



# WebKit GTK on (electronic) paper

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Collabora 

# Electronic paper

- Looks like paper
- Stable image, no refreshes
- Reflective, there is no backlight
- Wide viewing angle
- Comfortable to read

# Limitations

- Grayscale only (at the moment)
- Slow refresh
  - Only limited animations are possible
- Reduce the number of refreshes
  - Consumes power
  - Black / white flash → distracting

THE NEW YORK TIMES **NEWS SUMMARY** WEDNESDAY, JANUARY 10, 2007**BUSINESS DAY****Hoping for Another iPod,  
Apple Introduces iPhone**

With characteristic showmanship, Steven Jobs introduced Apple's long-awaited entry into the cellphone world, pronouncing it an achievement on a par with the Macintosh and the iPod. ►►

Cingular executives went

last year to get

deal so without so much

otype. ►►

As U.S. automakers try to find

a winning game plan to reverse their sliding market share, they seem to be looking back to the classic American muscle car. ►►

**Venezuela Shakes Markets**

Investors reacted with alarm in the United States and throughout Latin America as they measured the impact of President Hugo Chávez's plan to nationalize key areas of the economy. ►►

**Business Briefing** ►►

CLOSE

BACK

5 OF 6

**SPORTS WEDNESDAY****Two Leap to Hall of Fame,  
But Steroid Cloud Stops 3rd**

Cal Ripken Jr. and Tony Gwynn were both elected to the Baseball Hall of Fame in near-unanimous votes that reflected their standing within the sport. But their achievement was overshadowed by the voters' rejection of Mark McGwire, a slugger who had like a modern-day Don Baylor, a suspected steroid user. ►►

**Sports Briefing** ►►**OBITUARIES****Jane Bolin**

A judge whose appointment by Mayor Fiorello H. LaGuardia in 1939 made her the first black woman in the United States to become a judge, she was 98. ►►

**Iwao Takamoto**

The artist who created the mystery-solving Great Dane, Scooby-Doo, and many other indelible cartoon characters

# iRex Digital Reader 1000 series

- Document reader
  - More than just an e-books
  - PDFs, Mobipocket PRC, images, text files and simple HTML pages
- Stylus to annotate PDFs
  - Take notes, etc.

# The screen

- 10.2" screen
- 1024 x 1280
- Touch screen
  - Wacom sensors behind the screen
  - More accurate for note taking
  - Doesn't reduce brightness

# Specs for the DR 1000S

- Freescale i.MX31L
- 128 MB RAM
- Weight: 570 g (1.25 lbs)
- No internet connectivity

# Specs for the DR 1000SW

- Freescale i.MX31L
- 128 MB RAM
- Weight: 570 g (1.25 lbs)
- Wi-Fi and Bluetooth

# Software stack

- Poky Linux
- Gnome mobile
  - D-Bus, Hal, support for .desktop files
  - Cairo, GLib, Pango, GTK+ and Gconf
  - Poppler (for viewing PDFs)

# Changes in the stack

- Redraw simplifications
  - No widget pre-lighting or multi-step actions
  - No cursor blink
- Delayed button depressing
- Batched GtkEntry update
- Refresh hooks for screen updates

# Software licensing

- Only the document viewer framework is closed source
  - Plugins are free
  - The plugin interface is open and documented
- <http://developer.irexnet.com/pub/iOn/>

# Digital Reader 1000WS

- Wi-Fi connectivity
  - We need appropriate software
- Browser
  - Gecko is hard to adapt and slow
  - WebKit had missing features



