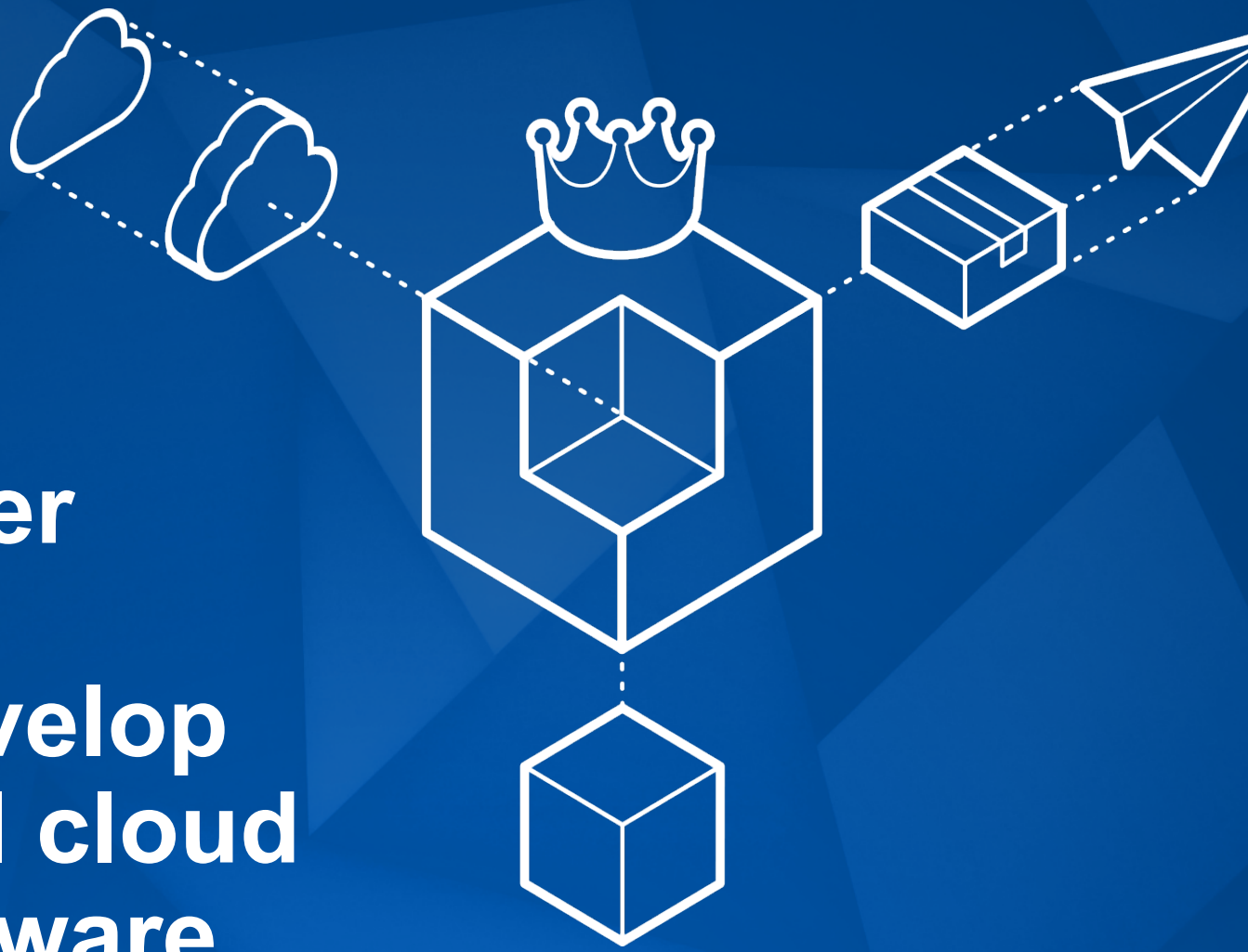


API billioner

How to develop successful cloud native software

Potr Bochyński

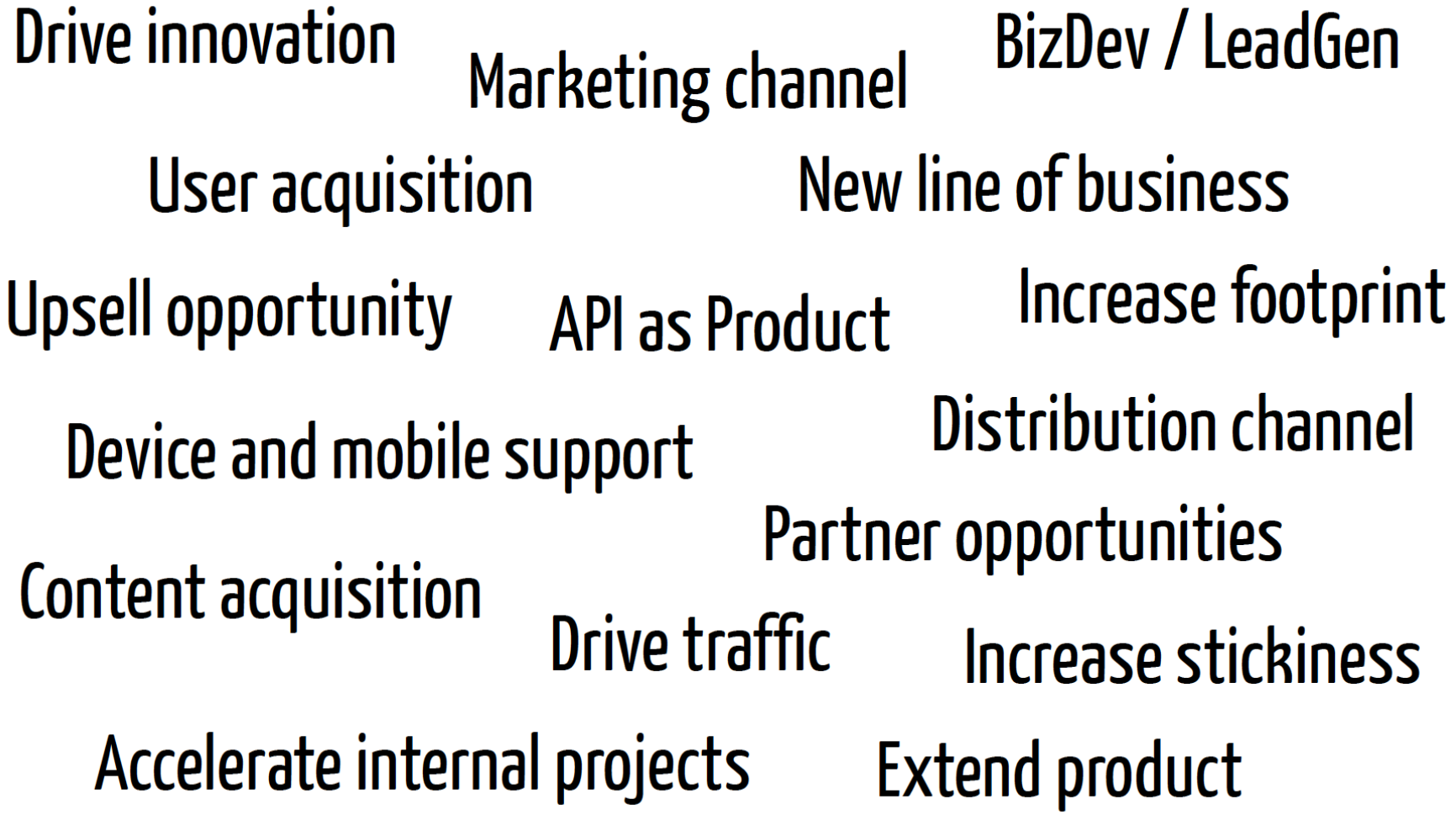
SAP

(v)

Agenda

- Basics of micro-services architecture
- API and its economy
- API first approach to software design
- Examples of API in our daily lives
