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# Pulse: A supervisory mobile application for performance management at the last-mile of health supply chains
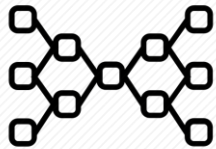
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# Overview

# Open source platform for supply chain & logistics in low-resource environments

Since 2010
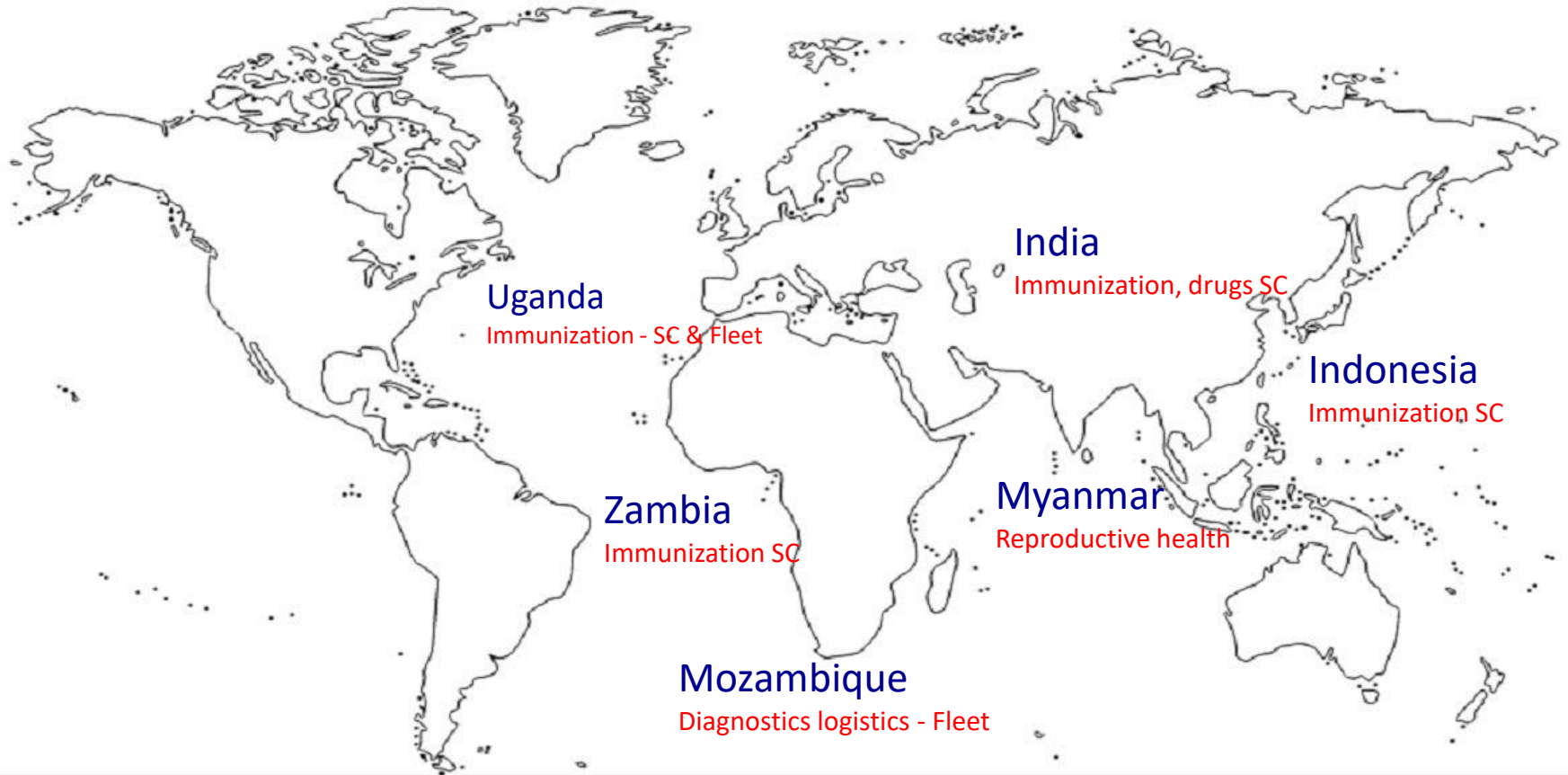
Supply chain management

Cold-chain Monitoring

Transportation Management

Built on

Principle of *bottom-up empowerment*

# In 6 countries

**India**
Immunization, drugs SC

**Uganda**
Immunization - SC & Fleet

**Indonesia**
Immunization SC

**Zambia**
Immunization SC

**Myanmar**
Reproductive health

**Mozambique**
Diagnostics logistics - Fleet

Supply chain and cold-chain logistics covering >25,000 health facilities across 570 districts, 30 states, 6 countries

# The problem of performance management

# Human performance is critical

- Human performance is essential for supply chain quality
    - Supply chain performance depends on human actions
    - Actions depend on relevant knowledge, skills and motivation

- Good performance relies on
    - Goal planning – goal setting, metrics
    - Evaluation - monitoring and review
    - Coaching – capacity development
    - Recognition – rewards and recognition

## Good managers are critical
- Oriented to quality and performance
- Are data-driven, a culture of data use
- Can motivate and build worker capacity

# Facility health worker capacity is limited

52% passed 12<sup>th</sup> grade

67% > 46 years

Never used a mobile app.

Limited or no  logistics training

*Study in Uttar Pradesh, India, 2014*

Supervisory bandwidth and procedures at district are limited

Multiple responsibilities
On the move
Minimal procedures
Minimal staff
Frequent transfers

# Last-mile management challenges

## District official

- Limited bandwidth

- Buried in bureaucracy

- Limited review procedures

- Low culture of data use

- Reactive risk management

## Health worker

- Insufficient capacity – knowledge, skills

- Overburdened

- Limited discipline

- Low accountability, motivation

Under-developed workforce, low motivation ➔ inconsistent supply chain quality

# Solution approach

Empower district officials with a monitoring app.

