



TOPOFF and P2P Semantic Querying for Information Sharing

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Collaborative Expedition Workshop #43

Building Sustainable Stewardship Practices Together – Part 2

National Science Foundation

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What is TOPOFF?



- A two-year cycle of seminars, planning events, and exercises mandated by Congress
 - Designed to strengthen the nation's capacity to prevent, prepare for, respond to, and recover from terrorist attacks involving weapons of mass destruction.
 - Sponsored by the DHS, Office for State and Local Coordination and Preparedness

From http://www.state.nj.us/njoem/pdf/DSPTF_TOPO2-8-05.pdf

TOPOFF 3 New Jersey

- Five day full-scale exercise in April 2005
- Focused on a bioterror event
 - Set up, operation and disassembly of a Point of Dispensing, or POD, for distributing medication
 - Test communications plan etc.
- Participants included
 - top officials
 - the Governor, senior executives from state agencies, elected county and municipal officials
 - first responders
 - law enforcement, public health and emergency medical services personnel and public communicators

TOPOFF and Information Sharing (IS)

■ TOPOFF 3 NJ results

- Some uncovered IS issues
 - Communication difficulties
 - Disparities in information provided by agencies
 - Chain of command and some roles unclear
 - Incomplete awareness of functions and responsibilities
 - Some organizations not sufficiently involved in planning

■ IS Needs Assessment (ISNA) follow-up study

- Office of Health Management, Morris County, NJ
- Mind-Alliance Systems
- 3-4Q 2005

■ Then ISNA software trials

ISNA: what does and doesn't work

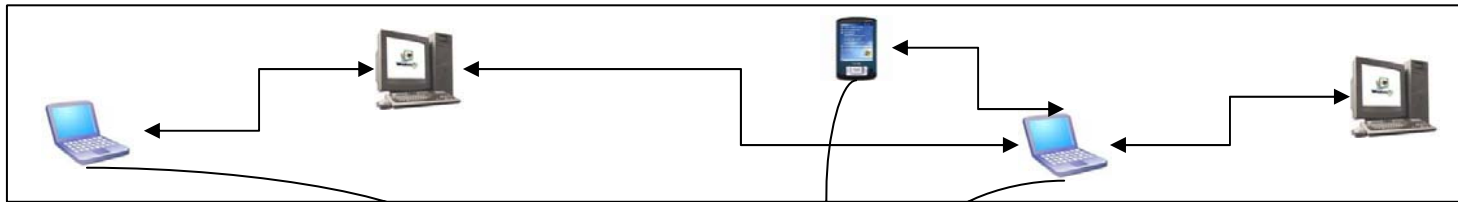
- ❏ “Ad-hoc” analysis doesn't work
 - A structured IS methodology is needed
- ❏ “Survey and report” doesn't scale up
 - Need perpetual, bottom-up collection of needs etc.
 - Automated matching of needs with resources
 - Online, anytime “table-top” IS exercises
 - Continuous assessment of IS capabilities and gaps
- ❏ “Centralize and distribute” runs into walls
 - Need to preserve local control over sharing of IS needs
 - Must support local IS preparedness activities

The Mind Alliance Network

- ❏ Pure peer-to-peer (P2P) software for ISNA
 - Targeting all Homeland Security stakeholders
 - Easy to install, easy to use (no IT expertise required)
 - Secure sharing and authorized discovery of
 - Profiles (roles, affiliations, expertise, interests, contact...)
 - Documents
 - Knowledge (keyed-in by user or extracted from data sources)
 - On-going IS preparedness exercises and analysis
 - based on simplified IS methodology
 - using collaborative IS scenario building
 - generates IS play books, IS maps, IS gaps reports...
- ❏ P2P ISNA is perpetual, bottom-up, methodical and decentralized

P2P ISNA

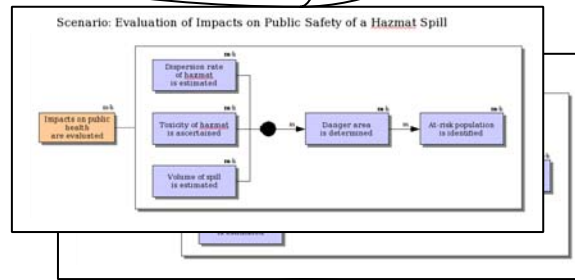
Mind Alliance P2P network



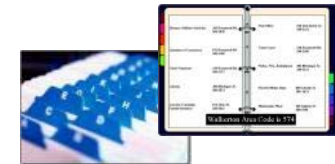
IS Scenarios

collaboration

discovery and matching



Resource directory

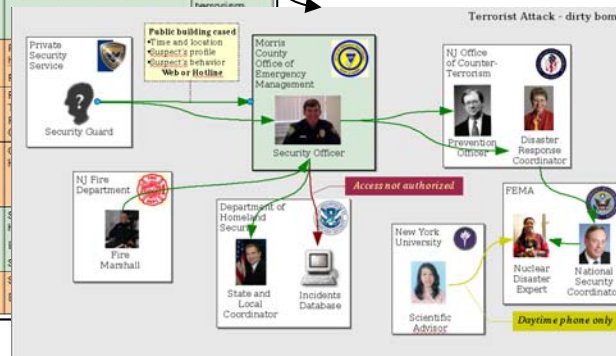


generation

IS play book

Scenario	Trigger	From	To	Info	Timing	Channel	Acting as
Derailment - with hazmat spill	A train derails	Train dispatcher	Self	Train ID Time and place	Minutes	Secure phone Emergency Pager	Disaster response coordinator
	A train derails (is freight train)	Self	State counter-terrorism officer	Train ID Time and place Health risks to population	Minutes	Secure phone: 1-877-123-4567	Counter-terrorist
	A train derails (is freight train)	Train dispatcher	Self	Train manifest	Minutes		
	Impacts on public health are evaluated	Toxic substance expert	Self	Health risks to population	Minutes		
Terrorist attack - dirty bomb	Public building is being cased	Building security guard	Self	Suspect's profile Description of activity Time and place	Minutes to hours		
	Public building is being cased	Self	State counter-terrorism officer	Suspect's profile Description of activity Time and place	Hours		
	Dirty bomb exploded	Fire marshall	Self	Time and place Damage report	Minutes		

IS map



IS gaps report



ISNA and Semantic Search

■ ISNA is knowledge-intensive

- “Find all officials that need to be contacted given the following public travel movements by a confirmed infected person and identify those officers that might not be reachable.”
- And multi-domain (counter-terrorism, health, finance, disaster recovery...)
- Best addressed with Semantic Web technologies
 - Ontologies and controlled vocabularies (OWL, SKOS)
 - Semantic integration across peers (RDF)
 - Semantic indexing of unstructured information (UIMA?)
 - Semantic search (SPARQL)

■ Large P2P network and complex queries

- Must scale to millions of users
- The simpler the UI, the more work the software does
 - Work = queries searching the P2P network

Building a P2P ISNA platform

❏ Infrastructure

- Scalable P2P platform (Structured P2P)
- Scalable semantic querying (patent-pending)

❏ IS Methodology

- Collaborative IS scenario building
- Automated IS analysis

❏ Human factors

- Simple user interface for non-techies
- Minimize data entry

❏ Security

- Comprehensive security and trust model

❏ Deployment

- Open source licensing
- “One-click install”

Moving forward

- Full IS methodology
- Software prototype
- Field tests
 - NJ Morris County Office of Health Management
 - NJ Office of Counter-Terrorism
 - NJ Department of Transportation Security
 - Others
- ISNA standards
 - XML schema, ontology, DRM...
- Version 1.0 for Homeland Security

Thank you

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