

Using HTML5 Offline Storage

Net deprived

Session 515

Alexey Proskuryakov

Safari and WebKit Engineer

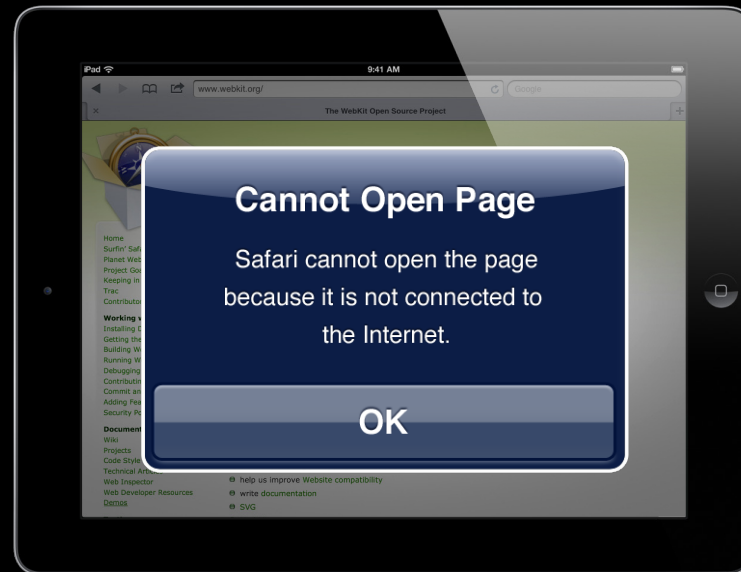
These are confidential sessions—please refrain from streaming, blogging, or taking pictures

Introduction



- Work on cellular networks
- Or offline

Introduction



The Goals

- Make sites load faster
- Cope with loss of network
- Implement it quickly





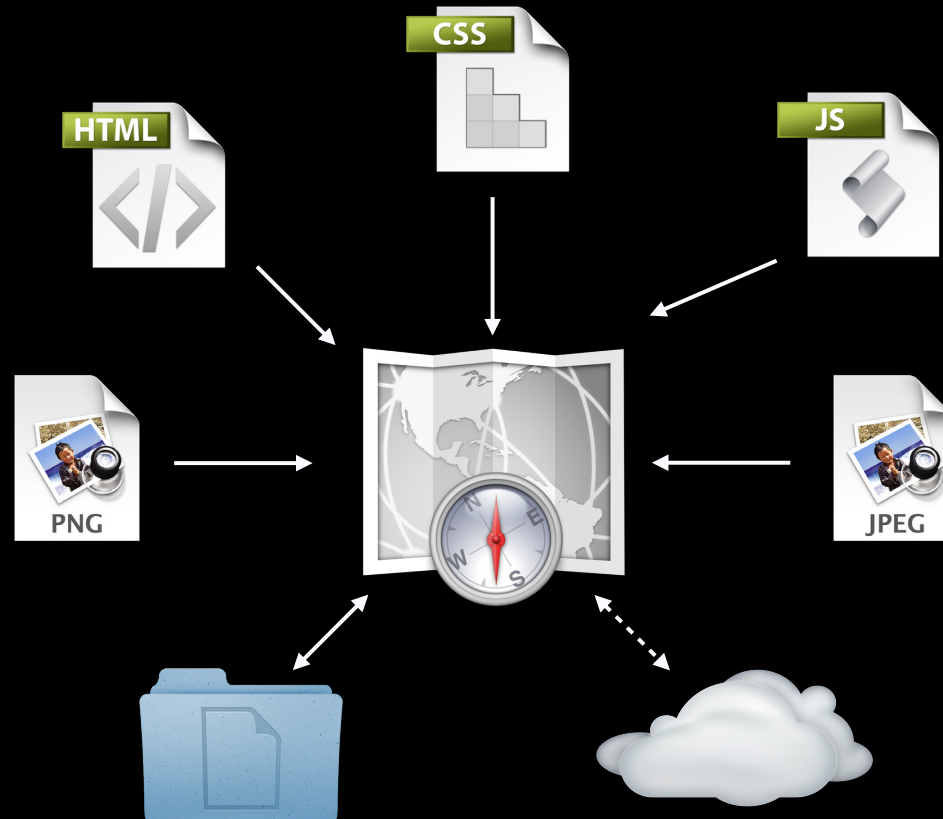
Agenda

- Offline technologies
- Debugging
- What's new

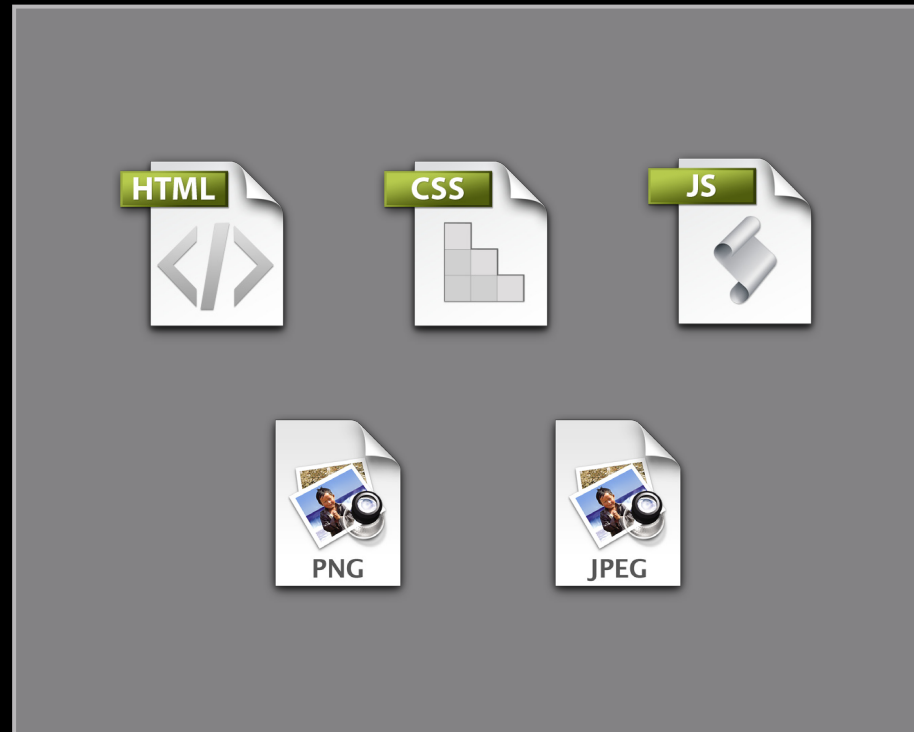
Storing Resources Offline

HTML5 offline application cache

What a Web Application Needs



Application Resources



Application Cache

- index.html

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
...
```

Application Cache

- index.html

