APACHE SLING & FRIENDS TECH MEETUP
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Sling Deployment Revisited

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Where is the Problem?

SLING & AEM DEPLOYMENTS TODAY

- Patchwork of Mechanisms
- Not deterministic
- Error Prone *(human factor)*
- Inefficient

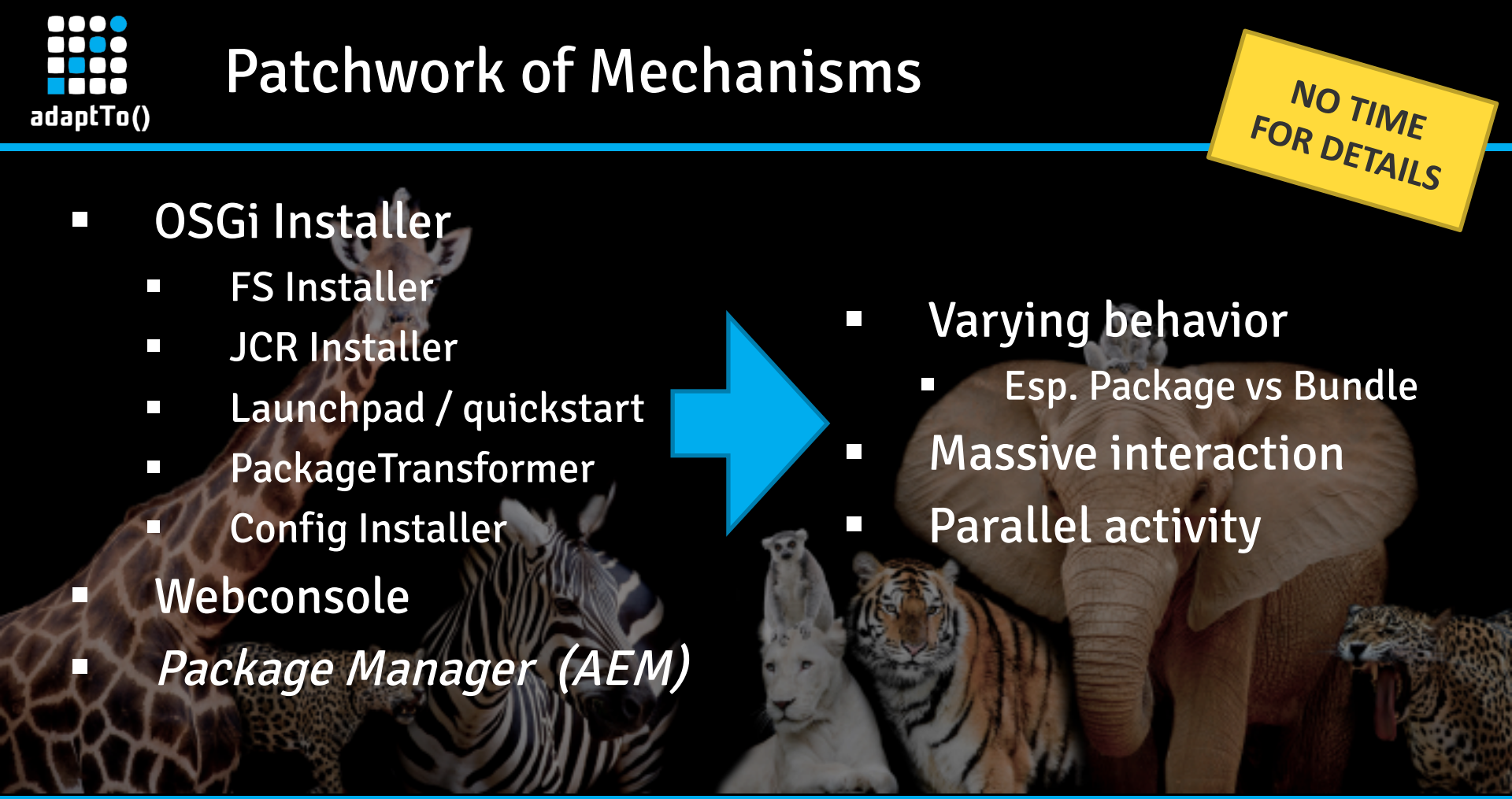
Painful to support & debug when failing!!!

