Emerging Digital Access to Standards and Content Authoring Technologies

The use of Digital Rights Management to enforce content misuse and copyright infringement

SES Webinar
October 16, 2013

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PART 1

XML for Standards Developers
What is XML?

http://www.w3.org/standards/xml/core

A simple text-based human-readable format for representing structured information, such as, documents, data, configurations, books, transactions, and invoices.

- It permits structured information to be shared between computers, software applications, and people;
- Implements a hierarchical tree structure.
Why XML is so popular

− Data is electronically encoded and is both human and machine readable;
− Data can be validated by an XML validator against the DTD or XML schema;
− Portable and platform independent;
− There are a variety of tools available to write, read, manipulate XML (Readers, Authoring Tools, and Parsers: just do a search on the internet);
− Content can be secured (WSS/WS-Security) to guarantee data integrity, sender’s identity, and data security with encryption.
How XML can be Used

- Configuration files (e.g. Tomcat server.xml web.xml, WebLogic config.xml);

- Transport and exchange data easily - Exchange data between incompatible systems over an IP network greatly reduces the complexity, since the data can be read by disparate, otherwise incompatible systems and software applications;

- Software development - web services, which are applications that communicate using open protocols. They are self-contained, self-describing (WSDL) and discoverable (UDDI - registry.) They can be used by external applications via HTTP and XML protocols.
How XML can be Used (Continued)

- Document Authoring and Delivery - Frees the author from creating content in proprietary formats, frees the content to assemble as the consumer chooses via any delivery channel (Example to follow);
- Databases (Examples to follow);
- Data Serialization - The process of converting an object into a form that can be transported (e.g. via HTTP);
- Web Site Maps - Useful for enabling public search engines to efficiently index web sites on the internet (www.schema.org);
- Automatic Updates (e.g. RSS feeds);
- ...and more...
XML Example 1 - XML Document

http://www.criticism.com/dita

An Introduction to XML: Building Your First Document

By Steve Hoenisch

1 Orientation
2 What Is XML?
   2.1 A Family of Technologies
3 The Ingredients of an XML Document
   3.1 Processing instructions
   3.2 A Document Type Declaration and a Root Element
   3.3 Other Elements
   3.4 Attributes and Comments
4 Well-Formedness Constraints
5 Follow Up with Self Study

Related Documents
1. An Introduction to XML
2. Structuring Documents in XML
3. Developing a Document Type Definition
4. Attributes and Entities in DTDs
5. An Introduction to XSL
6. Using XSLT to Separate Content from Presentation

Resources
1. XML Linking: An Introduction
2. World Wide Web Consortium
3. XML in 10 Points

1. XML specification
2. Microsoft Internet Explorer
3. UltraEdit

1. Orientation

XML, and XSLT, DTD, XPath, XSL-FO, XLink, XPointer, SAX, and DOM. To the
uninitiated, all the talk about XML quickly dissolves into an alphabet soup of W3C recommendations,
abbreviations, and acronyms. This column, with a minimum of technobabble and a good dose of hands-on
work, aims to indoctrinate you into the world of XML and to teach you how to use it for web publishing.
During the next 12 issues of XML-Journal, I will use tutorials to expand your knowledge of XML and, after the
first couple of columns, expose you to a different member of the XML family of technologies or to one of its
close relatives.

Today I’ll introduce you to XML and show you how to create your first XML document. Picking up where this
column leaves off, the next will discuss fundamentals of structuring and marking up data. Subsequent
columns will address such core XML technologies as XSL, DTDs, and XLink. Later in the year, I will turn to
more advanced XML topics and related technologies: XSLT, XSL-FO, XML Schema, XPath, DOM, SAX, JSP,
and web publishing frameworks like Apache Cocoon. Along the way, I’ll also touch on Cascading Style
Sheets (CSS), XHTML, and Wireless Markup Language (WML) as well as on XML parsers, XSL processors,
XML Document Example 1 - XML Document

