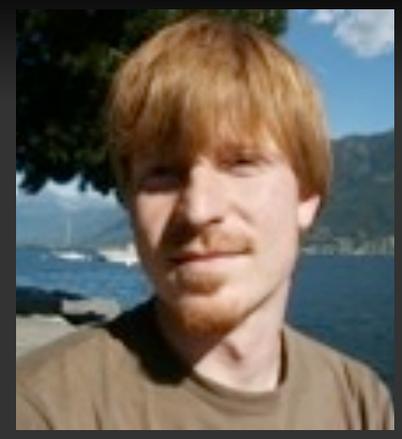
ACE in the Cloud

Karl Pauls & Marcel Offermans

luminis TECHNOLOGIES

Karl



- Member Apache Software Foundation
  - PMC: Felix, Sling, Incubator
  - PPMC: Ace, Clerezza, Celix
- Fellow at Luminis
- Co-Author of „OSGi in Action“
- karl.pauls@luminis.eu

Marcel

- Member Apache Software Foundation
  - PMC: Felix, Incubator
  - PPMC: ACE, Celix
- Fellow at Luminis
- marcel.offermans@luminis.eu

Luminis

Luminis

http://www.luminis.eu/?lang=en
http://luminis-technologies.com/

Requirements for exercises

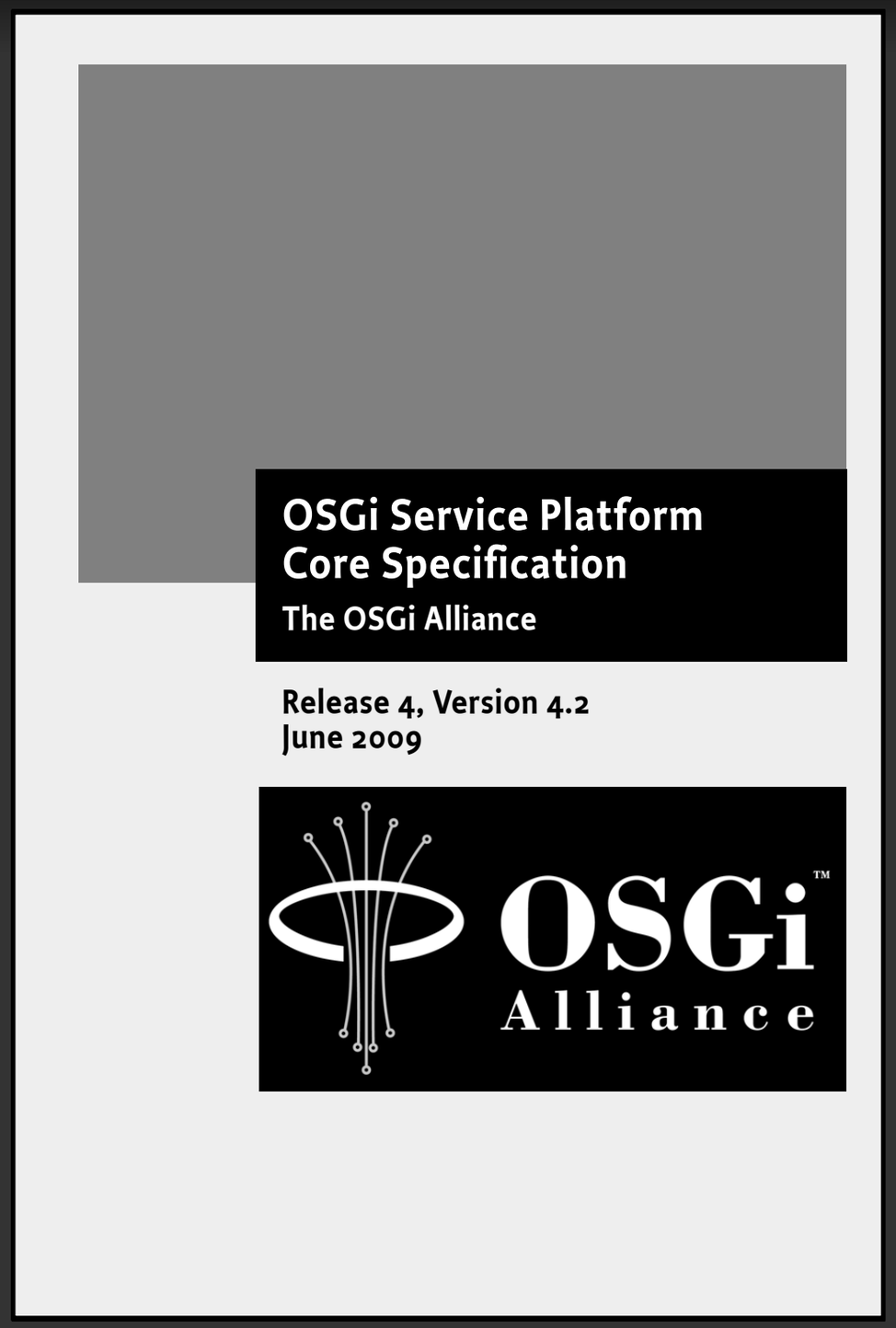
- Eclipse IDE
- Apache Maven
- Java 6
- BndTools
  - at http://njbartlett.name/bndtools.html
- E-mail eclipsecon-2011@luminis.eu for:
  - access to your EC-2 node with Apache ACE
  - a shared DropBox folder with the exercises

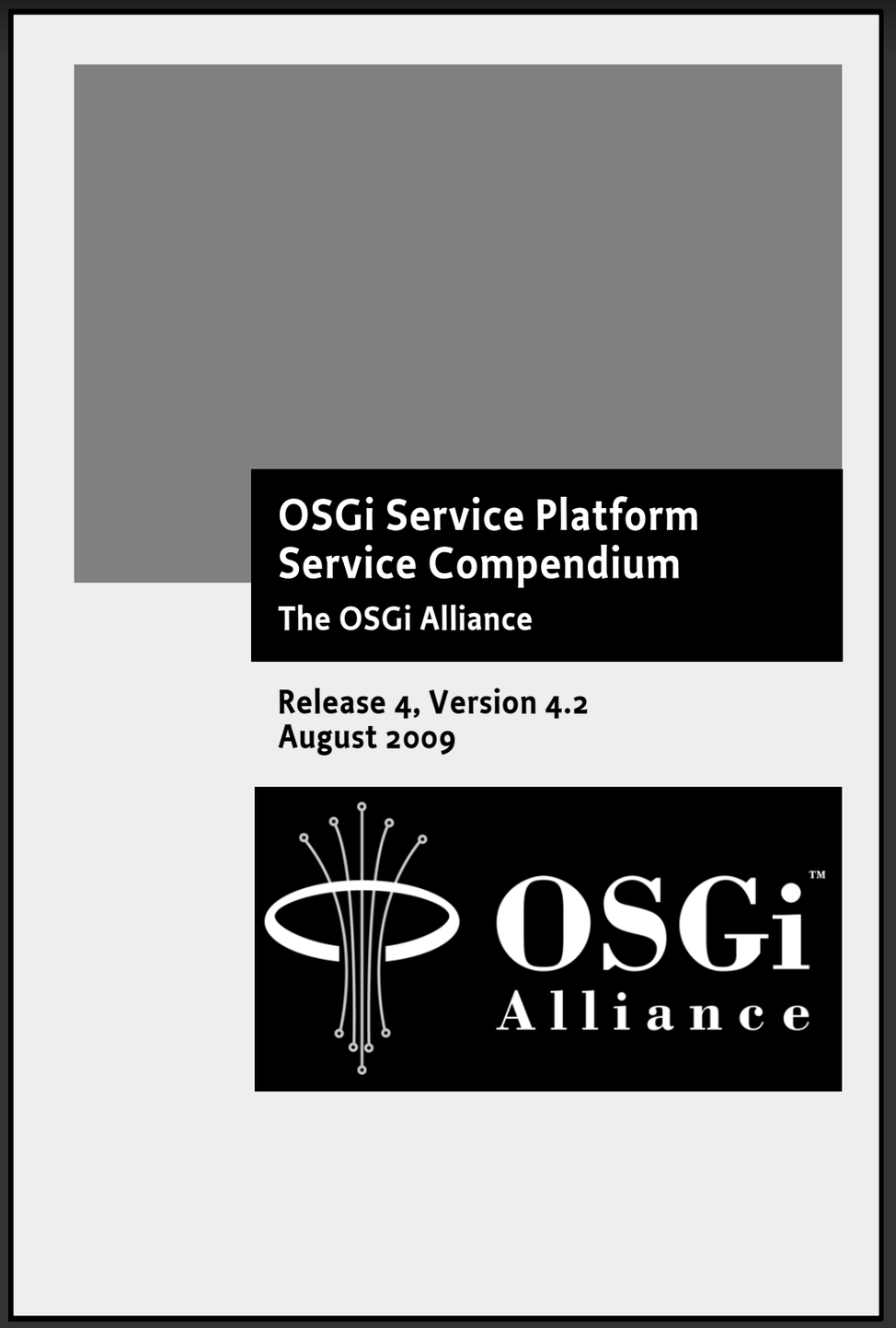
Agenda

- Provisioning in OSGi
- Hands on: creating an OSGi application
- Overview of Apache ACE
- Cloud extensions
- Hands on: deploying in the cloud
- Hands on: building and using ACE locally
- Closing Remarks

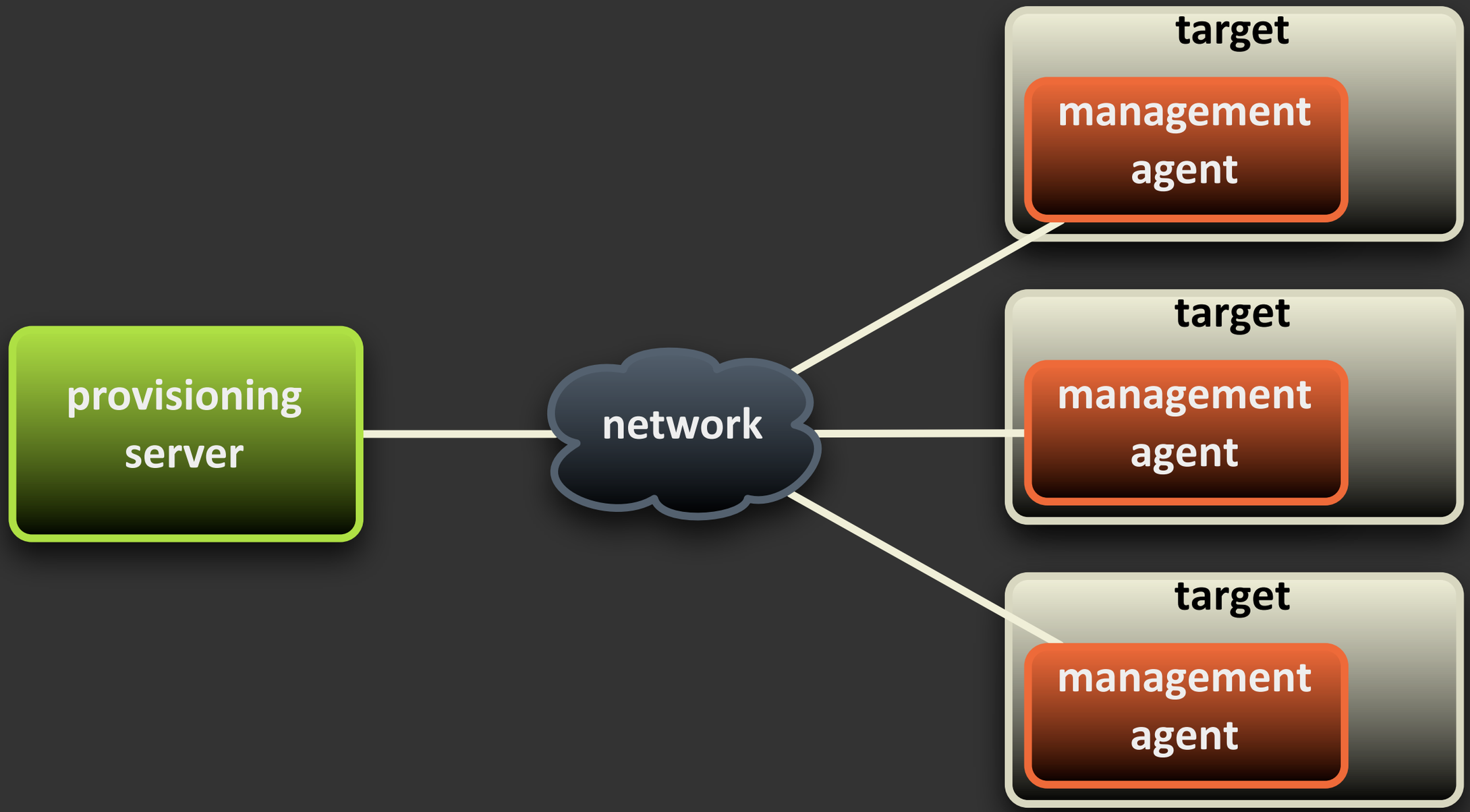
Provisioning in OSGi

OSGi: core + compendium





Topology


target
management agent
target
management agent
target
management agent
provisioning server
network