- Practical exercise: how to use existing API

Why API?



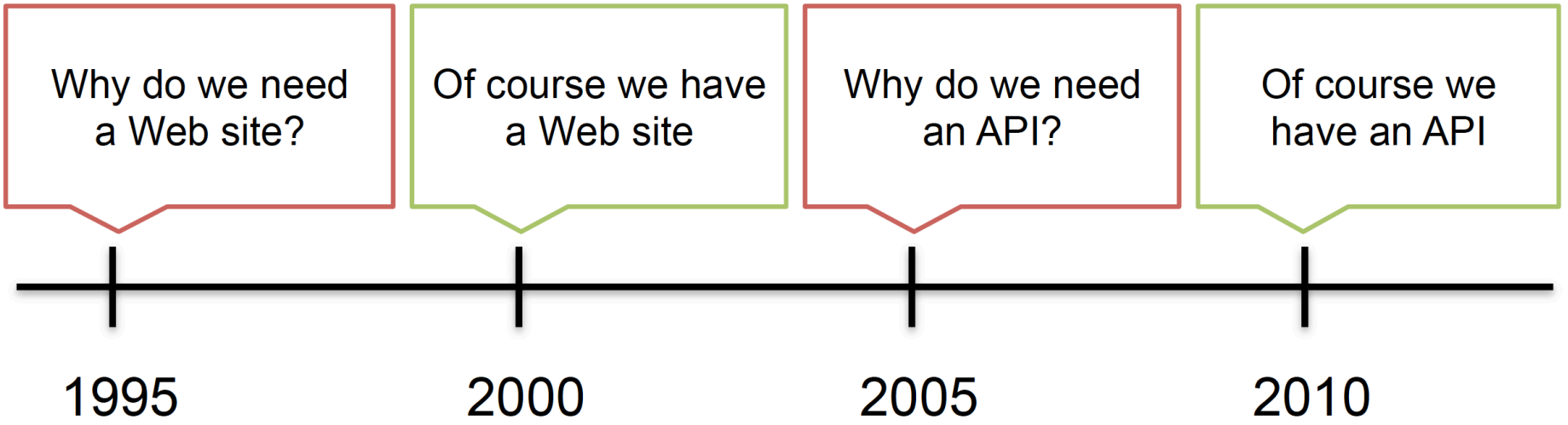
source: John Musser, http://www.slideshare.net/jmusser

API ECONOMY

“APIs have become the currency for success in the software as a service (SaaS) and broader cloud computing marketplace.”

