Provisioning the IoT

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Today's goals

1. Put IoT provisioning into context
2. Demo: modular provisioning
3. Apache ACE

Provisioning spectrum

Provisioning spectrum servers

Cloud/SaaS:

- full control
- reliable network
- VM/Containers

Provisioning spectrum

servers

Cloud/SaaS:

- full control
- reliable network
- VM/Containers

mobile

App stores:

- walled garden
- semi-reliable network
- full binaries

Provisioning spectrum

IoT

?

Provisioning?

'Just download latest binaries over FTP at system startup'

Provisioning wishlist

Modularity	*Feature composition*
	Remotely toggle features
Efficiency	*Bandwidth efficient*
	Avoid unnecessary updates
Automation	*Manage many devices*
	Insight: what runs where?
Security	*Not just any device*

IoT != IoT

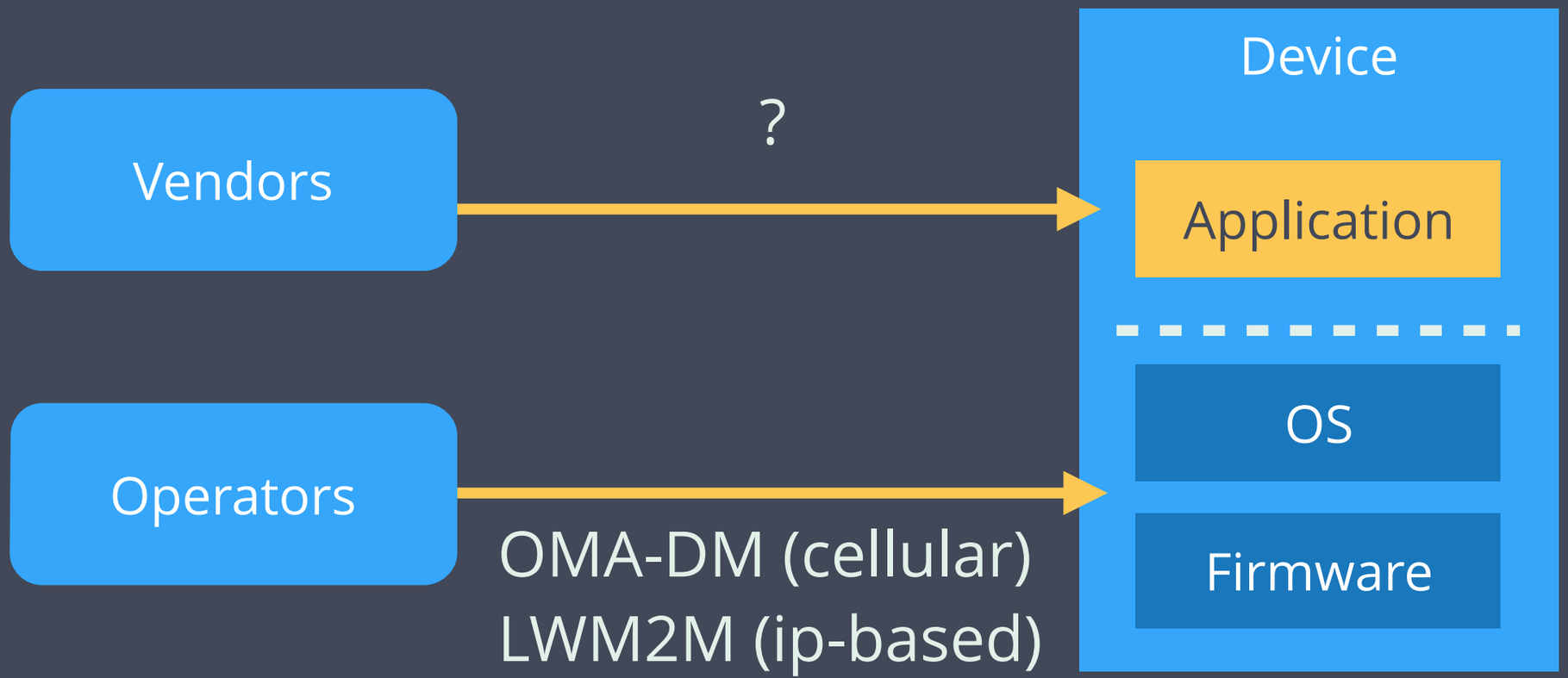
We are not talking about millions of devices:

IoT != IoT

We are not talking about millions of devices:

This talk is not about *device management*

IoT Provisioning standards



Mostly about *device management*

Software Update

There is a new version of your Tesla Model S software. Schedule installation, install now or close window to postpone.

12	00	
1	10	
2	20	AM
3	30	PM
4	40	

8 hr 47 min from now

SET FOR THIS TIME

INSTALL NOW

This update will take approximately 45 min
During the update process you will not be able to drive the vehicle or use the touchscreen, and your car alarm may be disarmed for a short duration. The car must be in PARK.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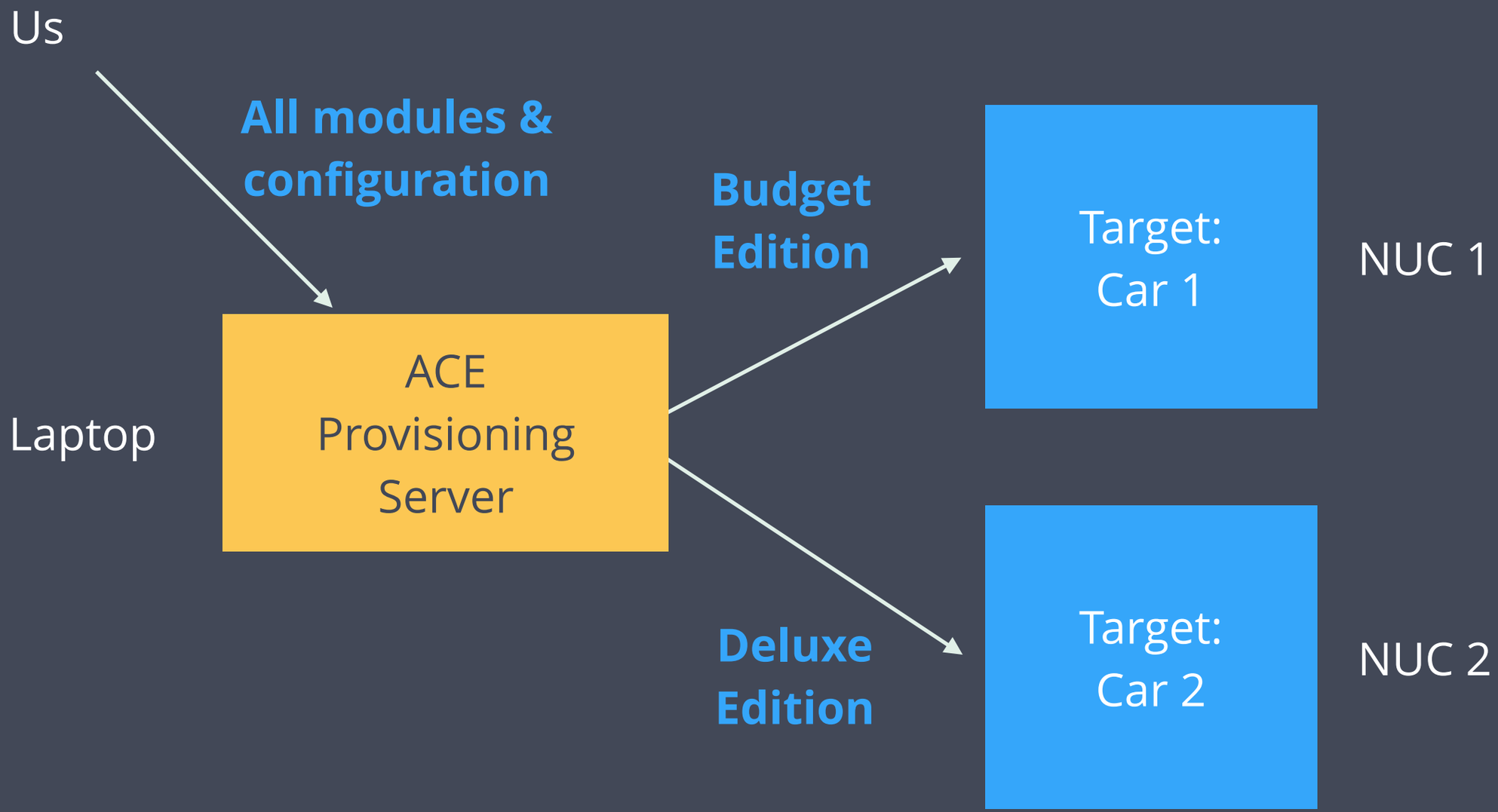
Demo time!

