Building a Privacy Sensitive Decentralized Demand-Driven Supply Chain (3DSC) for Pandemic Response

Gary Jackson, Jason Porter
CGI Federal

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CGI | global overview and range of services

Founded in 1976
48 years of profitable growth

$10.8 billion revenue

77,500 consultants

40 countries
400 locations

5,500 end-to-end services clients globally

170 IP-based solutions serving **50,000** clients

Range of services

High-end IT and business consulting

Systems integration

IT and business process outsourcing

Differentiators

Client-proximity model	Industry domain expertise
Intellectual Property	Global delivery network

CGI in Health & Life Sciences

Federal Government

Health Payers / Plans

Health Providers

State Government

Life Sciences

$3+ billion in **improper medical claims** payments have been **recovered** for government and commercial payers

~5,000 industry experts across the globe helping clients drive profitable growth

500+ biotech / pharmaceutical **projects completed** for 50 clients

6.6 billion records stored for health systems

Agenda

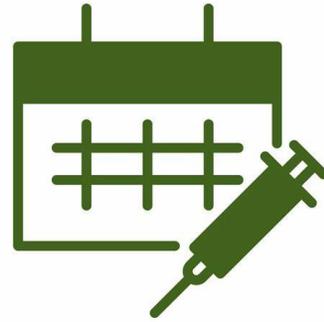| 01	02	03	04	05
Problem	Solution	Collaboration	Impact	Q&A

"Almost no one should be dying of COVID in the U.S. today, because the government is distributing free vaccines and antiviral medications. People who are denying themselves that opportunity because they're being misinformed."

- Dr. Robert Califf , FDA Commissioner

Problem(s)

Objectives

Get vaccines on-time to those in need

MPOX

HIV

Patient Privacy & Protection

Prevent Data as a Weapon

Deconstruct Misinformation

Solution

MPOX: JYNNEOS Vaccine

Tradename: **JYNNEOS**
Manufacturer: **Bavarian Nordic A/S**
Location: Hellerup, Denmark

JYNNEOS vaccine is approved for prevention of smallpox and MPOX. It is the primary vaccine being used in the U.S. during this outbreak.

The JYNNEOS vaccine is given as a **two-dose series**. The two doses should be given 28 days apart. The level of protection provided by only one dose is not known.

Peak immunity is expected to be reached **14 days** after the second dose of JYNNEOS vaccine.

JYNNEOS Vaccine | Monkeypox | Poxvirus | CDC

MPOX: ACAM2000 Vaccine

Tradename: **ACAM2000**
Manufacturer: Sanofi Pasteur Biologics Co
Location: Lyon, France

ACAM2000 vaccine is approved for prevention of smallpox and MPOX for those most highly susceptible.

ACAM2000 vaccine is licensed as a **single dose**.

Peak immunity is expected to be reached **4 weeks after** the dose of ACAM2000 is administered.

ACAM2000 Vaccine | Monkeypox | Poxvirus | CDC

Collaboration

MPOX Vaccine Supply Chain

Immutable Vaccine Supply Chain

Decentralized Ledger

ALICE

BOB

Blockchain can record the sequence of transactions and events in an immutable manner. Each block of data in the database has its own link to all previous blocks of data, making it difficult to manipulate the information in any one block.

A **smart contract** is a self-executing agreement between two parties and automatically executes when certain pre-established terms or conditions are met, eliminating the possibility of fraud or downtime by either party.