# WebKit

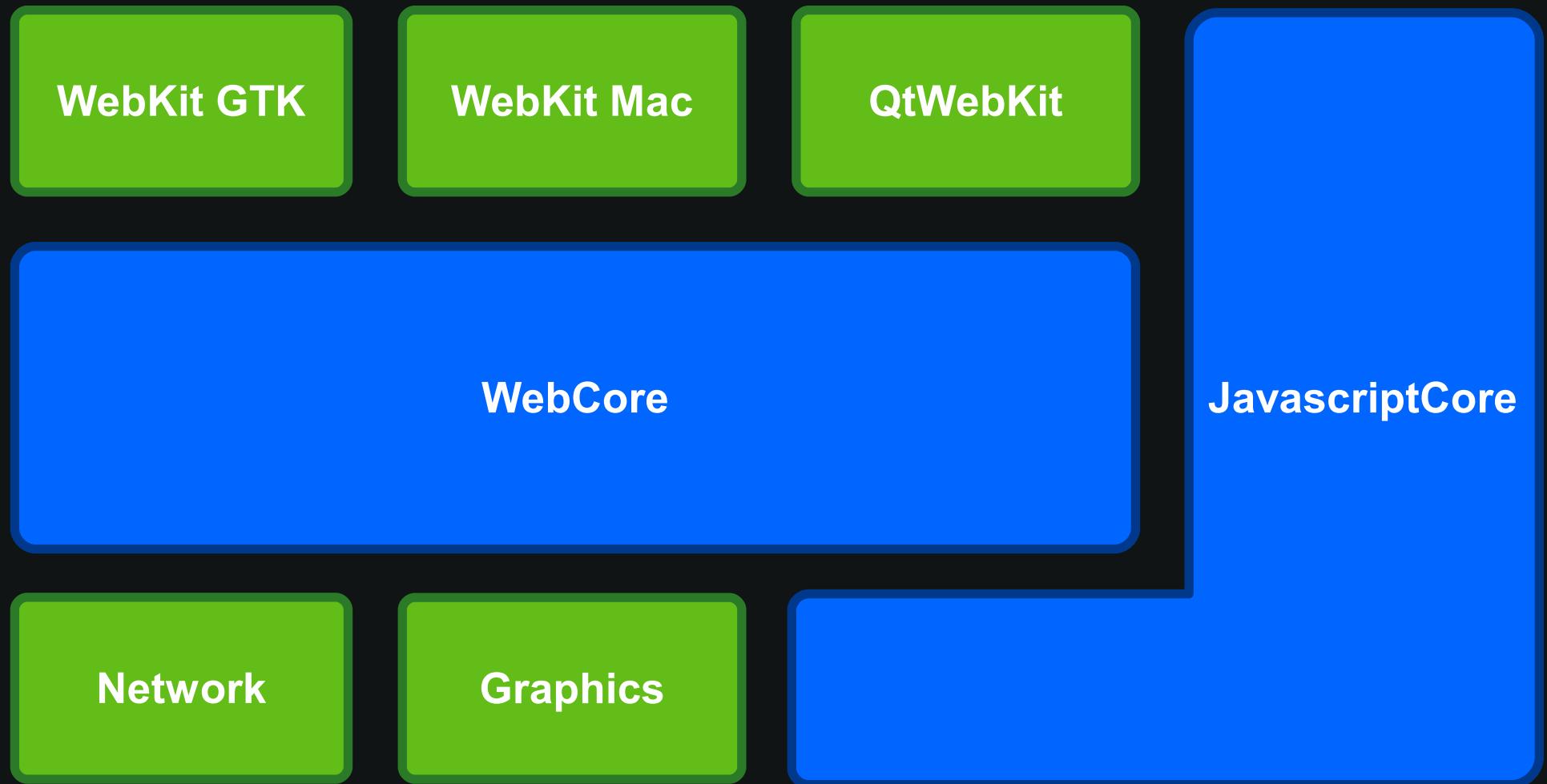
# What is WebKit?

- Web browser engine
- Not a full browser
- Not used only by browsers
  - Chat windows in Adium
  - Editor in email clients

# What does WebKit do?

- Retrieves the pages from the network
- Parsing
- Layout
- Rendering
- Javascript (with JavascriptCore)

# Architecture



# Architecture

WebKit GTK

WebCore

JavascriptCore

Curl or Soup

Cairo & Pango

# GTK-esque

- GObjects, signals, properties, etc.
- WebKitWebView is a normal widget
  - Example: insert it in a GtkScrolledView to get scrolling
- Trying to copy the GtkTextView and GtkTextBuffer API where possible

