Linked Data for Parts Management

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Background

- A project sponsored by Department of Defense (DOD) to make its vast supply chain more efficient

- XSB has developed the PartLink platform
  - Information about 40M component parts
  - Their manufacturers and suppliers
  - Materials, technical characteristics and more

- Using Semantic Web Standards
  - Provide a consistent format for data exchange
  - Model a large collection of engineering product information
About XSB

• Specializes in parts data management solutions
  • Integrated system to acquire, categorize, and standardize product data
  • Large public procurement knowledge base; ~65M Items of Supply
    – Products, Sources, Prices, Technical Characteristics, etc.

• Patented technologies and semantic web solutions

• Aerospace, Government and MRO concentration
Master Data File (MDF) Technology

Parts Management - MDF

- Source: Inventory Parts
- Price: Verify Fair Pricing
- Match: Parts to RFQs, Part #s
- Track: Market, Product Trends
- Target: Potential Markets, and Pricing
- Comply: Green, Hazardous

In a recent study XSB identified $5.5B in savings from the elimination of duplicate parts across three Fortune 100 companies.

Web Service API  Web Crawlers
The Situation

EXTENSIVE, DISPARATE DATA
- The Government manages information on more than 40 million component parts purchased by the DOD
- Multiple sources including manufacturers and distributors
- Specification and standard documents, both public and private, are also part of this extensive data collection
- Data is dispersed among a variety of databases and documents
- The information is not standardized or linked together
- No single source which contains all of the information needed to make effective parts management decisions

A VARIETY OF USER FUNCTIONS AND NEEDS
- Procurement officers are interested in part selection, sourcing, availability, price, obsolescence, and more.
- Maintenance personnel require information on repair and replacement procedures, testing
Our Objective

Make one of the largest parts databases in existence interoperable with data on the web, and provide a reliable means to exchange and use information across the DOD supply chain.
Technical Approach

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- Use W3C Semantic Web Standards to build an interoperable digital model for the semantics of parts and the specifications that govern them
- Leverage the infrastructure of the internet to operate at Web scale
- Publish parts management data as a linked data model utilizing a set of Web Resources with Uniform Resource Identifiers (URI)
- Develop an Application Programming Interface (API)
- Engage industry, standards bodies and Government in the development and adoption of standards
I want a ¼-20 x 3” SS hex head bolt

NASA QUDT
" = INCH, IN....

Measures

INCH same_as

Customers

Authorities

Suppliers

Materials

UNS Alloy Sxxxx

CRES same_as

SS same_as

+ same_as
Ontology
Impact

• **PartLink** represents a big convergence in parts management
  - **Database enhancements**
    - Linking more related and highly useful information
  - **Semantic technology**
    - Increasing processing capability for creating better knowledge

• **Potential gains for DOD**
  - Greater parts information – means better buying efficiency
  - Smaller logistics footprint and greater effectiveness
Aerospace Supply Chain

Primes/ (OEM): Boeing, Northrop Grumman

Tier 1 Suppliers
Includes: structure, propulsion, pneumatic system, flight control, navigation, fuel system, electrical power, etc.
Engines: Rolls-Royce, GE Aviation
Wings: BAE plc
Undercarriage: Smiths

Tier 2 Suppliers
Includes: suppliers of hydraulic pumps, motors, controls, etc

Tier 3 Suppliers
Includes: suppliers of components and parts such as solenoid, piston, O' Ring, cylinder & connectors
The Reality
Future Direction

- Leverage PartLink to provide data standardization as-a-service
- Support public/private supply chain partnerships
- Develop new applications for industry
- Allow developers to build their own applications
  - Shared, searchable data marts
  - Agile access to data analytics
Questions?

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Contributions Welcome

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App Developer Challenge

Develop Applications using the PartLink data model

Cash prizes – best App earns $5,000

Join us in building the Industrial Semantic Web

https://partlink.xsb.com
Example Apps

• NSN Information Search

• Weapon System Information

• 3D Model Research