ATHENA: INTERNET MODEL

MODEL OVERVIEW
The Internet is a critical part of the Nation’s infrastructure, supporting communications and data services for individuals, businesses, and other critical infrastructure sectors. The National Infrastructure Simulation and Analysis Center’s (NISAC’s) Internet model, Athena, coupled with the Internet route finding capability, Tracer, determines the consequence of disruption to the Internet. Athena enables Sandia National Laboratories to model and simulate the Nation’s Internet infrastructure based on commercially available and network-gathered data and provider relationships to determine potential outages and mitigation strategies. Athena-Tracer is an interactive capability allowing analysts to find common facility dependencies to explore impacts on infrastructures that depend on the Internet.

MODEL CHARACTERISTICS
- National perspective model that operates on facilities or individually constructed provider networks.
- Network topology based on physical infrastructure and network-gathered data coupled with heuristics to create a ring network.
- Able to determine cascading outages due to infrastructure failure and explore mitigation options.
- Able to determine shortest or provider-specific paths and find common dependencies.

OUTPUT
- Primary and cascading outages of Internet facilities.
- Common points across network paths.

MODEL APPLICATIONS
- Hurricane impact analysis.
- Impact of specific facility or network disruptions.
- Assessment of common dependencies for network routes for Internet-dependent infrastructures.
- Natural disaster planning exercises.

QUESTIONS ADDRESSED
Given an event that will impact Internet facilities, NISAC can use the Internet model to answer the following types of questions:
- How would loss of facilities in the network affect Internet service availability?
- How would loss of specific provider networks affect availability?
- Are there common facilities that other critical infrastructures depend on for their data traffic?
- What actions can be taken to minimize and mitigate the expected impact of a given disruption?

ABOUT OCIA
The Department of Homeland Security, National Protection and Programs Directorate’s (NPPD) Office of Cyber and Infrastructure Analysis (OCIA) manages NISAC, which is a Congressionally mandated center of excellence in modeling, simulation, and analysis of critical infrastructure.

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