Best Practices for Apache Cocoon

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About

- Member of the Apache Software Foundation
- Committer in some Apache Projects
  - Cocoon, Excalibur, Pluto, WSRP4J, Incubator
  - PMC: Cocoon, Incubator, Portals
- Chief Architect of the Competence Center Open Source, S&N AG, Germany
- Article/Book Author, Technical Reviewer
- Member of the JSR 286 spec group (Portlet API 2.0)
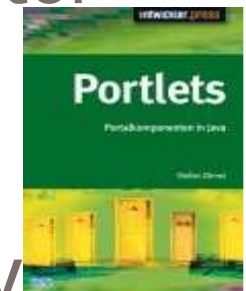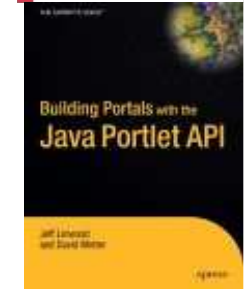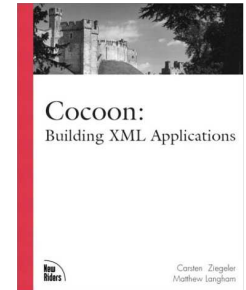
Agenda

- Cocoon in a Nutshell
- Cocoon Flow
- Cocoon Forms
- Business Layer
- Developing with Cocoon
- Outlook - Cocoon 2.2 and beyond
- Q/A

Expectations

- Rapid Development/Prototyping
- Use "Best of Breed"
- Flexibility
- Rich functionality out of the box
- Support for improved user experience (AJAX)

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Cocoon in a Nutshell

Apache Cocoon

- Top-Level Apache Open Source project
  - http://cocoon.apache.org
- Started in 1999 (XML Publishing Framework)
- Today
  - One of the most important Apache projects
  - Incorporates technologies from various project
  - Used/Supported by several minor and major companies

Motivation

- Cocoon is a powerful web application framework
  - It is **not** just an XML web publishing platform
- Serious web applications can still be fun
  - Write code only when you need to
- The magical trio: pipelines, flow and forms
- Cocoon is aimed at larger projects/teams!

Extensible Architecture

- Component Based Architecture
- Focus on *Composing* rather than *Programming*
  - *"We figure out the hard parts, you get to do the fun stuff."*
- Core + Blocks
  - Core = pipelines, sitemap, flow, forms, template
  - Blocks: Portal, Cron, FOP, Axis, POI, Batik, Databases, Authentication, OJB, SAP, WebDAV …
  - Built-time application assembly configuration
  - (Hot-deployment and -reconfiguration is comming)

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Scenarios

- Dynamic Document Generation
  - Based on XML/XSLT (but not limited to)
- Used for various application scenarios
  - Web Sites, Content Publishing
  - (XML) Portals/Workplaces
  - Processing Systems, Business Integration
  - CMS, Reporting, Administration Tools

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Some References

- VNU
- Vodafone
- BASF
- ÖAMTC
- Raiffeisen Zentralbank Austria (RZB)
- Rheinland Versicherungen
- Digital Insight's Web Center

  And more (we are not allowed to mention) ☺

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Real World Applications

Real World Applications

Real World Applications

Your Benefits

- Solid Framework (more than 5 years of experience)
- Separation of Concerns
- Real Team Development
- Rich Set of Functionality
- "Modern" techniques and frameworks

What You Should Do ☺

- Download/checkout Cocoon (2.1.9/2.2)
- Build and Run
- Try out the Demos
  - Forms and Flow
  - AJAX
  - Portal

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Introduction to Cocoon

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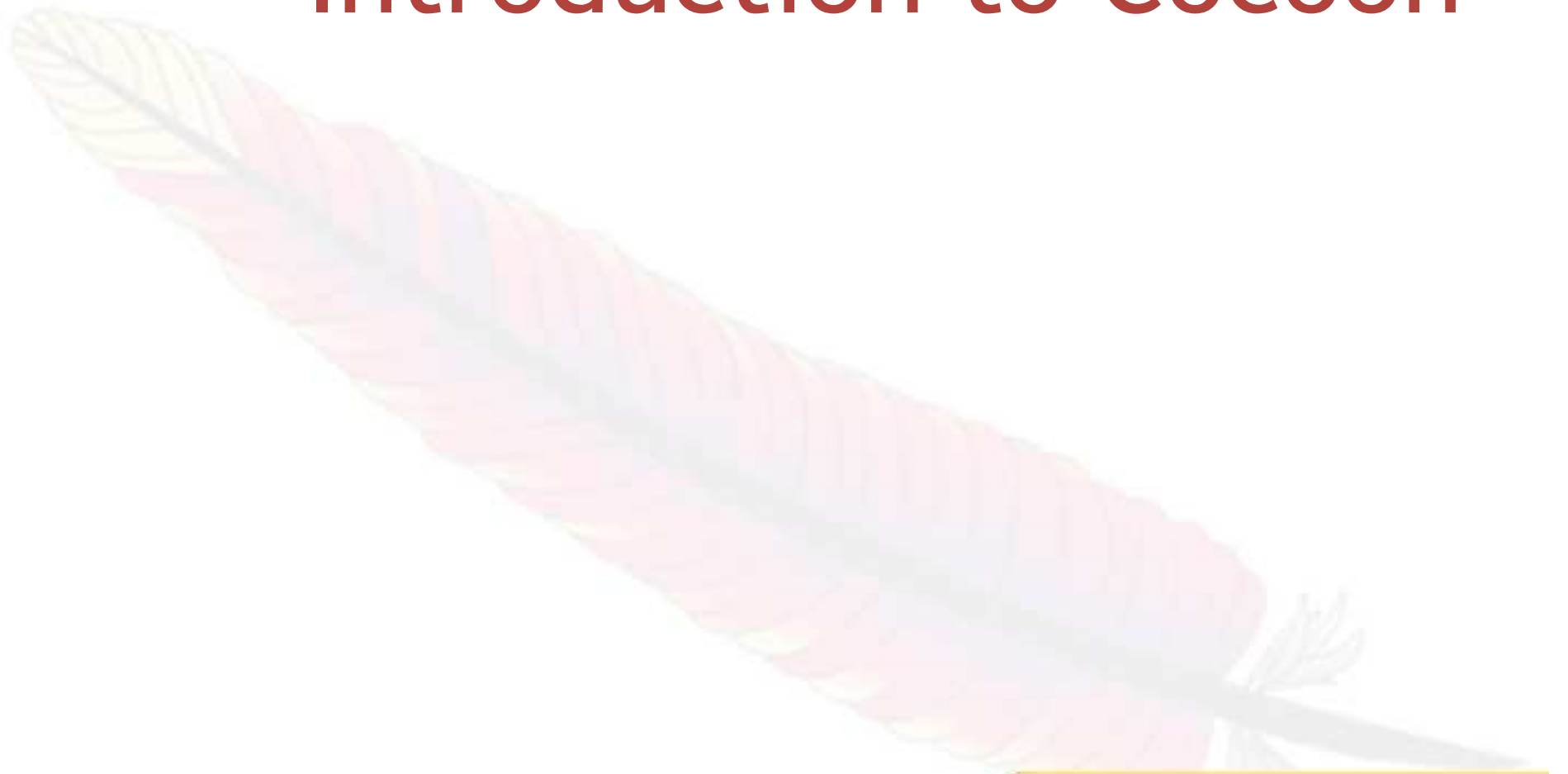
Separation of Concerns

