

Google™



# Developing Android Applications for Google TV

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5/11/2011



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# Agenda

- Overview of Google TV
- Optimizing your app for the TV
- Enabling your app for Google TV
- Extra capabilities, outlook for the future



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- **Overview of Google TV**
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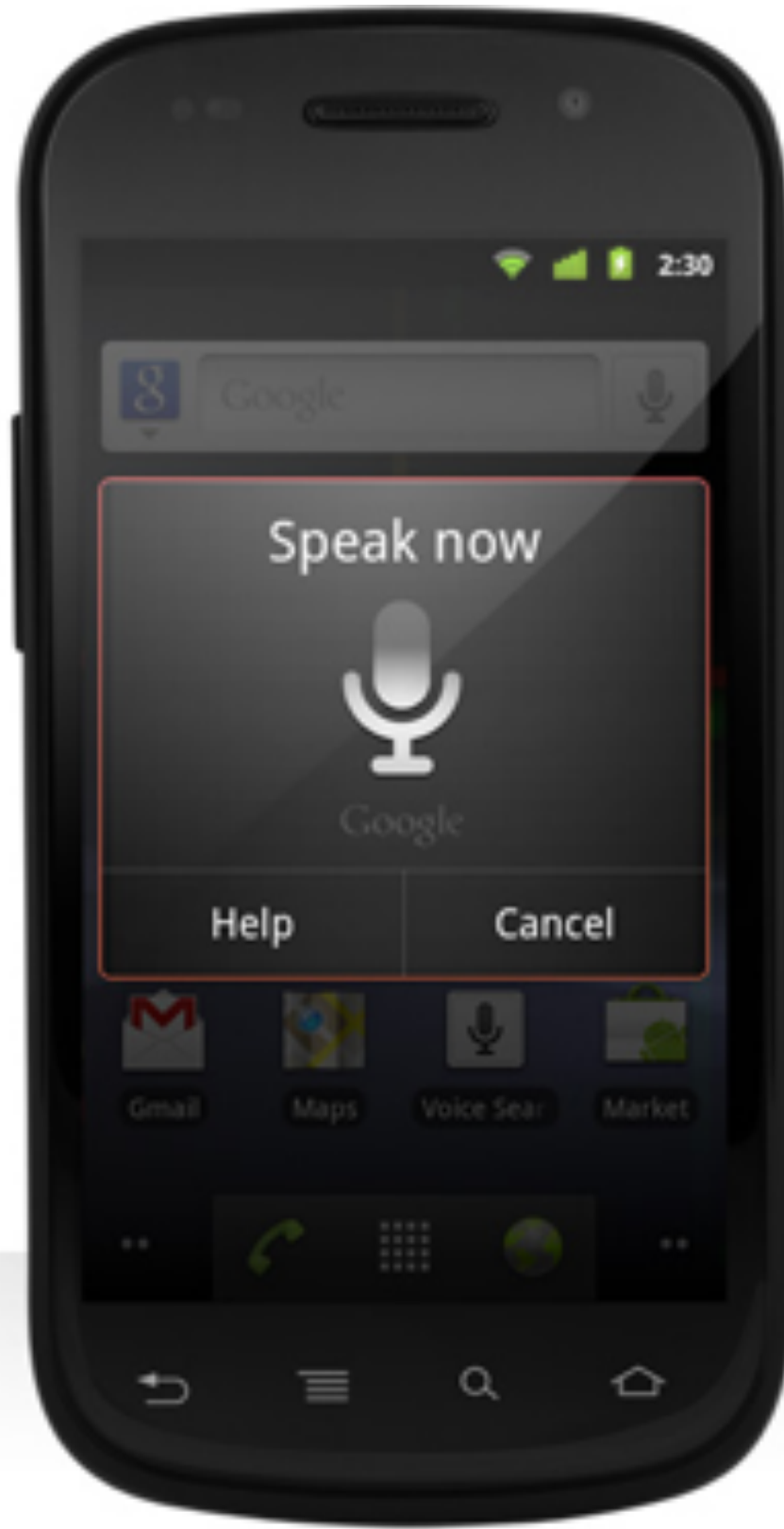


Google TV  
Not too long ago ...



# Google TV

... the world changed!



# Google TV

Remember the days...





