NanoContainer

Scripted Dependency Injection

by ~~Paul Hammant~~ Aslak Hellesoy, one of its lead developers.

The Presenter(s)

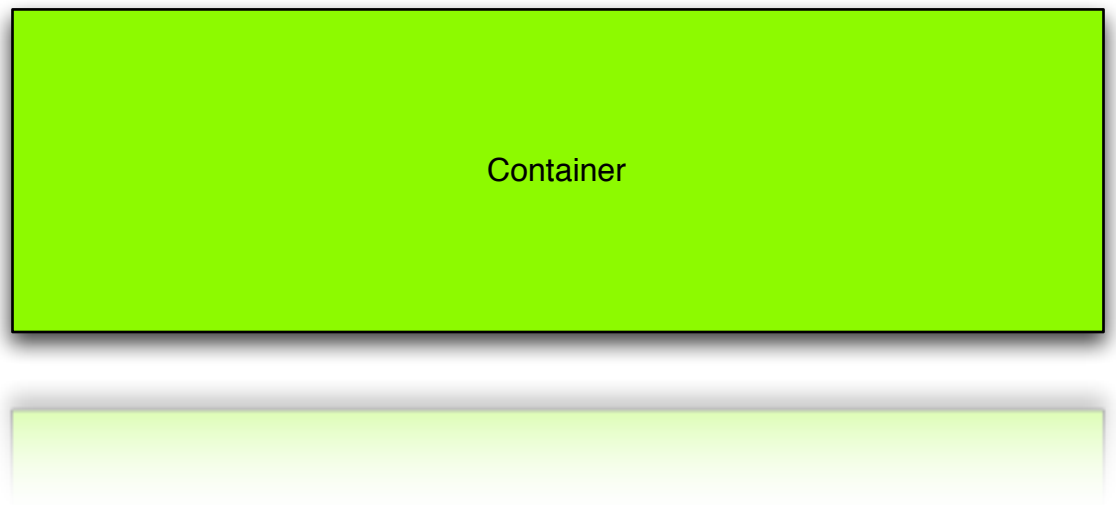
- Paul has was active with Avalon (the first IoC framework) years before Dependency Injection was coined. He's written many (stupid) IoC OSS tools over six years.
- Aslak is famous for XDoclet, Middlegen, Damage Control, QDox and eXtreme ideas like Ashcroft.

Quick facts and givens

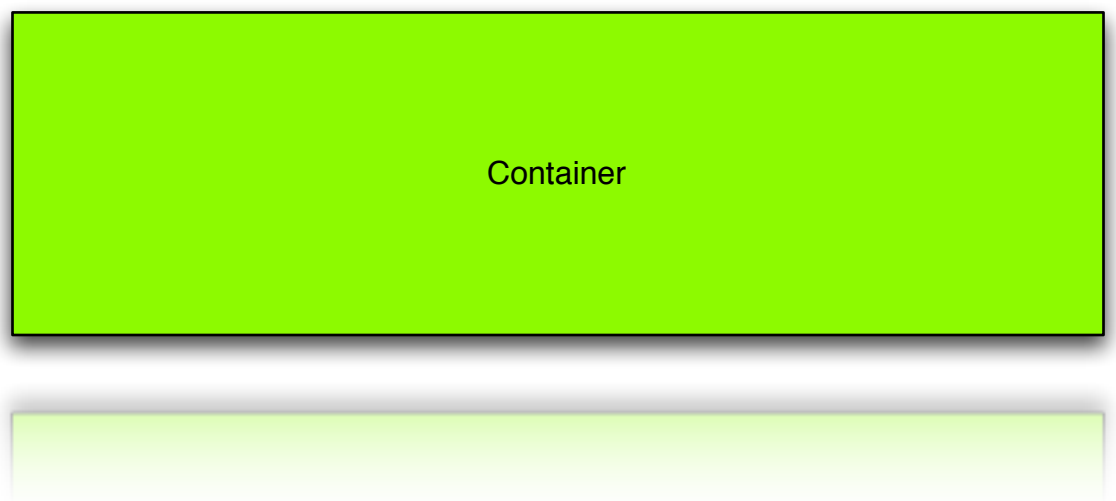
- We started PicoContainer and NanoContainer in 2003
- NanoContainer essentially extends PicoContainer (think russian dolls)
- We recommend Constructor Dependency Injection (CDI) over Setter (SDI)
- You should already know why singletons in large enterprise apps are bad
- You might also be tired of writing XML to anyone's specification
- PicoContainer has no meta-data, NanoContainer is 'open' to multiple meta implementations

