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# REST Introduction

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Strategische IT-Beratung,  
Architekturconsulting, Entwicklung

Service-orientierte Architekturen (SOA)  
(WS-\*, REST, OSS-Lösungen, Governance)

Rationelle Software-Produktion  
(MDA, MDSD, Java EE, Ruby on Rails)

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## What is REST?

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# REST: An Architectural Style

One of a number of “architectural styles”

... described by Roy Fielding in his dissertation

... defined via a set of *constraints* that have to be met

... architectural principles underlying HTTP, defined *a posteriori*

... with the Web as one particular instance

See: <http://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm>

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# REST: The Web Used Correctly

A system or application architecture

... that uses HTTP, URI and other Web standards “correctly”

... is “on” the Web, not tunneled through it

... also called “WOA”, “ROA”, “RESTful HTTP”

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# REST: XML without SOAP

Send plain XML (w/o a SOAP Envelope) via HTTP

- ... violating the Web as much as WS-\*
- ... preferably use GET to invoke methods
- ... or tunnel everything through POST
- ... commonly called “POX”

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***Only* option 1 is the right one**  
**(because Roy said so)**

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**But we'll go with option 2  
(and equate “REST” with  
“RESTful HTTP usage”)**

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**and avoid option 3  
like the plague**

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# REST Explained in 5 Easy Steps

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## 1. Give Every “Thing” an ID

`http://example.com/customers/1234`

`http://example.com/orders/2007/10/776654`

`http://example.com/products/4554`

`http://example.com/processes/sal-increase-234`

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## 2. Link Things To Each Other

```
<order self='http://example.com/orders/1234'>
  <amount>23</amount>
  <product ref='http://example.com/products/4554' />
  <customer ref='http://example.com/customers/1234' />
</order>
```

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## 3. Use Standard Methods

|        |                                       |
|--------|---------------------------------------|
| GET    | retrieve information, possibly cached |
| PUT    | Update or create with known ID        |
| POST   | Create or append sub-resource         |
| DELETE | (Logically) remove                    |

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## 4. Allow for Multiple “Representations”

GET /customers/1234  
Host: example.com  
Accept: application/vnd.mycompany.customer+xml

