POSSIBLE mobile

Does It Work? Can You Test It?

Kirk Chambers, *QA Engineer*
Derek Rozycki, *QA Engineer*

This presentation contains confidential information intended only for the recipient(s) named above. Any other distribution, re-transmission, copying or disclosure of this message is strictly prohibited. If you have received this transmission in error, please notify me immediately by telephone or return email, and delete this presentation from your system.

Think about the following
Does it Work?

Testing is Hard!

Testing is Hard!

The elephant in the room
(It’s automation)

How to write a test plan

Deeper analysis on common problems

QA Process and you

Automation?

Permutations and You

What does “exhaustive” really mean?

Did you know?

There’s about 915 million possible ways to combine six 2x4 lego bricks

Permutations and You

All the Permutations...

What does this mean for testing?

1 case per second = 30 years to finish

1 case per ms = 1.5 weeks to finish

Most automation tools kill and relaunch app with each test case

Permutations and You

Long story short:

Testing every case is impossible

Permutations and You

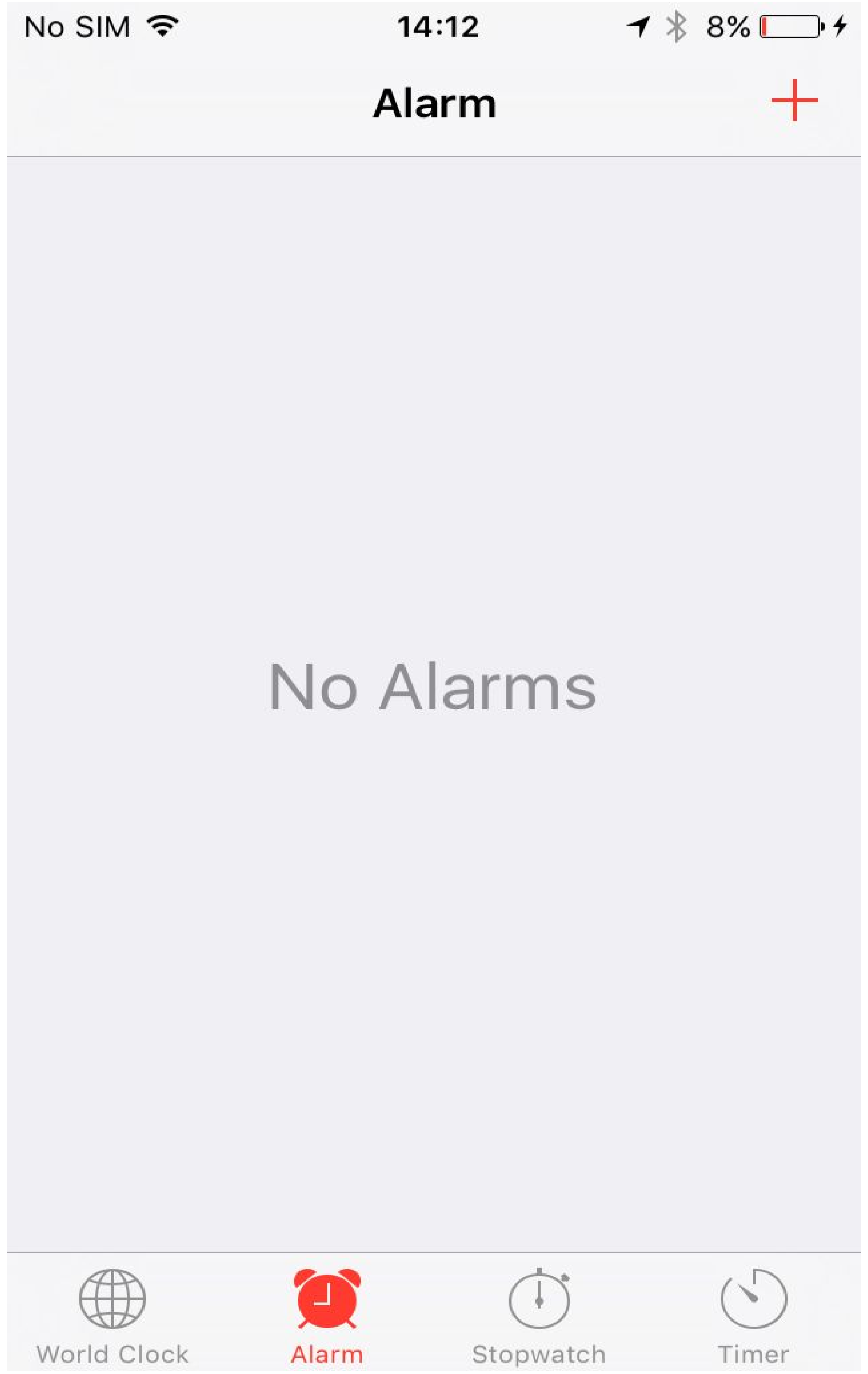
What if there was a better way??

Like… knowing what you're doing?

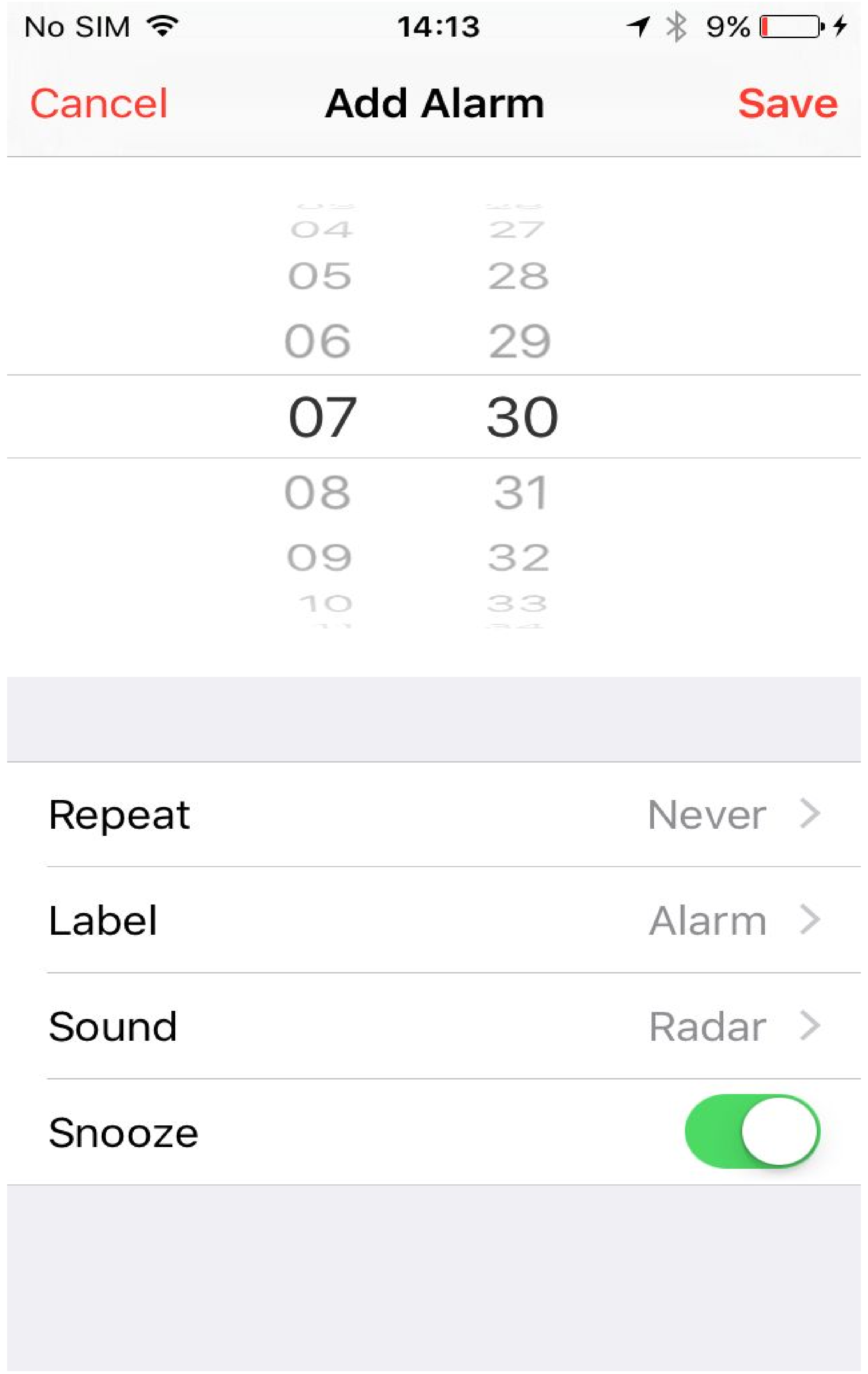
Like… modeling the app?

