

Open Source Digital Infrastructure for Vaccination and Certification

DIVOC

SHARED VISION

Enable countries to digitally orchestrate large scale vaccination and certification programs using open source digital infrastructure as a public good.



Large scale vaccination needs multiple systems interplaying seamlessly and orchestrated digitally





WE EXPECT 3 PHASES



Infrastructure should seamlessly allow these transitions



COUNTRIES NEED

An approach that works at scale (10 million vaccinations/day) and scales what works (select the right vaccines based on their efficacy, safety, etc)

An elastic system (from 10,000 vaccinations a day to 10 million a day)

Digital first design

A system which is agile and responsive

Real time observability is key (vaccines efficacy, supply issues, rollout, monitoring)

A well designed infrastructure (scale, orchestrate, monitor, evolve)

Ability to expand and manage new vaccination facilities and trained personnel





Guiding Principles

- Versatile
- Allows for plug & play
- Trustworthy
- Citizen-centric approach

Architecture Principles

- Micro-services & API based
- Interoperable
- Scalable
- Flexible & Configurable
- Observable
- Resilient
- Privacy & Security by design
- Open Standards
- Trustable
- Internationalizable



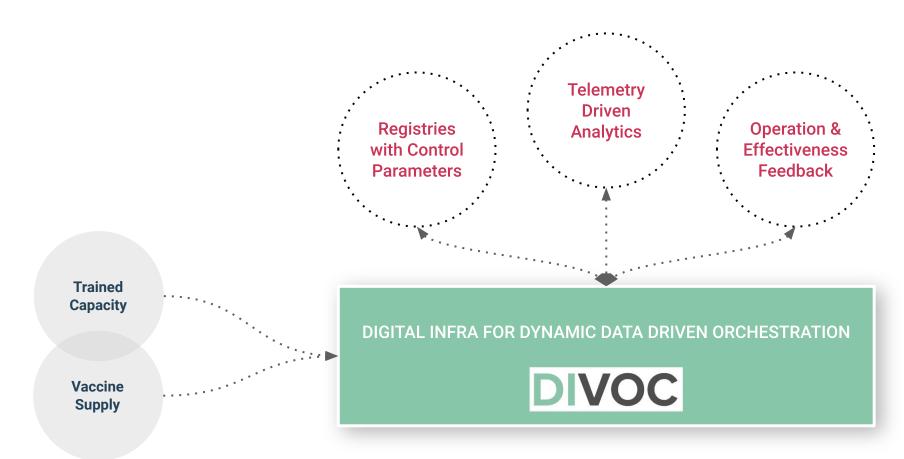
DIVOC has 3 core modules

each of which can be used independently or together and integrated with existing systems





DYNAMIC ORCHESTRATION USING DIGITAL INFRA





DIGITAL ORCHESTRATION MODULE

ORCHESTRATION CONTROLS

USING REGISTRIES

PROGRAM REGISTRY

Programs that are being rolled out
Active Status
Allowed vaccines
Start and end dates
Certificate Templates

VACCINE REGISTRY

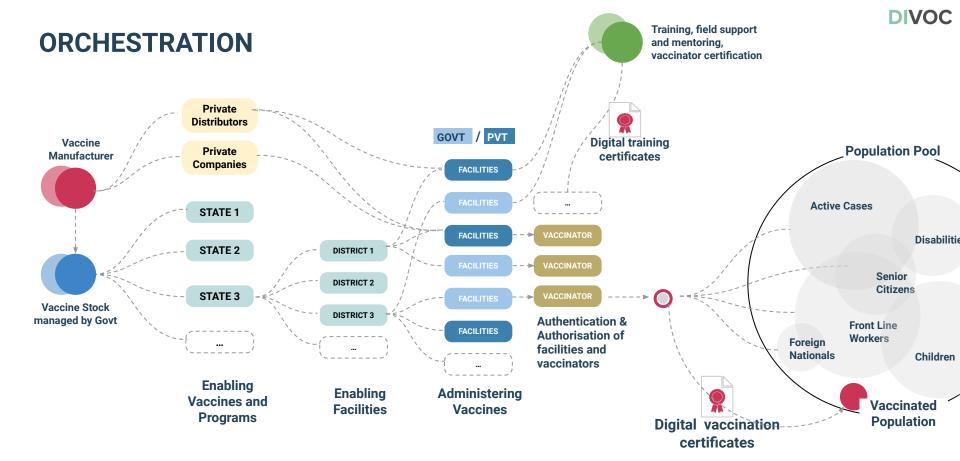
Approved vaccines
Active Status
Vaccination schedule
Batch deny list
Max retail price
Age/Geo/Gender Filter
Rule if any (in future)
Vaccination Method

