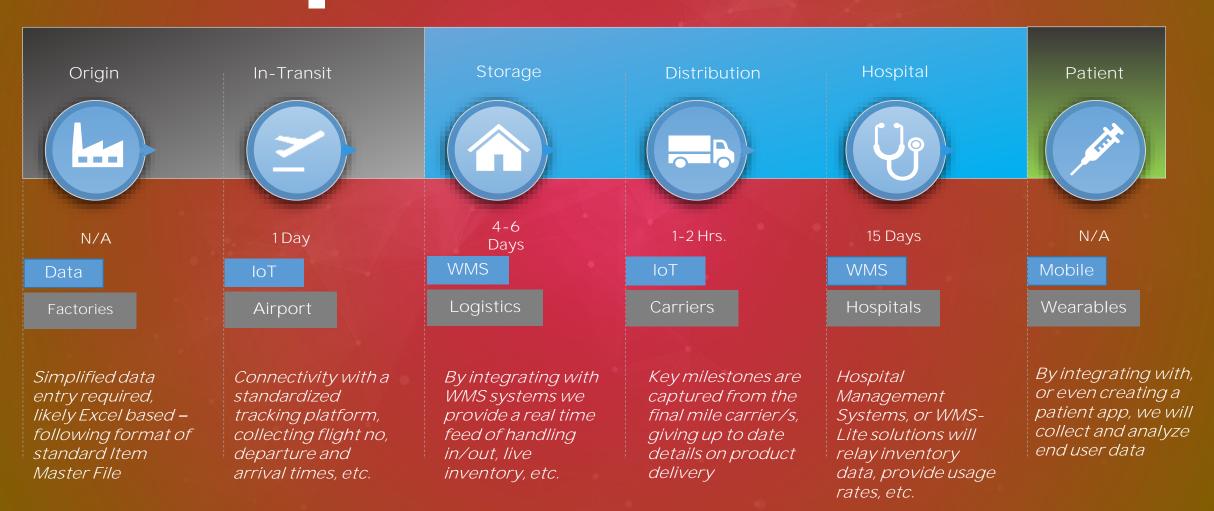




A Blockchain-based Vaccine Supply Chain Solution





mUnity is a collection of digital products and services to support vaccine distribution. A reporting system that covers an end-to-end supply chain of the vaccines, with the existing collaboration efforts of Digital Cluster in Abu Dhabi Ports Group (ADPG) and Rafed (purchasing organization managing the procurement of healthcare supplies and products).

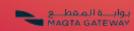
The Digital Cluster initiated the project in ADPG as a response to the COVID-19 pandemic around the world and to contribute to global efforts to optimize the vaccine supply chain. mUnity provides a detailed view, reporting, and Track & Trade features. It also provides simplicity and visibility across the entire process. Maqta Gateway® LLC, a wholly-owned ADPG, is a company that operates under its Digital Cluster and provides external services to the Trade Community.

The Vaccine's physical supply chain has different stages that the Vaccine goes through from origin to destination. Along this line, mUnity covers the Data Journey alongside the physical journey.

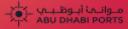
















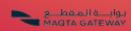


The project is part of the HOPE Consortium in Abu Dhabi Emirate. It was spearheaded by the Department of Health – Abu Dhabi, which led to the emirate-wide consortium formation. The HOPE Consortium is a collective of industry-leading partners committed to working together to overcome these challenges to distribute vaccines. It brings together leading brands to deliver an end-to-end solution to distribute COVID-19 vaccines globally. It was formed as a response to the pandemic in November 2020 to contribute to global vaccine distribution. Six founding partners led the logistics for vaccine delivery and demand planning. The Digital Cluster of ADPG/Maqta Gateway LLC. through mUnity provides a one-stop 24/7 holistic and blockchain-enabled solution for vaccine track-and-trace services from production to patient. It is used by all entities and players involved in the vaccine supply chain and provides complete visibility and transparency on vaccine information with over 20 interactive dashboards. It has delivered vaccines currently over 50 countries with over 5 Agreements in place.

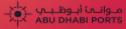
















mUnity For a Better Tomorrow

Overview

In March 2021, the Digital Cluster in ADPG has arranged with the other partners in the Hope Consortium "The World Immunisation & Logistics Summit" which is the first global event of its kind for optimization of vaccine distribution that was hosted virtually. It was a major international gathering of front runners and senior decision-makers leading the charge in the collective human effort against the COVID-19 pandemic. The two-day summit had the participation of over 2550 attendees from 191 countries from all corners of the globe representing governments, key multi-national NGOs, IGOs, pharmaceutical and global supply chain players, as well as leading academics. It was presented by over 60 Speakers, World Leaders and Industry Experts.

