#Architecture201x

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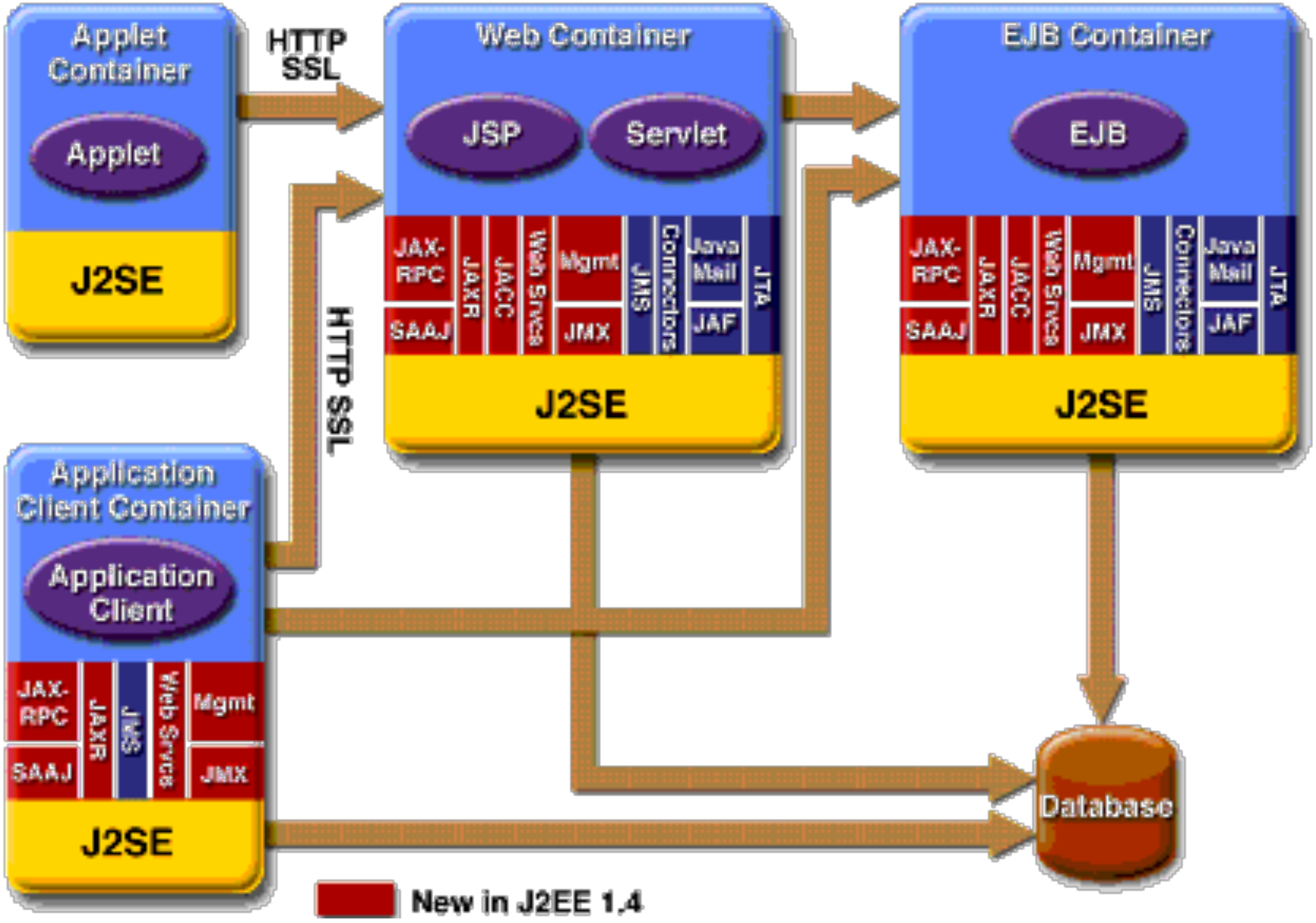
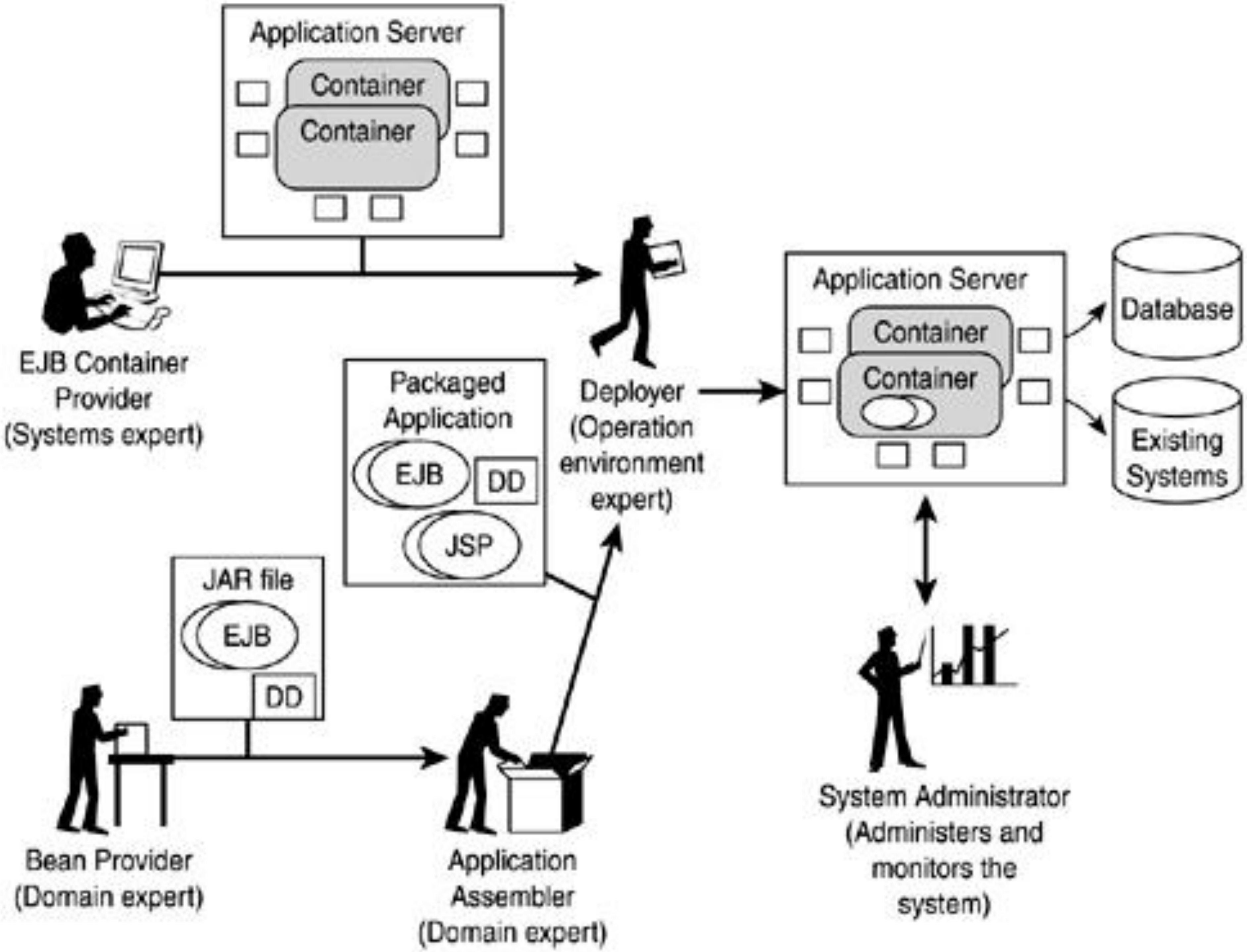
@stilkov

