

Services

Web Engineering
Prof. D. König
Christian Ribeaud

Web Resilience

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



Sir Tim Berners-Lee invented the World Wide Web in 1989.

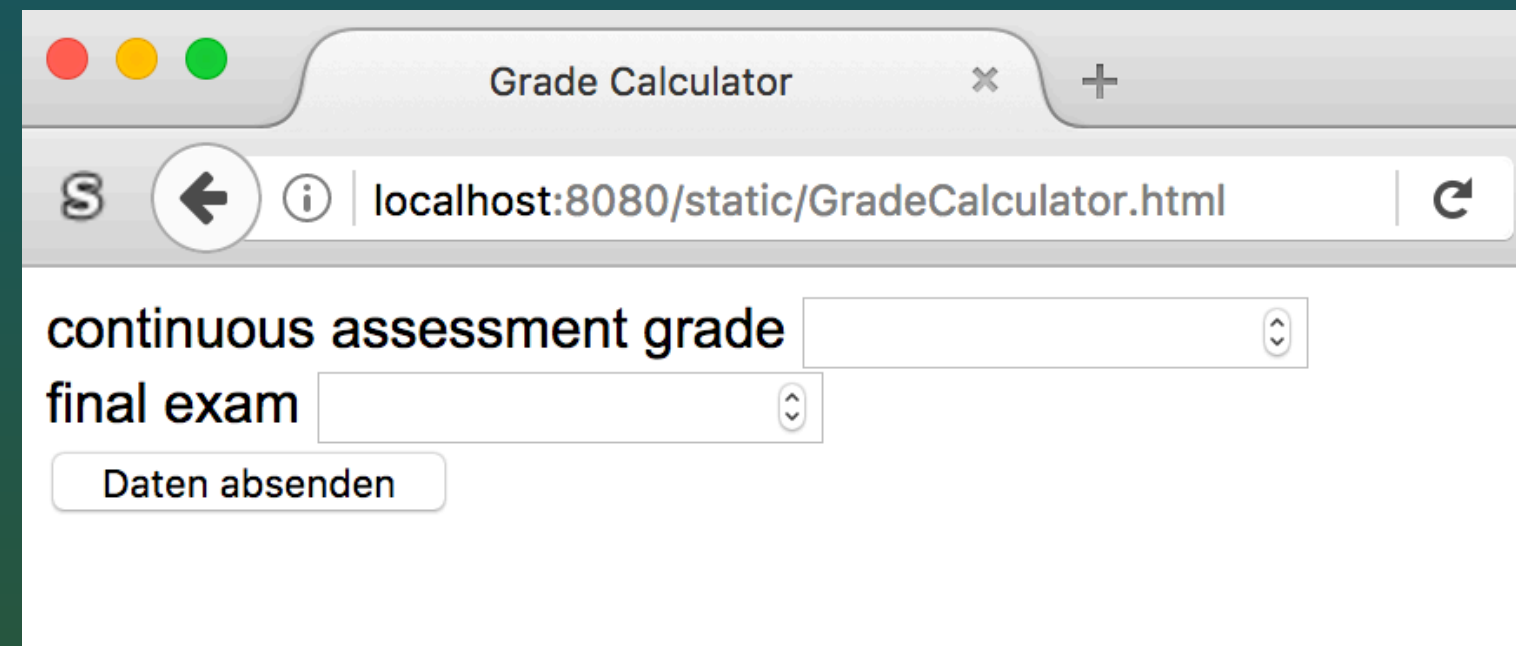
Web Resilience

**Be restrictive
what you expose**

**Be tolerant
what you consume**

Three Tier Web Applications

Client



Server



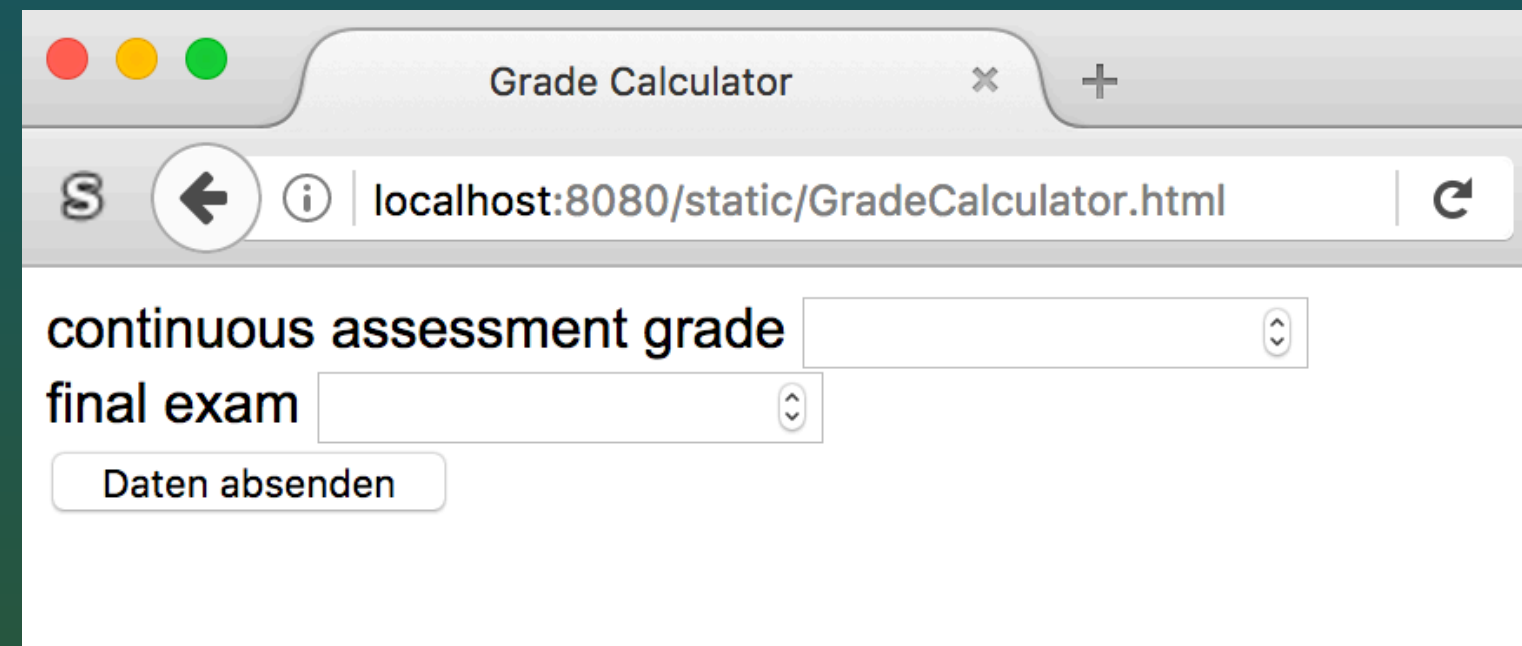
DB



persist

Server with Service

Client



Server



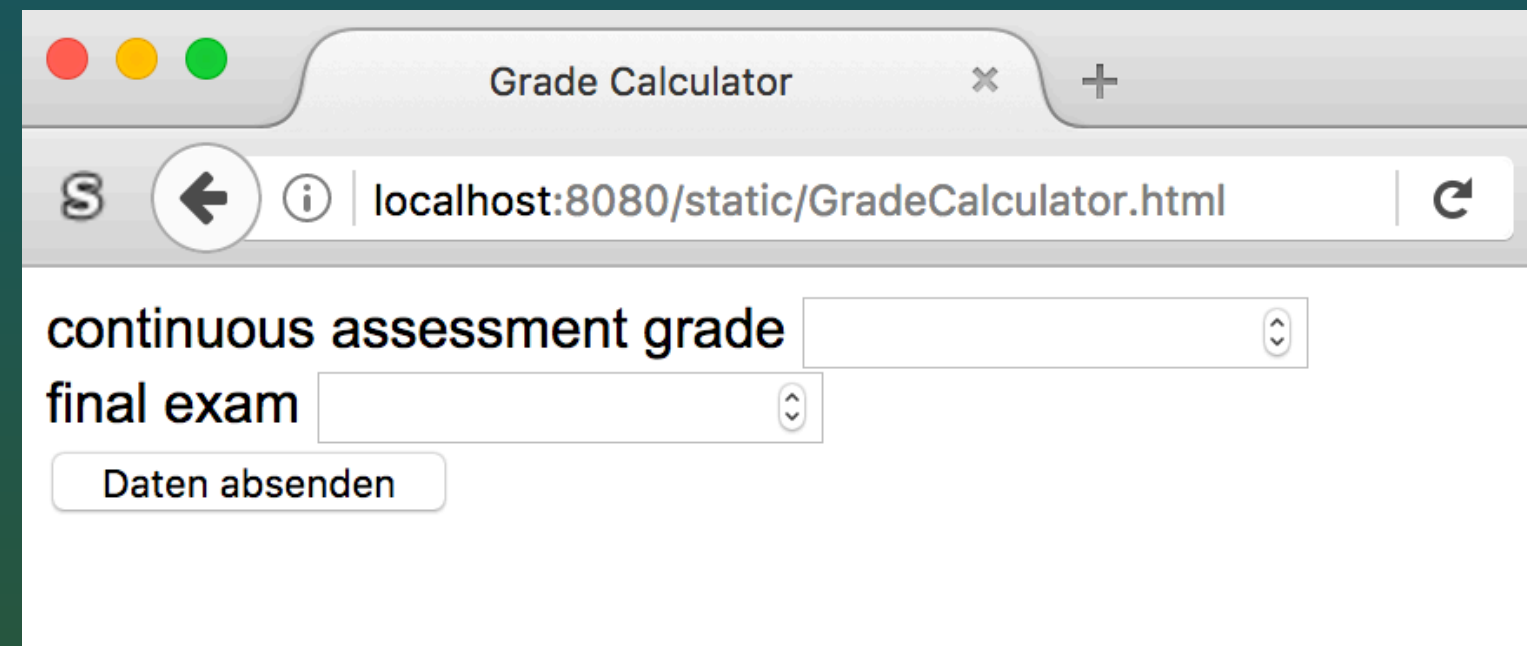
Service



req/resp

"Smart UI" with Service

Client



Server



Service



req/resp



JavaScript Service APIs

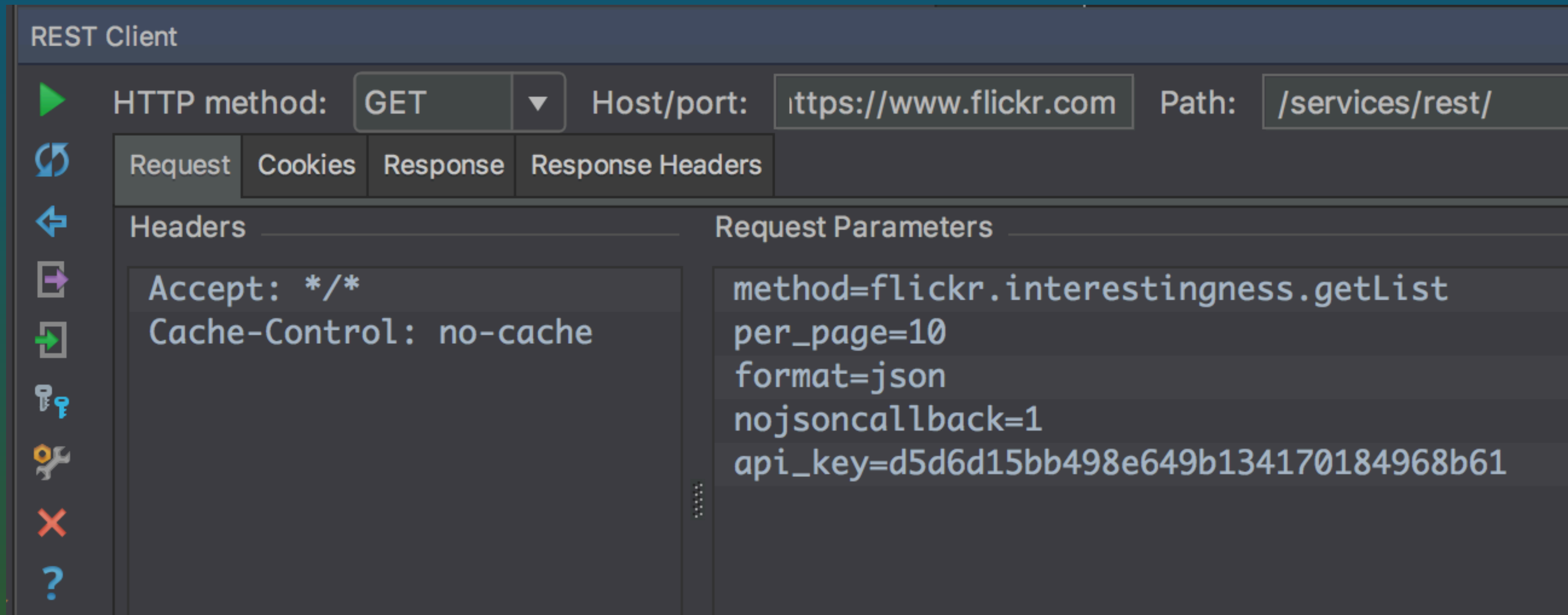
[https://www.flickr.com/services/api/
request.rest.html](https://www.flickr.com/services/api/request.rest.html)

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: Host/port: Path:

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,
