Microservices and IoT

David Bosschaert and Carsten Ziegeler

I am doing IoT !

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I am doing IoT !

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- R&D Adobe Ireland
- Co-chair OSGi Enterprise Expert Group
- Apache Felix, Aries PMC member and committer
- … other opensource projects
- Cloud and embedded computing enthusiast

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Carsten Ziegeler

- RnD Adobe Research Switzerland
- Team Lead / Founder of Adobe Granite
- Member of the Apache Software Foundation
- VP of Apache Felix and Sling
- OSGi Expert Groups and Board member

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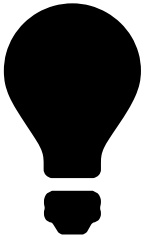
IoT

IoT Hello World!



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I am doing IoT ?

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IoT and AEM

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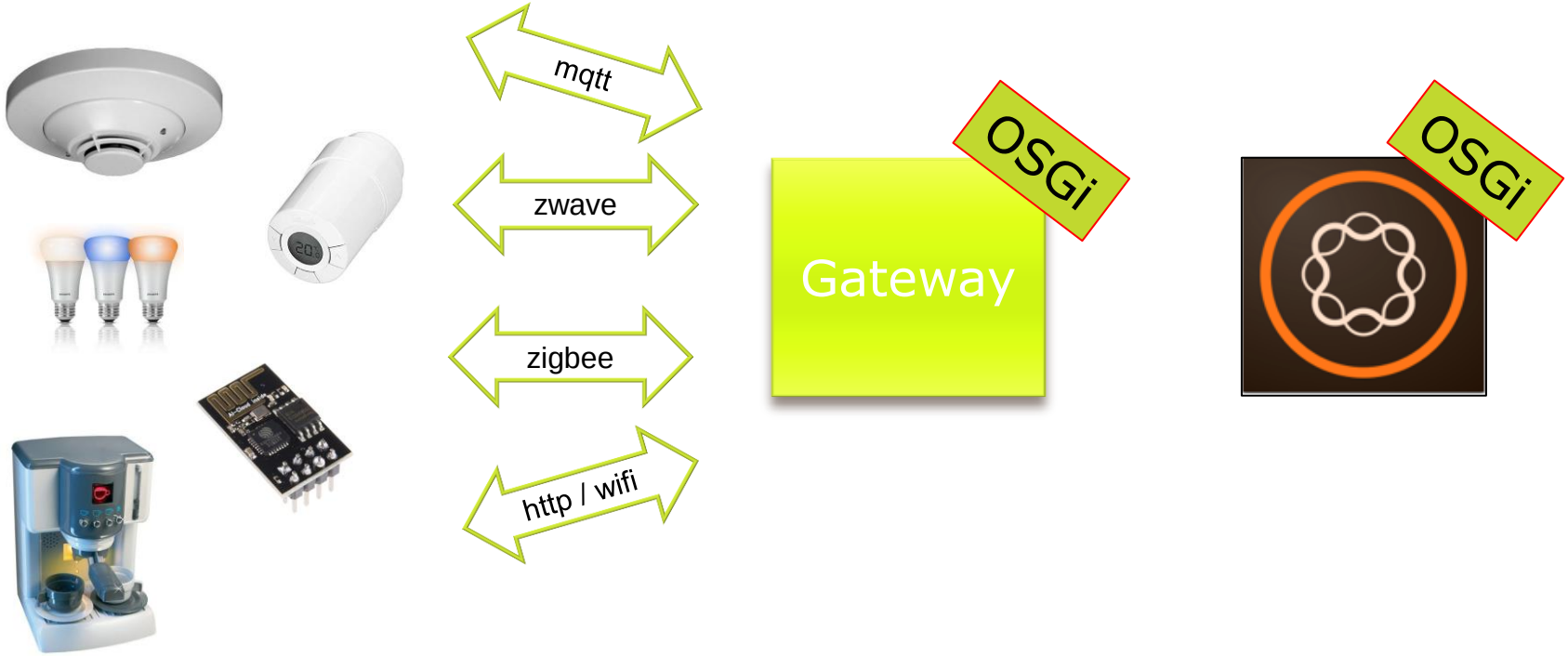
IoT and AEM