Patchwork of Mechanisms

NO TIME FOR DETAILS

- OSGi Installer
  - FS Installer
  - JCR Installer
  - Launchpad / quickstart
  - PackageTransformer
  - Config Installer
- Webconsole
- *Package Manager (AEM)*

- Varying behavior
  - Esp. Package vs Bundle
- Massive interaction
- Parallel activity



Not deterministic

NO TIME FOR DETAILS

- Stateful
- Race conditions by ambiguous dependencies
- Undefined Endstate
- Unverifiable Outcome

!!!!!

Deployment only declares changes

not the full target state

Error Prone

NO TIME FOR DETAILS

- Manual dependency declaration for packages
- Filter changes can easily cause left-overs
- Instance state alters install sequence of deplyoment units *(pre-satisfied dependencies)*
- Altering sequence prevents reliable testing

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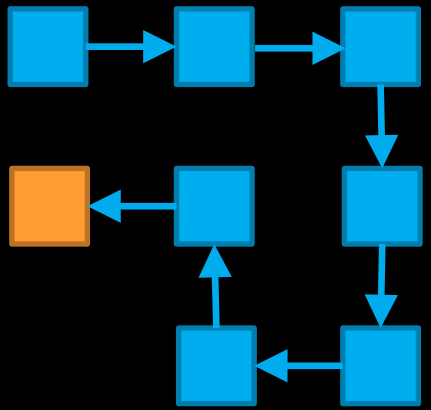
Inefficient

NO TIME FOR DETAILS



- Unoptimized Instruction Flow
- Retry until success
- Rewiring of OSGi Bundles (Config & DS)
- Roundtrips through nested deployment units

The Challenge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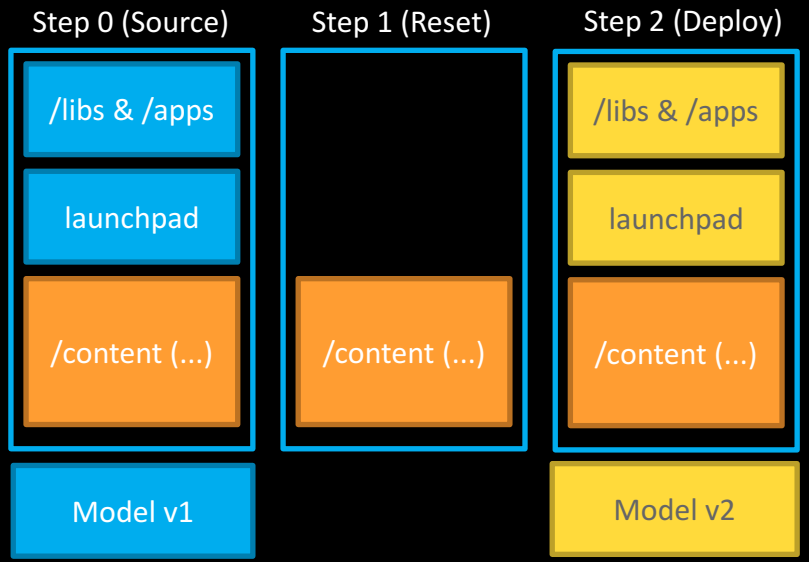
Vision

