDL)

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1.

W3C: WSDL XML ,  
,  
,  
,  
( ). WSDL ,  
,  
,  
,  
WSDL  
SOAP 1.1, HTTP GET/POST MIME.

2.0 W3C. WSDL 1.2 2.0; 1.1, W3C,  
WSDL 1.1. WSDL 2.0,  
HTTP ( GET  
POST 1.1), WSDL 2.0 -  
RESTful , -  
WSDL 1.1. , - ( 2.0)  
Business Process (BPEL) WSDL 1.1.  
WSDL :

```
<?xml version="1.0" encoding="UTF-8"?>
<description xmlns="http://www.w3.org/ns/wSDL"
  xmlns:tns="http://www.tmsws.com/wsd120sample"
  xmlns:whhttp="http://schemas.xmlsoap.org/wSDL/http/"
  xmlns:wsoap="http://schemas.xmlsoap.org/wSDL/soap/"
  targetNamespace="http://www.tmsws.com/wsd120sample">

  <!-- Abstract type -->
  <types>
    <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
      xmlns="http://www.tmsws.com/wsd120sample"
      targetNamespace="http://www.example.com/wsd120sample">

      <xs:element name="request"> ... </xs:element>
      <xs:element name="response"> ... </xs:element>
    </xs:schema>
  </types>

  <!-- Abstract interfaces -->
  <interface name="Interfacel">
    <fault name="Error1" element="tns:response"/>
    <operation name="Opp1" pattern="http://www.w3.org/ns/wSDL/in-out">