Alarm Clock

An App Example



No Alarms



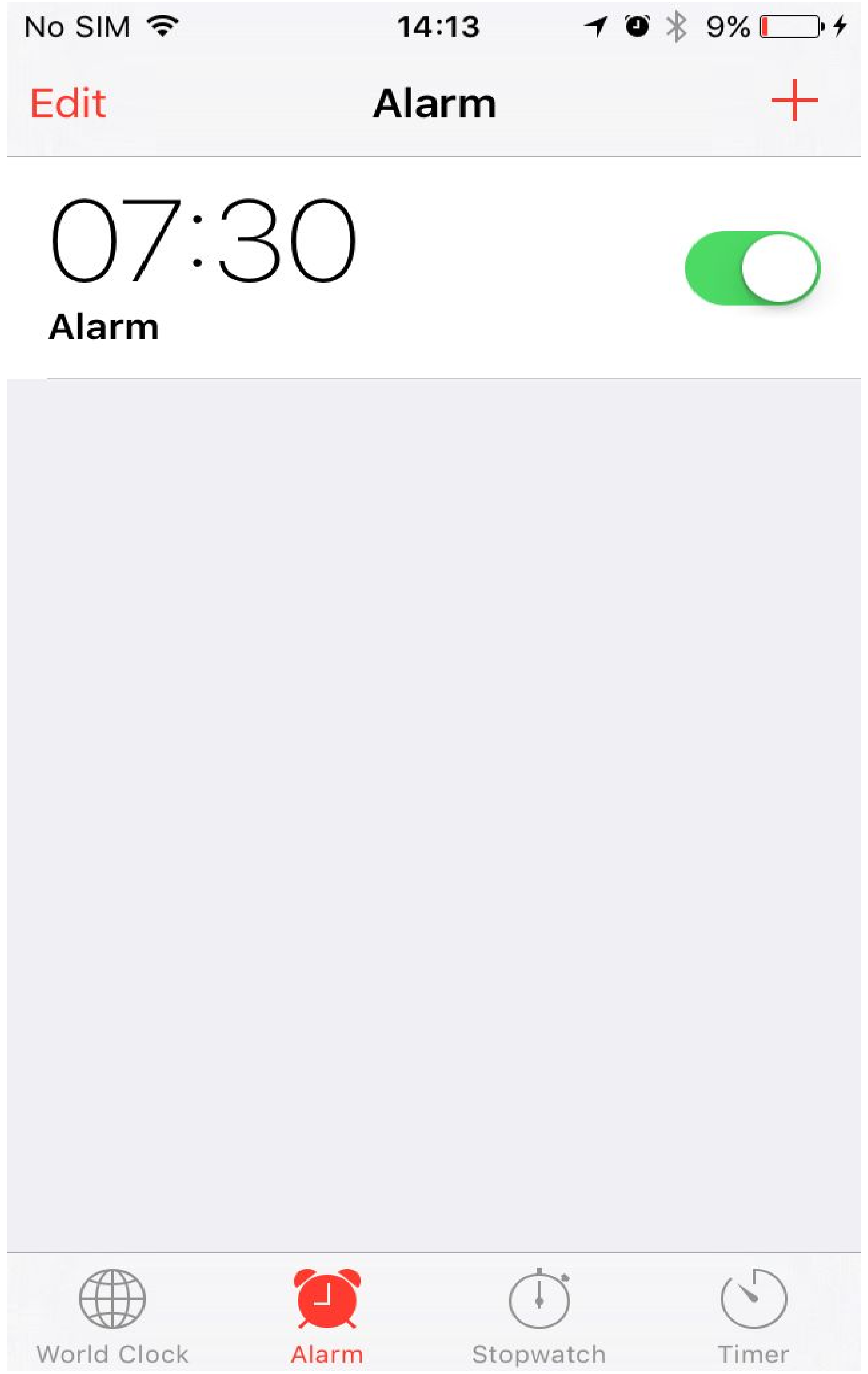
07 30

Repeat Never >

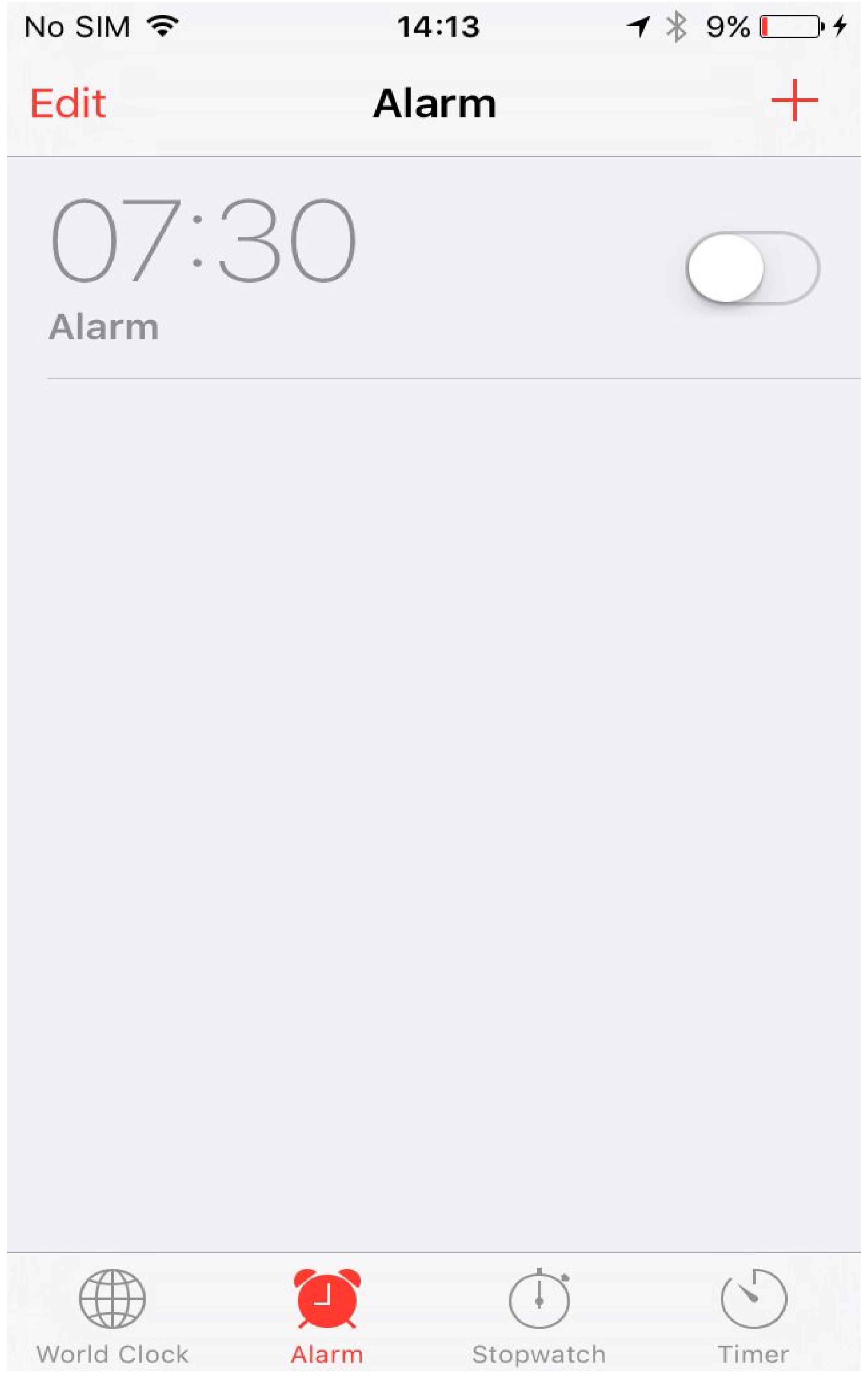
Label Alarm >

Sound Radar >

Snooze ●



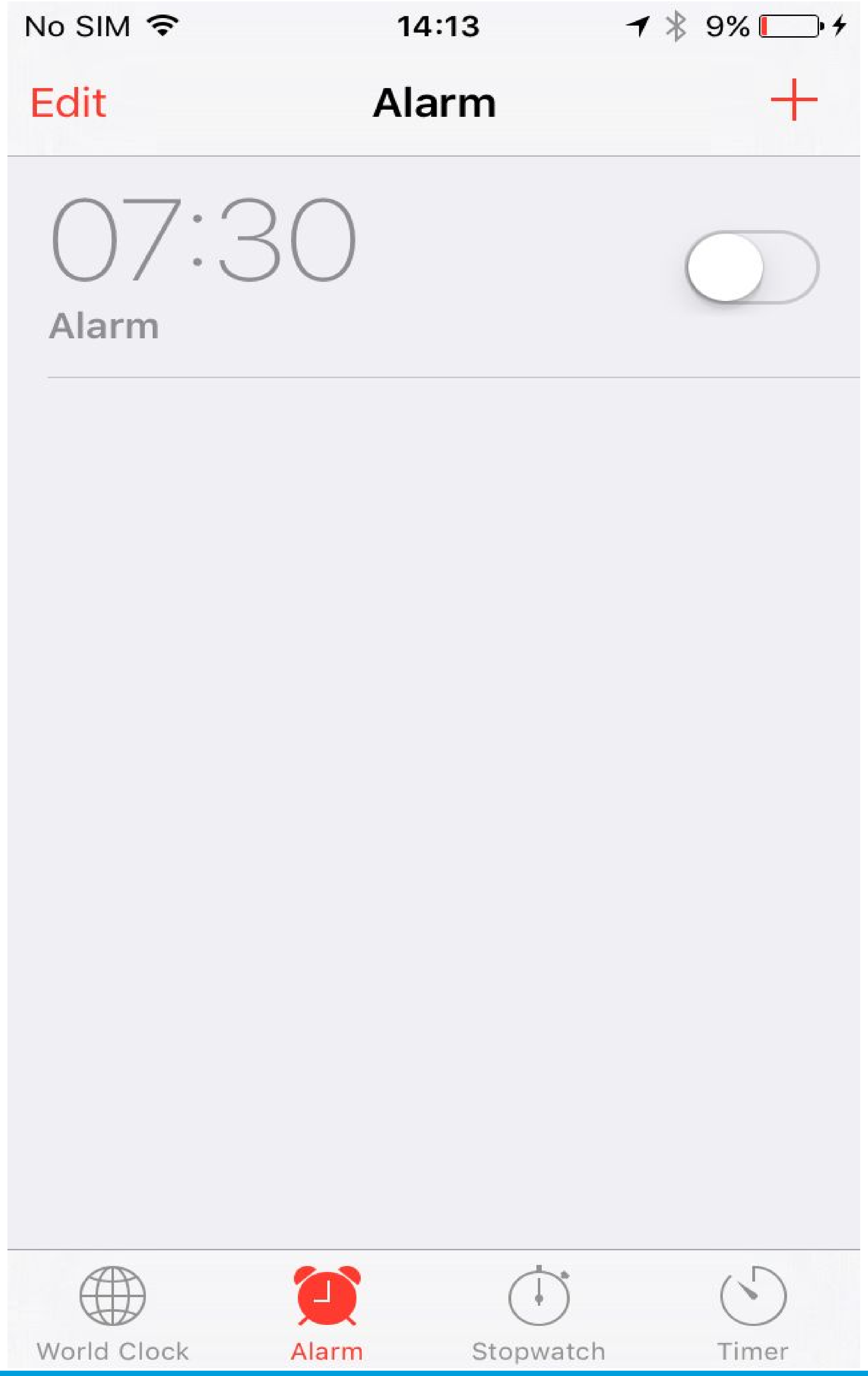
07:30
Alarm ●



07:30
Alarm ○

State Diagram: NOT SET State

An App Example

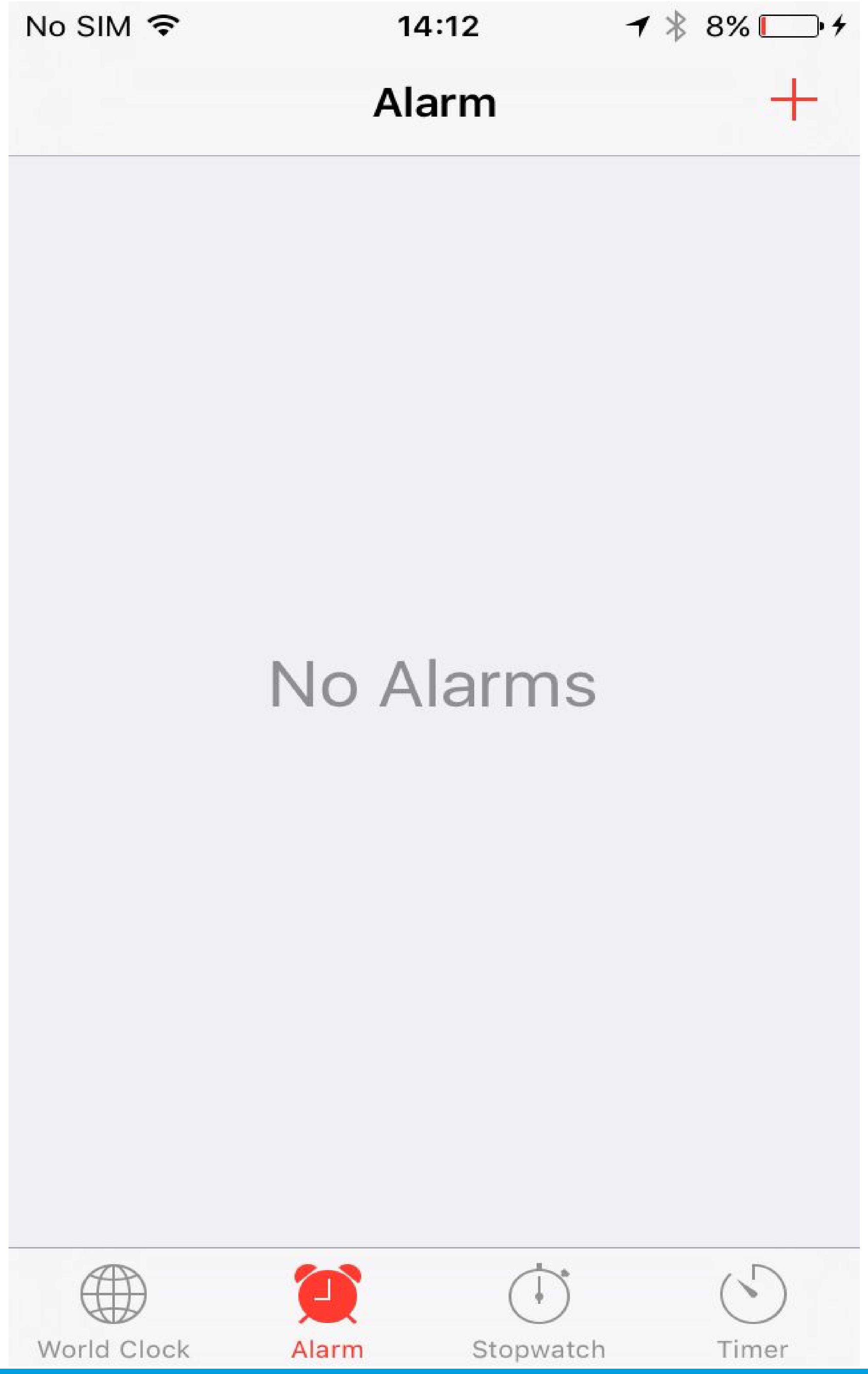


No SIM 14:13 9%

Edit Alarm +

07:30

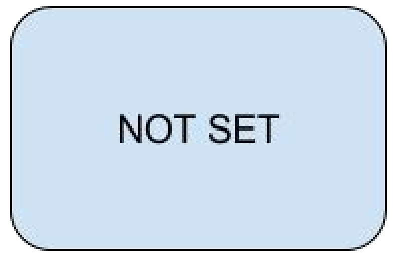
Alarm



No SIM 14:12 8%

Alarm +

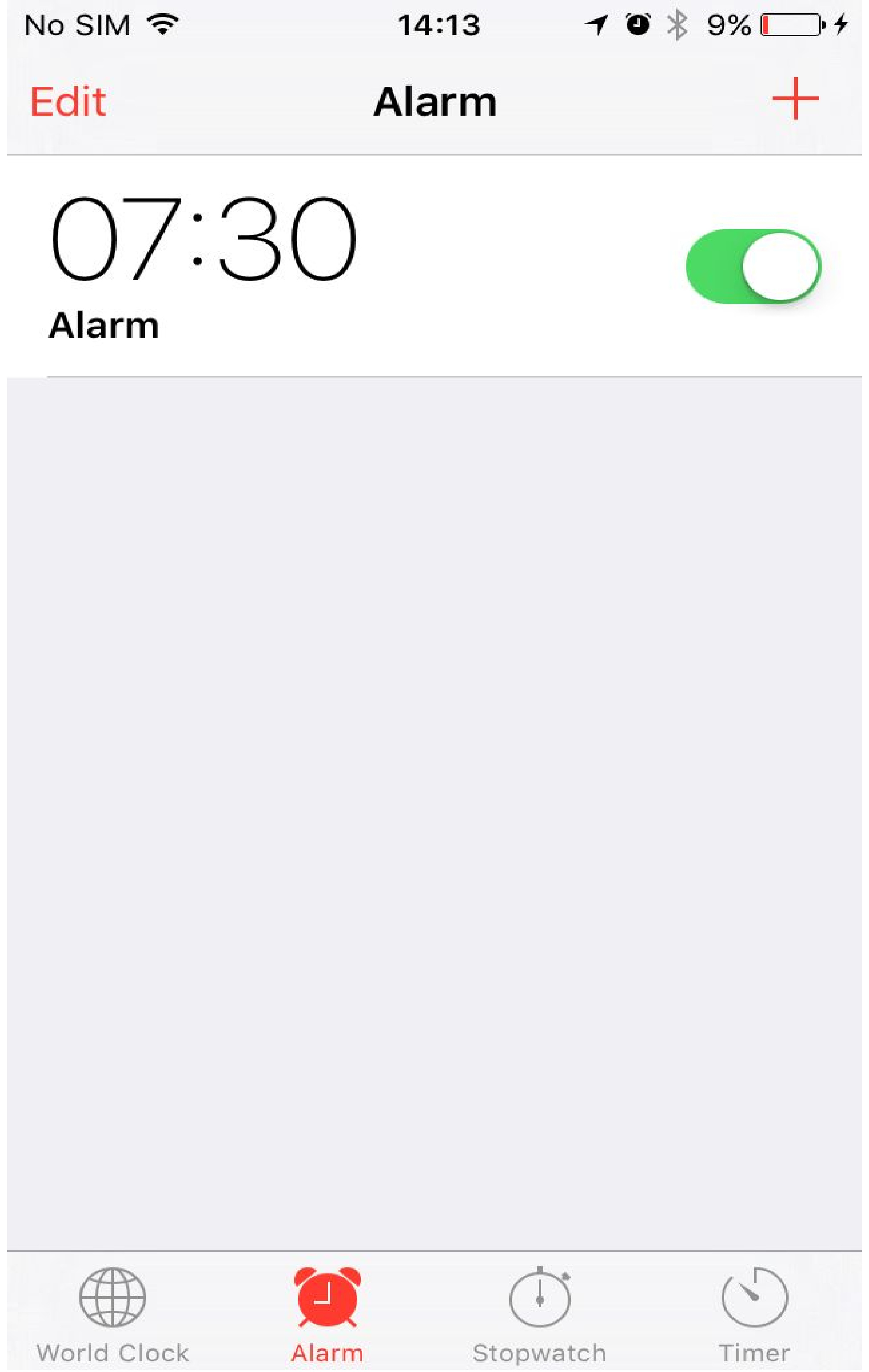
No Alarms



NOT SET

State Diagram -- ALARM SET State

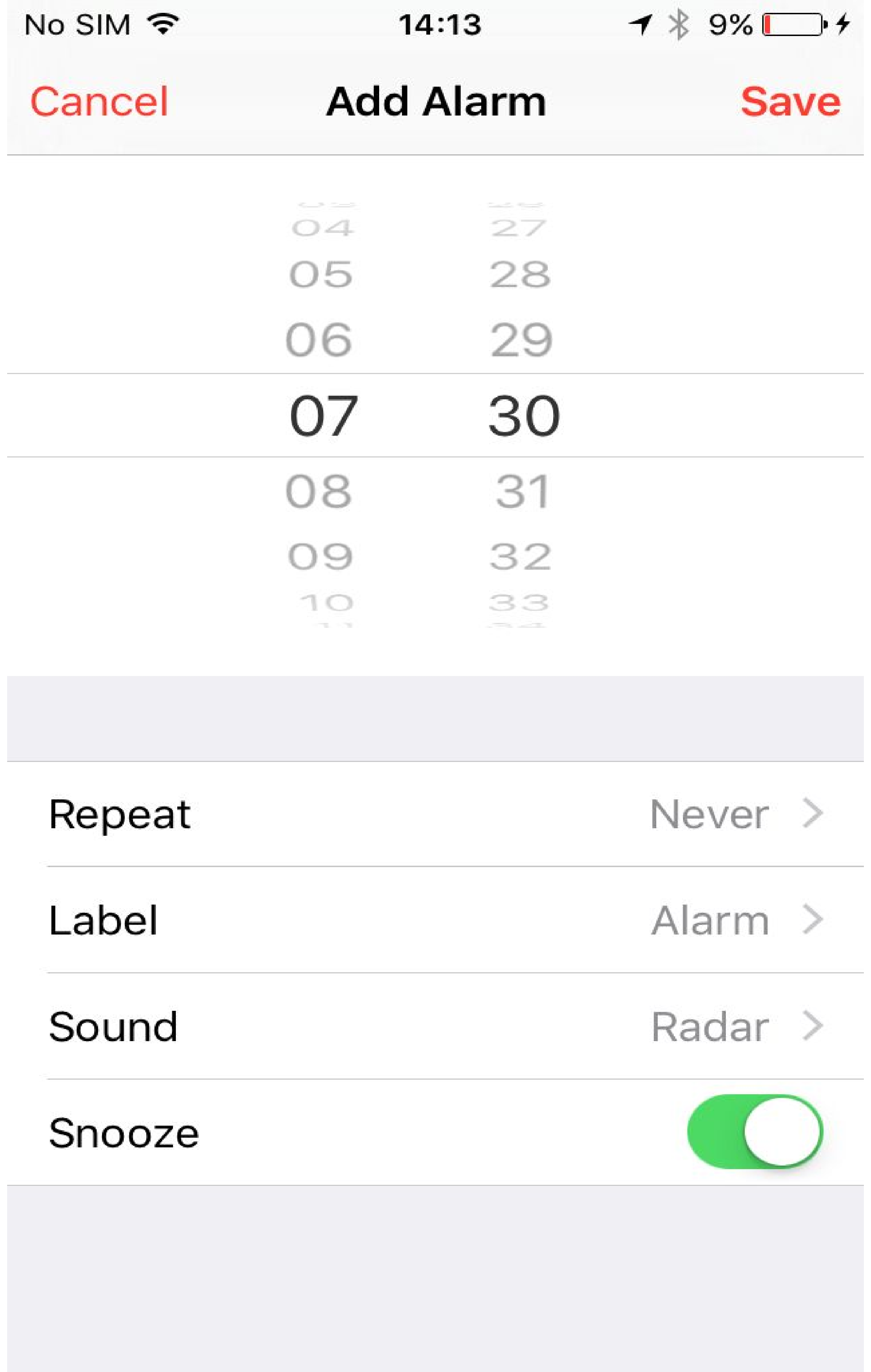
An App Example



ALARM SET

State Diagram -- ALARM Transition

An App Example



No SIM 14:13 9%

Cancel **Add Alarm** Save

07 30

Repeat Never

Label Alarm

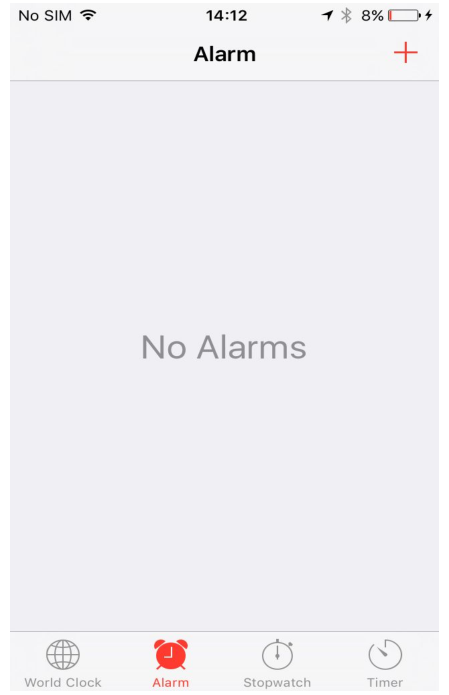
Sound Radar

Snooze

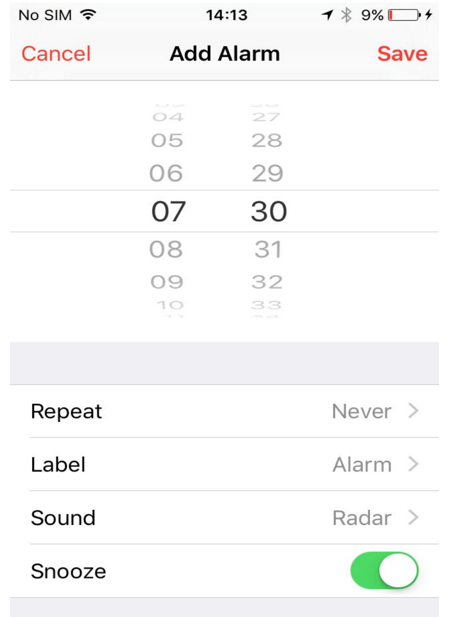
ALARM SET FOR X

State Diagram: Part 1

An App Example



No Alarms

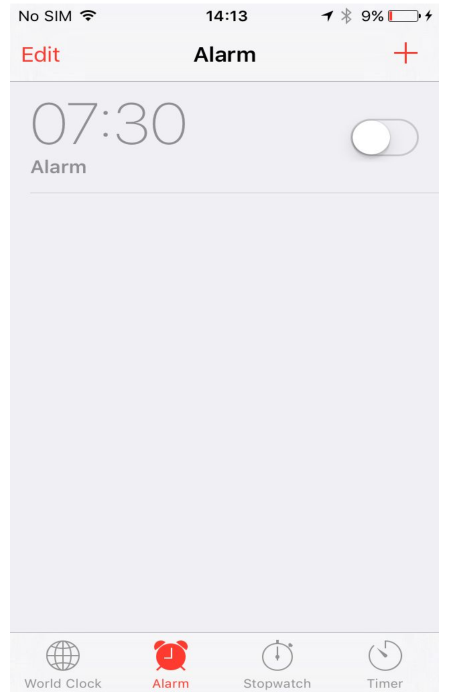


Repeat Never

