JSON

...

Is XML still relevant?

- XML 1.0 since 1998
- XML 1.1 (2004) is the latest standard
  - But XML 1.0 is still most widely used
- XML dominant technology 2000-2010 for data exchange

Problems with XML

- Verbose by design
  - Tags used twice
  - Boilerplate text
- Needs parsing
- The environment is changing
  - SOAP and REST

SOAP

- Protocol relying on XML

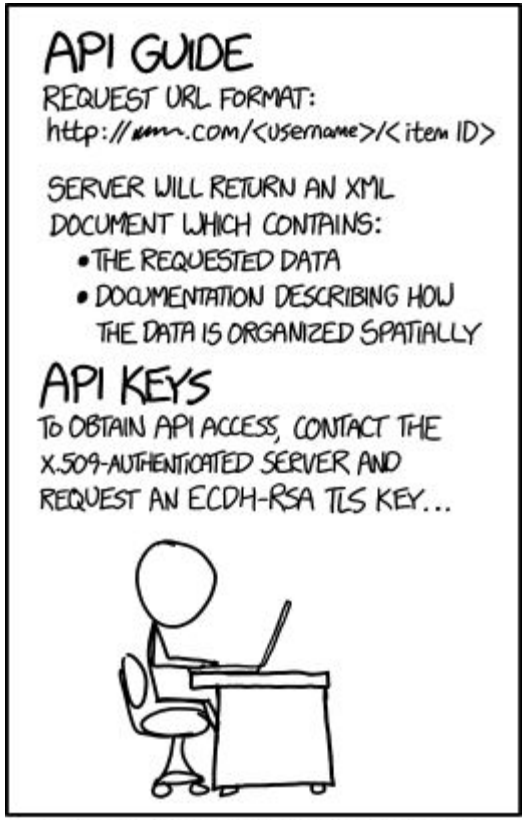
```
<?xml version="1.0"?>
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:m="http://www.example.org/stock/Surya">
  <soap:Header>
  </soap:Header>
  <soap:Body>
    <m:GetStockPrice>
      <m:StockName>IBM</m:StockName>
    </m:GetStockPrice>
  </soap:Body>
</soap:Envelope>
```

REST

- Architectural style: URIs point to resources

http://api.wunderground.com/api/*Your_Key*/conditions/q/CA/San_Francisco.json


```
{ ...
   "weather": "Partly Cloudy",
  "temperature_string": "66.3 F (19.1 C)",
  "temp_f": 66.3,
  "temp_c": 19.1,
  "relative_humidity": "65%",
  "wind_string": "From the NNW at 22.0 MPH Gusting to 28.0 MPH",
  "wind_dir": "NNW",
  "wind_degrees": 346,
  "wind_mph": 22.0,
  ...  }
}
```



IF YOU DO THINGS RIGHT, IT CAN TAKE PEOPLE A WHILE TO REALIZE THAT YOUR "API DOCUMENTATION" IS JUST INSTRUCTIONS FOR HOW TO LOOK AT YOUR WEBSITE.

JSON

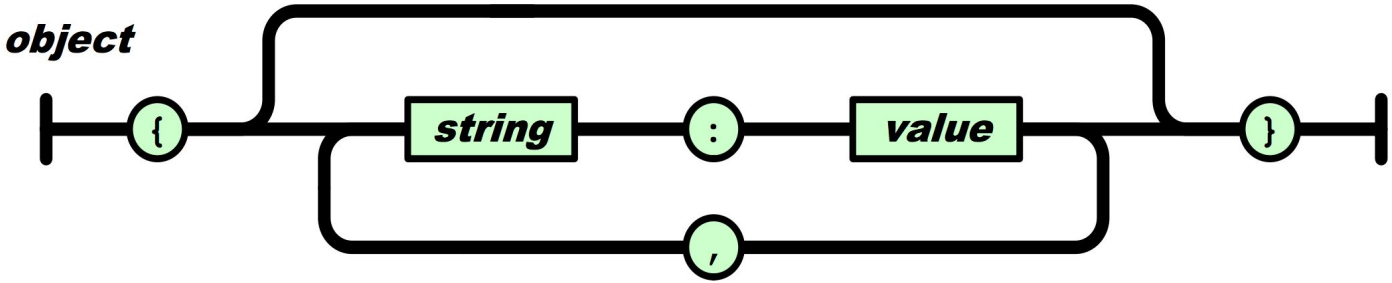
- Human-readable
- Attribute-value pairs
- Derived from JavaScript
    - But language independent now