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OSGi for Gateway and Cloud

- Unified platform
- Share & Reuse
- Provisioning, tooling...
- Dynamically updatable

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OSGi Device Abstraction Layer

- Devices and Functions
- Protocol independent

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OSGi IoT

- Protocols (CoAP, MQTT)
- Zigbee, EnOcean
- Not limited to this

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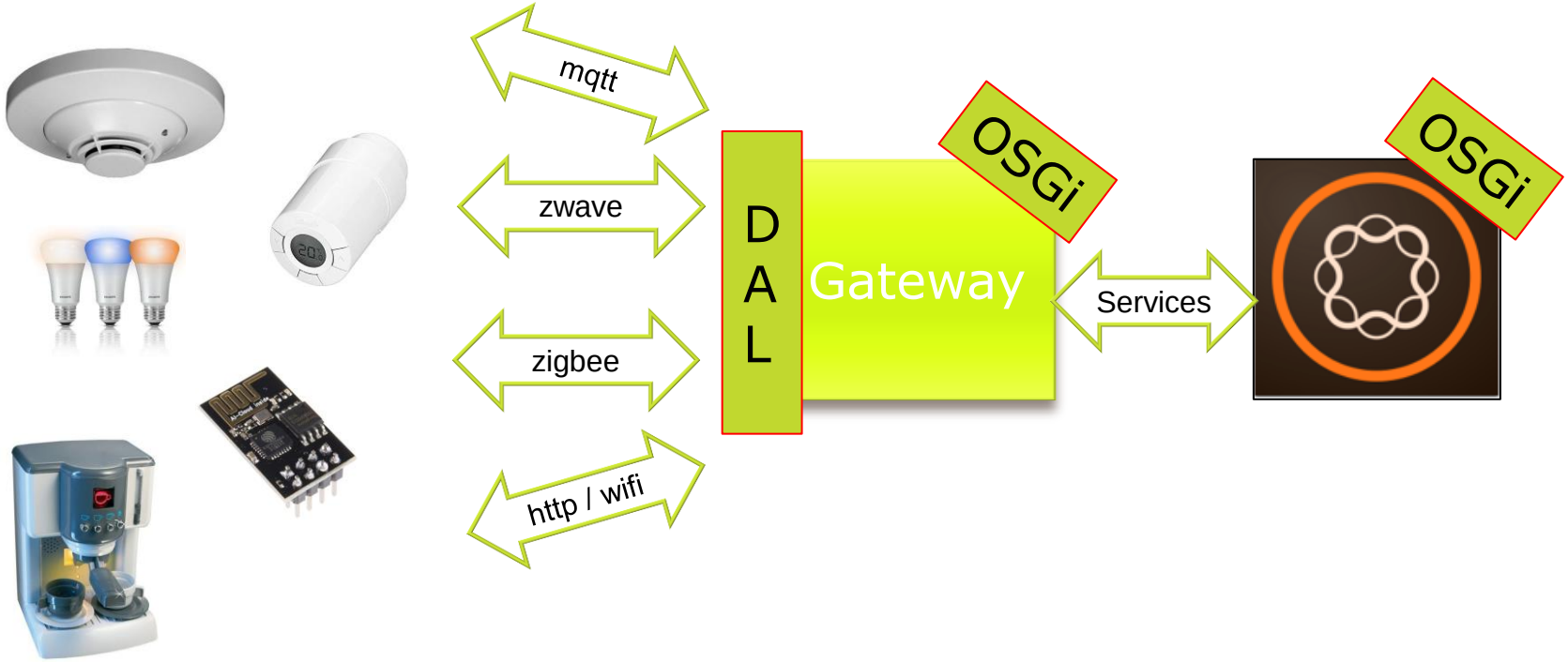
IoT



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Adobe

And now Camera, Lights, and…ACTION

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Demo Scenario

Photo credit:
www.bargainmoose.ca

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Increase sale discount with the weather!

