SIMDEPENDENCY
Simulated Dependency Scenarios for Decision Makers

SIMDEPENDENCY BACKGROUND

Understanding and visualizing the complex relationships that exist between classes of critical infrastructure is of vital national security interest to the United States. Critical infrastructure, as defined here, represents the collection of interdependent physical utilities and services that support the day-to-day function of cities, municipalities, townships, states, and larger regions within the United States. Critical infrastructure includes, but is not limited to, a wide range of elements and services such as electrical power plants, power lines, water treatment plants, and data centers that operate together to support essential local and national functions like internet service, electricity, and clean water.

Infrastructure is often highly complex and interdependent, where the failure at any particular node could render the larger infrastructure either partially or wholly non-functional. Indeed, events like the Northeast blackout of 2003 and the very recent cyber attack that took major retailers like Amazon and social networks like Twitter offline highlight that the threat posed to the national infrastructure comes from various fronts. Confronting the threats posed to the infrastructure is a complex undertaking, but one solution may be to construct tools that allow for simulation of natural and manmade events to better insight into the weaknesses in current infrastructure.
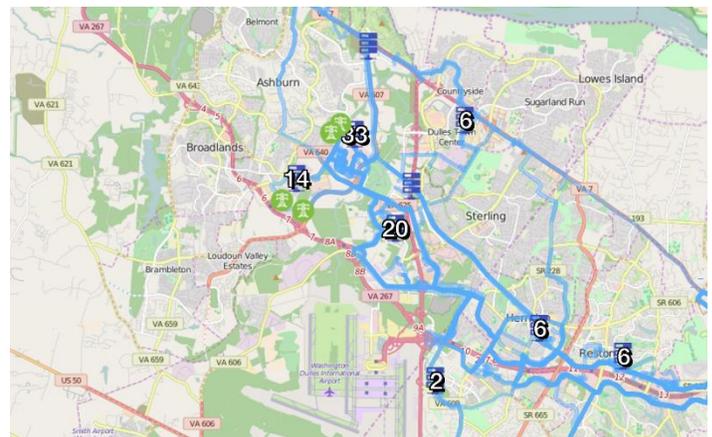
The importance of understanding the behavior of the infrastructure grid under various circumstances is clear, but the inherent complexity of the nation's infrastructure makes assessing vulnerabilities and producing actionable intelligence a difficult task. One solution to this challenge is the development of computer-based visualization and simulations tools. Moreover, the programmatic nature of these tools allows for static data to be selectively refined, animated, and even be made interactive. Being able to simulate failures in the infrastructure and visualizing the consequential impact of these failures undoubtedly has potential to provide invaluable information for national security stakeholders. SimDependency represents one such tool being designed to meet the needs of assessing risk in the United States' increasingly interdependent infrastructure.
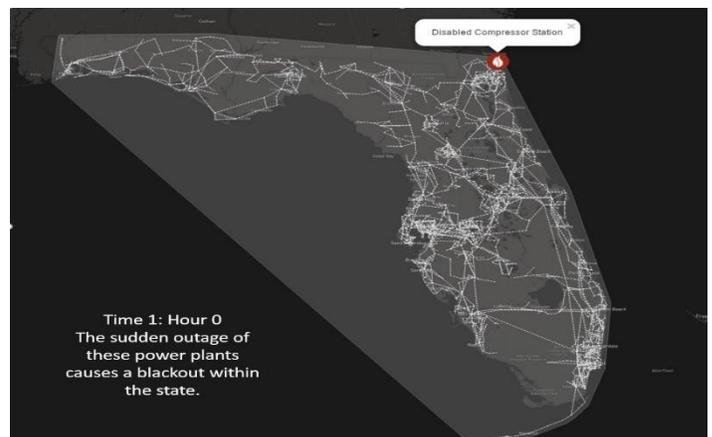
CURRENT MODELS

Currently, SIMDependency has worked to model different dependency structures to include: generic dependency modeling, internet dependency modeling, and consequence dependency modeling. The images to the right highlight each of the three different modeling versions of SIMDependency.

Generic Dependency Modeling

Internet Dependency Modeling

Consequence Dependency Modeling

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