

# Mobile Testing

**CS585 Software Verification and Validation**

**February 16th, 2015**

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**CAL POLY POMONA**

## BUSINESSES MAKING SENSE OF MOBILE

iPhone is being deployed  
or tested by



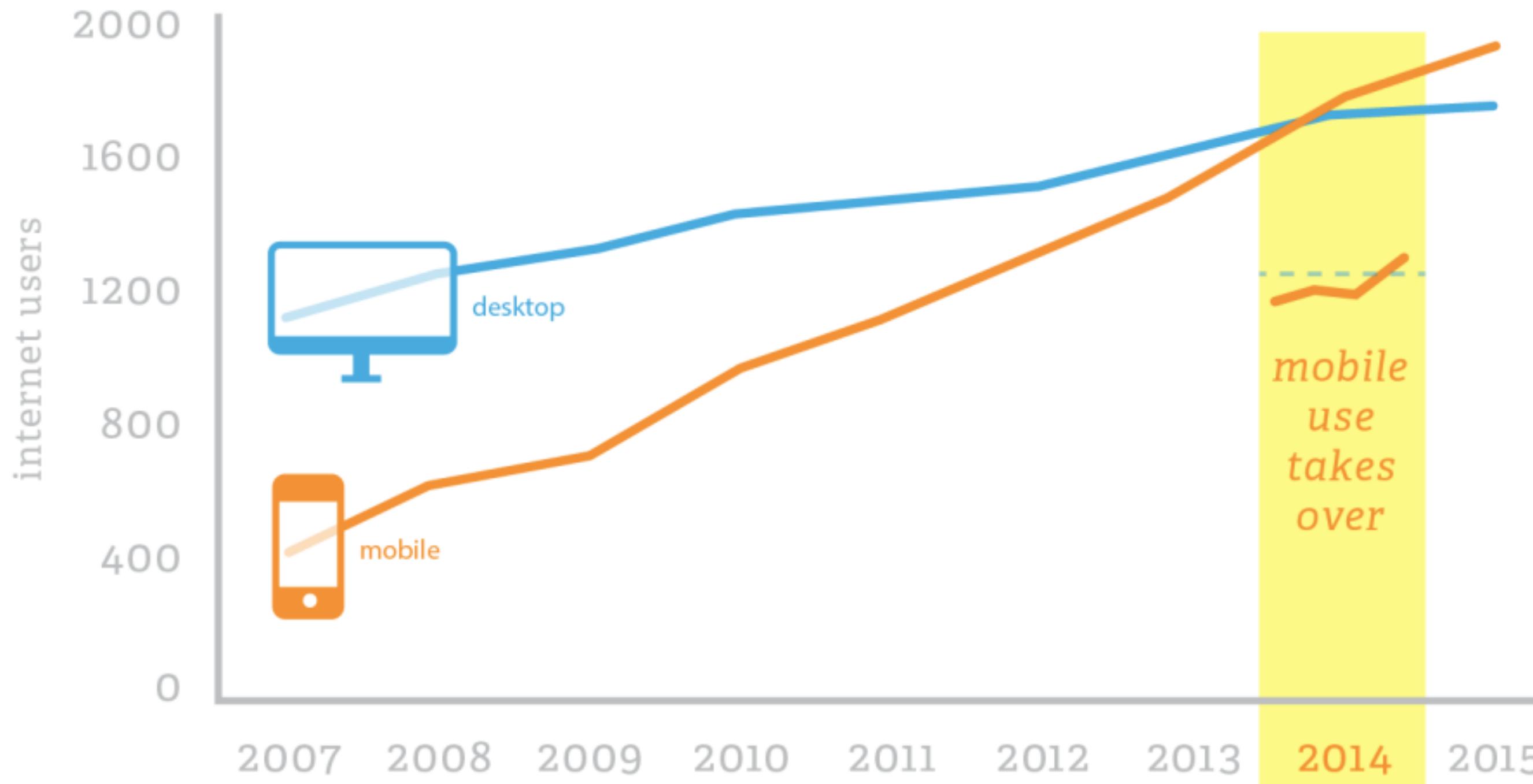
iPad is being deployed  
or used at



Companies large and small are also developing their own mobile apps to target new customers or engage existing ones.

# 2014: YEAR OF THE Mobile Revolution

MOBILE INTERNET USE WILL OVERTAKE DESKTOPS THIS YEAR.

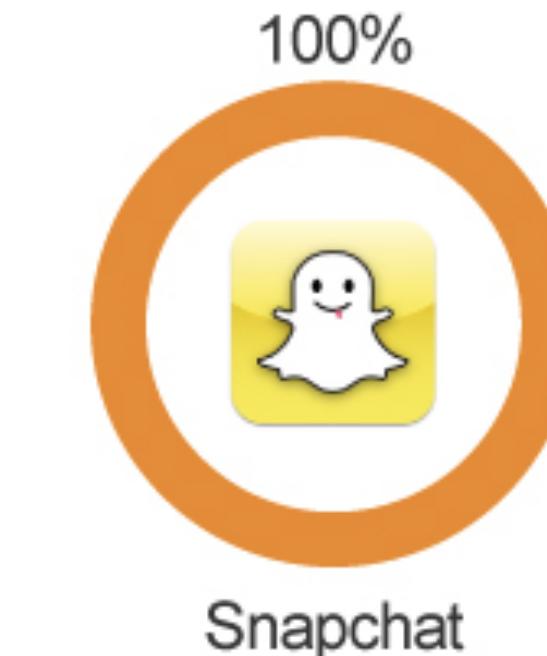
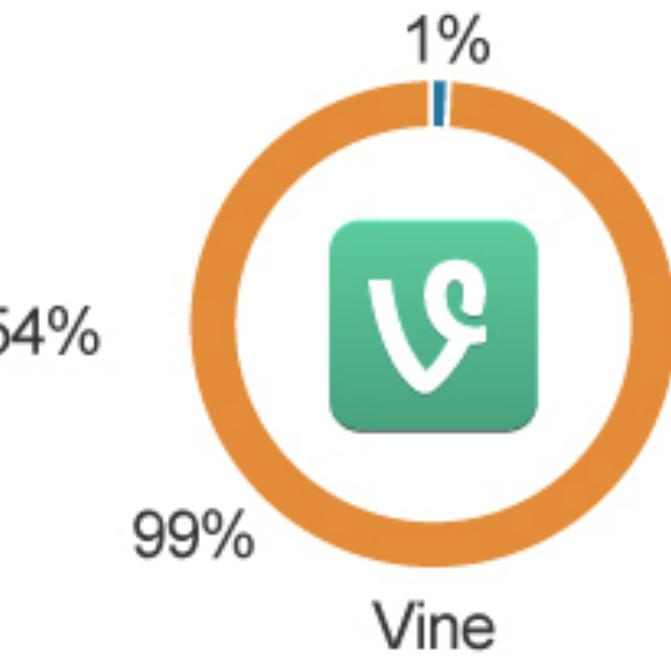
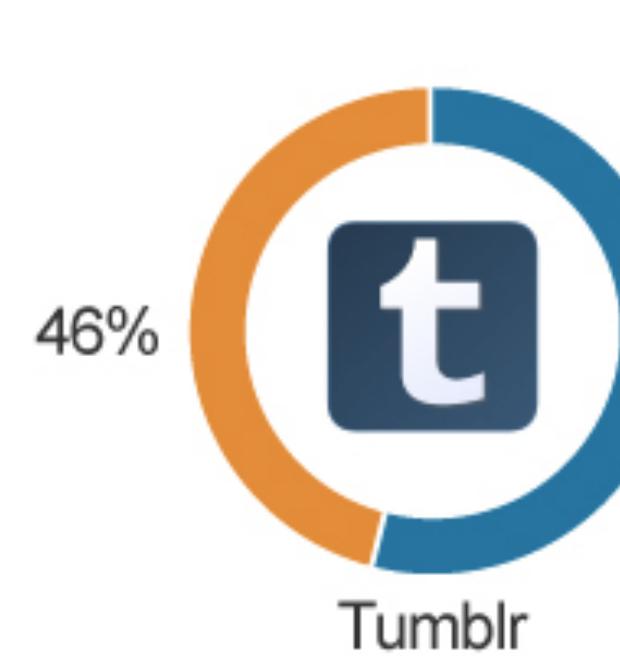
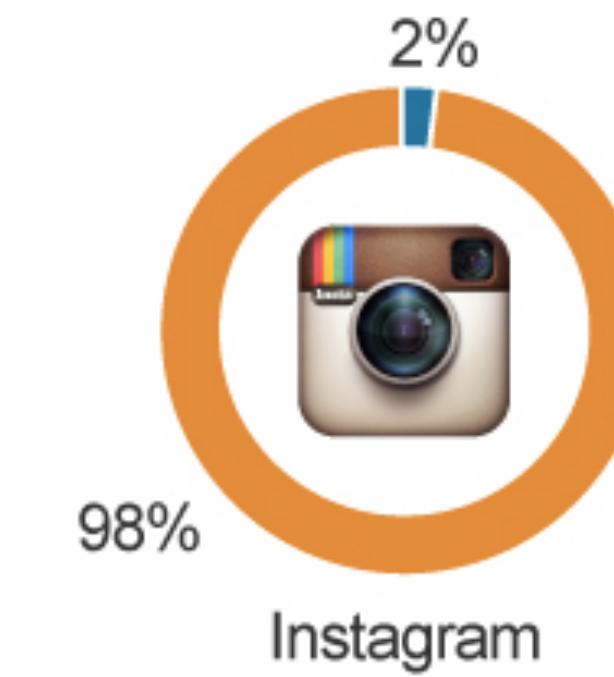
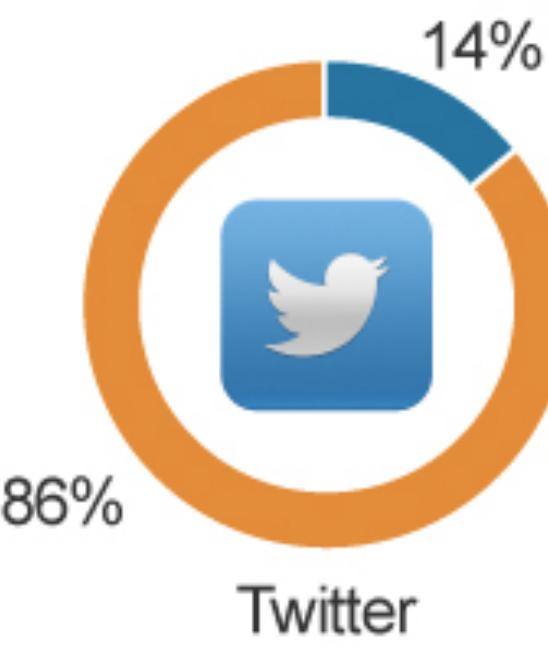
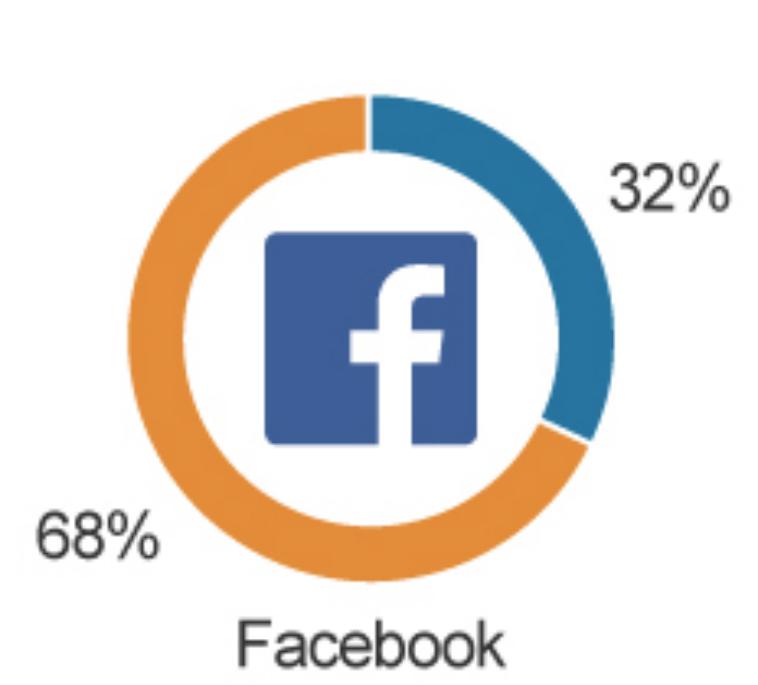