Clipart credit: pixabay.com

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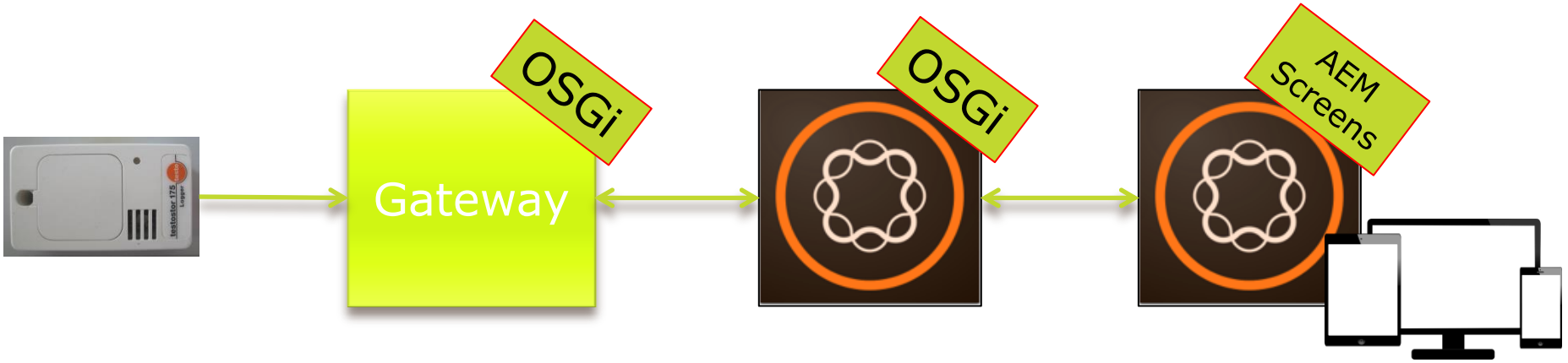
Architecture



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Adobe

Microservices

Microservices

- Do one thing but do it right
- Resource optimizations
- Focused development/testing
- Reduced time to production

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Microservices

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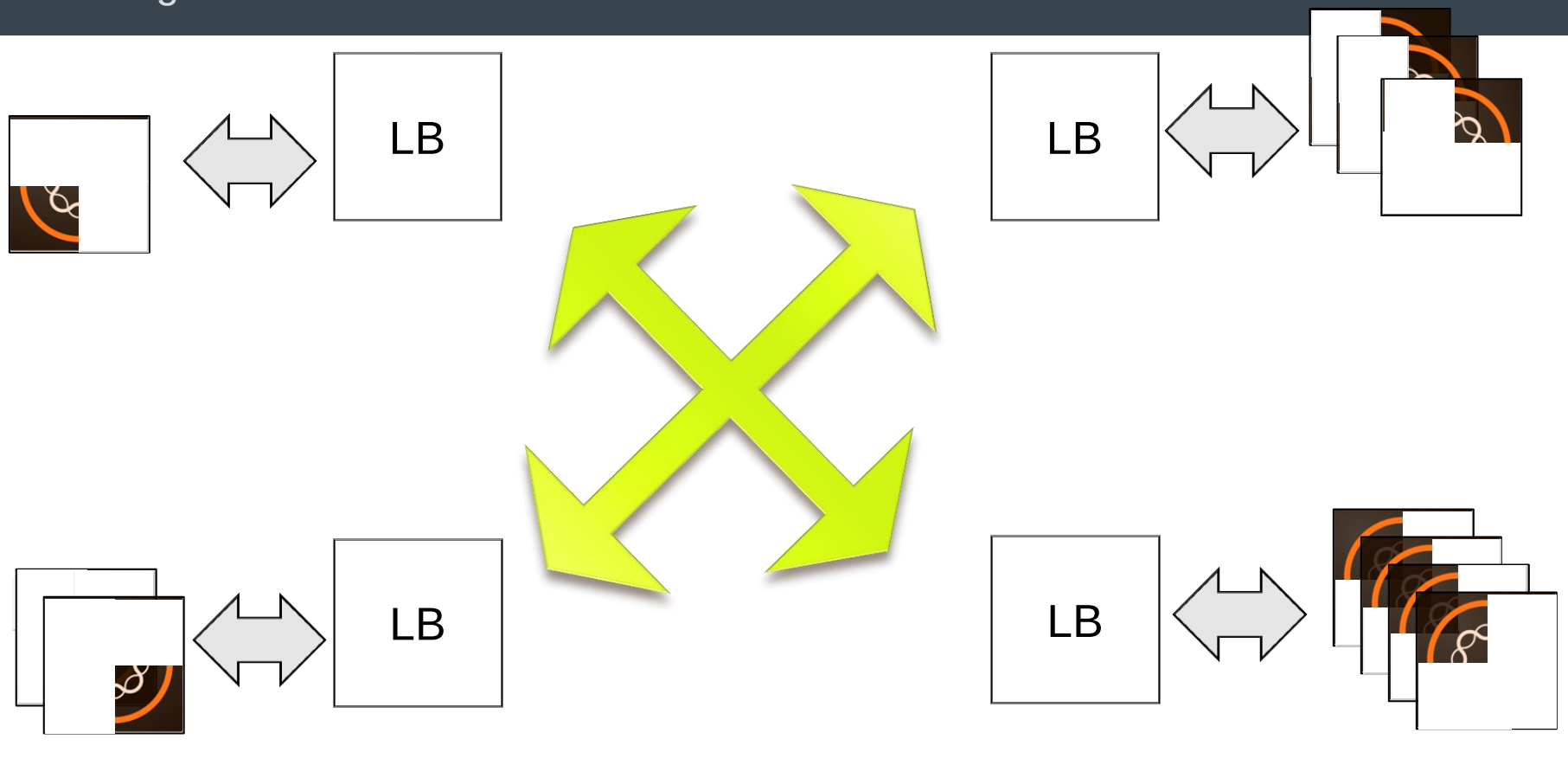
Scaling



