

WCF Web API

// making REST a first class citizen in .NET

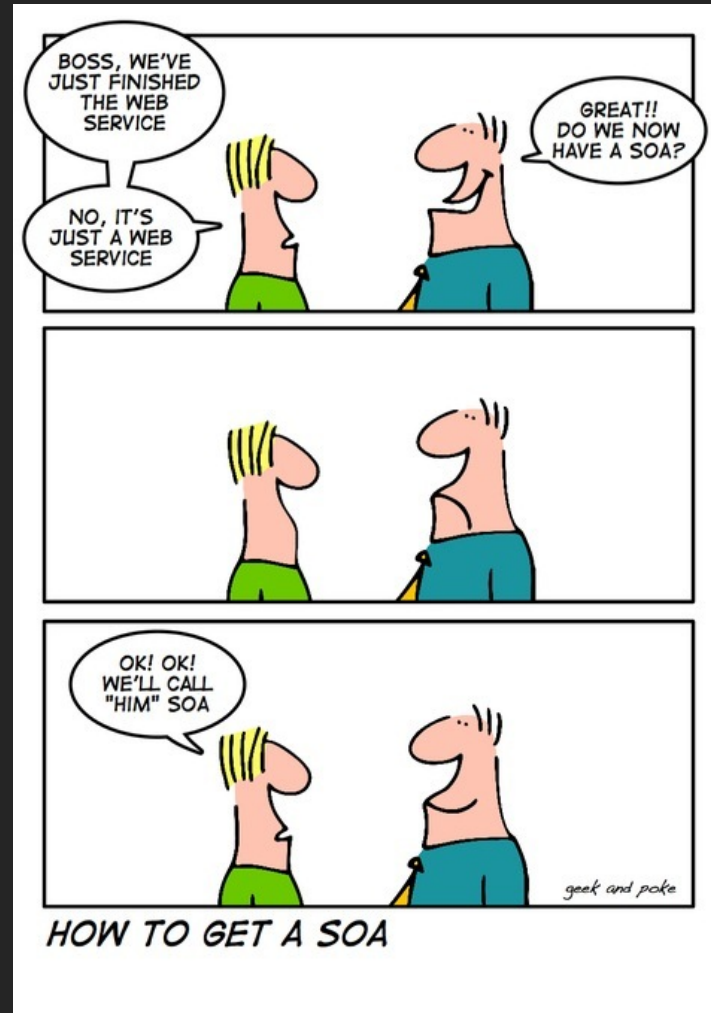
Alexander Zeitler

Alexander Zeitler

blog.alexonasp.net | [@AlexZeitler](https://twitter.com/AlexZeitler)