      <input messageLabel="In" element="tns:request"/>
      <output messageLabel="Out" element="tns:response"/>
    </operation>
  </interface>
```

```

<!-- Concrete Binding Over HTTP -->
  <binding name="HttpBinding" interface="tns:Interfacel"
    type="http://www.w3.org/ns/wsd1/http">
    <operation ref="tns:Get" whttp:method="GET"/>
  </binding>

<!-- Concrete Binding with SOAP-->
  <binding name="SoapBinding" interface="tns:Interfacel"
    type="http://www.w3.org/ns/wsd1/soap"
    wsoap:protocol="http://www.w3.org/2003/05/soap/bindings/HTTP/"
    wsoap:mepDefault="http://www.w3.org/2003/05/soap/mep/request-
response">
    <operation ref="tns:Get" />
  </binding>

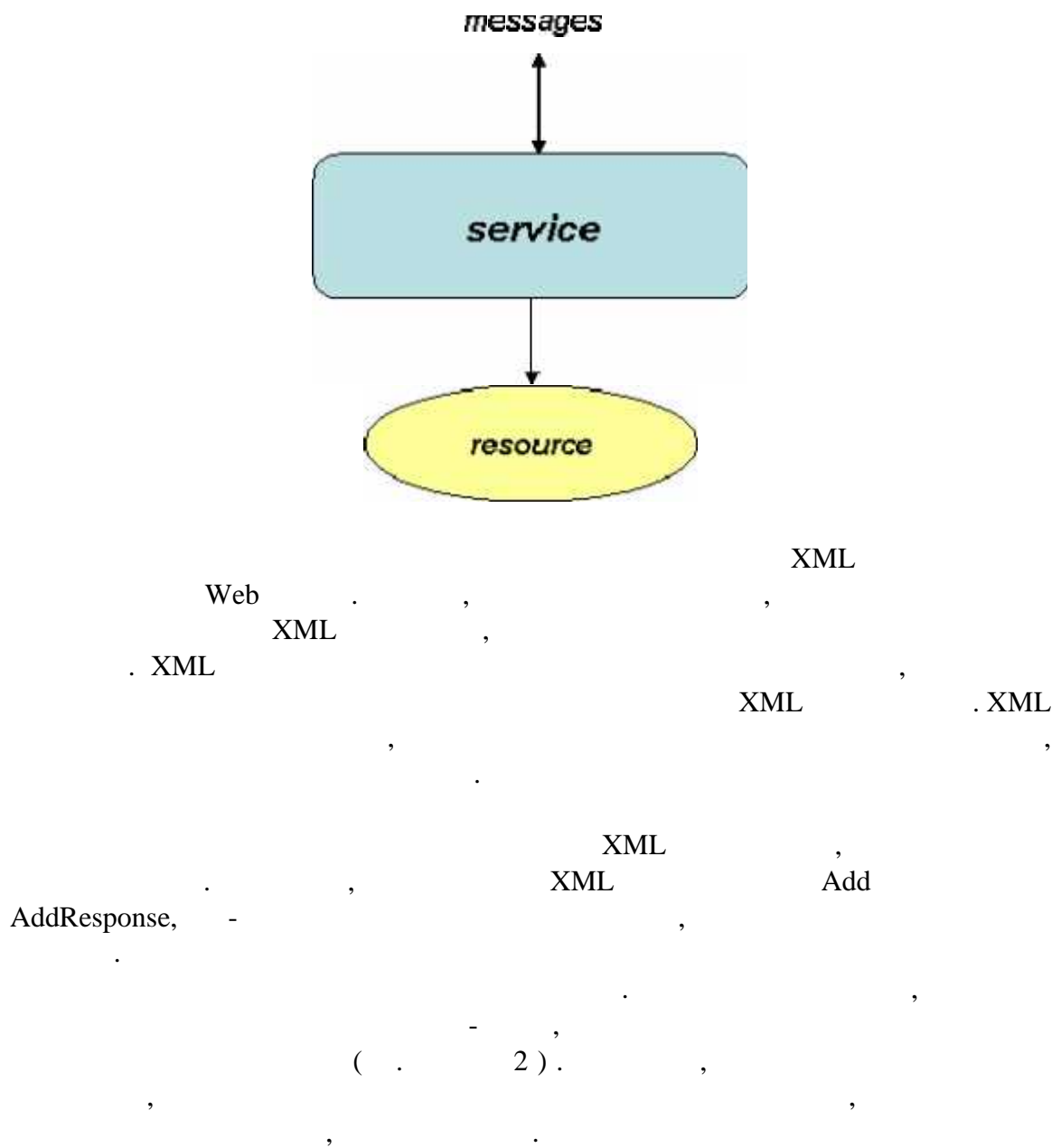
<!-- Web Service offering endpoints for both bindings-->
  <service name="Service1" interface="tns:Interfacel">
    <endpoint name="HttpEndpoint"
      binding="tns:HttpBinding"
      address="http://www.example.com/rest/" />
    <endpoint name="SoapEndpoint"
      binding="tns:SoapBinding"
      address="http://www.example.com/soap/" />
  </service>
</description>

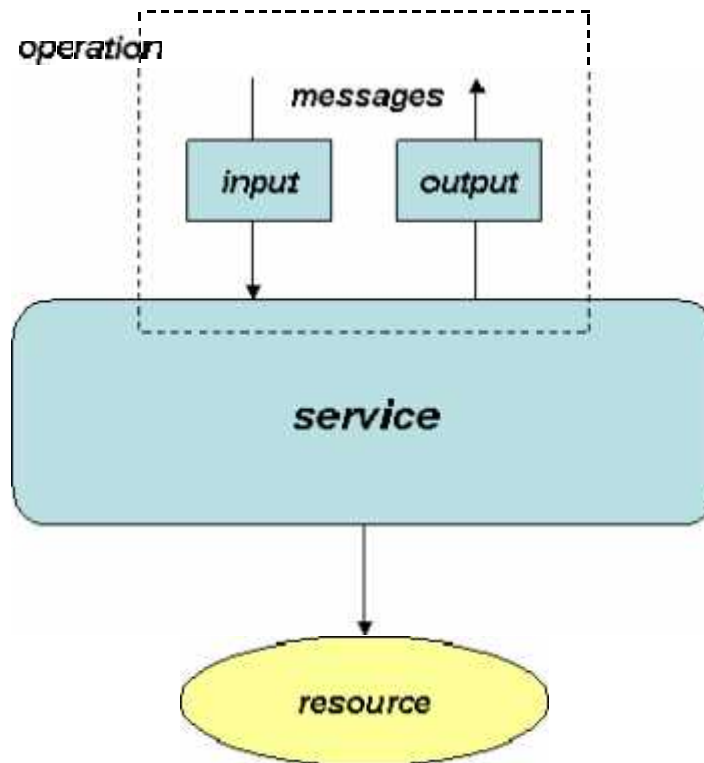
```

2.