- Escalate risks on a "need to know" basis

- Highlight good performance

- Enable "appreciation" in a frictionless manner

**Empowering capabilities**

- Anytime, anywhere

- On-demand and event-driven

- Textually summarized events

- Drill-down to the last-level of problem

- Contextual actions

- Parameterized performance goals
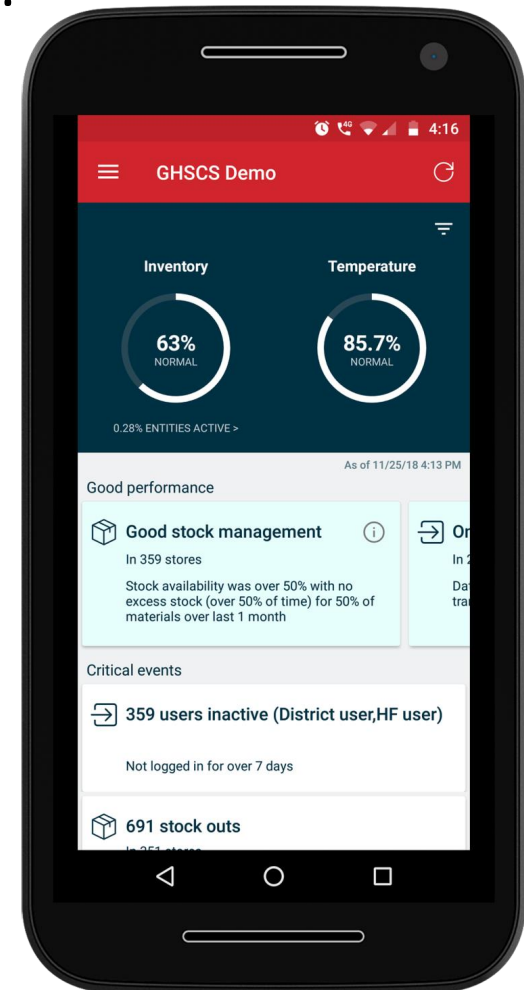


**Pulse**

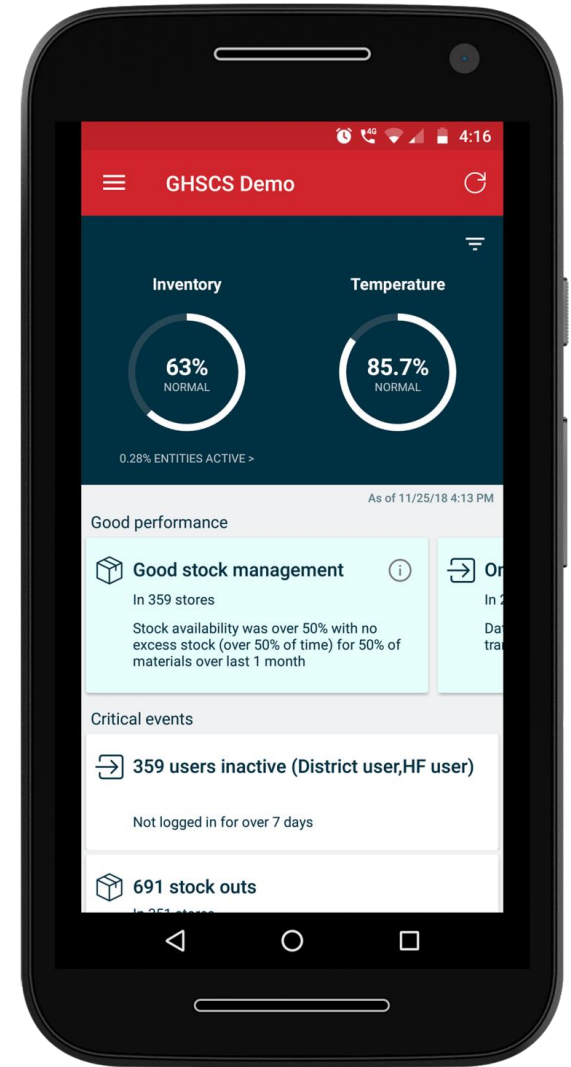Big data and machine intelligence behind the scenes

# Pulse – a monitoring application
For District Officials

Interactive dashboards for inventory and temperature monitoring

