Go Small

To Go Big


platform.sh

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<30 secs

0

downtime

- Micro-Services Oriented
- Creates a perfect Staging Cluster on-the-Fly for every pull-request with a byte level copy of production data
- Go Live as Often as you Need
- Supports NodeJS, PHP, MongoDB, Postgres, RabbitMQ,

Go Small

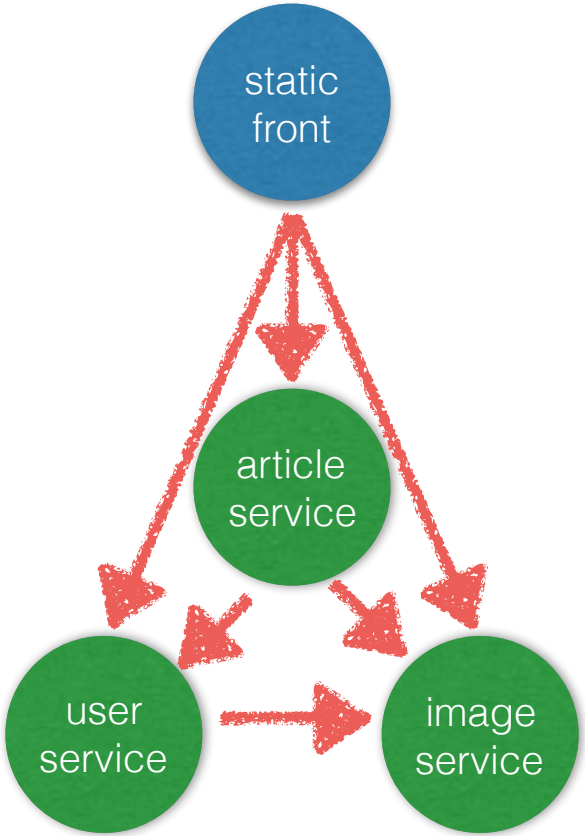
To Go Big

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Scaling through micro-services

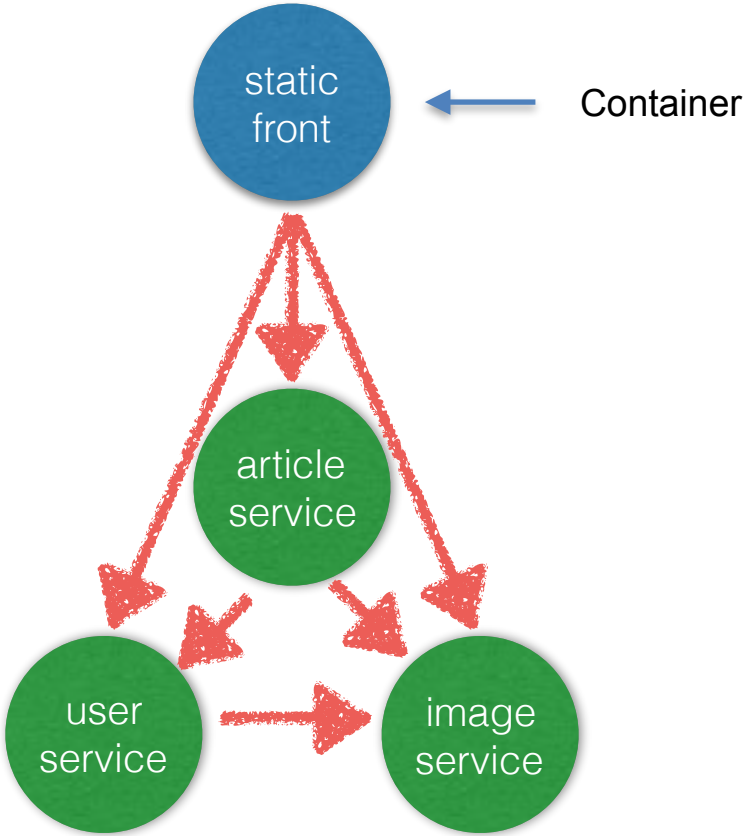
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Microservices:
an application design paradigm



