



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.



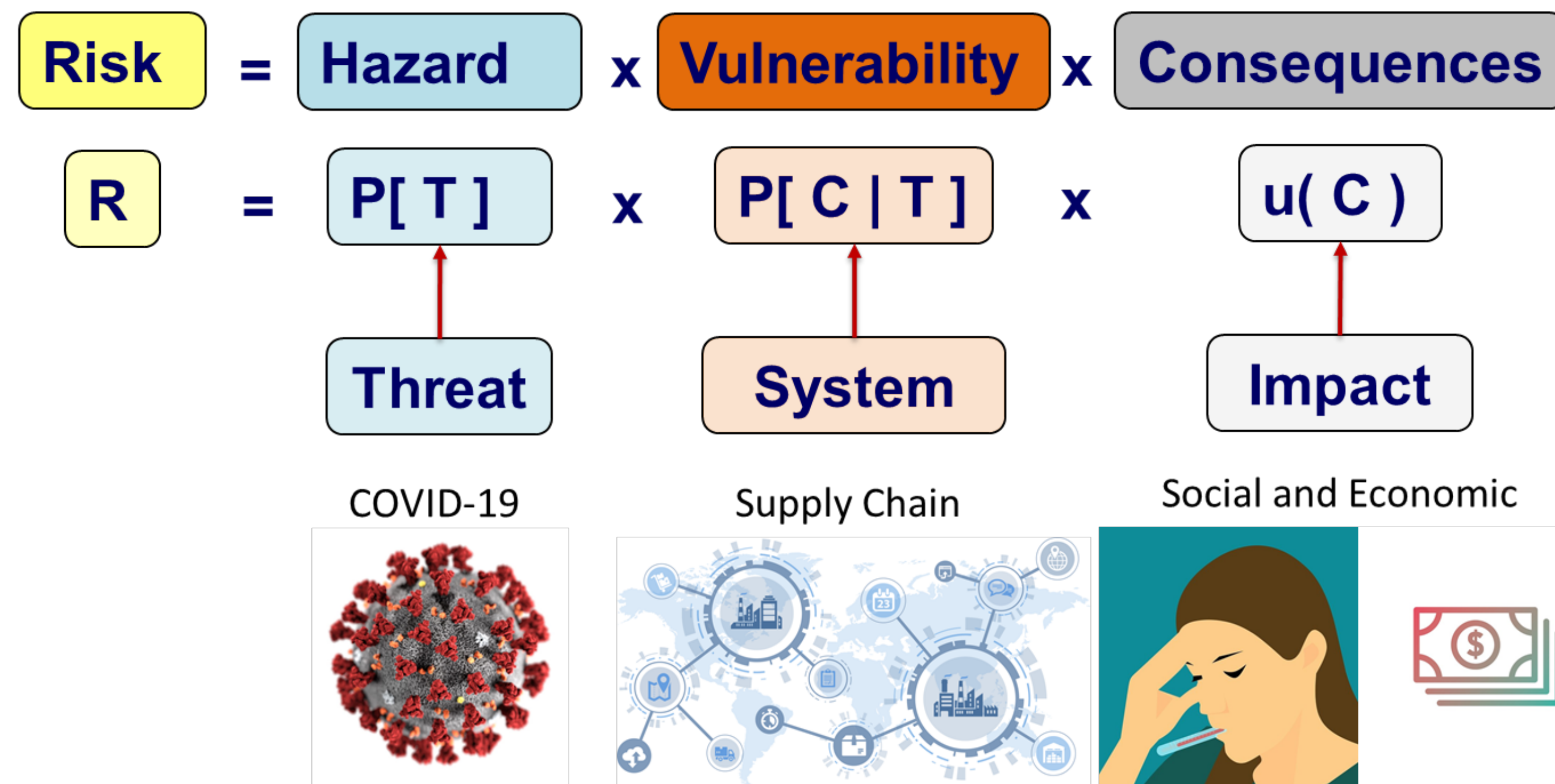
Student Name(s): Guillermo Duran (g.duran@tamu.edu), Juan Pablo Alvarado, Enrique Zarate-Losoya, Alexi Allen, Audrey Guzman, Cesar Torres, Araceli Lopez-Acosta.