Source: ComScore

## Most Social Networks Are Now Mobile-First

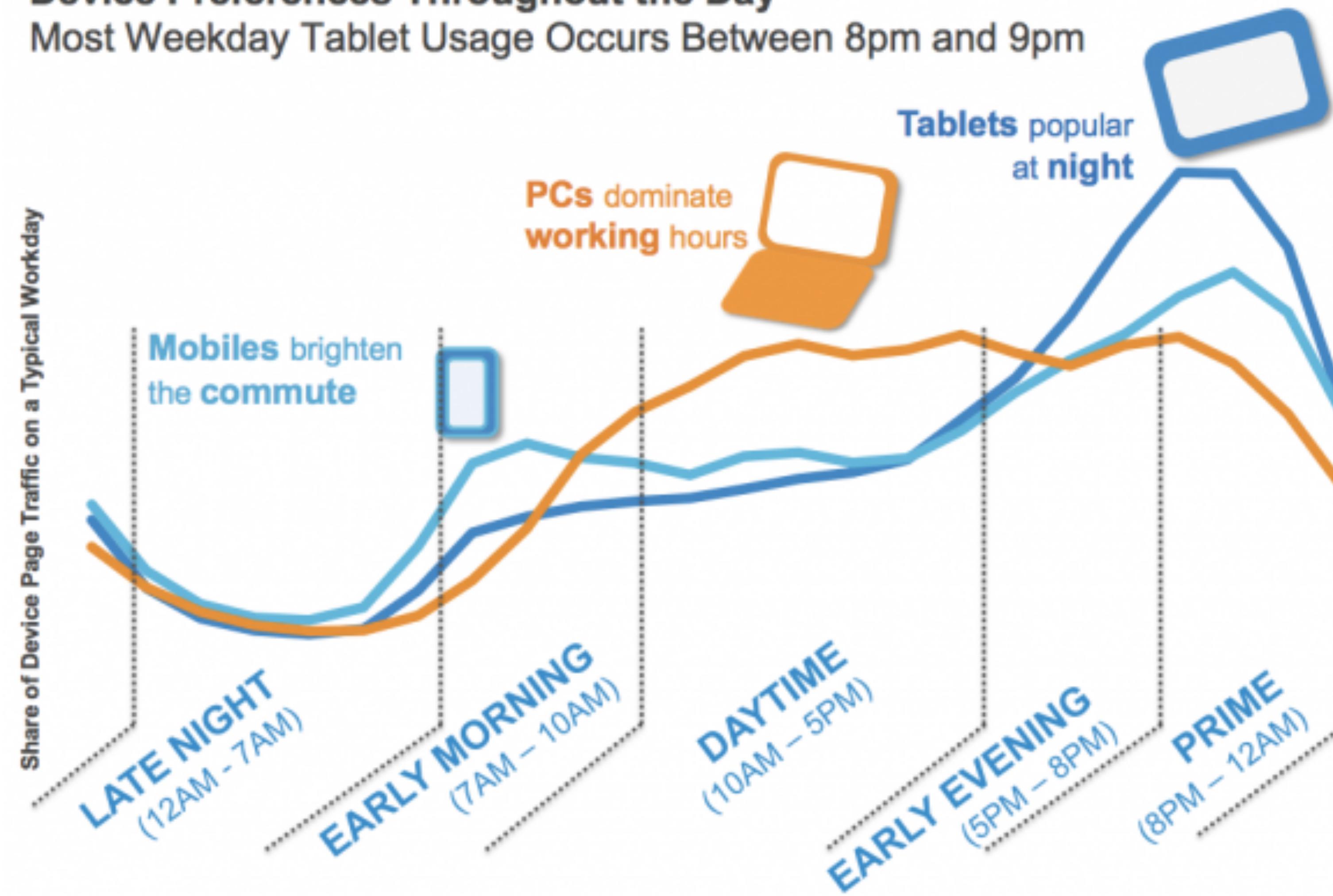
% of time spent on social networks in the United States, by platform\*