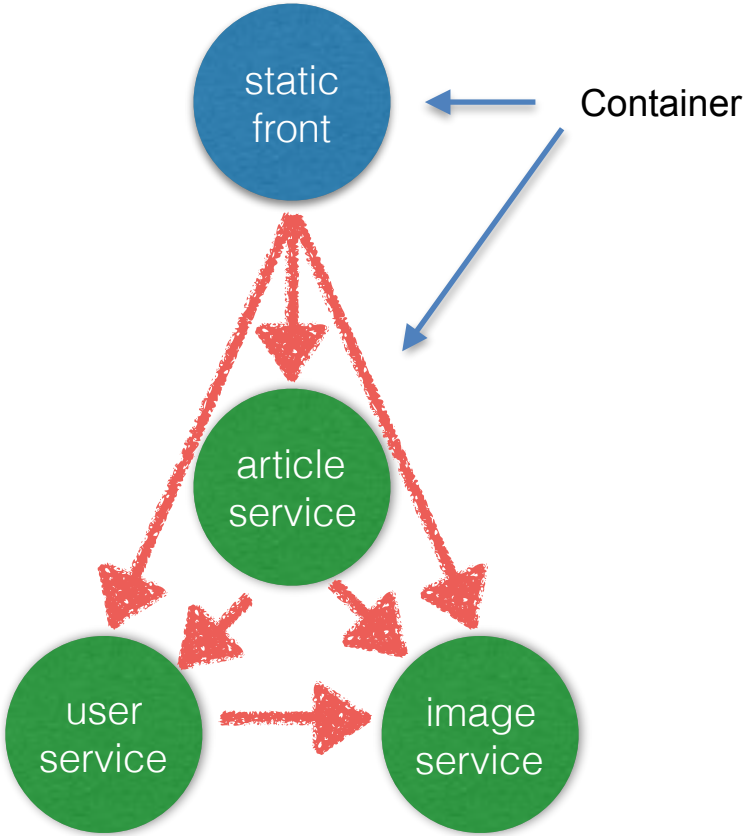
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Microservices: an operational paradigm



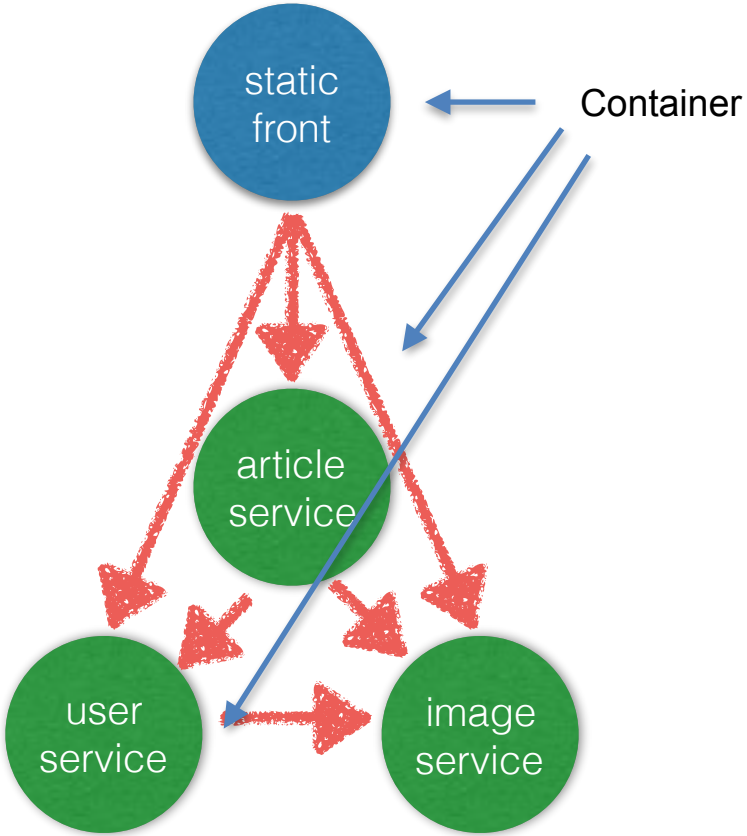
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Microservices: an operational paradigm