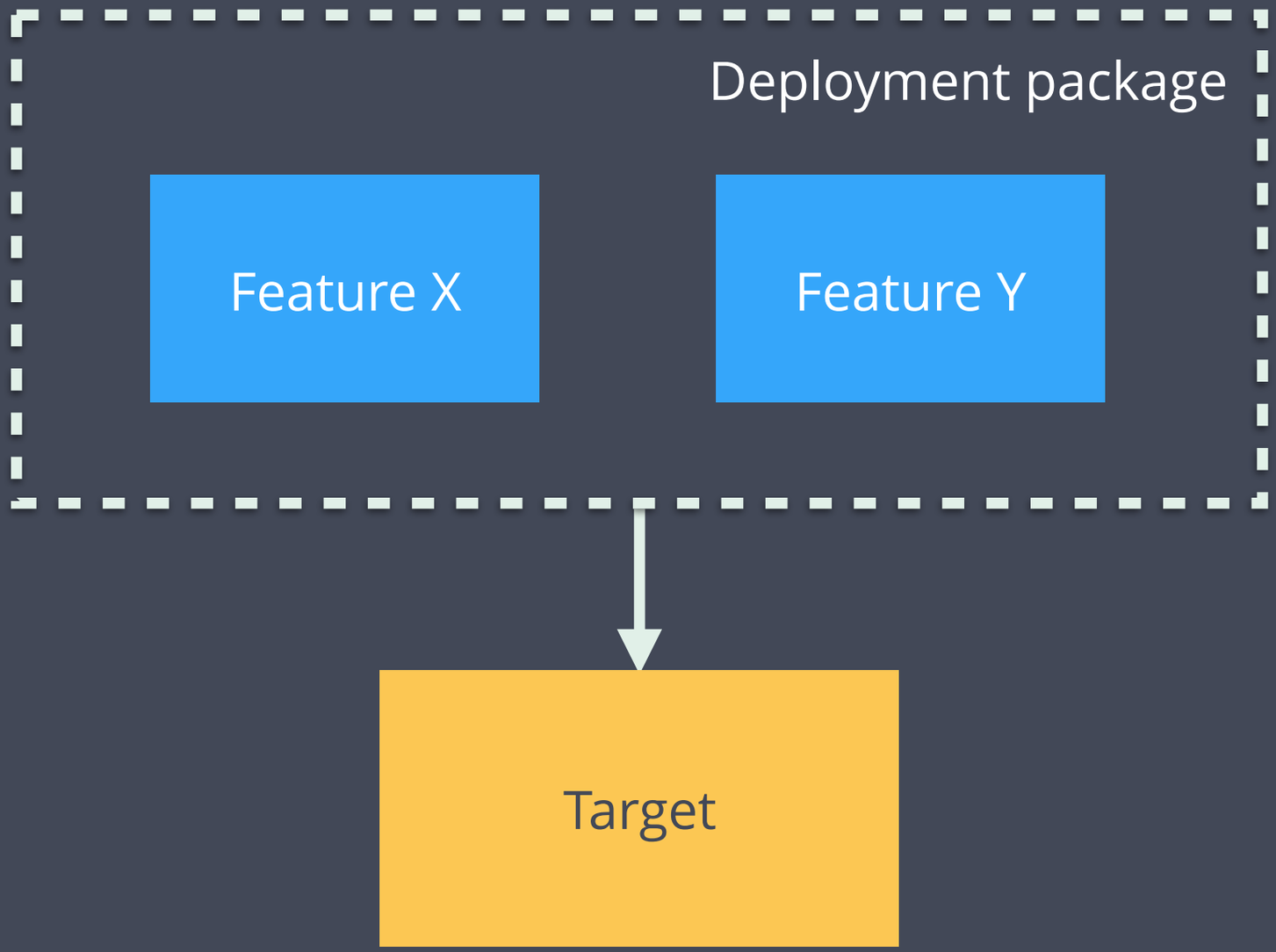
Provisioning demo

ACE Car Entertainment



Modular systems

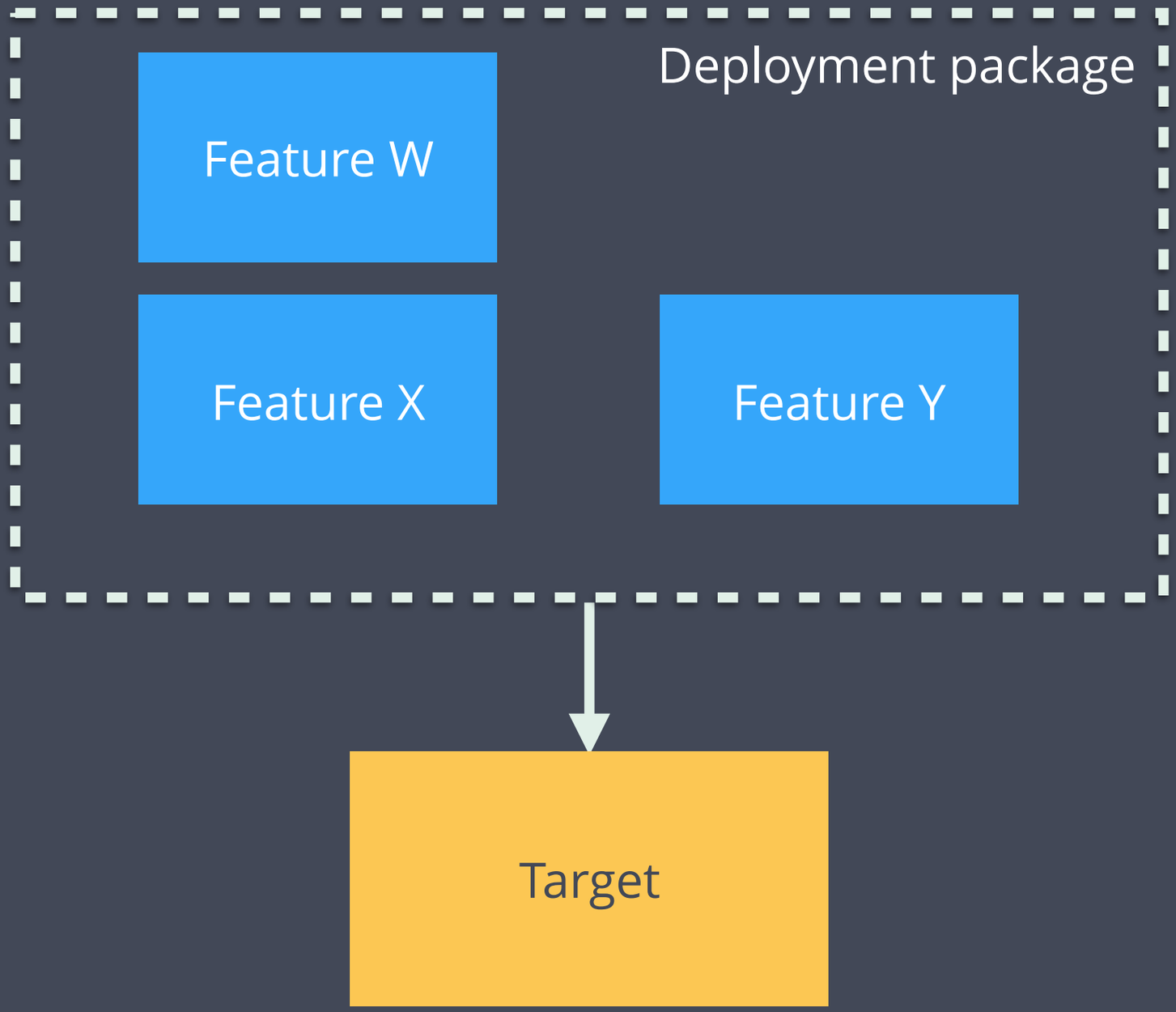
Monolithic deployment: installation



Modular systems

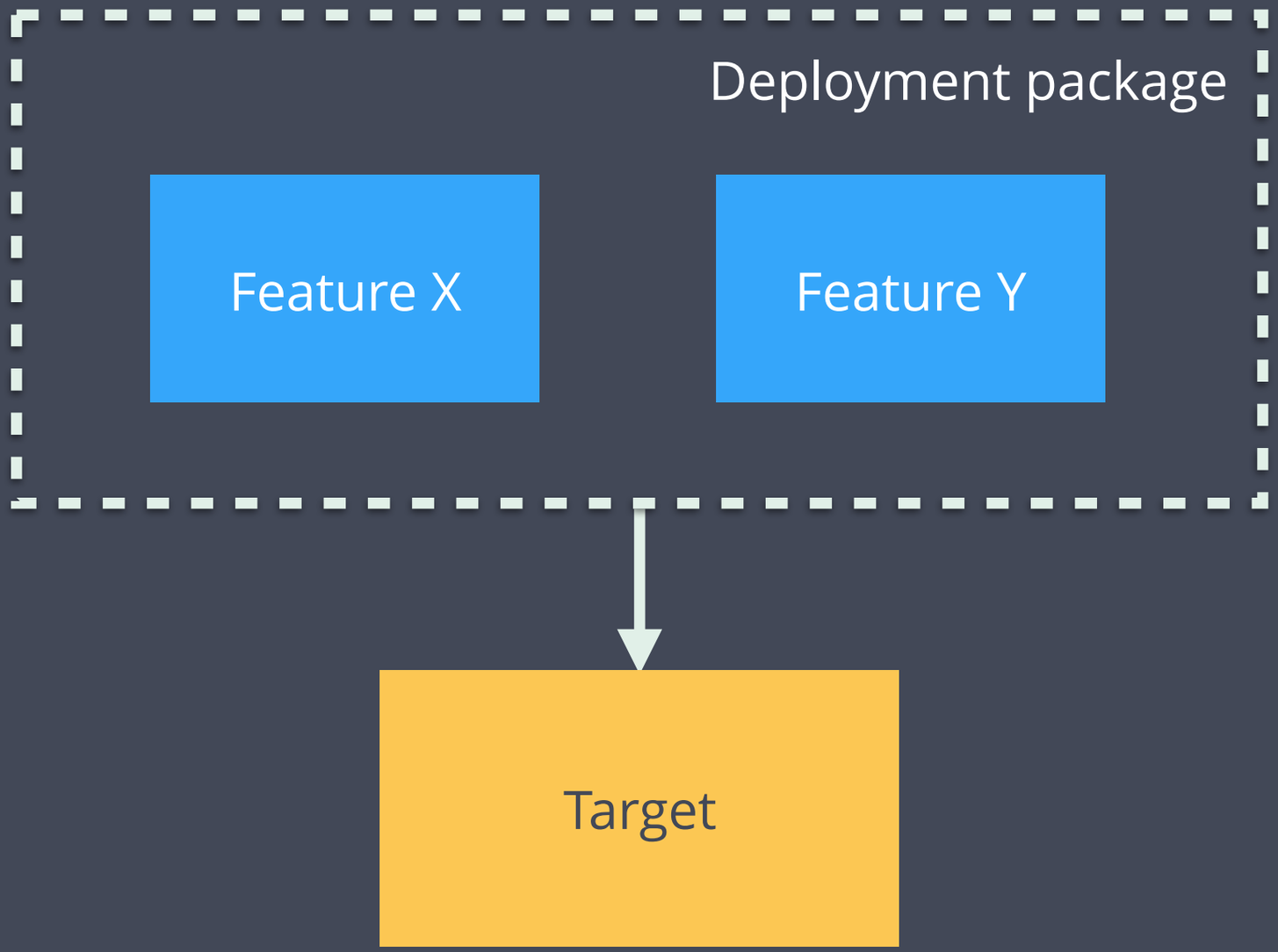
Monolithic deployment: update

