

# **IBM FileNet P8: Accelerate with IBM FileNet P8 Technical White Paper**

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**Overview**

As the world leader in enterprise content management (ECM) solutions, FileNet, an IBM company, created **IBM FileNet P8**, the next-generation platform designed to form the basis of your enterprise content, process and compliance solutions.

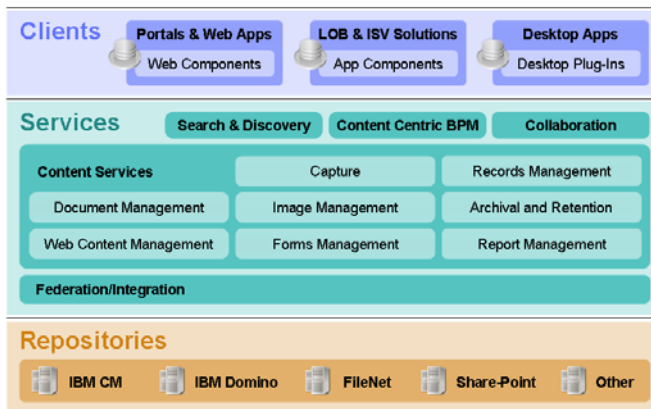
FileNet P8 is a highly scalable business process and content management platform that enables users to better access, manage, share and process unstructured content throughout its lifecycle. The platform allows you to make better decisions faster, and drives your enterprise toward lower costs and higher business agility through the following key features:

- True Unified Platform
- Superior Performance
- Leading Enterprise Functionality
- Compliance Management Infrastructure

**True Unified Platform**

FileNet P8 utilizes Service Oriented Architecture (SOA) to offer functionality as services from the platform. By standardizing on SOA as a model, FileNet P8 lowers total cost of ownership (TCO) and reduces the complexity inherent in working with multiple repositories.

**ECM Group Portfolio**



FileNet P8 exposes the following services through a variety of transports:

- Auditing
- Catalog Services
- Classification
- Content Federation Services
- Decision Management
- Distribution
- Event Services
- Forms
- IDARS
- Interoperability
- Library Services
- Lifecycle Management
- Object Management
- Optimization Services
- Publishing
- Retention Management
- Search
- Workflow
- XML Management

These services, which all FileNet applications utilize, are exposed through Web Services as well as through traditional APIs such as Java and .NET. The applications combine the services to create market-leading, content-enabled vertical applications (CEVA).

For more information about the services exposed, please consult with your account team for a copy of the *Enterprise Reference Architecture*.

### **Open Standards**

IBM is strongly committed to open standards and provides significant thought leadership in this area. In fact, the company is actively involved in numerous organizations, such as AIIM, BPMI, IETF, JCP, W3C, WfMC, WS-I, and OASIS, that are responsible for the development of standards and specifications based on and related to Content Management, Process Management, Web, applications, XML, Web Services, and interoperability.

Standards promote compatibility, interoperability, reliability and extensibility, which reduces the cost of ownership for our customers, increases the ease of developing enterprise applications, and increases the seamless interoperability of all products and solutions within the enterprise.

The FileNet P8 platform is based on J2EE and XML Web Services, which enables organizations to maximize their previous investments in their corporate IT environments. Extensive testing with industry-leading infrastructure products has been done to ensure FileNet P8 applications can be deployed rapidly.

### **Connectivity**

IBM's adherence to open standards enables seamless integration with existing e-business infrastructures, enterprise systems, authoring applications, and development tools. FileNet P8 provides robust and highly flexible system integration capabilities in a mix-and-match approach that enables the selection of the best method for an organization's specific integration needs.

FileNet P8's integration capabilities range from out-of-box desktop applications and non-FileNet repository integration to highly specific XML Web Services integration of legacy and ERP systems. The platform's process capabilities can be extended to provide integration through pre-configured steps within a business process to leverage Java, JMS, Web Services as well as integration into EAI tools from vendors such as Vitria, IBM, and WebMethods.

IBM enables enterprises to support their system of choice in the following areas:

- Directory Management (LDAP)
- Authentication (LDAP and JAAS)
- Single Sign On (JAAS)
- Process (BPEL, WS, Component Integrator)
- Process Modeling (BPMN)
- Process Rules Integration
- Content Federation Services (CFS/IBM IICE)

IBM also provides integrations for the common systems found in enterprises:

- Database: MS SQL, Oracle, DB2
- Directory: IBM Tivoli, Novell, Active Directory, and SunOne
- ERP: SAP

IBM FileNet Content Federation Services, a component of FileNet P8, allows enterprises to search, catalog, classify, secure, retain, comply, activate and delete content residing in repositories across the enterprise. This component provides linkage between third-party repositories and FileNet P8, enabling content to reside in the original repository, but be centrally managed in FileNet P8.

