

Software craftsmanship

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GoF : 24 patterns

Creational

Builder, Factory method, Abstract factory, Prototype, Singleton

Structural

Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy, Delegation

Behavioral

Chain of responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template method, Visitor



Organize your time

Get Things Done

Pomodoro

Eisenhower matrix



Organize your code

Version control system (VCS)

Branching : feature / release



Organize your learning

Monitor technology

POC

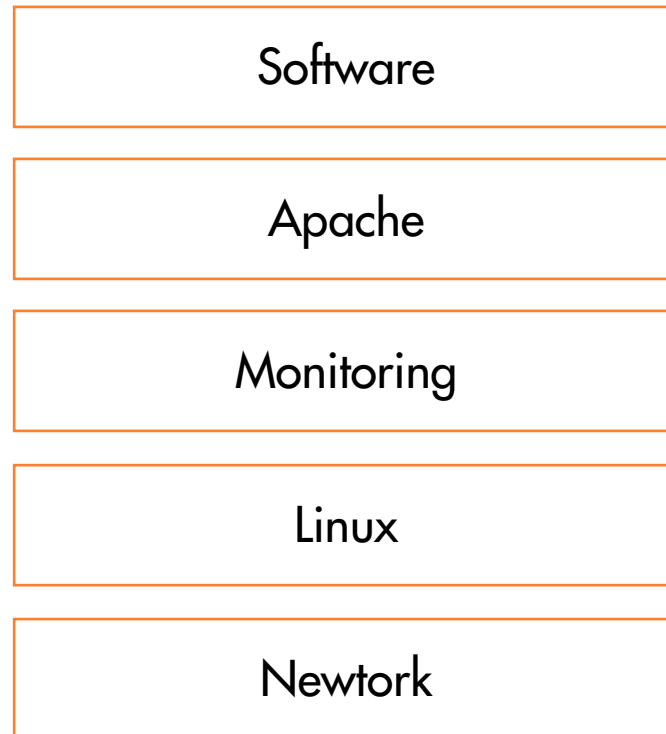
Coding dojo / Kata

Pair programming

IT in company



Software needs





Classic segregation

IT-Development

Develop software

Paid for new features

IT-Production

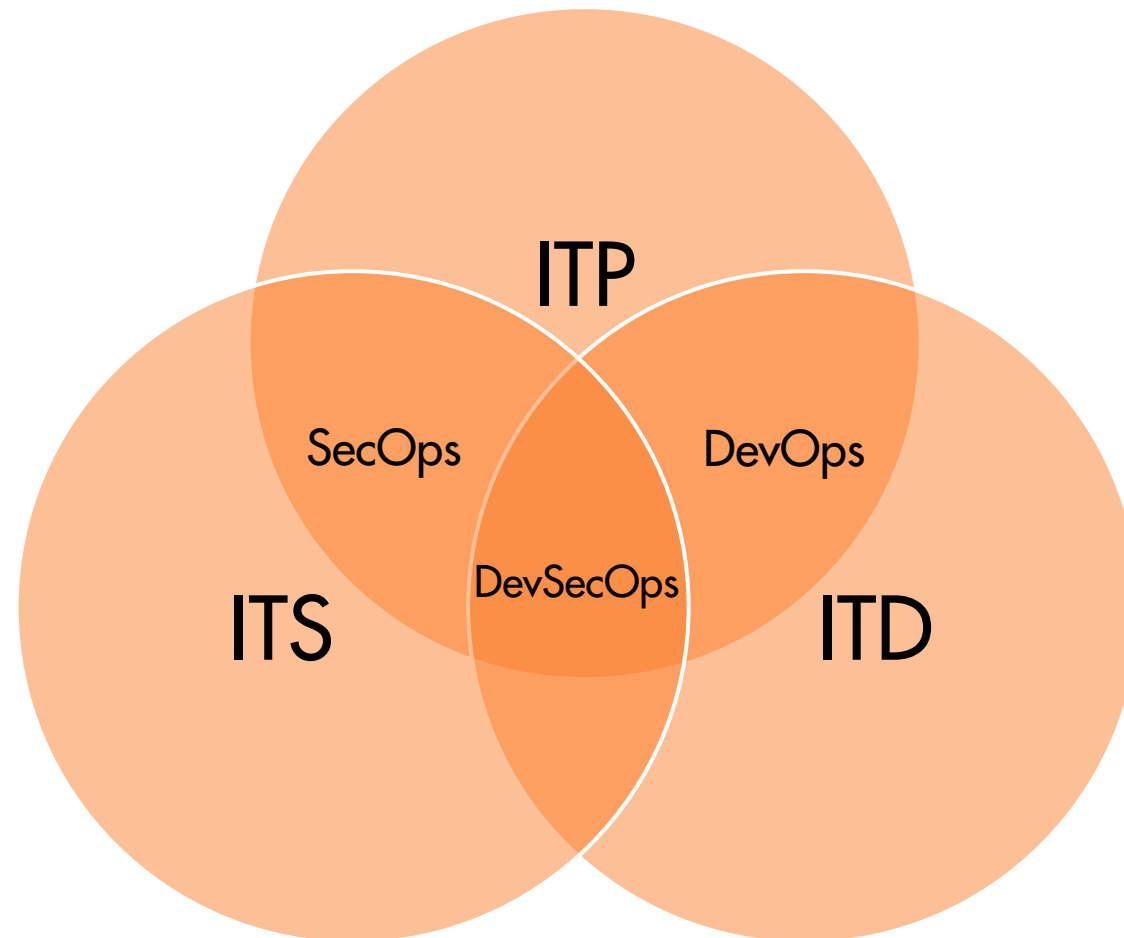
Manage software in production
Assist users

Paid for uptime

IT-System

Manage hardware and OS+
Handles DPR

Paid for stability, security



Assume failures



User error investigation

Call support (N1)

Use standard procedures (N1)

Check logs (N2)

Check configuration (N2)

Call development : Error in software (N3)



Help them using

- Error messages
- Cristal clear logs

Logs



Create new wish
Error returned

```
2020-03-31 09:48:26.1539|INFO|0HLULB1T307F0|WishController|Create : New wish for #433 by #ce4ed122-3cfd-47cf-a8ea-9d0b9d4c55f4 : My Mobility
2020-03-31 09:48:26.1575|WARN|0HLULB1T307F0|WishController|HasOneNotNull - Property not found : LinkedId
2020-03-31 09:48:26.1575|WARN|0HLULB1T307F0|WishController|Error returned from HasOneNotNull : Property not found : LinkedId
```