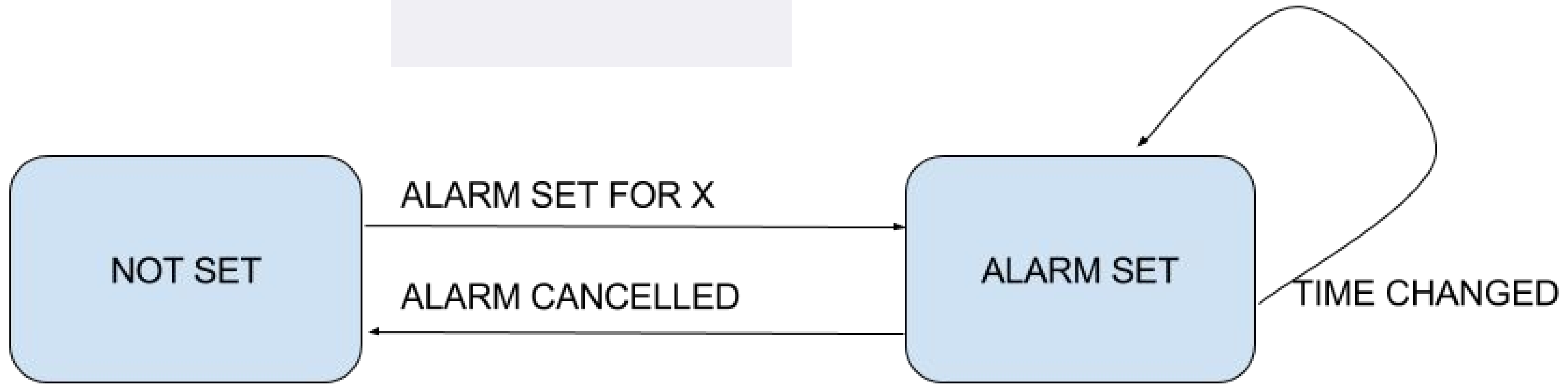
Label Alarm

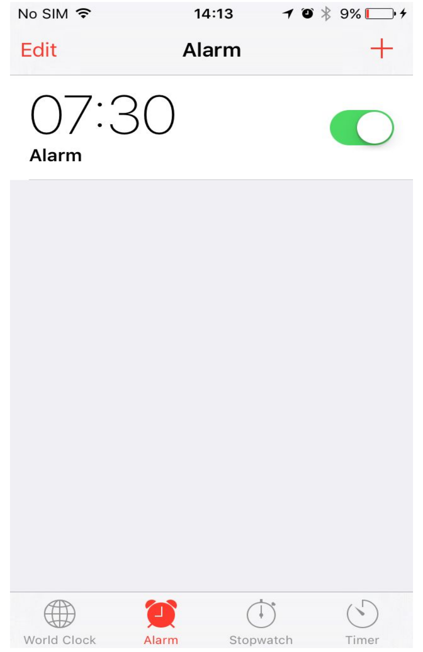
Sound Radar

Snooze



07:30
Alarm

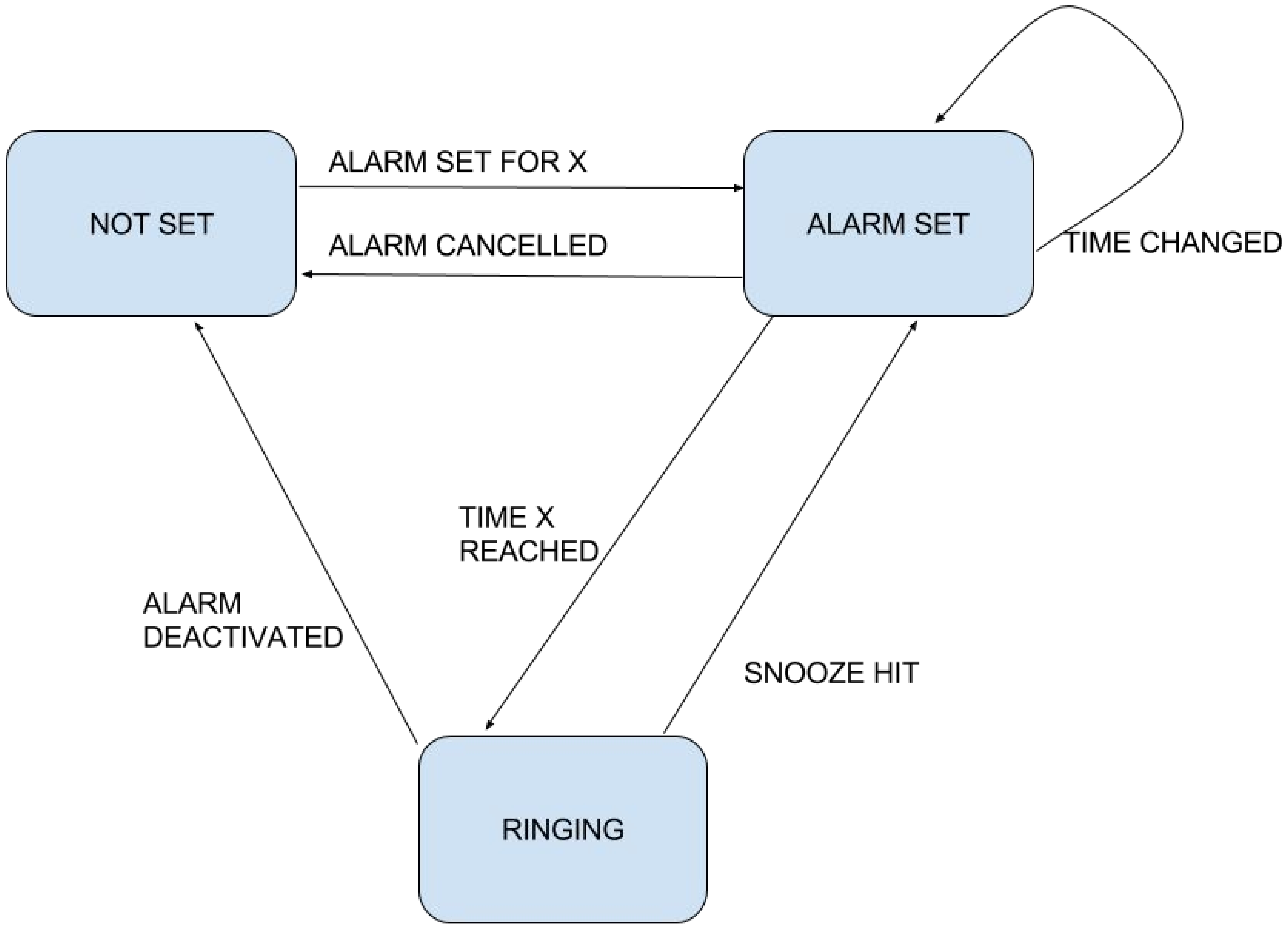




07:30
Alarm

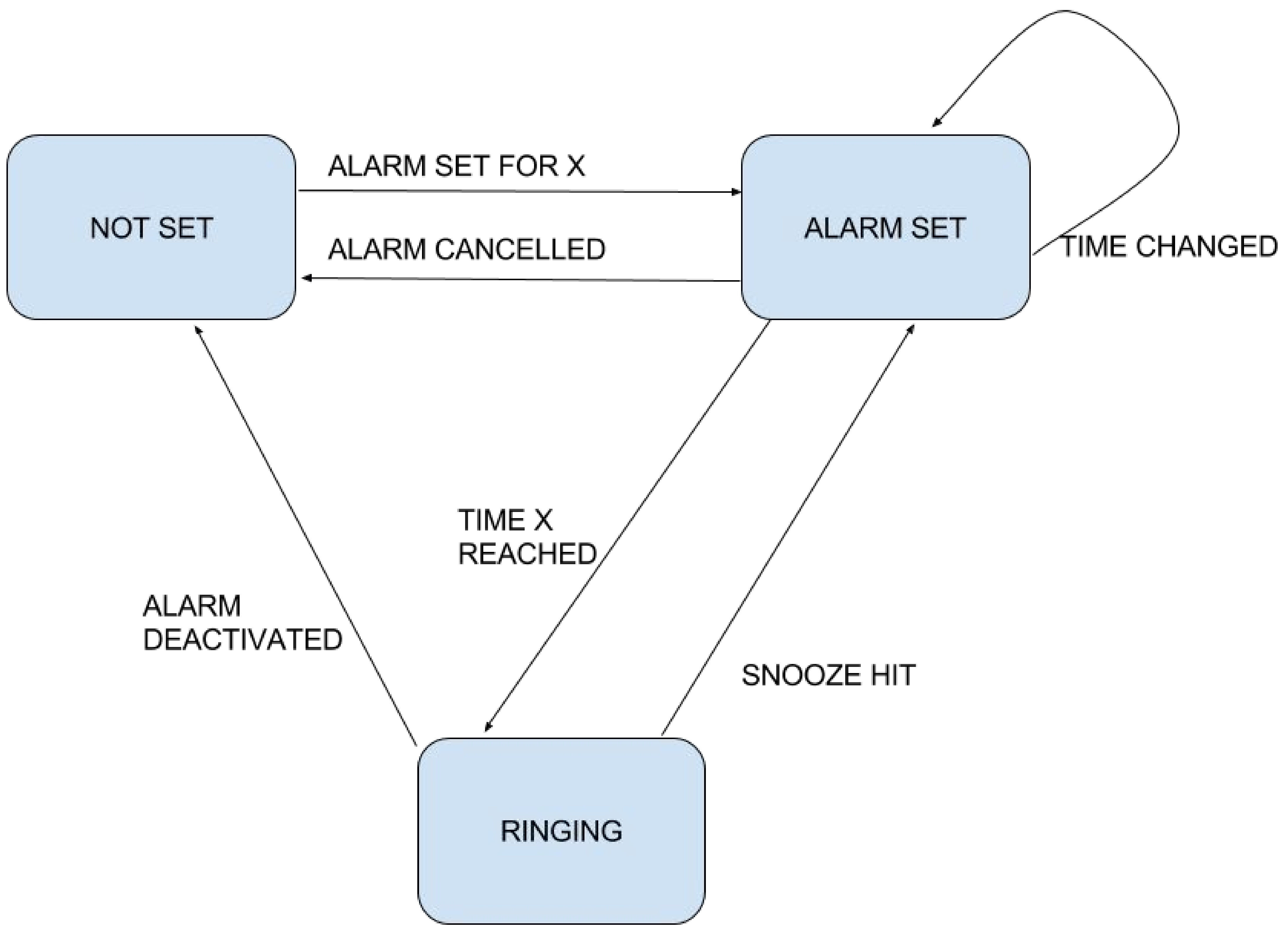
State Diagram: Completed

An App Example



State Diagram

Talking Points



Similar to user flow diagram

Clear and concise patterns for app usage

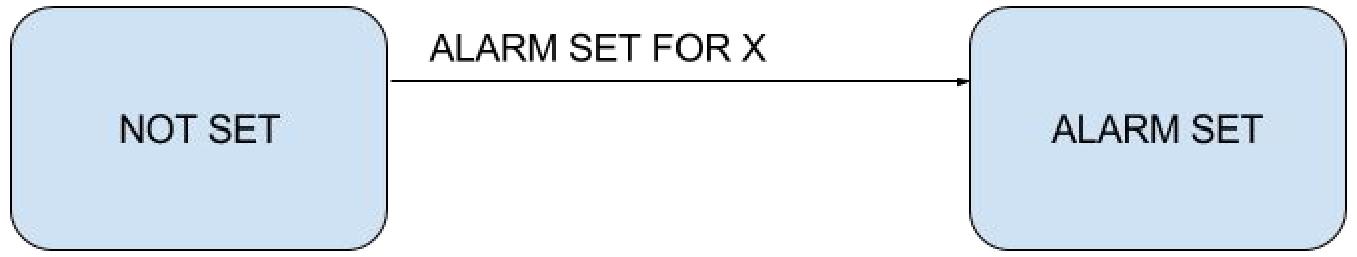
Hits every state a user can

Readily convertible to test plan

From a "good" FSM diagram, can infer requirements (and vice versa!)

Test Plan: NOT SET to ALARM SET

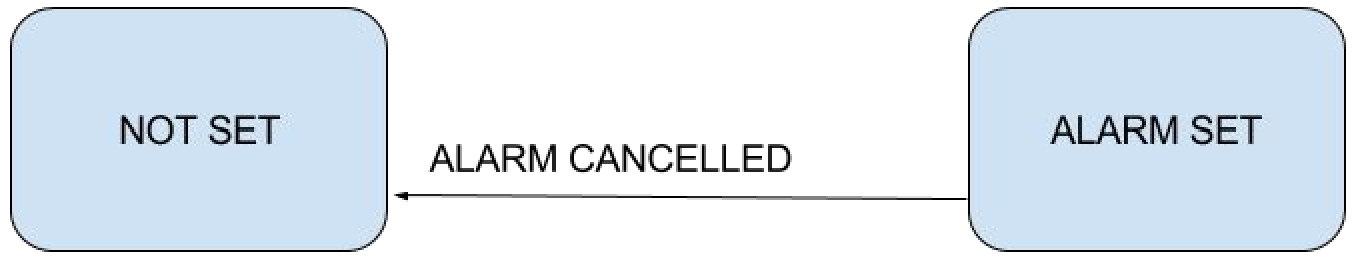
How to Create



Current State	Steps	New State to Verify
No Alarms	Tap "+" icon	Verify new alarm modal
New Alarm Modal	Set alarm	Returned to alarms list New alarm is present

Test Plan: ALARM SET to NOT SET

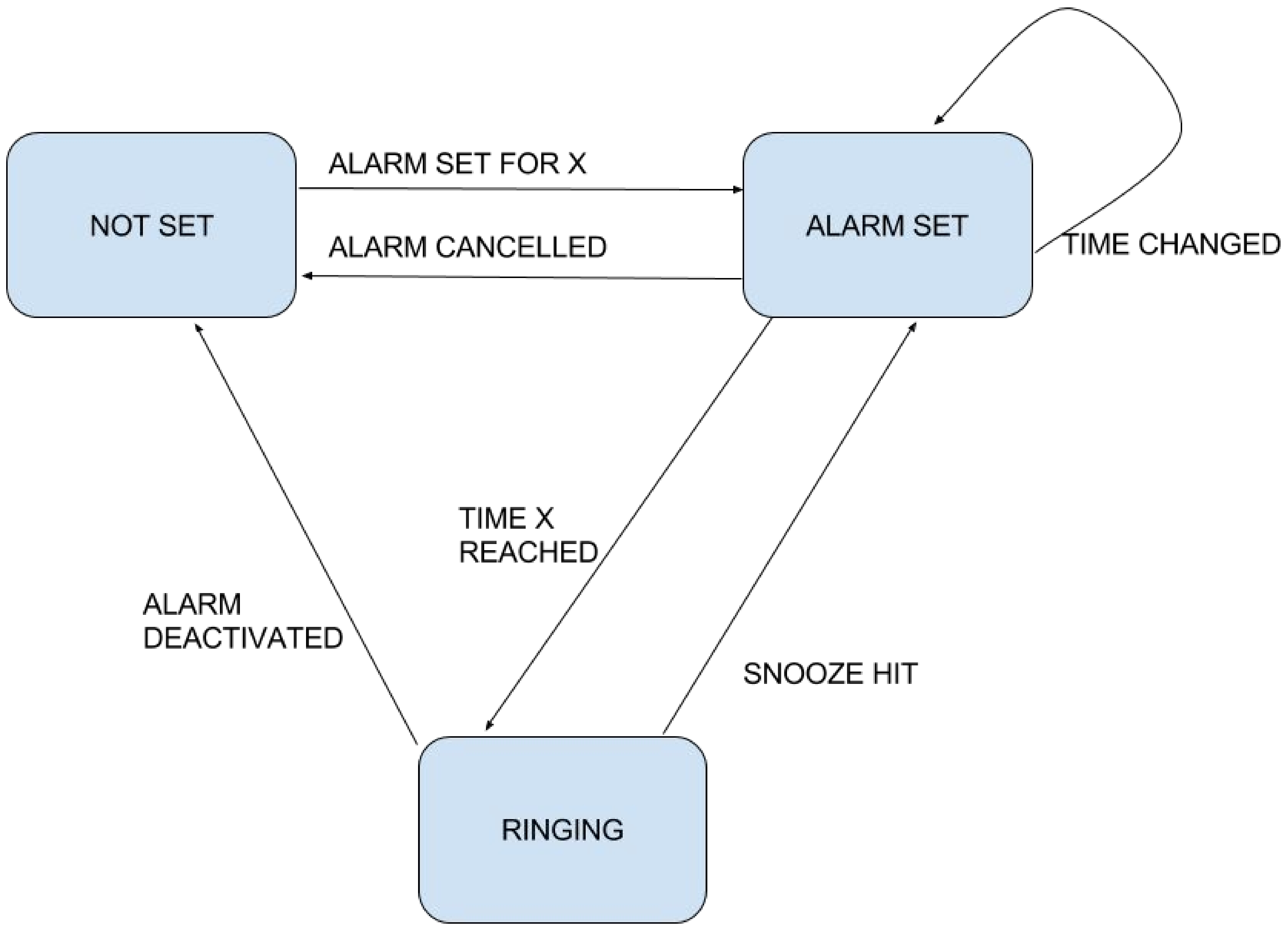
How to Create



Current State	Steps	New State to Verify
Single alarm show	Tap toggle	Alarm in deactivated state

Test Plan: Full Diagram