```
<!DOCTYPE html>  
<html manifest="application.manifest">  
<head>  
...
```

```
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Application Cache

- index.html

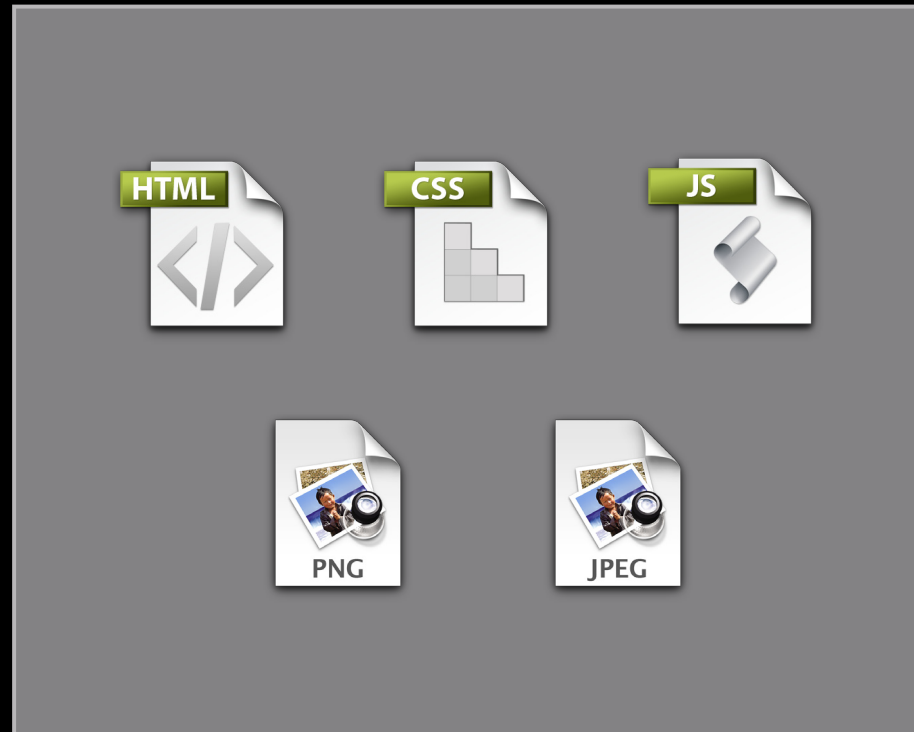
```
<!DOCTYPE html>  
<html manifest="application.manifest">  
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...  

```

- application.manifest

```
CACHE MANIFEST  
# The document and its manifest are always cached implicitly.  
stylesheet.css  
image.jpg  
http://example.org/3rd_party_image.jpg
```