Firstly:
IoC Crash Course

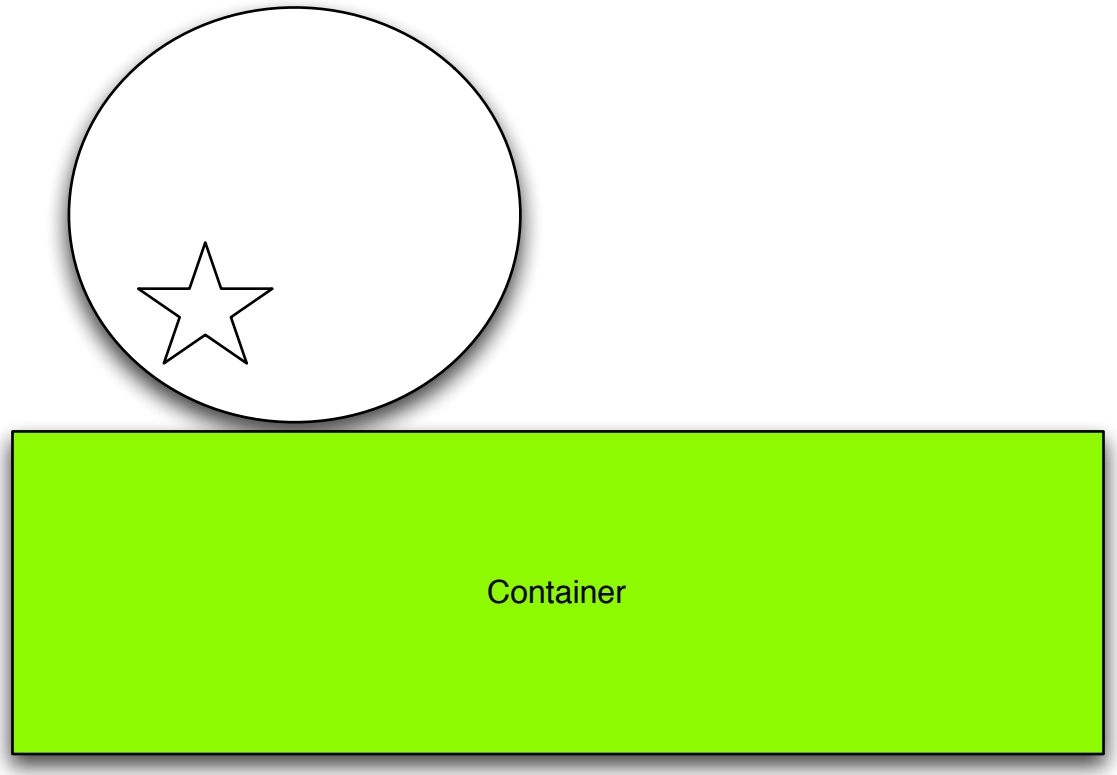
Containers control
Components



Container Instantiated



Phase 1: *Registration*



Circle registered (needs Star)