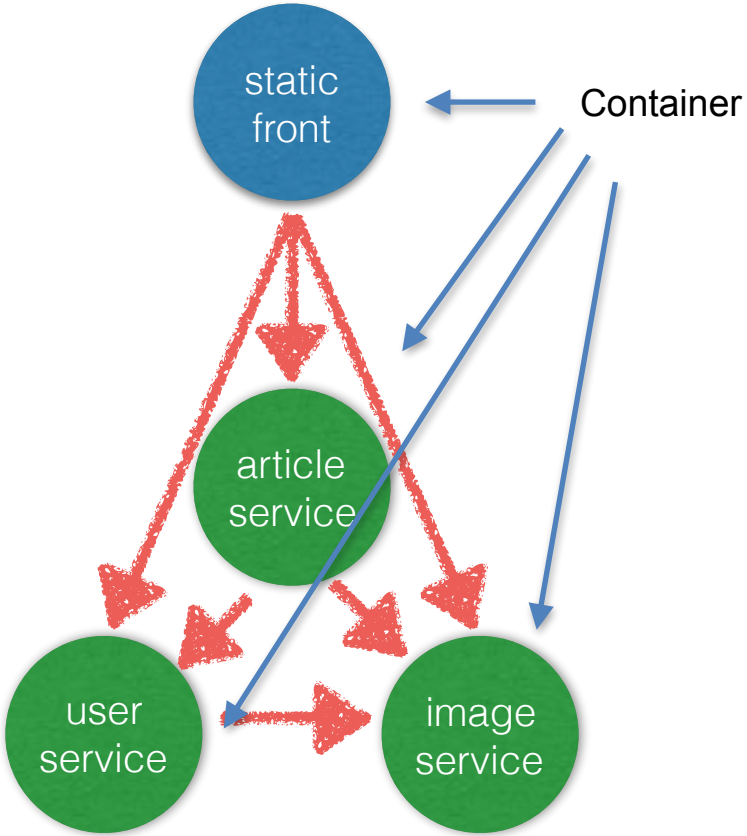
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Microservices: an operational paradigm



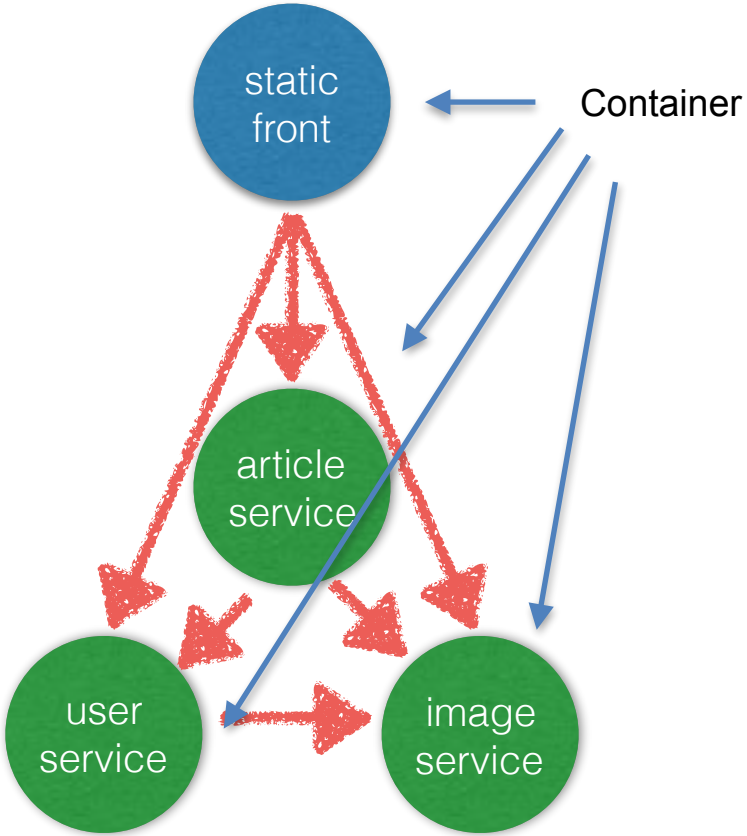
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Microservices: an operational paradigm