SOA



HTTP

§ HyperText Transfer Protocol

§ Request / Response

HTTP | Request / Response



HTTP

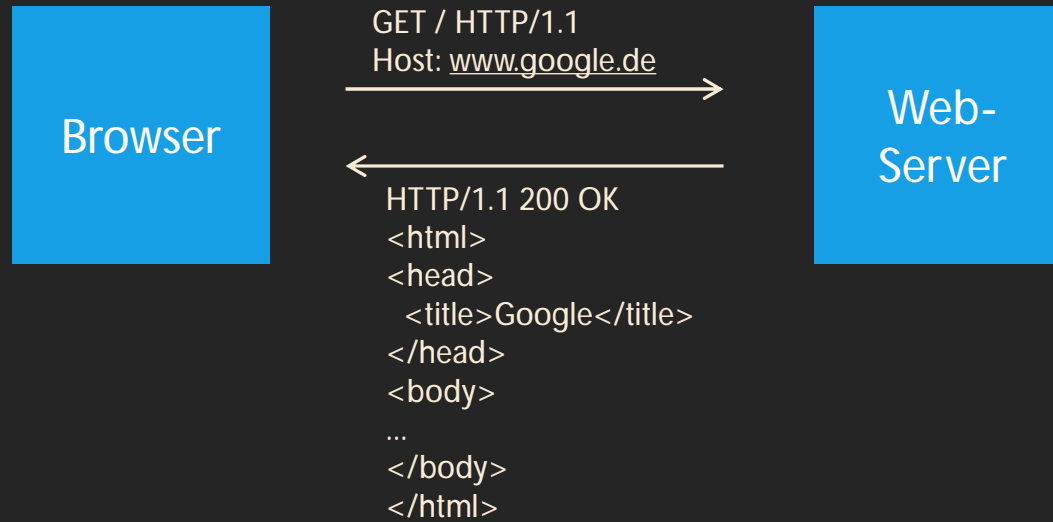
§ HyperText Transfer Protocol

§ Request / Response

§ HTTP-Methoden | GET / POST / PUT / DELETE ...

§ HTTP Status-Codes | 200 / 404 / 403 / 500 ...

HTTP | Methoden / Status Codes





Demo | Hello World mit HTTP

SOAP

- § XML über HTTP
- § Nur ein Endpunkt für alle Methodenaufrufe nötig
- § Nur POST Methode verwendet
- § HTTP Status-Code 200 für alle Responses
- § WS-* / WSDL

SOA via HTTP | Was steckt drin?

§ Request

- § Pfad

- § HTTP Methode

- § Fokus-Information

- § Methoden-Information

§ Response

- § Status

- § Entity



Demo | SOAP / POX

Demo | SOAP / POX



Statistics Inspectors AutoResponder Request Builder Filters Log Timeline

Use this page to handcraft a HTTP Request. You can clone a prior request by dragging and dropping a session from the Web Sessions list. Execute

Parsed Raw Options

POST http://api.flickr.com/services/soap HTTP/1.1 Help...

Request Headers

User-Agent: Fiddler
Host: api.flickr.com
Content-Length: 397

Request Body

```
<s:Envelope
  xmlns:s="http://www.w3.org/2003/05/soap-envelope"
  xmlns:xsi="http://www.w3.org/1999/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/1999/XMLSchema"
>
  <s:Body>
    <x:FlickrRequest xmlns:x="urn:flickr">
      <api_key>a756c65bbb732fa1184f205874cbee14</api_key>
      <method>flickr.test.echo</method>
      <name>Alexander Zeitler</name>
    </x:FlickrRequest>
  </s:Body>
</s:Envelope>
```

Demo | SOAP / POX



Statistics Inspectors AutoResponder Request Builder Filters Log Timeline

Headers TextView WebForms HexView JSON Auth Raw XML JSON

Request Headers [Raw] [Header Definitions]

POST /services/soap HTTP/1.1

- Client
 - User-Agent: Fiddler
- Entity
 - Content-Length: 397
- Transport
 - Host: api.flickr.com

Transformer Headers TextView ImageView HexView WebView JSON Auth Caching Privacy

Raw XML JSON

```
HTTP/1.1 200 OK
Date: Wed, 29 Jun 2011 20:43:36 GMT
P3P: policyref="http://p3p.yahoo.com/w3c/p3p.xml", CP="CAO DSP COR CUR ADM DEV TAI PSA
X-Served-By: www83.flickr.mud.yahoo.com
Cache-Control: private
Content-Length: 457
Connection: close
Content-Type: application/soap+xml; charset=utf-8

<?xml version="1.0" encoding="utf-8" ?>
<s:Envelope
  xmlns:s="http://www.w3.org/2003/05/soap-envelope"
  xmlns:xsi="http://www.w3.org/1999/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/1999/XMLSchema"
>
  <s:Body>
    <x:FlickrResponse xmlns:x="urn:flickr">
      &lt;api_key&gt;a756c65bbb732fa1184f205874cbee14&lt;/api_key&gt;
      &lt;method&gt;flickr.test.echo&lt;/method&gt;
      &lt;name&gt;Alexander Zeitler&lt;/name&gt;
    </x:FlickrResponse>
  </s:Body>
</s:Envelope>
```

Demo | SOAP / POX



Statistics Inspectors AutoResponder Request Builder Filters Log Timeline

Headers TextView WebForms HexView JSON Auth Raw XML JSON

Request Headers [Raw] [Header Definitions]