High Level Goals

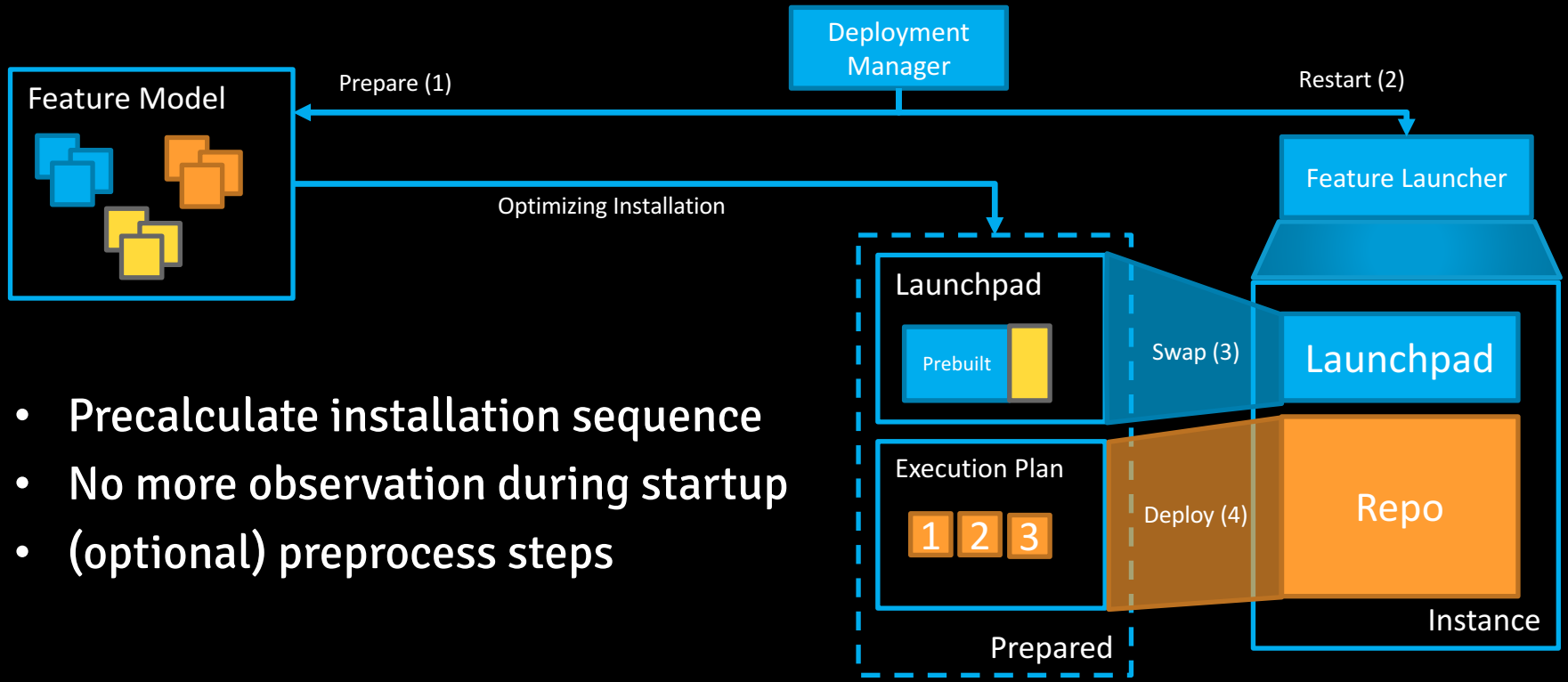
Deterministic Deployments	• No more race conditions • Predictable • Reproducable • No more state handling
Prepared Deployments	• Reduce install startup times • Precalculate & identify failures ahead of deployment
Conflictless Deliveries	• Validated consistency **ahead** of deployment • Reduce human effort to declare dependencies
Composed Instances	• Reduce to **ONE** mechanism (install, patching, upgrades, configuration) • Model reflecting layering of instance (Vendor, Integrator, Operator)