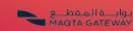




















Airline **Provider** **Digital Solutions Provider**

UAE **GPO**

Logistics Provider **UAE Medical Authority**



The partners in the HOPE Consortium play a critical and essential role with an integrated logistics and digital solution overseen by the Department of Health- Abu Dhabi. The consortium has reached over 4.5b consumers in 4 time zones. The founding members of the Hope Consortium are the main profiles accessing mUnity for supply chain information, which are:

- Department of Health: The regulator of the healthcare sector in the emirate of Abu Dhabi, the Department of Health

 Abu Dhabi (DoH), is offering regulatory oversight to the HOPE Consortium. DoH is internationally recognized as a robust healthcare regulator, achieving one of the most successful global responses to the COVID-19 pandemic. DoH provides scientific knowledge and medical expertise as a powerhouse in life science regulation.
- 2. Etihad Cargo: the cargo and logistics arm of Etihad Airways, the national airline of the UAE. From its hub in Abu Dhabi, Etihad Cargo provides a vital link between Asia, Europe, Africa and the US. Etihad has launched Pharma Life the first IATA's Centre of Excellence for Independent Validators (CEIV) certified vaccine transport solution in the MENA region. Etihad Cargo has direct connections to the globe through a global network of trusted partners and an extensive fleet of cargo aircraft to deliver vaccines through the HOPE Consortium's supply chain.

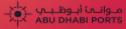
















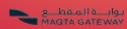


- 3. Abu Dhabi Ports Group (Logistics Cluster): as the UAE's key strategic logistics enabler, ADPG- Logistics Cluster, provides end-to-end logistics support clearing and freight management, storage, order processing and redistribution of COVID-19 vaccines for the HOPE Consortium. ADPG- Logistics Cluster operates the Largest Cold & Ultra-Cold Chain, an advanced 19,000 sqm cold and ultracold storage facility with the capability to store over 120 million vaccines of all types at any time and temperatures ranging from +8°C to -80°C.
- 4. Sky CeII: is an award-winning provider of temperature-controlled container solutions focusing on serving global pharmaceutical companies. Its best-in-class container solutions can maintain cold and ultra-cold temperatures for extended periods, enabling vaccines to be received and safely absorbed by nations with limited logistical and refrigeration capabilities.
- 5. Rafed: is a Group Purchasing Organization (GPO) that leverages the bulk purchasing power of the UAE. Experienced in managing purchases of large volumes of vaccines and other pharmaceutical products and supporting humanitarian initiatives, as part of the HOPE Consortium, Rafed is responsible for providing procurement management services on behalf of DoH.

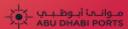
HOPE (M)

















6. Maqta Gateway/ Abu Dhabi Ports Group (Digital Cluster): Maqta Gateway is ADPG's digital arm and a leader in developing integrated and digital global trade solutions. Its unique blockchain-enabled vaccine management system, mUnity, can ensure that vaccines are digitally managed, tracked and delivered, from production to those in need, around the globe safely, transparently, and on time. mUnity provides a 24/7 customer service operation solution that can be developed based on customer requirements to track the cold chain vaccine pharmaceutical supply chain worldwide.

Main Customer (Vaccine Distributor - Total of 5):

An example of a Key Distributor is Group 42, a leading Artificial Intelligence and Cloud Computing company dedicated to developing and implementing holistic and scalable technology solutions. It has a Pharmaceutical arm that has partnered with the largest vaccine manufacturers and with Rafed to distribute the vaccine.

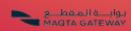
Other Customers:

Freight Forwarders: 16 leading global freight forwarders such as Aramex, FedEx, UPS, DHL, Agility., DSV, and Hellmann.

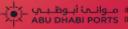




















A Blockchain-based Vaccine Supply Chain Solution



Decentralized Data

Tamper-proof Data

High Transparency

High Availability



Our Commitment to UN SDGs





Goal 3. Ensure healthy lives and promote well-being for all at all ages

The Digital Cluster of ADPG/ Maqta Gateway is committed to promoting and prioritizing the health and well-being for all its stakeholders and the wider Community

Target 3.8 Achieve universal health coverage, including financial risk protection, access to quality essential healthcare services and safe, effective, quality and affordable essential medicines and vaccines for all.

