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# Why?

# Security

## Acrobat and Reader X release notes

If you have trouble opening a note, right-click and save the file to your desktop.

Date	Release Notes	Release Type*	Focus
Jan 8, 2013	10.1.5	Q	<b>Latest release.</b> This is a regular quarterly update that provides security mitigations, feature enhancements, and bug fixes.
Aug 14, 2012	10.1.4	Q	This is a regular quarterly update that provides security mitigations, feature enhancements, and bug fixes.
Apr 10, 2012	10.1.3	Q	This is a regular quarterly update that provides security mitigations, feature enhancements, and bug fixes.
Jan 10, 2012	10.1.2	Q	This is a regular quarterly update that provides security mitigations, feature enhancements, and bug fixes.
Sept 13, 2011	10.1.1	Q	This a regular quarterly update with security enhancements, improvements to stability, and bug fixes.
Jun 14, 2011	10.1	Q	This is a major update that provides security fixes, feature updates, and major enhancements such as Protected View for Acrobat.

# User Experience

# Performance

## What's in a PDF?

text, images, vector graphics

# Practice What You Preach



"Any application that can be written in JavaScript, will eventually be written in JavaScript" - Atwood's Law

# DEMO





# The Guts

# Portable Document Format

Developed in the Early 90s

PostScript influences

Open Standard - ISO32000-1:2008

A spec that uses many specs

# File Layout

## Header

```
%PDF-1.7
```

## Body

```
2 0 obj  
<<  
  /Type /Pages
```

## xref Table

```
xref  
0 6  
0000000000 65535 f
```

## Trailer

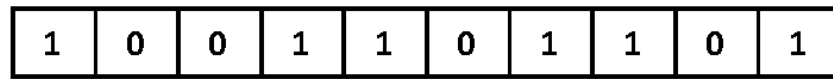
```
trailer  
<<  
  /Size 6  
  /Root 1 0 R
```

# Page Details

```
5 0 obj % page content
<<
  /Length 44
>>
stream
BT
70 50 TD
/F1 12 Tf
(Hello, world!) Tj
ET
endstream
endobj
```

# The PDF.js Bits

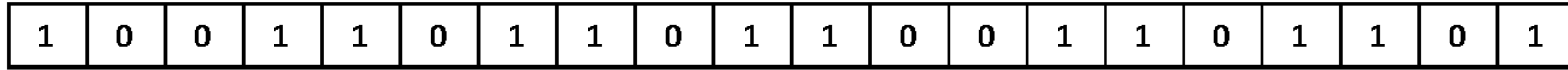
# Rendering Overview



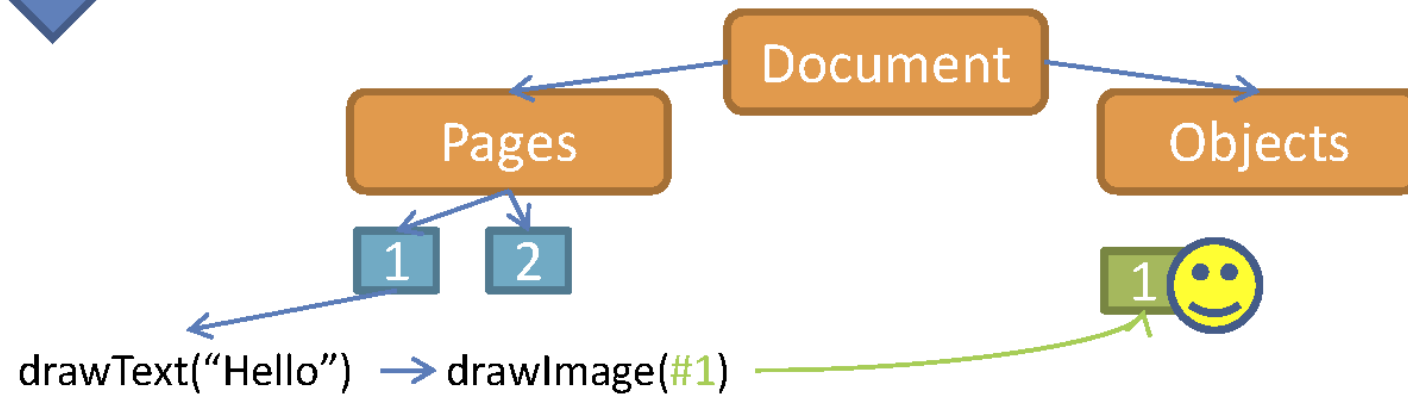
← binary file format



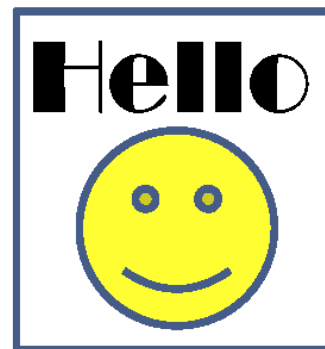
Decompress, decrypt



Parse



Render





# Grab the Bytes

## XHR2 Makes this Easy

```
// prepare server request
var xhr = new XMLHttpRequest();
xhr.open('GET', url);
xhr.responseType = 'arraybuffer';
xhr.onload = function() {
    var buffer = xhr.response; // buffer is ArrayBuffer
};
xhr.send(null);
```

# Parsing & Extracting

Relatively Easy

Except streams can be compressed and/or encrypted.