Logs

Use different levels : Trace, Debug, Info, Warning, Error, Fatal

Use an existing framework

There is never too much logs

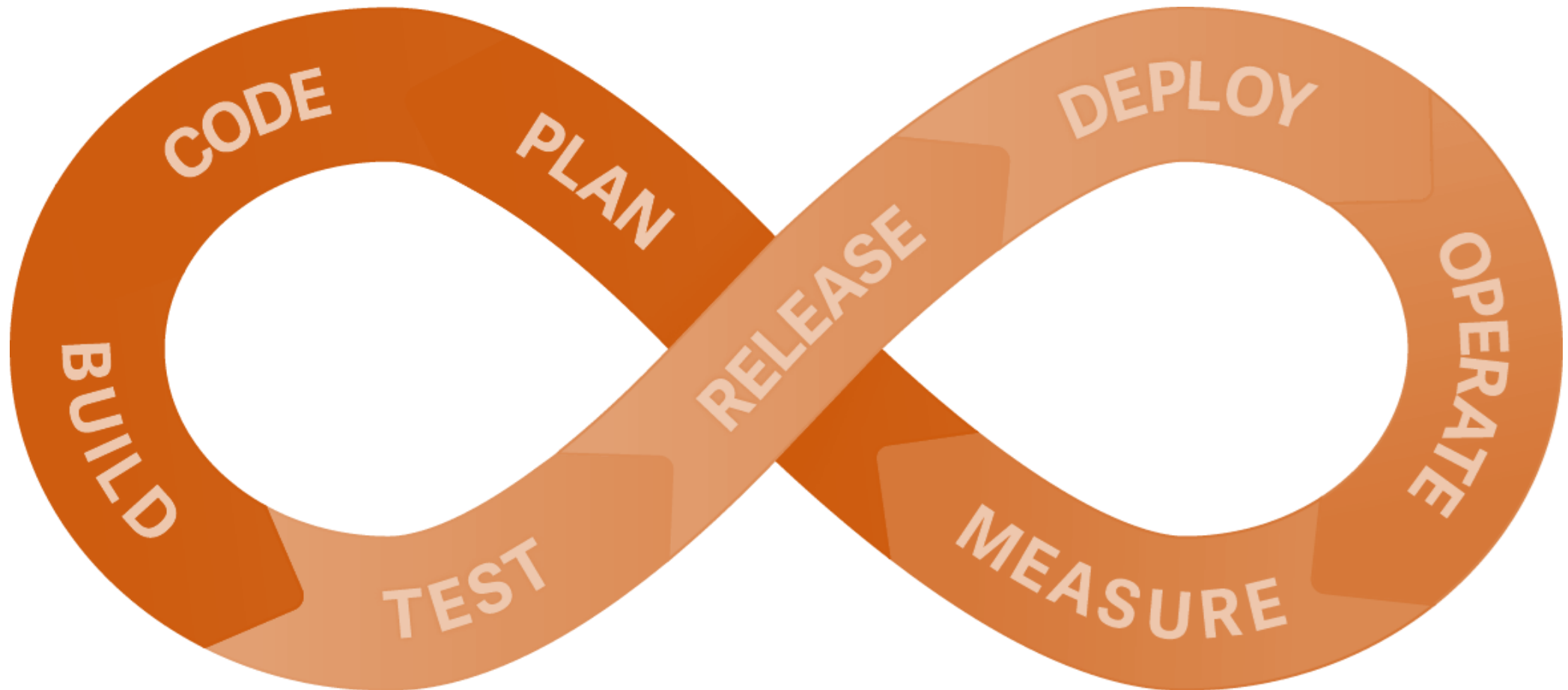
Logs



```
2020-03-31 09:48:29.5343|INFO|0HLULB1T307FQ|SkillController|Create : New skill is asked : Foo by #ce4ed122-3cfd-47cf-a8ea-9d0b9d4c55f4
2020-03-31 09:48:29.5485|INFO|0HLULB1T307FQ|SkillController|Execute Create
2020-03-31 09:48:29.6462|ERROR|0HLULB1T307FQ|SkillController|Exception in SafeRun : Internal error : Create
2020-03-31 09:48:29.6462|ERROR|0HLULB1T307FQ|SkillController|An error occurred while updating the entries. See the inner exception for details.
2020-03-31 09:48:29.6462|ERROR|0HLULB1T307FQ|SkillController|    at
Microsoft.EntityFrameworkCore.Update.ReaderModificationCommandBatch.ExecuteAsync(IRelationalConnection connection, CancellationToken cancellationToken)
    at Microsoft.EntityFrameworkCore.Update.Internal.BatchExecutor.ExecuteAsync(DbContext _, ValueTuple`2 parameters, CancellationToken cancellationToken)
    at Microsoft.EntityFrameworkCore.SqlServer.Storage.Internal.SqlServerExecutionStrategy.ExecuteAsync[TState,TResult](TState state, Func`4 operation, Func`4
verifySucceeded, CancellationToken cancellationToken)
    at Microsoft.EntityFrameworkCore.ChangeTracking.Internal.StateManager.SaveChangesAsync(IReadOnlyList`1 entriesToSave, CancellationToken cancellationToken)
    at Microsoft.EntityFrameworkCore.ChangeTracking.Internal.StateManager.SaveChangesAsync(Boolean acceptAllChangesOnSuccess, CancellationToken
cancellationToken)
    at Microsoft.EntityFrameworkCore.DbContext.SaveChangesAsync(Boolean acceptAllChangesOnSuccess, CancellationToken cancellationToken)
    at SkillRepository.Create(String userId, SkillDto item, String language) in /Repositories/SkillRepository.cs:line 191
    at AController`2.SafeRun[TResult](Func`2 handler, String caller)
2020-03-31 09:48:29.6462|ERROR|0HLULB1T307FQ|SkillController|Cannot insert the value NULL into column 'Name', table 'test-1.dbo.Skill'; column
does not allow nulls. INSERT fails.
The statement has been terminated.
2020-03-31 09:48:29.6462|ERROR|0HLULB1T307FQ|SkillController|    at System.Data.SqlClient.SqlCommand.<>c.<ExecuteDbDataReaderAsync>b__122_0(Task`1 result)
    at System.Threading.Tasks.ContinuationResultTaskFromResultTask`2.InnerInvoke()
    at System.Threading.ExecutionContext.RunInternal(ExecutionContext executionContext, ContextCallback callback, Object state)
--- End of stack trace from previous location where exception was thrown ---
    at System.Threading.Tasks.Task.ExecuteWithThreadLocal(Task& currentTaskSlot)
--- End of stack trace from previous location where exception was thrown ---
    at Microsoft.EntityFrameworkCore.Storage.Internal.RelationalCommand.ExecuteAsync(IRelationalConnection connection, DbCommandMethod executeMethod,
IReadOnlyDictionary`2 parameterValues, CancellationToken cancellationToken)
```



From dev to PROD





CI/CD Quesaco

Continuous : forming an unbroken whole; without interruption

integration :

The coordination of processes

delivery :

The action of delivering letters, packages ... babies

deployment :

The action of bringing resources into effective action



CI process goal

Validate code at each steps, for each developers

Confirm software stability (a minimum)

Create a delivery workflow

Avoid human interaction

Fail fast !

