

Jalios JCMS 5.6

"Master your Content"

Technical White Paper

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Introduction

Jalios JCMS 5.6¹ is a natively integrated solution for content management, documentary portal and complete collaborative working. The application is light and simple to use, giving complete control to all IT staff and business users. It combines the advantages of a ready-to-use application with an intuitive, user-friendly man-machine interface and the flexibility, openness and extensibility of a powerful Java/XML development platform of which all the APIs are published. It can be extended to meet the specific needs of each project and integrates easily in corporate information systems, providing the quality of service required for strategic applications.

Better control for everyone

Thanks to Jalios JCMS, even without prior training all the people involved in content management – webmasters, administrators, document validators, managers, contributors and users – can intuitively publish content, organize its distribution via portals, and access information using an ordinary web browser.

Computer graphics designers can use their favorite HTML editor and they don't need to be Java developers to create or modify publication templates. Developers have complete access to JCMS APIs, JSP tags and JSP source code.

The JCMS concept emerged during the Pharos research project run by the Dyade economic interest group formed by Bull and the French National Institute For Research In Computer Science And Control (INRIA). The company Jalios, a spin-off of Bull and INRIA, was created in 2001.

JCMS 5.6

JCMS 5.5 included many enhancements making for greater ease of use for regular business users and occasional users. It had been extended to be able to handle very large data volumes; it took better account of operating constraints and the quality of service requirements of strategic business applications. JCMS 5.6 now adds support of groups of groups and new reporting and monitoring tools.

The purpose of this White Paper is to present the technical architecture aspects of JCMS an understanding of which will facilitate the integration of JCMS in enterprise information systems and its subsequent operation.

¹ Jalios JCMS is available in three Editions: Enterprise, Workgroup and Starter. The choice will depend on the number of authenticated users, the languages supported, the workspaces required and the number of applications running on the production server.

1. Functional architecture

Jalios JCMS is an information management software package that natively integrates content management and light EDM functions and collaborative working and portal tools. It provides a single base for managing all documents and publications; it supports processes and editorial and application workflows:

- Creation/editing/deletion of content
- Management of office and multimedia documents
- Version management
- Content categorization and indexing
- Definition of roles, rights and validation circuits
- Presentation management (portal)
- Control and validation
- Browsing and searching
- Online forms and application workflows

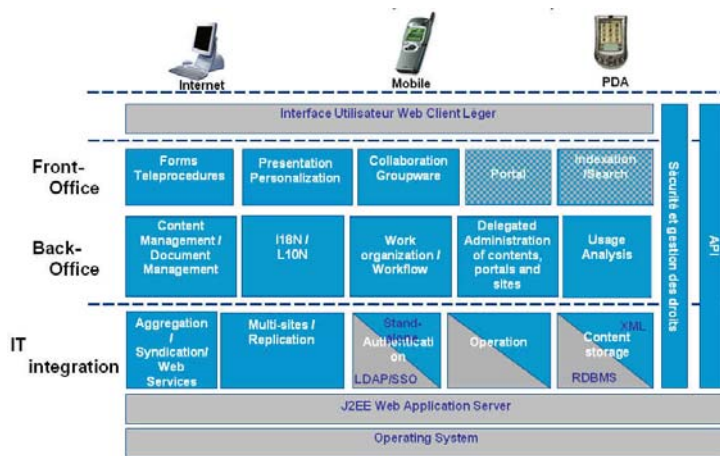


Figure 1 – JCMS functional architecture

The content managed by JCMS can be structured Web publications, documents managed in the JCMS information management base or data extracted from the information system.

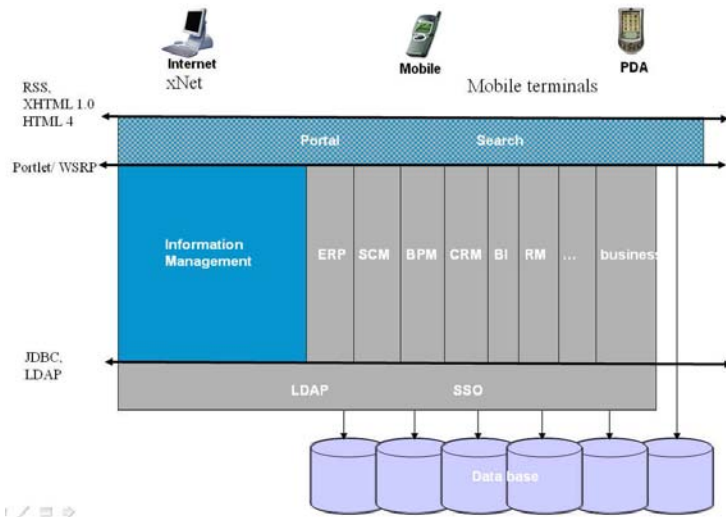


Figure 2 – JaliOS JCMS integrated in the information system

2. Internal architecture of JaliOS JCMS

JaliOS JCMS is based on a subset of the J2EE architecture: JSP/Servlet.

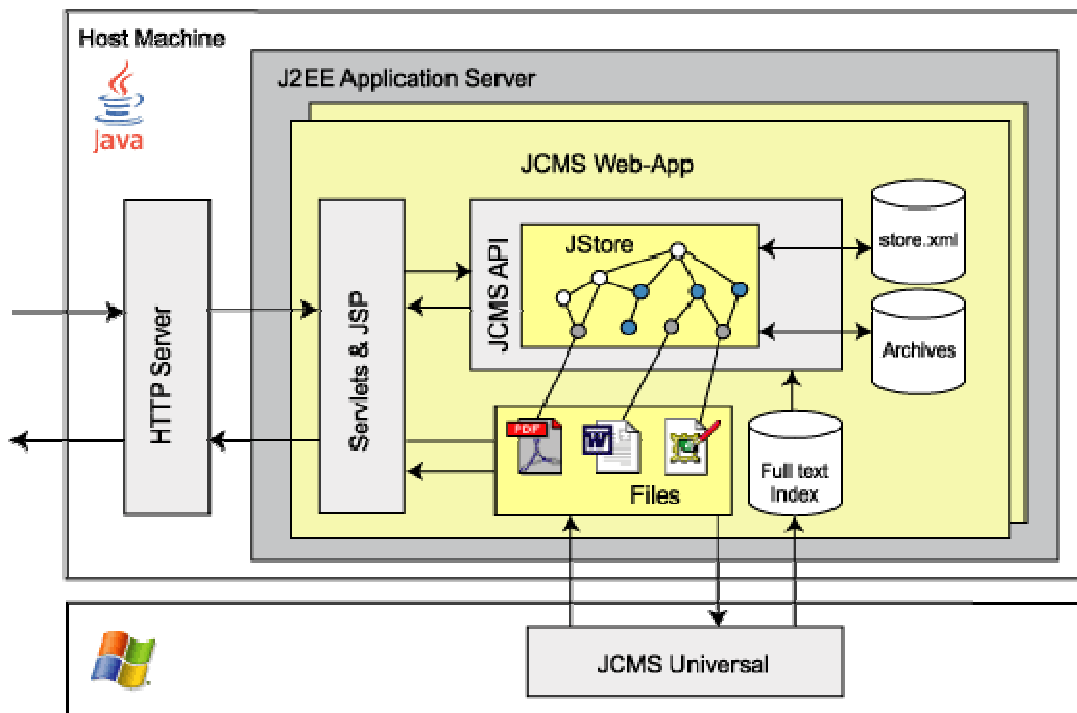


Figure 3 – JCMS technical architecture

Depending on the functional needs, a JCMS web site will be:

- ❖ Either an application managed by a web application server: each site is autonomous and has its own data, properties, resource files, classes and JSPs.
- ❖ Or a "sub-site" managed within a single web application: JCMS includes "website factory" features that industrialize the creation and management of multiple sites sharing a set of resources (styles, templates, etc.) within the same application.

2.1. Data storage

A JCMS application stores all its data via its JStore database. JStore provides a simple, robust persistence mechanism by journalization, enabling applications to run without an external database² thanks to the functionalities provided natively by Java libraries. The JStore journal (store.xml) uses an XML format: this file does not conserve an image of the Java objects graph, but rather a list of write operations (creation, modification, deletion) made on the objects. When the site is started, the graph is rebuilt by reading the journal and re-executing all the operations. All the pointers are re-established, in other words all the attributes contained in the identifier of an object are replaced by the Java reference on this object when it is restored.