Target 3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks



mUnity Supported the delivery of COVID-19 Vaccines to more than 50 countries free of Charge. More than 40 were developing Countries



Our Commitment to UN SDGs







Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

The Digital Cluster of ADPG/ Maqta Gateway is committed to promoting optimized work environment, boosting productivity, and offering economic gains with the use of Technology that is accessible to all

Target 8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including a focus on high-value-added and labour-intensive sectors



mUnity supported the development of the Technology Infrastructure for vaccine track and trace for better decision-making, leading to time and cost savings and an efficient vaccine supply.



Our Commitment to UN SDGs





Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

The Digital Cluster of ADPG/ Maqta Gateway is committed to building unified innovative digital infrastructure that is sustainable, resilient, and accessible to all

Target 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human wellbeing, with a focus on affordable and equitable access for all



mUnity supported efficient supply of vaccines and had direct integration with the Trade Single Window in Abu Dhabi, named Advanced Trade and Logistics Platform (ATLP). mUnity provides real-time information access with high transparency to all cargo-related information and updates from only one point of contact.

mUnity is considered to be one of a kind end-to-end vaccine tracking system that covers all supply chain steps from Manufacturing all the way to vaccine Administration. mUnity provided high safety by preventing low-quality and counterfeit vaccines that seriously affect human health from entering the supply chain. This was achieved through high monitoring and visibility throughout the various steps.



Estimated Impact

| Business case/Request Type | Time required Before mUnity (mins) | Time Required After mUnity (mins) |
|---|------------------------------------|-----------------------------------|
| Track end to end COVID 19 vaccines shipment | 20 | 2 |
| Monitor the shipment condition during the journey and in the warehouse | 20 | 3 |
| Check Number of available vaccines (Vials and doses) in different statuses, including reserve orders. | 30 | 2 |
| Report Generation and Sharing* | 120 | 5 |

Estimated Cost Savings for mUnity Stakeholders (based on Time Savings) is at least AED 46 Million (USD 12.53mm) **

Optimization of the Supply Chain Due to the transparency supported Decisions Making (No Shortages in Vaccine Delivery)

Estimated 25% Improved Supply Chain Efficiency due to mUnity (mainly avoided product loss)

Estimated Vaccine Waste Averted due to mUnity is 124 Million Vaccines

Estimated GHG Emissions Averted due to mUnity efficiency 7 million (kgCO2e)

^{*}This includes requesting the data, rearranging the data, and designing the report, writing and formatting, and reviewing and obtaining the approvals to share the report.

^{**}Assuming that each user have used each type of requests twice for each order/batch



















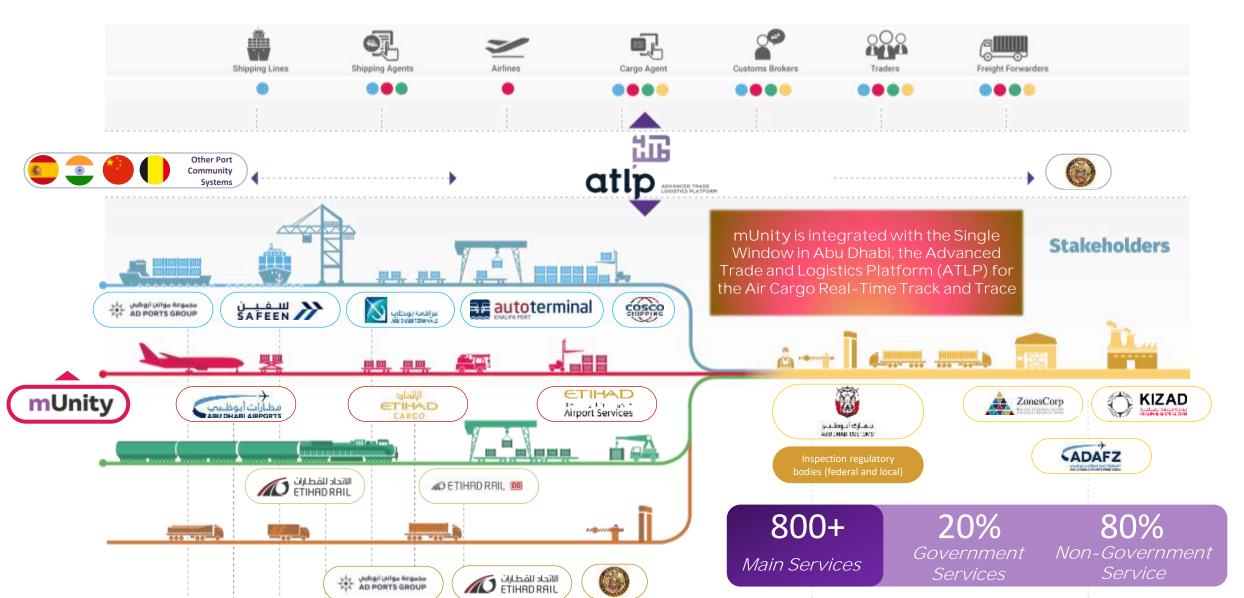














Testimonials

"And to top it all, we got the likes of Maqta Gateway.