FACILITY REGISTRY

Approved facilities
Location (state, district, postal code)
Active Status
Vaccination daily rate
Max vaccination stations
Total supply (if available)
Rating & feedback

VACCINATOR REGISTRY

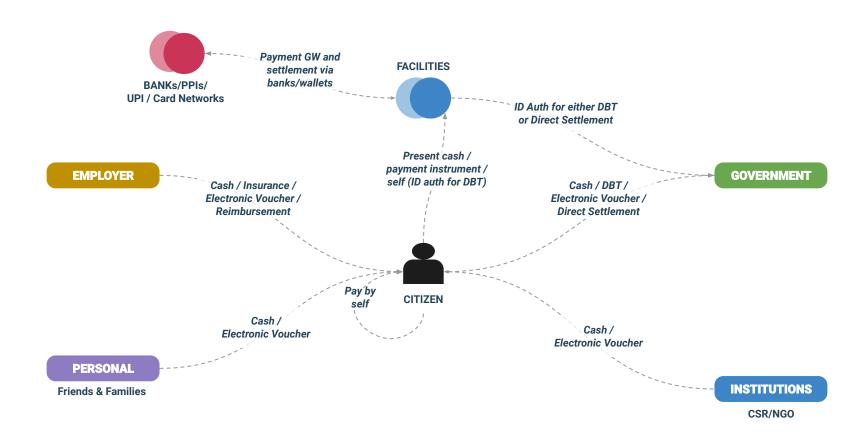
Trained vaccinators
Active Status
Training certificate
Associated facilities
Rating & feedback



A platform to orchestrate the complexity within an ecosystem of diverse players to administer a vaccine program across the country successfully.



LEVERAGING MULTIPLE PAYMENT MECHANISMS





HANDLING MULTIPLE DOSES AND REMINDERS

VACCINE REGISTRY

Approved vaccines

Active Status

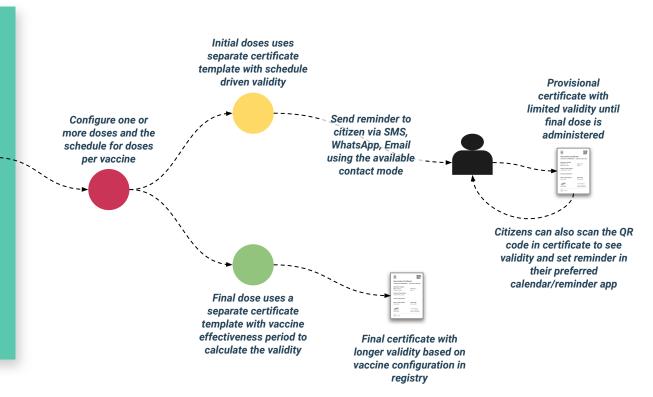
Vaccination schedule -

Batch deny list

Max retail price

Age/Geo/Gender Filter Rule if any (in future)

Vaccination Method





DIGITAL CERTIFICATE MODULE



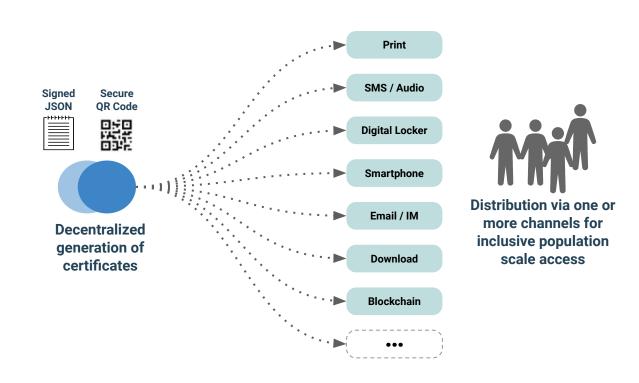
VACCINATION CERTIFICATE

- Conforming to WHO/IHR guidelines* based on
 W3C verifiable credential* specifications
- Authenticity verifiable via digitally signed QR code
- Available digitally on smartphone with QR code
- Printable for non-smartphone users
- Multilingual templates (for data and layout)
- Ability for users to download/print after vaccination either at facility or from home in self/assisted modes
- Integratable to health Lockers and certificate lockers
- Easy integration with immunization e-registry