# Google TV

The BIG Picture

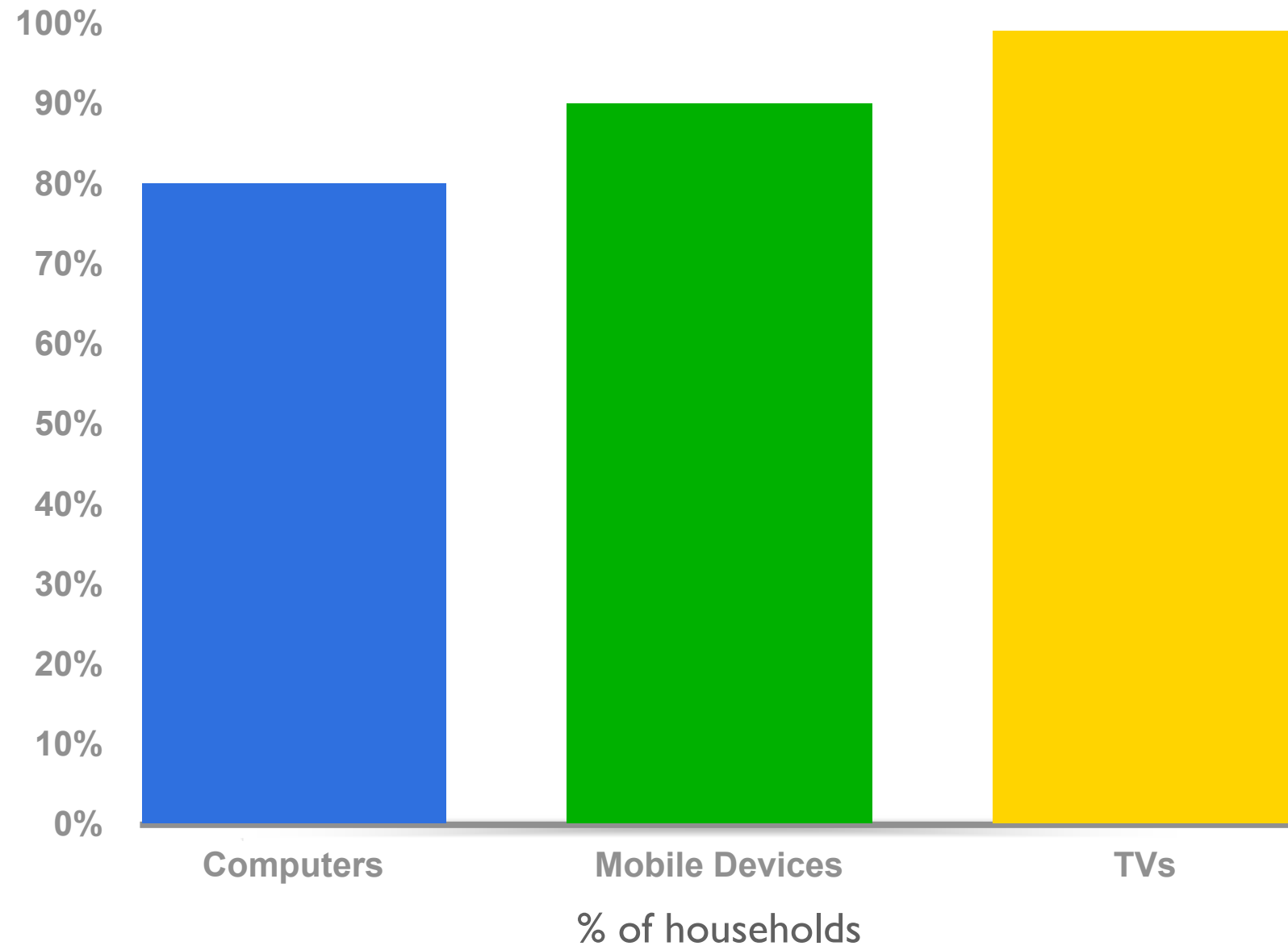


!= Device



== Platform for Developers

# Why is Television Interesting?



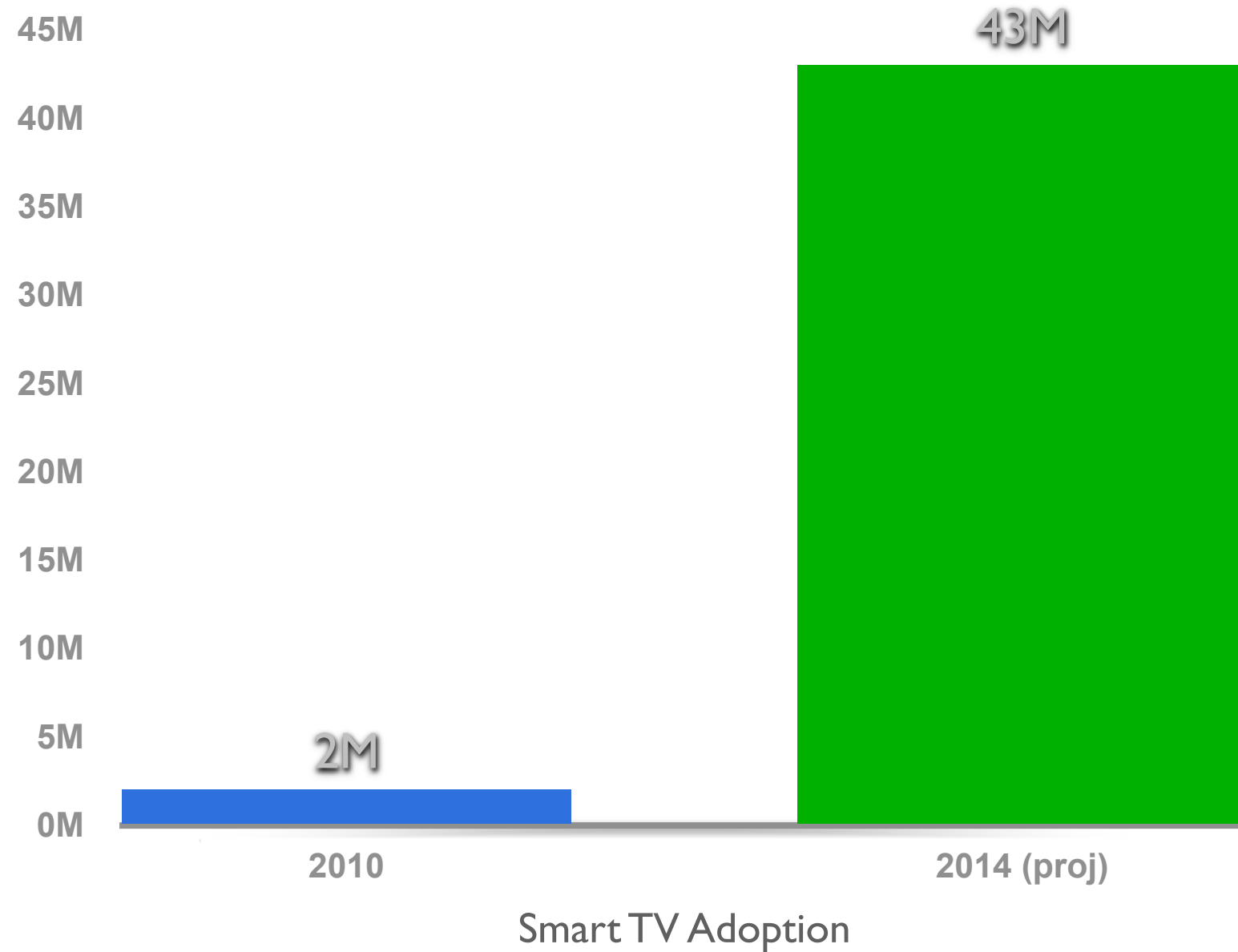
More American households have TVs than cell phones or computers.

<sup>1</sup> Source: Nielsen Research

<sup>2</sup> Source: Pew Research, Internet and American Life Project 2011

<sup>3</sup> Source: International Telecommunication Union, The World in 2009: ICT Facts and Figures

# Why is Television Interesting?



By 2014, more than 1/3 of households in the US will have an Internet-connected television.

<sup>1</sup> Source: James McQuivey, Forrester Research, *Connected TVs Will Sell, But Will They Get Used?*, 2010

<sup>2</sup> Source: In-Stat Research, *Installed Base of "Smart TV" Web-Enabled Home Consumer Electronics Devices to Reach Over 230 Million by 2014*

# What's coming to Google TV

- Google TV will be updated with Honeycomb later this summer
- Major developer features:
  - Android compatibility
  - Android Market
  - adb
- SDK add-on:
  - Emulator
  - Additional TV specific functionality
- Google TV IP Remote Protocol

# Honeycomb on Google TV

- What does this mean for Developers:
  - Google TV is compatible with Android 3
  - You can now create applications for the living room
  
- Developers can use regular Android 3 SDK (API Level 11)



# Google TV - with Honeycomb



# Google TV - with Honeycomb

The screenshot shows a Google TV search interface with a dark background and a search bar at the top containing the text "green day". Below the search bar, there are several search results:

- See all TV and Movie results for 'green day'**: Accompanied by a multi-colored icon.
- Green Day Live at the Fox**: Includes a "live tv" icon, "HD" badge, and "Now Playing | abc" text.
- Green Day - Wikipedia, the free encyclopedia**: Includes the Chrome logo and the URL "en.wikipedia.org/wiki/Green\_Day".
- More results**: A highlighted blue bar with a downward arrow icon and the text "Napster (1), Pandora (1)".
- Green Day artist**: Includes a cat-like face icon.
- Green Day Radio station**: Includes the Pandora logo.

The background of the interface features a dark image of a crowd with their hands raised in the air.

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# Designing for TV

TVs are not just "big phones"

- Input Devices:
  - No touch screen, but a D-Pad
  - Full keyboard
  - Mouse -- a "fake" touch screen
- The TV screen:  
It's big, but is a "10ft experience"
- Shared Device  
vs.  
Personal Device



# Designing for TV



## Input Devices

# Designing for TV - input devices



Five Way  
Navigation

"D-Pad"