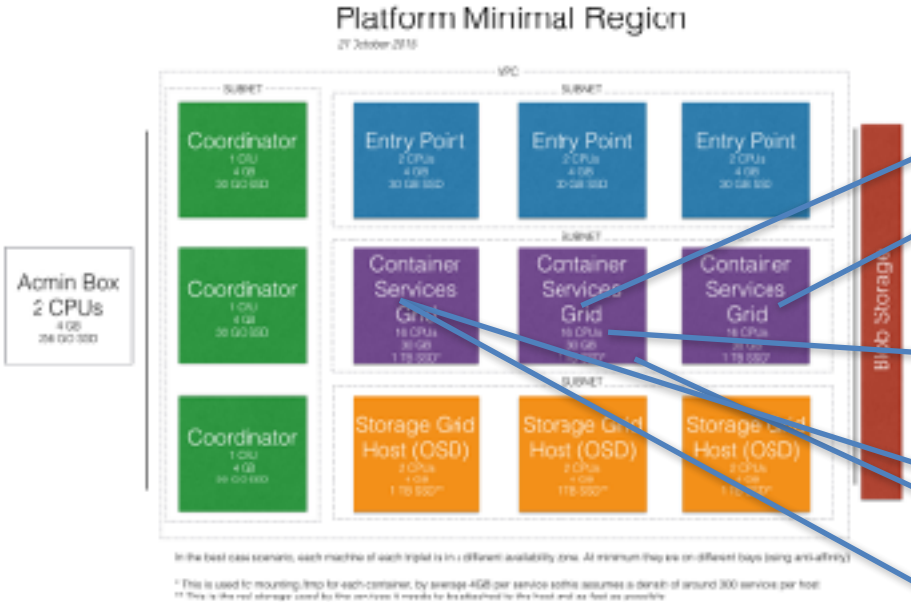
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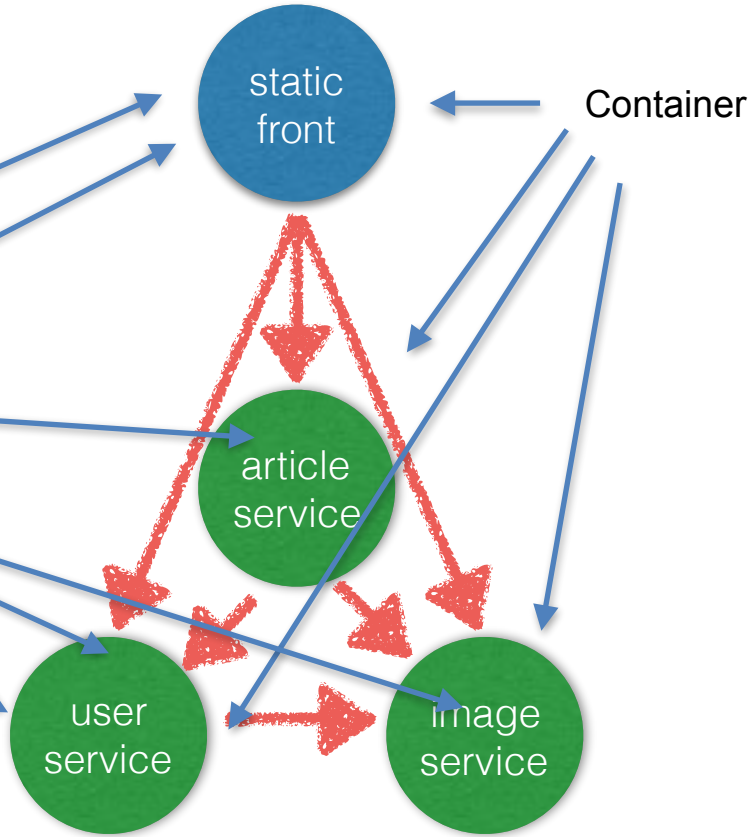
Microservices: an operational paradigm