ONCE THE CERTIFICATE IS ISSUED, MULTI-CHANNEL DISTRIBUTION AND PRINT SCHEMES SHOULD WORK TO ENSURE COUNTRIES AND USERS HAVE A CHOICE





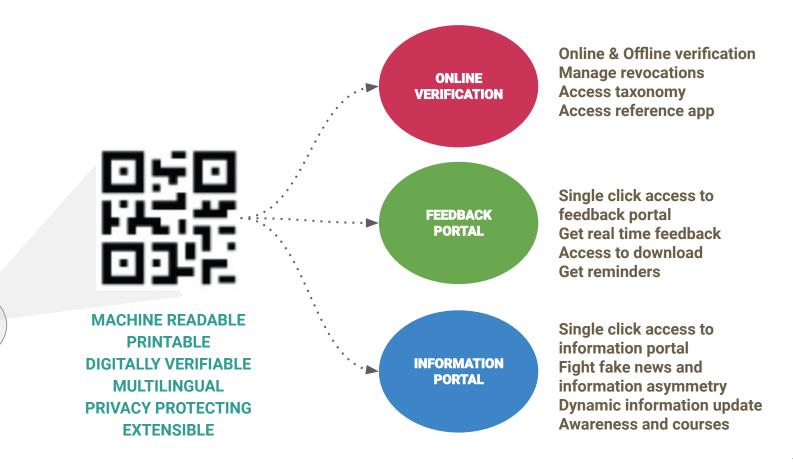
ENERGIZED VACCINATION CERTIFICATE

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Vaccination Certificate

Centre of Vaccination

Certificate ID : DMESSRI0233 Issue Date: 23 Dec 2021





BENEFITING ALL



For the individual

- 1. Proof of vaccination
- 2. Verify authenticity offline/online
- 3. Reminder for doses
- 4. Meet people, get back to work
- 5. Get info via QR code
- 6. Provide feedback via QR code



For the society

- Opens up functions, meetings, businesses
- 2. Opens up economy
- 3. Track towards regional herd immunity



For the world

- 1. Open up travel, events
- 2. Opens up trade
- 3. Incorporate certificate into travel passes
- 4. Opens global economy.

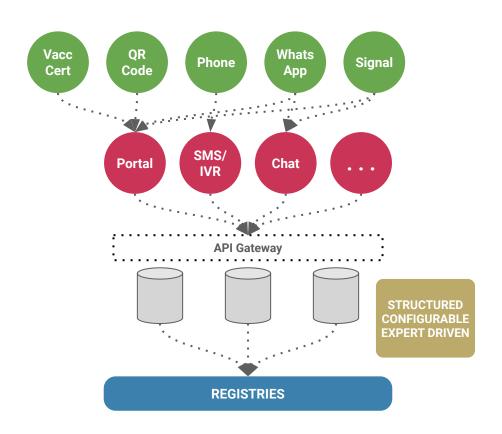


DIGITAL FEEDBACK MODULE



POST VACCINATION FEEDBACK LOOP

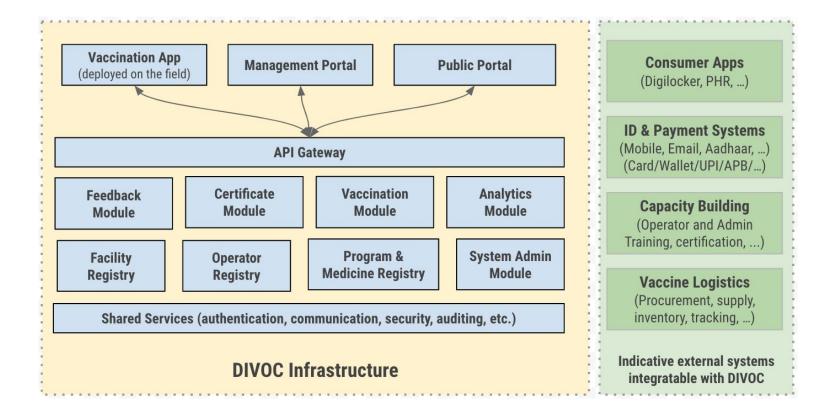
- Structured feedback
 - Configurable, expert driven
- 3 Types
 - Facility rating & feedback
 - Vaccinator rating & feedback
 - Vaccination response feedback
- Multi channel, multi-lingual
 - Public portal, inbound sms, IVR, WhatsApp, other apps via API
 - Multiple languages
- Self service and assisted modes
- Integratable with AEFI systems and processes.



