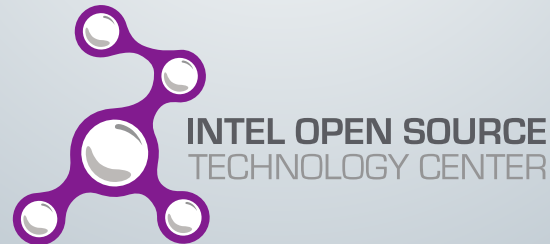


# Rendering Quality in WebKit's Open Source Graphics Stack

Dominik Röttsches

[dominik.roettsches@intel.com](mailto:dominik.roettsches@intel.com)

[01.org/webkit](http://01.org/webkit)



# About

- WebKit Software Engineer @ Intel Finland, OTC
- WebKit Committer
- Specialized in Tizen WebKit's Graphics Backend

## In this talk

- Define rendering quality
- WebKit's 2D rendering stack
- Improvements to Tizen WebKit's rendering quality

# Rendering Quality

- Site looks "as intended by the author"
- Text & graphics look accurate & pleasant
  - Sharp
  - Readable
  - Regular spacing & layout
- No glitches, artifacts, gaps, irregularities

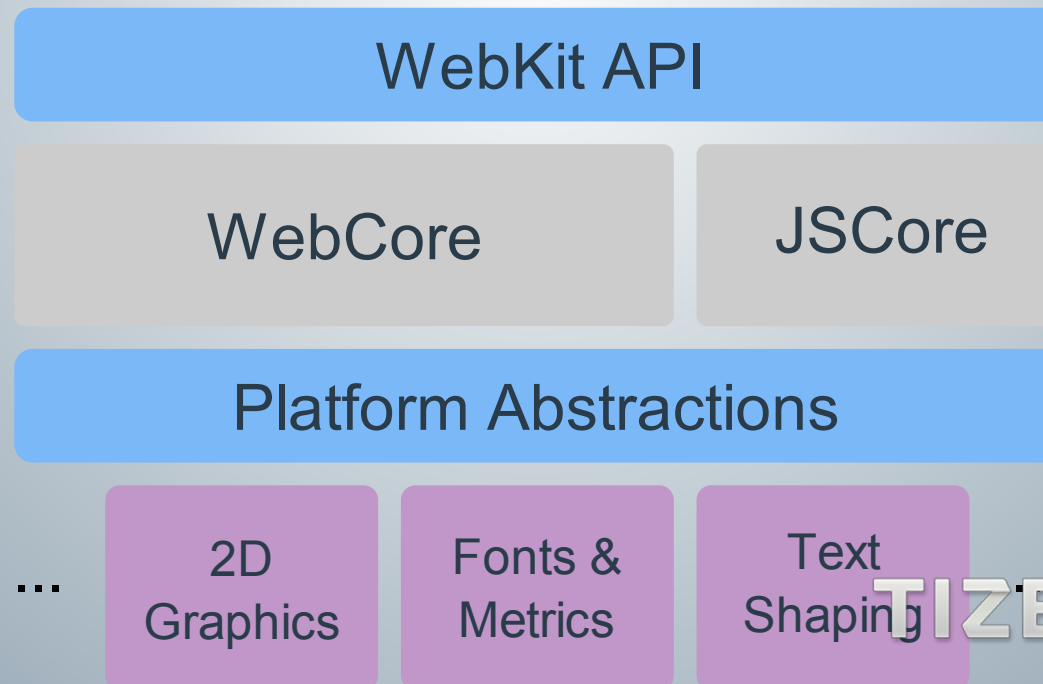
# "Looks as intended" = Consistency

- across platforms and devices
- across browsers
- across different screens
- with look & feel of the operating system

**Great looking fonts and graphics  
create a great user experience.**



# WebKit Graphics Backend



Graphics

Metrics

Shaping

# WebKit Graphics Stacks

	2D Graphics	Font & Metrics	Text Shaping
<b>Tizen WebKit</b>	Cairo	FreeType	HarfBuzz NG (ex: Pango)
<b>WebKit GTK</b>	Cairo	FreeType	HarfBuzz NG (ex: Pango)
<b>Safari</b>	CoreGraphics	CoreText	CoreText
<b>Chromium Linux</b>	Skia	FreeType	HarfBuzz NG
<b>Chromium Mac</b>	Skia	CoreText (via Skia)	HarfBuzz NG
<b>Qt WebKit</b>	QPainter	Platform dependent	HarfBuzz NG