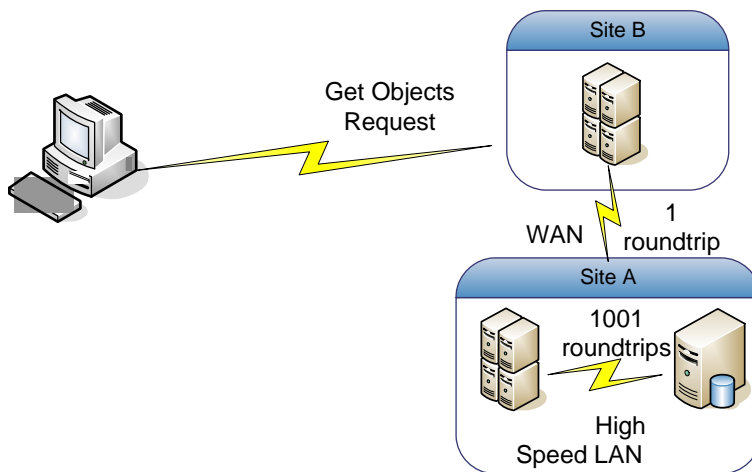
### ***Geographic Usage***

While FileNet Panagon provides support for concurrent access from disparate geographies, FileNet P8 has greater support and thus superior performance. FileNet P8 supports request forwarding, content caching, and content replication on select storage systems as described below.

### ***Request Forwarding***

FileNet P8 has been optimized to work in distributed geographic environments through sites, virtual servers, and servers. Servers will work with their own site's resources, such as File Stores, Databases and Object Stores. When the system receives a request, it will investigate the request to see if it involves local resources. If so, the request will be handled locally. If the request involves other sites, the server will automatically forward it to an appropriate server in another site.

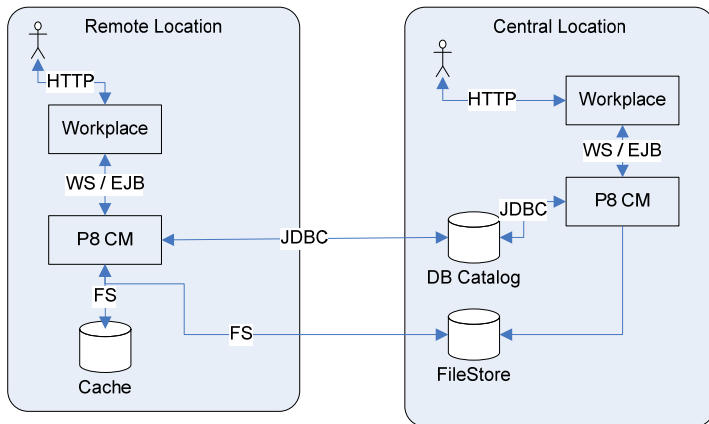
The diagram below shows a single FileNet P8 domain with two sites. There is one satellite sites (B) and a main site (A). The satellite site provide local processing and caching and, when necessary, efficiently forward the request to site A. This greatly improves the response time for the customer when using non-local resources, and greatly reduces the roundtrips across the networks optimizing both the network usage and the response time.



### ***Content Caching***

Content caching enables the utilization of a set of storage resources at remote sites for storing frequently retrieved local content, reducing response times at remote locations for content that is cached. Content is cached automatically after the first retrieval. With minimal customization and configuration, content can be staged, or "pre-fetched," at the remote locations through BPM or scripts.

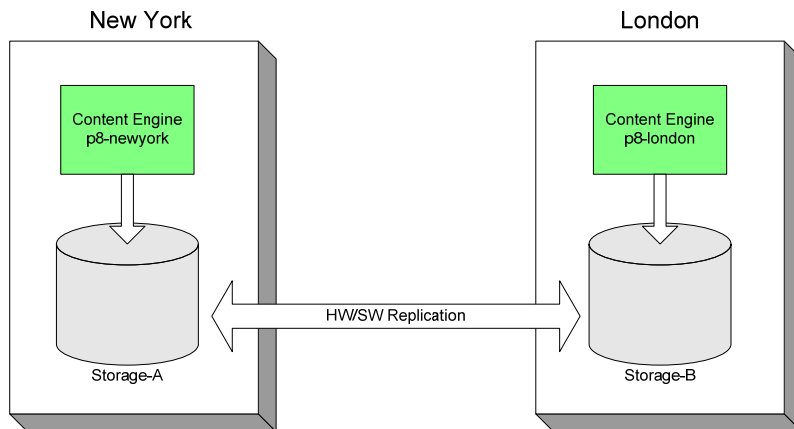
The following diagram illustrates the flow paths for content caching:



### Content Replication

Content Replication is the ability to have content duplicated at multiple sites while maintaining a single catalog. This improves content ingestion and access, while reducing the response times for users at other locations. Furthermore, maintaining a single catalog prevents conflicts on updates.

