Spring and Eclipse RCP

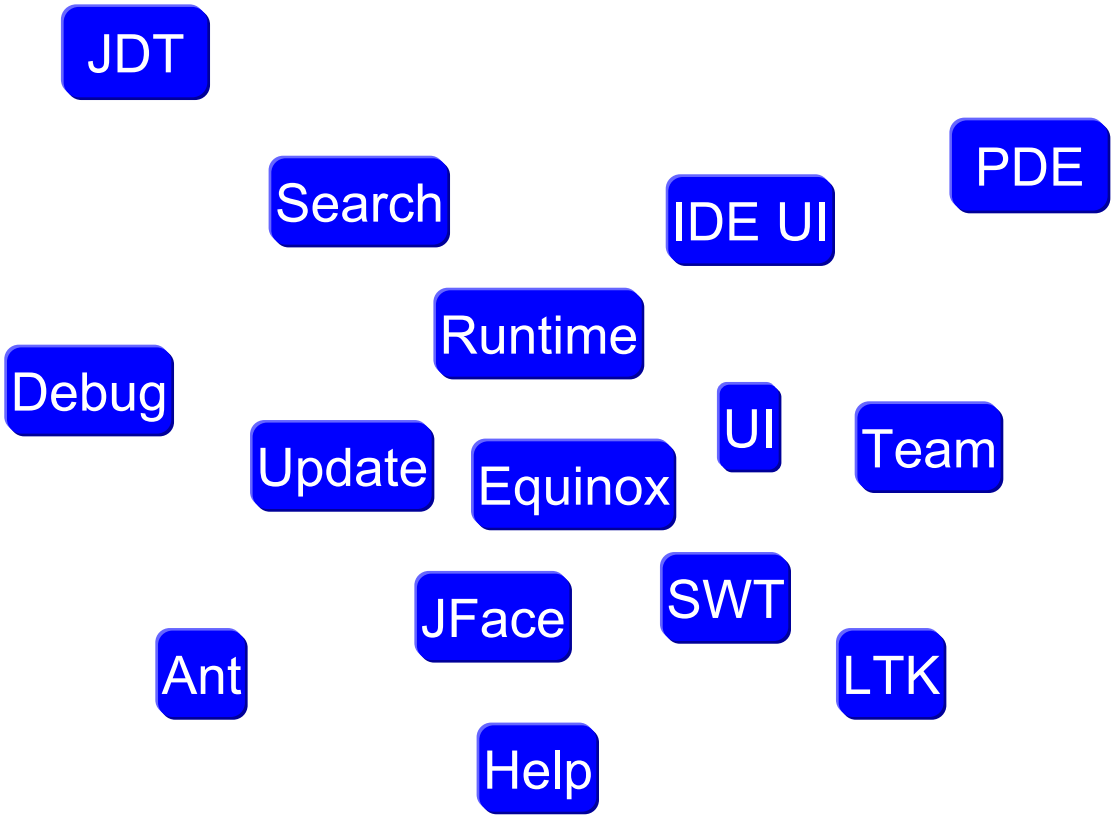
Martin Lippert
akquinet agile GmbH
lippert@acm.org
Equinox Incubator Committer

Agenda

- What is the Eclipse Rich Client Platform?
- Spring and Eclipse RCP
  - Spring Backends for Eclipse RCP
  - Eclipse RCP + Spring on Client and Server
  - OSGi and Spring everywhere
  - More Spring on the Client
- Conclusions

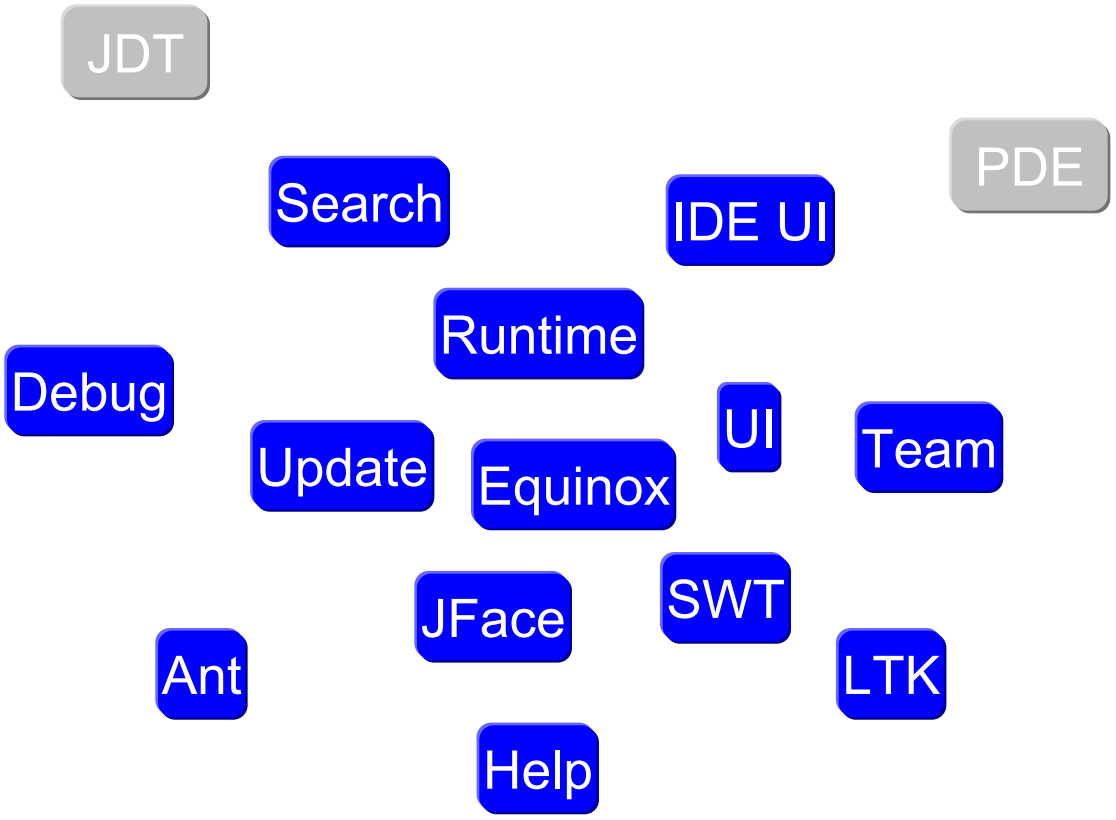
What is Eclipse Rich Client Platform?

