White Paper

EMC DOCUMENT SCIENCES xPRESSION ENTERPRISE INTEGRATION

How xPression integrates with applications, content, data, web, and distribution systems

Abstract

This white paper describes the EMC® Document Sciences® xPression® integration mechanisms and explains how each is used within content-intensive solutions.

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Executive summary

Content-intensive business solutions focus on improving the efficiency of defining and executing business processes that involve the creation and management of various types of content. Examples of content-intensive business solutions include the following:

- Customer service correspondence management

- Marketing collateral generation from a marketing automation or CRM system

- Claims correspondence in insurance and financial services

- Insurance policy issuance

- Contract generation, negotiation, and finalization in OTC trading in capital markets

- Financial portfolio reporting and analysis

At the heart of content-intensive business solutions is the capability of generating highly customized and personalized communications, such as financial reports and statements, marketing collateral, contracts, policies, and customer correspondence, in a variety of formats for distribution via multiple delivery channels. This capability is referred to using many terms, including customer communications management, dynamic content publishing, document automation, variable data publishing, and enterprise personalization. Regardless of the term used, content-intensive solutions require the integration of customer communications management with five other types of systems: application, data source, content repository, Web infrastructure, and distribution/output fulfillment systems.

The EMC® Document Sciences® xPression® software suite, the leading customer communications personalization and management system, was designed specifically to integrate with other systems within enterprise environments. xPression provides the following types of integration and connectivity mechanisms with specific integration mechanisms:

- Application integration through SOAP web services, Java API, or JMS messaging

- Data integration through JDBC, XML, and XQuery

- Content integration through high-speed specialized APIs to enterprise content management (ECM) systems

- Web-based integration through HTTP

- Distribution integration through industry-standard output formats and protocols

This white paper describes each of these integration mechanisms and explains how each is used within content-intensive solutions. Please refer to other available white papers for information on the architecture and functionality of xPression, as well as more detailed descriptions of xPression's integration mechanisms.

xPression integration architecture

This section and Figure 1 summarize the five integration mechanisms in xPression. More detailed descriptions of each mechanism follow this section.
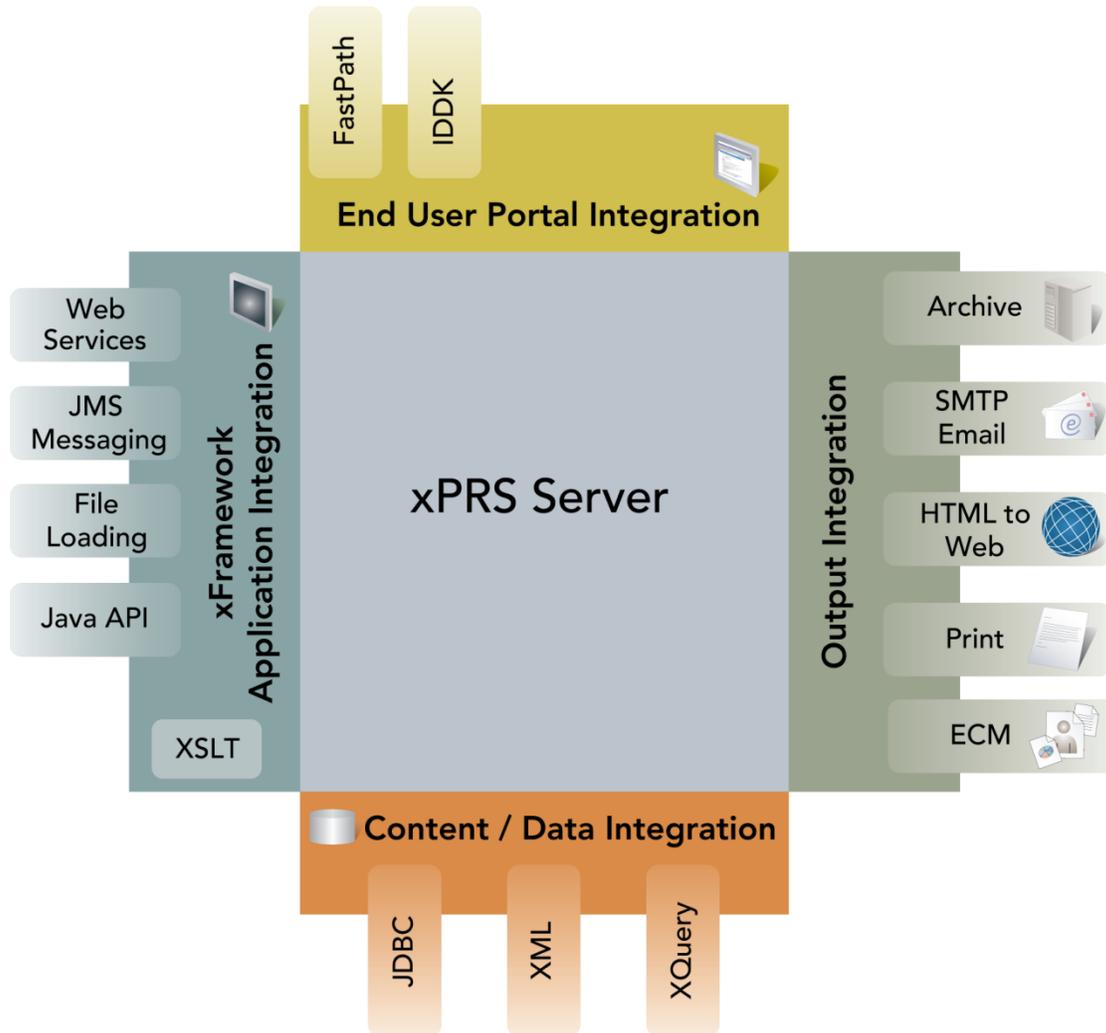

