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# An Aviation Whitepaper: Leveraging Flight Operations Content with Dynamic Publishing

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### Introduction

Airlines today face an unprecedented level of operational pressure due to competition and dramatically increasing fuel prices. To help manage their businesses in today's dynamic operating environment, airlines need to leverage a wide range of complex content to ensure safe, cost-effective operation as well as compliance with regulatory requirements. Flight manuals, operations manuals, bulletins, forms, navigational aids, weather information, logs and corporate policies are just some of the content types requiring more timely authoring, review, and delivery. Real-time delivery of this content to reduce operating costs (due to unanticipated flight diversion associated with adverse weather, latency in communicating operational improvements, etc.) can help make the difference between quarterly profit and quarterly loss.

A "closed loop" technology platform, coupled with highly specialized system integration services, has proven successful for many of the joint clients served by Mark Logic and Flatirons Solutions. As a leading provider of high performance native XML servers, Mark Logic understands the power of dynamic content delivery in meeting the challenges facing today's airlines. As a longtime Mark Logic partner and experienced integrator in the aerospace vertical, Flatirons Solutions brings the systems integration expertise to blend Mark Logic's unique offering with best of breed solutions for content authoring, review / approval, and publishing to serve the vital content systems within the airline enterprise (including internal portals, in-cabin interfaces, training systems, etc.).

In this paper we describe how a dynamic content delivery platform that combines an intuitive but structured component authoring tool, the powerful XML delivery capabilities of the Mark Logic Server, and seamless integrations to downstream content systems, can significantly reduce the cost and complexity of managing flight operations content. This reduction in cost and complexity translates into greater operational efficiency, better compliance with regulatory requirements, and a lower total cost of ownership.

# Dynamic Publishing for Operations Documentation

## *The Authoring Process*

Recent developments in technology and best practices for content have introduced a new approach to authoring, managing, and delivering content that dramatically simplifies the process of managing operations documentation. This framework is based on two key concepts: **topical authoring** and **dynamic publishing**.

Topical authoring is based on the notion of authoring and managing content as reusable topics. Rather than authoring documents for final delivery, topics are created in a way that allows them to be assembled in multiple ways for operations documentation that addresses specific needs. Substantial benefits arise from this approach:

- **Updates are more efficient** – the authoring team can update a single topic rather than the many documents where a topic is reused.
- **Information is more consistent** – because topics are reused, the chance of inconsistency across documents is substantially reduced if not eliminated.
- **Review and approval is accelerated** – rather than reviewing and approving many documents that are impacted by a change of policy, individual topics can be reviewed and managed with greater speed and efficiency.
- **Dynamic publishing is enabled** – topics can be leveraged in role and task aware content applications that provide better information products for airline crew, such as electronic flight bags.

While topical authoring has presented the airline with significant value, it has been difficult to successfully implement. In the past, airlines have typically approached topical authoring in the following way:

- **Define a schema** – different communities would need to agree on a schema to represent all the types of information needed to provide operations documentation. Frequently this could result in time-consuming “religious wars” within the airline as different communities tried to agree on the use of a single standard, such as S1000D or DITA, or the development of a custom schema for their needs. Necessary updates to this schema over time could force the authoring communities to revisit these debates.
- **Adopt a proprietary XML authoring tool** – authors would need to be trained on the use of a specialized authoring tool, forcing the airline to incur substantial costs in technology, training, conversion, and deployment. Furthermore, it has proven very difficult to successfully roll out specialized authoring tools to content authors.
- **Invest in complex document management systems** – to facilitate author collaboration, workflow, versioning, and auditing of content, complex, expensive content management systems need to be integrated with the XML authoring tools.
- **Pre-define static delivery formats** – the operations documentation team would need to define a fixed set of delivery formats for the content. The team would need to carefully weigh the costs and benefits of multiple formats because the more formats and specialized representations of the information to address specific user communities, the more time consuming and complex it is to manage updates to the content. Accordingly, compromises are made to take a “one size fits all” approach to content delivery.