- UI: Templating and XSLT
  - Available components (Cocoon Forms)
  - XHTML, CSS, AJAX
- Controller/Application Flow
  - Cocoon Flow (JavaScript), Spring WebFlow
- Business Layer
  - Cocoon Forms
  - JavaScript/Java
  - 3rd party frameworks

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Apache Cocoon
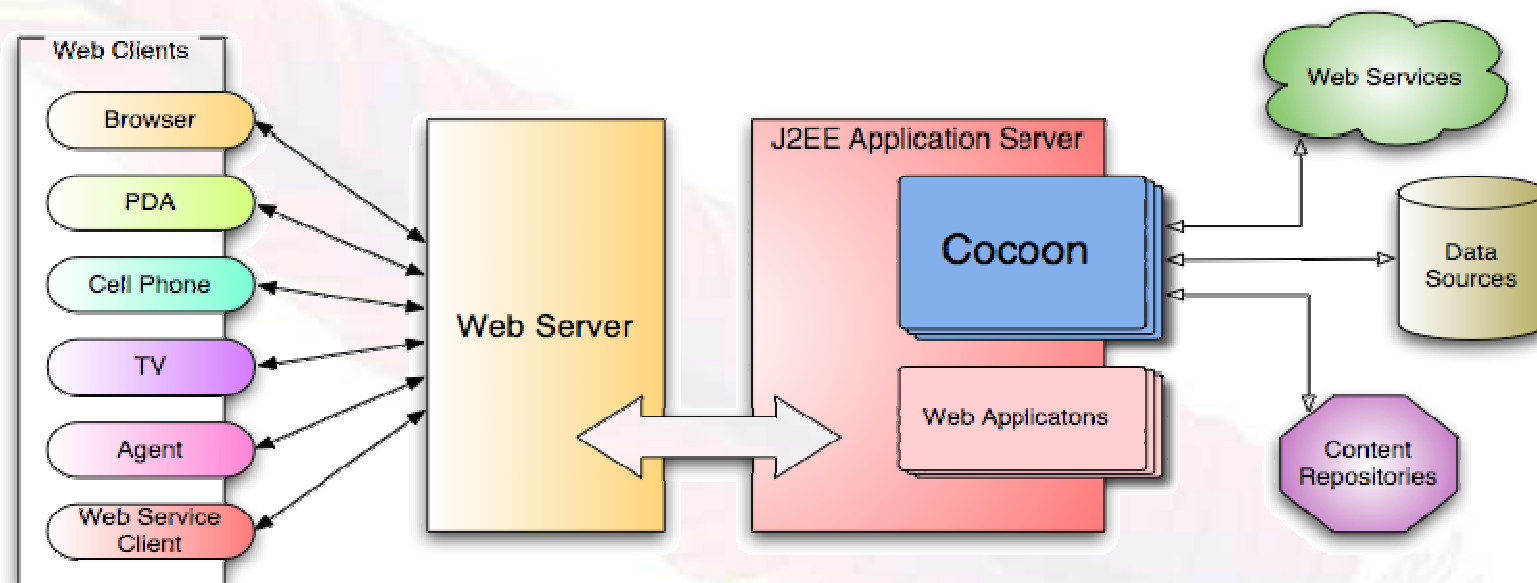
Web Publishing with Cocoon

- Flexible Data Integration / Aggregation
  - XML files, XML over HTTP
  - Databases, LDAP, SAP
  - ...
- Flexible Publishing (using XSLT)
  - HTML, WML, XML
  - PDF, SVG, PS, Office Documents
  - ...

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Request Handling (Sitemap)

Sitemap

Request

Matcher

Generator — Transformer — Serializer

Generator — Transformer — Serializer

Response

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Request Handling (Sitemap)


```
…
<map:match pattern="helloworld" type="wildcard">
    <map:generate  type="file" src="helloworld.xml"/>
    <map:transform type="xslt" src="helloworld2html.xsl"/>
    <map:serialize type="html"/>
</map:match>
…
```

