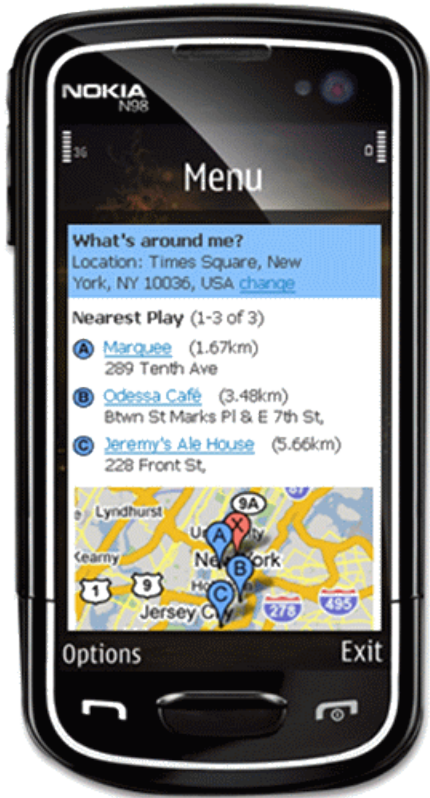# Maps APIs & Mobile

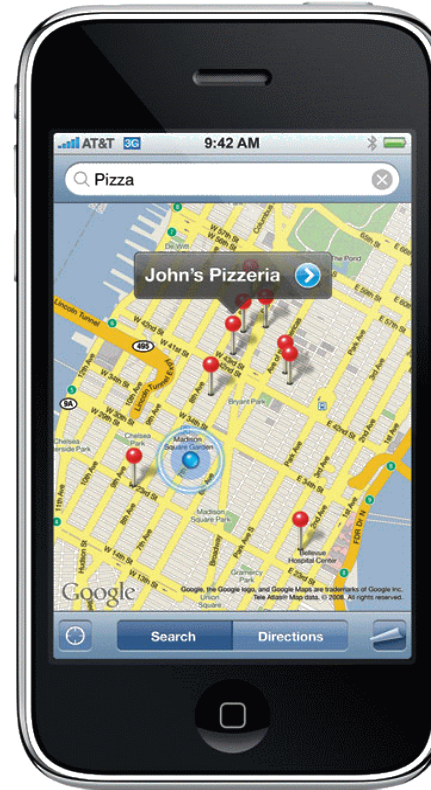Susannah Raub, Google
Ken Hoetmer, Lonely Planet
May 28, 2009

What are the API options?

Lowest common denominator:
Static Maps

Android, iPhone:
Native APIs

iPhone, Android, Nokia, Palm, etc:
JavaScript API

Google 09 I/O

Why develop in a browser?

- Many different platforms

- Let us solve the cross-device issues

- Mashups available on desktop as well as mobile

- No download

- We can release features (and bug fixes) faster

What makes mobile browsers tricky?

- Screen size

- User interface and interaction

- Speed

- Use cases

Speed

- iPhone Safari is ~10x slower to parse JavaScript than desktop browsers

- Caching is limited compared to desktop browsers

- Every millisecond matters

Causes of Latency

- Serving data

- Download time
  - Bandwidth vs latency
    - 3G networks have reasonably high bandwidth but high latency
    - Loading small and big files take a surprisingly similar amount of time

- JavaScript parsing time
  - CPU Bound
  - Expected to improve over time

Google 09

Back up: What is latency?

- Page load: the time until all components of the page are loaded, visible, and usable

- User perceived: the time until the page appears to have loaded

Google 09 I/O

Reducing latency on mobiles

- Reduce size of JavaScript
    - Compile/obfuscate code
    - Delay load code until required
- Combine image fetches using sprites

Google 09

Static Maps

http://maps.google.com/staticmap
 ?center=-41.5,172.5
 &zoom=5
 &size=320x480
 &maptype=terrain
 &markers=-41.283333,174.783333,greenw
 &key=MAPS_API_KEY
 &sensor=false

HTTP Geocoding Service

- Available without the JavaScript download
- Use in JavaScript when addresses do not change
- Reverse geocoding is also available

```
http://maps.google.com/maps/geo
 ?q=Wellington+NZ
 &output=json
 &oe=utf8
 &key=MAPS_API_KEY
 &sensor=false
```

So, how well does Google Maps API v2 work on mobile browsers?