Jeff Kaplan

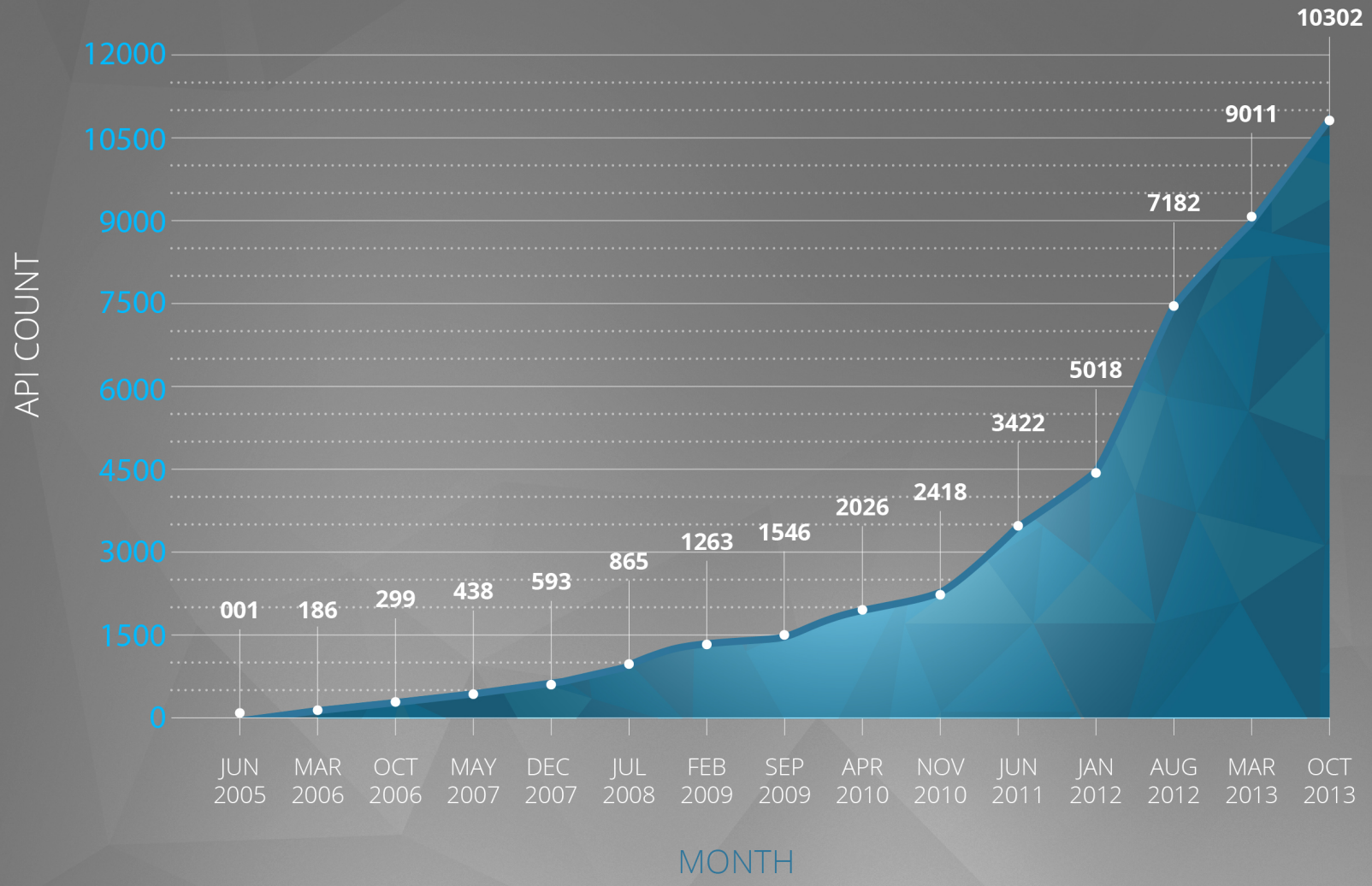
API



source: John Musser, http://www.slideshare.net/jmusser

ProgrammableWeb

Growth In Web APIs Since 2005



API market

http://www.programmableweb.com/apis/directory

https://www.mashape.com/explore

https://www.publicapis.com/

http://developer.mashery.com/apis

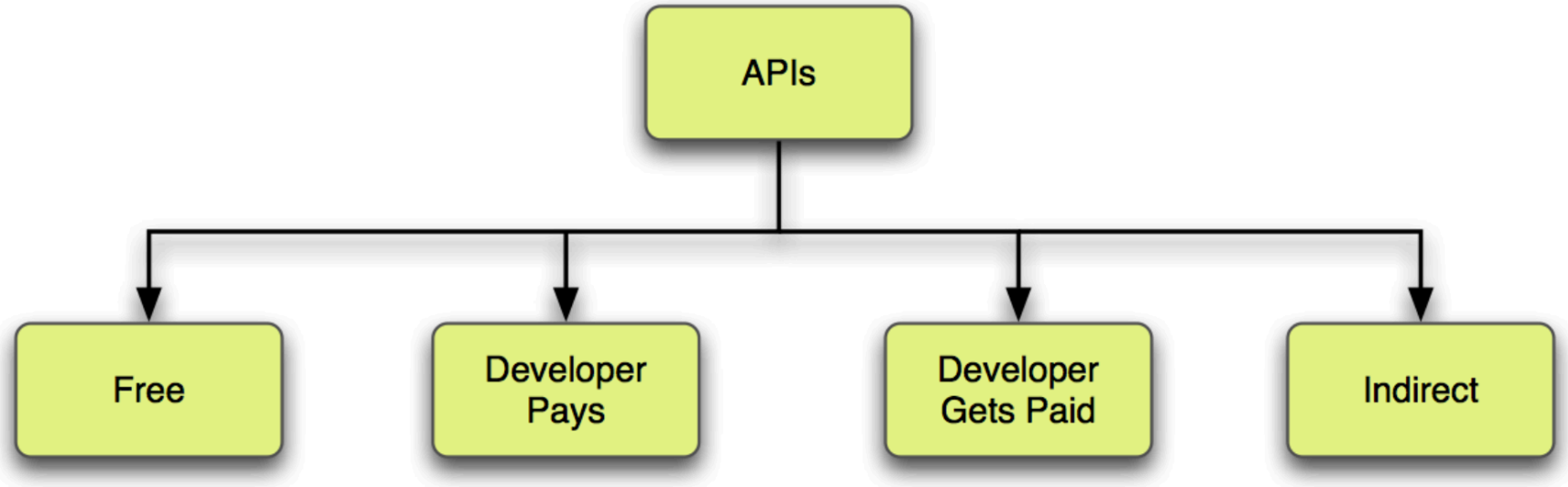
APIs, now a billion $ business

= $2 billion/year

"90% of what we do is business through APIs"

John Watton, Expedia Affiliate Network, Travolution.co.uk, April 2012

API Buisness Models



source: John Musser, http://www.slideshare.net/jmusser

API economy

- your API is your software frontend
- API usage is important feedback
- KPIs mainly based on API usage and performance
- secured API = less problems with frontends

API economy - KPIs

- **Trafic: total API calls, top methods, call chains, quota faults**
- **Developers: total, active, top developers, trending apps**
- **Service: performance, availability, error rates**
- **Marketing: registrations, traffic sources**
- **Business: direct revenue, market share**
- **engagement**

API economy

API Billionaire Club

twitter	13 billion API calls / day *(May 2011)*
Google	5 billion API calls / day *(April 2010)*
facebook	5 billion API calls / day *(October 2009)*
ACCU WEATHER	1.1 billion API calls / day *(April 2011)*
KLOUT	1 billion API calls / day *(May 2012)*
ebay	1 billion API calls / day *(Q1 2012)*
Sabre	1 billion API calls / day *(January 2012)*

source: John Musser, http://www.slideshare.net/jmusser

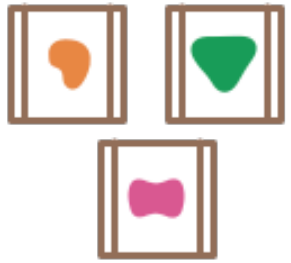
TRY IT !!!

