# DECENTRALIZED PANDEMIC RESERVE

## JOIN THE CONSORTIUM

COVID-19 HACKATHON

# Summary

As hospitals and essential businesses compete for necessary supplies, companies are repurposing their production lines to join the fight against COVID-19. However, pivoting manufacturing capabilities and connecting with areas of greatest need is no easy task. “Communities must determine the real-time effective reproductive number it can accept” (NY Times) given its own circumstances, in order to plan for resources needed for the particular stage of the epidemic it is at.

# From perfume to hand sanitiser, TVs to face masks: how companies are changing track to fight COVID-19

# Combating the coronavirus: Fashion designers, automakers and other companies make masks and medical supplies

# When N.Y. Needed Hospital Space, Film Location Scouts Pitched In

Enterprising creative workers, like artists, photographers and students, are using their unique skills to help the city through the pandemic.

## Texas hospitals brace for coronavirus surge with uncertain stocks of protective gear

> "'I will give you X number, you are to make these last for however long,'" a Panhandle hospital executive told one of his clinics when it sought more respirators. "We've got to ration these resources."

HELPING HANDS | UPDATED MAR. 30, 2020

# HOW CAN I DONATE SUPPLIES TO NEW YORK HOSPITALS IN NEED?

# North Carolina hospitals asking for masks, gloves for COVID-19 response

# Solution - Immediate

The Decentralized Pandemic Reserve (DPR) aims to create an autonomous supply chain consortium that matches resource need based on manufacturing equipment, materials, and product availability :

- A DAO (consortium) of hospitals in need, aggregated by triage and world demand.
- A platform to assess the need against data models of activity (healthcare.gov/covid or healthdata.org/covid) to deliver supply.
- A logistics and supply chain database connecting manufacturers who want to pivot with the material, machinery or IP needed to do so.

