
# Web API Design Maturity Model

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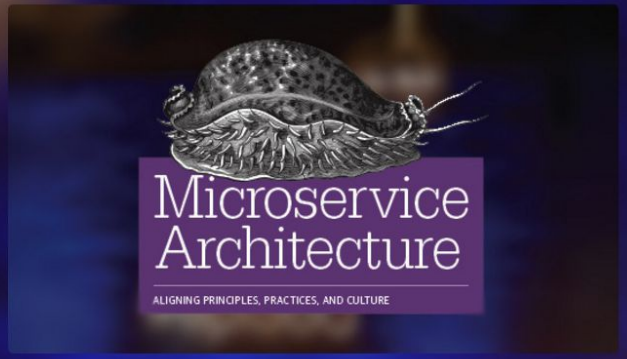
EBOOK

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DESIGN AND APPLY MICROSERVICES TO EMBRACE CONTINUAL CHANGE IN THE DIGITAL ECONOMY

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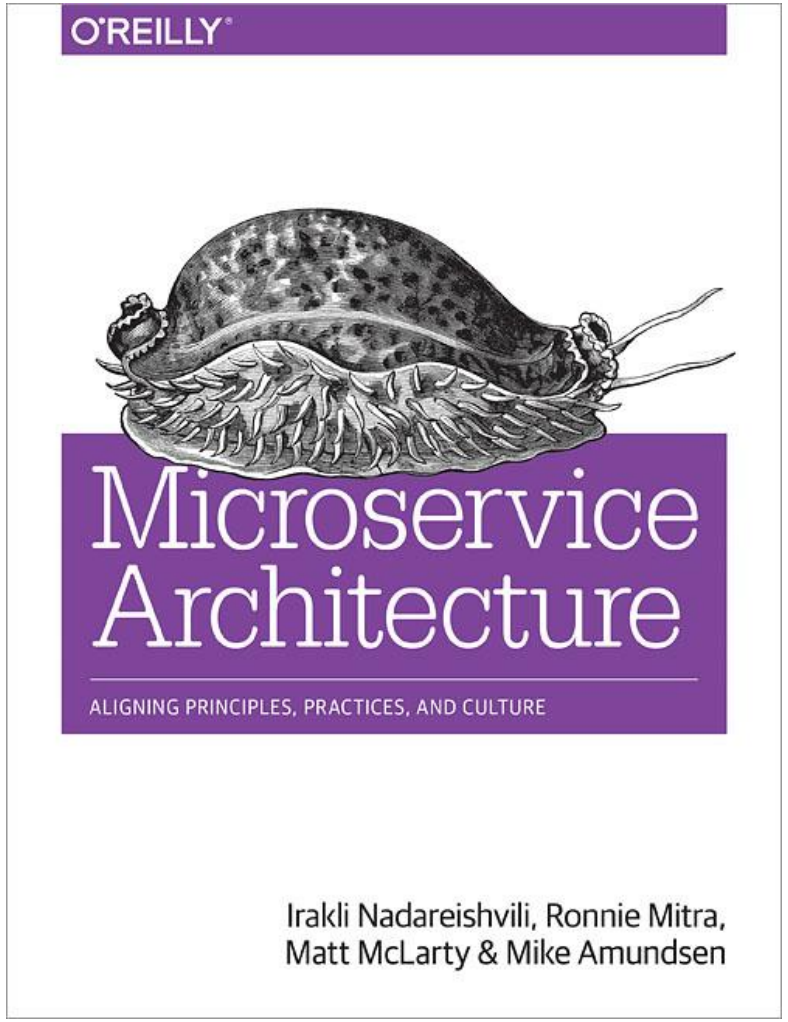
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Microservice Architecture
ALIGNING PRINCIPLES, PRACTICES, AND CULTURE
Irakli Nadareishvili, Ronnie Mitra,
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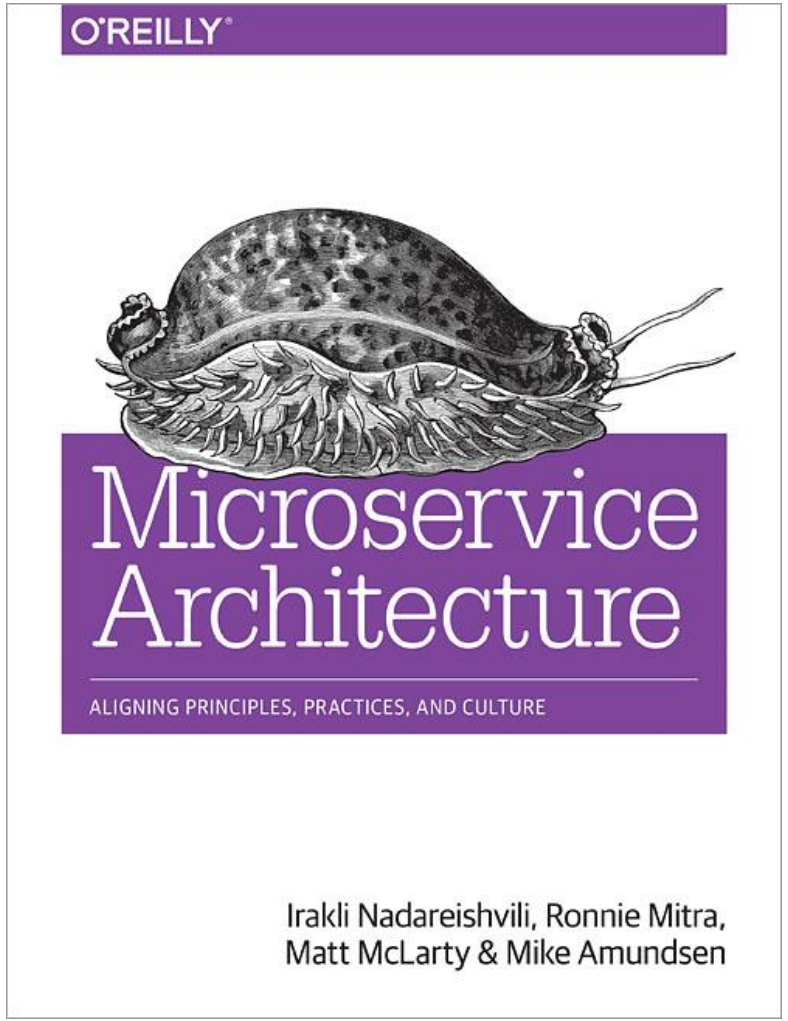