github.com/pbochynski/api-workshop

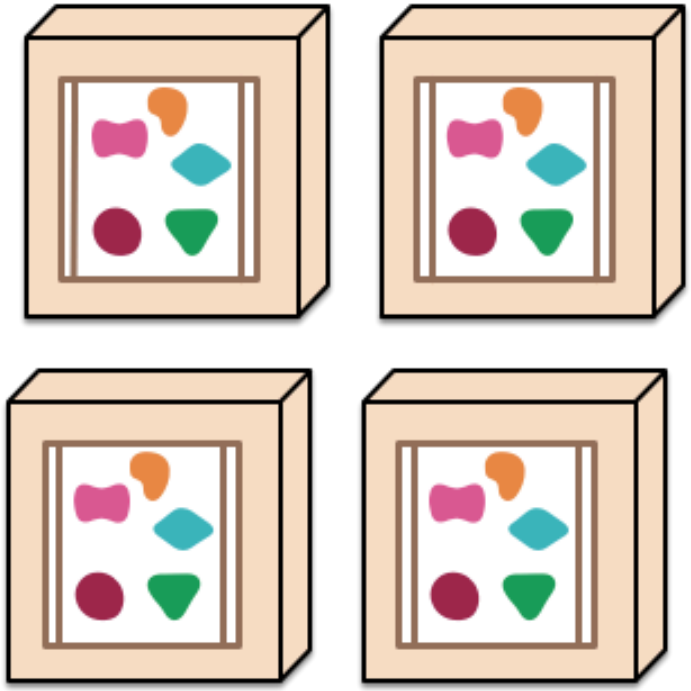
Monolith and microservices (martinfowler.com)

A monolithic application puts all its functionality into a single process...

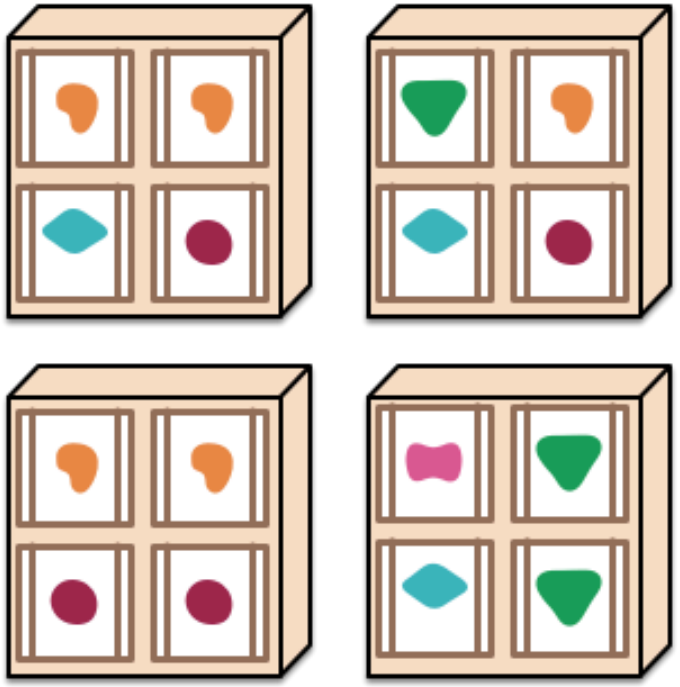
A microservices architecture puts each element of functionality into a separate service...



... and scales by replicating the monolith on multiple servers



... and scales by distributing these services across servers, replicating as needed.



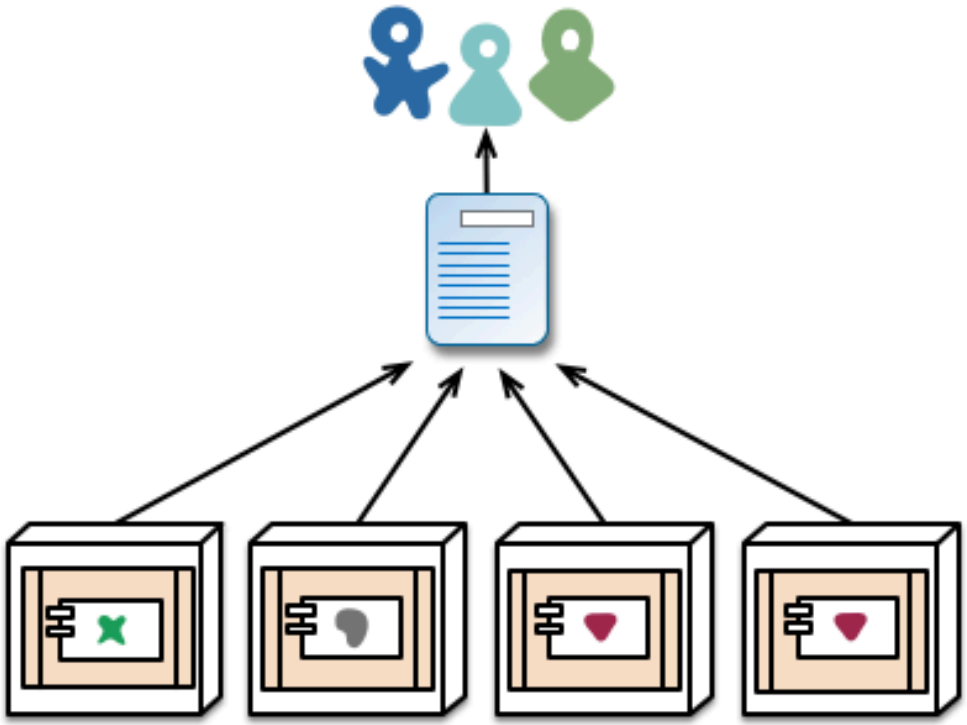
source: http://martinfowler.com/articles/microservices.html

