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# Mac OS X and PDF

## The Real Story

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# Overview

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- Mac OS X
- PDF
- Where's the overlap?

# You are here because...

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- You're currently working with Mac OS and are interested in what Mac OS X brings to the table.
- You're curious about what Apple's latest hype is all about.
- You're already awake and had to find something to kill time.
- You're a friend of mine and wanted to heckle

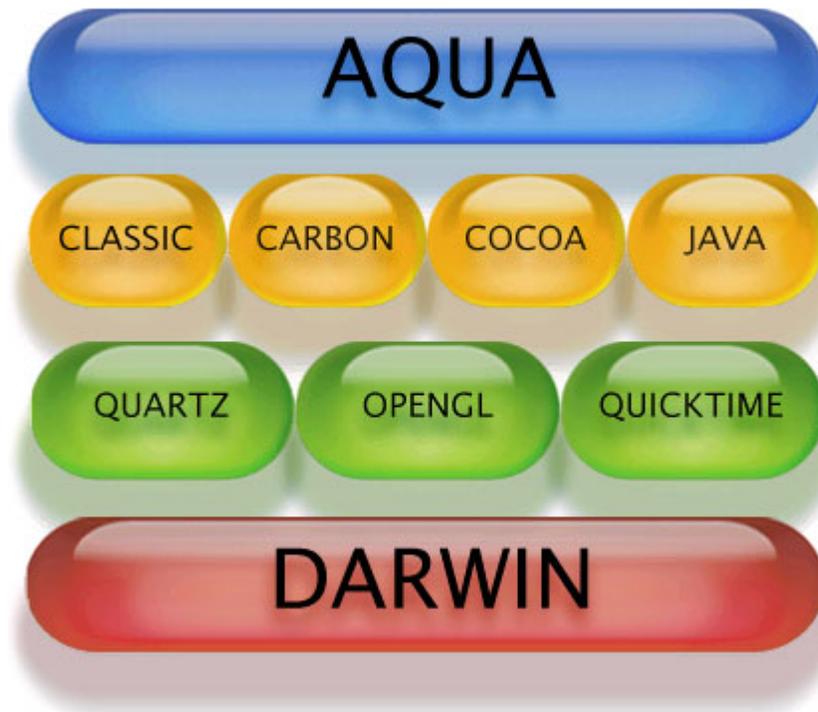
# How I do things

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- You should all have copies of the presentation that you received when you walked in.
- There is also an electronic copy of this presentation (PDF format, of course!) on my website at <http://www.lazerware.com/>
- I've left time at the end for Q&A, but please feel free to ask questions at any time!

# Mac OS X Overview

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# Darwin

- “Core OS” (Kernel)
  - Solid Unix foundation
    - FreeBSD 3.2 & Mach 3.0
    - Memory protection, preemptive multitasking, etc.
  - High performance I/O
    - Firewire, USB, etc.
- Open source



# Graphics

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- Quartz
  - Adobe Imaging Model (PDF)
    - Includes full anti-aliasing and opacity/transparency
- OpenGL
  - Industry standard 3D engine used by Quake & Maya
- QuickTime



# Graphics Demos - Quartz

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# Graphics Demos – OpenGL

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# Application Frameworks

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- Classic
  - Compatibility “box” for existing Mac OS applications.
- Carbon
  - Modern versions of Mac OS applications prepared for Mac OS X.
- Cocoa
  - Completely new applications written using a modern object-oriented framework in either Objective-C or Java.



# Aqua

- New and improved User Interface & Experience for Mac OS X
  - Aqua brings your Mac to life with color, depth, translucence and fluid motion.
  - The new controls resemble polished gems.
  - Buttons indicate active or nonactive status by glowing and dimming.
  - Icons are crisply rendered at up to 128x128 pixels in size.
  - Drop shadows give windows greater depth.