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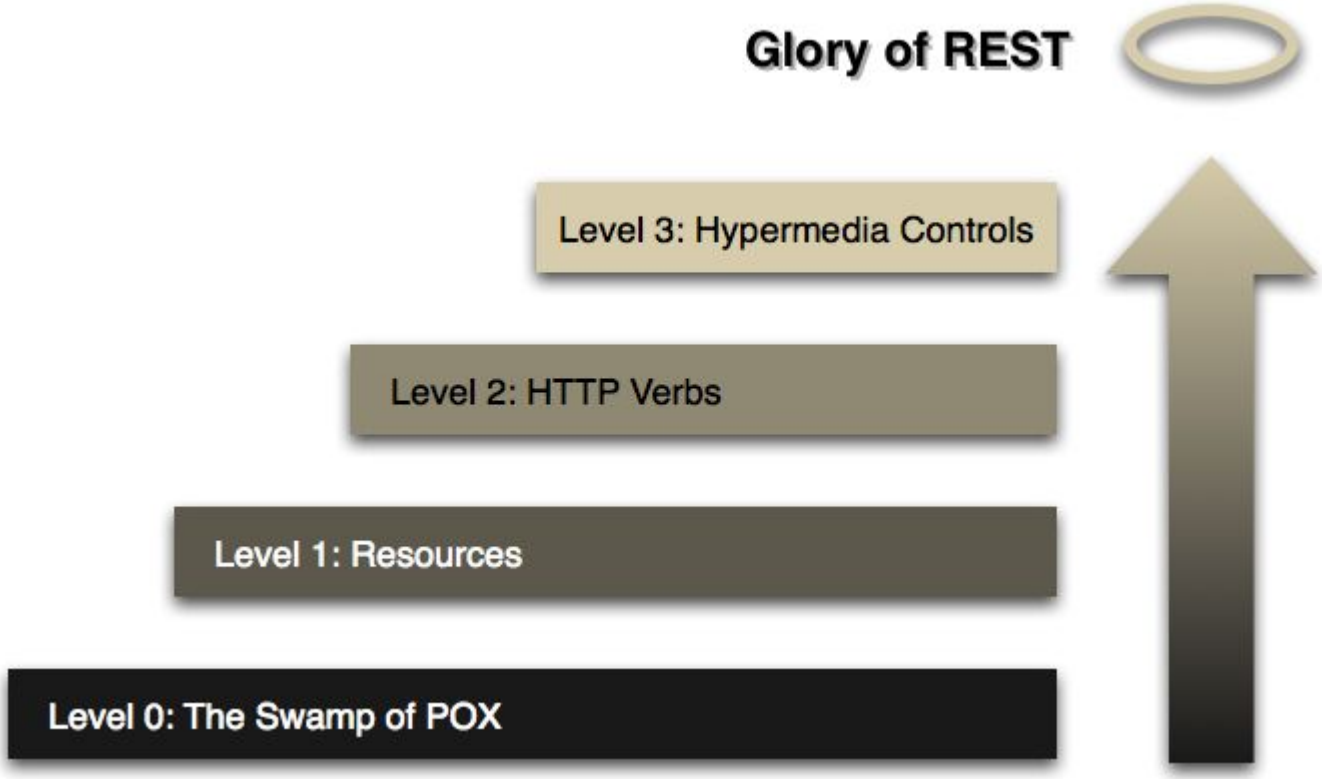
# Web API Design Maturity Model

# Richardson Maturity Model (via Martin Fowler)




http://martinfowler.com/articles/richardsonMaturityModel.html

*“I did RMM as a maturity model because I noticed that each 'step' corresponded to the adoption of a specific technology.”*