We appreciated that the physical identity and journey of the vaccine is very important but equally important in this day of age is to have a digital identity that follow the vaccine all the way from where its being originating to the destination side, where it gives a live data and a live visualizations of what's the temperature integrity of that vaccine, where is it, whatever it is in the world, and what's the management of the inventory remaining and how can we move it to achieve the maximum efficiency around the distribution and the matching of the vaccination program."

Dr. Omar Najim- Executive Office Director at DoH
 Source: Hope Consortium- South Africa Virtual Roadshow



"But this is vitally important because having a physical supply chain and with all the of right partners doesn't mean anything unless we know where the vaccines are, and that they're being stored in their appropriate temperatures as they move through that supply chain.

And that's a key role that Maqta play in the HOPE Consortium."

 Robert Sutton- Head of Logistics Cluster at Abu Dhabi Ports Group Source: Hope Consortium- Pakistan Virtual Roadshow





Earned Media Impact



83 pieces of coverage



901M online readership



1.53Mestimated coverage views



635 social shares



48
average
domain
authority



1.76M circulation



100 positive sentiment



Coverage Highlights





HOPE Consortium's World Immunization & Logistics Abu Dhabi's HOPE to host Immunisation & Summit kicks off in Abu Dhabi

(1) Tayle Today Mart. The no bear 2021 units Court. (1) (1) (2)



33 Mech 2021: UAS Minister of Foreign Affairs and International

operation Shelkin Abdullan Bin Zayed Al Nahyan opened on Monday the HDPE Consumous World Instrumentation & Location Science with a call on extracor

Logistics Summit



Abs Dealers HOFE Consortium but sensurced the inergenal World immunisation & Lagratics Science, a major international patheony of front naturals and service decision makers wealing the charge in the collective huma

As the first-ever World Immunisation & Logistics Summit concludes, the HOPE Consortium, leading experts pledge to close the global immunisation gap



ABU DHABI, 30th March, 2021 (WAM) -- Abu Dhabr's HOPE Consortium and world-leading experts marked the end of The World Immunisation & Logistics Summit today by pledging to close the global immunisation gap. Through a series of key discussions with global healthcare professionals, philanthropists, decision makers and senior government officials, the consensus was formed that innovation, ingenuity and inclusiveness are key to finding a global solution to the COVID-19 pandemic and ensuring equitable access to vaccines for all.

Abdullah bin Mohammed Al Hamed, Chairman, Department of Health -- Abu Dhabi, delivered the operang address titled "Innovation, ingenuity and inclusiveness: Finding the human solution to a global challenge. He spoke of the pace at which countries and communities had collaborated since the pandemic began. "In 2020 and so far this year, the CDVID-19 global pandemic continues to be one of the largest and most complex global challenges in modern times. It's incredible how the world has come together to tackle this issue that transcends communities, borders and continents," he said.

Discussing the resilience and success that the world has shown, Al Hamed said: "There are incredible technology and scientific advancements that have been developed as a result of the pandemic. Under one unified goal, countries around the world are working tirelessly to find solutions"

Speaking of the achievements of Abu Dhabi and the HOPE Consortium to date, he explained: "We strongly believe no one can do this alone. Together, we have a capacity to handle over six billion doses of the vaccine this year, and we are already increasing this to deliver over 18 billion vaccine doses by the end of 2021, with the capacity to deliver this anywhere in the world. We believe the HOPE Consorbum is a catalyst for even greater collaboration with partners worldwide."

Millions of jabs, stored in UAE warehouse, ready to be shipped

Andrea, AF Hardward Farth

dilines of COVID-O variety off its a waterlander to Albe Offichi. validing to be obligated globally and

topiger fridaye, at 40 Celabar. The building to Mu Dhabi's

helife industrial fower is purt of the HOPE Consention, a comme al vanciae impinios group unt a reposed for storage and visione of COVID-49-shalla wagerd.