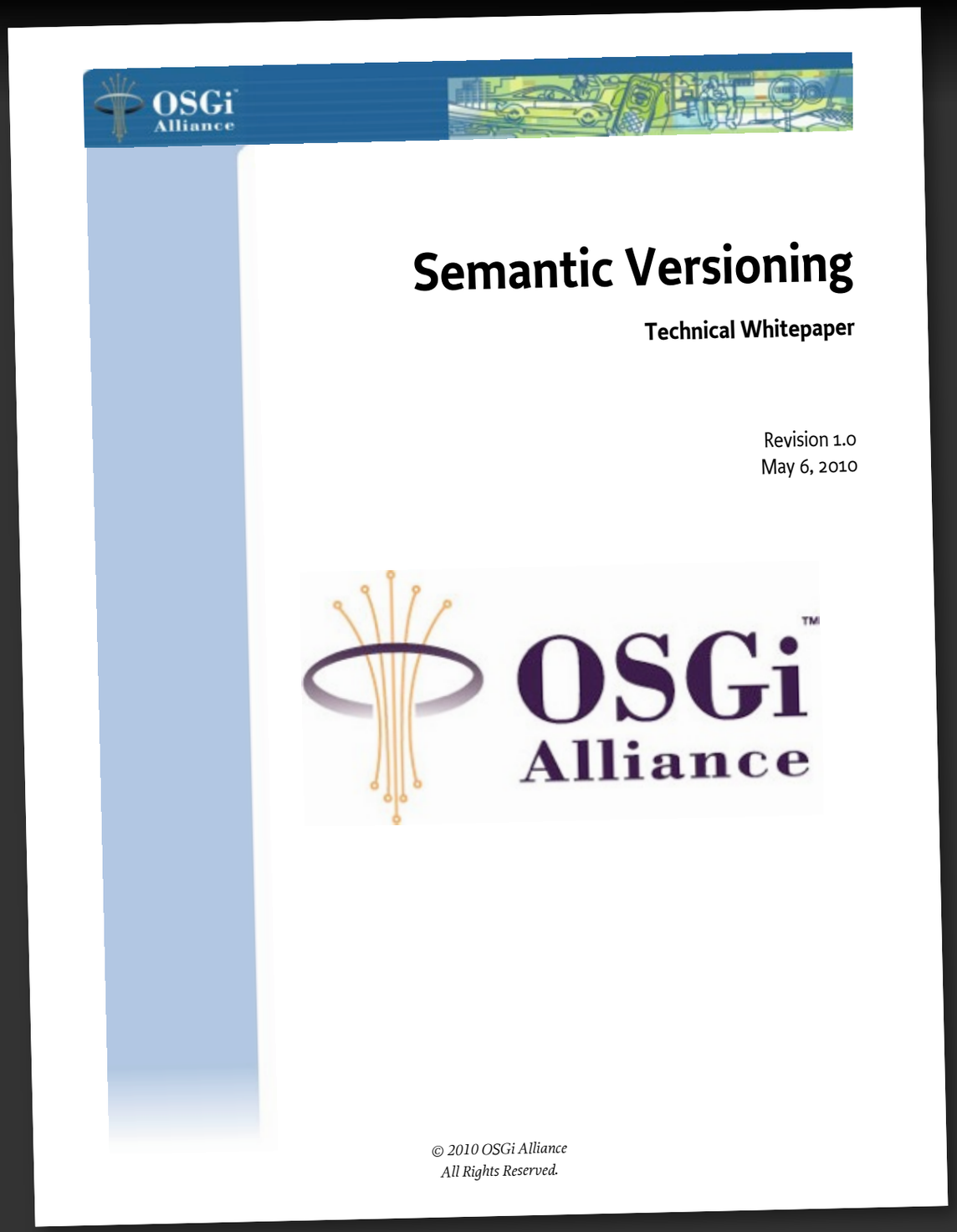
Management Agent

- manages life cycle of bundles
  BundleContext
- controls package sharing policies
  PackageAdmin
- controls starting/stopping order
  StartLevel
- implements a security policy
  ConditionalPermissionAdmin

Management Agent

- manages life cycle of bundles
  BundleContext
- controls package sharing policies
  PackageAdmin
- controls starting/stopping order
  StartLevel
- implements a security policy
  ConditionalPermissionAdmin

Tip: Semantic Versioning whitepaper


OSGi Alliance

Semantic Versioning

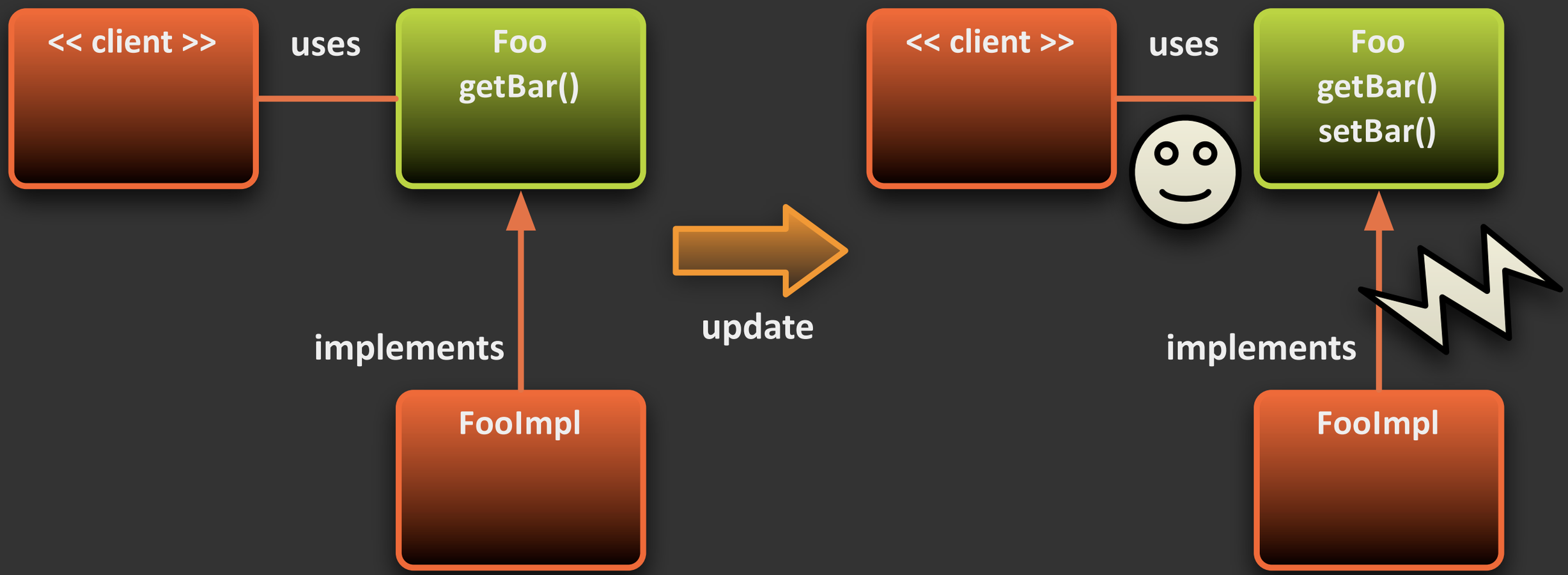
Technical Whitepaper

Revision 1.0
May 6, 2010

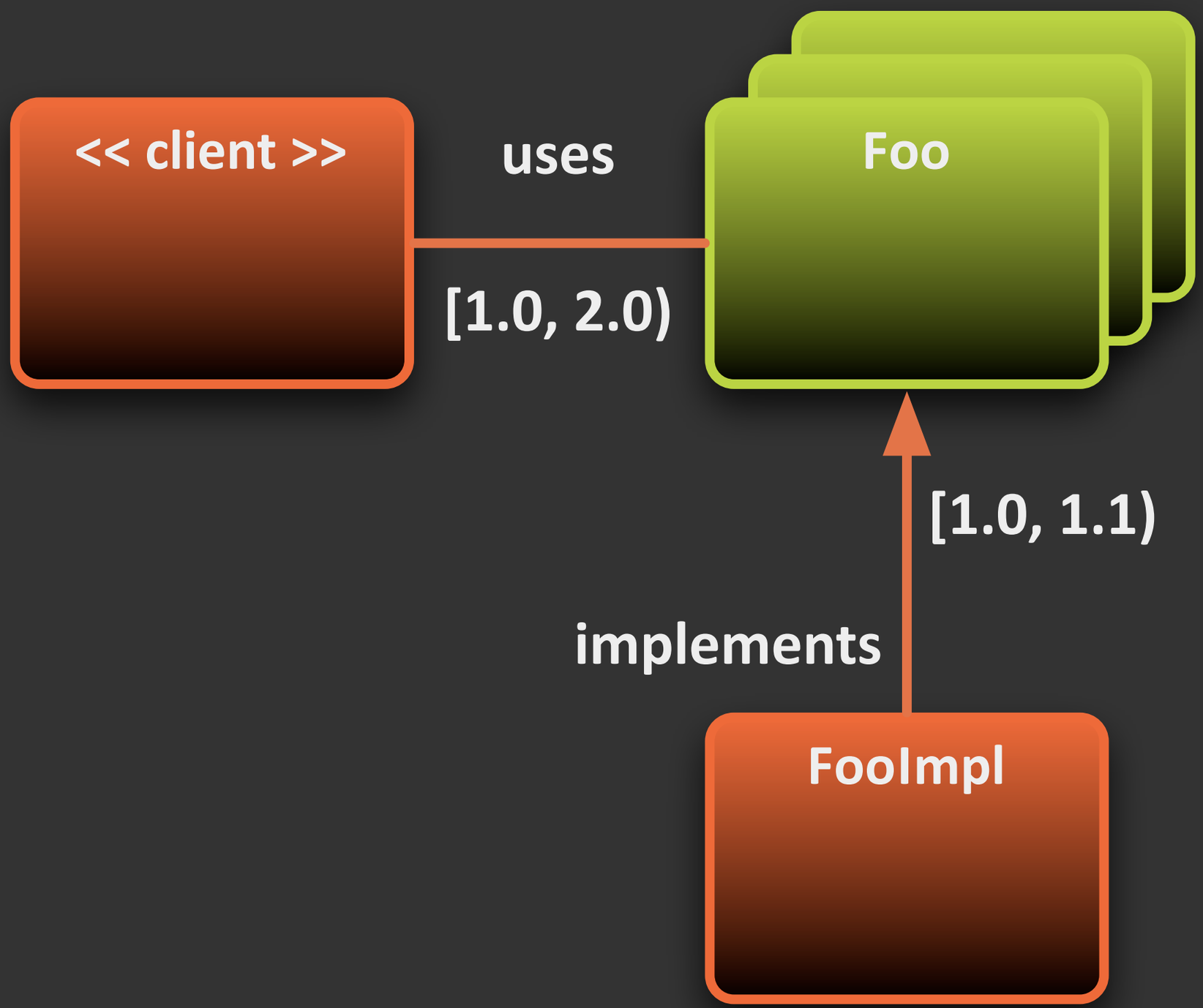
OSGi™ Alliance

Source: http://www.osgi.org/wiki/uploads/Links/SemanticVersioning.pdf

Downsides and Pitfalls



Best Practice



bndtools

Bnd

- Tool to create bundles
- .bnd files are “manifests on steroids”
  - Bundle-Version: 1.0.0
    Bundle-Activator: search.solr.Activator
    Private-Package: search.solr,\
        org.apache.lucene*, org.apache.solr*,\
    Import-Package: org.w3c.*,\
        javax.xml*, !junit.*, !sun.misc,\
        *
    Include-Resource: conf
- Details at: http://www.aqute.biz/Code/Bnd

BndTools

- Eclipse tools, based on Bnd
- very fast development cycle
- one or more bundles per project
- supports OSGi versioning policies
- Documentation and installation: http://njbartlett.name/bndtools.html