Limited connectivity
Bandwidth inefficient



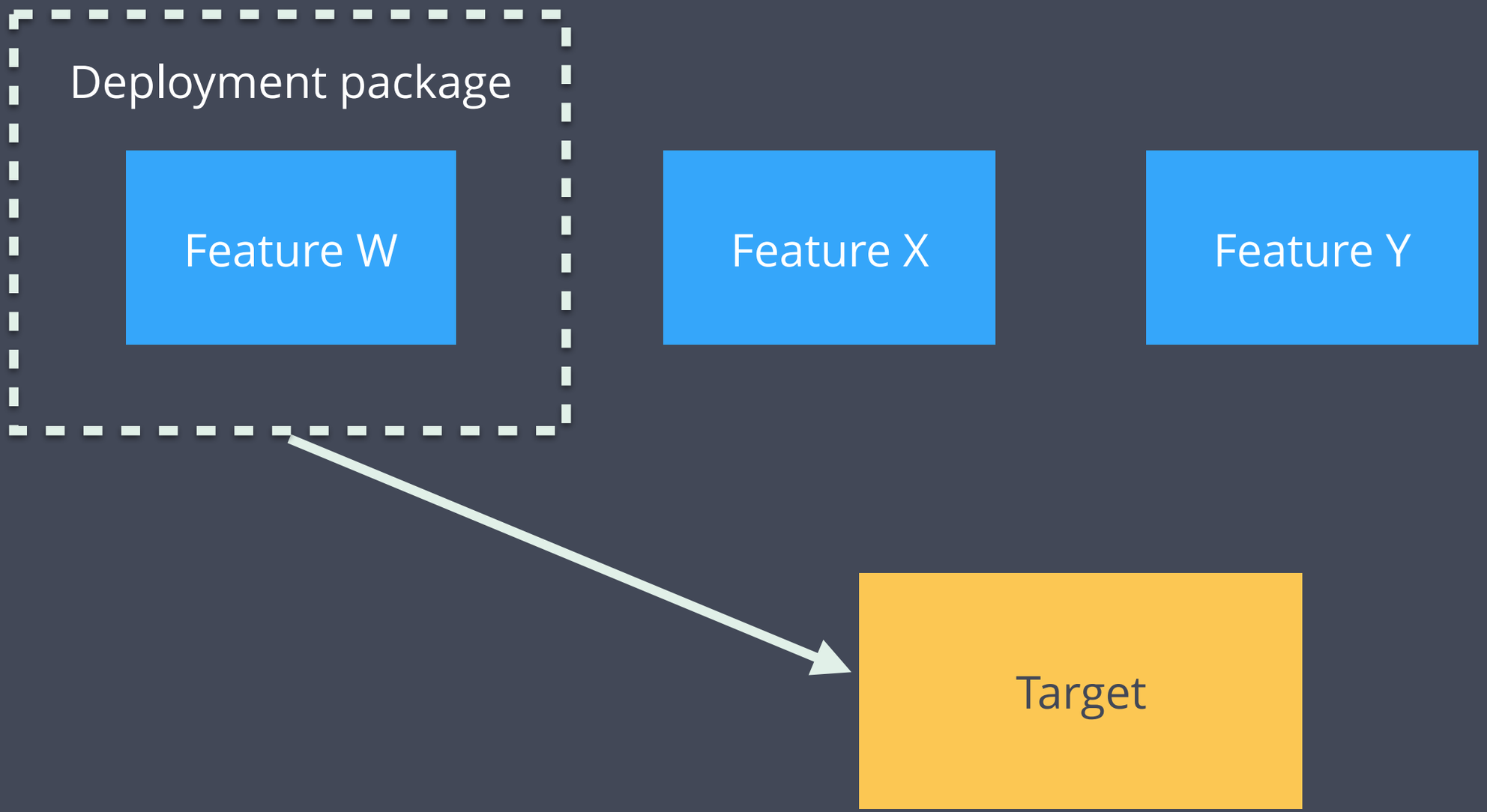
Modular systems

Modular deployment: installation



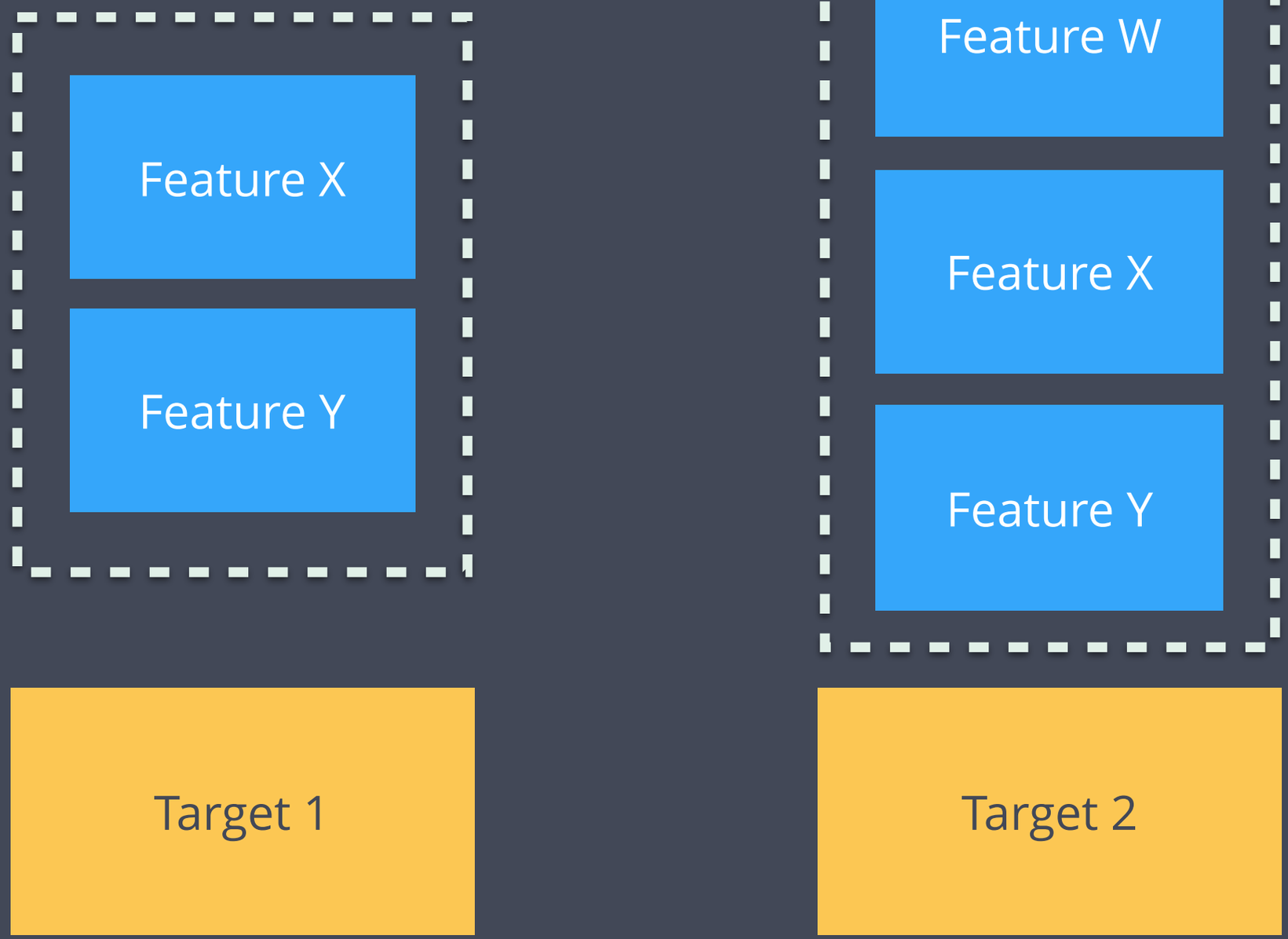
Modular systems

Modular deployment: update



Modular systems

