

timbuktu

# THE OPPORTUNITY

# Smartphone adoption growing in Africa

Percentage of connections



Source: GSMA Intelligence

# Internet usage in Africa

<http://www.gsma.com/mobileeconomy/africa/>

- 226 million smartphones (end 2015)
- set to triple by 2020



**Benedict Evans**

@BenedictEvans



Following

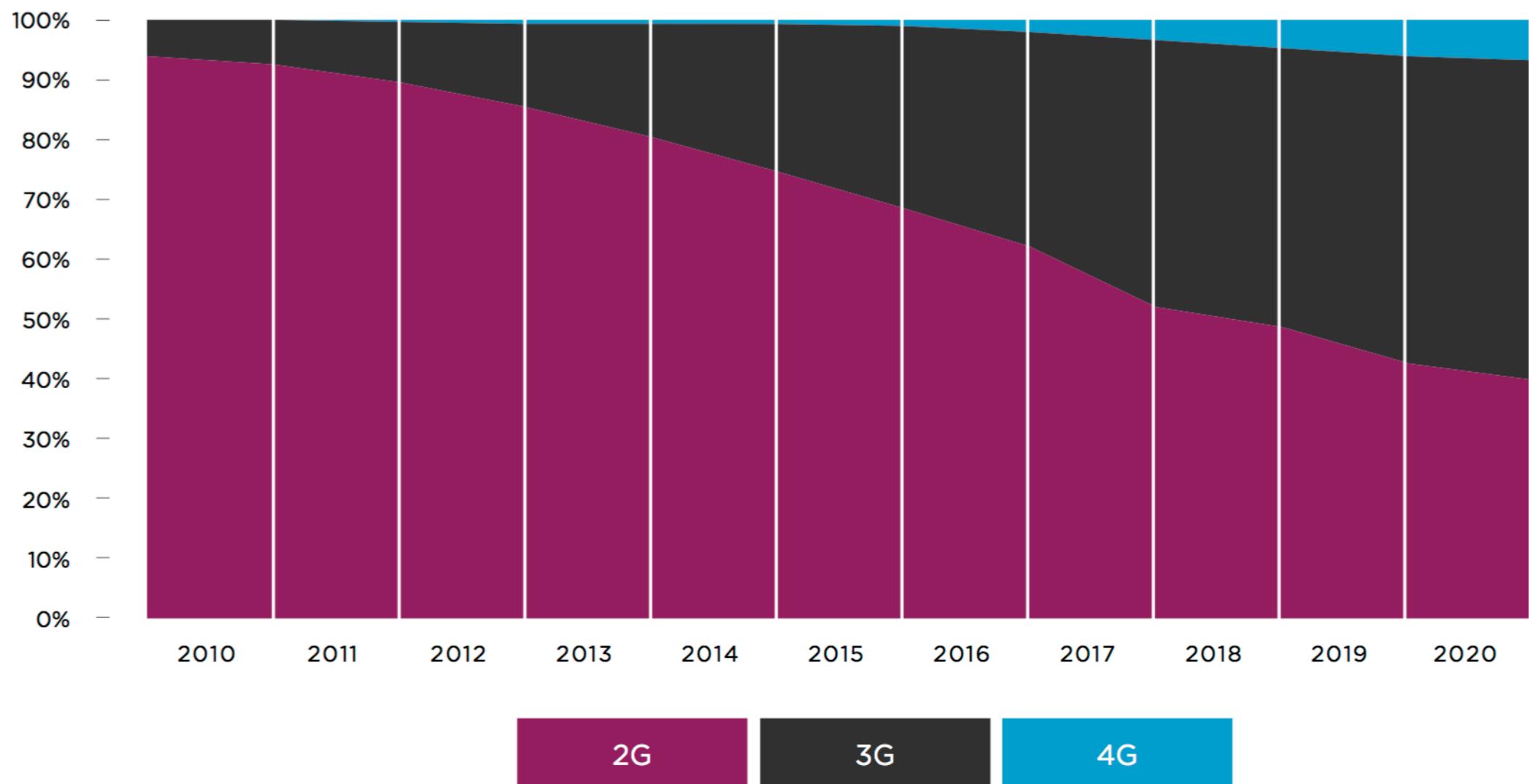
Most people on earth will have a smartphone.  
But that's like saying all households in the US  
got electricity. It's just the beginning.