*Leonard Richardson, NYPL*

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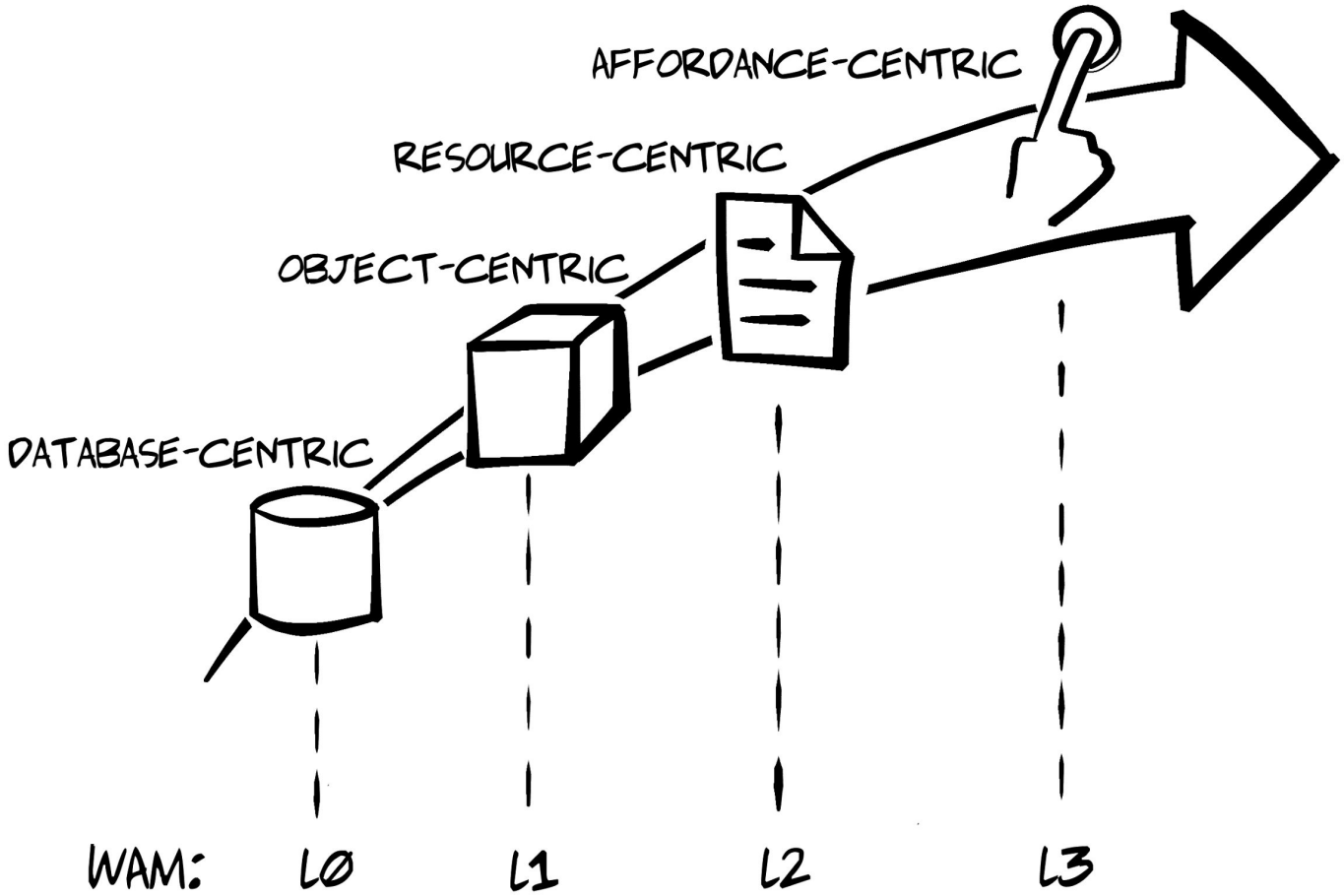

*“I did WADM as a maturity model because I noticed that each 'step' corresponded to the adoption of a specific model definition to expose as the API.”*

*Mike Amundsen, 2016*

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# Maturity Models

## RMM

Focus on the API response documents.

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# Maturity Models

**RMM**

Focus on the API response documents.

**WADM**

Focus on the API definition documents.

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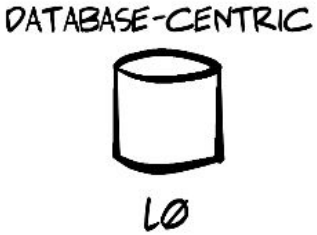
# Web API Design Maturity Model

# Web API Design Maturity Model

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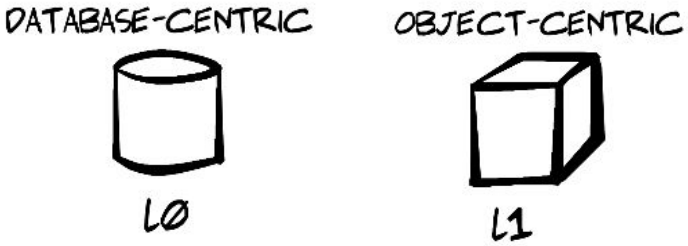
# Web API Design Maturity Model

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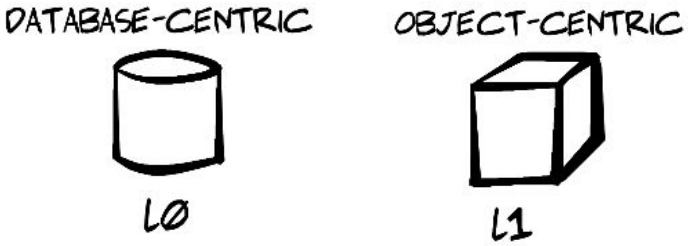
# Web API Design Maturity Model

## Internal Models

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# Web API Design Maturity Model

