



QtWebKit和HTML5简介

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内容

- HTML5简介
- QtWebKit简介
- QtWebKit功能演示
- QtWebKit的未来
- 问答



关于我

- 殷允桥 2000年毕业于东北大学
 - charles.yin@nokia.com,IRC:chayin
- 曾就职于宝钢，惠普和波音公司从事软件研发
- 2009至今：诺基亚布里斯班研发中心
- 曾参与的项目：
 - QSql,QtMobility(QtContacts,QtOrganizer,QtVersit)
- 现在: QML team
 - Canvas,Animation,QmlTest

炙手可热的HTML5

HTML





HTML5的历史(W3C)

- 1991: HTML诞生
- IETF HTML 2.0
- 1999: W3C HTML 4.01
- XHTML 1.0 (X = eXtensible)
- XHTML 1.1 (X = XML)
- XHTML 2



HTML5的历史(WHATWG)

- 2000: Opera发起
- Web Apps 1.0
- Web Forms 2.0
- 2006:W3C + WHATWG
- 2012:候选标准
- 2022:推荐标准？



HTML5的定义:狭义

HTML5 = HTML 4.x + XHTML 1.x
+ DOM





HTML5的定义:广义

HTML5 ~ = HTML + CSS +
Javascript





WebKit

- 开源 (LGPL/BSD)
- 广泛使用
 - 浏览器:Safari, Chrome, 搜狗, 傲游, QQ
 - 移动平台:Symbian, MeeGo, iOS, Android, BlackBerry
- 各种平台的移植:
 - Mac, Chrome, Gtk..
 - QtWebKit





WebKit的小历史

- 1997 khtmlw
- 1999 W3C DOM, KJS
- 2000 CSS, KHTML
- 2002 Safari/WebKit

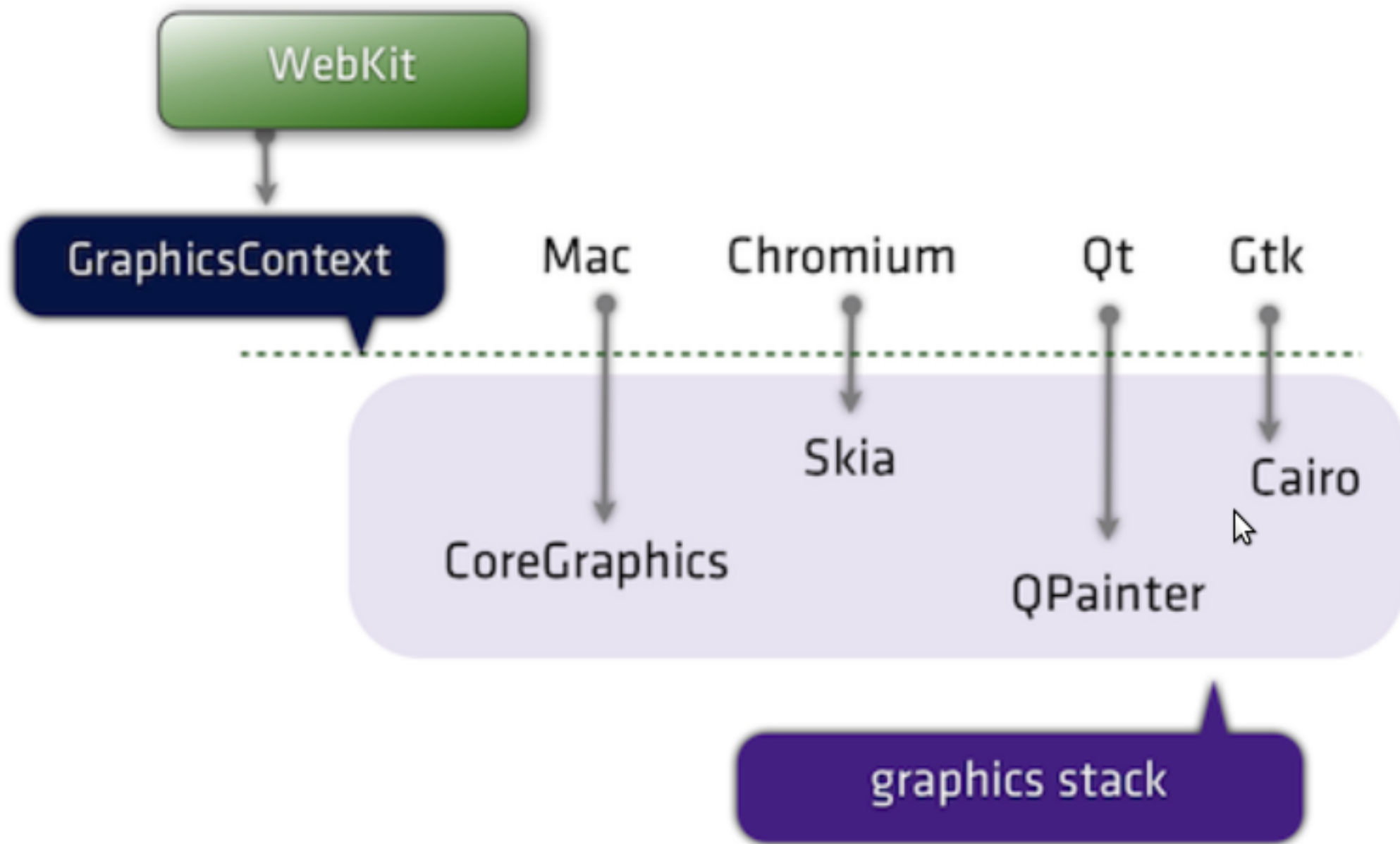
```
khtmlview.h
/* This file is part of the KDE project

   Copyright
   (C) 1997 Martin Jones (mjones@kde.org)
   (C) 1998 Waldo Bastian (bastian@kde.org)
   (C) 1998, 1999 Torben Weis (weis@kde.org)
   (C) 1999 Lars Knoll (knoll@kde.org)
   (C) 1999 Antti Koivisto (koivisto@kde.org)

   This library is free software; ....
```