SYSTEM DETAILS

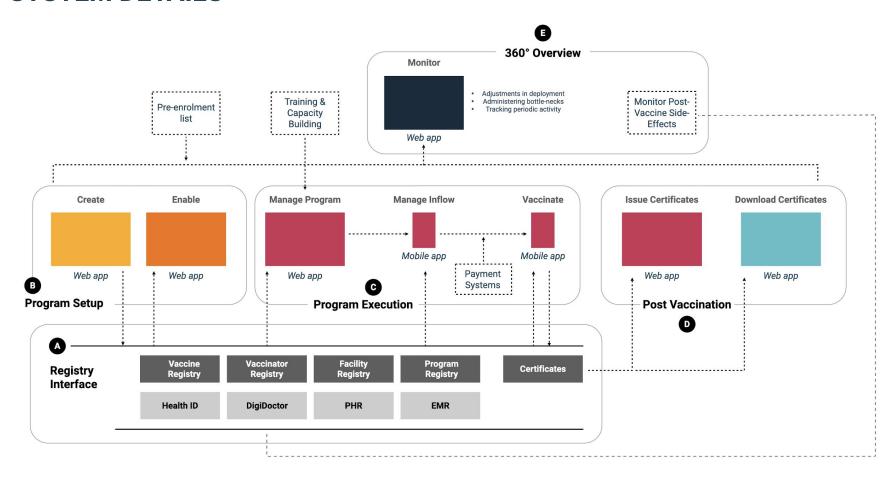


HIGH LEVEL ARCHITECTURE





SYSTEM DETAILS





REGISTRY INTERFACE

Registry control parameters

- Facility vaccination rate
- Facility enablements
- Health worker authorisation

Interacting with the DIVOC platform in 3 ways -

Using DIVOC Front-end interface

Individuals /
Institutions or Facilities can use the web/mobile application to add relevant details about the vaccine, vaccine administrator and the participating facility.

Using Existing Registries

Seamless integration can be achieved using the DIVOC's open APIs.

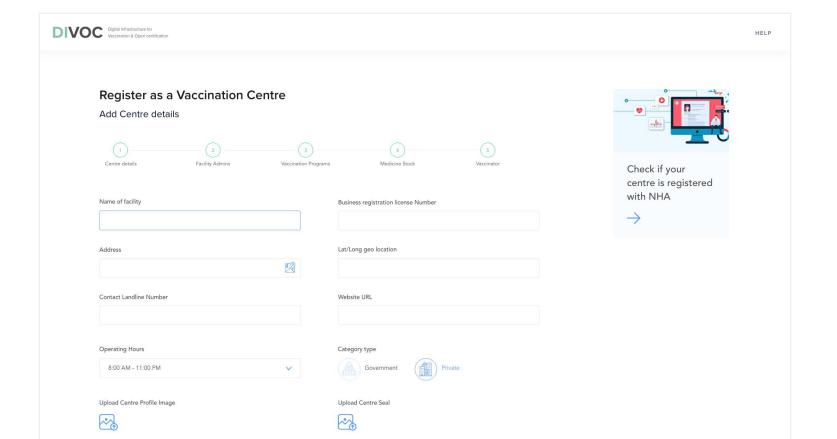
Backend uploads by System Admin

Data from MS Excel can be used for bulk-upload of information into the registry.