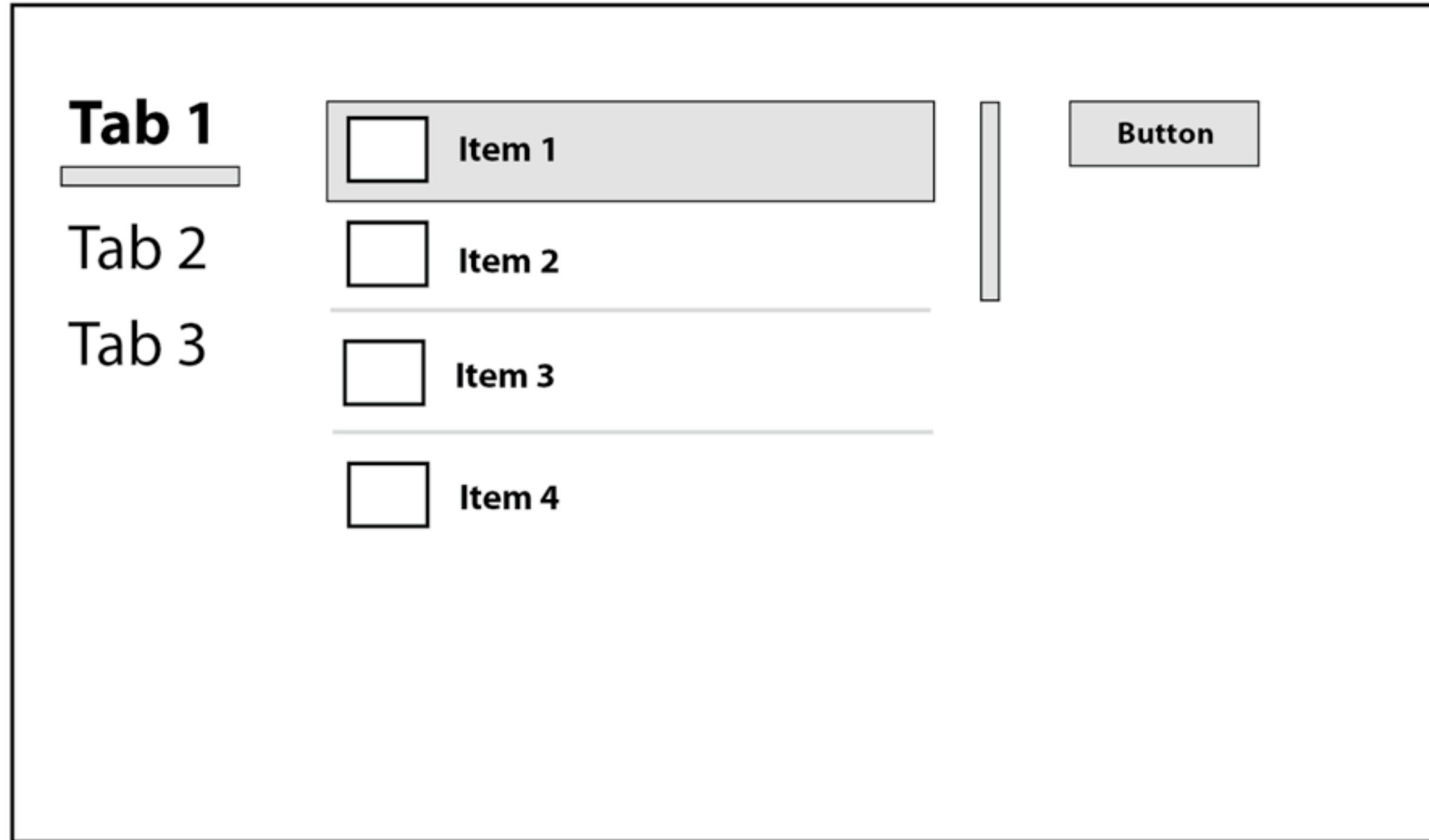
# Designing for TV - input devices

Example of a touch-optimized UI



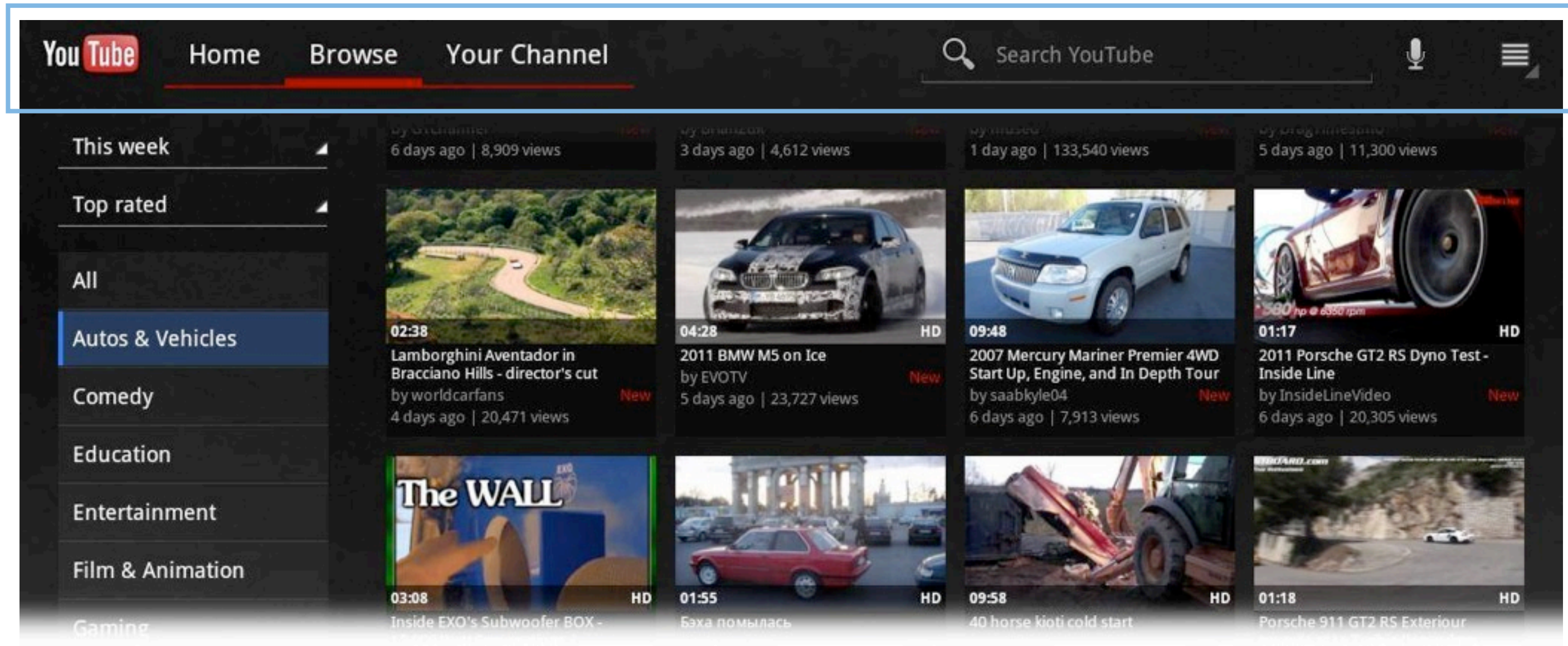
# Designing for TV - input devices

Improved for D-Pad navigation



# Designing for TV - input devices

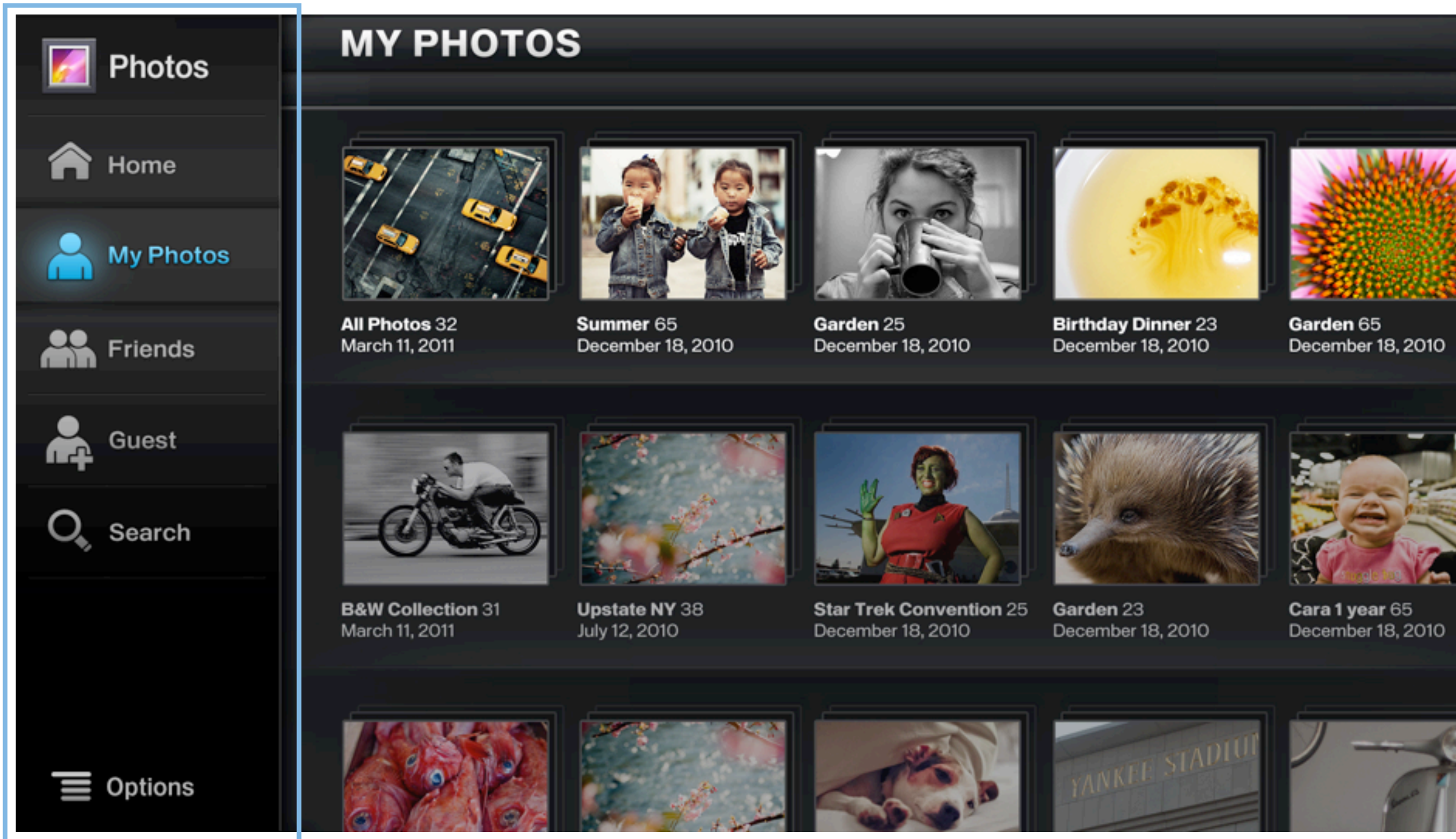
## Action Bar on Tablets



The Action Bar standardizes app navigation and the highlighting of menu options.

# Designing for TV - input devices

Action Bar optimized for D-Pad



# Designing for TV



The Screen





# Designing for TV - the screen

Sizes, resolutions & densities

	<b><i>LDPI</i></b> (Low Density) ~120 DPI	<b><i>MDPI</i></b> (Medium Density) ~160 DPI	<b><i>HDPI</i></b> (High Density) ~240 DPI	<b><i>XHDPI</i></b> (Extra High Density) ~320 DPI
Small Screen	QVGA (240x320)			
Normal Screen	WQVGA400 (240x400) WQVGA432 (240x432)	HVGA (320x480) <b>HTC-GI</b>	WVGA800 (480x800) WVGA854 (480x854)	
Large Screen		WVGA800*(480x800) WVGA854*(480x854)		
Extra Large Screen		WXGA (1280x800) <b>Xoom Tablet</b>		

# Designing for TV - the screen

Sizes, resolutions & densities

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Small Screen	QVGA (240x320)			
Normal Screen	WQVGA400 (240x400) WQVGA432 (240x432)	HVGA (320x480) <b>HTC-G1</b>	WVGA800 (480x800) WVGA854 (480x854)	
Large Screen		WVGA800*(480x800) WVGA854*(480x854)	<b>TV 720P (1280x720)</b>	<b>TV 1080p (1920x1080)</b>
Extra Large Screen		WXGA (1280x800) <b>Xoom Tablet</b>		

# Designing for TV - the screen

Why only "large" ?

Users are much further away from the screen than phones or tablets!



- This makes the "effective" visual screen density much higher (in fact: xhdpi on 1080p)
- ... which means the system will scale elements more
- ... which means the effective screen size is "only" large

# Designing for TV - the screen

Sizes, resolutions, densities

	Max. Physical Resolution	Density	DPI	Max. Logical Resolution	Screen Size
720 p	1280 X 720 px	HDPI	213	960 dp X 540 dp	Large
1080 p	1920 X 1080 px	XHDPI	320	960 dp X 540 dp	Large

- Yes, our DPI values are 213 & 320
  - Physically it's ~50 pixels/inch or so, but viewed from a distance, the density appears much higher
- Yes, a TV screen is "Large".
  - At a 10ft distance, a TV appears smaller than a Tablet!