QtWebKit和WebKit的关系





QtWebKit和WebKit的关系

```
<html>
<body>
<div>
Hello Qt!
</div>
</body>
</html>
```



QtWebKit和WebKit的关系

载入





QtWebKit和WebKit的关系

载入->解析为DOM树



QtWebKit和WebKit的关系

载入->解析为DOM树(HTMLDocument, Element, Text, Image...)





QtWebKit和WebKit的关系

载入->解析为DOM树->生成渲染树





QtWebKit和WebKit的关系

载入->解析为DOM树->生成渲染树(RenderObject, RenderImage, RenderText, RenderTable...)





QtWebKit和WebKit的关系

载入->解析为DOM树->生成渲染树->决定风格样式:RenderStyle(CSS)





QtWebKit和WebKit的关系

载入->解析为DOM树->生成渲染树->决定风格样式->
布局与定位: void layout()





QtWebKit和WebKit的关系

载入->解析为DOM树->生成渲染树->决定风格样式->
布局与定位->渲染(GraphicsContext)





QtWebKit和WebKit的关系

载入->解析为DOM树->生成渲染树->决定风格样式->
生成布局->渲染->平台相关渲染:GraphicsContextQt





QtWebKit和WebKit的关系

载入->解析为DOM树->生成渲染树->决定风格样式->
生成布局->渲染->平台相关渲染

```
QPainter::drawText(x,y,"Hello Qt!")
```