Good performance indicators that can be "liked"

Critical indicators that need immediate action

Risk detection and "social" recognition made frictionless

# Interactive dashboards



- Monitor on-demand
  - Stock availability
  - Cold-chain storage temperature
  - Data entry activity

- Interactively drill-down

- Multiple Views and filters
  - View by locations or materials
  - Filter by various attributes
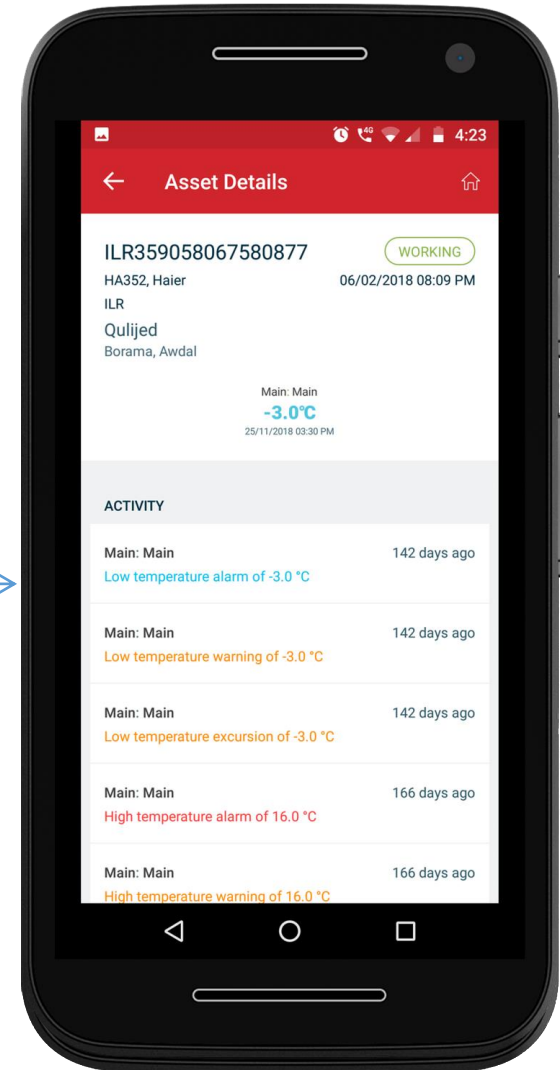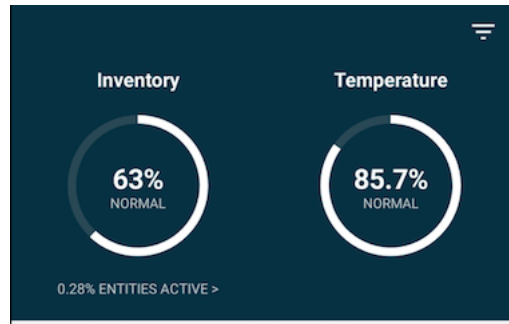
Troubleshoot down to the last point of problem, actionable information

