



The Government of Karnataka efficiently manages COVID-19 patient care through the power of data engineering

The Big Picture

The Government of Karnataka (GoK) embarked on a journey partnering with the technology industry to provide fast care and support to COVID-19 positive patients by streamlining patient management processes and enabling thousands of frontline staff with timely and relevant information to manage better patient outcomes.

Before the solution was implemented, a significant amount of time was spent on manually managing patient data across multiple sources across districts to provide patient care. As the cases increased, GoK has identified the need for a centralized and automated platform that enables seamless data integration between different systems to manage patient outcomes. Fractal was tasked by the state war room to build a technology solution that would integrate and harmonize COVID patient data across multiple platforms and applications.

India's federal structure calls for multiple agencies from municipalities to the central government to work together to deliver COVID-19 healthcare services and programs to citizens seamlessly and without delay. To achieve this and determine the next best action for COVID+ cases, the task force needed timely, correct, and accessible information to manage testing outcomes, hospital & COVID center admissions, and type of care required for the patient (ICU, HDU, or regular bed).

Patient Management System

The Government of Karnataka has set up a multi-functional team to build a patient management system that will provide care and assurance to all C+ patients within the state. The system will leverage technology to streamline processes by bringing together patient communication and patient management in near real-time. The key initiatives of the patient management system include:

- SMS Communication of C+ results with key information (SRFID & Patient ID) to the patient within an hour after testing positive by the State War Room.
- Call for Care contact from the Apathamithra team within 4 hours of C+ result to validate patient information, assess patient health (symptoms and risks), and capture health care requirements (the type of bed, type of hospital, or home isolation).
- Follow up call from healthcare professionals/doctors for triaging high risk or hospital admission cases to assess health situation further and recommend alternate care if required.
- Contact (home visit or call) from the district C+ control room teams to confirm requirements and arrange for health care facilities as required by the patient.
- District teams to pass missing or untraceable C+ patient information to local police for tracing.
- Assignment of the required healthcare facilities (beds and ambulance for transport) through a central hospital bed management system.
- Assist the ambulance teams with accurate patient information and geolocation for efficient movement to the assigned facilities.
- District and State C+ Control teams to follow up on patients throughout the process to ensure care and a safe return to home (discharges)

Transformative Solution

Fractal was tasked to build a technology platform that will support multiple teams by providing timely and accurate data to support patient outcomes. The platform should automate data flow across the different applications and maintain a 'Golden Record' with the latest and most accurate information of the patient. Fractal has developed a centralized end to end solution for Karnataka State on Microsoft Azure that enabled;

- Hourly processing of C+ cases
 - Automated hourly processing of all ICMR C+ cases in Karnataka.
 - Automated line listing (assignment of State & District patient numbers) which will enable C+ patients to get access to health care.
 - Geotagging and zonation (appending jurisdiction information) to segregate patients based on their ICMR addresses.
 - Publishing new incremental C+ cases (within 10 mins) to SMS application, Call for Care team, State War Room, and District War Rooms.
- Near Real-Time processing of Call for Care recommendations to update the 'Golden Record' and publishing the updated records to the Patient Management Application run by the district authorities.
- Integration with the hospital bed management system to capture patient outcomes (hospital information, type of care (ICU, HDU, Ward) and discharge or death information) to update and maintain the 'Golden Record.' This enables the core administration teams to gain insights into C+ outcomes and devise better strategies for minimizing fatalities in the state.
- Provide timely and accurate data to support other Government of Karnataka COVID applications like contact tracing and quarantine watch to monitor and contain the spread of disease.
- Generation of automated operational reporting in Power BI to assist district and state war room teams in decision making.

Response from the State War Room



The integrated technology platform set-up by Fractal has enabled measures which are patient-facing, hospital-facing, and public-health facing, namely:

- Arranging appropriate and faster healthcare for the patients;
- Conserving limited higher-order hospital facilities for patients with medical complications and risks;
- Informing testing efforts for getting focussed on high-risk contacts, including family members.

The platform, with the integration of eight diverse systems in a near automated manner, has facilitated "at scale" implementation of the above measures to facilitate faster opening up of the economy in an assured manner while managing fallouts of the pandemic.

The support from Fractal for the pandemic management has evolved to the current comprehensive level over the past five months, starting from analytical insights into the data to support the formulation of appropriate strategies and action plans by the government, followed by data processing for operational support for public health measures such as quarantine watch, and finally to setting up of the integrated platform connecting the eight diverse systems¹. The platform entails APIs across the systems, cleaning up of the data to usable formats, validations to ensure consistency, and incremental build-up of the golden record for each patient.

This has been a unique partnership between the Government of Karnataka and the IT industry in Bangalore under the aegis of NASSCOM.

- Ajay Seth, MD BMRCL and Chairman, State Disease Surveillance Team

The Change

Centralized and a fully automated data platform that enables multiple COVID response teams to manage better patient outcomes by:

- Seamlessly integrating data across multiple COVID applications/systems and creating a 'Golden Record' for every C+ patient in the state.
- Providing timely and accurate information to the relevant teams enabling them to reach out to C+ patients and provide the required care, information, and assurance to patients through multiple channels (SMS, call center, and field workers).
- Supporting applications that provide relevant and timely information to 1000's of COVID field teams to manage patient outcomes better.
- Minimizing the dependency on manual resources for data management and derisking single point of failures within the system.
- Enabling rapid response from GoK to provide care and reduce fatalities among the residents of Karnataka state.

References:

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Eight diverse systems providing or exchanging information on the integrated platform: 1. ICMR portal, 2. GoK State War Room Line Listing application, 3. Google maps location service, 4. Call for Care system of Apathamitra helpline set up with assistance from Infosys BPM, 5. KRSAC GIS services, 6. BBMP Smart City Index application for Patient Management, 7. Step One system of tele-triaging, 8. GoK State War Room applications for contact tracing and quarantine watch.

About Fractal

Fractal is one of the most prominent players in the Artificial Intelligence space. Fractal's mission is to power every human decision in the enterprise and uses the power of AI to help the world's most admired Fortune 100 companies.

Fractal's products include Qure.ai to assist radiologists make better diagnostic decisions, Cuddle.ai to assist CEOs and senior executives make better tactical and strategic decisions, Theremin.ai to improve investment decisions and Eugenie.ai to find anomalies in high velocity data.

Fractal has consistently been rated as India's best companies to work for, by The Great Place to Work® Institute. Fractal has been featured as a leader in the Specialized Insights Service Providers Wave™ 2020, Customer Analytics Service Providers Wave™ 2019 by Forrester Research, and recognized as an "Honorable Vendor" in 2019 magic quadrant for data & analytics by Gartner.

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