Hands On

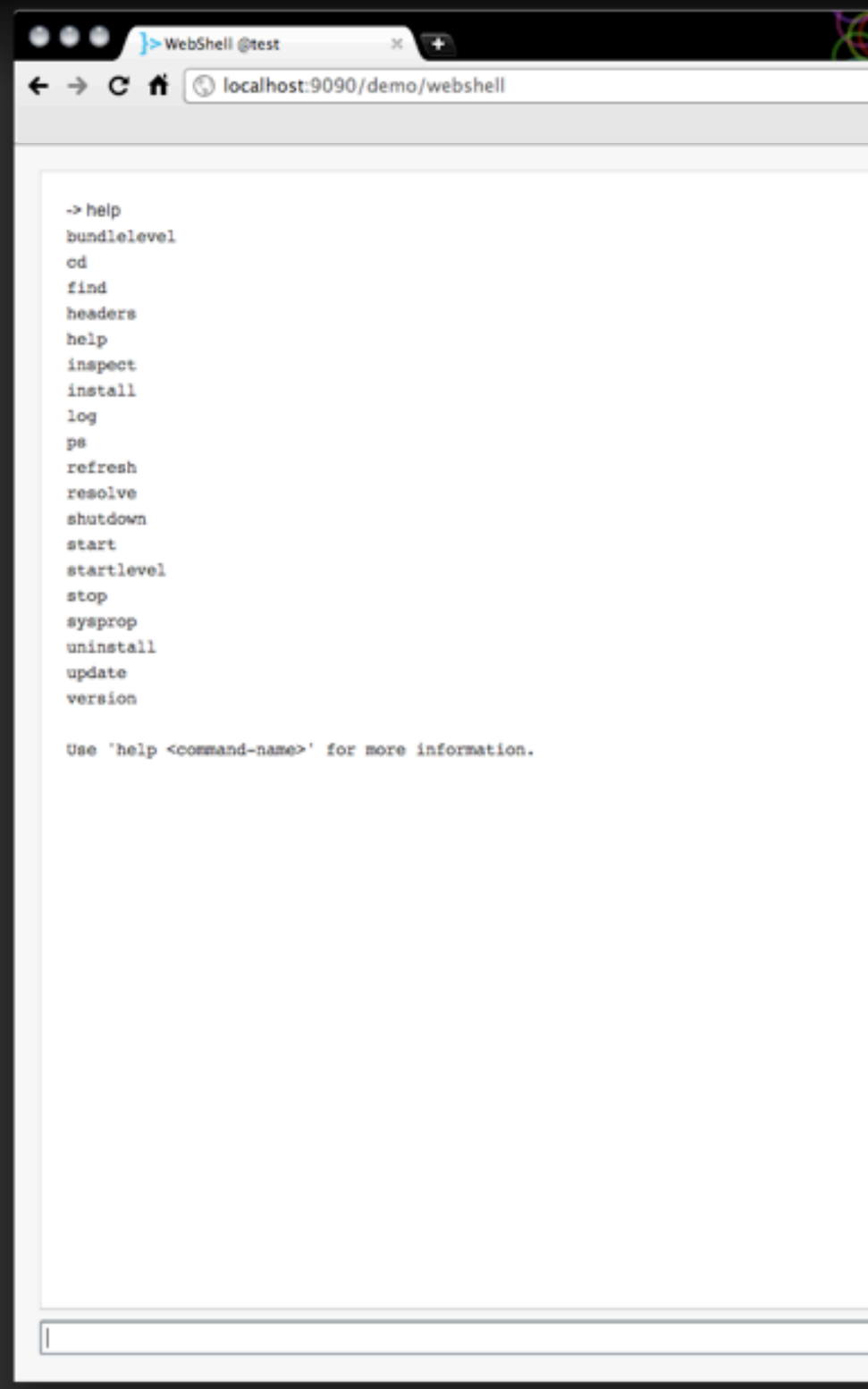
1. OSGi application

Introducing “WebShell”

- A simple OSGi application that uses the Felix Shell
- Web based using the Vaadin UI toolkit
- Configurable through Configuration Admin

Introducing “WebShell”

- A simple OSGi application that uses the Felix Shell
- Web based using the Vaadin UI toolkit
- Configurable through Configuration Admin



Exercise

- Create a new Eclipse workspace
- Import projects from the projects.zip located on the dropbox folder or memory stick
- Go to webshell/bnd.bnd, in the context menu do “Run As/OSGi Run”
- Point your browser at http://localhost:9090/demo/webshell

Apache ACE

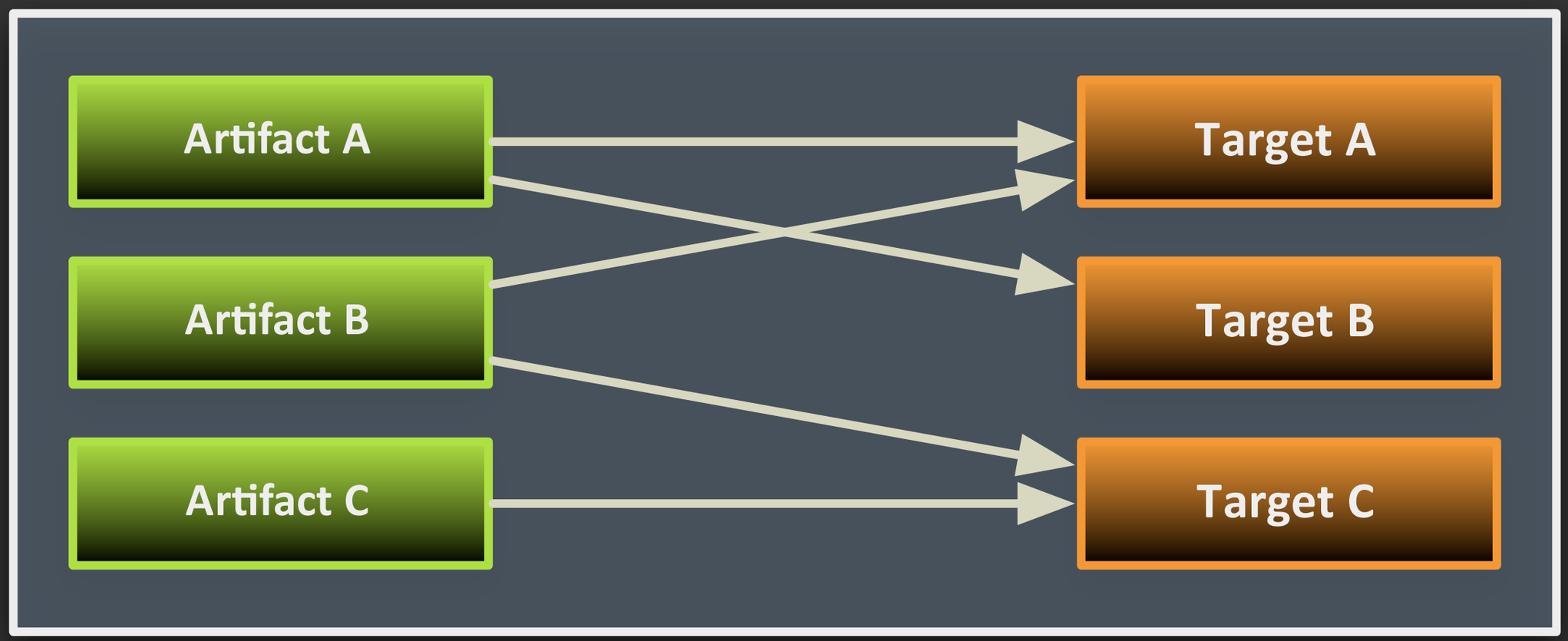
Provisioning Solutions

- Apache Felix File Install
- Apache Karaf
- Equinox p2
- OSGi Bundle Repository Client
- Pax Runner
- Apache ACE

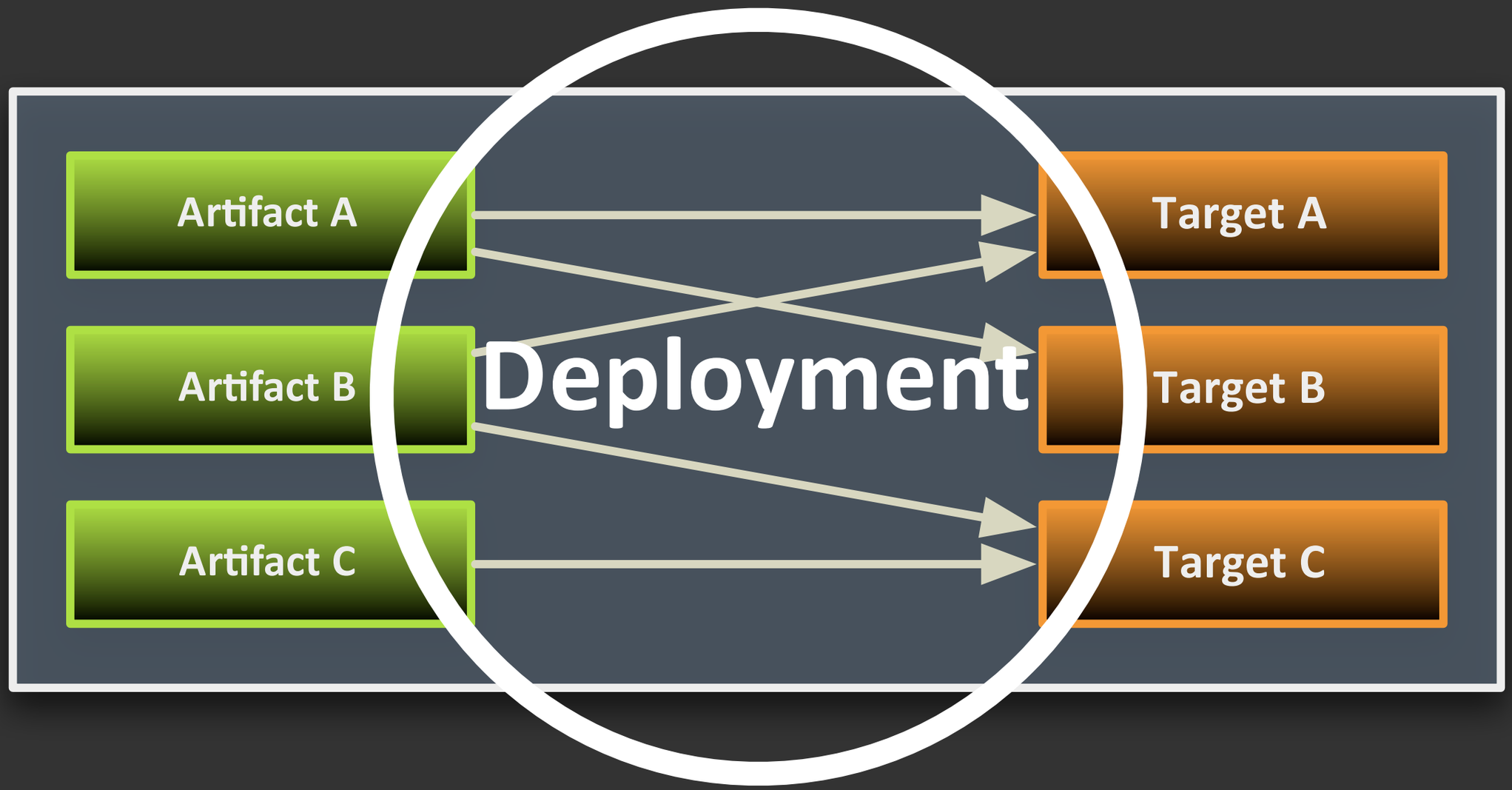
Apache ACE

- Started in incubator on April 24th 2009
- Software distribution framework based on OSGi
- 12 committers
- working codebase
- http://incubator.apache.org/ace/