Disclaimer first

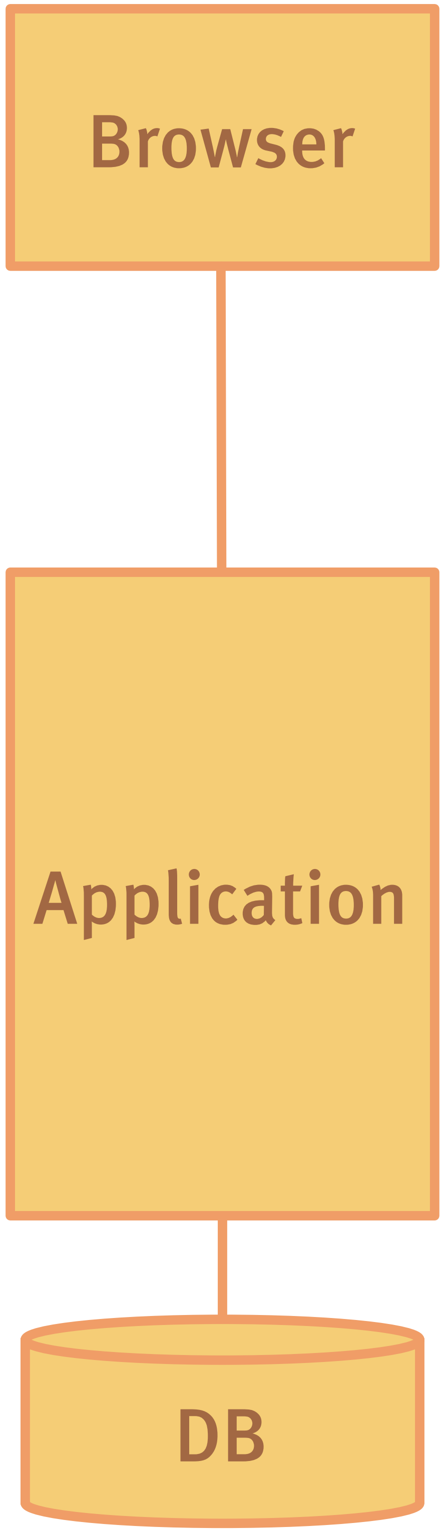
Let’s start with the enterprise

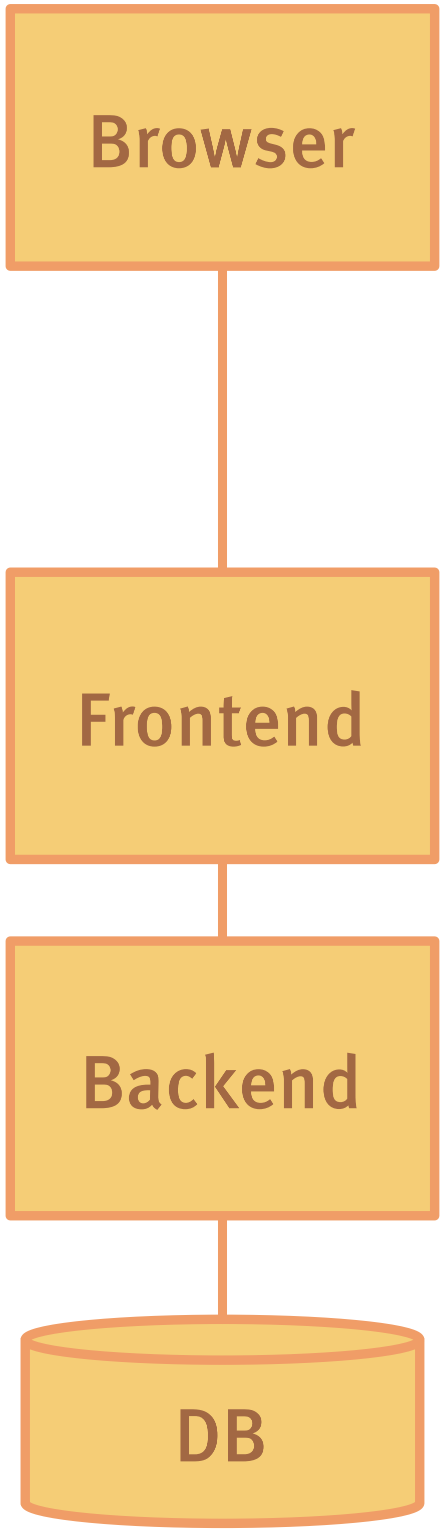


The J2EE(TM) 1.4 Tutorial, http://docs.oracle.com/cd/E17802_01/j2ee/j2ee/1.4/docs/tutorial-update2/doc/Overview7.html


Application Server
Container
Container
EJB Container Provider (Systems expert)
Packaged Application
EJB
DD
JSP
JAR file
EJB
DD
Deployer (Operation environment expert)
Application Server
Container
Container
Database
Existing Systems
Bean Provider (Domain expert)
Application Assembler (Domain expert)
System Administrator (Administers and monitors the system)

GỬI PHẢN HỒI, http://ejbvn.wordpress.com


Browser
Application
DB


Browser
Frontend
Backend
DB

Assumptions to be challenged

One single system

One single environment

Predictable load

Clear & distinct roles

Planned releases

Built because they have to be

Somewhat Limited Agility

Increased Desaster Potential

1 2 3

Cut Things into Pieces

Small, lightweight, focused apps

My favorite programmer’s story

Task: Read a file of text, determine the *n* most frequently used words, and print out a sorted list of those words along with their frequencies.

Donald Knuth

10-page literal
Pascal program,
including innovative
new data structure

Doug McIlroy

```
tr -cs A-Za-z '\n' |
tr A-Z a-z |
sort |
uniq -c |
sort -rn |
sed ${1}q
```

Dr. Drang, http://www.leancrew.com/all-this/2011/12/more-shell-less-egg/

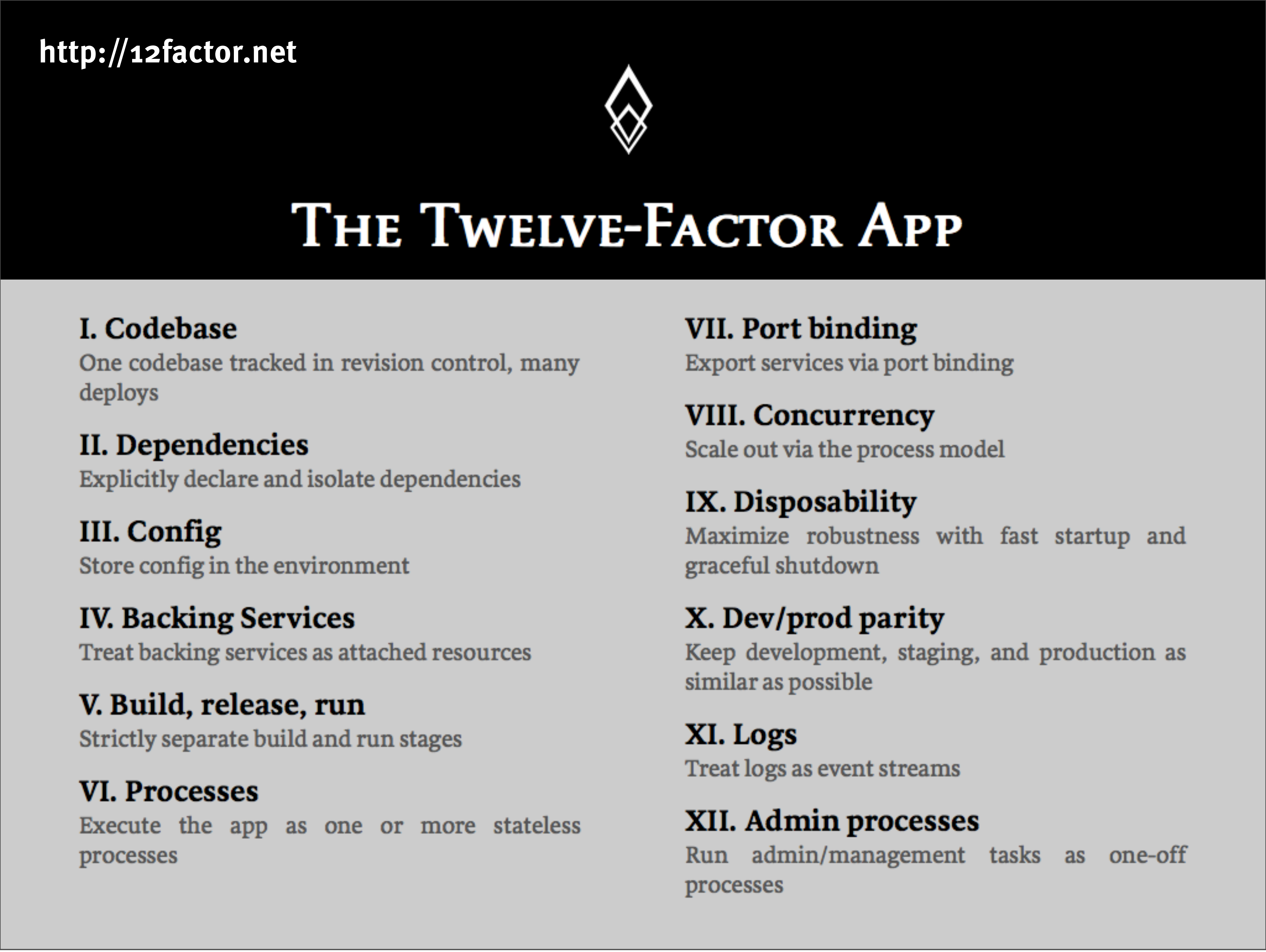
Small, lightweight, focused apps

Simple process run model

Back to building servers

Closer to the metal

http://12factor.net



The Twelve-Factor App

I. Codebase
One codebase tracked in revision control, many deploys

II. Dependencies
Explicitly declare and isolate dependencies

III. Config
Store config in the environment

IV. Backing Services
Treat backing services as attached resources

V. Build, release, run
Strictly separate build and run stages

VI. Processes
Execute the app as one or more stateless processes

VII. Port binding
Export services via port binding

VIII. Concurrency
Scale out via the process model

IX. Disposability
Maximize robustness with fast startup and graceful shutdown

X. Dev/prod parity
Keep development, staging, and production as similar as possible

XI. Logs
Treat logs as event streams

XII. Admin processes
Run admin/management tasks as one-off processes

Isolation and independence

Polyglotism

Built for replacement,
not for re-use

amazon.com®

FAQ

Press Release

Customer Experience

User Manual

Werner Vogels, http://www.allthingsdistributed.com/2006/11/working_backwards.html

