

mozilla



Insight Gaia - OS Shell in a `<html>`

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In this Talk

- Everything you can help
 - As a user / beta tester
 - As a web developer
- Everything you can play
 - Desktop builds
 - Phone hacking! (Not *that*)

Background: What it takes to implement a OS shell?

```
git pull git://github.com/mozilla-b2g/gaia.git
```

Similar Web OS Shells

- Others tried: “Cloud Desktop”
 - eyeOS/jolicloud/Synology DSM ...
- Gaia is unique in a way that it runs a phone

From the perspective of the web

- Hosting 3rd-party content safely
 - `<iframe>`s? Pretty close.
- Window/app management
 - How phones manage apps? Home screen?
 - How Firefox manage tabs? Bookmarks?

From the perspective of a phone

- Device management
 - Screen/wifi/power/memory/connectivity
- System user interfaces
 - Lock screen/dialogs/pull-down menu/keyboard/status bar/permission ...
- Common applications
 - Phone/Contacts/Message/Settings/Browser/Camera/Gallery ...

Gaia: 91 MB total

```
du -ch -l .git -l xulrunner-sdk -l profile -l  
media-samples -l dictionaries . | tail -n 1
```


System app: 2.7M total

```
du -ch ./apps/system/ | tail -n 1
```

```
accessibility.js    hardware_buttons.js  sleep_menu.js
activities.js       identity.js           sound_manager.js
airplane_mode.js   keyboard_manager.js  source_view.js
app_install_manager.js  list_menu.js        statusbar.js
applications.js     lockscreen.js        storage.js
attention_screen.js  mobile_info.js       system_banner.js
authentication_dialog.js  modal_dialog.js     trusted_ui.js
background_service.js  mouse2touch.js      ttlview.js
battery_manager.js    notifications.js     updatable.js
bluetooth.js         operator_variant     update_manager.js
bluetooth_transfer.js  payment.js           utility_tray.js
bootstrap.js         permission_manager.js  value_selector
cards_view.js        popup_manager.js      voicemail.js
context_menu.js      quick_settings.js     wifi.js
cost_control.js      screen_manager.js     window_manager.js
crash_reporter.js    screenshot.js         wrapper.js
gridview.js          sim_lock.js
```

```
ls ./apps/system/js/
```

Gaia

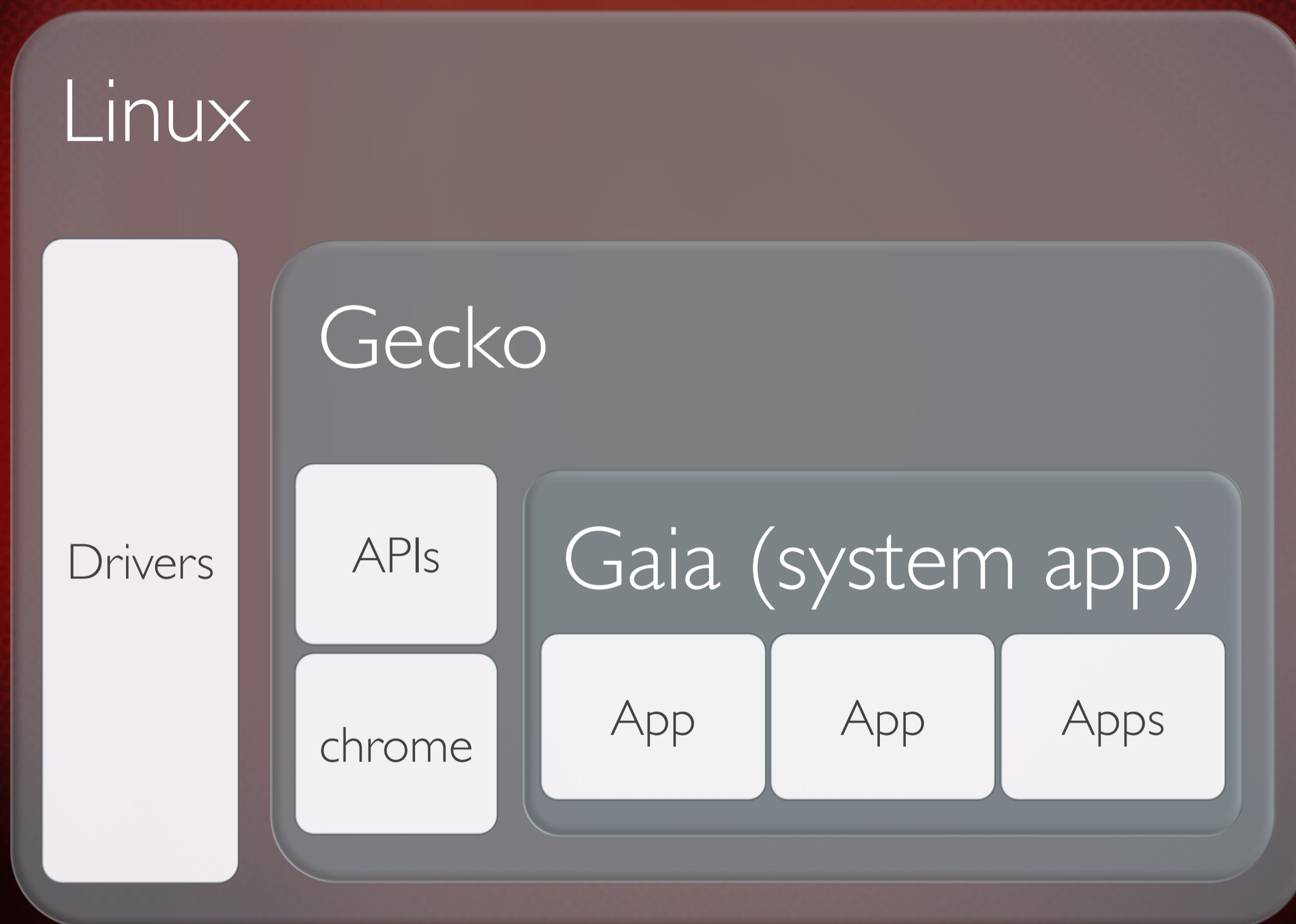
Gaia, n., Greek Mythology the Earth personified as a goddess, daughter of Chaos.