■ Desktop ■ Mobile



## Device Preferences Throughout the Day

Most Weekday Tablet Usage Occurs Between 8pm and 9pm



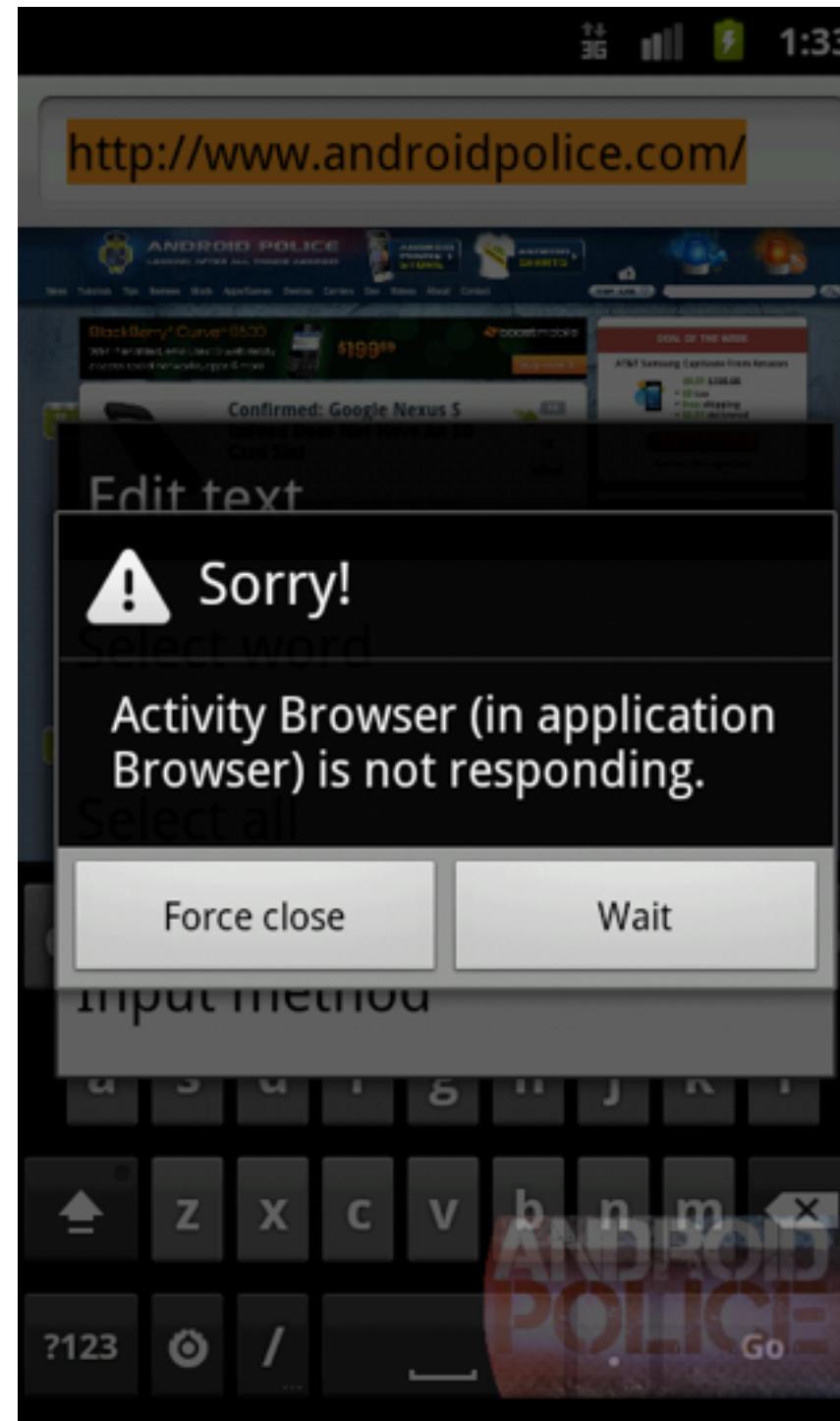
# Mobile Testing is Different



# Challenges of Mobile Testing



Restricted Platform



Unpredictable UI/UX



Changing Environments



Compatibility

# Functional & Non-Functional Testing



Functional

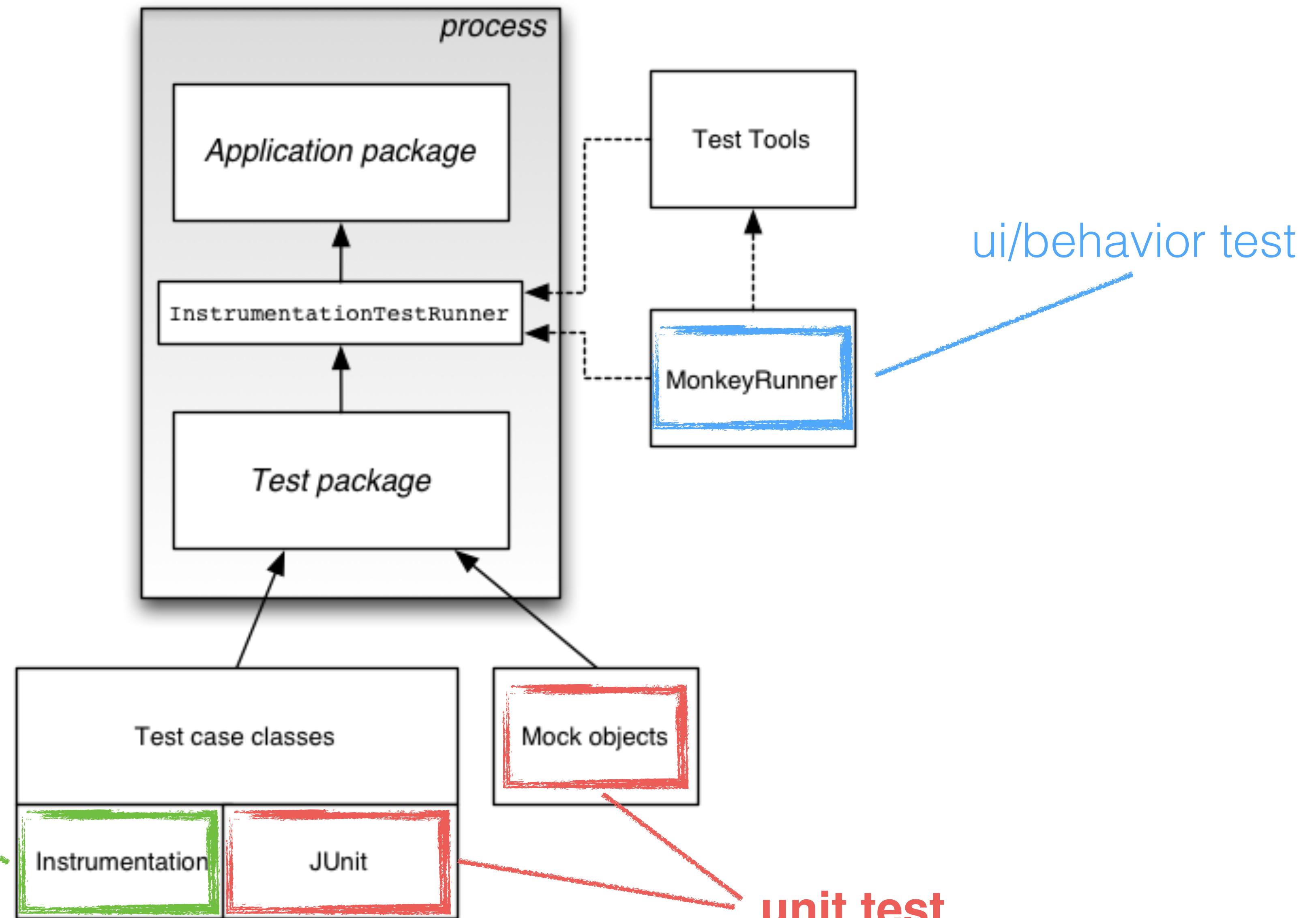


Non-Functional  
*(Network, Performance,  
Battery, Security)*

# Functional Testing in Android



instrumentation test

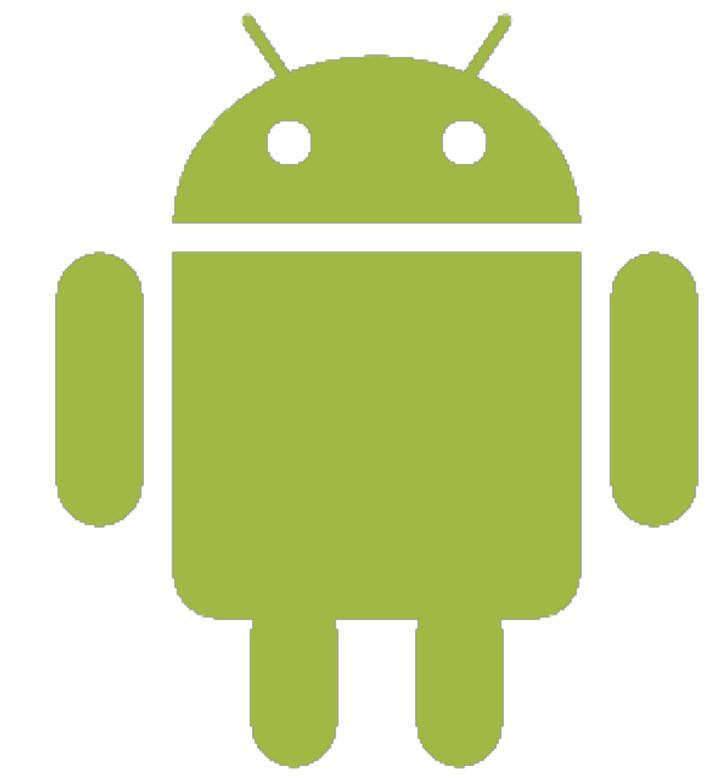


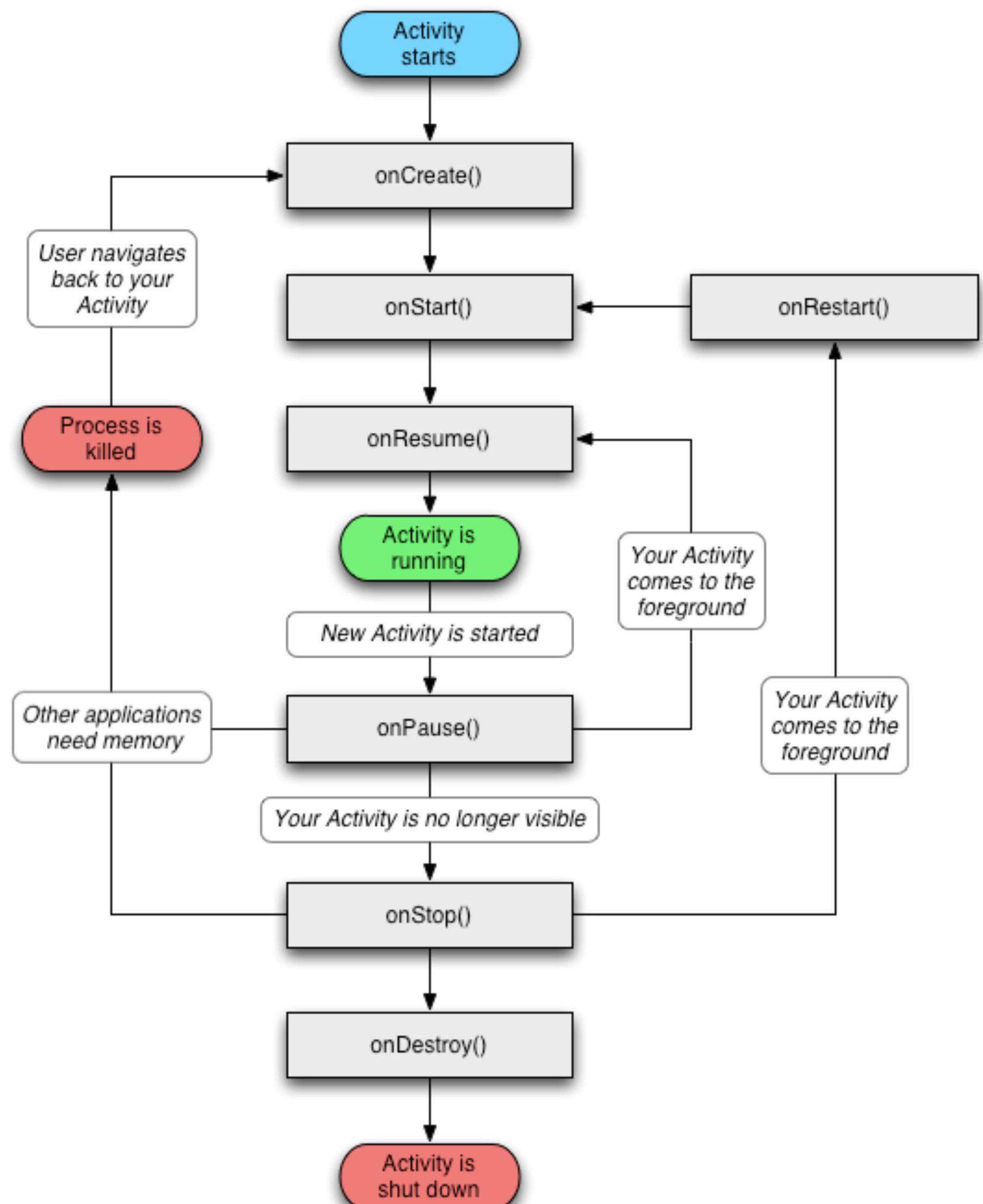
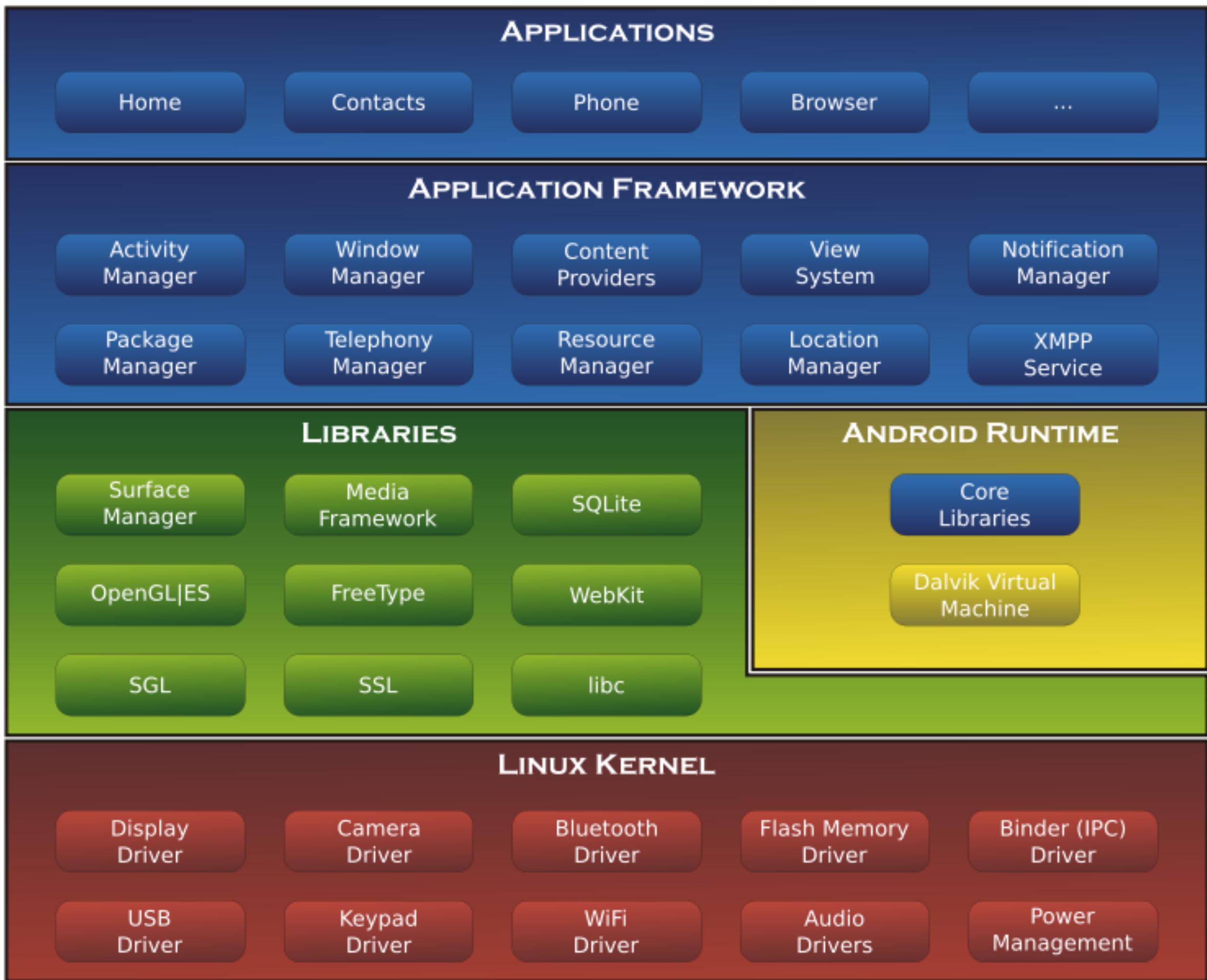
unit test