Eclipse is a Composition of Components



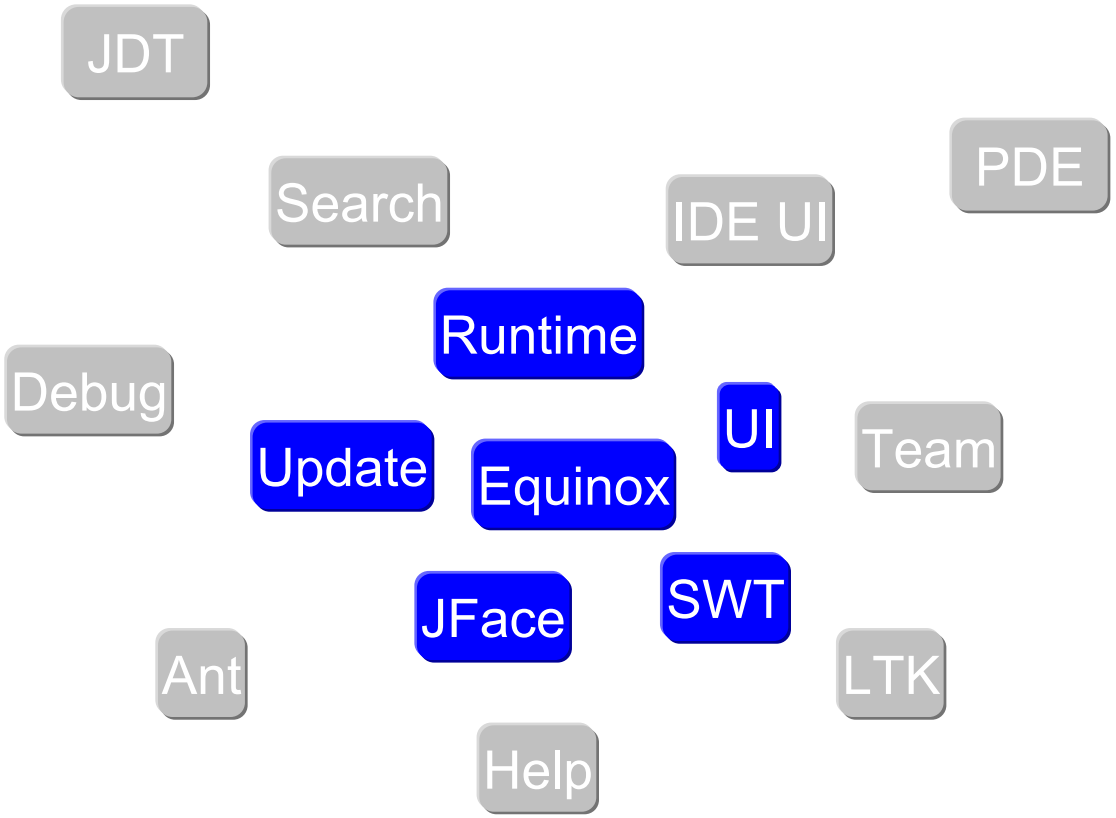
Eclipse SDK/Java IDE

Generic IDE Components



Eclipse IDE

Eclipse Rich Client Platform

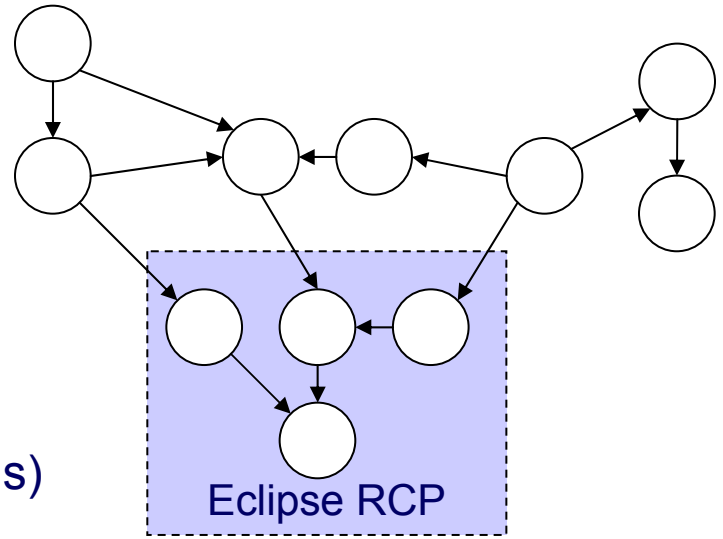


Why Use Eclipse Rich Client Platform?

- A consistent and native look and feel across applications and features
- Provides common application services
  - Native look and feel
  - Window management
  - Standardized component model (Equinox)
    - Pervasive extensibility – Extension registry
    - Update Manager
  - Help system
- First-class development tools
- Middleware for building rich client applications!
  - Allows programmers to focus on core application not the plumbing
  - Don’t reinvent the wheel

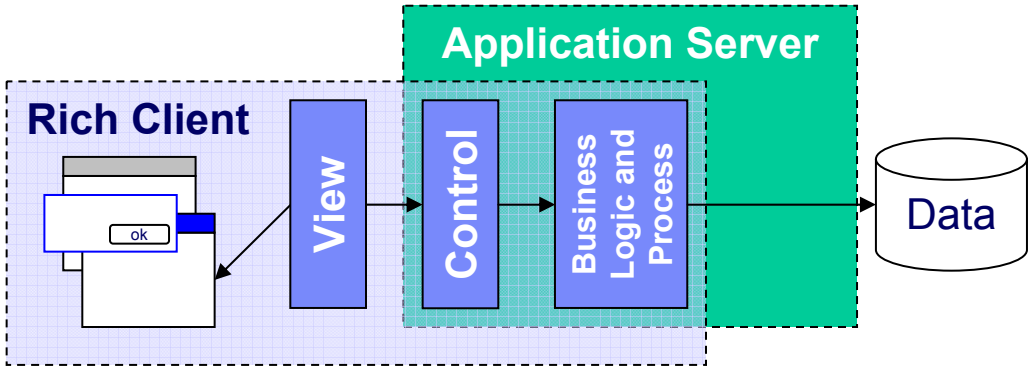
Equinox

- Equinox is the Eclipse component model
  - Based on OSGi R4 specification
  - Standard Java lacks an explicit notion of components
- Components == Bundles == Plug-in
  - Versioned
  - Defined declaratively
  - Dynamically loadable/unloadable
  - Support dynamic update and install
- Explicitly define
  - Dependencies
  - Runtime visibility
  - Interactions (extension points/extensions)