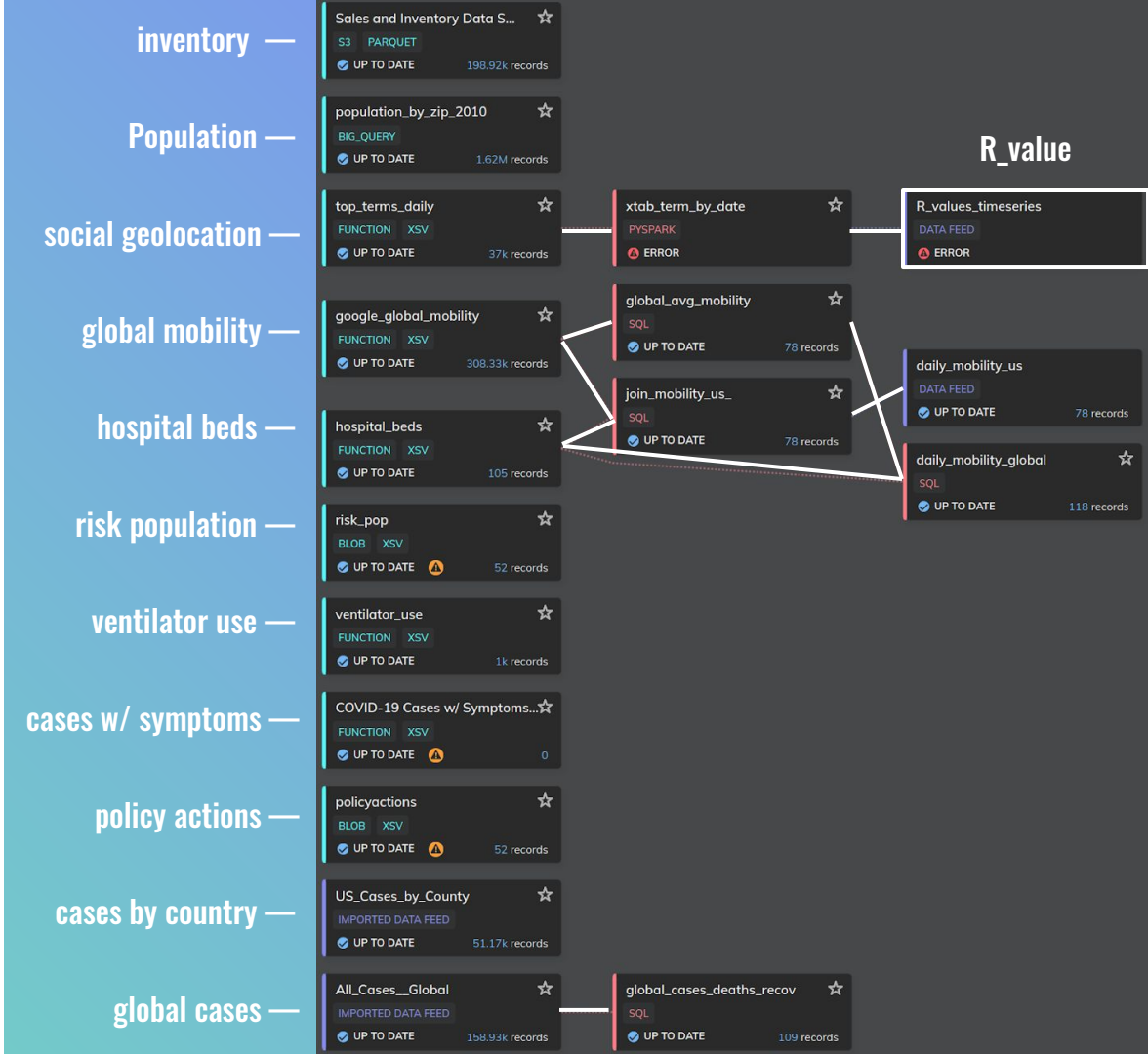
# USE OF DATA

# Data

We need more than the daily amount of reported cases, **we need** the coronavirus's real-time, effective reproduction number, or its actual ability to spread at a particular time.
- NY Times

So that we can:

- Compare the NEED vs the CURVE
- Inform the consortium
- Identify Need (IDN) by %
- Vote before supply requests are made

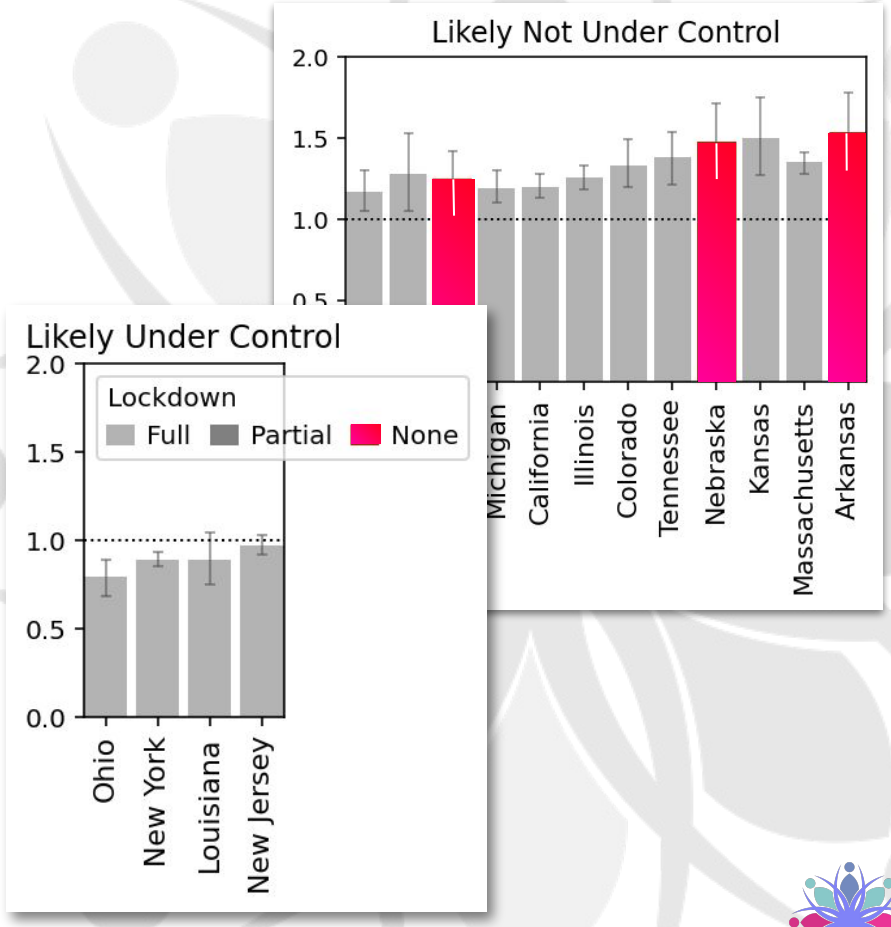


# R-Value

In any epidemic, R(t) is the measure known as the effective reproduction number. It's the number of people who become infected per infectious person at time $t$. The most well-known version of this number is the basic reproduction number: $R_0$ when $t=0$. However, $R_0$ is a single measure **that does not** adapt with changes in behavior and restrictions.