The store.xml file increases in size over time. JCMS includes a cleaning function that conserves in the journal file only operations that make sense from a functional point of view, such as the ones related to new versions or validation.

The structure of data types and associated workflows are also stored in XML format.

Attached documents (images, PDF, MS Office documents, etc.) are only referenced by the objects managed in Jstore; they are stored physically in the files system. Their use is nevertheless controlled by JCMS that checks access rights before allowing documents to be opened.

2.2. Content presentation

Portal composition information and portlet parameters are stored in JStore as publications. Their appearance (skin) is defined by CSS files.

The presentation templates are JSP-type files; these JSPs are coupled with CSS style sheets. They are generated automatically by JCMS and can be modified by graphics designers to adapt the presentation to the enterprise's chosen house style. They operate alongside the application JSPs that execute application processes (searching, filtering, alert management, administration, content management, etc.).

To guarantee high performance, some or all the portlets can be cached. Each cache can be configured autonomously taking account of the nature of the information being managed. It is possible to specify the scope (for all or personalized) and the refreshment mode. In the case of a portlet whose content changes very little and that is common to all users, a global cache is suitable. On the other hand, for portlets providing information specific to each user, one cache per session could be used, for example, refreshed every time new publications arrive.

2.3. Data replication

JCMS integrates the JSync data replication protocol that ensures synchronization of the data between several JCMS instances. JSync enables high-availability architectures (with load balancing and redundancy) and decentralized architectures (JCMS instances spread over an extranet, for example). These different architectures are described in section 4 of this guide.

² JCMS can nevertheless access business data in a database (RDBMS) by means of parametric SQL fields (from content type) and SQL portlets.

JSync is an optimistic replication protocol of epidemic propagation type. It uses the HTTP(S) protocol. JSync enables very flexible topologies. In a replicated architecture every instance of JCMS is called a replica. The replicas are organized in a group with a leader. Each replica modifies its data autonomously then notifies these changes to its leader which in turn propagates them to the other replicas of the group in order to assure global data coherence. However, a replica can disconnect itself, diverge then reconnect later to propagate its new data. JCMS supports two modification propagation modes:

- ❖ immediate propagation (distribution as soon as the new data is stabilized);
- ❖ manual propagation (distribution at the request of the administrator).

After divergence periods data conflicts can appear. For example, a given data item may have been modified on one replica but deleted on another. During propagation of new data, JSync automatically resolves this type of conflict. Deletions have priority; concurrent updates are reordered homogeneously. Inter-object conflicts (for example, deletion of a category on one replica and addition of an item referencing this category on another replica) are detected by integrity control. Despite these means, it is best to avoid conflicts, so it is recommended to keep the divergence periods short. Ideally all contributors should be grouped on the same replica. On the other hand, readers can be spread over all the replicas of the group. In the case of load balancing, care should nevertheless be taken to ensure the load balancer monitors the J2EE sessions ("sticky session").

JSync can also handle the replication of documents associated with data. This is practical when the replicas are dispersed, for example on different networks. On the other hand, when JSync is used to perform load balancing, it is strongly recommended to create a sharing space for documents between the replicas.

2.4. Indexing and searching engine

JCMS features a Lucene-based publication indexing engine. Apart from searching for full text strings, this engine can perform advanced searches (search by field, Boolean combinations, approximate matching). In the event of unsuccessful searches due to typing errors, the closest terms are proposed. Search results are sorted by order of pertinence using a TFxIDF-based algorithm.

A textual search can be combined with a search on metadata such as category, document type, publication date, language, author, etc.

2.5. JCMS Universal

The publications contained in JCMS can reference attached files such as office documents. In order that textual searches extend to the content of these documents, these must be indexed using JCMS Universal. This is an application independent of JCMS that serves two functions:

- ❖ It converts into PDF format documents filed in the JCMS upload folder (almost 300 formats are supported);
- ❖ It indexes the text of PDF documents, including those resulting from conversions.

To perform the PDF conversions, JCMS Universal uses the ActivePDF component. This requires a Windows 2000 platform. ActivePDF can operate alone or with the Microsoft Office suite (in which case the PDF documents generated are of better quality, although Office is not required for the indexing).

JCMS Universal interacts with JCMS only via the files placed in the upload folder and the Lucene folder that contains the index. If JCMS is running in a Unix architecture, a Windows system must be provided for JCMS Universal, and the upload folder used by JCMS must be accessible from Windows.

3. Integration in the enterprise information system

It is Jalios' policy to support open standards since this facilitates the integration of JCMS in corporate information systems. Support of thin client architecture, without Applets or Active X, is also strategic in order to ensure zero deployment on desktops and universal access using a simple browser of any kind.

3.1. Interaction with the information system

JCMS web applications (WebApps) conform to J2EE 1.3 specifications and use Servlet 2.3, JSP 1.2, JNDI, JDBC and JavaMail APIs. They therefore operate on applications servers that conform to these specifications.

Integration with the messaging system is achieved by using the SMTP protocol; integration with the directory is by means of the LDAP v3 protocol; integration with the databases is by means of the standard SQL database access interface JDBC (Java DataBase Connectivity).

Content is published and distributed in compliance with W3C standards: XHTML 1.0³, WCAG 1.0 version A for optimal accessibility.

To distribute content Jalios JCMS can integrate in the enterprise information system in various ways:

- autonomously using JCMS's portal functions;
- interfaced with an infrastructure portal by means of JSR 168⁴ portlets;
- by exporting and/or importing RSS/Atom XML sources.

To access external RSS sources or to communication with external replicas, JCMS may need to send HTTP requests outside the enterprise. For this purpose it can be configured to use the enterprise's outgoing proxy.

In addition to supporting many industry standards, Jalios certifies the good operation of JCMS Enterprise Edition on and with commercially available infrastructure software (see Appendix 2: Certified Environments).

³ Except for the rich text component.

⁴ Requires JCMS Portal Connector.

3.2. Data streams matrix

Table 1 below shows the matrix of network streams between the various components with which JCMS interacts. This matrix does not show indirect components that JCMS may require such as Reverse Proxy or load balancer.

The file server is presented as a separate component, and indeed it is recommended to place JCMS Universal on a dedicated Windows server. JCMS Universal therefore accesses JCMS upload and Lucene folders via a file sharing system (SMB, NFS, etc.). Moreover, in high-availability architectures JCMS replicas share the upload and Lucene folders. These folders may be located on one of the replicas or on a file sharing server.

	HTTP server	Application server	JCMS	JSYNC	JCMS Universal	File server	Database	Messaging	Directory	Outgoing proxy	JCMS Portal Connector
Customer	HTTP(s)										
HTTP server		Depends on the vendor									
Application server			Internal								
JCMS			HTTP(s)		Via files	SMB, NFS, etc.	JDBC	SMTP	LDAP	HTTP(s)	
JSYNC				HTTP(s)							
JCMS Universal			Via files			SMB, NFS, etc.					
JCMS Portal Connector	HTTP(s)										
Infrastructure portal											Depends on the vendor

Table 1 – Matrix of network streams (the source is shown in the first column)