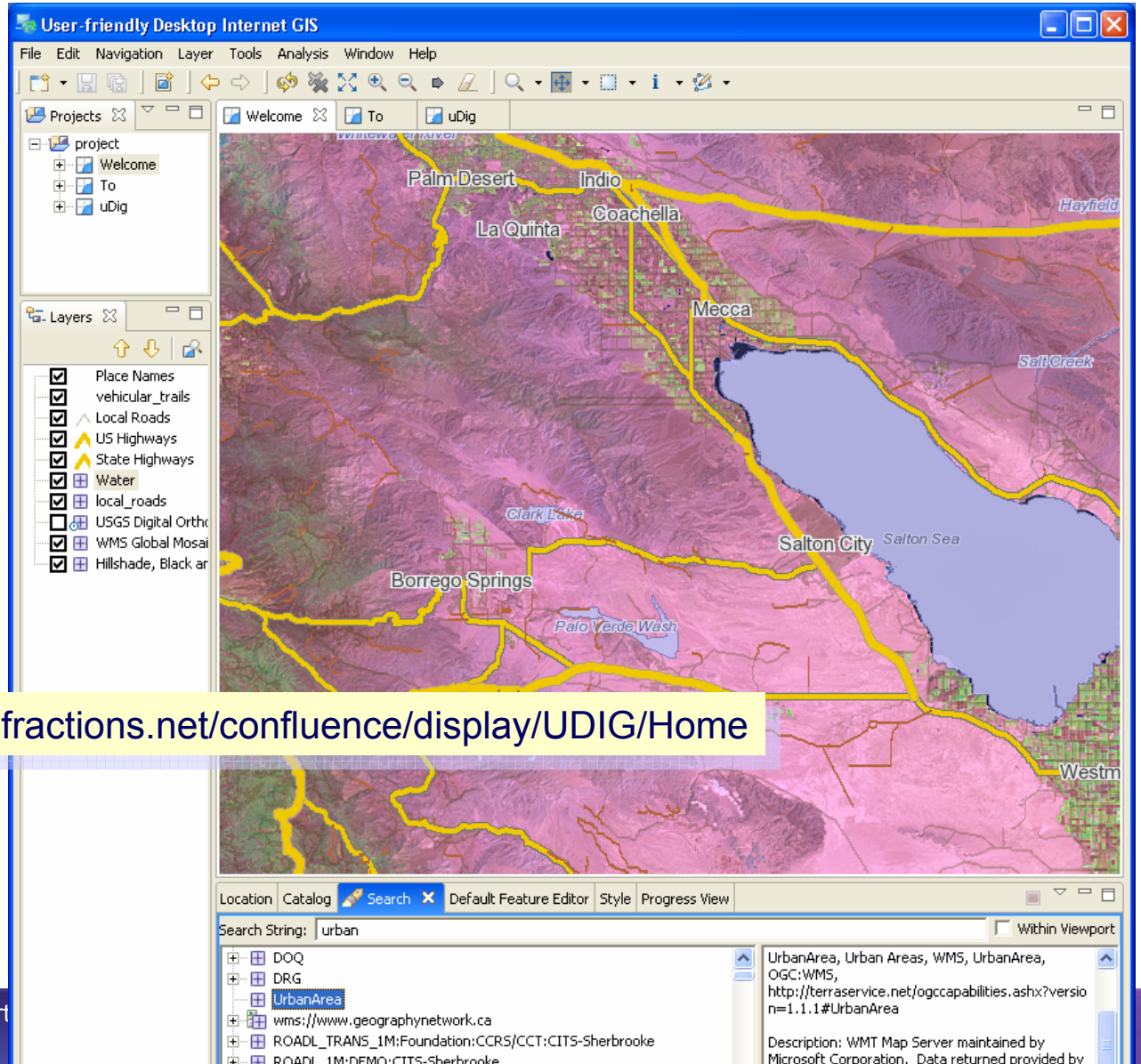


The typical RCP Application

- Rich user experience
- Platform independent
- Component model
- Integrated update mechanism
- Extensible
- **Typically (though not necessarily) a client for some backend service**