# Critical event indicators

- Stock outs not resolved over 7 days

- 15 days of stock expiring in 2 months

- Cumulative heat exposure of >24 hours in 4 days

- Cumulative cold exposure of >6 hours in 2 days

- No data entry since 7 days
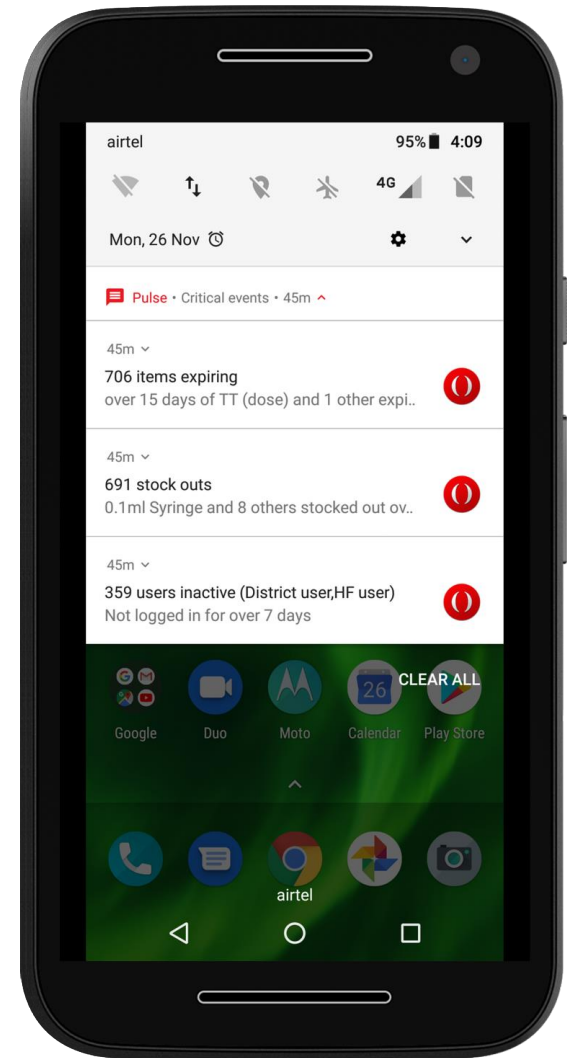
Surfaces risks automatically, enables instant action

# Good performance indicators



- Good stock management
  - Stock of all items available 100% of the time since last 3 months
  - Excess stock no more than 15% of the time

- Good asset management
  - No excursions since last 3 months

- Good data entry performance
  - Data entered within 24 hours of dispensing since last 3 months