Digital Assets Marketplace
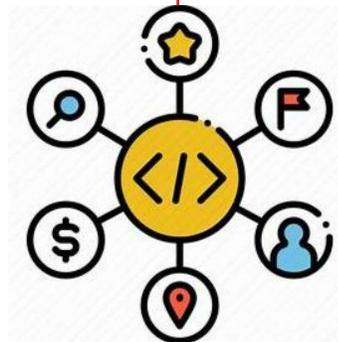
Algorithms

Inventory Days of Supply

Help identify how much inventory you have to cover the order fulfillment for a specific number of days.
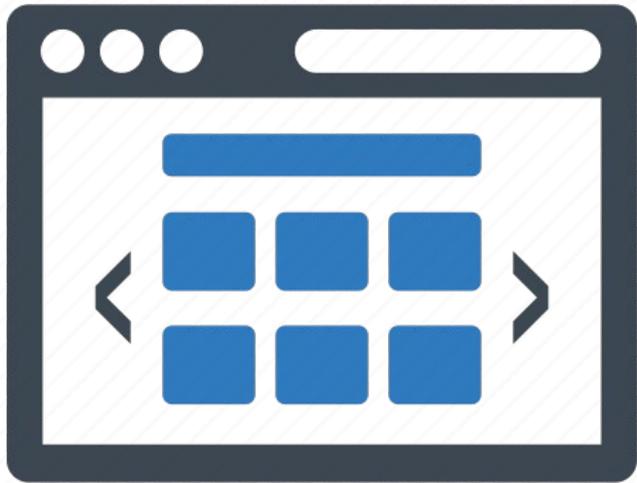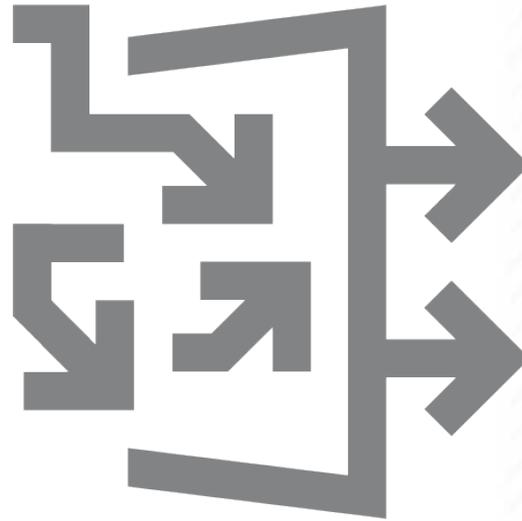
Perfect Order Percentage

This metric helps identify the percentage of orders that get shipped in time without any damage, delay, documentation error, etc.