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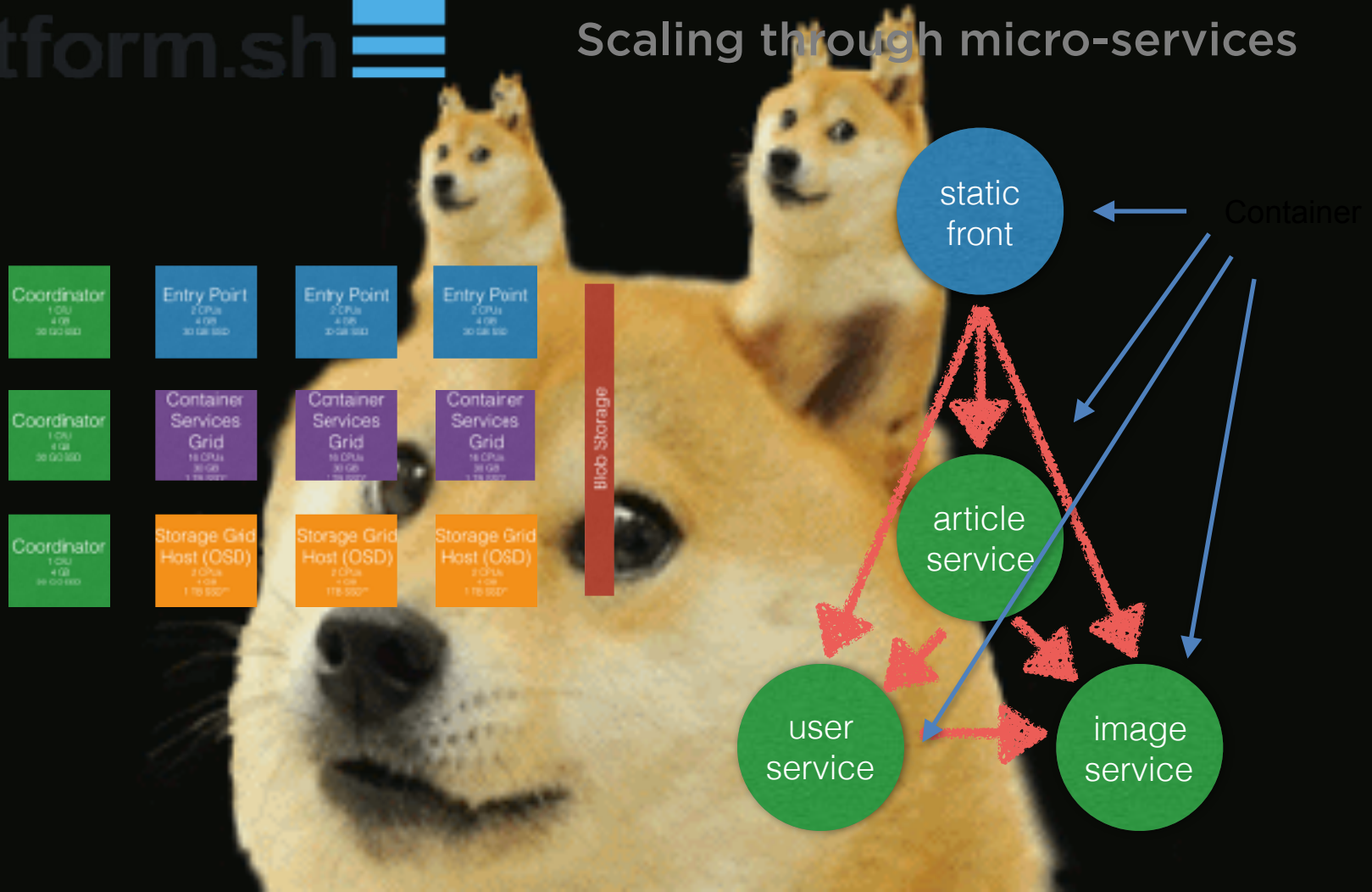
Microservices: application design + operations