- Good supply performance
  - >90% of last-mile stores have >90% availability with 1 supply per month since last 3 months
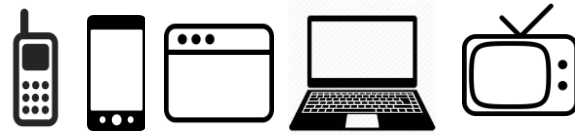
Option to "Like" good performance
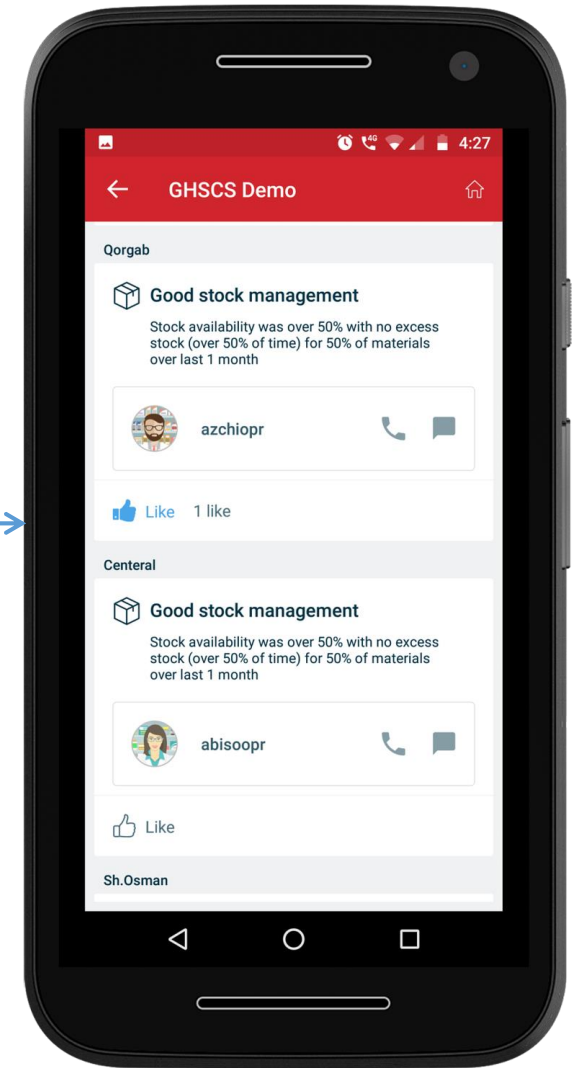
Parameterized goals surface good performance, enables recognition