Figure 1. xPression integration architecture

1. **xFramework and the Interactive Document Development Kit (IDDK):** xPression uses these for application integration with front-end systems, such as CRM, ERP, business administration systems, and enterprise portals. In general, front-end systems can use xPression's integration interfaces, called xFramework and IDDK, to integrate with xPression using synchronous communication through web services. The mechanism also provides an XSLT transformer to transform data from the format provided by the external system to a streamlined XML format preferred by xPression to improve performance.

2. **Variable data integration layer:** xPression provides three main mechanisms for retrieving data from a variety of data sources: JDBC for relational databases (RDB), XML processing for any XML data source, and XQuery for mapping, accessing, and

manipulating a variety of data sources, including flat files, RDB, legacy mainframe, XML, and others.

3. **Content integration connectors:** External content in a variety of formats and in various repositories can be imported into xPression, both at document design time and at document generation time. xPression uses high-speed proprietary protocols specific to various ECM systems, such as Documentum® Foundation Classes (DFC) for EMC Documentum, to retrieve content from these sources.

4. **Web integration:** Web-based systems can embed xPression's web applications, xResponse and xRevise, using a mechanism called FastPath. Through FastPath, an application can "drop into" one of several screens of xResponse or xRevise by passing data in HTTP parameters for authentication information and XML-based document data.

5. **Output distribution integration:** Integration with distribution channels is provided through output formats specific to the channel. For example, documents for email distribution are produced in HTML or Adobe PDF, and the SMTP protocol is used to deliver them to email distribution systems. Personalized Web landing pages are produced in HTML for inclusion into a web content management system or for presentment by a Web server. Printed documents are generated in Adobe PostScript, PPML, IBM AFP, or HP PCL formats. A variety of archival solutions is supported by producing indexed documents in the formats required by these archival solutions. The xPression-generated documents are then loaded into the archive storage facilities through an import script as required by the archive solution of choice.

