Open Services, Interoperability, and Hypermedia

OSLC Fest 2018 in Stockholm

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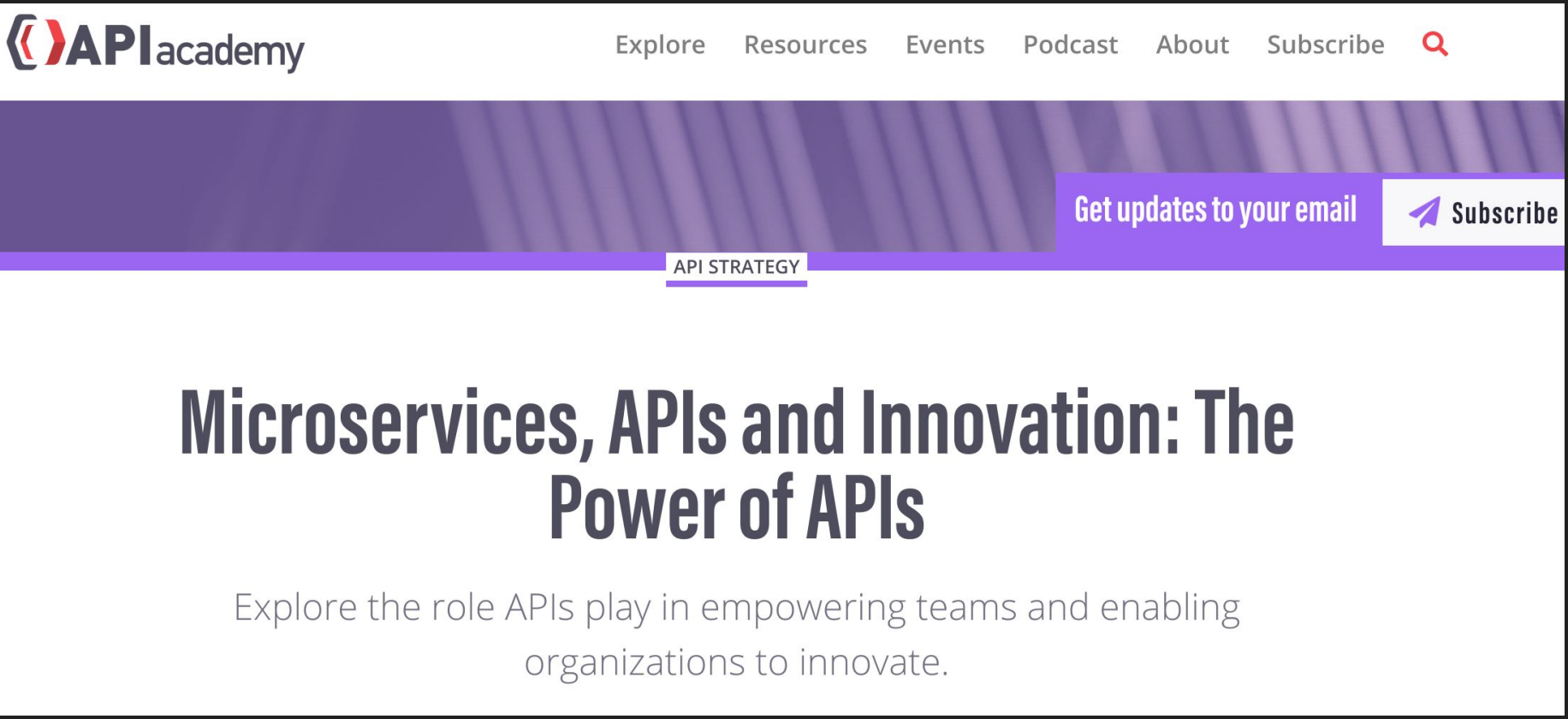
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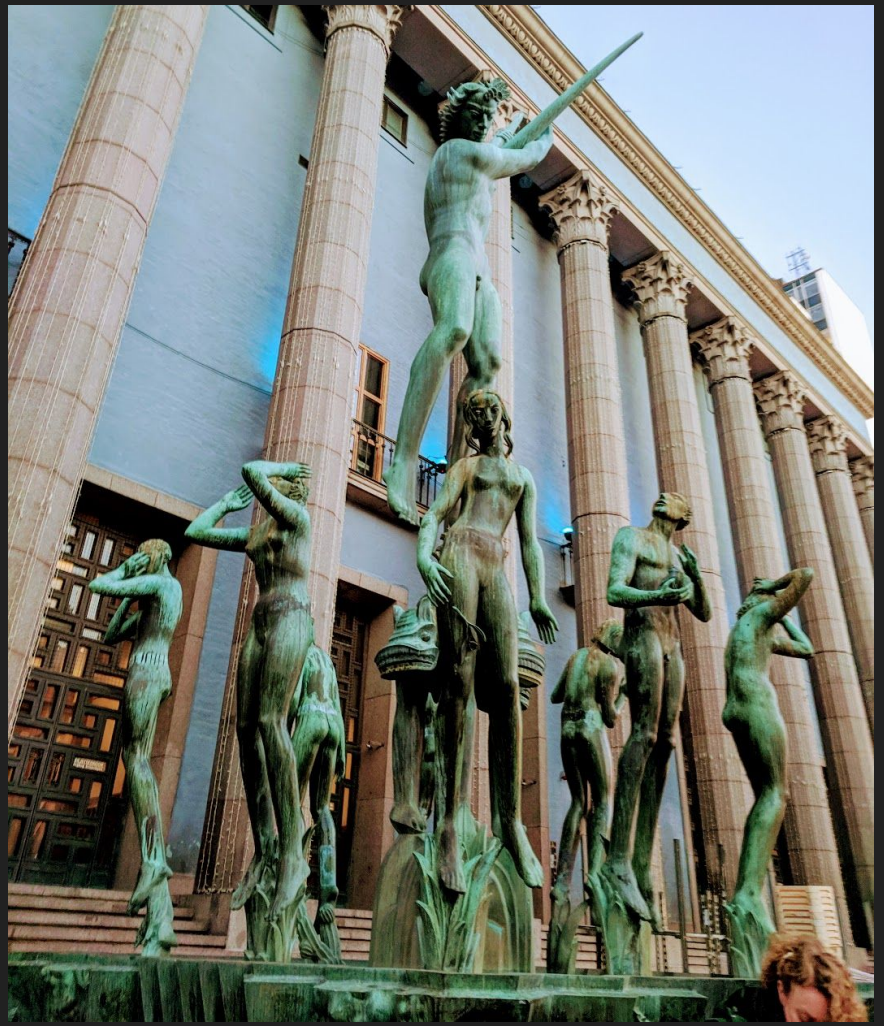

