



JavaOne

Building an Embeddable Enterprise Content Management Core With the Latest Java™ Technologies

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Goal of This Session

Learn how a Content Management core is built

Learn about the design and use of Nuxeo™ 5, an embeddable, extensible Enterprise Content Management framework for Java™ Platform, Enterprise Edition (Java™ EE platform) and other platforms.

Agenda

What Is Enterprise Content Management

What Do We Want to Achieve

Core Framework

Core and High-Level Services

UI Layers

Extensible and Pluggable

Using the Framework

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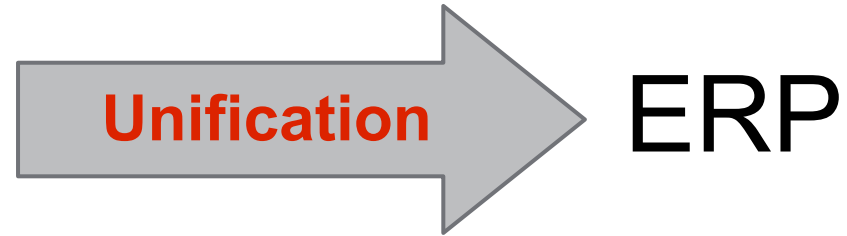
Using the Framework

What Is

Enterprise Content Management?

1990–2000...

- Manufacturing
- Supply Chain
- HR
- Accounting
- Activity Management
- Shipping



What Is

Enterprise Content Management?

2000–20...

- Documents (Records, E-Mail, Media)
- Acquisition
- Search Engine
- Archiving
- Collaboration
- Web Publishing
- Access Control
- Compliance

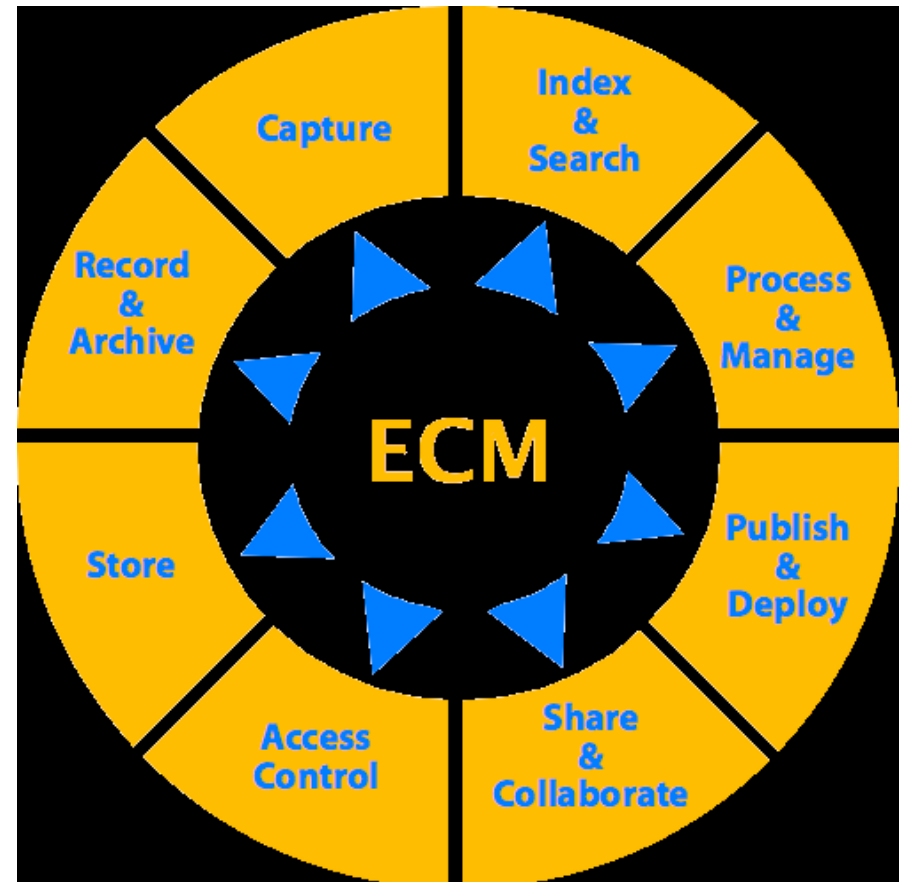


What Is Enterprise Content Management?