Cached Resources

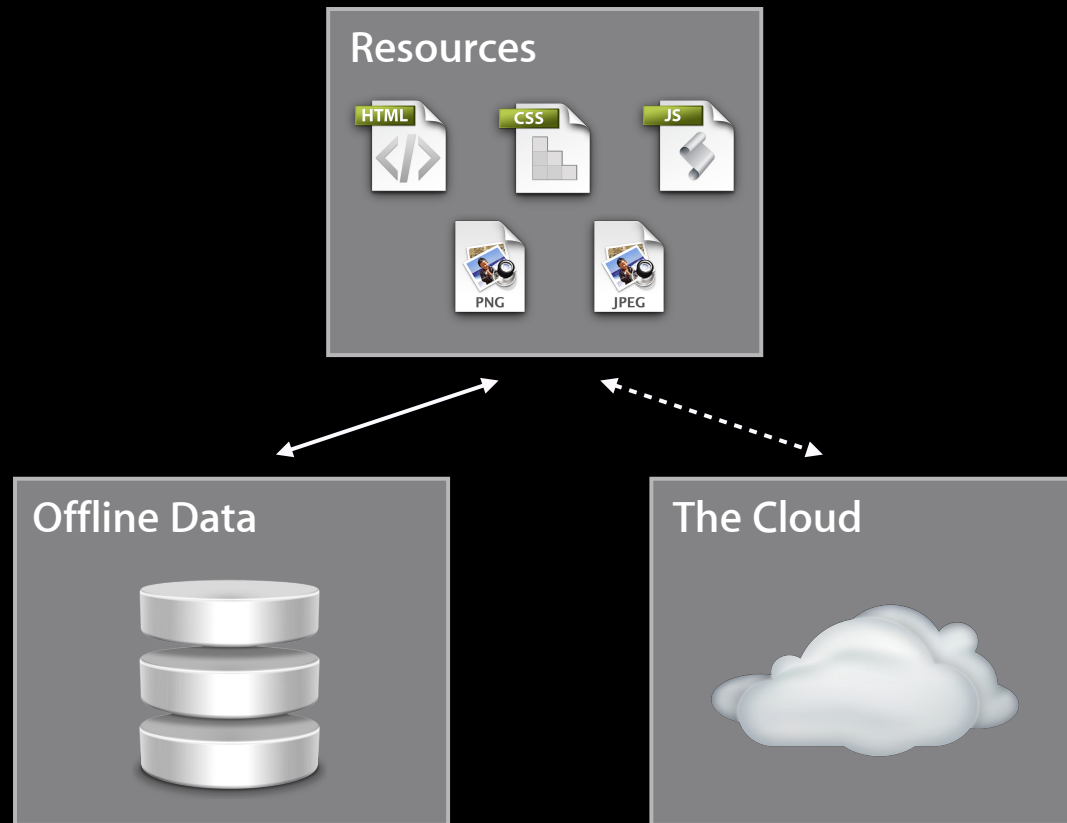


Cached Resources

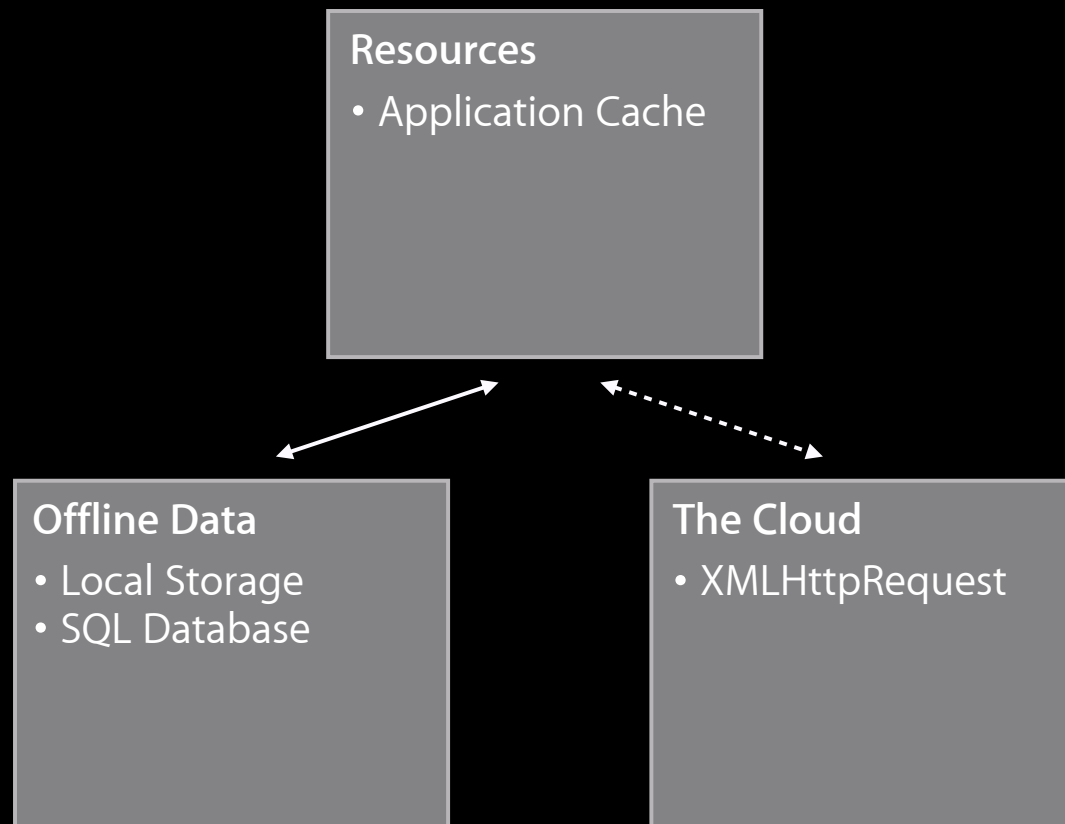
New



Application Resources and Data



Application Resources and Data



Network Access

- Blocked by default
- Makes development easier
- Can be allowed for some URLs

Network Access

Cache manifest file

CACHE MANIFEST

The document and its manifest are always cached implicitly.

stylesheet.css

image.jpg

http://example.org/3rd_party_image.jpg

NETWORK:

Matches all URLs with this prefix.

<http://api.flickr.com>

Network Access

Cache manifest file

CACHE MANIFEST

```
# The document and its manifest are always cached implicitly.
```

```
stylesheet.css
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```
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http://example.org/3rd_party_image.jpg
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NETWORK:

```
# Matches all URLs with this prefix.
```

```
http://api.flickr.com/services/replace
```

Network Access

Cache manifest file

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The document and its manifest are always cached implicitly.

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NETWORK:

Matches all URLs with this prefix.

<http://api.flickr.com/services/upload>

Network Access

Cache manifest file

CACHE MANIFEST

The document and its manifest are always cached implicitly.

stylesheet.css

image.jpg

http://example.org/3rd_party_image.jpg

NETWORK:

Matches all URLs with this prefix.

<http://api.flickr.com/rest/?method=flickr.test.echo&name=value>

Network Access

Cache manifest file

CACHE MANIFEST

The document and its manifest are always cached implicitly.

stylesheet.css

image.jpg

http://example.org/3rd_party_image.jpg

NETWORK:

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<http://api.flickr.com>

Network Access



Cache manifest file

CACHE MANIFEST

The document and its manifest are always cached implicitly.

stylesheet.css

image.jpg

http://example.org/3rd_party_image.jpg

NETWORK:

Any resources that are not in the cache may be fetched from the network.

*

Network Access

Cache manifest file

CACHE MANIFEST

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NETWORK:

```
# Any resources that are not in the cache may be fetched from the network.  
*
```

FALLBACK:

```
# Fallback resources are implicitly cached.  
savedGamePreview.php? genericPreview.png
```

Network Access

Cache manifest file

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```

Offline Applications for iOS