Research Mentor(s): Zenon Medina-Cetina, PhD, Greg Pompelli, PhD, Matt Cochran, DVM, Maria J. Perez-Patron, PhD, Miriam Olivares, GISP, Oscar Sanchez-Siordia, PhD, Victor Gutierrez, Minerva Rojas

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

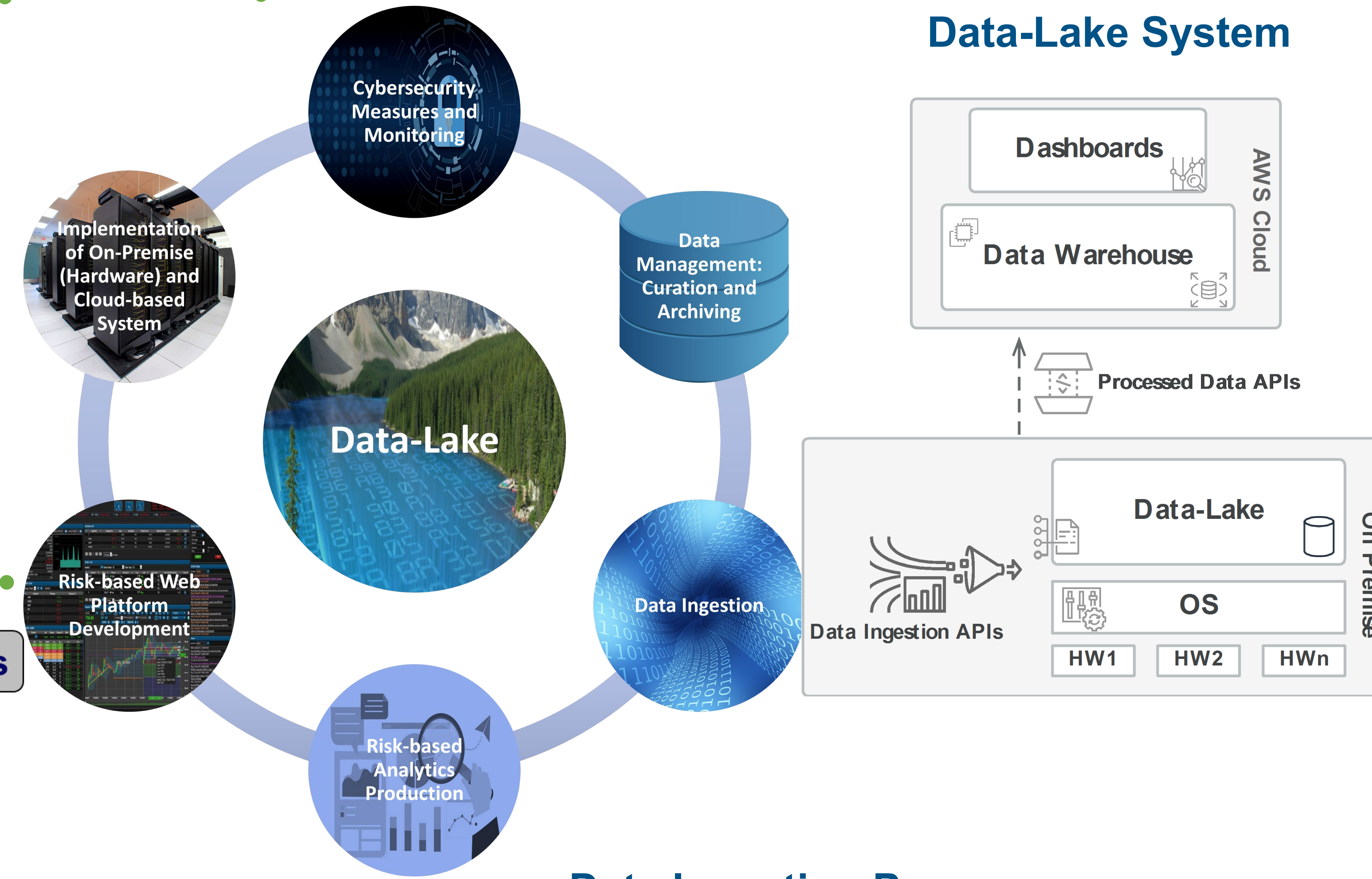


Hazard = The probability that a particular Threat *T* with a given intensity *P(T)* is exceeded within a given period of time.

