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REST Introduction

<http://www.innoq.com>

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Fokus auf SOA, Web-Services, REST

SOA-Editor InfoQ.com

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(mit Dr. Gernot Starke)

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Autor “REST und HTTP”, dpunkt, Juli 2009

heise Developer podcast “SoftwareArchitekTOUR”
(mit M. Stal, M. Völter, C. Weyer)

Beratungsunternehmen für Software-Architekturen

~50 Mitarbeiter
in D (Ratingen, Darmstadt)
und CH (Zürich)



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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)

What is REST?

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>

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”

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”

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

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

**and avoid option 3
like the plague**

REST Explained in 5 Easy Steps

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`

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>
```

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

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

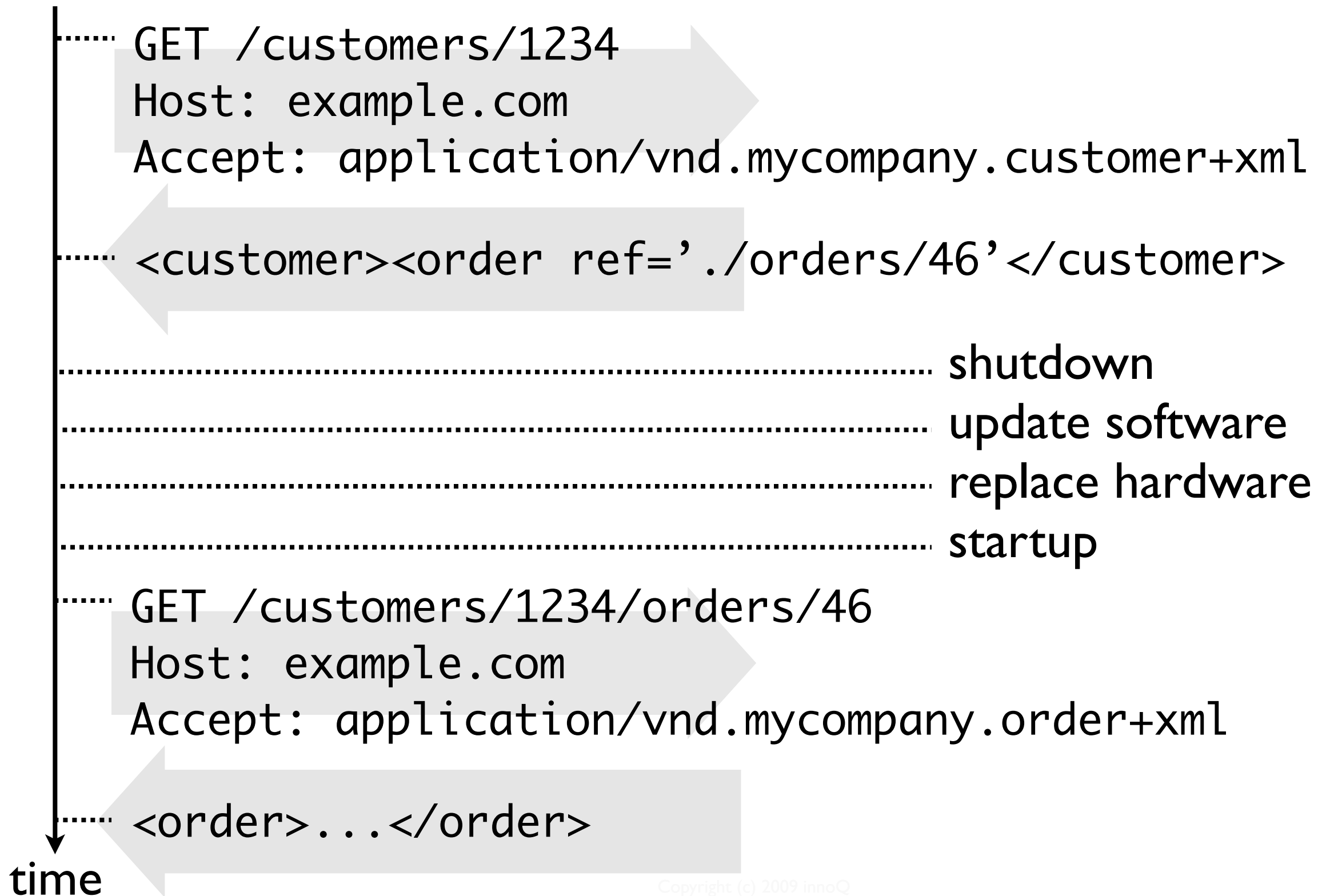
Accept: text/x-vcard

begin:vcard

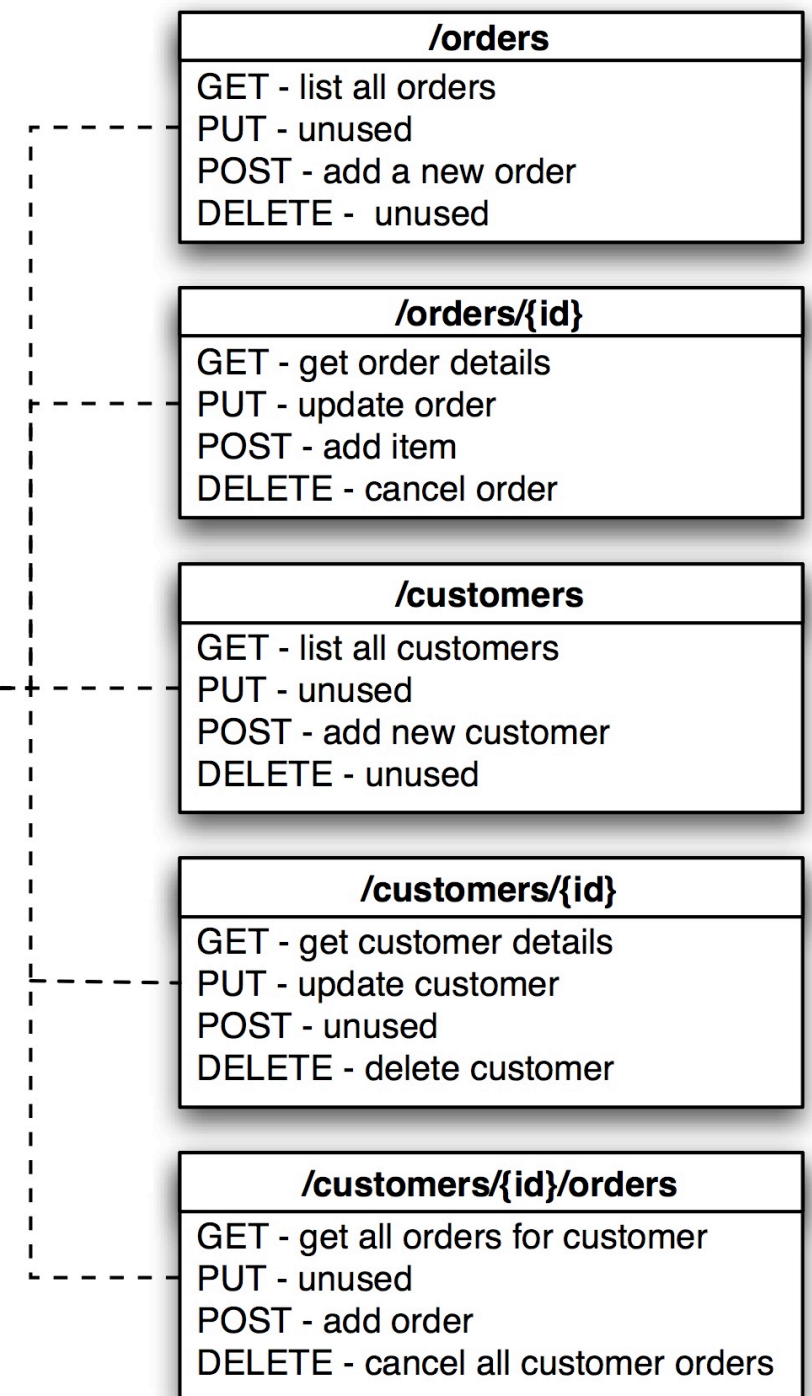
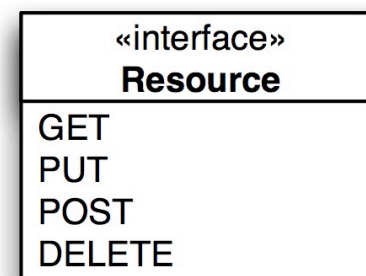
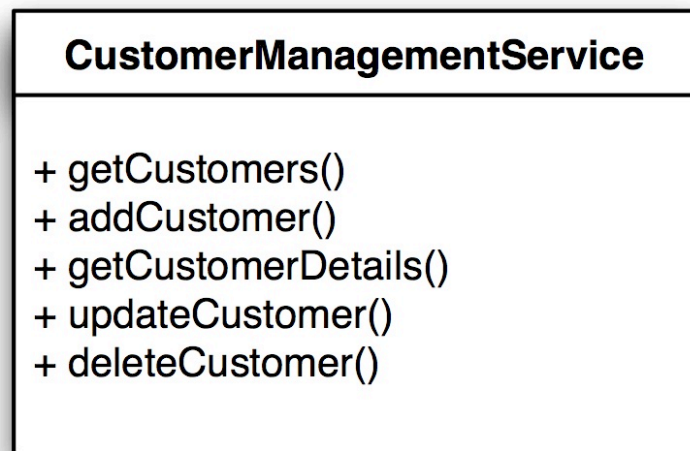
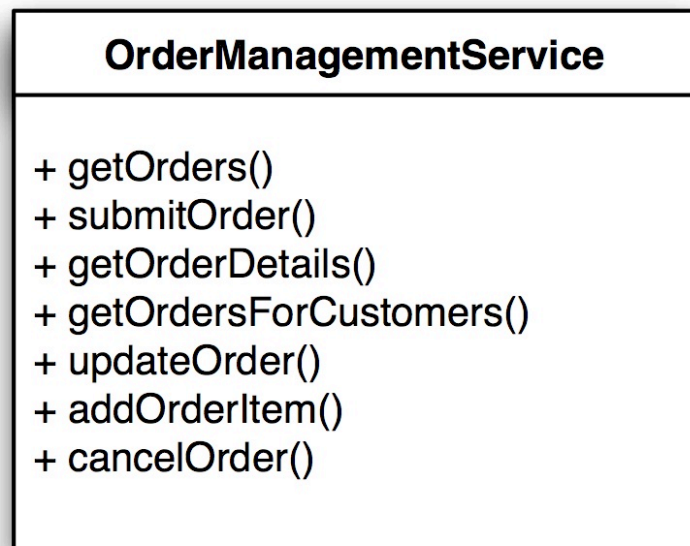
...

end:vcard

5. Communicate Statelessly



Consequences



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)

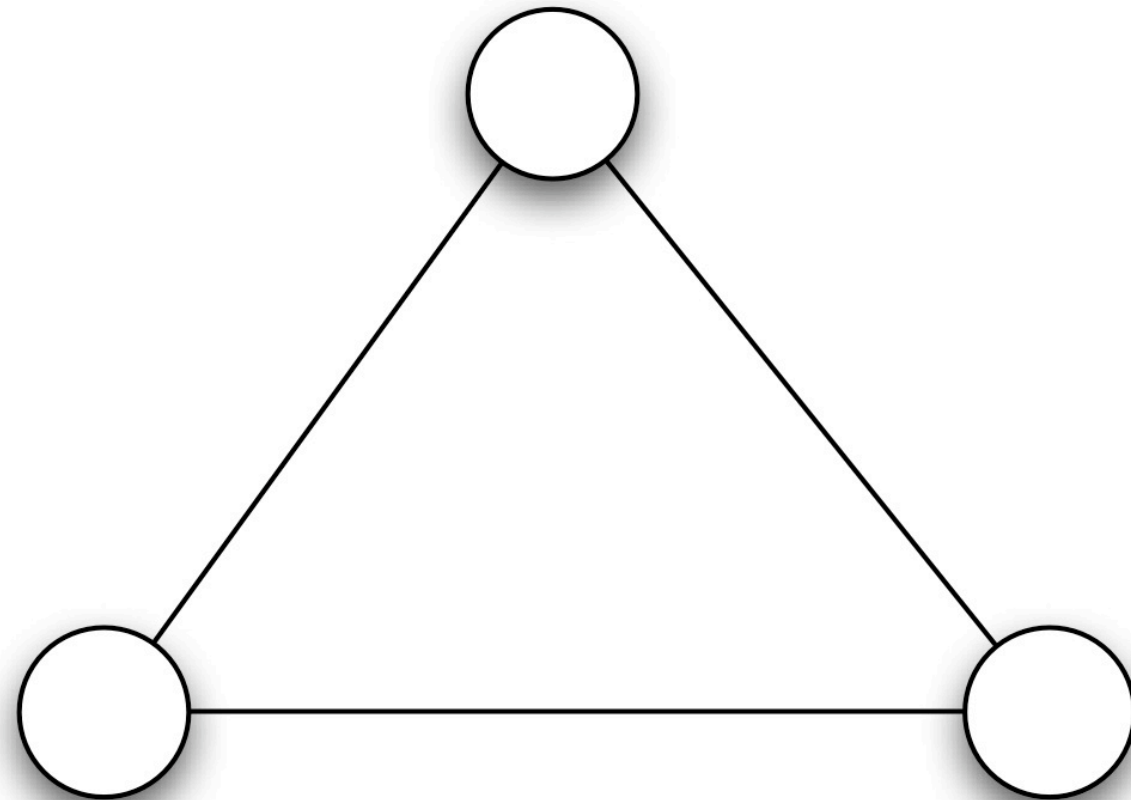
→ PUT /orders/0815/status ↵
<status>shipped</status>

shipOrder(ID) [variation]

→ POST /shipments ↵
Data
← Location: http://.../shipments/4711

many