The technologies used to:

- Capture
- Create
- Manage
- Store
- Preserve
- Reuse
- Deliver

content within the enterprise



Agenda

What Is Enterprise Content Management

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Using the Framework

What Do We Want to Achieve?

- Create a Framework
- Make It Extensible
- Make It Multi-Platform
- Use the Latest Technologies
- Open Source

What Do We Want to Achieve?

- **Create a Framework**
 - Set of Services
 - Software Bundles
 - Set of APIs
 - Open to other systems
 - Configuration
 - XML rather than code

What Do We Want to Achieve?

- Create a Framework
- **Make It Extensible**
 - New services
 - New backends to existing services

What Do We Want to Achieve?

- Create a Framework
- Make It Extensible
- **Make It Multi-Platform**
 - POJOs
 - Java EE platform
 - Clusterable, distributable
 - Eclipse
 - Rich Client Platform (RCP)
 - Mix of those
 - RCP client, Java EE platform server

What Do We Want to Achieve?

- Create a Framework
- Make It Extensible
- Make It Multi-Platform
- **Use the Latest Technologies**
 - Java platform v.5, Java EE 5
 - OSGi
 - JCR (JSR-170, JSR-283), W3C XML Schemas
 - JavaServer Faces™ technology, Facelets
 - BPEL, WfMC
 - SOAP, WSDL

What Do We Want to Achieve?

- Create a Framework
- Make It Extensible
- Make It Multi-Platform
- Use the Latest Technologies
- **Open Source**
 - LGPL, EPL
 - <http://www.nuxeo.org>

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Core Framework

The basics

- Schemas
- Document Types
- Life Cycle
- Repository
- Security

Core Framework

- **Schemas**
 - Structure the documents
 - XML Schemas
 - Complex Types
 - Attached Files

Core Framework: Schema

DublinCore

```
<xs:schema>
  <xs:element name="title" type="xs:string"/>
  <xs:element name="description" type="xs:string"/>
  <xs:element name="rights" type="xs:string"/>
  <xs:element name="created" type="xs:date"/>
  <xs:element name="modified" type="xs:date"/>
  <xs:element name="issued" type="xs:date"/>
  <xs:element name="format" type="xs:string"/>
  <xs:element name="language" type="xs:string"/>
  ...
</xs:schema>
```

Core Framework: Schema *Baddies*

```
<xs:schema>
  <xs:complexType name="baddie">
    <xs:sequence>
      <xs:element name="surname" type="xs:string"/>
      <xs:element name="level" type="xs:positiveInteger"/>
      <xs:element name="birth" type="xs:date"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="baddies">
    <xs:sequence>
      <xs:element name="baddie" type="baddie"
        minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:element name="baddies" type="baddies"/>
</xs:schema>
```

Core Framework: XML Equivalent

```
<baddies>  
  <baddie>  
    <surname>Sylar</surname>  
    <level>38</level>  
    <birth>1962-06-11</birth>  
  </baddie>  
</baddies>
```

Core Framework

- Schemas
- **Document Types**
 - High-level name
 - Aggregate schemas
 - Facets

Core Framework: Document Type

```
<doctype name="Note" extends="Document">
```

```
  <schema name="dublincore"/>
```

```
  <schema name="note"/>
```

```
    <facet name="Commentable"/>
```

```
    <facet name="Versionable"/>
```

```
    <facet name="Publishable"/>
```

```
</doctype>
```

Core Framework

- Schemas
- Document Types
- **Life Cycle**
 - States
 - Transitions

Core Framework: Life Cycle States

```
<lifecycle name="default" initial="project">
  <states>
    <state name="project">
      <transitions>
        <transition>approve</transition>
      </transitions>
    </state>
    <state name="approved">
      <transitions>
        <transition>obsolete</transition>
      </transitions>
    </state>
    <state name="obsolete"/>
  </states>
  ...
```