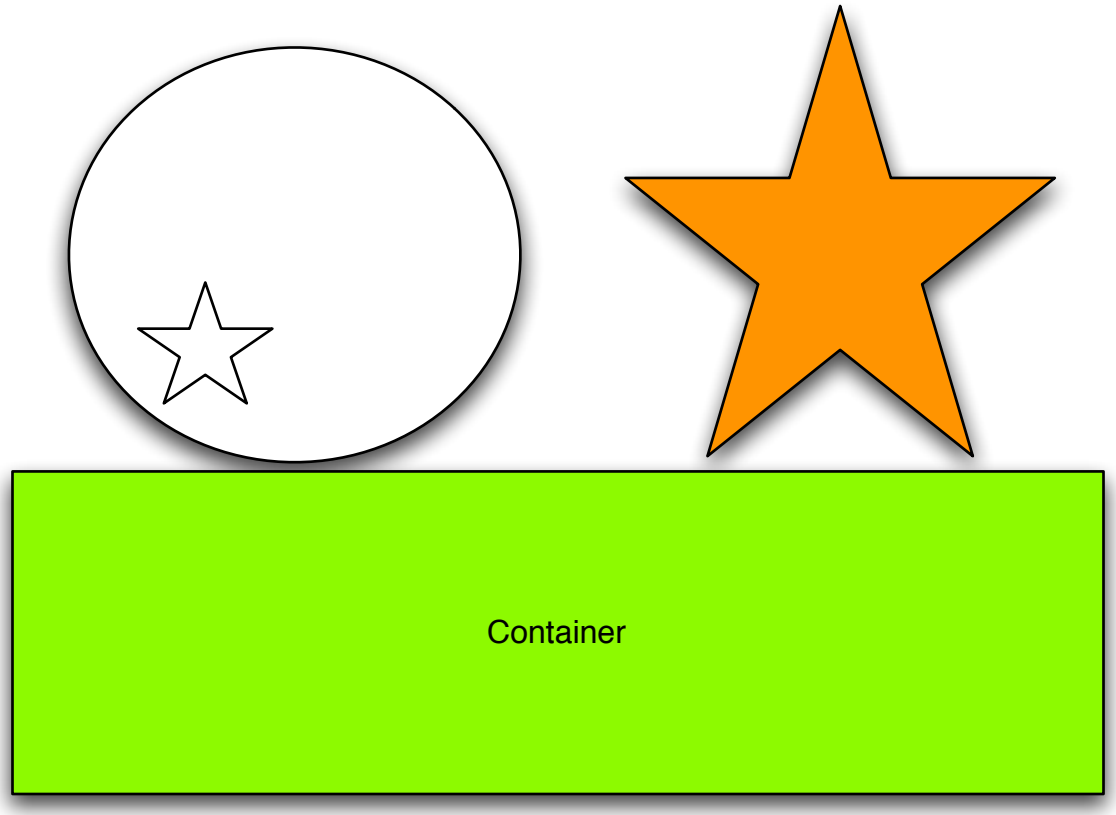
Star registered

Circle and Star source

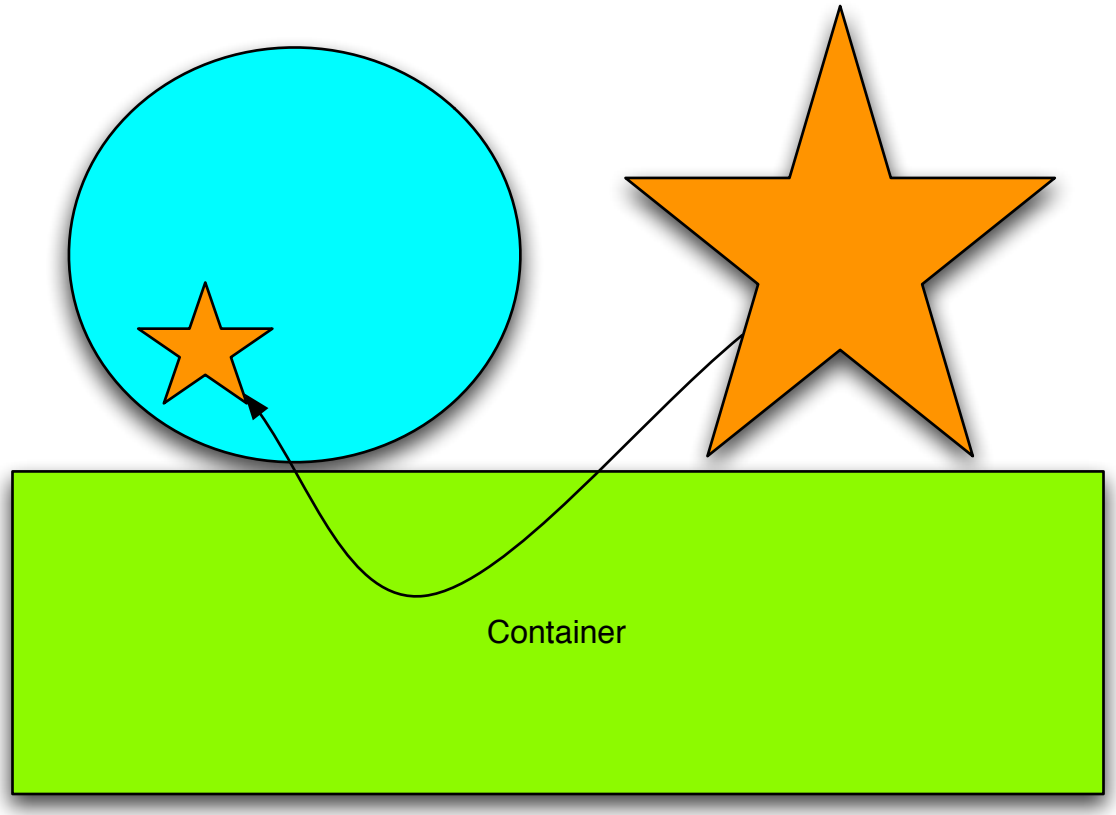
```
public class Circle

  public Circle(Star star) {

  }

}


public class Star {

}
```