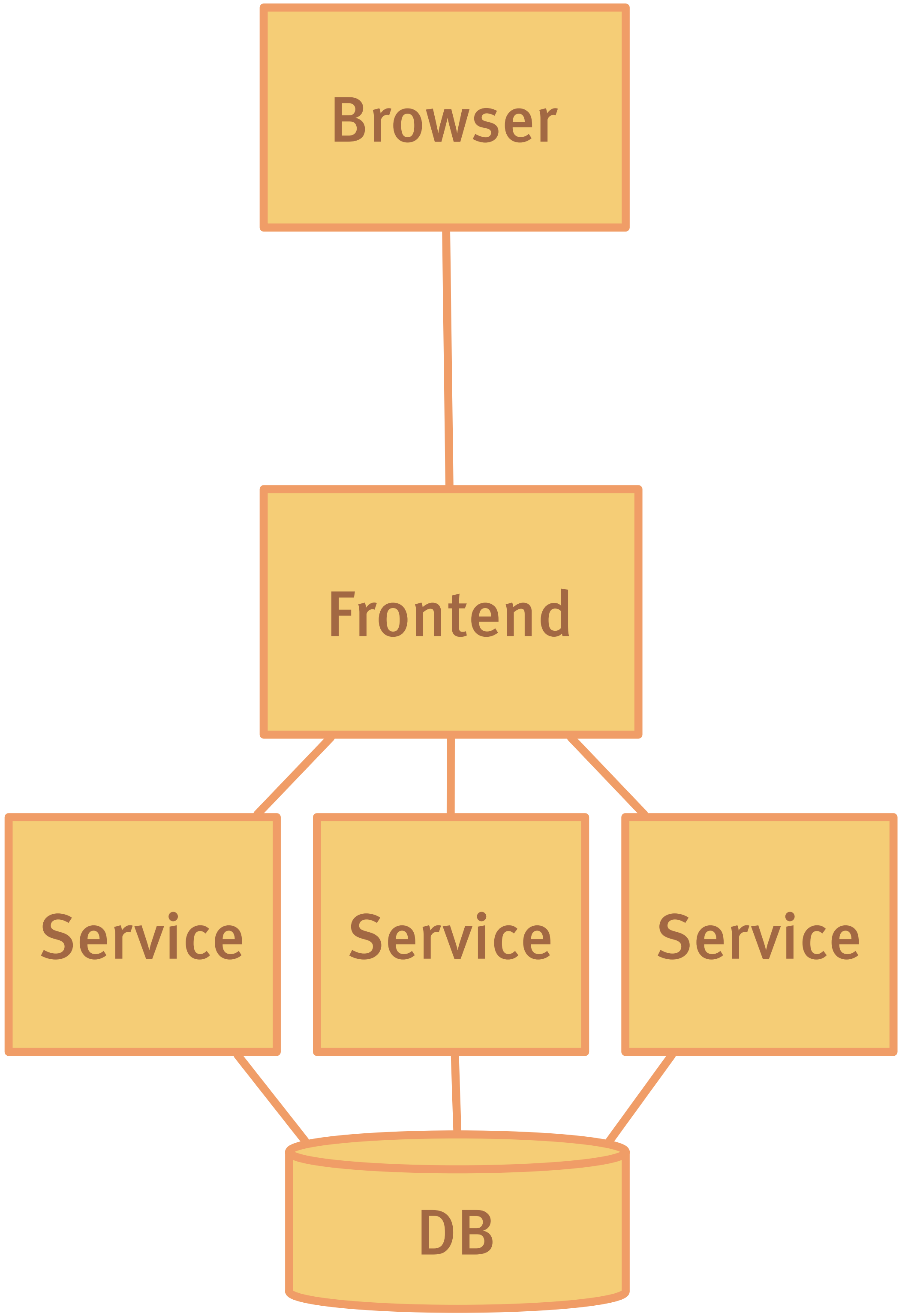
GROUPON®

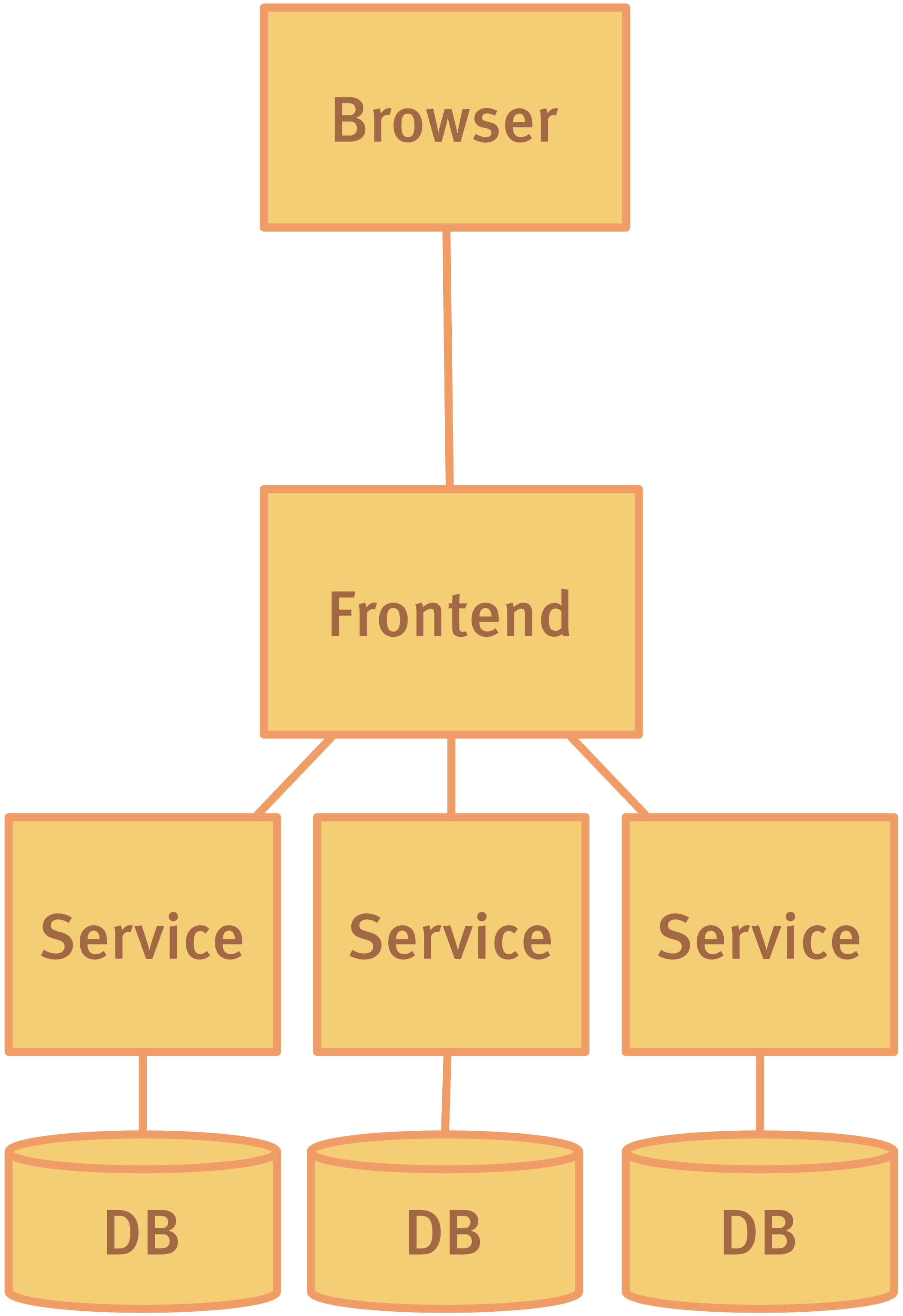
Dismantled monolith

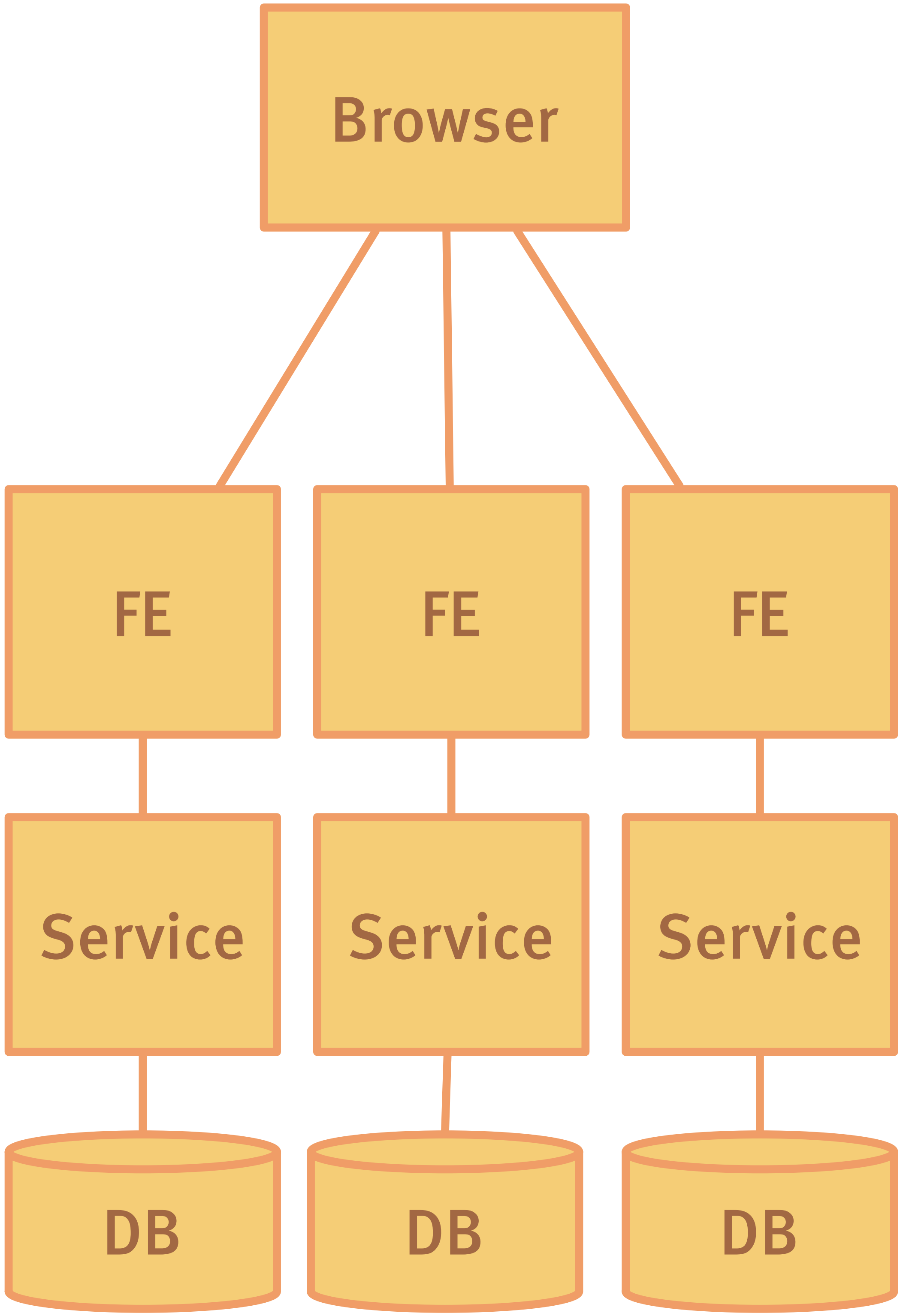
Backend & front-end services

(Re-Implementation in Node.js)