- Not very

- Initial download: 60kB in 2006; 190kB now

- Time to load tiles

- Synchronous access to state limits ability to delay-load code

- Code base not designed with mobile in mind

Introducing v3

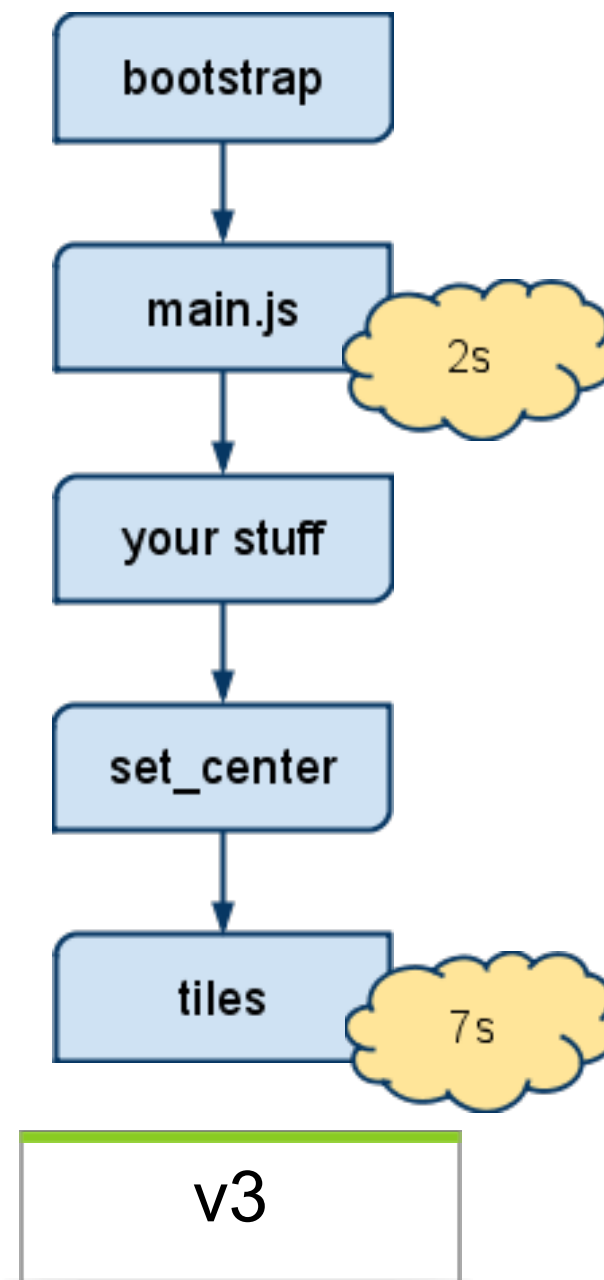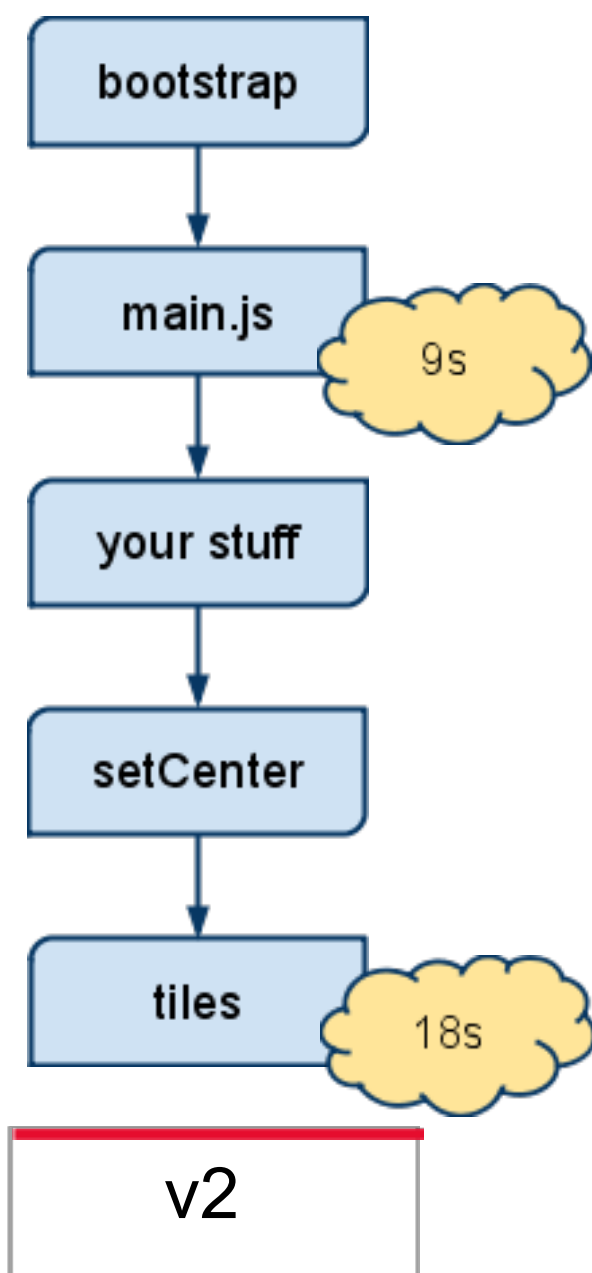# How does v3 address these issues?