The content is replicated through hardware or software at the storage tier utilizing the best solution for the enterprise, and thus the best replication performance and cost for the customer. The diagram below illustrates an example of content replication. When accessing content from New York, the New York system will access Storage-A first. If the content is not yet replicated, the system will then access Storage-B.



### Superior Performance

System performance is dependent upon specifics of hardware, system architecture, and software components, network bandwidth and data volumes, and user levels. Recent studies<sup>1</sup> have shown that FileNet P8 scales extremely well, showing no performance degradation over more than 2 billion objects and 730,000 transactions per hour. A complete system can be architected and sized to process complex rule decision combinations based on an organization's specific throughput needs.

### Scalability

The FileNet P8 components support enterprise-level scalability with a multi-tier, distributed architecture. FileNet's components support active/active clustering (farming) and vertical scaling. The FileNet product suites are engineered to support mission-critical, highly scalable enterprise installations.

A number of our customers are licensed to support tens of thousands of users. Two such customers include:

- A number of our customers are licensed to support tens of thousands of users. Two such customers include:  
A large telecommunications firm, which currently has 55,000 users in production, is using FileNet's workflow solution to handle customer services processing.
- One of the largest publicly held insurance firms in the U.S., which has over 20,000 users, is using their IBM FileNet system to manage over 2 billion documents.

FileNet P8's distributed software services architecture is ideal for enterprise-class deployment, because those services can be replicated among multiple servers based on demand, which leads to nearly limitless scalability. FileNet P8 is architected to exploit future advances in processor, memory, bus and peripheral technology, as well as to enable multiple systems to operate together through intersystem communications.

Specific scalability considerations supported by the FileNet P8 platform include:

- Web, Content Engine (CE), Process Engine (PE), and application servers can be farmed to support large numbers of users (horizontal scaling).
- Multiple instances of the application server can be run on a single machine (vertical scaling, sometimes referred to as application server clusters).

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<sup>1</sup> Please see the performance whitepaper, "FileNet P8 2-Billion Objects with File Store Content on Hitachi Storage," for more information. Ask your account team for a copy.

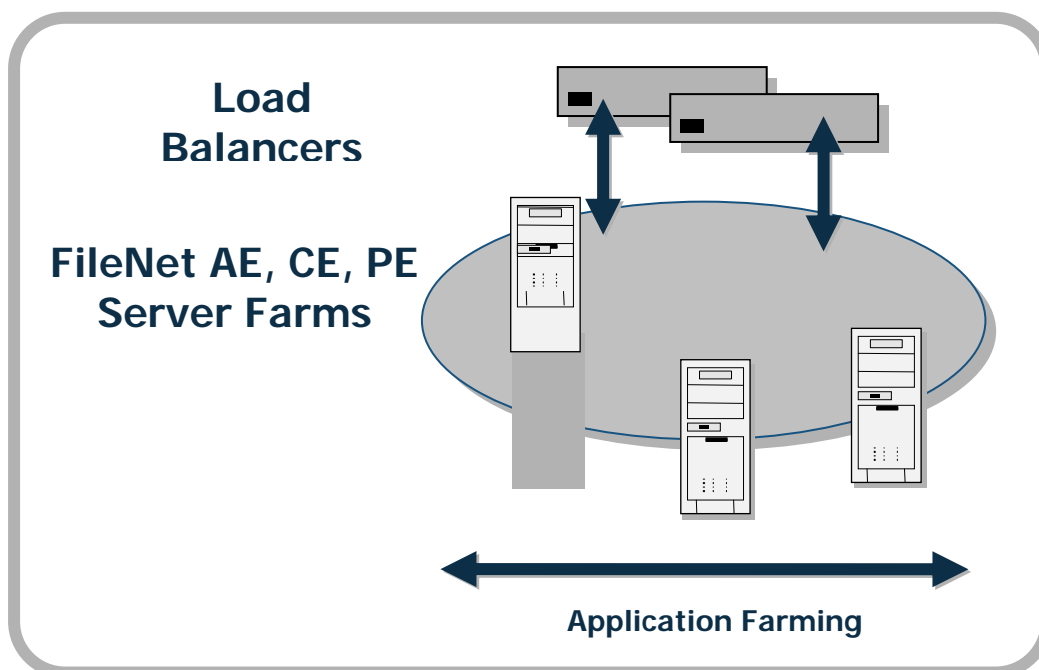
- Database software can be remotely configured to run on a separate machine so that CPU cycles can be dedicated to database transactions.
- Services that access a content repository can be distributed across any number of machines to handle heavy user access.
- Multiple content repositories can be distributed across databases and machines, allowing the same system to service multiple applications.
- Web sites can be easily deployed to multiple targets for handling large numbers of users.
- Multiple Rendition Engines can be configured to support large numbers of format translations.