# THE CHALLENGE

1. Most smartphone users will still be stuck on slow / expensive connections for the foreseeable future.

# Technology migration in Africa

Percentage of connections



Source: GSMA Intelligence

2. Only around 10 million fixed-line broadband subscriptions (for 1.2 billion people).



# Existing approach

- Access to extremely large inventory.
- Find an item by doing:  
Search + Filter + Scroll + Tap for details
- Each step requires network

# Existing approach

Example: Amazon's Android app

- 21 Mb data needed to buy 5 items
- ~ 240 taps needed to place first order

# What do we do?

- We sell only groceries to people around Cape Town, through a dedicated Android app.
- It's the first step towards building a new kind of online retailer, that works well in emerging-market conditions.



2 kg  
NETT  
NETTO  
WHEN PACKED

KULTIVAR/CULTIVAR  
CERES AARTAPPELS  
Packing date: 17.01.2018  
Weight: 1.7 kg  
Product of South Africa

FROMMAN  
PUC.  
PACKING DATE:

GEWAASHD

# Our approach

- Only the goods you need for solving a simple, everyday task (e.g. buying groceries for a household).
- Dedicated app, with a simple UI that uses little data.
- Only in a limited geographic area.

# Our approach

How does it compare?

- ~~21 Mb~~ 0.25 Mb data needed to buy 5 items
- Works offline - you only need to be connected when proceeding to checkout.
- ~~~ 240 taps~~ 65 taps needed for first order

20:59 ... ☰ 🔍

**Shop Timbuktu**

**HOUSEHOLD** **OTHER FOOD** **PLES** **TOILETRIES**

**Sudz** 2 litre @R39.95

**Sunlight** Laundry soap 500 gr @R12.45

**OMO** Washing powder 2 kg @R59.95

**BRAND** ARIEL OMO SUNLIGHT

**PACK SIZE** 1 KG 2 KG

**OPTIONS** AUTO MULTI A - +

**PRICES CANDLES** Candles 400 gr (6's) @R23.95

**Scotch** Sponge scourer

20:56 ... ☰ 🔍

**Shop Timbuktu**

**FRESH PRODUCE** STAPLES OTHER FOOD HO

Apples 1 x 1 kg @R7.50

Oranges 7 kg @R37.50

Beetroot 1 x 750 gr @R7.00 R3.50   
Only 8 left in stock.

Broccoli 1 off @R6.75

Butternut 3 kg @R31.15

Carrots 5 kg @R24.00 R14.00

Cauliflower 1 off @R10.30

Gem squash 8 kg @R75.00

Onions 8 kg @R15.00

21:00 ... ☰ 🔍

**Shop Timbuktu**

Your order contains

apples	R7.50
1 x 1 kg (Golden Delicious)	
beetroot	R3.50
1 x 750 gr	
carrots	R9.20
2 x 750 gr	
washing powder	R239.80
4 x 2 kg (OMO)	

\*All prices include VAT where applicable

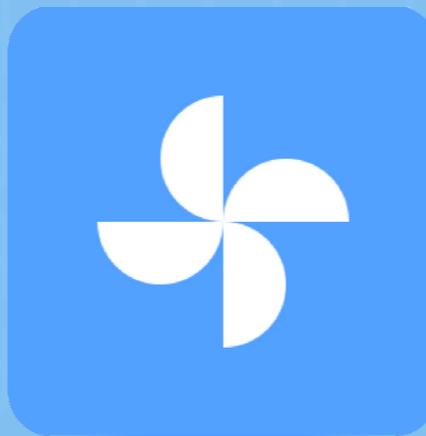
Delivery	R50.00
Total	R310.00

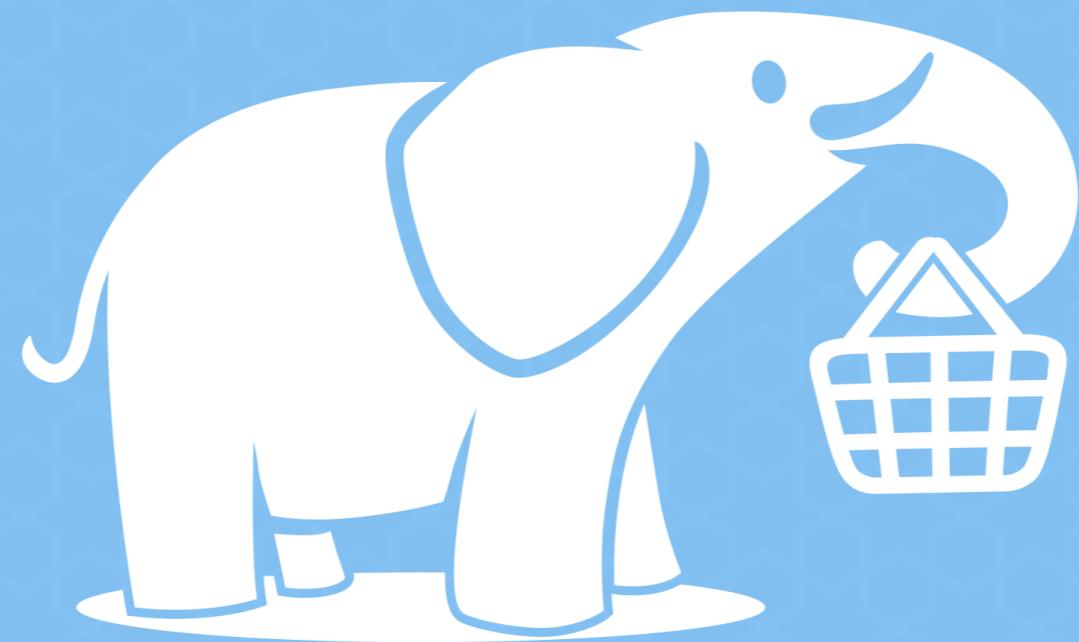
**PLACE ORDER**

“There is always a need for anyone that  
can do a simple job thoroughly.”

- Charles Eames

# Our approach





timbuktu

# TECH STACK

# Postgres + PostGIS

# Flask + SQLAlchemy

[models.py](#)

Raw