No Data Movement

Static Datasets

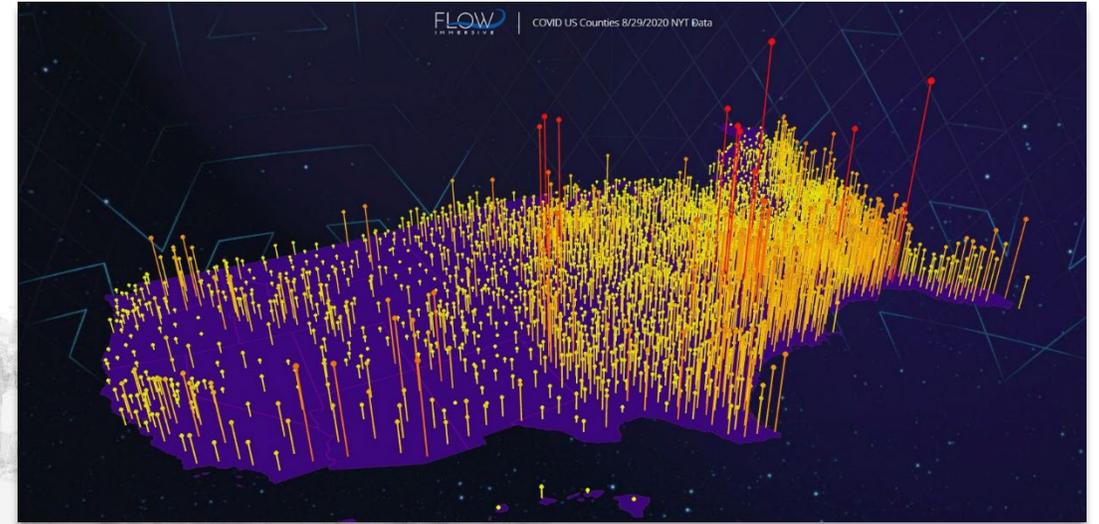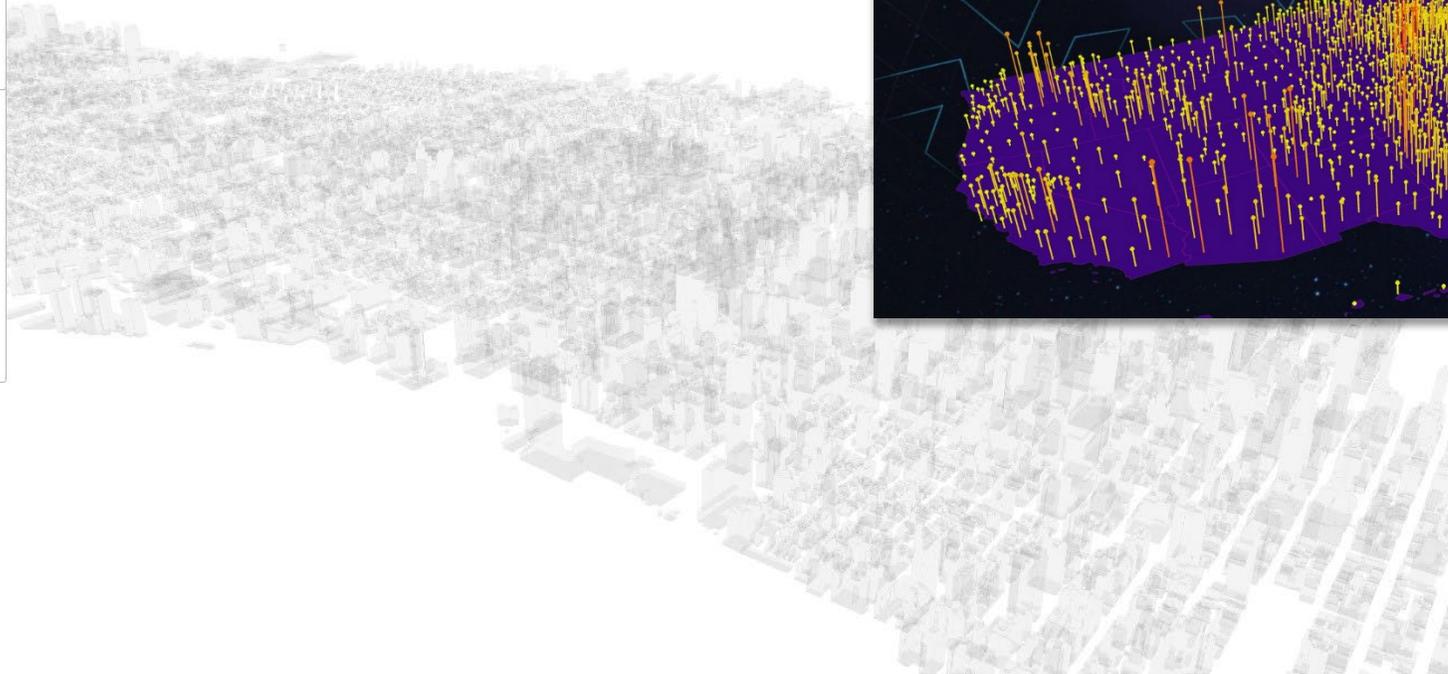**Training