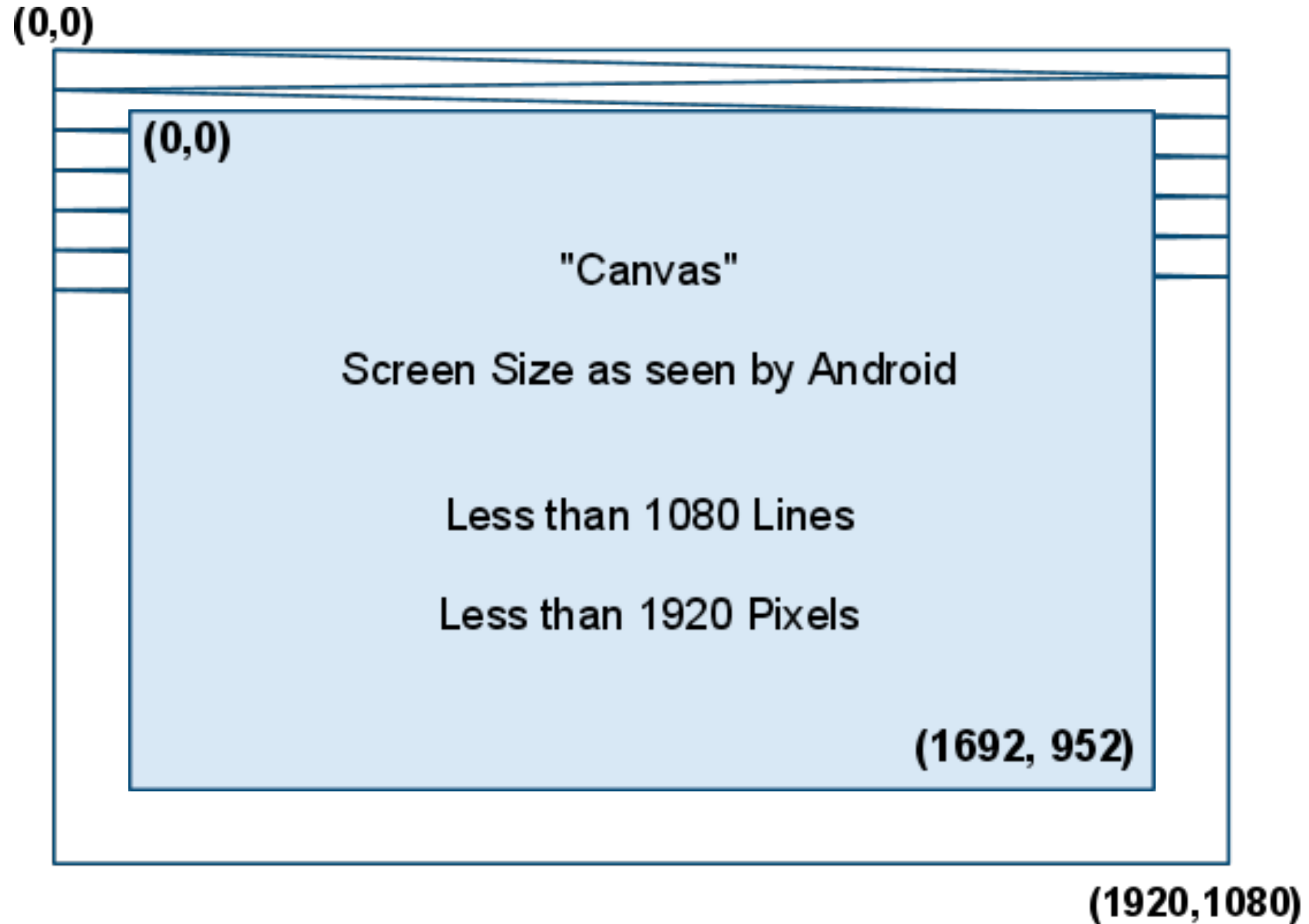
# Designing for TV - the screen

TV Overscan.... a little bit of History



# Designing for TV - the screen

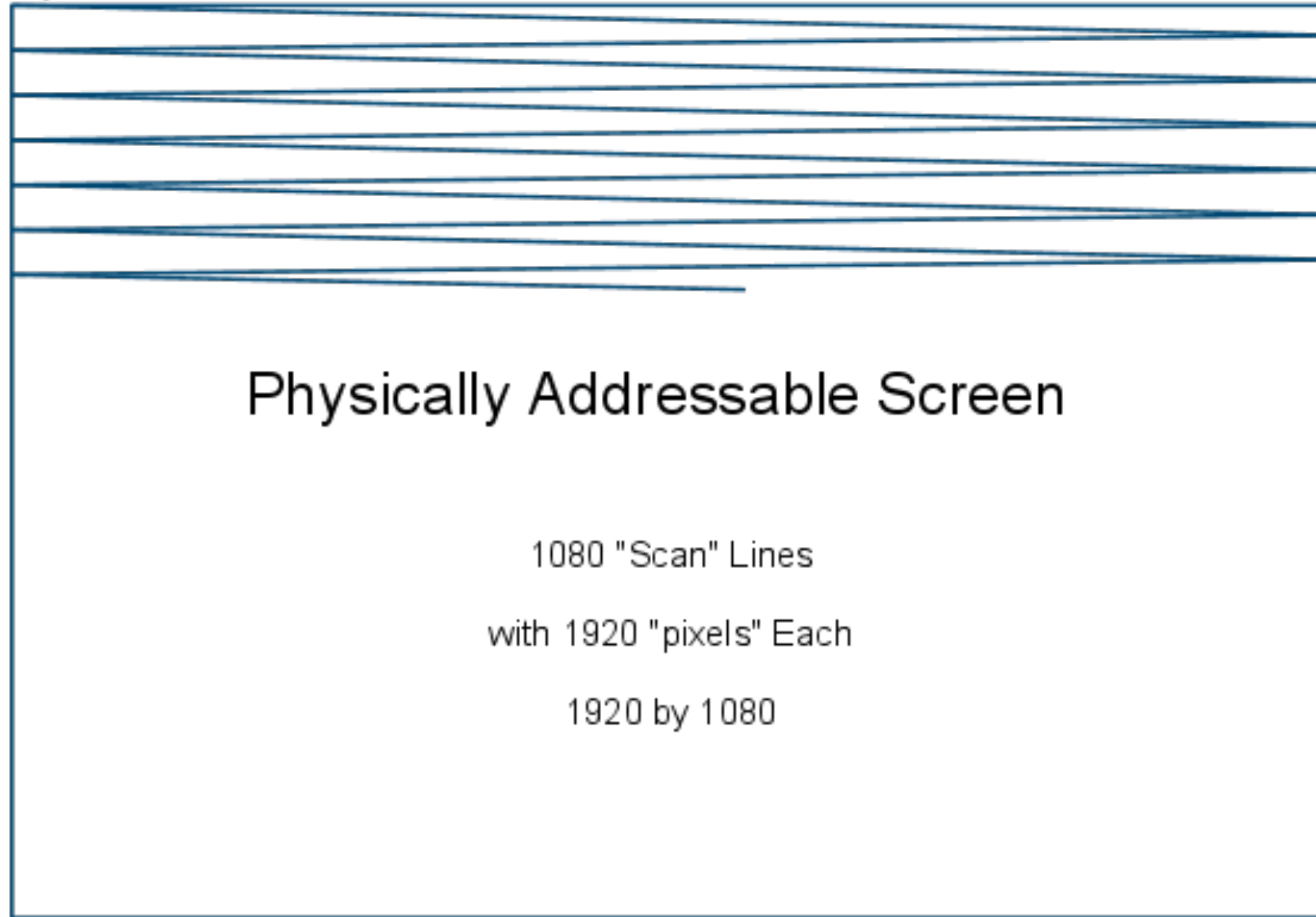
TV Overscan in Google TV



# Designing for TV - the screen

TV Overscan in Google TV

**(0,0)**



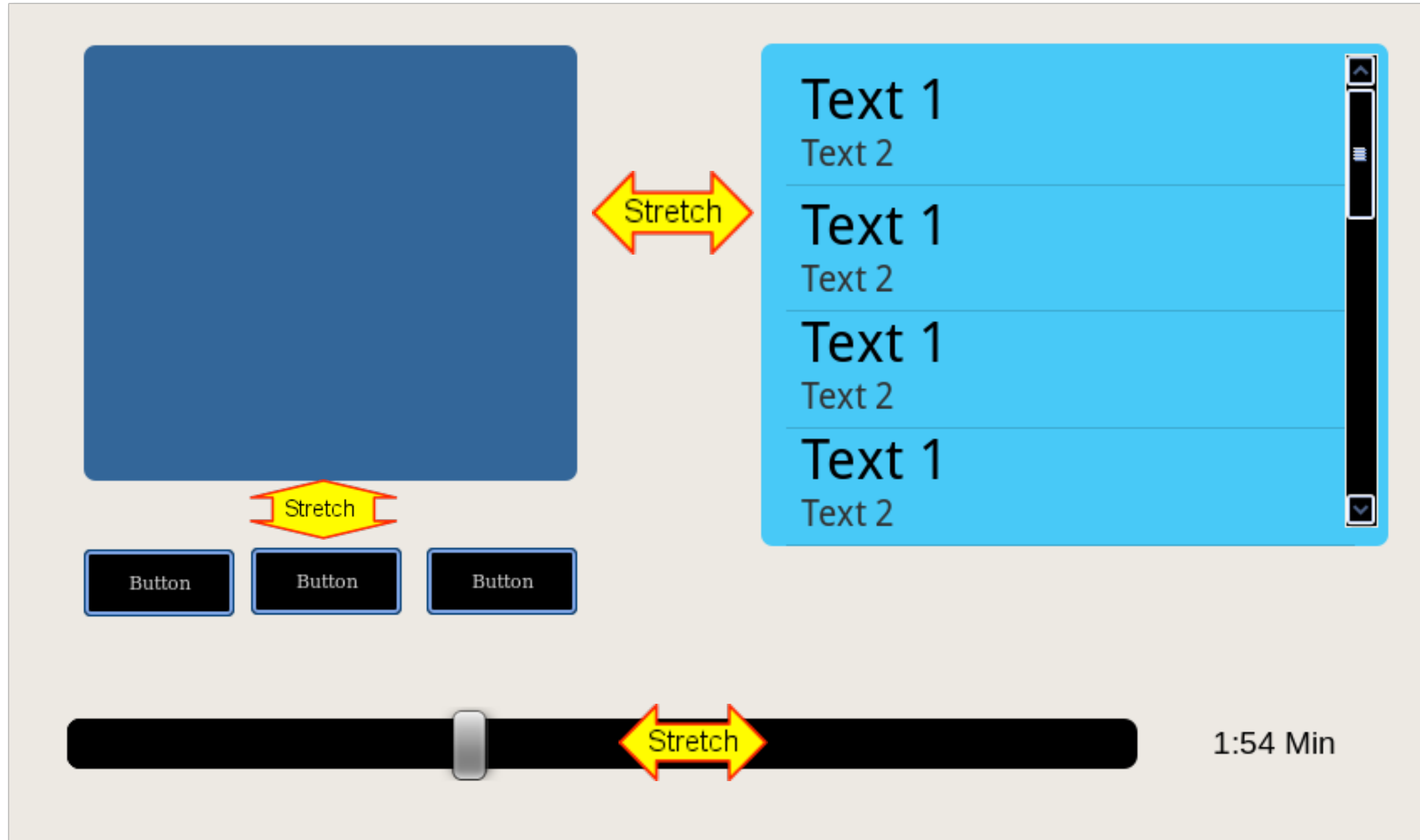
Physically Addressable Screen

1080 "Scan" Lines  
with 1920 "pixels" Each  
1920 by 1080

**(1920,1080)**

# Designing for TV - the screen

Dealing with overscan - use dynamic Layouts





# Designing for TV - the screen

## Orientation

- TV viewers cannot re-orient their screen
- Activities that lock into portrait mode, or set the orientation at runtime, are **NOT** good candidates for TV
- Ensure your apps function in landscape, and look good too!

