U.S. Department of Homeland Security
Centers of Excellence Summit
University research and workforce development for a safe and secure Homeland

Design, Development, Implementation and Operation of CBTS-SGL Data Lake System to Produce Risk Analytics of Supply Chains Impacted by COVID-19 and Other Converging Threats.

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CROSS-BORDER THREAT SCREENING AND SUPPLY CHAIN DEFENSE
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TEXAS A&M UNIVERSITY

SGL Stochastic Geomechanics Laboratory

Homeland Security Challenge

To address the public health impacts of the COVID-19 pandemic and other converging Threats on the U.S. – Mexico trade it is critical to support all health supply chain systems for both infrastructure and workforce, and to do it accounting for the inherent cultural regional differences, and considering the current and emerging regional social, economic and environmental risks.

Approach / Methodology

Risk = Hazard x Vulnerability x Consequences

R = P[T] x P[C | T] x u(C)

P[T] → Threat: COVID-19

P[C | T] → System: Supply Chain

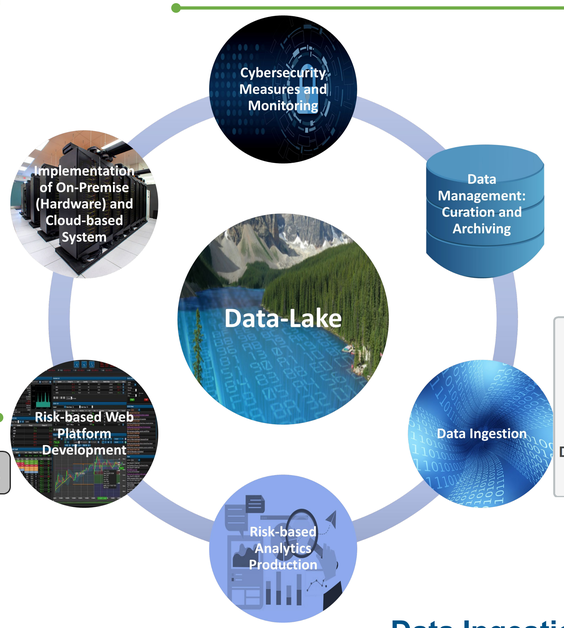
u(C) → Impact: Social and Economic

Hazard = The probability that a particular *Threat T* with a given intensity **P(T)** is exceeded within a given period of time.

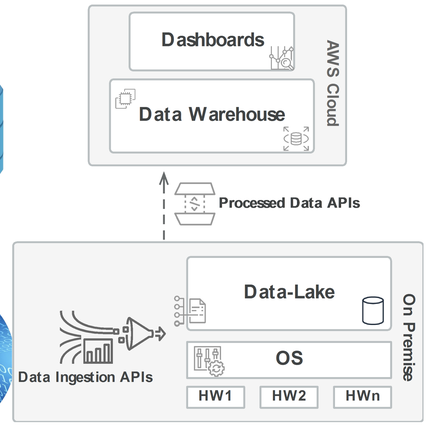
Vulnerability = The probability of reaching a *Consequence* or damage in the element or system of interest, conditioned on a given Threat intensity **P(C|T)**.

Consequences = The expected Consequence value u(C) of the element or system of interest exposed to a given *Threat* intensity.

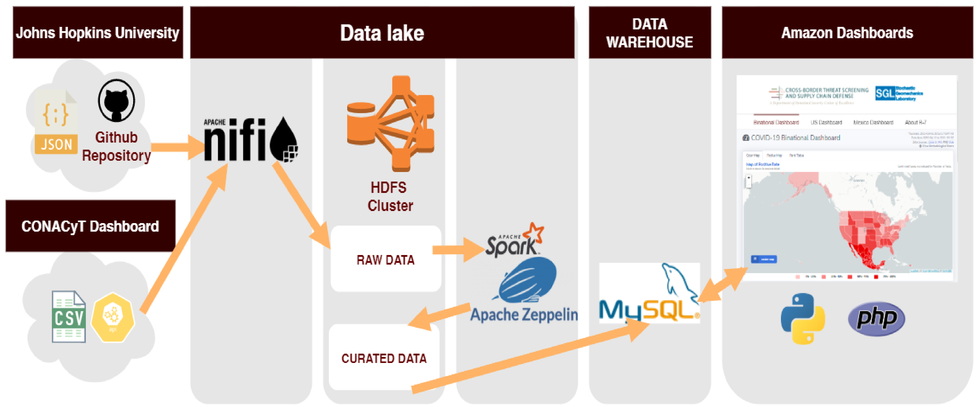
Outcomes / Results



Data-Lake System



Data Ingestion Process



Outcomes / Results

Risk-based Web Platform

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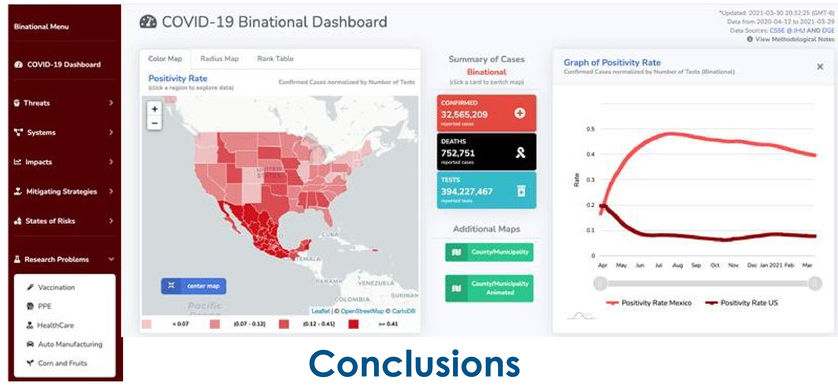

Conclusions

- A Web platform was developed by integrating a Risk Assessment framework with Data-Lake technology to better communicate Supply Chain Risks due to COVID-19 and other emerging Threats such as natural and anthropogenic Threats.
- The Web platform has a unique structure based on the Risk Assessment framework that classifies evidence in terms of Threats, Systems, Impacts, Mitigating Strategies, and States of Risk
- Risk-based analytics are produced to populate the platform to better inform decision-makers regarding potential social, economic, and environmental Supply Chain Risks.

Disclaimer: The views and conclusions contained herein are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S Department of Homeland Security.

References

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