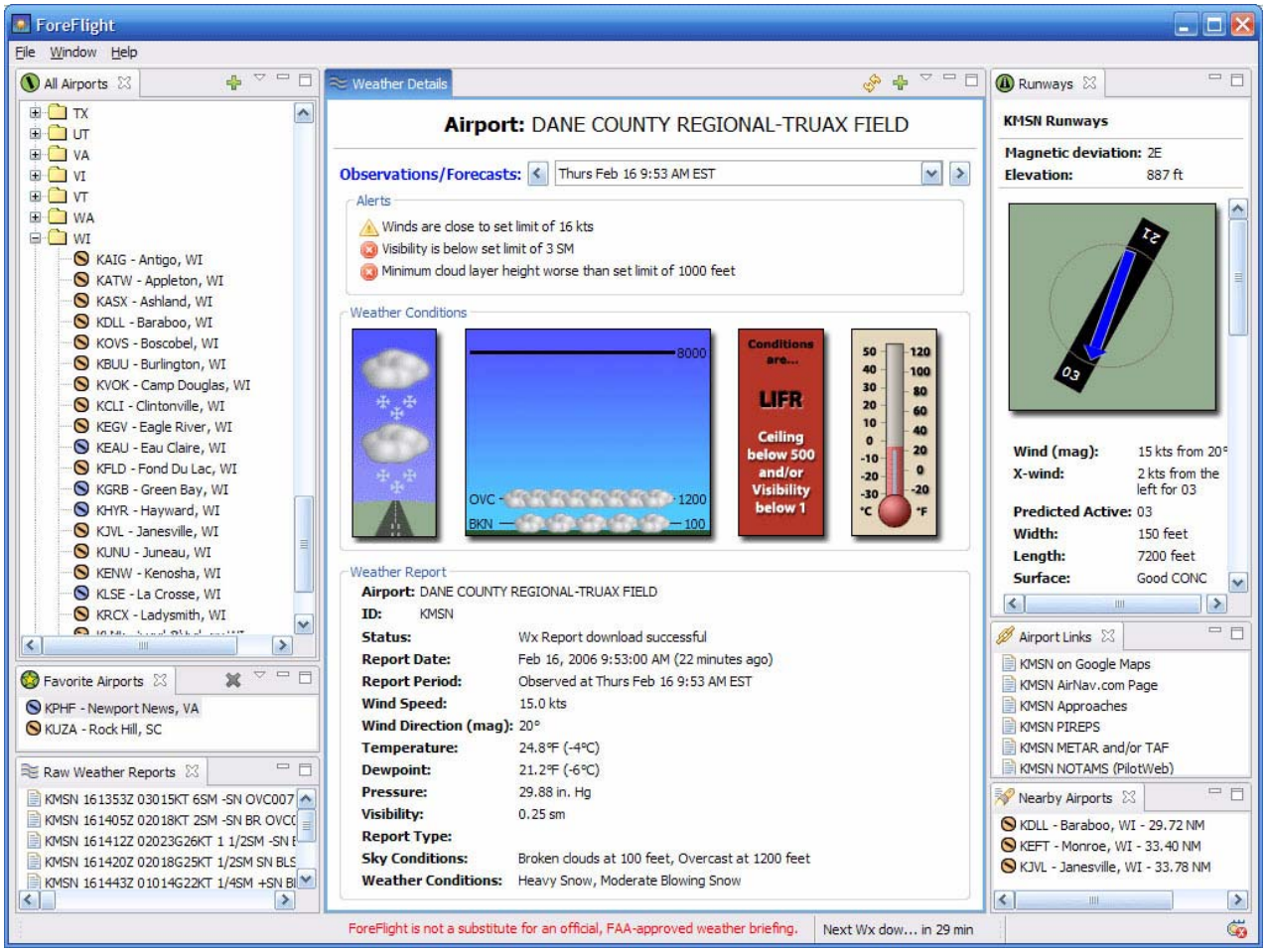
Example: GIS



http://udig.refractions.net/confluence/display/UDIG/Home

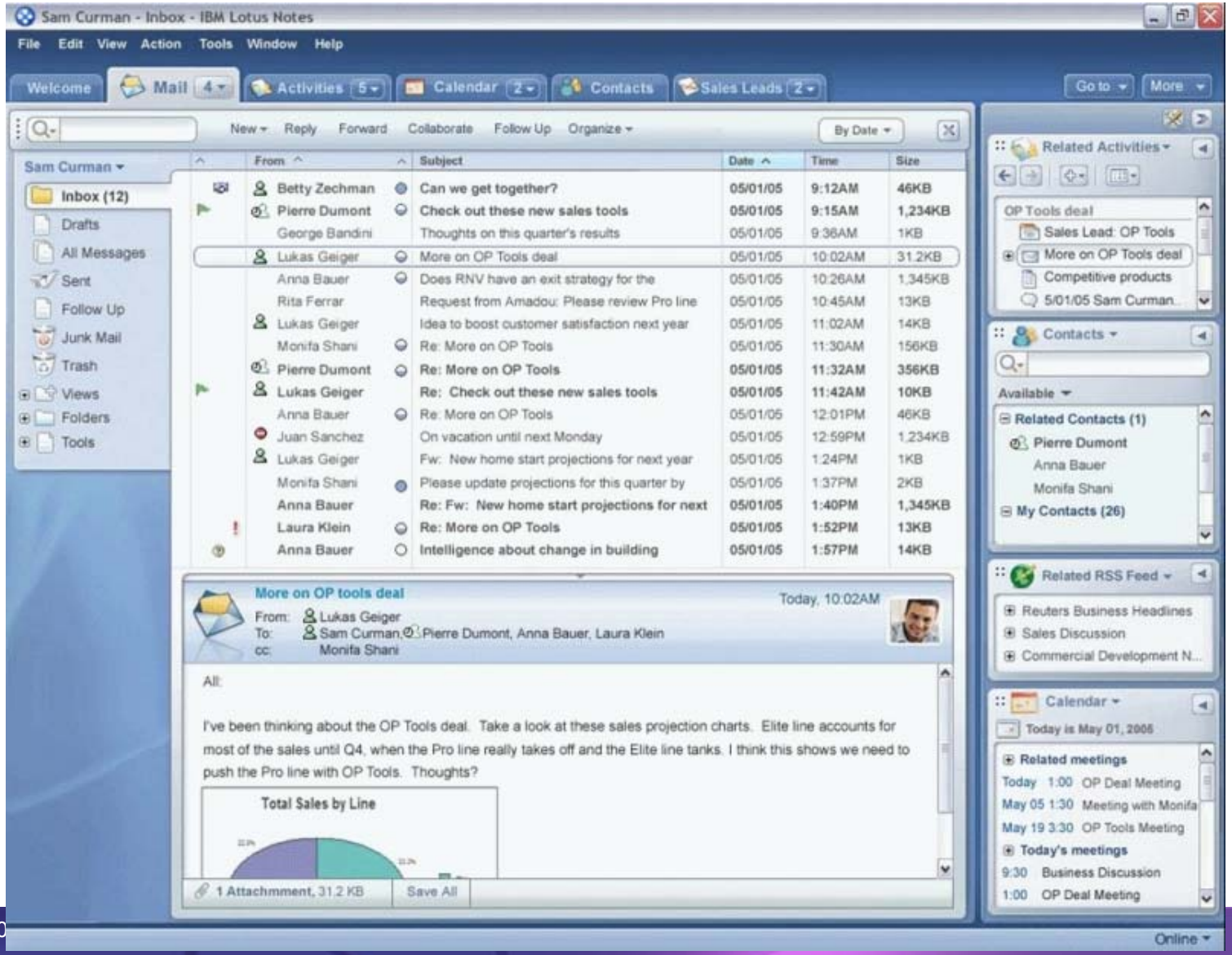
Example: ForeFlight

- Displays critical information graphically and prominently
- Displays alerts when conditions are near or exceeding the user's preferred limits
- Connects via the web to weather and information services
- Multiple ergonomic views of the weather that affects the go/no-go flight decision



http://www.foreflight.com/

Example: Lotus Notes “Hannover”