You could have guessed this

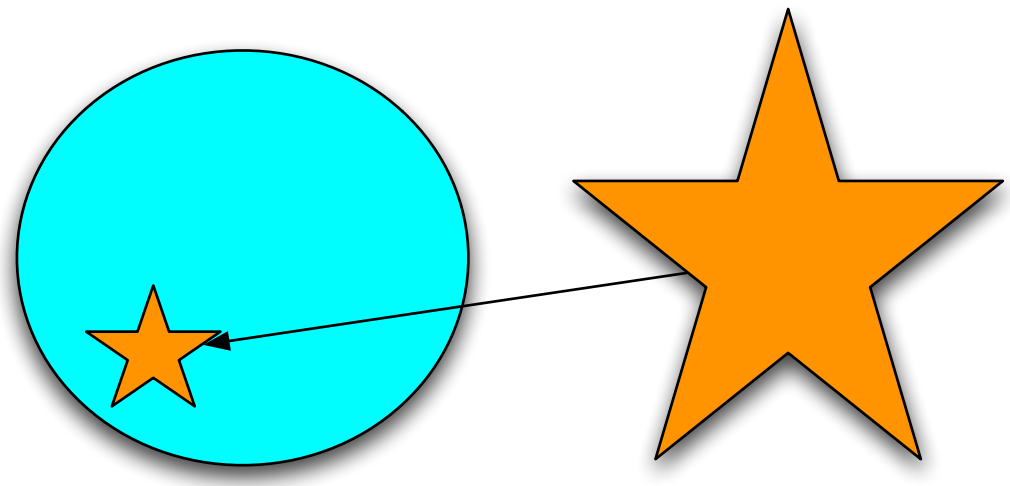
Phase 2: Instantiation



Star instantiated



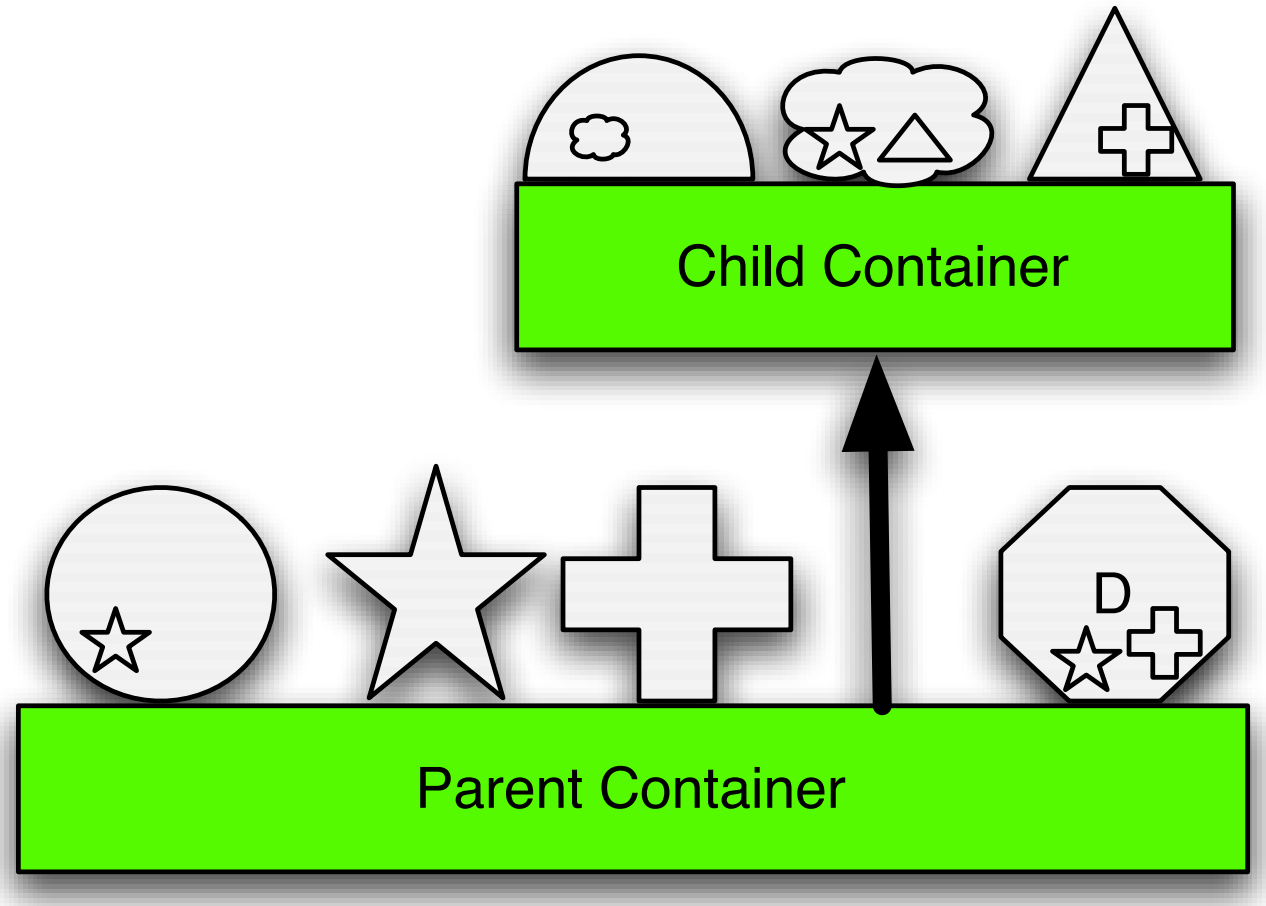
Circle instantiated, referring to Star



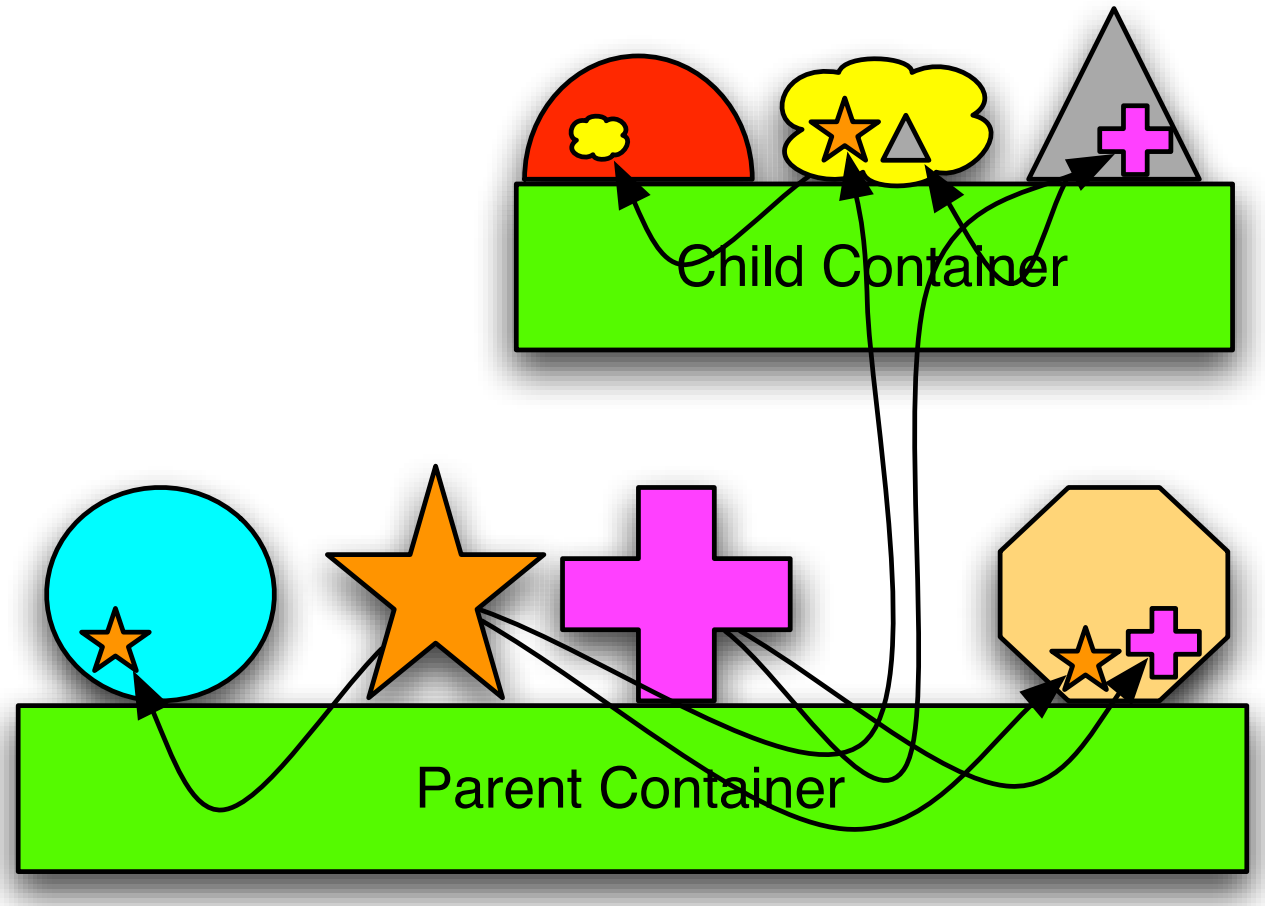
Container often disposed of

IoC Crash Course

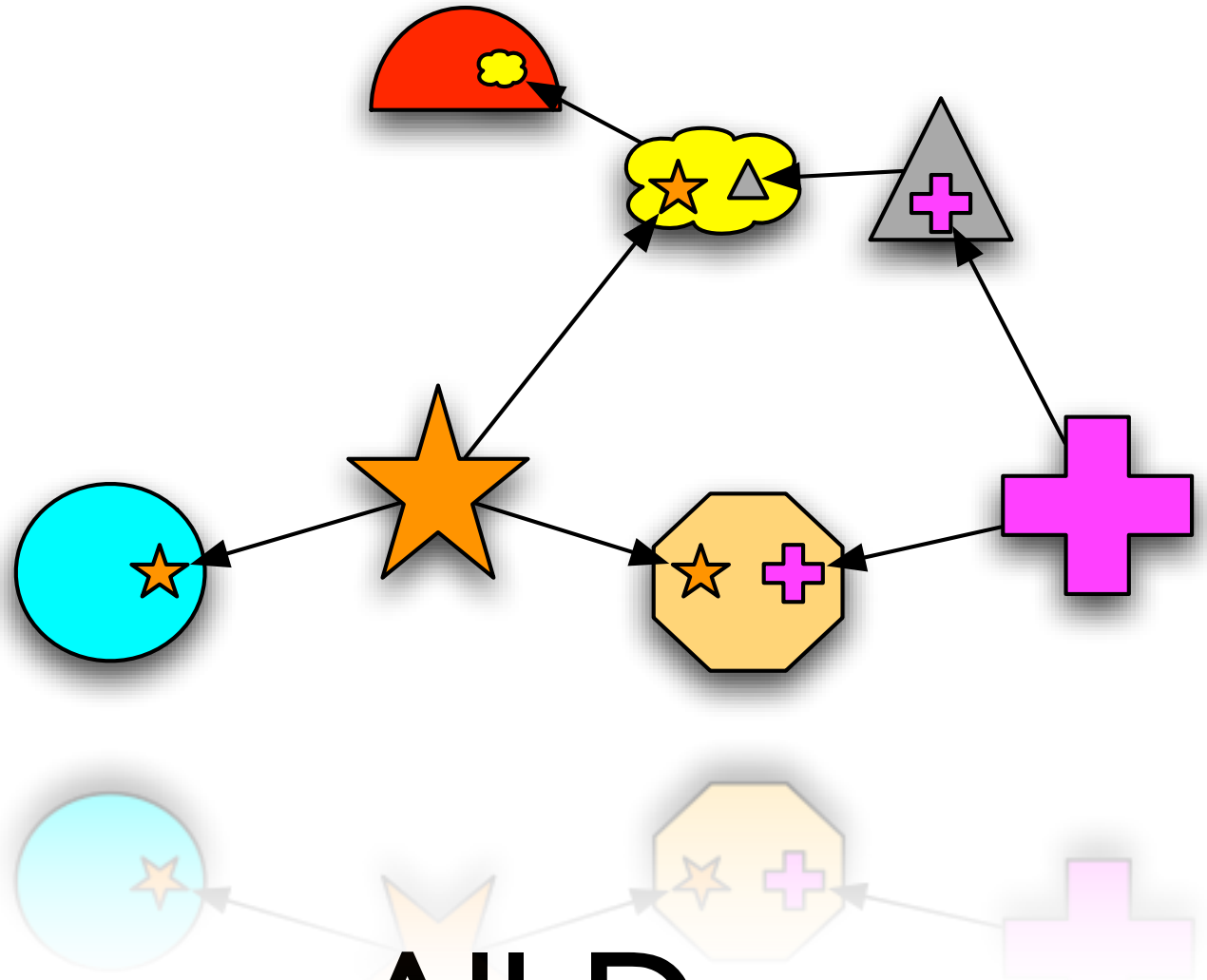
Container hierarchies: Scoping of dependencies



Registration



Instantiation



All Done

IoC Recap

- Containers instantiate registered components
- Component dependencies are satisfied by their container
- Components shouldn't reference their containers
- Life-cycle (start/stop) and configuration are also controlled by the container
- Hierarchies blah blah

Introducing NanoContainer via (simplified) code examples..

PicoContainer - the only way

```
MutablePicoContainer pico
  = new DefaultPicoContainer();
pico.register(Map.class,
              HashMap.class);
pico.register(NeedsMap.class);
Object nm
  = pico.getInstance(NeedsMap.class);
```

NanoContainer - in code

```
NanoContainer nano
  = new DefaultNanoContainer();
nano.register(“java.util.Map.class”,
   “java.util.HashMap.class”);
nano.register(“my.NeedsMap.class”);
Object nm
  = nano.getInstance(“my.NeedsMap.class”);
```

XML NanoContainer

```
<container>
  <component key="java.util.Map"
             class="java.util.HashMap"/>
  <component class= "my.NeedsMap"/>
</container>
```

Groovy NanoContainer

```
container {
  component(key:“java.util.Map”,
            class:“java.util.HashMap”)
  component(class:“my.NeedsMap”)
}
```

Groovy is a language though

```
container {
  component(key:java.util.Map,
            class:java.util.HashMap)
  component(class:my.NeedsMap)
}
```

* can reference classes in classpath or classloader...