REGISTRY INTERFACE





PROGRAM SETUP

Part 1

Vaccination Program Setup

- · Approved vaccines & medicines
- Vaccination schedule
- · Vaccination Method
- Program Description
- Start & End dates
- Effective until
- Price

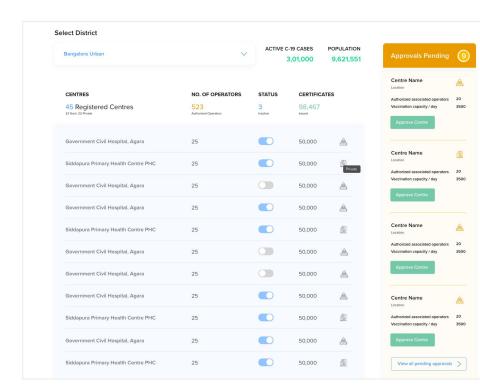
Vaccination program setup can be done by the Ministry of Health & Welfare using the DIVOC front-end interface

Part 2

Execution Plan Setup

- Enabling approved facilities
- Enabling approved administrators
- · Enabling zones for program deployment
- · Vaccine stock allocations

Execution plan setup can be done by the Central / State / District health officials





PROGRAM EXECUTION

Part 1

Facility Admin Module

- Add / authenticate vaccinators
- Manage and track all on-going vaccination programs at the facility
- Print digital receipts / certificates
- Communication interface with the central/state/district health offices
- · Generate reports for internal audits and analytics

This web-application is used by the facility manager to manage and track the overall program at that facility.

Part 2

Facility Vaccination Module

- · Authenticate the inflow of recipients
- Manage the daily vaccination workloads
- · Verify recipient and create digital certificates

Manage Program

Used by the facility admin for managing the program at the facility

Manage Inflow

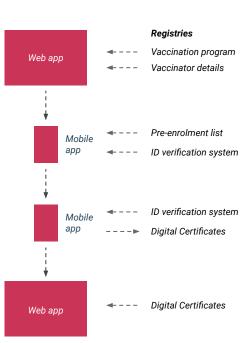
Used by the facility staff to add recipient details / authenticate pre-enrolled list of recipients

Vaccinate

Used by the vaccinators (Doctors/Nurses) to authenticate and issue digital certificates

Issue Certificates

Used by the facility staff to print receipts/certificates post vaccination



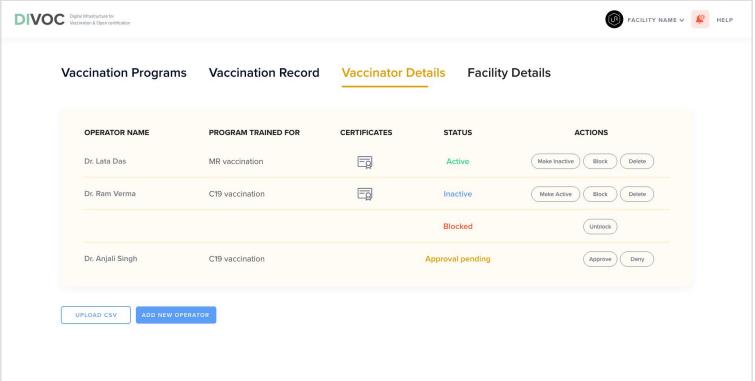
This will be used by the health worker while administering the vaccine.



PROGRAM EXECUTION

Manage Program

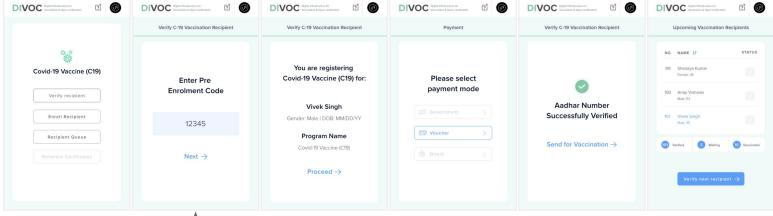
Used by the facility admin for managing the program at the facility





VACCINATION FLOW





Vivek Singh, you have been registered to receive the C-19 vaccine. Please proceed to the nearest vaccination centre:

Gwp0.7&lsg=AB8625DQxcz

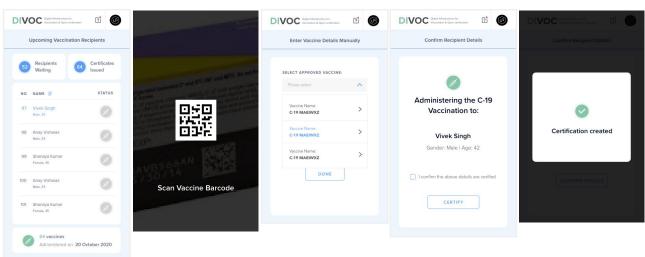
Please show this Pre
Enrolment Code: 12345 to the centre admin.