#### **Availability**

FileNet recommends two key technologies to ensure high availability of FileNet P8 products in the event of local component failure: server farms at the presentation tier and server clusters with shared storage for back-end services and databases in the business logic and data tiers.

#### *Server Farms*

The current best practice for highly available Web and application servers is a server farm accessed through hardware or software load-balancing technology. A server farm is a set of load-balanced servers that are all active and providing the same service concurrently with the same applications, as shown in the diagram below.





A load-balanced server farm provides both better availability and better scalability than a single server. When a server in the farm fails, the farm automatically detects the failure and directs user requests away from the failed server to the other servers in the farm, thereby keeping the service available. Administrators can increase system performance and capacity by adding servers to the farm, also known as “horizontal scaling.”

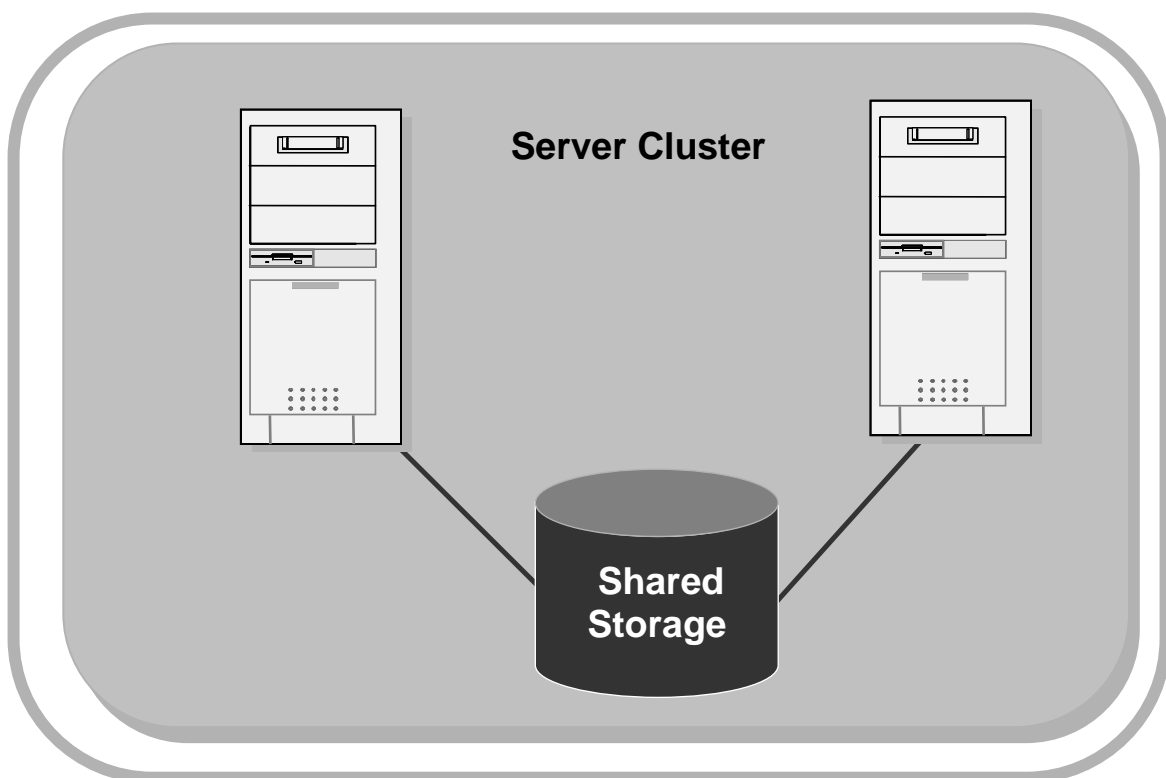
Both software and hardware load balancers are available for managing server farms, for instance:

- Cisco and f5 Networks offer hardware-based load-balancing devices.
- Windows 2000/2003 Server includes a software-based load-balancing capability, Microsoft Network Load Balancing (NLB).
- J2EE application servers, BEA WebLogic, IBM WebSphere, and JBoss, all provide built-in software load-balancing capabilities.