JSON compared to XML

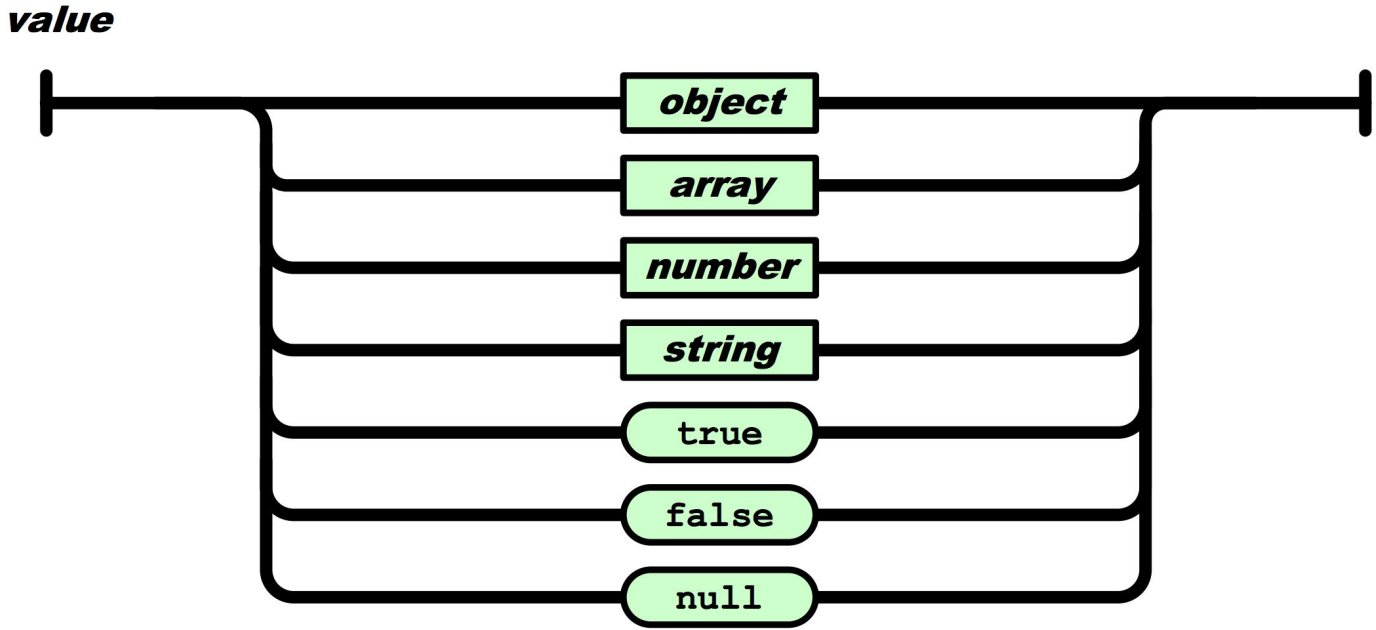
```
{
  "firstName": "John",
  "lastName": "Smith",
  "address": {
    "streetAddress": "21 2nd Street",
    "city": "New York"
  },
  "phoneNumbers": [
    {
      "type": "home",
      "number": "212 555-1234"
    },
    {
      "type": "fax",
      ...
    }
  ]
}
```

```
<person>
  <firstName>John</firstName>
  <lastName>Smith</lastName>
  <age>25</age>
  <address>
    <streetAddress>21 2nd
Street</streetAddress>
    <city>New York</city>
  </address>
  <phoneNumbers>
    <phoneNumber>
      <type>home</type>
      <number>212 555-1234</number>
    </phoneNumber>
    <phoneNumber>
      ...
    </phoneNumber>
  </phoneNumbers>
</person>
```