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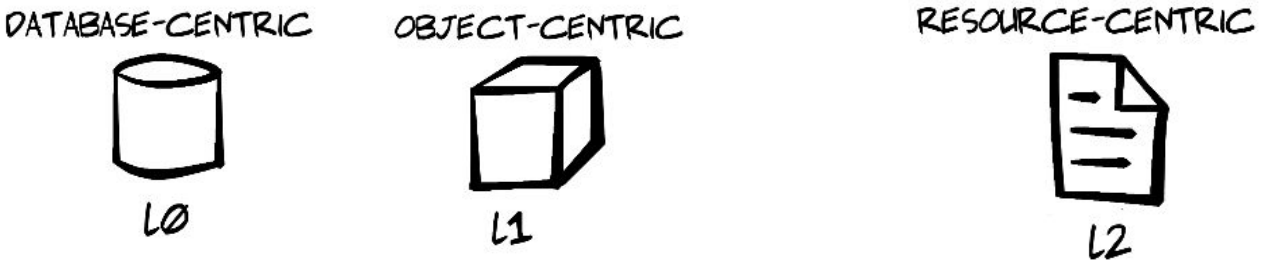


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# Web API Design Maturity Model

## Internal Models


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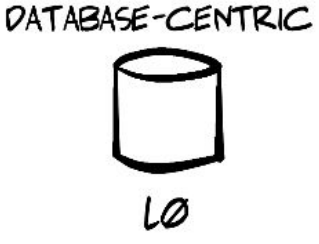
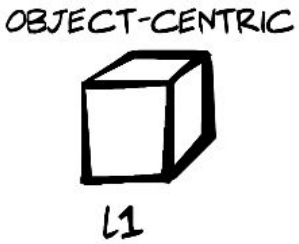
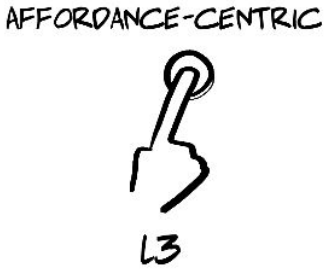
## Internal Models




## External Models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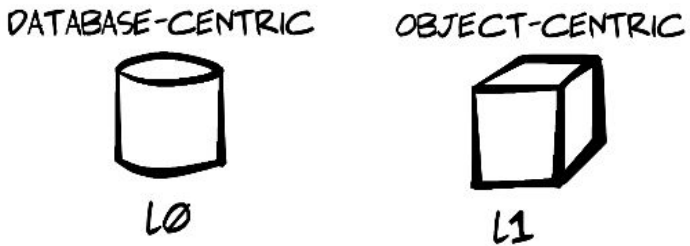
# Internal Models

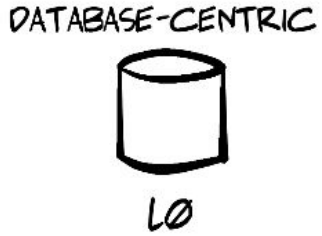


# Data-Centric (WADM.L0)

API is the exposed data model

The “go-to” approach for many enterprise IT

Lots of off-the-shelf and SaaS products available



# Data-Centric (WADM.L0)

```
{
  "db": {
    "user": "-- YOUR DATABASE USERNAME --",
    "password": "-- YOUR DATABASE PASSWORD --",
    "server": "-- YOUR DATABASE SERVER --",
    "database": "-- YOUR DATABASE NAME --",
    "options": {
      "instanceName": "-- THE SERVER INSTANCE --"
    }
  },
  "routes": [
    {
      "method": "get",
      "endpoint": "/customer",
      "query": "SELECT * FROM customers;"
    },
    {
      "method": "post",
      "endpoint": "/customer",
      "query": "INSERT INTO customers (firstName, lastName, email) VALUES ('{{ data.firstName }}
customers WHERE id=SCOPE_IDENTITY();"
    },
    {
      "method": "get",
      "endpoint": "/customer/:customerId",
      "query": "SELECT * FROM customers WHERE id={{ params.customerId }};"
    },
    {
      "method": "put",
      "endpoint": "/customer/:customerId",
      "query": "UPDATE customers SET firstName='{{ data.firstName }}', lastName='{{ data.lastNam
}};SELECT * FROM customers WHERE id={{ params.customerId }};"
    },
```


https://www.npmjs.com/package/resquel

# Data-Centric (WADM.L0)

Virtually NO design, so this is “level zero” on WADM scale

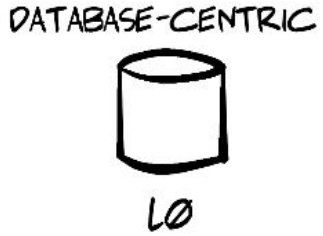
Upside:

- Quick and easy

Downside:

- Often exposes business model and/or valuable IP
- Tight-coupling to internal model
- May depend on unique data-tech (GROUP-BY, etc.)