Deterministic Deployments



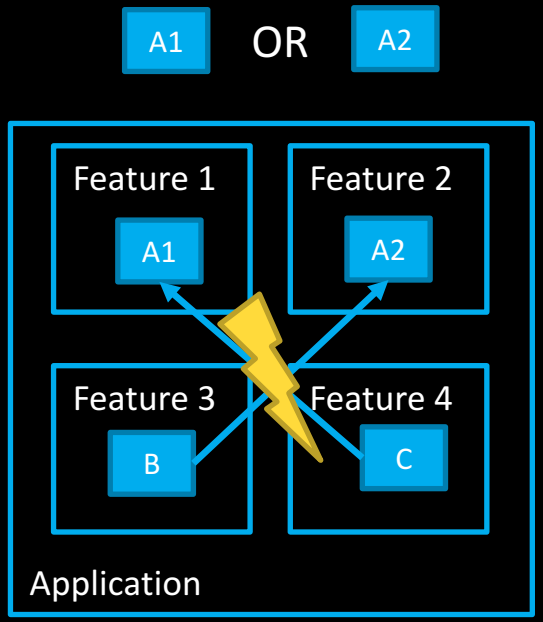
- Complete Dependency Tree
  - Close gap between Appcontent & Java
- Full application state in feature model
- Rebuild application state each time

Prepared Deployments

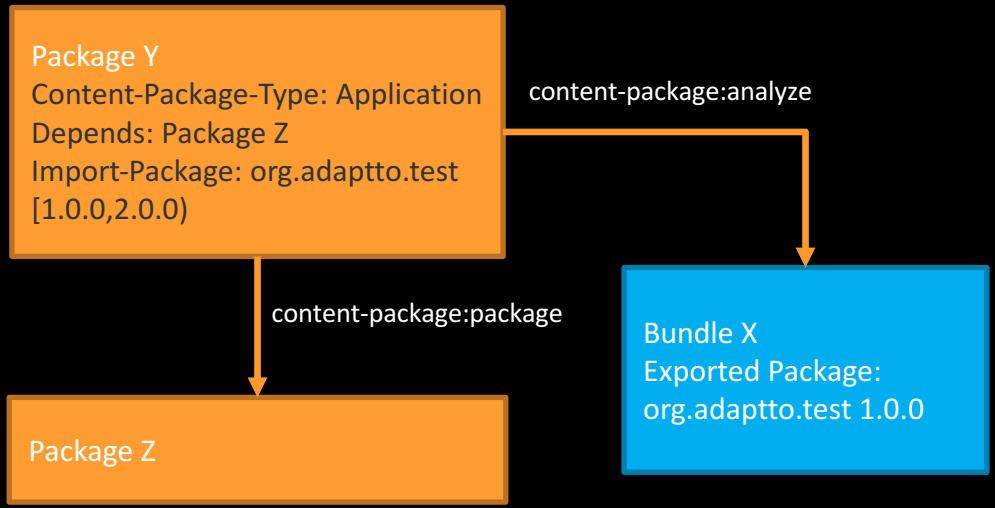


- Precalculate installation sequence
- No more observation during startup
- (optional) preprocess steps

