

Big Data in the Global Nuclear Detection Architecture

Noël Nachtigal
Sandia National Laboratories

Briefing to the California Council on Science and Technology
October 13, 2011

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company,
for the United States Department of Energy's National Nuclear Security Administration
under contract DE-AC04-94AL85000.



Homeland
Security



Data Provenance: Radiation Portal Monitors

- The Global Nuclear Detection Architecture (GNDA) was mandated in HSPD-14 (2005) and in the SAFE Port Act (2006)
- As part of the GNDA, Customs and Border Protection (CBP) scans incoming cargo, vehicles, and pedestrians, for radiological and nuclear (rad/nuc) threats.
- Result: a substantial amount of data is collected, analyzed, and stored



Data Usage

- **The data are used in a variety of ways:**
 - Studies in support of the continued development of the GNDA
 - Analyses in support of the resolution of detection events
 - Development of scenarios used to test new equipment or new CONOPs
 - ...
- **The data are used by many users:**
 - DHS components
 - Federal partners
 - State, local, and tribal law enforcement
- **This leads to both technological challenges and policy issues.**



Technological Challenges

- Huge amounts of data that need to be: assembled, stored, retrieved, processed, queried, exchanged
 - Even subsets are large
 - Querying often involves additional processing (e.g., extracting content from an image)
- Interoperability and data exchange standards needed to enable use by a broad user base
- Mechanisms for enforcing policy-mandated controls
 - Authorization and authentication
 - Data integrity
 - Authorized usage



Policy Issues

- Infrastructure development
- Information sharing agreements
- Jurisdictional limits



Questions?



Homeland
Security