A Universal Data Element Framework (UDEF) Pilot to Locate Industry Resources for Disaster Response Teams

For The

Semantic Interoperability Community of Practice

Version 1.0: October 14, 2005

DOCUMENT HISTORY

1. RELEASE HISTORY

Initial release: Version 1.0	Revision: October 14, 2005

| Revision Number	Revision Date	Summary of Changes

INTRODUCTION

1. PURPOSE

The purpose of this pilot is to demonstrate how the Universal Data Element Framework (UDEF) could enable a disaster response team to find needed resources available within industry inventories on an ad hoc basis. A goal of this pilot is to support the Federal Enterprise Architecture Data Reference Model and the associated interoperability objectives of the United States eGov Act of 2002.

2. UDEF – A BRIEF DESCRIPTION

The UDEF is an evolving standard global method for categorizing data element concepts (as defined by ISO/IEC 11179) that exist across multiple applications. It assigns each data element concept an alphanumeric tag plus a semantically rich name – that in most cases can stand-alone without requiring a separate definition. For example, "Purchase Order Number" found in an invoice from industry to the government is a commonly encountered data element concept. This concept has a UDEF tag **d.t.2_13.35.8** and associated UDEF name **Purchase.Order.DOCUMENT_Government.Assigned.IDENTIFIER**.

The UDEF name and associated ID pair is similar in several ways to the Domain Name System (DNS) used to manage computer-sensible IP addresses in 123.456.789 format and to associate them to user-friendly formats such as www.company.com If adopted on a global scale, the UDEF could become a Semantic DNS.

The following diagram highlights a few extracts from the UDEF and illustrates a common data element concept with its UDEF name and associated UDEF tag.

Purchase Order Document_Type Code UDEF ID = d.t.2_33.4
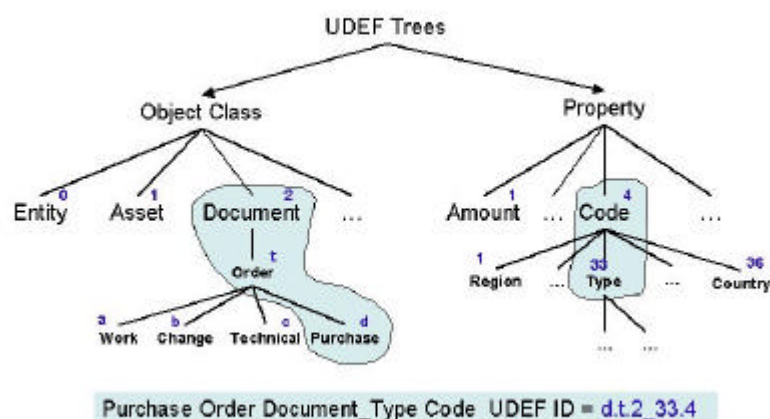
3. EDXL – A BRIEF DESCRIPTION

EDXL (Emergency Data eXchange Language) is a family of XML-based messaging standards that govern information exchange among disparate emergency professions and systems. Emergency response practitioners drive requirements and messaging structure focused on specific mission tasks and processes such as requesting resources. Adoption of these standards facilitates seamless communication without the need to change existing systems.

The EDXL Distribution Element (DE) facilitates flexible routing of any properly formatted message without knowing specific recipients. The DE is currently in the OASIS public comment phase. EDXL Resource Messages support requests, responses, orders, etc. for persons and things required in emergencies, and is currently under OASIS review to become a set of public standards. Both CAP alerts (public warnings) and HAVEbed messages (Hospital status and availability) are being adopted as EDXL standards.

EDXL standards focus on messaging *structure* supporting key business processes. *Content* (e.g. actual lists of available resources) is not defined in the standard. The standard message provides a mechanism to reference external lists that define available content (e.g. resources).

The EDXL initiative is a national effort including a diverse and representative group of local, state and federal emergency response organizations and professionals, sponsored by the Department of Homeland Security's Disaster Management e-Gov Initiative. These practitioners prioritize specific message needs and define base requirements. A broader Standards Working Group (SWG), which also includes industry and technology organizations, then defines specific requirements including message types and transactions needed. Through an iterative process a draft specification is produced, tested against real-world scenarios, and is then submitted in to a standards body (OASIS) to go through its process for establishment as a public standard.

Pilot Name.
A Universal Data Element Framework (UDEF) Pilot to Locate Industry Resources for Disaster Response Teams.

Pilot Point of Contact.
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Sponsoring Organization.
The Department of Homeland Security is invited to be the sponsor.