Mark Logic and Flatirons Solutions have worked with leading airlines to develop a powerful solution for flight and maintenance operations documentation that leverages existing tools where possible and dramatically simplifies successful deployment of the solution. The system is built on the following components:

- **Microsoft Word or Forms-based Authoring Tools** – for authoring structured content using familiar, simple user interfaces that allow content authors to focus on the content itself rather than its tagging or XML structure.

## Leveraging Flight Operations Content with Dynamic Publishing

- **Native XML Authoring Tools (optional)** – For authoring teams that have an existing proficiency with structuring authoring applications and content markup, the use of native XML authoring tools (either thick or thin client versions, depending on the deployment model ) can encourage the creation of well-formed content with minimal additional processing.
- **Mark Logic Server** – for storage of content in native XML for rapid document assembly and dynamic publishing.
- **Publishing Engines and Systems Integration** – for ensuring that the dynamically published content is optimized for consumption by a wide variety of destination systems across the airline enterprise.
- **Leverage Collaborative and Workflow Tools for Review/Approval** – Mark Logic and Flatirons Solutions have effectively leveraged leading collaborative and workflow tools to provide seamless review and approval functionality after content creation to ensure that new or revised content is thoroughly reviewed, annotated, and revised according to corporate and regulatory standards prior to delivery to downstream content platforms.

The challenges of deploying complex developer-oriented XML authoring tools to the author community are eliminated; instead, authors can use tools which they are already familiar -- either Microsoft Word or a forms-based interface that dramatically streamlines the authoring process by providing a simplified user interface for entering and categorizing inbound content. Under this model, authors can create reusable topics efficiently, with minimal impact to their authoring processes. Furthermore, powerful metadata can be assigned to the topics with minimal knowledge of back-end XML required by content authors and contributors.

### ***Dynamic Publishing and Content Delivery***

But content authoring covers only the first part of the dynamic delivery process. Airlines can better serve their users and increase the value of their operations documentation by implementing dynamic publishing as part of their overall solution. Dynamic publishing allows for contextual information to be delivered to the end user that is both role and task aware. Topics are assembled into a dynamic publication that addresses the individual's need within their specific context, and is rendered appropriately for the form factor of their information device. Dynamic publishing allows the airline to leverage a common collection of topics for multiple delivery applications so that authoring, review, and approval can be performed once for all usage scenarios.

### ***Off-Plane Delivery***

Operations documentation isn't just for the cockpit – it's for all the airline communities who collaborate to ensure safety and efficiency in the operation of the airline. By providing for storage, updates, search, and display of operations content that is dynamic and contextual to a user's needs, MarkLogic Server acts as the heart of your operations documentation delivery systems. Rather than creating static renditions of operations for each audience, MarkLogic provides precision assembly of the appropriate information that is contextualized to the point of use of the user. By addressing multiple audiences from a single content set, MarkLogic provides unprecedented efficiency and accuracy in airline operations content delivery.

Some features of this type of solution include:

- **Automate updates** – seamlessly flow updates to policies and procedures in a controlled fashion to your users.
- **Ensure sign off** – alert key users of critical updates, and prove they have read it for audit purposes.
- **Rapid information discovery** – reduce the time users spend looking for information by delivering contextual, precision information with a single click.
- **Browser-based interface** – reduce training and on-ramping times for new employees by proving a simple to use application that is intuitive and productive for all users.
- **Dynamic delivery** – assemble information that is role and task aware rather than “one size fits all.”

## Leveraging Flight Operations Content with Dynamic Publishing

Deployment features include:

- **Scalability and Performance** – ensure sub-second response times to users with thousands of concurrent users.
- **Rapid deployment** – rapid installation, browser-based administration, automatic indexing, and minimal integration requirements allow for rapid deployment in the enterprise.
- **Open standards** – MarkLogic Server is based on XML, XQuery, HTTP, and other key standards. MarkLogic Server fits naturally into service oriented architectures.