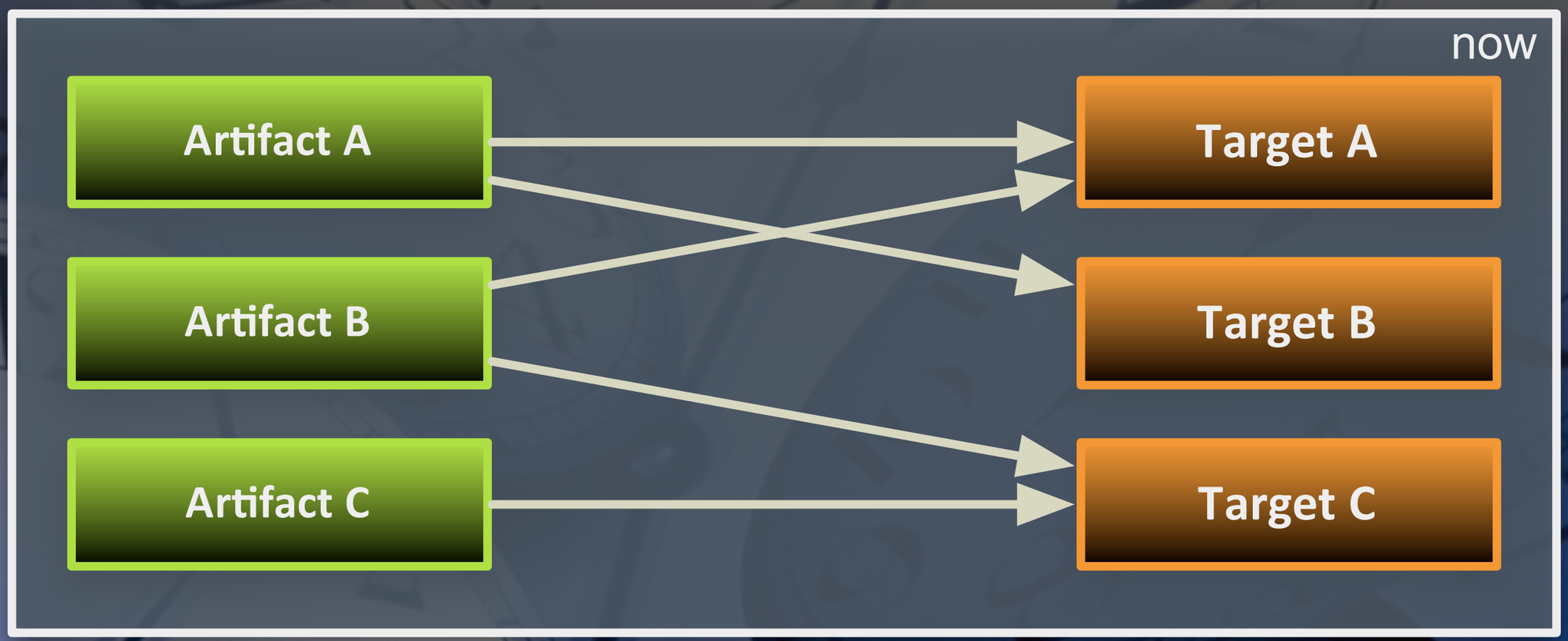
Deployment



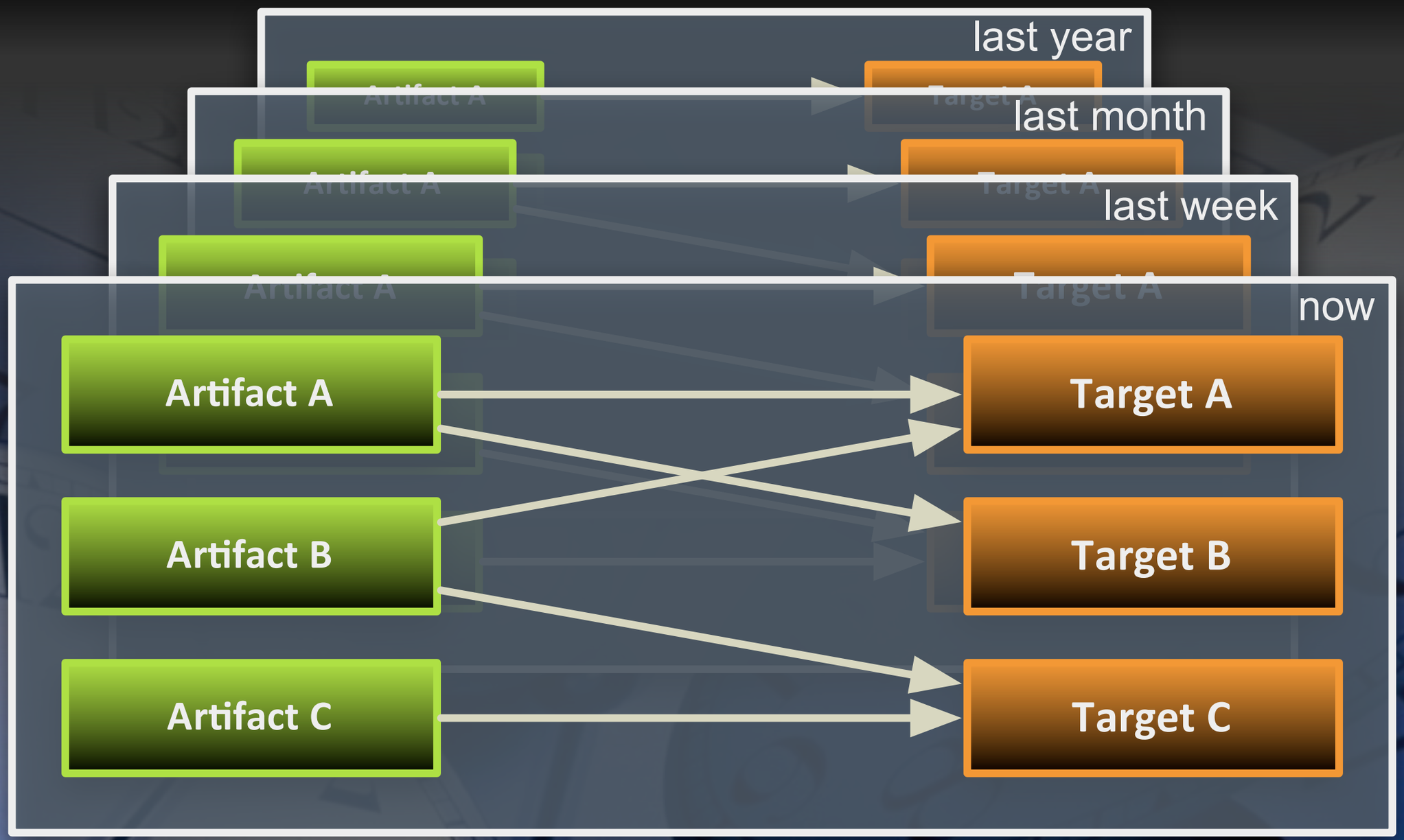
Deployment


Artifact A
Artifact B
Artifact C
Deployment
Target A
Target B
Target C

Keeping the history



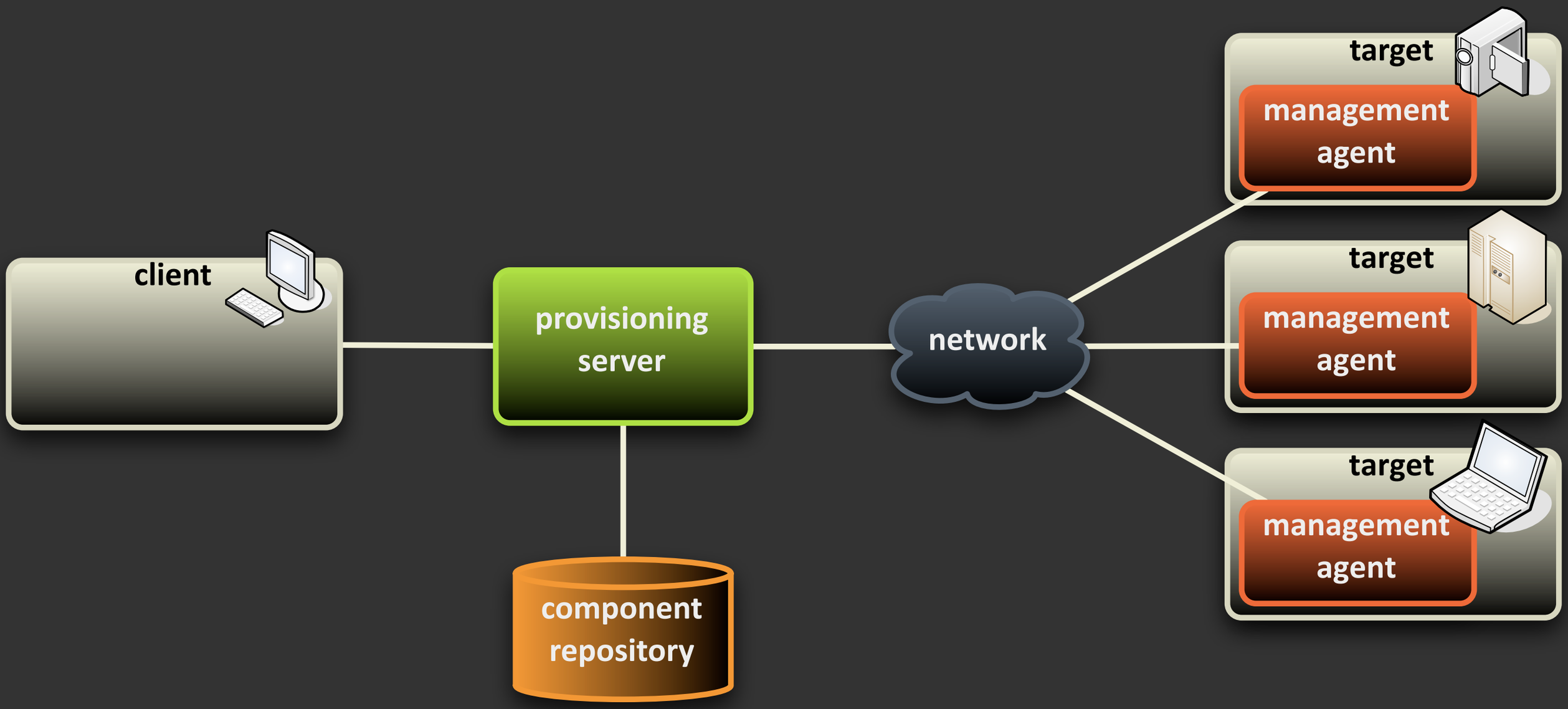
Keeping the history



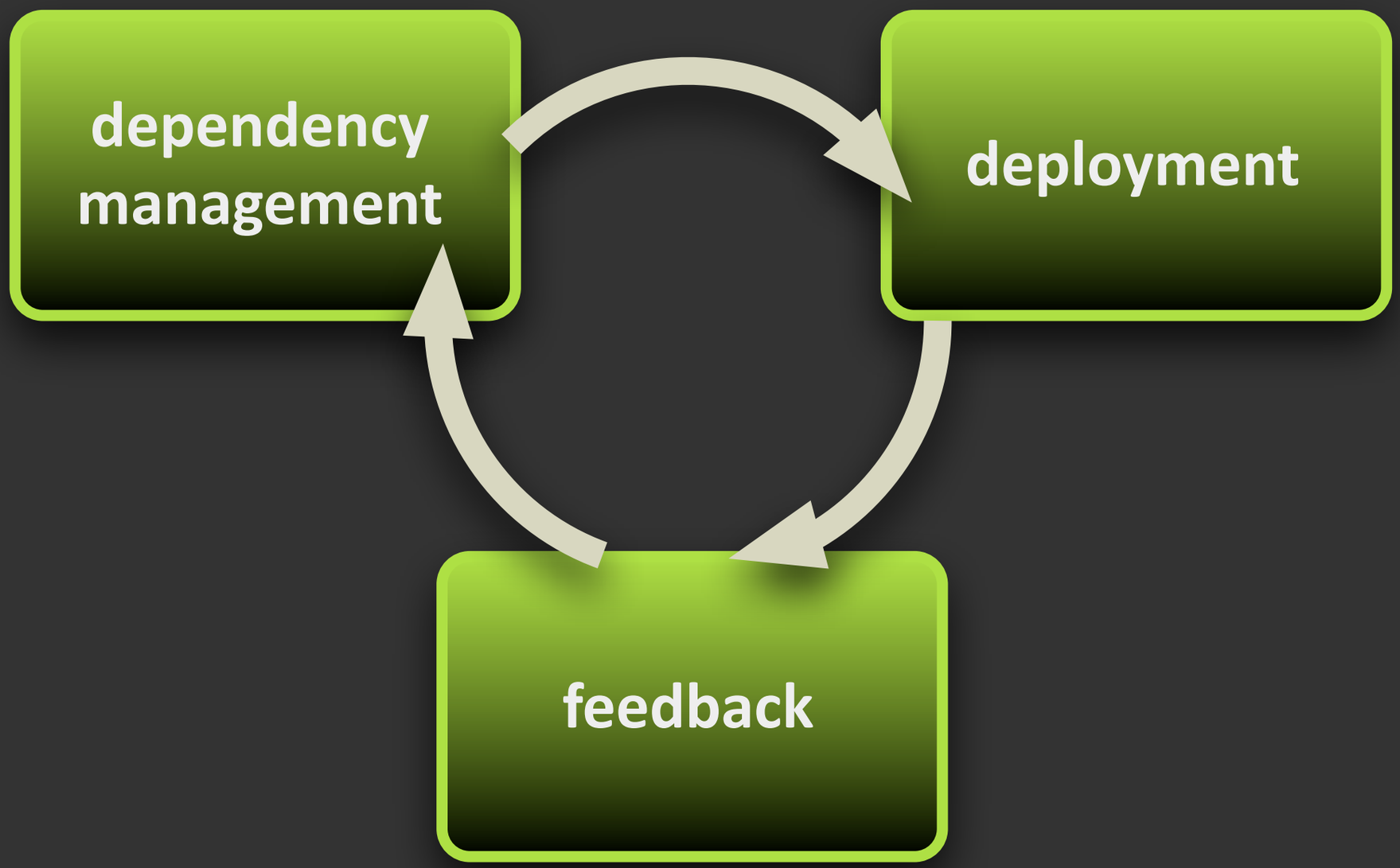
Why?