Data types



Operations

many

Instances

very few
(one per service)

OrderManagementService

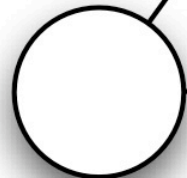
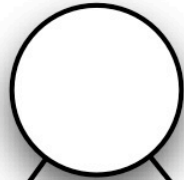
- + getOrders()
- + submitOrder()
- + getOrderDetails()
- + getOrdersForCustomers()
- + updateOrder()
- + addOrderItem()
- + cancelOrder()

CustomerManagementService

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

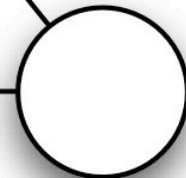
many

Data types



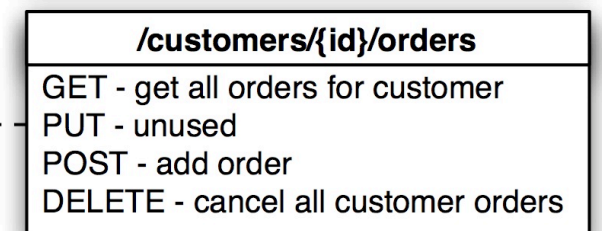
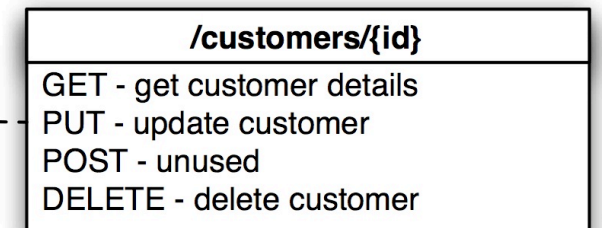
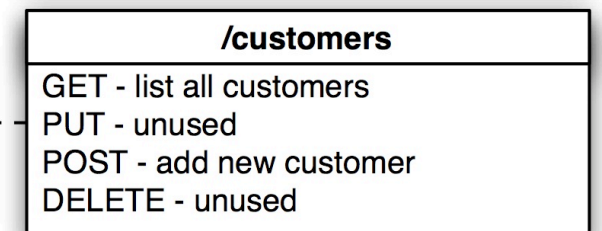
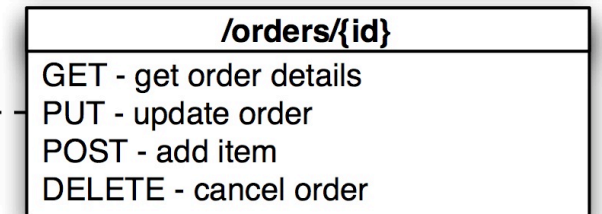
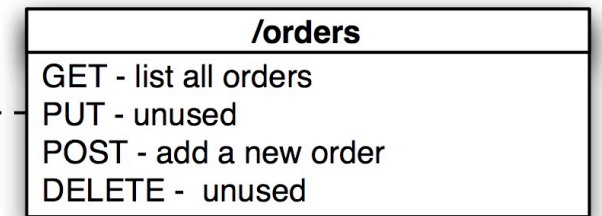
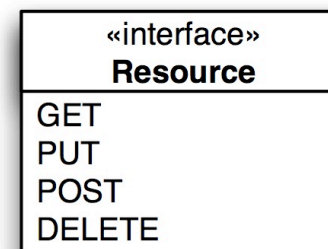
Operations

very few
(fixed)



Instances

many



REST and Web Services

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