Core Framework: Life Cycle Transitions

```
<lifecycle name="default" initial="project">
  ...
  <transitions>
    <transition name="approve" destination="approved">
      <description>Approve the document</description>
    </transition>
    <transition name="obsolete"
destination="obsolete">
      <description>Obsolete the document</description>
    </transition>
  </transitions>
</lifecycle>
```

Core Framework

- Schemas
- Document Types
- Life Cycle
- **Repository**
 - Hierarchical
 - Versioning
 - Backend
 - API

Core Framework: Repository

- Hierarchical
 - Servers, Domains
 - Tree of documents
- Versioning
 - Save, View, Restore
 - Policy
- Backend
 - JCR, SQL
- API
 - Nuxeo 5, JCR 2 (JSR 283)

Core Framework

- Schemas
- Document Types
- Life Cycle
- Repository
- **Security**
 - Users, Groups
 - Permissions
 - ACLs

Core Framework: Security ACLs

- Basic Access Control Entry (ACE)
 - DENY Read to Anonymous
 - GRANT Write to group:Developers
- Ordered List
- Manipulated by different services
 - User assignment
 - Workflow
 - Record management locks
- Placeful and Inherited

Agenda

What Is Enterprise Content Management

What Do We Want to Achieve

Core Framework

Core and High-Level Services

UI Layers

Extensible and Pluggable

Using the Framework



Core Services

Fundamental Services

- Event System
- Directories
- User Manager
- Query

Core Services

- **Event System**
 - Synchronous Listeners
 - Low Level
 - Creation, Modification, Deletion
 - Move, Copy
 - Security Changes
 - Bridged to Java Message Service (JMS)
 - Asynchronous Handlers
 - Non-Core components can participate

Core Services

- Event System
- **Directories**
 - Tabular Data
 - Users and Groups
 - Vocabularies
 - Entries are placeless documents

Core Services: Directory

```
<directory name="country">  
  <schema>vocabulary</schema>  
  <dataSource>java:/nxsqldirectory</dataSource>  
  <table>country</table>  
  <idField>id</idField>  
  <sqlScript>country.sql</sqlScript>  
</directory>
```

```
<xs:schema>  
  <xs:element name="id" type="xs:string"/>  
  <xs:element name="label" type="xs:string"/>  
  <xs:element name="obsolete" type="xs:boolean"/>  
</xs:schema>
```

Core Services

- Event System
- Directories
- **User Manager**
 - Bridge directories and user authentication
 - Interfaces with the application server
 - Global defaults

Core Services

- Event System
- Directories
- User Manager
- **Query**
 - Multiple Backends
 - Intelligent Dispatcher
 - Query Language: NXQL

Core Services: Query

```
SELECT * FROM Documents WHERE  
  dc:title LIKE 'JavaOne%'
```

```
SELECT * FROM Documents WHERE  
  dc:modified >= TIMESTAMP '2007-01-01T00:00:00'
```