#### *Server Clusters*

For a high availability solution, the core FileNet P8 servers are now farmable in an active/active environment. Some secondary or tertiary servers still require an active/passive cluster such as Rendition Engine.

In most active/passive server cluster configurations, only one server is actively serving clients at a time (“active/passive” configuration), as opposed to server farms, where all servers are active all the time.



Server cluster products from the major server vendors include HP's MC/ServiceGuard for HP-UX, IBM's HACMP for AIX, Microsoft Cluster Server for Windows 2000 and 2003, and Sun Cluster for Solaris. Symantec's Veritas line offers its Veritas Cluster Server product for all of these platforms.

### ***High Availability vs. Disaster Recovery***

High availability and disaster recovery both have business continuity as their goal, but under different conditions. High availability refers to maintaining a service in the event of local component failures, such as a server crash, loss of a hard drive, or a network switch failure. Disaster recovery, on the other hand, typically refers to the loss of an entire site due to natural or man-made disasters.

While the goal of continued business operation is the same for both high availability and disaster recovery, the solutions are quite different. Providing for high availability requires local redundant components in the form of server farms and server clusters, as described above. In contrast, disaster recovery has two key requirements: a full remote replacement system, ranging from a new system that is built when needed, to a full, pre-existing hot standby system; and a full copy of the data from the lost site.

Depending on an organization's specific requirements, solutions for disaster recovery range from sending data backup tapes off site, to real time data replication, to redundant storage devices at a recovery site. FileNet P8 has complete high availability and disaster recovery solutions that can be fully customized to address an organization's specific requirements.

### ***Manageability***

FileNet P8 provides a complete set of system administration tools that allow for monitoring, validating and configuring changes from a central location with dispersed deployment. These tools range from tracking consoles (e.g., Process Analyzer, Process Tracker) to designers (e.g., Process Designer, Template Designer, Search Designer, etc.), to monitoring and configuration tools such as the Enterprise Manager, Configuration Console, Process Task Manager, and System Manager.

#### ***Enterprise Manager***

The Enterprise Manager is a Microsoft Management Console-based tool that administrators use to manage Content Engine services and object stores. The Enterprise Manager provides a graphical, wizard-based user interface to perform the following tasks:

- Create and manage object stores and file stores
- Manage services
- Create and manage classes and properties
- Create and manage security policies and default security for object authorization

- Create and manage lifecycle policies
- Create and manage event subscriptions
- Import and export objects and metadata definitions as XML
- Search and perform bulk updates on search results
- Configure XML classification
- Perform document management tasks (check-in, check-out, etc.)
- Configure trace logging

#### *Configuration Console*

The Configuration Console provides the tools to create and modify the workflow structures — isolated regions, queues, rosters and event logs. The Configuration Console also provides management tools to configure event logging and statistics collection, and to set performance parameters.

#### *Process Task Manager*

The Process Task Manager is a tool that administrators use to manage and configure the Process Engine services, including the Process Service, Pooled Process Manager, Process Router and Process Analyzer.

#### *System Manager*

Through System Manager, FileNet P8 integrates with system management tools like Tivoli and HP OpenView, which provides orchestration and management of system components and resources on an enterprise level.

### **Leading Enterprise Functionality**

FileNet provides leading enterprise functionality as a platform in the content management, process management and compliance space. The following features reduce the time and cost to deploy an application on top of the P8 platform.

#### ***Single Sign On (SSO)***

FileNet P8 provides out-of-the-box support for Netegrity SSO into your enterprise-authentication environment. For other systems, P8 supports Java authentication and authorization service (JAAS), which allows pluggable authentication frameworks. This reduces the management of identities, users, group management and authentication schemes, allowing your users to utilize their current authentication method. Because SSO support is built into the platform, SSO is efficient and suitable for all performance workloads.

#### ***Content Federation Services (CFS)***

The FileNet P8 platform provides content federation, i.e., the connection of multiple, disparate content repositories into a single enterprise source for business content. Once utilizing CFS, FileNet P8 can actively access content from multiple

sources while propagating the metadata into the system. Content stays where it lives and is accessible and active in an enterprise repository.