XML Web

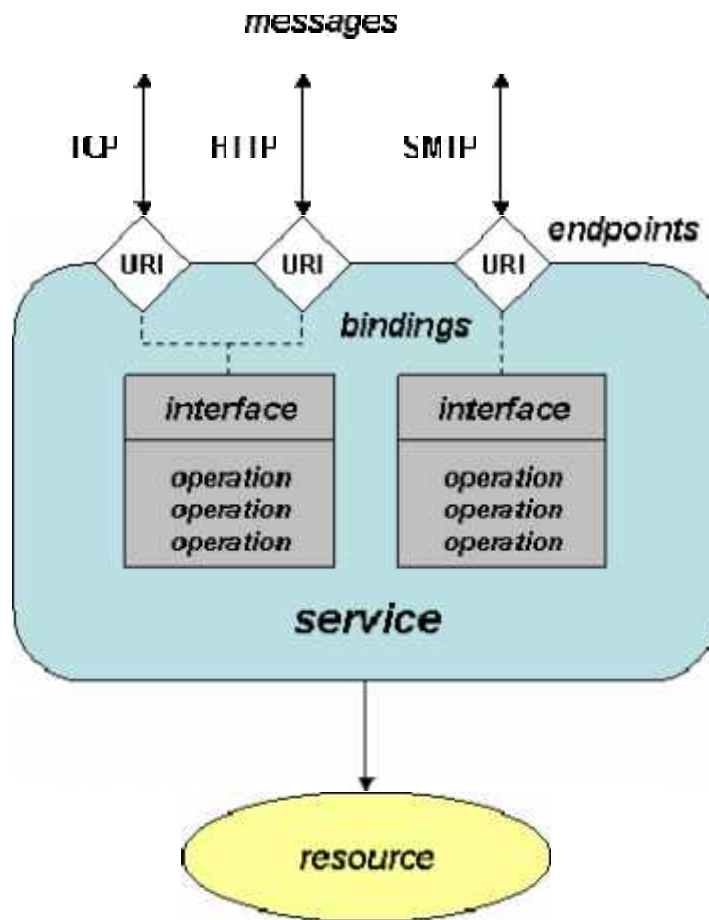
XML .  
 XML TCP, HTTP, SMTP  
 "Web" (  
 " ) , XML  
 , ( . 1).





(endpoint) ( . 3 ).

URI,



XML  
XML Schema

. Web Services Description Language (WSDL)  
. WSDL

endpoint .

WSDL

WSDL .

WSDL

IDL

DCOM) .

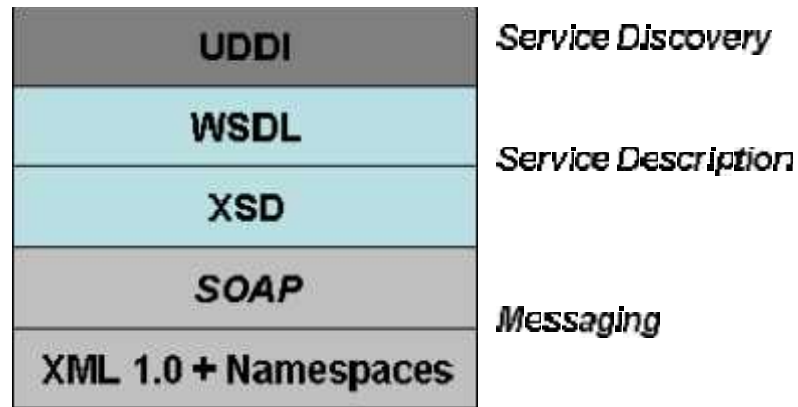
, WS -I Basic

1.0

WSDL

XML

( . 4 )