3.3. Architecture without an infrastructure portal

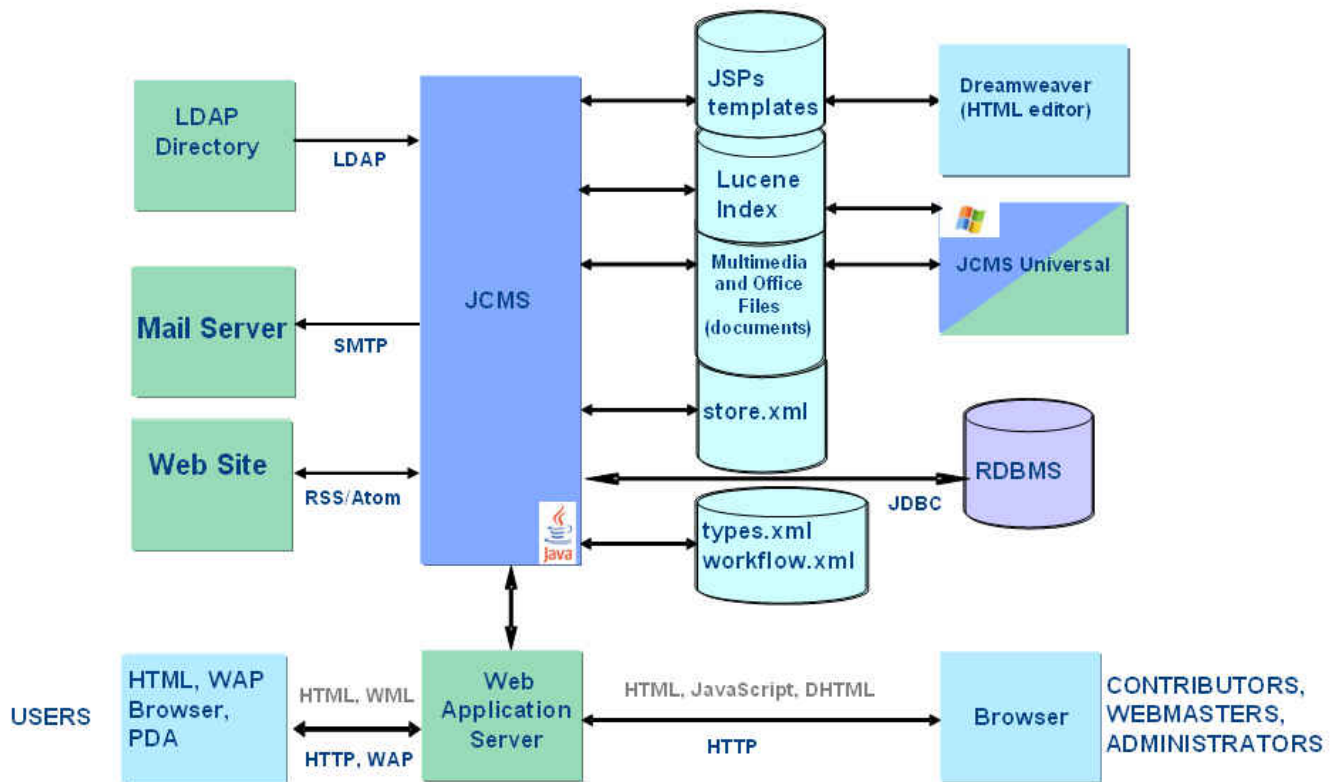


Figure 4 – JaliOS JCMS – Global technical architecture (autonomous deployment)

3.4. JCMS integrated in an infrastructure portal

It is possible to interface the JCMS content management system with an infrastructure portal such as BEA, IBM or Plumtree using JCMS Portal Connector that supports the JSR 168 specifications.

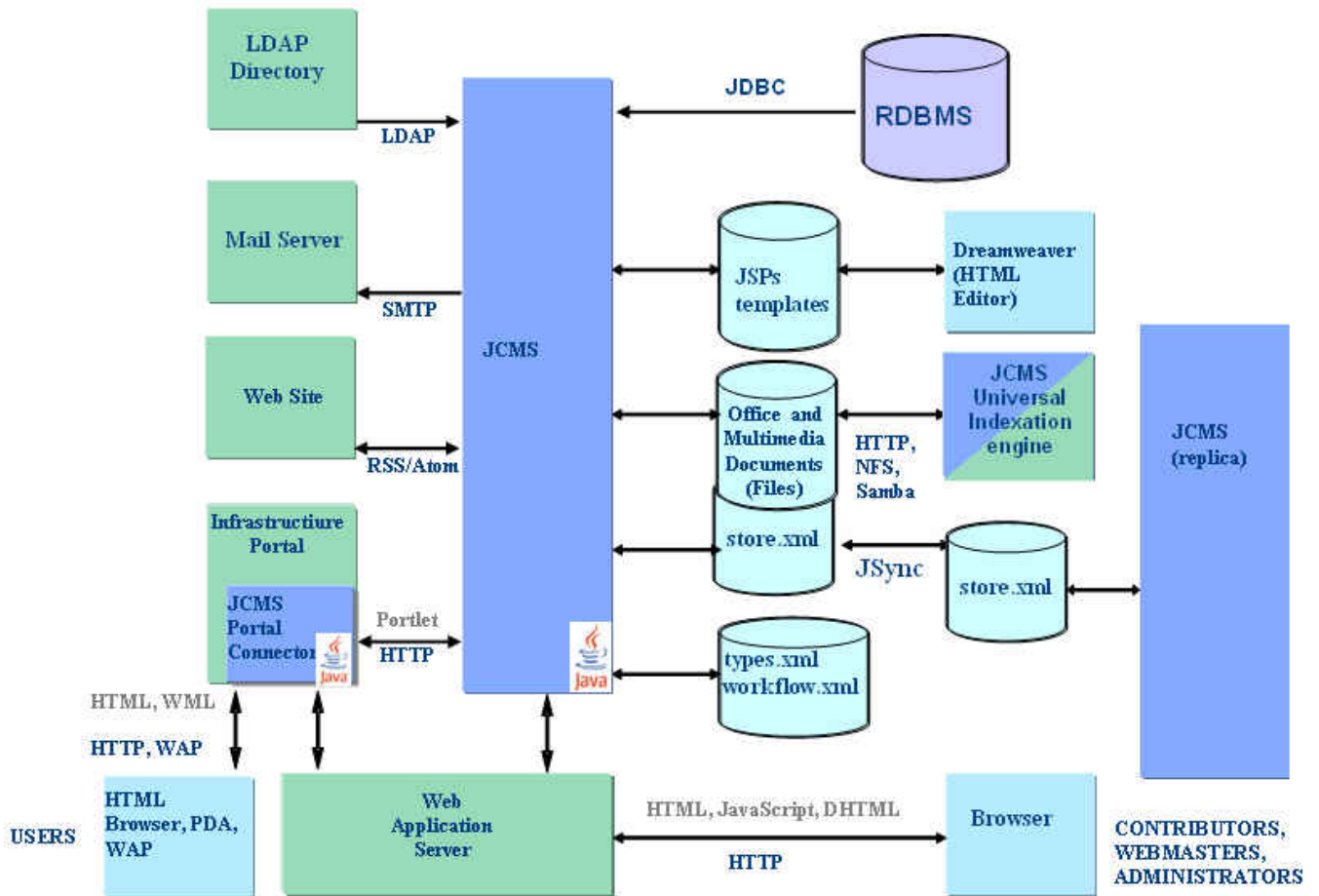


Figure 5 – JaliOS JCMS and JCMS Portal Connector – Global technical architecture (integrated in an infrastructure portal)

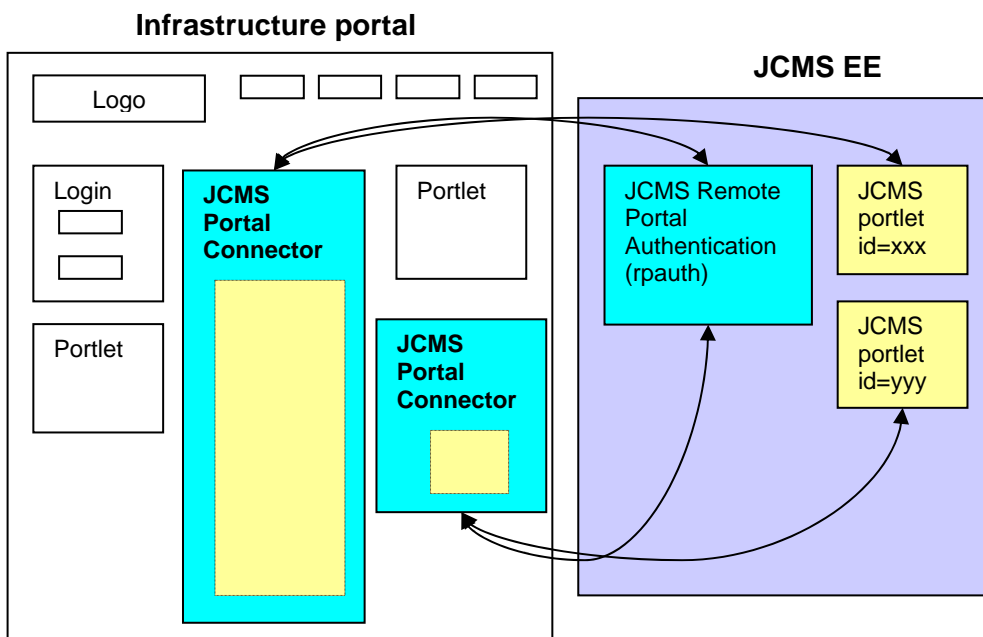


Figure 6 – JaliOS JCMS Enterprise Edition and JCMS Portal Connector – Global technical architecture (integrated in an infrastructure portal)