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Hypermedia : Definitions

Ted Nelson's hyperlinks (1965)

The words hypertext, hyperlink, and hypermedia were coined by Ted Nelson around 1965.

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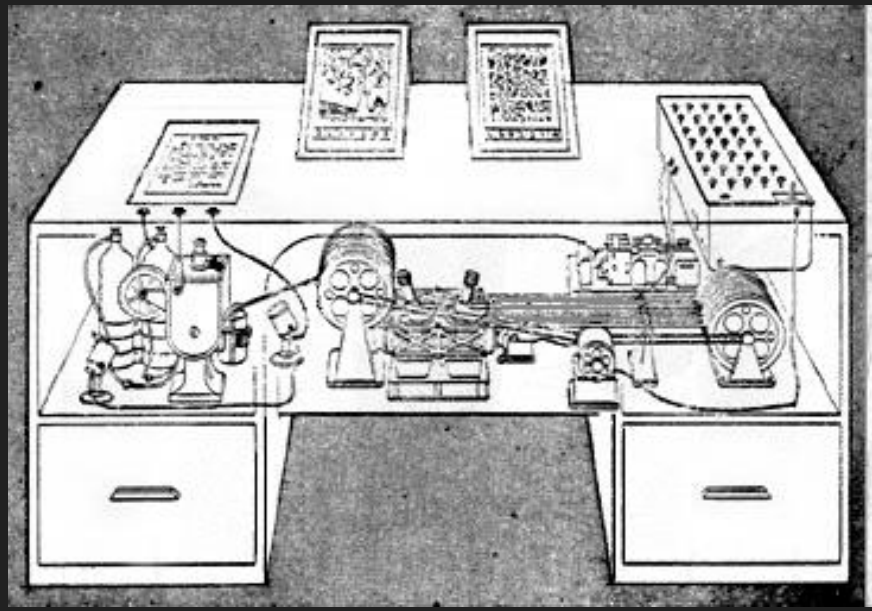
Vannevar Bush's Reader (1945)