Providers push cost of change to consumers



*“First step in breaking the data-centric habit, is to stop designing systems as a collection of data services, and instead design for business capabilities.”*

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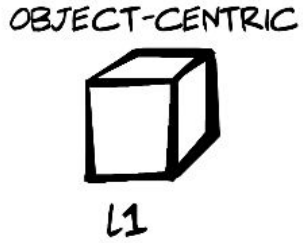
# Object-Centric (WADM.L1)

API is the exposed object model

Common for SOA or Canonical Model approach

Classic SOAP-style implementation pattern



# Object-Centric (WADM.L1)

```
<definitions name="HelloService"
   targetNamespace="http://www.examples.com/wsdl/HelloService.wsdl"
   xmlns="http://schemas.xmlsoap.org/wsdl/"
   xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
   xmlns:tns="http://www.examples.com/wsdl/HelloService.wsdl"
   xmlns:xsd="http://www.w3.org/2001/XMLSchema">

   <message name="SayHelloRequest">
      <part name="firstName" type="xsd:string"/>
   </message>

   <message name="SayHelloResponse">
      <part name="greeting" type="xsd:string"/>
   </message>

   <portType name="Hello_PortType">
      <operation name="sayHello">
         <input message="tns:SayHelloRequest"/>
         <output message="tns:SayHelloResponse"/>
      </operation>
   </portType>
```

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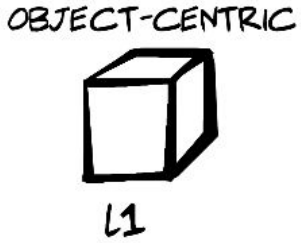
http://www.tutorialspoint.com/wsdl/wsdl_example.htm



# Object-Centric (WADM.L1)

Some design, so this get's "level one" on the WADM scale

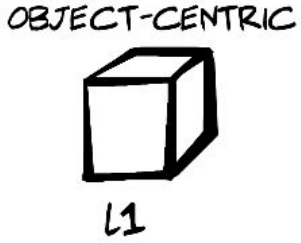
Upside:

- Lots of great tool support
- Models can be built quickly, use-case rich, and targeted

Downside:

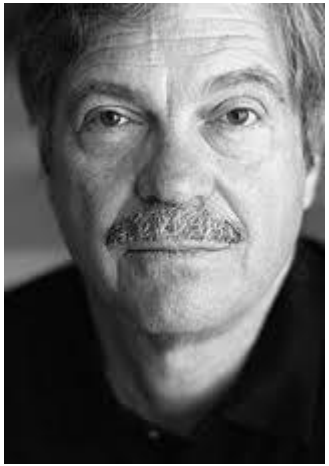
- Changes to internal models can leak out to interface
- Often consumer model is not provider model (esp. mobile)

Coordinating consumer/provider models can be "heavy-handed"



*“I'm sorry that I long ago coined the term objects for this topic because it gets many people to focus on the lesser idea. The big idea is messaging.”*

*Alan Kay, 1998*



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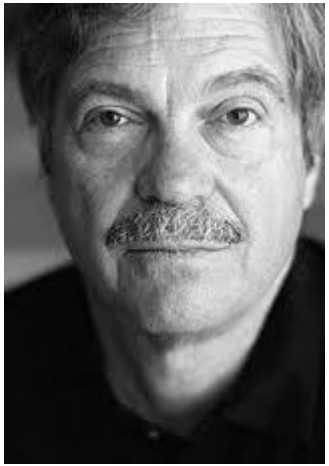

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# External Models


# Resource-Centric (WADM.L2)

API is a set of HTTP-style resources

Common for browser and mobile development shops

Lots of Resource-First products available
(Swagger/OAI, RAML, Blueprint, etc.)

# Resource-Centric (WADM.L2)

```
### Edit A Product [PATCH]
Updates A Product

+ Request (application/json)

        {
        "id": "1",
        "name": "Product One",
        "description": "This is the full description of the product.",
        "url": "http://example.com",
        "image": "http://example.com/image.jpg",
        "thumbnailUrl": "http://example.com/image-thumb.jpg",
        "keywords": "western, cowboy",
        "brand": "Brand Name",
        "color": "Black",
        "itemCondition": "New",
        "manufacturer": "Manufacturer Name",
        "model": "Black",
        "sku": "SKU #",
        "weight": "12 pounds",
        "width": "12 inches",
        "height": "12 inches",
        "depth": "12 inches"
        }

+ Response 200

    [Product][]

### Delete A Product [DELETE]
+ Response 204
```


http://apievangelist.com/2014/03/08/hello-world-product-api-with-blueprint-raml-and-swagger/

# Resource-Centric (WADM.L2)

External design earns this one “level 2”

Upside:

- Focus is on the interface
- Often has a consumer-centric focus (when done well)

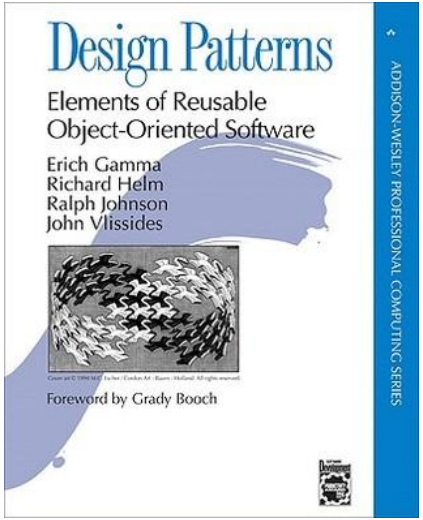
Downside:

- Sometimes just the internal object model (CRUD)
- Usually HTTP-centric (WebSockets? Thrift?)