4. Examples of architecture

4.1. Intranet: continuous content publication

JCMS supports two types of implementation for different usages:

- Simple Intranet without autonomy for Webmasters

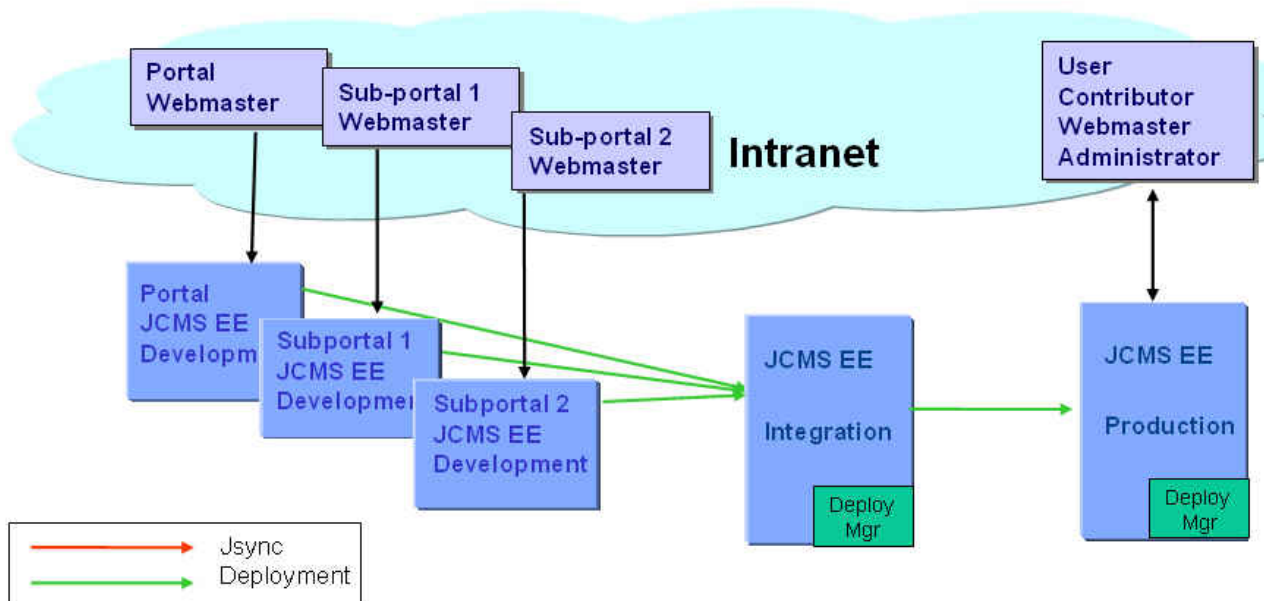


Figure 7 – JaliOS JCMS – Principle of deployment of an "intranet" architecture

The definition of document structures (publication types), their associated presentation (templates), their associated workflows and the portal design are managed on the JCMS development instance.

Contributions and consultations are applied to the JCMS production instance.

Examples of architecture

- JCMS deployment architecture with intranet usage and several business portals ("website factory")

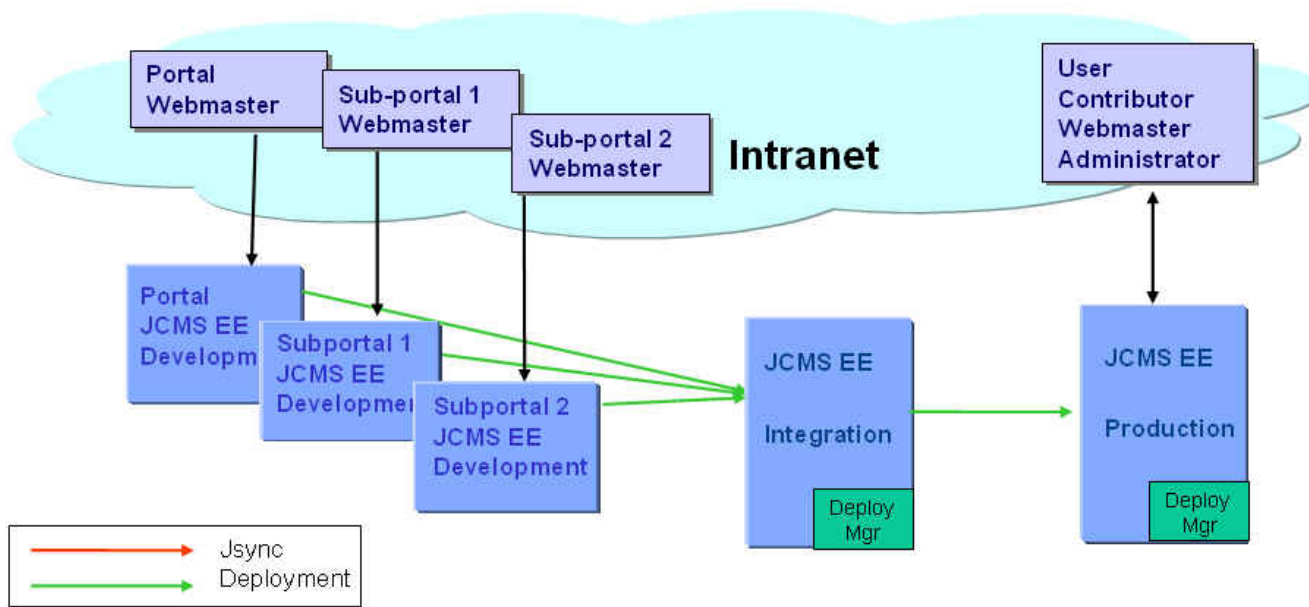


Figure 8 – JaliOS JCMS Enterprise Edition – JaliOS JCMS "website factory" deployment architecture

The definition of document structures (publication types), their associated presentation (templates), their associated workflows and the portal design are managed on the respective development sites.

Contributions and consultation are performed on the production site.

4.2. Extranet

JCMS's replication protocol enables decentralized content management, within an extranet for example. In this type of architecture, all the contributors working for a partner editor modify a local replica. The changes made to this replica are regularly fed to the leader replica which in turn propagates them to the other replicas of the group to keep the document base of the group globally coherent.

The changes can be propagated in several ways:

- ❖ immediate propagation: the local replica is connected permanently to the leader replica;
- ❖ manual propagation: the local replica connects from time to time to propagate changes.