## Application integration with xFramework and IDDK

Content-intensive business solutions often require integration of several applications to complete the desired business process. For example, in claims processing a claims system that manages claims data often triggers the workflow to produce a correspondence, such as a claims acknowledgement letter or a settlement letter with a check. In this solution, the claims processing system will need to be integrated with xPression. xPression provides two web services-based interfaces to enable this integration. The xFramework interface supports straight-through document assembly and publishing functions. IDDK supports interactive document assembly and publishing. We define interactive documents as those that provide user support for optional paragraph selection, external content selection, editing, tracking, and reporting.

Integration using web services

A web service encapsulates specific business functionality and provides a standard interface to the functionality using XML and a standard protocol. This makes the business functionality universally available to any requester, regardless of the technology used. xPression web services are based on standards, including WS-I, WSDL, SOAP, and UDDI, and can be integrated into any application that supports the SOAP protocol. Through these web services, systems built using a variety of

technologies, such as Microsoft .NET, CORBA, Java EE, and others, can integrate with xPression to obtain the services they need.

Most integration between xPression and external front-end systems, such as CRM, ERP, business administration systems, and enterprise portals systems, can be done using xPression's web services interface, which offers the simplest and highest level of integration. In general, the integration is enabled through an adapter that sits between the external system and xPression. This adapter calls xPression's web services. In some cases, the external system provides an "exit" that can be used to call xPression web services directly. The general flow of web services integration is shown in Figure 2.
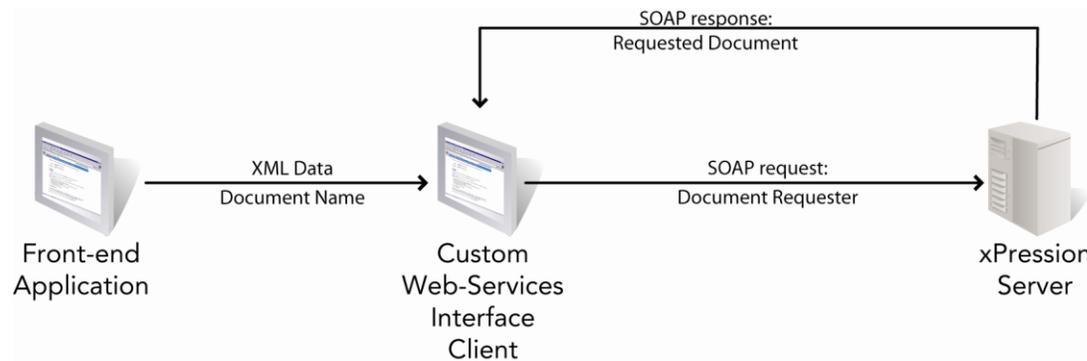
Figure 2. Integration using web services

For such integration, xFramework and IDDK offer a set of web services, each with many methods, to access the most important services in xPression. These web services enable an external system to include a set of document generation functions in its workflow.