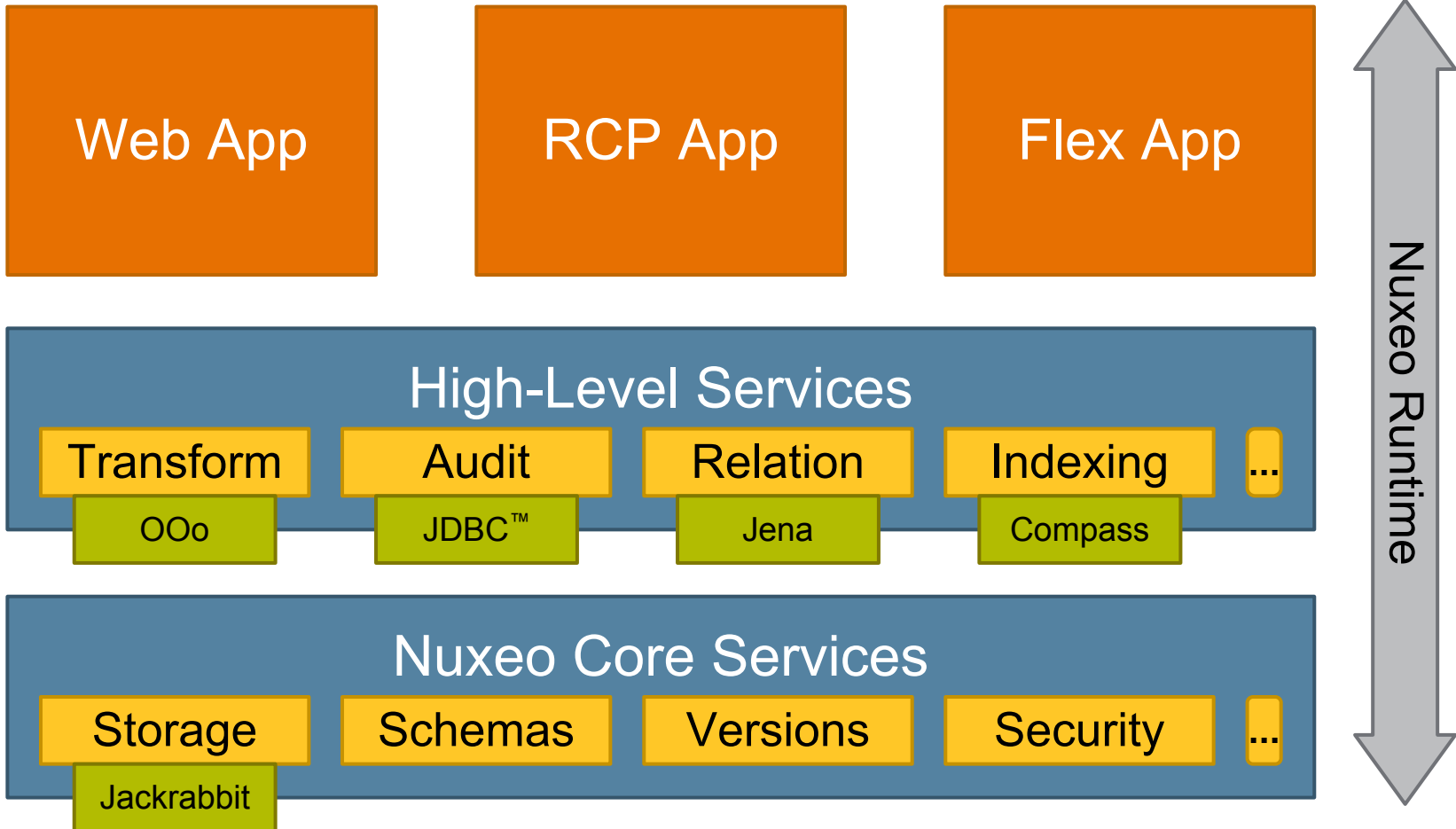
```
SELECT * FROM Documents WHERE  
  ecm:path STARTSWITH '/customers/proposals'
```

High-Level Services

Advanced functionality

- Audit and Logging
- Comments
- Transformations
- Relations
- Workflow
- Action Manager
- Mime Types
- Scheduler