Differentiate with ease



Modular systems

How?

OSGi

De facto standard for Java modularity

Small footprint

Dynamic service model

music
v1.0.0

dashboard
v1.0.0

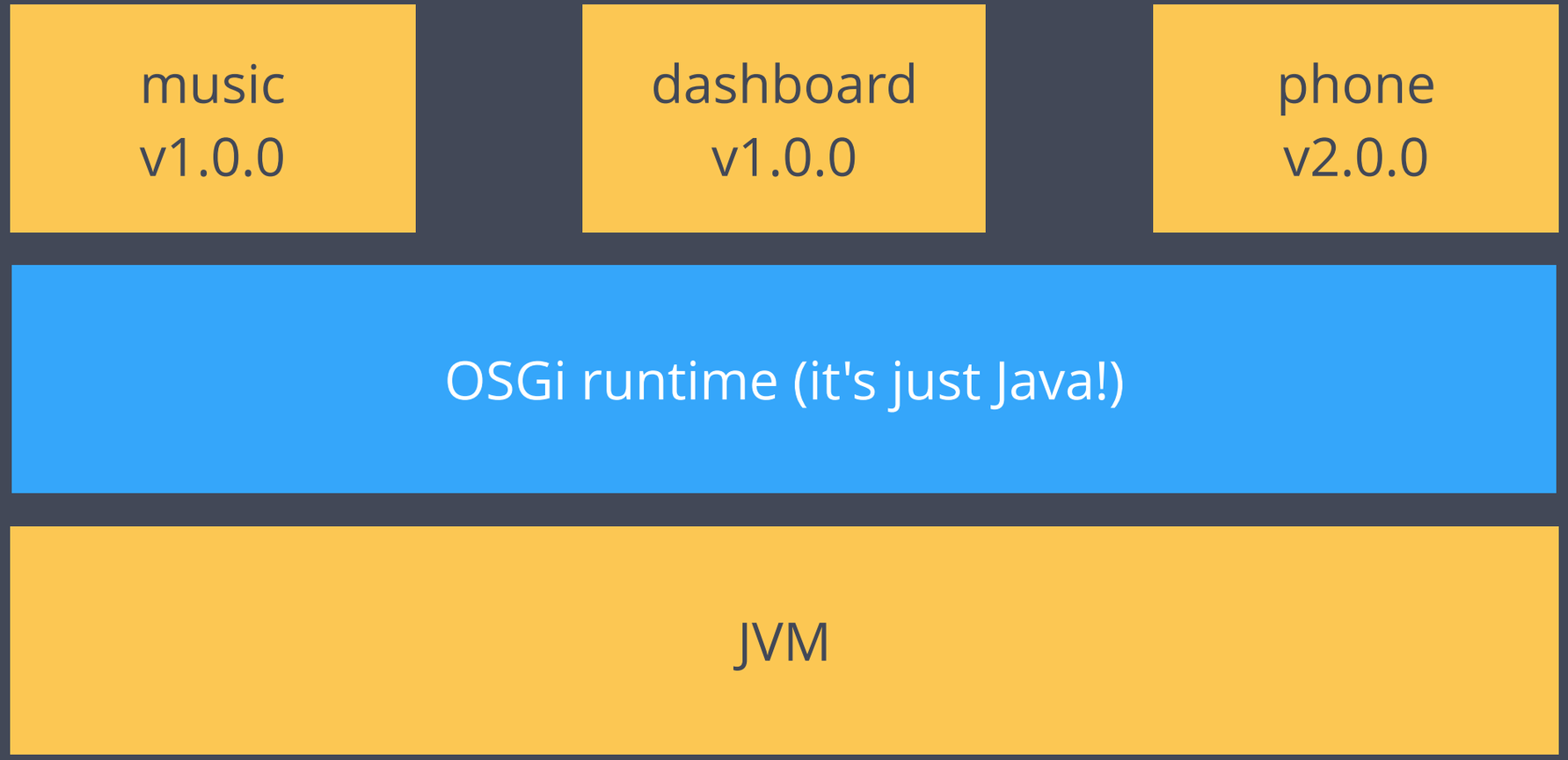
phone
v1.0.0

OSGi runtime (it's just Java!)

