"Trusted Data Sharing Architecture"

Unique Cross-Jurisdictional Network Security

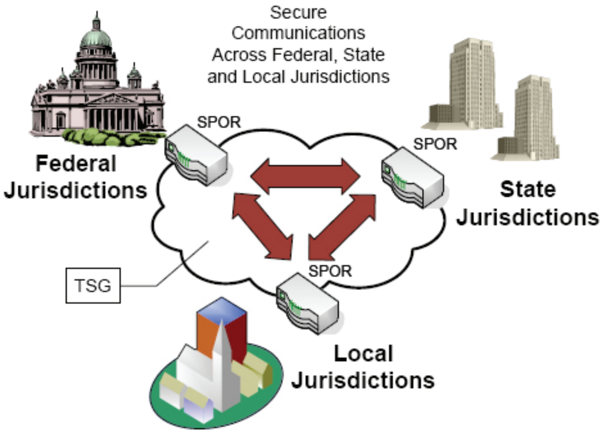
Problem

In today's world of cyber-based information sharing, a gap in technology prohibits securely transmitting cyber information to multiple independent jurisdictions. The gap in technology can be defined in three ways:

(1) Each jurisdictional agency has separate security mechanisms in place making communication among differing agencies difficult

(2) When cyber communication is initiated between jurisdictions, the data is unsecured

(3) When two differing agencies manage to securely transmit data, adding a third recipient (scalability) is complex



Solution

In order to close this gap, Sandia National Laboratories is partnering with industry experts in the development of a systems-of-systems solution to provide secure data routing and communication across federal, state and local governmental jurisdictions, as well as improving business and industry cyber communication security.

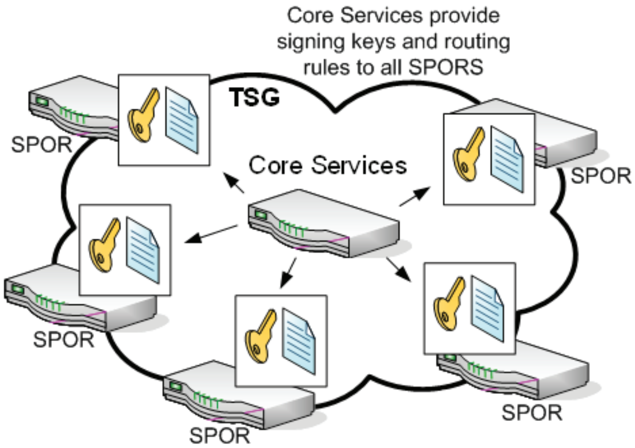
A well-architected Trusted Data Sharing solution must include secure policy-oriented routing, data privacy, data protection and open standards. The Trusted Data Sharing Architecture will incorporate a national framework of **Secure Policy-oriented Object Routers (SPORs)** that will provide the means to securely transmit information using standards-based policy and routing rules. These standards-based rules and policies will provide a means to identify the sender and receiver of a message, what they are allowed to do with that message, and the protection of that message. Furthermore, these rules and policies prohibit unauthorized users from accessing the data. The data sharing technology will utilize a **Trans-enterprise Services Grid (TSG)** that will enable information sharing among entities where there is no single governance or management authority. Some unique benefits of the Trusted Data Sharing Architecture are:

- **Security** - Messages will only be delivered to intended recipients, and receivers are notified that the message is sent by authorized senders. Secure, event-driven, choreographed information sharing
- **Interoperability** - Cross-enterprise operability assures secure interoperability across multiple jurisdictions, agencies and communities of interest
- **Scalability** – Jurisdictions may be added to the recipient list without creating security risks to the system
- **Near Real Time Awareness** - Service Orientated Architecture (SOA), along with the TSG and standards-based routing promise near real-time situational awareness
- **Geographically Targeted** - Messages will be sent by multiple channels, reaching more destinations, anywhere, anytime

How Trusted Data Sharing Works

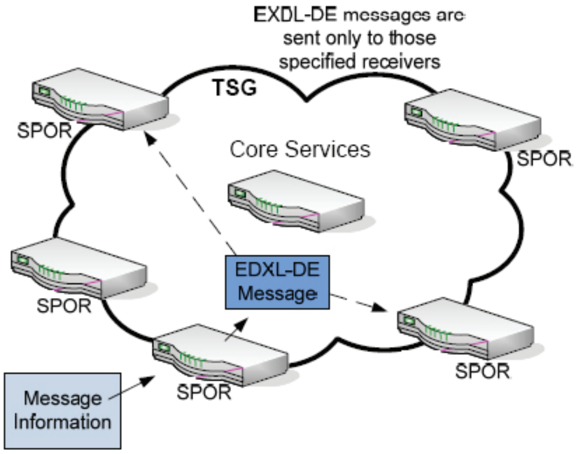
Trusted Data Sharing utilizes Core Services that are responsible for propagation of policy, routing rules and data protection information to all participating SPORs.

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.



After this information is distributed by the Core Services, a message can be injected into the SPOR. The SPOR will then deliver that message to the specified SPOR location(s) using **EDXL-DE (EDXL – Distribution Element)** routed through the TSG. When the message is sent to the receiving SPOR, the message will bear the sender's identification information for authentication purposes.

Trans-Enterprise Services Grid (TSG)



With today's cyber data sharing technology, it is not possible for multiple independent entities with varied technical, policy, and security mechanisms to securely communicate since the fundamental messaging systems are separately owned and governed, and each has different policies and protocols. **Service Oriented Architecture (SOAs)** have been specifically designed to solve the cross-enterprise message system integration problem while at the same time, addressing scalability. The TSG is an implementation of a SOA. **OASIS (Organization for the Advancement of Structured Information Standards)** http://www.oasis-open.org/home/index.php drives the development, convergence, and adoption of open standards for SOA, security, web services, documents, e-commerce, government and law, localization, supply chains, XML processing, and other areas of need. Participants in OASIS represent over 600 organizations and members reside in over 100 countries. Benefits to using OASIS standards allows potential cost reduction, stimulation of innovation, growth to global markets, and protection of the right of free choice of technology. Using OASIS standards, the TSG architecture centers around a data-centric processing flow model in which context, status, and security are kept with the message object itself. This method eliminates tremendous amounts of traffic by removing unnecessary steps in the process and by simplifying the work done at particular process nodes within the system. It is the unique ability of the TSG to wrap and unwrap context, provide security, and eliminate unnecessary amounts of processor overhead and traffic between nodes. Communication between SPORs is performed using IP (Internet Protocol) so the SPORS are connected between the jurisdiction's enterprise and the Internet, and the TSG itself forms a secure divider from the Internet. Features provided by the TSG include:

- **Non-repudiated message admission** (ensuring that the message was actually sent by the entity that claimed to send it)
- **Transfer of Trust** as the message flows through the grid (TSG is trusted, delegated carrier of information); and
- **State Encapsulation** in the message data object (additional routing, security and policy information that is carried with the message)

Opportunity to Collaborate

Research and development is ongoing to bring this ground-breaking technology to fruition. Once this trusted data sharing framework is implemented, it will revolutionize national cyber data sharing methods.

Learn more at: http://www.sandia.gov/mission/homeland/index.html

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