Often still leaks internal objects and requires isomorphic models

*“Program to an interface, not an implementation.”*

*Gamma, et al, 1992*

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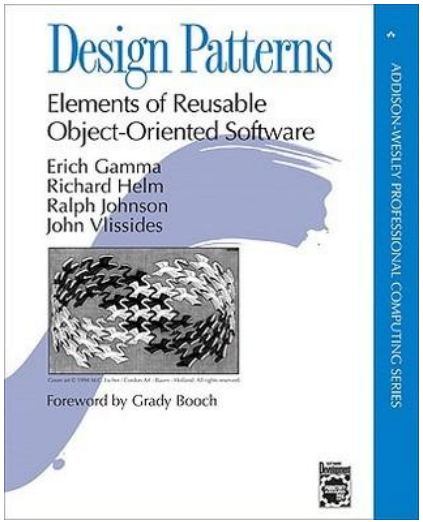


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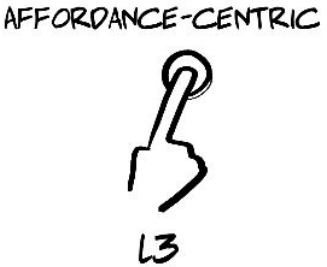
# Affordance-Centric (WADM.L3)

API is a expressed as structured messages (e.g. hypermedia formats)

Common for hypermedia-style and reactive-style implementations

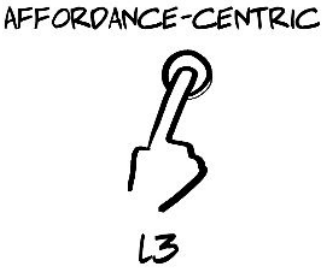
Several registered media types
(HTML, Atom, HAL, Siren, Collection+JSON, Mason, UBER, etc.)



# Affordance-Centric (WADM.L3)

```
<alps version="1.0">
   <link rel="help" href="http://example.org/documentation/products.html"/>
   <doc>    This is a prototype product API.  </doc>
   <!-- transitions -->
   <descriptor id="item" type="safe" rt="#product">
      <doc>Retrieve A Single Product</doc>
   </descriptor>
   <descriptor id="collection" type="safe" rt="#product">
      <doc>Provides access to all products</doc>
   </descriptor>
   <descriptor id="search" type="safe" rt="#product">
      <doc>Provides access to all products</doc>
      <descriptor href="#id"/>
   </descriptor>
   <descriptor id="edit" type="idempotent" rt="#product">
      <doc>Updates A Product</doc>
      <descriptor href="#product"/>
   </descriptor>
   <descriptor id="create" type="unsafe" rt="#product">
      <doc>Allows the creation of a new product</doc>
      <descriptor href="#product"/>
   </descriptor>
   <descriptor id="delete" type="idempotent">
      <doc>Delete A Product </doc>
   </descriptor>
   <!-- product -->
   <descriptor id="product" type="semantic">
      <descriptor id="id"/>
      <descriptor id="name"/>
```

https://gist.github.com/mamund/9443276



# Affordance-Centric (WADM.L3)

External design independent of all internal models makes this one “level 3”

Upside:

- Focus is on the use-cases, actions
- Usually doesn’t restrict protocol, format, or workflow

Downside:

- Very few tools/practices widely shared
- For M2M cases, relies on custom code and/or vocabularies

Focus on actions over data means more reliance on shared dictionaries

*“When I say hypertext, I mean the simultaneous presentation of information and controls such that the information becomes the affordance through which the user (or automaton) obtains choices and selects actions.”*

*Roy T. Fielding, 2008*

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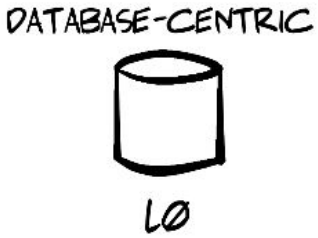
So, what does this all mean?

# Modeling at different levels…

**Data model** may have:

- Customer Table
- Invoice Table
- CustomerVisits Table



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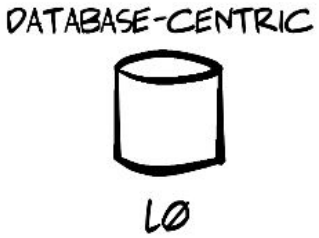
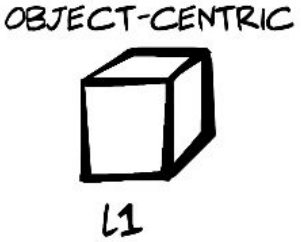



**Object Model** may have:

- CustomerSummary
  - (basic info, summary of invoices, & visits)
- `CustomerSummary.Read,`
  - `.FilterByName, .Update, .Suspend`, etc.

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# Modeling at different levels…

**Resource model** may have:

`/customersummary/{custid}`

with a LINK to `/invoices/{custid}`

and a LINK to `/visits/{custid}`


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# Modeling at different levels…

**Resource model** may have:

`/customersummary/{custid}`
with a LINK to `/invoices/{custid}`
and a LINK to `/visits/{custid}`

**Affordance Model** may have:

`customerSummary`
`CustomerRead`,
`CustomerFilter`,
`CustomerSuspend`,
`CustomerSearch`,
etc.