# Designing for TV

A Social Device

# Designing for TV - a social device

Keep in mind:

- TVs are used by multiple people, often simultaneously

# Designing for TV

## Recap

You can make an awesome Android app on TV if you understand what makes TV different:

- Optimize for D-Pad navigation; avoid relying on touch (mouse)
- Provide assets, layouts etc. as necessary for TV configurations
- Keep in mind it is a shared device

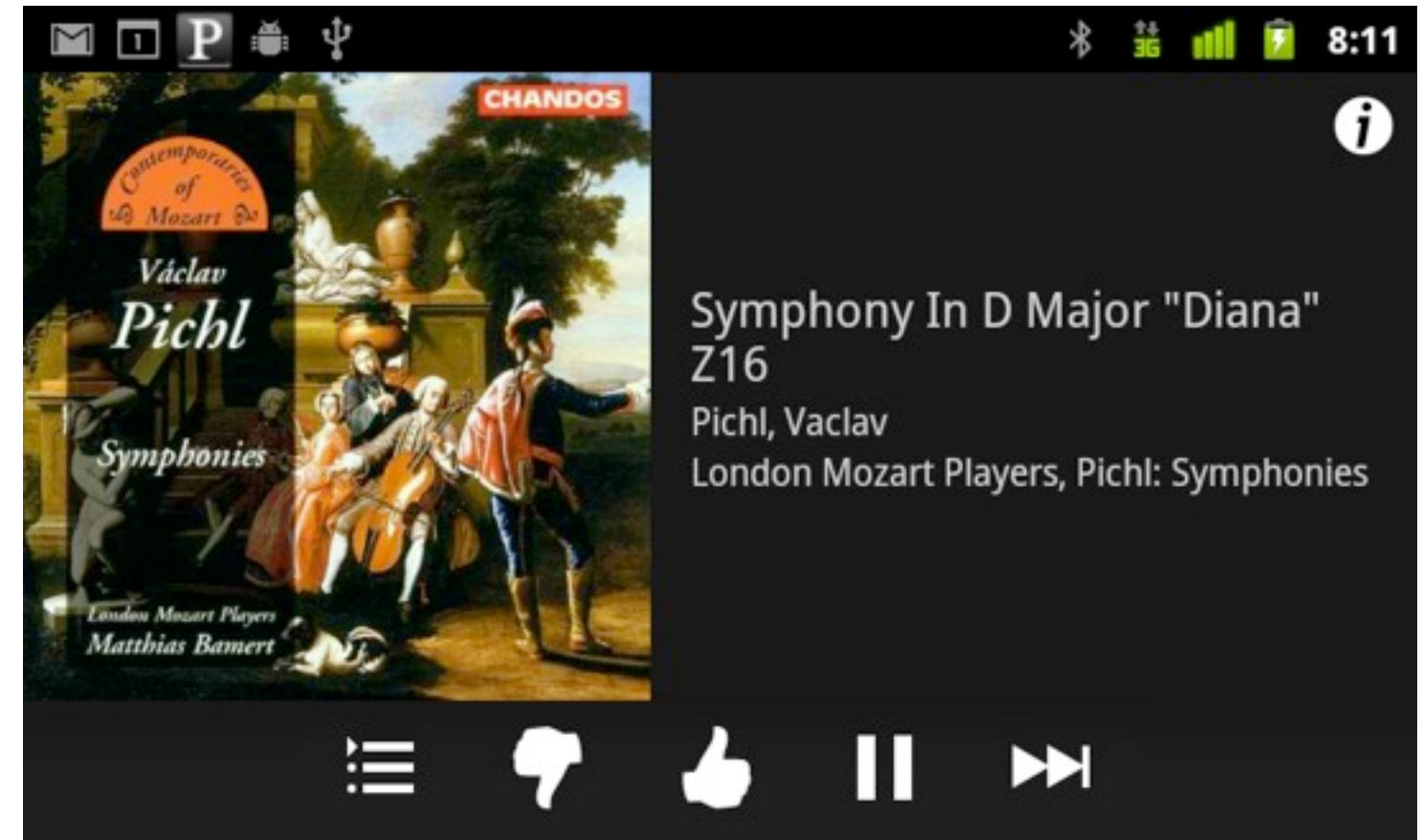
# Designing for TV

Examples

# Designing for TV

Pandora Internet Radio

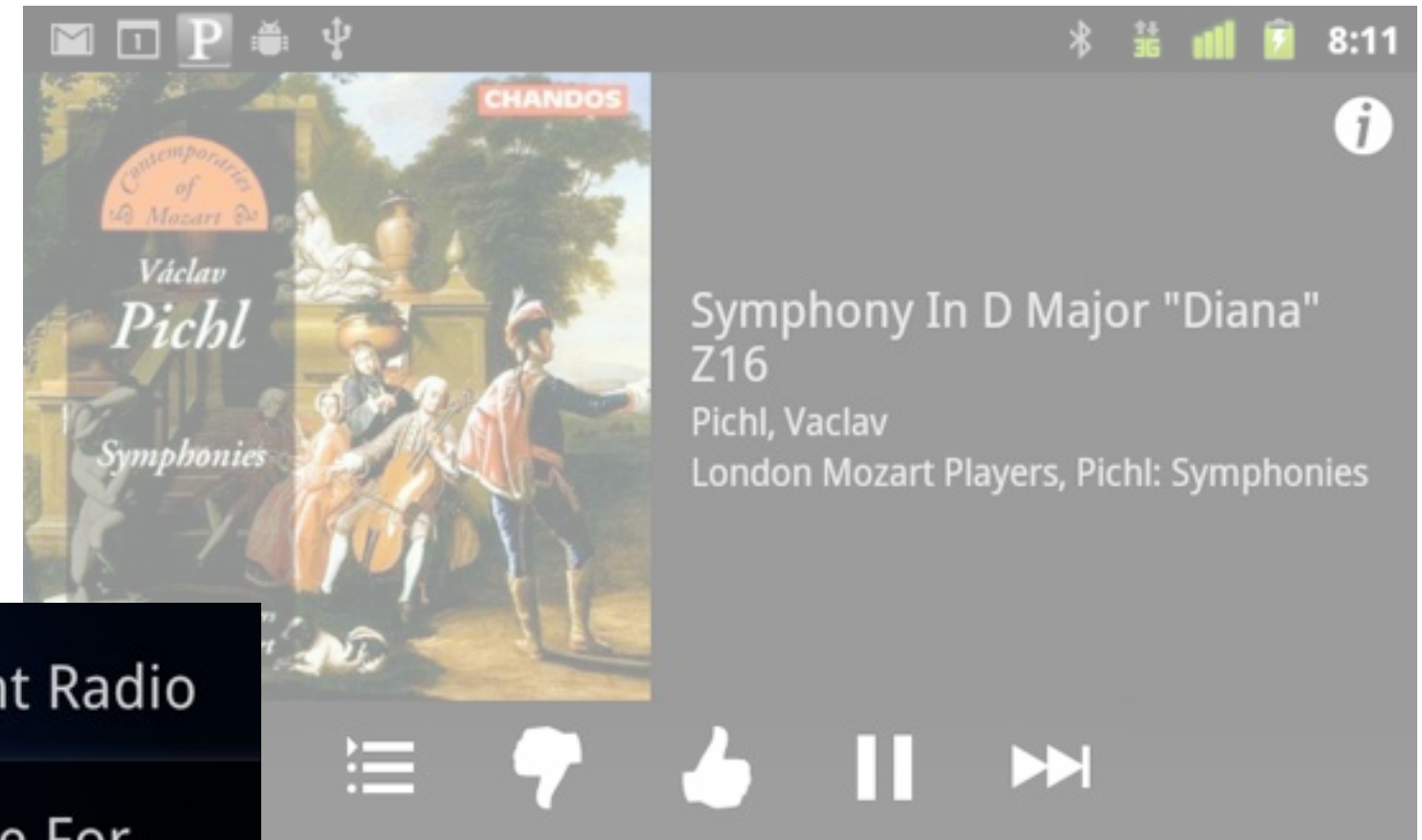
Very similar design of  
Mobile and TV Application



# Designing for TV

Pandora Internet Radio

Very similar design of  
Mobile and TV Application



# Designing for TV

## CNBC Real Time

Custom UI for

- Mobile
- Web
- TV





# Designing for TV

## CNBC Real Time

### Custom UI for

- Mobile
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**RT REAL-TIME QUOTES** SEARCH

Symbol / Company   Symbol Lookup

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U.S. ASIA-PACIFIC **EUROPE** ECONOMY ENERGY GREEN TECHNOLOGY BLOGS

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#### European Shares Close up Ahead of US Earnings

French CAC 40 Index

	LAST	CHANGE	% CHANGE
* FTSE	6055.75	▲ 48.38	+0.81%
* DAX	7217.02	▲ 38.24	+0.53%
* CAC 40	4061.91	▲ 33.61	+0.83%
* FTCNBC	5085.90	▲ 21.06	+0.42%

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Stress tests on European Union banks this year will use tougher criteria for measuring capital than last year, according to details released by the European Banking Authority Friday.