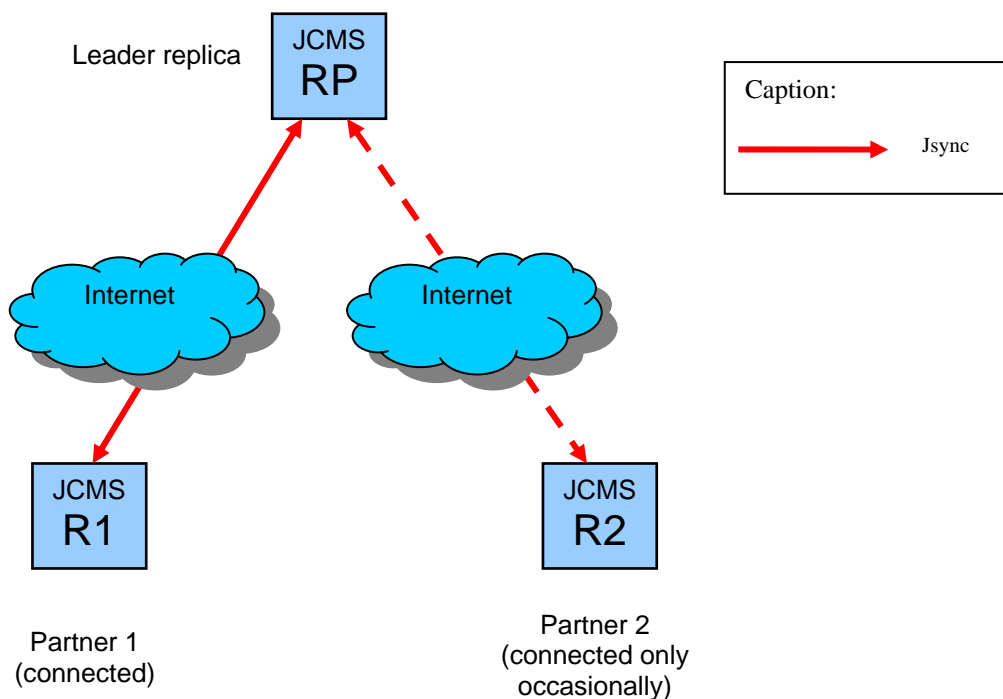


Figure 9 – JaliOS JCMS – JCMS extranet with replication

4.3. Internet: content publication in batches

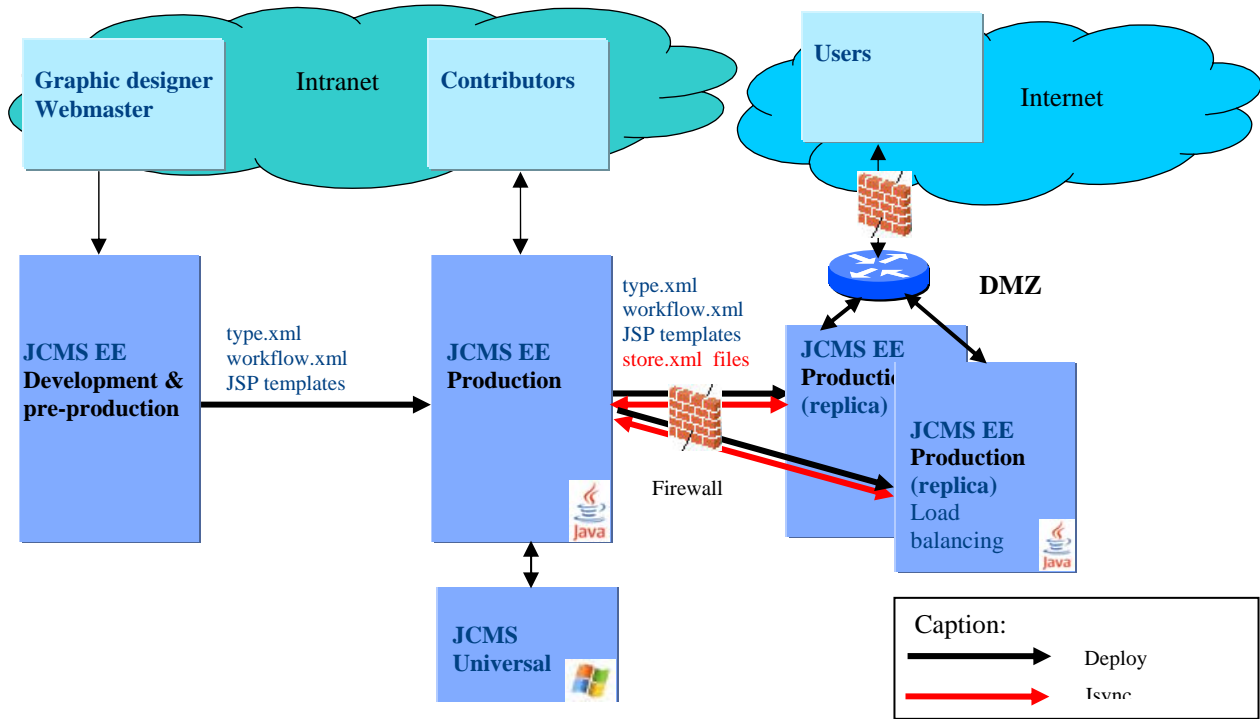


Figure 10 – JaliOS JCMS Enterprise Edition – Principle of the "Internet" deployment architecture

Content is distributed between the demilitarized zone (DMZ), or the Service Provider's facility, and the intranet by making use of the JSync protocol (on HTTP); documents and indexes are distributed using the Rsync protocol.

To meet service availability requirements, an upgradeable and available application architecture implements a load balancer and a second (or several) production instance that handles the increasing load and ensures availability of the distribution servers (see §5.4 Architecture with quality of service).

5. Quality of service – performance and high availability

5.1. Mono-server performance

JCMS is a J2EE application that maximize the advantages of the J2EE servers it supports.

Correct tailoring and configuration of the server enable JCMS to exploit fully the potential of its architecture: the choice of a 64-bit server (for upgradeability reasons) and an appropriate memory capacity enable a production server to be regulated according to the volume of data to be managed. Configuration⁵ of the memory allocated to the Java Virtual Machine (JVM) ensures optimized memory management.

JCMS also provides caching mechanisms that facilitate customization and dynamic updates:

- ❖ Performance optimization: configuration of JCMS to hide some or all of the portal pages;
- ❖ Cache at portal page model level: conserves all pages generated by the model;
- ❖ Cache at component level: cache available for all the pages using the portlet.

JCMS supports different cache accessibility policies, for example:

- ❖ Global cache: shared by anonymous users or when there is no personalization. Global caches are stored in memory (parameter-defined volume).
- ❖ Cache for each J2EE session and group: used when the portlet contains information personalized for the user. These caches are stored on disk.

5.2. Load-balancing architecture

The JCMS load balancing architecture is useful in multi-server and/or multi-processor architectures. Moreover a second server or additional processor may be recommended for generating usage reports.

The characteristics of JCMS load balancing functions are:

- ❖ The leader replica propagates the modifications to all the replicas.
- ❖ Modifications can be made on any replica (however, performance is better when most writes are centralized).
- ❖ Hierarchical topology of replicas.
- ❖ High availability.

⁵ See the White Papers on performance and the JaliOSXperience website (<http://support.jalios.com>).

- ❖ Each replica is a WebApp.
- ❖ Distribution of modifications only (better performance).
- ❖ Propagation after a certain delay to group updates on specific content sets.
- ❖ Three document management options:
 - Shared (NFS, Samba, etc.). This is the recommended option for load balancing;
 - Replicated by JSync;
 - Replicated by an external mechanism (e.g. rsync).
- ❖ Distribution protocol: HTTP / secure HTTP (HTTPS: HTTP over SSL).

5.3. Performance under load

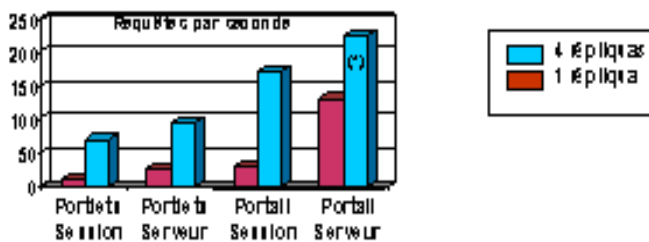


Figure 11 – A load balancing architecture associated with good cache usage enhances performance by multiplying the frontals

A JCMS portal can handle up to 130 requests per second with a mono-server architecture (performance obtained on a Tomcat server with a SPARC Solaris architecture and a server cache). A load balancing architecture boosts this performance in proportion to the number of CPU nodes.