Datasets**

Specific Time Boxed Real-Time Datasets
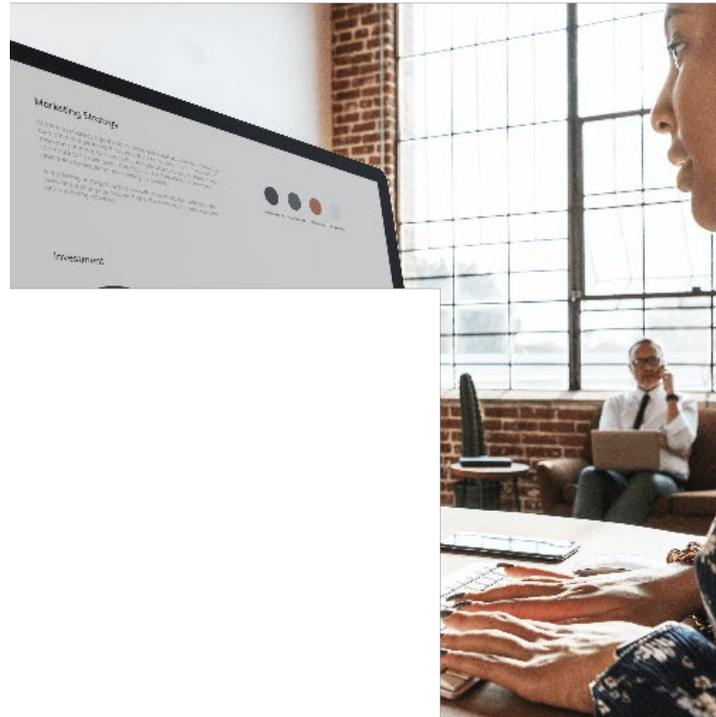
Immersive Objects