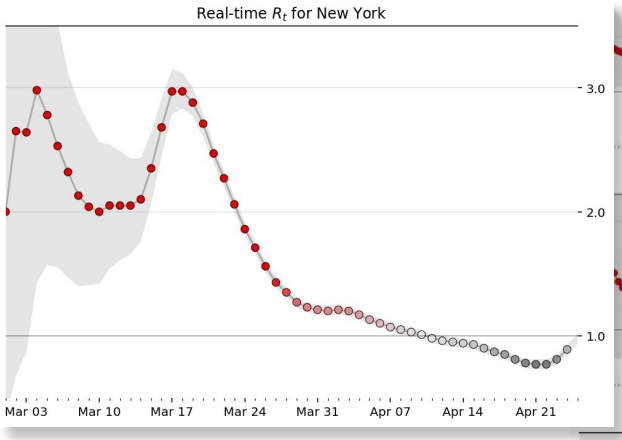
As a pandemic evolves, increasing restrictions (or potential releasing of restrictions) change R(t) Knowing the current $R_t$ is essential. When R>1, the pandemic will spread through the entire population. If R(t)<1, the pandemic will grow to some fixed number less than the population. The lower $R_t$, the more manageable the situation. The value of $R_t$ helps us

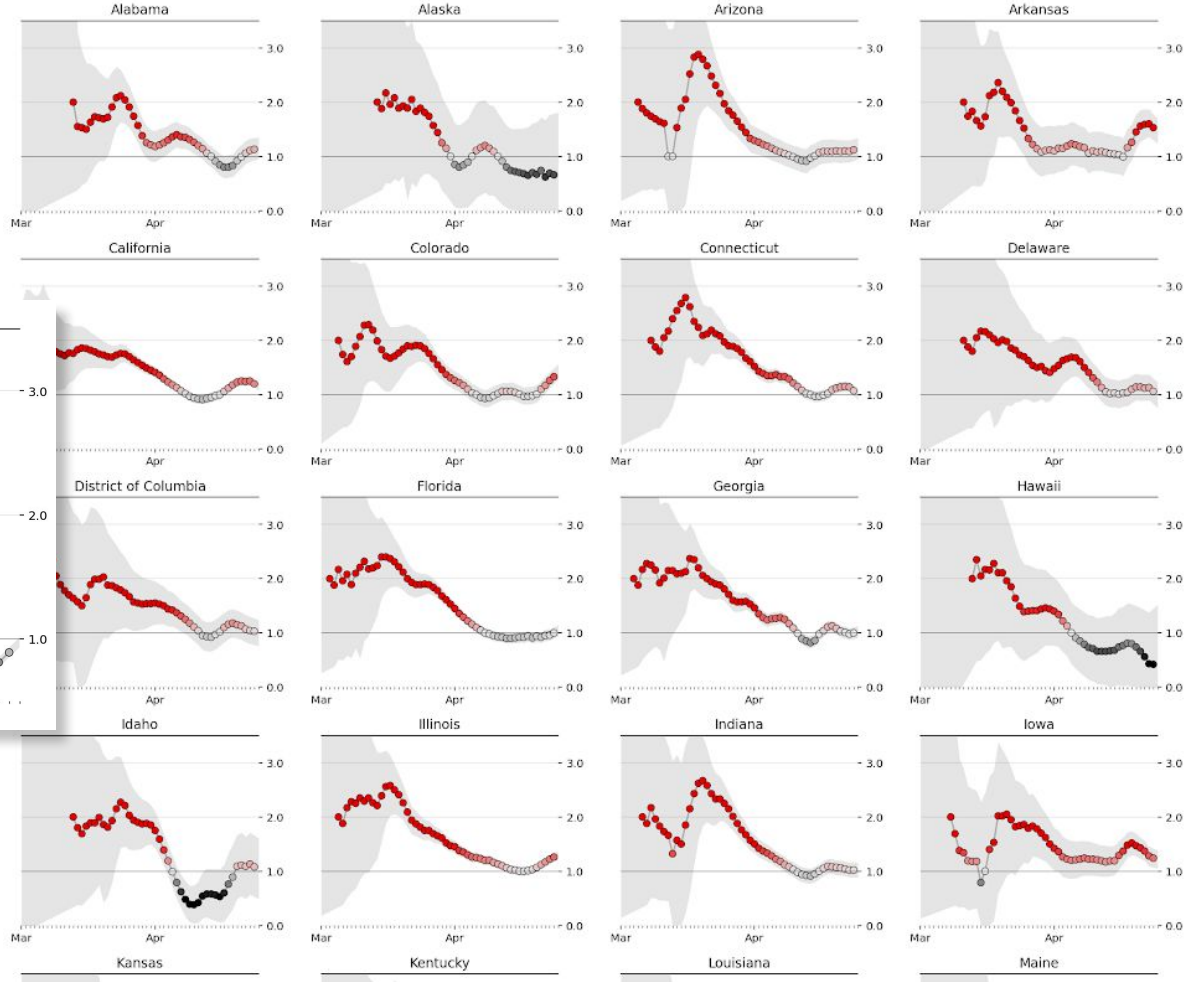
1. Understand how effective our measures have been controlling an outbreak.
2. Gives us vital information about whether we should increase or reduce restrictions based on our competing goals of economic prosperity and human safety. [Well-respected epidemiologists argue] **tracking R(t) is the only way to manage through this crisis**.