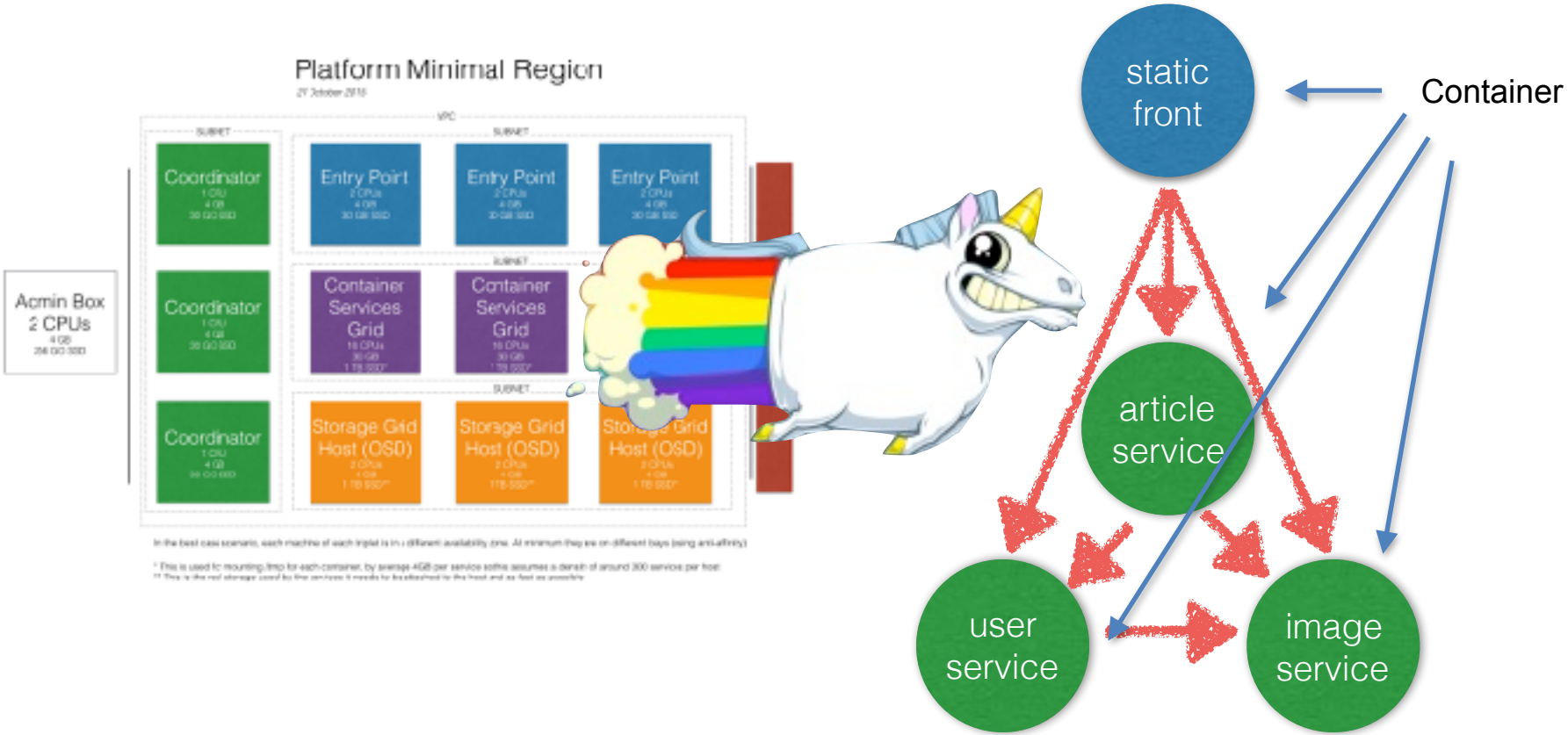
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Scaling through micro-services