5.4. Architecture with quality of service

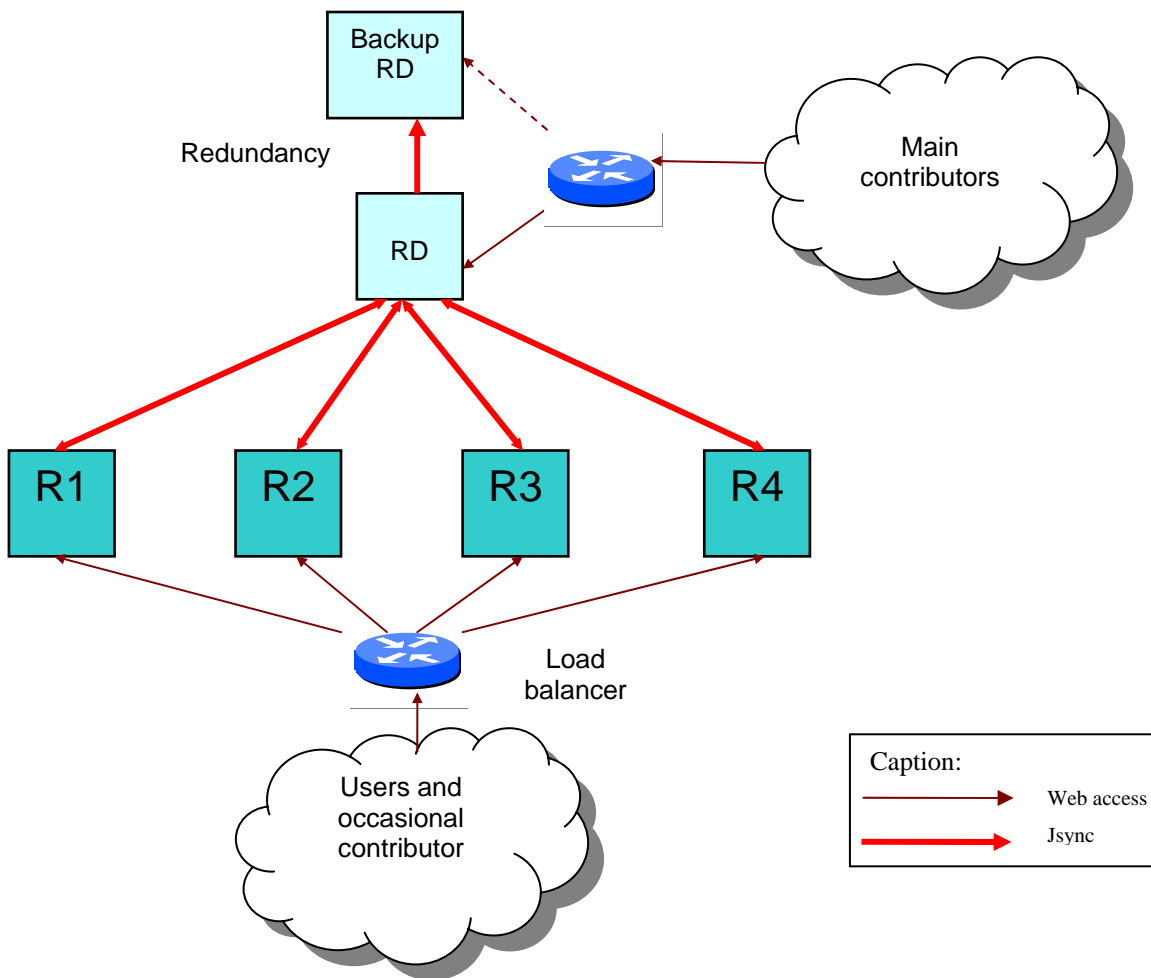


Figure 12 – JaliOS JCMS - Architecture with quality of service

Thanks to JCMS's replication functionalities, a production architecture with quality of service is possible: fault tolerance (failover) and load balancing.

6. Development, testing and commissioning procedures

JCMS includes specific tools for easy updating of JCMS (specific developments or new releases) then restarting of production: the Upgrade Manager and the DeployManager.

6.1. Updating JCMS releases

The adaptation possibilities of JCMS are numerous and affect files disseminated throughout the tree structure of the WebApp. During the migration phase, the Upgrade Manager integrated in JCMS simplifies the collection of changes made. This tool rapidly detects all files that have changed and any modifications that conflict with the new JCMS release. It produces a zip file containing all the client specific development that must be applied on the new release.

6.2. Bringing new developments into production

New versions of a site or additional services and components developed for an existing site must be tested then deployed on the production instance. JCMS provides an integrated tool, the Deploy Manager, to handle the merging of new components into the application in use then testing and deployment of the modified version.

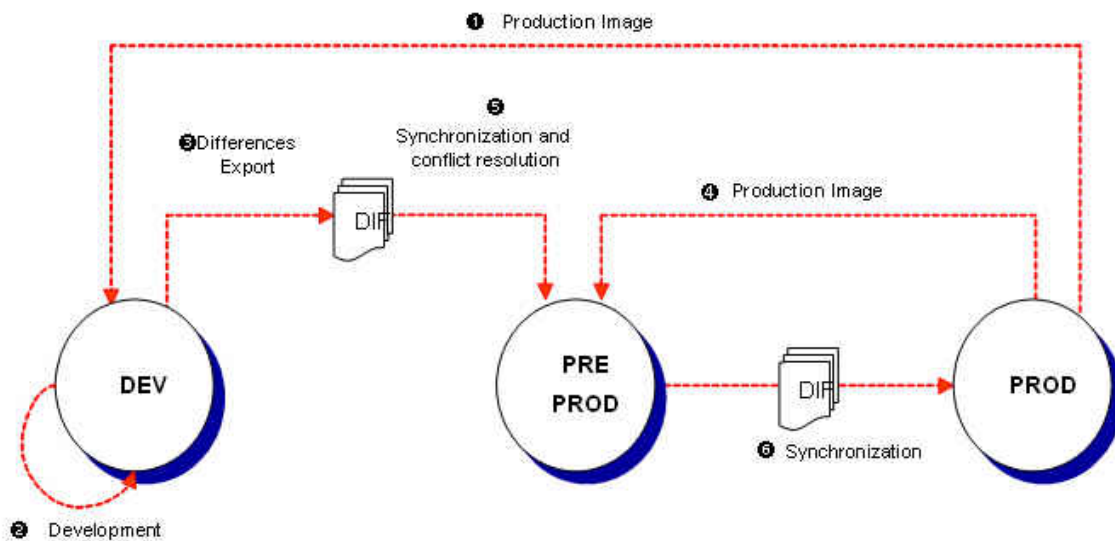


Figure 13 – Jalios JCMS Enterprise Edition – Procedure for handling new developments

- **Development phase**

- 1 The developer starts from an image of the instance recovered in the production zone. This image contains differences relative to the production version to facilitate the later synchronization.
- 2 The developer makes his modifications. Once these are terminated and validated, he recovers a new image of the production instance and consults the list of potential conflicts (e.g. modification of objects in the image).
- 3 Once the conflicts are resolved, he generates the deployment file (zip file of changes) to be able to transfer the modifications to pre-production.

- **Validation phase in pre-production**

- 4 Write operations are stopped on the production instance. An image of the production instance is recovered and deployed in the pre-production application server.
- 5 The changes are deployed and validated on this instance. If the changes are not validated, write operations can be allowed again on the production instance.

- **Deployment phase in production**

- 6 The production instance is made inactive (all read and write requests on the production instance are redirected to a maintenance page) then backed up. The changes are deployed and validated on this instance. If the changes are not validated, the rollback procedure is triggered. The production instance is restarted and reactivated: reads and writes are re-established.

Conclusion

Jalios JCMS is a complete solution yet simple, light and flexible enough to meet to real needs of enterprises. Its innovative architecture gives users great control over their content management. This application integrates easily into corporate information systems and guarantees a high level of service quality satisfying the most demanding users.

Jalios JCMS enables the enterprise to deploy a content management and portal infrastructure and moreover to save money thanks to increased efficiency and productivity.

Appendix 1: History of JaliOS JCMS releases

A detailed list of JCMS functionalities can be consulted at: http://www.jalios.com/display.jsp?id=c_6465

➤ **Pharos (JCMS 1.0)**

Collaborative web directory

Availability: 2000

Functional evolutions

- Management of annotations: URLs and opinions
- Management of members (contributors)
- Categorization
- Full-text searching on categories and metadata, and refinement

Technical evolutions

- Java / XML architecture
- Storage of the data in memory with persistence mechanism by XML journalization
- Integration of SMTP messaging

➤ **JCMS 2.0.1**

Departmental / work group content management

Availability: March 2002

Functional evolutions

- Management of publication types
- Management of publications
- Management of attachments
- Management of users and rights
- Collaboration: forums, FAQ, glossary
- Administrator work space
- Presentation management – Taglibs / DreamWeaver
- Multi-channel distribution: Web, WAP, e-mail

Technical evolutions

- Application Server: J2EE Servlet 2.2 JSP 1.1: Tomcat 3.x, Resin 1.2.x, IBM WAS 3.5.3
- LDAP integration

➤ **JCMS 2.1**

Departmental / work group CMS⁶

Availability: July 2002

Functional evolutions

- Personalized work space for members of the editorial team
- Fine management of groups and rights (read / write)
- Editorial workflow
- Selection of publications (caddy)
- Properties management via a Web interface
- Multi-channel distribution: Web, WAP, e-mail

Technical evolutions

- J2EE application servers: BEA WebLogic 6.1

➤ **JCMS Universal 1.0**

Optional JCMS module enabling a file in any of 280 formats to be converted into PDF format, to make the document accessible via a browser.