https://engineering.groupon.com/2013/misc/i-tier-dismantling-the-monoliths/


Browser
Frontend
Service
Service
Service
DB


Browser
Frontend
Service
Service
Service
DB
DB
DB


Browser
FE
FE
FE
Service
Service
Service
DB
DB
DB

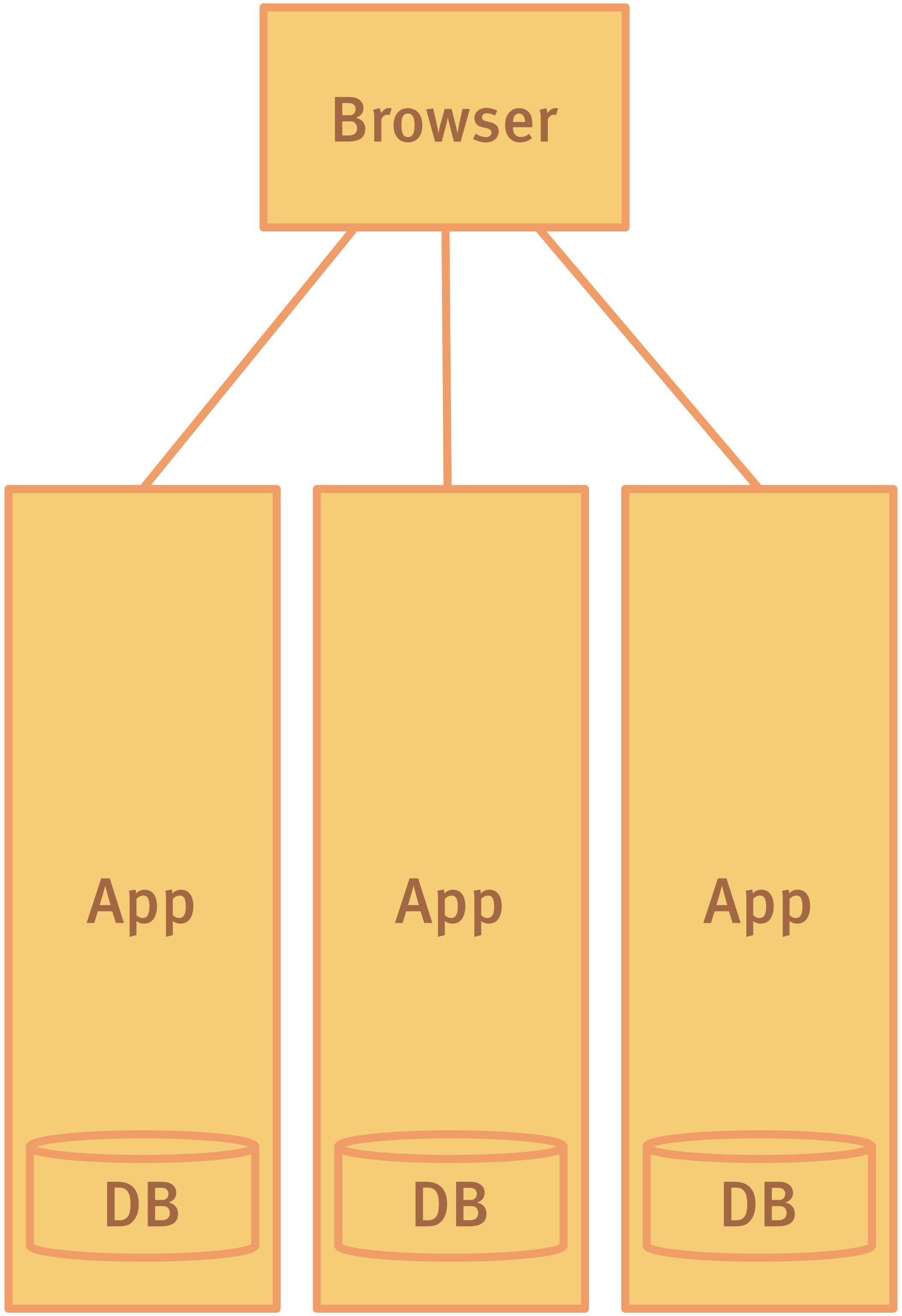
Organization ↔ Architecture

Independent “Verticals”

REST-based macro architecture

Individual micro architecture

Kraus, Steinacker, Wegner: Teile und Herrsche – Kleine Systeme für große Architekturen, http://bit.ly/152cXbx


Browser
App
App
App
DB
DB
DB

amazon.com®

Services as DNA

“Dogfooding”