JSON

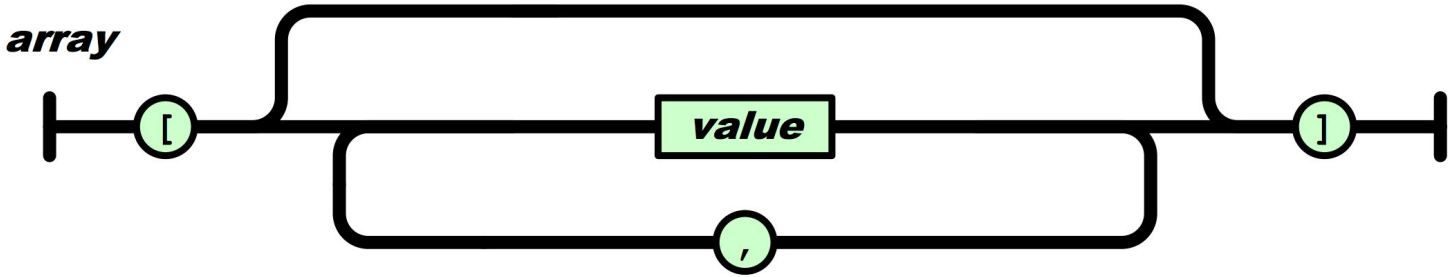


JSON



JSON

- Order does matter in arrays!



JSON

```
{
  "firstName": "John",
  "lastName": "Smith",
  "address": {
    "streetAddress": "21 2nd Street",
    "city": "New York"
  },
  "phoneNumbers": [
    {
      "type": "home",
      "number": "212 555-1234"
    },
    {
      "type": "fax",
      ...
    }
  ]
}
```

JSON: Strings

- Any Unicode character between `"double quotes"`, except for `"`, `\` and control characters
  - Backlash escapes `"` and `\`
  - Whitespace within `""` is perfectly fine
  - So are `\t` etc.

JSON: Numbers

- Integers (positive and negative)

```
{ "temperature" : -2 }
```

- Floats

```
{ "price" : 4.34 }
```

- Scientific

```
{ "size" : 4e-10 }
```

JSON: Numbers

- The way numbers are represented internally depends on implementation
  - JavaScript, for example, treats all numbers as floats (64 bit)
  - But other implementations might do it differently
- If precision is an issue, you might better use strings and parse them

JSON

- Protected words: `true`, `false`, `null`
  - Good practise to return empty arrays or objects, though

```
{ "addresses" : null }
```

```
{ "addresses" : [] }
```

- Whitespace outside of "" is ignored

JSON Schema

- Not a standard, but draft
  - Currently under development
  - Getting popular
- Inspired by XML Schema

JSON Schema

```
{
	"title": "Person",
	"type": "object",
	"properties": {
		"firstName": {
			"type": "string"
		},
		"lastName": {
			"type": "string"
		},
		"age": {
			"description": "Age in years",
			"type": "integer",
			"minimum": 0
		}
	},
	"required": ["firstName", "lastName"]
}
```

```
{
  "firstName" : "Ulrieke" ,
  "lastName" : "von Groll"
}
```

XML is still relevant

- No standard for JSON validation
- JSON not as expressive
- XML still the standard in many enterprise environments
- Bigger companies / PubMed
  - Markup / annotation
- domain.xml configuration files

XML is still relevant

- JSON good for atomic values
- But what about richer APIs? What about mixed content? Web uses HTML for this, which is XML basically
- What about namespaces?

Further Reading

- https://blog.wimtenbrink.nl/2014/02/21/is-xml-in-decline/
- http://idratherbewriting.com/2015/02/13/xml-and-the-web-drifting-farther-apart/