A photograph of a tunnel entrance. The tunnel has a brick-lined archway. A bright light source is visible at the end of the tunnel, creating a strong glow. The walls of the tunnel are made of dark, rough-hewn stone. The floor is uneven and appears to be dirt or gravel. The overall atmosphere is dark and mysterious.

Tunneling Through POST

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

“Endpoint”?



**DEAD
END**



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

Contribution to the Net's Value

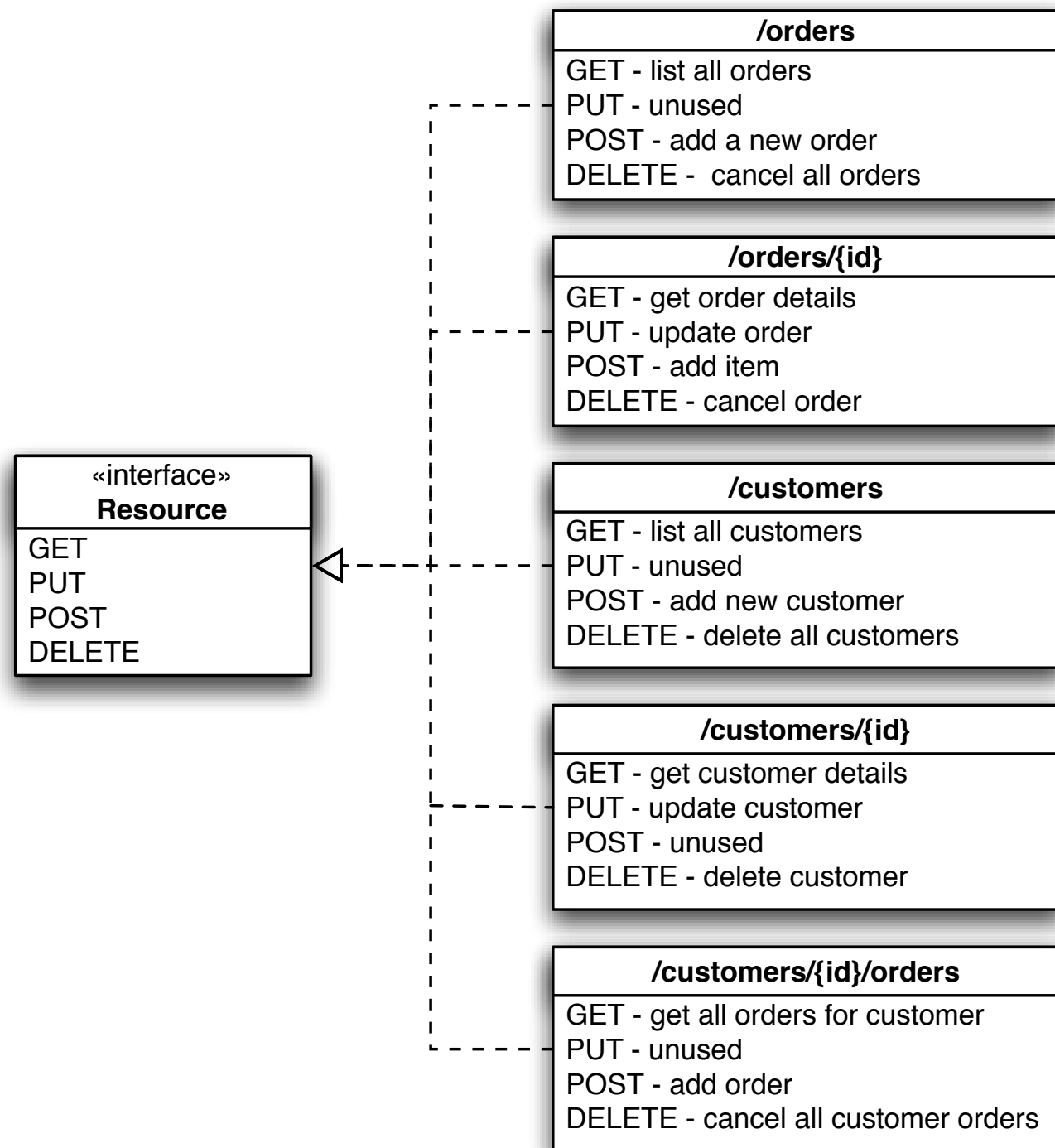
2 URLs

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

1 method

- ▶ POST

REST Approach



A single *generic* (uniform) interface for everything

Generic verbs mapped to resource semantics

A standard application protocol (e.g. HTTP)

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, ...

Why You Should Care

APIs and Web Services

ADVERTISING & BUSINESS SERVICES



APT from Yahoo!