### On-Plane Delivery

Mark Logic Server has been successfully deployed by Flatirons Solutions as a key component of the Electronic Flight Bag (EFB), an exciting new technology that replaces bulky hardcopy flight manuals and flight operations manuals with more usable, up to date electronic content. By combining storage, updates, search, and display capabilities in a single, lightweight technology, MarkLogic Server is the ideal technology for electronic delivery of operations manuals to the pilot on the flight deck. The EFB provides airlines with a dramatic reduction in print costs, access to more timely weather and procedural information during flight, and the ergonomic benefits associated with replacing 30-40 pounds of bound paper with digitally delivered content. Unlike some EFB solutions that simply distribute PDF files, XML based content delivery provides numerous advanced features for crew usability.

Some of the features associated with a Mark Logic-based EFB solution include:

- **Day and night modes** – pilots can select optimal display modes for both night and day time usage.
- **Browse** - Pilots can browse through all documentation in a fashion that is familiar and similar to their paper operations manuals. Information is clearly presented on the screen in an easy to read interface.
- **Search** – Pilots can search through all operations using a powerful interface that features an auto-complete search box and relevance ranked delivery of granular information.
- **One-step results** - Rather than forcing pilots to scroll through entire electronic documents, they are immediately presented with precisely the procedure they are looking for based on their search and interaction with the application.
- **Bookmarks** - Pilots can bookmark sections that are frequently used, thereby providing an alternative navigation mechanism for the operations that is personalized to the pilot.
- **Annotations** – Pilots can annotate sections of the operations documentation to provide feedback to the policy authoring team in an easy to use and automated fashion. As the EFB is synchronized with the network, the pilot annotations flow back to the authoring team.

Some of the deployment benefits associated with a Mark Logic powered EFB solution include:

- **Automatic updates** – the EFB application automatically synchronizes the latest updates to operations manuals each time it interacts with the airline network. These updates are processed electronically, automatically, and seamlessly to the flight deck. Pilots can confidently interact with the latest versions of the manuals.
- **Touch screen interface** – Pilots interact with their operations manuals through a touch screen device that is simple and intuitive to use.
- **Lightweight application** – the EFB application runs as a single application on commodity hardware with minimal storage and performance requirements, on Windows and Linux operating systems. No database, application, or web servers are required, only MarkLogic Server.
- **Multiple devices** – deliver to browsers, the EFB, and mobile devices such as PDAs using a single application and content base. It is no longer necessary to generate static versions of content for each application scenario, and each delivery device; efficiently and accurately delivery dynamic content to your users, no matter their interaction point.

### Conclusion

A closed loop publishing capability like that described in this paper combines the power of Mark Logic Server with simplified component authoring tools and world class systems integration services from Flatirons Solutions to provide an end-to-end solution for airlines operations documentation. It is no longer necessary to implement complex authoring tools and silo'd content management systems that only provide static electronic documents or latent, duplicative content.

Through the potent combination of software and services described in this paper, airlines are able to provide a robust, easy to deploy solution for flight operations content creation and dynamic delivery to achieve dramatic reductions operating costs (thanks to fuel savings, reduced print costs, faster uptake of procedural improvements, etc.). By delivering flight operations content more accurately, more quickly (with less cost), and in a more user-targeted fashion, this closed loop platform helps airlines realize a competitive advantage over organizations relying on traditional methods.

### About Flatirons Solutions

Flatirons Solutions, an Inc. 500 company, provides consulting, systems integration, and systems & software engineering services to Fortune 500 companies and government agencies. A leading content management solutions provider specializing in XML-based publishing, Flatirons has provided enterprise-wide solutions – using both DITA and DocBook – in industries such as aerospace, transportation, publishing, manufacturing, financial services, insurance, and healthcare. Flatirons Solutions also actively participates in both DITA and DocBook OASIS technical committees. Established in 2001, Flatirons Solutions is a privately-held company headquartered in Boulder, Colorado, with offices in Washington D.C. and Ft Worth, TX. For more information visit Flatirons Solutions on the web at <http://www.FlatironsSolutions.com>.



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