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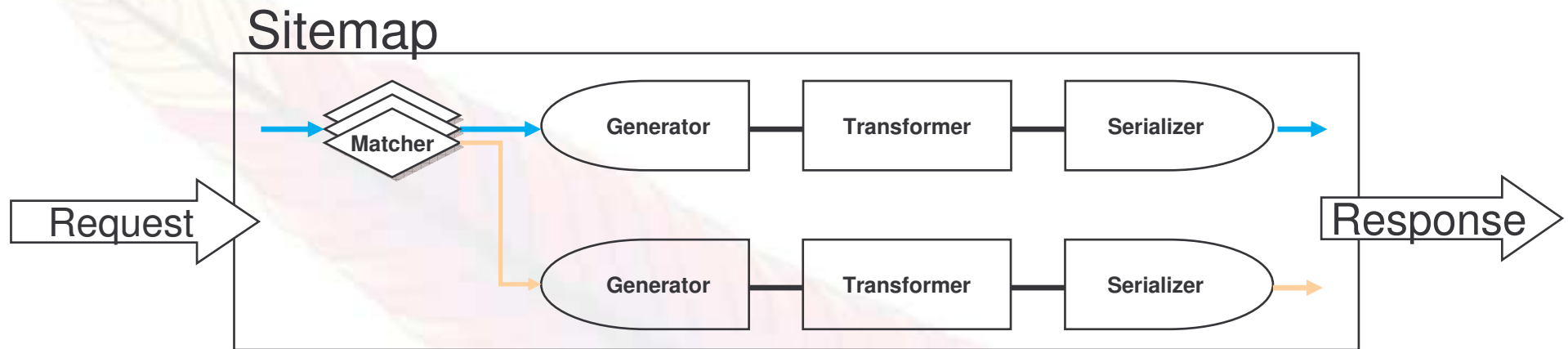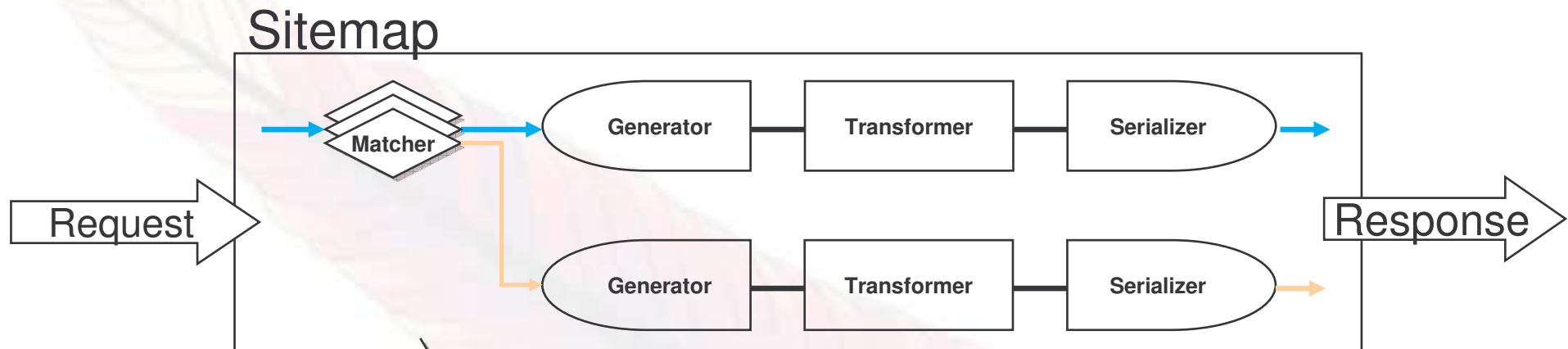
Device Detection / Multi Channel

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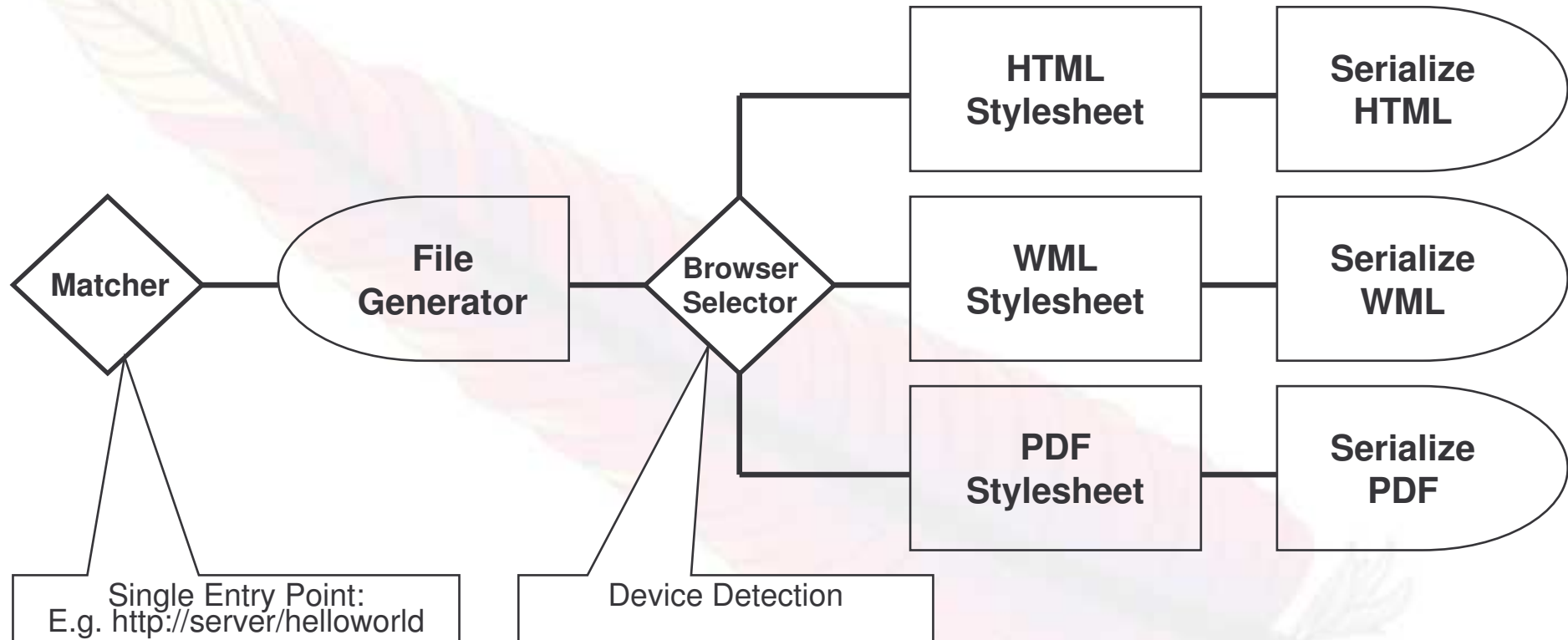
Standard Pipeline Components