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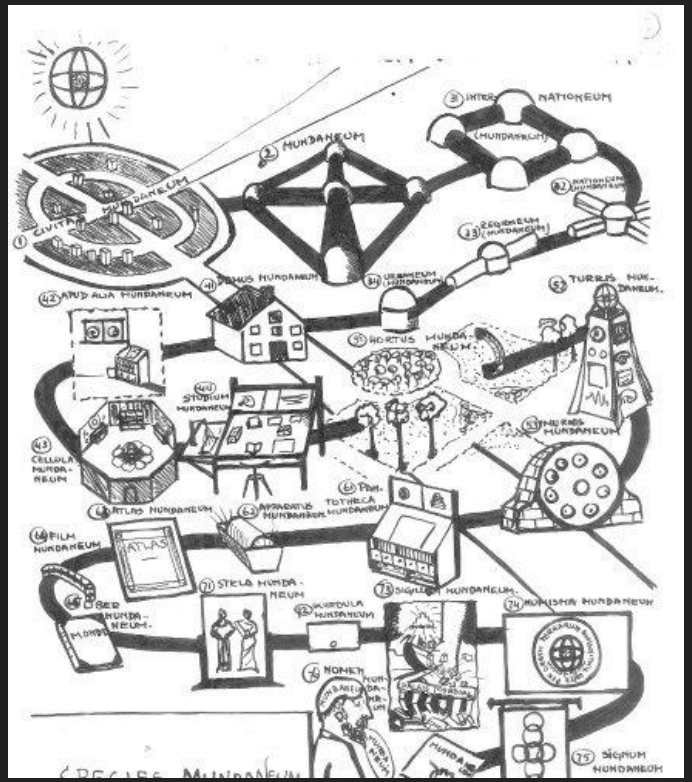
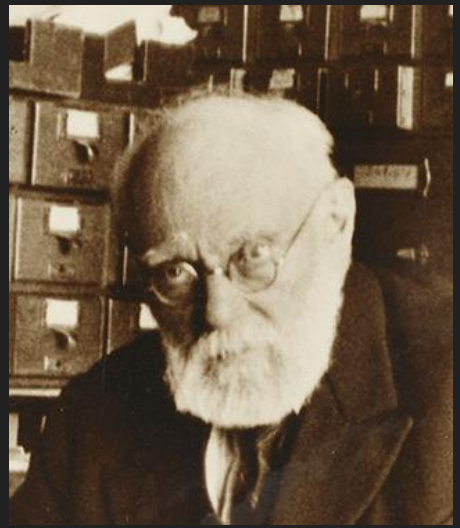
Paul Otlet's World Wide Network (1934)

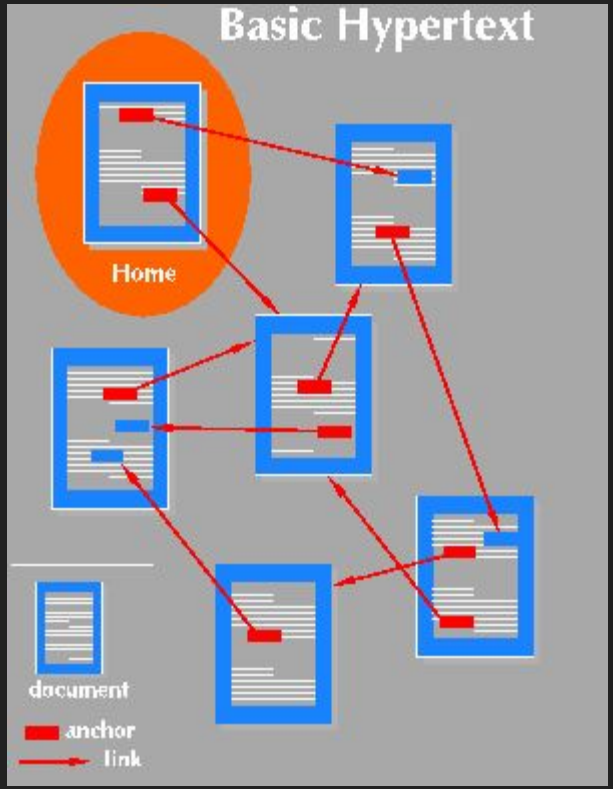




By Paul Otlet - Mundaneum, Public Domain, https://commons.wikimedia.org/w/index.php?curid=38324530

What is Hypermedia?

Hypertext is text which is not constrained to be linear.