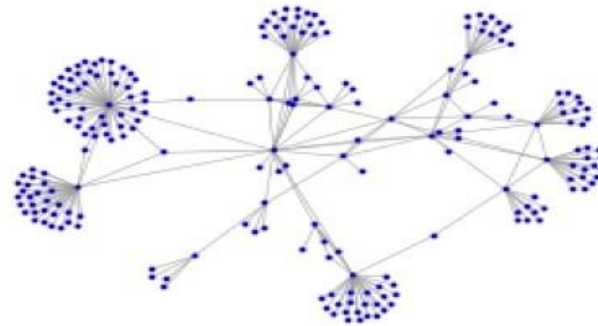# Human-centered technology

For low-resource environments

**Robust**

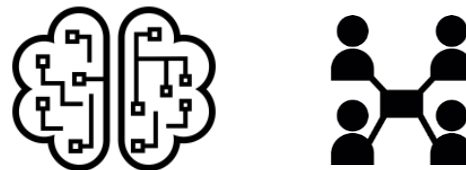Offline GPRS  SMS  Voice

Any phone or computer    Any network or medium

**Scalable**

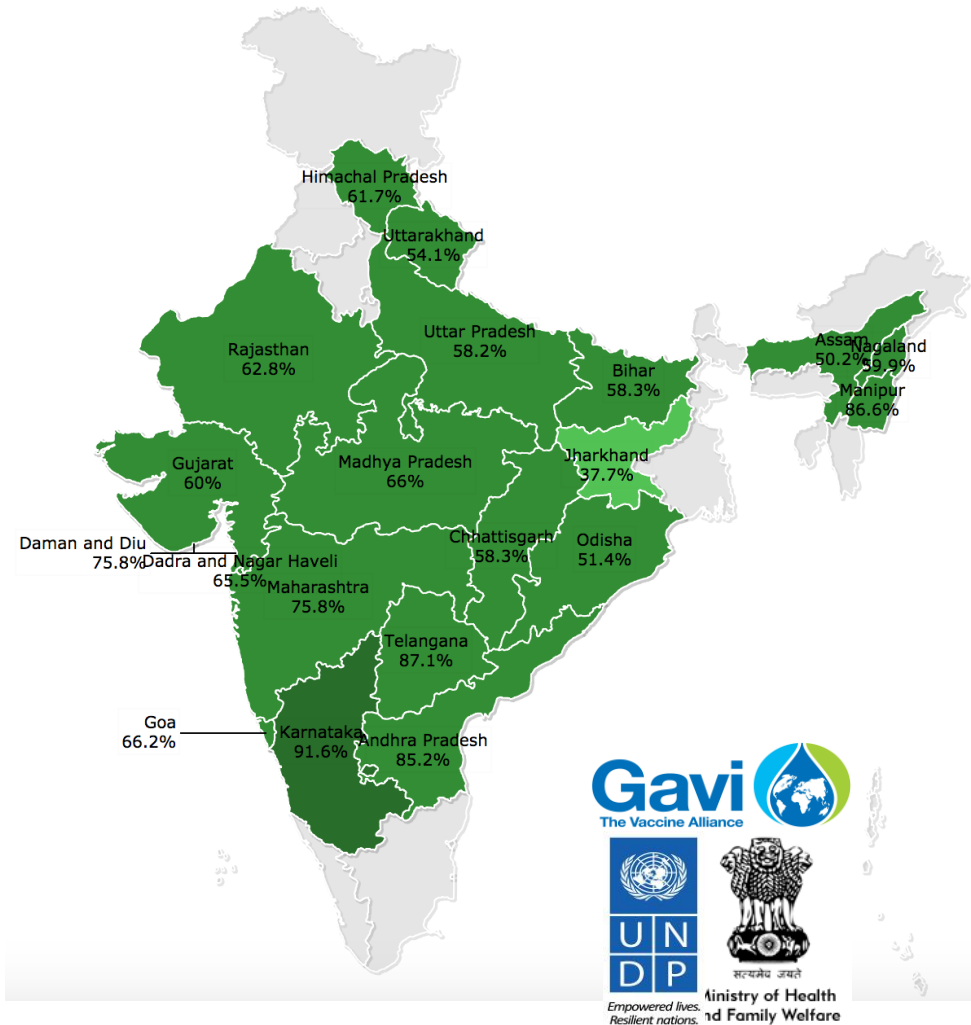Thousands of nodes, Millions of transactions, Terabytes of data

**Smart**

Machine and social intelligence

# Initial results

# India's immunization supply chain



## 95% stock availability

20 states, 540 districts
19,000+ facilities
15,000+ refrigerators monitored
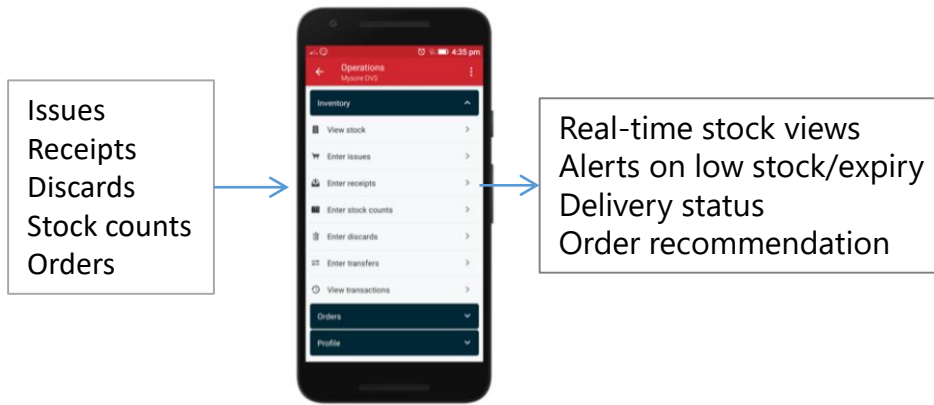
**Big data**
> 2 M transactions / month
> 30 M temperature data / month
> 2 TB of analytic data

