

# Services

## Web Engineering

### Prof. D. König



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RESEARCH SUBJECT



## SIR TIM BERNERS-LEE

United Kingdom – 2016

### CITATION

For inventing the World Wide Web, the first web browser, and the fundamental protocols and algorithms allowing the Web to scale.



ACM DL  
AUTHOR PROFILE



RESEARCH  
SUBJECTS

# Web Resilience

The Web has never gone down  
since its inception  
in 1989.



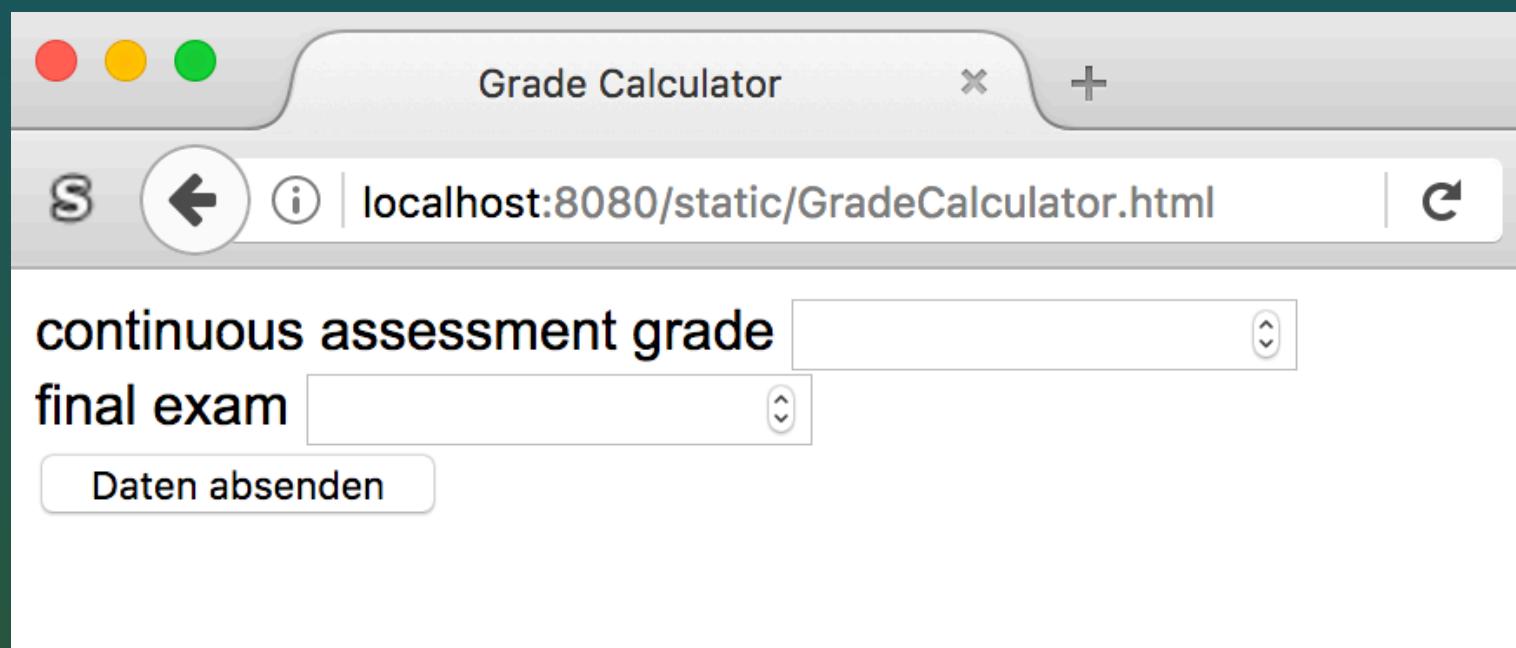
# Web Resilience

**BE RESTRICTIVE  
WHAT YOU EXPOSE**

**BE TOLERANT  
WHAT YOU CONSUME**

# Three Tier Web Applications

*Client*



*Server*



*DB*

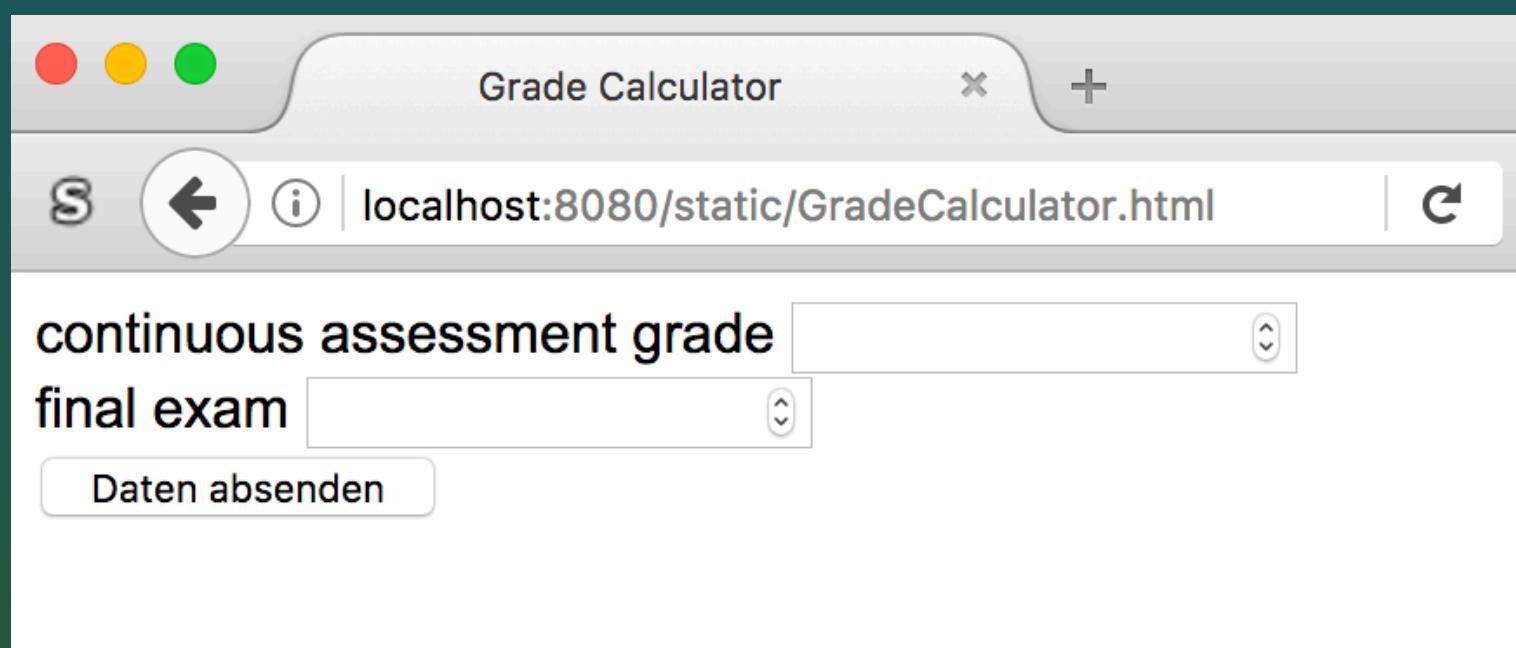


*persist*



# Server with Service

*Client*



*Server*