# Aqua Demo

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# Quartz in Depth

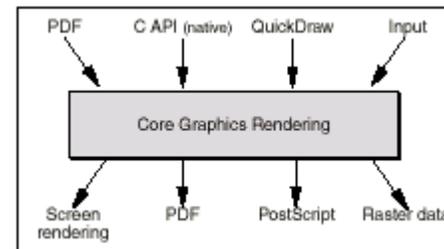
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- Quartz Compositor
  - device-independent color and pixel depth
  - remote display
  - layered compositing (per-pixel mixer)
  - double buffered windows
  - System-wide ColorSync integration
- Quartz 2D
  - 2D vector library based on Adobe Imaging Model

# Quartz 2D

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- Quartz 2D enables a number of important features for (modern) applications
  - Best 2D graphics system of ANY OS
    - high-quality screen rendering
    - automatic on-screen preview of graphics (WYSIWYG?)
  - Integration with PDF
    - “Save as PDF”
      - disk and clipboard
    - “Import PDF”
    - Conversion of PDF’s
      - raster data or PostScript



# Quartz 2D & Printing

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- Printer “Spool Files” are PDF files
- Print Preview for all (modern) applications
  - Works by simply bringing up the spool file in the default PDF viewer (usually Preview)
- PDF-based rendering
  - providing PDF capability for all printers, including inexpensive raster printers
- PDF to Postscript conversion

# PDF Overview

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# PDF - What's in there?

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- PostScript/Adobe imaging model
  - Text & graphics in a device & resolution independent manner
- Bitmap Images
- Annotations
  - Text notes, Hyperlinks, Annotations, Movies, Sounds & Widgets
- Forms

# Adobe Imaging Model

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- Same model as Postscript, where a page is drawn by “placing paint” on a selected area
  - “Figures” can be letter shapes or regions defined by lines and curves (paths) or sampled images
    - Paint can be any color (in any color space)
    - Transformations (scale, rotate, skew, translate)
  - Figures can be clipped to any other figure/shape
  - Figures are “overlaid” on each other, in the order they exist in the page description.

# Fonts

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- The following types of fonts are supported
  - Type 1
  - Type 3
  - TrueType
  - Type 0
  - CIDFont Type 0 & 2
- There are 14 fonts that are “built-in”, including the Courier, Helvetica and Times families, Symbol & ITC Zapf Dingbats.

# Color Spaces

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- PDF Supports 11 color spaces
  - 3 device dependant
    - DeviceGray, DeviceRGB & DeviceCMYK
  - 4 device independent
    - CalGray, CalRGB, Lab & ICCBased
  - 4 special
    - Indexed, Pattern, Separation & DeviceN

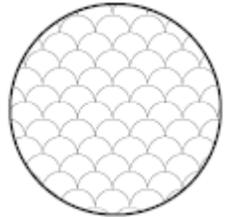
# Patterns

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- Two types

- Tiling

- A sequence of explicit marking instructions which are repeated once per tile



- Smooth shading

- Description of the desired effect in terms of transitions between colors across a certain area



- All patterns are treated as colors

# Images

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- PDF support a number of different types
  - Image masks
  - Grayscale images (1, 2, 4, & 8 bit)
  - Color images (1, 2, 4, & 8 bits per component)
    - Number of components is determined by color space
- Images are usually either in JPEG or TIFF formats or an array of "pixel data"

# Form XObject

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- A form xobject is kind of like a Mac OS PICT or Windows Metafile. It's a named self-contained description of text, graphics or sample images that can be drawn more than once on a single page, or on multiple pages.

# Annotations

- Text Notes
- Markup
  - Underline, strikeout, highlight
  - Circle, Rect, Pen/Scribble
- Hypertext Links
  - Inter-document, intra-document
  - URI's
- Movies
- Sounds
- Widgets



## Information Age Insecurity



*This is a  
simple text  
annotation*



The Information Age is irrevocably altering the means by which the Government must approach the challenge of protecting its information. Protection no longer equates to placing documents in filing cabinets with strong combination locks. Instead, information vital to the security and continued prosperity of the United States resides in a series of increasingly interconnected classified and unclassified systems. The Commission believes that the findings and recommendations noted below provide policymakers the means to begin protecting information properly now and into the next century.