How to Create



Current State	Steps	New State to Verify
-	Launch app	Empty alarm state
No Alarms	Tap "+" icon	Verify new alarm modal
New Alarm Modal	Set alarm	Returned to alarms list New alarm is present
Single alarm show	Tap toggle	Alarm in deactivated state
Deactivated Alarm	Tap toggle	Alarm in active state
Active State for Time X	Tap alarm	Alarm edit modal shown
Edit Alarm	Change time	Returned to alarms list New alarm time is present
Alarm Primed	Get to specified time	Alarm rings
Ringing Alarm	Hit “Snooze”	Alarm stops Alarm primed for 10 minutes later
Alarm Primed	Get to new specified time	Alarm rings
Ringing Alarm	Hit off button	Alarm stops Alarm is in deactivated state

Test Plan

Completed Version

Current State	Steps	New State to Verify	PASS or FAIL?	Completed?
-	Launch app	Empty alarm state	PASS	Y
No Alarms	Tap "+" icon	Verify new alarm modal	PASS	Y
New Alarm Modal	Set alarm	Returned to alarms list New alarm is present	PASS	Y
Single Alarm Show	Tap toggle	Alarm in deactivated state	PASS	Y
Deactivated Alarm	Tap toggle	Alarm in active state		N
Active State for Time X	Tap alarm	Alarm edit modal shown		N
Edit Alarm	Change time	Returned to alarms list New alarm time is present		N
Alarm Primed	Get to specified time	Alarm rings		N
Ringing Alarm	Hit “Snooze”	Alarm stops Alarm primed for 10 minutes later		N
Alarm Primed	Get to new specified time	Alarm rings		N
Ringing Alarm	Hit off button	Alarm stops Alarm is in deactivated state		N

Test Plan

The Hit List

- Easily flows from an FSM diagram
- Can stand on its own
  - i.e. Do not need ancillary requirements to follow plan
- Straight forward execution
- Highly repeatable
- Reaches all relevant states
- Provides completed versus not-completed list
- Enables QA/team review

Onwards!

What’s Next? Why, deconstruction!

State Deconstruction

Transition Deconstruction

...**Spoiler Alert:** We’ll discuss both!

What Should You Test?

- Always test the happy path
- Adhoc Testing
- Negative Testing
- Repeat Tests
- Look at all supported OS levels