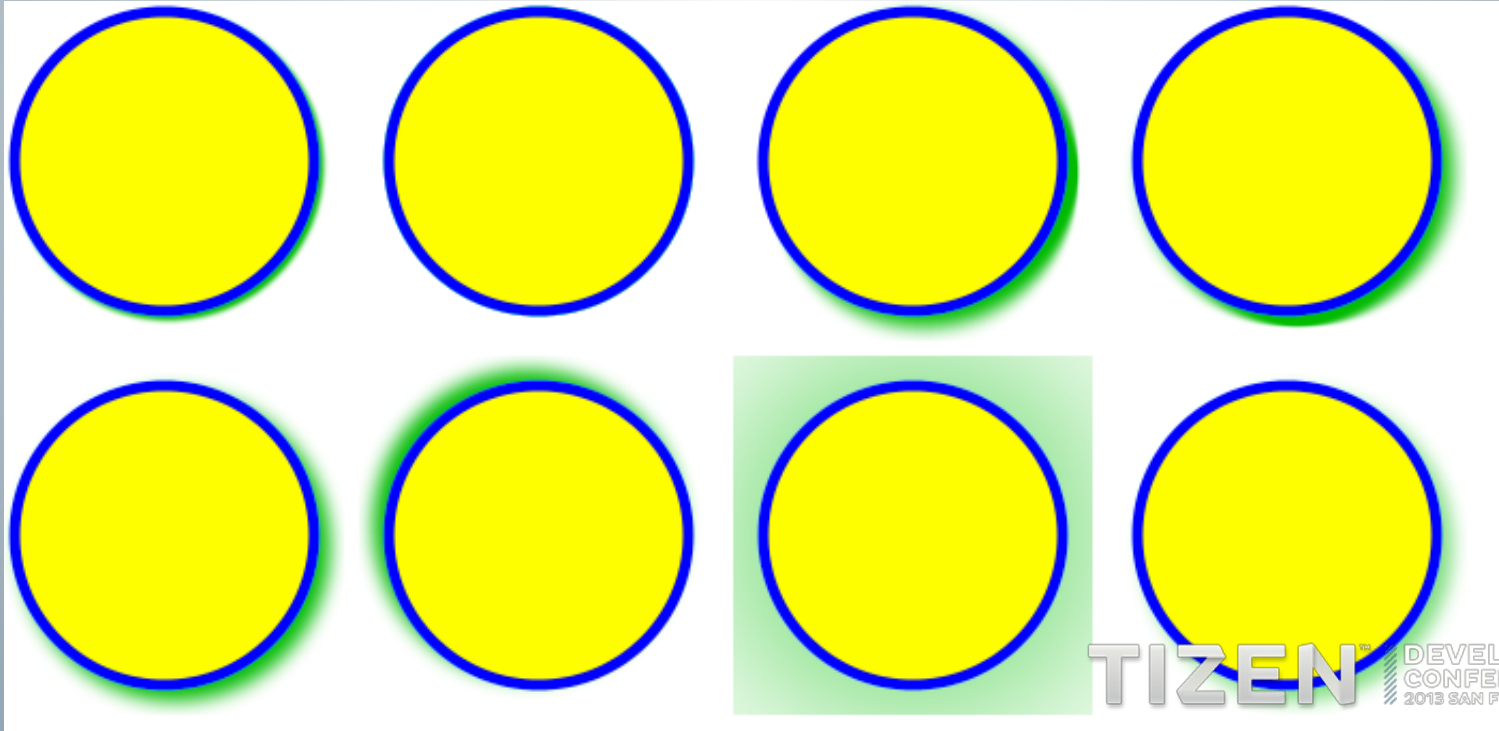
# What could possibly go wrong?