All applications on the P8 platform are unaware that content may be in many different repositories; in other words, they continue to access the content from where it originally was stored. As changes are made in the underlying repository, CFS will propagate those changes into P8.

Currently FileNet CFS supports Image Services (IS) and Content Services (CS), and offers IICE for other third-party repositories.

#### ***Improved Metadata Model***

FileNet P8 has been enhanced to support a truly enterprise metadata model with single inheritance. Unlike some competitors, there is no performance impact to creating sub-classes of your metadata model. The model also includes object value properties, which can reference another object in the system. In addition, FileNet P8 includes name/value pairs for choice lists. The metadata model has been greatly improved for expressibility, inheritance and performance in P8.

#### ***Improved eForms Integration with Content and Process***

FileNet P8 allows customers to create and manage online forms in a web browser, which can appear the same as hard copy paper forms, yet are more advanced, easier to use, and less costly to implement. FileNet P8 eForms provides the ability to process electronic forms as stand-alone documents or to use an electronic form as the user interface for business process workflow or document entry. eForms allows creation of high-fidelity, highly intelligent electronic forms that tightly integrate with FileNet P8 without customer programming.

#### ***APIs and Toolkits***

The FileNet P8 family of products provides an extensive collection of development and integration tools. These tools, described below, allow users to develop applications or extend existing applications using a wide variety of technology option and skill sets.

##### *Content Java API*

The Content Java API provides networked access to Content Engine objects, exposing runtime and administrative behavior. For example, via the Content Java API, the application can create objects such as documents, folders, custom objects and subscriptions, as well as modify their properties, permissions, versioning and all other functionality exposed by the engine. The API also includes administrative methods for configuring and controlling the content engine.

#### *Process Java API*

The Process Java API provides classes for accessing the workflow definition, administration, configuration and runtime features of the Process Engine. For example, the Process Java API can be used to build a custom step processor, which performs all the operations associated with a step in a workflow.

#### *Web Services*

The FileNet P8 platform includes Web Services for both Content and Process in compliance with WS-I Basic Profile 1.0 and WS-Security. In addition, workflows and perform queue, step and roster operations can be created and launched. The Process Engine also provides process orchestration functionality, based on Web Services and BPM standards (BPEL4WS), which can be called from an external client.

#### *Web Application Toolkit*

The Web Application Toolkit provides a Model-View-Controller framework for building event-driven, JSP-based web applications. A number of IBM FileNet applications, such as IBM FileNet P8 Workplace and IBM FileNet Records Manager, were built using this framework.

#### *Workplace Integration and Customization*

The Workplace Application, which provides thin-client Web access to content and process management servers, is customizable and includes a Java API. The FileNet-supplied source code for this application can be modified to enhance functionality, such as integrating third-party viewers.

#### *Application Integration API Toolkit*

The Application Integration API Toolkit enables third-party client applications to integrate with FileNet Workplace by interacting with Workplace Application Integration objects. Win32-based client applications that run on either Microsoft Windows® 2000 or Windows® XP, such as Microsoft® Word and Outlook, can integrate with FileNet Workplace using the Application Integration in-process COM components and interfaces contained in the toolkit. The toolkit also includes Java Servlets that support the client COM components and interfaces.

#### *Workplace Application Integration ExpressAddIn*

The ExpressAddIn is a developer tool that enables two-way communication between a third-party application and the FileNet Application Integration infrastructure. The tool is implemented via COM interfaces and methods, and communication with the Application Integration framework is achieved through the use of an event sink and event handlers.

The ExpressAddIn provides developers with a simpler method for accessing the Application Integration framework than the objects in the Workplace Application Integration API toolkit. ExpressAddIn also offers features that are not available from

the Toolkit, such as document tracking. In addition, the ExpressAddIn unites various Application Integration functionalities into a single operation, whereas the Toolkit requires multiple commands to be stacked in order to achieve the same behavior.

The ExpressAddIn is delivered with the Add-In sample application, which demonstrates how to use the ExpressAddIn to integrate a third-party application with the FileNet Application Integration infrastructure. Developers can customize the sample code to rapidly integrate their application into the framework and easily customize an integration to meet their specific needs.

#### *Portal Integrations*

FileNet P8 includes a portal integration framework that provides commonly required content and process functionality within third-party portal products. This framework currently supports BEA's WebLogic Portal environment, and includes portlets that provide end-user functionality such as authoring content, browsing features for accessing content, and providing a view of a user's in-box.

#### **XML**

FileNet P8 provides robust and flexible XML management capabilities. The platform natively understands XML content and provides multiple methods for managing XML content and applying Active Content benefits to stored XML content as described below.