Example: Integration of workflow systems using xPression web services

Document Sciences has successfully integrated several workflow engines with xPression using web services. Figure 3 demonstrates a typical workflow integration.
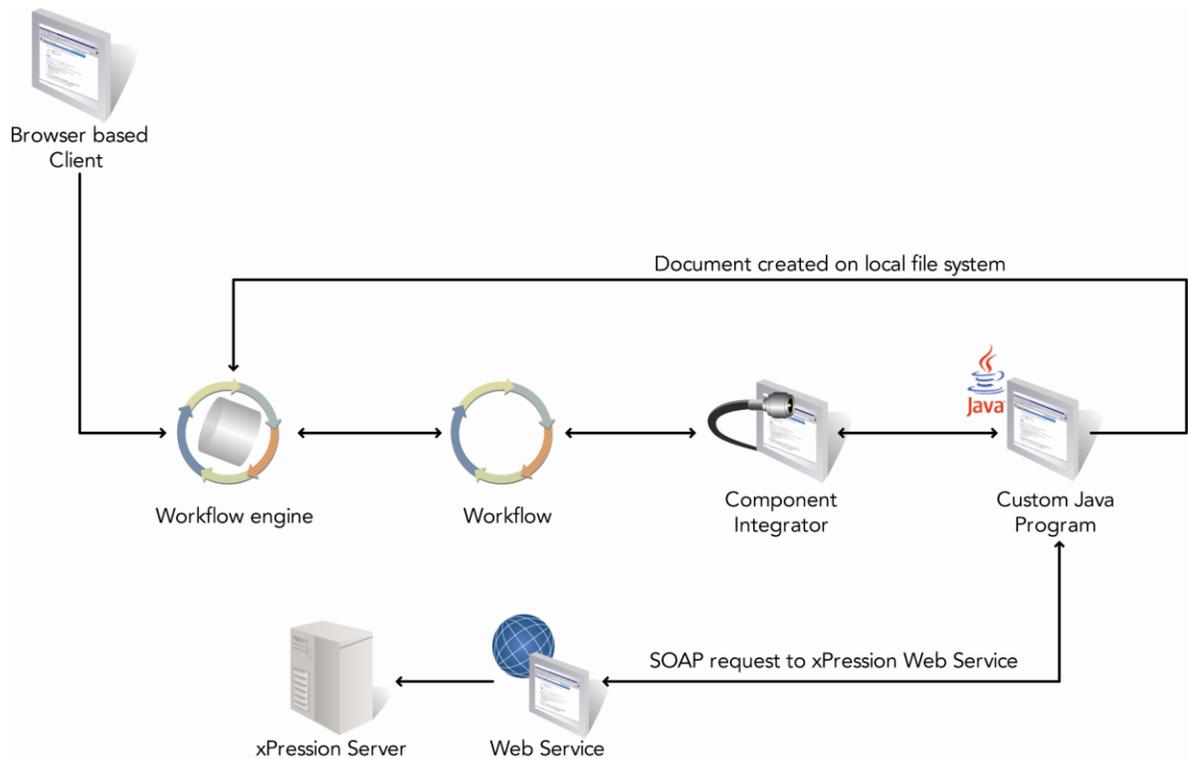
Figure 3. Integration of workflow systems with xPression

As shown in the figure, a typical workflow system provides a component integrator that allows a workflow to dynamically invoke methods of a Java class. This allows data fields from the workflow to be passed to the method, which in turn interacts with xPression web services.

In this particular example, a custom Java interface program was developed that calls the xPression Document Requestor web service to generate the user-requested document using the user-supplied variable data, and then returns the generated document to the workflow in Adobe PDF format for further processing by the user.