Interact with our advertising platform and ad exchange-based technology.



Y! Search Marketing

Create and manage campaigns, pull reports, set bids



Windows Azure



[Google Apps APIs](#)



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- AWS Premium Support

Payments & Billing

On-Demand Workforce

Alexa Web Services

Amazon Fulfillment & Associates



Access and update contacts in the Yahoo! Address Book.



Build applications to list messages, display folders, compose and send messages.



Create add-on features that run inside Yahoo! Messenger.

CONTENT



Finance

RSS feeds deliver timely data on



HotJobs

Post, edit, refresh and delete public



MyBlogLog

Build social networking services

“My Internet is bigger than your enterprise.”

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 ...

www.bundesbank.de/bankenaufsicht/bankenaufsicht_basel.php - 27k -

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Die drei Säulen von **Basel 2** Im Rahmen dieser so genannten zweiten Säule, die als integraler Bestandteil des neuen Kapitalakkords gleichberechtigt neben den ...

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Dipl.-Kfm.(FH) Christian Reichling, Steuerberater aus Köln (Cologne) berät Sie gerne in allen Fragen der Bilanzierung und Besteuerung von Gesellschaften ...

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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.

www.dihk.de/inhalt/informationen/news/schwerpunkte/rating/basel.html - 6k -

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Unlock information as resources

VersicherungX

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Hans Müller, 40880 Ratingen, Kunde seit dem 1.3.2001, letzte Aktualisierung 1.1.2009 ...
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Q&A

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