Orchestration

- Various solutions
- Containers
- The twelve-factor app
- Disposability

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Communication

- Discovery / Topology
- REST
- Distributed OSGi

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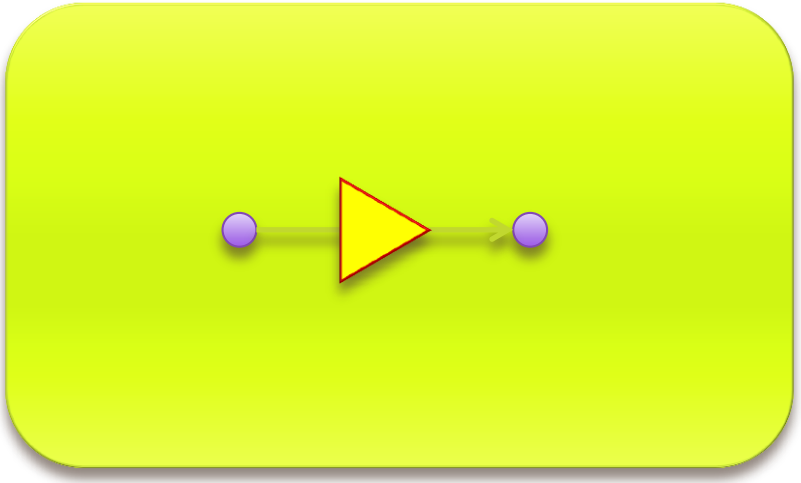
OSGi Services