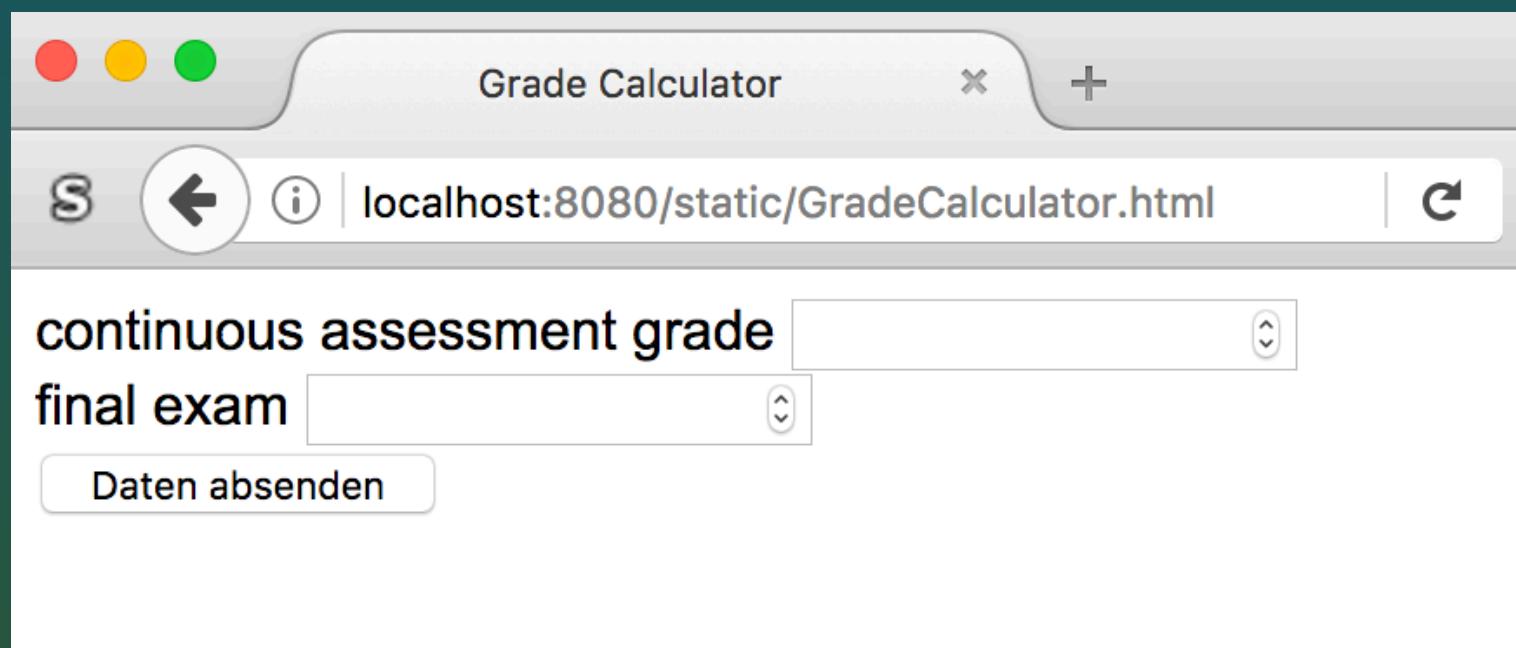
*Service*



*req/resp*

# "Smart UI" with Service

*Client*



*Server*



*Service*



*req/resp*

# JavaScript Service APIs

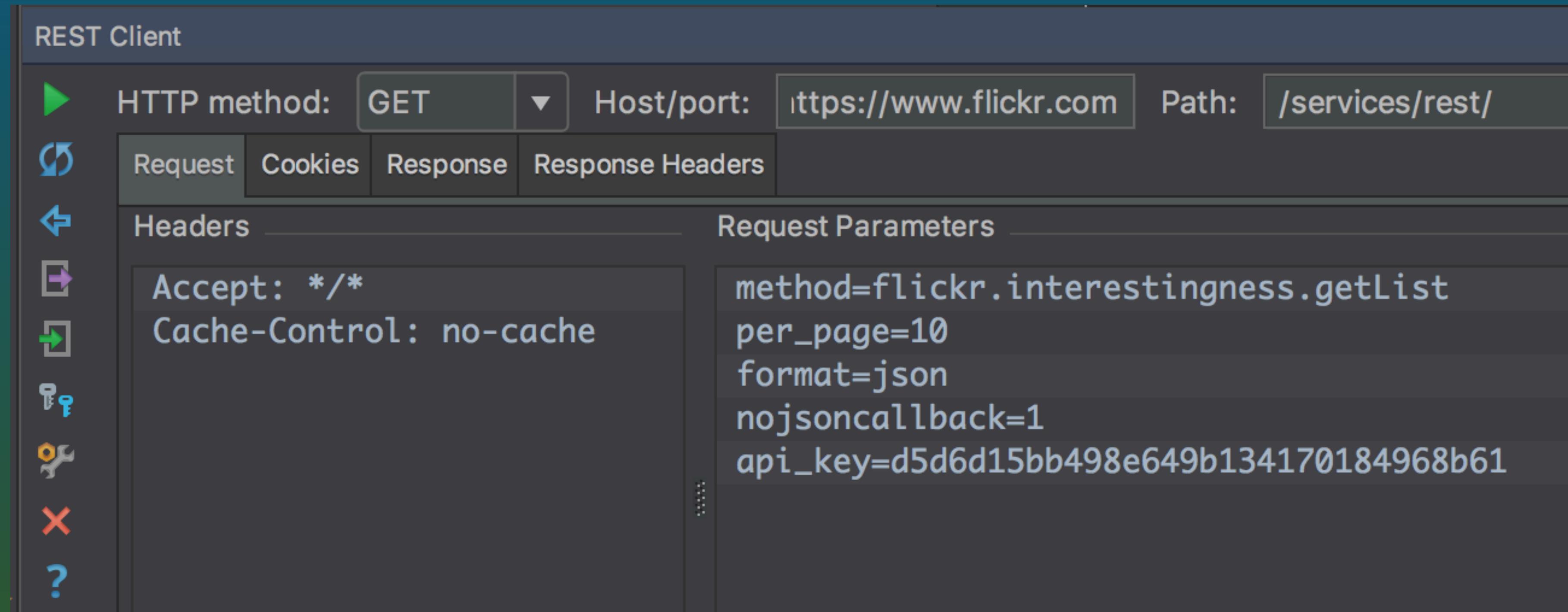
[https://www.flickr.com/services/api/  
request.rest.html](https://www.flickr.com/services/api/request.rest.html)

Get a developer key (use mine carefully)