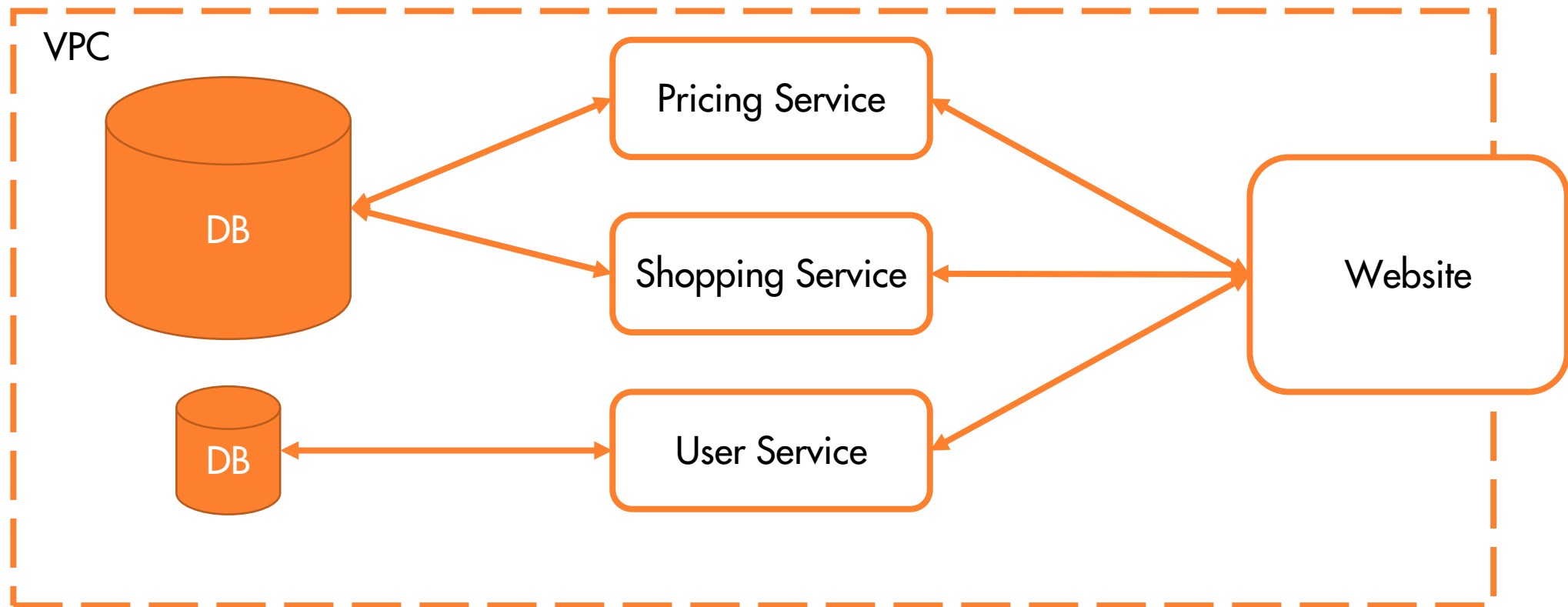


How to go live

1. Take a (development) ticket
2. Develop using BDD, TDD (and pair programming)
3. Push on VCS
4. Deploy on a test environment
5. Test your software
6. Everything is OK, then deploy on production

Eventually calculate metrics like coverage, technical debt...

A Software





Delivery process

1. Get sources
2. Add version
3. Build
4. Run tests
5. Publish components



Environments

DEV

PROD

PRE-PROD

UAT

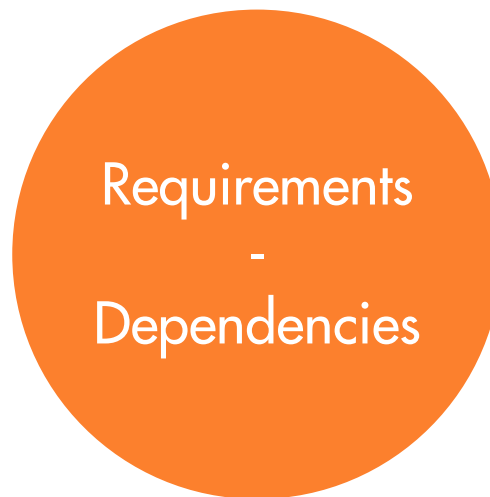
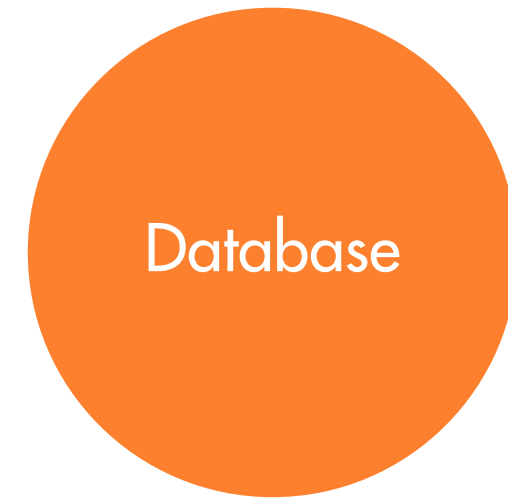


Create packages

1. Get sources
2. Add version
3. Build
4. Run tests
- 5. Create one package for each components**
6. Publish packages



An environment is





CI/CD Tools

Shell script !