# Districts fully empowered

## Data entry on a phone
Pharmacist (> 20,000 users)



Issues
Receipts
Discards
Stock counts
Orders

Real-time stock views
Alerts on low stock/expiry
Delivery status
Order recommendation

## Remote temperature monitoring
Temperature loggers (> 15,000 loggers)



Berlinger    NexLeaf    Nimble

## Monitoring on a phone
District officials (> 340 officials)

# Initial findings – methodology

- Application usage data over **11** months (Google analytics)
  - Jan-Nov 2018
- **22** district officials were interviewed across **16** districts in **4** states of India
  - Gujarat, Uttar Pradesh, Bihar, Assam
  - Users with at least 6 months of usage
- Key questions:
  - What features of Pulse have helped you the most?
  - What actions were taken on reviewing critical indicators?
  - How were good performance indicators utilized for improving performance?

# Strong adoption of Pulse – Jan-Nov 2018

**>340 daily active users**

Monday, October 29, 2018
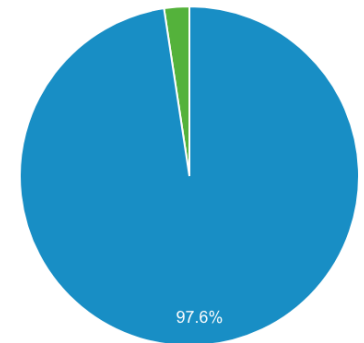■ 1 Day Active Users: **342**

■ Returning Users  ■ New Users
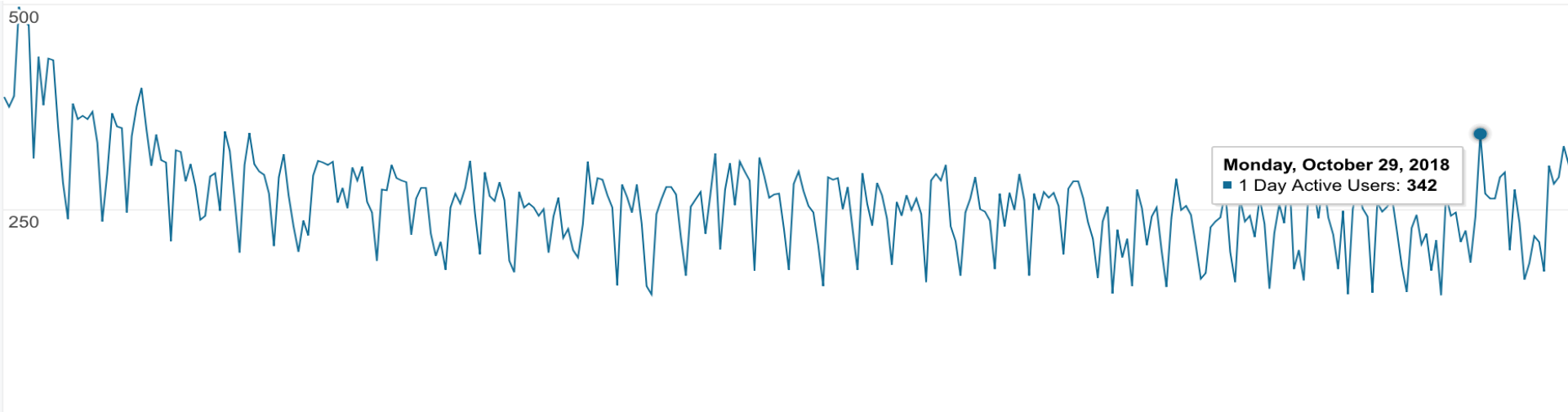
Sessions
167,406