BACKGROUND

Hope Consortium: UK looks to inactivated Valneva vaccine to tackle Covid-19 variants

Tirtlet vaccine minister Nuthin Tabasi tels Abe Thabi event about principal bacetor dust roll out the autom



The UK could pin its freques on a new mechanised vaccine to help guard against varients of the

entection against new strains

ARAB NEWS



Hope Consortium hailed as timely effort to ensure equitable COVID-19 vaccine access

Abu Dhabi as logistics hub can help conflict-ridden, needy countries deliver

nihah Zaman, Sanlor Danorter







Received Awards



MENA Stevie Award 2022 Most Valuable Corporate Response (COVID-19)



International Business Award 2022 Most Valuable Corporate Response (COVID-19)



oin. /ve always

Transport & Logistics Middle East (TLME) Heroes of the Pandemic Awards 2021 Hero of the Pandemic in Technology Award





Additional Resources

Videos and Websites:

Hope Consortium Introduction Video: https://youtu.be/2wCdZUdwvyE

Hope Consortium Introduction Website: https://hopeconsortium.com/

World Immunization & Logistics Summit Website:

https://hopeconsortium.com/news-media/world-summit/

World Immunization & Logistics Summit Overview Video: https://youtu.be/OtZdI-fjzT4
Opening Ceremony and Keynotes from the World Immunisation & Logistics Summit Day 1: https://youtu.be/qp4JIEtInEs

References:

- 1) Bryan Patenaude, Jeromie Ballreich, Estimating & comparing greenhouse gas emissions for existing intramuscular COVID-19 vaccines and a novel thermostable oral vaccine, The Journal of Climate Change and Health, Volume 6, 2022
- Juliet Martin, The supply chain innovations behind the world's largest vaccine programme, Controlant, Pharmaceutical Technology, 2022

https://www.pharmaceutical-technology.com/sponsored/the-supply-chain-innovations-behind-the-worlds-largest-vaccine-programme/