WSDL ( . . . XML ),

WSDL , WSDL SOAP

Microsoft ®. NET

WSDL . Wsd.exe

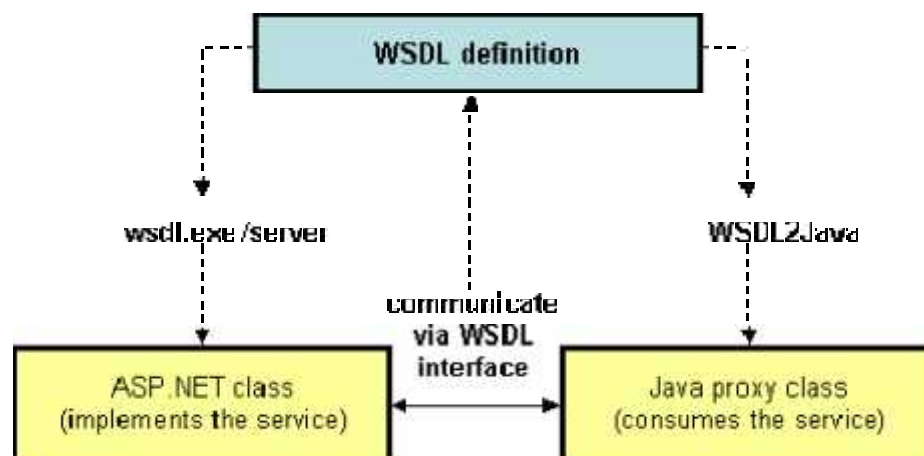
wsdl.exe

. (Apache Axis

Java

, WSDL2Java, WSDL

( 5).



WSDL 1.1

WSDL 1.1,



WSDL (The WS-I)

3. WSDL

- a. WSDL e XML XML namespace-a <http://schemas.xmlsoap.org/wSDL/> .
- types, message, interface, binding, service.
- WSDL:

```
<!-- WSDL definition structure -->
<definitions
  name="MathService"
  targetNamespace="http://example.org/math/"
  xmlns="http://schemas.xmlsoap.org/wSDL/"
>
  <!-- abstract definitions -->
  <types> ...
  <message> ...
  <interface> ...

  <!-- concrete definitions -->
  <binding> ...
  <service> ...
</definition>
```

	:
Types	XML , .
message	A , , .
interface	( );
Binding	
Service	, binding (URI)

b. (types)

WSDL types e XML .

XML types a,

WSDL XML Schema,

MathInput (Add, Subtract, Multiply, Divide) MathOutput

(AddResponse, SubtractResponse, MultiplyResponse DivideResponse).

```

<definitions
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:y="http://example.org/math/"
  xmlns:ns="http://example.org/math/types/"
  targetNamespace="http://example.org/math/"
>
  <types>
    <xs:schema
      targetNamespace="http://example.org/math/types/"
      xmlns="http://example.org/math/types/"
    >
      <xs:complexType name="MathInput">
        <xs:sequence>
          <xs:element name="x" type="xs:double"/>
          <xs:element name="y" type="xs:double"/>
        </xs:sequence>
      </xs:complexType>
      <xs:complexType name="MathOutput">
        <xs:sequence>
          <xs:element name="result" type="xs:double"/>
        </xs:sequence>
      </xs:complexType>
      <xs:element name="Add" type="MathInput"/>
      <xs:element name="AddResponse" type="MathOutput"/>
      <xs:element name="Subtract" type="MathInput"/>
      <xs:element name="SubtractResponse" type="MathOutput"/>
      <xs:element name="Multiply" type="MathInput"/>
      <xs:element name="MultiplyResponse" type="MathOutput"/>
      <xs:element name="Divide" type="MathInput"/>
      <xs:element name="DivideResponse" type="MathOutput"/>
    </xs:schema>
  </types>
  ...
</definitions>

```

c. (messages)