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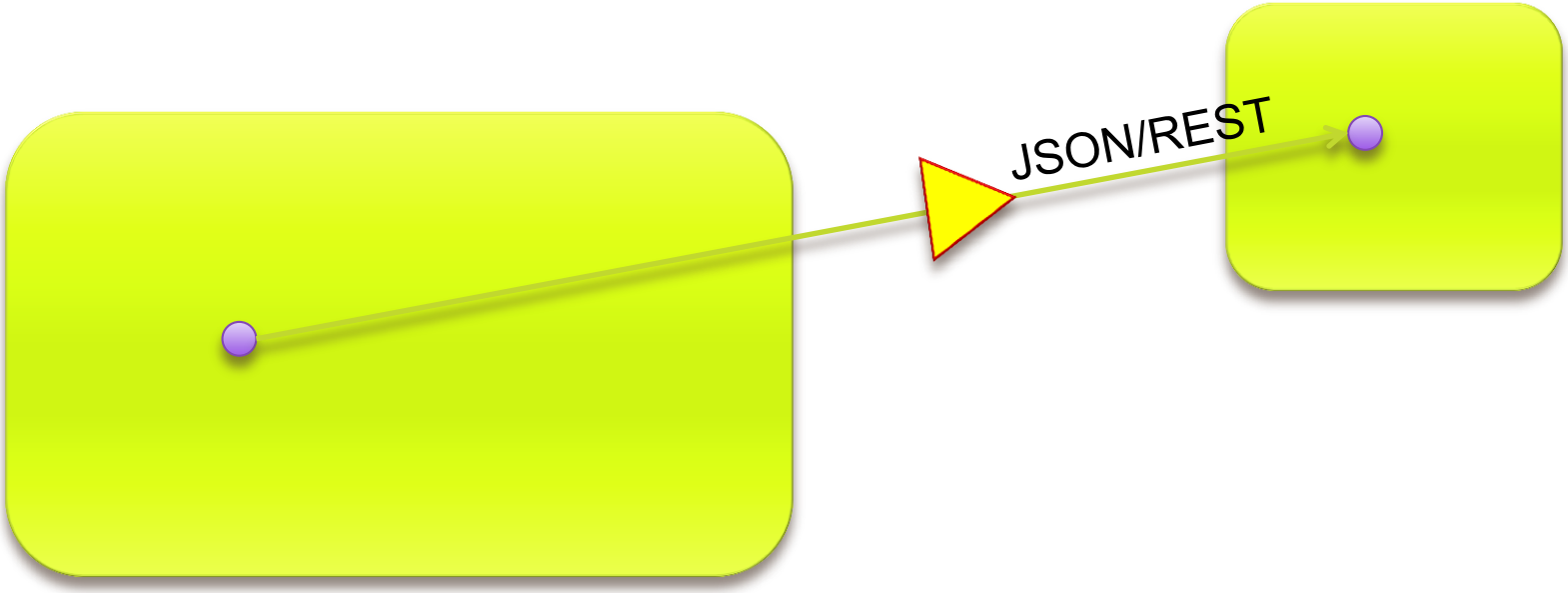
OSGi Remote Services