Action

Introduction of Trusted Execution Environments

Cocktail Shaker

A hardware-secured environment delivering Trusted Device Identity

Standard application processor or microcontroller with hardware security

Rich OS

TEE

Secured Resources

Secure Processing

Secure Biometrics

Secure Input

Secure Display

Secure Element

Secure Storage
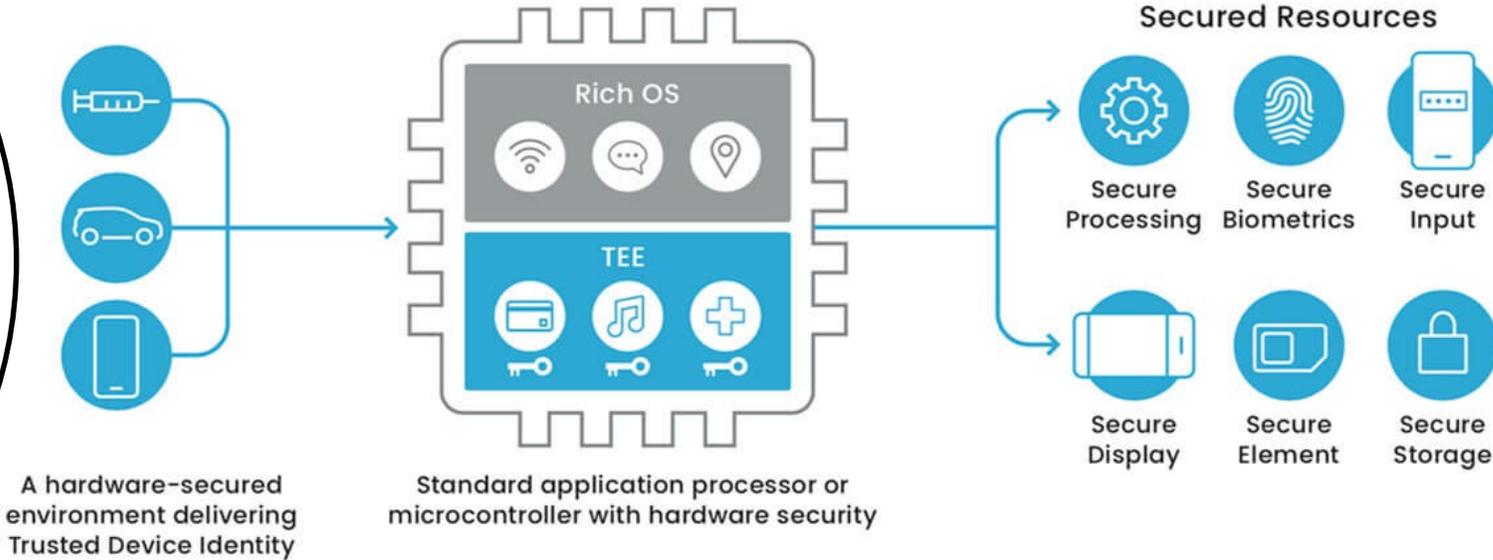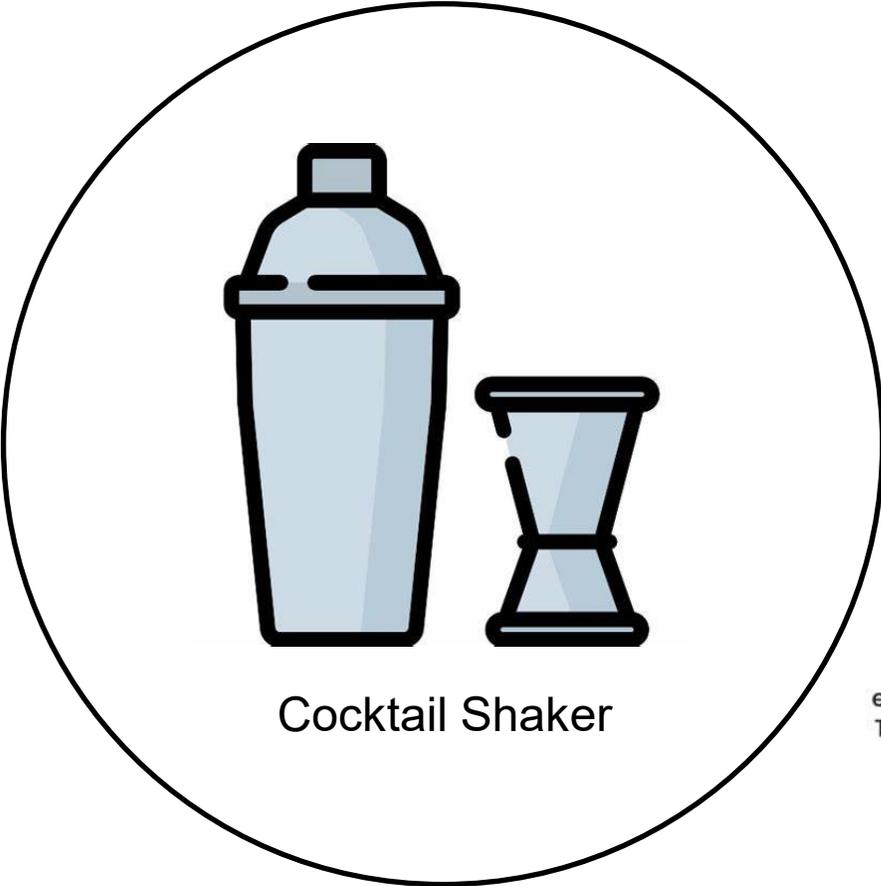
Introduction of Zero Knowledge Proofs