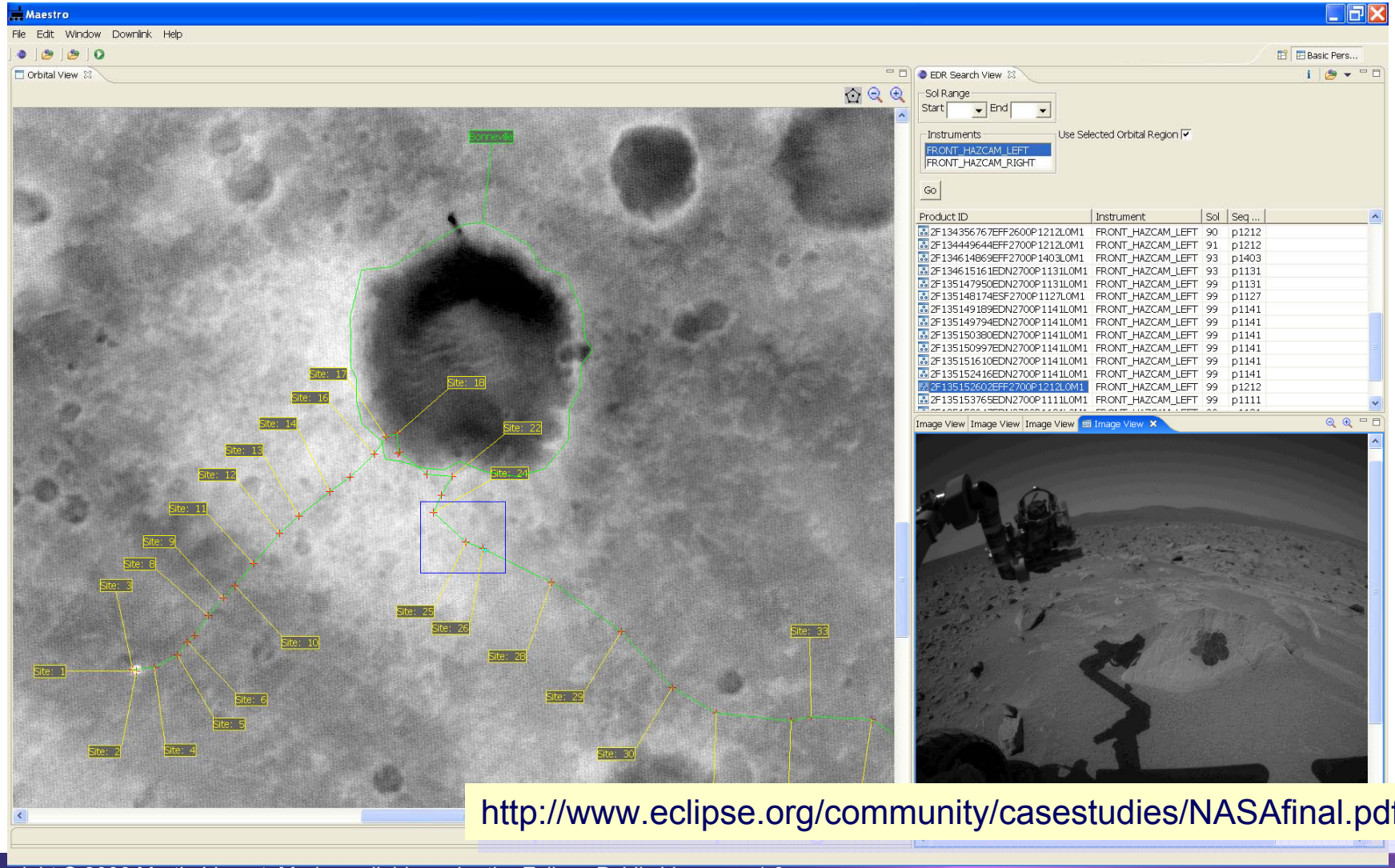


Example: RSS Solutions

- Advanced planning and scheduling (APS) solutions

http://www.eclipse.org/community/casestudies/RSSfinal.pdf

Example: Maestro – NASA Space Mission Management



http://www.eclipse.org/community/casestudies/NASAfinal.pdf

Spring Backends for Eclipse RCP

Spring-based Backends

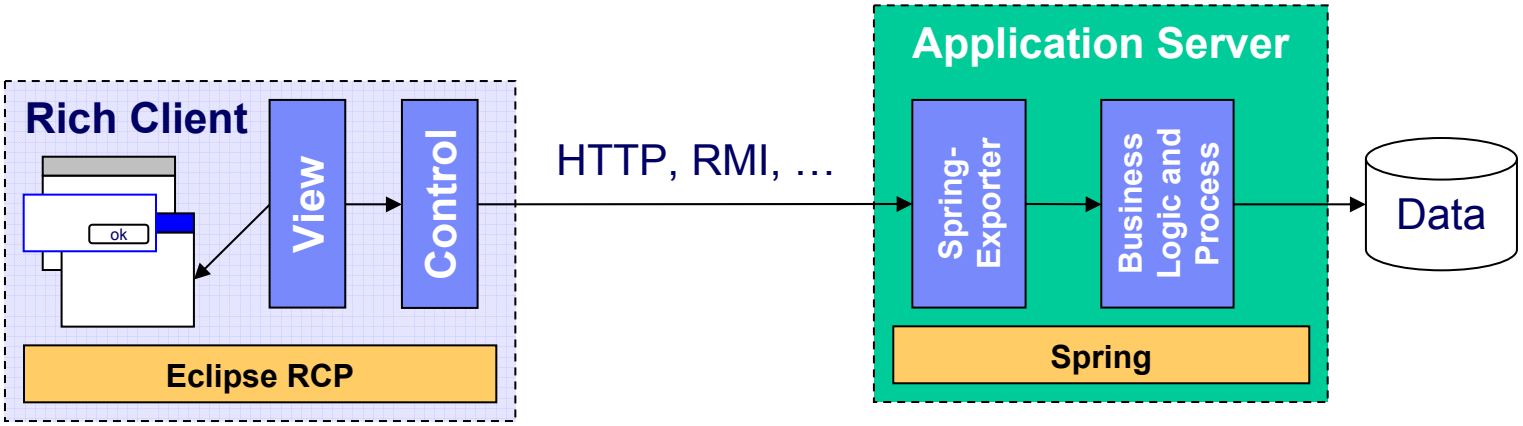
- Spring is great for implementing the backend:
  - Dependency injection for the implementation
  - AOP for cross-cutting and interceptor-based features
  - Easy transaction handling
  - Easy integration of other technology like O/R mapping, security, and so on…

- *It is a natural choice to implement the backend using Spring*

Pure RCP Client for the Spring Backend

- Client: Pure RCP
- Server: Pure Spring

- Ways to communicate, for example:
  - Server provides RESTful/SOAP services, client consumes via HTTP
  - Server provides services via RMI, client consumes via RMI



Evaluation

- Unrestricted usage of Spring on the server
- Unrestricted usage of RCP on the client
  - Including additional features like data binding support, BIRT, …
- Simple communication protocol (which is good)
  - But difficult for sophisticated remote interfaces

- Different deployment and programming models (OSGi bundles on the client, typical WAR file on the server)
  - Good for highly decoupled systems
  - Difficult for more integrated systems