JVM

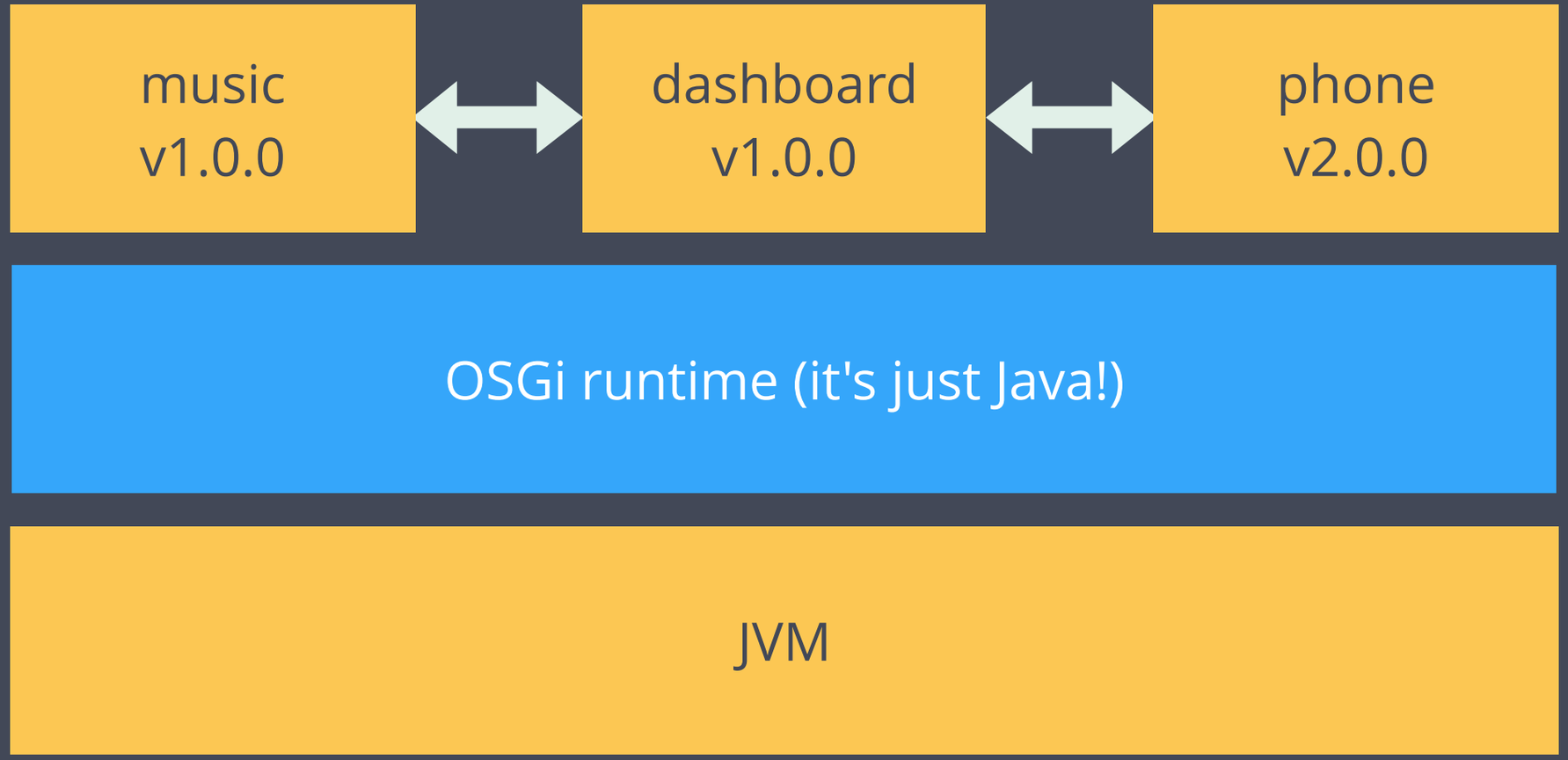
OSGi

Hot-swap bundles

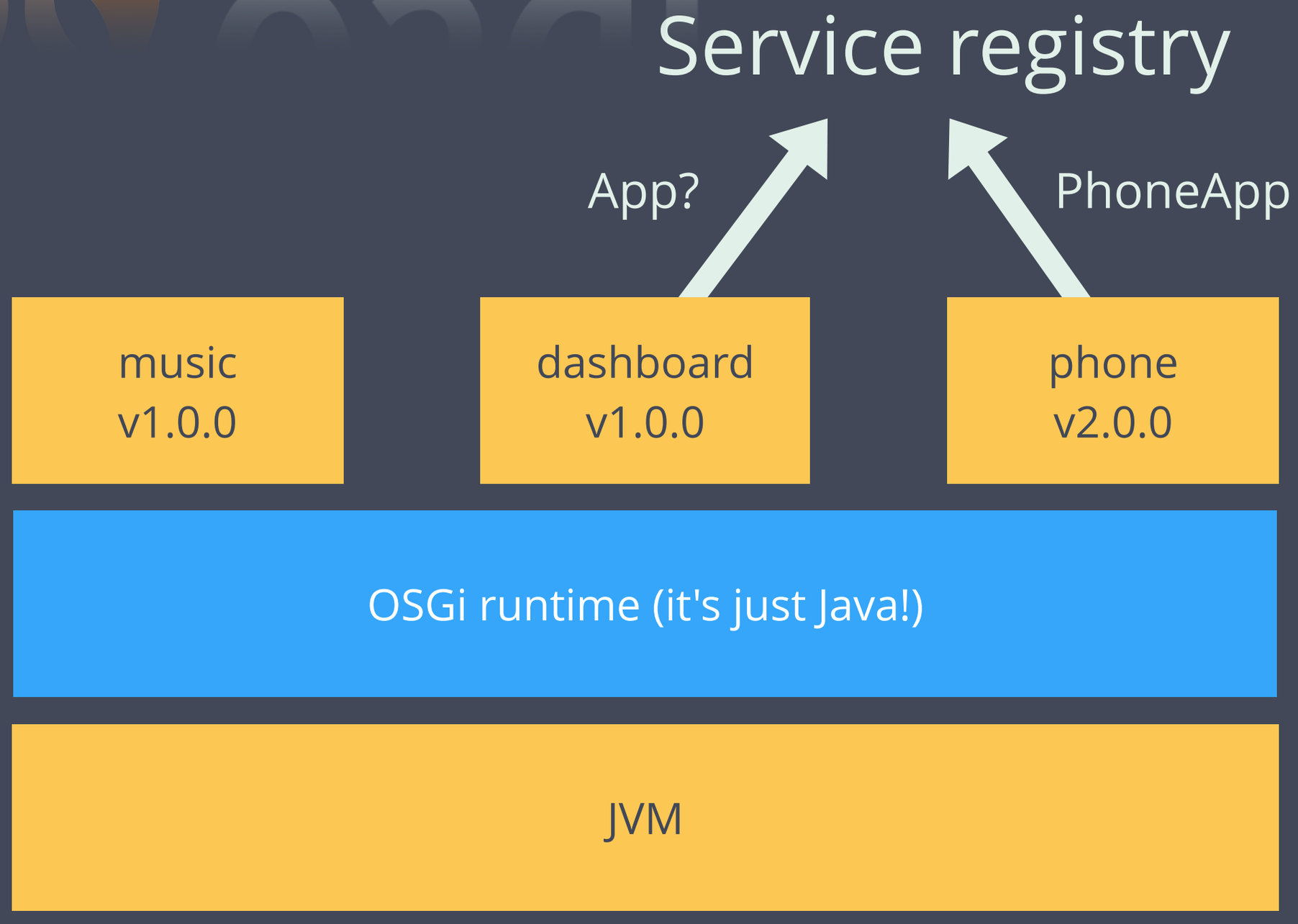


OSGi

Dependencies explicit
in bundle metadata

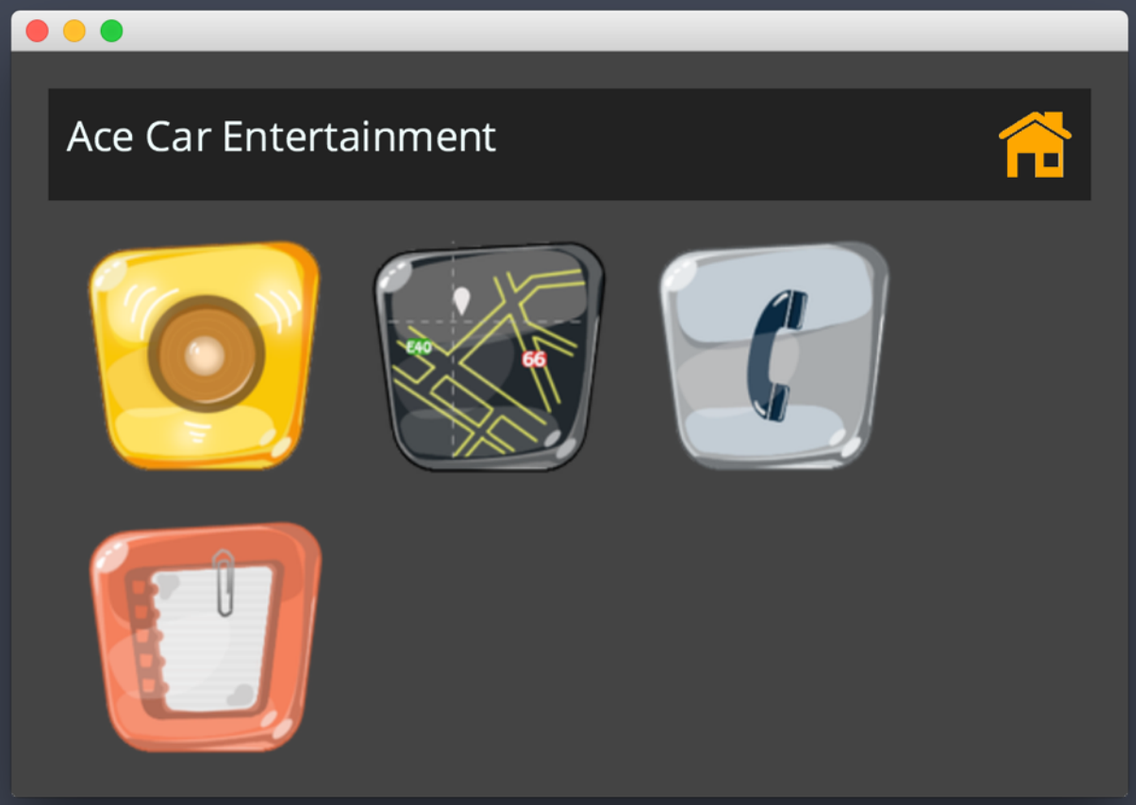


OSGi


Service registry
App?
PhoneApp
music
v1.0.0
dashboard
v1.0.0
phone
v2.0.0
OSGi runtime (it's just Java!)
JVM