Layered Framework: Functional View

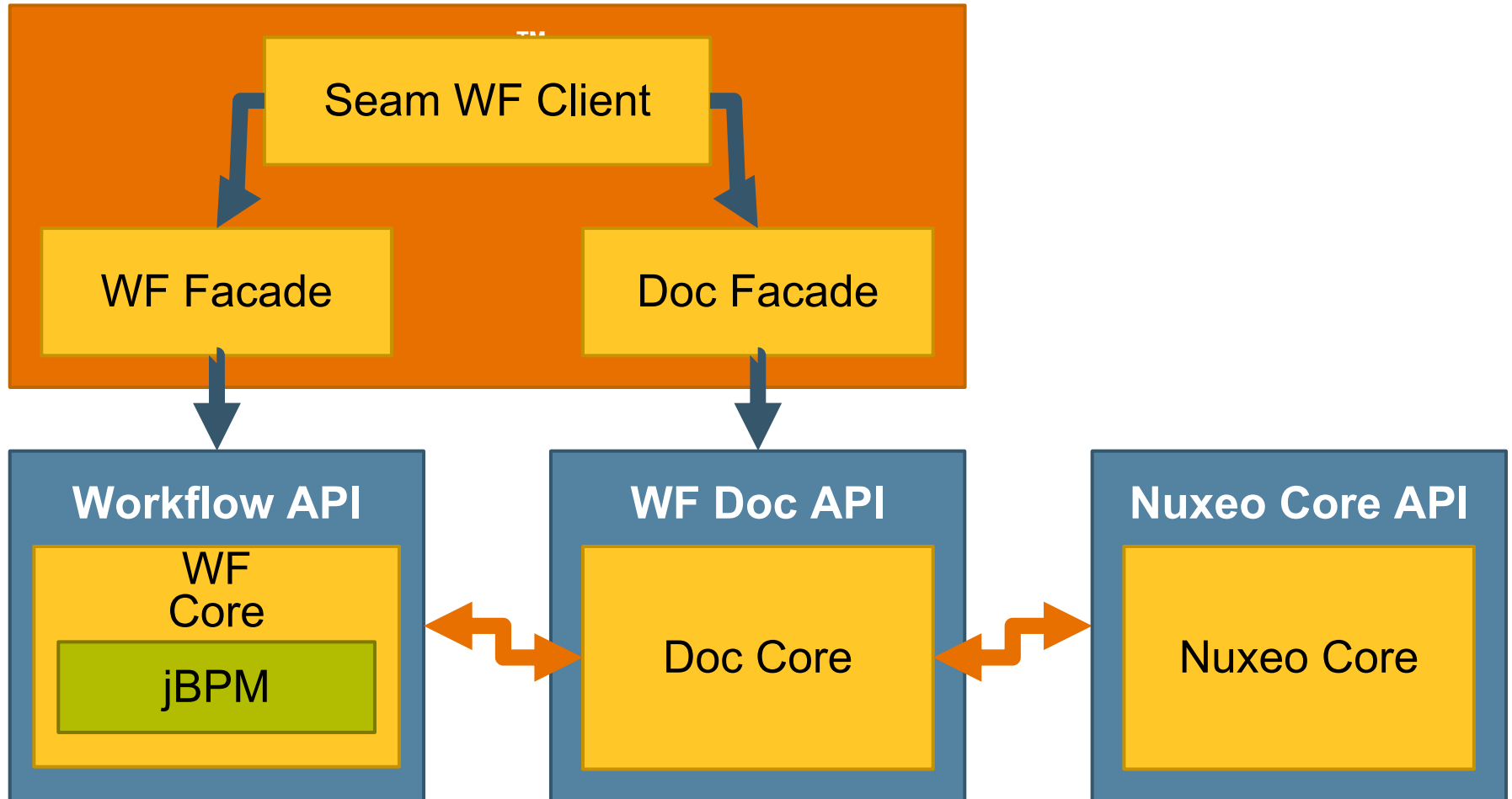


JDBC™ = Java DataBase Connectivity

Layered Framework: Workflow

```
org.nuxeo.ecm.platform.workflow.api  
org.nuxeo.ecm.platform.workflow.client  
org.nuxeo.ecm.platform.workflow.core  
org.nuxeo.ecm.platform.workflow.document  
org.nuxeo.ecm.platform.workflow.document-api  
org.nuxeo.ecm.platform.workflow.document-facade  
org.nuxeo.ecm.platform.workflow.facade  
org.nuxeo.ecm.platform.workflow.jbpm
```


Layered Framework: Workflow





DEMO



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Extensible and Pluggable


Using the Framework

UI Layers

How the user interacts with the system

- Web
 - JavaServer Faces technology, Ajax4jsf, Facelets
 - EJB specification Action Listeners
 - JBoss Seam
 - Theming Engine: NXThemes
- Eclipse RCP