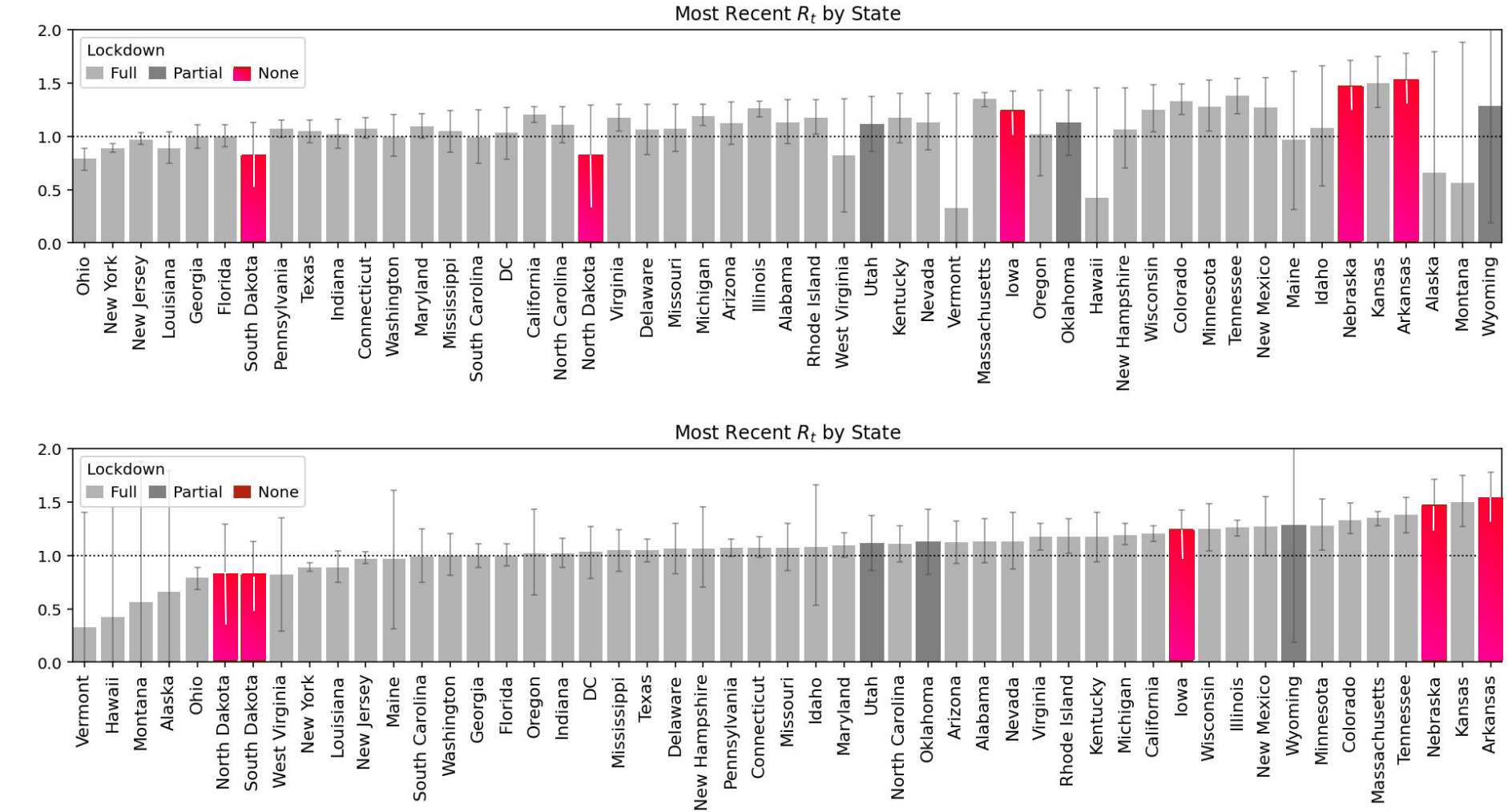


# R-Value

By State

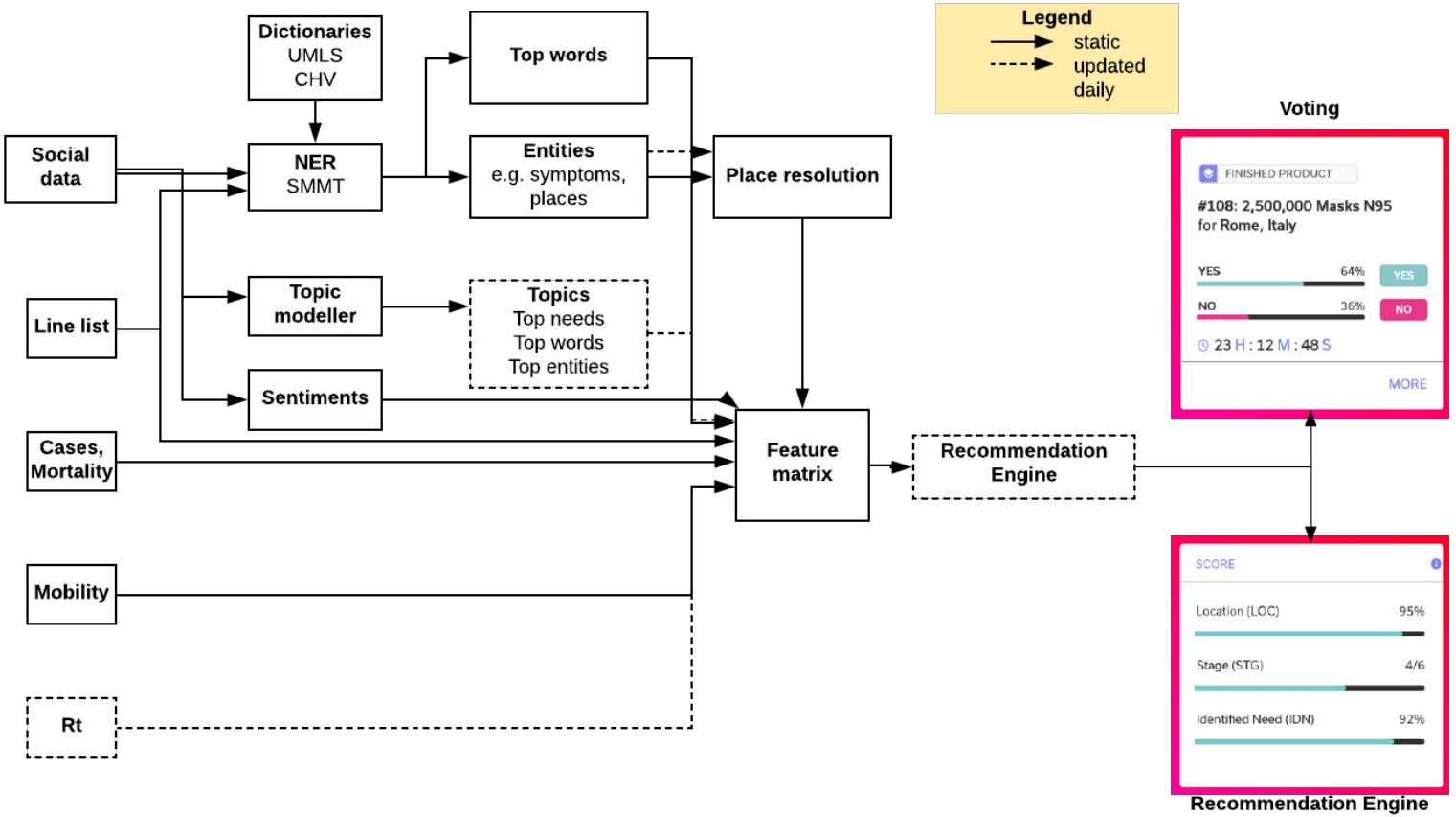


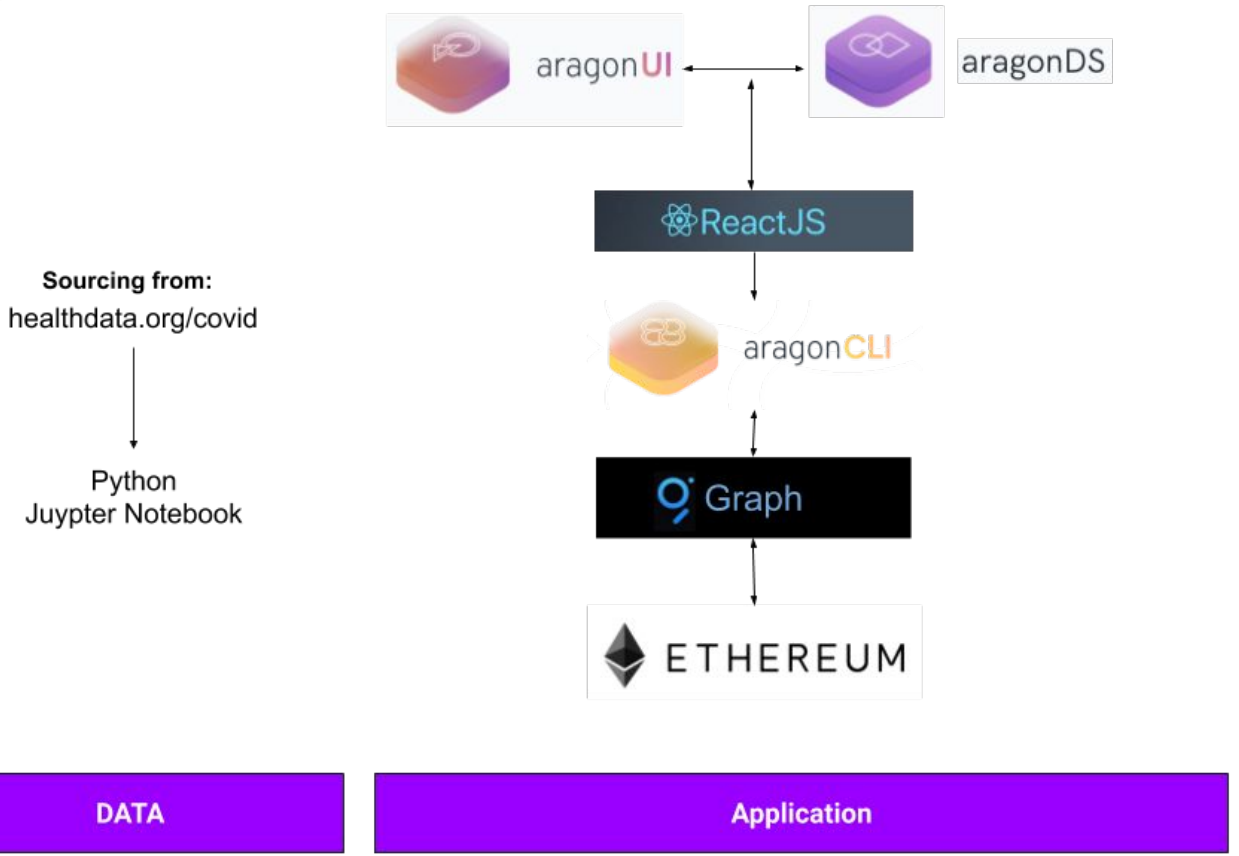

Most Recent $R_t$ by State
Lockdown
Full
Partial
None
2.0
1.5
1.0
0.5
0.0
Ohio
New York
New Jersey
Louisiana
Georgia
Florida
South Dakota
Pennsylvania
Texas
Indiana
Connecticut
Washington
Maryland
Mississippi
South Carolina
DC
California
North Carolina
North Dakota
Virginia
Delaware
Missouri
Michigan
Arizona
Illinois
Alabama
Rhode Island
West Virginia
Utah
Kentucky
Nevada
Vermont
Massachusetts
Iowa
Oregon
Oklahoma
Hawaii
New Hampshire
Wisconsin
Colorado
Minnesota
Tennessee
New Mexico
Maine
Idaho
Nebraska
Kansas
Arkansas
Alaska
Montana
Wyoming
Most Recent $R_t$ by State
Lockdown
Full
Partial
None
2.0
1.5
1.0
0.5
0.0
Vermont
Hawaii
Montana
Alaska
Ohio
North Dakota
South Dakota
West Virginia
New York
Louisiana
New Jersey
Maine
South Carolina
Washington
Georgia
Florida
Oregon
Indiana
DC
Mississippi
Texas
Delaware
New Hampshire
Pennsylvania
Connecticut
Missouri
Idaho
Maryland
Utah
North Carolina
Oklahoma
Arizona
Alabama
Nevada
Virginia
Rhode Island
Kentucky
Michigan
California
Iowa
Wisconsin
Illinois
New Mexico
Wyoming
Minnesota
Colorado
Massachusetts
Tennessee
Nebraska
Kansas
Arkansas

