Information Sharing through Automated Negotiation

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Challenge

- Information sharing between organizations needs more than just common information model or ontology.

- Even with federated identity management system, trust relationship is often context-based.

- Extensive human interactions is needed to make information sharing decisions.

- Needs a way to speed up the information sharing negotiation process to minutes or seconds.

- Automated negotiation is a NP-hard problem often involves billions of possibilities.
JPL Policy Negotiation Engine

Introducing Rules

Introducing Variables

Introducing Priority Relations

Name

Types of Rules

Pseudo-English Form of Rules

Defeasible Logic Policy Interface

Policy Title:

Rule Definition

Add Blank Rule

Rule: Conditions:

Add Positive Add Negative

Add an item to this box to use it as a condition or result.

Priority Definition

Superior Rule: Inferior Rule:

Add Priority

Types of Rules

Rules:

RPL will be using A_Satisfied_Policy

Pseudo-English Form of Rules
Policy Editor

Exporting to RuleML format
Multi-Round Policy Negotiation Process

DPC: JPL's efficient defeasible engine

Final Result
Hierarchical Dynamic Policy Negotiation Process

Diagram showing the process of hierarchical dynamic policy negotiation between two network domains (Network X and Network Y). The process involves the following steps:

1. **Negotiation Request**: A negotiation request is sent from Network X to Network Y.
2. **Policy Negotiation**: The policy negotiation process occurs between the networks.
3. **Result Policy**: The result policy is then sent back from Network Y to Network X.
4. **Unsuccessful or Not Allowed**: If the negotiation is unsuccessful or not allowed, the process may continue with further steps or iterations.

Key elements include:
- **NMS**: Network Management System
- **GIG**: Global Information Grid
- **DPN**: Domain Policy Negotiation

The diagram illustrates the flow of information and the negotiation process between the network domains and management systems.
Summary

- Dynamic policy negotiation enables real-time information sharing decision making.

- Dynamic policy negotiation enables building of trust based on the current context.

- Dynamic policy negotiation provides a new tool in sharing critical information in real-time for cyber security.