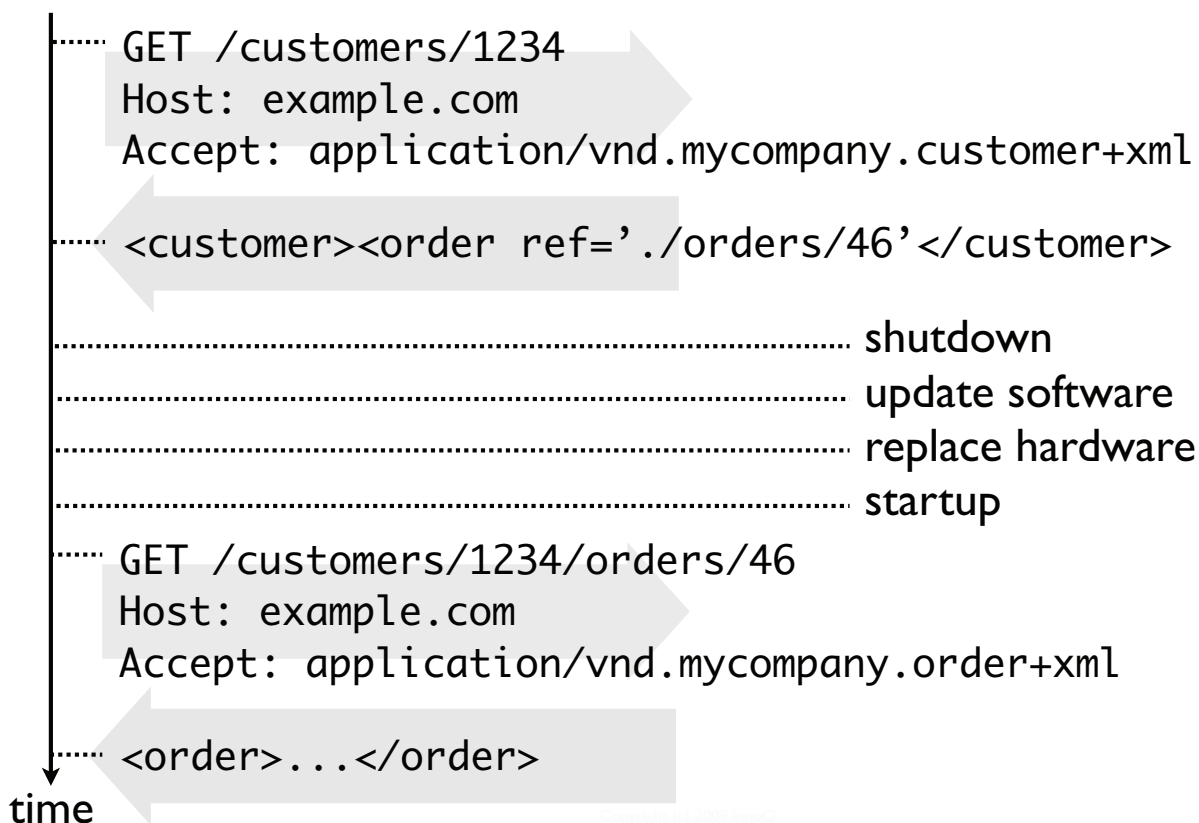
<customer>...</customer>

GET /customers/1234  
Host: example.com  
Accept: text/x-vcard

begin:vcard  
...  
end:vcard

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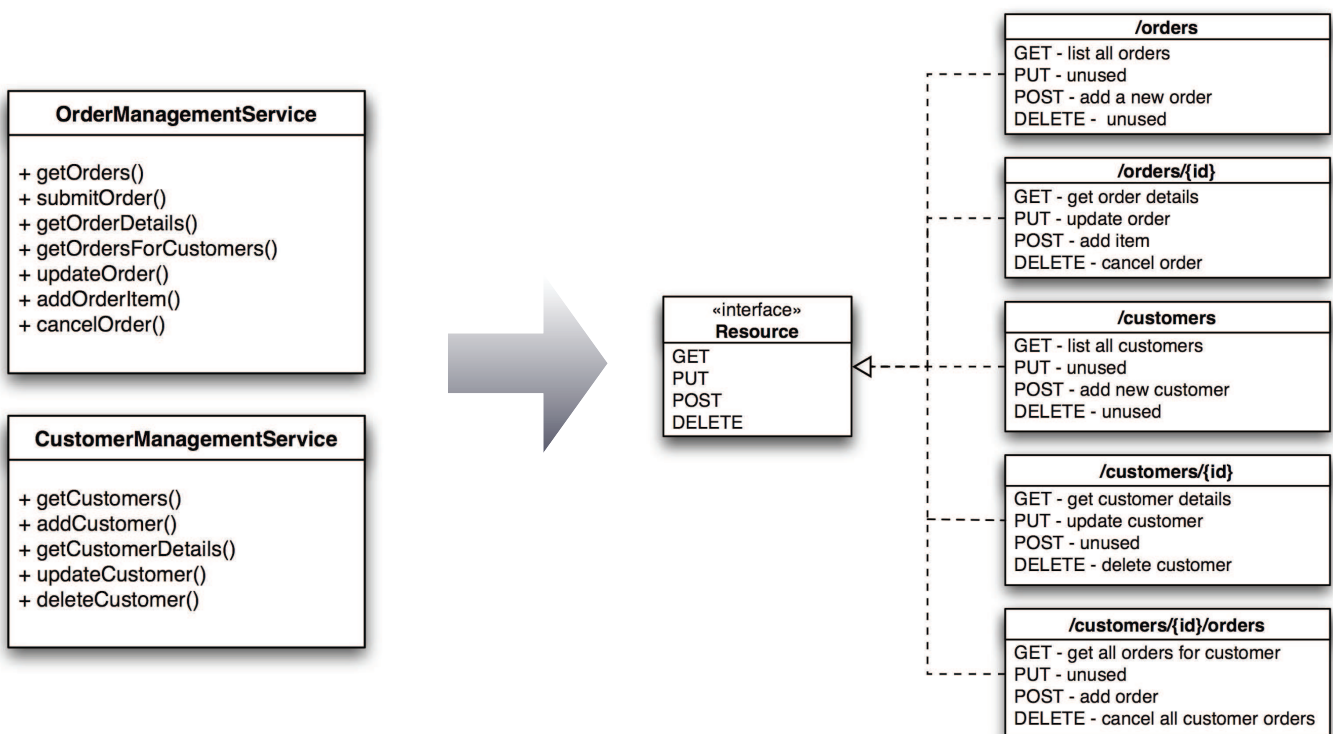
## 5. Communicate Statelessly