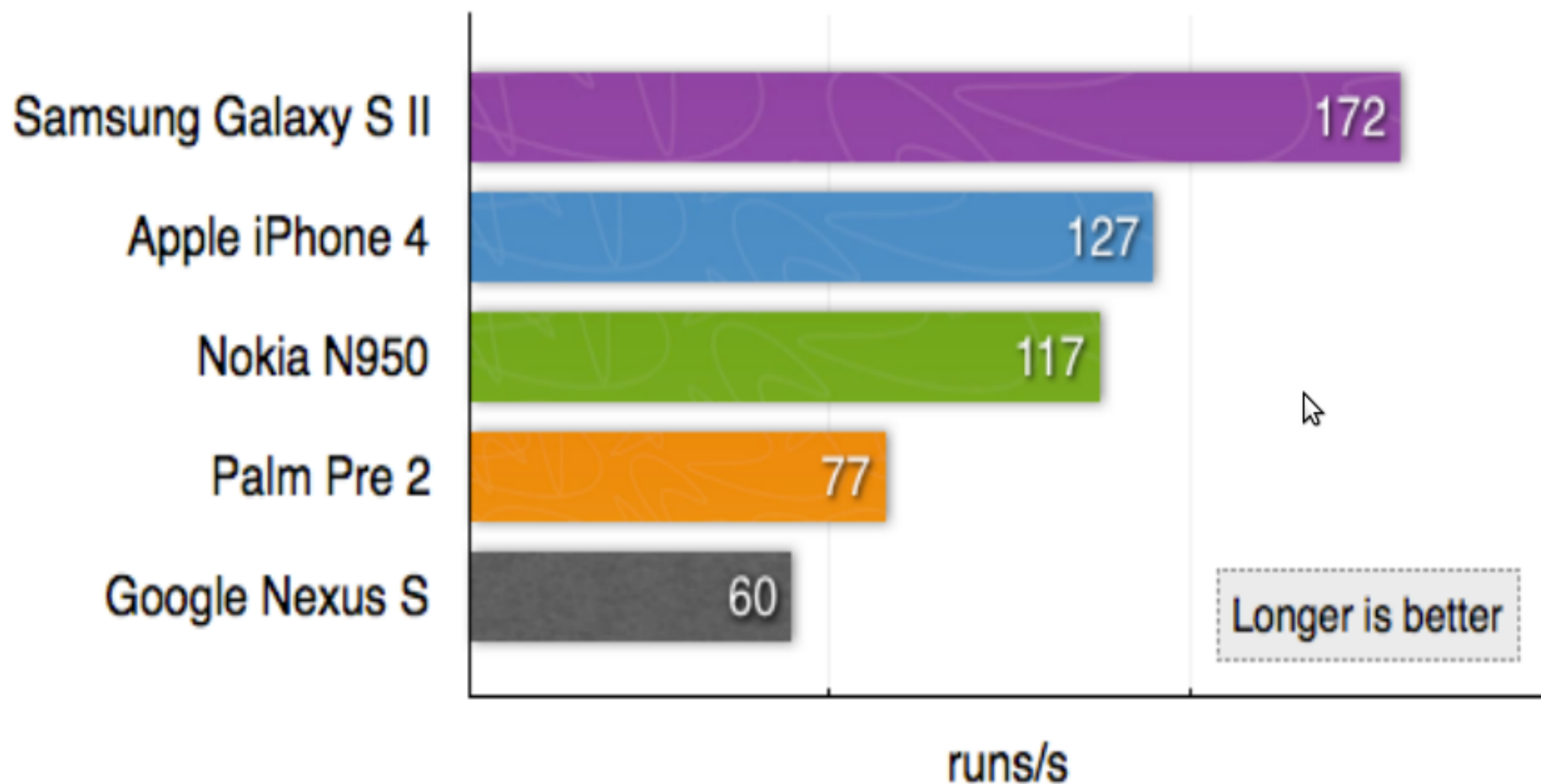


QtWebKit的特点

- 性能优越
- 功能丰富
- 高效方便的接口
 - 同时支持C++和QML接口
 - 功能易于按需订制
- 跨平台
- 清晰的API设计和文档

N9 Goal 浏览器性能

Dromaeo DOM Tests





HTML5带来的挑战

- 网页复杂度高
 - 文字, 图片, 视频, 曲线, 动画...
- 网页内容多
 - 新浪, 网易, 淘宝...
- 多层内容组合: CSS3动画
- 用户体验要求高
 - 平滑缩放
 - 平滑触摸滚动

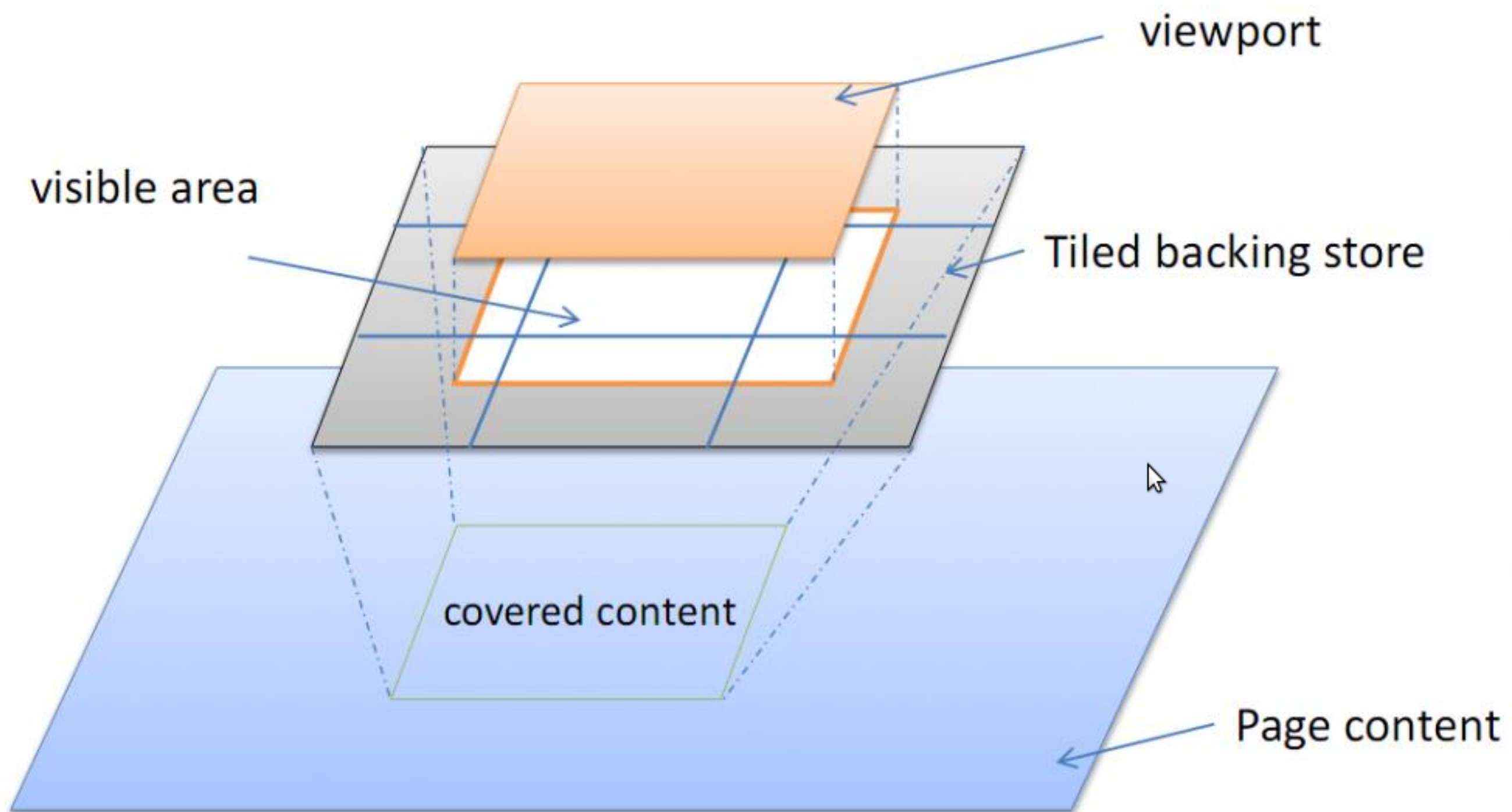


QtWebKit的解决方案

分片后备存储
Tiled backing store

```
QWebSettings::setAttribute(  
QWebSettings::TiledBackingStoreEnabled, true);
```