Jenkins

Tavis CI

Bamboo

Teamcity



Demo : Teamcity

Software architectures



Monolith

Aka Single-tiered

Self-contained

Independant



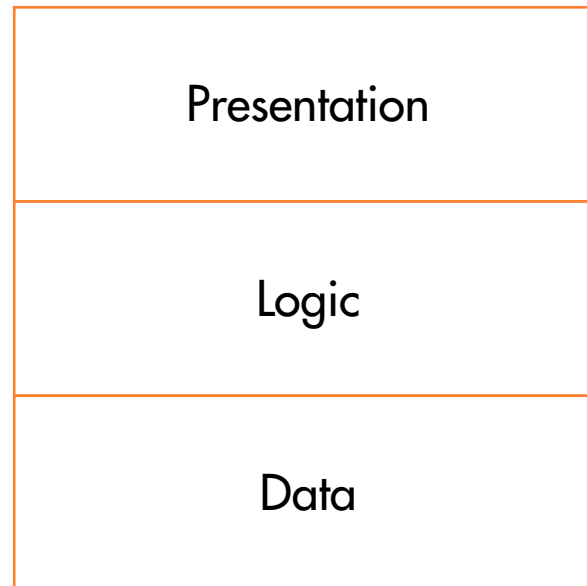
Multi-tier

Layer separation

Flexible

Reusable

3-tier



3-tier



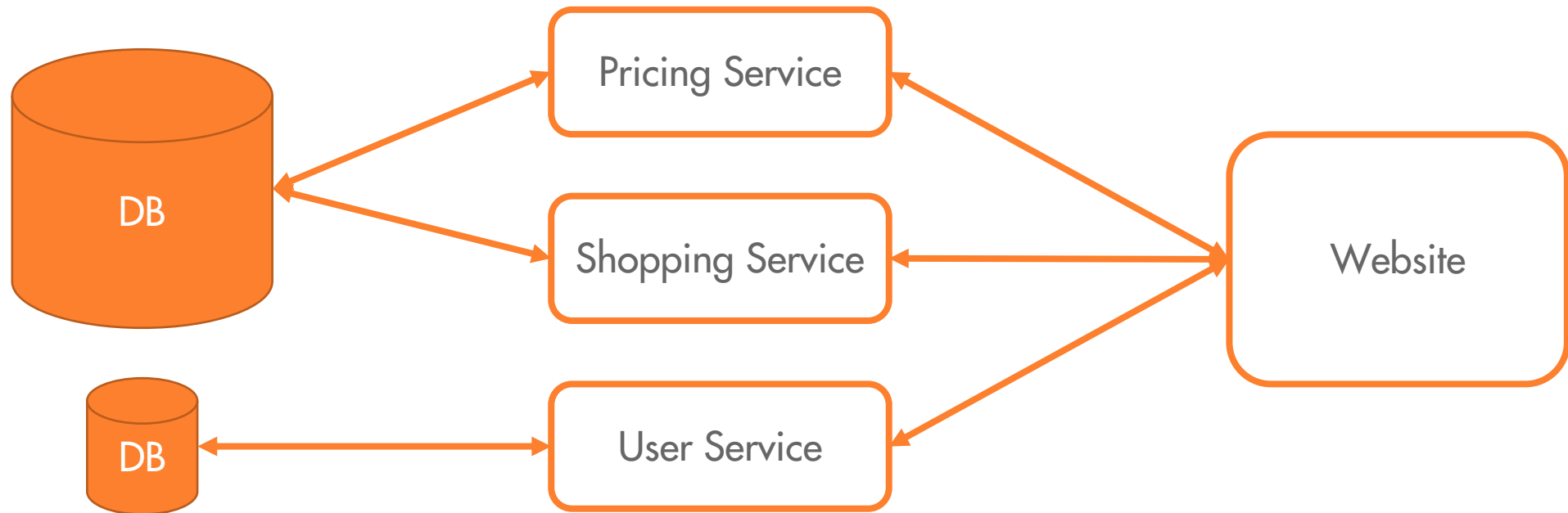


SOA : Service Oriented Architecture

A service :

- represents a business activity
- is self contained
- is a black box for its consumers
- may consist of other underlying services

An SOA Software





Communication



Local : IPC

File

Local - Bidirectional
One process at time for writing

Signal

Local - Unidirectional
Not used for data

Pipe

Local - Unidirectional

Shared Memory

Local - Bidirectional
One process at time for writing

Socket

Local or network – bidirectional
Synchronous

Message queue

Local or network – bidirectional
Asynchronous



Problem...

What if I send a message and the service is down ?

How to send a message which can be handled by multiples services, but only processed by one ?

How to handle a client deconnection ? A master ?



Message queueing (aka MQ)

It's like a mailbox

Increase TCP/IP features :

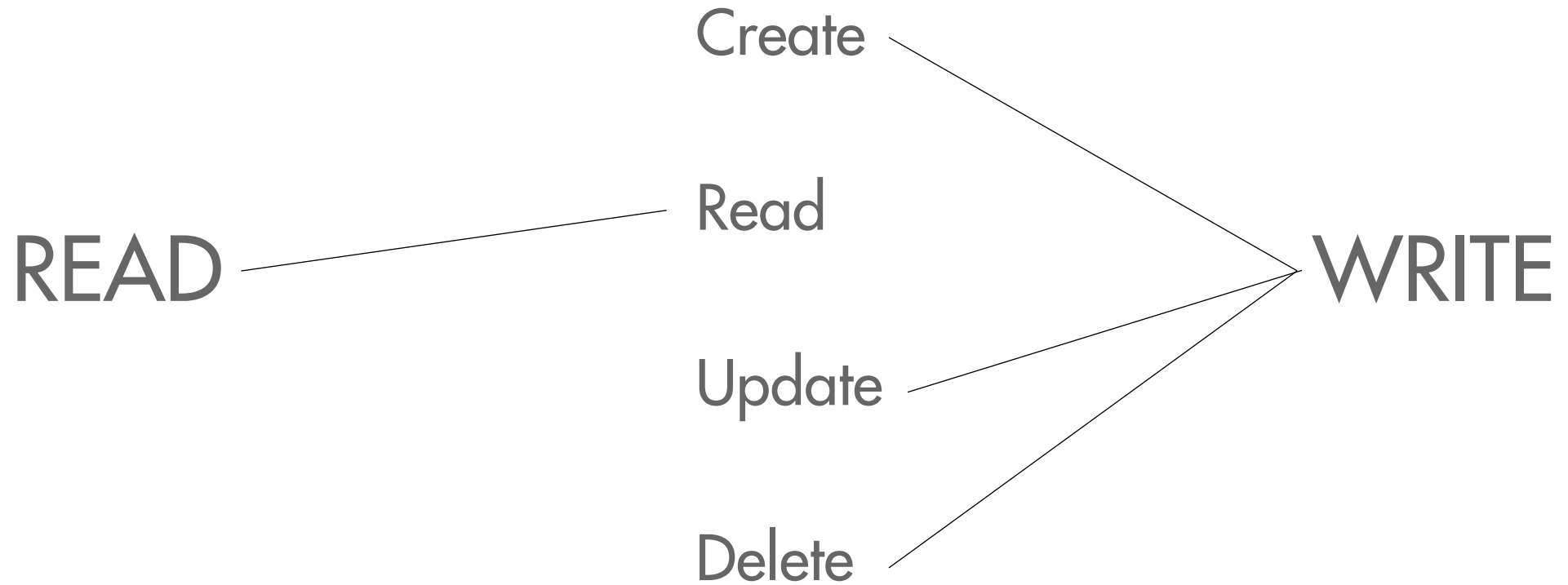
- Durability – purging : is the message saved ? What is its TTL ?
- Delivery policy : should the message be delivered once or more ?
- Security : which applications should have the message ?
- Notifications : the publisher can be notified when message is received

Implentations : Apache ActiveMQ, ØMQ, RabbitMQ, JMS,

API

04/06/2020

CRUD





REST

CRUD operations

Stateless

On HTTP/S

VERB	Request has body	Response has body	Safe	Idempotent	Cacheable
GET	Optional	YES	YES	YES	YES
POST	YES	YES	NO	NO	YES
PUT	YES	YES	NO	YES	NO
DELETE	NO	NO	NO	YES	NO



REST

`/api/users`

GET	POST	PUT	DELETE
Retrieve all users	Create a new user	N/A	Delete all users

`/api/users/{id}`

GET	POST	PUT	DELETE
Retrieve one user	N/A	Update user	Delete user



REST

```
/api/profile  
/api/profile/search  
/api/profile/{id}  
/api/profile/{id}/job  
/api/profile/{id}/skills  
/api/profile/{id}/username
```

```
Job{  
    id                integer($int32)  
    company           string  
    beginDate         string($date-time)  
    endDate           string($date-time)  
    title             string  
    description        string  
    errorMessage      string  
}
```

```
/api/opportunity  
/api/opportunity/{id}  
/api/opportunity/{id}/profile  
/api/opportunity/{id}/profile/{profileId}
```



REST

GET /api/profile/47/job

```
[
  {
    "id": 22,
    "company": "Crafty",
    "beginDate": "2017-03",
    "title": "CTO",
    "description": "Conception d'un outil d'aide à la décision RH..."
  }, {
    "id": 23,
    "company": "Margoconseil",
    "beginDate": "2013-09",
    "endDate": "2017-02",
    "title": "Knowledge Management",
    "description": "Création d'un pôle dédié à l'apprentissage du développement..."
  }, {
    "id": 24,
    "company": "SGCIB - CTT",
    "beginDate": "2012-04",
    "endDate": "2013-09",
    "title": "Développeur",
    "description": "Intégration des produits de taux et des dérivés de taux..."
  }, {
    "id": 25,
    "company": "HSBC - GBM",
    "beginDate": "2010-02",
    "endDate": "2012-03",
    "title": "Développeur",
    "description": "Conception d'un outil de trading basé sur une architecture SOA"
  }
]
```



REST

PUT /api/profile/47/job/22

```
{  
  "company": "Crafty",  
  "beginDate": "2017-03",  
  "title": "Développeur",  
  "description": "Conception d'un outil de cartographie des compétences."  
}
```

```
{  
  "company": "22",  
  "company": "Crafty",  
  "beginDate": "2017-03",  
  "title": "Développeur",  
  "description": "Conception d'un outil de cartographie des compétences."  
}
```

POST /api/profile/47/job

```
{  
  "company": "Crafty",  
  "beginDate": "2017-03",  
  "title": "Développeur",  
  "description": "Conception d'un outil de cartographie des compétences."  
}
```




OpenData – OpenAPI

Free to use, reuse, and redistribute

Lots of companies : GAFAM, RATP, gouvernements ...