Nuxeo 5 Screenshot



You are logged as Administrator | [Dashboard](#) | [Log out](#)
[Members management](#)

[Advanced search](#)

- Default domain
 - Sections
 - Templates
 - Workspaces
 - Baddies



My WorkList
No Document in Clipboard

> [Default domain](#) > [Workspaces](#) > [Baddies](#) > [Sylar](#) [[Permanent link to this document](#)]

Sylar

The ultimate baddie

[Summary](#) | [Publish](#) | [Relations](#) | [Review](#) | [Email](#) | [Modify](#) | [Metadata](#) | [Comments](#) | [History](#)

Document properties

Title Sylar

Description The ultimate baddie

Note Has not been seen recently.
Avoid at all cost!

Life cycle information

Life cycle policy Default

Current life cycle state Project

Document versioning

Current version 01.01

Eclipse Screenshot

AFP Multimedia Console NG


File Edit Styled Edit Search Window Help


Workspace

CHRONOLOGIE: TV-D... HINTERGRUND: "Mad... *Frankreich: Sark... x %

DEU In... SID Im... IF... Ani... Video


NewsML Metadata

 Im französischen Präsidentschaftsrennen hat der Konservative Nicolas Sarkozy vor dem TV-Duell mit der Sozialistin Ségolène Royal in Umfragen weiter klar vorn gelegen. Nach zwei Erhebungen der Institute BVA und Ipsos/Dell würden die Franzosen Sarkozy am Sonntag mit 52 bis 53,5 Prozent zum neuen Staatsoberhaupt wählen. Royal käme auf 46,5 bis 48 Prozent der Stimmen. Das TV-Duell am Abend gilt für sie als letzte große Möglichkeit, das Blatt vor der Stichwahl am Sonntag noch zu wenden.


 Sarkozy zeigte sich vor dem TV-Duell gelassen. Er forderte im Radiosender France Inter, "nicht zu dramatisieren, was durch die Debatte auf dem Spiel steht". Das Gespräch sei für ihn "nicht entscheidend" für den Wahlausgang. "Ich glaube nicht, dass die Franzosen lediglich aufgrund des Eindrucks aus einer zweistündigen Debatte einen Präsident auf fünf Jahre wählen."


In dem TV-Duell würden "zwei unterschiedliche Gesellschaftsentwürfe" aufeinandertreffen, sagte Sozialistenchef François Hollande im TV-Sender LCI. Royal werde zeigen, dass Sarkozys Vorstellungen "gefährlich" seien. Die Fernseh-Debatte werde "dazu beitragen, die Überzeugungen vieler unserer Mitbürger zu bilden, die sich noch nicht entschieden haben".


Dabei geht es vor allem um die Wähler des ausgedehnten Präsidentschaftskandidaten François Bayrou. Der Liberale, der einen Kurs der Mitte jenseits des klassischen Rechts-links-Schemas der französischen Politik fordert, war in der ersten Runde mit 6,8 Millionen Stimmen auf den dritten Platz gekommen. Nach der





Description PubDate


 72597248G5309_2006 17:35 02-05
LOS ANGELES, CA - NOVEMBER 21: Singer Britney Spears presents...


 20070423-DE02C-Franl 17:29 02-05
90 x 110 mm Grafik Ergebnisse nach

 20070423-DE01C-Franl 17:28 02-05
90 x 85 mm Grafik Aktualisierte Fassung der Grafik von 12.30 Uhr....

 FRANCE-VOTE-COMBO 17:17 02-05
Combo of pictures showing French Socialist presidential candidate...

 MIDEAST-ISRAEL-LEBA 16:40 02-05
Israels march with their national flags and signs along the highway...

 LATVIA-NATO-SUMMIT 14:06 02-05
Turkish Prime Minister Recep Tayyip Erdogan poses prior to bilateral...