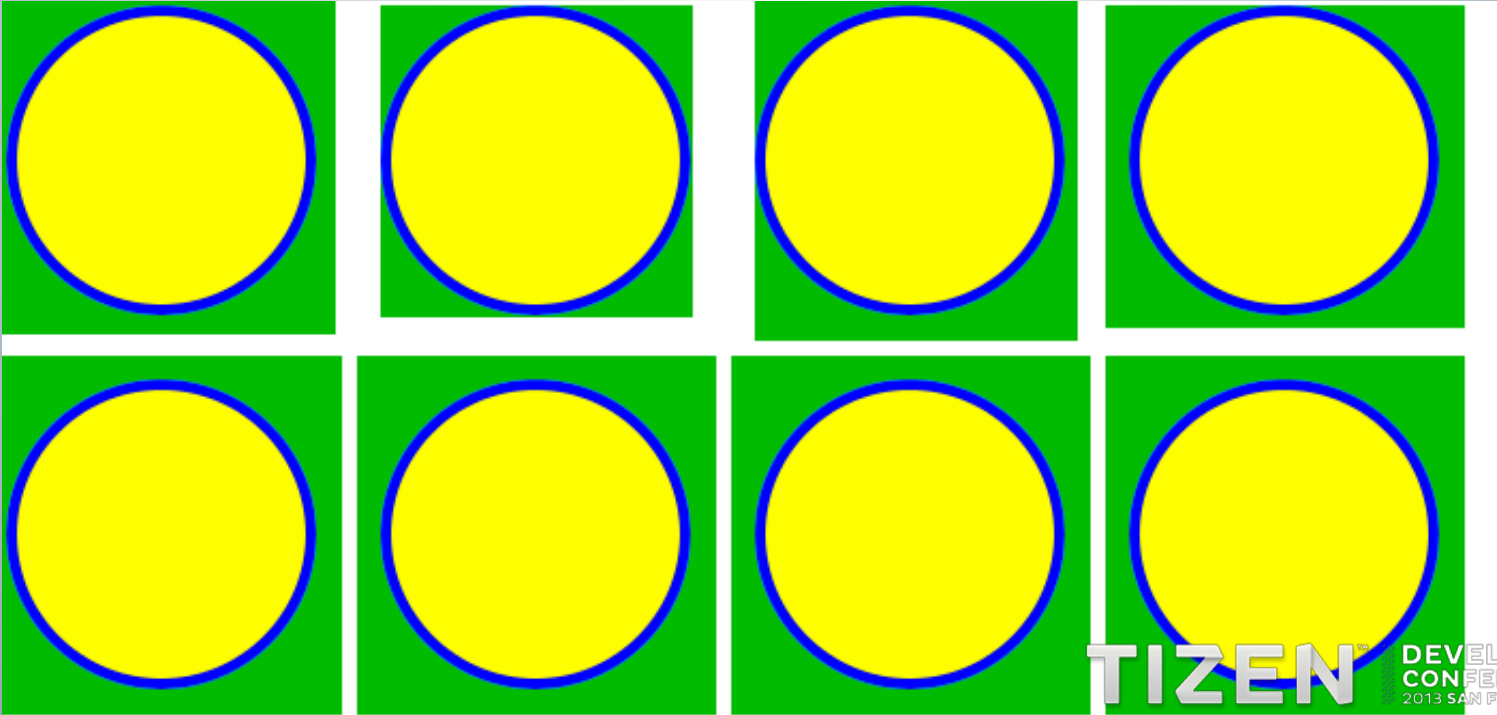
- (Downloadable) Fonts
- Shadows
- Layout, Scaling and Zooming Precision

# Font Selection & Font Antialiasing

# Web Fonts & Complex Font Support

# Shadows in CSS and SVG







# Baseline Positioning of Text

Sphinx

baseline

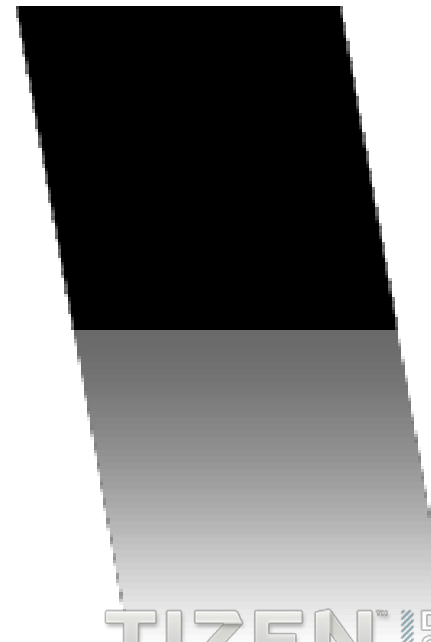
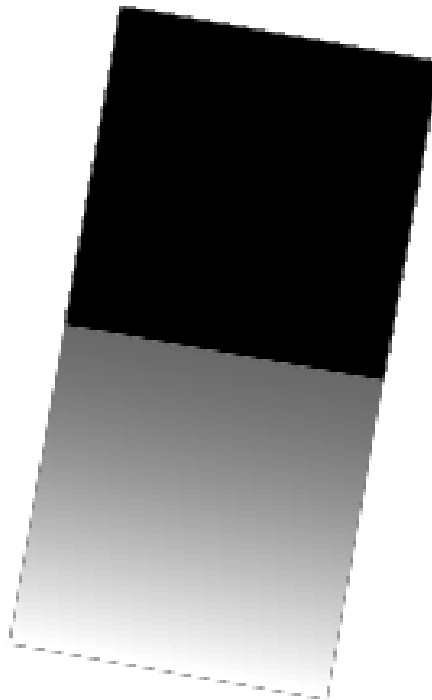
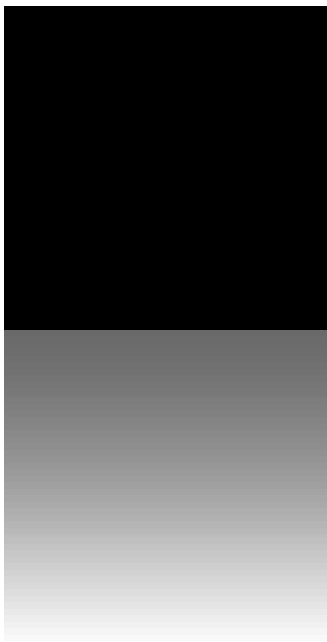
descent