#### *XML Content Authoring and Ingestion Support*

IBM FileNet Content Manager supports integration with XML Authoring applications through WebDAV support. The system automatically opens the correct XML application on a content view or check-out request if the client application is correctly configured. Along with a custom event action on content check-in, FileNet Content Manager offers validation of XML submitted via configuration and content bursting with configuration option.

FileNet Content Manager also provides multiple, wizard-based input templates, all of which can be tailored to ingesting XML content or wrapping non-XML content with content class-specific XML, as well as XML content ingestion via content syndication. Syndicated XML content can be pushed from a provider and then processed and normalized by Content Manager.

#### *XML Content Classifier*

FileNet Content Manager XML Classifier identifies content types according to MIME type, content class and configuration behavior provided to meet the organization's business needs. Specific DTD can be supported, and error handling is provided.

### ***Event-Based Architecture***

FileNet Content Manager uses an event model that provides a key application development capability that enables the specification of custom actions that occur when objects are added, updated or deleted in the repository. These actions can be synchronous and veto the action, or asynchronous for processing on certain actions. This model makes it possible to build extensible applications that are loosely coupled with each other and may be integrated with other key systems.

The most common use of the Event Model is to launch a process as a response to a specific action (document added, property changed, document filed, etc.). This provides a platform for building rules and policies into the platforms and out of the total number of applications on top of FileNet P8.

### ***Lifecycle***

FileNet P8 provides extensive out-of-the-box capabilities for recording, storing and viewing the status of each content object through its lifecycle. FileNet P8 automatically captures and logs all content events and changes, and allows properly authorized users to view, edit and update content. The platform also allows for content class-specific lifecycles to be created, thus providing best practice automation and reduced administration costs.

Content states and lifecycle policies are typically highly sequential. For example, a loan application's lifecycle is likely to have states that occur in the following order:

- Application
- Approval
- Funding
- Servicing
- Closed

These states reflect the order in which the actual object passes from one process and state to another. As the object moves from one state to the next, the lifecycle state is updated. If necessary, FileNet P8 allows you to define a class of content that allows demotion in state or lifecycle stage if necessary.

Regardless of the actual lifecycle policy implemented, FileNet P8 maintains all content metadata, properties, security and access rights automatically. Content actions and changes are logged for audit and reporting purposes as well. This greatly speeds application development and enforcement of key policies at the platform level, rather than in each application.

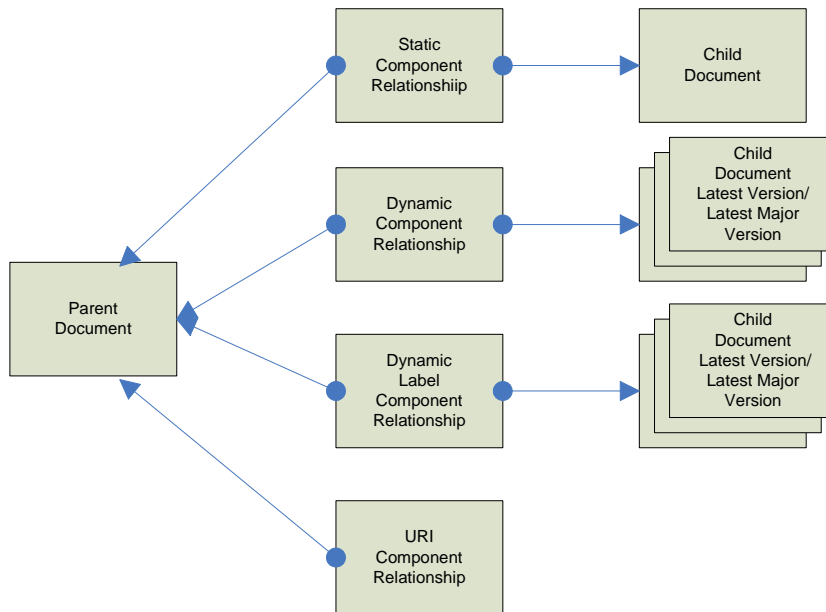
### **Cross-Repository Search**

FileNet enables cross-repository search, which facilitates searching against multiple repositories with the same request. All identified repositories will be searched, the metadata automatically matched into a common definition, and the results returned.

### **Compound Documents**

FileNet P8 supports a new compound document framework that enables applications to seamlessly manage sets of documents. This framework includes binding behaviors such as bind to the latest version, the latest major version or a particular label. Upon binding, certain behaviors can be enforced, such as cascade delete to child component or prevent delete of parent if relationship exists.