Microservices characteristics

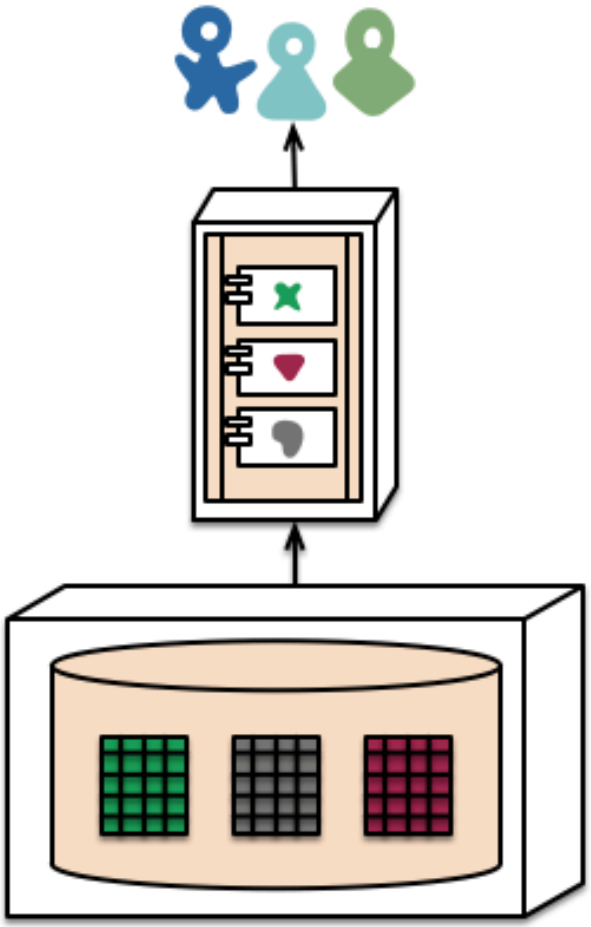
- Componentization via services
- Organized around business capabilities
- Products not projects
- Smart endpoints and dumb pipes
- Decentralized governance
- Decentralized data management
- Infrastructure automation
- Design for failure
- Evolutionary design

Components in software

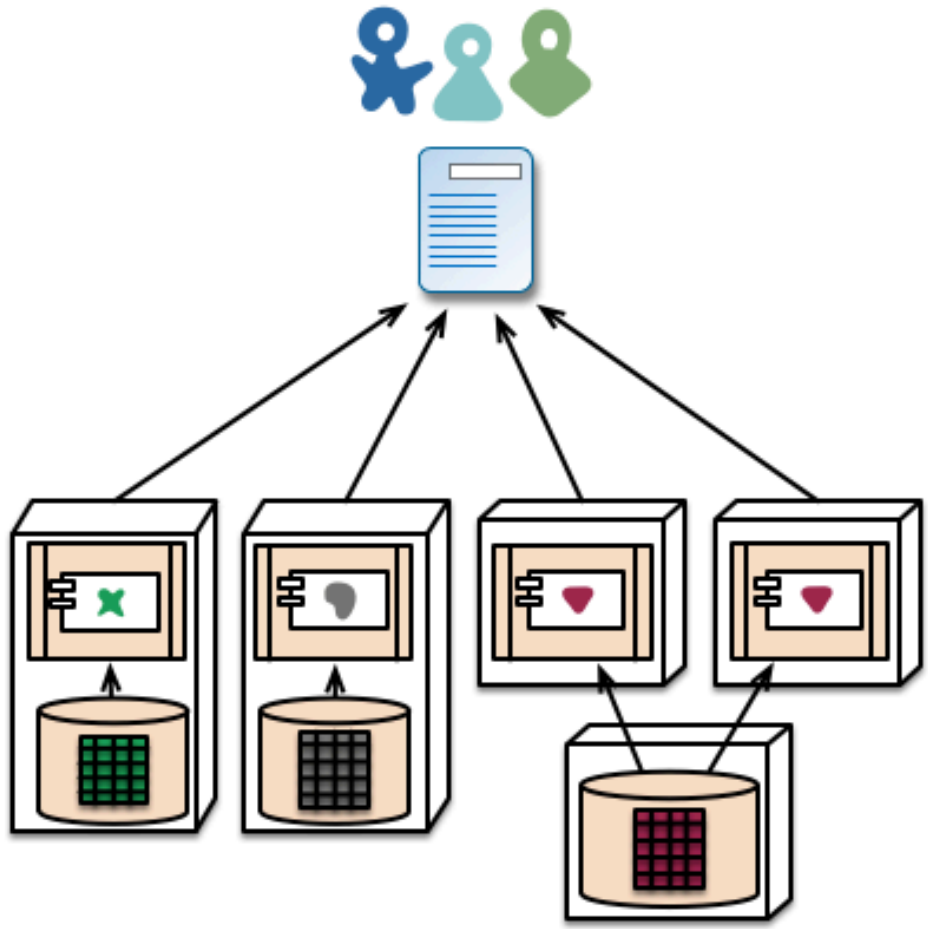
- procedures (libraries)
- CORBA
- EJB
- SOA + ESB
- microservices