- Significantly reduced initial download size: 35kB

- Significantly reduced loading time

- Incorporates static map to reduce perceived latency

- Designed with mobile devices in mind

Race: v2 vs v3

Speed Comparison

v2

bootstrap → main.js (9s) → your stuff → setCenter → tiles (18s)

v3

bootstrap → main.js (2s) → your stuff → set_center → tiles (7s)

Google 09 I/O

How does v3 accomplish this improvement?

- Load static map under the hood to render map faster
- MVC Architecture
  - Loads state-storing Models initially
  - Asynchronously loads Views required to render objects like Map and Marker
  - Allows rich application development
- Expected size increase for new features is minimal

- Internal untangling of code to help us add new features and fix bugs faster

What does v3 look like?

```
var map = new google.maps.Map(
  document.getElementById("map_canvas"),
  { center: new google.maps.LatLng(37.442, -122.142),
  zoom: 13,
  mapTypeId: google.maps.MapTypeId.ROADMAP
  });
var marker = new google.maps.Marker(
  {
  position: map.get_center(),
  map: map
  });
```

Overlay Map Demo

Overlay Map in MVC

```javascript
// Initialize two maps: one full size and one in a small div in the corner
// of the large map.
var map = new google.maps.Map(document.getElementById('map_canvas'));
var overlayMap = new google.maps.Map(
  document.getElementById('overlayMap'), {
    mapTypeId: google.maps.MapTypeId.ROADMAP, // Always show roadmap
    disableDefaultUI: true  // Turn off the controls
  });

// Set up zoom_changed listeners so that overlayMap's zoom changes to be 4
// less than map's and map's 4 greater than overlayMap's.
google.maps.event.addListener(map, 'zoom_changed', function() {
  var newZoom = Math.max(map.get_zoom() - 4, 0);
  if (overlayMap.get_zoom() != newZoom) overlayMap.set_zoom(newZoom);
});
google.maps.event.addListener(overlayMap, 'zoom_changed', function() {
  var newZoom = overlayMap.get_zoom() + 4;
  if (map.get_zoom() != newZoom) map.set_zoom(newZoom);
});

// overlayMap's center stays in sync with map's center
overlayMap.bindTo('center', map, 'center');
// Set map's properties now that all bindings and listeners are set up.
map.set_zoom(8);  // This will trigger a zoom_changed on the map
map.set_center(new google.maps.LatLng(-34.397, 150.644));
map.set_mapTypeId(google.maps.MapTypeId.ROADMAP);

// RectangleOverlay ellided
```

Adjust for Screen Size

What else is new in v3?