Availability: September 2002

➤ **JCMS 3 Enterprise Edition**

Enterprise CMS

Availability: January 2003

Functional evolutions

- Portal management (documentary portal)
 - Organization of content into a portal and sub-portals
 - Construction of portal pages
 - MyPortal personal page (Phase 1): user personalization (reorganization) of the enterprise portal pages and business sub-portals.
 - Portlets: requests, searching, browsing...
- Version management on content and documentary sheets
- WYSIWYG HTML editor (for IE 5.5 +)
- Editing of complex publication types
- Rights management: editing rights on categories
- Members management: information on members
- Serial processing on a selection of content (global operations)
- Management of logs and usages (Phase 1)
 - Statistics for each user and page
- Management of folders / documents (EDM-type functions):

⁶ Content Management System.

- Indexing of attachments and extension of searches to them (JCMS Universal 2)
- Work space for contributors
- Delegated administration (Phase 1):
 - Content management

Usability evolutions

- Category Manager
- Publication Manager
- Members and Group Manager
- Content Type Editor
- Workflows Editor
- Localization (French or English) of all user interfaces

Technical evolutions

- Cache management
- J2EE JSP 2.3/JSP 1.2: IBM WAS 5.0, Caucho Resin 2.1.x, Tomcat 4.x, BEA WebLogic Server 7.0, SunOne AS 7.x

➤ **JCMS Universal 2.1**

Optional JCMS module enabling a file in any of 280 formats to be converted into PDF format, to make all attached documents accessible via a browser.

Availability: September 2003

Extension of textual searching to attachments.

➤ **JCMS 4.0 Enterprise Edition**

Enterprise documentary portal and CMS. "Website factory" feature to industrialize the creation and management of new sites.

Availability: October 2003

Functional evolutions

- Heritage of types
- Portal management
 - Workflow on portals
 - Portal model (sub-sites) and instantiation of sub-sites
 - New portlets: RSS, survey, iframe, wysiwyg...
- Multilingual support (Phase 1)
 - Latin character sets (ISO latin 1)
 - Multilingual content

- Management of forms, online surveys
- Delegated administration (Phase 2)
 - Checking rights on categories
 - Global operations accessible to all editorial players
 - Portal management
- Usage management (Phase 2)
 - Statistics for each user group and publication
- Enriched searching functions
 - Highlighting of words sought in content
 - Synonym management for searching on categories
- Management of folders/files (EDM-type functions)
 - Document format recognition
- Collaborative edition:
 - Check-in / check-out
 - Editing rights on publications

Usability evolutions

- Work list (workflow)
- Graphic representation of the workflow
- User Manual

Technical evolutions

- J2EE JSP 2.3/JSP 1.2: BEA WebLogic Server 8.1

➤ JCMS 4.1.x Enterprise Edition

Enterprise documentary portal and CMS, taking into account operating and quality of service constraints.

Availability: June 2004

Functional evolutions

- Manager of RSS sources (Feed portlet), RSS 2.0 portlet
- Workspaces management giving autonomy to editorial teams and project teams
 - Delegation of rights within workspaces
 - Workspaces for editorial groups
- Renovation and enrichment of workflows
 - Instantiation for workspaces and content types
 - Editorial roles
 - Workflow with multiple approval and express workflow
 - Workflow portlet
- Collaborative

- Reader monitoring: tracking of the reading of content items
- Connected Members portlet
- Display of the search results within a given portal.
- Management of folders/files (EDM-type functions)
 - Management of document versions
- Content archiving
- Replication
 - Support for decentralized editing

Usability evolutions

- Wizard for deployment of sub-portals/workspaces
- Simple text component: toolbar
- Rich text component: CSS bar to ensure the house style is respected; configuration of icon bars; search/replace
- User Manual in HTML format integrated in the application

Technical evolutions

- Taking into account of operating and quality of service constraints
 - DeployManager for semi-automatic deployment between development/pre-production and production instances
 - High-availability architecture (failover)
 - Upgradeable architecture (load balancing)
- Support of WCAG web content accessibility specifications
- Support of API portlet (JSR 168) (Phase 1)
 - Provision of Jalios JCMS portlets for integration in infrastructure portals
- RSS2.0
- Compression of HTTP streams to reduce bandwidth consumption
- Support of architectures with reverse proxy
- LDAP: directory support (Notes, Novell eDirectory).

➤ **JCMS Portal Connector 1.0**

Optional JCMS module enabling a JCMS portal and content manager to be integrated in a third-party infrastructure portal (BEA, IBM, Sun, etc.) in compliance with the JSR168 standard.

Availability: June 2004

➤ **JCMS 5.0.x**

Integrated Information Management Solution for Enterprises. Operating constraints and quality of service requirements better taken into account.

Availability: January 2005

Functional evolutions

- Workflow
 - Validator defined by applying a rule
 - Workflow portlet
- Collaborative portlets
 - Calendar sharing portlet
 - Notification portlet
 - Favorites portlet
- Enrichment of forums
 - Alert
 - Forum/distinction closure
 - New ergonomics
 - Attachments
- Functional administration
 - Analysis of usage statistics
 - CSV export: members, groups, workspace, search, form submissions

Usability enhancements

- Rich text editor
 - Spell-checker
 - Cleaning of copy-pasted Word and HTML
- Simple text editor
 - Spell-checker
- Workflow portlet

Technical enhancements

- Security
 - Intrusion detection,
 - Forbidden operations,
 - Data integrity control,
 - HTTPS for authentication
- Technical administration
 - Configurable operating log (log4j)
 - Memory consumption
- Plug-in interface
 - Integrity control / validation

- External authentication / SSO
- Searching
- Rights policy
- Certification of J2EE servers:
 - Oracle AS 10g
 - IBM Websphere 5.1 on HP-UX and AIX

➤ **JCMS 5.5**

Integrated Information Management Solution for Enterprises. New ergonomics, accessibility and support for large data volumes.

Availability: February 2006

Functional enhancements

- Functional administration
 - Global operations on the members/groups/workspace/ categories
 - Search/replace on publication titles
 - Access rights management by consultation profiles ("audiencing")
 - Dashboards
- Enrichment of searching
 - Management of pertinence
 - Spelling suggestions
 - Searching by field
 - Advanced searching via Lucene syntax
- Multi-channel access
 - Recognition of the terminal then routing to the appropriate portal
- Content Type Editor support of new field types
 - Parametric SQL fields
 - Thumbnail field
 - Clickable image field
- Enriched workflows
 - Choice of the validator from a list
 - Reminder alerts
 - AND/OR logic on roles
 - Application workflows
- Renovated media explorer
 - Management of all types of multimedia files: image, audio, video, flash
- Multilingual support (Phase 2)
 - Support of extended character sets (UTF-8)
 - Copy of translation

- Choice of default language, content item by content item
- Intuitive URLs

Usability enhancements

- Content creation, editing and validation from the front-office for business users
- Reorganization of administration spaces
- Data entry interfaces easier to use
- New dashboards:
 - Dashboard for publications being written
 - Dashboard for intuitive URLs

Technical enhancements

- Improved front-office performance
 - More efficient request system
 - New rendering engine (lighter HTML pages produced)
 - Selective loading of CSS and Javascript files
 - Faster searches
- Improved back-office performance
 - Categories tree loaded dynamically (Ajax)
 - Lighter editing forms
- Multi-channel access
 - Recognition of the terminal then routing to the appropriate portal
- Data management
 - Cleaning of the store
 - Management of text search indexes
- Solidity
 - Partitioning of portlet errors
- Support of industry standards
 - Conformity to XHTML 1.0 Transitional
 - Extended character sets (UTF-8)
 - Multi-channel User Agent Profile (UAProf)
 - Dublin Core (metadata)

➤ JCMS 5.6

Integrated Information management Solution for Enterprises. Reporting and monitoring.

Availability: June 2006

Functional enhancements

- Functional administration
 - Management of groups of groups
- Usage reports
 - Cross-referencing of criteria
 - Extensibility

Technical enhancements

- Multichannel access
 - i-mode terminals
- Security
 - Security filter (anti-physhing)
- Support of industry standards
 - iCal (shared calendar format)
- J2EE application servers
 - IBM WebSphere 6.0.2
 - Tomcat 5.5/JDK 1.5

➤ **JCMS Universal 2.2**

Optional JCMS module enabling a file in any of 280 formats to be converted into PDF format, to make all attached documents accessible via a browser.

Availability: September 2006

Enhancements

- Windows 2003 and Office 2003 support
- Operating log (log4j)

Appendix 2: Certified environments

JCMS 5.6 WebApps conform to the J2SE 1.3 specifications and use Servlet 2.3, JSP 1.2 APIs.