```
<meta name="apple-mobile-w  
content="yes">
```

```
<meta name="apple-mobile-w  
content="black">
```

```
<link rel="apple-touch-ico  
href="/custom_icon.p
```

```
<link rel="apple-touch-sta  
href="/startup.png">
```



Application Cache Update

Deploying new versions of the application

- Old and new resources are never mixed
- Cache manifest content is checked
 - So, change the manifest when changing resources
- A new version of the application is not used on existing pages

Providing Feedback

- Downloading is transparent in Safari
- DOM events for custom UI

checking

noupdate

downloading

progress

cached

updateready

obsolete

error

Demo

Andy Estes
Safari and WebKit Engineer

What Users Will See

User's Point of View

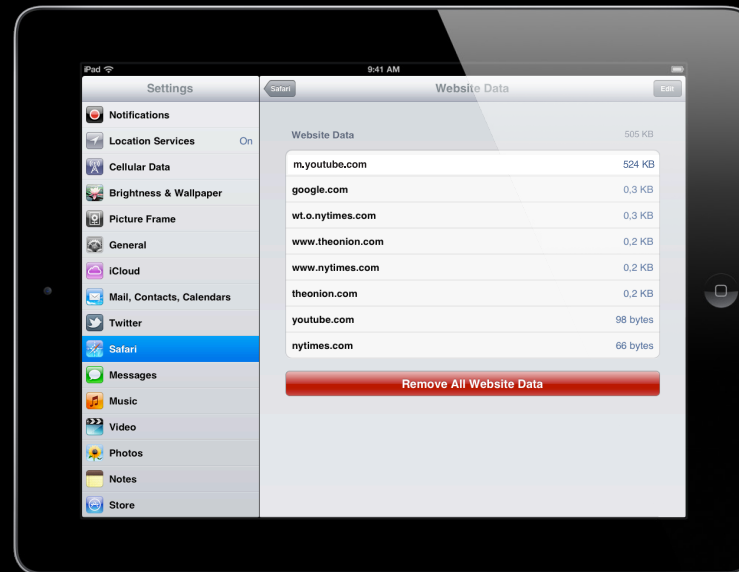


- Privacy implications
- Safari shows what sites have left traces
- A user can empty application cache and data storage

iOS Website Data Settings

View sites that have stored data locally

New

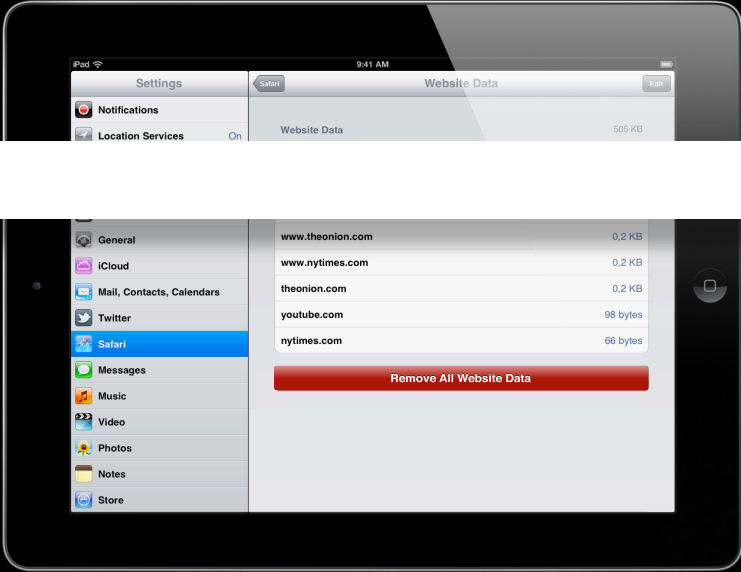


iOS Website Data Settings

View sites that have stored data locally

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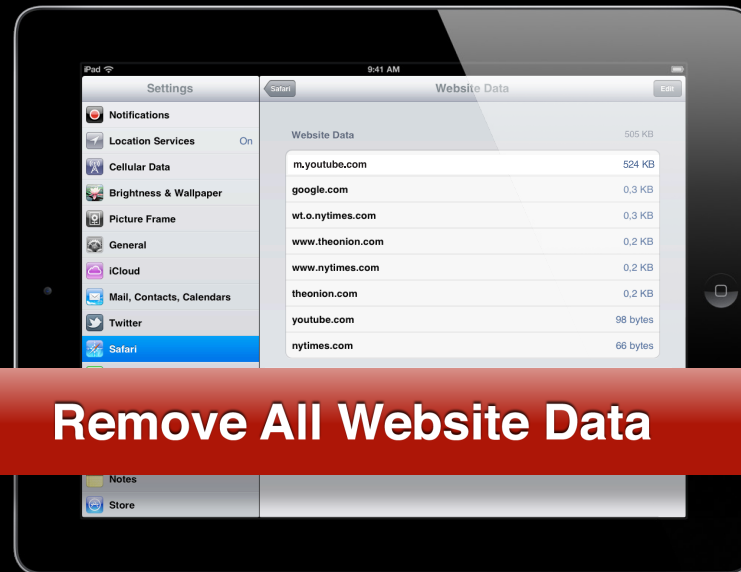
m.youtube.com 524 KB



iOS Website Data Settings

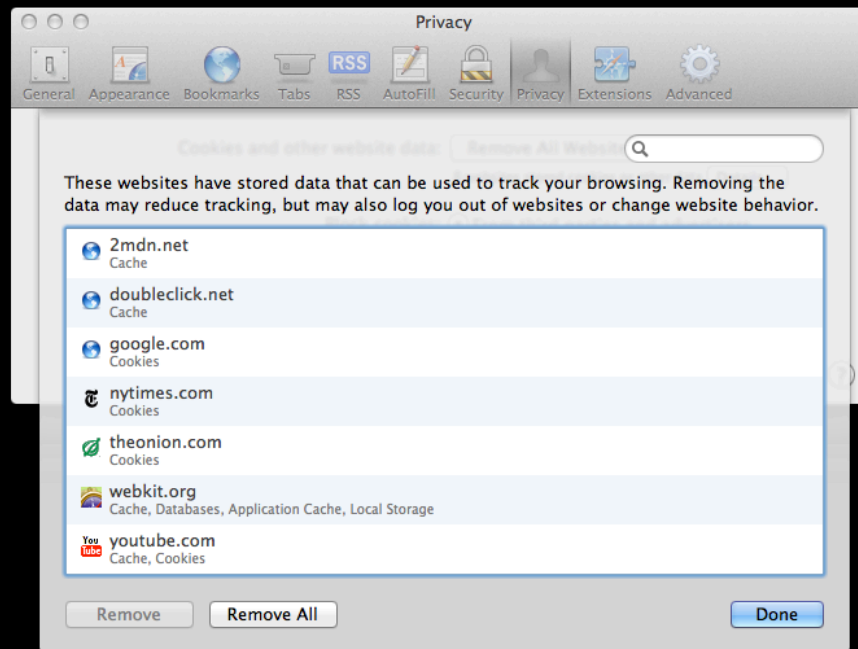
View sites that have stored data locally

New



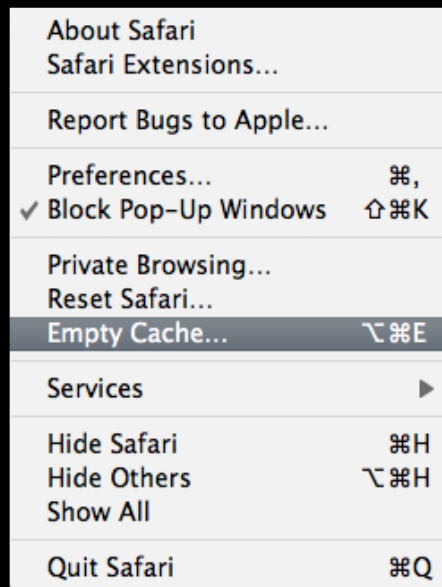
Desktop Privacy Settings

View sites that have stored data locally



Reset Safari and Empty Cache

General maintenance



Storing and Synchronizing Data

Synchronizing User Data

- Users expect transparent saving
- Cannot save to the server when offline
- Constantly saving affects performance and battery life

Synchronizing User Data

How often should I sync?

- How much work can the user afford to lose?
- Save locally when offline
 - ...or for better performance
- Handle `beforeunload` and `pagehide` events to synchronize immediately

Cookies

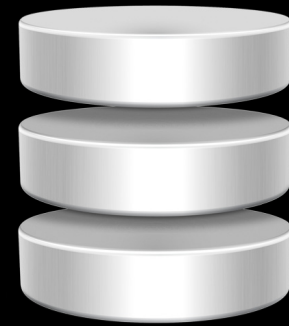


- Size limit
- Sent to server
- Unusual security model

Local Storage

- Items are key/value pairs
- Origin-based security

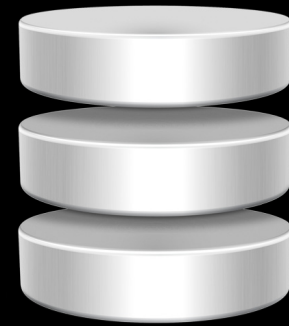
```
<script>  
    localStorage.playerName = "Mega Destroyer";  
    localStorage.currentLevel = "1";  
</script>
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Local Storage