- Automate deployment
- Insight into who uses what
- History of each system
- Consistent development, testing, production
- Basis for several possible extensions

Topology


target
management agent
client
provisioning server
network
target
management agent
component repository
target
management agent

High level overview



High level overview

dependency management

Dependency Management

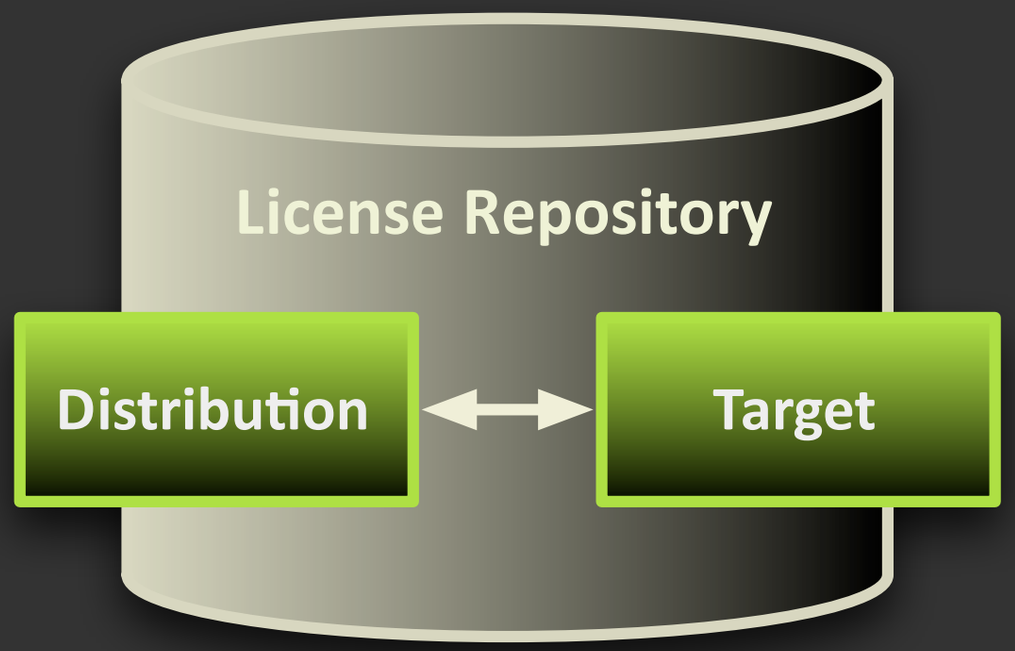
- Organizing artifacts
- Mapping them to targets

Organizing artifacts

- group artifacts: makes them manageable
- two levels: feature and distribution
- Analogy: IKEA catalog
- data is kept in “store repository”

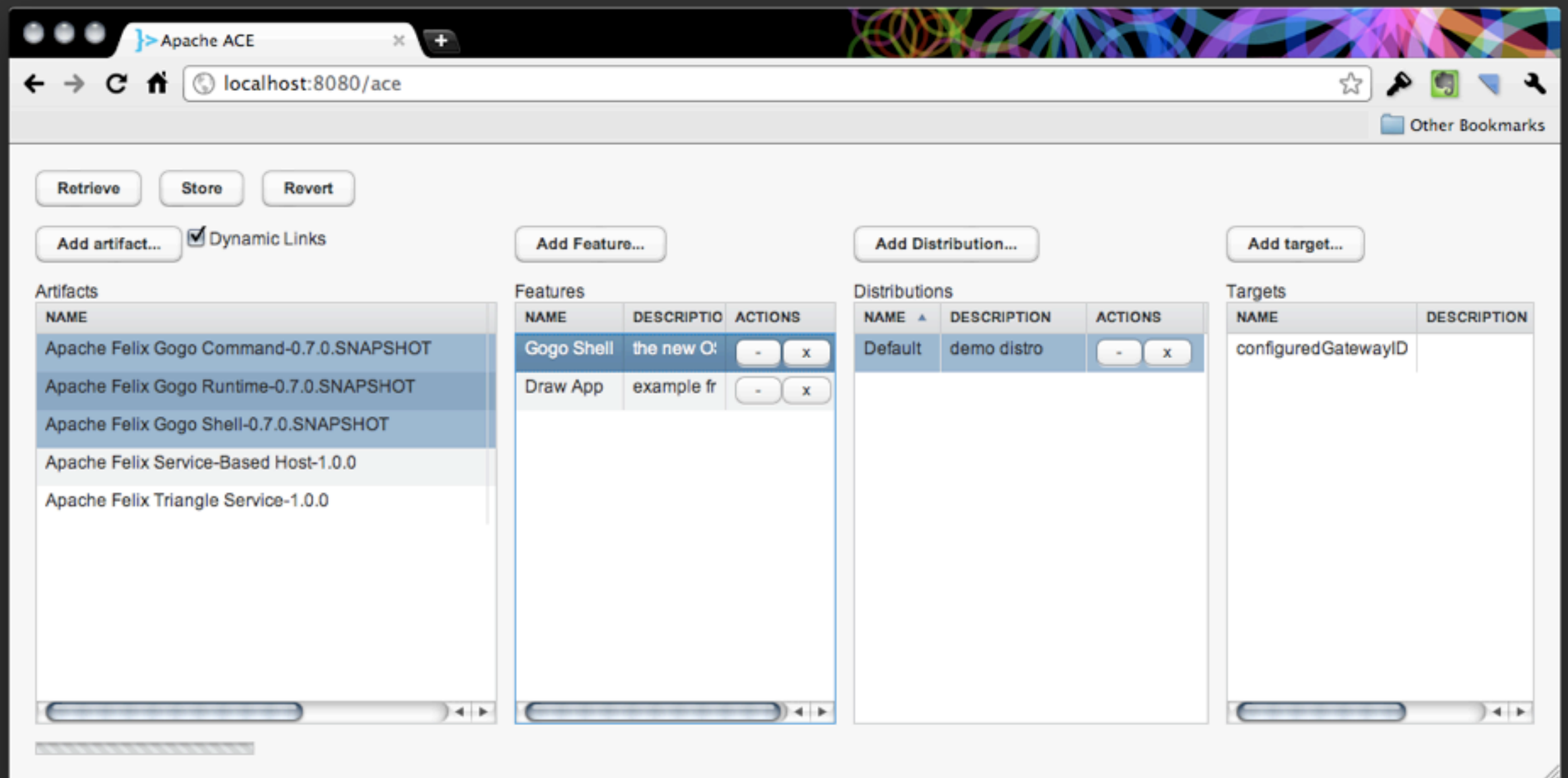
Mapping them onto targets

- mapping distributions to targets
- sometimes done by an external system
- data kept in “license repository”