Variable data integration

The core of xPression is the ability to generate highly personalized customer communications for a target recipient. Variable data about that target recipient is a key input to the content customization process. Such variable data typically resides in a variety of data sources within an organization. xPression offers the flexibility to integrate with these multiple data sources through JDBC interfaces to relational databases, through XML data, or through XQuery, which can access and manipulate data from multiple data sources, including mainframe databases, flat files, and other legacy sources of data. The data integration abilities are depicted in Figure 4.
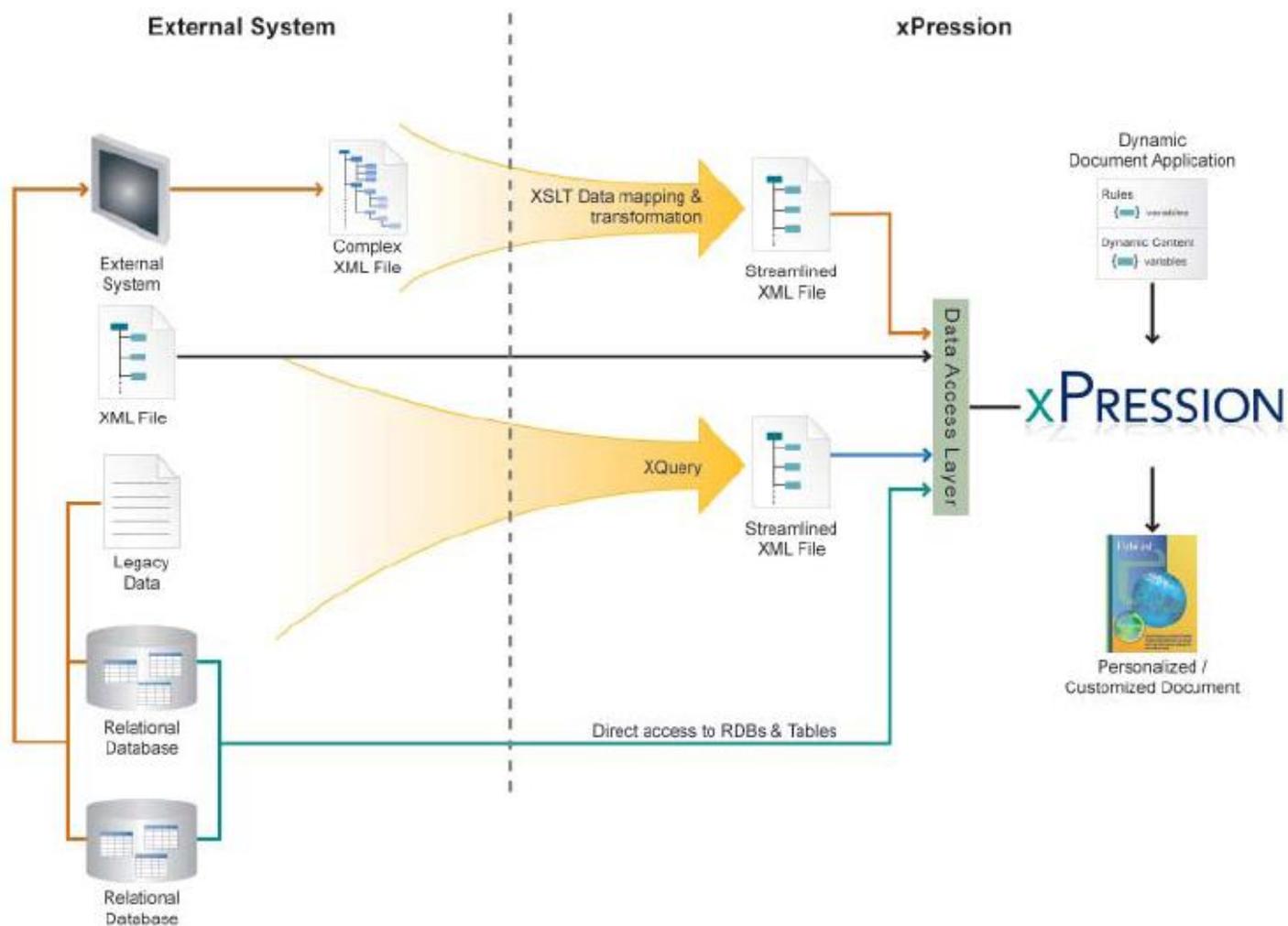
Figure 4. Data integration and mediation

xPression provides a data source-agnostic query facility for data integration that separates document design from the actual data source, providing organizations with the flexibility to choose the appropriate data input depending upon the task at hand – without impacting the document template design. This means that a variable document application can be used within a batch process driven by one or more relational database systems, directly accessible from the xPression server through the data access layer. Alternatively, variable data can be provided as a set of XML or flat files that is mapped and transformed to a streamlined XML structure that the xPression server consumes.

xPression also recognizes that while XML standards bodies are making significant progress in the creation of standards, the rate of adoption of these standards can lag behind. The result of this reality is that external systems with which xPression may need to be integrated produce a variety of XML dialects, most of which are not streamlined for document generation. This necessitates the transformation of that XML (or other data formats) into more efficient XML that is streamlined for document

generation. This is the reason that xPression provides a robust XQuery mechanism that can map multiple, varied data sources into a single XML data source that is then consumed by xPression, as shown in Figure 4.

Content integration

xPression creates highly personalized and targeted customer communications that reflect a customer's unique relationship and status with the company, incorporating a mix of content and data specific to their relationship. This is accomplished through the creation of a dynamic document template that includes content selection rules and variables, from which many personalized and customized documents can be generated based on data. A document designer can use any of the design tools provided by xPression to define a dynamic document template. xPression design tools currently provide native support for Microsoft Word, Adobe InDesign, and Adobe Dreamweaver. The content from any of these widely used tools, as well as externally generated images, Microsoft Word files, and PDFs, can be used without transformation in the design of dynamic document templates.