# Consequences

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# Mapping Examples

getFreeTimeSlots(Person)

→ GET /people/{id}/timeslots?state=free

rejectApplication(Application)

→ POST /rejections ←

<application>http://...</application> ←

<reason>Unsuitable for us!</reason>

performTariffCalculation(Data)

→ POST /contracts ←

Data

← Location: http://.../contracts/4711

→ GET /contracts/4711/tariff

← Result

shipOrder(ID)

→ PUT /orders/0815/status ←

<status>shipped</status>

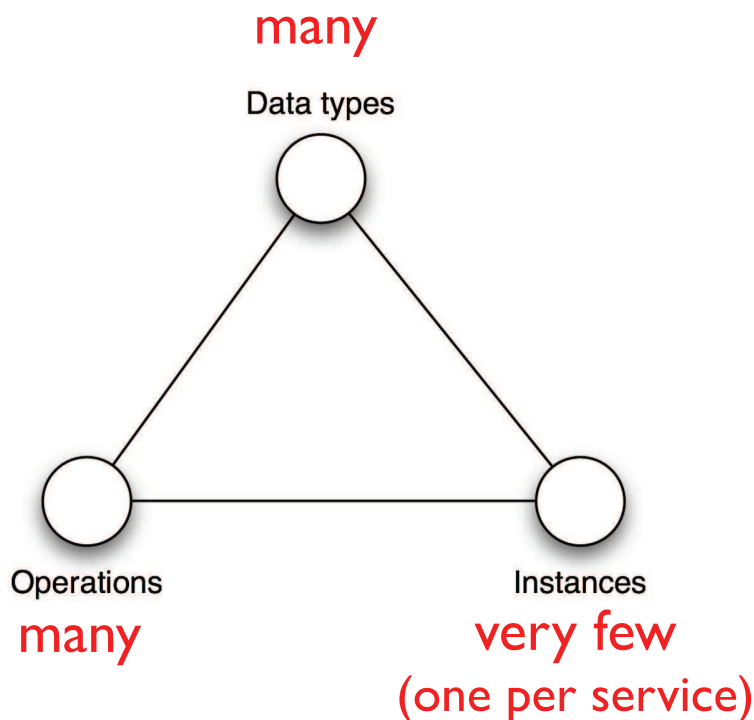
shipOrder(ID) [variation]