http://www.criticism.com/dita/xml_intro.xml

<!--
<?xml:stylesheet type="text/xsl" href="ss/dit2htm.xsl"?>
-->

<topic product="xd" version="0.7" output="html">
  <title>
  An Introduction to XML: Building Your First Document
  </title>
  <prolog product="xmlj">
    <objdesc objname="xml_intro.xml" output="html" product="xmlj" platform="xmlj_v215.jpg" objdir="dita"
      version="July 9, 2004"/>
  </prolog>
  <body/>
  <topic>
    <title>Orientation</title>
    <body>
      <p>XML. And XSLT, DTD, XPath, XSL-FO, XLink, XPointer, SAX, and DOM. To the uninitiated, all the talk about XML quickly dissolves into an alphabet soup of W3C recommendations, abbreviations, and acronyms. This column, with a minimum of technobabble and a good dose of hands-on work, aims to indoctrinate you into the world of XML and to teach you how to use it for web publishing. During the next 12 issues of XML Journal, I will use tutorials to expand your knowledge of XML and, after the first couple of columns, expose you to a different member of the XML family of technologies or to one of its close relatives.</p>
      <p>Today I’ll introduce you to XML and show you how to create your first XML document. Picking up where this column leaves off, the next will discuss fundamentals of structuring and marking up data. Subsequent columns will address such core XML technologies as XSL, DTDs and XLink. Later in the year, I will turn to more advanced XML topics and related technologies: XSLT, XSL-FO, XML Schema, XPath, DOM, SAX, JSP, and web publishing frameworks like Apache Cocoon. Along the way, I’ll also touch on Cascading Style Sheets (CSS), XHTML, and Wireless Markup Language (WML) as well as on XML parsers, XSL processors, and a few handy XML tools.</p>
    </body>
  </topic>
</topic>
XML Document Example 1 - XML Document (Continued)

http://www.criticism.com/dita/ss/dit2htm.xsl

```xml
- <!--
  dit2htm.xsl 1.02: 06 Sept 2001
  DITA topic to HTML: "single topic to single web page"-level view
  ++ sh mods marked by ++ Extended, customized, and modified by Steve Hoenisch. ++ Last updated by sh on 08/11/04.
  Copyright IBM Corporation, 2001
  This file is part of the DITA package on IBM's developerWorks site.
  See license.txt for disclaimers.
  ------------------------------------------------------------------------
  Note that the localization method is observed to work okay for Saxon
  (for example, C:\pkg\dita\saxon DITA-readme.xml ss\dit2htm.xsl Lang=sp > DITA-readme.htm
  will produce a version with Spanish generated text), but msxml seems to pick whatever
  was last defined in the strings.xml file.
  -->
- <xsl:stylesheet version="1.0">
  <!-- stylesheet imports -->
  <!--[if gte IE 6]>
  set output method here. base format is standard html
  <![endif]-->
  <xsl:output method="html" encoding="UTF-8" indent="yes"/>
- <!--[if !isHTML5]>
  null out some things whose content will be built elsewhere or excluded
  <![endif]-->
  <!--[if gte IE 6]>
  <xsl:template match="fig/desc"/>-->
  <xsl:template match="*[contains(@spec,' topic.desc ')]"/>
  <!--[if !isHTML5]>
  <xsl:template match="*[contains(@spec,' topic.title ')]"/>
  <!--[if gte IE 6]>
  <xsl:template match="*[contains(@spec,' topic.section ')]/*[contains(@spec,' topic.title ')]" priority="100"/>
  <xsl:template match="*[contains(@spec,' topic.fig ')]/*[contains(@spec,' topic.title ')]" priority="100"/>
  <xsl:template match="*[contains(@spec,' topic.table ')]/*[contains(@spec,' topic.title ')]" priority="100"/>
  <!--[if !isHTML5]>
  footnotes can be collected as endnotes or cast as popups
  <![endif]-->
```
XML Document Example 2 - database record