# Android Unit Test

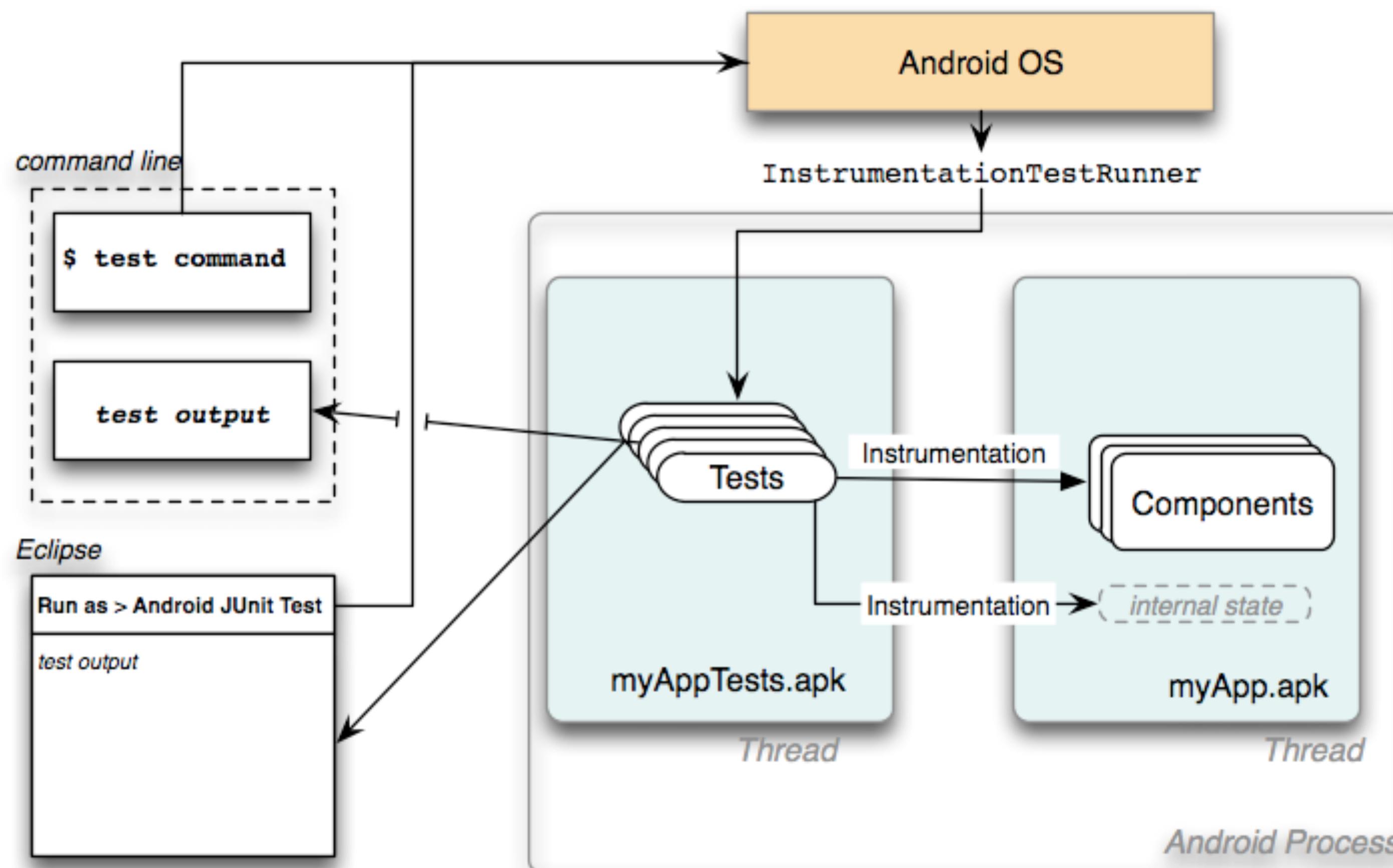


JUnit +

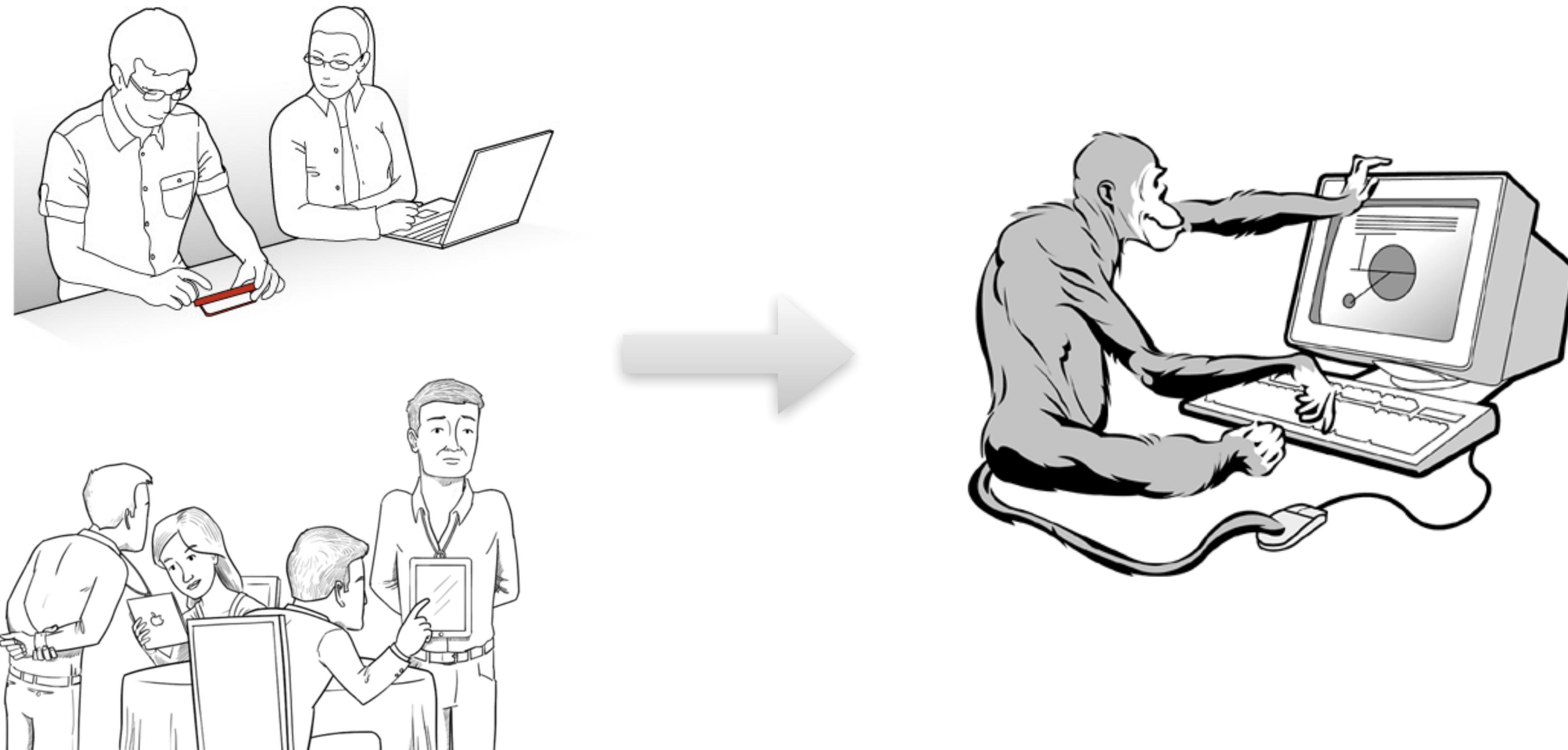




# Android Instrumentation Test



# Android MonkeyRunner



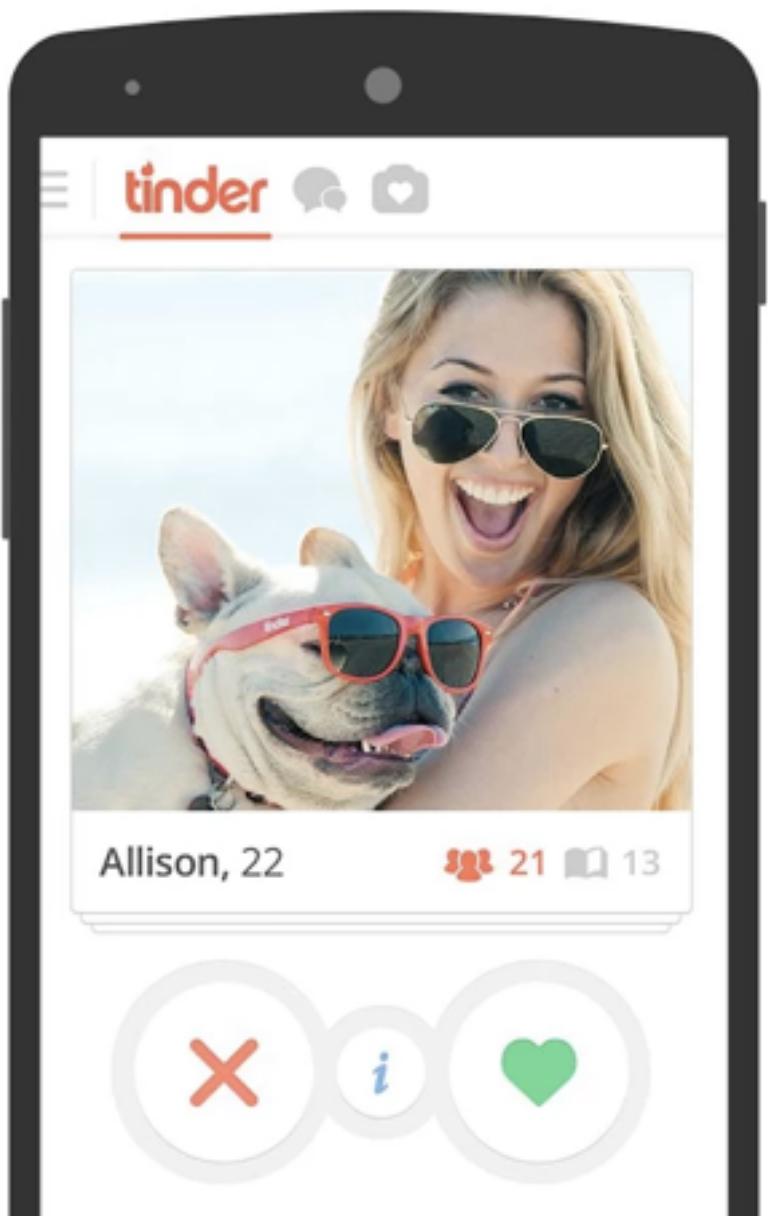
# Use Case: Browser Performance Testing



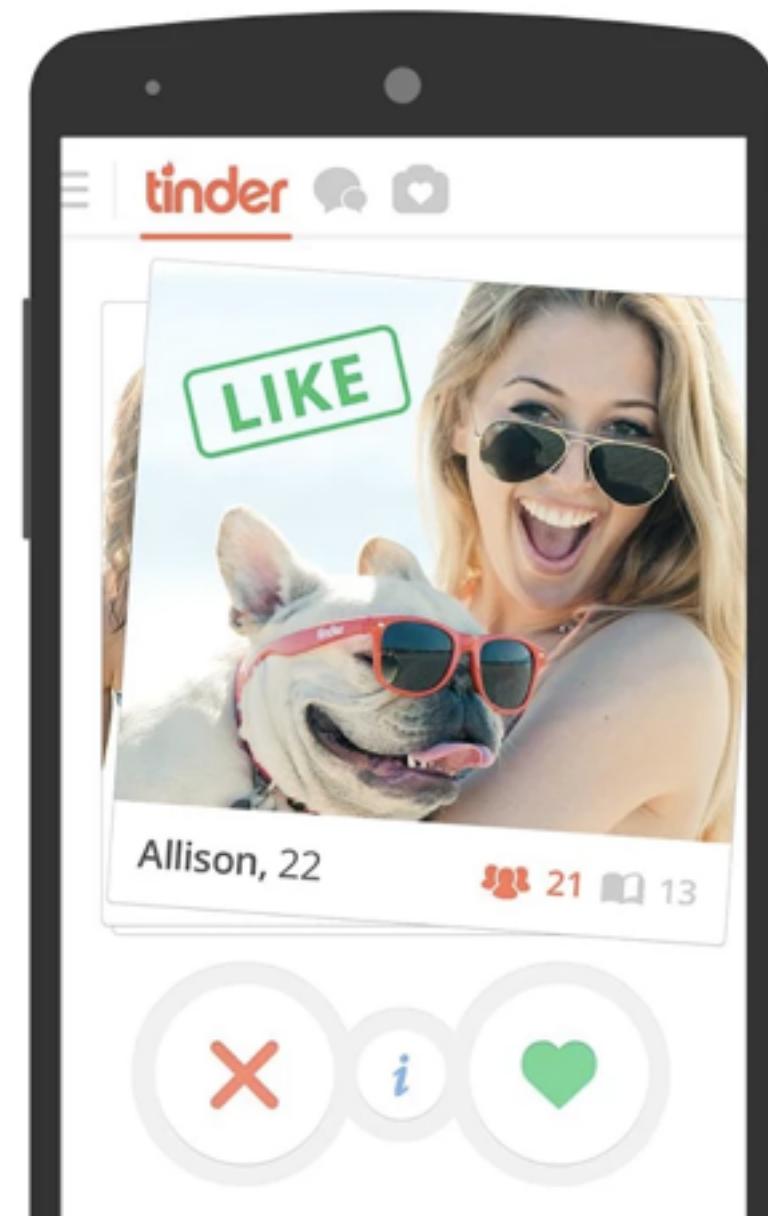
Test the average time  
needed to load the top  
10,000 URLs for 100 times