mUnity For a Better Tomorrow

Screenshots-Login Page





Screenshots-Landing Page







Supply Chain Tracking



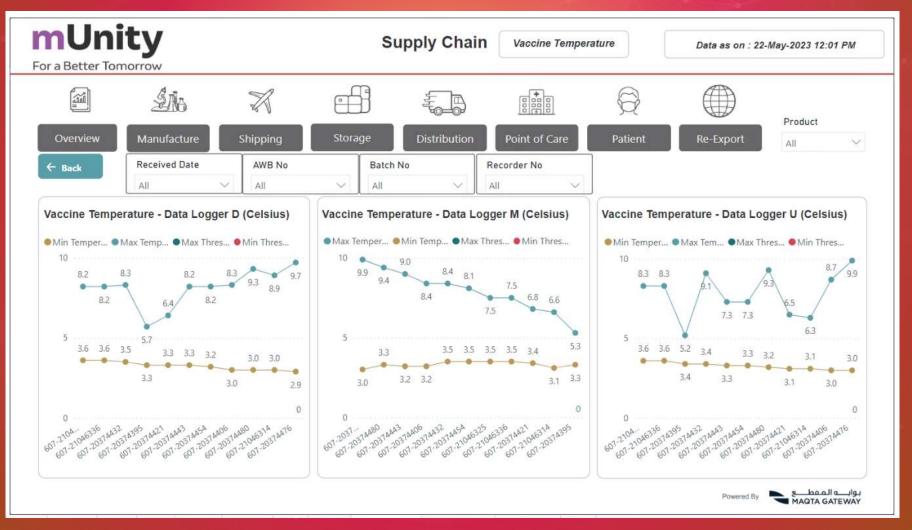
Inventory Management



Vaccine Summary

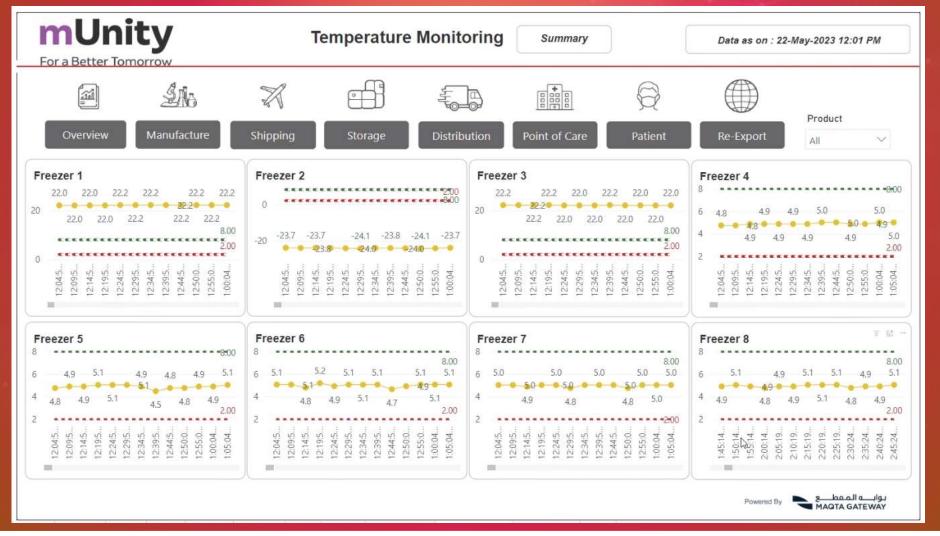


Screenshots-Supply Chain Temperature Monitoring



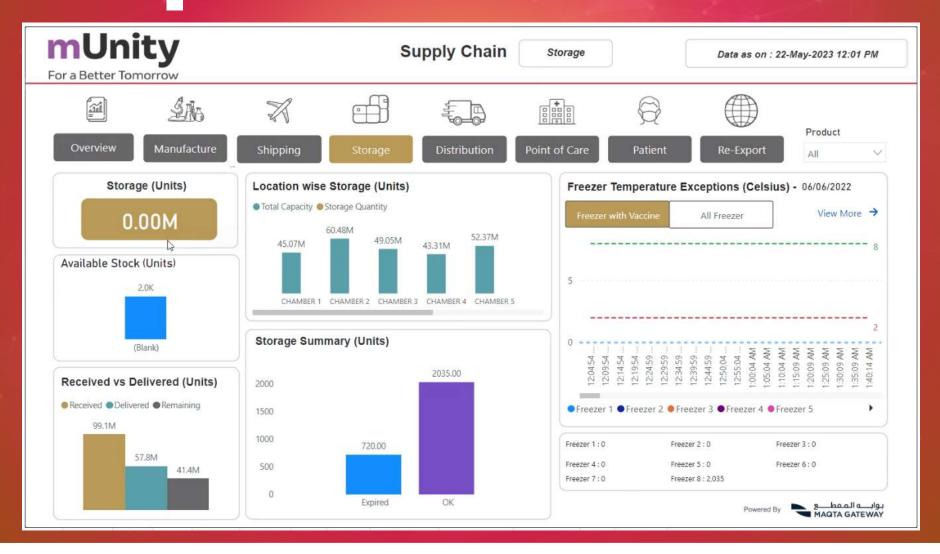
mUnity For a Better Tomorrow

Screenshots-Storage Temperature Monitoring



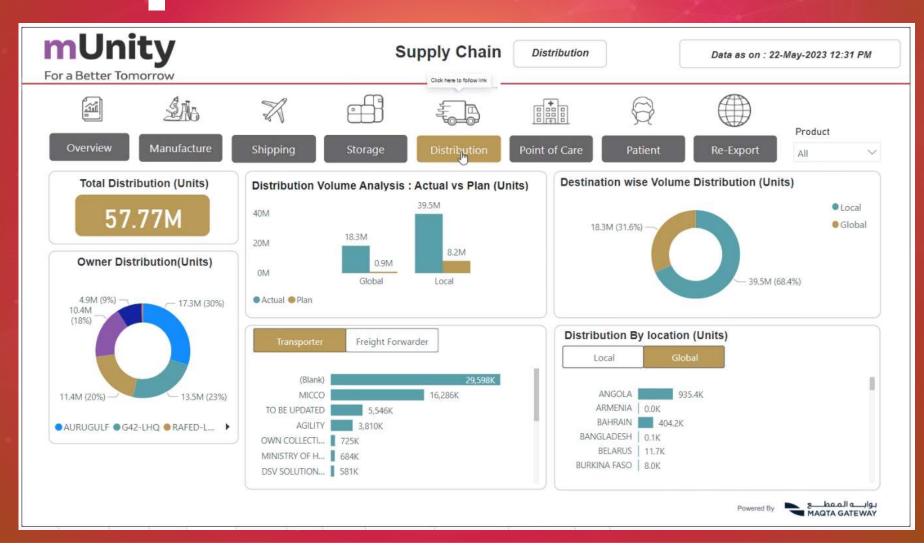


Screenshots-Storage Dashboard



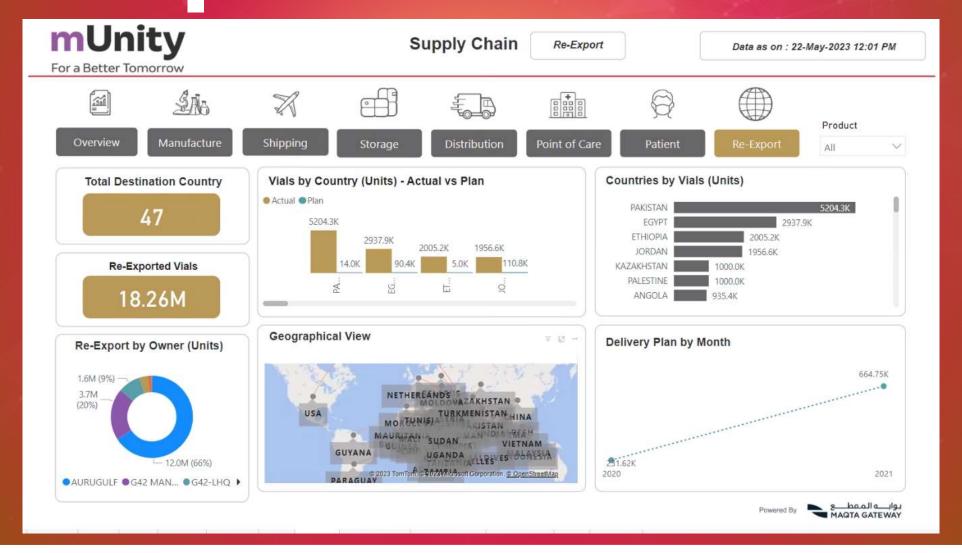