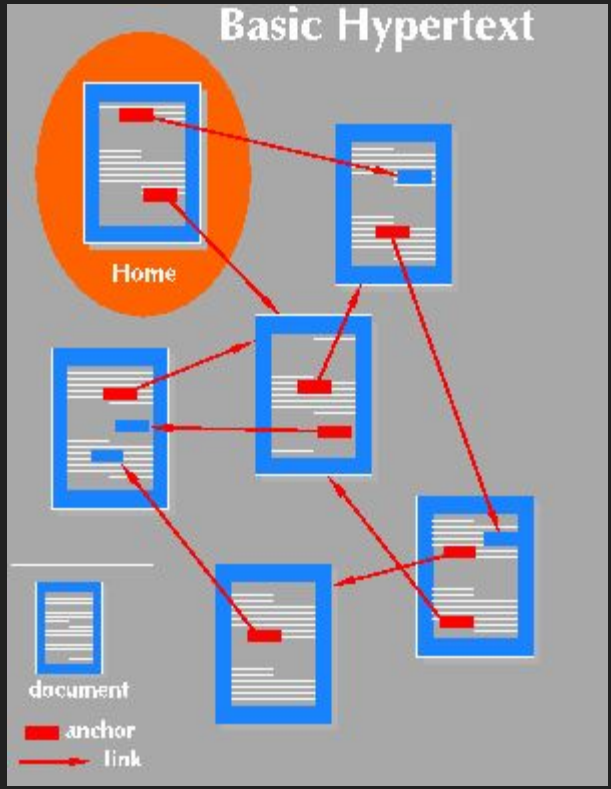


https://www.w3.org/WhatIs.html

What is Hypermedia?

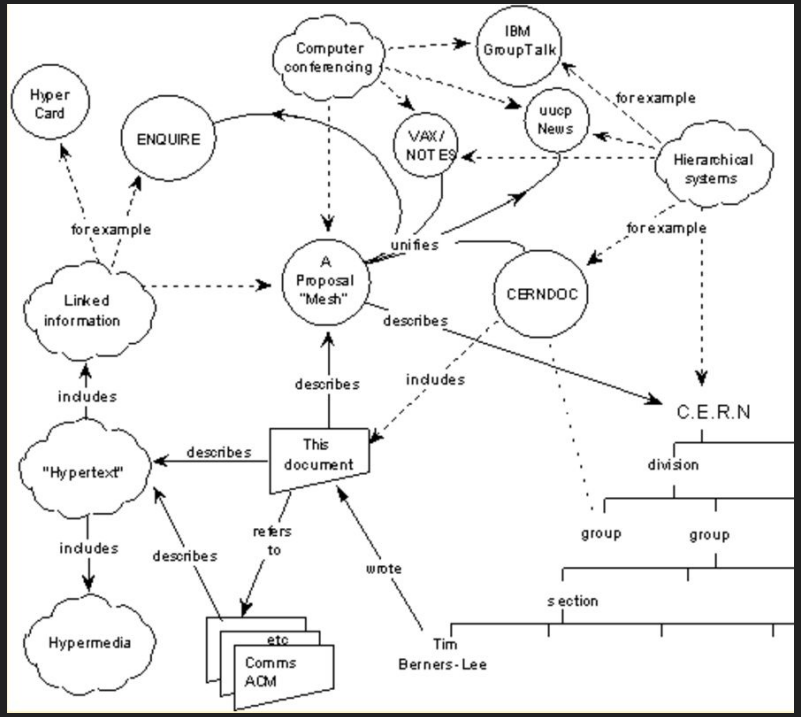
Hypertext is text which is not constrained to be linear.

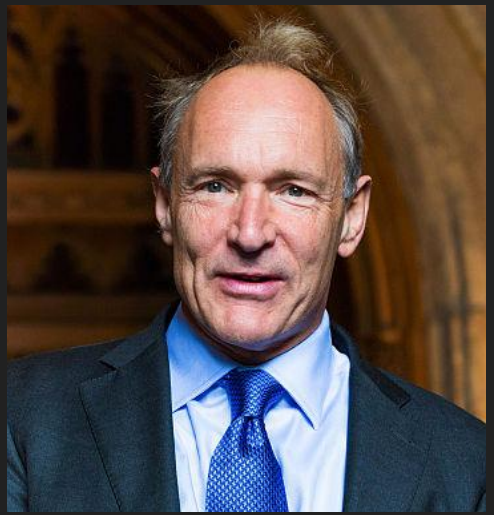
Hypertext is text which contains links to other texts.



https://www.w3.org/WhatIs.html

Tim Berners-Lee WWW (1989)





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Hypermedia provides
"extreme late binding" at runtime.