POST /services/soap HTTP/1.1

- Client
 - User-Agent: Fiddler
- Entity
 - Content-Length: 397
- Transport
 - Host: api.flickr.com

Transformer Headers TextView ImageView HexView WebView JSON Auth Caching Privacy

Raw XML JSON

```
HTTP/1.1 200 OK
Date: Wed, 29 Jun 2011 20:43:36 GMT
P3P: policyref="http://p3p.yahoo.com/w3c/p3p.xml", CP="CAO DSP COR CUR ADM DEV TAI PSA
X-Served-By: www83.flickr.mud.yahoo.com
Cache-Control: private
Content-Length: 457
Connection: close
Content-Type: application/soap+xml; charset=utf-8

<?xml version="1.0" encoding="utf-8" ?>
<s:Envelope
  xmlns:s="http://www.w3.org/2003/05/soap-envelope"
  xmlns:xsi="http://www.w3.org/1999/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/1999/XMLSchema"
>
  <s:Body>
    <x:FlickrResponse xmlns:x="urn:flickr">
      &lt;api_key&gt;a756c65bbb732fa1184f205874cbee14&lt;/api_key&gt;
      &lt;method&gt;flickr.test.echo&lt;/method&gt;
      &lt;name&gt;Alexander Zeitler&lt;/name&gt;
    </x:FlickrResponse>
  </s:Body>
</s:Envelope>
```

Demo | SOAP / POX



The screenshot shows the Fiddler web proxy tool interface. The top menu includes Statistics, Inspectors, AutoResponder, Request Builder, Filters, Log, and Timeline. Below the menu are tabs for Headers, TextView, WebForms, HexView, JSON, Auth, Raw, XML, and JSON. The main window displays 'Request Headers' for a POST request to /services/soap HTTP/1.1. The headers are categorized into Client (User-Agent: Fiddler), Entity (Content-Length: 397), and Transport (Host: api.flickr.com). Below the headers are tabs for Transformer, Headers, TextView, ImageView, HexView, WebView, JSON, Auth, Caching, and Privacy. The 'Raw' tab is selected, showing the response body in XML format. The response is an HTTP 200 OK with headers including Date, P3P, X-Served-By, Cache-Control, Content-Length, Connection, and Content-Type. The XML body is a SOAP fault with the following structure:

```
HTTP/1.1 200 OK
Date: Wed, 29 Jun 2011 20:47:07 GMT
P3P: policyref="http://p3p.yahoo.com/w3c/p3p.xml", CP="CAO DSP COR CUR ADM DEV TAI PSA I
X-Served-By: www60.flickr.mud.yahoo.com
Cache-Control: private
Content-Length: 433
Connection: close
Content-Type: application/soap+xml; charset=utf-8

<?xml version="1.0" encoding="utf-8" ?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope">
  <s:Body>
    <s:Fault>
      <faultcode>flickr.error.112</faultcode>
      <faultstring>Method "flickr.test.ping" not found</faultst
      <faultactor>http://www.flickr.com/services/soap/</faultactor>
      <details>Please see http://www.flickr.com/services/api/ for more de
    </s:Fault>
  </s:Body>
</s:Envelope>
```



http://www.flickr.com/photos/fresh_photo/3479598520/



REST

- § REpresentational State Transfer
- § Verwendung von HTTP und Prinzipien des Webs
- § Stateless (anders als HTTP im „Browser-Web“)
- § Nicht auf Web-Anwendungen beschränkt
- § Selbstbeschreibend

REST | There's an URI for that

- § Ressource

 - § URI

 - § Repräsentation(en)

- § <http://localhost/contacts>

- § <http://localhost/contact/4>

REST | Vorteile



§ Skalierbarkeit

- § Caching (ETAG)

- § Beliebige Formate (MIME-Types)

- § Lose Kopplung (Links/Stateless)