→ POST /shipments ←

Data

← Location: http://.../shipments/4711

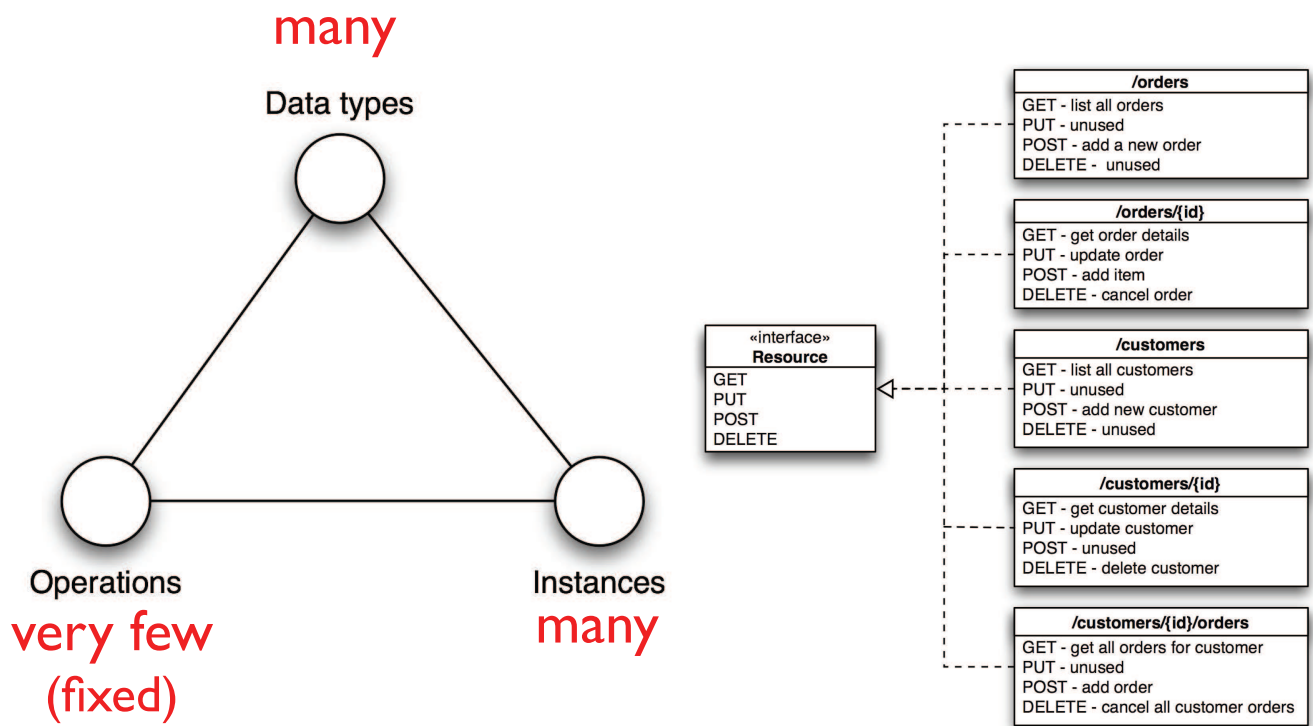
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| OrderManagementService    |
|---------------------------|
| + getOrders()             |
| + submitOrder()           |
| + getOrderDetails()       |
| + getOrdersForCustomers() |
| + updateOrder()           |
| + addOrderItem()          |
| + cancelOrder()           |

| CustomerManagementService |
|---------------------------|
| + getCustomers()          |
| + addCustomer()           |
| + getCustomerDetails()    |
| + updateCustomer()        |
| + deleteCustomer()        |

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# REST and Web Services

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# Web Services Issues

*Web Services* are “Web” in name only

WS-\* tends to ignore the web

Abstractions leak, anyway

Protocol independence is a bug, not a feature

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POST http://example.com/CustomerMgmt

```
<soap:Envelope  
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">  
  <soap:Body>  
    <deleteCustomer xmlns="http://example.com/ns1">  
      <customerId>13</customerId>  
    </ns:deleteCustomer>  
  </soap:Body>  
</soap:Envelope>
```

Method

ID

Endpoint

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# “Endpoint”?

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# Web Services

## OrderManagementService

- + getOrders()
- + submitOrder()
- + getOrderDetails()
- + getOrdersForCustomers()
- + updateOrder()
- + addOrderItem()
- + cancelOrder()
- + cancelAllOrders()

## CustomerManagementService

- + getCustomers()
- + addCustomer()
- + getCustomerDetails()
- + updateCustomer()
- + deleteCustomer()
- + deleteAllCustomers()

A separate interface (façade) for each purpose

As known CORBA, DCOM, RMI/EJB

Often used for SOA (“CORBA w/ angle brackets)

Application-specific protocol

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# Contribution to the Net's Value