Eclipse RCP + Spring on Client and Server

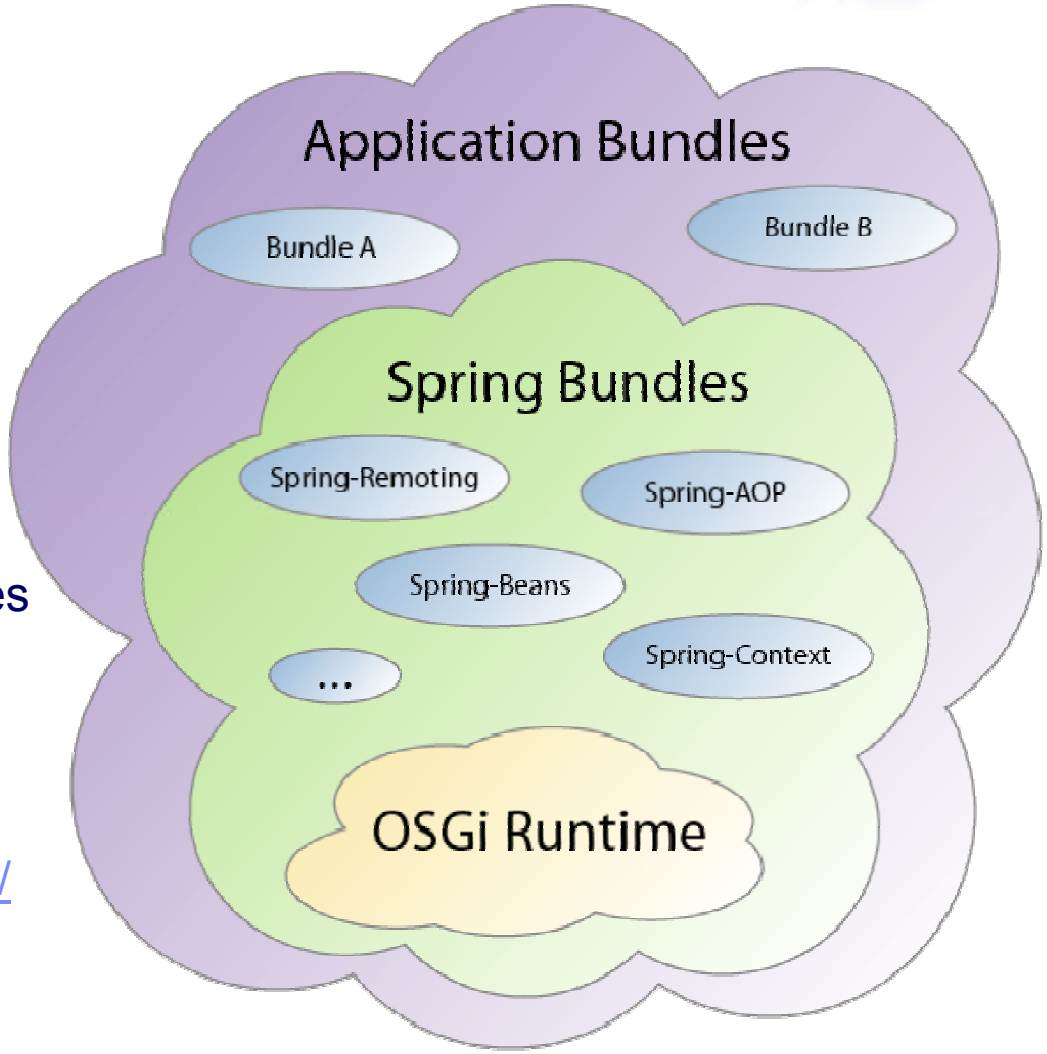
The Spring-OSGi bridge

- Spring-OSGi is an additional Spring project
- Allows to use Spring in OSGi applications
  - Per-Bundle application context definition
  - Application context initialization at bundle activation
- New <osgi:…> namespace:
  - Spring-Beans as OSGi-Services and vice versa
  - Dynamic behavior of OSGi via proxies
  - Inter-bundle dependency injection

Spring and Equinox combined

- Easy to use
- But it is just the beginning, the base infrastructure
- The interplay with the Spring libraries need to be investigated in the future
- Classloading could cause problems with third-party libraries that are used by Spring

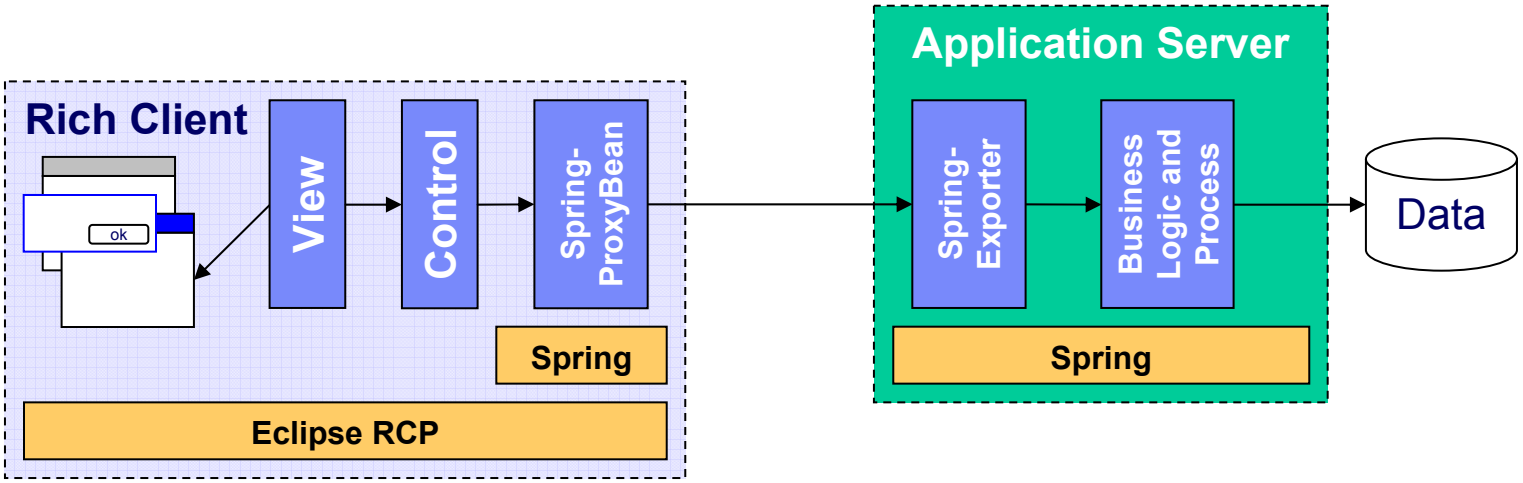
- Detailed information: http://www.springframework.org/osgi/



RCP + Spring on the Client

- Client: Eclipse RCP + Spring/OSGi
- Server: Pure Spring

- Uses Spring/Remoting for remote communication
  - With all the possible variations (RMI, HTTPInvoker, Hessian, Burlap, etc.)