§ Einfaches Deployment

- § Installation einzelner Komponenten

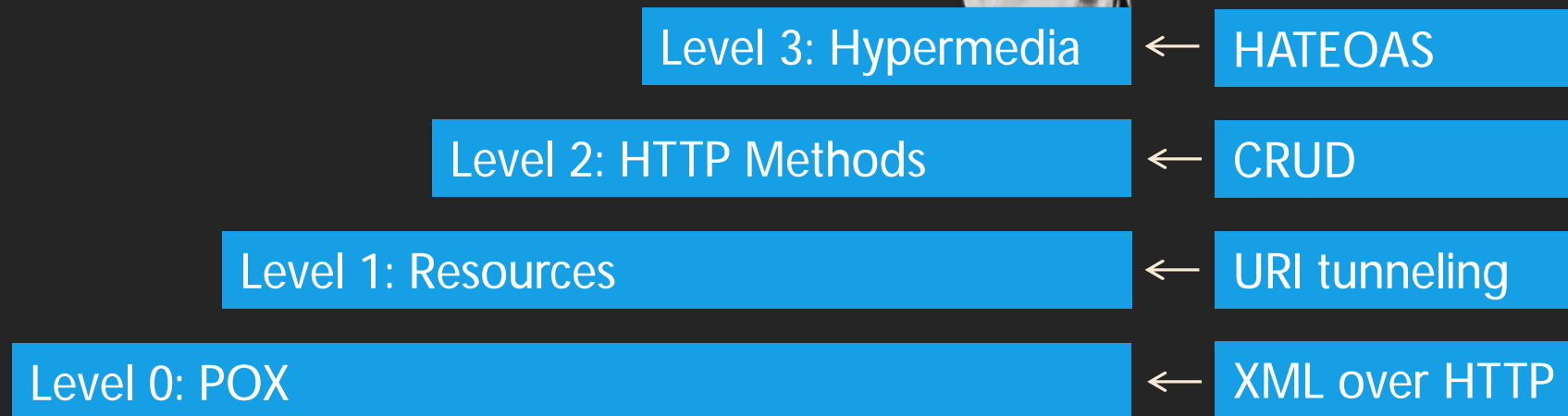
- § Einfache Komposition (Ressourcen vs. Services)

§ REST basiert auf bewährten Standards

REST | your data everywhere



REST | Richardson Maturity Model



REST | HATEOAS

§ Hypermedia As The Engine Of Application State

§ Hypermedia

§ Links

§ ATOM

Demo | This is not REST



Demo | This is not REST



Parsed Raw Options

POST http://api.flickr.com/services/rest/?method=flickr.test.echo&name=Alexander&api_key=a756c65bbb732fa118 HTTP/1.1

Request Headers Help...

User-Agent: Fiddler
Host: api.flickr.com
Content-Length: 0

Request Body

Demo | This is not REST



```
Transformer Headers TextView ImageView HexView WebView JSON Auth Caching Privacy Raw XML
JSON
HTTP/1.1 200 OK
Date: Wed, 29 Jun 2011 21:58:25 GMT
P3P: policyref="http://p3p.yahoo.com/w3c/p3p.xml", CP="CAO DSP COR CUR ADM DEV TAI PSA PSD IVAi IVDi CONI
Content-Length: 172
X-Served-By: ww32.flickr.mud.yahoo.com
Cache-Control: private
Vary: Accept-Encoding
Connection: close
Content-Type: text/xml; charset=utf-8
<?xml version="1.0" encoding="utf-8" ?>
<rsp stat="ok">
<method>flickr.test.echo</method>
<name>Alexander</name>
<api_key>a756c65bbb732fa1184f205874cbee14</api_key>
</rsp>
```

Find... View in Notepad

Demo | This is not REST



```
Transformer Headers TextView ImageView HexView WebView JSON Auth Caching Privacy Raw XML
JSON
HTTP/1.1 200 OK
Date: Wed, 29 Jun 2011 21:58:25 GMT
P3P: policyref="http://p3p.yahoo.com/w3c/p3p.xml", CP="CAO DSP COR CUR ADM DEV TAI PSA PSD IVAi IVDi CONI
Content-Length: 172
X-Served-By: ww32.flickr.mud.yahoo.com
Cache-Control: private
Vary: Accept-Encoding
Connection: close
Content-Type: text/xml; charset=utf-8
<?xml version="1.0" encoding="utf-8" ?>
<rsp stat="ok">
<method>flickr.test.echo</method>
<name>Alexander</name>
<api_key>a756c65bbb732fa1184f205874cbee14</api_key>
</rsp>
```

Find... View in Notepad

Demo | This is not REST



Use this page to handcraft a HTTP Request. You can clone a prior request by dragging and dropping a session from the Web Sessions list. Execute

Parsed Raw Options

POST ▼ `http://api.flickr.com/services/rest/?method=flickr.test.ping&name=Alexander&api_key=a756c65bbb732fa1184` HTTP/1.1 ▼

Request Headers Help...