# WebKit on iRex DRs

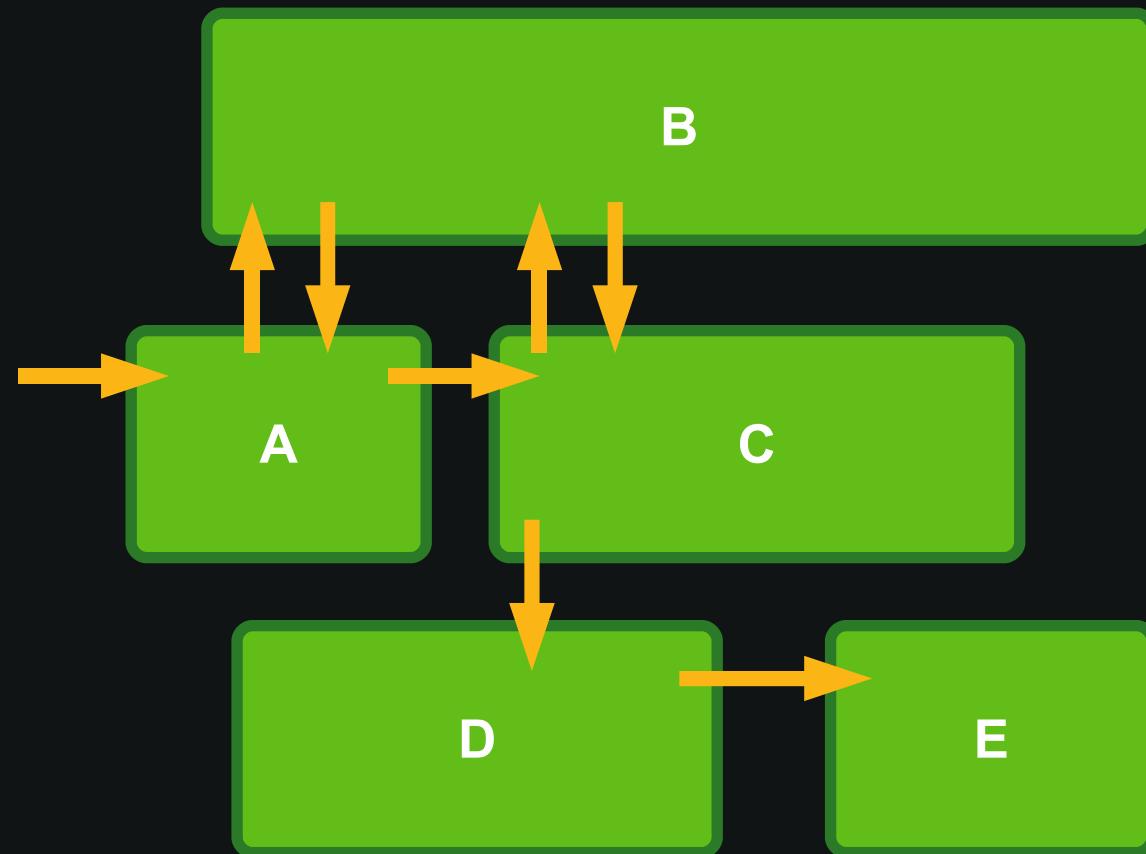


# Missing features

- In April WebKit GTK was very good at rendering
- But missing features needed for browsers
  - Download
  - Zoom
  - Saving
  - On-disk cache
  - Pop-up blocking
  - Etc.

# Keyboard navigation

- Directional, not just TAB and SHIFT-TAB



# Reduce the refreshes

- WebKit has optimizations for embedded devices
  - Content shown as soon as possible
  - Bad for devices based on electronic paper!
- We need the opposite
  - Refresh only when really needed

# Animations

- Real animations are impossible
  - A full refresh takes ~0.7 seconds
  - Partial black and white only refreshes are ~0.2 seconds
- Only the first frame for animated GIFs

# Flash

- First frame often uninteresting
- Move some seconds forward
- Stop if user interaction is required
- Patched swfdec