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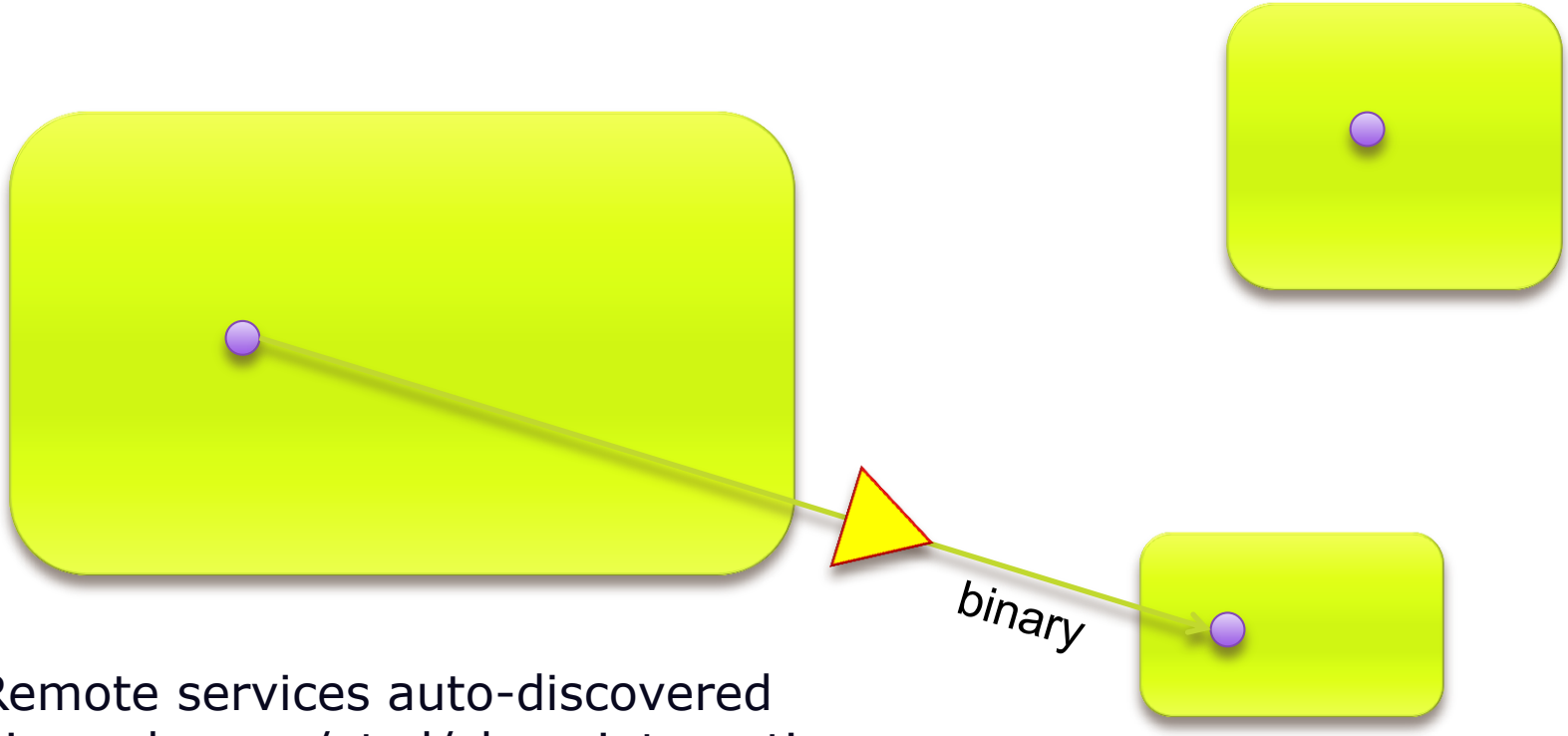
Remote Services – dynamic rebinding