Comps from diff classloaders

```
container {
  classLoader {
    classPathElement(path:“foo.jar”)
    component(key:java.util.Map,
        class:“FooMap”)
  }
  component(class:my.NeedsMap)
}
```

Permissions too

```
container {
  classLoader {
    classPathElement(path:“foo.jar”) {
      grant(new SocketPermission
                (“google.com:80”))
    }
    component(class:“FooMap”)
  }
  component(class:my.NeedsMap)
}
```

only if using a security manager

Containers hierarchies

```
container {
  container {
    component(class:my.NeedsMap)
  }
  component(class:FooMap)
  component(class:CantRequireNeedsMap)
}
```

Implementation hiding

```
container(class:ImplHidingContainer) {
  component(key:Map, class:FooMap)
  component(
    class:NeedsMapButCantCastToFooMap)
}
```

NanoContainer Recap

- Java, XML, Groovy
  - un shown were JavaScript, Jython, Beanshell
- Implementation hiding
- Container Hierarchies
- Standalone or embedded (all markups/langs)

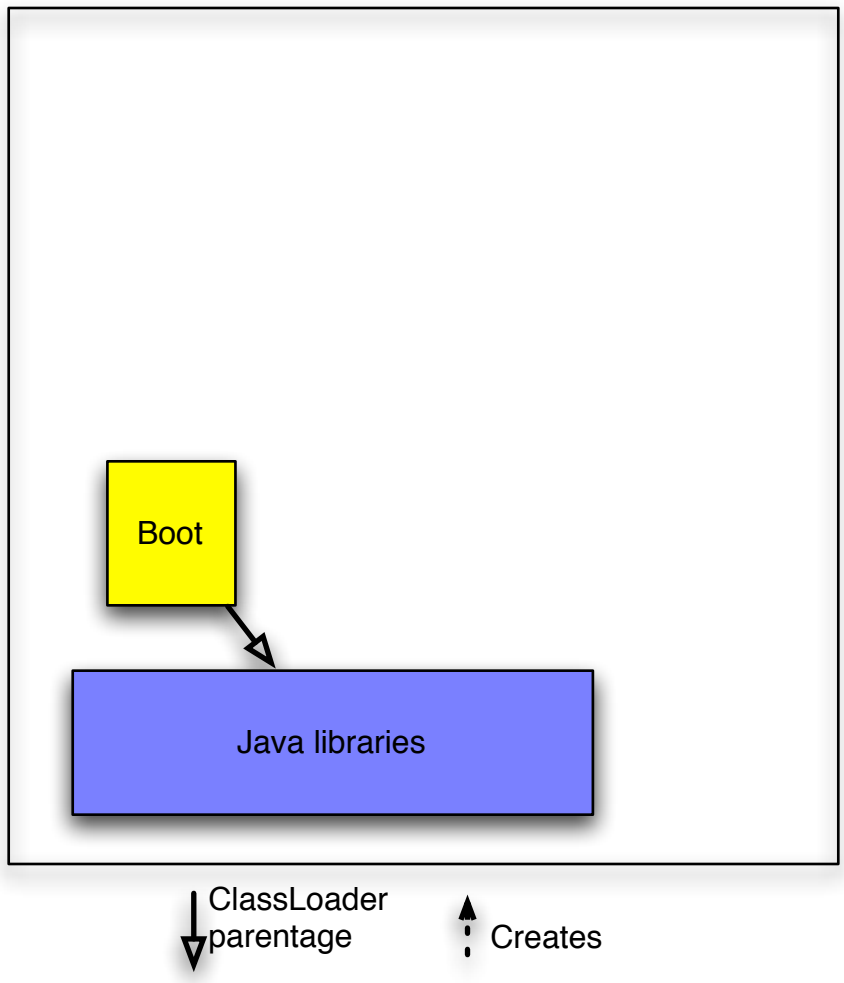
XML is like the
Groovy one,
but hurts your eyes
some more cos of
the <angle brackets/>

you can image the others..

.. they're less declarative

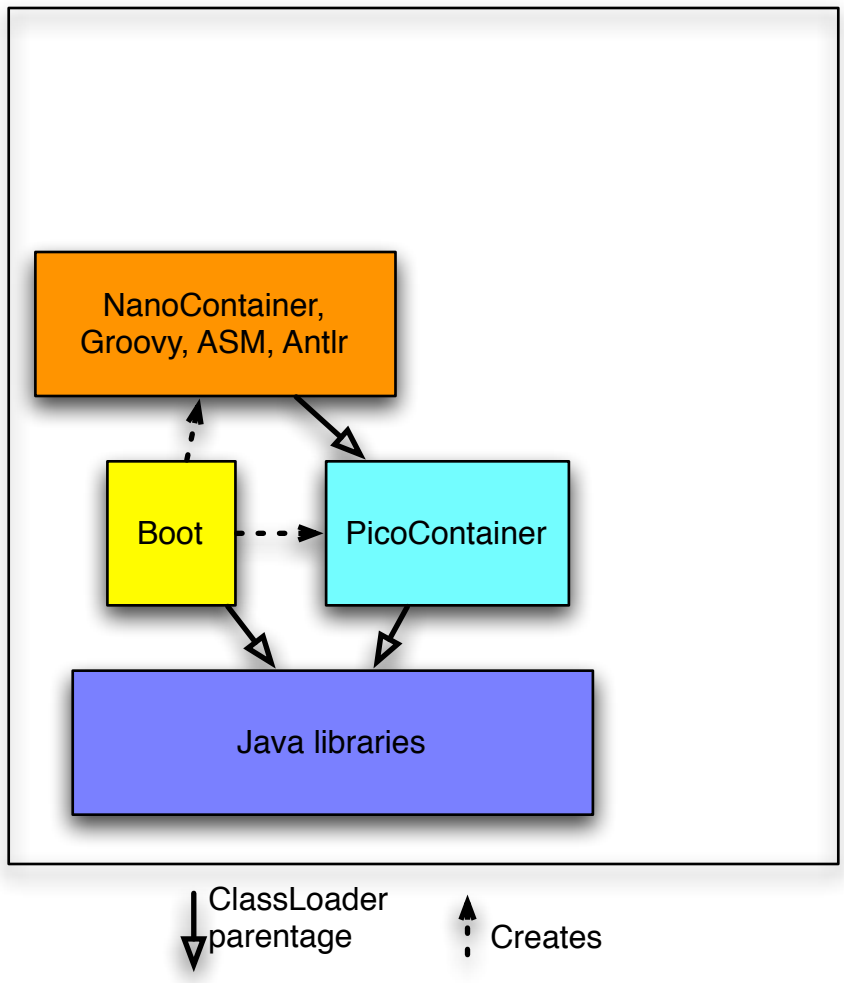
A different view of the classloader hierarchy...