 BRITAIN-FASHION-KAT 13:24 02-05
British Supermodel Kate Moss poses in a window

Quick View

LATVIA-NATO-SUMMIT-ERDOGAN

SubHeadLines

No sub head lines



Current element:P P:7 W:321 C:2076 W:55 / C:345 User:drenevey Role:A...ditor 18M of 31M

Agenda

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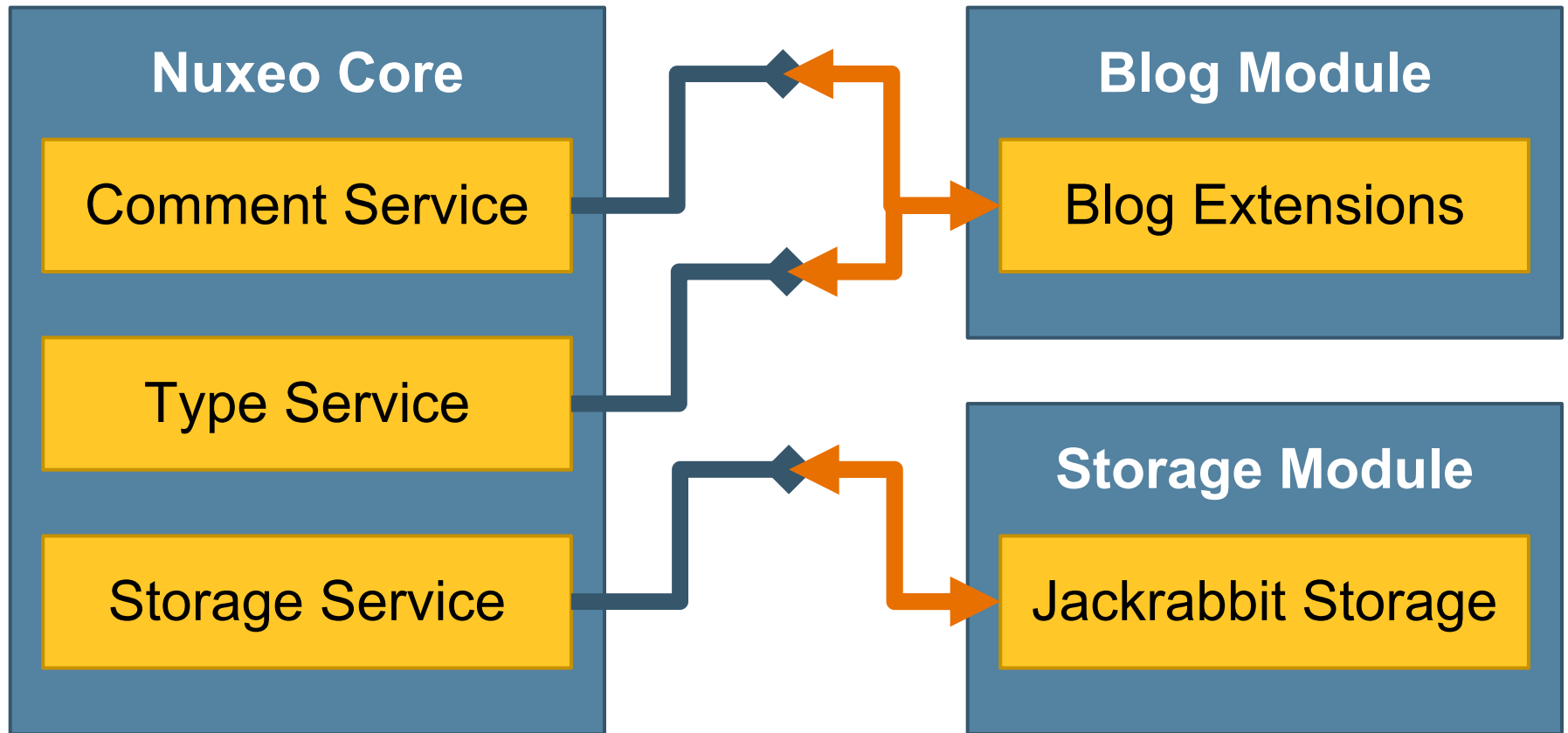
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Extensible and Pluggable