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Scaling through micro-services





Scale is xs, s, m, l, xl, xxl, xxxl on many dimensions not a magic word



Dimensions...

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What can have size?
Well, everything.

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- The number of read requests per second
- The number of write requests per second
- The number of endpoints your api exposes
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Even Scaling Has Scale

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These are the different dimensions you need to think about, these are the different scale dimensions.



Dimension

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Issue

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• Availability

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• Latency

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Issue

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• Consistency

platform.sh

Solution

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• Caching

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Solution

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• Hypermedia transclusion

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Solution

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- HTTP2
- Custom Media Types
- Binary / Streaming APIs

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Dimension

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• Availability

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Issue

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• Consistency

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• Validation

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Issue

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- Security

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Solution

- The number of read requests per second
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• CQRS: Command Query Responsibility Segregation

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Solution

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• Backpressure management - PRG (Post / Redirect / Get)

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Solution

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• Message Queue intermediation

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Solution

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• No IDs only

UUIDS

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- Authentication
- middleware / proxy

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Dimension

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About Pattern Names

Micro-Services

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About Pattern Names

- This not stuff that is invented because it sounds like a charming idea we want to test out
  - Anyway beware of these.
- These are the result of post-hoc analysis of the last few projects we did and worked out nicely
- I have been doing micro-services since 2008. It works.
- Its just good engineering.

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Micro-Services

It is about other general guiding principals

KISS = Single Responsibility Principal = Do one thing do it well

Release Early, Release Often = Continuous Everything = Test All The Things

Containers = Horizontal Scaling = Automation

Micro-Services

Can be implemented in many ways

It can be shaped like this:



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Micro-Services

Can be implemented in many ways

Or like this:



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Micro-Services

Can be implemented in many ways

Or this:



Micro-Services

Can be implemented in many ways

But One Litmus Test For Correctly Implemented Micro-Services:

Staggered releases

Caching and Hypermedia Transclusion

Separating End-Points makes it easy to have a different caching strategy for every API

Hypermedia Transclusion (including the response of one API in another) gives you at the same time an efficient cache, and a clear way to bust it.



Micro-Services

Hypermedia Transclusions

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Micro-Services

Hypermedia Transclusions

it's much easier to merge several #microservices into a #monolith, than to split a #monolith into separate #microservices

@nivertech

GET https://eu.platform.sh/api/projects



```
[
  {
    "id": "wowgouvqhdlem",
    "_links": {
      "self": {
        "href": "/api/projects/wowgouvqhdlem"
      },
      "#edit": {
        "href": "/api/projects/wowgouvqhdlem"
      },
      "#ui": {
        "href": "https://eu.platform.sh/#/projects/wowgouvqhdlem"
      },
      "#subscription_estimate": {
        "href": "/api/projects/wowgouvqhdlem/subscription_estimate"
      },
      "#manage-access": {
        "href": "/api/projects/wowgouvqhdlem/manage-access"
```

```
    "title": "wordpress",
    "created_at": "2015-07-14T15:20:12.282000+00:00",
    "updated_at": "2015-07-14T15:20:52.511000+00:00",
    "default_domain": null,
    "owner": "384491da-031e-4c23-b264-9f96040a6e36",
    "subscription": {
      "user_licenses": 1,
      "restricted": false,
      "included_users": 1,
      "storage": 5120,
      "environments": 3,
      "license_uri": "https://accounts.platform.sh/api/platform/licenses/12606",
      "plan": "development",
      "suspended": false,
      "subscription_management_uri": "https://accounts.platform.sh/user/2879/orders"
    }
  },
    "title": "wordpress",
```