Use key to request a secret

Use secret to request a resource

# Integrated REST Client



# Result

REST Client

HTTP method: GET Host/port: https://www.flickr.com Path: /services/rest/

Request Cookies Response Response Headers

```
{"photos": {"page": 1, "pages": 50, "perpage": 10, "total": 500, "photo": [{"id": "2849", "server": "2849", "farm": 3, "title": "Stump Lake 4.2", "ispublic": 1, "isfriend": 0, "isfamily": 0}, {"id": "33748943162", "owner": "82828410@N02", "secret": "be35ff66ae", "server": "2913", "farm": 3, "title": "Picking up pop", "ispublic": 1, "isfriend": 0, "isfamily": 0}, {"id": "33868667896", "owner": "57866871@N03", "secret": "b0880c5edf", "server": "2943", "farm": 3, "title": "Light...Bodie Lighthouse, Outer Banks, North Carolina", "ispublic": 1, "isfriend": 0, "isfamily": 0}, {"id": "33868667896", "owner": "9969966@N03", "secret": "74aa1570d3", "server": "2874", "farm": 3, "title": "Light...Bodie Lighthouse, Outer Banks, North Carolina", "ispublic": 1, "isfriend": 0, "isfamily": 0}]}}, {"method": "GET", "url": "https://www.flickr.com/services/rest/", "headers": {}, "cookies": {}, "body": null}, {"status": 200, "headers": {"Content-Type": "application/json; charset=UTF-8"}, "body": {"photos": {"page": 1, "pages": 50, "perpage": 10, "total": 500, "photo": [{"id": "2849", "server": "2849", "farm": 3, "title": "Stump Lake 4.2", "ispublic": 1, "isfriend": 0, "isfamily": 0}, {"id": "33748943162", "owner": "82828410@N02", "secret": "be35ff66ae", "server": "2913", "farm": 3, "title": "Picking up pop", "ispublic": 1, "isfriend": 0, "isfamily": 0}, {"id": "33868667896", "owner": "57866871@N03", "secret": "b0880c5edf", "server": "2943", "farm": 3, "title": "Light...Bodie Lighthouse, Outer Banks, North Carolina", "ispublic": 1, "isfriend": 0, "isfamily": 0}, {"id": "33868667896", "owner": "9969966@N03", "secret": "74aa1570d3", "server": "2874", "farm": 3, "title": "Light...Bodie Lighthouse, Outer Banks, North Carolina", "ispublic": 1, "isfriend": 0, "isfamily": 0}]}}, {"method": "GET", "url": "https://www.flickr.com/services/rest/", "headers": {}, "cookies": {}, "body": null}], [{"label": "Request", "icon": "\ud83d\udcbb"}, {"label": "Cookies", "icon": "\ud83d\udd04"}, {"label": "Response", "icon": "\ud83d\udcbb"}, {"label": "Response Headers", "icon": "\ud83d\udcbb"}], [{"label": "JSON", "icon": "\ud83d\udcbb"}]
```

# Result

```
{"photos": {  
    "page":1, "pages":50, "perpage":10, "total":500,  
    "photo": [ {  
        "id" : "33090986453",  
        "owner" : "133058989@N03",  
        "secret" : "5ce24df9f7",  
        "server" : "2849",  
        "title" : "Stump Lake 4.2"  
    }, ...  
]} , ...
```

# Fetch Resource URL Pattern

`http://static.flickr.com/  
server-id/id_secret_m.jpg`

# URL

Uniform Resource Locator

protocol, host, port, path, query, fragment

scheme://[user:password@]host[:port]][/]path[?query][#fragment]

# HTTP(s)

Hyper Text  
Transfer Protocol

Very simple  
Line/delimiter based

```
# First request
GET /quote?symb=YHOO HTTP/1.1
Host: www.example.org

HTTP/1.1 200 OK
Content-Type: text/plain; charset=UTF-8
15.96

# Second request 10 minutes later
GET /quote?symb=YHOO HTTP/1.1
Host: www.example.org

HTTP/1.1 200 OK
Content-Type: text/plain; charset=UTF-8
16.10
```

# HTTP Verbs

Verb	Change	Use
<b>GET</b>	No	Single or collective read, may be cached
<b>PUT</b>	Yes	Modify resource in place
<b>POST</b>	Yes	Create new resource
<b>DELETE</b>	Yes	Delete resource
HEAD	No	
OPTIONS	No	

# REST

Representational State Transfer

- Resource addressing by URL
- Uniform operations by HTTP verbs
- Self-containment (no conversational state)
- Choice of format (XML, JSON, ...)

# REST Issues

Easy to get started - easy to get lost.

Type safety, Versioning, Documentation

Addressing Operations as Resources

# REST Alternatives

SOAP (WSDL),

CORBA (IDL),

EJB, \*-RPC, RMI,

local services

# REST in Grails

<http://docs.grails.org/latest/guide/webServices.html>

Note the usage of `@Resource` in domain classes and "respond" instead of "render" in the controller actions.