# Use Case: Smart Tinder

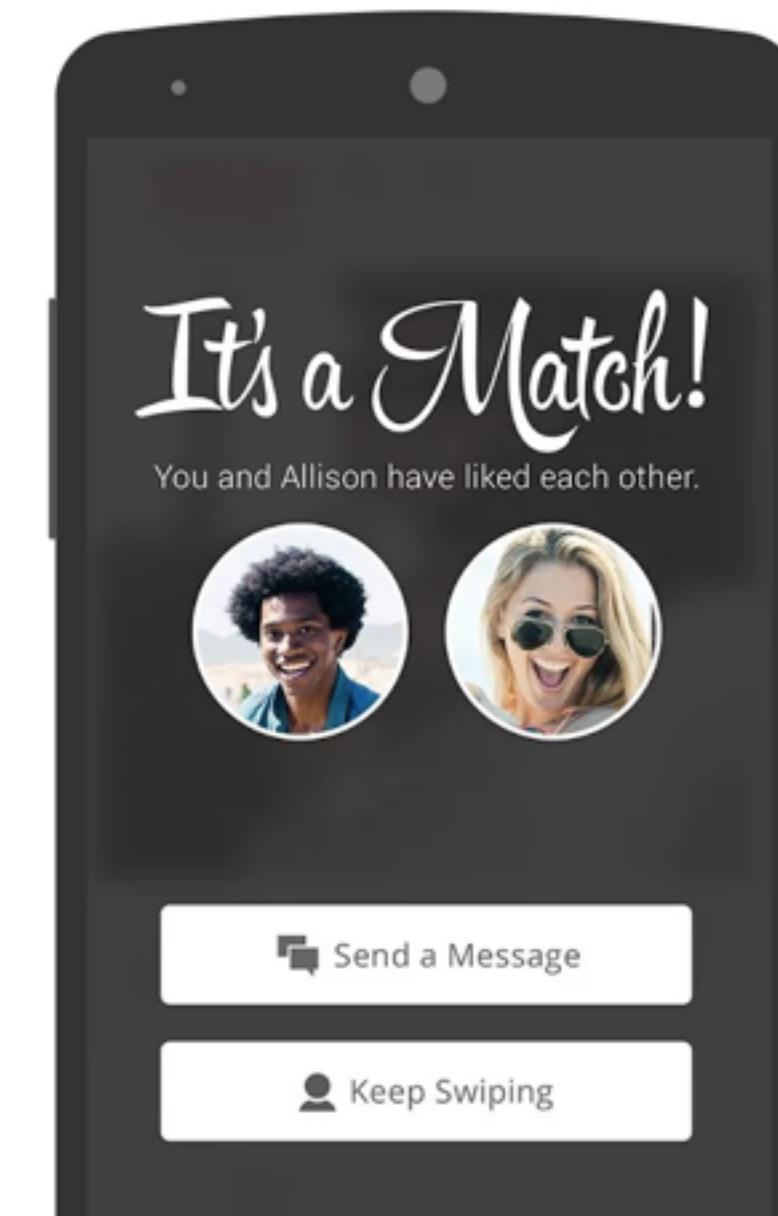
Tinder finds interesting people around you...



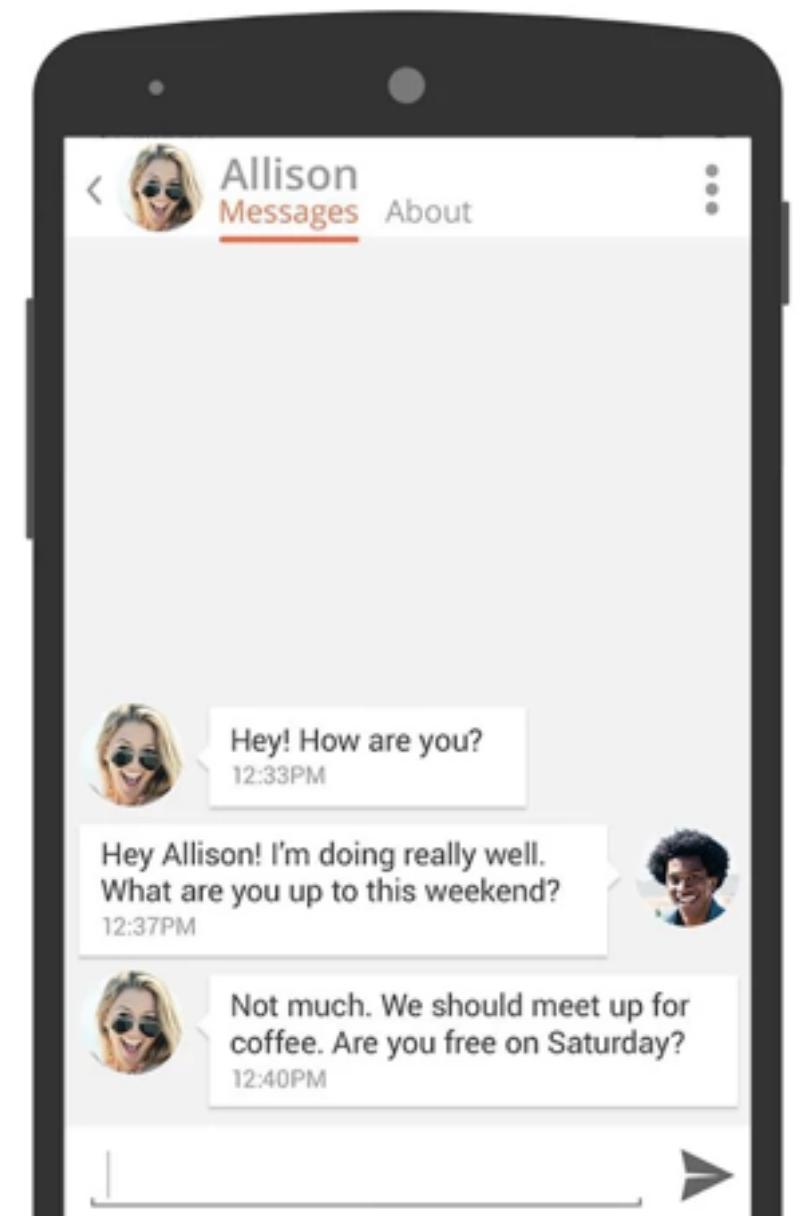
Anonymously like or pass on each suggestion



If two people happen to like each other...