Two-pizza rule

Steve Yegge, https://plus.google.com/110981030061712822816/posts/AaygmbzVeRq

Tools

Embedded Jetty

Play

Netty

vert.x

Modern Java EE containers

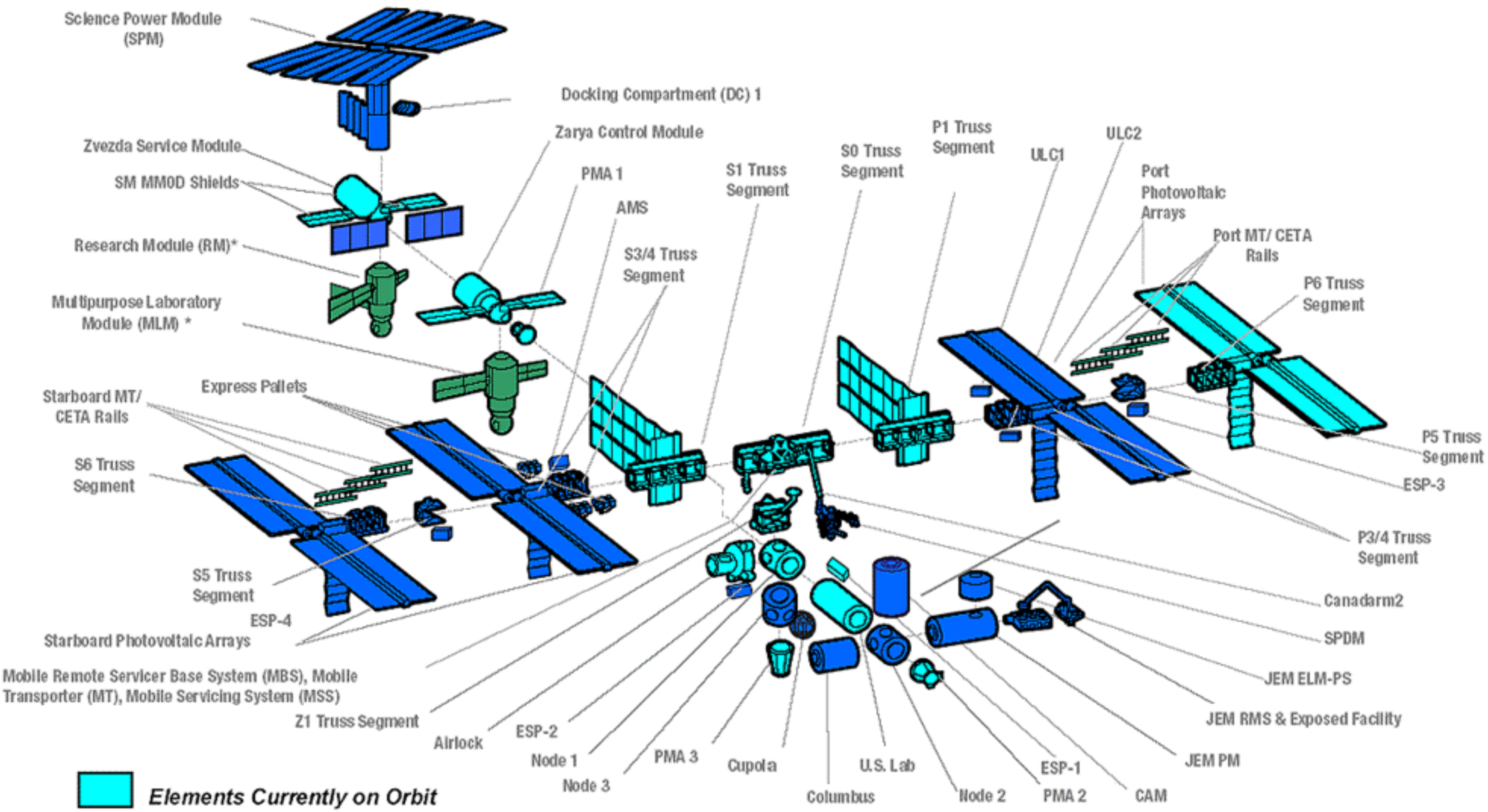
Akka

Node.js

DropWizard

ISS Technical Configuration

Endorsed by ISS Heads of Agency on July 23, 2004



■ *Elements Currently on Orbit*

🟦 *Elements Pending US Shuttle Launch*

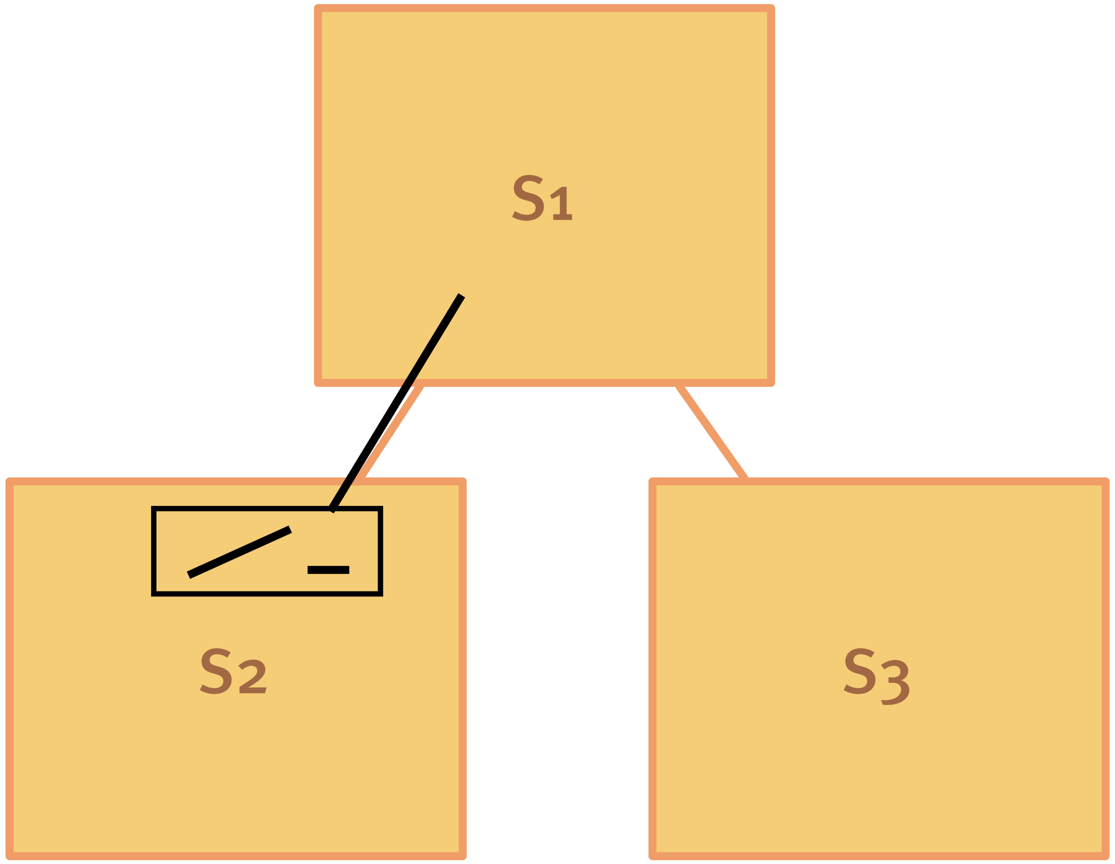
🟩 *Elements Pending Russian Launch*

•RM and MLM are included in Russian plans and launched on Russian vehicles

1 **2** 3

Integrate pieces to form a whole

Robust systems
Unreliable networks


S1
S2
S3

Tools

Akka

Hystrix

Finagle