- Program the Sitemap
- Define the matches and pipelines
- Separating Content from Layout

Generator	Transformer	Serializer

File / HTTP / FTP Generator
Template Generators
    (JXPath, Velocity, ...)
Directory Generator
System Info Generators
Custom

XSLT Transformer
  (Xalan, XSLTC, Saxon...)
Data Transformer
  (SQL, LDAP, i18n, Session...)
Aggregation Transformers
Filter Transformers
Custom

HTML Serializer
WML Serializer
XML Serializer
PDF/PS/RTF Serializer
JPG/PNG Serializer
Office Documents Serializer
Custom

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Web Publishing with Cocoon

- Dynamic Document Generation
  - Separation of Content and Layout
- Powerful Processing Description (Sitemap)
- Flexible Pipeline Concept
  - Many available components
- Conditional Processing (Matches/Selects)
- Caching

Web Applications
Cocoon Flow

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Cocoon "MVC"
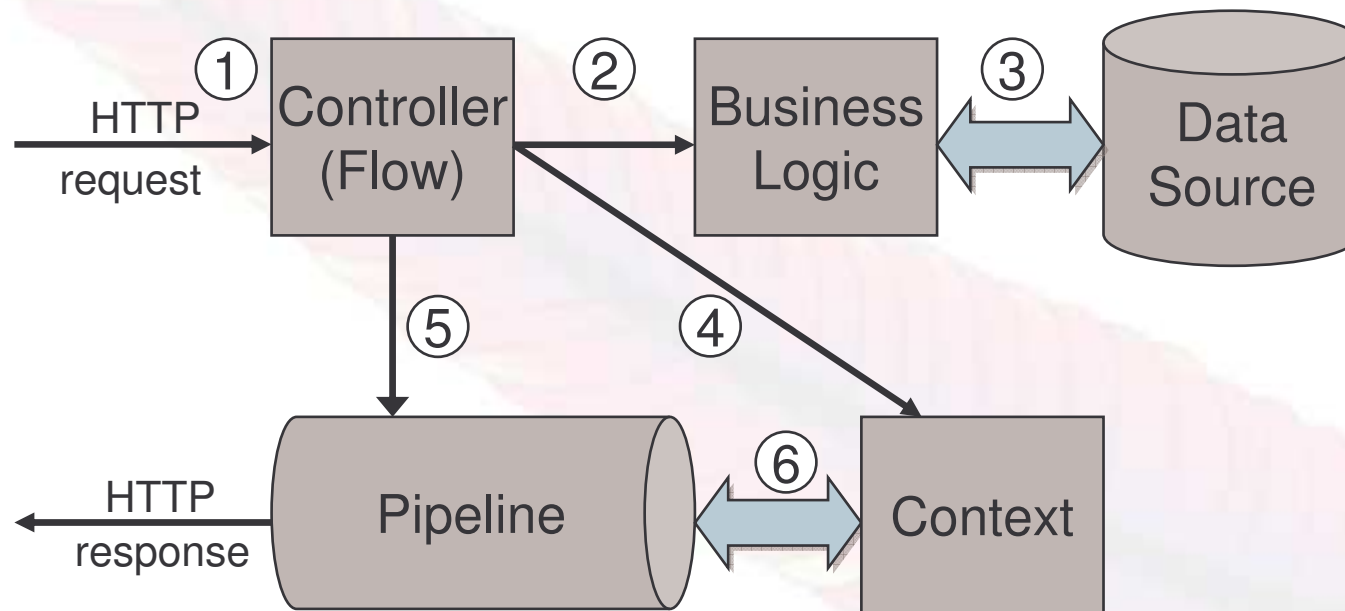
Cocoon Flow - A Control Layer

- Glues together:
  - business logic
  - page flow
  - presentation
- Uses JavaScript scripts
  - server side
  - with Continuations

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Flow - Example

- Newsletter Registration
  - User enters email
    - Page with form
  - If the email is not valid, user has to re-enter
    - Redisplay page with form
  - If the email is valid, show message
    - Another Page

Flow - Example
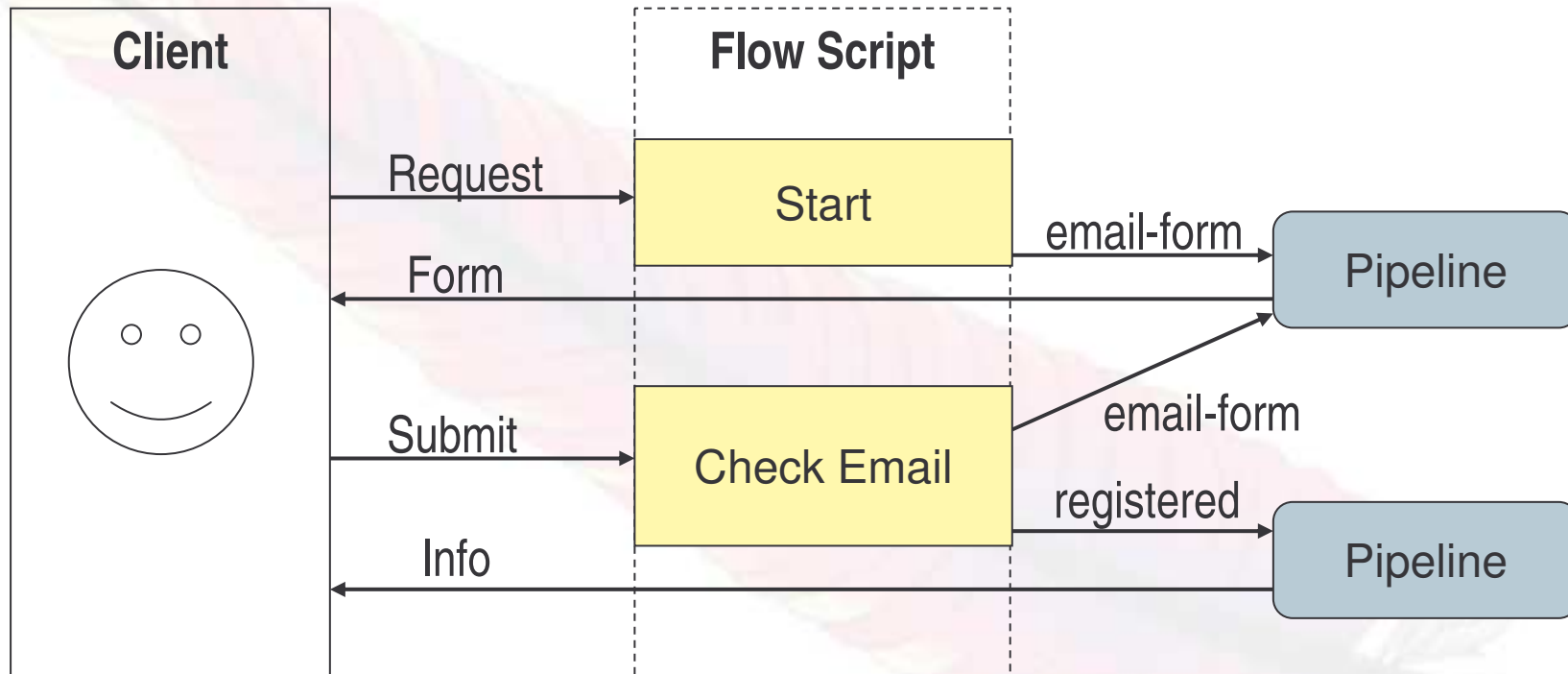
Flow - Example

```
function newsletter() {

  var email = null;

  while(email == null) {
    cocoon.sendPageAndWait("email-form");        ☞ Pipeline

    email = cocoon.request.get("email"));

    if (!checkEmail(email))
        email = null;
  }
  cocoon.sendPage("registered", {who: email});   ☞ Pipeline

}
```