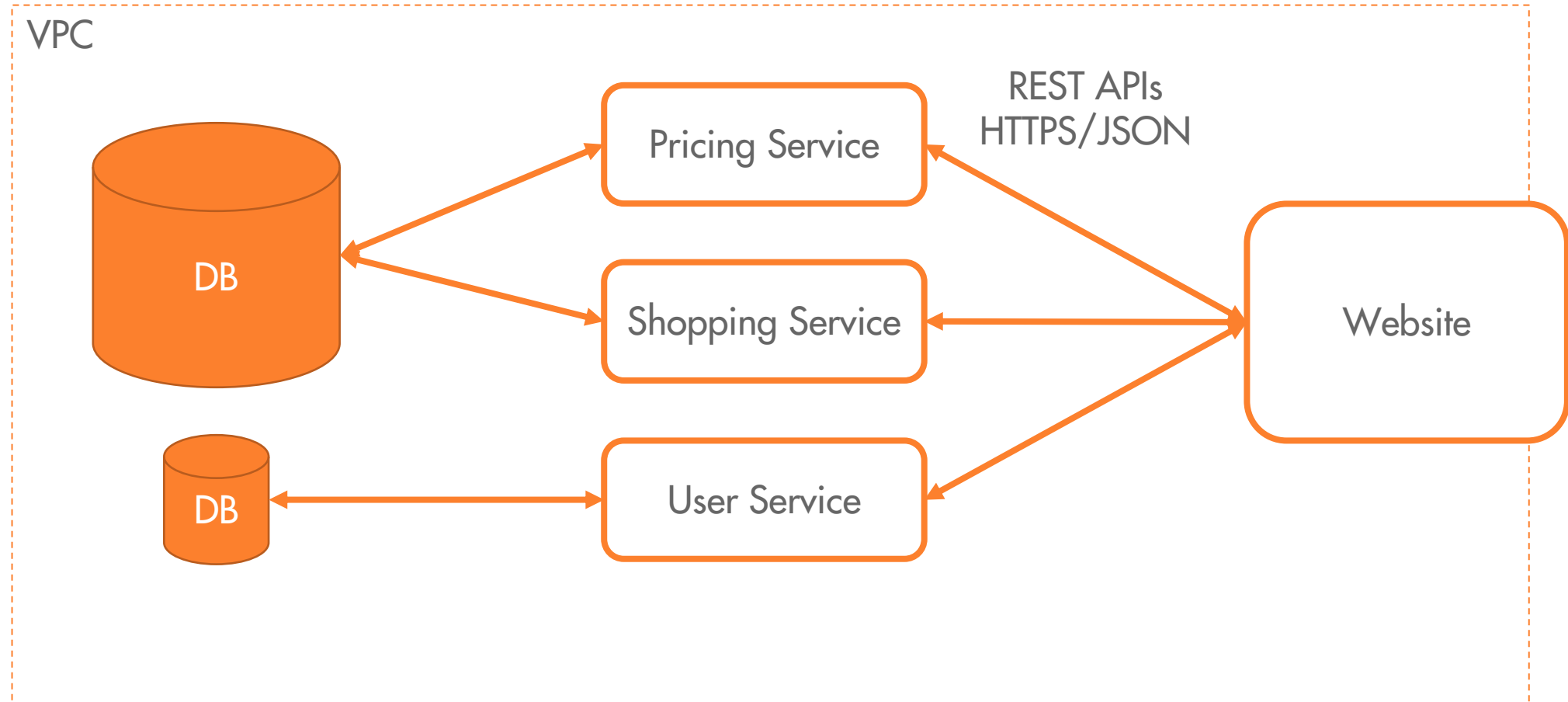
Lots of domains : genetic, chemical, geographic, justice ...

Swagger

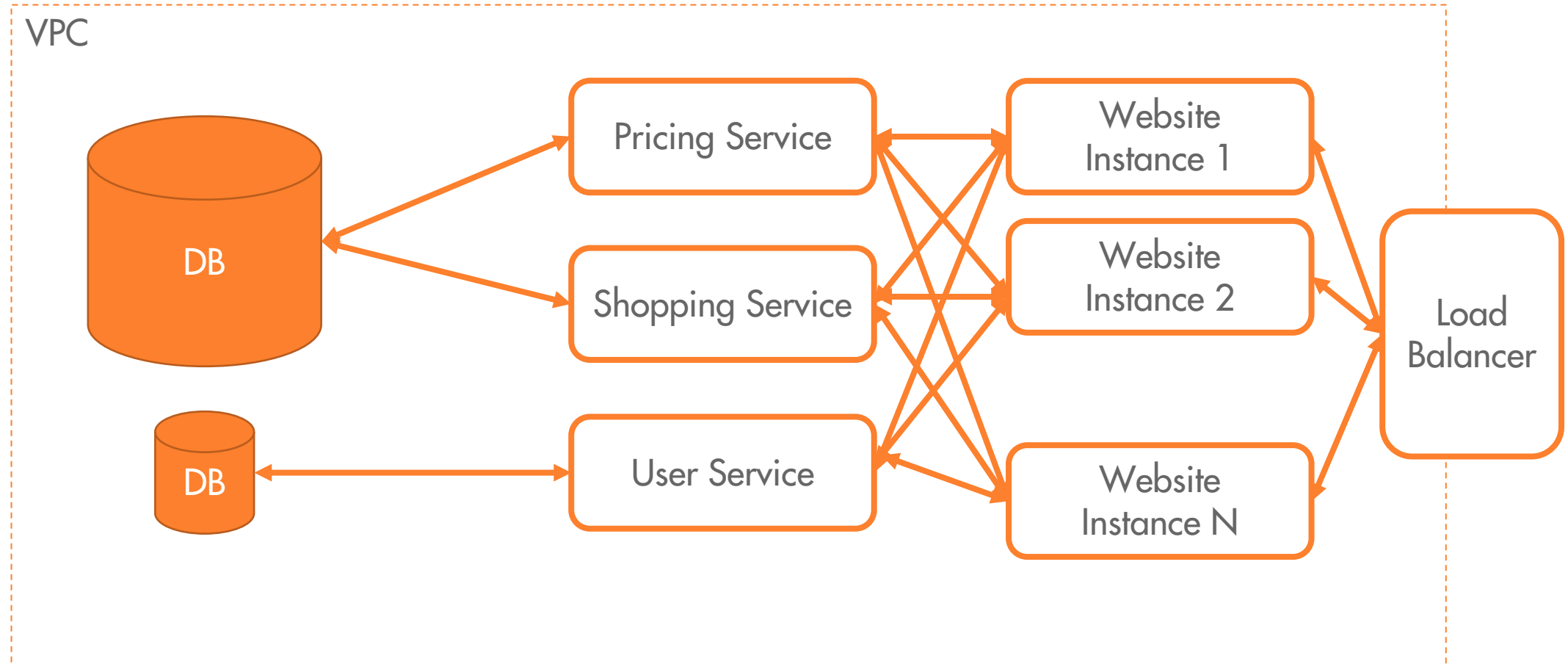


Let's go further

An SOA Software



An SOA Software



But there is still a problem...