User-Agent: Fiddler
Host: api.flickr.com
Content-Length: 0

Request Body

Demo | This is not REST



Use this page to handcraft a HTTP Request. You can clone a prior request by dragging and dropping a session from the Web Sessions list. Execute

Parsed Raw Options

POST http://api.flickr.com/services/rest/?method=flickr.test.ping&name=Alexander&api_key=a756c65bbb732fa118 HTTP/1.1

Request Headers Help...

User-Agent: Fiddler
Host: api.flickr.com
Content-Length: 0

Request Body

Demo | This is not REST



```
Transformer Headers TextView ImageView HexView WebView JSON Auth Caching Privacy Raw XML
JSON
HTTP/1.1 200 OK
Date: Wed, 29 Jun 2011 22:04:40 GMT
P3P: policyref="http://p3p.yahoo.com/w3c/p3p.xml", CP="CAO DSP COR CUR ADM DEV TAI PSA PSD IVAi IVDi CONi
Content-Length: 137
X-Served-By: www18.flickr.mud.yahoo.com
Cache-Control: private
Vary: Accept-Encoding
Connection: close
Content-Type: text/xml; charset=utf-8

<?xml version="1.0" encoding="utf-8" ?>
<rsp stat="fail">
  <err code="112" msg="Method &quot;flickr.test.ping&quot; not found" />
</rsp>
```

WCF Web API

- § „Make HTTP a first class citizen in .NET“
- § Einfache Erstellung von REST-Services mit WCF
 - § Schlanke Konfiguration
 - § Testbarkeit
- § Einfach erweiterbar
 - § Formatter
 - § Instance Factories
 - § MessageHandlerFactories
 - § ErrorHandler
- § OData
- § Basiert auf WCF 4.0
- § .NET Framework 4.0 (kein Client Profile verwenden)
- § Out-of-Band Release



Demo | WCF Web API (CRUD)

How to GET a cup of coffee?



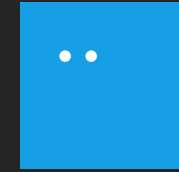
<http://www.flickr.com/photos/rwp-roger/2410222127>



Demo | WCF Web API (RestBucks)

<http://restbuckson.net>

REST | Ressourcen

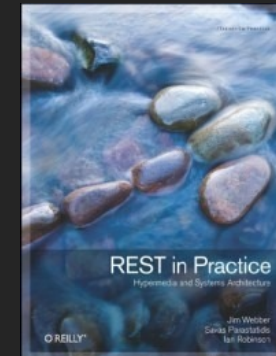


§ WCF Web API

- § <http://wcf.codeplex.com>
- § NuGet WebApi.*
- § <http://restbuckson.net>

§ Bücher

- § RESTful Web Services
- § REST in Practice



§ Videos

- § <http://channel9.msdn.com/Events/MIX/MIX11/FRM14>
- § <http://channel9.msdn.com/Events/DevDays/DevDays-2011-Netherlands/Devdays017>
- § <http://channel9.msdn.com/Events/DevDays/DevDays-2011-Netherlands/Devdays103>
- § <http://channel9.msdn.com/Events/TechDays/TechDays-2011-Belgium/TD009>
- § <http://channel9.msdn.com/Events/TechDays/TechDays-2011-Belgium/TD021>

§ Web

- § <http://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm>
- § <http://code.google.com/p/implementing-rest/>
- § <http://blog.alexonasp.net/?tag=/web+api>





<http://www.flickr.com/photos/nateone/3768979925>