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The View Layer - Pipeline
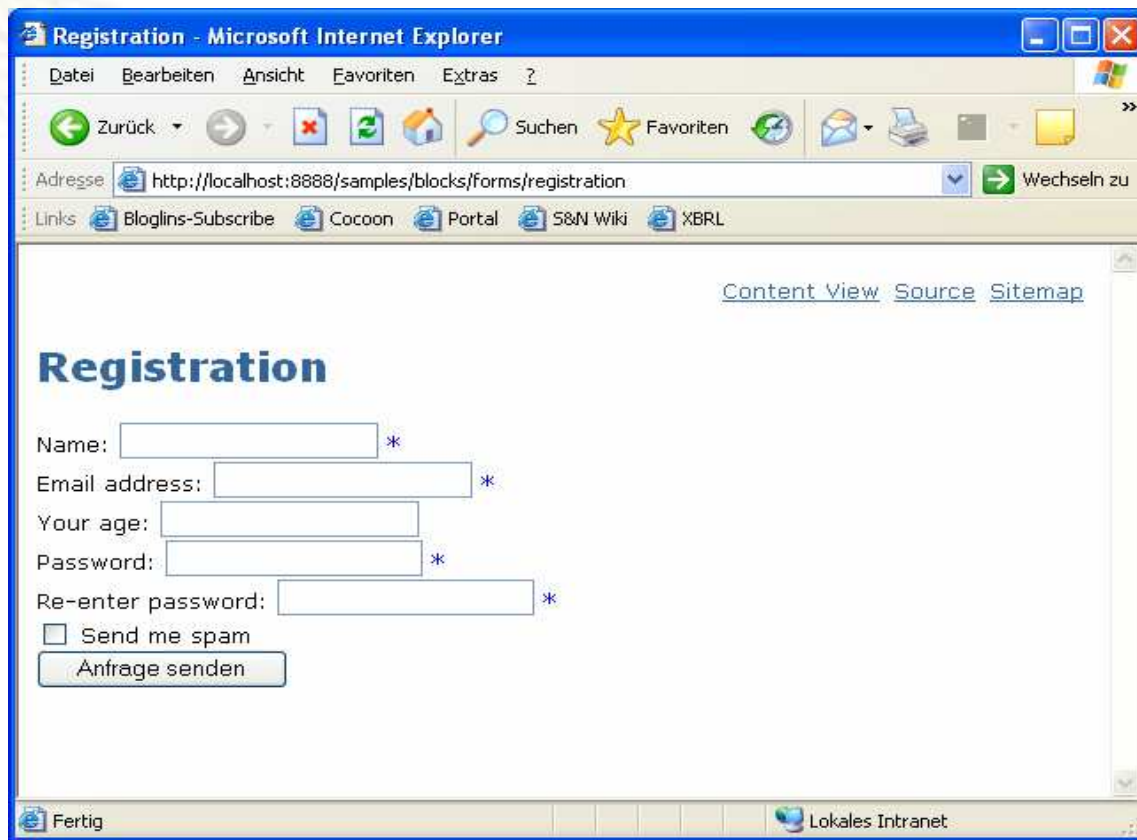
- Cocoon 2.1.9+: Template Block (new jxtg)
- JXTemplateGenerator
- JXTemplateTransformer
- Other alternatives available
  - Velocity, XSP
- Custom components

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Flow In a Nutshell

- Cocoon Flow is a big improvement
  - Powerful concept for building applications
  - Page flow
- Different options for building the View
  - JXTemplateGenerator (Template Block)
- Documentation is not that good
  - Check the Cocoon Wiki
  - Search the web!