The current state problem

What did my user ?

How can I guaranty it ?

Can I prove it ?

So let's think events !



Events afterall

Item Added

Item removed

Payment received

Order shipped

Item added : book

Payment received

Order shipped



Events afterall

Item Added

Item removed

Payment received

Order shipped

Item added : book

Item added : DVD

Item removed : DVD

Payment received

Order shipped



Event sourcing

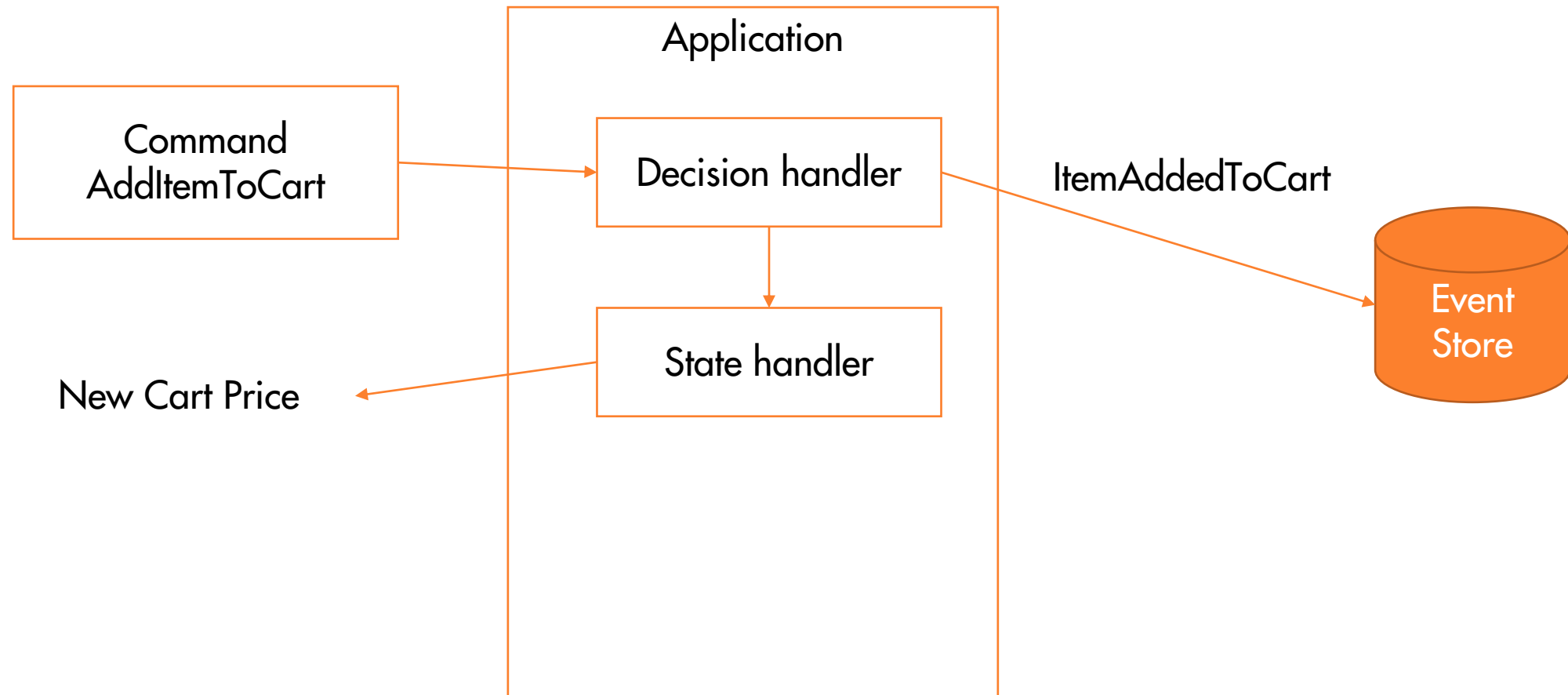
Command : user intention => AddItemToCart