```
1 class Model(db.Model):
2     __abstract__ = True
3
4     def as_dict(self, include_relations=False):
5
6         # attributes from the model's own columns
7         columns = self.__table__.columns
8         tmp_dict = {
9             c.name: getattr(self, c.name) for c in columns
10            }
11
12         relations = self.__mapper__.relationships.keys()
13         for key in relations:
14             if include_relations or key not in inspect(self).unloaded:
15                 # nest related objects
16                 related_content = getattr(self, key)
17                 if related_content:
18                     try:
19                         tmp_dict[key] = []
20                         for item in related_content:
21                             tmp_dict[key].append(item.as_dict())
22                     except TypeError:
23                         tmp_dict[key] = related_content.as_dict()
24
25         return tmp_dict
```

[models.py](#)

Raw

```
1  class DeliverySlot(Model):
2      __tablename__ = "delivery_slot"
3      delivery_slot_id = db.Column(db.Integer(), primary_key=True)
4      start = db.Column(db.DateTime(), nullable=False)
5      end = db.Column(db.DateTime(), nullable=True)
6
7      city_id = db.Column(db.Integer, db.ForeignKey('city.city_id'), nullable=False)
8      city = db.relationship('City', lazy='joined')
9
10     def as_dict(self, include_relations=False):
11
12         # account for timezones
13         timezone = pytz.timezone(self.city.timezone)
14         if self.start.tzinfo is None or self.start.tzinfo.utcoffset(self.start) is None:
15             # the datetime object is naive, and needs to be adjusted for timezone
16             self.start = self.start.replace(tzinfo=pytz.UTC).astimezone(tz=timezone)
17         if self.end is not None and (self.end.tzinfo is None or self.end.tzinfo.utcoffset(self.end) is None):
18             # the datetime object is naive, and needs to be adjusted for timezone
19             self.end = self.end.replace(tzinfo=pytz.UTC).astimezone(tz=timezone)
20
21         # now convert to dict
22         out = super().as_dict(include_relations=include_relations)
23         return out
```

# FlaskAdmin

List (17)