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Web Applications
Cocoon Forms

Simple Form Application

Cocoon Forms

- Official Cocoon Form framework "CForms"
- Fundamentals
  - Very little Java coding required
    - No Action/ActionBean required!
  - Strong datatyping & type conversion capabilities
  - Offers a growing set of ready-made widgets
  - Server-side form model plus event model

Widget Oriented Approach

- Set of standard widgets. For example:
  - Field (input, listbox, radiobuttons, textarea)
  - Booleanfield (checkbox)
  - Multivalue field (listbox, checkboxes)
  - Aggregated field
  - Action (button)
  - Upload
  - Repeater (tabular forms with functions)

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How it works

Define Widgets (Declaration)

2004-04-23	Date
This is a text field...	Arbitrary Text
English ▾	
⦿ On ○ Off	Enumeration
OK	

Define Page (Template)

Date: 2004-04-23   English ▾

This is a text field...   ⦿ On   ○ Off

OK

Form Objects

Business Objects

HTML

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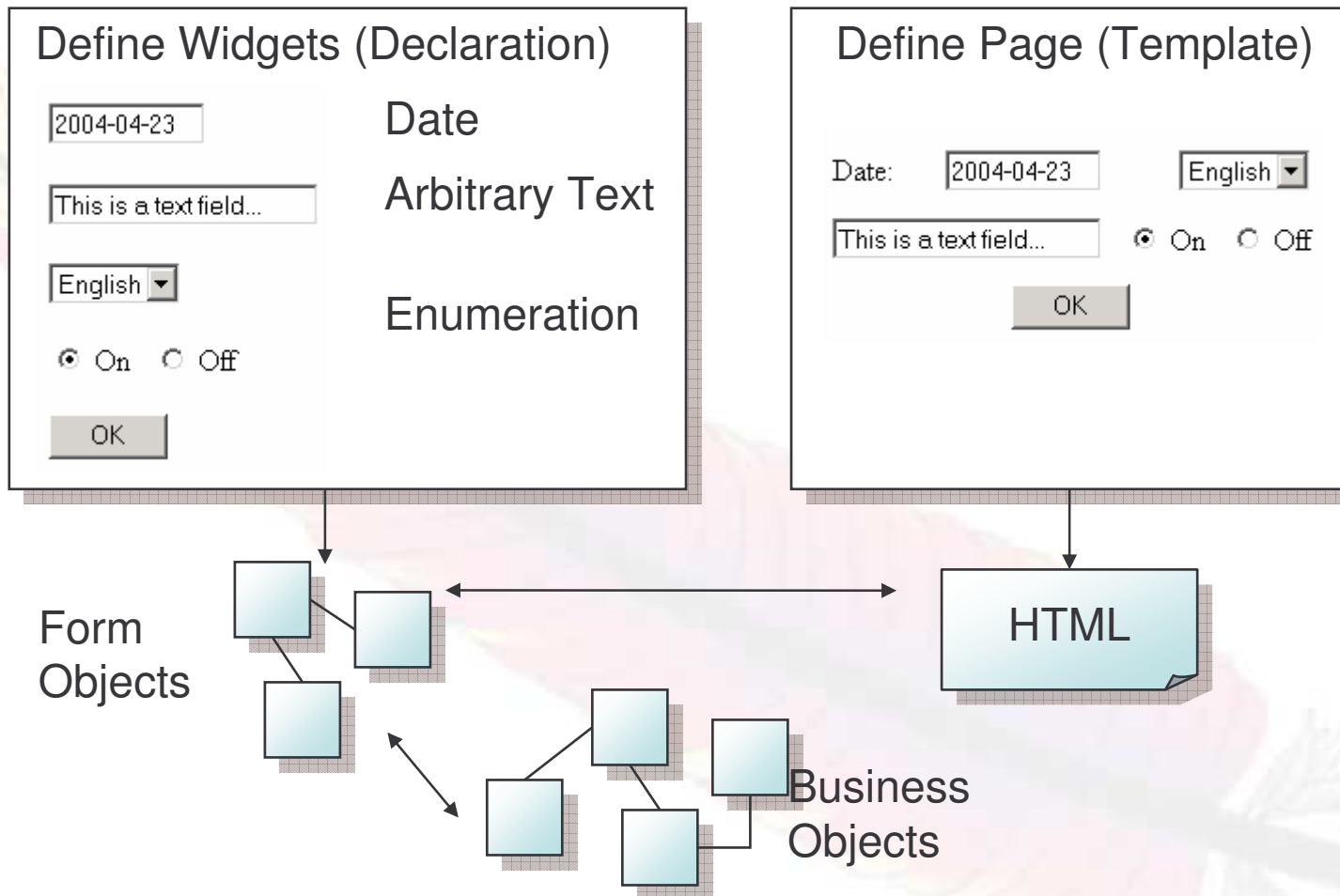
Forms and Flow

- Use Cocoon Flow as the controller or „glue"
  - Java Script on the server
- Flow creates/manages the Forms model
- Forms Framework takes care of validation
- Predefined Functionality
  - For flow
  - For the view (jxtg)

Cocoon Forms

- Separation of Concerns
  - Model, Template(s) and
  - Optional Binding (XML, Beans)
- Predefined widgets and validation rules
- Many hooks incl. event handling
- AJAX ready - "it just works"

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Web Applications
Business Layer

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Simple Web Application
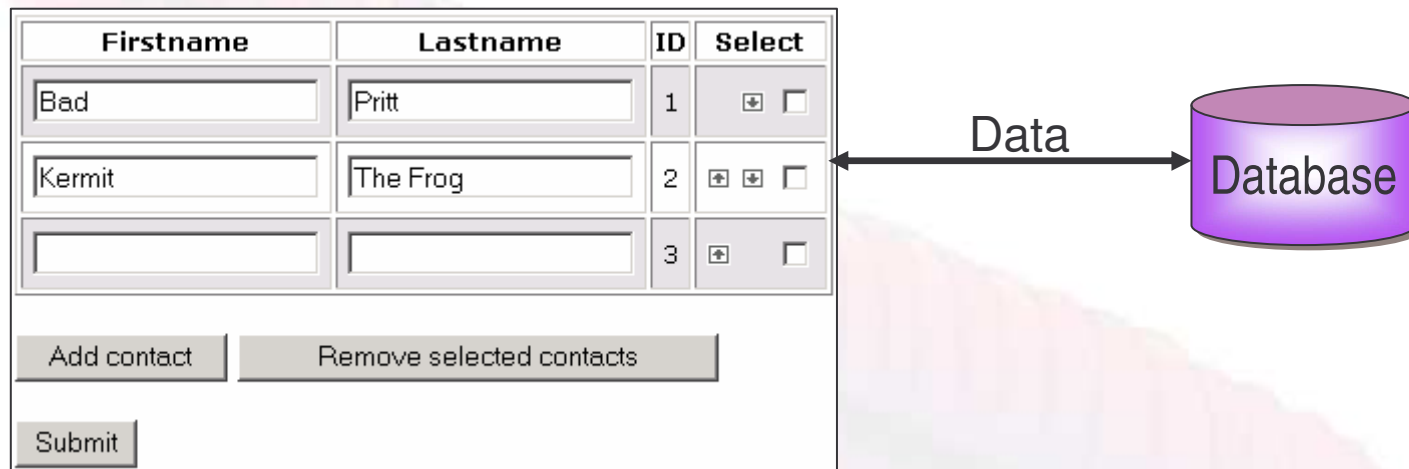
Business Layer: it is up to you!