Event : happened in the past => ItemAddedToCart
immutable

Event store

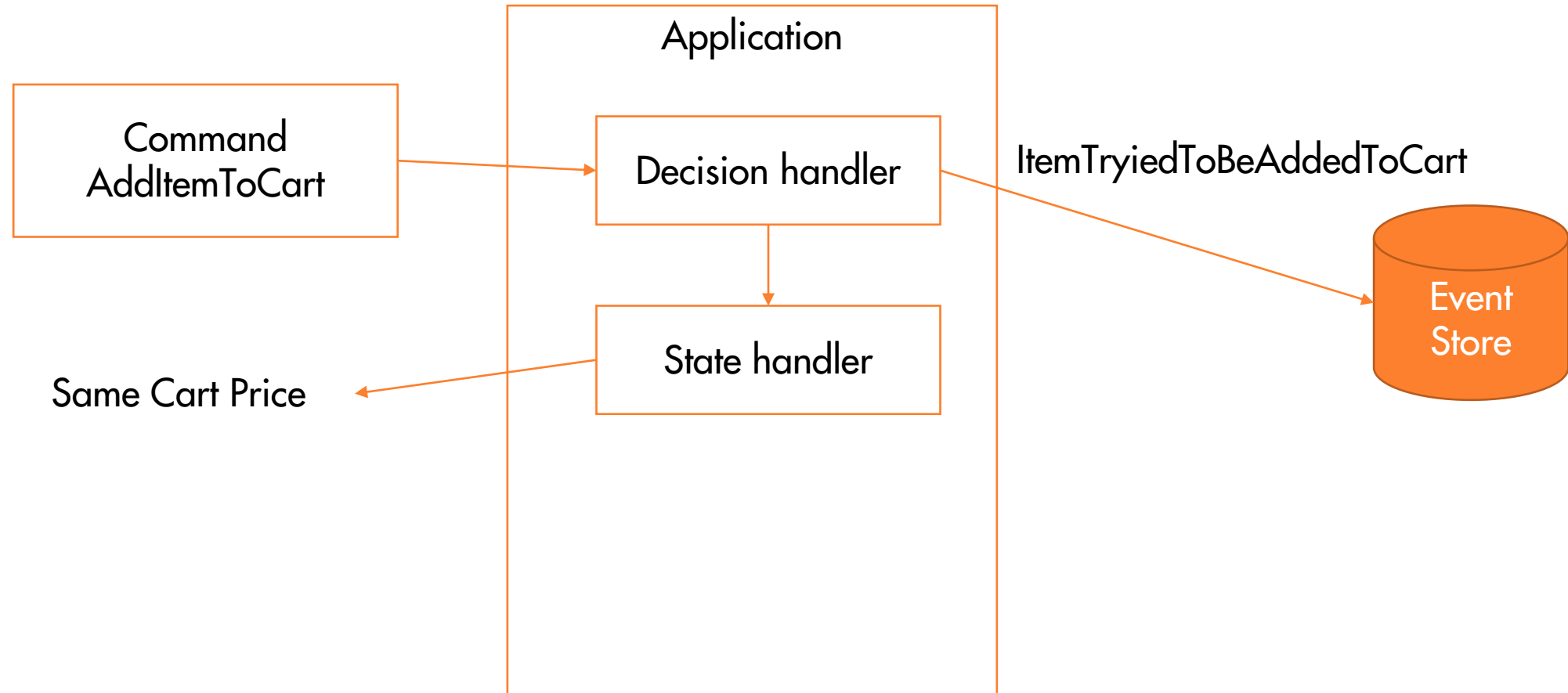


Event sourcing





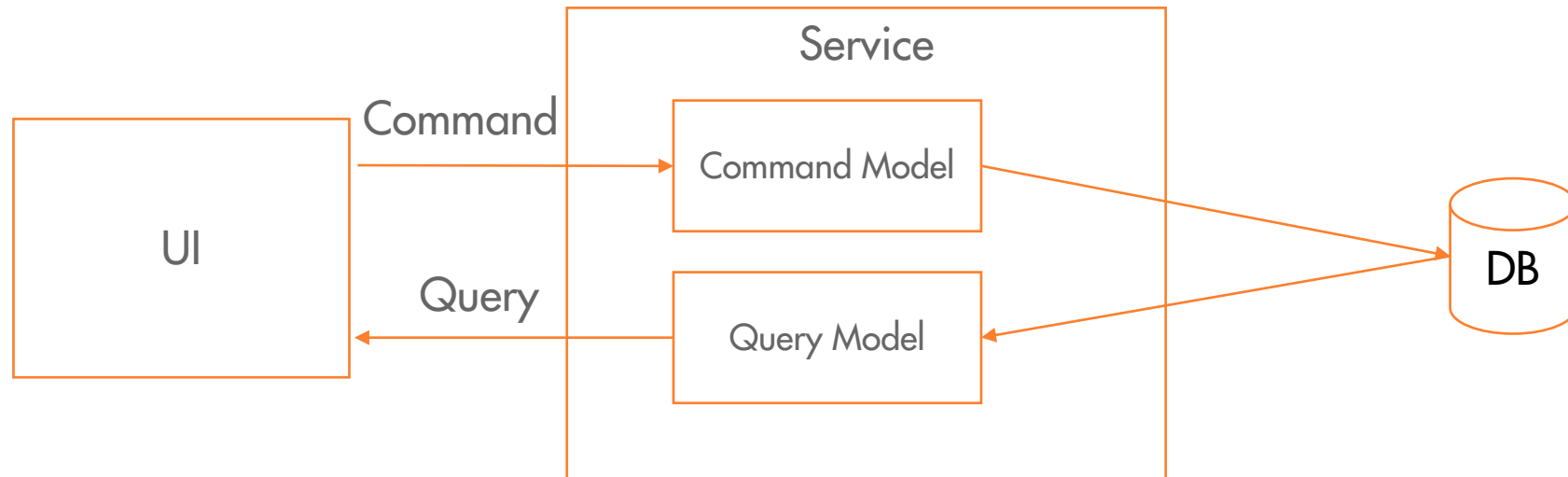
Event sourcing





CQRS

Command and Query Responsibility Segregation

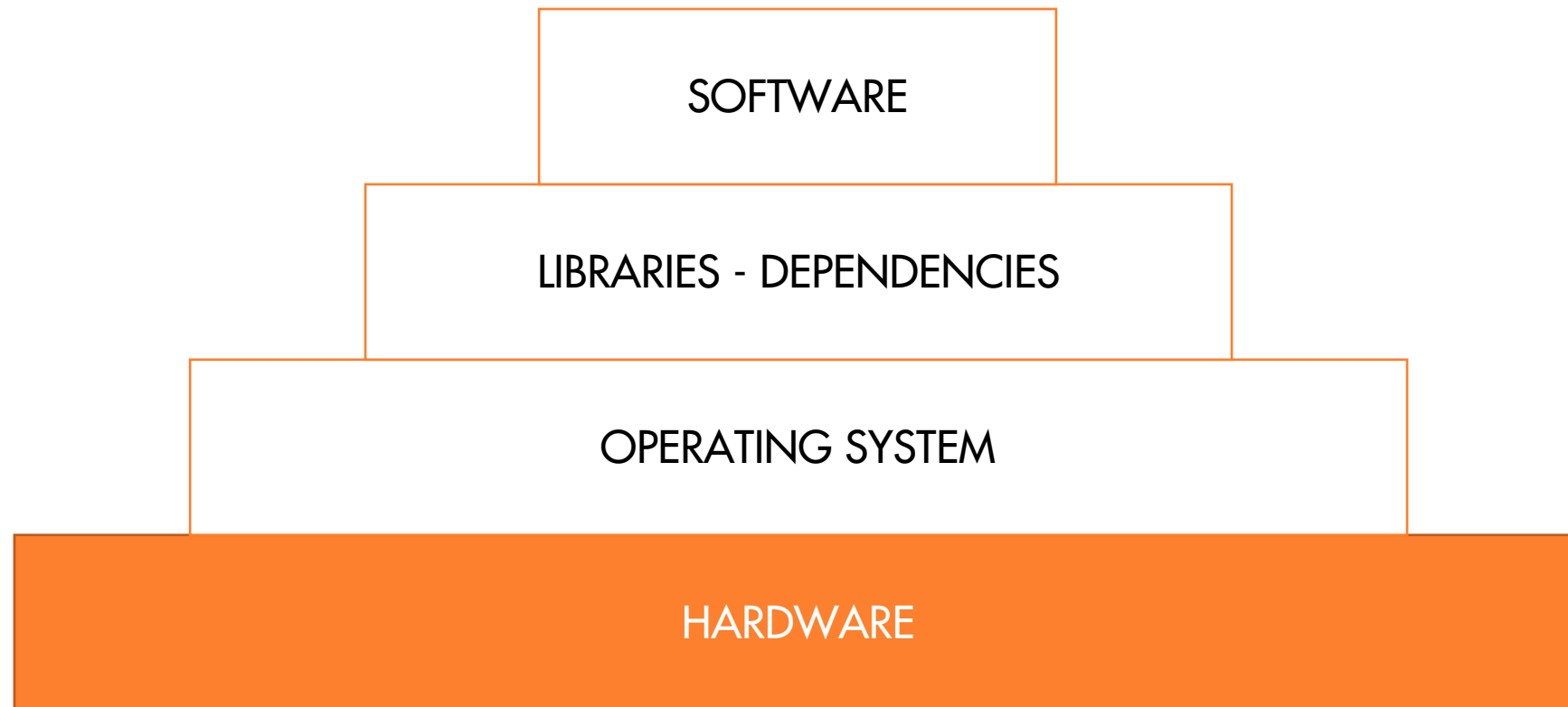


Cloud

06/06/2018



How to run?



I am a user

I use services !!!

2017 *This Is What Happens In An Internet Minute*





I'm a developer

Why should I care about hardware failure ?

Infrastructure as a Service

Why must I update the operating system ?

Platform as a Service

Is the (right) JVM installed ?