Screen Views
632,007

Screens / Session
3.78

97.6%

District officials have wholeheartedly adopted this

logistimo

# Qualitative findings – critical indicators

District officials intervened *immediately* to resolve these risks:

(Based on interviews of 22 district officials across 16 districts)

| Risks detected early | Coordinated actions pro-actively |
|---|---|
| **7** near-expiry stock events | Saved costs<br><br>**Actions**: Redistributed thousands of SKUs |
| **12** cumulative heating/freezing exposure | Prevented wastage through coordinated and timely actions<br><br>**Actions**: power backups reassured, faster time to repair, timely shifting of vaccines, proactive replacement of fridges, maintenance practices reinforced (e.g. defrosting) |
| **5** delayed data entry events | Improved worker capacity<br><br>**Actions**: Retrained at the site |

Risks that officials would otherwise be unaware of were acted on *immediately,* leading to improved service, cost savings and better capacity

# Qualitative findings – good performance

**6,525 "likes" given**
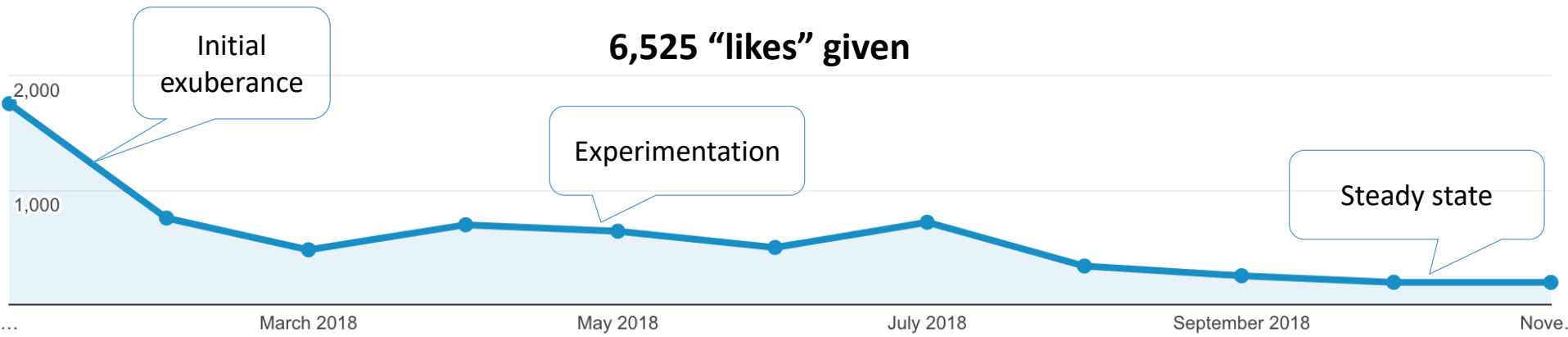
- In **13** districts, "likes" were given to varying number of facilities, with 34 facilities being liked on the average

- In **3** districts, a new practice was initiated by the district officials to recognize facilities with "likes" in monthly Medical Officer meetings

- In **4** districts, screenshot of stores "liked" were shared on the district's WhatsApp group, which motivated pharmacists to sustain performance

- In most districts with consistent "like" activity, respondents confirmed that pharmacists were motivated to strive for better performance

"Social" pressure works to drive performance –
Creative practices emerged, people felt motivated, others strived to raise the bar

# Summary

- Mobile app. was strongly adopted compared to a web interface by most district officials, who had little supervisory bandwidth or were on the move

- District officials were able to pro-actively mitigate supply chain risks, which would otherwise have not come to their attention in time, while also understanding capacity constraints in the process

- Notification of good performance promoted new behaviors for recognition of pharmacists/medical-officers in the district, that were otherwise non-existent

- Social pressure worked, where receiving "likes" lead to improved motivations, and bottom-up efforts to improve performance

The monitoring app enabled a frictionless channel for district officials to improve performance and efficiency

Thank you!

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