Modular systems

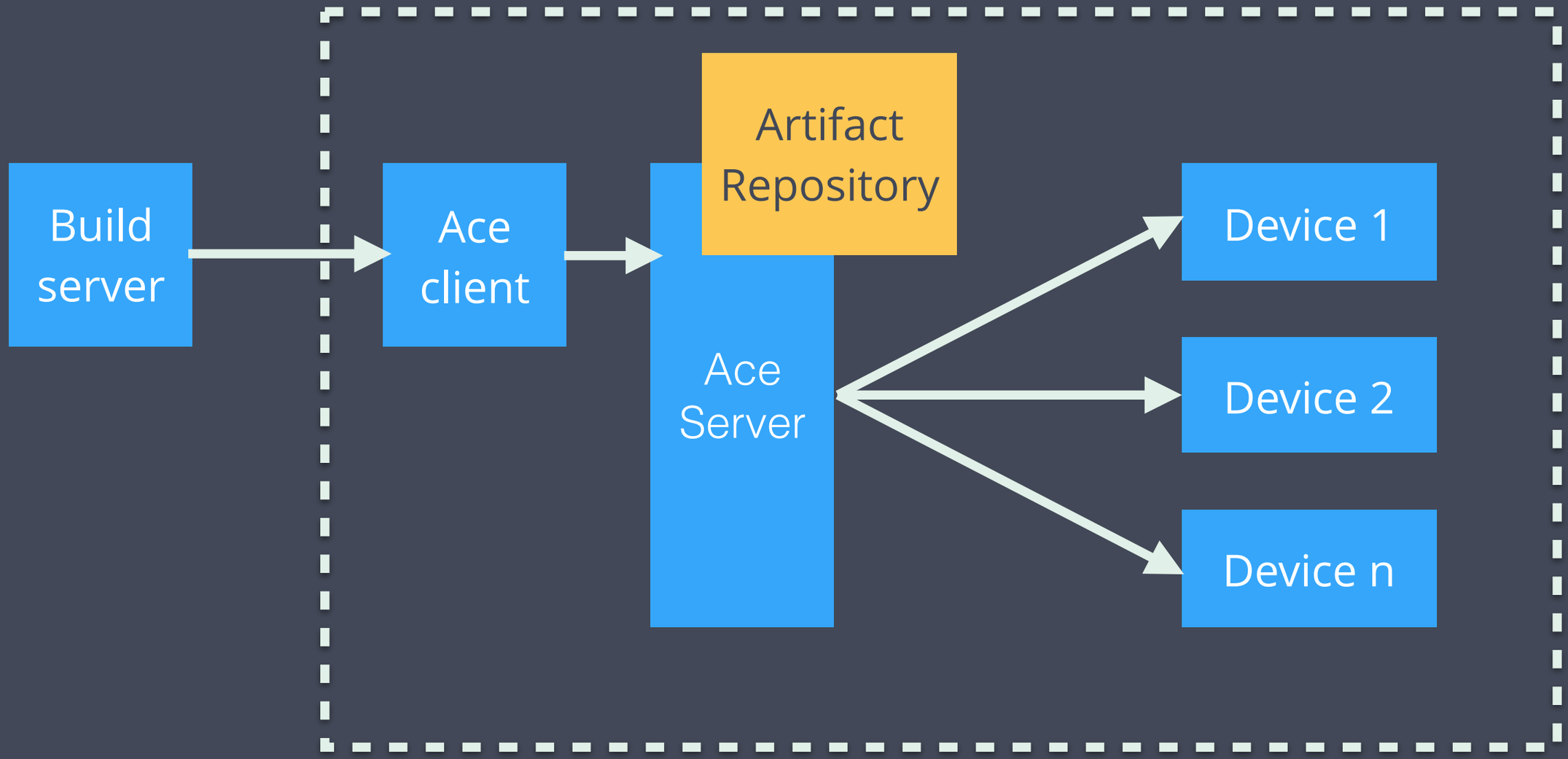
Demo code



Code @ bit.ly/carprov

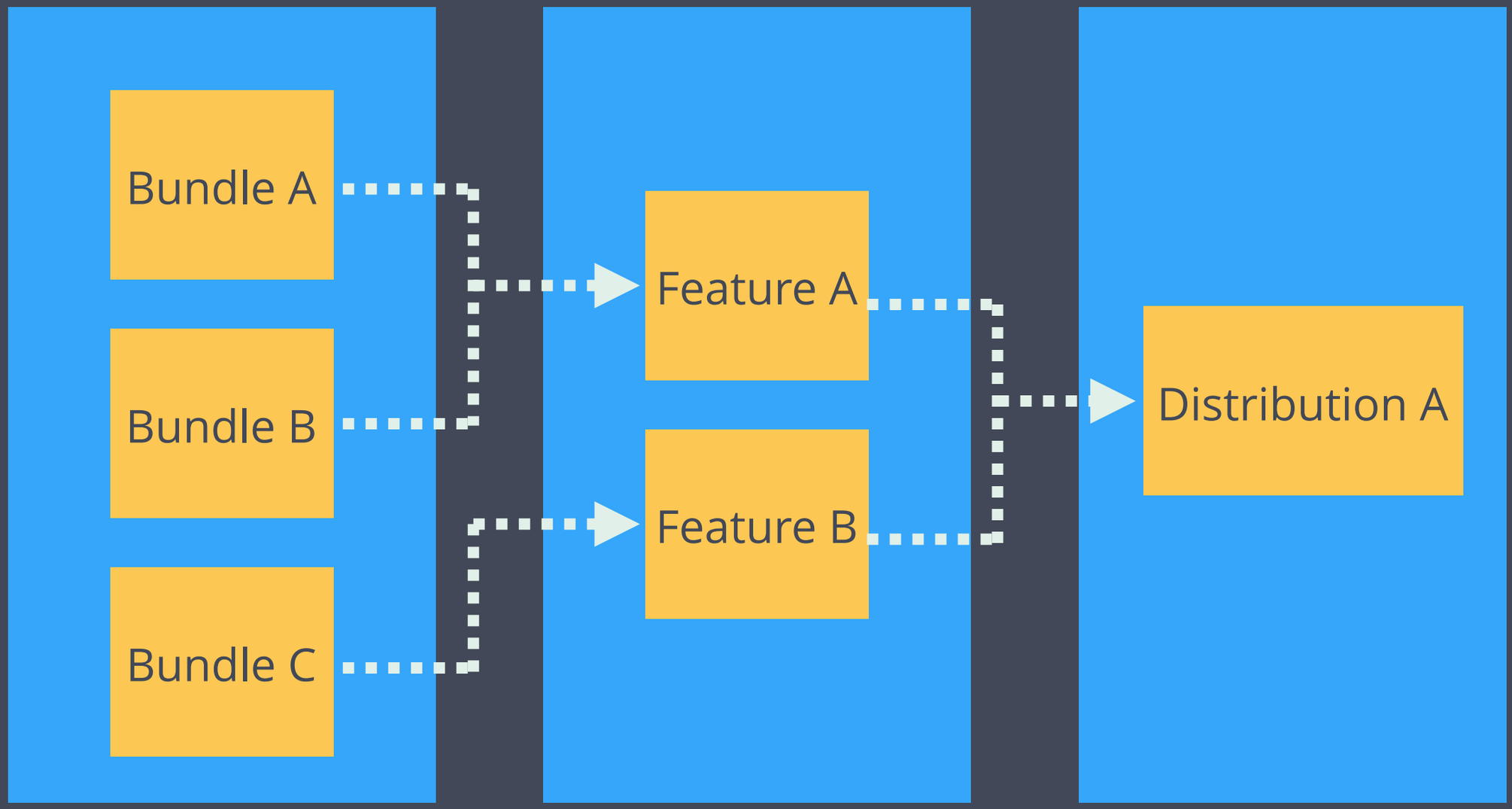

Apache
ACE

Apache ACE Architecture