In addition, external content fragments that are authored by various departments (legal clauses, paragraphs, logos, images, and so on in Word .doc or .docx formats, full page PDF files or images) can all be managed in an ECM system, and xPression allows referencing and retrieval of this content at document runtime. Also, static content such as native Word, InDesign, or HTML files can be turned into xPression dynamic content by using any of the xPression design tools to add rules, variables, and other dynamic content. The document template then undergoes an approval process in xPression to make sure that the approved content fits within the layout design and that all of the rules are correct.

xPression pulls in this external content, using web services or high-speed proprietary protocols such as DFC for Documentum.

Web integration

xPression provides a simple mechanism to allow web applications to embed xPression functionality provided by the two xPression web applications, xResponse and xRevise. xResponse allows users to generate correspondence documents in real time, on-demand, from a web front end. Users can also edit the correspondence if they have the appropriate permissions. xResponse also provides an approval workflow for correspondence. xRevise is a web application for contract generation, revision, and history management.

xPression provides FastPath, which uses the HTTP protocol to call xResponse or xRevise and "drop into" any of their screens (as appropriate) by providing all of the data that would have been collected in the preceding screens. Thus, FastPath enables the integration of xResponse and xRevise functionality into other Web-based applications in a seamless manner.

Alternatively, for customers that do not wish to use the xRevise and xResponse web-based user interfaces, IDDK allows organizations to build custom interactive applications, or add interactive document capabilities to their existing line-of-business systems.
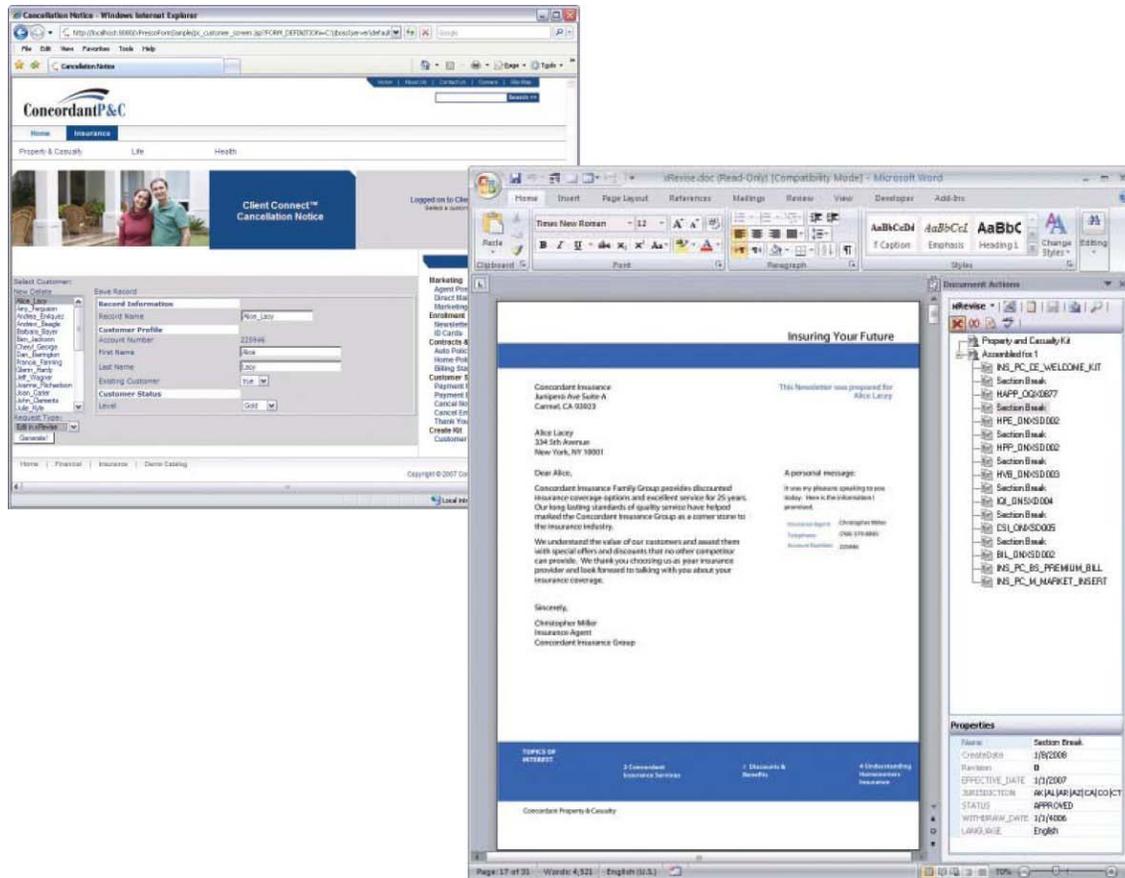