x-height

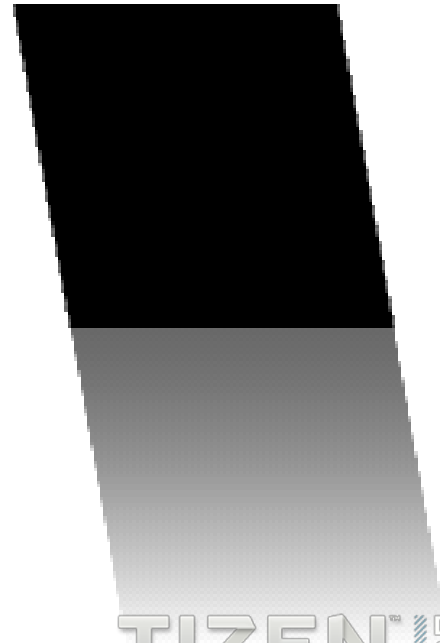
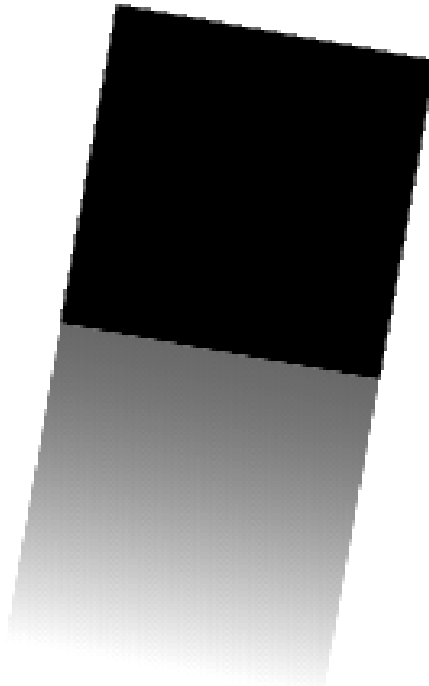
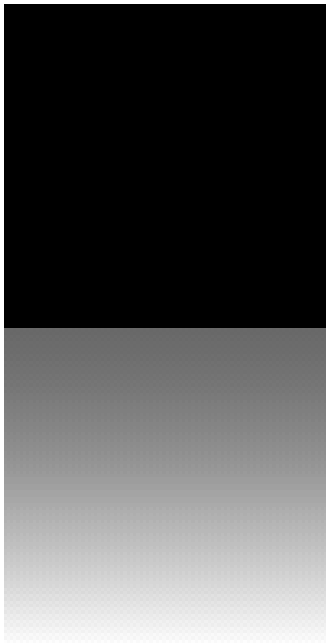
aim aim

ajm ajm

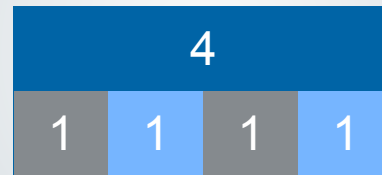
# Artifacts on Reflections





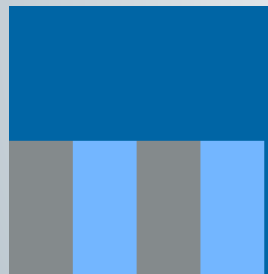


# Fractional Units in Layout



**Fractional Units Gone Wrong**

# Fractional Units Gone Wrong





## Sub-pixel Layout to the Rescue

- Keeps account of fractional layout values
- Takes into account zooming and scaling
- Lays out web page with fractional precision
- Renders snapped to device pixels

# What needs to be done right?

- Font Selection
- Font Aliasing Settings
- Web Fonts & Complex Font Rendering
- Robust Graphics Backend
- Layout, Scaling and Zooming Precision

# Great User Experience in Tizen WebKit

- High quality font rendering
- Complex font rendering for web fonts
- Improvements to Tizen WebKit's graphics backend
- Sub pixel layout for accurate scaling and zooming