Chat with your matches inside the app



# Non-Functional Testing



# Network Diversity



• T • Mobile



# Network Diversity



# Network Diversity

example: over-the-air update

example: log collection



# Device Interruptions



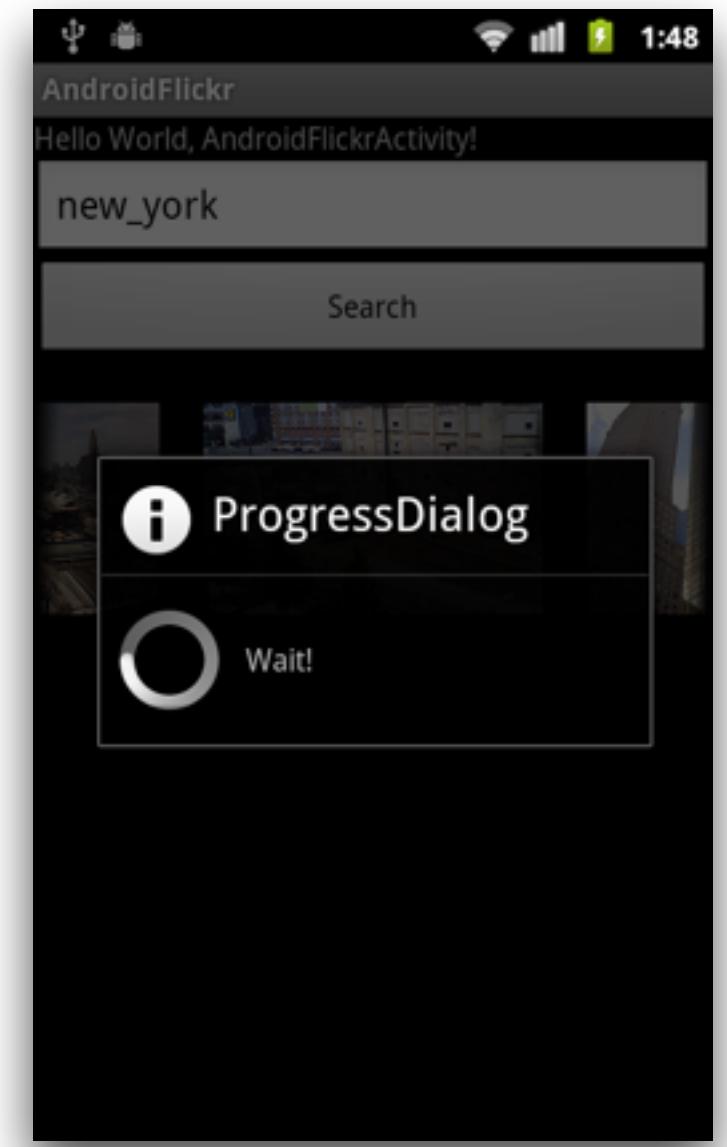
Incoming Calls



Notifications

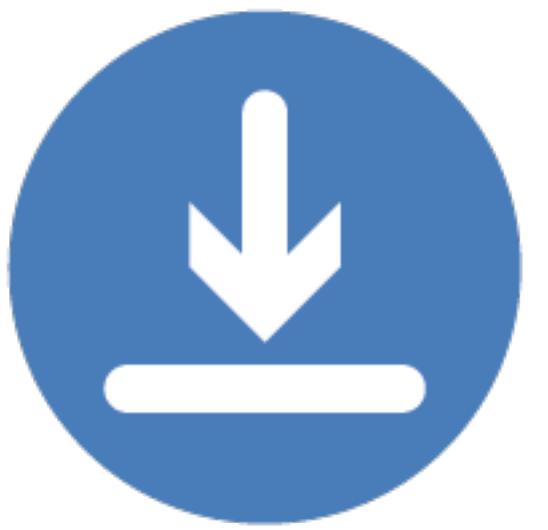


Power Alert



Background Tasks

# Installation Conditions



Install



Uninstall



Reinstall



Update

# Performance communication



# Performance

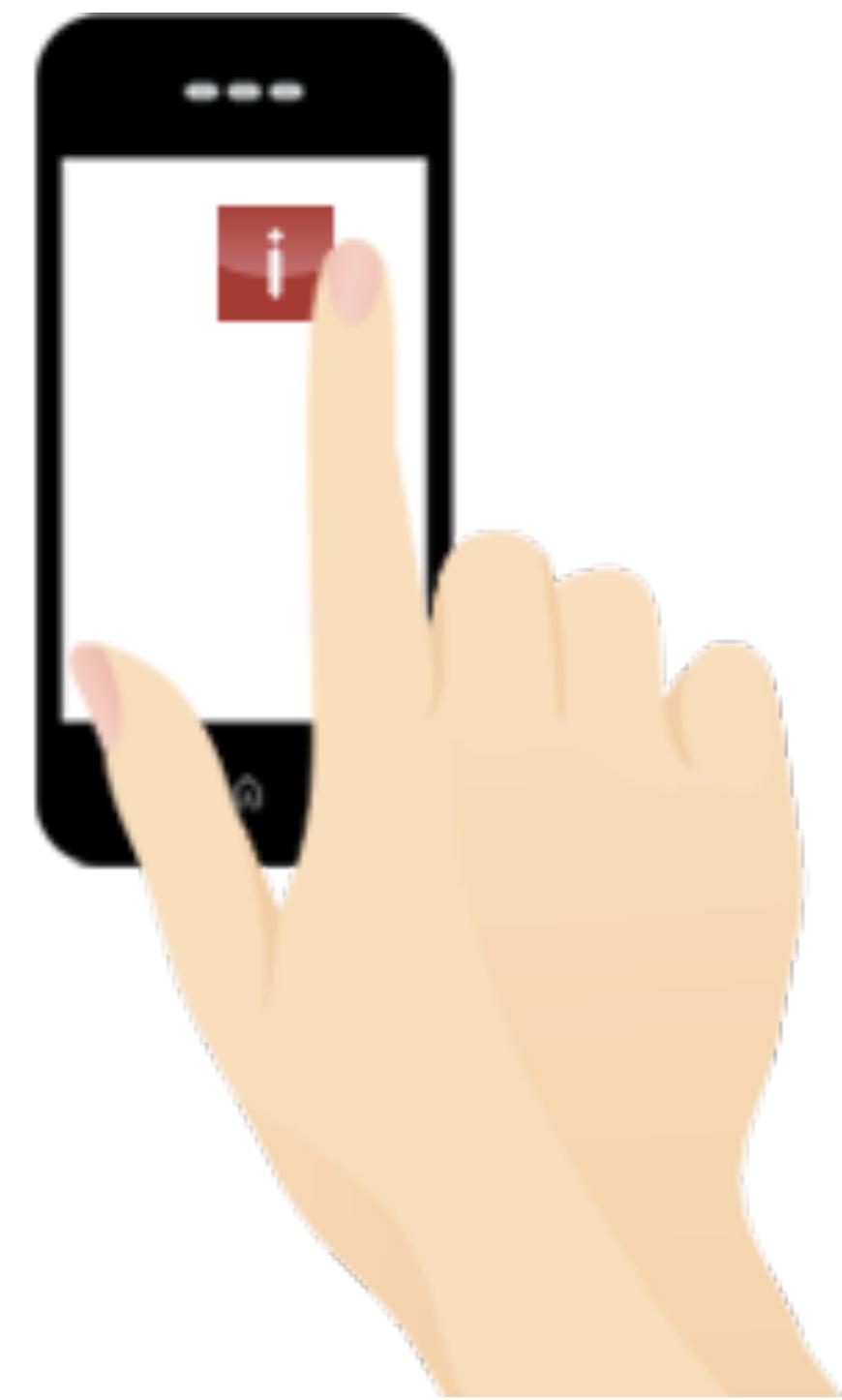
communication  
example: mobile AR



<https://www.youtube.com/watch?v=c4zdt-ziyVM>

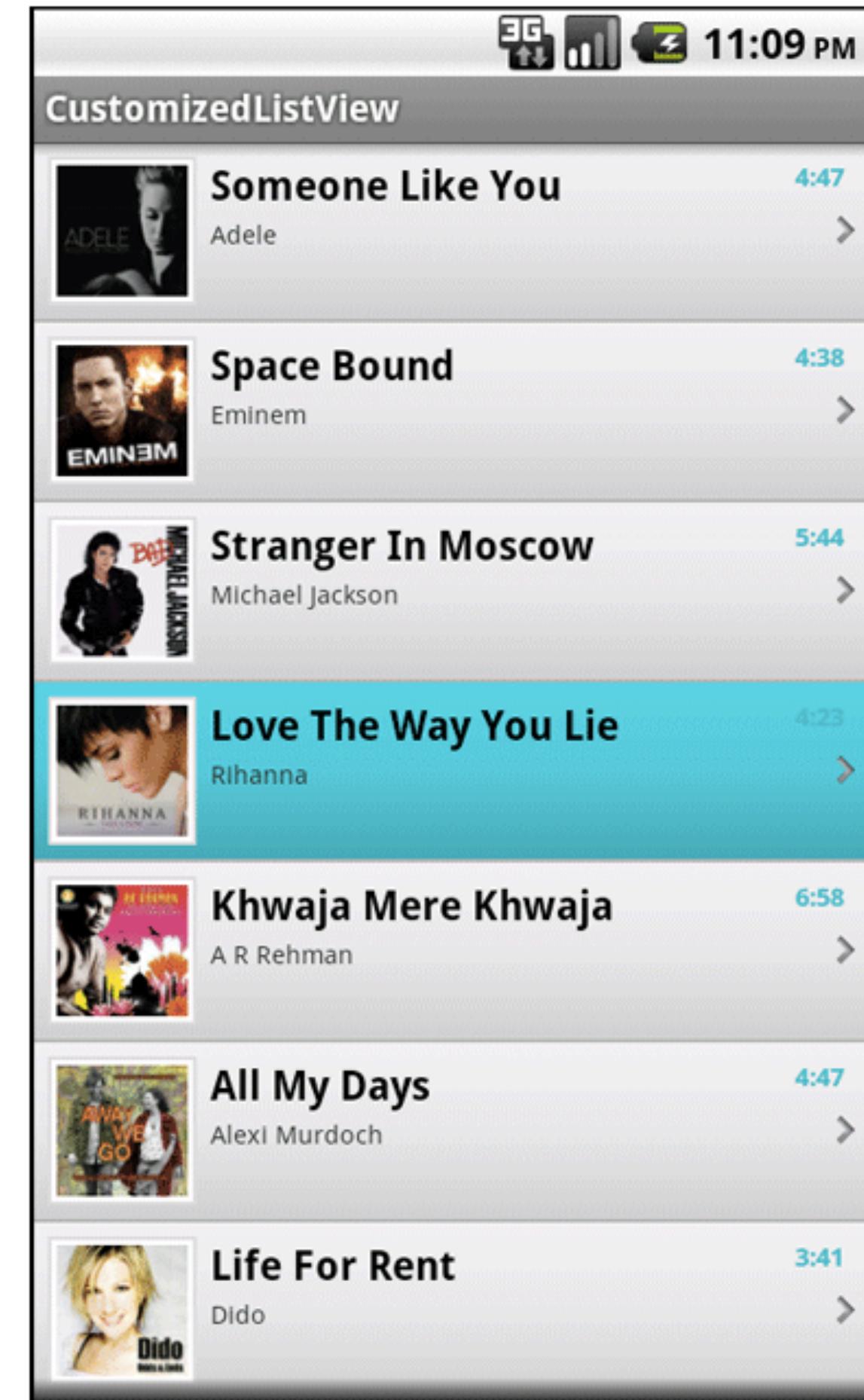
# Performance

ui response



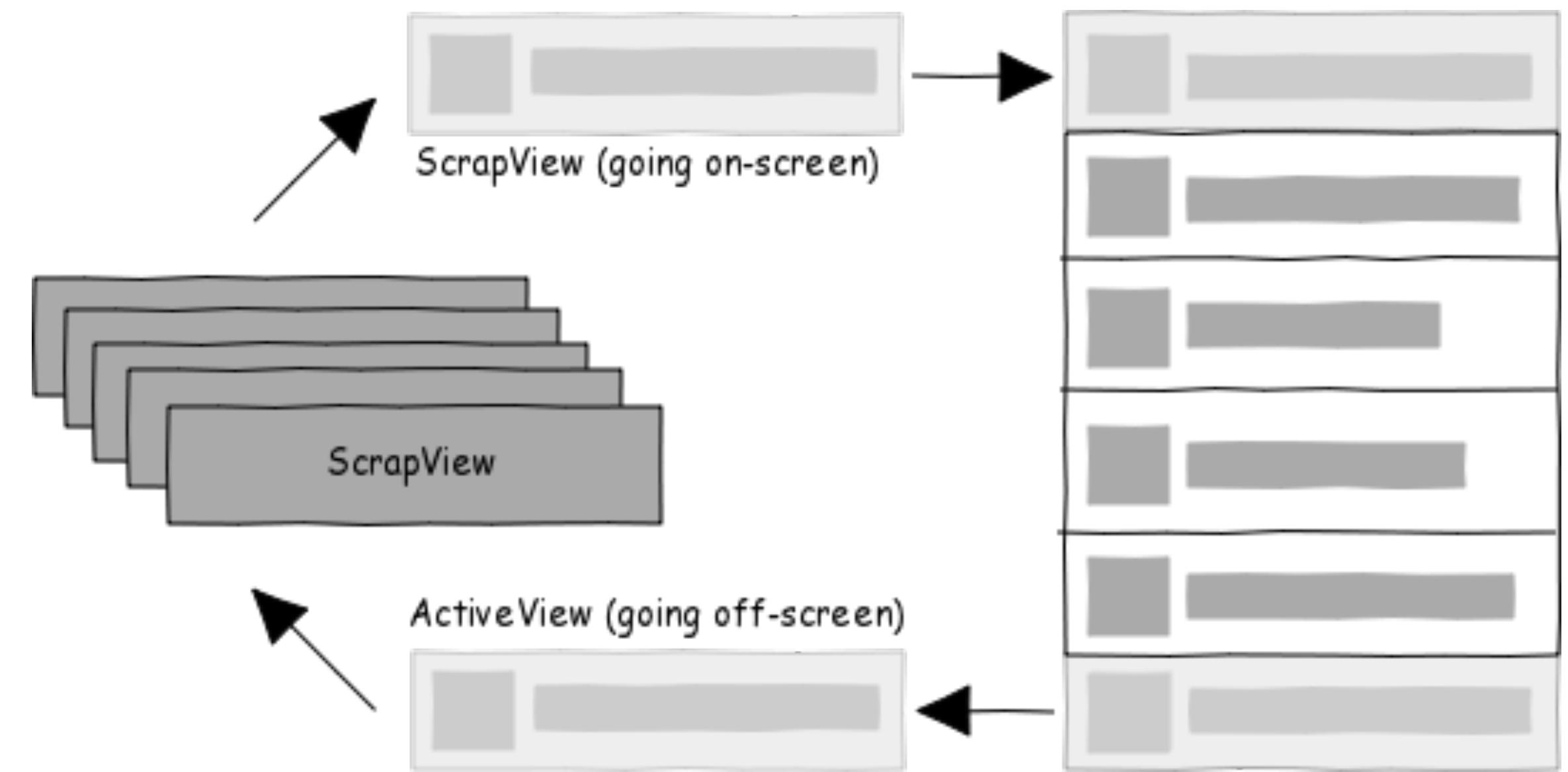
# Performance

ui response  
example: Android ListView



# Performance

ui response  
example: Android ListView



```

@Override
public View getView(int position, View convertView, ViewGroup parent) {
    @Override
    public View getView(int position, View convertView, ViewGroup parent) {
        //inflate row layout
        LayoutInflator inflater = LayoutInflator.from(context);
        View row =inflater.inflate(R.layout.list_item, parent,false);

        Person person =persons.get(position);

        //get all required widgets
        TextView textViewFirstName =(TextView) row.findViewById(R.id.textViewFirstName);
        TextView textViewLastName =(TextView) row.findViewById(R.id.textViewLastName);
        TextView textViewAge =(TextView) row.findViewById(R.id.textViewAge);
        TextView textViewId =(TextView) row.findViewById(R.id.textViewId);

        //show data
        textViewFirstName.setText(person.FirstName);
        textViewLastName.setText(person.LastName);
        textViewAge.setText("Age "+person.Age);
        textViewId.setText("ID "+person.Id);

        return row;
    }

    @Override
    public View getView(int position, View convertView, ViewGroup parent) {
        View row=convertView;
        ViewHolder holder=null;
        //inflate row layout
        if(row==null){
            row =inflater.inflate(R.layout.list_item, parent,false);
            holder =new ViewHolder(row);
            row.setTag(holder);
        }else{
            holder =(ViewHolder) row.getTag();
        }

        Person person =persons.get(position);

        //show data
        holder.textViewFirstName.setText(person.FirstName);
        holder.textViewLastName.setText(person.LastName);
        holder.textViewAge.setText("Age "+person.Age);
        holder.textViewId.setText("ID "+person.Id);

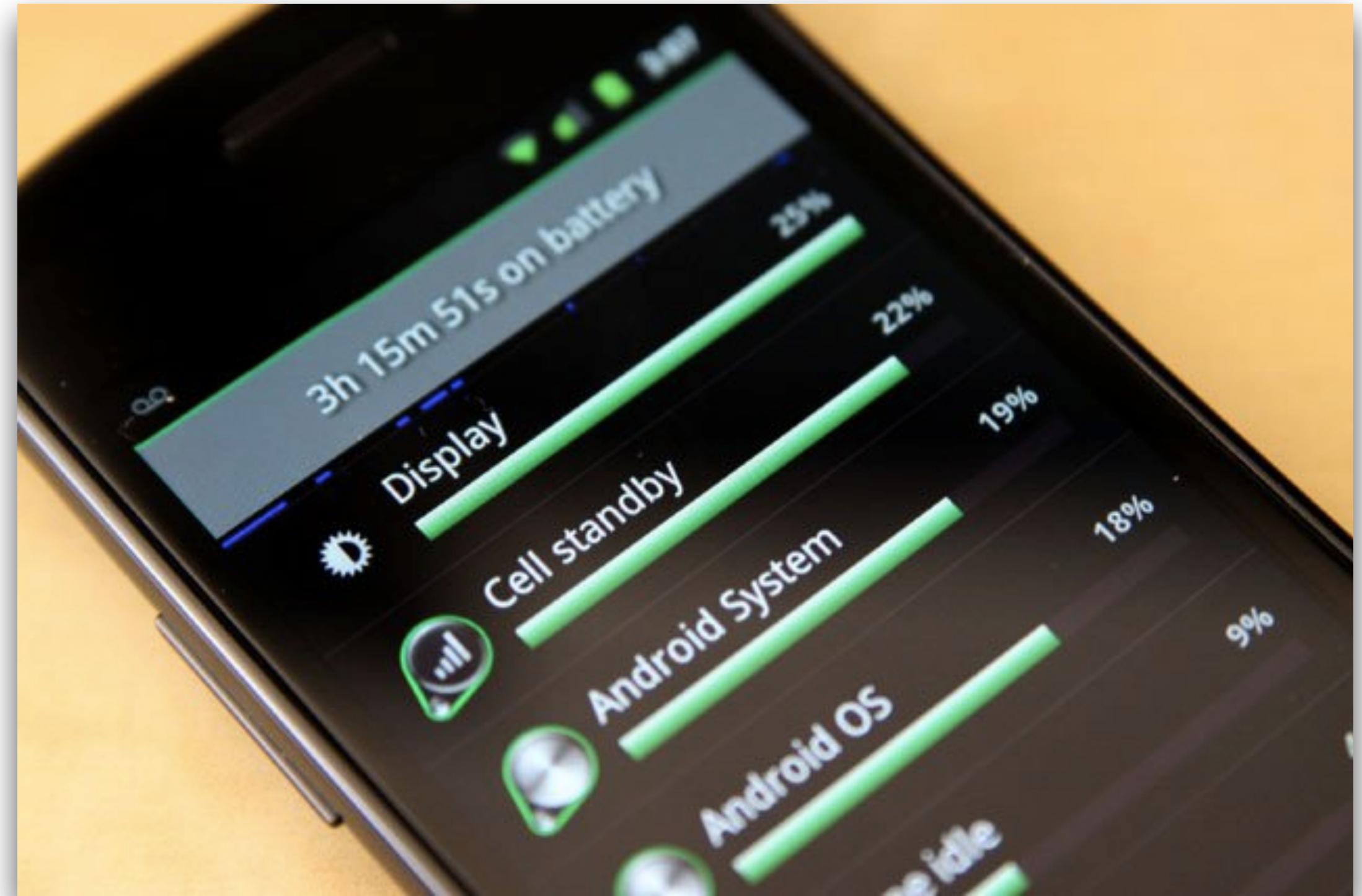
        return row;
    }
}