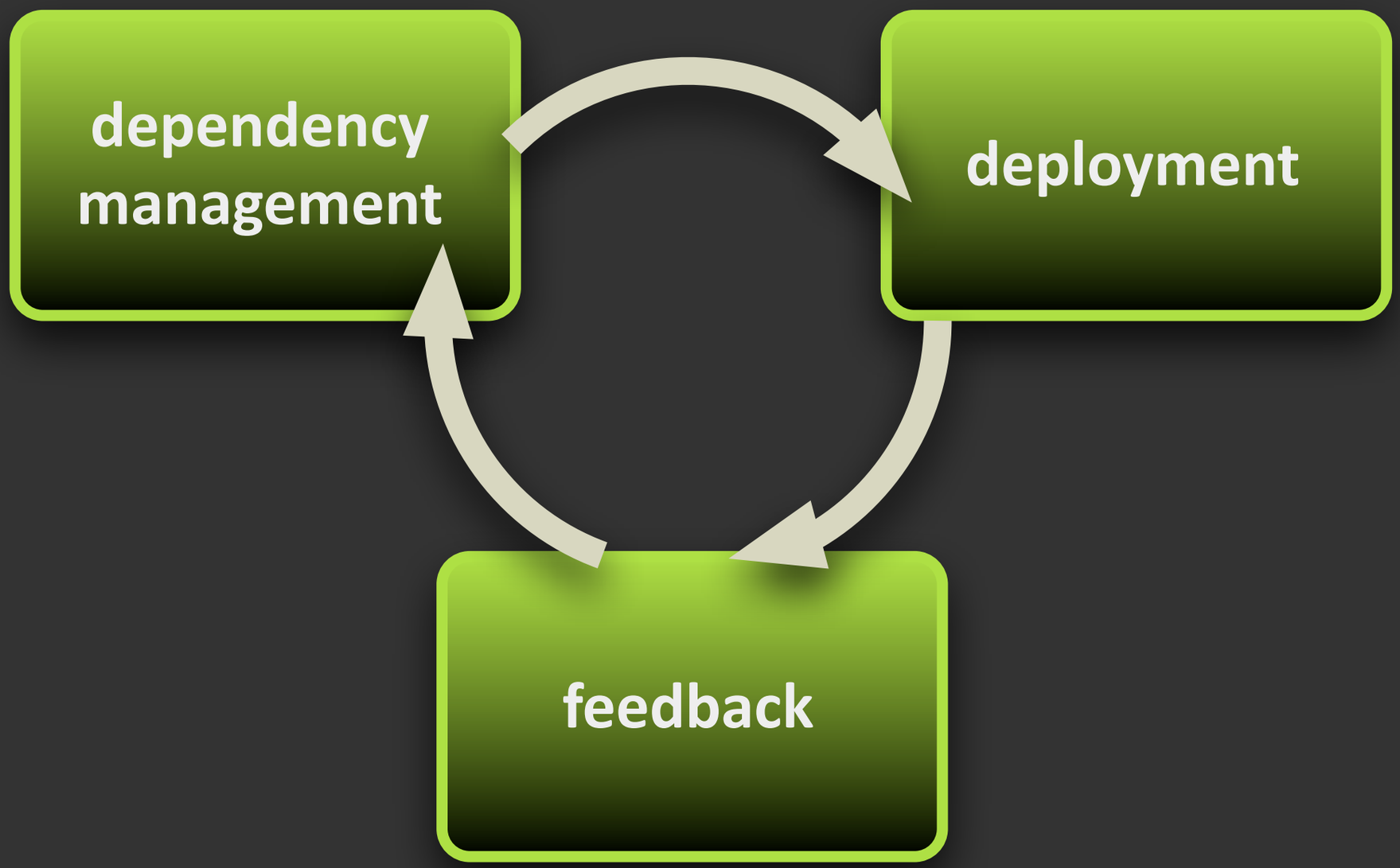


User Interface

- retrieve, modify and store
- interact with OBR



High level overview

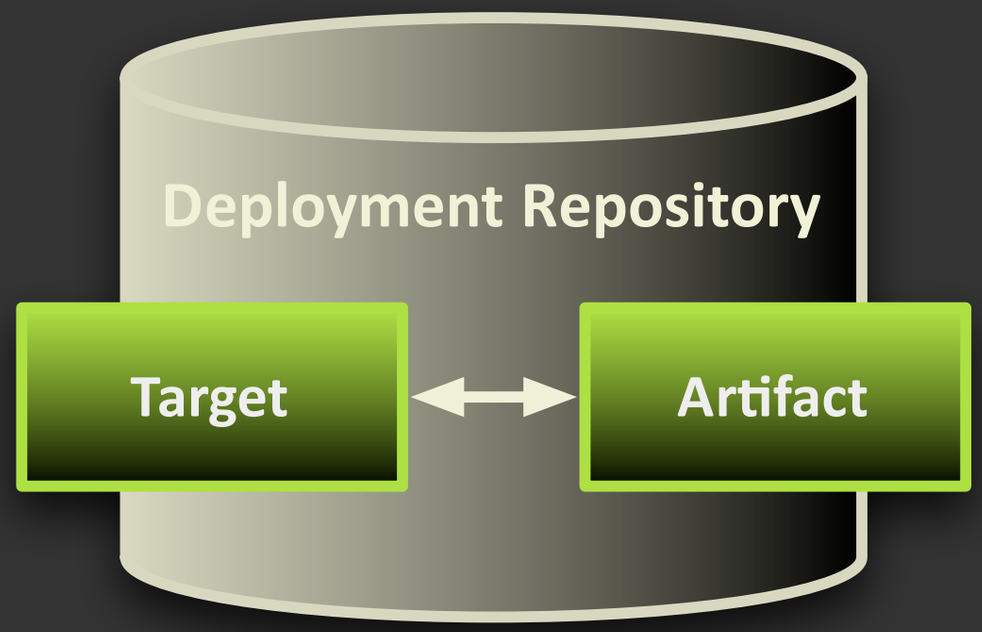


High level overview

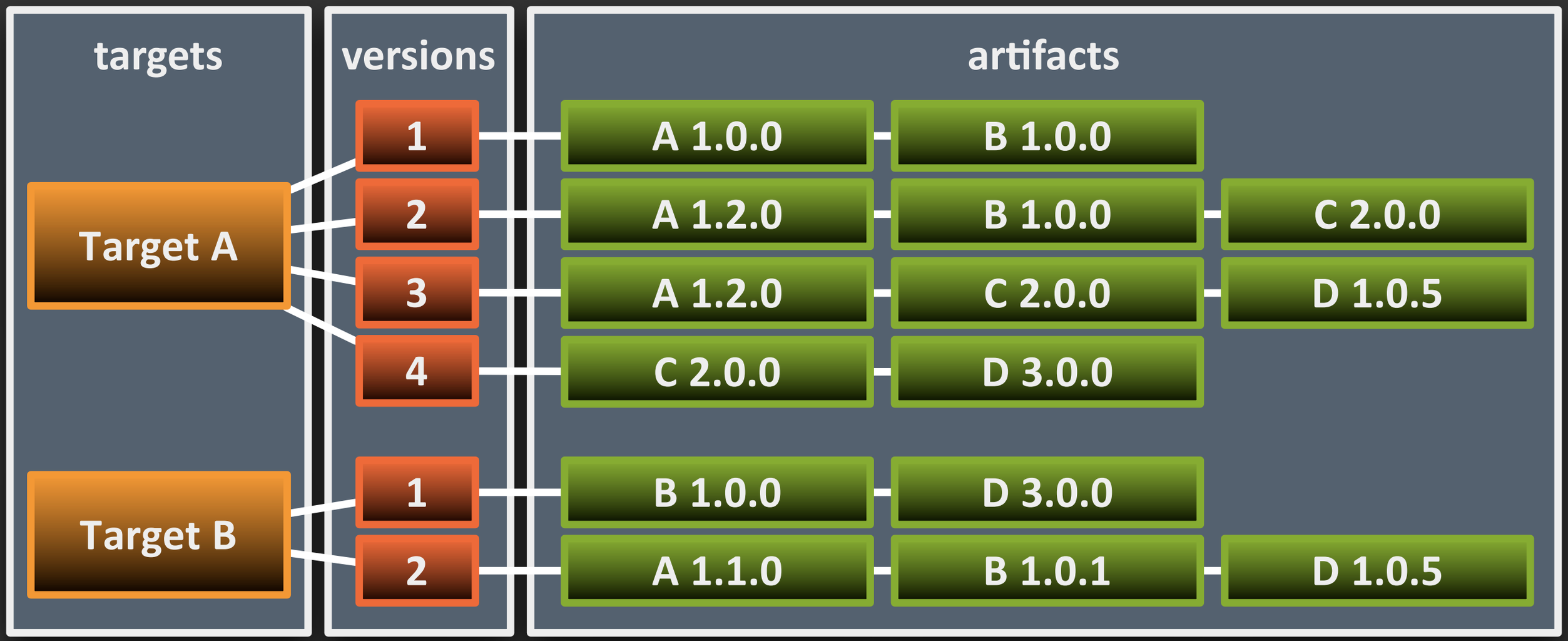
deployment

Deployment

- deployment repository
- management agent



Deployment Repository

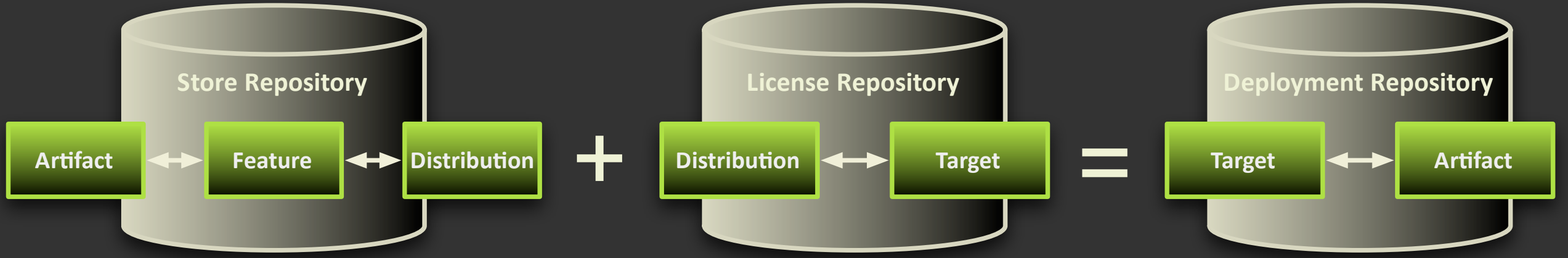


Management Agent

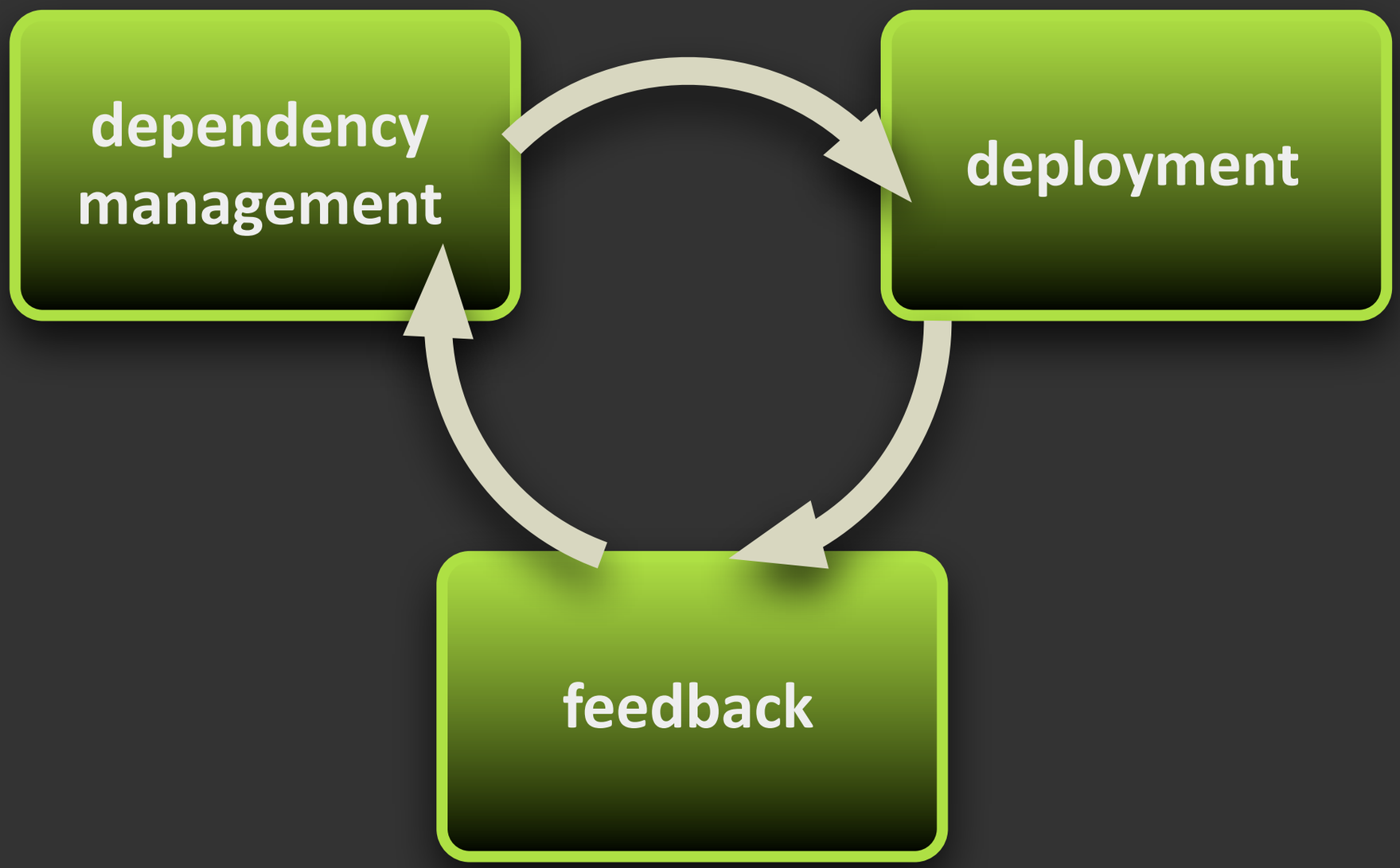
Deployment Admin

- deployment packages
- versioned set of artifacts
- transactional install/update
- fix packages provide deltas
- signing makes them secure
- extensible through resource processors
- AutoConfig defines configuration admin data