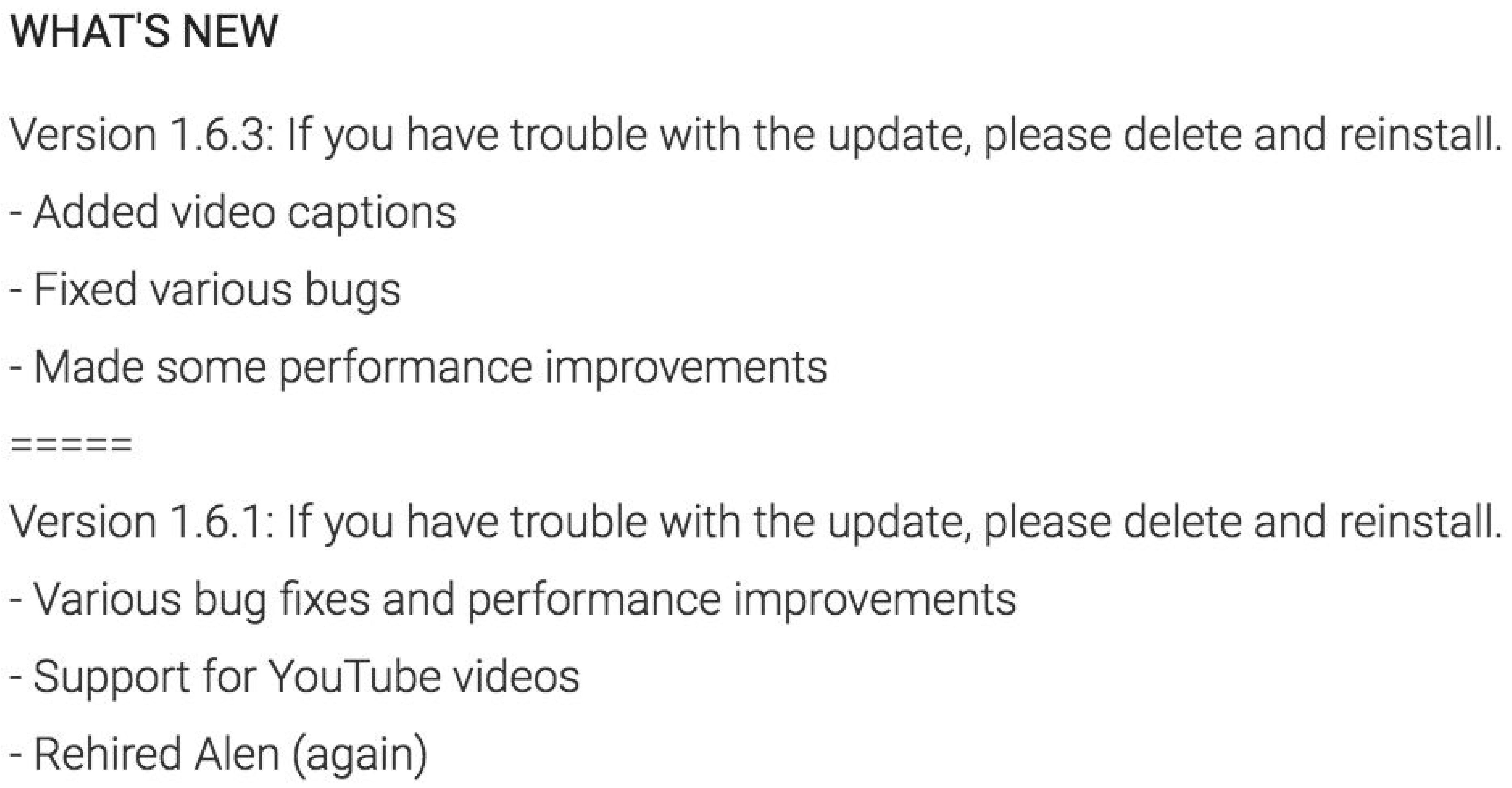
Happy Path and what it isnt

- Always test Happy Path!
  - Do not stop there
- Does not cover what a user will do
- Users always find a way off the road

Negative is Positive

- Make sure the app behaves correctly with “bad” or “unexpected” input/data

Did they really just do that?



WHAT'S NEW

Version 1.6.3: If you have trouble with the update, please delete and reinstall.

- Added video captions

- Fixed various bugs

- Made some performance improvements

=====

Version 1.6.1: If you have trouble with the update, please delete and reinstall.

- Various bug fixes and performance improvements

- Support for YouTube videos

- Rehired Alen (again)

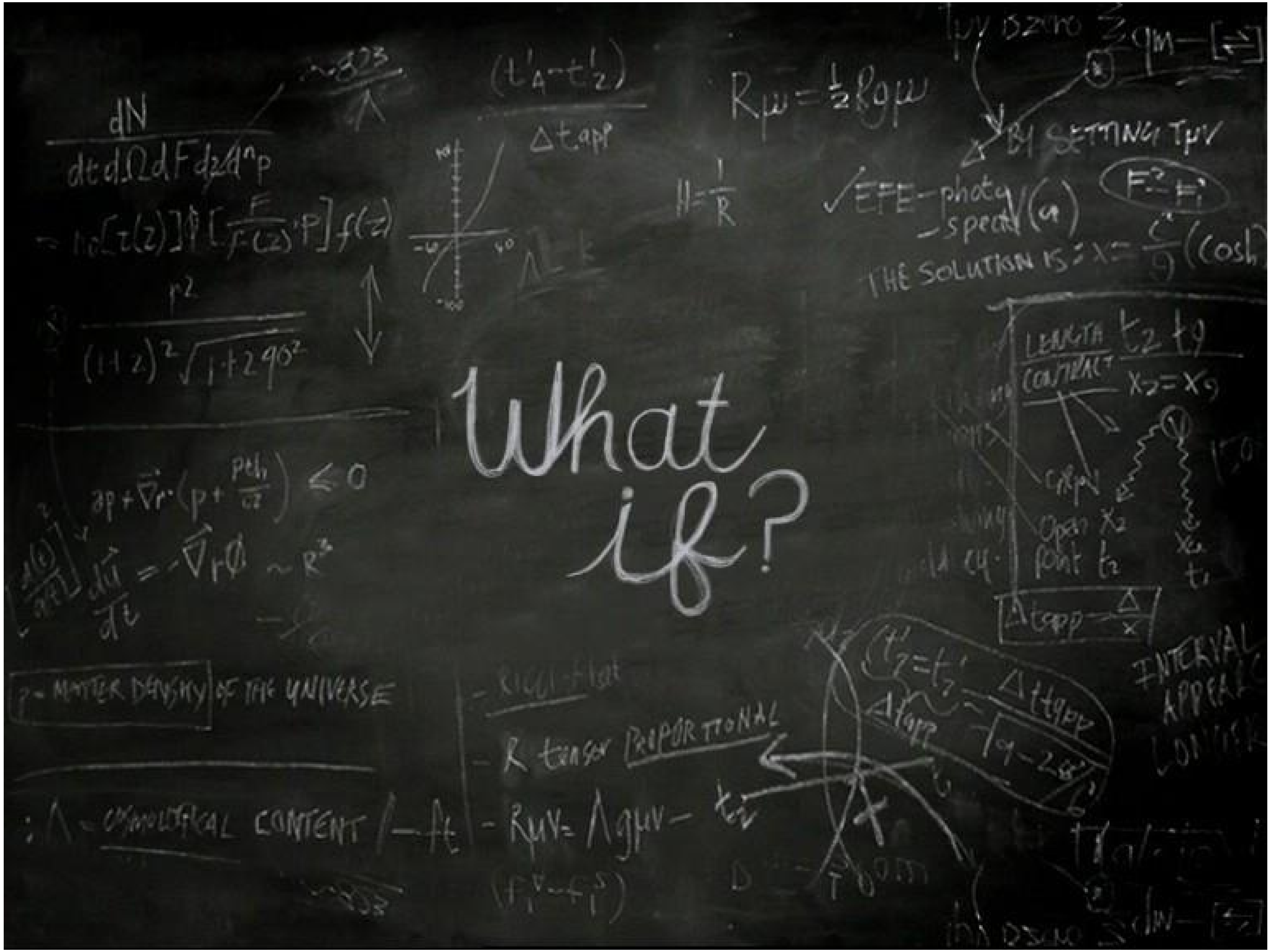
Upgrade Upgrade Upgrade

- Always do upgrade tests
- Store -> Release builds
- Look for the following
  - Database/Data issues
  - Ensure no Debug options are left
  - Data/Settings are retained

Do it again, then once more

Get to know your app

- Spend some time getting to know your app
- Take it to a nice dinner
- Bring it out during commercial breaks
- Use it in bed


What if?
ρ = MATTER DENSITY OF THE UNIVERSE
Λ = COSMOLOGICAL CONTENT
Ricci-flat
R tensor PROPORTIONAL
Rμν = Λgμν
Rμν = ½Rgμν
Δtapp
BY SETTING Tμν
EFE – photo
THE SOLUTION IS
LENGTH CONTRACT
INTERVAL APPEARS

App Launch

The Easy Part!

A user decided to use your app - how did that happen?

- App icon tapped
- App resumed with multitasking view
- App opened via deeplink
- App instant run?!

App Icon Tapped

Most Common Entrance

A clean app launch - everything should be solid, right?

Considerations:

- Network connectivity
- Permissions needed for app launch
- Landing state
- API state
- First launch versus subsequent launches
- Upgrade versus clean install
- Background versus foreground action

App Deeplink

Further Considerations...

Does it matter where a user came from?

What happens to the “current” app state?

API / app state / deeplink divergence?

Hardware States - Fixed

Hardware States - Fixed

Basic device differences:

Device size
Processor architecture
Screen resolution
Memory Limits

Emulator/simulator do not fully replicate these states.

Hardware States - Variable

Permissions

Spotty data connection

Location services

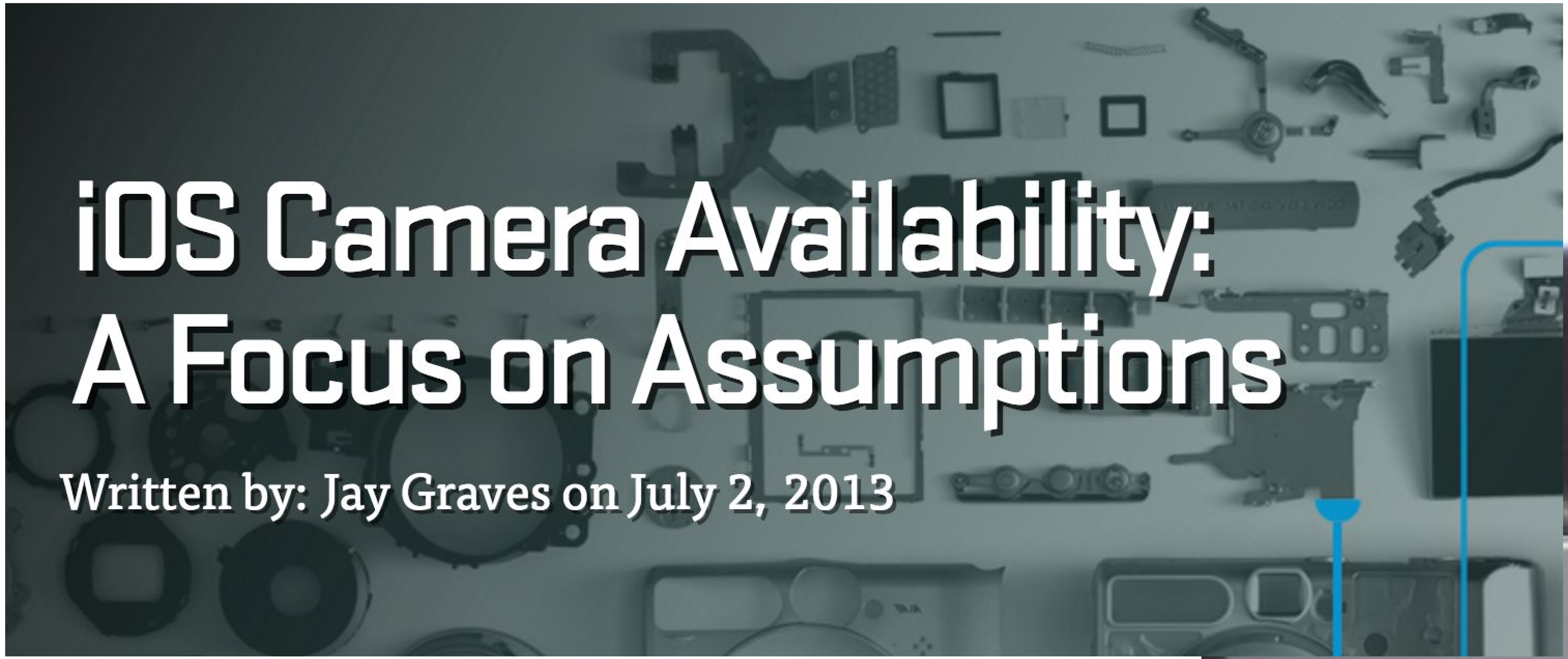
Power Levels (Low Power Mode)