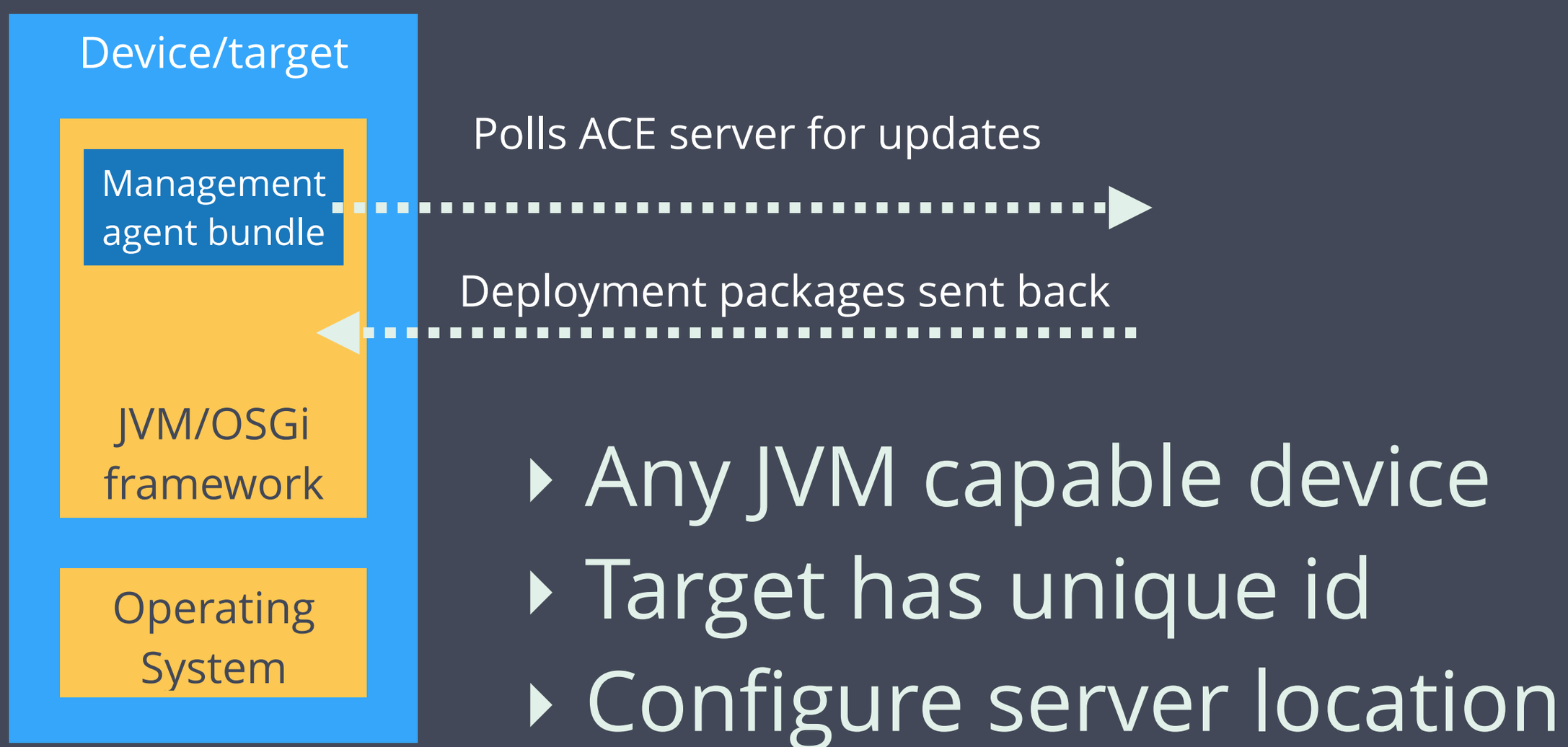
Apache ACE

Model



Apache ACE

Targets



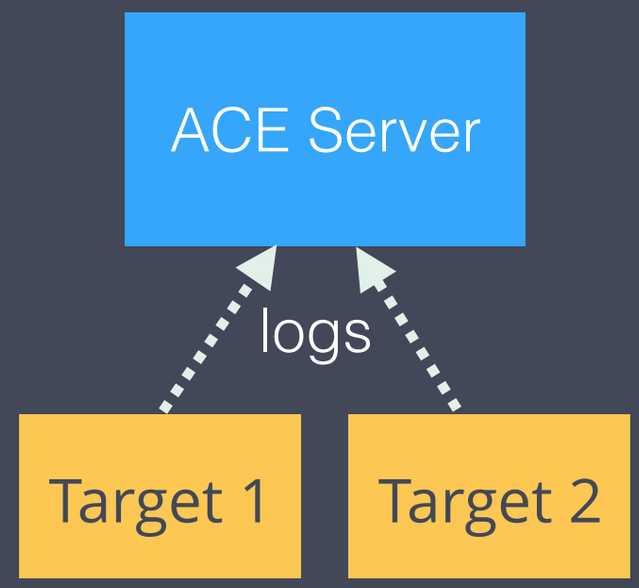
- Any JVM capable device
- Target has unique id
- Configure server location