分片后备存储

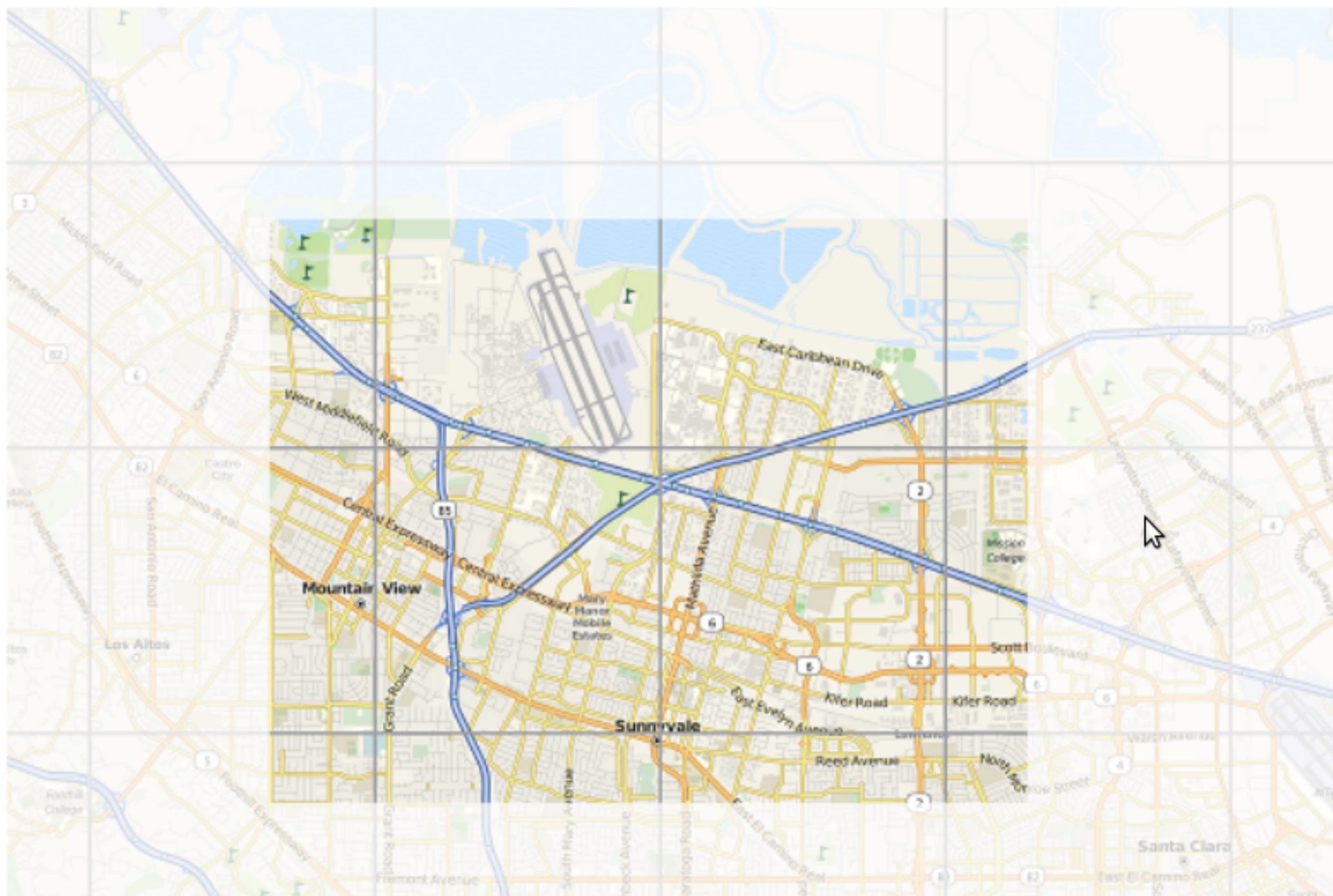


分片后备存储

复杂度高 => 离屏渲染
内容多 => 分片渲染
缩放 => 渐进渲染



分片后备存储:分片渲染



分片后备存储: 渐进渲染



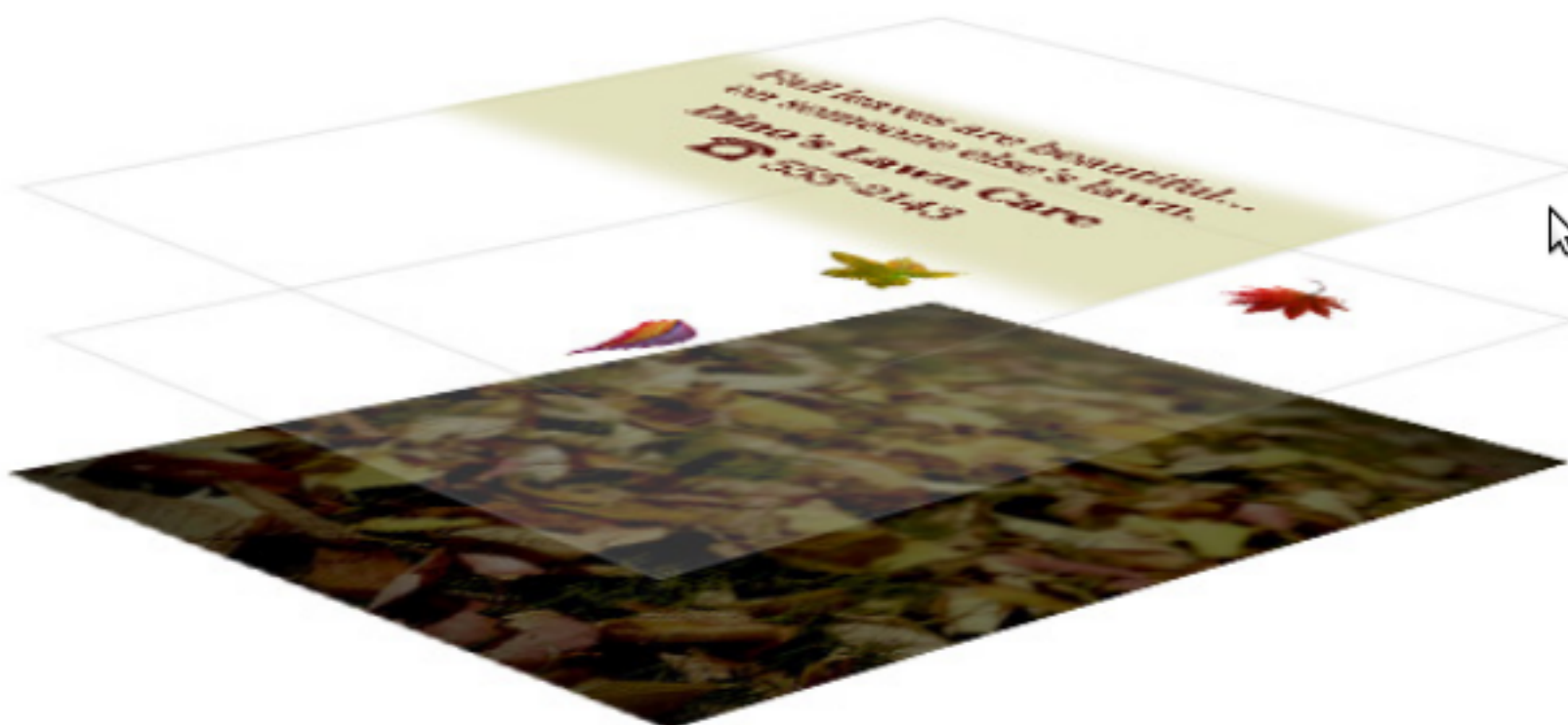
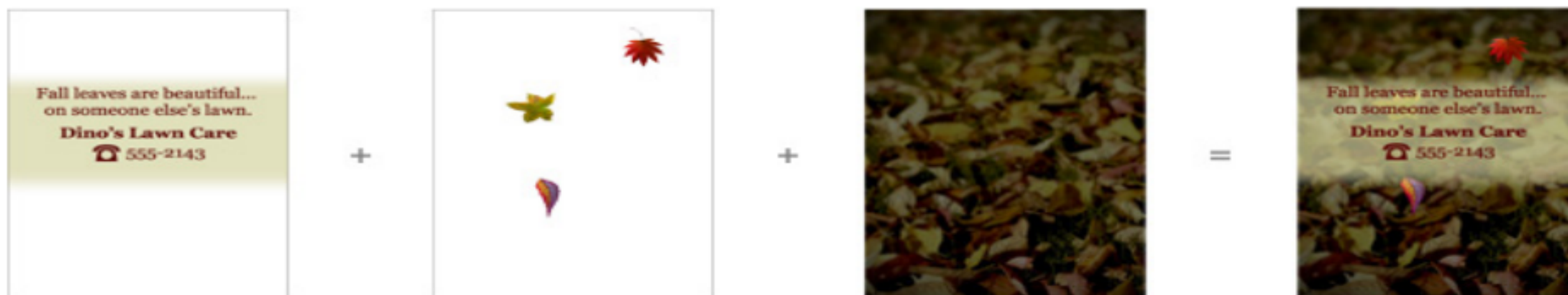


QtWebKit的解决方案

多层/CSS3动画 => GPU硬件组合加速
Hardware accelerated compositing

```
QWebSettings::setAttribute(  
QWebSettings::AcceleratedCompositingEnabled, true);
```

GPU硬件组合加速



GPU硬件组合加速





QtWebKit的解决方案

平滑触摸滚动 => 帧扁平化(消除滚动条)
Frame flattening

```
QWebSettings::globalSettings()  
->setAttribute(QWebSettings::FrameFlatteningEnabled,  
              true);
```



内部实现: QGraphicsWebView::setResizesToContents(true);



易于定制: QWebSettings

功能相关设定





QWebSettings: 功能相关设定

- `QWebSettings::JavascriptEnabled`
- `QWebSettings::PluginsEnabled`
- 本地存储相关功能
 - `QWebSettings::OfflineStorageDatabaseEnabled`
 - `QWebSettings::OfflineWebApplicationCacheEnabled`
 - `QWebSettings::LocalStorageEnabled`



易于定制: QWebSettings

行为相关设定





QWebSettings: 行为相关设定

- `QWebSettings::JavascriptCanOpenWindows`
- `QWebSettings::AutoLoadImages`
- `QWebSettings::DnsPrefetchEnabled`
- `QWebSettings::JavascriptCanCloseWindows`
- `QWebSettings::JavascriptCanAccessClipboard`
- `QWebSettings::ZoomTextOnly`
- ...