- Items are key/value pairs
- Origin-based security

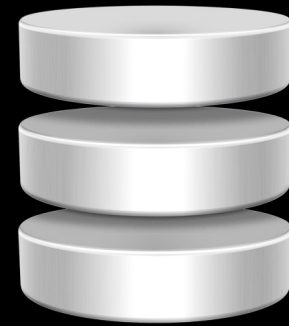
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Local Storage

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</script>
```



SQL Database

- Real-world SQL
- Asynchronous and callback-based
- Origin-based security



SQL Database

```
db.transaction(function(tx) {
    tx.executeSql(
        "SELECT name, company FROM WWDCAttendees", [], function(tx, result) {
            for (var i = 0; i < result.rows.length; ++i) {
                var row = result.rows.item(i);
                process(row.name, row.company);
            }
        }, function(tx, error) {
            alert('Failed to retrieve data: ' + error.message);
            return;
        });
});
```


SQL Database

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Demo

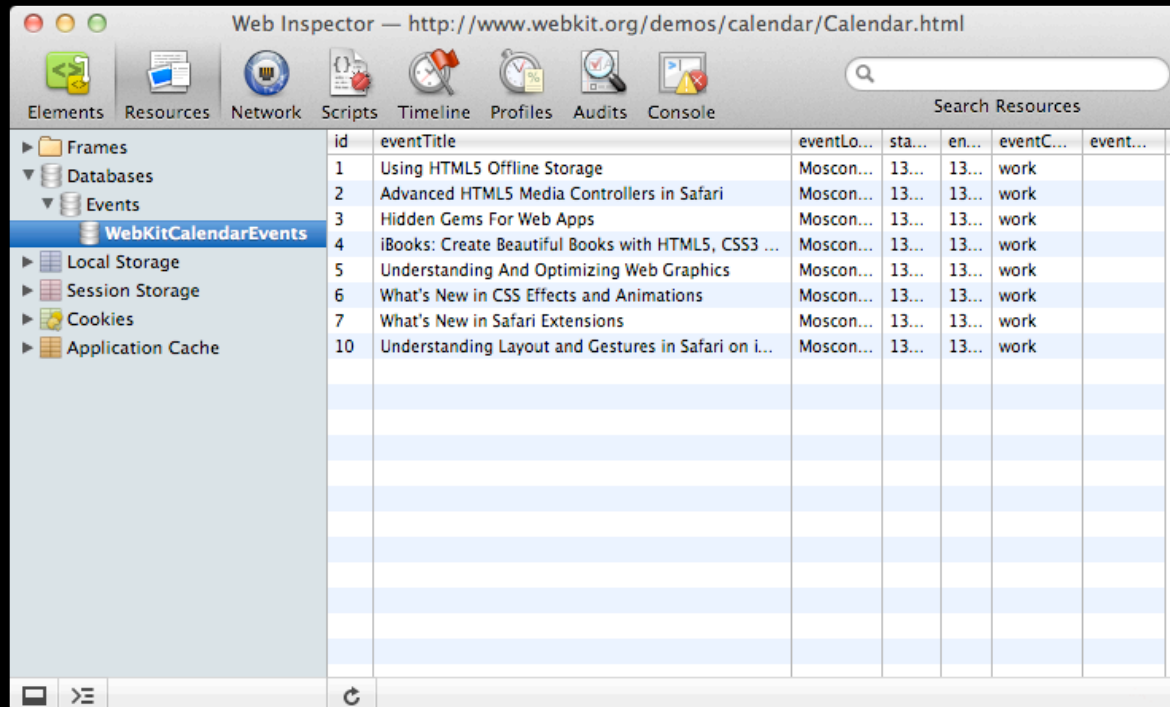
Andy Estes
Safari and WebKit Engineer

Debugging Offline Applications

If Nothing Works

- Web Inspector console
- Web Inspector Resources pane
- Log progress events

SQL Database

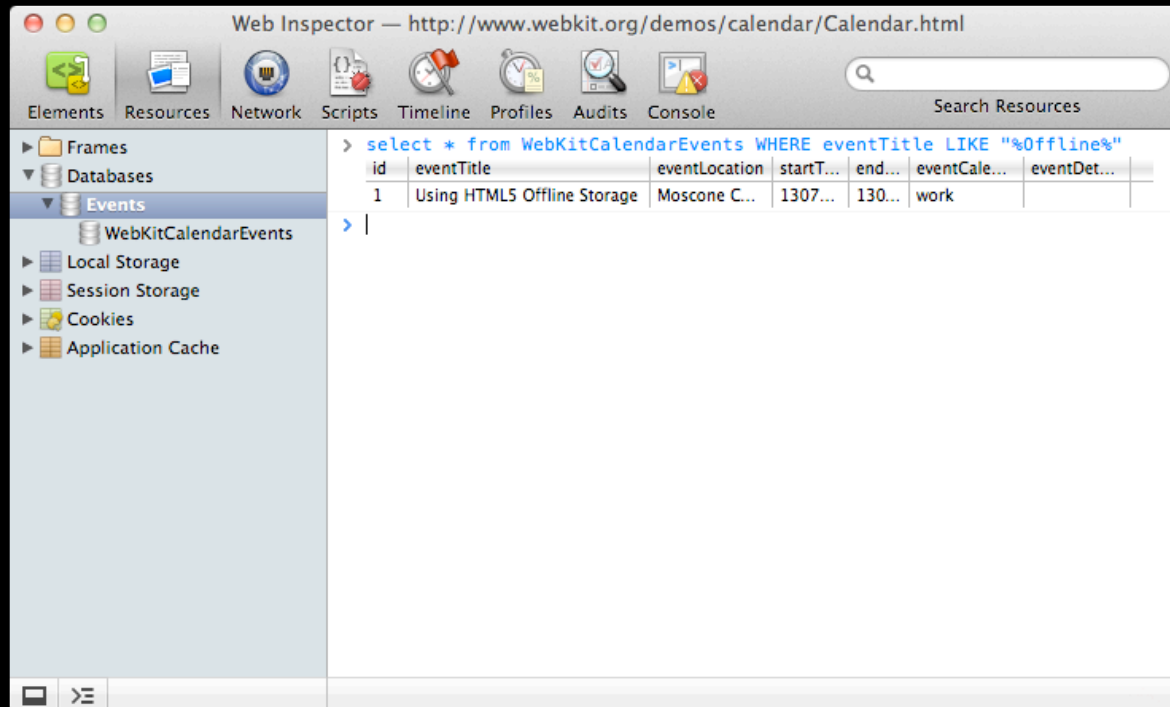