Hypermedia : Examples

NOT Hypermedia Examples

```
"http://www.example.org/search"
```

```
"http://www.example.org/images/logo"
```

```
"http://www.example.org/my-keywords"
```

Hypermedia Examples

```
<a href="http://www.example.org/search" title="view search page">Search</a>
```

Hypermedia Examples

```
<a href="http://www.example.org/search" title="view search page">Search</a>
```

```
<img src="http://www.example.org/images/logo" title="company logo" />
```

Hypermedia Examples

```
<a href="http://www.example.org/search" title="view search page">Search</a>
```

```
<img src="http://www.example.org/images/logo" title="company logo" />
```

```
<form method="get">
  <label>Search term:</label>
  <input name="query" type="text" value="" />
  <input type="submit" />
</form>
```

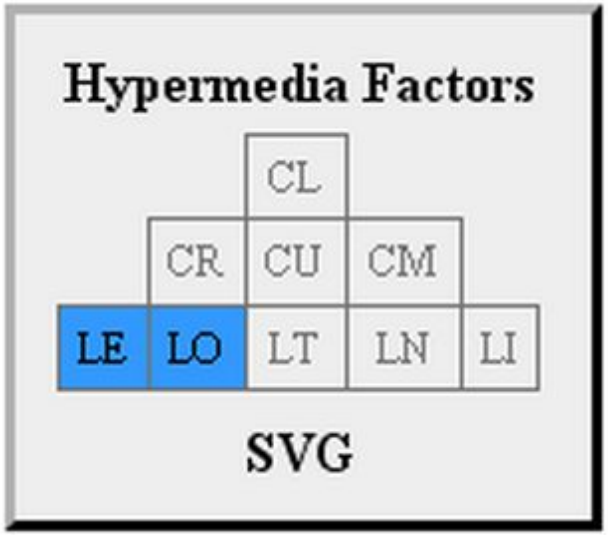
Hypermedia Examples

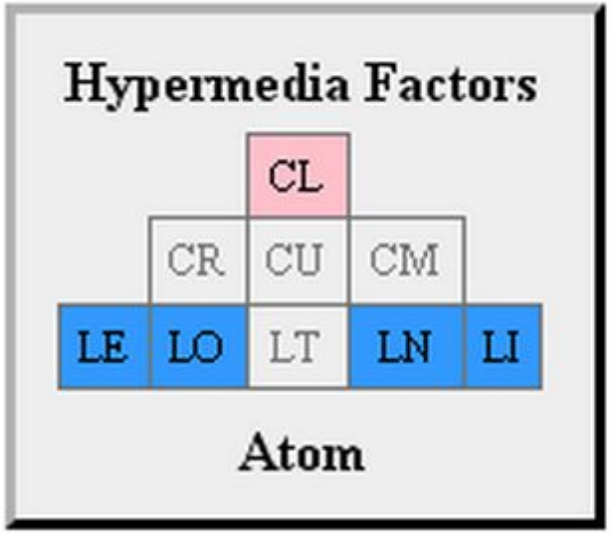
```
<a href="http://www.example.org/search" title="view search page">Search</a>
```

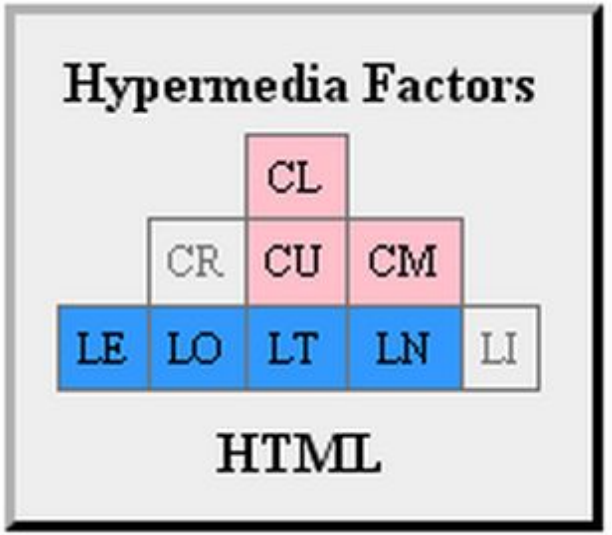
```
<img src="http://www.example.org/images/logo" title="company logo" />
```

```
<form method="get">
  <label>Search term:</label>
  <input name="query" type="text" value="" />
  <input type="submit" />
</form>
```

```
<form method="post" action="http://www.example.org/my-keywords"/>
  <label>Keywords:</label>
  <input name="keywords" type="text" value="" />
  <input type="submit" />
</form>
```