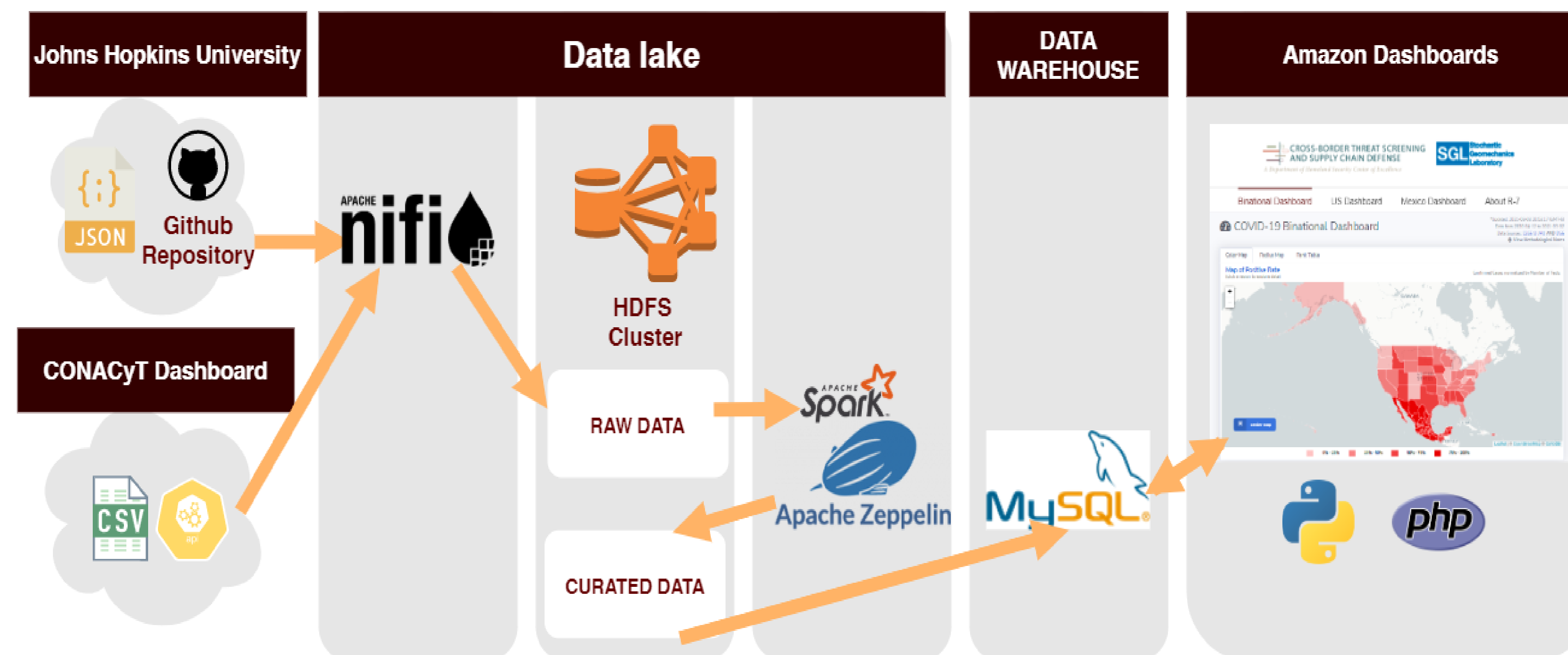
Vulnerability = The probability of reaching a Consequence or damage in the element or system of interest, conditioned on a given Threat intensity *P(C|T)*.