The screenshot shows the Web Inspector interface for a Safari browser. The 'Databases' pane on the left is expanded to show 'Events', which contains a database named 'WebKitCalendarEvents'. The main pane displays a table with the following data:

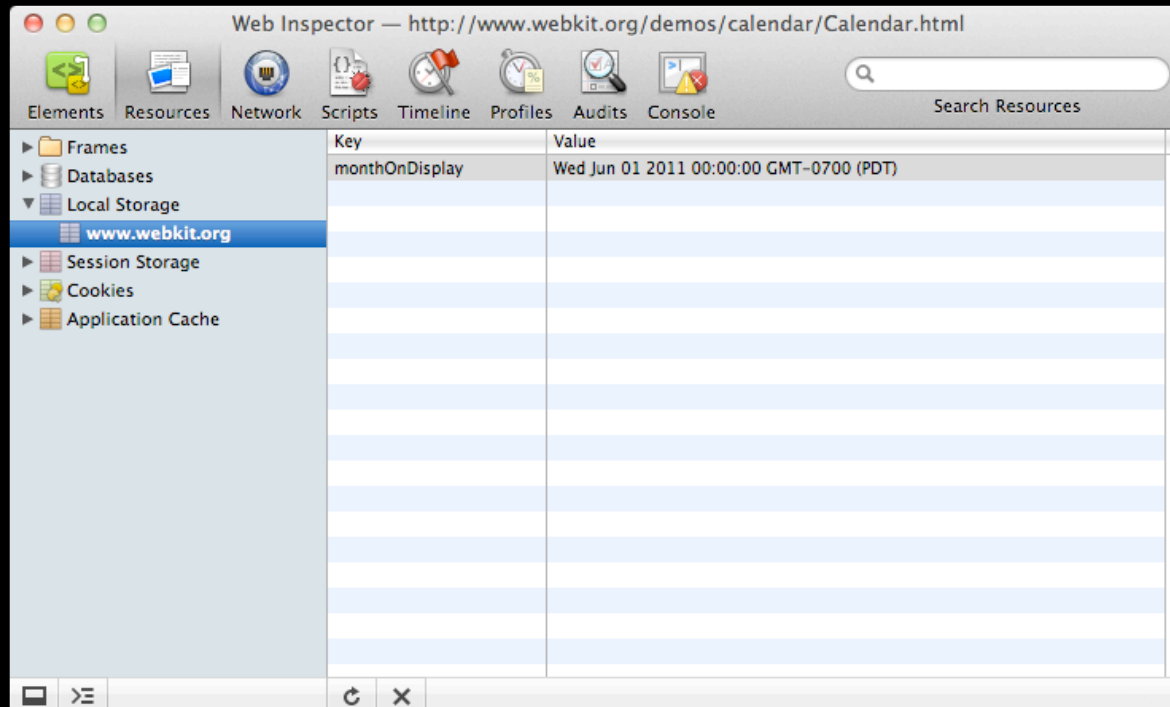
id	eventTitle	eventLo...	sta...	en...	eventC...	event...
1	Using HTML5 Offline Storage	Moscon...	13...	13...	work	
2	Advanced HTML5 Media Controllers in Safari	Moscon...	13...	13...	work	
3	Hidden Gems For Web Apps	Moscon...	13...	13...	work	
4	iBooks: Create Beautiful Books with HTML5, CSS3 ...	Moscon...	13...	13...	work	
5	Understanding And Optimizing Web Graphics	Moscon...	13...	13...	work	
6	What's New in CSS Effects and Animations	Moscon...	13...	13...	work	
7	What's New in Safari Extensions	Moscon...	13...	13...	work	
10	Understanding Layout and Gestures in Safari on i...	Moscon...	13...	13...	work	

SQL Database

Execute arbitrary SQL

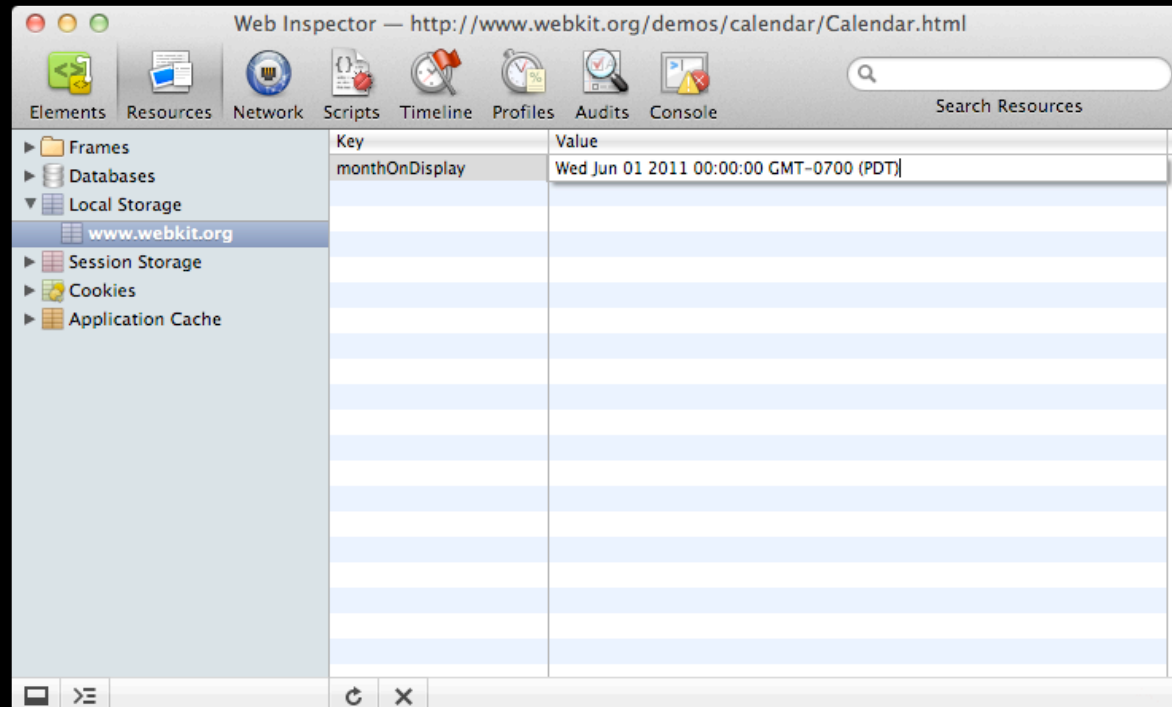


Local Storage



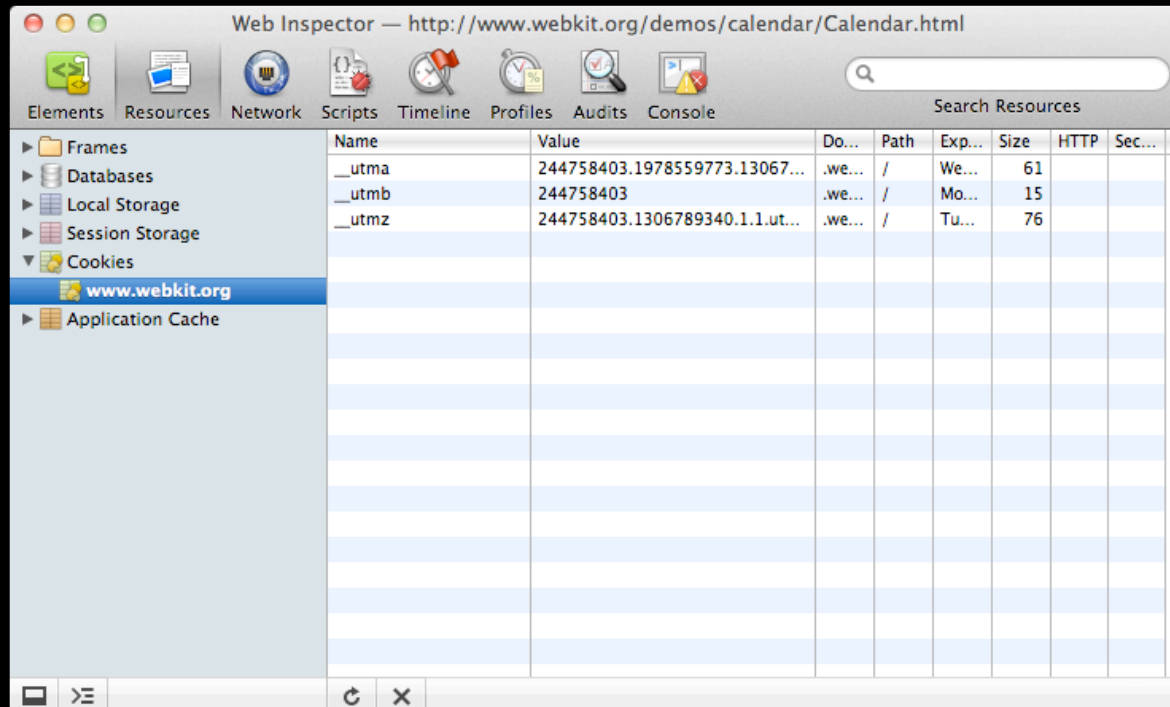
Local Storage

Editable view



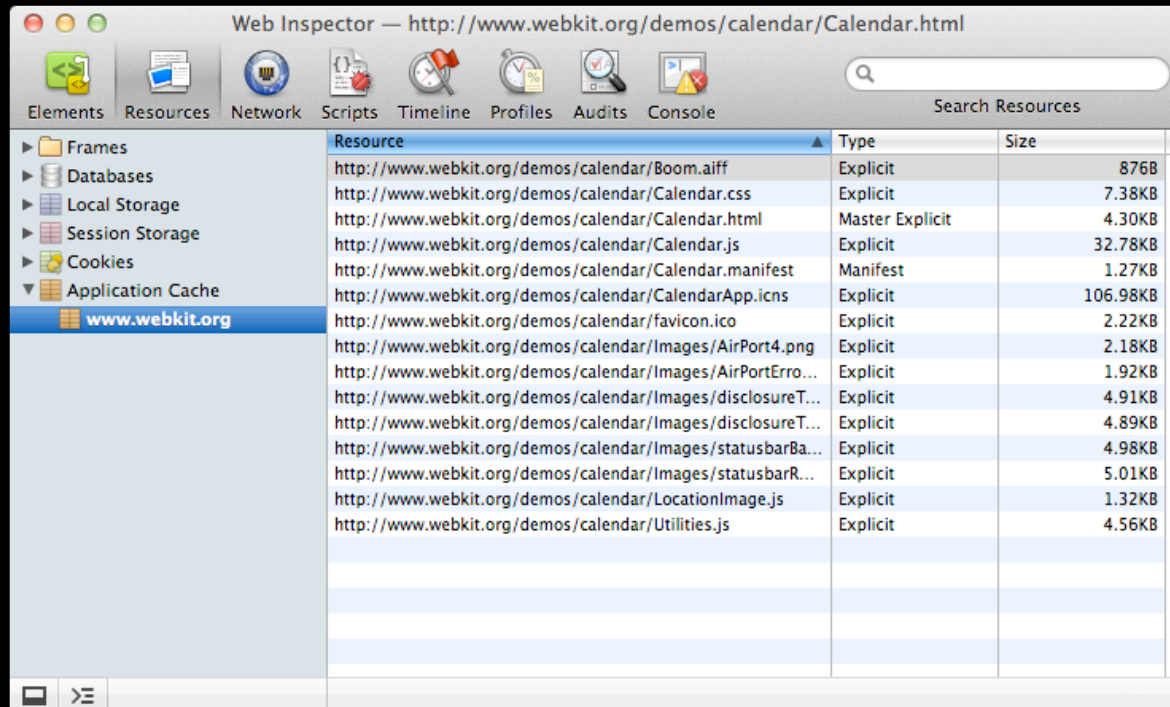
Cookies

View and delete cookies



Application Cache

New