## 2 URLs

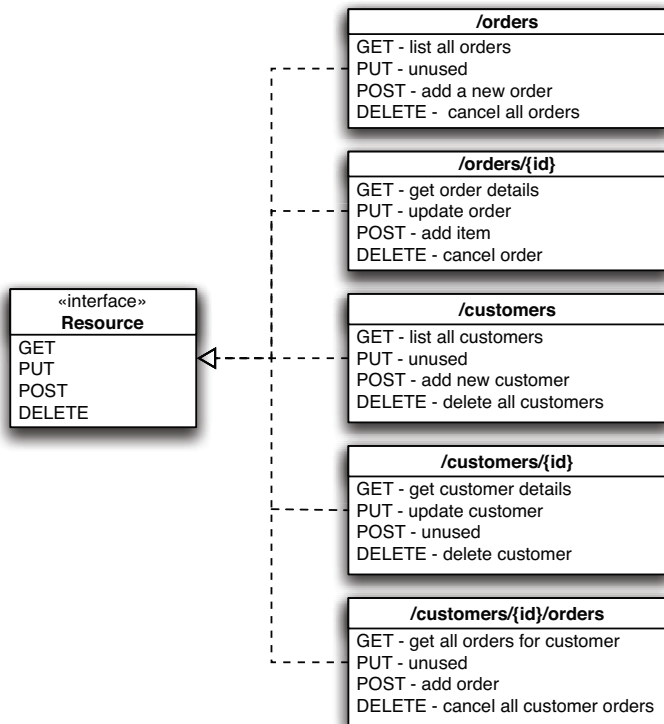
- ▶ <http://example.com/customerservice>
- ▶ <http://example.com/orderservice>

## 1 method

- ▶ POST

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# REST Approach



A single *generic* (uniform) interface for everything

Generic verbs mapped to resource semantics

A standard application protocol (e.g. HTTP)

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## Contribution to the Net's Value

*Millions* of URLs

- ▶ every customer
- ▶ every order

4-6 supported methods per resource

- ▶ GET, PUT, POST, DELETE, OPTIONS, HEAD

Cacheable, addressable, linkable, ...

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# Why You Should Care

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The image is a screenshot of the Yahoo! Developer Network (YDN) homepage. At the top, there is a blue header with the "YAHOO! DEVELOPER NETWORK" logo. Below this, the main heading is "APIs and Web Services". Underneath, there are several sections:

- ADVERTISING & BUSINESS SERVICES**: This section includes "APT from Yahoo!" (Interact with our advertising platform and ad exchange-based technology) and "Y! Search Marketing" (Create and manage campaigns, pull reports, set bids).
- Google Apps APIs**: A list of various Google APIs including Google Base Data API, Blogger Data API, Google Book Search Data API, Google Calendar Data API, Google Code Search Data API, Google Contacts Data API, Google Documents List Data API, Google Finance Portfolio Data API, Google Health Data API, Google Notebook Data API, Picasa Web Albums Data API, Google Spreadsheets Data API, Webmaster Tools Data API, and YouTube Data API.
- Infrastructure Services**: A list of services including Amazon Elastic Compute Cloud (Amazon EC2), Amazon SimpleDB, Amazon Simple Storage Service (Amazon S3), Amazon CloudFront, Amazon Simple Queue Service (Amazon SQS), and AWS Premium Support.
- Payments & Billing**: A section for payment and billing services.
- On-Demand Workforce**: A section for on-demand workforce services.
- Alexa Web Services**: A section for Alexa web services.
- Amazon Fulfillment & Associates**: A section for Amazon fulfillment and associates services.

At the bottom, there are more sections like "Finance" (RSS feeds deliver timely data on), "HotJobs" (Post, edit, refresh and delete public), and "MyBlogLog" (Build social networking services). The overall layout is clean and organized, with a focus on providing developers with a wide range of services and APIs.

*“My Internet is bigger than your enterprise.”*

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**We've been there  
before ...**



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Der Terminus **Basel II** bezeichnet die Gesamtheit der Eigenkapitalvorschriften, die vom **Basler** Ausschuss für Bankenaufsicht in den letzten Jahren ...

[de.wikipedia.org/wiki/Basel\\_II](#) - 72k - [Cached](#) - [Similar pages](#) -

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**Basel II** - Die neue Baseler Eigenkapitalvereinbarung ... Während der im Jahr 1998 begonnenen Entwicklung des **Basel II** Regelwerkes standen die Aufsicht und ...

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Ausführliche Informationen zum Thema **Basel II** – neue Bedingungen für Firmenkredite, Rating und Tipps.

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Der Deutsche Industrie- und Handelskammertag (DIHK) ist die Spitzenorganisation der 80 Industrie- und Handelskammern (IHKs) in Deutschland.

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# Q&A

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