Magic 8 Ball

PROVER

DFCD 689F

MVL3 VC2L

2ER4 P93F

VERIFIER

PROOFS AND SECRET DATA

Protecting Privacy

Sensitive PII

- Full Name
- Social Security Number (SSN)
- Driver's License
- **Sexual Orientation**
- Mailing Address
- Credit Card information
- Passport Information
- Financial Information
- Medical Records

Non-Sensitive PII

- Zip code
- Race
- **Gender**
- Date of birth
- Place of birth
- Religion

Personally identifiable information (**PII**) is information that, when used alone or with other relevant data, can identify an individual.

Impact
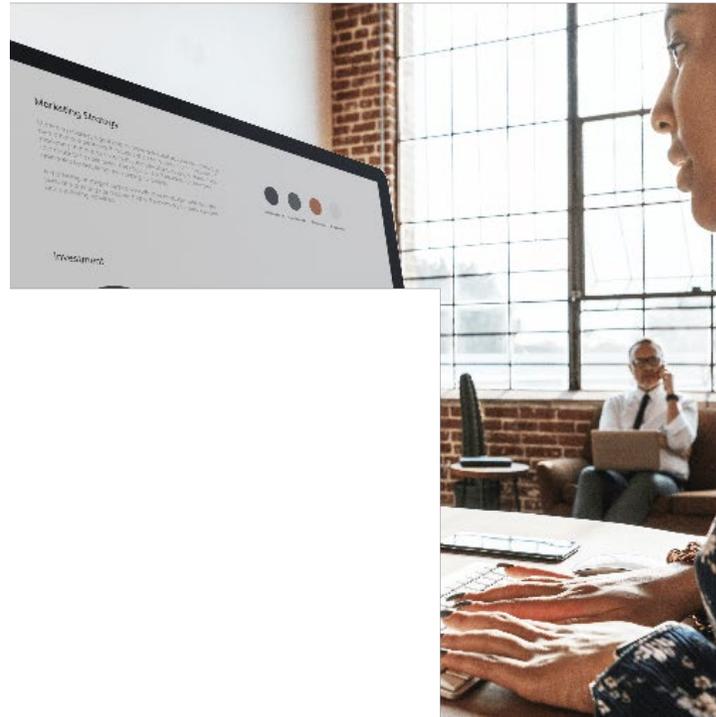
Ascertainment Bias

Ascertainment bias generally refers to situations in which the way data is collected is more likely to include some members of a population than others.

- Data skewed toward more MPOX infections within the MSM community.
- It's theorized that MSM have a better relationship with medical practitioners than heterosexual men, which could mean they are more likely to report MPOX symptoms and get tested for the virus.
- Heterosexual social networks have not been investigated enough to make the conclusion that this is not a broader problem

Heavy-tailed sexual contact networks and the epidemiology of monkeypox outbreak in non-endemic regions, May 2022 | medRxiv

Vaccination Equity

Discover links to reach populations who are most affected by MPOX virus who face barriers to awareness, education, and prevention measures like vaccination.

- Location of vaccination sites
- Vaccine hesitancy
- Mistrust of government
- Lack of access to on-line scheduling technology
- Avoid events oriented to specific sexual or gender identities or sexual activity

Monkeypox Vaccine Equity Pilot Program | Monkeypox | Poxvirus | CDC

Organic Immutable Chain of Trust

Contact trace the face of trust for patients who face barriers to awareness, education, and prevention measures like vaccination.
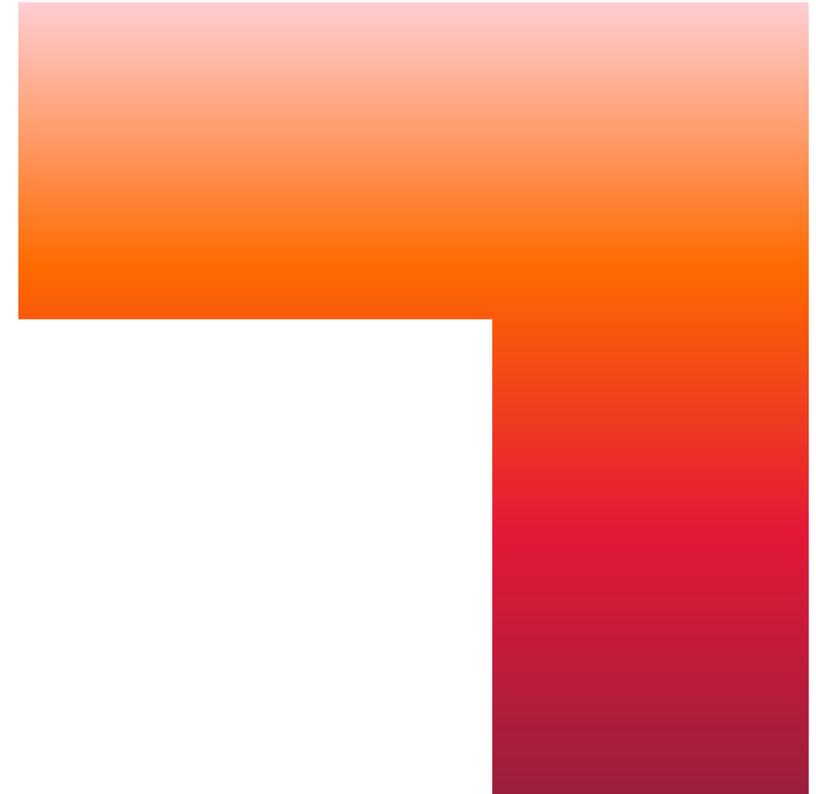
- Age
- Race
- Sex
- Language
- Background

Q&A

Insights you can act on

Github.com/enterlifeonline/utk-monkeypox
Github.com/enterlifeonline/utk-blockchain-supply-chain

CGI