Messages WSDL ,  
 .  
 ( document )  
 ( RPC ).  
 (\* , ? ):

```
<definitions .... >
  <message name="nmtoken"> *
    <part name="nmtoken" element="qname"? type="qname"?/> *
  </message>
</definitions>
```

WSDL. RPC ,  
 document ,  
 XML ,  
 :

```
<definitions
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:y="http://example.org/math/"
  xmlns:ns="http://example.org/math/types/"
  targetNamespace="http://example.org/math/"
>
  ...
  <message name="AddMessage">
    <part name="parameter" element="ns:Add"/>
  </message>
  <message name="AddResponseMessage">
    <part name="parameter" element="ns:AddResponse"/>
  </message>
  <message name="SubtractMessage">
    <part name="parameter" element="ns:Subtract"/>
  </message>
  <message name="SubtractResponseMessage">
    <part name="parameter" element="ns:SubtractResponse"/>
  </message>
  ...
</definitions>
```

d. (interfaces/protTypes)  
 portType/interface WSDL ,  
 "portType" ,

WSDL 1.2

portType

ata

interface

interface , (\* ):

```

<definitions .... >
  <interface name="nmtoken">
    <operation name="nmtoken" .... /> *
  </interdace>
</definitions>

```

WSDL

input output , output , fault .

(MEP)

input , output request-response

output input solicit-response .

input input one-way ,

output output notification.

MathInterface, 4 :

Add, Subtract, Multiply, Divide

```

<definitions
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:y="http://example.org/math/"
  xmlns:ns="http://example.org/math/types/"
  targetNamespace="http://example.org/math/"
>
  ...
  <interface name="MathInterface">
    <operation name="Add">
      <input message="y:AddMessage" />
      <output message="y:AddResponseMessage" />
    </operation>
    <operation name="Subtract">
      <input message="y:SubtractMessage" />
      <output message="y:SubtractResponseMessage" />
    </operation>
    <operation name="Multiply">
      <input message="y:MultiplyMessage" />
      <output message="y:MultiplyResponseMessage" />
    </operation>
    <operation name="Divide">
      <input message="y:DivideMessage" />
    </operation>
  </interface>

```

```

        <output message="y:DivideResponseMessage"/>
    </operation>
</interface>
...
</definitions>

```

e. (Bindings)

Binding WSDL . Binding ,

WSDL ,

binding , (\* , ?

):

```

<wsdl:definitions .... >
  <wsdl:binding name="nmtoken" type="qname"> *
    <!-- extensibility element providing binding details --> *
    <wsdl:operation name="nmtoken"> *
      <!-- extensibility element for operation details --> *
      <wsdl:input name="nmtoken"? > ?
        <!-- extensibility element for body details -->
      </wsdl:input>
      <wsdl:output name="nmtoken"? > ?
        <!-- extensibility element for body details -->
      </wsdl:output>
      <wsdl:fault name="nmtoken"> *
        <!-- extensibility element for body details -->
      </wsdl:fault>
    </wsdl:operation>
  </wsdl:binding>
</wsdl:definitions>

```

WSDL binding .

WSDL

WSDL

SOAP binding- , binidng MathInterface

SOAP / HTTP:

```

<definitions
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"

```

```

xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:y="http://example.org/math/"
xmlns:ns="http://example.org/math/types/"
targetNamespace="http://example.org/math/"
>
...
<binding name="MathSoapHttpBinding" type="y:MathInterface">
  <soap:binding style="document"
    transport="http://schemas.xmlsoap.org/soap/http"/>
  <operation name="Add">
    <soap:operation
      soapAction="http://example.org/math/#Add"/>
    <input>
      <soap:body use="literal"/>
    </input>
    <output>
      <soap:body use="literal"/>
    </output>
  </operation>
  ...
</binding>
...
</definitions>

```

Soap:binding , SOAP 1.1 . document RPC ),  
 ( (HTTP ) . Soap:operation  
 SOAPAction HTTP . soap:body  
 SOAP Body ( literal encoded). ,  
 .  
 document SOAP , XML ,  
 XML ,  
 RPC SOAP , XML .  
 .  
 use , "encoded" , SOAP  
 . "literal" ,  
 ( "literal" ) . ,  
 XML Schema, .  
 , Add document/literal bindings :

```

<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
>
  <SOAP-ENV:Body>