H-Factors and Hypermedia Types
http://amundsen.com/hypermedia/

data.json

```
{
  "task": [
    {
      "id": "137h96l7mpv",
      "title": "LAX",
      "completeFlag": "true",
      "assignedUser": "bob",
      "dateCreated": "2016-01-14T17:48:42.083Z",
      "dateUpdated": "2016-01-27T22:03:02.850Z"
    }
  ]
}
```

links.json

```
{
  "task": [
    {
      "url" : "http://api.examples.org/137h96l7mpv",
      "id": "137h96l7mpv",
      "title": "LAX",
      "completeFlag": "true",
      "assignedUser": "bob",
      "dateCreated": "2016-01-14T17:48:42.083Z",
      "dateUpdated": "2016-01-27T22:03:02.850Z"
    }
  ]
}
```

actions-01.json

```
{
  "task": [
    {
      "url" : "http://api.examples.org/137h96l7mpv",
      "edit" : "http://api.examples.org/edit?id=137h96l7mpv",
      "id": "137h96l7mpv",
      "title": "LAX",
      "completeFlag": "true",
      "assignedUser": "bob",
      "dateCreated": "2016-01-14T17:48:42.083Z",
      "dateUpdated": "2016-01-27T22:03:02.850Z"
    }
  ]
}
```

actions-02.json

```
{
  "task": [
    {
      "url" : "http://api.examples.org/137h96l7mpv",
      "edit" : "http://api.examples.org/edit?id=137h96l7mpv",
      "approve" : "http://api.examples.org/approve?id=137h96l7mpv",
      "id": "137h96l7mpv",
      "title": "LAX",
      "completeFlag": "true",
      "assignedUser": "bob",
      "dateCreated": "2016-01-14T17:48:42.083Z",
      "dateUpdated": "2016-01-27T22:03:02.850Z"
    }
  ]
}
```

actions-03.json

```
{
  "task": [
    {
      "url" : "http://api.examples.org/137h96l7mpv",
      "action" : {
        "name" : "approve",
        "url": "http://api.examples.org/approve?id=137h96l7mpv",
        "method" : "put"
      },
      "id": "137h96l7mpv",
      "title": "LAX",
      "completeFlag": "true",
      "assignedUser": "bob",
      "dateCreated": "2016-01-14T17:48:42.083Z",
      "dateUpdated": "2016-01-27T22:03:02.850Z"
    }
  ]
}
```

actions-04.json

```
{
  "task": [
    {
      "url" : "http://api.examples.org/137h96l7mpv",
      "action" : {
        "name" : "approve",
        "url" : "http://api.examples.org/approve?id=137h96l7mpv",
        "method" : "put",
        "values" : [
          {
          "name" : "completeFlag",
          "value" : "true",
          "required" : "true",
          "regex" : "^true|false$"
          },
          {
            ...
          }
        ],
      },
      "id": "137h96l7mpv",
```

Hypermedia adds
more information to the message

Hypermedia : affordances

Affordances

"The affordances of the environment are what it offers ... what it provides or furnishes, either for good or ill.

James Gibson, 1977

James Gibson

Ecological Approach to Visual Perception, Gibson, 1979

Affordances

"The term affordance refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used."

Donald Norman, 1988

Donald Norman

The Design of Everyday Things, Donald Norman 1988, 2013

Affordances

“When I say Hypertext, I mean the simultaneous presentation of information and controls such that the information becomes the affordance through which the user obtains choices and selects actions.”

Roy Fielding, 2008

Roy Fielding

Architectural Styles and the Design of Network-based Software Architectures, Fielding, 2001

Hypermedia affords
dis-coordinated change over time

So...

The more

you place in the message, the less you need in the code.

The more
[info]
you place in the message, the less you need in the code.

The more
[meaning|info]
you place in the message, the less you need in the code.

The more
[context|meaning|info]
you place in the message, the less you need in the code.

The Best Software Architecture

"The best software architecture 'knows' what changes often and makes that easy."

- Paul Clements

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