Micro-Services

Caching

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Caching

.platform/routes.yaml

```
"http://subscriptions.{default}/":
    type: upstream
    upstream: "api-subscription:php"
    cache:
        enabled: false
"http://users.{default}/":
    type: upstream
    upstream: "api-user:nodejs"
    cache:
      cookies:
      - '*'
      default_ttl: 0
      enabled: true
      headers:
      - Accept
      - Accept-Language
    ssi:
      enabled: false
"http://pro.{default}/api/v2":
    type: upstream
    upstream: "api:php"
    cache:
        enabled: false
```

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Issue

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• Availability

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Solution

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● Message Queue intermediation

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Message Queue intermediation

- Inside = Outside?

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Message Queue intermediation

- Inside != Outside

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Message Queue intermediation

- Your Micro-Services should speak HTTP and probably json/http
- But they can and should talk to each other on a binary protocol through a message queue such as Kafka
- Use the message queue to intermediate _all_ writes
- Type Safety Helps
- Don’t block on writes; PRG

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Solutions....

- Ideology will hurt you
- Decomposition has a price

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Solutions....

- Ideology will hurt you
- You are writing a distributed system

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Solutions....

- Distributed systems have theorems
- Like about the limits of consistency availability without conflicts

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Solutions....

- Caching brings consistency and latency issues
- Transclusions makes consistency hard but also documentation and code generation harder
- Write intermediation is going to require you to write **MUCH** more code, creates other latency issues and will make your brain bleed

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Micro-Services

Can be implemented in many ways

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Release Early, Release Often = Continuous Everything = Test All The Things

Micro-Services

Can be implemented in many ways

One Litmus test:

Many releases
Staggered Releases

Micro-Services

Continuous Deployment

Forces you to resolve your versioning issues. Your documentation workflow. It forces you to automate all the things. It makes since you think about caching.

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Operational complexity

- **The number of read requests per second**
- **The number of write requests per second**
- **The number of endpoints your api exposes**
- The number of methods your api exposes
- The number of elements that compose the documents that you send and receive
- The number of lines of code that make your codebase
- The number of developers working on the project internally
- The number of developers using your API externally
- The number of changes you need to do each year

- The number of deployments you do
- The number of years you need to support older versions of your API
- The number of pages of documentation
- The number of client libraries you maintain
- The number of code examples you maintain
- The number of servers you have
- The number of external services you rely on
- The number of internal services you expose
- The number of minutes a month you can be down

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Code complexity

- The number of read requests per second
- The number of write requests per second
- **The number of endpoints your api exposes**
- **The number of methods your api exposes**
- **The number of elements that compose the documents that you send and receive**
- **The number of lines of code that make your codebase**
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Change Management ...

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- **The number of deployments you do**
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- In previous years I presented here first the idea that the API is a product that requires design
- Than some common technical patterns you might want to follow
- Last year I showed how an API can be stateful, binary and good ! (GIT as an API)
- Think of it as a progression. A progression towards the maturity of our domain.

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- Micro-Services is a buzzword - that means this simple thing we called REST APIs has become overly complex and we need to manage the complexity
- Micro-Service is a **set** of common patterns that help manage complexity over time through decomposition
- It means: solve your problems one by one

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- It means: solve your problems one by one
- It requires a higher level of understanding of your infrastructure and a higher level of automation
- Something that will force you to implement those common good patterns correctly
- It is not only an application design paradigm but also an operations paradigm
- **Continuous Delivery and staggered releases are key**



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QUESTIONS?