<?xml version="1.0" encoding="ISO-8859-1"?><record id="00001">
  <name>
    <first>Katy</first>
    <middle>M</middle>
    <last>Patel</last>
  </name>
  <phonenum type="home">
    <areacode>212</areacode>
    <number>274-1212</number>
  </phonenum>
  <phonenum type="office">
    <areacode>646</areacode>
    <number>333-8856</number>
  </phonenum>
  <email>kpatel@verizon.net</email>
</record>
XML Tree Structure Example

www.w3schools.com/xml/xml_tree.asp
XML Tree Structure Example

http://www.w3schools.com/xml/xml_tree.asp

<?xml version="1.0" encoding="ISO-8859-1"?><record id="00001">
  <bookstore>
    <book category="COOKING">
      <title lang="en">Everyday Italian</title>
      <author>Giada De Laurentiis</author>
      <year>2005</year>
      <price>30.00</price>
    </book>
    <book category="CHILDREN">
      <title lang="en">Harry Potter</title>
      <author>J K. Rowling</author>
      <year>2005</year>
      <price>29.99</price>
    </book>
    <book category="WEB">
      <title lang="en">Learning XML</title>
      <author>Erik T. Ray</author>
      <year>2003</year>
      <price>39.95</price>
    </book>
  </bookstore>
Advantages of XML to Standards Developers

- Define your own elements so it supports your publishing needs (Schema or DTD);
- Take advantage of latest trends (e.g. mobile web);
- Integration opportunities;
- Multiple output formats;
- Platform independence;
- New product offerings increase revenue opportunities and increase reach;
- Automatic TOC, linking, catalog creation and updates...and more;
- Reduces overall costs of authoring and delivery through increased automation;
- Reduces revision cycles and increases quality and consistency;
- Human readable (however, requires the human to read and understand the DTD or XML schema, either of which defines the structure of an XML document);
- Well structured data so it is easily referenced, searched, and manipulated.
Advantages of XML to Standards Developers (Continued)

- Increases granularity of content (componentized content) enabling collaborative development and reusability;

- Reusable content stored in a database or authoring tool simplifies content management tasks;

- Increases automation (publishing in multiple formats, reuse of content across different document formats, enabling consolidation of content);

- Improves quality and reduces errors - Less human intervention required with the use of XML validators: check content against the DTD or XML schema;

- Increases reuse of content to produce new products via assembly of content components;

- Embedded external content enhances the user experience and richness of the publication;
Multi-channel publishing (e.g. Paper, PDF, HTML, ePub, XML);

Repurposes (Web, Mobile, DVD, Feeds);

Aggregates interrelated document sets (packages);

Value added features (editing, tagging, linking, integrating);

Downloads, Subscription, Pay-Per-Use at various levels of granularity;

New business models offer flexibility;
- Rent content by the document or book,
- Rent content by the collection (e.g. publisher),
- Pay by the page,
- Pay by the minute,
- Pay per view,
- Some free material.
Basic Requirements

– Develop or adopt a DTD or Schema;
– Convert documents from current format to XML (outsource or acquire tools and talent);
– Find an appropriate authoring and content management platforms to develop, transform, and maintain content;
– Find an appropriate delivery platform that offers a rich set of functionality and features.
Challenges

Schema

- Structure and compatibility issues (which lead to QC issues);
- Linking between documents can be a difficult and tedious task;
- Version Control is critical to maintain consistency across multiple documents and formats;
- Translation and localization can be expensive (requires a significant amount of time and effort to get right);
- Localization can be complex (XLIFF, TMX, SRX, and LISA);
- Embedding external data can impact usability (Can “gum up” certain types of viewers);
- Trade off granularity for initial and operational costs.
Best Practices

– Know the use of your content (e.g. Documents referenced in regulations);

– Restructure and enrich your content to support automation;

– Incorporate tagging using automation and manual work if necessary;

– Use fully automated system to enhance the XML to add additional tags;

– Create appropriate products that fit in naturally with the XML content.
Hosted Solutions

- Web portals powered by various cloud-based platforms (e.g. adaptive Technologies http://edaptiveTechnologies.com );
- Enhance basic XML format iteratively using automated processes;
- Create tags and links to improve productivity;
- Enable a collaborative environment for efficient, fast development work;
- Multi-channel dynamic content;
- Search by taxonomy and/or full text;
- Shopping cart integration (end-to-end functionality);
- Social media integration (e.g. Twitter, Facebook).
Hosted Solutions (Continued)

- Value added features (annotations, linking, advanced search);
- Convert and deliver documents in multiple formats (HTML, PDF, XML, and others);
- Mobile-ready;
- Integrate with external content (regulations, other documents);
- Collaboration and notifications;
- Track changes and versioning;
- Combine content from multiple documents to create new documents;
- Embedded content to enhance the user experience (e.g. How to videos, training videos, contact information for technical experts).
PART 2
The Mobile Web
Digital Content for the Mobile Web