易于定制: QWebSettings

安全相关设定





QWebSettings: 安全相关设定

- 匿名浏览
 - `QWebSettings::PrivateBrowsingEnabled`
- 跨域执行脚本保护
 - `QWebSettings::XSSAuditingEnabled`
- 本地和远程资源访问控制
 - `QWebSettings::LocalContentCanAccessFileUrls`
 - `QWebSettings::LocalContentCanAccessRemoteUrls`



易于定制: QWebSettings

性能相关设定





QWebSettings: 性能相关设定

- `QWebSettings::AcceleratedCompositingEnabled`
- `QWebSettings::TiledBackingStoreEnabled`
- `QWebSettings::FrameFlatteningEnabled`





易于定制: QWebSettings

开发相关设定





QWebSettings: 开发相关设定

- `QWebSettings::DeveloperExtrasEnabled`





QtWebKit Qt模块

- QWebView
- QWebPage
- QWebFrame
- QWebSettings
- 详细文档:
 - <http://doc.qt.nokia.com/4.8/qtwebkit.html>



QtWebKit Qt模块

```
#include <QtWebKit>
//...
view = new QWebView(this);
view->load(QString::fromLatin1(
    "http://www.google.com"));
//.pro
QT += webkit network
```



QtWebKit QML模块

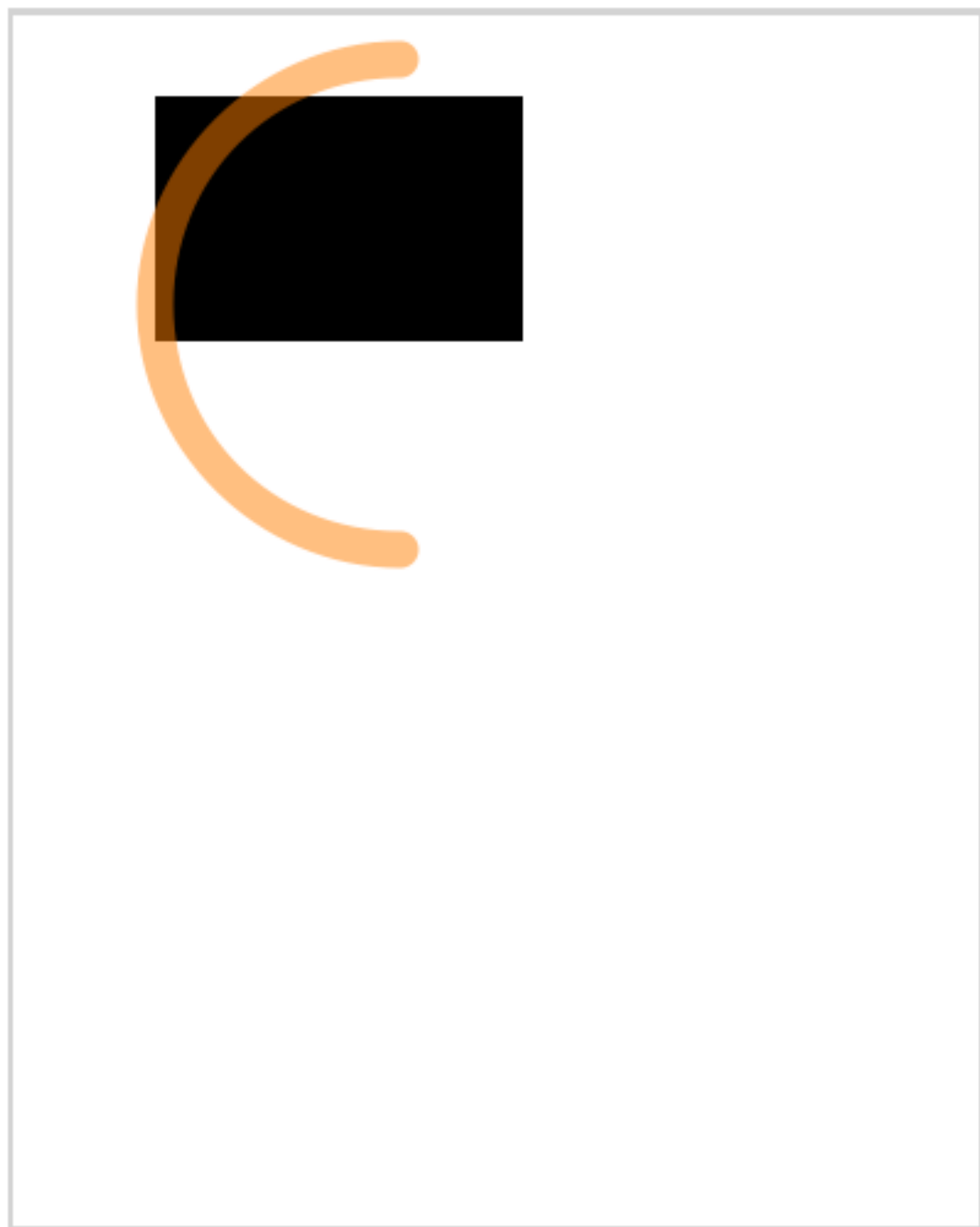
```
import QtWebKit 1.0
WebView {
    url: "http://www.nokia.com"
    preferredWidth: 490
    preferredHeight: 400
    scale: 2
    smooth: true
    settings.autoLoadImages:true
    onLoadStarted:{
        console.log("start loading:" + url) }
    onLoadFinished:{
        console.log("finished loading:" + url)}
    onLoadFailed:{
        console.log("failed loading:" + url)}
    onDoubleClick:{
        console.log("clicking:" + clickx + "," + clicky)}
}
```