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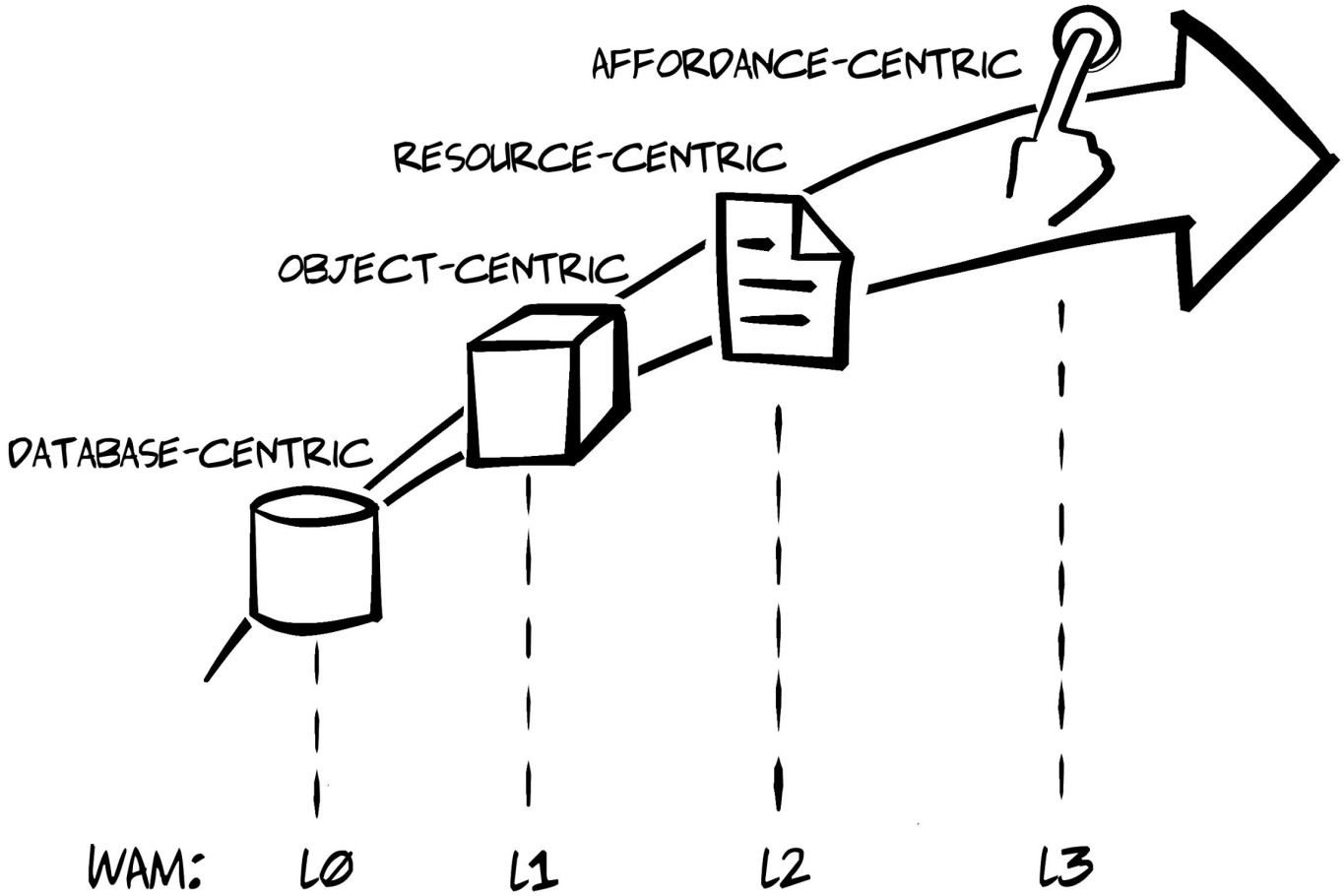
# Web API Design Maturity Model



*“Your data model is not your object model is not your resource model is not your affordance model.”*

*Mike Amundsen, 2016*

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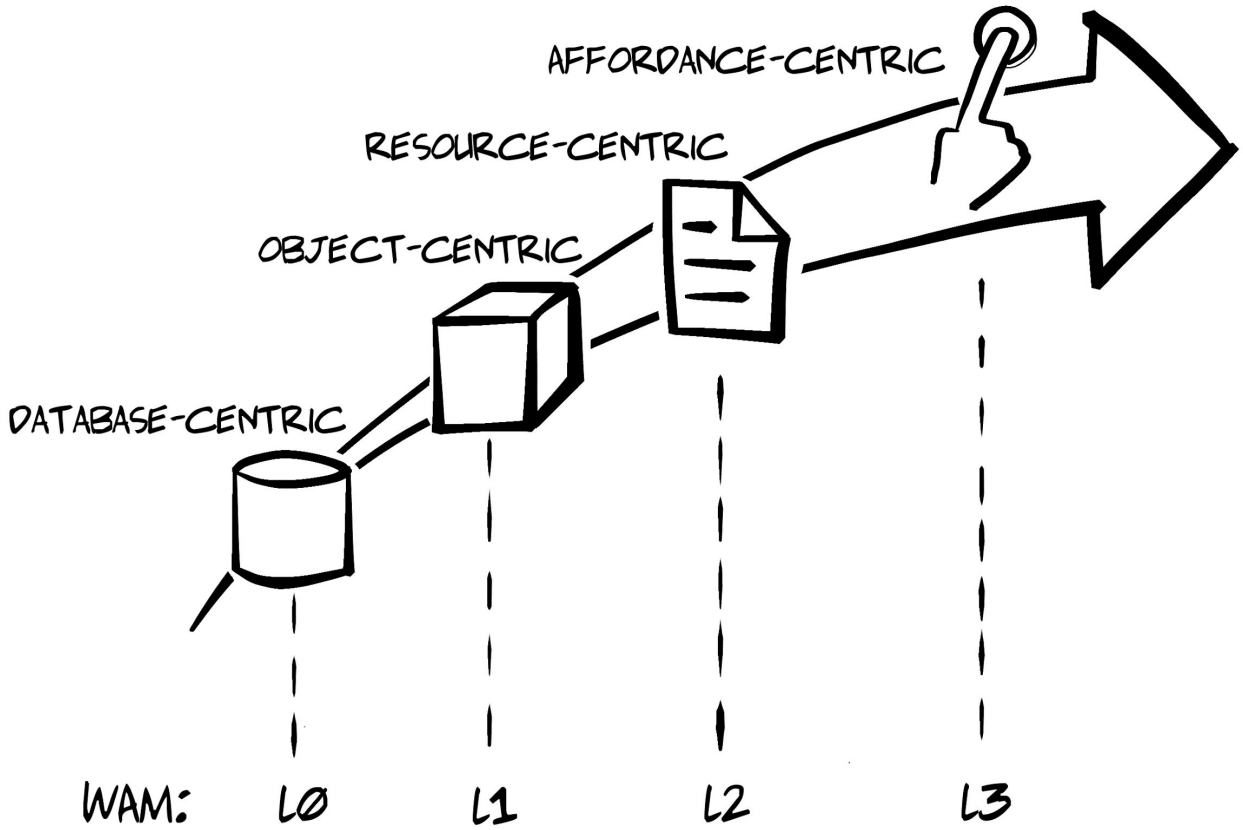
# QUESTIONS? COMMENTS?