The certified JDK is JDK 1.4.2 except for Tomcat 5.5 which is also certified with JDK 1.5.

➤ Development server environment

Operating system	Minimum hardware configuration	Web application server
Windows XP Pro Windows 2000 SP4 Windows 2003	Pentium 1.7 GHz, 1 GB RAM, 10 GB disk	Caucho Resin 2.1, 3.0 Tomcat 5.0, 5.5
Linux RedHat (7.3, 8.0, 9.0, Enterprise Linux), Debian (3.0), Mandrake (10.1)	Pentium 1.7 GHz, 1 GB RAM, 10 GB disk	Caucho Resin 2.1, 3.0 Tomcat 5.0, 5.5
Solaris 8 Solaris 9 Solaris 10	UltraSPARC 900 MHz, 1 GB RAM, 10 GB disk	Caucho Resin 2.1, 3.0 Tomcat 5.0, 5.5
AIX 5.2	PowerPC 4 1 GHz, 1 GB RAM, 10 GB disk	Caucho Resin 2.1, 3.0 Tomcat 5.0, 5.5
HP-UX B11.11	HP-PA, 1 GB RAM, 10 GB disk	Tomcat 5.0, 5.5
MacOS X 10.4	PowerPC G4 1 GHz, 1 GB RAM, 10 GB disk	Caucho Resin 2.1 Tomcat 5.0, 5.5

➤ Pre-production and production server environment

Operating system	Minimum hardware configuration	Web application server
Windows XP Pro Windows 2000 SP4 Windows 2003	Pentium or Xeon 2.4 GHz, 1 GB RAM, 10 GB disk	Resin 2.1, 3.0 Tomcat 5.0, 5.5 IBM WebSphere AS 6.0.2 BEA WebLogic Server 8.1 SP5 Oracle AS 10g

Linux RedHat (7.3, 8.0, 9.0, Enterprise Linux), Debian (3.0), Mandrake (10.1)R	Pentium or Xeon 2.4 GHz, 1 GB RAM, 10 GB disk	Resin 2.1, 3.0 Tomcat 5.0, 5.5 IBM WebSphere AS 6 BEA WebLogic Server 8.1 SP5 Oracle AS 10g
AIX 5.2	PowerPC 4 1.4 GHz, 1 GB RAM, 10 GB disk	Tomcat 5.0 BEA WebLogic Server 8.1 SP5 IBM WebSphere AS 5.1
Solaris 8 Solaris 9 Solaris 10	UltraSPARC 900 MHz, 1 GB RAM, 10 GB disk	Tomcat 5.0, 5.5 Resin 2.1, 3.0 SunOne AS 7.0 BEA WebLogic Server 8.1 SP5 IBM WebSphere AS 6.0.2
HP-UX B11.11	HP-PA, 1 GB RAM, 10 GB disk	Tomcat 5.0
MacOS X 10.4	PowerPC G4 1 GHz, 1 GB RAM, 10 GB disk	Tomcat 5.0

➤ JCMS Portal Connector 1.0

Operating system	Minimum hardware configuration	Web application server
Windows XP Pro Windows 2000 Windows 2003	Depends on infrastructure portal	IBM WebSphere AS 5.0 BEA WebLogic Server 8.1
Linux RedHat 7.3 RedHat 9	Depends on infrastructure portal	Resin 2.1 Tomcat 5.5 IBM WebSphere AS 5.0
Solaris 8 Solaris 9 Solaris 10	Depends on infrastructure portal	Tomcat 5.5 Tomcat 5.0 Resin 2.1 SunOne AS 7.0 BEA WebLogic Server 8.1

➤ Complementary modules

Hardware configuration	Standard supported	Certified products
Directory	LDAP v3	Sun ONE Directory Server 6.1 Open LDAP Notes LDAP Active Directory Novell e-Directory
Infrastructure portals ⁷	JSR 168	BEA WebLogic Portal Server

⁷ Requires JCMS Portal Connector 1.0.

Appendix 2: Certified environments

Messaging	SMTP	Sendmail MS Exchange 5.5 SunOne Messaging Server
Browser on intensive contributor's workstation (rich text component)	HTML 4, DHTML and iframe, editable content, JavaScript	MS Internet Explorer 5.5 or later
Browser on other workstations	HTML 4, DHTML, JavaScript	MS Internet Explorer 5.5 or later Netscape Navigator 7 or later Opera Mozilla Firefox
Browser on reader workstation	HTML 4, JavaScript	MS Internet Explorer 4 or later Netscape Navigator 4.7 or later Opera Mozilla Firefox
HTML editor for computer graphics designer		Macromedia DreamWeaver 4 Macromedia DreamWeaver MX

➤ JCMS Universal 2.2

JCMS Universal is composed of two components:

- JUniversal Converter of third-party origin (activePDF) and which performs the PDF conversion.
- JUniversal Indexer that builds the index of PDF files and extends JCMS searching to this index.

The certified environments for JUniversal Converter are those supported by activePDF⁸. JUniversal Converter requires a MS-Windows environment. In addition, it is recommended to install Microsoft Office 2003 on the same server to ensure good PDF rendering of MSOffice documents.

Universal Indexer is a Java component supported by Unix, Linux and Windows.

⁸ See <http://www.activepdf.com/products/serverproducts/server/sysreqs.cfm> for the system requirements of activePDF Server and <http://www.activepdf.com/products/serverproducts/docconverter/sysreqs.cfm> for the system requirements of activePDF DocConverter

Appendix 3: Hardware tailoring

➤ Memory capacity

This is the main parameters used to adapt a production server. The minimum RAM capacities are indicated in Appendix 2. To determine the memory capacity necessary for data, the following rule of thumb can be applied: 256 MB for 30,000 A4 pages (supposing that one A4 page contains 3 KB of raw ASCII text that consumes 7 KB of RAM once integrated in JCMS). Every character is coded on 2 bytes since Java uses UNICODE.

➤ Disk capacity

The minimum disk capacity required is 10 GB. The disk capacity necessary for data storage must include space for attachments and shared images. RAID disks are recommended.

➤ Number of processors

JCMS requires CPU resources and memory. As a general rule, one mono-processor server is sufficient. The load-balancing architecture can exploit Symmetric MultiProcessing (SMP) architectures. Moreover, a second server or additional processor may be advisable for generating usage reports.

A JCMS portal can handle up to 130 requests per second in a mono-server⁹ architecture. Implementation of a load-balancing architecture enables this performance to be boosted in proportion to the number of CPU nodes. See the "Benchmarks JCMS" white papers or consult Jalios for precise information on tailoring and performance on Intel and SPARC architectures, with various Web application servers, in a mono-server and/or load-balancing architecture.

⁹ Performances obtained on a Tomcat server with a SPARC Solaris architecture and use of a server cache. The data carrying capacity of the network is important since this could be saturated at this request rate.

Appendix 4: Glossary

Category – Hierarchy of terms used to characterize and organize content.

Template – A definition of the presentation of a type of information which is itself defined by its structure. An information type may require several templates to be displayed

HTML (Hyper Text Markup Language) – One of the basic Internet standards. Browsers receive information in this format

Load Balancing – Architecture used to distribute the workload by spreading requests over a group of servers.

JSP (Java Server Page) – Java-based technology enabling developers to generate dynamically HTML or XML code or any other type of web page.

JSync – Replication protocol used by JCMS. It is based on the HTTP(S) protocol.

Portal – Designates here the software tools used to aggregate and personalize information from multiple sources to offer a single presentation. A distinction is made between a **documentary** portal that supports content management and an **infrastructure** portal used to facilitate applications integration.

Portlet – A dynamic component enabling construction of portal pages by configuration.

Portlet API – To enable interoperability between portlets and portals, the JSR 168 portlet API specification standardizes the interface between a *portal* and web services (this is an interface of higher level than a *servlet*).

Reverse Proxy – HTTP server rerouting requests to other HTTP servers according to rules.

Servlet – Standard programming interface between a Web server and code generating pages dynamically.

Workflow – A work organization mechanism. The documentary workflow is a special case managing the life cycle of the documents from creation to archiving.

XML (eXtensible Markup Language) – A standard of the W3C consortium that has become a widely accepted base for various data interchange formats.

Web Services – Services used to manage inter-application communication using the same HTTP protocol as the web browser.



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