

# Programação Web

## Web APIs

Carlos Bazilio

[carlosbazilio@id.uff.br](mailto:carlosbazilio@id.uff.br)

<http://www.ic.uff.br/~bazilio/cursos/progweb>

# Por quê expor dados?

- Permitir que sistemas, e não apenas pessoas, usufruam dos dados que gerencia
- Agregar valor ao seu negócio
- Quanto o Google Maps vale? Seria padrão se não expusesse sua forma de acesso?

# Exemplo e Contra-Exemplo GoogleMaps - FlightRadar

The screenshot displays the FlightRadar24 website interface. At the top, the browser address bar shows the URL <https://www.flightradar24.com/-22.83,-43.22/7> and the search bar contains the text "air traffic". The website header includes the "flightradar24 LIVE AIR TRAFFIC" logo, navigation links for "Apps", "Add coverage", "Data / History", "Social", "Press", and "About", and a "Log in" button with the current UTC time "13:18".

The main content area features a map of Brazil with numerous yellow aircraft icons and blue location pins. On the left sidebar, there are sections for "AIRPORT DELAYS" (listing airports like Shanghai (SHA), Manila (MNL), and Zhengzhou (CGO)), "TWEETS" (with a tweet about flight #BA286), and "BLOG POSTS" (with a post titled "A Quick Fix—Getting a 787 Back in the Air After a Diversion").

At the bottom of the page, there is a large advertisement for "TRADING ONLINE" by XM, which includes the text "FX Moedas", "Ações", "Ouro", "Petróleo", and "COMECE COM \$30 GRATUITOS". The Google logo is visible in the bottom left corner, and the footer contains "Map data ©2016 Google", "50 km", and "Terms of Use".



# Exemplo e Contra-Exemplo GoogleMaps - MarineTraffic

The screenshot displays the MarineTraffic website interface. At the top, the browser address bar shows the URL <https://www.marinetraffic.com/en/ais/home/centerx:-65.0/centery:-35.2/zoom:3>. The website header includes the MarineTraffic logo, navigation links for "Live Map", "Explore", "Community", and "Pricing", a search bar with the text "Vessel, Port, etc.", and a "Log In" button. The main content area is a map of the Atlantic Ocean, densely populated with colorful icons representing ships. A sidebar on the left contains various map controls. At the bottom of the map, there is a "Poseidon" advertisement for marine supplies. On the right side, a Creative Cloud advertisement is visible, featuring the text "Crie com a Creative Cloud. Aplicativos para fotografia, design, vídeo e Web por R\$ 43,00/mês." and a "Associe-se já" button. The footer of the page includes links for "Terms", "Privacy", "User Agreement", "English (EN)", "About", "MarineTraffic Blog", and "Help Centre", along with social media icons for Apple and YouTube.

# Exemplos e Contra-Exemplos

- Portal e-Cidadania do Senado Federal:  
<https://www12.senado.leg.br/ecidadania>
- Prefeitura do Rio:  
<http://www.armazemdedados.rio.rj.gov.br/>  
<http://data.rio/>
- Prefeitura de Chicago:  
<https://data.cityofchicago.org/>

# Critérios para Expor Dados



**USEFUL**



**USABLE**

# Mandamentos de Jeff Bezos (Amazon) - (~2002)

- 1) All teams will henceforth expose their data and functionality through service interfaces.
- 2) Teams must communicate with each other through these interfaces.
- 3) There will be no other form of interprocess communication allowed: no direct linking, no direct reads of another team's data store, no shared-memory model, no back-doors whatsoever. The only communication allowed is via service interface calls over the network.

# Mandamentos de Jeff Bezos (Amazon) - (~2002)

- 4) It doesn't matter what technology they use. HTTP, Corba, Pubsub, custom protocols -- doesn't matter. Bezos doesn't care.
- 5) All service interfaces, without exception, must be designed from the ground up to be externalizable. That is to say, the team must plan and design to be able to expose the interface to developers in the outside world. No exceptions.
- 6) Anyone who doesn't do this will be fired.
- 7) Thank you; have a nice day!



# Formatos de Datos

- JSON

```
{
  "@context": "http://json-ld.org/contexts/person.jsonld",
  "@id": "http://dbpedia.org/resource/John_Lennon",
  "name": "John Lennon",
  "born": "1940-10-09",
  "spouse": "http://dbpedia.org/resource/Cynthia_Lennon"
}
```

# Formatos de Dados

- RESTFul API's
  - API's que seguem o estilo arquitetural REST:
    - Client-Server
    - Stateless
    - Cacheable
    - Layered System
    - Uniform Interface

# Formatos de Datos

- RESTFuL API's

HTTP methods				
Uniform Resource Locator (URL)	GET	PUT	POST	DELETE
Collection, such as <i><a href="http://api.example.com/resources/">http://api.example.com/resources/</a></i>	List the URIs and perhaps other details of the collection's members.	Replace the entire collection with another collection.	Create a new entry in the collection. The new entry's URI is assigned automatically and is usually returned by the operation. <sup>[17]</sup>	Delete the entire collection.
Element, such as <i><a href="http://api.example.com/resources/item17">http://api.example.com/resources/item17</a></i>	Retrieve a representation of the addressed member of the collection, expressed in an appropriate Internet media type.	Replace the addressed member of the collection, or if it does not exist, create it.	Not generally used. Treat the addressed member as a collection in its own right and create a new entry within it. <sup>[17]</sup>	Delete the addressed member of the collection.

# Implementando uma API sem Codificação

- <https://github.com/typicode/json-server>

# HAL - Hypertext Application Language

- Formato simples para navegação entre links de recursos numa API
- A grosso modo, é um HTML para máquinas
- É um Internet Draft (IETF – Internet Engineering Task Force)



# Exemplo de Uso da HAL Site de Oxford

- <http://www.ox.ac.uk/>
- <http://m.ox.ac.uk/#>
- <http://api.m.ox.ac.uk/browser/#/>

# Referências

- Minibook da InfoQ:  
<https://www.infoq.com/minibooks/emag-web-api>
- Página do Kin Lane (evangelista em APIs):  
<http://apievangelist.com/index.html>
- Post do ex-funcionário da Amazon:  
<http://www2.ic.uff.br/~bazilio/cursos/sistweb/material/EmailAmazon.pdf>
- Repositório de APIs para desenvolvedores:  
<http://www.programmableweb.com/>
- Wikipedia de REST:  
[http://www.wikiwand.com/en/Representational\\_state\\_transfer](http://www.wikiwand.com/en/Representational_state_transfer)

# Referências

- Livro sobre RESTFul Web Services:  
[http://restfulwebapis.com/RESTful\\_Web\\_Services/](http://restfulwebapis.com/RESTful_Web_Services/)
- Internet Draft do JSON HAL:  
<https://tools.ietf.org/html/draft-kelly-json-hal-08>
- Lei de Acesso à Informação (Lei 12527, cap. II, art 8o., paragrafo 3o.):  
[http://www.planalto.gov.br/ccivil\\_03/\\_ato2011-2014/2011/lei/l12527.htm](http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2011/lei/l12527.htm)