# TECHNICAL BUILD

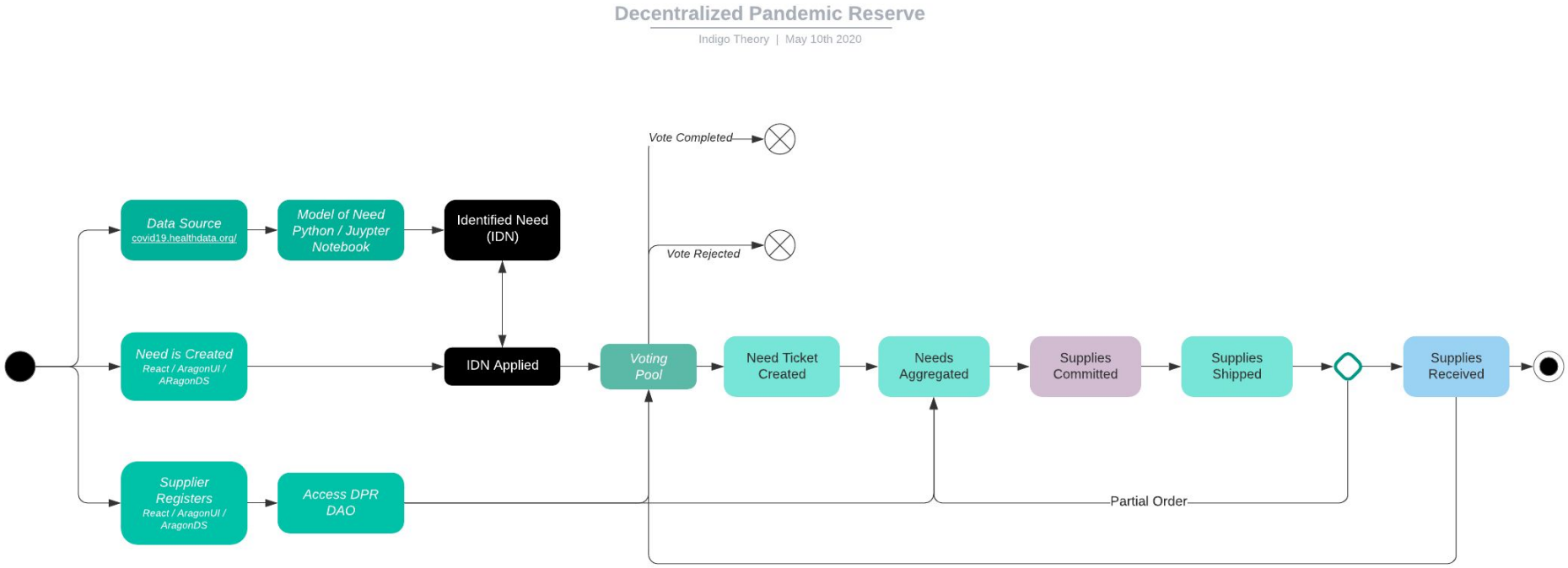
# Architecture



# Tech Stack


aragonUI
aragonDS
ReactJS
Sourcing from:
healthdata.org/covid
aragonCLI
Python
Juypter Notebook
Graph
ETHEREUM
DATA
Application