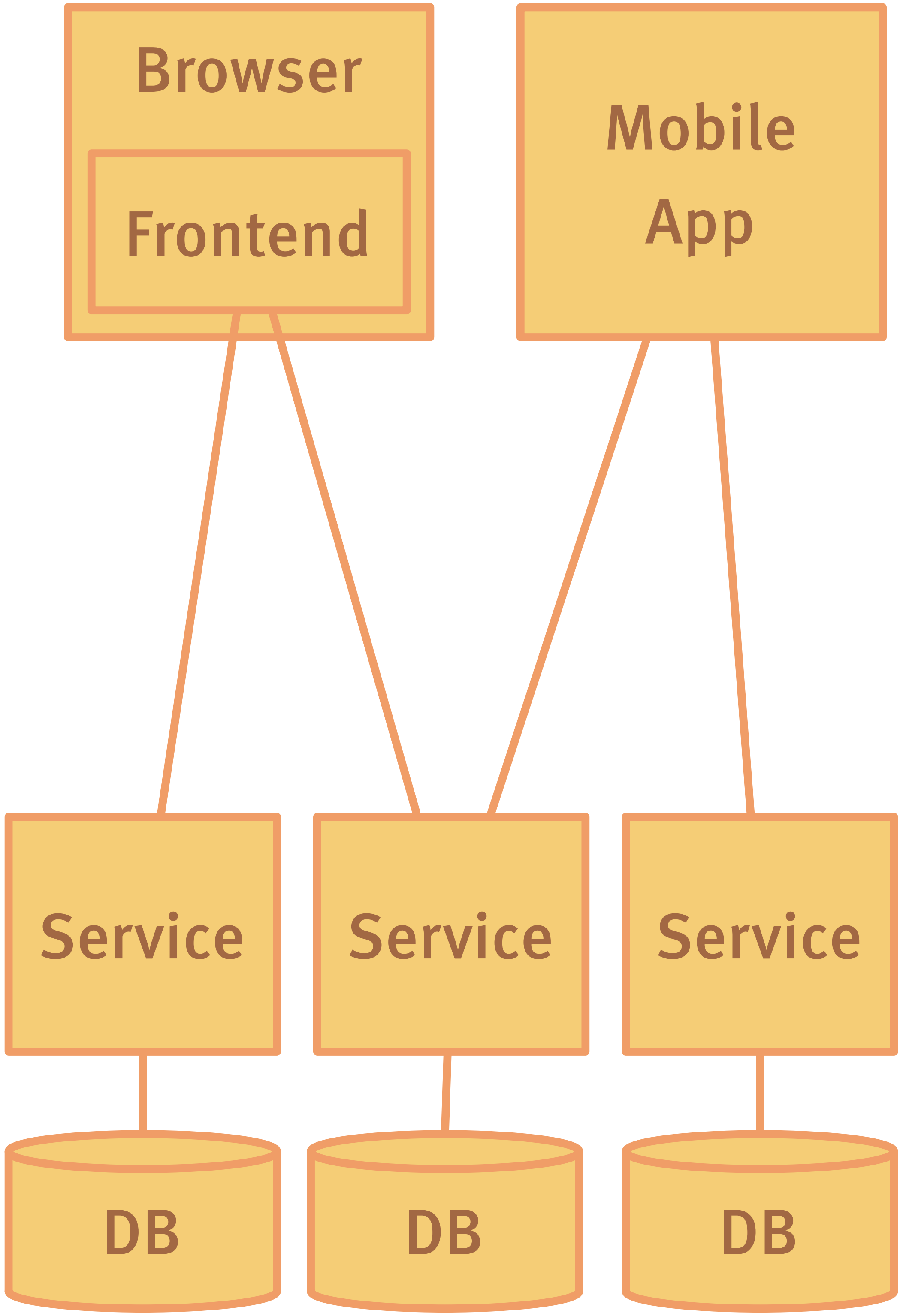
Smart aggregation

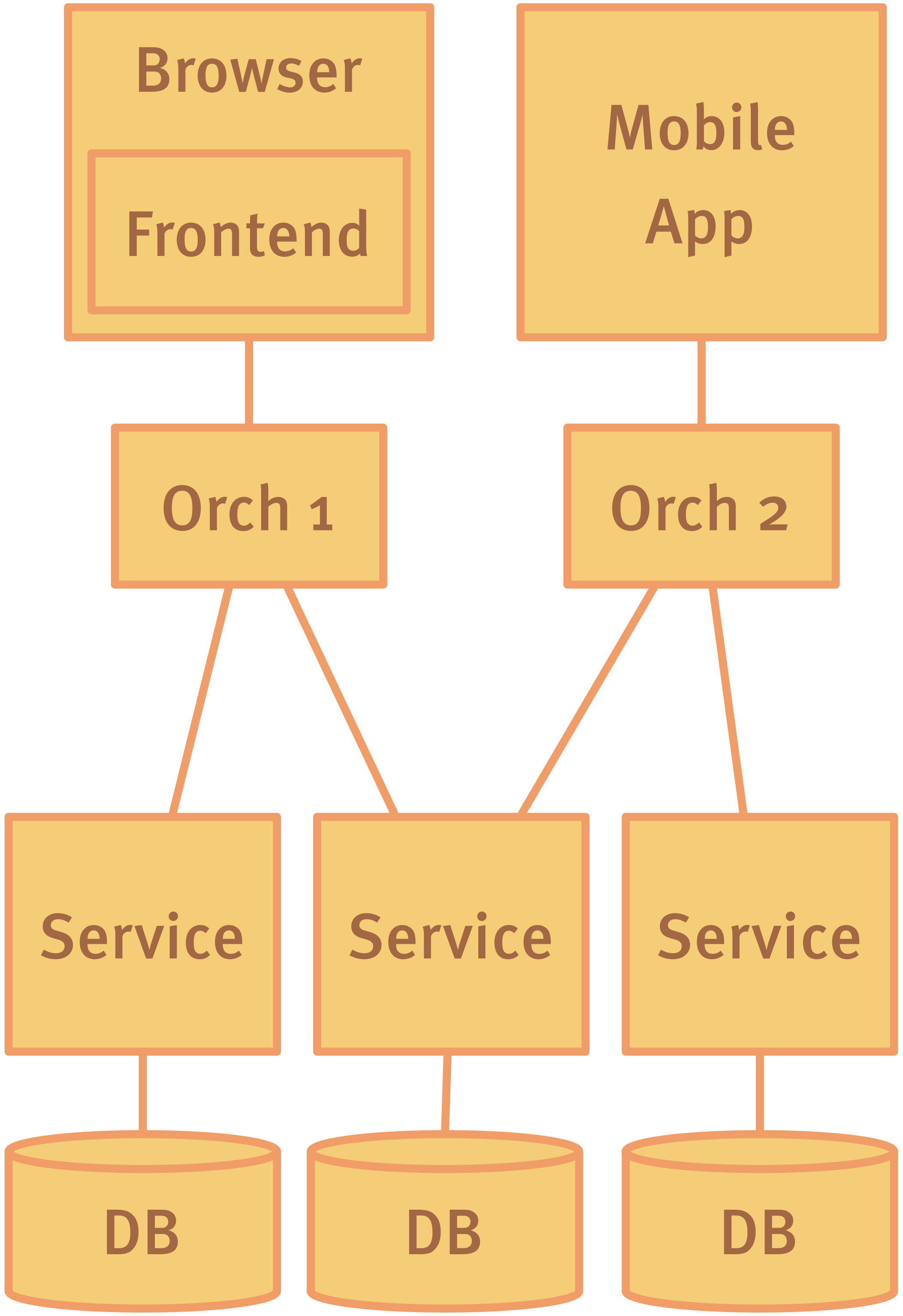
NETFLIX

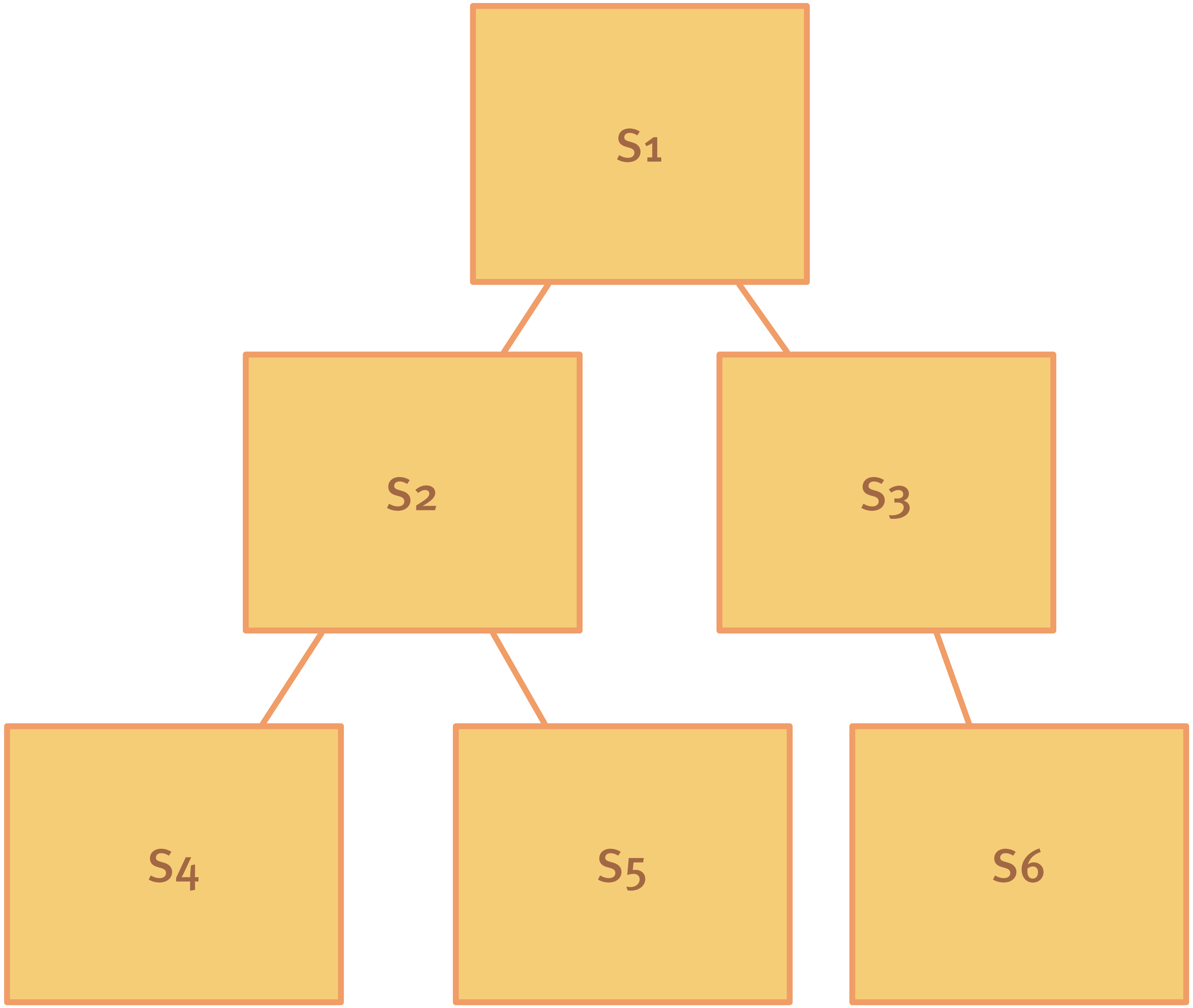
REST APIs

Client-specific orchestration

Streaming architecture


Browser
Frontend
Mobile App
Service
Service
Service
DB
DB
DB


Browser
Frontend
Mobile App
Orch 1
Orch 2
Service
Service
Service
DB
DB
DB



S1

S2

S3

S4

S5

S6

Tools

Storm

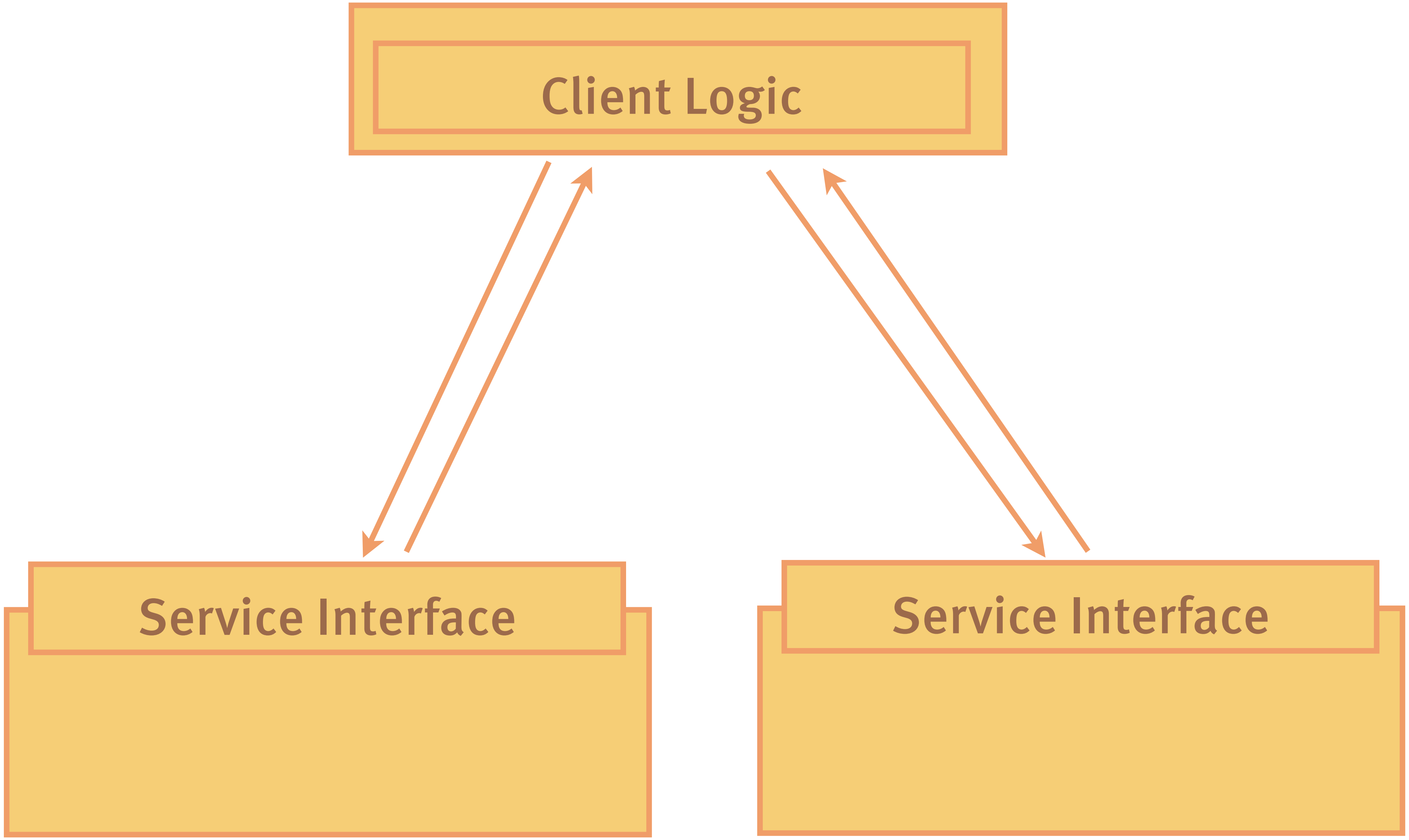
Rx

ql.io

spray

Play

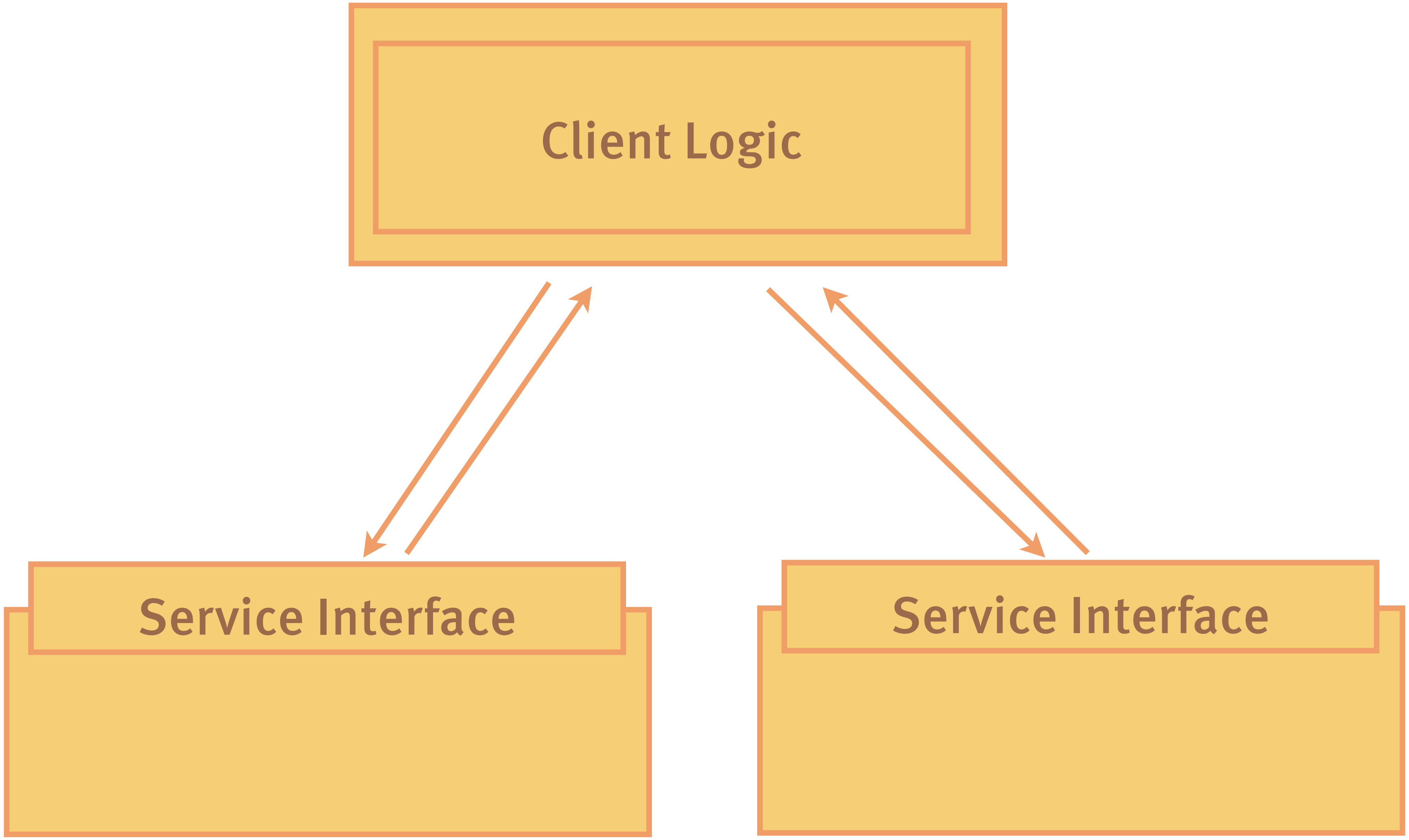
Web-native front-end integration

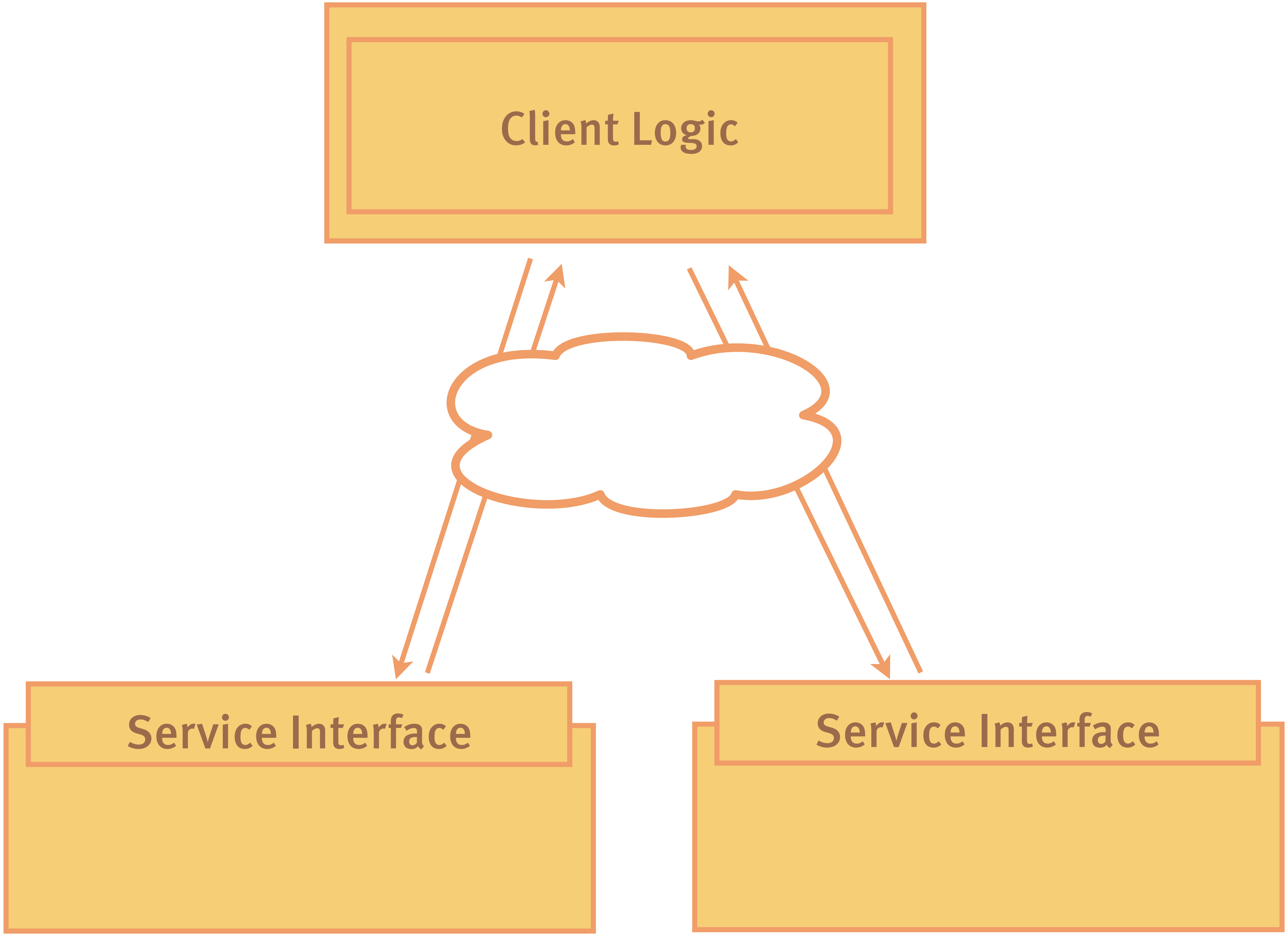


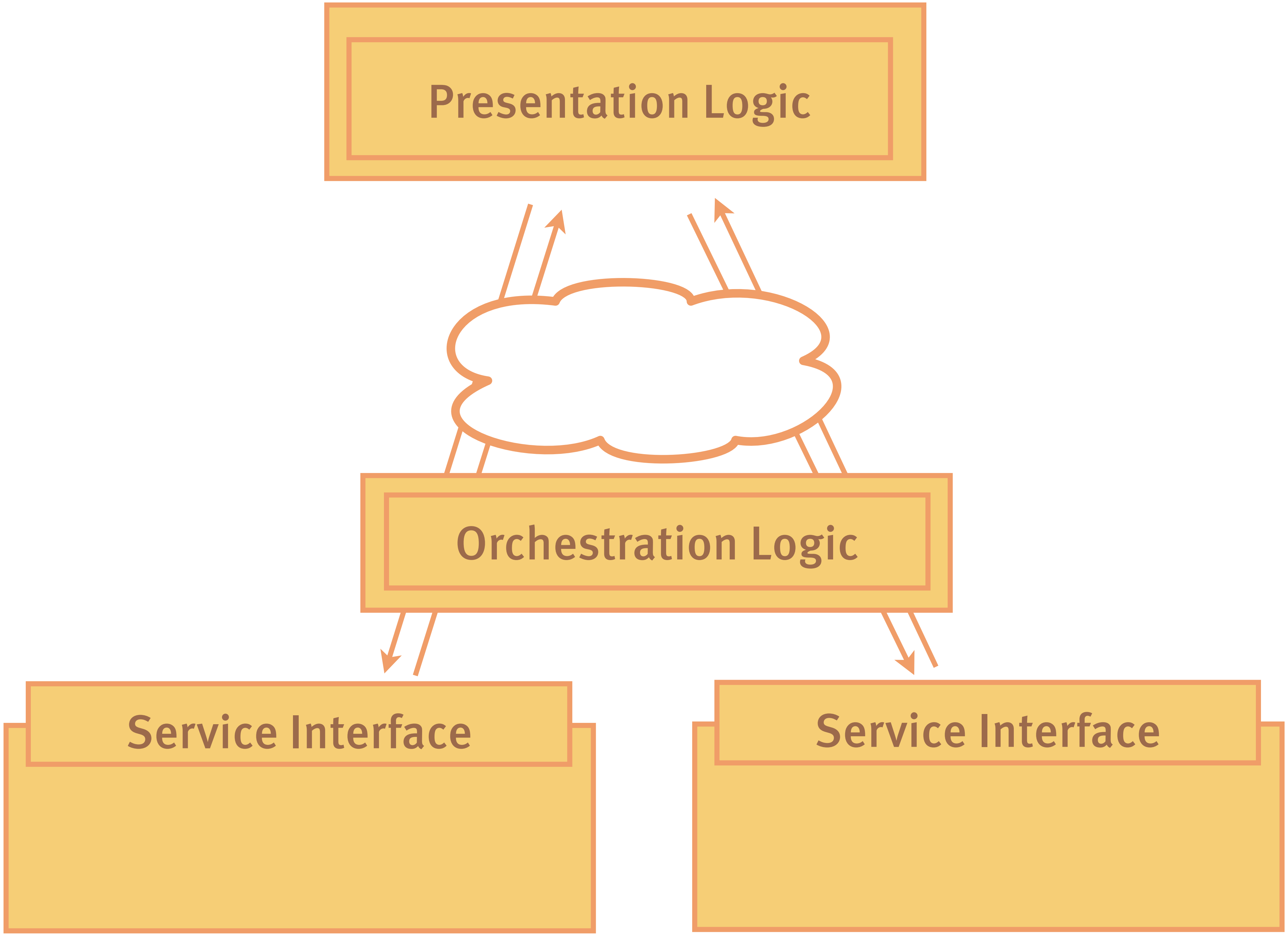
Client Logic

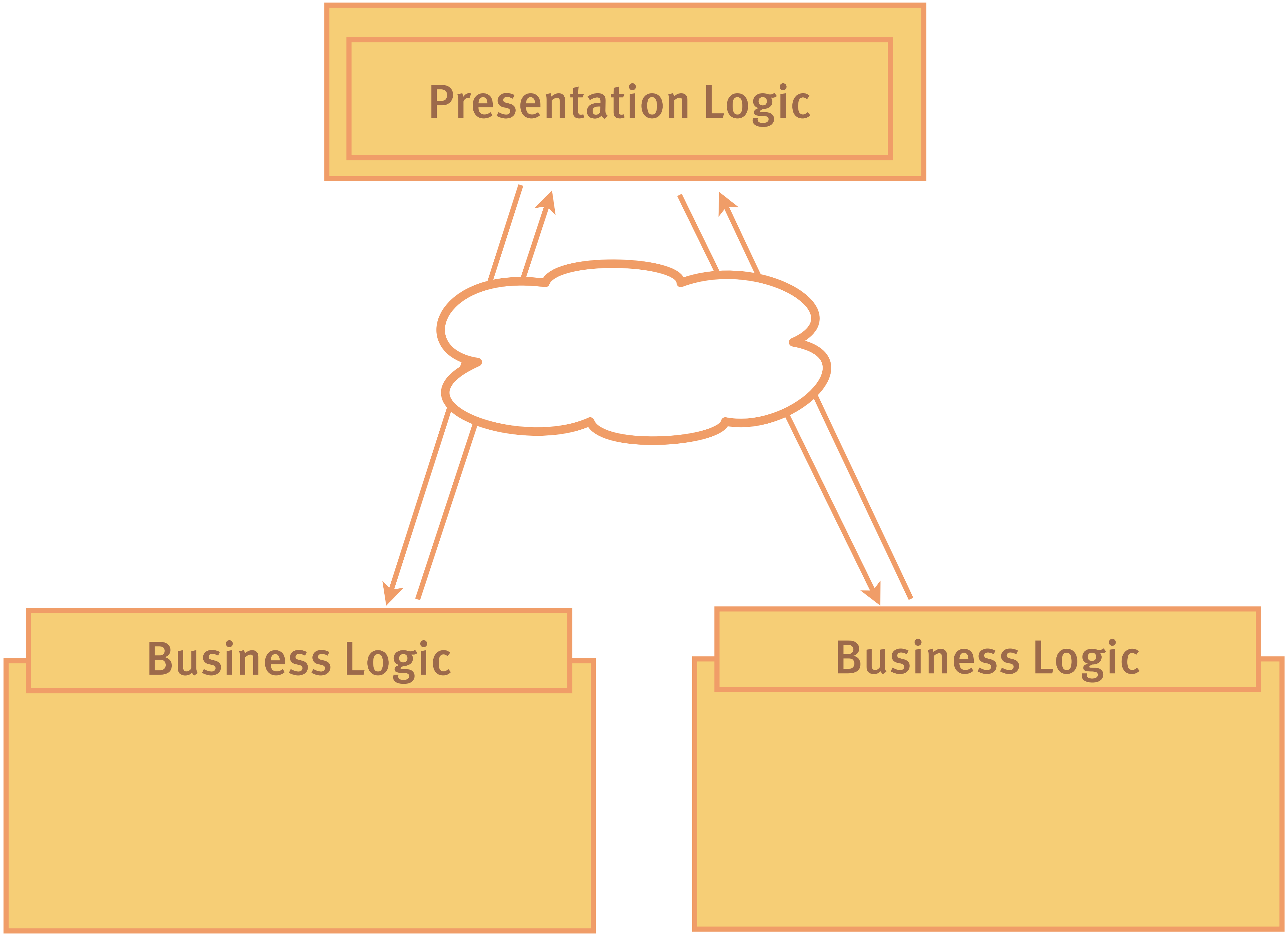