- Use FlowScript all-the-way (bad!)
- Use some O/R mapping (OJB, Hibernate) from inside FlowScript (slightly better)
- FlowScript + Java facade, providing access to BO and methods on back-end
- (opt.) Avalon (config, monitoring, logging)
- Spring or Hivemind

Binding

- Forms usually used for editing data
- Declare binding between widgets and business objects instead of implementing it
- Support for binding to JavaBeans and XML documents

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Sample Web Application

Flow Script

Request form → 1. Request data

2. Load form

Show form ← 3. Send page

Submit form → 4. Save form

5. Store data

Show result page ← 6. Send page

DAO

OJB

MySQL

Java Beans

Binding

Form model

Binding

Java Beans

DAO

OJB

MySQL
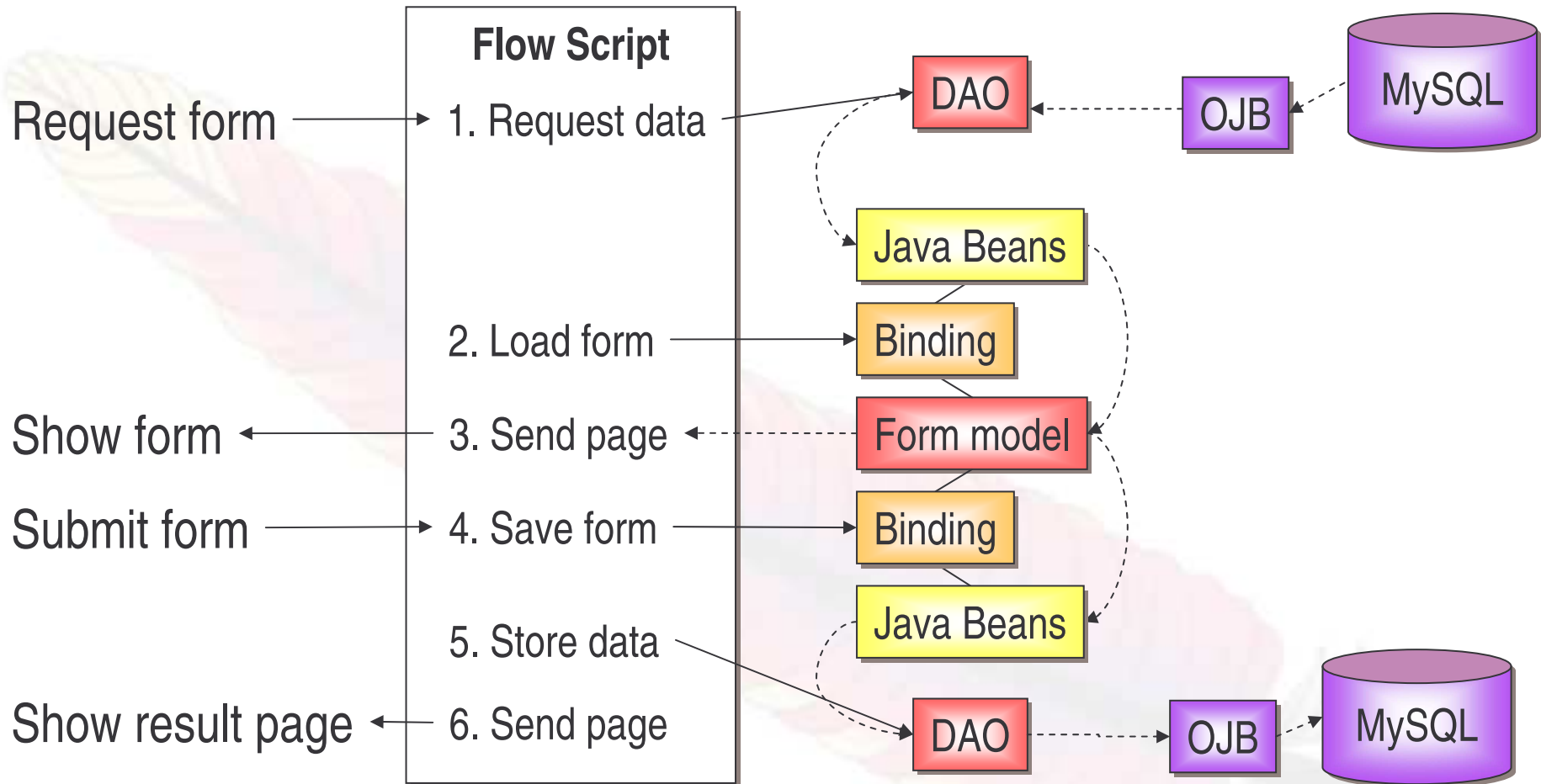
Building Web Applications

- There are many more features like
  - Dynamic form generation
    - Widgets depend on selected values/objects
    - Selection lists etc.
  - Hooks in the validation and binding framework
  - Prepared functionality for flow and jxtg
- You are not locked in – use what you need
  - Spring, Hibernate etc.