- Migration away from PDFs and traditional document formats (eReaders, virtual libraries, virtual books);
- Enablers of digital content;
  - Mobile wireless devices with high resolution screens,
  - High bandwidth wireless networks,
  - Digitized books,
  - Powerful software applications deliver a rich user experience,
  - Text-to-speech technologies,
  - Modern search engines.
Standards Development for the Mobile Web


- The PDF format is a good document page description language that is used to display unencrypted PDF documents;

- Publishers must enable the use of documents on handheld devices and via web browsers, in PDF, HTML, XML, and other formats;

- PDF not fully supported on all mobile wireless devices;

- Many standards publishers control their PDF documents using some form of Digital Rights Management (DRM), however, those systems must be adapted to handle the new formats.
Standards Development and the Mobile Web (Continued)

- DRM schemes originally implemented for static document formats like PDF can enable conversion of content to and from these other formats;

- In a multi-format digital world it is also possible to enable new lines of business, such as the management of annotation metadata, and to provide customized user experiences of a sort never possible before;

- Basic unencrypted, simple, flat PDFs display content identically in readers, browsers, and in other technologies capable of displaying PDFs;

- However, this breaks down when adding enhanced features, things start to break down (e.g., Annotations, links, forms, navigation, security handlers);

- Free readers do not display content consistently and do not work well with security handlers (binary plugins) other than the native security handler. This is limiting the format that protected documents can be rendered;
Differences Between the Web and the Mobile Web

When operating on a 3G or 4G network,

- The mobile web is slower and suffers from higher network latency;
- The mobile web is slowed down by hardware limitations and battery life;
- The mobile web requires a different UI suitable for small screen devices;
- The mobile web must have a different navigational motif;
- The mobile web requires a more complex SEO strategy;
- The mobile web offers a rich set of new possibilities (location based advertising, for example);
- The mobile web requires “sipping” instead of “gulping” information.
- Users are interested in different information when viewing internet based content on a mobile device;
- Apps rule, but HTML5 is rapidly gaining ground because it is a standard protocol, lightweight, and secure;
Ecommerce Sales

(http://mashable.com/2013/04/24/mcommerce-sales-forecast/)
Mcommerce Sales

(http://www.businessinsider.com/how-mobile-web-time-is-divvied-up-2013-44)
# How Mobile Devices are Used

(http://www.businessinsider.com/how-mobile-web-time-is-divvied-up-2013-44)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Minutes per hour</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>14</td>
<td>23.3%</td>
</tr>
<tr>
<td>Social networking</td>
<td>9</td>
<td>14.9%</td>
</tr>
<tr>
<td>Entertainment</td>
<td>8</td>
<td>13.0%</td>
</tr>
<tr>
<td>Shopping and classifieds</td>
<td>6</td>
<td>10.8%</td>
</tr>
<tr>
<td>Travel</td>
<td>6</td>
<td>9.3%</td>
</tr>
<tr>
<td>Business and finance</td>
<td>5</td>
<td>8.2%</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>4</td>
<td>7.2%</td>
</tr>
<tr>
<td>News and media</td>
<td>3</td>
<td>5.0%</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>8.4%</td>
</tr>
</tbody>
</table>

Note: ages 18+; includes mobile browsing with an app; excludes app usage; read chart as if time spent on mobile devices in 2012 was distilled into 1 hour, then 14 minutes (23.3%) of it would be spent on email; numbers may not add up to 100% due to rounding.

How Mobile Devices are Used

(https://www.emarketer.com/Article/Smartphones-Tablets-Drive-Faster-Growth-Ecommerce-Sales/1009835)