        "secret": "be35ff66ae",
        "owner": "82828410@N02"
      },
      {
        "id": "2913",
        "server": "2913",
        "farm": 3,
        "title": "Picking up pop",
        "ispublic": 1,
        "isfriend": 0,
        "isfamily": 0,
        "secret": "b0880c5edf",
        "owner": "82828410@N02"
      },
      {
        "id": "2943",
        "server": "2943",
        "farm": 3,
        "title": "Light...Bodie Lighthouse, Outer Banks, North Carolina",
        "ispublic": 1,
        "isfriend": 0,
        "isfamily": 0,
        "secret": "74aa1570d3",
        "owner": "57866871@N03"
      },
      {
        "id": "33748943162",
        "server": "2874",
        "farm": 3,
        "title": "Light...Bodie Lighthouse, Outer Banks, North Carolina",
        "ispublic": 1,
        "isfriend": 0,
        "isfamily": 0,
        "secret": "3e488aae5e",
        "owner": "33050285@N03"
      },
      {
        "id": "33868667896",
        "server": "9969966",
        "farm": 3,
        "title": "Light...Bodie Lighthouse, Outer Banks, North Carolina",
        "ispublic": 1,
        "isfriend": 0,
        "isfamily": 0,
        "secret": "9969966",
        "owner": "9969966@N03"
      }
    ]
  }
}
```

JSON

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=YH00 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=YH00 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
GET	No	Single or collective read, may be cached
PUT	Yes	Modify resource in place
POST	Yes	Create new resource
DELETE	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
(<https://swagger.io>)

Addressing Operations as Resources

REST Alternatives

SOAP (WSDL - Determines operations, NOT resources),

CORBA (IDL),

EJB, *-RPC , RMI,

local services (method invocation)

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.