

# **IIC2513 - TECNOLOGÍAS Y APLICACIONES WEB**

**I-2016**



# WEB SERVICES



# Motivación





Aplicación A

Aplicación B

**¿Cómo pueden comunicarse las aplicaciones A y B?**



- ✱ **Comunicación manual**
  - ✱ **P.e. Intercambio de archivos**
- ✱ **Llamados del sistema**
- ✱ **RPC (Remote Procedure Call)**
  - ✱ **P.e. Java RMI (Remote Method Invocation)**



**¿Llamados web?**



<http://futbol-results.com/api>

## Request

```
<RemoteCall class="FutbolSource" method="getResult">  
  <param name="user" value="polla-iic2513" />  
  <param name="token" value="630614611d98f6bc..." />  
  <param name="scope" value="Copa America 2016" />  
  <param name="team1" value="EE.UU." />  
  <param name="team2" value="Colombia" />  
</RemoteCall>
```

## Response

```
<Response>  
  <Result>  
    <team1>0</team1>  
    <team2>2</team2>  
  </Result>  
</Response>
```

Ejemplo de XML-RPC (falso)

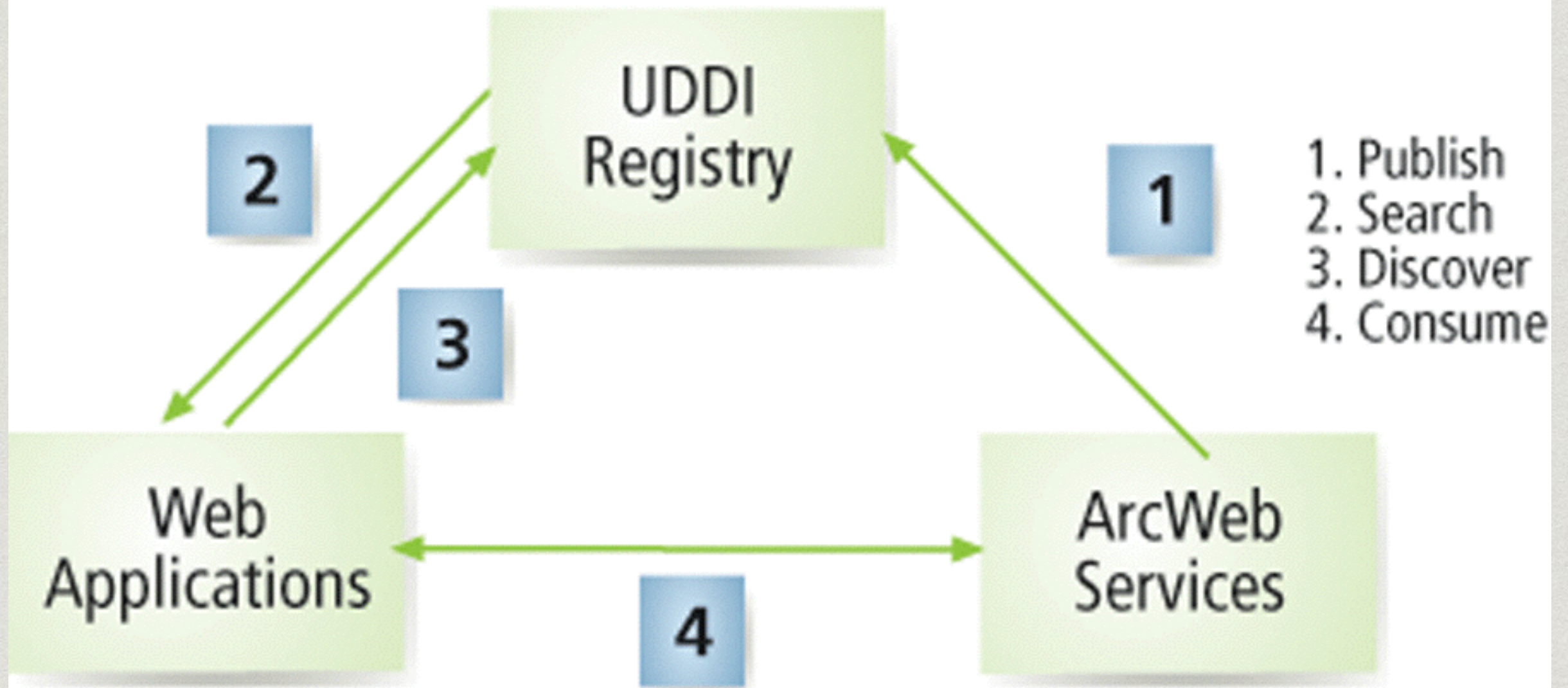


# WEB SERVICES (SOAP)



WSDL

## Web Services



SOAP



```
<definitions name="HelloService"
  targetNamespace="http://www.examples.com/wsdl/HelloService.wsdl"
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:tns="http://www.examples.com/wsdl/HelloService.wsdl"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">

  <message name="SayHelloRequest">
    <part name="firstName" type="xsd:string"/>
  </message>

  <message name="SayHelloResponse">
    <part name="greeting" type="xsd:string"/>
  </message>

  <portType name="Hello_PortType">
    <operation name="sayHello">
      <input message="tns:SayHelloRequest"/>
      <output message="tns:SayHelloResponse"/>
    </operation>
  </portType>

  <binding name="Hello_Binding" type="tns:Hello_PortType">
    <soap:binding style="rpc"
      transport="http://schemas.xmlsoap.org/soap/http"/>
    <operation name="sayHello">
      <soap:operation soapAction="sayHello"/>
      <input>
        <soap:body
          encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
          namespace="urn:examples:helloservice"
          use="encoded"/>
      </input>

      <output>
        <soap:body
          encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
          namespace="urn:examples:helloservice"
          use="encoded"/>
      </output>
    </operation>
  </binding>

  <service name="Hello_Service">
    <documentation>WSDL File for HelloService</documentation>