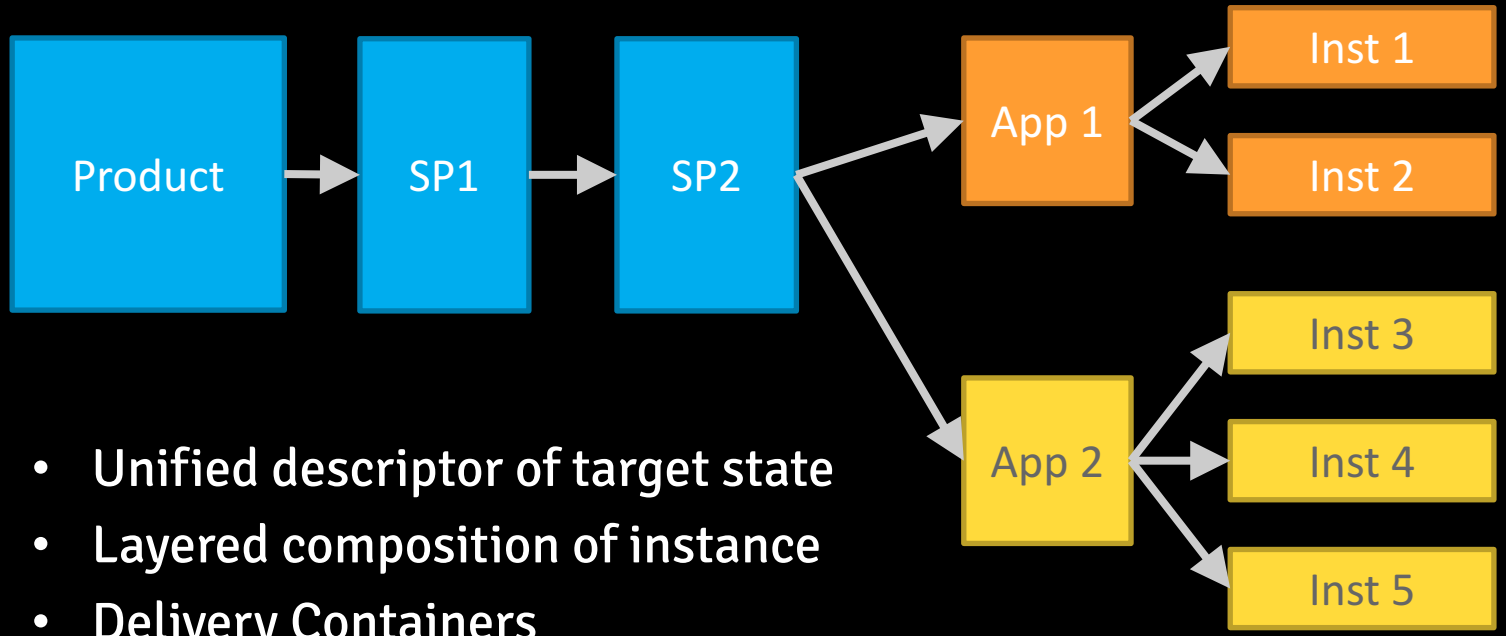
Conflictless Deliveries



- Validation of feature model
- Improved dependency metadata in vlt
- Validation of deployment units