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Developing with Cocoon

Development Environment

- Choose a Cocoon version (2.1.9 or "dev")
- Choose the blocks you need (now or later)
- Be prepared to update Cocoon during development (Important bugfixes/features)
- Separate your own code from Cocoon
- Don't use internals (classes/methods etc.)
- Remember: **it's open source!**

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Development Environment

- Modules (in your CVS/SVN):
  - Cocoon (released/from SVN)
  - Own framework (if required)
  - Application One
  - Application Two
  - …
  - Optional: Integration Test

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Development Environment

- Automated Build Process (Checkout, Build, Run)
- IDE: Eclipse
- Build System: Ant (in Cocoon)
- Run with Jetty (in Cocoon) or Tomcat
- Testing: JUnit (in Cocoon), AntEater
- CI: CruiseControl/Continuum /Cron Job
- QM: Checkstyle, PMD, Findbugs
- (Use Issue Tracking Systems)

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Development Environment

- Process
  - Cocoon as Eclipse Project
  - Own Modules as separate Eclipse Projects
  - Cocoon Mounttable to mount own applications
  - Local Block Descriptor for own applications
  - Build Cocoon once (!)
  - Run/Debug from within Eclipse
  - (Own Build script to create war files for deployment)

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Directory Structure for blocks

- Block Directory Structure

myapplication
    conf   Patches (xconf, sitemap etc.)
    java   Java Code
    lib   Java Libs
    webapp   Own webapp
    local.blocks.myapplication.xblocks

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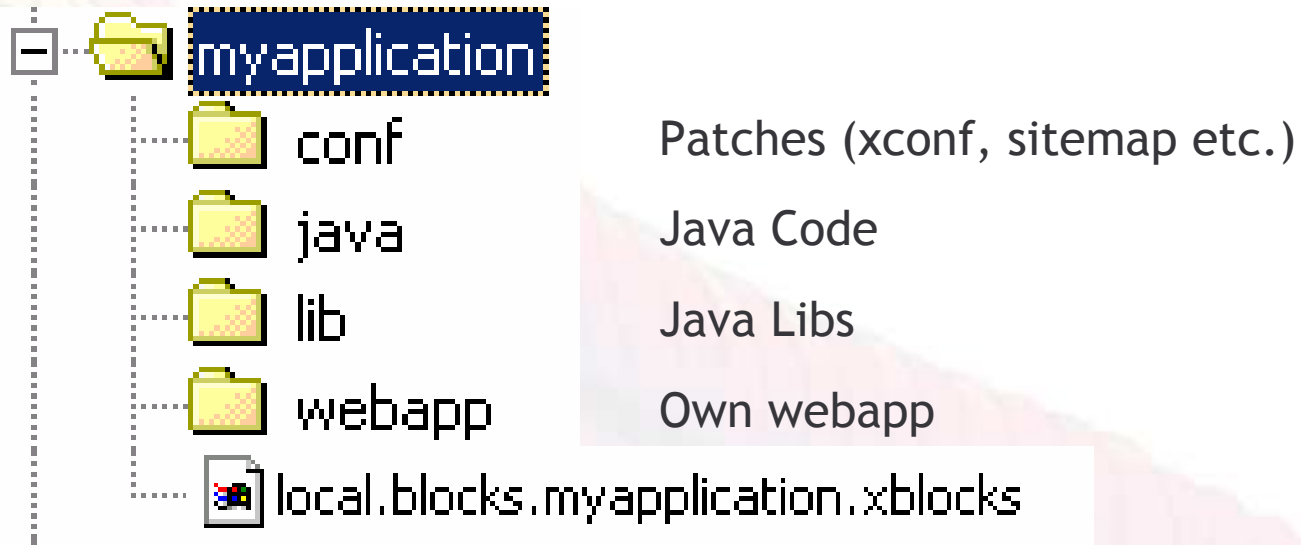
Summary and Outlook

Building Web Applications

- The Easy Way
  - Use Cocoon with Flow, Forms and Template ☺
  - Add your own business layer (Spring, Hibernate)
    - Don't use flow script for everything
  - Benefit from separation of concerns
    - Develop component oriented
- But
  - The first steps might be hard!
  - Don't give up – the effort pays back

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Building Web Applications

- The Easy Way
  - Create a developer friendly environment
    - No build script invocation during development
  - Use tests and CI

- Be part of the Cocoon community
  - Report problems or bugs
  - Make suggestions
  - Try to help out, submit patches etc.

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Benefits I

- Stable platform (4 years+)
- Large community
  - Including large corporations
- Separation of Concerns
  - Team Development
- Optimized for performance and stability
  - Caching, Pooling

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Benefits II

- Cocoon offers a great variety
  - Most of the hard work is done already
  - AJAX, Portal framework etc.
- Component orient architecture
  - Extensible with own components
- Flexible data integration and publishing
  - Often: No programming needed

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And Development Continues!

- 2.1.9 Released (2.1.10 will follow)
- Release Early – Release Often ☺
- New features are constantly added
  - New Blocks
- Enhanced
  - Usability and Performance
- Bug Fixes
- Next major innovation: Cocoon 2.2

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The Vision: Real Blocks™

- Hot-Deployment
- Resolving of dependencies
  - Maven-style repository downloads
  - Versioning
  - Classloading
- Reconfiguration
- Make blocks independent (own versioning)

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Benefits of Cocoon 2.2

- Rapid Development
- Spring 2.0
- Modular Configuration
  - Avalon (Compatibility)
  - Spring
  - Property Replacements
- Running Modes
- Hierarchical Configuration

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The Current State of 2.2

- Requires JDK 1.4 / Servlet 2.3
- New Build System
  - Maven 2
- First "Milestone Release" soon!
- Check it out and give feedback!

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Further Information

- Apache Cocoon Project
  - http://cocoon.apache.org
  - Downloads, Mailing-Lists, Links
- Cocoon Documentation Wiki
  - http://wiki.apache.org/cocoon
- Apache Forrest, Apache Lenya and others!
- Books available
- Competence Center Open Source ☺
  - http://www.ophelos.de

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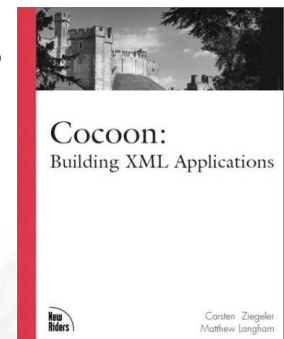
Thanks for your attention!

Questions?

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