Remote services auto-discovered
via zookeeper/etcd/slp … integration

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Using Local OSGi Services

```
class MyComponent {
  @Reference
  PaymentService paymentService;

  @Activate
  public void activate() {
    paymentService.makePayment(…);
  }
```

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Using Remote OSGi Services

```
class MyComponent {
  @Reference
  PaymentService paymentService;

  @Activate
  public void activate() {
    paymentService.makePayment(…);
  }
```

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Registering an OSGi Service

```
@Component(service=PaymentService.class)
class MyPaymentService implements PaymentService {
  public boolean makePayment(…) {
    ...
  }
}
```

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Registering a Remote OSGi Service

```
@Component(service=PaymentService.class,
  property="service.exported.interfaces=*")
class MyPaymentService implements PaymentService {
  public boolean makePayment(…) {
    ...
  }
}
```

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Asynchronous Services

```
class MyComponent {
  @Reference
  PaymentService paymentService;

  @Reference
  Async asyncService;

  @Activate
  public void activate() {
    PaymentService mediated =
      asyncService.mediate(paymentService, PaymentService.class);

    asyncService.call(mediated.makePayment(…))
      .then(p -> updatePaymentStatus(p));
    // … thread continues while payment service being called …
```

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Provisioning

- Cloud : Orchestration of AEM/OSGi
- Gateways : Manage through AEM/OSGi

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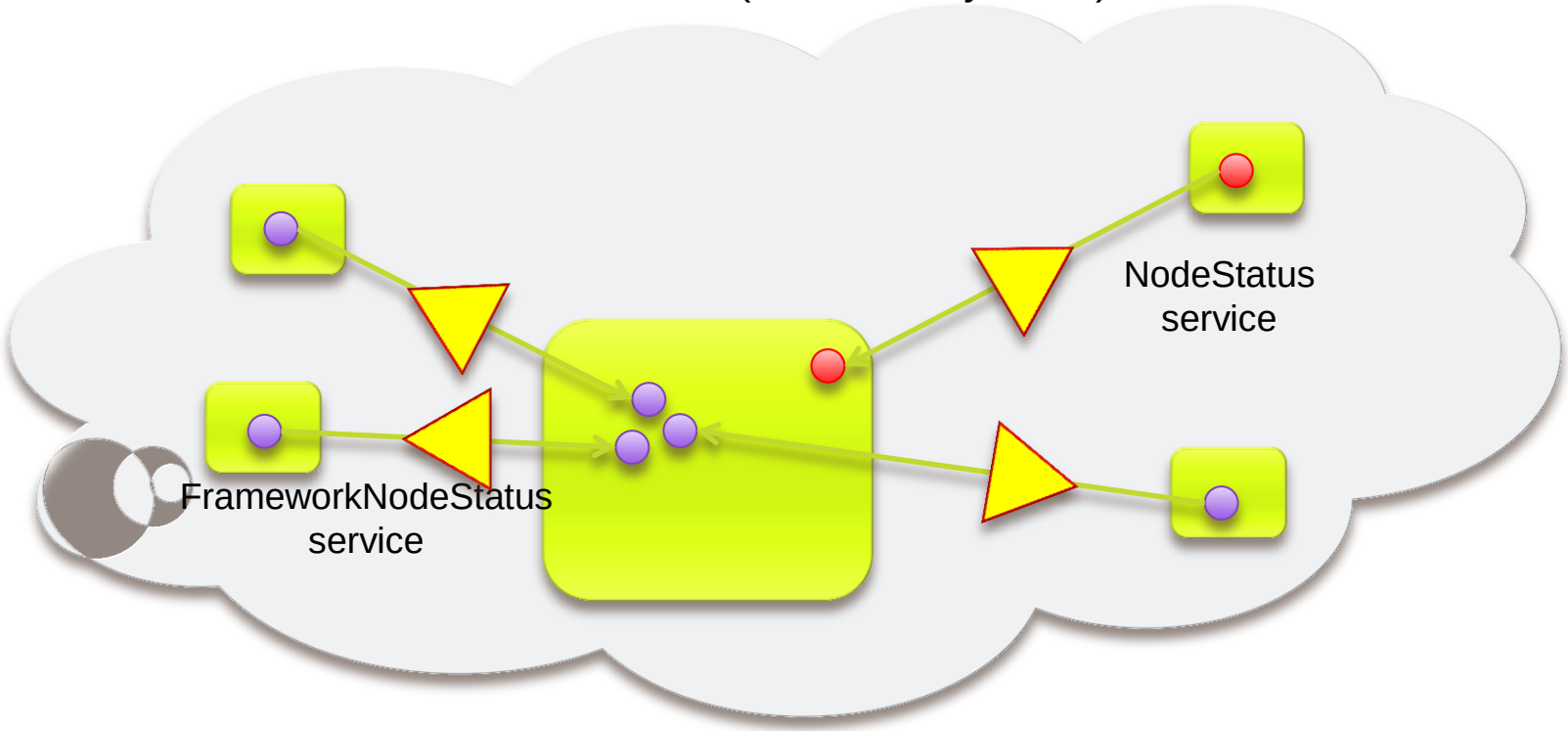
Cloud discovery and provisioning

- RFC 183 Cluster Information (Cloud Ecosystems)