From dependency to deployment



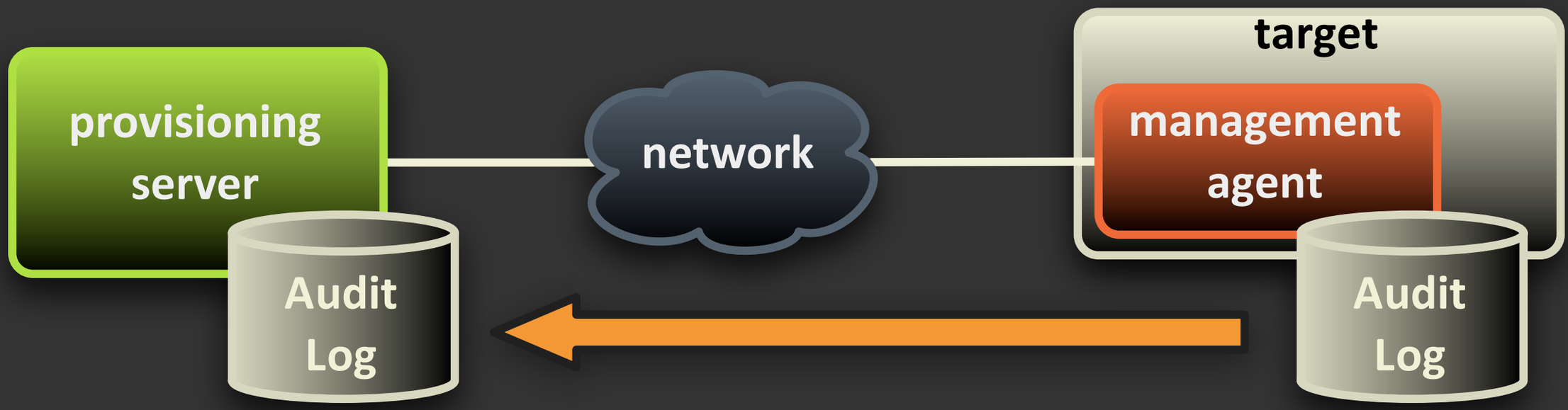
High level overview



High level overview

feedback

Feedback

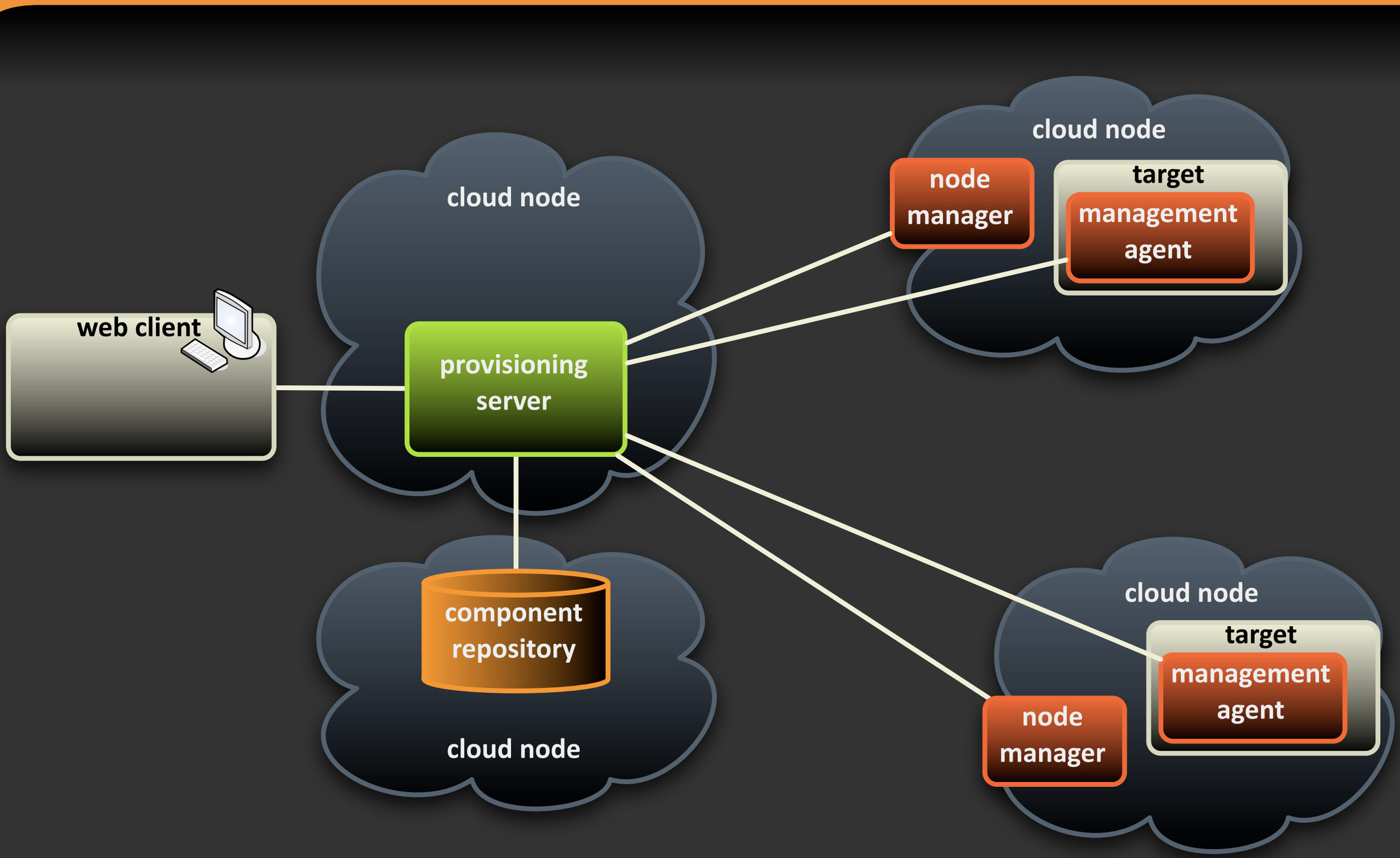


17:34 Checked for updates, none found
23:20 Bundle 23 stopped
13:23 Target started
13:24 Starting update from version 5 to 8
13:24 Bundle 37 updated
13:25 Update to version 8 succeeded
14:25 Target stopped

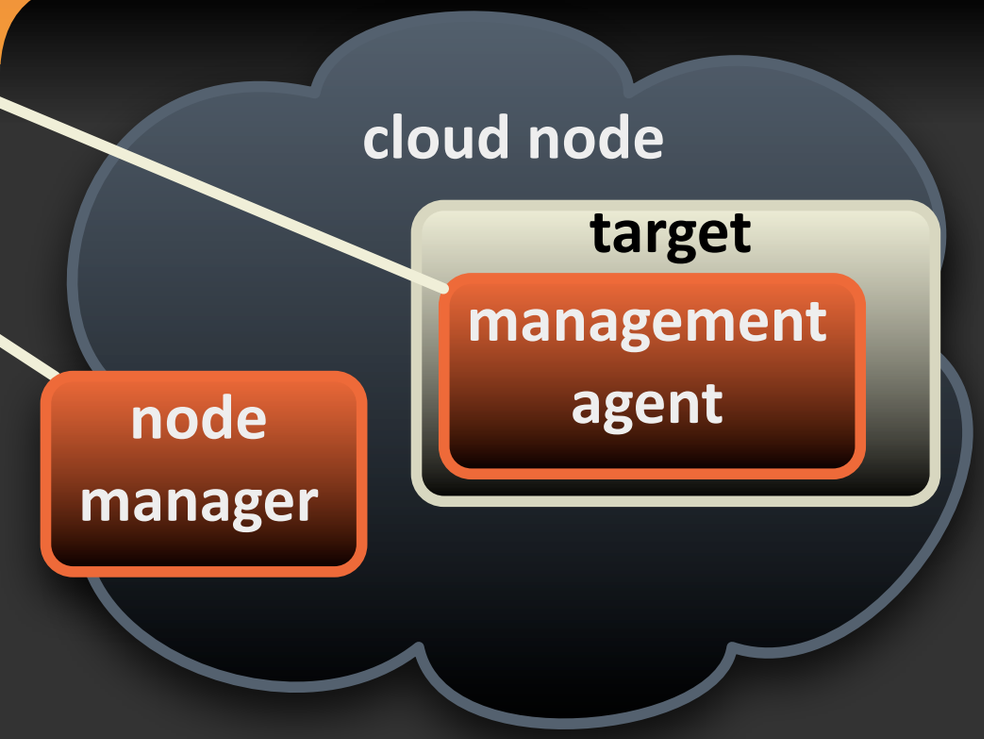
13:23 Target started
13:24 Starting update from version 5 to 8
13:24 Bundle 37 updated
13:25 Update to version 8 succeeded
14:25 Target stopped

ACE in the Cloud

ACE in the Cloud



Node Manager



- Node Manager
  - bootstraps the node
  - launches targets
  - measures performance data

ACE UI Extensions

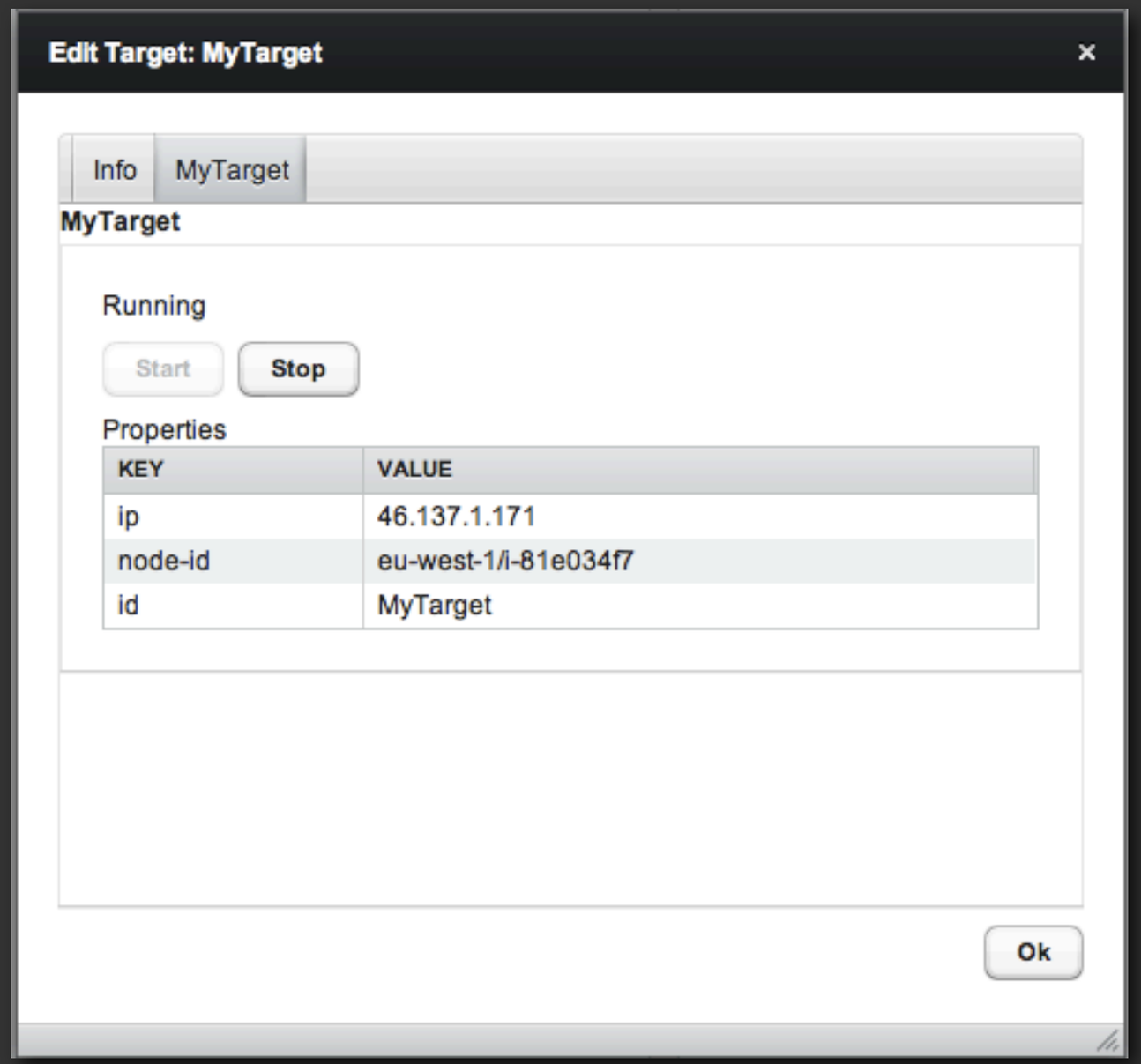
```
/**
 * Creates components for named extension points in the Vaadin UI. Extension factories
 * are used throughout the UI to allow other bundles to contribute features.
 */
public interface UIExtensionFactory {
    public static final String EXTENSION_POINT_KEY = "extension_point";
    public static final Object EXTENSION_POINT_VALUE_ARTIFACT = "artifact";
    public static final Object EXTENSION_POINT_VALUE_FEATURE = "feature";
    public static final Object EXTENSION_POINT_VALUE_DISTRIBUTION = "distribution";
    public static final Object EXTENSION_POINT_VALUE_TARGET = "target";

    /**
     * Creates a UI component for use in the extension point. The contents of the
     * context are extension-point dependent.
     */
    Component create(Map<String, Object> context);
}
```

Cloud Extension

- Currently supports one target per node
- Uses jclouds.org
- Implementation for Amazon EC-2

Cloud Extension

- Currently supports one target per node
- Uses jclouds.org
- Implementation for Amazon EC-2



Hands On

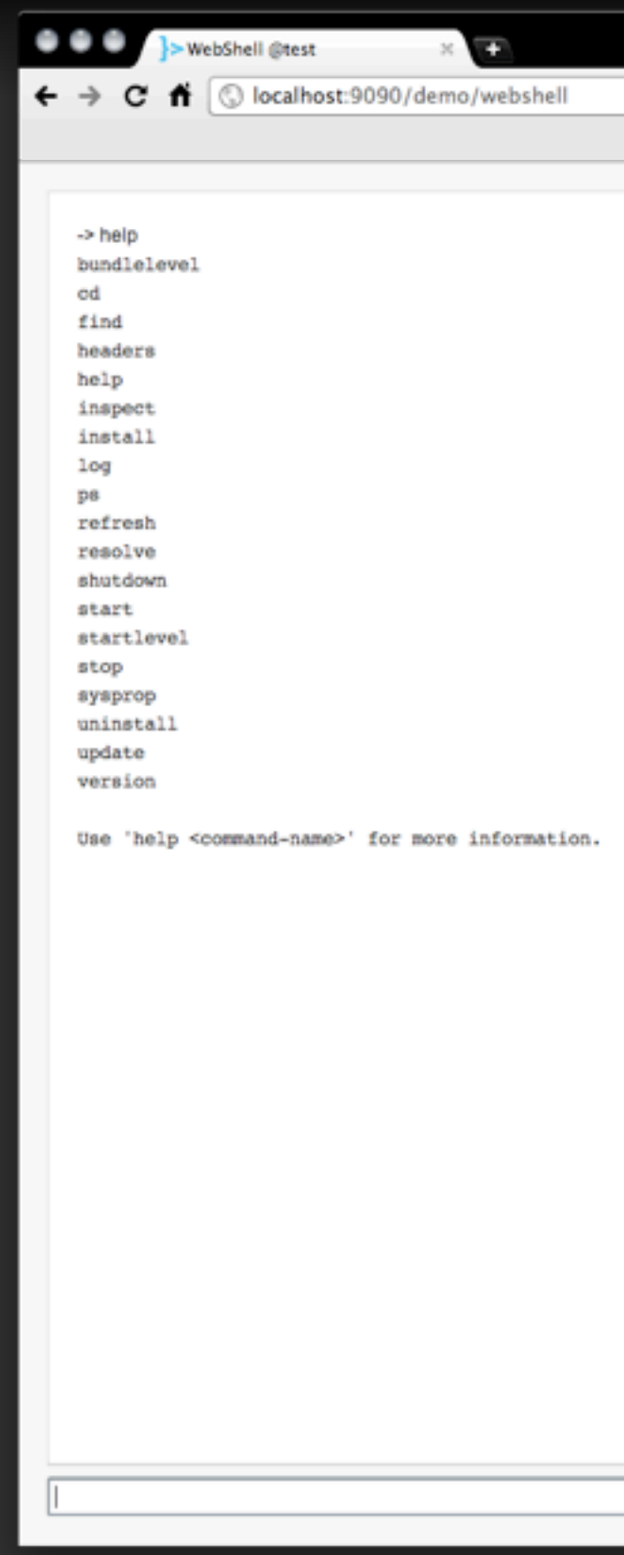
2. the Cloud

Deploying ACE with ACE

- For the next exercise we want to give everybody their own copy of ACE in the cloud
- We've pre-created most of them already, and will show you how to create and deploy a new instance