```

Reuse the existing view if available

# Battery

network communications  
camera  
blue booth  
gps  
computation



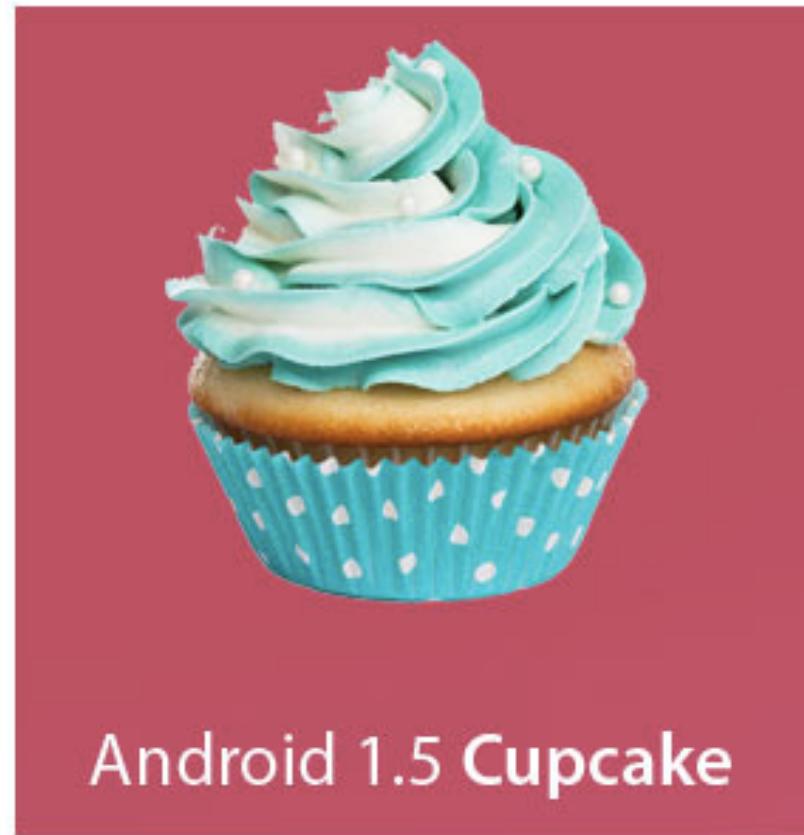
# App Monitoring

user behavior  
errors/exceptions  
logs  
performance

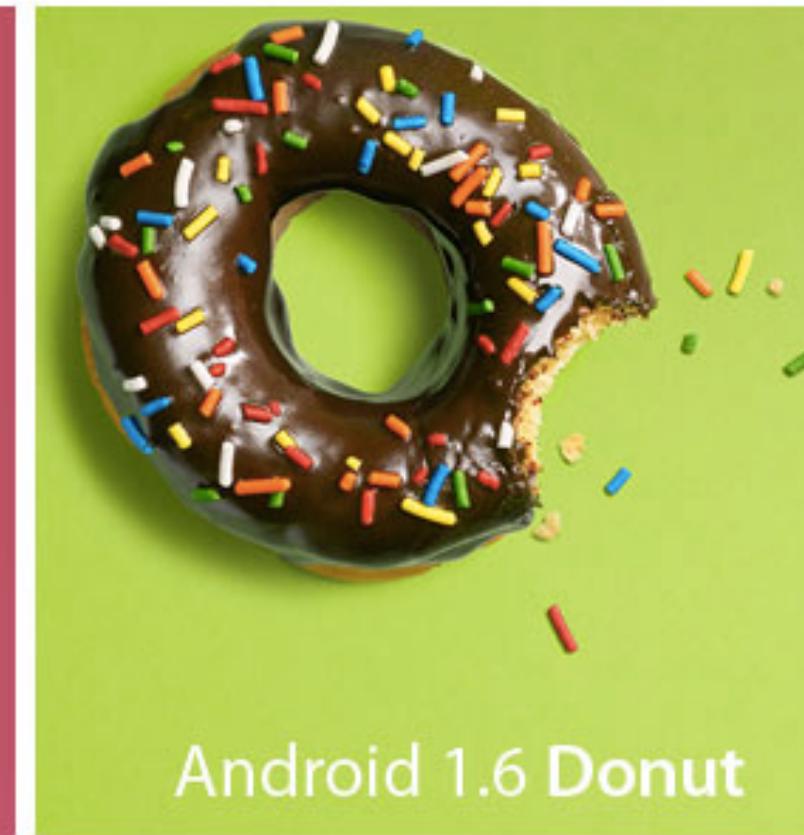


<http://newrelic.com/mobile-monitoring>

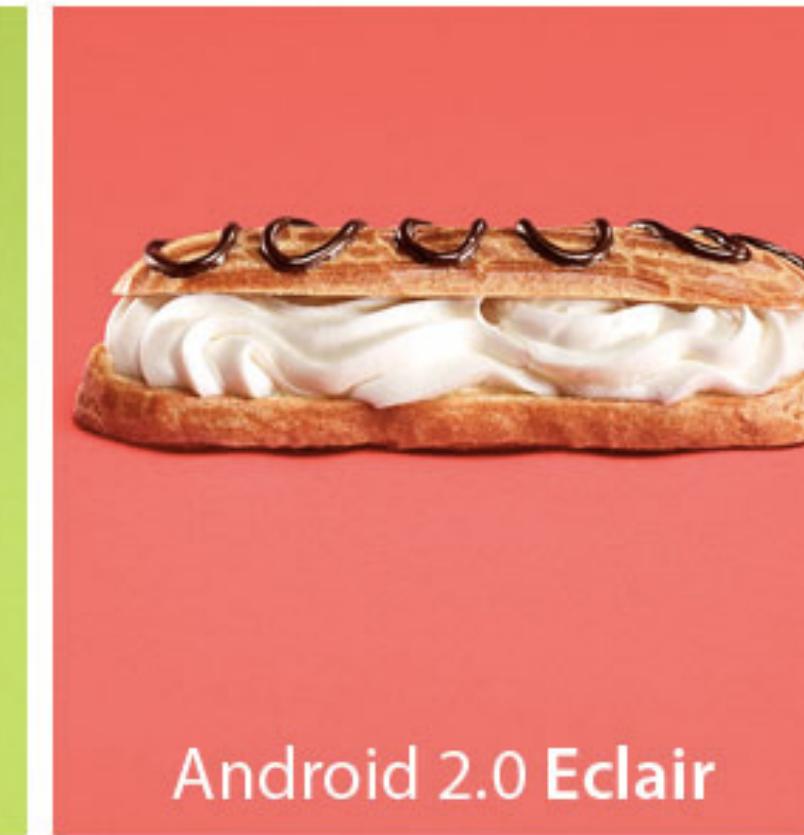
# Device Compatibility



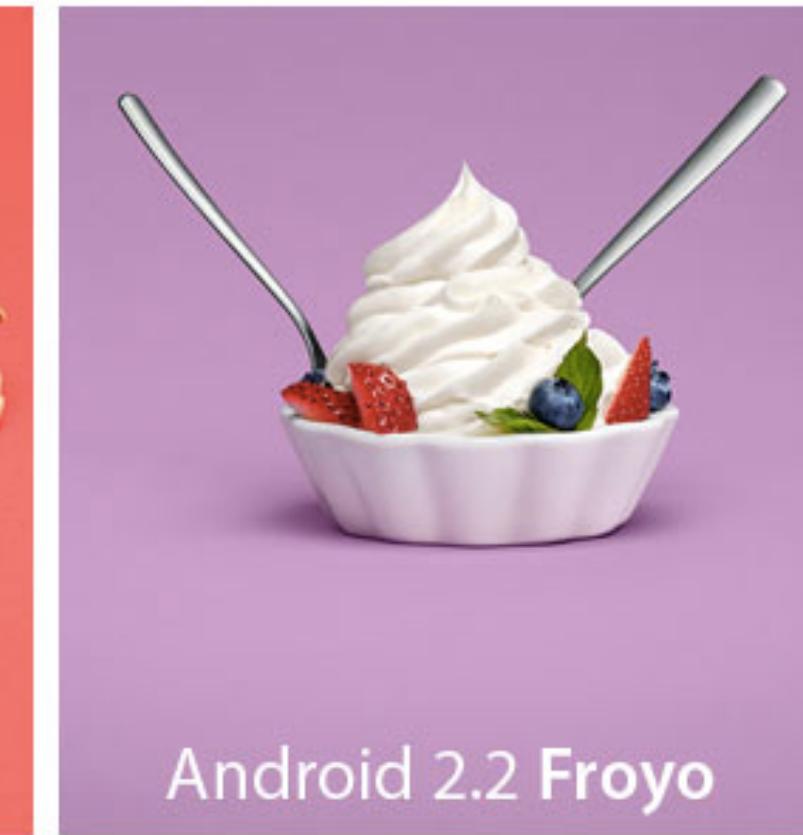
Android 1.5 Cupcake