Screenshots-Distribution Dashboard



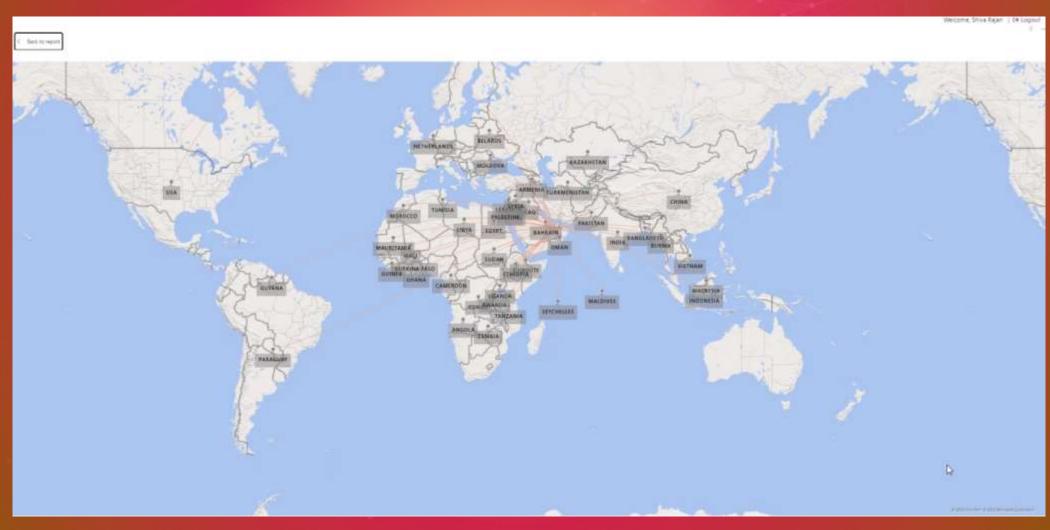


Screenshots-Re-export Dashboard



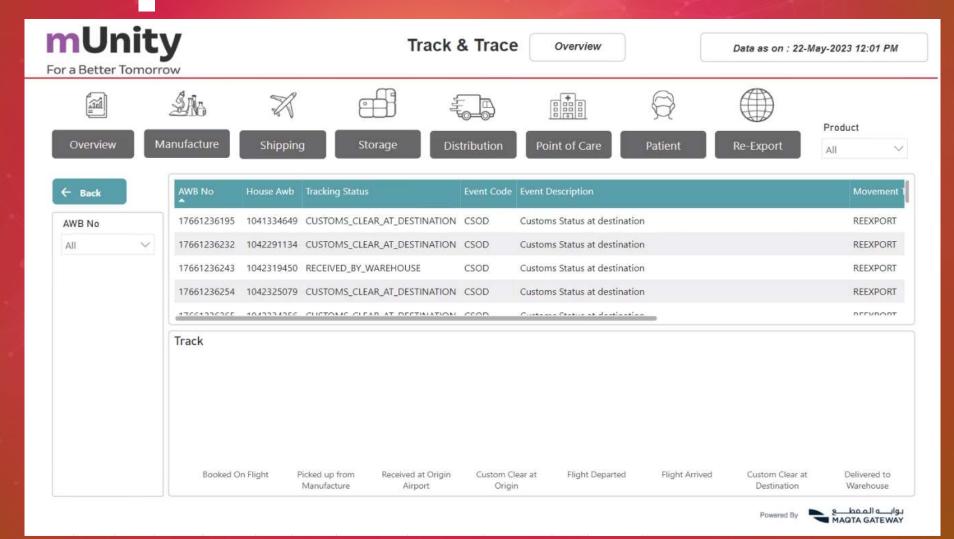


Screenshots-Re-export Geographical View



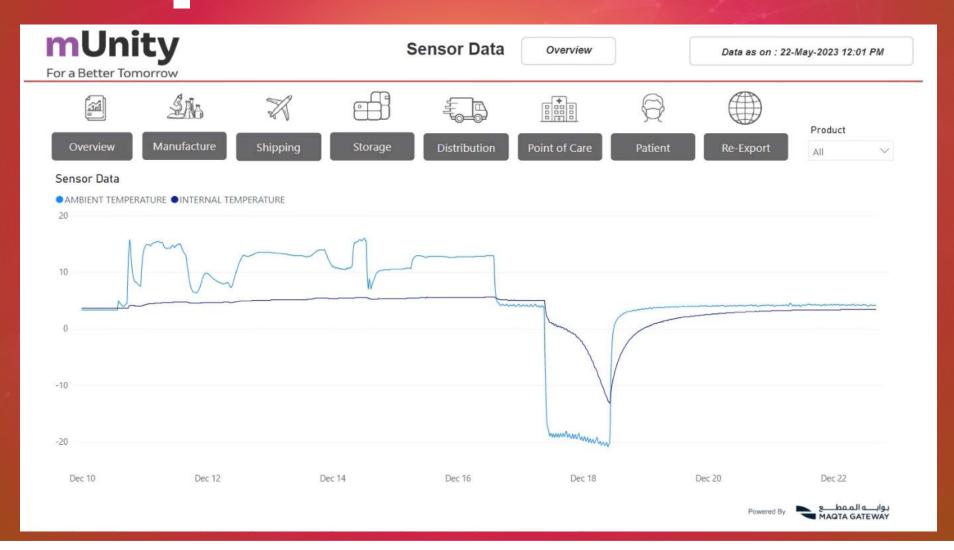


Screenshots-Track & Trace



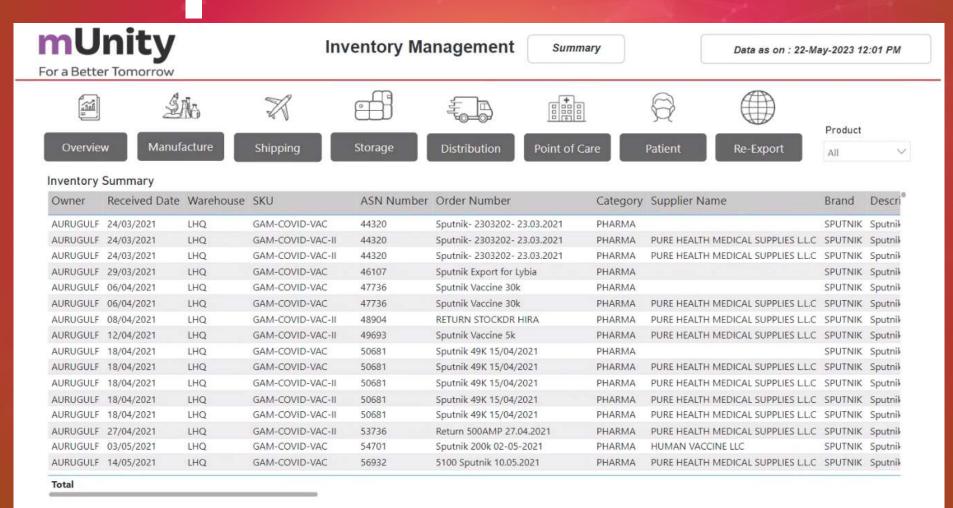


Screenshots-Sensor Data



mUnity For a Better Tomorrow

Screenshots-Inventory Management





Future Plan

After achieving the goal of

mass vaccination, the last transaction in mUnity was on Mid-year 2022.

After the Success achieved by the Hope Consortium and mUnity, there is a plan to move mUnity beyond COVID-19 vaccines.

There is a discussion between RAFED and Ministry of Health, to upgrade the system and utilize it along with the physical logistics and cold chain to service the wider pharmaceutical market.

More integrations to be added and customization based on the specifics of the medical products and equipment

Therefore, mUnity will potentially form the basis of further projects within the health sector in Abu Dhabi.