- US Says HSBC Helped Rich Tax Dodgers

Euro Ministers See Portugal Bailout Deal by Mid-May  
 Afraid of Euro Break-Up? Buy Eastern Europe Debt  
 Georgia President on Euro Zone Debt Crisis  
 Spain's Biggest Export, Young People  
 BP-Rosneft Deal Remains Blocked Indefinitely  
 TNT Issues Profit Warning on Brazil Woes  
 Egyptians Now Protest Against Mubarak Surrogates  
 Libya Rebels Blame NATO for Air Strike Mistake  
 Royal Bride Middleton Is No Diana, Say Experts  
 Trichet Shows Up Bernanke on Inflation?

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.05	▲ 0.78	0.96%
.11	▲ 0.40	1.69%
7.00	▲ 6.82	1.10%
.40	▲ 1.69	2.39%

Quote on CNBC Mobile Web

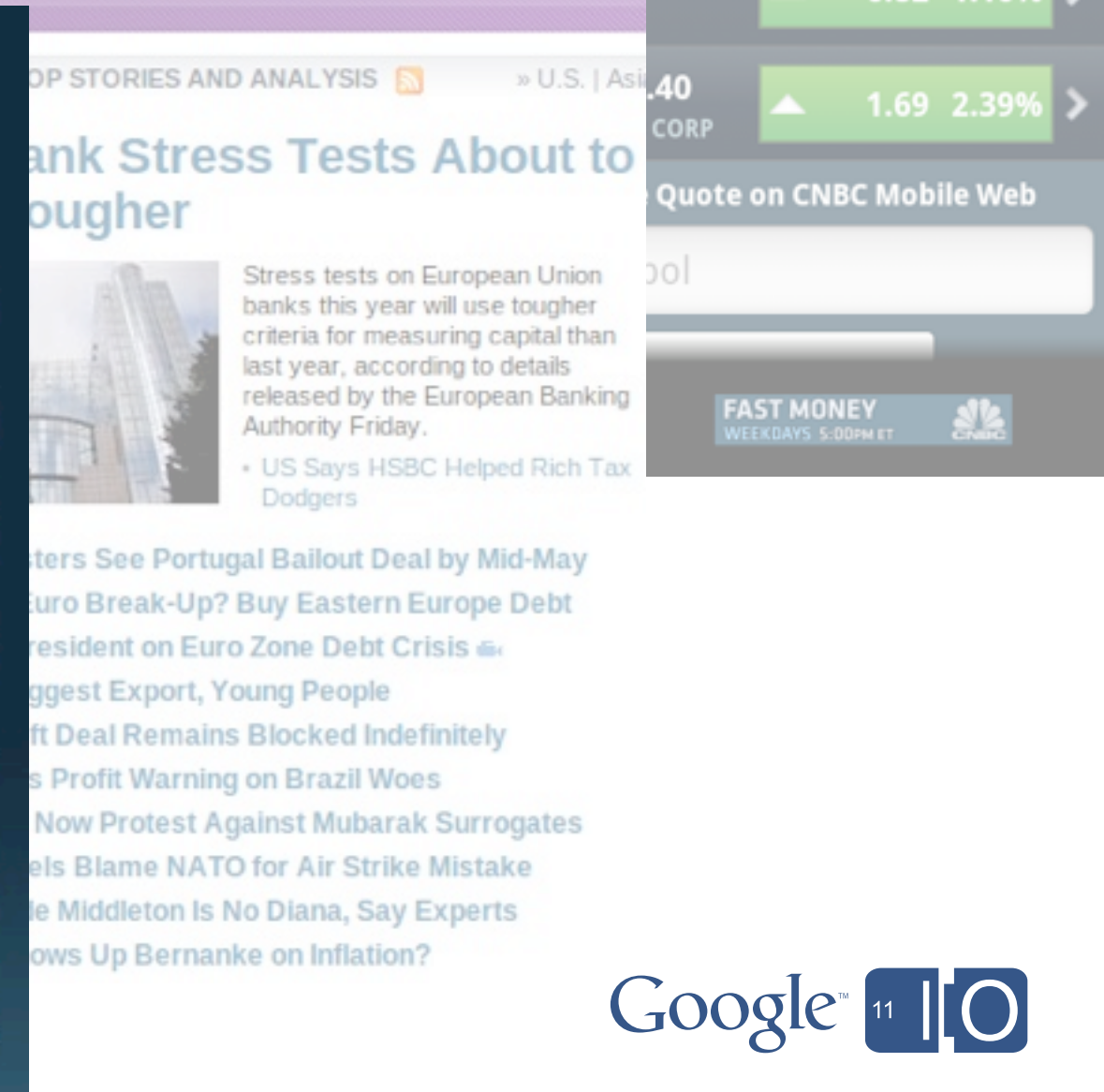
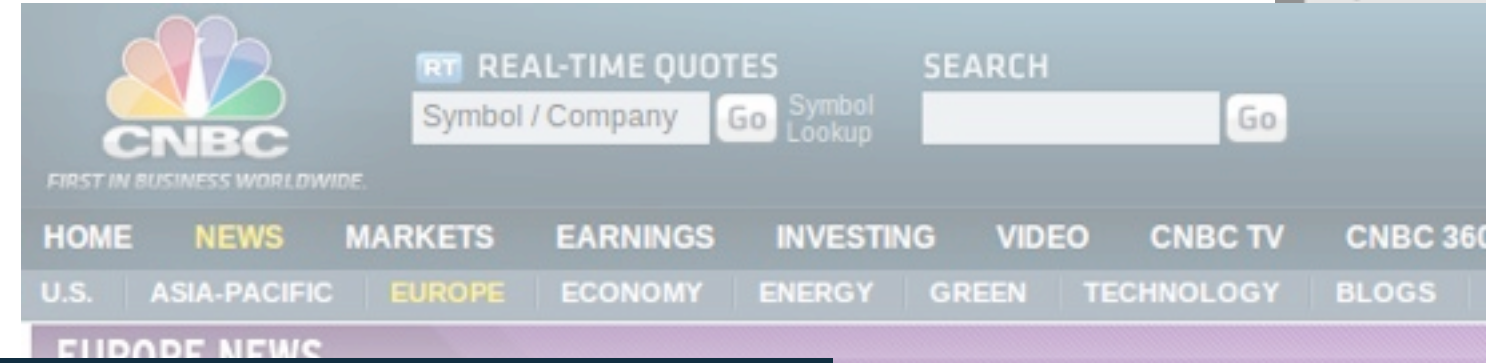
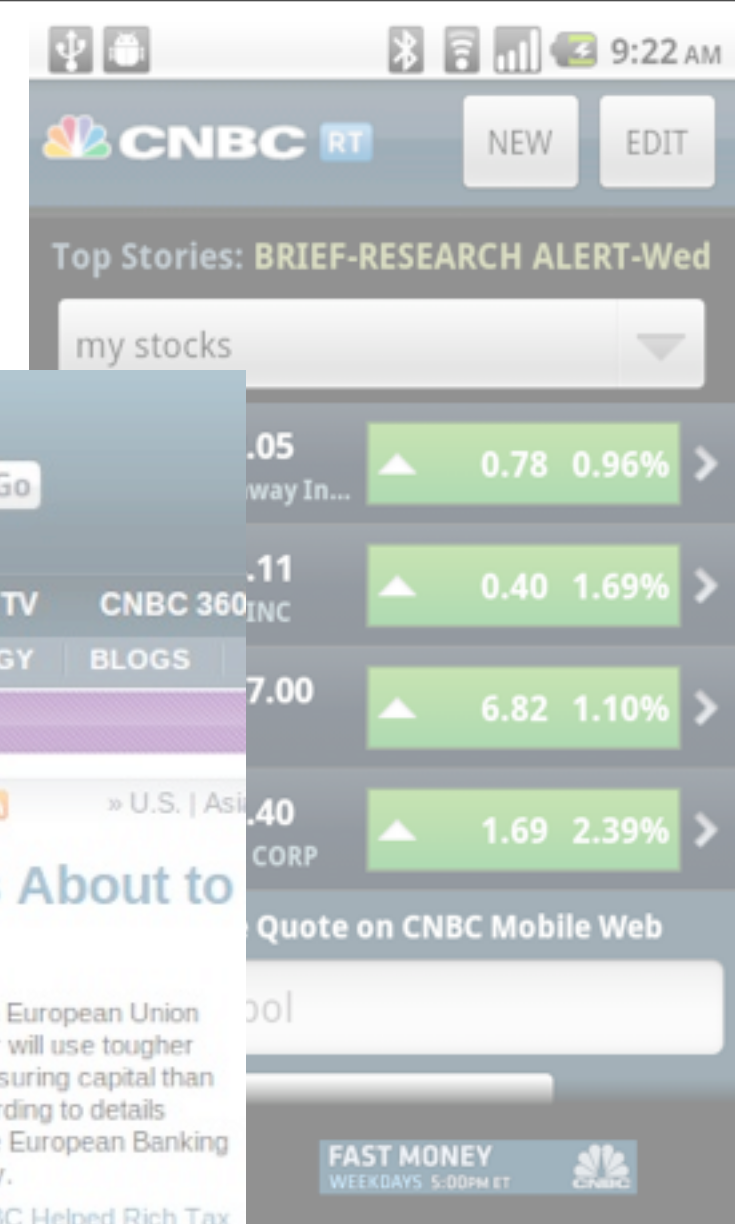
FAST MONEY WEEKDAYS 5:00PM ET