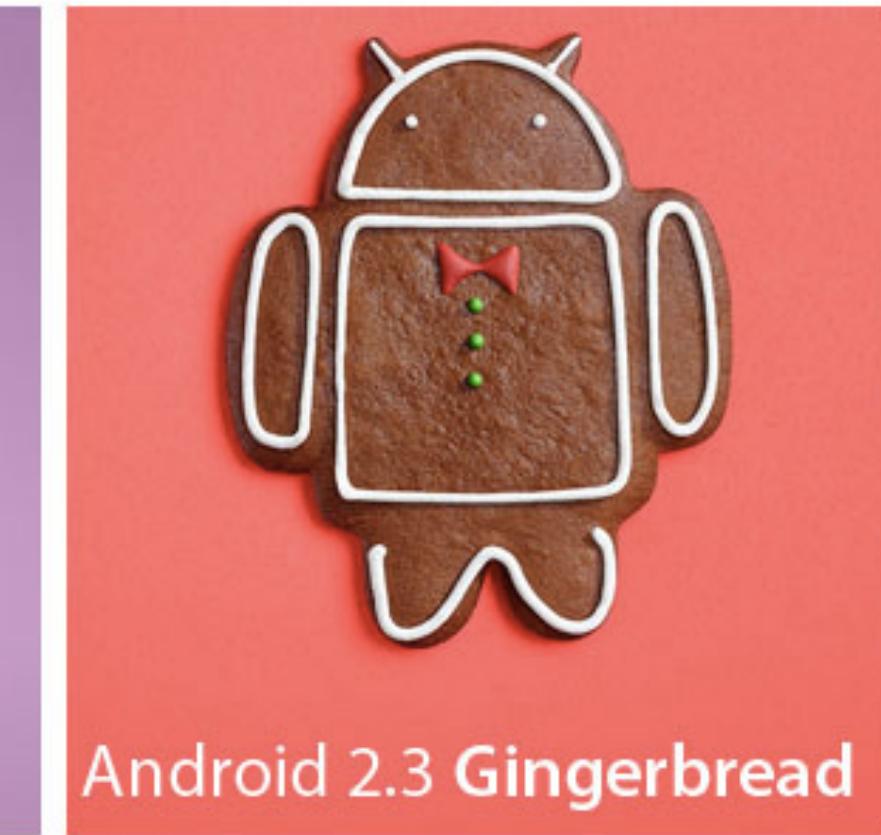
Android 1.6 Donut



Android 2.0 Eclair



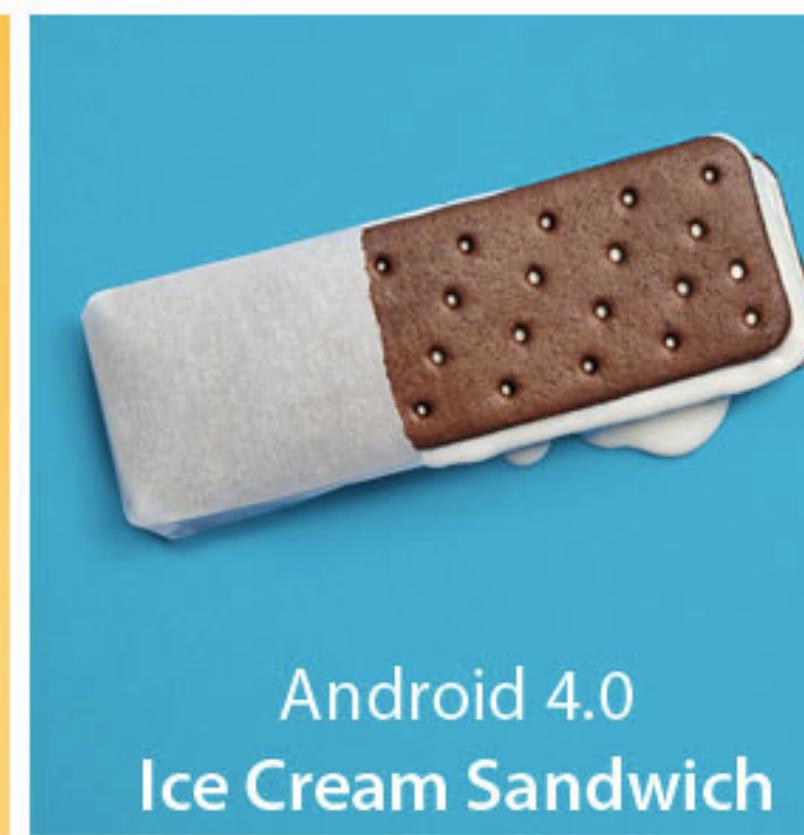
Android 2.2 Froyo



Android 2.3 Gingerbread



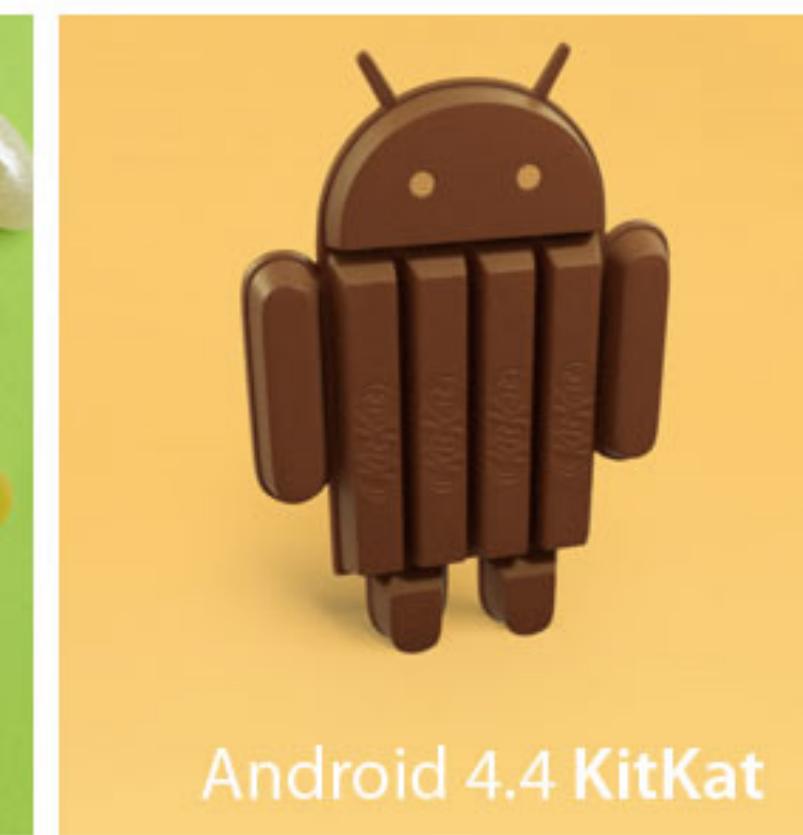
Android 3.0 Honeycomb



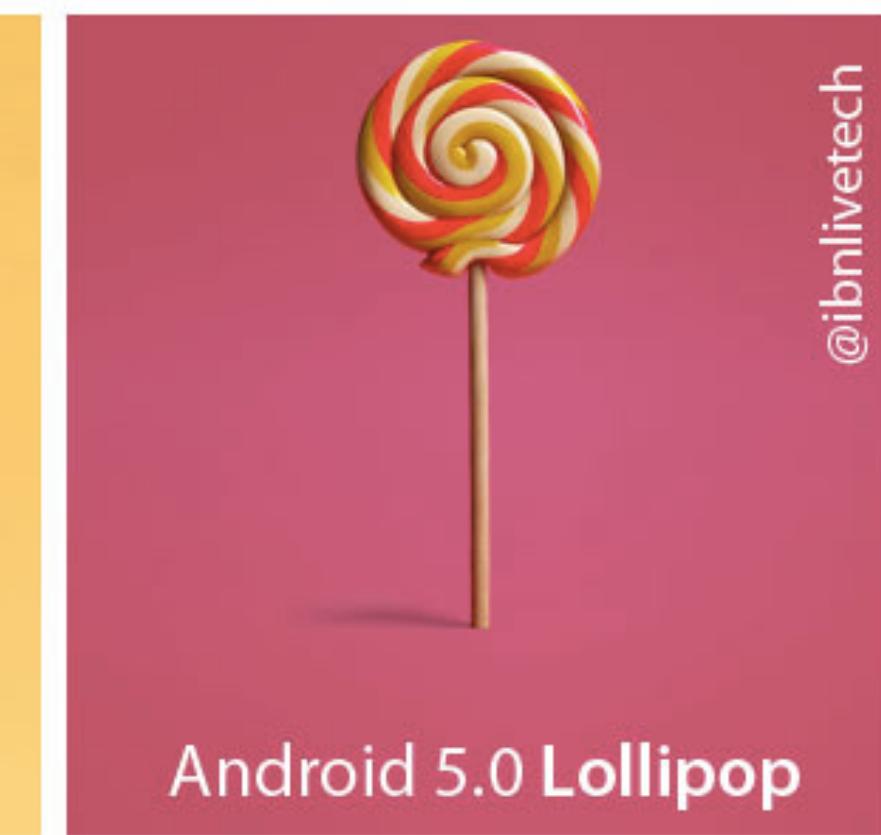
Android 4.0  
Ice Cream Sandwich



Android 4.1 Jelly Bean



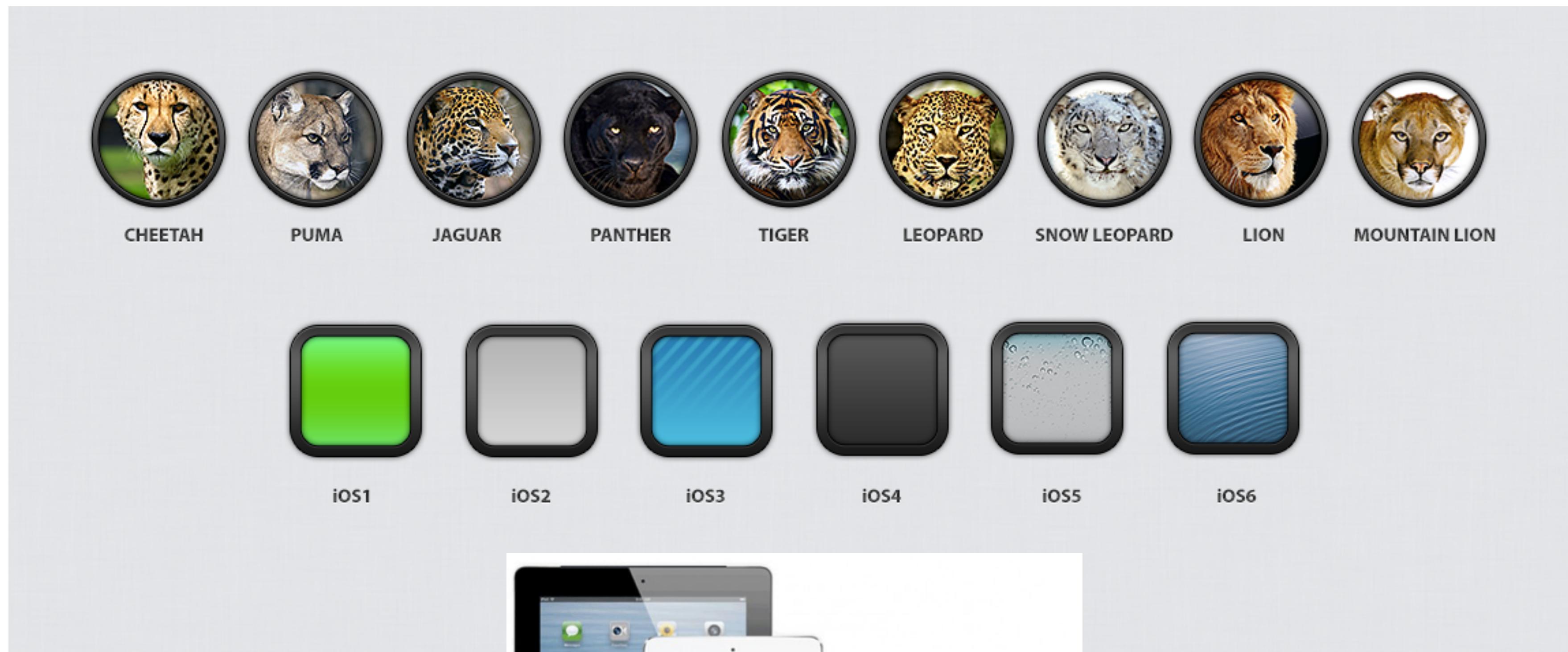
Android 4.4 KitKat



Android 5.0 Lollipop

@ibnlivetech

# Device Compatibility



# Device Compatibility