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Provisioning Model

- Descriptive
- Feature based
- Complete

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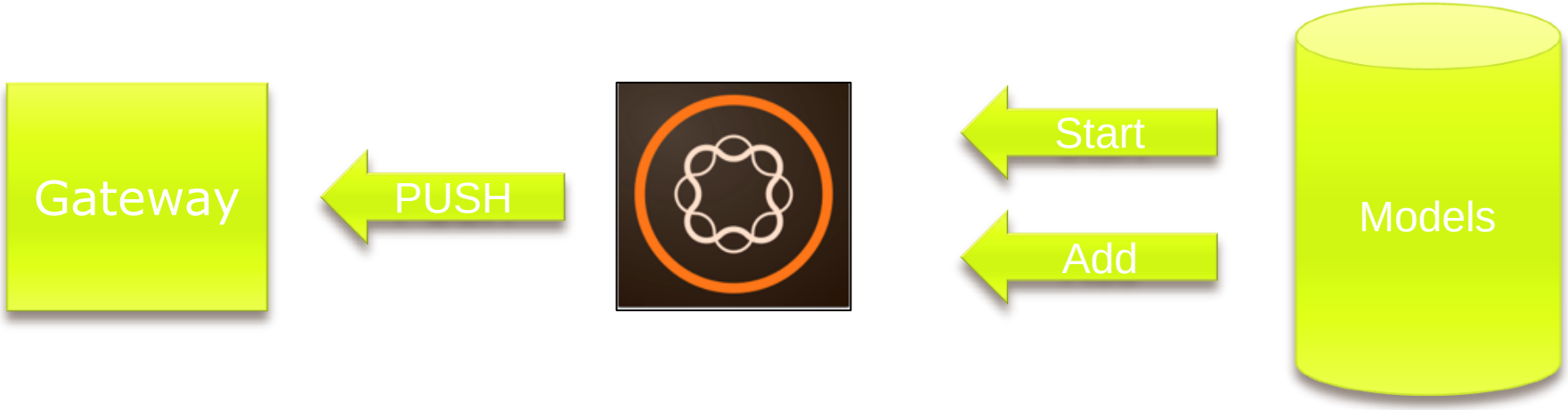
Provisioning



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Requirements and Capabilities

- Imports / Exports
- Provided / Required Services
- Functionality (whiteboard, extender)
- Extensible (database)

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OSGi Resolver & Repositories

- Verify runnable configuration
- Calculate required / missing modules

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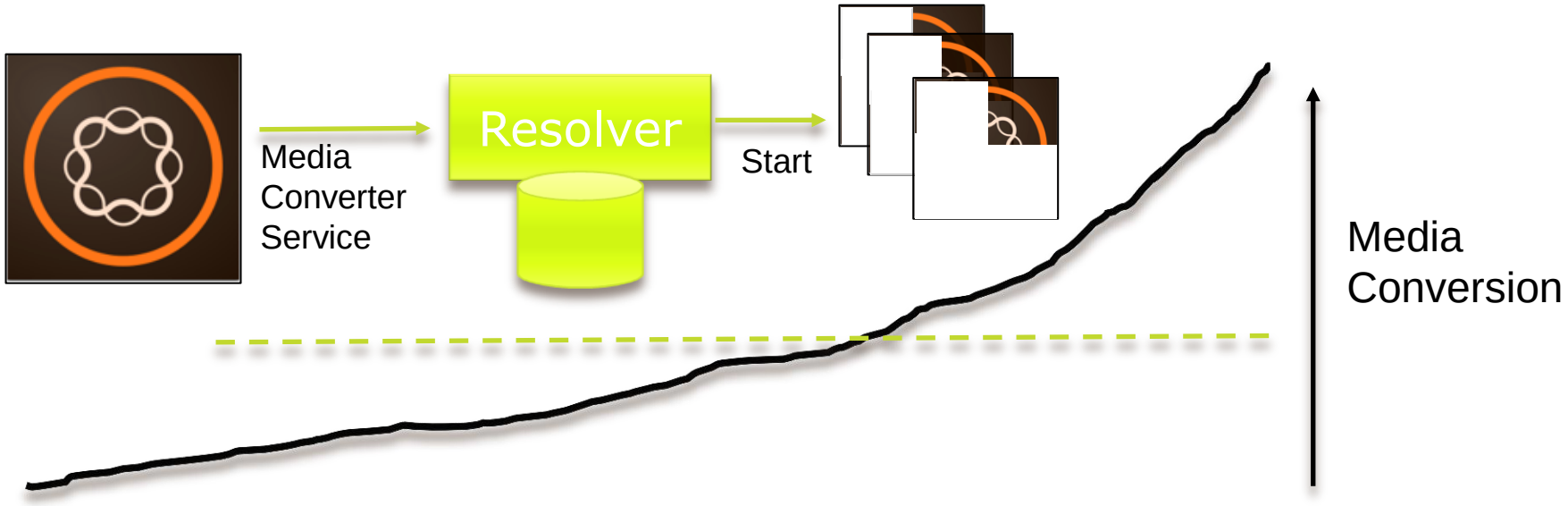
Dynamic Provisioning & Orchestration



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OSGi / AEM is the ideal base for IoT and Microservices

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THANK YOU.