…

~~Profit?~~

Permissions - or lack thereof

Permissions - or lack thereof



iOS Camera Availability: A Focus on Assumptions

Written by: Jay Graves on July 2, 2013

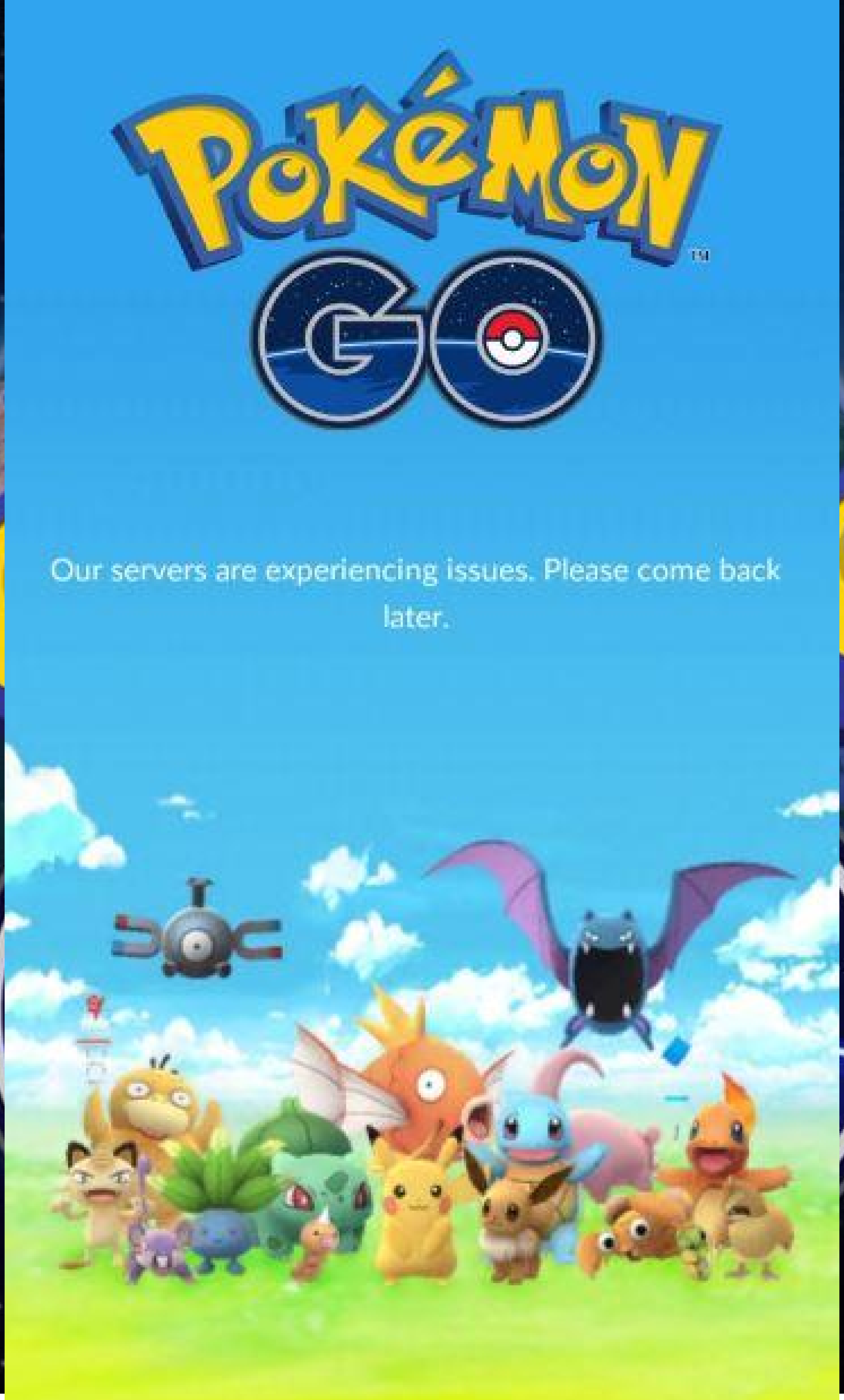
https://possiblemobile.com/2013/07/ios-camera-availability/

Permissions - or lack thereof

Permissions:

- Denied by default, then granted at run time
- Can be turned off at any point by a user

Pokémon
GO
TM



Our servers are experiencing issues. Please come back later.

App Data

Where Does It Come From?

User Data (from device)

- Some form of Database (CoreData, MySQL, etc)
- User keychain data
- User Defaults
- Local Assets

API Data (from a server)

- Structured data (XML, JSON, etc)
- Images
- Feed-based states

API Data

Normal Flow

State Transition:

State1 → State2 → State3

General Considerations:

- Data stability - is all of the data for a state transition present?
- State transition possible while:
  - App is open
  - App is backgrounded (Background refresh)
  - App is killed (either manually or by watchdog, etc)

API Data

Missed Connections

State Transition:

State1 → State2 → State3

Missed Connections:

- What if the app is killed during State1, and misses State2 entirely?
- What happens if the API hiccups, and bypasses State2?

Can the app recover and seamlessly go from State1 to State3?

API Data

Retrograde Wheelbarrow

Backwards motion in state transition?

State1 → State2 → State1

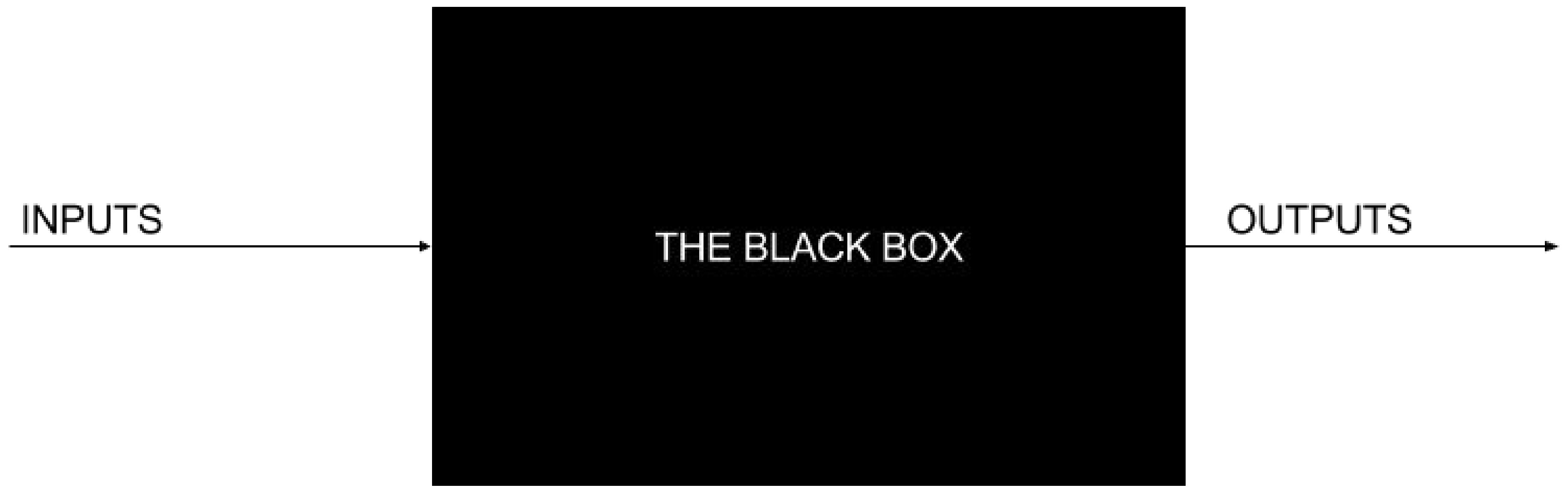
Pedantic Questions:

- Is this something that should be expected?
- Is this something that could happen:
  - As an API hiccup?
  - With manually edited feeds?
- Is this really a business question?

The Black Box

Black Box Model

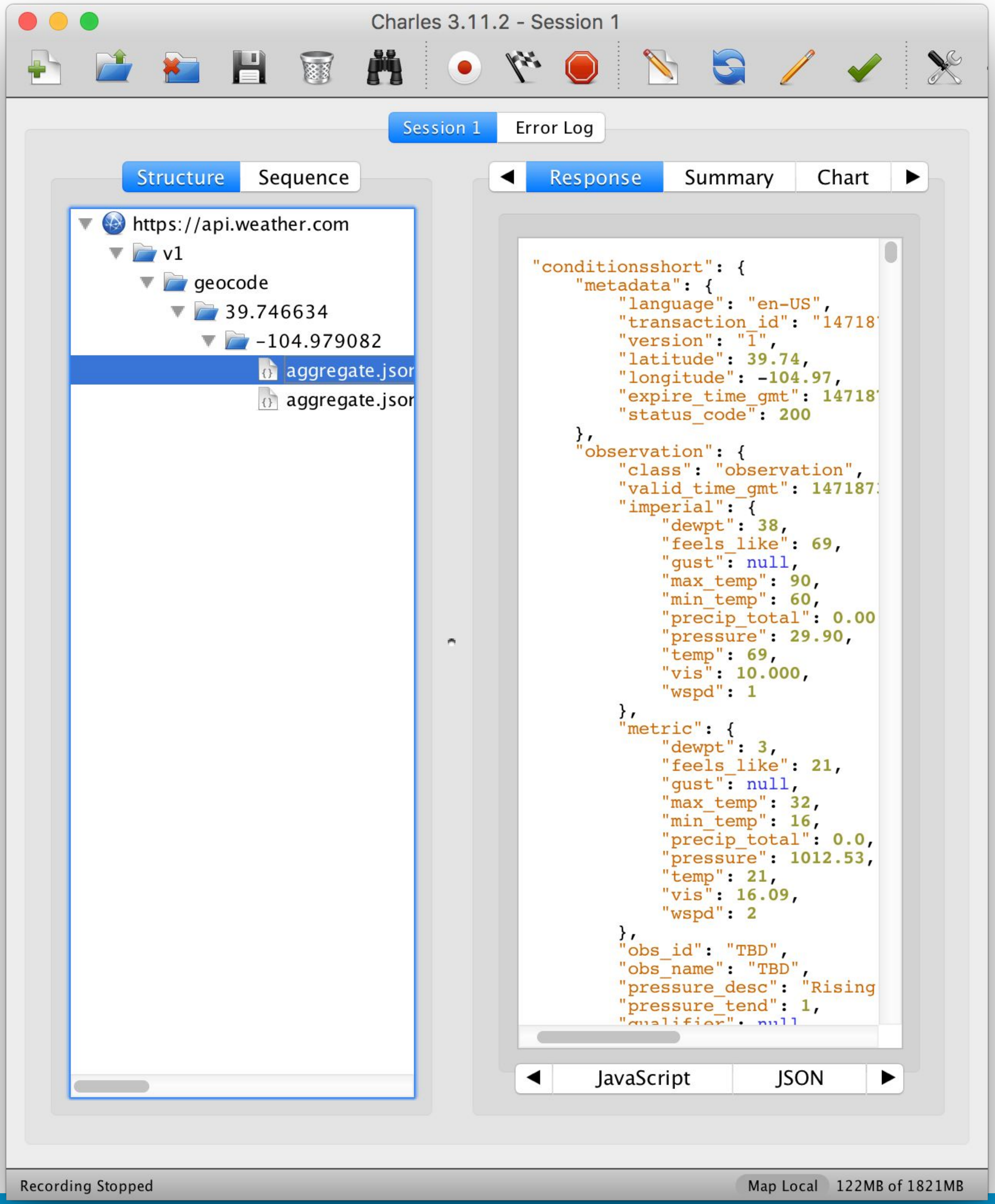
From a Magic Hat...