Exercise: “WebShell” in the cloud

- We’ve already created a ‘webshell/deploy’ folder containing all relevant artifacts
- Using a pre-installed copy of ACE, we are going to deploy it on a new cloud node



Hands On

3. ACE

Building and running ACE

- **Checkout the sources:**

```
svn co http://svn.apache.org/repos/asf/incubator/ace/trunk/ ace
```

- **Build everything:**

```
cd ace
mvn -DskipTests=true install
```

- **Launch the server:**

```
cd ace-target-devserver/
cd target/
cd org.apache.ace.target.devserver-0.8.0-SNAPSHOT-distribution/
cd ace-devserver/
sh run.sh
```

on Windows:

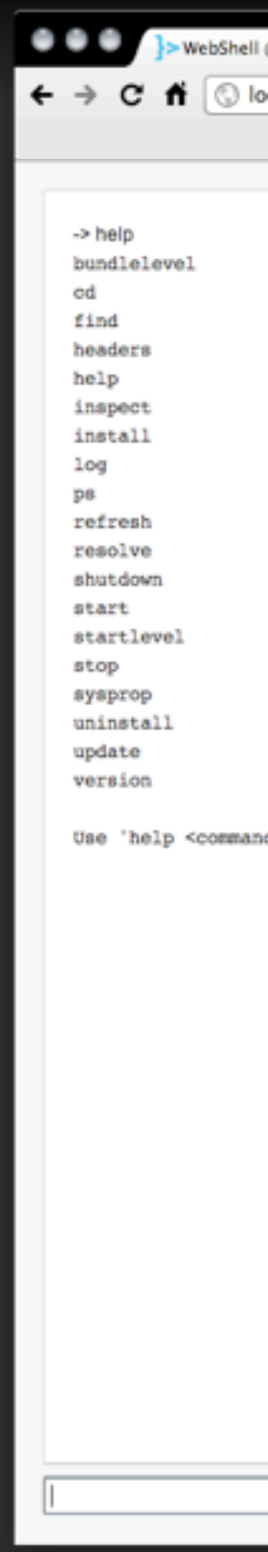
```
run.bat
```

- **Launch a target:**

```
cd ace-launcher
cd target
java -jar org.apache.ace.launcher-0.8.0-SNAPSHOT.jar
```

Exercise

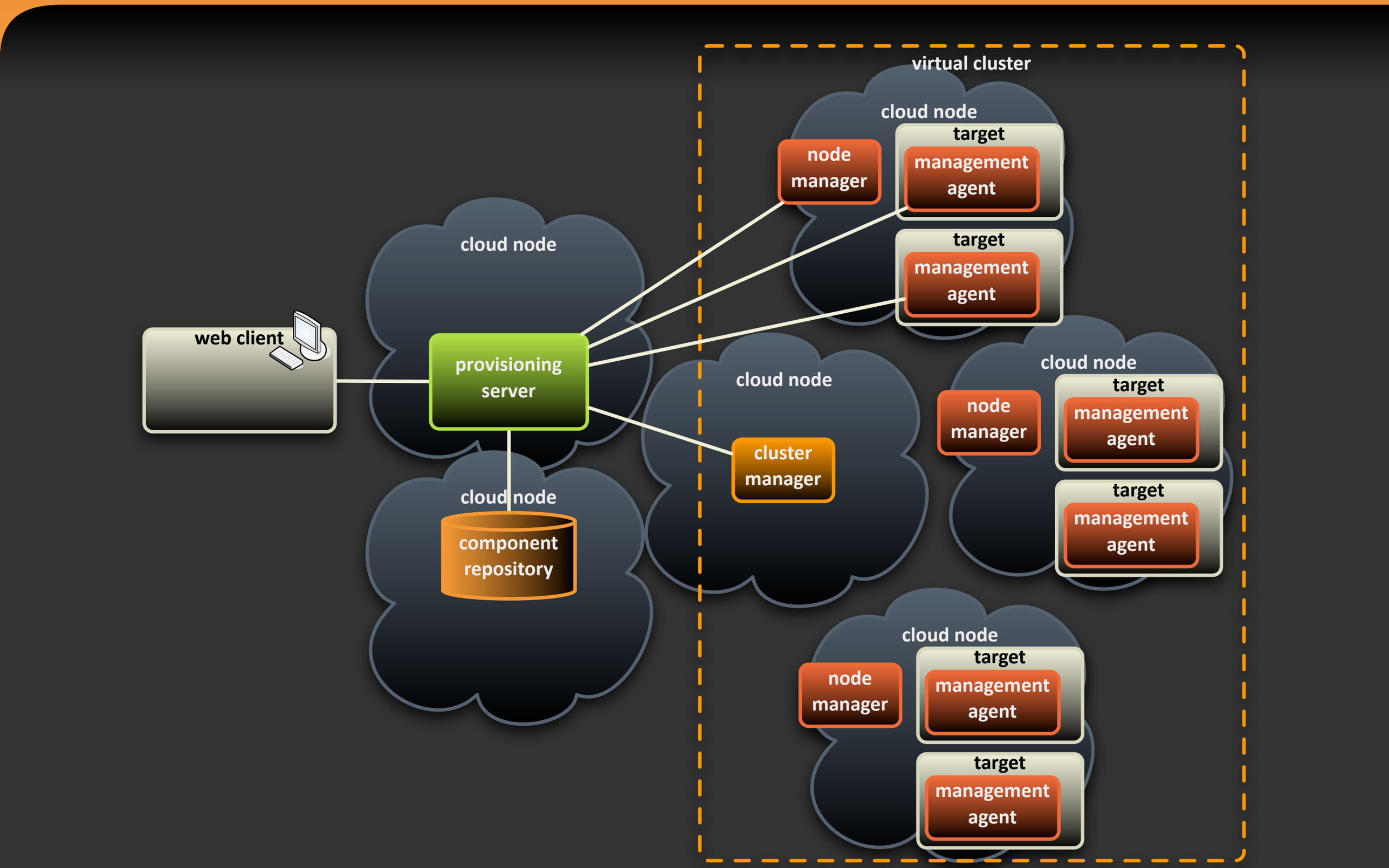
- After building ACE and running a server and a target, we can now locally deploy the “WebShell”



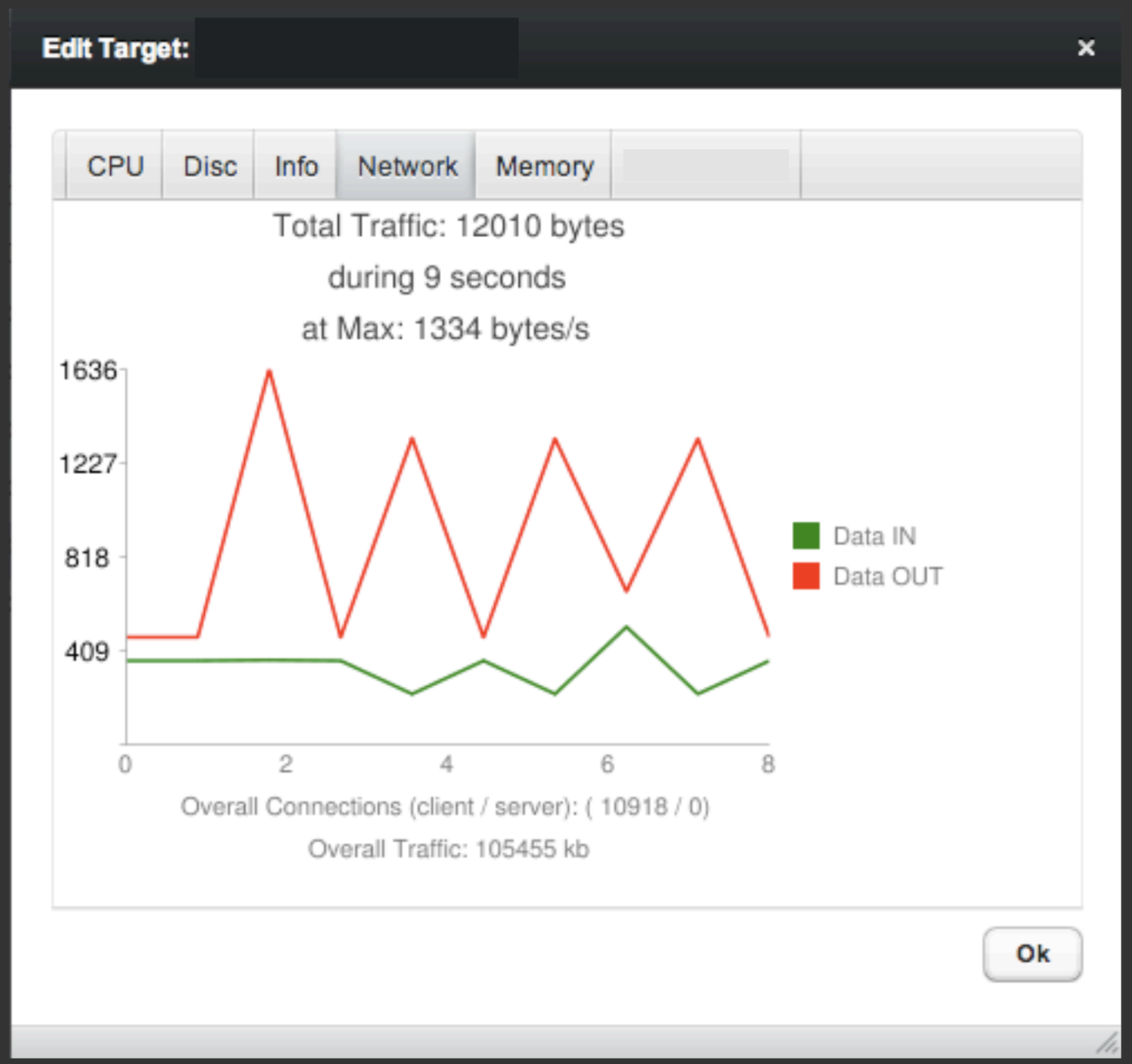
Closing Remarks

- We've looked at ACE, built it and ran it in the cloud and on our local system
- Brief peek into the future of cloud support in ACE
- Announcing a new open source project: Amdatu

Future of ACE in the Cloud



Future of ACE in the Cloud



amdatu

Amdatu

“Amdatu is an Open Source platform and runtime for open, service oriented and cloud aware applications”

- Multi-tenancy
- Provisioning
- IaaS support
- (Elastic) Scalability
- Manageability
- Serviceability
- Reusability

Amdatu

“Amdatu is an Open Source platform and runtime for open, service oriented and cloud aware applications”

http://amdatu.org/

- Multi-tenancy
- Provisioning
- IaaS support
- (Elastic) Scalability
- Manageability
- Serviceability
- Reusability

Amdatu Subprojects

- Amdatu Core
- Amdatu Provisioning
- Amdatu Semantic
- Amdatu Auth
- Amdatu Social
- Amdatu Storage
- Amdatu Search

Links

- http://incubator.apache.org/ace/
- http://felix.apache.org/
- http://amdatu.org/
- http://www.luminis.eu/?lang=en
- http://luminis-technologies.com/