# Reduce the scrolling

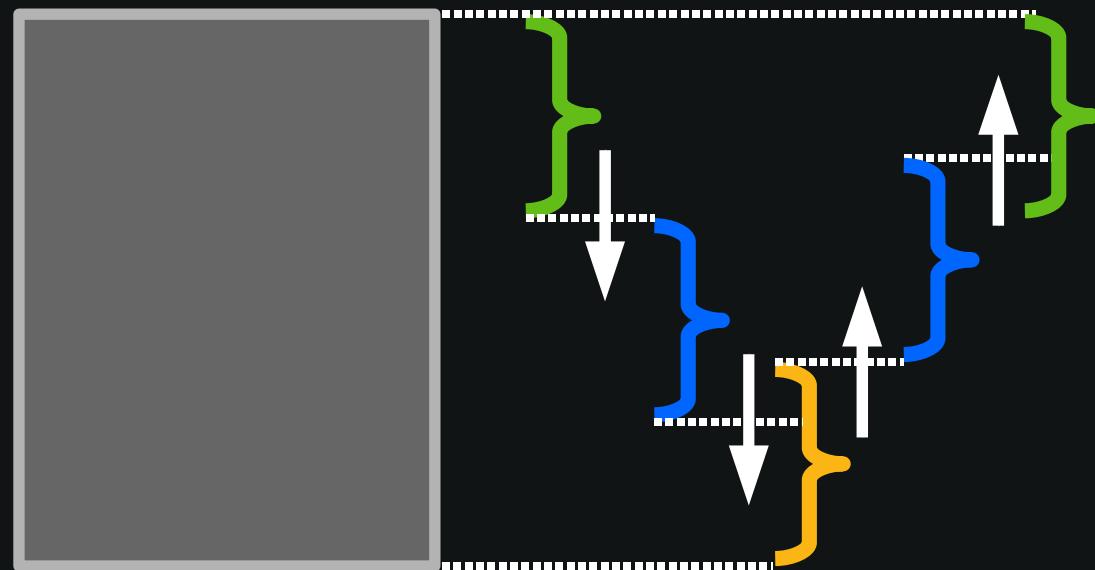
- High latency makes it impossible to scroll as on a normal computer
  - Both horizontally and vertically
- Ideally show web pages as a book

# Use printing functionalities?

- Draws page by page to a cairo context
- Code written for printing, not for display!
  - WebCore loses track of active elements
  - Links are not clickable
- Too hard to reimplement

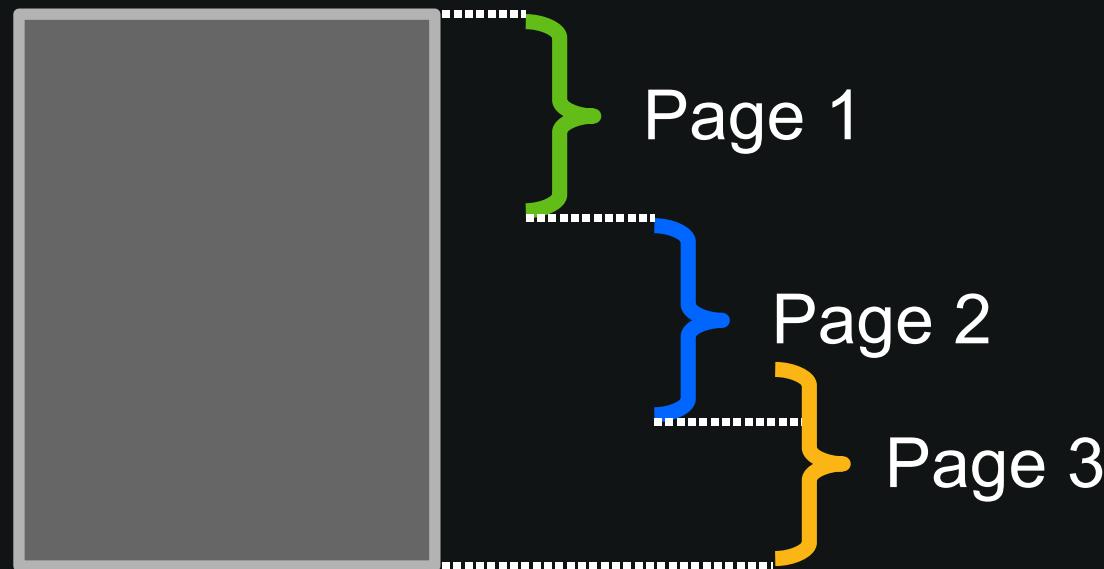
# Vertical scroll

- Just modify the GtkAdjustment
- Not just PgUp / PgDown



# Vertical scroll

- Just modify the GtkAdjustment
- Not just PgUp / PgDown



# Horizontal scrolling

- Avoid it as much as possible
- Try to fit everything in the horizontal space
- Basically:
  - \* { max-width: 100% !important; }

# Offline use

- Must be usable offline
- Need to save web pages to disk
- File HTML + directory for resources
  - Good for developers
  - Bad for file managers

# MHTML archives for offline use

- Single MIME file
- Binary files are Base64 encoded
- No need to modify the HTML structure to update links

# Links



[www.collabora.co.uk](http://www.collabora.co.uk)



[www.irextechnologies.com](http://www.irextechnologies.com)



[www.webkit.org](http://www.webkit.org)

[live.gnome.org/WebKitGtk](http://live.gnome.org/WebKitGtk)

#webkit-gtk on freenode