Security:

- Explicit target registration
- HTTP auth or SSL Client Certificates

Process:

- Manual update approval
- Custom properties
- Audit logs



Scripting

REST

GET /work/{id}/feature

Java API

workspaceMgr.cw().lf()

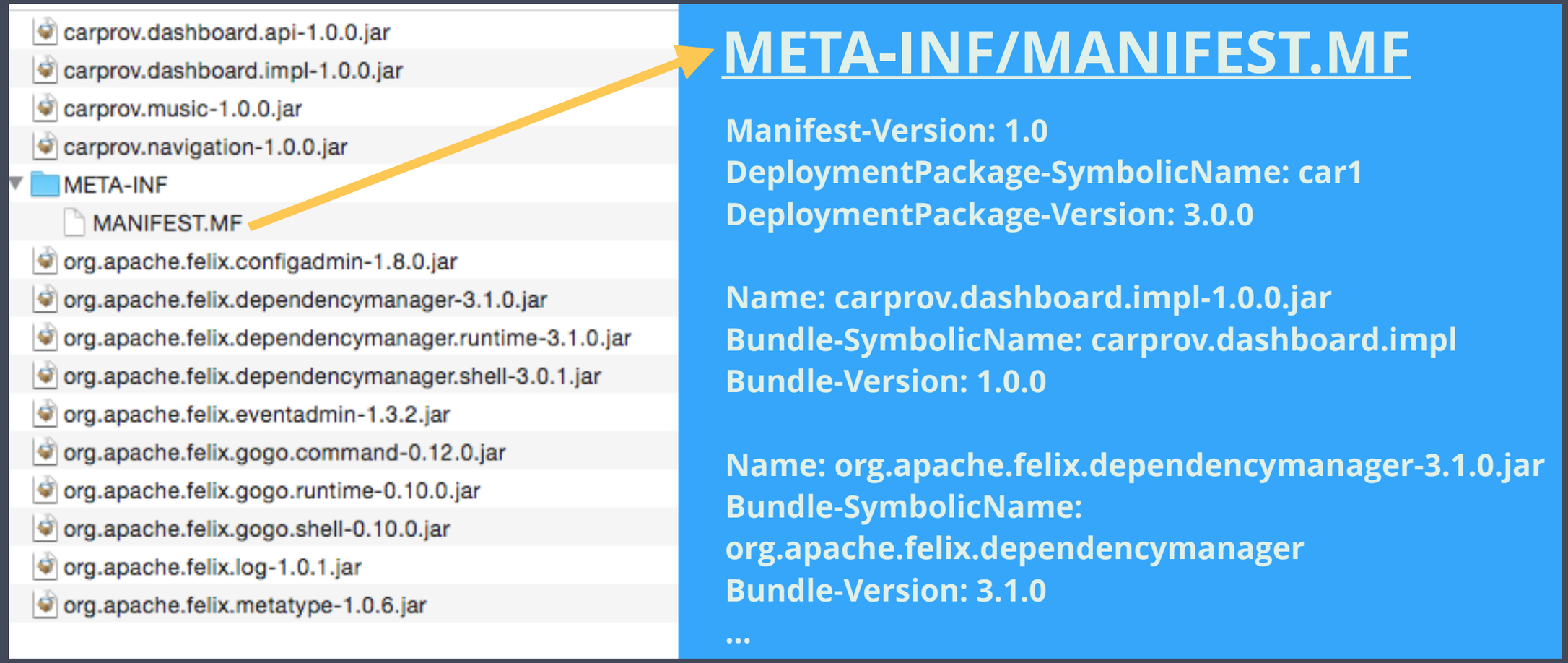
Gogo script

scriptable OSGi shell, calls (low-level) Java API

Deployment packages

Structure

GET /deployment/car1/versions/3.0.0



Deployment packages

Installation on target

- Transactional: retries and rollback
- Installation status in audit log

- Unreliable networks:
  - Download instead of stream
  - Resumable downloads
  - Custom update strategies

ACE Extensibility

- Built on modular OSGi architecture
- Different repository implementations
- Custom update strategies on targets
- Multiple topologies (e.g. relay server)
- ResourceProcessors for new artifact types

ACE Extensibility

ResourceProcessor

- Recognizes your artifact type
- Handles installation on target
- Upload ResourceProcessor to ACE

ACE Extensibility

Configuration ResourceProcessor

- Handles XML (MetaType) configs
- Placeholders replaced with target tags

On server:

```
...
   <Value>${context.mySpecificProperty}</Value>
...
```

On target:

```
...
   <Value>mySpecificValue</Value>
...
```

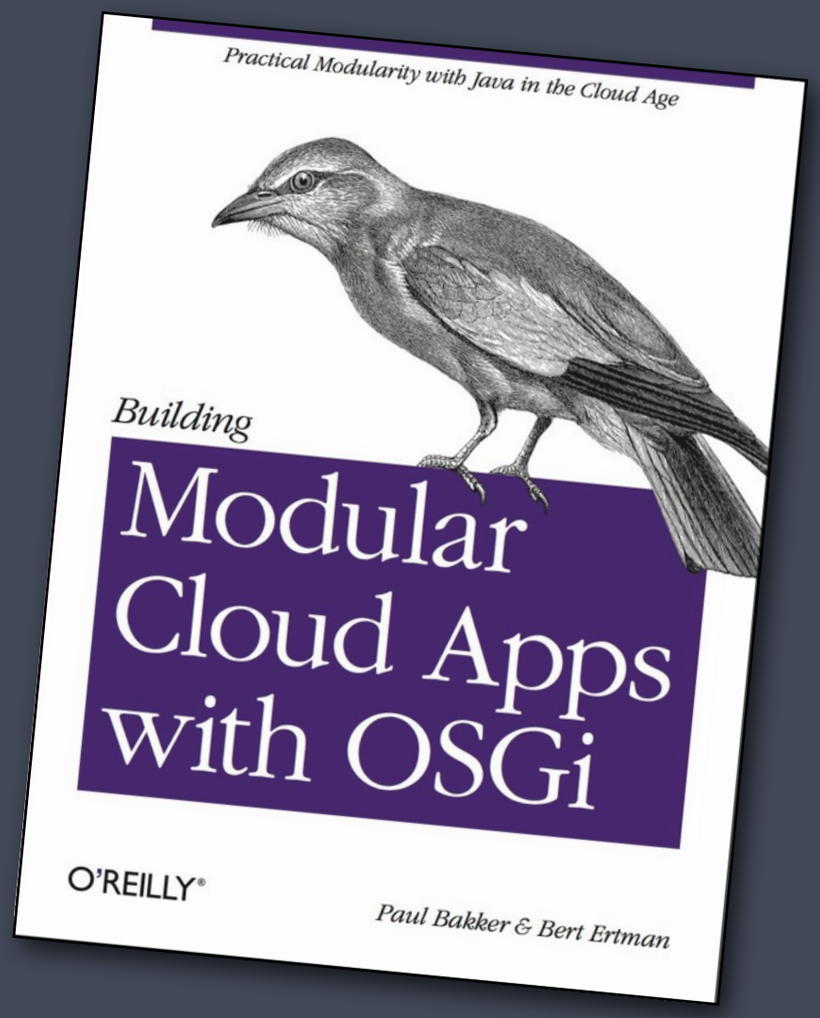
In summary

Apache ACE simplifies IoT deployments

Modular applications rock!

Modular deployment is worth your while

Thank you!



Code @
bit.ly/carprov

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luminis
Conversing worlds

amdatu

Apache ACE