QtWebKit HTML5能力演示

- Canvas
- Video/Audio
- HTML5测试
- ACID3测试
- CSS测试

Canvas



```
<canvas id="myCanvasA"  
  width="300" height="225">  
</canvas>
```

```
var c =  
document.getElementById("myCanvasA");  
var ctx = c.getContext("2d");  
ctx.fillRect(50, 25, 150, 100);  
ctx.beginPath();  
ctx.arc(150, 110, 100, Math.PI * 1/2,  
Math.PI * 3/2);  
ctx.lineWidth = 15;  
  ctx.lineCap = "round";  
ctx.strokeStyle = "rgba(255, 127, 0,  
0.5)";  
ctx.stroke();
```



Canvas

- 高效2D绘图
 - QPainter in Javascript
- 典型应用
 - Charts, Games, Animations





Canvas



20

PlasmaTree - Click on the black area to start a new tree

#fork: 34

Canvas

FlowerPower © mhepekka

Size



Petals



Bezier



Color

[Clear](#)[Save](#)☒ Flattr

25





Video/Audio

- 后端实现
 - Phonon
 - QtMultimediaKit
- Windows: DirectShow
- Mac: QuickTime
- Linux: gstreamer

```
<video poster="movie.jpg" controls>
<source src='movie.webm'
        type='video/webm;
        codecs="vp8.0, vorbis"'/>

<source src='movie.ogv'
        type='video/ogg;
        codecs="theora, vorbis"'/>

<source src='movie.mp4'
        type='video/mp4;
        codecs="avc1.4D401E, mp4a.40.2"'/>
</video>
```

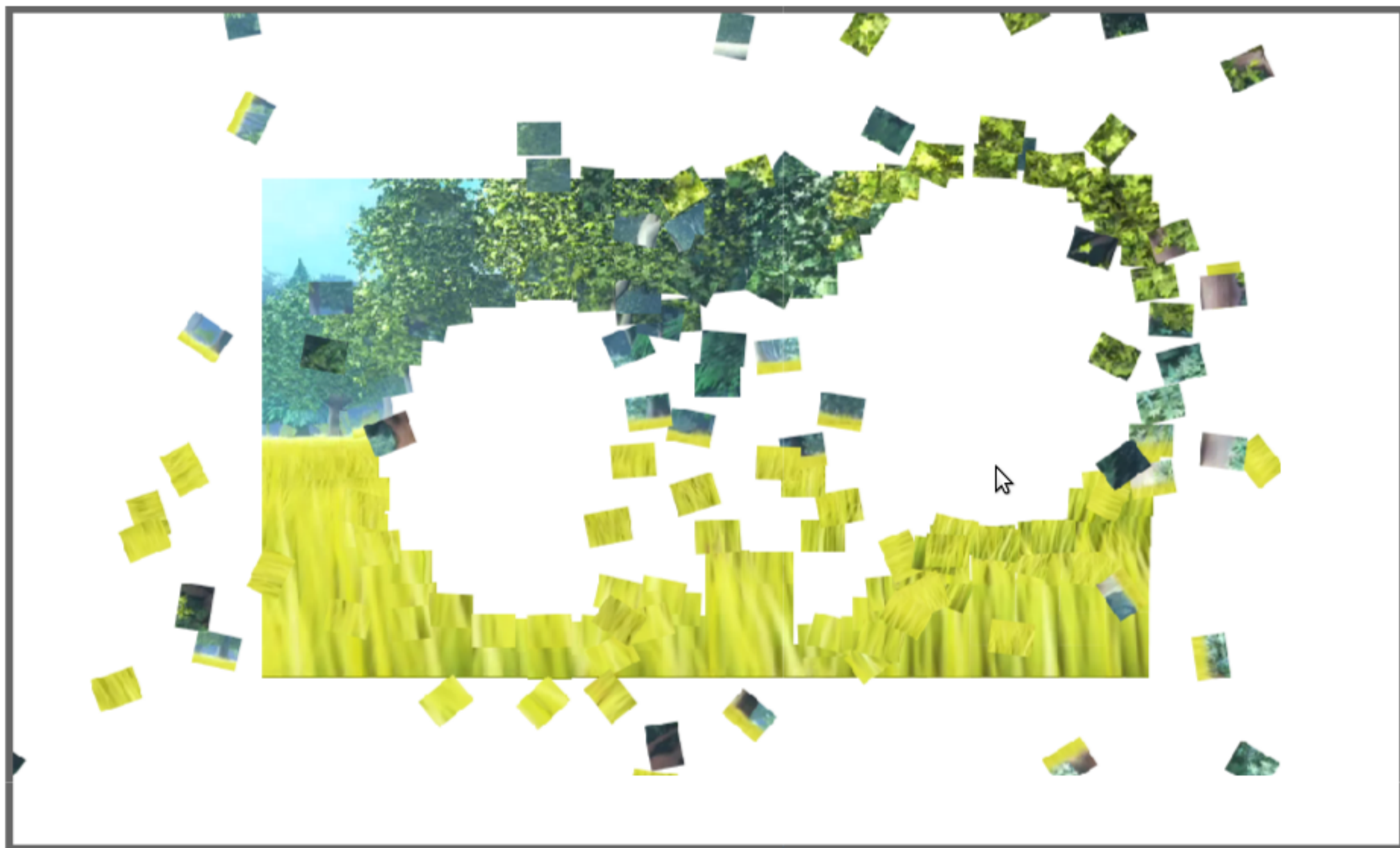



Video/Audio: 格式之争

- HTML5 草案
- 候选条件:
 - 压缩比
 - 图像质量
 - CPU 解码压力
- 候选者:
 - Ogg
 - H.264
 - VP8 (WebM 项目: VP8 Video + Vorbis audio)