Using the Framework

NXRuntime: Extension Points



NXRuntime: Extension Points

```
<component name="core.TypeService" version="1.0">  
  <implementation  
    class="org.nuxeo.ecm.core.schema.TypeService"/>  
  
  <extension-point name="schema">  
    <object  
class="org.nuxeo.ecm.core.schema.SchemaBinding-  
Descriptor"/>  
  </extension-point>  
  
  <extension-point name="doctype">  
    <object class="org.nuxeo.ecm.core.schema.DocumentType-  
Descriptor"/>  
  </extension-point>  
  
</component>
```

NXRuntime: Extension Point Contributions

```
<component name="MyTypes" version="1.0">  
  
  <extension target="core.TypeService" point="schema">  
    <schema name="common" src="common.xsd"/>  
    <schema name="dublincore" src="dublincore.xsd"  
      prefix="dc"/>  
  </extension>  
  
  <extension target="core.TypeService" point="doctype">  
    <doctype name="Note" extends="Document">  
      <schema name="common"/>  
      ...  
    </doctype>  
  </extension>  
  
</component>
```

Services Are Pluggable

One implementation isn't always sufficient

- Internal Service Provider Interfaces (SPI)
- Repository Backend
- Directory Backend
- Workflow Service
- Indexing Service
- Relation Service
- Transformation Service

Plug Into Different Platforms

Run anywhere

- POJO Bundles
 - OSGi Dependencies
- Extension Points
- Generic Lookup Service
- Java EE platform Deployment
 - JBoss
 - GlassFish

Plug Into Java EE Platform: Problems

- Modules hard to reuse on other platforms
- XML module descriptors don't allow fragmentation
- Hardcoded package names in code or XML
- Cannot add functionality without redeploying the entire application
- No extension model (plugins)

Plug Into Java EE Platform: Deployment

- Deployment
 - Ordering
 - Dynamic Activation
 - Contributed XML descriptors
 - EAR: application.xml, jboss-app.xml
 - WAR: web.xml, faces-config.xml, pages.xml
 - Other: persistence.xml, datasources
 - L10n properties files
- Services as MBeans
- Lookup Service

Plug Into OSGi

- OSGi as Basic Format
 - Java Archive (JAR)
 - Meta-Information
- NXRuntime
 - Extension points
 - Definition
 - Contributions
 - Specialized Deployment

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Using the Framework

How to build an application with it

- **Contribute to Extension Points**
 - Schemas, Documents
 - Actions
 - Event Listeners
 - Directories
- **XHTML UI**
 - JavaServer Faces technology
- **EJB specification Action Listeners**
 - Seam
- **Deployment Rules**

Using the Framework: JavaServer Faces Technology

```
<h:outputText value="#{messages['label.edit']}"
class="top"/>
<h:form>
  <h:panelGrid columns="3" styleClass="dataInput"
    columnClasses="labelColumn,fieldColumn">

    <h:outputText value="#{messages['label.title']}" />
    <h:inputText
value="#{currentDocument.dublincore.title}"
    class="dataInputText" id="title" required="true">
      <f:validateLength minimum="5" />
    </h:inputText>
    <h:message styleClass="errorMessage" for="title" />

    <h:outputText value="" />
    <h:commandButton value="#{messages['label.save']}"
    styleClass="button" type="submit"
    action="#{documentActions.updateCurrentDocument}" />
  </h:form>
```

Using the Framework: Action Listener

```
@Stateless  
@Name("myActions")  
public class MyActionsBean implements MyActions {  
  
    @In(required = true)  
    protected Document currentDocument;  
  
    public String doSubmit() throws ClientException {  
        String title =  
currentDocument.getProperty("dc:title");  
        title += " (Captured)";  
        currentDocument.setProperty("dc:title", title);  
        currentDocument.save();  
        return null;  
    }  
}
```

Summary

- Modular Framework
- Flexible Backends
- Platform Independent
- Easy Extensions
- Open Source
- We Welcome Your Ideas and Contributions!

For More Information

<http://www.nuxeo.org/>

<http://svn.nuxeo.org/>

<http://lists.nuxeo.com/mailman/listinfo/ecm>





Q&A

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