This is an era of extraordinary change not only in information technology, but also in the very way in which individuals communicate with one another. The Commission's goal is not to predict the future but to ensure that these technological changes will help mold. Rather, it is to better understand the nature of the new threats so that the Government, with the full support of the private sector, can mitigate or prevent them.

At present, there exists what appears to be a growing gap between technological change and the human capacity to adapt to that change. The risk is that the Government will make bad decisions not because it has too little information, but rather because it has too much information about the wrong things. In such a rapid-paced and changing environment, it is only natural to fall back on old biases, protocols, and shortcuts. Convictions, as Nietzsche once noted, can be "more dangerous enemies of truth than lies."

## Federal Government Information Security and the National Information Infrastructure

The information revolution, characterized by the growing convergence of computer and communications technologies, requires a fundamental rethinking of traditional approaches to safeguarding national security information. Those responsible for the protection of national security face new, increasingly difficult challenges presented by the proliferation of computer networks linked by telephone lines, cable, direct broadcast service, and wireless communications, and by the replacement of the traditional computer mainframe by personal computers. In this new electronic world—the National Information Infrastructure (NII)—best symbolized by the steadily growing global Internet, it is not clear what responsibility the Federal Government has to protect the infrastructure that stores, carries, and transmits nearly all of the Government's unclassified and classified information.

The NII within the United States is only one portion of the Global Information Infrastructure (GII) that connects public and private computer networks around the world. For the Federal Government to assume a leadership position in protecting the NII,

# Actions

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- These are things that can be attached to certain objects/events in a document
  - Open doc, close doc, view page, mouse enter/leave, annotations, form elements, etc.
- They come in a few types:
  - GoTo, GoToR(emote), URI
  - Launch
  - Sound, Movie
  - JavaScript

# AcroForms

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- There a number of predefined field types
  - Button (checkbox/radio/push)
  - Text
  - Choice (popup, combo or list)
- Fields can be typed (integer, string, boolean) and marked read-only.
- Fields can be “calculated”, such that a JavaScript will be auto-executed when a “related” field is modified.

# Other things

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- Bookmarks
- Embedded Files
  - You can embed an entire file (of any type!) inside a PDF document
- Structured/Tagged PDF
  - Allows for storing information about the logical structure of a document along side the layout.
- MetaData
- Security & Digital Signatures