# Drawing on Canvas

Most commands map nicely to canvas

'2 3 m' =>

```
ctx.moveTo(2, 3);
```

'4 5 10 10 re' =>

```
ctx.rect(4, 5, 10, 10);
```

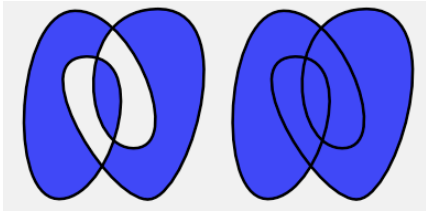
...

# Drawing on Canvas

Some did **not**, so we're working on adding them to the canvas spec:



dashed lines



even odd fill



extended blend modes



masks

Well that's not so bad...

For  $0 \leq x \leq 1$ ,  $t = t_0 + (t_1 - t_0)x$ .

For  $0 \leq x' \leq 1$ ,  $t = t_0 + (t_1 - t_0)x'$ .

...on to the harder parts.

# Text/Fonts

Most Browser Supports: TrueType, OpenType, WOFF

PDF supports: TrueType, OpenType, Type1(PostScript),  
Type3

Bad Fonts (Open Type Sanitizer)

Font Engines

## What to do?

Parse, sanitize, and convert fonts to OpenType.

# Images

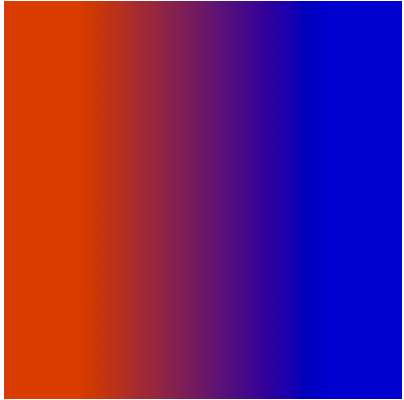
Browser Supports: JPEG, GIF, PNG

PDF Supports: CCITT fax, JPEG2000, JBIG2, and variants of JPEG that aren't supported by the browser.

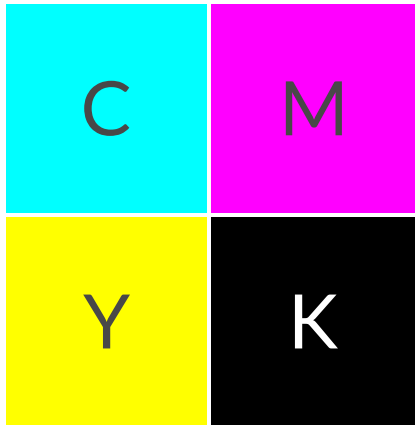
## What to do?

Decode what we can in the browser, but use JavaScript decoders for the unsupported formats.

# More than just text, images:



Patterns: Tiling & Gradients



Colorspaces

$f(x) \Rightarrow y$  Functions

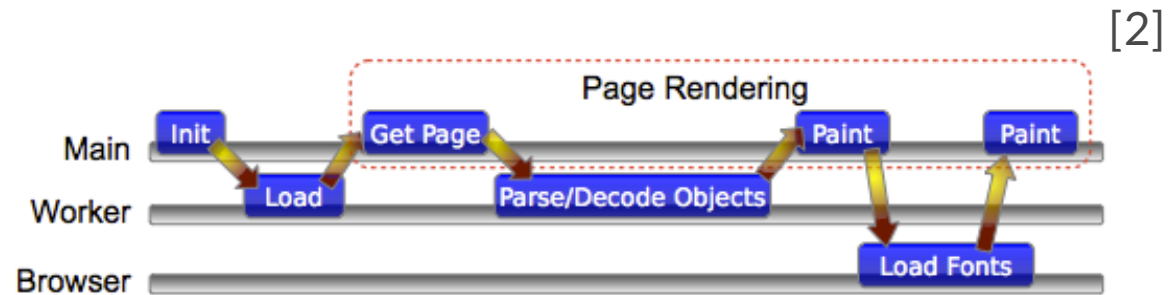


# The Viewer

# Responsiveness

and I don't mean a mobile format

## Web Workers!



setTimeout  
Prioritize



# Text is Really Hard

A letter isn't just a letter.

■▲■▲■▲ => ababab

Char	Code	Glyph	Text
------	------	-------	------

	0x1E	fi	'f' 'i'
--	------	----	---------

Not all fonts have proper unicode values.

Left to Right, Right to Left.

# Lessons Learned

Plan for asynchronous operations.

Do as much possible in the worker(s).

Unit test.

Be defensive.

# Current Status

Supports the majority of common PDF features

Renders many PDFs quickly

Works in Firefox, Chrome, IE9+, Opera, Safari

Chrome extension

**Default PDF viewer in Firefox Beta**

# Help us!

<https://github.com/mozilla/pdf.js>

## Talk to Us

#pdfjs irc.mozilla.org

@pdfjs

dev-pdf-js@lists.mozilla.org

# Thanks!

References:

- [1] **Chris Jones' Presentation**
- [2] **Yury Delendik's Presentation**