



# SingleStore Powers True Digital Group's Effort to Flatten the Curve of COVID-19

# 30 MILLION

Mobile phones that must be evaluated in real-time for location events

# 500K

Anonymized location events every second

“ Before COVID-19 we didn't have a need to do analysis on real-time location data. The crisis proved there is an application for using real-time data to aid decision-making, and now that we have it, we're seeing a lot of applications where we can use it. ”

Bernd Vindevogel,  
Chief Analytics Officer

## Business Goals

Preventing the spread of COVID-19 is a worldwide initiative, and the latest data from outbreak hotspots show that social distancing is starting to help flatten the curve.

Because carriers can be asymptomatic for as much as two weeks and unknowingly spread the virus, contact tracing is an approach many countries are evaluating. But it would require human contact tracers to speak with millions of individuals—time scientists and healthcare front-line workers don't have.

In Thailand, True Digital Group, the digital arm of Thailand's leading telecommunication provider, wants to automate human contact tracing of the country's population to assist the Thai government in providing a tool to track the spread of COVID-19 and:

- Enable test-and-trace at scale and in a timely fashion
- Identify how Thailand's mass population moves around the country
- Determine what it can deliver to protect Thai authorities and obviate the need for testing

## Technology Requirements

But, to achieve this True Digital Group needs to build a real-time visualization and alerting system that automatically determines where large gatherings of people are occurring via geographic density of mobile phone locations. Given the urgency of the pandemic, the solution needed to be built in a two-week time frame.

This requires powerful technology that can perform event stream processing on 500,000 anonymous mobile phone location events every second for 30+ million mobile phones in Thailand. This visualization must respond to ad hoc, interactive analysis by users. The solution must support a moving time window of undetermined duration to support queries against real-time and recent data for contact tracing. Additionally, two petabytes of reference and historical data must be available in some situations for further analysis.

Lastly, the real-time visualization must support geoanalytic queries with ultra-low-latency on the order of milliseconds.

## Why SingleStore? Fast & Real-time

Prior to the pandemic, True Digital Group spent 24 months prototyping and developing a system that could do real-time, interactive analysis on large data sets. It tried this using a few different databases where the computation strategy was to land data in Hadoop and then run map-reduce on the data every 24 hours. But, while this computed data powered a dashboard, the response speed of the queries wasn't fast enough nor was the data real-time.

For COVID-19 the data has to be low-latency, real-time data which shows how anonymous mobile phones are moving and immediately and proactively determine the location hubs of increasing population density.

For fast-changing data, the response time of the backend database is a crucial component in ensuring this fast user experience. SingleStore is uniquely suited to these types of workloads which combine the scaling of new data being written while simultaneously handling highly-concurrent lookup queries and complex analytic queries.

**With SingleStore supporting more than a trillion rows per second of raw data, it comfortably handles the ingestion of 500,000 events and being the application database for True Digital Group's customer-facing system, Tracepulse.**

## Business Outcomes

### One week to develop the first operational version of True Digital Group's Tracepulse

The Tracepulse application was designed and built with SingleStore showing that rapid development and quick, agile iterative DevOps cycles can be done with SingleStore. Since it was developed, the functionality has been iteratively developed and extended in order to demonstrate new possibilities for analysis to the Thai Government's authorities.

### Power wall-sized dashboards in Thailand's crisis operations control center

Streaming raw, anonymized location data from the core telco network into SingleStore via Google Cloud Storage (GCS), allows dashboard users to zoom in, real-time and see where large gatherings may be forming and helps to determine the optimal placement of resources, like medical supplies, to enable dynamic real location of human and physical resources to make disaster relief efforts more proactive.

### In-the-moment view of mobile phone density

The SingleStore database serves highly concurrent queries invoked by an interactive geo-analytic dashboard, and this drillable dashboard provides an in-the-moment view of the density of mobile phones in any given area from the country-level down to the city block.

### Granular visibility of mobile phone density data

Users of Tracepulse can visually explore this geographical information and zoom in for a granular, detailed view of clusters of anonymized mobile phones to spot potential emerging problems. Each click progressively queries SingleStore to calculate the new statistics for each geographical region as users drill down.