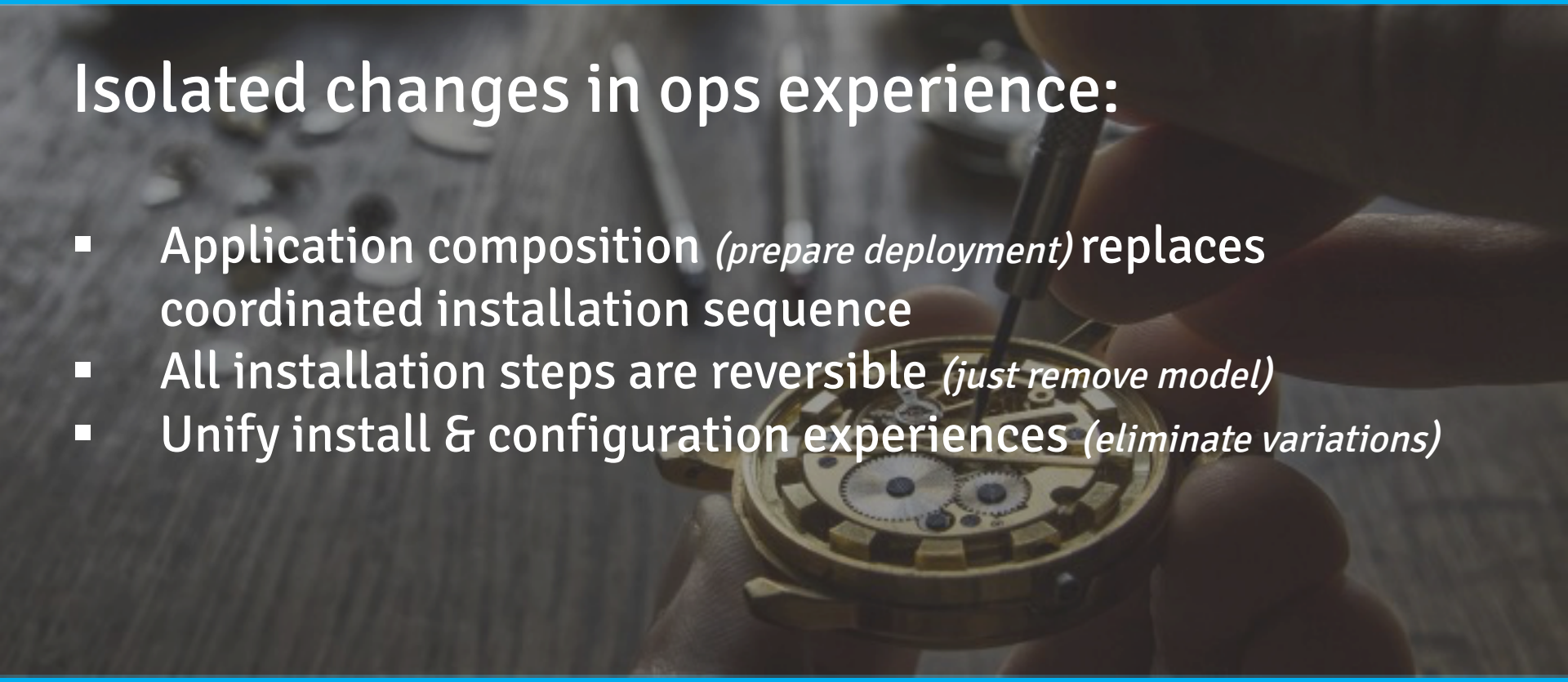


Composed Instances



- Unified descriptor of target state
- Layered composition of instance
- Delivery Containers