```

```

    <m:Add xmlns:m="http://example.org/math/types/">
      <x>3.14159265358979</x>
      <y>3.14159265358979</y>
    </m:Add>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

, SOAP Body , document/literal , Add  
 - , , RPC/encoded binding-a.  
 WSDL , RPC/encoded binding  
 :

```

...
<message name="AddMessage">
  <part name="parameter" type="ns:MathInput"/>
</message>
<message name="AddResponseMessage">
  <part name="parameter" type="ns:MathOutput"/>
</message>
...
<binding name="MathSoapHttpBinding" type="y:MathInterface">
  <soap:binding style="rpc"
    transport="http://schemas.xmlsoap.org/soap/http"/>
  <operation name="Add">
    <soap:operation
      soapAction="http://example.org/math/#Add"/>
    <input>
      <soap:body use="encoded"/>
    </input>
    <output>
      <soap:body use="encoded"/>
    </output>
  </operation>
  ...
</binding>

```

, Add - ,  
 :

```

<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:SOAP-ENC="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:m0="http://example.org/math/types/"

```

```

>
<SOAP-ENV:Body>
  <m:Add xmlns:m="http://example.org/math/">
    <parameter xsi:type="m0:MathInput">
      <x xsi:type="xsd:double">3.14159265358979</x>
      <y xsi:type="xsd:double">3.14159265358979</y>
    </parameter>
  </m:Add>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

. - - ,  
 .  
 ( .  
 ) .  
 , WS -I ,  
 SOAP , Basic Profile 1.0 . ,  
 , Basic 1.0 .  
 , SOAP Encoding .  
 - SOAP / / ( ,  
 - ) .  
 , -  
 WS -I " " ,  
 , RPC / , ,  
 , RPC / . RPC /  
 RPC / /  
 - .  
 SOAP , WSDL  
 : HTTP GET POST MIME .  
 .  
 f. (Services)  
 WSDL service ,  
 binding. service , :

```

<definitions ....>
  <service ....> *
    <port name="nmtoken" binding="qname"> *
      <!-- extensibility element defines address details -->
    </port>
  </service>

```



```
</definitions>
```

binding. ,  
interface ,  
,  
MathService MathSoapHttpBinding URL ,  
<http://localhost/math/math.asmx>:

```
<definitions
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:y="http://example.org/math/"
  xmlns:ns="http://example.org/math/types/"
  targetNamespace="http://example.org/math/"
>
...
<service name="MathService">
  <port name="MathEndpoint" binding="y:MathSoapHttpBinding">
    <soap:address
      location="http://localhost/math/math.asmx"/>
    </port>
  </service>
</definitions>
```

- 4.
- a. WSDL 1.0 ( 2000) IBM, Microsoft Ariba ,  
SOAP .  
: NASSL (Network Application Service  
Specification Language) IBM SDL (Service Description Language)  
Microsoft.
  - b. WSDL 1.1, 2001 ., WSDL 1.0.  
1.0 1.1.
  - c. WSDL 1.2 ( 2003 .) W3C. W3C:  
WSDL 1.2 - . WSDL 1.2  
. WSDL 1.2
  - d. WSDL 2.0 W3C SOAP /  
2007 . WSDL 1.2  
WSDL 2.0, WSDL, :  
i.

- ii. message
- iii.
- iv. PortTypes interfaces
- v. Ports endpoints

5.

- a. W3C Specification: <http://www.w3.org/TR/wsdl20/>
- b. Wikipedia (BG): <http://bg.wikipedia.org/wiki/WSDL>
- c. Wikipedia (EN):  
[http://en.wikipedia.org/wiki/Web\\_Services\\_Description\\_Language](http://en.wikipedia.org/wiki/Web_Services_Description_Language)
- d. MSDN - <http://msdn.microsoft.com>