# Designing for TV

## CNBC Real Time

Custom UI for

- Mobile
- Web
- TV



# Agenda

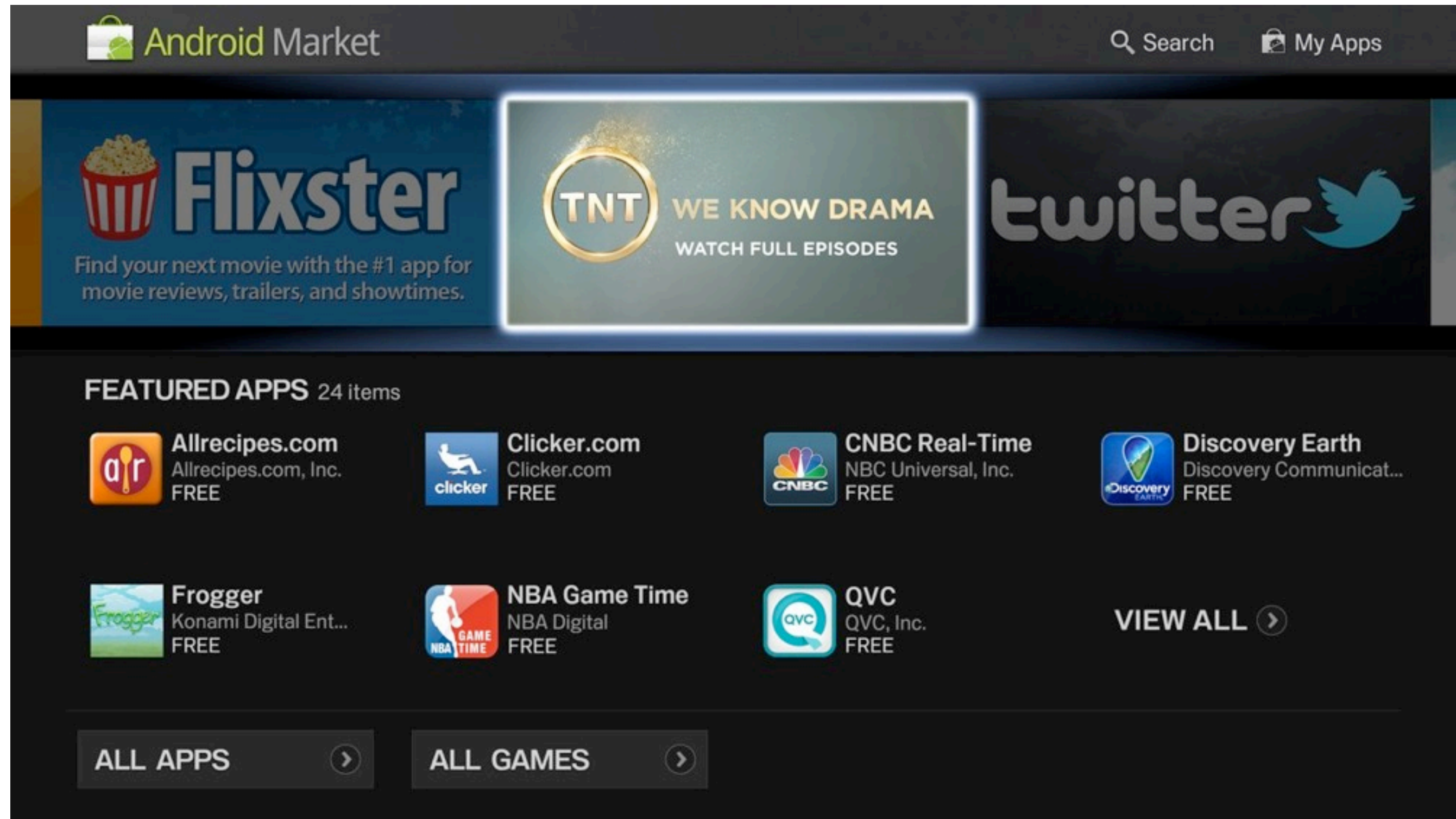
- Overview of Google TV
- Optimizing your app for the TV
- **Enabling your app for Google TV**
- Extra capabilities, outlook for the future



# Enabling for Google TV



# Enabling for Google TV - Market



# Enabling for Google TV - emulator

## Right now:

Run your app on the Honeycomb emulator

- set to a TV resolution (720p), TV density (hdpi), higher vm heap size

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## Coming soon:

Run your app with Google TV-Honeycomb images

- Includes nuanced behavior differences, additional APIs, and the TV "look & feel"

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## Right now:

Run your app on the Honeycomb emulator

- set to a TV resolution (720p), TV density (hdpi), higher vm heap size

## Coming soon:

Run your app with Google TV-Honeycomb images

- Includes nuanced behavior differences, additional APIs, and the TV "look & feel"

## Later this summer:

Run your app on an updated Google TV device with adb



# Enabling for Google TV - emulator

Use the Android Emulator for Google TV

Name: GoogleTV-720p

Target: Android 3.0 - API Level 11

SD Card:  Size: 10 MiB  File: Browse...

Snapshot:  Enabled

Skin:  Built-in: Default (WXGA)  Resolution: 1152 x 648

Hardware:

Property	Value
Abstracted LCD density	213
DPad support	yes
Max VM application heap size	48

Override the existing configuration with the defaults

Buttons: Cancel, Edit AVD, New..., Delete

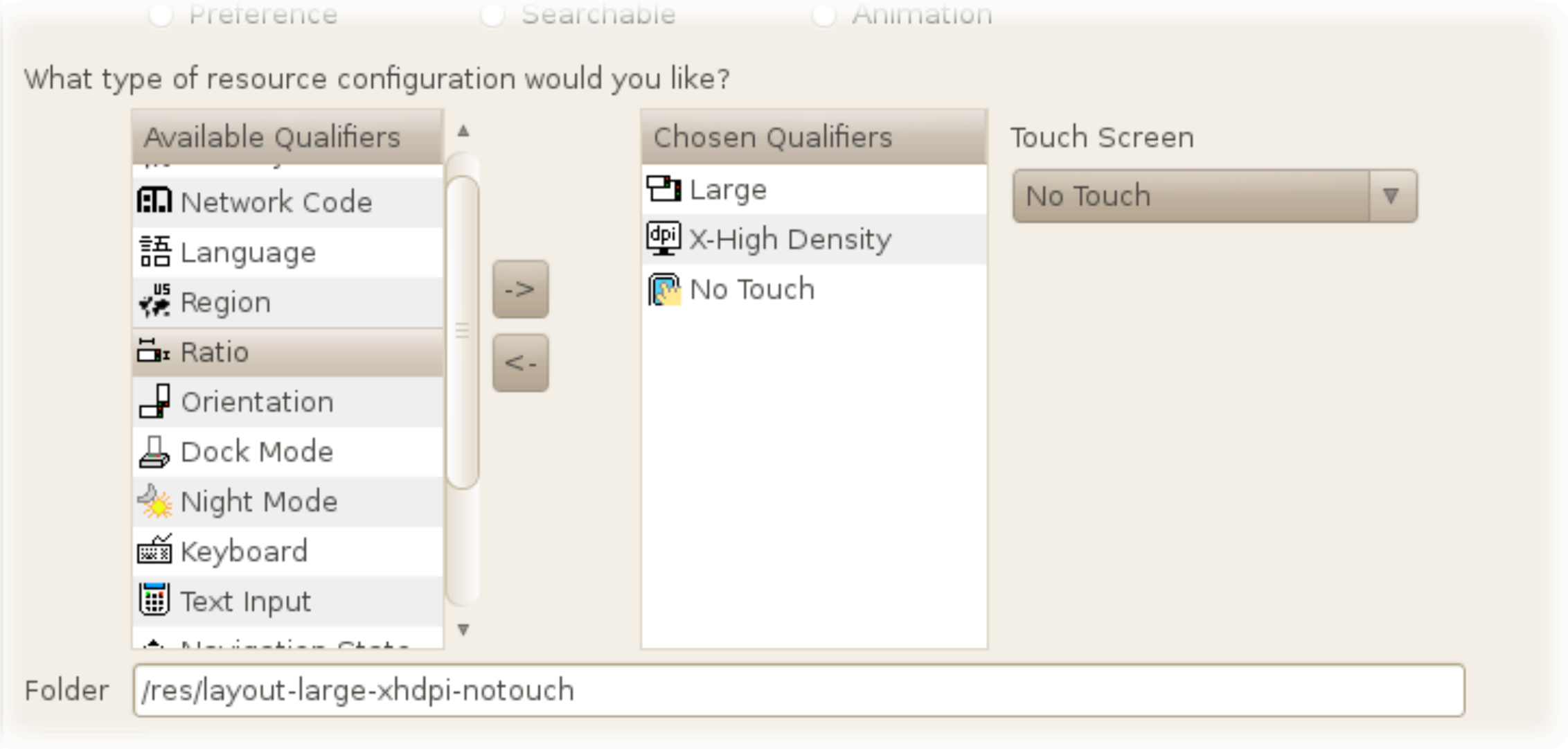
# Enabling for Google TV

So you want to optimize your app for TV.

What do you *REALLY* want?