Decentralized data management

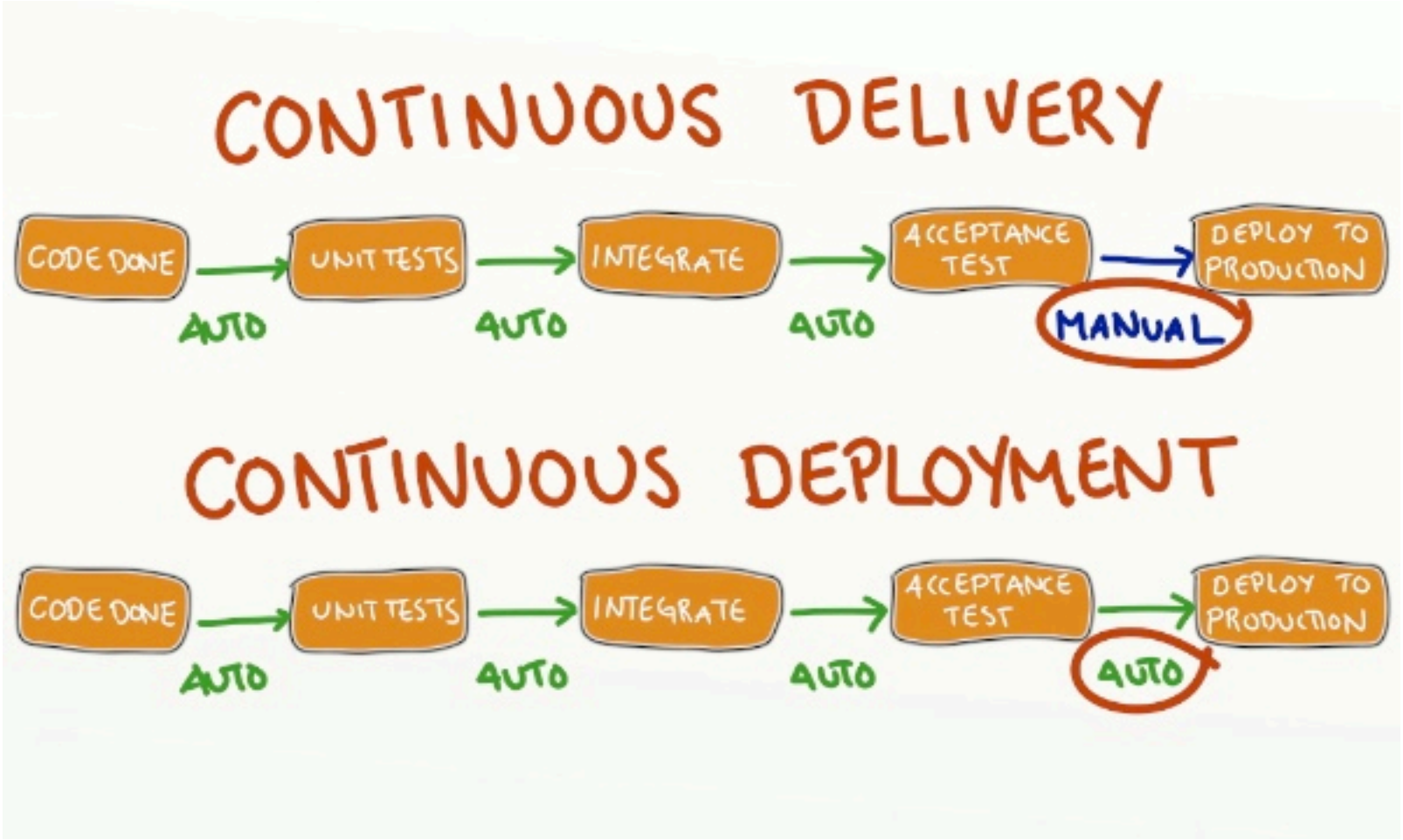


monolith - single database



microservices - application databases

Infrastructure automation



Microservices benefits

- **strong module boundaries**
- **independent deployment**
- **technology diversity**

Definitions (wikipedia)

Service-oriented architecture (SOA):

an architectural pattern in computer software design in which application components provide services to other components via a communications protocol, typically over a network.