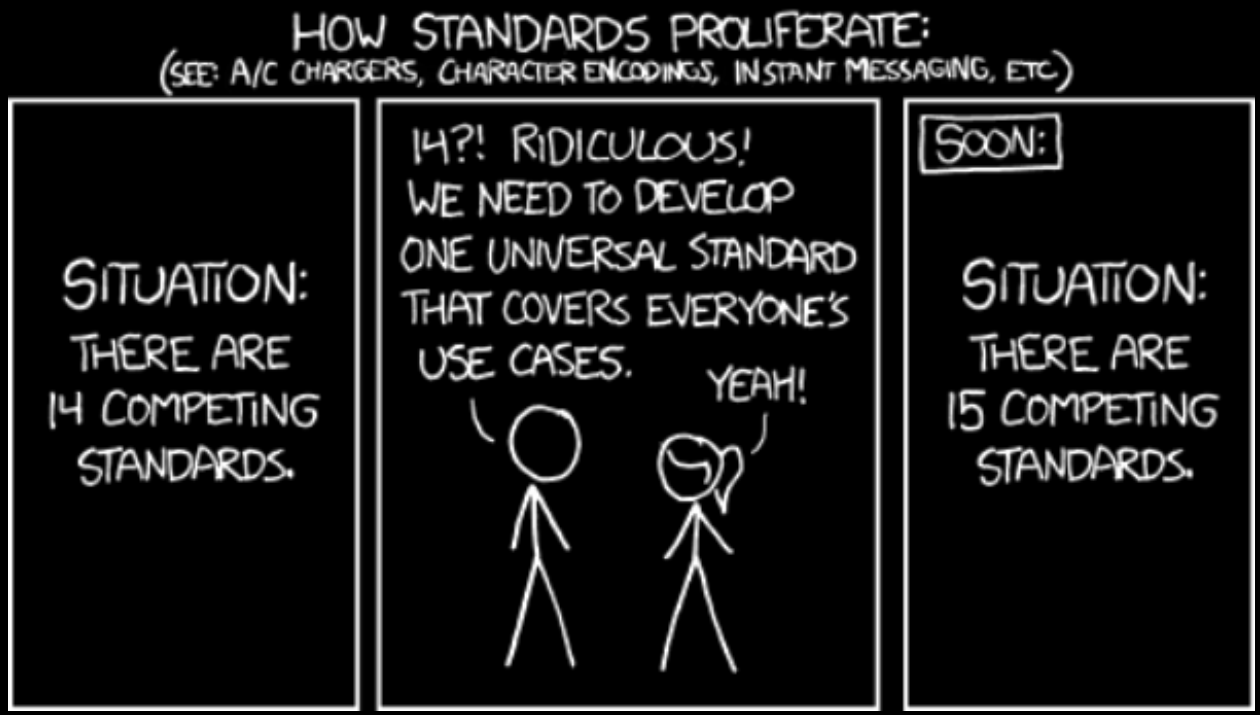
The Experience



Isolated changes in ops experience:

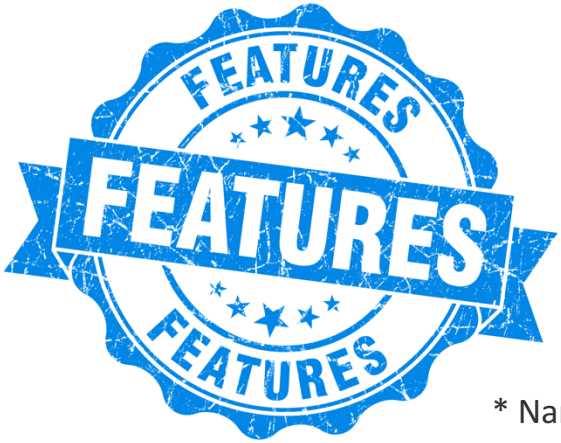
- Application composition *(prepare deployment)* replaces coordinated installation sequence
- All installation steps are reversible *(just remove model)*
- Unify install & configuration experiences *(eliminate variations)*

What do we do?