General Disaster Management Problem Summary.
Since it is nearly impossible to pre-plan for all types, all scenarios and all magnitudes of disasters (manmade or natural), there is a high probability that time-critical response resources will not be in the right place at the right time for a given response team. Time-critical resources could include tools, equipment, supplies, consumables, conveyance means (trucks, row boats, etc.) or other products that the manufacturing industry-at-large might have available in the quantities and locations needed to support a response team. The primary problem is – how does a response team discover the availability of near-by resources that are available in a manufacturer's inventory warehouse? Once discovered, the response team then needs to order the time-critical resources.

Pilot Problem Summary.
A large-scale natural disaster creates a situation where search and recovery response personnel need to carry GPS transmitters and portable walkie-talkies so that the recovery operations can be coordinated from a nearby command center. Unfortunately, the 9-volt batteries brought to the site exceeded their shelf-life more than four years ago and therefore are unable to provide sufficient power.

Pilot Scope.
The pilot scope includes the technology to create two UDEF based messages – the message to discover the needed resources and the message to order the needed resources.

Pilot Assumptions.
- The UDEF has been adopted as a global standard.
- EDXL messaging standards have been adopted by the vendor products and systems
- The pilot will leverage the EDXL message format(s) specified by or submitted into the OASIS EM-TC based upon pilot timing.
- Vendor products such as ERP applications, middleware (EAI, EII, etc.) applications and other applications include UDEF IDs as optional aliases within the product APIs.

- Company portals are capable of exposing UDEF IDs as optional aliases for machine-to-machine discovery of data that the company wants to share.
- Vendor products enable end users to automatically generate UDEF IDs from user-friendly input tools.

Pilot Description.

Based on the entering assumption that the UDEF and EDXL have become globally adopted standards, a relatively simple UDEF based query is submitted by the disaster relief team carried via an EDXL message. They discover a 9-volt battery manufacturer warehouse location about five miles from the disaster area with sufficient quantity of batteries to meet the response team's need.

An EDXL resource Request for Information (RFI) message containing the following two key UDEF names and alphanumeric tags is sent to all manufacturing business portals that had been registered with the federal government. The message would contain two UDEF tags.

NineVolt.Lithium.Battery.PRODUCT_Inventory.QUANTITY
a.a.aj.9_36.11

NineVolt.Lithium.Battery.PRODUCT_Inventory.Location.Postal.Zone.CODE
a.a.aj.9_1.2.1.10.4

The response team user would use the UDEF interface to his/her application following the tree structures under PRODUCT and under QUANTITY to derive the associated UDEF tag automatically. The user would then repeat the process using the same PRODUCT path but then use the CODE tree for the second element. The message sent to all manufacturer portals registered with the centralized disaster relief registry would contain two UDEF tags --- **a.a.aj.9_36.11** and **a.a.aj.9_1.2.1.10.4**

Each manufacturer's portal that had both pieces of relevant information (e.g., 9-volt batteries in inventory and a postal zone code location) would respond to the broadcast with the requested quantity and inventory location postal code information. All others would ignore the message containing the two tags.

After deciding upon an inventory with sufficient quantity of 9 volt batteries only five miles from the disaster area, the response team submits an EDXL resource order message via the battery manufacturer's portal – again using UDEF tags as the common semantic since one system used OAGIS and the other system used ANSI X12 for describing a standard purchase order. A UDEF tag indexed between the two standards will be maintained in a central repository.

Pilot Objectives.

Demonstrate the relative flexibility and ease of using the UDEF as a semantic interoperability enabler across disparate applications.

Demonstrate tools that can incorporate UDEF within their schema to simplify and help accelerate UDEF adoption.

Pilot Activities.

Roles and responsibilities of primary participants --

- The Open Group UDEF Forum http://www.opengroup.org/udef/ will define the UDEF content applicable to the scenario described in the pilot and take the lead role in this project.
- The OASIS Emergency Management (EM) TC http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=emergency will define the EDXL message wrapper standards (perhaps draft) applicable to this pilot and pending EM TC approval, they will perform an advisory role.
- Unicorn http://www.unicorn.com/ will demonstrate how the UDEF can be applied to ontologies and other standards within their registry/repository tool. They will also provide an example mapping based on UDEF to correlate the purchase order from the disaster response team (using one standard) to the purchase order format expected by the battery supplier company.
- Safyre Solutions Inc http://www.safyre.com/ will demonstrate how the disaster response team can automatically generate UDEF tags with an application that could be the front-end to a hand-held message delivery system on a PDA.
- The GEIA DHS National Information Exchange Model (NIEM) team will perform an advisory role.

Pilot Schedule and Status.

The schedule will be developed once the primary participants have had the opportunity to decide upon their respective roles and resource commitments.