The screenshot shows the Web Inspector interface for the URL `http://www.webkit.org/demos/calendar/Calendar.html`. The left sidebar displays various storage categories, with 'Application Cache' expanded to show the cache for 'www.webkit.org'. The main pane displays a table of resources stored in the cache.

Resource	Type	Size
<code>http://www.webkit.org/demos/calendar/Boom.aiff</code>	Explicit	876B
<code>http://www.webkit.org/demos/calendar/Calendar.css</code>	Explicit	7.38KB
<code>http://www.webkit.org/demos/calendar/Calendar.html</code>	Master Explicit	4.30KB
<code>http://www.webkit.org/demos/calendar/Calendar.js</code>	Explicit	32.78KB
<code>http://www.webkit.org/demos/calendar/Calendar.manifest</code>	Manifest	1.27KB
<code>http://www.webkit.org/demos/calendar/CalendarApp.icns</code>	Explicit	106.98KB
<code>http://www.webkit.org/demos/calendar/favicon.ico</code>	Explicit	2.22KB
<code>http://www.webkit.org/demos/calendar/Images/AirPort4.png</code>	Explicit	2.18KB
<code>http://www.webkit.org/demos/calendar/Images/AirPortErro...</code>	Explicit	1.92KB
<code>http://www.webkit.org/demos/calendar/Images/disclosureT...</code>	Explicit	4.91KB
<code>http://www.webkit.org/demos/calendar/Images/disclosureT...</code>	Explicit	4.89KB