# Where's the overlap?

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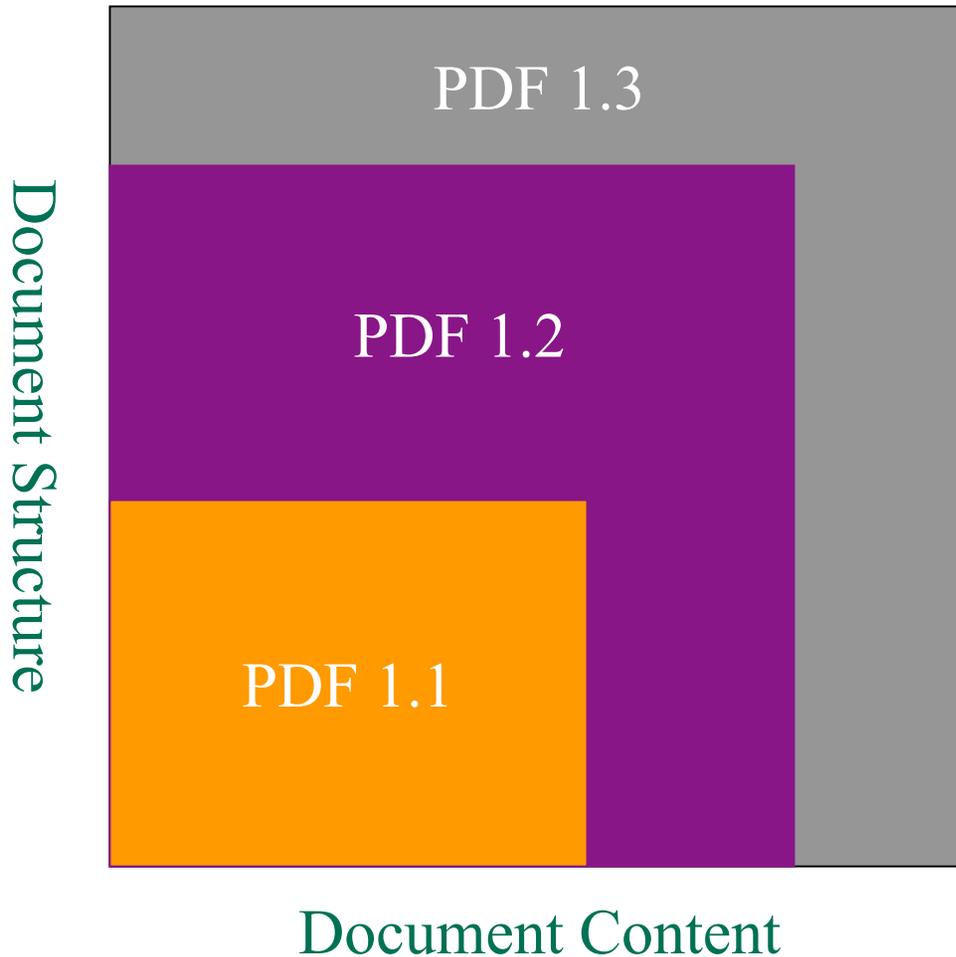
# Apple's PDF Philosophy

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- The Adobe Imaging Model matches what professionals see on screen and in print
- PDF is an existing cross-platform standard that can be used to record & playback all of the imaging aspects of the AIM
  - In other words, it's the replacement for PICT
- It's more important that Grandma be able to send her files to friends and family, than the professional can send files to press.
  - Consumer-level PDF