用Canvas API操作Video标签内容





QtWebKit HTML5测试

THE HTML5 TEST – HOW WELL DOES YOUR BROWSER SUPPORT HTML5?

your browser

other browsers

Updated!
August 23, 2011

your browser scores

293

AND 14 BONUS
POINTS

out of a total of 450 points

ABOUT THE TEST

The HTML5 test score is an indication of how well your browser supports the upcoming HTML5 standard and related specifications. Even though the specification isn't finalized yet, all major browser manufacturers are making sure their browser is ready for the future. Find out which parts of HTML5 are already supported by your browser today and compare the results with other browsers.



Parsing rules

2 bonus points

11

<!DOCTYPE html> triggers standards mode

Yes ✓

HTML5 tokenizer

Yes ✓

HTML5 tree building

Yes ✓

HTML5 defines rules for embedding SVG and MathML inside a regular HTML document. Support for SVG and MathML is not

SPONSORS

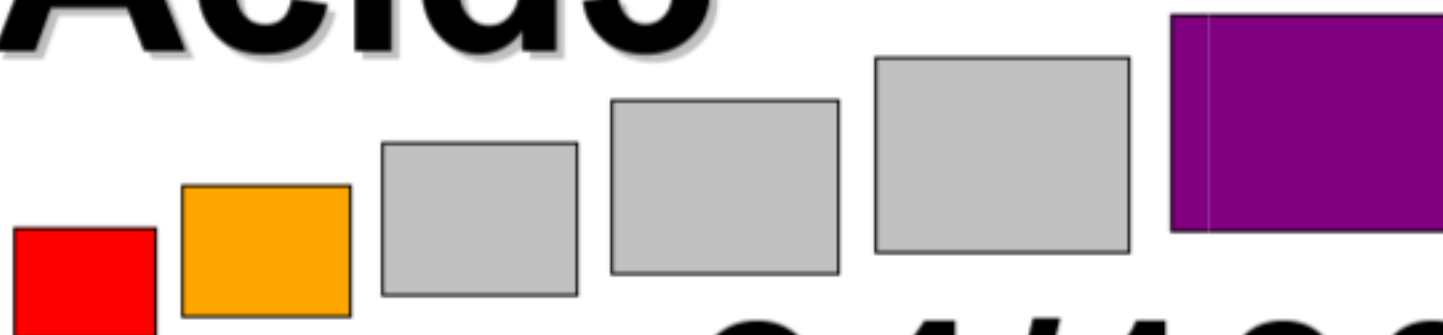
NOW YOU CAN
MAKE APPS

HTML5



QtWebKit ACID3测试

FAIL
Acid3



94/100

To pass the test, a browser must use its default settings, the animation has to be smooth, the score has to end on 100/100, and the final page has to look exactly, pixel for pixel, like [this reference rendering](#).



QtWebKit CSS能力测试

- 圆角(radius)
- 阴影(box-shadow)
- 转换(transform)
- 梯度(gradient)
- 动画(animation)





WebKit/QtWebKit的未来

- 基于WebKit2架构
 - 响应性
 - 稳定性
 - 安全性
 - 第一个采用WebKit2架构的浏览器：N9 Goal浏览器
- 同时提供C++/QML API: QML优先
 - DesktopWebView 针对桌面环境优化
 - TouchWebView 针对移动触摸设备优化



WebKit/QtWebKit的未来

```
Import QtQuick 2.0
Import QtWebKit 3.0
WebView {
    id: webView
    width:1024;hieght:768
    Component.onCompleted: {
        webView.load("http://google.com")
    }
}
```



WebKit/QtWebKit的未来

- QtWebKit Accelerated Compositing Report
 - <http://labs.qt.nokia.com/2011/11/10/qtwebkit-accelerated-compositing-report/>
- An old/new approach to QtWebKit Hybrid
 - <http://labs.qt.nokia.com/2011/08/31/an-oldnew-approach-to-qtwebkit-hybrid/>
- QtWebKitForQt5
 - trac.webkit.org/wiki/QtWebKitForQt5
- Qt5在线文档
 - <http://doc.qt.nokia.com/qt5/qmlwebkit.html>



参与WebKit/QtWebKit开发

- IRC:irc.freenode.net
 - #webkit, #qtwebkit
- 邮件列表:<http://lists.webkit.org>
- Wiki:<http://trac.webkit.org/wiki/>
- 缺陷跟踪:
 - <http://trac.webkit.org/wiki/QtWebKitBugs>
- QtWebKit开发计划:
 - <http://bugreports.qt.nokia.com/browse/QTWEBKIT>



问题?



谢谢大家!