    <port binding="tns:Hello_Binding" name="Hello_Port">
      <soap:address
        location="http://www.examples.com/SayHello/" />
    </port>
  </service>
</definitions>
```





## **SOAP Envelope**

**SOAP Header**  
(Metadata about  
the message)

**SOAP Body**  
("Run routine  
X over on  
machine Y")



```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope
  xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

  <soapenv:Header>
    <ns1:RequestHeader
      soapenv:actor="http://schemas.xmlsoap.org/soap/actor/next"
      soapenv:mustUnderstand="0"
      xmlns:ns1="https://www.google.com/apis/ads/publisher/v201605">
      <ns1:networkCode>123456</ns1:networkCode>
      <ns1:applicationName>DfpApi-Java-2.1.0-dfp_test</ns1:applicationName>
    </ns1:RequestHeader>
  </soapenv:Header>

  <soapenv:Body>
    <getAdUnitsByStatement xmlns="https://www.google.com/apis/ads/publisher/v201605">
      <filterStatement>
        <query>WHERE parentId IS NULL LIMIT 500</query>
      </filterStatement>
    </getAdUnitsByStatement>
  </soapenv:Body>

</soapenv:Envelope>
```



```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">

  <soap:Header>
    <ResponseHeader xmlns="https://www.google.com/apis/ads/publisher/v201605">
      <requestId>xxxxxxxxxxxxxxxxxxxxxx</requestId>
      <responseTime>1063</responseTime>
    </ResponseHeader>
  </soap:Header>

  <soap:Body>
    <getAdUnitsByStatementResponse xmlns="https://www.google.com/apis/ads/publisher/
v201605">
      <rval>
        <totalResultSetSize>1</totalResultSetSize>
        <startIndex>0</startIndex>
        <results>
          <id>2372</id>
          <name>RootAdUnit</name>
          <description></description>
          <targetWindow>TOP</targetWindow>
          <status>ACTIVE</status>
          <adUnitCode>1002372</adUnitCode>
          <inheritedAdSenseSettings>
            <value>
              <adSenseEnabled>true</adSenseEnabled>
              <borderColor>FFFFFF</borderColor>
              <titleColor>0000FF</titleColor>
              <backgroundColor>FFFFFF</backgroundColor>
              <textColor>000000</textColor>
              <urlColor>008000</urlColor>
            </value>
          </inheritedAdSenseSettings>
        </results>
      </rval>
    </getAdUnitsByStatementResponse>
  </soap:Body>
</soap:Envelope>
```