Create

Add Filter▼

With selected▼

Search

x Category

equals ▾

laundry ▾

Reset Filters

x City

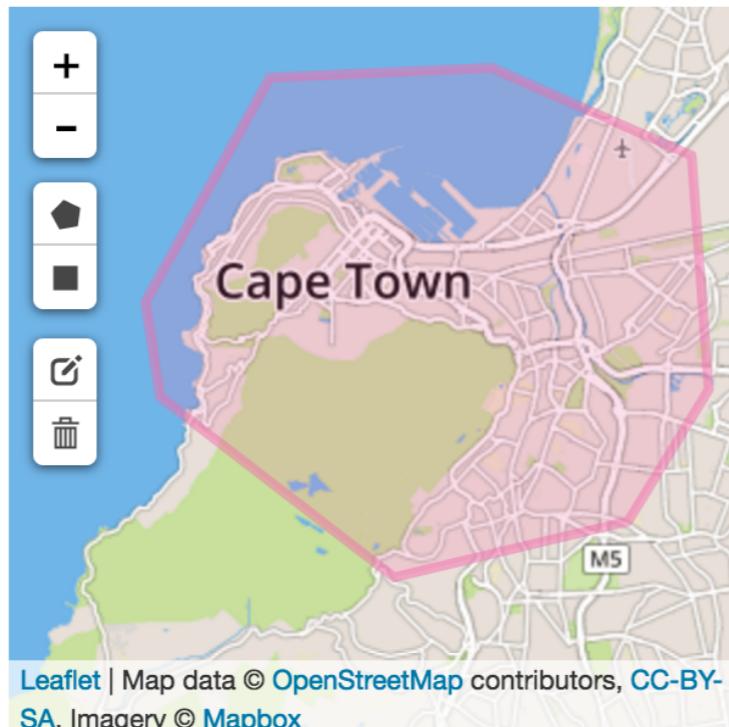
equals ▾

Cape Town ▾

		Category	Product Id	Active	Name	Brand	Pack Size	Variation	Default Pack Price	Wholesale Pack Price	Comparison Pack Price	Inventory Level	Discount
<input type="checkbox"/>	 	laundry	261	<input checked="" type="checkbox"/>	washing powder	Sunlight	1 kg	hand powder	R27.95	R24.50	R27.99		
<input type="checkbox"/>	 	laundry	260	<input checked="" type="checkbox"/>	washing powder	Sunlight	2 kg	hand powder	R49.95	R34.99	R49.99	7	R7.00
<input type="checkbox"/>	 	laundry	216	<input checked="" type="checkbox"/>	fabric softener	Sta Soft	500 ml	spring fresh refill	R24.95	R21.99	R24.99		
<input type="checkbox"/>	 	laundry	215	<input checked="" type="checkbox"/>	fabric softener	Sta Soft	2 litre	spring fresh	R39.95	R30.49	R39.99		
<input type="checkbox"/>	 	laundry	214	<input checked="" type="checkbox"/>	fabric softener	Sta Soft	500 ml	baby refill	R24.95	R21.99	R24.99		
<input type="checkbox"/>	 	laundry	213	<input checked="" type="checkbox"/>	fabric softener	Sta Soft	2 litre	baby	R39.85	R30.49	R39.90		

[List](#)[Create](#)**City \***

Cape Town

**Excluded****Geom****Description**[Save](#)[Save and Add Another](#)[Save and Continue Editing](#)[Cancel](#)

# Docker + Docker- compose

# Vanilla Android

# Pitfalls

# Pitfalls

1. Android's sheer complexity

Blank app template starts with:

- 48,3 MB on disk
- 1 837 files & directories

# Pitfalls

## 1. ~~Android's sheer complexity~~

Be patient with yourself

# Pitfalls

## 2. JSON handling in Android

# Pitfalls

2. ~~JSON handling in Android~~

use SQLite

# Pitfalls

3. Keeping sane with all the data models

1. Postgres tables
2. SQLAlchemy model classes
3. JSON API
4. Client-side SQLite tables
5. Client-side Java model classes

# Pitfalls

3. Keeping sane with all the data models

Keep it simple: de-normalise where possible

# Pitfalls

4. Slow upgrade cycle on Android

# Pitfalls

## 4. Slow upgrade cycle on Android

Gracefully terminate support for old client  
versions

# Thank you!

questions?

Petrus Janse van Rensburg

@petrusjvr

[petrus@timbuktu.io](mailto:petrus@timbuktu.io)