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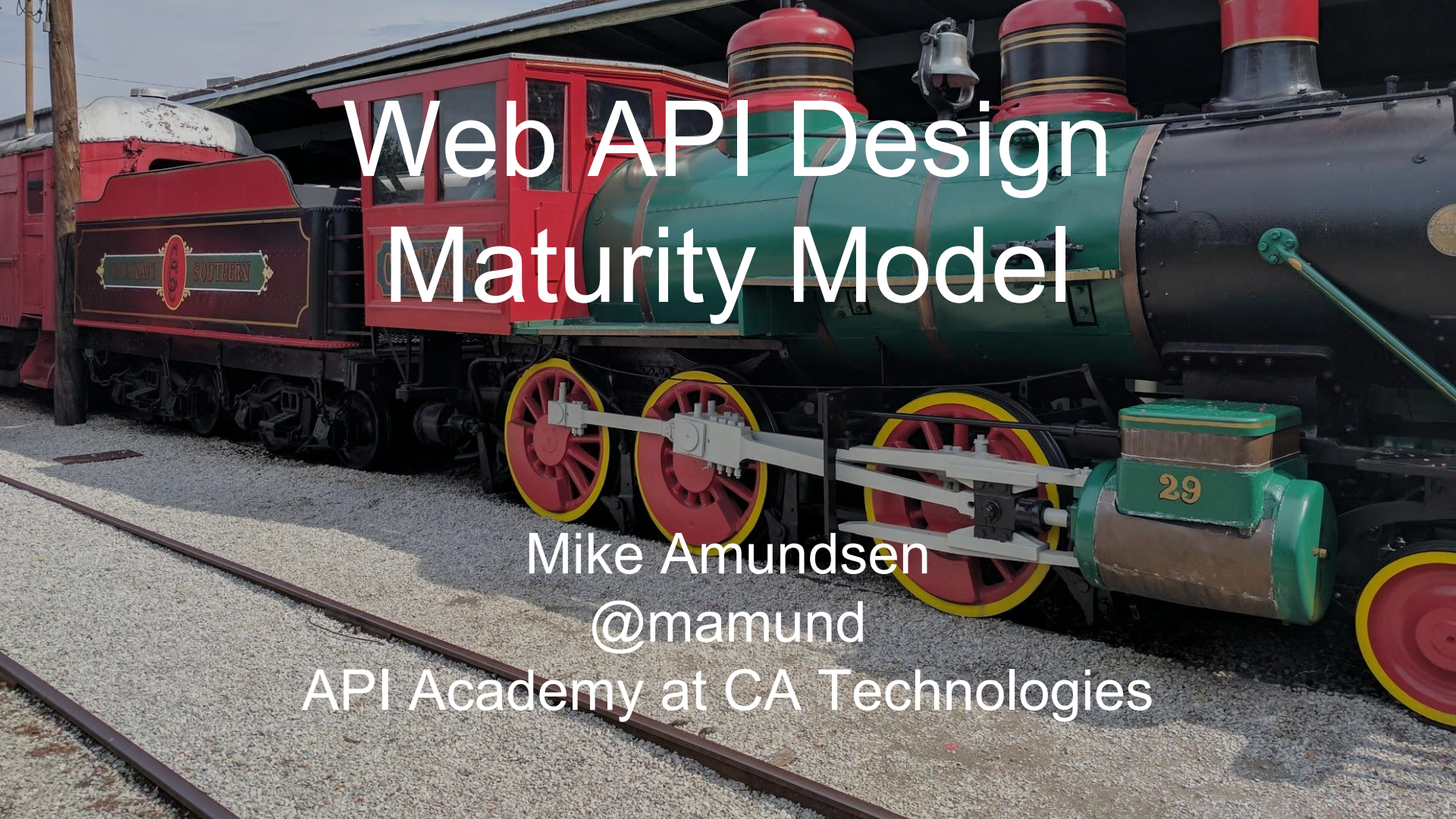


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