NanoContainer Booting



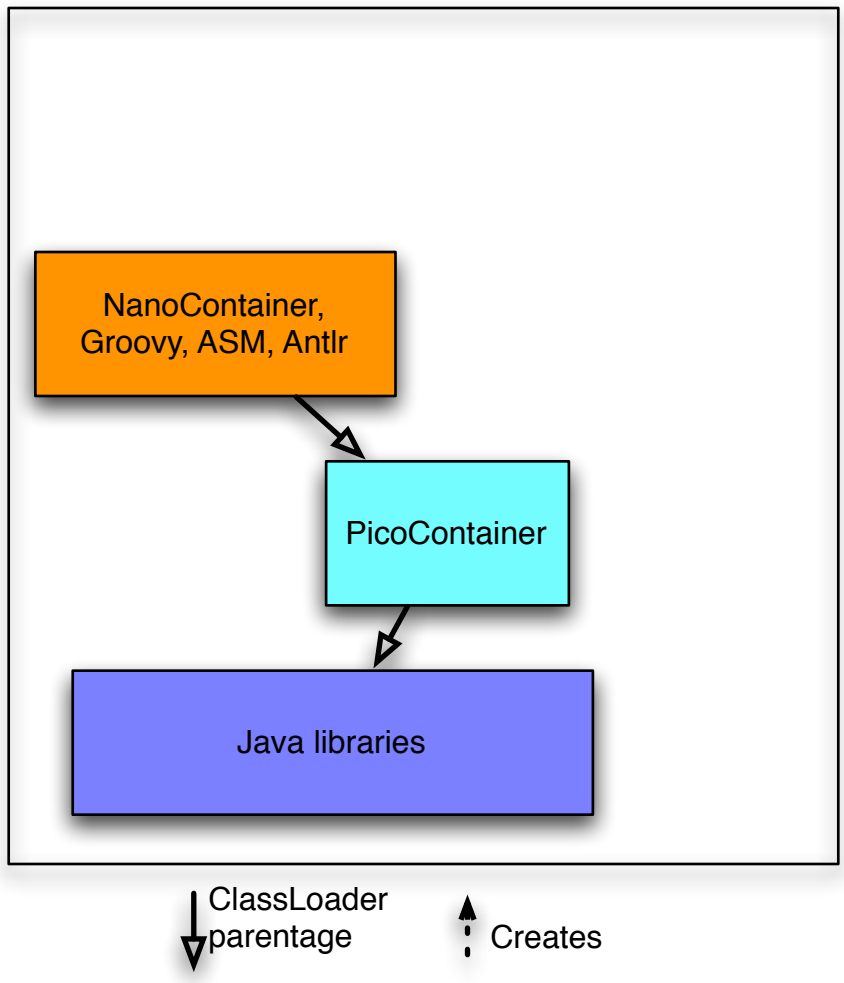
- NanoContainer-Boot started via a main method.

NanoContainer Booting



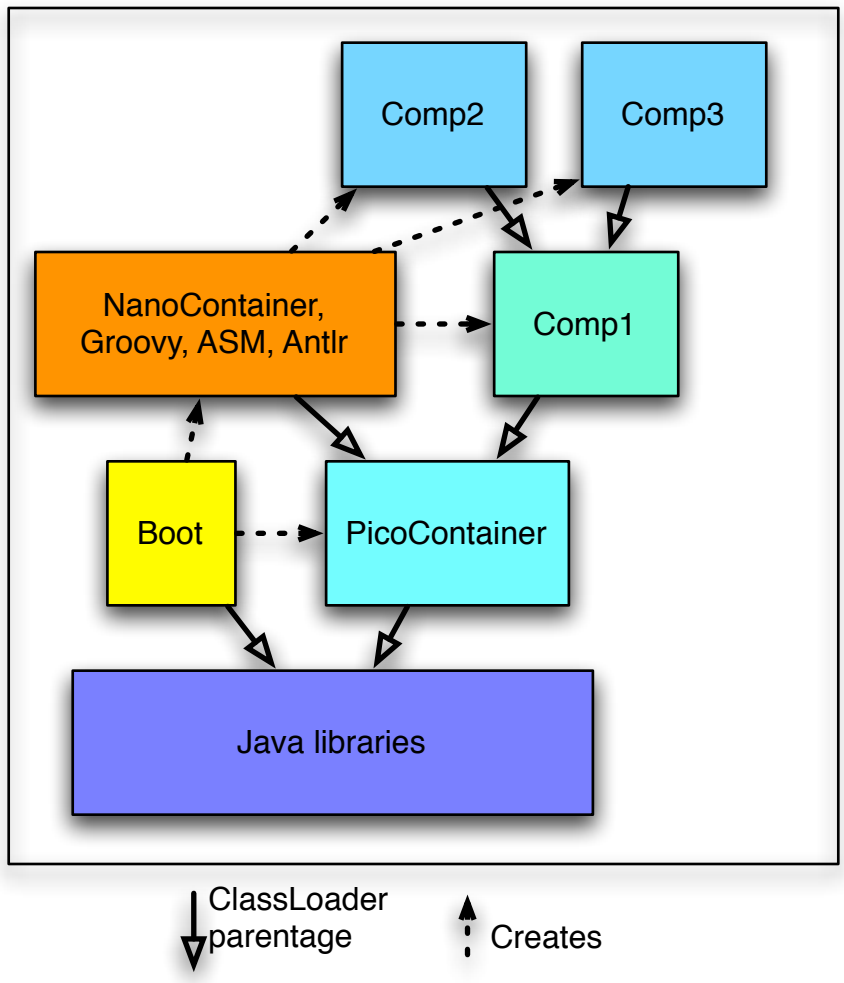
- Boot creates a tree of two classloaders, ensures it is not part of that tree.