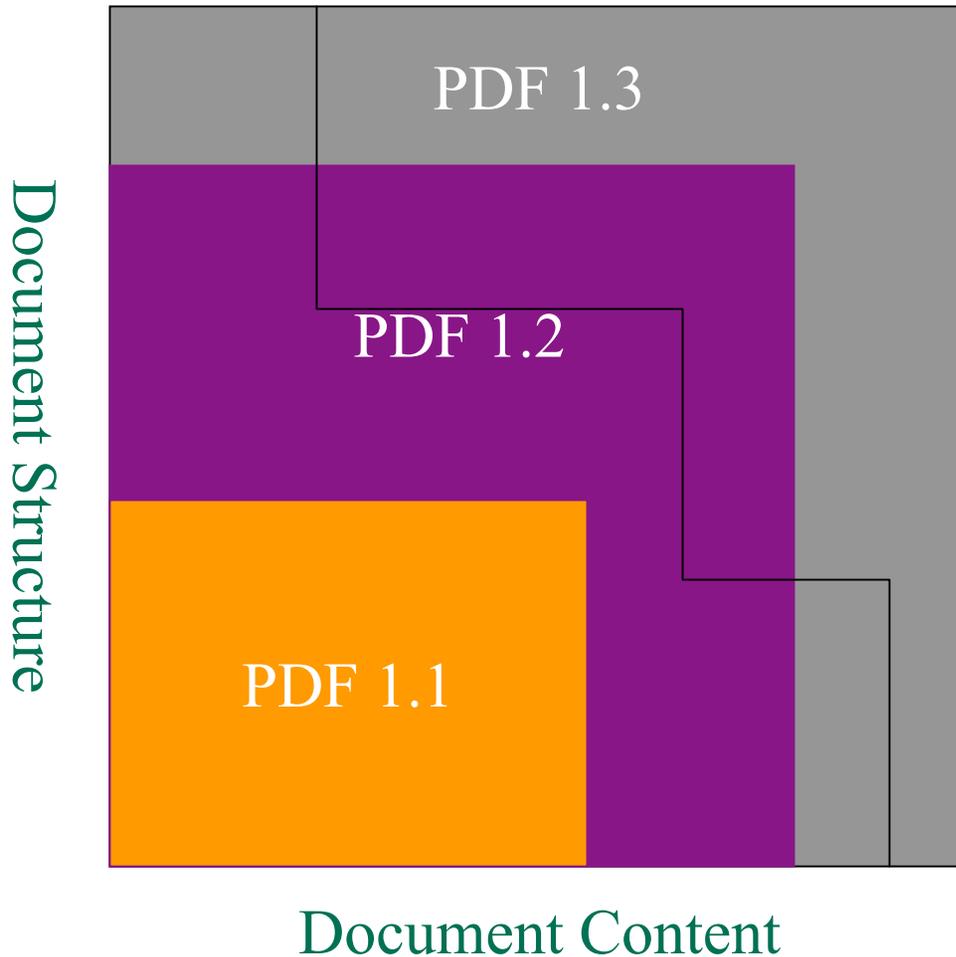
# Quartz's level of PDF support

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# Quartz's level of PDF support - 2

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# Quartz's level of PDF support - 3

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- PDF 1.2+ (or 1.3-)
  - No high-end prepress features (trapping, overprint, knockout, etc.)
  - No color separations
  - No smooth shading (gradients)
  - Limited support for RTL (right to left) languages

# Quartz's level of PDF Support - 4

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- All fonts are subset
  - In order to solve the CJK embedding problem, they generalized the solution for all text
- All objects are described with ICC profiles
- Streams are compressed

# Quartz's level of PDF Support – 5

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- As of 10.1, no “DocInfo” to identify OS X generated documents
- Whatever the producing application “records” is what you end up with. There is no “post processing” ala Acrobat Distiller
  - NO linearization (“Fast Web View”) support
  - NO “optimization” support
    - Duplicate font & image elimination
  - NO image downsampling

# PDF support, in detail

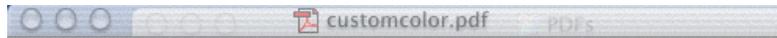
PDF Feature	Yes	No	Comments
Adobe Imaging Model	✓		
Embedded Fonts	✓		
Color Spaces	✓		No Smooth Shading
Patterns	✓		No Smooth Shading
Images	✓		No mask support
Prepress Features		✗	
Form XObjects	✓		
Annotations & AcroForms		✗	
Actions		✗	
Bookmarks		✗	
Embedded Files, Structure		✗	
Security & Digital Signatures		✗	