<table>
<thead>
<tr>
<th>US Mobile Buyers, by Device, 2011-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Mobile buyers (millions)</td>
</tr>
<tr>
<td>34.0</td>
</tr>
<tr>
<td>% of digital buyers</td>
</tr>
<tr>
<td>23.7%</td>
</tr>
<tr>
<td>Buyers on smartphone (millions)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>% of smartphone users</td>
</tr>
<tr>
<td>29.0%</td>
</tr>
<tr>
<td>% of mobile buyers</td>
</tr>
<tr>
<td>77.2%</td>
</tr>
<tr>
<td>% of digital buyers</td>
</tr>
<tr>
<td>18.3%</td>
</tr>
<tr>
<td>Buyers on tablet (millions)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>% of tablet users</td>
</tr>
<tr>
<td>50.0%</td>
</tr>
<tr>
<td>% of mobile buyers</td>
</tr>
<tr>
<td>45.5%</td>
</tr>
<tr>
<td>% of digital buyers</td>
</tr>
<tr>
<td>10.8%</td>
</tr>
</tbody>
</table>

Note: ages 14+; mobile device users who have used their mobile device to make at least one purchase via web browser or mobile app during the calendar year
Source: eMarketer, April 2013

www.emarketer.com
Services Used

(http://www.businessinsider.com/mobile-web-use-continues-to-rise-2012-6)
Priorities within Organizations


“Which channels has your organization prioritized in relation to digital customer experience initiatives?”
(Select all that apply)

- Traditional (e.g., desktop) web: 80%
- Mobile web, for tablet: 59%
- Mobile web (excluding tablet): 56%
- Social site or community: 47%
- Mobile application, for tablet: 44%
- Mobile application (excluding tablet): 42%
- Digital signage and kiosks: 13%
- Emerging channels (e.g., wearables, digital interfaces): 6%
- Smart TV: 3%
- Don’t know: 1%

Base: 233 digital experience delivery professionals (multiple responses accepted)

Source: March 2013 Global Digital Experience Delivery Online Survey

American National Standards Institute

Source: Forrester Research, Inc.
PART 3

Digital Rights Management (DRM)
Digital Rights Management (DRM)

DRM is a means of protecting copyrighted materials by preventing unauthorized use and redistribution of digital media. It enables the content publisher to exercise control over the way that content consumers use their materials;

DRM products were created to counter the rampant piracy of commercially marketed digital content;

It works by taking control over the content away from the user and putting it back in the hands of the content publisher;

DRM protection can be found in DVDs, CD, electronic documents, e-mail, MP3 files, and a host of other digital content formats and media. Our discussion will focus on protecting standards content.
Controlling Unauthorized Use

The content publisher can protect intellectual property and enforce copyrighted materials by controlling how their content is used.

DRM...
- Expires documents based on usage and/or time,
- Permits or disallows off-line access and usage,
- Permits read-only access,
- Permits view-only access,
- Restricts downloading, saving, copying, editing, printing documents,
- Controls how much of the text is visible at one time
- Prevents screen shots,
- Locks files to users and/or devices,
- Much more...
Countering Piracy

DRM products were created to counter the rampant piracy of commercially marketing digital content.

- World Intellectual Property Organization Copyright Treaty (WIPO WTC) Article 11 requires treaty members to outlaw DRM circumvention;
- Digital Millennium Copyright Act (DMCA) criminalizes technology that circumvents DRM;
- European Directive on Copyright requires the EU to implement legal protection of copyrighted materials.

(Laws are not slowing down the development of software designed to crack DRM protection, so DRM vendors are in a mode of continuously enhancing their security model to thwart new threats from cyber-criminals.)
Controlling Unauthorized Use

DRM works by taking control over the content away from the user and putting it back in the hands of the content publisher.

− Encrypted files render the protected file unreadable,
− Configurable permissions (AKA “permissioning”);
− The file will read permissions before opening;
− Typically requires installation of a binary or other “plugin” to enforce permissions;
− Content providers can manipulate permissions to enforce copyrights and acceptable use;
− Permissions and access to protected files can be changed at will by the publisher;
− Permissions can be “swapped” between formats, users, and systems - if so desired.
Applications of DRM

DRM protection can be found in digital documents, DVDs, CD, e-mail, MP3 files, digital movies, and a host of other digital content formats and media.