Microservices:

a software architecture style in which complex applications are composed of small, independent processes communicating with each other using language-agnostic APIs

Bad reputation of SOA

BIG, EXPENSIVE, PROPRIETY SOFTWARE

COMPLEX BIG SERVICES

CENTRAL INFRASTRUCTURE – ESB

HEAVY WEIGHT PROTOCOLS (SOAP)

SOAP vs REST

SOAP

```
POST
/GetStock
HTTP/1.1
Host: www.example.org
Content-°©-Type: applicaNon/soap+xml
<?xml version="1.0"?>
<soap:Envelope
xmlns:soap="hXp://www.w3.org/2001/12/soap-°©-
envelope"
soap:encodingStyle="hXp://www.w3.org/2001/12/
soap-°©-encoding">
<soap:Body xmlns:m="hXp://www.example.org/
stock">
  <m:GetStockPrice>
  <m:StockName>SAP</m:StockName>
  </m:GetStockPrice>
</soap:Body>
</soap:Envelope>
```

REST

```
GET http://example.org/stock/SAP
```

SOAP vs REST

XML

```
<?xml
version="1.0"?>
<soap:Envelope
xmlns:soap="hXp://www.w3.org/2001/12/soap-°©-
envelope"
soap:encodingStyle="hXp://www.w3.org/
2001/12/soap-°©-encoding">
<soap:Body
xmlns:m="hXp://www.example.org/
stock">
<m:GetStockPriceResponse>
<m:Price>68.72</m:Price>
</m:GetStockPriceResponse>
</soap:Body>
</soap:Envelope>
```

JSON

```
{
"symbol”: ”SAP",
"price”: 68.72,
}
```

Microservices

Pragmatic and agile approach to SOA

- **single responsibility principle**
- **built for fault-tolerance**
- **infrastructure automation**

SOA DONE RIGHT

SAP

microservices – not a free lunch

Significant Operations Overhead

Substantial DevOps Skills Required

Duplication Of Effort

Distributed System Complexity

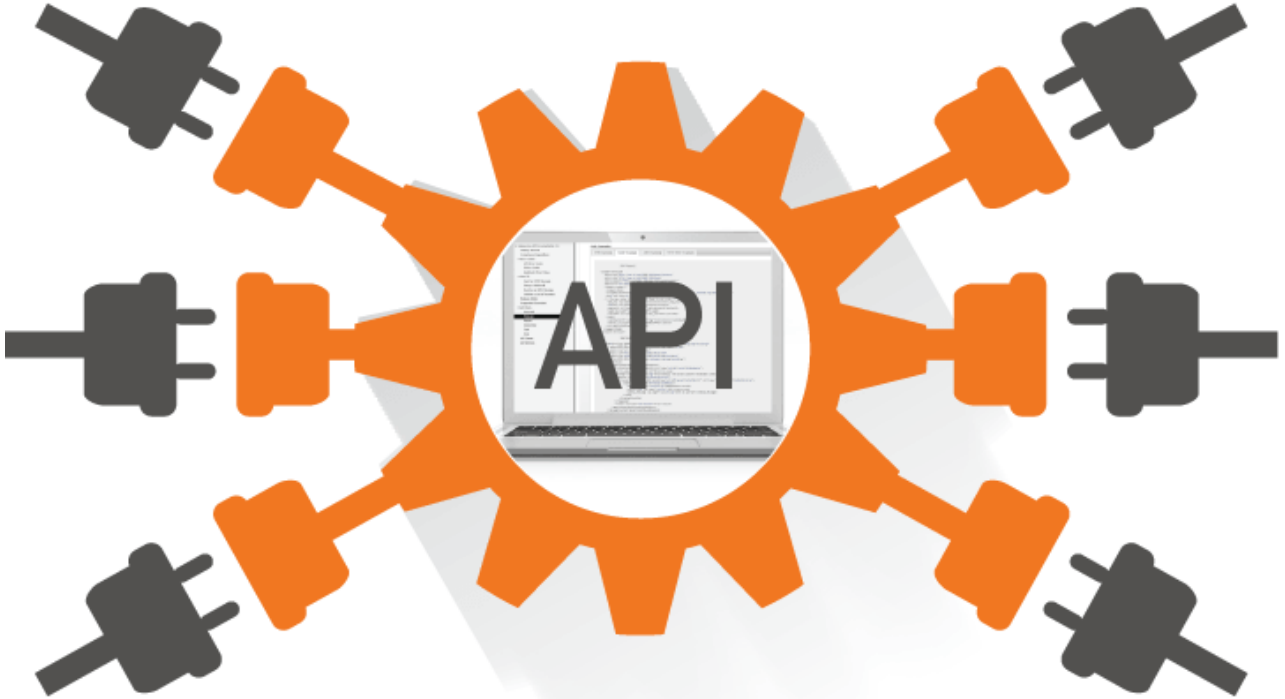
Asynchronicity Is Difficult!

Testability Challenges

Conway’s Law

Microservices and API

- **Standardize edges not nodes**
- **To make microservices interchangeable we need well defined, stable, technology independent interfaces**



API billioner – what next?

- **API design: top-down vs. bottom-up**
- **RAML, Swagger, API Blueprint**
- **basics of REST**
- **security & OAauth 2.0 explained**

SAP