Gaia

- Front-end “shell” of Firefox OS phones
- The visual layer, composed entirely of web technologies
 - Everything is `<div>`, every logic is written in Javascript
- Easily customizable to phone vendors, phone hackers, web developers
- YOU!

Gaia concept: frame hierarchy, and special APIs

Boot 2 Gecko architecture



Frame hierarchy

```
<xul:window>
```

```
<html:iframe src="app://system.gaiamobile.org/">
```

```
<iframe src="browser">
```

```
<iframe src="mozilla.org">
```

```
<iframe src="phone">
```

```
<iframe src="message">
```

Frame busting!

- `if (window.top !== window) die();`
- X-Frame:
- ``

MozBrowser API

- `<iframe mozbrowser src="google.com">`
- `<xul:browser>` (re)implementation in HTML
- Prevent framebusting, allow (some) cross-origin control over iframe content
- Written entirely in Javascript!
 - Check Gecko source code
[./mozilla-central/source/dom/browser-element/](https://hg.mozilla-central/source/dom/browser-element/)

Frame hierarchy

```
<xul:window>
```

```
<html:iframe src="system" mozbrowser>
```

```
<iframe src="browser" mozbrowser>
```

```
<iframe src="mozilla.org" mozbrowser>
```

```
<iframe src="phone" mozbrowser>
```

```
<iframe src="message" mozbrowser>
```

Permission controls

- App-by-app basis & frame-origin control
 - Camera access/device storage access/geolocation access
- “mozapps” attribute
 - mozapps=“browser/manifest.webapp”

Manifest-based permission control

```
{  
  "permissions": {  
    "telephony": {},  
    "voicemail": {},  
    "contacts": { "access": "readwrite" },  
    "mobileconnection": {}  
  }  
}
```

Frame hierarchy

```
<xul:window>
```

```
<html:iframe src="system" mozbrowser mozapps=..>
```

```
<iframe src="browser" mozbrowser mozapps=..>
```

```
<iframe src="mozilla.org" mozbrowser>
```

```
<iframe src="phone" mozbrowser mozapps=..>
```

```
<iframe src="message" mozbrowser mozapps=..>
```

Crashes!

- If in-process app crashes, the entire Gecko crashes
 - (Desktop Firefox rarely crashes, except plug-ins)
- Move apps out of main process; isolate apps down to process level
- “remote” attribute

Frame hierarchy

```
<xul:window>
```

```
<html:iframe src="system" mozbrowser mozapps=..>
```

```
<iframe src="browser" mozbrowser mozapps=.. remote>
```

```
<iframe src="mozilla.org" mozbrowser remote>
```

```
<iframe src="phone" mozbrowser mozapps=.. remote>
```

```
<iframe src="message" mozbrowser mozapps=.. remote>
```

APIs

- <https://wiki.mozilla.org/WebAPI>
- Telephony/SMS/Wifi management/Camera/Vibration/Idle/Orientation/Settings/Power management/Mobile connection status/Audio channels/TCP Socket/Geolocation/Device Storage/Contacts/Web App Management/Battery status/Time/FM Radio/Payment/Archive/Devicelight sensor/Proximity sensor/System XHR
- Dive into code, see how Web interacts with _____!

Can I try?

Sure, double click ./index.html and open it in
Firefox ...



B2G Desktop

- Proudly supported by release engineering team
<http://ftp.mozilla.org/pub/mozilla.org/b2g/nightly/latest-mozilla-central/>
- Download, and double click, it comes with a build-in Gaia!
- Hardware APIs is not available, sorry :(

Launch it with your own Gaia

- Run “make” in the Gaia repository
- Launch B2G Desktop with following command
`./b2g-bin -profile /my/gaia/profile`
- “make” is needed to zip some Gaia apps into packaged apps
 - Some API privileged require app to be packaged
 - (“DEBUG=1 make” is currently broken)

Debugging Gaia

- `dump()`
- `console.log()`
- Remote Debugger in Nightly
- No inspector yet :(-- work on Nightly for layout works first)

What you can help

- We are really close from shipping the first version, activities are fast and intense
- Bug hunt! Late features!

Bug hunt on B2G Desktop

- Find non-hardware related bugs, or UX issues
- Provide fix in Javascript/CSS/HTML of existing bugs
- Bug component: Boot2Gecko::Gaia
- Web Developers: This is **the** opportunity to get your work into a shipping phone (without learning anything new first!)

Specific bugs to hunt

- Performance; find extra repaint with paint-flashing
 - Settings -> Device info -> More info -> Developer -> Flash repainted area
- Off-main thread animation (OMTA; async animation)
 - CSS animates incorrectly on B2G Desktop but correct on nightly
- Functional: App installation, built-in app functionalities

Where to find the team

- [#gaia](http://irc.mozilla.org)
- [dev-gaia mailing list](#)
- Shop for bugs on Bugzilla and take what you can solve

Beyond ver. 1.0

- OS Shell in a <html> is a unique opportunity, a canvas for experimenting new OS shell and user interfaces
- Can Firefox OS evolving into something doesn't look like any existing platform?
- Fork it, hack it, announce and demonstrate your proposal out loud!



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