# Some Examples

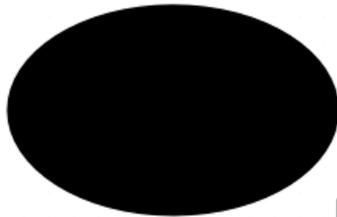
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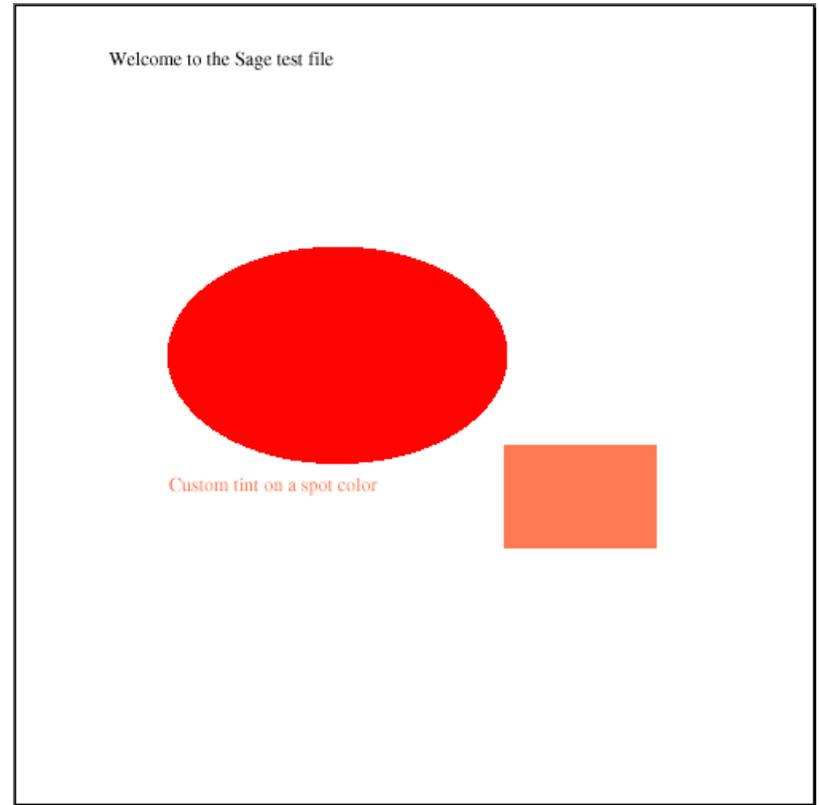
# Example 1 – Spot Color