**WEB SERVICE REST**



**Idea: usar los elementos “naturales” de la web**



## Ejemplos

**HTTP GET <http://example.com/MyWebService/user/11>**

**HTTP DELETE <http://example.com/MyWebService/users/11>**



# Ejercicio

**Construir un servicio web en app de cartas magic  
(magic\_decks):**

**GET <http://localhost:3000/ws/types>  
entrega una lista de tipos en formato json**



# HTTP



# REQUEST

HTTP





**GET /doc/test.html HTTP/1.1**

Host: www.test101.com

Accept: image/gif, image/jpeg, \*/\*

Accept-Language: en-us

Accept-Encoding: gzip, deflate

User-Agent: Mozilla/4.0

Content-Length: 35

bookId=12345&author=Tan+Ah+Teck

Request Line

Request Headers

Request  
Message  
Header

A blank line separates header & body

Request Message Body



# RESPONSE

HTTP





**HTTP/1.1 200 OK**

Date: Sun, 08 Feb xxxx 01:11:12 GMT

Server: Apache/1.3.29 (Win32)

Last-Modified: Sat, 07 Feb xxxx

ETag: "0-23-4024c3a5"

Accept-Ranges: bytes

Content-Length: 35

Connection: close

Content-Type: text/html

<h1>My Home page</h1>

→ Status Line

Response Headers

} Response  
Message  
Header

→ A blank line separates header & body

} Response Message Body



**GET /doc/test.html HTTP/1.1**

Host: www.test101.com

Accept: image/gif, image/jpeg, \*/\*

Accept-Language: en-us

Accept-Encoding: gzip, deflate

User-Agent: Mozilla/4.0

Content-Length: 35

bookId=12345&author=Tan+Ah+Teck

Request Line

Request Headers

Request  
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A blank line separates header & body

Request Message Body

**HTTP/1.1 200 OK**

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ETag: "0-23-4024c3a5"

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Content-Length: 35

Connection: close

Content-Type: text/html

<h1>My Home page</h1>

Status Line

Response Headers

Response  
Message  
Header

A blank line separates header & body

Response Message Body



# HTTP Verbs

- \* OPTIONS

- \* GET

- \* HEAD

- \* POST

- \* PUT

- \* PATCH

- \* DELETE

- \* CONNECT

- \* TRACE



HTTP Method ⬆	RFC ⬆	Request Has Body ⬆	Response Has Body ⬆	Safe ⬆	Idempotent ⬆	Cacheable ⬆
GET	<a href="#">RFC 7231</a> 🔗	No	Yes	Yes	Yes	Yes
HEAD	<a href="#">RFC 7231</a> 🔗	No	No	Yes	Yes	Yes
POST	<a href="#">RFC 7231</a> 🔗	Yes	Yes	No	No	Yes
PUT	<a href="#">RFC 7231</a> 🔗	Yes	Yes	No	Yes	No
DELETE	<a href="#">RFC 7231</a> 🔗	No	Yes	No	Yes	No
CONNECT	<a href="#">RFC 7231</a> 🔗	Yes	Yes	No	No	No
OPTIONS	<a href="#">RFC 7231</a> 🔗	No	Yes	Yes	Yes	No
TRACE	<a href="#">RFC 7231</a> 🔗	No	Yes	Yes	Yes	No
PATCH	<a href="#">RFC 5789</a> 🔗	Yes	Yes	No	No	Yes

# HTTP VERBS

## RESUMEN



## Referencias:

<https://www.w3.org/Protocols/rfc2616/rfc2616-sec9.html>

[http://www.tutorialspoint.com/http/http\\_methods.htm](http://www.tutorialspoint.com/http/http_methods.htm)



# Status codes

- \* 1xx - Información
- \* 2xx - Éxito. Ej: 200 Ok
- \* 3xx - Redirección. Ej: 301 Moved Permanently
- \* 4xx - Error de cliente. Ej: 404 Not Found
- \* 5xx - Error de servidor. Ej: 501 Not Implemented



## Referencias:

<https://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html>

[https://en.wikipedia.org/wiki/List\\_of\\_HTTP\\_status\\_codes](https://en.wikipedia.org/wiki/List_of_HTTP_status_codes)

[http://www.tutorialspoint.com/http/http\\_status\\_codes.htm](http://www.tutorialspoint.com/http/http_status_codes.htm)



# Headers

[https://en.wikipedia.org/wiki/List\\_of\\_HTTP\\_header\\_fields](https://en.wikipedia.org/wiki/List_of_HTTP_header_fields)

[http://www.tutorialspoint.com/http/http\\_header\\_fields.htm](http://www.tutorialspoint.com/http/http_header_fields.htm)



# WEB SERVICES RESTful



# Principios

- \* URL -> determina un recurso / recursos
- \* HTTP Verb -> acción
- \* Status code -> resultado



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