<code>http://www.webkit.org/demos/calendar/Images/statusbarBa...</code>	Explicit	4.98KB
<code>http://www.webkit.org/demos/calendar/Images/statusbarR...</code>	Explicit	5.01KB
<code>http://www.webkit.org/demos/calendar/LocationImage.js</code>	Explicit	1.32KB
<code>http://www.webkit.org/demos/calendar/Utilities.js</code>	Explicit	4.56KB

Summary

- Offline technologies are essential on mobile
- The platform has gotten more powerful
- Safari offers great development tools

More Information

Vicki Murley

Safari Technologies Evangelist
vicki@apple.com

HTML5 Application Cache Specification

<http://www.whatwg.org/html>

HTML5 Web Storage Specification

<http://dev.w3.org/html5/webstorage>

HTML5 Web SQL Database Specification

<http://dev.w3.org/html5/webdatabase>

More Information

WebKit Open Source Project

<http://www.webkit.org/>
#webkit on irc.freenode.net

Safari Dev Center

<http://developer.apple.com/safari>

Apple Developer Forums

<http://devforums.apple.com>

Sessions

Hidden Gems for Web Apps

Marina
Tuesday 3:15PM

Labs

Safari Extensions Lab

Internet and Web Lab A
Thursday 4:30PM

HTML5 Offline Storage Lab

Internet and Web Lab B
Friday 9:00AM

