PDF Specification

Gaps, UX, and Future Challenges

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PDF Specs: gaps, UX and future challenges

- Core Principle: Consistent Rendering
- Early decisions
- Gaps in Defined Features
- Undefined UI Behaviours
- Inconsistent Implementations
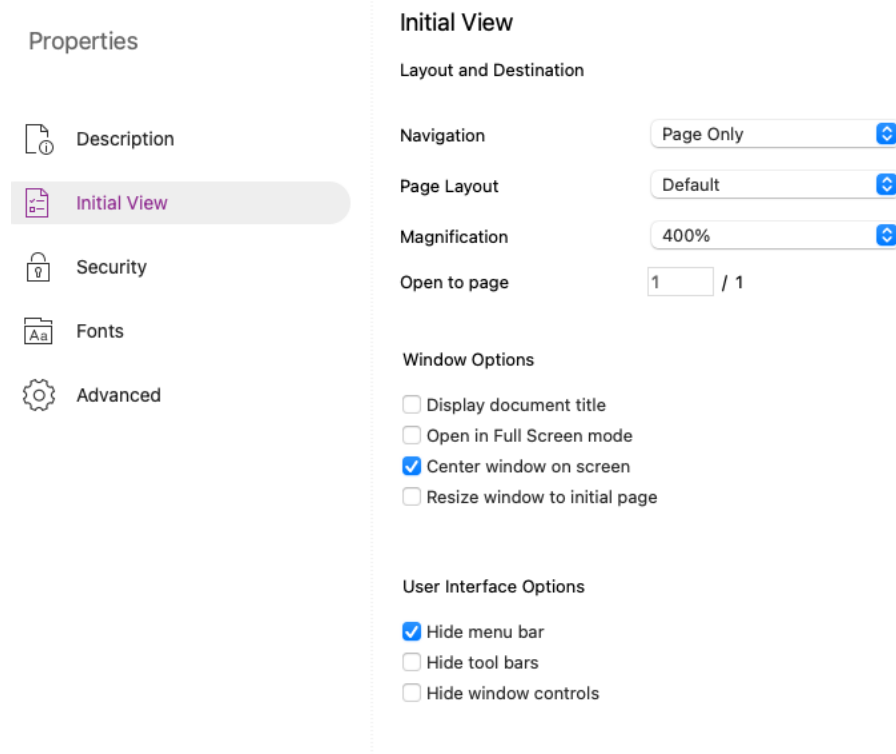- The Standardization Debate

AUGUST

The Camelot Project
J. Warnock

This document describes the base technology and ideas behind the project named "Camelot." This project's goal is to solve a fundamental problem that confronts today's companies. The problem is concerned with our ability to communicate visual material between different computer applications and systems. The specific problem is that most programs print to a wide range of printers, but there is no universal way to communicate and view this printed information electronically. The popularity of FAX machines has given us a way to send images around to produce remote paper, but the lack of quality, the high communication bandwidth and the device specific nature of FAX has made the solution less than desirable. What industries badly need is a universal way to communicate documents across a wide variety of machine configurations, operating systems and communication networks. These documents should be viewable on any display and should be printable on any modern printers. If this problem can be solved, then the fundamental way people work will change.

PDF User Experience: Challenges, Evolution

- The Nature of PDF User Experience
  - What the Specification Defines (Doesn't)
  - Undefined yet "Standardized"
  - Device-Specific Consumption
- Challenges and Inconsistencies
  - Lack of Definition Leading to Gaps
  - Impact on User Expectations
  - Stagnation of Innovation

Properties

- Description
- Initial View
- Security
- Fonts
- Advanced

Initial View

Layout and Destination

Navigation	Page Only
Page Layout	Default
Magnification	400%
Open to page	1 / 1

Window Options

- ☐ Display document title
- ☐ Open in Full Screen mode
- ☑ Center window on screen
- ☐ Resize window to initial page

User Interface Options

- ☑ Hide menu bar
- ☐ Hide tool bars
- ☐ Hide window controls

PDF User Experience: Challenges, Evolution, and Future with AI

- Why User Experience Matters
  - The "Contract with the User"
  - Reliability and Intent Fidelity Processors and Interaction
  - Changing Audience and Expectations

- The Future of PDF User Experience
  - Arguments Against Standardization
  - Arguments For Standardization
  - Risks of Inaction

The **AS** entry is an *auto state* array consisting of one or more *usage application dictionaries* that specify how interactive PDF processors shall, and non-interactive PDF processors should, automatically set the state of optional content groups based on external factors, as discussed in 8.11.4.4, "Usage and usage application dictionaries".

Core PDF Features Customers Need

- **Security & Collaboration**
  - Digital signatures, password protection, and real-time collaboration are critical for enterprise adoption and compliance.

- **Extraction**
  - Text extraction (select, copy&paste)
  - Structure data extraction (table)

Core PDF Features Customers Need

- ## OCR
  - Customers expect reliable OCR to convert scanned invoices, forms, and contracts into usable digital text, enabling search and automation

- ## Redaction
  - Redaction must be precise and irreversible. Customers demand tools that protect sensitive data at scale without risk of leaks.

What PDF Spec says

- Security & Collaboration
  - Digital signature validation discussion
- Extraction
  - Unicode identification, What is word? Reading order?
- OCR
  - Invisible text on top of image
- Redaction
  - Redaction annotation defines an area

AI perspective on PDF

- AI in the PDF Workflow
  - AI is format-agnostic—it extracts meaning, not layout. For AI, PDFs are containers of text and data.
  - Customers, however, care deeply about preserving structure, appearance, and compliance.

AI extending PDF value

- Smart redaction
  - AI can detect sensitive data patterns (PII, financial data) and redact them intelligently, reducing manual effort.

- Auto-tagging
  - AI can enrich documents with metadata, improving discoverability and compliance automation .

AI extending PDF value

- **Collaboration & form filling**
  - AI can automate processes, reviewing document, editing.
- **Talking to documents**
  - AI can enrich documents with metadata, improving discoverability and compliance automation .

Shaping Innovation and Future Relevance

- Standardization of De Facto Behaviour
- Specific "Unwritten Rules" and Expectations
- Impact on Innovation
- Changing Expectations with AI and New Consumption Models
- Future Relevance

Name	name	(*Optional*) The name of an icon that shall be used in displaying the annotation. Interactive PDF processors shall provide predefined icon appearances for at least the following standard names: *Comment, Key, Note, Help, NewParagraph, Paragraph, Insert* Additional names may be supported as well. Default value: *Note*.

Question for future

- Why the consistency in PDF consumption matter?
- Should we try to standardize user experience?
- What about PDF features that already exist?
- How will AI usage change our user interface?
- AI produces inconsistent output. Does it matter?
- How will users consume PDF in the future?
- Is the relevance of "Consistent rendering" still present?

Q&A

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