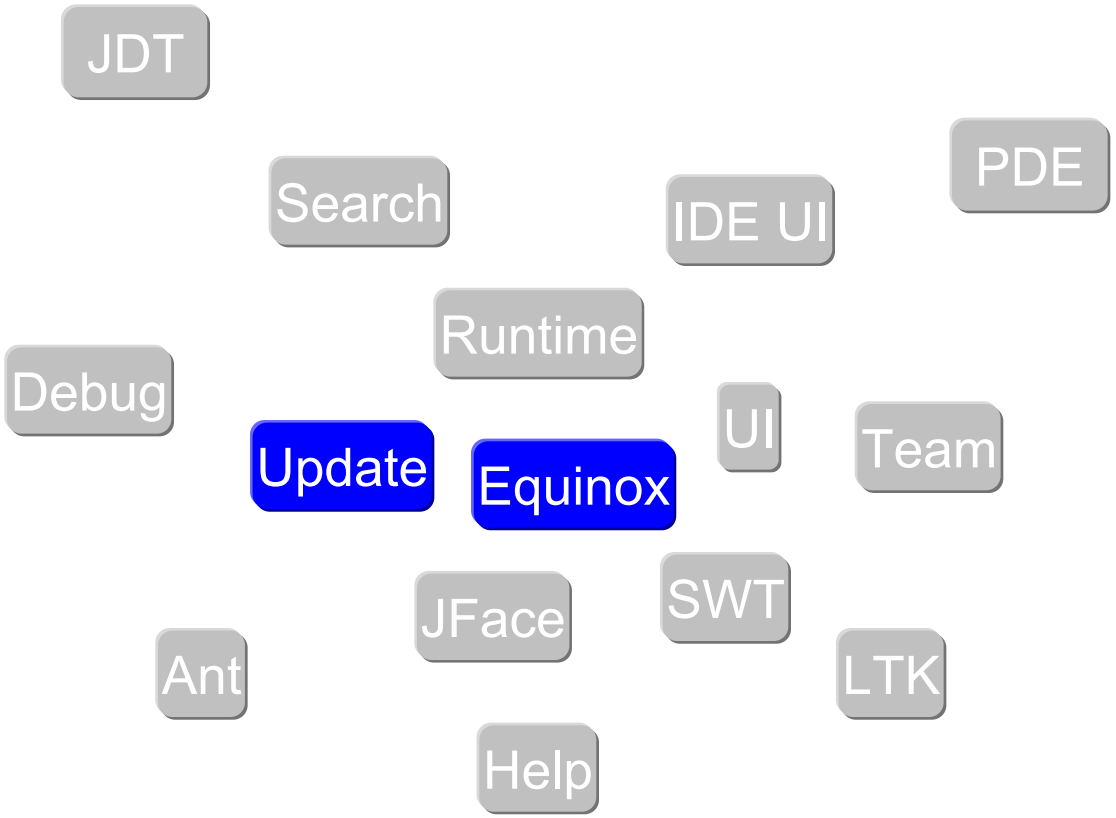
Evaluation

- Unrestricted usage of Spring on the client **and** the server
- Unrestricted usage of RCP on the client
- Easy remote communication via Spring/Remoting on both sides

- Still different deployment and programming models
  (OSGi bundles on the client, typical WAR file on the server)
  - Although most likely classes are shared between client and server

OSGi and Spring everywhere

Eclipse Rich Server Platform (RSP)



Server-side Eclipse

- Why use the Equinox component technology only on the client side?

- Component model
- Update mechanism
- Extensibility

- All interesting for server-side applications as well

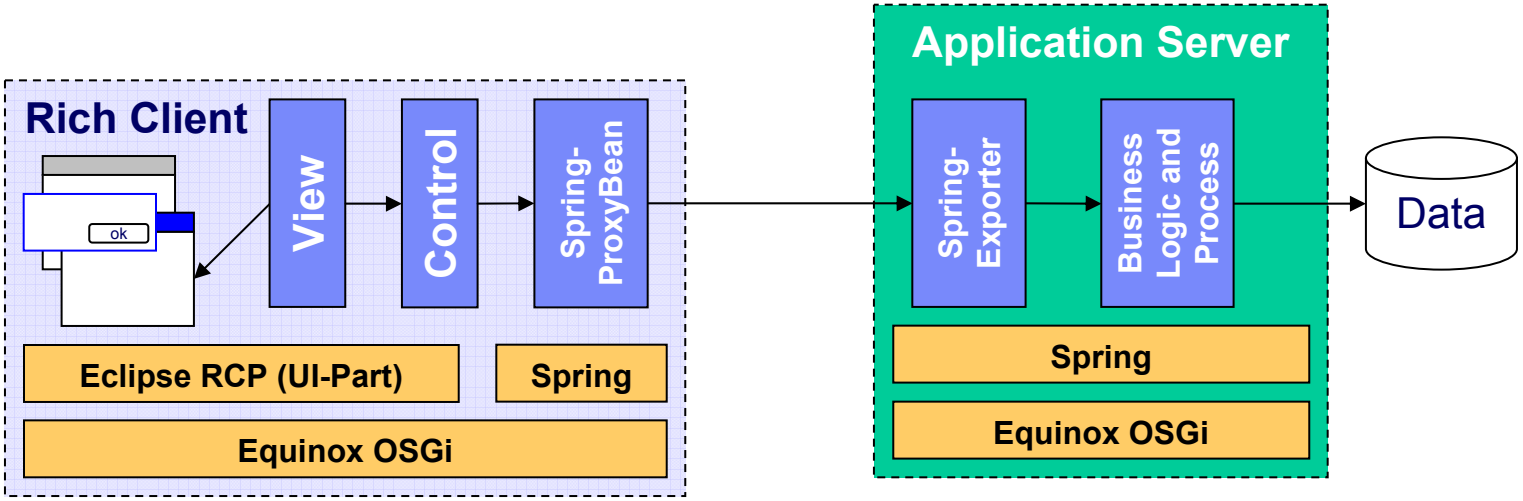
Server-side Equinox/OSGi is well accepted…