Figure 5. A web-based application launches xRevise using the FastPath mechanism

Output distribution integration

xPression generates documents in a variety of formats suitable for distribution via five main distribution channels. For each of these channels, xPression provides integration mechanisms, as follows:

- **Print/File:** xPression can generate a wide range of print data streams and file formats that are appropriate for both local printing and high-volume centralized print devices. These standard formats include .docx, Adobe PDF, Adobe PostScript, IBM AFP, and HP PCL. Powerful output processing features, such as tray pulls, imposition, splitting, portioning, bar coding, merging, and others, are supported out-of-the-box in xPression. In addition, associated with each output stream, the user can define a script that is invoked when the output is generated;

this script can be used to send print file(s) to the printer or invoke print fulfillment software.

- **Email:** xPression can produce HTML, XML, and PDF output for distribution via email as the body of the message (rich HTML), a multipart MIME XML file for high-volume email, or as an attachment to email messages. It is important to note that the rich HTML produced by xPression is standards-based and thus can be viewed in any browser-based email system, such as Yahoo, Gmail, and Hotmail, without distortion. xPression stores the generated email content in the xPression database; a distribution controller checks the email queue periodically and forwards queued email messages to the appropriate email server based on the output definition.

- **Web:** xPression can produce fully standardized rich HTML for integration with web content management systems or for distribution to a web server directly. The generated HTML files can be stored in a staging area, validated, and then moved to the web server folder for presentment over the Web.

- **Archive:** xPression can generate various archival formats and indices appropriate for industry-leading archival system vendors. Current vendors that are supported out-of-the-box include EMC Documentum, IBM OnDemand, IBM FileNet P8, Panagon Capture and MRII/HPII, and DocFinity. xPression also has the ability to generate a generic XML index file format suitable for a variety of other archival solutions to enable integration with those systems that are not supported out-of-the-box.

- **SMS.** xPression can generate output in plain text for distribution via SMS channels.

Integration roadmap

The integration capabilities of xPression are continually enhanced. For example, with xPression 4 EMC Document Sciences introduced IDDK, a toolkit specifically targeted at adding interactive document development functionality to third-party systems and custom applications. xPression 4 shipped with its first pre-built component, xEditor. The company will continue to add pre-built, web-based components to IDDK to reduce integration time, coding, and expense. EMC Document Sciences remains committed to industry standards wherever appropriate. As the XML standards for content description continue to evolve, and as these standards become more widely adopted, xPression will be extended to maximize content compatibility and reusability across multiple channels.

Technological breakthroughs by infrastructure vendors may also bring new integration opportunities with xPression, including ECM solutions, portal servers, and business integration servers.

Conclusion

Generating highly customized and personalized customer communications lies at the heart of many content-intensive business processes. That's why it's imperative that a customer communications management system seamlessly integrate with the other systems and data sources involved in these processes. EMC Document Sciences xPression has been designed to easily integrate with a wide range of applications, data, and content through the five methods described in this paper and architected to accommodate future methods as they emerge.