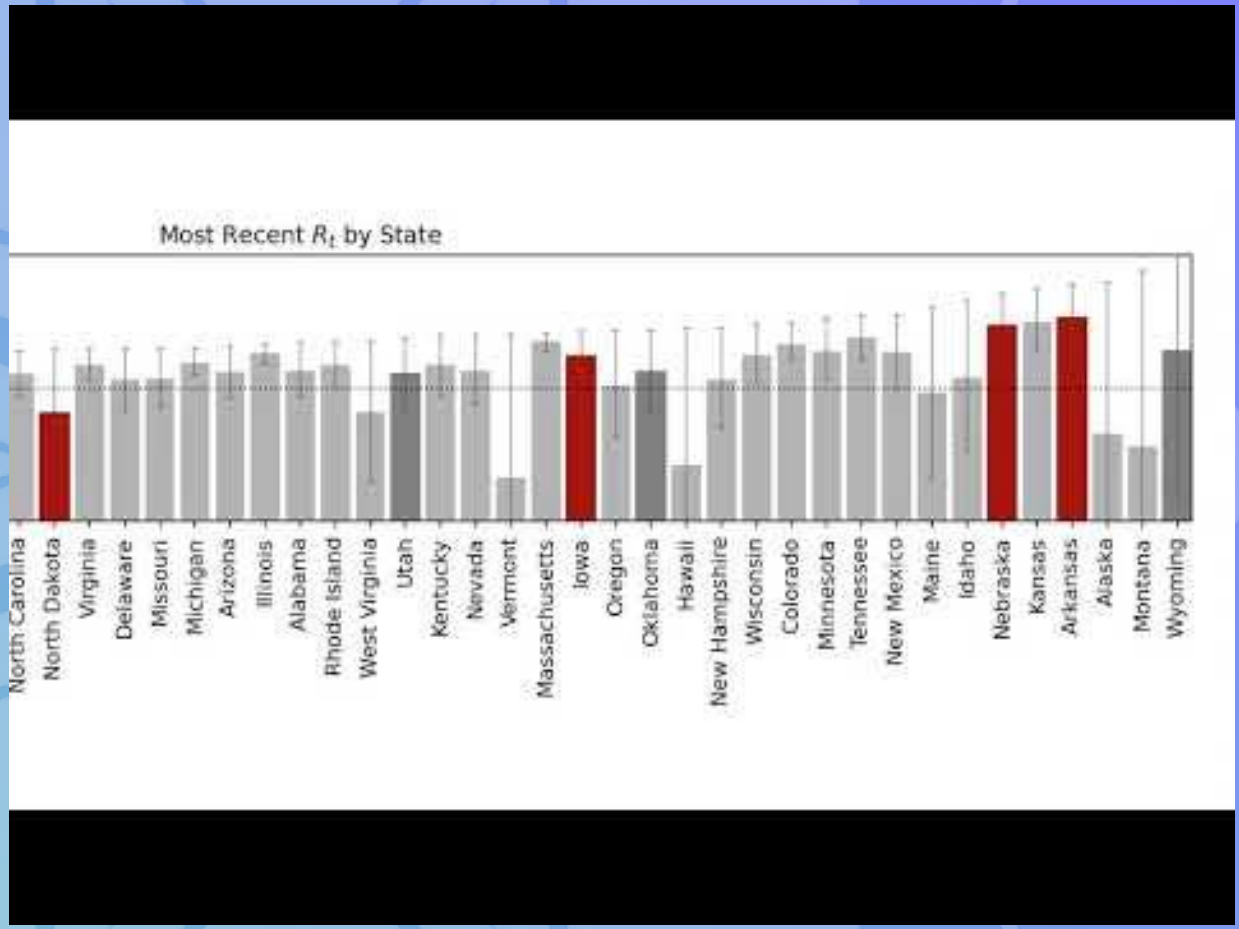
# Process Map


Decentralized Pandemic Reserve
Indigo Theory | May 10th 2020
Vote Completed
Vote Rejected
Data Source
covid19.healthdata.org/
Model of Need
Python / Juypter
Notebook
Identified Need
(IDN)
Need is Created
React / AragonUI /
ARagonDS
IDN Applied
Voting
Pool
Need Ticket
Created
Needs
Aggregated
Supplies
Committed
Supplies
Shipped
Supplies
Received
Supplier
Registers
React / AragonUI /
AragonDS
Access DPR
DAO
Partial Order

# Demo & Links

Axure prototype

Invision prototype



# IMPACT & INSIGHTS

# Solution - Long Term Impact

- Ability to impact policy with the true state of the virus's spread
- Activity data can be mined from our consortium and be used to determine how people mix — which in turn could be used to infer the likelihood of their passing the virus around.

- Leverage data to create an **epidemic monitoring instrument**, forecasting the demand, voting on the need and relying on the consortium to deliver the supply.
- Potential for all industries that are currently facing tremendous demand disruption and connected idle resources to repurpose and develop innovative solutions to the people and places who need them most.

A **true** measure
of our effectiveness
is a lack of
your **need**

# Sources


- ☥ https://www.nytimes.com/2020/04/06/opinion/coronavirus-end-social-distancing.html
- https://covid19.healthdata.org/united-states-of-america
- https://www.weforum.org/agenda/2020/03/from-perfume-to-hand-sanitiser-tvs-to-face-masks-how-companies-are-changing-track-to-fight-covid-19/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