Welcome to the Sage test file



Custom tint on a spot color

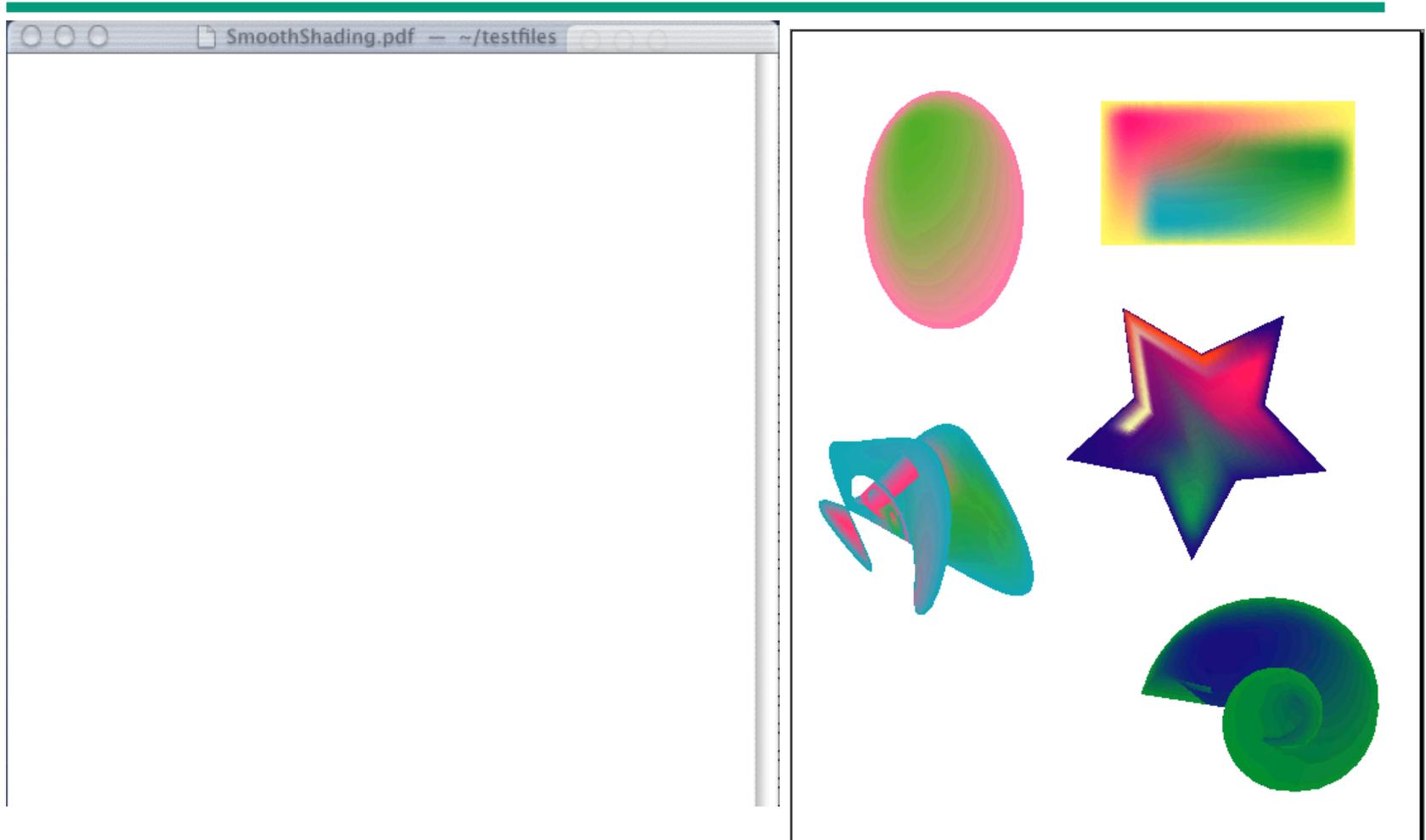


Welcome to the Sage test file

Custom tint on a spot color



# Example 2 – Smooth Shading



# Example 3 – Misc.

RGB Image    Masked 72dpi RGB Image    CMYK Image

Reversed Text Type 1    Reversed Text TrueType

CMYK Color    Gray Scale

C	0%
M	10%
Y	20%
K	30%
	40%
	50%
	60%
	70%
	80%
	90%
	100%

RGB Color

R	0%
G	10%
B	20%
	30%
	40%
	50%
	60%
	70%
	80%
	90%
	100%

SS Text Over    Text Under    Text Over

Angled Type 1    Angled TrueType

Reversed Text

MacUpper Ascii TT    Mac Upper Ascii TT

PC Upper Ascii TT    PC Upper Ascii TT

Compound Path

Text Mask

Clips    Blends

Text Over    Level 2 Pattern    Pattern

Reversed Text Type 1    Reversed Text TrueType

RGB Image    Masked 72dpi RGB Image    CMYK Image

CMYK Color    Gray Scale

C	0%
M	10%
Y	20%
K	30%
	40%
	50%
	60%
	70%
	80%
	90%
	100%

RGB Color

R	0%
G	10%
B	20%
	30%
	40%
	50%
	60%
	70%
	80%
	90%
	100%

SS Text Over    Text Under    Text Over

Angled Type 1    Angled TrueType

Reversed Text

MacUpper Ascii TT    Mac Upper Ascii TT

PC Upper Ascii TT    PC Upper Ascii TT

Compound Path

Text Mask

Image Clips    Mask    Blends

Text Over    Level 2 Pattern    Pattern

# Example 4 - Annotations

Form Stamps.pdf — ~/testfiles

**V Information Age Insecurity**

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**V Information Age Insecurity** **APPROVED**

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**Hot**

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# What does it all mean?

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- It means that PDF is going to become a VERY popular format for people to exchange documents.
  - Including a LOT more PDF's on the web
    - unfortunately, they won't be "smart" (links, bookmarks, etc.)
- It means that professional publishers don't really care about Quartz
  - They aren't going to really get any benefit from it and it may even cause them problems with customers sending in non-press ready documents!
- It means that Mac OS X users may not actually get the full meaning/experience of your documents
  - if it uses features not supported by Quartz.

# Conclusion/Wrap Up

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- It's going to be an interesting year for PDF!
- Mac OS X has a lot of potential, both in general and especially for bringing PDF even more into the “mainstream”.
- People already involved in PDF “solutions” are going to find that working with Mac OS X users will complicate things.

# Q & A

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