- WAS 6.1
- Adobe Version Cue

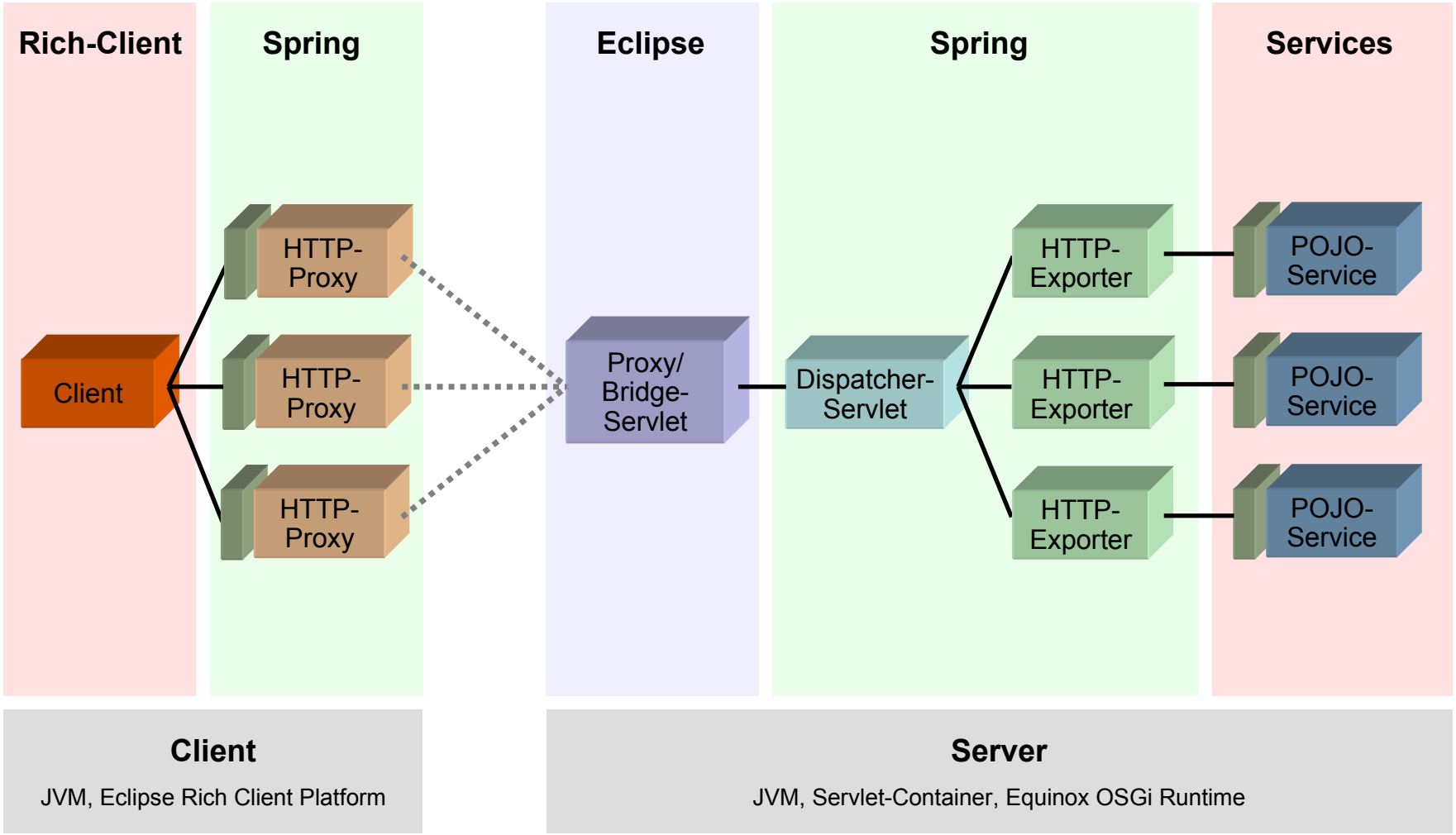
- Apache Harmony
- Eclipse Rich AJAX Platform
- …

Middle-tiers on Equinox

- Equinox can be used to implement middle-tiers
  - Same component model on both sides
  - Same extensibility for both sides
- Client and server could share the same components
- Integration with web-/app-servers possible



Example: Remoting for POJOs



Equinox-based web apps

- Equinox can run inside a web app or the web-app can run on top of Equinox

- Web-app can be componentized
- Web-app can be designed and implemented for extensibility (Extension-Points)

More Spring on the RCP-based Client

More Spring on the Rich Client

- How can we benefit from Spring on the client aside from Spring/Remoting?
- Dependency injection and all other technology abstractions usable as well
  - Just straight forward using Spring/OSGi
- How to incorporate this with the Extension-Registry?
  - For example, inject dependencies into views and editors?

The typical Extension Definition

- We define a view via an extension
- The view itself is created by the workbench via the extension registry on demand

```
<extension point="org.eclipse.ui.views">
  <view
    name="My View"
    class="org.eclipse.example.rcpspring.MyView"
    id="org.eclipse.example.rcpspring.view">
  </view>
</extension>
```

Defining the View via Spring

- Instead we would like to inject dependencies into the view
- Therefore we define the view “bean” within the Spring context

```
<bean id="injectedView"
    class="org.eclipse.example.rcpspring.MyInjectedView">
  <property name="businessService"
     ref="businessService"/>
</bean>
```

Adapt the Extension Definition

- Instead of the view directly we declare a factory in the extension definition

```
<extension point="org.eclipse.ui.views">
  <view
    name="My Injected View"
    class="org.eclipse.example.rcpspring.
                                    MyInjectedViewFactory"
    id="org.eclipse.example.rcpspring.injectedview">
  </view>
</extension>
```

Creating an Extension Factory

- The Extension-Registry now creates the factory instead of the view and calls `setInitializationData(..)` and `create()`

```
public class MyInjectedViewFactory implements
  IExecutableExtensionFactory, IExecutableExtension {

  public Object create() throws ... {
    return this.view;}

  public void setInitializationData(..) throws ... {
    this.view = (MyInjectedView)
      Activator.getAppContext().getBean("injectedView");
    this.view.setInitializationData(..);
  }

...
```

Side Note: Extension-Registry vs. DI

- Extension-Registry:
  - Designed to open-up specific parts of a component for extension
  - Scalable through declarative metadata
- Dependency Injection:
  - Designed to de-couple classes
  - No metadata, not designed for scalability

Conclusions

Conclusion

- A big step forward:
  - A homogeneous programming and deployment model through the usage of **Equinox/OSGi and Spring** for **Client and Server**
  - Eclipse RCP as UI framework for the rich client

- Component model for client and server (through OSGi component model and Spring dependency injection)
- Extensibility for client and server (through Extension-Registry)
- Technology abstractions for client and server (through Spring)

- ***What else do we need? ;-)***

Thank you for your attention!

- Questions welcome !!!

Special thanks to Jeff McAffer for feedback and material

Martin Lippert

lippert@acm.org

Recommended RCP Reading

- Eclipse Rich Client Platform
  - By Jeff McAffer and Jean-Michel Lemieux
  - Addison-Wesley Professional
  - ISBN: 0321334612
- SWT : The Standard Widget Toolkit, Volume 1
  - By Steve Northover, Mike Wilson
  - Addison-Wesley Professional
  - ISBN: 0321256638
- Contributing to Eclipse: Principles, Patterns, and Plugins
  - By Erich Gamma, Kent Beck
  - Addison-Wesley Professional
  - ISBN: 0321205758