Platform as a Service

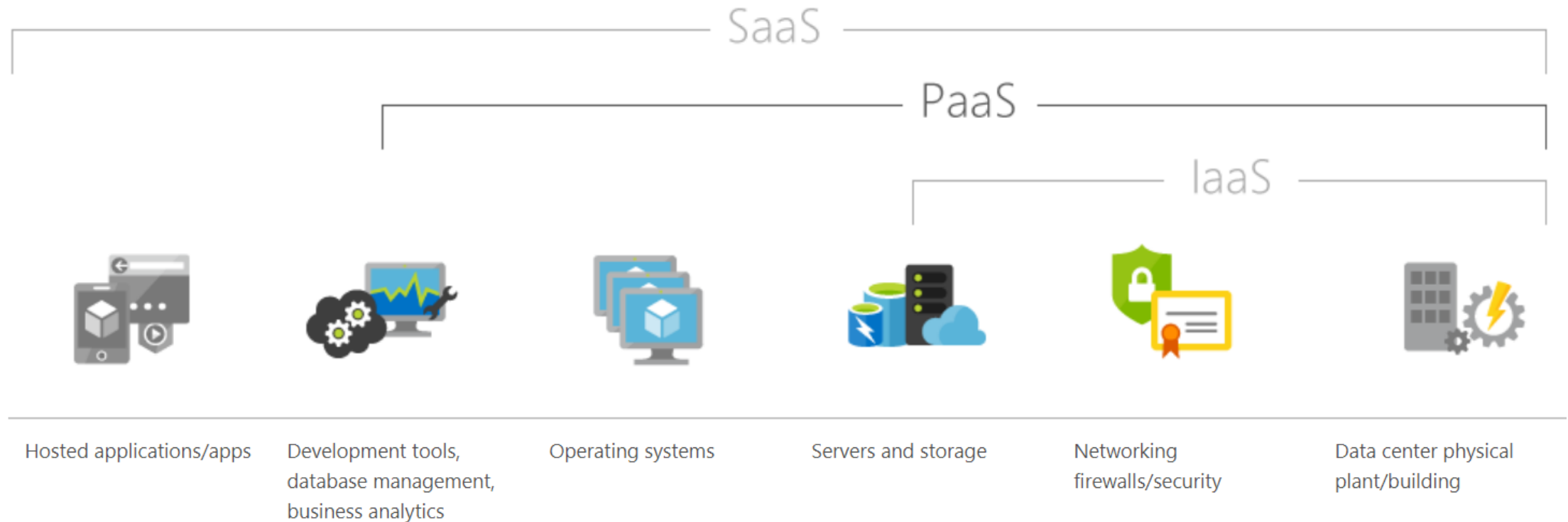
I don't know nothing about SQL Server, I just want a database !

Platform as a Service / Software as a Service

ITO are against me !

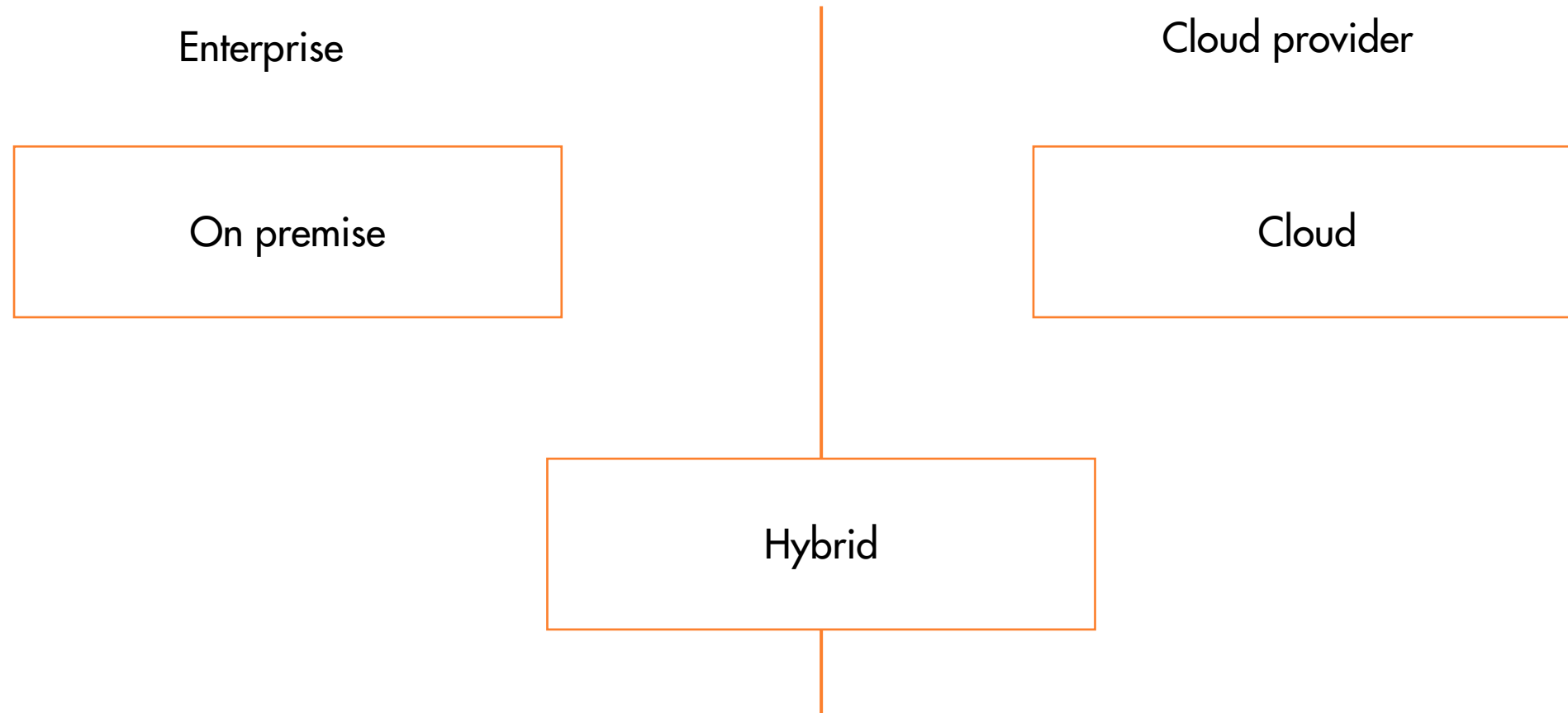


IaaS to SaaS





Me or nothing





Lambda functions

One endpoint, one function

Focus on objective

Access defined resources

Call other functions if needed

To Conclude



Software craftsmanship

Clean code, SOLID, Design pattern

Methodologies

Technical : TDD, DDD

Organizational : agility, SCRUM, Kanban

Mindset : (learn, fail, repeat,)ⁿ then succeed



How to continue

Books :

Clean Code: A Handbook of Agile Software Craftsmanship
by Robert C. Martin (aka Uncle bob)

Design Patterns: Elements of Reusable Object-Oriented Software
by Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides

Domain-Driven Design: Tackling Complexity in the Heart of Software
by Eric Evans



How to continue

Blogs :

Martin Fowler <https://martinfowler.com>

Companies :

<http://blog.xebia.fr>

<https://blog.octo.com>

Meetups !

Thank you