Service Interface

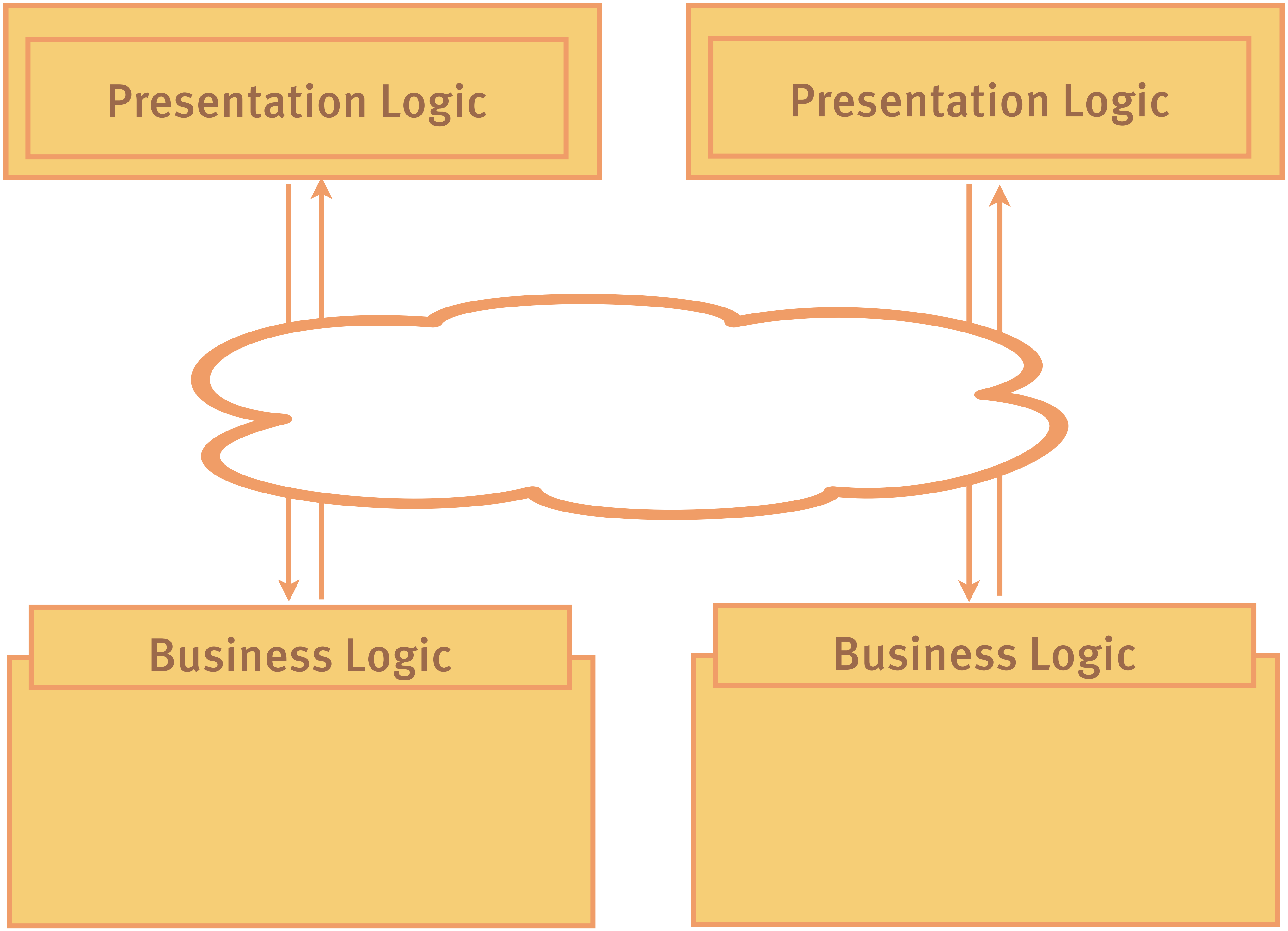
Service Interface


Client Logic
Service Interface
Service Interface


Client Logic
Service Interface
Service Interface


Presentation Logic
Orchestration Logic
Service Interface
Service Interface


Presentation Logic
Business Logic
Business Logic


Presentation Logic
Presentation Logic
Business Logic
Business Logic

GOV.UK

Simple semantic HTML

Open Data

Single domain – no portal

“Google as the homepage”

Polyglot environment

https://gds.blog.gov.uk/govuk-launch-colophon/

Tools & Approaches

MVC Web Frameworks

RESTful HTTP

ROCA

1 2 3

Change & run efficiently

Horizontal scaling

Virtualized operating system as container

Fully automated, repeatable deployment

Transparent monitoring

Etsy

Small changesets

Everyone deploys

Fast deploys

Change flags

Graphs/metrics

Fix fast/roll forward

Ross Snyder, http://www.slideshare.net/beamrider9/continuous-deployment-at-etsy-a-tale-of-two-approaches

NETFLIX

Fully cloud-based

Self-made PaaS

Simian Army

Adrian Cockcroft, http://www.infoq.com/presentations/Netflix-Architecture

Tools

logstash

Packer

Vagrant

Metrics

Puppet

Zipkin

docker

Chef

KUKA
KUKA
KUKA

Summary

Build smaller

Aggregate smartly

Merge run & change

Thank you!

Questions?

Comments?

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