- Our discussion will focus on protecting standards content (i.e. PDF, Flash, and HTML);
- Code is embedded in PDF files that decrypts and enforces the permissions specified for the protected document (128-bit RC4 or 128/256-bit AES cipher is used);
- Flash files are protected by locking them and providing “view-only” access to them with no download capability (AES 256-bit encryption is applied to the protected file).
DRM for the Mobile Web

- There is a basic display environment for encrypted files that can be constructed dynamically by reading the device type and other information from the server. Eventually every user will be able to render documents in any HTML5 browser;

- Corporate penetration of HTML5 browsers 50 - 75%, so in the meantime there are transitional technologies used to leverage Flash in order to avoid having to install and use plugins.;

- Modern DRM solutions will still control protected PDFs that are opened in traditional operating environments (e.g., Windows, Unix, Linux, MacOS), but in addition, they have developed apps for wireless mobile small display devices that work with the same back-end IT infrastructure.
DRM for the Mobile Web (Continued)

- There should only be the need for a single (encrypted) instance of any PDF document which the DRM system would be capable of converting to any other supported format;

- Conversions to other formats ought to retain the protection and permissioning specified in the original encrypted PDF document;

- The delivery platform should be smart enough to determine which format to deliver to the device based on the capabilities of the device;

- Users should be able to open the same documents on any device with the same or similar protection parameters and maintain an excellent user experience;

- As DRM becomes easier to use, we trade off some control over content and user experience;

- All DRM operations are processed and controlled from centralized servers.
Decryption and rendering is done on the server, so the infrastructure has to grow in order to scale up as the number of users increases;

The DRM system renders PDFs into HTML5 documents;

Documents with heavy graphics are rendered perfectly in PDF and Flash, however, HTML5 is more difficult hence still needs refinement;

Works on any device that has a HTML5 browser.
DRM for the Mobile Web (PDF, Flash, and Custom Apps)

- A PDF plugin intercepts calls to open, print, save, and perform other operations and communicates with a permission server to determine whether or not the user can perform the desired operations;

- Flash IS the plugin and is leveraged to control access to the flash file (which originally was a PDF and converted to Flash);

- Flash ubiquitous in corporate environment;

- PDF and Flash based DRM generates and stores a unique signature of the local machine to grant permissions to the file to open and allow the permitted actions on the file;

- IOS and Android apps;

- Permissions can be stored on the server, in a file on the local machine/device (off-line permissions), or both and can be changed dynamically when necessary;

- Processing is distributed on each of the end-user devices.
XML

- DRM for Open Document Format (ODF) and Office Open XML (OOXML, OpenXML) formats are supported;
- DRM for XML content is still not perfected, but will be;
- Some parts or all of the XML content is encrypted and protected;
- The file structure remains unchanged;
- Open content on the server and “projects” it into the users’ environment (Cable TV model) instead of delivering the content to the user’s device;

ePub

- DRM for ePub viewers natural next step when DRM is perfected for XML, however, there are challenges because they use proprietary DRM
Comparison of DRM capabilities Across Viewers

<table>
<thead>
<tr>
<th>Feature</th>
<th>FileOpen Plug-in for Adobe Reader/Acrobat</th>
<th>FileOpen Viewer (Flash/OPN) — no plug-in required.</th>
<th>HTML5</th>
<th>FileOpen Viewer for Android, iPad &amp; iPhone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expiration by Usage (Open/Prints)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Expiration by Time/Term</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Offline Expiration by Usage (Open/Prints)</td>
<td>✔</td>
<td>✗</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Offline Expiration by Time</td>
<td>✔</td>
<td>✗</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Read Only Access</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Print Restrictions</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Text Copy Prevention (Max word restrictions &amp; prevention)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Screenshot Prevention</td>
<td>✔</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Blur-on-Unfocus</td>
<td>✗</td>
<td>✔</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Disable Save</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Machine Limits</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Embargo</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Watermarks</td>
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</tbody>
</table>

Permissions may be immediately revoked or renewed globally, no matter where the document resides.
Movement Toward Zero-install DRM

- Migration from Flash to HTML5;
- Javascript “sniffs” the browser to discover capabilities with regard to Flash and HTML5;
- Zero-install with Flash and HTML5;
  - Browser based plug-ins encryption SWF file,
  - User is not required to install a viewer inside a browser,
  - String contains permissions, authentication information, other parameters and a URL for a permission server,
  - Communicates with permission server to open protected file inside browser using Flash.
The standardization community would benefit from adopting new content authoring and delivery technologies that are efficient, highly scalable, enable broader reach, are extensible and that deliver a rich end-user experience in a secure multi-platform environment.
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