NanoContainer Booting



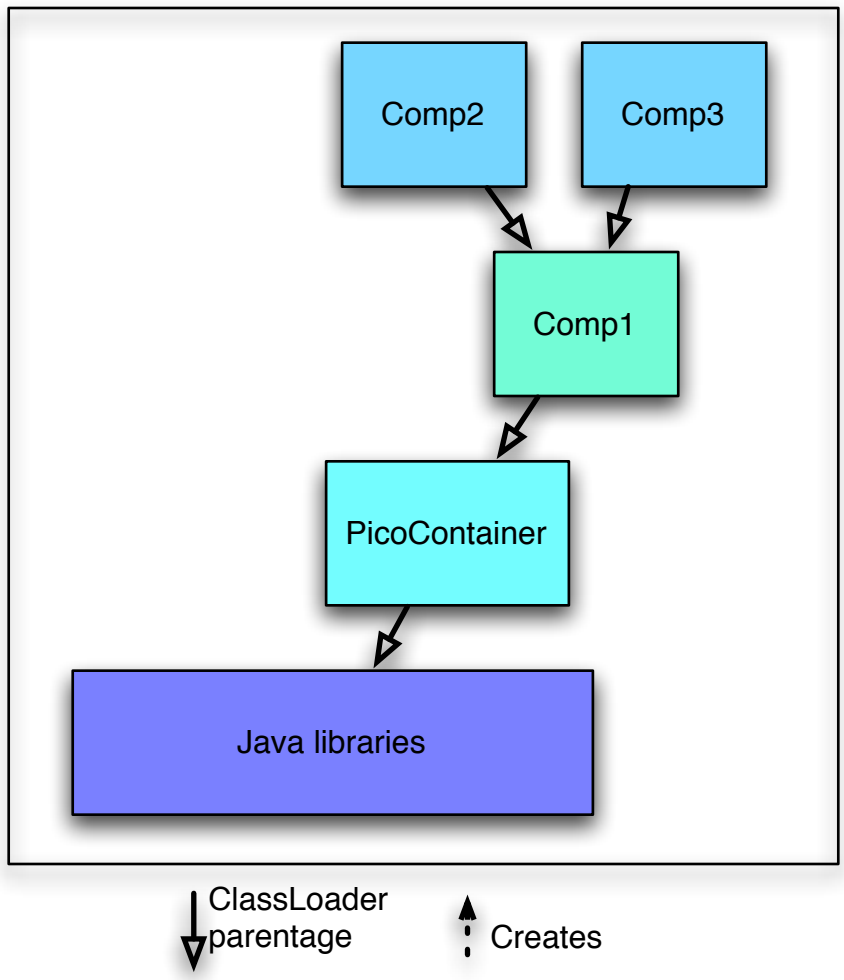
- Boot hands control to NanoContainer, effectively taking itself out of the picture

NanoContainer Booting



- NanoContainer (and Groovy etc) create more of the classloader hierarchy, keeping itself out of the resulting classloader tree

NanoContainer Booting



- From the point of view of the component, NanoContainer, Groovy (etc) and Boot are invisible

Related NanoContainer Components

- NanoWar - some bindings to web frameworks (Struts, Webwork plus 'NanoWeb' our own tiny one)
- Hibernate bindings (2 & 3)
- Remoting, etc.

Yup, all this in development since 2003

What Next?

In-lined Web-apps

```
container {
  component(BizBean)
  webContainer(host:“*”, port:80) {
    context(“foo/”) {
      servlet(“bar.xyz”,
        class:BarServletNeedsBizBean)
    }
  }
}
```

No web.xml obviously

Tiering

```
tier(name:“persistence”) {
  exposedComponent(PersistenceFoo)
  component(FooSerializer)
  component(FooRepicator)
  tier(name:“biz”) {
    component(BizBeanUsingFoo)
    component(BizBean2)
  }
}
```

Publishing

```
publication {
  soapPublisher(host:“*”, port:8080)
  container {
    component(my.ZipCodeServiceImpl) {
      publish(name:“zipCodeService”)
    }
    component(NeedsZipServices)
  }
}
```

Subscription

```
subscription {
  soapSubscriber(host:“beatle”, port:8080)
  container {
    remoteComponent
          (key:my.ZipCodeServiceme,
           name:“zipCodeService”)
    component(AlsoNeedsZipServices)
  }
}
```

Spring vs Pico/Nano

- Could use Pico and Nano for some usages Spring is used for.
- Spring is more comprehensive for J2EE though (we're chasing it).
- You can use Pico and Nano with Spring.
- Pico/Nano has an audience amongst specialist embedders.