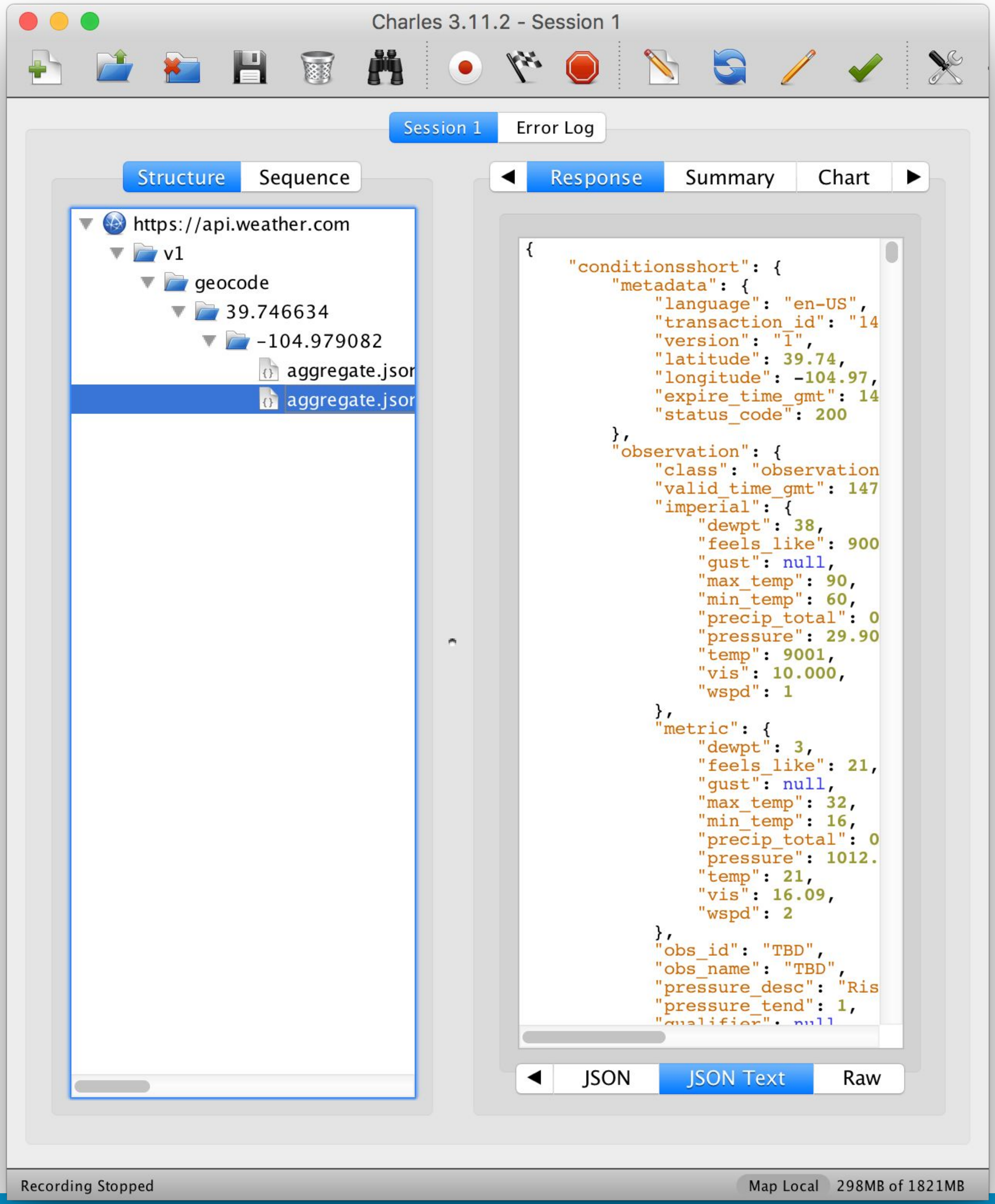
- Test the app like a user uses the app!
- Not necessarily the best way to test, but reliable way to test
- Not how you unit test!
- Integration testing

Charles Proxy

Don’t Let Out the Magic Smoke… Don’t Open the Black Box!



```
"conditionsshort": {
    "metadata": {
        "language": "en-US",
        "transaction_id": "14718
        "version": "1",
        "latitude": 39.74,
        "longitude": -104.97,
        "expire_time_gmt": 14718
        "status_code": 200
    },
    "observation": {
        "class": "observation",
        "valid_time_gmt": 147187
        "imperial": {
            "dewpt": 38,
            "feels_like": 69,
            "gust": null,
            "max_temp": 90,
            "min_temp": 60,
            "precip_total": 0.00
            "pressure": 29.90,
            "temp": 69,
            "vis": 10.000,
            "wspd": 1
        },
        "metric": {
            "dewpt": 3,
            "feels_like": 21,
            "gust": null,
            "max_temp": 32,
            "min_temp": 16,
            "precip_total": 0.0,
            "pressure": 1012.53,
            "temp": 21,
            "vis": 16.09,
            "wspd": 2
        },
        "obs_id": "TBD",
        "obs_name": "TBD",
        "pressure_desc": "Rising
        "pressure_tend": 1,
        "qualifier": null
```



```
{
    "conditionsshort": {
        "metadata": {
            "language": "en-US",
            "transaction_id": "14
            "version": "1",
            "latitude": 39.74,
            "longitude": -104.97,
            "expire_time_gmt": 14
            "status_code": 200
        },
        "observation": {
            "class": "observation
            "valid_time_gmt": 147
            "imperial": {
                "dewpt": 38,
                "feels_like": 900
                "gust": null,
                "max_temp": 90,
                "min_temp": 60,
                "precip_total": 0
                "pressure": 29.90
                "temp": 9001,
                "vis": 10.000,
                "wspd": 1
            },
            "metric": {
                "dewpt": 3,
                "feels_like": 21,
                "gust": null,
                "max_temp": 32,
                "min_temp": 16,
                "precip_total": 0
                "pressure": 1012.
                "temp": 21,
                "vis": 16.09,
                "wspd": 2
            },
            "obs_id": "TBD",
            "obs_name": "TBD",
            "pressure_desc": "Ris
            "pressure_tend": 1,
            "qualifier": null
```

Tying It All Together...

QA All the Apps!

The elephant has left the room (automation, remember)

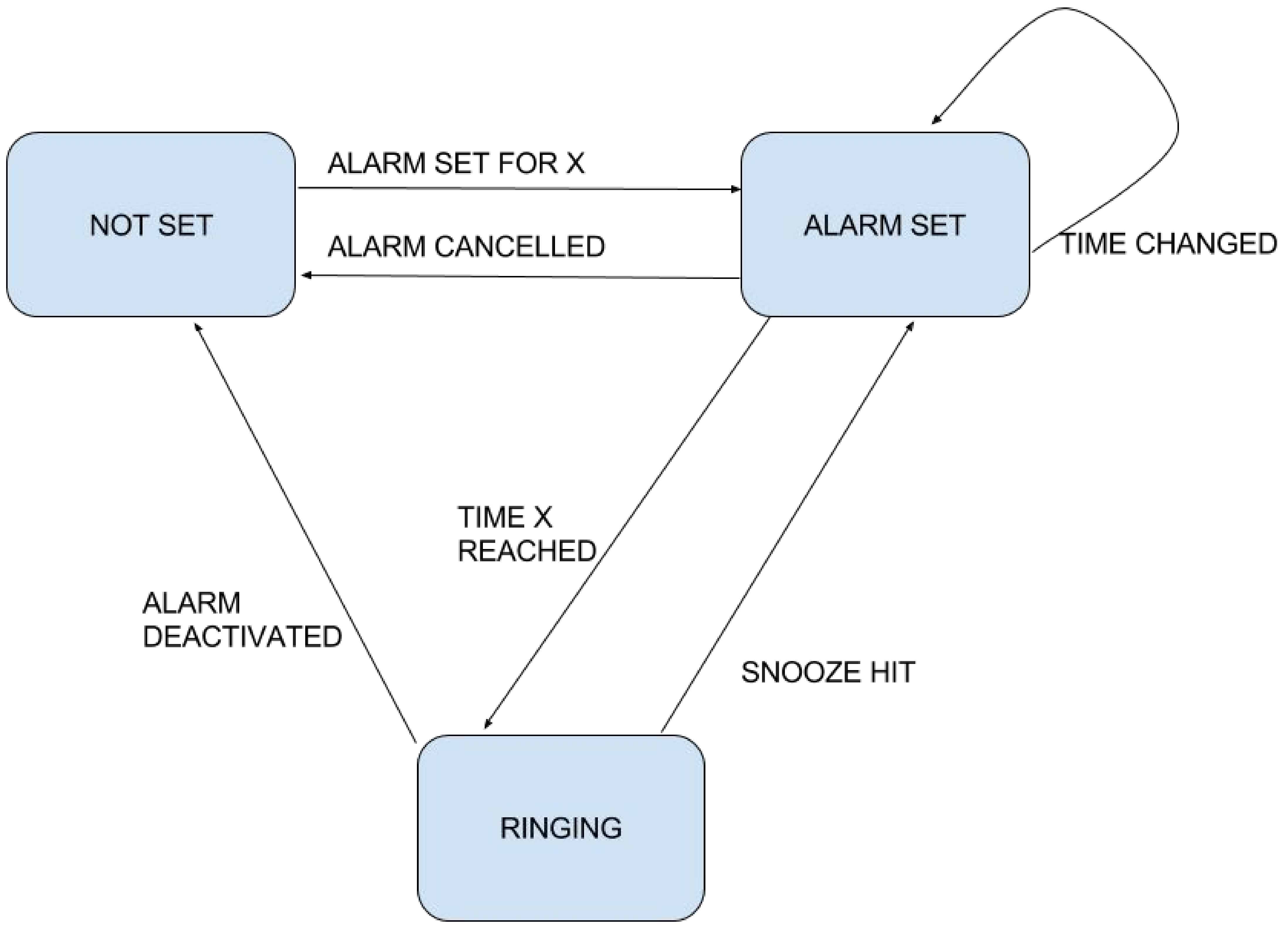
How to write a test plan

Deeper analysis on common problems

QA Process and you

State Diagram vs Test Plan

Which would you like to read?



Current State	Steps	New State to Verify
-	Launch app	Empty alarm state
No Alarms	Tap "+" icon	Verify new alarm modal
New Alarm Modal	Set alarm	Returned to alarms list New alarm is present
Single alarm show	Tap toggle	Alarm in deactivated state
Deactivated Alarm	Tap toggle	Alarm in active state
Active State for Time X	Tap alarm	Alarm edit modal shown
Edit Alarm	Change time	Returned to alarms list New alarm time is present
Alarm Primed	Get to specified time	Alarm rings
Ringing Alarm	Hit “Snooze”	Alarm stops Alarm primed for 10 minutes later
Alarm Primed	Get to new specified time	Alarm rings
Ringing Alarm	Hit off button	Alarm stops Alarm is in deactivated state

QA Process

Things to think about

- Where does QA fit into Dev Process
- Structure
- Documentation
- Accountability/QA Review
- Communication
- Expectations

CRASHES ARE BAD
MMMKAY
memegenerator.net

Happy Testing!

Thank You!

https://github.com/d2therak/DoesItWork