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

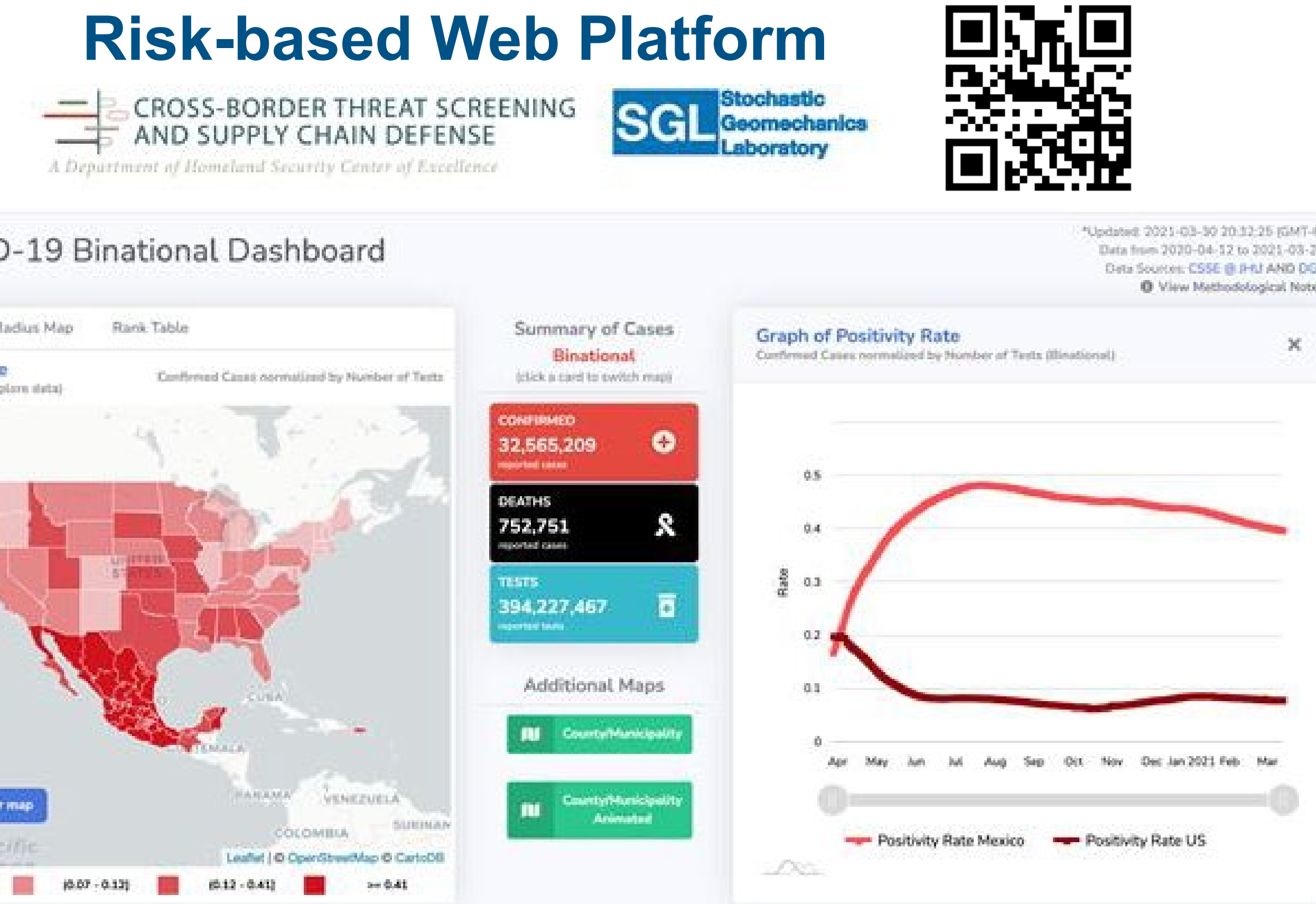
Outcomes / Results



Data Ingestion Process



Outcomes / Results



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.

References

- Medina-Cetina, Zenon and Nadim, Farrokh (2008) 'Stochastic design of an early warning system', Georisk: Assessment and Management of Risk for Engineered Systems and Geohazards, 2: 4, 223 – 236
- Official Mexico COVID-19 Dashboard (2020). Web Page. Accessed 04/01/2021. URL: <https://datos.covid-19.conacyt.mx/>
- John Hopkins Coronavirus Resource Center (2020). Web Page. Accessed 04/01/2021. URL: <https://coronavirus.jhu.edu/us-map>
- IBM Corporation (2017). 'Hortonworks Data Platform: An open-architecture platform to manage data in motion and at rest'.

Acknowledgements

This research is supported by the DHS Countering Weapons of Mass Destruction Office (CWMD), and the DHS Science and Technology Directorate (S&T) Office of University Programs (OUP).

This material is based upon work funded by the U.S. Department of Homeland Security under Cooperative Agreement No. 18STCBT0001.