The following diagram illustrates the different compound document relationships that can be created in FileNet P8 4.0:



For more information, please ask your account team for a copy of the *IBM FileNet Content Manager Compound Document* whitepaper.

### **Classification Framework**

FileNet P8 provides a classification framework for classifying incoming documents and filing them into folders or set properties based on the content. An XML classifier is provided as a sample.



### ***J2EE platform***

FileNet provides J2EE™ Application Components and System Components that operate in J2EE Platform Products (application servers) such as BEA WebLogic®, IBM WebSphere®, JBoss, Oracle Application Server, and Apache Tomcat. (Ask your account team for a copy of the *Java Platform Enterprise Edition Specification*, v1.4 for a description of these component types.) In addition, FileNet applications leverage the J2EE application model to build multi-tier applications that deliver the scalability, accessibility and administration required by enterprise applications.

An extensive set of Java APIs is provided for programming custom applications and for extending the out-of-the-box applications. These APIs provide programmatic interfaces for interaction with the Content and Process Engines, and can be used to build a variety of application architectures, including those that rely on a J2EE Web Container (Java Server Pages™ and Java Servlets™), Enterprise Java Beans (EJB) Container, or J2SE stand-alone Java applications.

### ***Advanced Security Functionality***

FileNet P8 provides several enhancements to authorization, such as marking sets, security inheritance and security policies. Marking sets allow a customer to define a hierarchical list or flat list of labels and assign content and users to that label. The user will not have permission until the user has that label or, in the case of a hierarchical marking set, that label or higher. This functionality is typically used in FileNet Records Management.

Security Policies are a set of Access Control List (ACL) templates, known as security templates, that can be applied automatically to objects as they change state or specifically by an application at a certain point. Security in FileNet P8 is through ACLs that grant and deny with a very granular level of permissions. These ACLs can be inherited through folder parent-child relationships for a configurable depth for each security setting. In other words, these ACLs will be inherited to documents or custom objects when the security parent (primary folder relationship) is set to a folder with the inheritable ACLs.

### **Compliance Management Infrastructure**

In addition to allowing content and processes to comply with the regulations described above, the FileNet P8 platform provides an ideal and thorough Compliance Management Infrastructure environment. This environment, through native applications and partner solutions, allows the enterprise to comply with multiple regulatory compliance requirements.

The FileNet Compliance Infrastructure provides:

- Fully integrated records and email management capabilities that can be driven directly through business processes without relying on end-user actions.
- Active management of internal controls for ongoing support of Sarbanes-Oxley (sections 301, 302, 404, 409, 508 and 1102) and other corporate governance regulations, minimizing operational costs and risks beyond the initial certification.

- Support for enterprise risk management requirements (cataloging, assessment, active monitoring and reporting) including support for Basel II and Solvency II.
- Functionality to register, manage, resolve and report client complaints in order to fulfill FSA Dispute Resolution and Redress requirements.
- Content production (e.g., quotations, marketing collateral, correspondence, etc.), reviewing processes and safeguards to support FSA Financial Promotions regulations.
- Functionality to address numerous other regulatory requirements, such as advertising standards, ISO standards, data protection, and more.

A more detailed discussion of the role that FileNet P8 architecture and its components can play in compliance management can be found in the “Records Manager Business White Paper.” Ask your account team for a copy of this white paper.

### ***Auditing***

IBM's ECM products manage security and monitor access to diverse content repositories, including desktops and network drives. IBM's role in managing content and processes across organizations can be leveraged to deliver significant value with regard to setting security controls and assigning access and user rights to that information, creating monitoring processes, and measuring and reporting on activities associated with information. FileNet P8 enables organizations to assign role-based security across all workgroup documents.

Full auditing capabilities provide the means for understanding business outcomes and gaining insight into processes so enterprises can track how and why decisions were made while meeting compliance and corporate governance requirements.

### ***Lockdown***

FileNet P8 automatically locks content down to prevent unauthorized modifications and performs integrity checks on the content retrieved to verify that it has not been changed on disk due to hardware failure or malfeasance.

### **Accelerate Your Business with IBM FileNet P8**

As part of IBM's commitment to bringing you next-generation technologies, IBM is offering the “*Accelerate with P8*” program to current FileNet Panagon users. *Accelerate with P8* is a comprehensive program to help you understand, plan and manage each stage of your journey into the P8 family. *Accelerate with P8* offers you financial incentives, education and the same high standard of service and support that you have come to expect from IBM to help you along the way. For more information, please contact your IBM representative.



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