# Enabling for Google TV

What you want	Method	Why not?
Optimize look and navigation for screen size/notouch	large-hdpi-notouch & large-xhdpi-notouch (resources)	You have something TV-specific in your app



# Enabling for Google TV

What you want	Method	Why not?
Optimize look and navigation for screen size/notouch	large-hdpi-notouch & large-xhdpi-notouch (resources)	You have something TV-specific in your app
Check at runtime if it's a Google TV, special treatment	PM.hasSystemFeature ()	It's special treatment

```
<uses-feature  
  android:name="com.google.android.tv"  
  android:required= ??? />
```

# Enabling for Google TV

What you want	Method	Why not?
Optimize look and navigation for screen size/notouch	large-hdpi-notouch & large-xhdpi-notouch (resources)	You have something TV-specific in your app
Check at runtime if it's a Google TV, special treatment	PM.hasSystemFeature ()	It's special treatment
Use the Google TV library when it's available	Manifest:<uses-library>	Specify it only if you use the library

```
<uses-library  
  android:name="com.google.android.tv"  
  android:required= ??? />
```

# Enabling for Google TV - Market

## Filtering & Features

Google TV has different hardware features than your typical Android device.  
Only require what you truly require!

Description	Feature ID
Emulated Touch Screen	<code>android.hardware.faketouch</code>
Basic Location and Network Location	<code>android.hardware.location</code> <code>android.hardware.location.network</code>
WiFi	<code>android.hardware.wifi</code>
Google TV	<code>com.google.android.tv</code>

# Enabling for Google TV - Market

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WiFi	<code>android.hardware.wifi</code>
Google TV	<code>com.google.android.tv</code>

 Watch out for implicit requirements from using permissions. Check docs to be safe.  
Be **explicit** about what you require and **don't** require!

# Enabling for Google TV - Market

Filtering & Features - touch options

Your app...	Feature in Manifest
... needs a real touchscreen	<b>(default) -or- android.hardware.touchscreen required=true</b>



# Enabling for Google TV - Market

## Filtering & Features - touch options

Your app...	Feature in Manifest
... needs a real touchscreen	(default) -or- <code>android.hardware.touchscreen required=true</code>
... needs some sort of 'touch', but is OK with a 'fake' one (mouse or touchscreen)	<code>android.hardware.touchscreen required=false</code>  <code>android.hardware.faketouch required=true</code>

# Enabling for Google TV - Market

## Filtering & Features - touch options

Your app...	Feature in Manifest
... needs a real touchscreen	<pre>(default) -or- android.hardware.touchscreen required=true</pre>
... needs some sort of 'touch', but is OK with a 'fake' one (mouse or touchscreen)	<pre>android.hardware.touchscreen required=false  android.hardware.faketouch required=true</pre>
... is fully D-Pad friendly	<pre><b>android.hardware.touchscreen required=false</b></pre>

# Enabling for Google TV - Market

Your app will not show up in Market for Google TV if it uses:

- NDK
- Camera, microphone
- Sensors, etc

We are working hard to enable these features in future versions of Google TV.

# Enabling for Google TV - Market

Your app will not show up in Market for Google TV if it uses:

- NDK
- Camera, microphone
- Sensors, etc

We are working hard to enable these features in future versions of Google TV.

... probably not the accelerometer.

# Enabling for Google TV - Market

How to ensure your app shows up in Market

```
<uses-feature
  android:name="android.hardware.touchscreen"
  android:required="false" />

<uses-feature
  android:name="android.hardware.location.gps"
  android:required="false" />

<uses-feature
  android:name="android.hardware.telephony"
  android:required="false" />

...etc
```

# Enabling for Google TV - Market

Market opt-out

**Q:** "Help! My app looks terrible on TV and I can't fix it right now!  
Make it go away!"

**A:** Your app is probably already filtered out by *implicitly requiring* touchscreen.  
If not, doing so is the simplest way right now to not be on the market.

```
<uses-feature  
  android:name="android.hardware.touchscreen"  
  android:required="true" />
```

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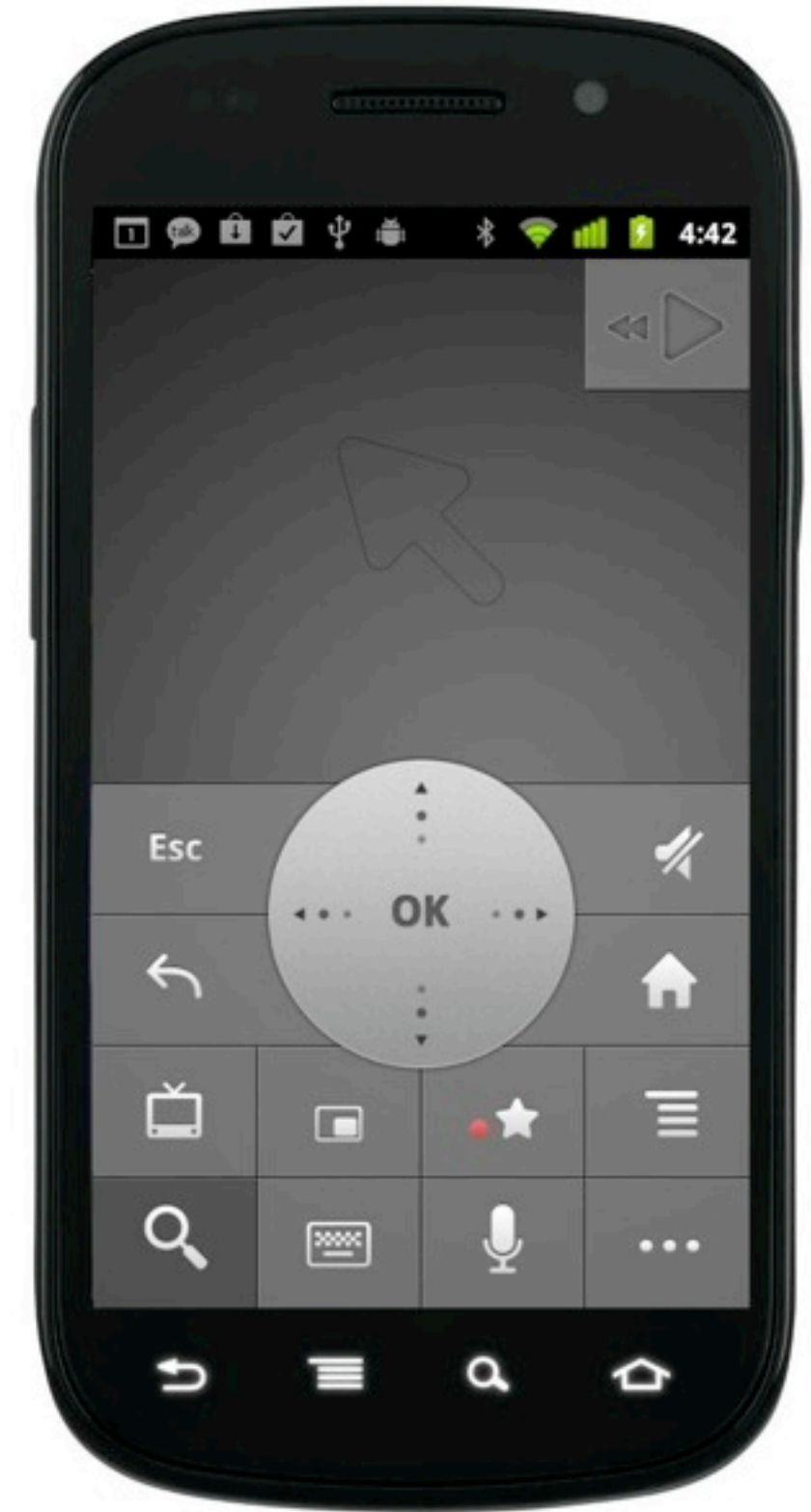


# TV Remote apps

connect to a Google TV

Let your mobile phone control your Google TV

- Pair with, and control Google TV
- Works with all Google TV devices. Right now!
- Available today for iPhone and Android phones





# TV Remote apps

connect to a Google TV

Let your mobile phone control your Google TV

- Pair with, and control Google TV
- Works with all Google TV devices. Right now!
- Available today for iPhone and Android phones
- **We are releasing the source code for the Android application under the Apache 2.0 License:**

<https://code.google.com/p/google-tv-remote/>



# Develop your own TV Remote apps

connect to a Google TV

Step 1: Pair your remote app with a Google TV (on the same network)

<https://code.google.com/p/google-tv-pairing-protocol/>

Step 2: Send keys, mouse events, and URIs to the connected Google TV

<https://code.google.com/p/anymote-protocol/>



# Google TV Extra Capabilities

## Channel Listing Content Provider

<b>_ID</b>	<b>Name</b>	<b>Callsign</b>	<b>URI</b>
1	CNBC	CNBC	[tv uri]
2	Discovery Channel	DSC	[tv uri]
3	KQED	KQED	[tv uri]
...	...	...	...

Obviously, this is only the start. There is a lot more functionality which we will expose via an add-on library later this summer.

# Summary

- Emulate a TV-like screen: *right now*

# Summary

- Emulate a TV-like screen: *right now*
- Develop a Google TV remote app: *right now*

# Summary

- Emulate a TV-like screen: *right now*
- Develop a Google TV remote app: *right now*
- Emulate a Google TV system: *coming soon*

# Summary

- Emulate a TV-like screen: ***right now***
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# Summary

- Emulate a TV-like screen: *right now*
- Develop a Google TV remote app: *right now*
- Emulate a Google TV system: *coming soon*
- Google TVs with ADB & Market: *later this summer*
- Get more TV specific APIs: *under development*





# Q&A

Submit your live questions at:

<http://goo.gl/mod/3uEG>

Scan Tag for more info about Google TV:

<http://goo.gl/Nns9f>

Find us on:

<http://stackoverflow.com/>

Tag: **Google-TV**