- Chrome and iPhone Safari are supported

- No keys required

- Default UI enabled

- New geocoding API

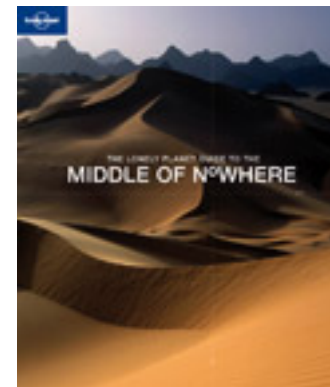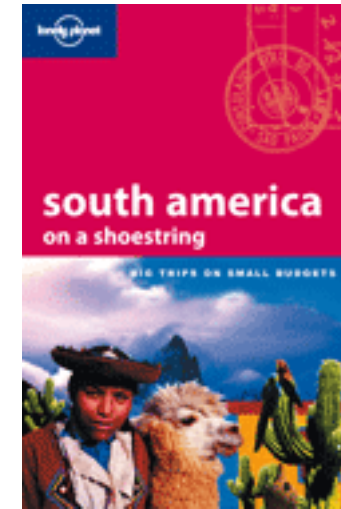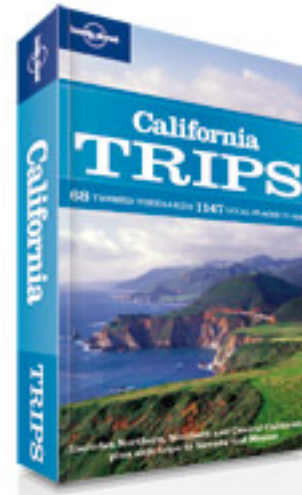- Limited features, but more coming soon!

Demo

Developer's Perspective

Lonely Planet - Iconic Guidebooks

Lonely Planet Digital

- Website - lonelyplanet.com
- Mobile site for iPhone - touch.lonelyplanet.com
- Mobile site for other devices - m.lonelyplanet.com
- Native guidebook app for iPhone
- Native phrasebook apps for iPhone, Android, Blackberry
- Compass and Live! apps for Android

What do we require of maps on mobile devices?

- 3 main features
    - Where is it?
    - What's around it?
    - Get me there!

- If we can locate the device, 2 more features
    - Where am I?
    - What's around me?

Google 09

How do we deal with maps on mobile?

- Tile server + route-me library on native iPhone city guide app
  - Solves all 5 requirements, but not cross-platform

- Static Maps API on m.lonelyplanet.com
  - Display points of interest and other points around them
  - Simulated map navigation by generating links to new static maps
  - Adequate for 'where is it?' and 'what's around it?', bad for 'get me there!', 'where am I?', and 'what's around me?'

How do we deal with maps on mobile? (cont)

- KML link to iPhone maps app on touch.lonelyplanet.com
  - Point of interest and 10 nearby points compiled into KML and opened in iPhone maps app
  - Good for 'where is it?' and 'get me there!', 'where am I?', bad for 'what's around it?', 'what's around me?'
  - Poor site experience

- Alternative: Google Maps JavaScript API v3
  - Good for 'where is it?' and 'what's around it?'
  - 'Where am I?' and 'what's around me?' coming in iPhone OS 3.0
  - Keeps user on the site instead of closing Safari to open maps app
  - Open native maps app for directions

Demo

Questions!

http://code.google.com/apis/maps/documentation/v3/