https://xkcd.com/927/

Introducing Features

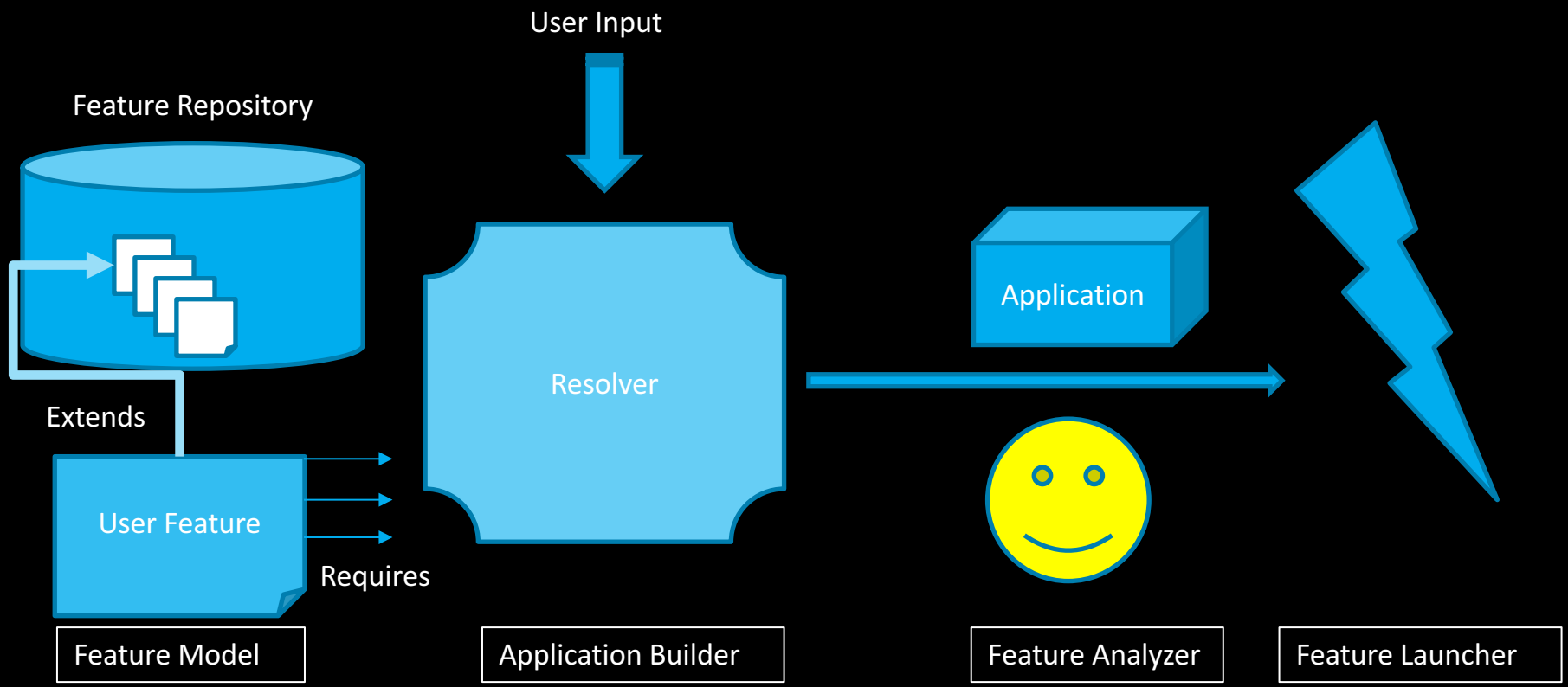


Sling Features*

* Name: TBD

- Well defined provisioning model with named and versioned features
- Requirement/Capability based as well as include based dependencies
- Resolver based composition and extensible analysis framework
- Sling focused launcher for immutable deployments

High level flow



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Feature Model

```
 {
 "id" : "org.apache.sling/my.app/1.0",
 "includes" : [ {
             "id" : "org.apache.sling/sling/9",
             "removals" : {
                 "configurations" : [],
                 "bundles": [],
                 "framework-properties" : [] }}],
"requirements" : [{
    "namespace" : "osgi.contract",
    "directives" : {"filter" :
       "(&(osgi.contract=JavaServlet(version=3.1))"}}],
"capabilities" : [{
     "namespace" : "osgi.implementation",
     "attributes" : {
        "osgi.implementation" : "osgi.http",
        "version:Version" : "1.1"}}],
```

```
"bundles" : {
  "1" : [
       "org.apache.sling/security-server/2.2.0",
       "org.apache.sling/application-bundle/2.0.0",
       "org.apache.sling/another-bundle/2.1.0" ],
  "2" : [
       "org.apache.sling/foo-xyz/1.2.3"]},
"configurations" {
        "my.pid" {
           "foo" : 5,
           "bar" : "test",
           "number:Integer" : 7
        },
        "my.factory.pid~name" {
           "a.value" : "yeah"
        }},
"repoinit:Text|true" : "...",
"content-packages:ARTIFACTS|false" :[...]}
```

Feature Launcher

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What is already done?

- Feature Model Draft
  - https://svn.apache.org/repos/asf/sling/whiteboard/cziegeler/feature/readme.md
- Vault Metadata Extensions
- Vault Improvements
- Maven tooling for content-package *(ASF contribution)*
- Feature Launcher Prototype

What YOU can do!

- **Hackathon**: Play around and provide feedback!
  - https://github.com/DominikSuess/adaptto2017-demo
  - Ideas:
    - Get continuous deployments running with feature launcher
    - Reset application state using federate repo (0DT POC)
    - Work on Deployment Manager
    - Introduce precalculation (OSGi & Packages)
    - Check out content-package & tooling improvements

HAPPY HACKING