- * Only payment mode is captured. The actual payment transactions would happen on the prevalent digital payment systems present in a country.
- * ID authentication service may vary based on the prevalent system of use in a country.

DIVOC

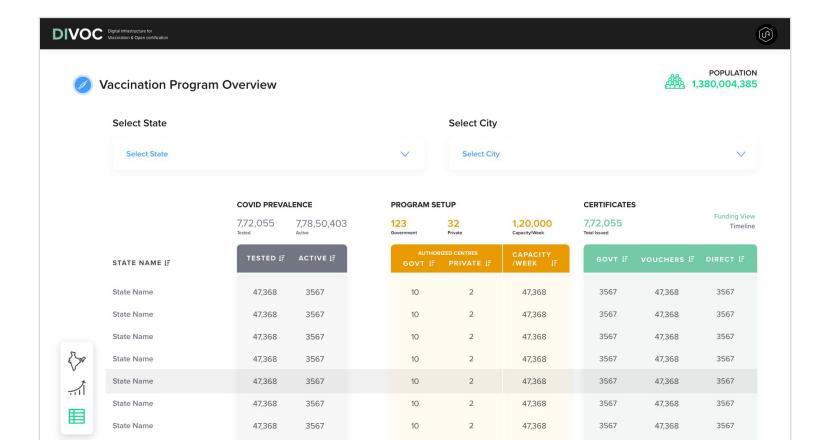
VACCINATION FLOW





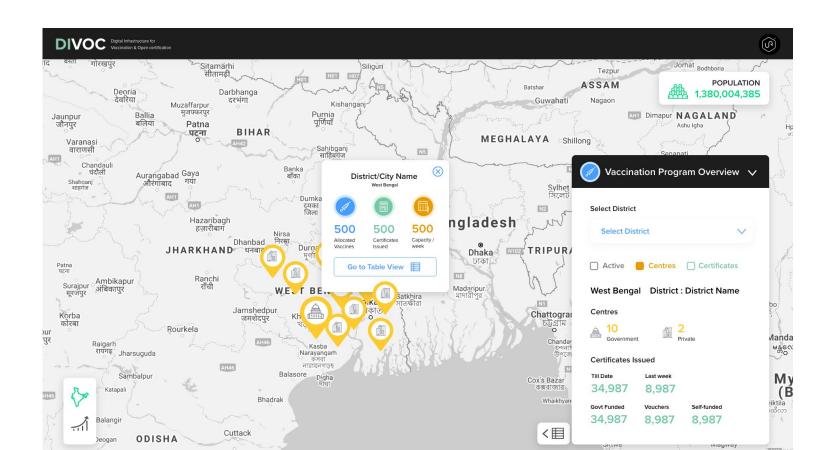


REAL TIME DASHBOARDS USING ANONYMIZED TELEMETRY



DIVOC

REAL TIME DASHBOARDS USING ANONYMIZED TELEMETRY



IN SUMMARY

Ability to vaccinate and certify the entire population at speed and scale in a controlled manner.

To manage the entire vaccination process by **leveraging existing ecosystems** and source of funds in a unified manner

To **control and manage** the approved medicine, its supply, facilities, operators, geographies of operation and the daily vaccination rate as per the supply of vaccines and the country's priorities.

To facilitate the above using a **digital backbone** in a seamless, efficient, auditable and a trustable manner, keeping choice, privacy and security in mind.

Issue a portable digitally verifiable certificate to citizens so that they can get back to work.

Obtain operational and **post vaccination feedback** in self-service and assisted modes

DIVOC

A fully open source digital public good for any country to adopt From the team who have experience in building population scale platforms

Digital Orchestration

Digital Certification

Digital Feedback

Adopters can choose any of the above modules or all together, integrate with existing systems, extend it, and use it freely.

Project repo @ https://github.com/bharat-dpi/DIVOC
Documentation @ https://bharat-dpi.github.io/DIVOC/



THANK YOU