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Use of Software COTS within C4ISR Systems: Contribution of Information Sharing to Enhanced Risk Management, the eCots Approach

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eCOTS

The acquisition, integration and maintenance of software COTS within military systems require extremely reliable and accurate knowledge about the products, the technologies and the actors of the software industry. Gathering and analysing the required information is a daunting task for single organizations. eCots initiative (http://www.ecots.org) proposes to build collaboratively a semi-structured online database dedicated to the description of the evolving software COTS industry. eCots ontologies that represent the gathered data can be seamlessly extended to address specific COTS families such as military ones. The eCots.org platform can be linked to private replicates that get periodically synchronized with the public repository and that complete public data with descriptions and schemas restricted to specific groups of users. A secure Internet eCots-NATO portal could be set up using the same mechanism, helping participants to share lessons learned in building military applications and to reduce risks inherent to the use of software COTS.

1.0 INTRODUCTION

The growing use of commercial off-the-shelf software components instead of in-house developments is followed by a non-negligible loss of control of the systems in which they are used, and increases dependency on COTS components' producers, particularly critical in the case of obsolescence. This loss of control and this dependency can be compensated only by extremely reliable, accurate and continuously updated knowledge of the software component market and its trends. It is a matter of factual data, not subjected to interpretation, both on the actors (producers, distributors and consulting companies) and the products in this market. This data must be processed on the technical, commercial, economical, financial and legal dimensions.

Most industrial groups try nowadays to organize the collection of COTS information in order to make it available in-house, but the effort is considerable due to the size and variability of the software component market and the difficulty to collect and update information. This assessment and selection phase is consequently a hard task for enterprises, particularly for SMEs, which cannot invest enough time or money into COTS management to gain qualified information.

Although specialized companies dedicated to technological analysis and market monitoring can bring help in the process of collecting software descriptions, the analysis they provide are often expensive and short-lived. In addition, this information market has not developed a standard for COTS description.

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eCots proposes to build an open and collaborative online directory of COTS products and producers, to promote the development of COTS standard description models and to foster the use of COTS Based Software Systems. In some way, eCots aims at becoming the Wikipedia of software components.

2.0 PROMOTION OF COTS DESCRIPTION STANDARDS

Various cataloguing initiatives exist on the Internet. Open and collaborative portals such as Freshmeat, Linux Software Maps or technology-specific portals such as JdoCentral benefit from a large community of contributors producing a huge volume of data. However, these portals contain only brief descriptions of inventoried components. Proprietary catalogues such as KnowledgeStorm, CXP or online marketplaces such as ComponentSource provide visitors with more detailed data but each data provider uses its own description model and identification scheme. Apart from these formal catalogues, the Web contains also many software community portals such as TheServerSide containing abundant and accurate however unstructured information.

In order to give momentum to these various cataloguing efforts, eCots proposes to gather COTS communities of researchers, users and vendors to elaborate collaboratively a description framework for identifying and describing functional, technical and legal aspects of COTS products. Such a framework would then serve as the foundation for new types of software catalogues, usable by humans as well as by automatic selection tools.

3.0 ECOTS DESCRIPTION MODEL

eCots platform implements a model describing COTS products, versions and producers and the relations between these notions. Figure 2 gives an overview of current eCots model, which has been created as a prototype to build a first version of a COTS database and to serve as a starting point for discussion. Next step will consist in building collaboratively a robust widely accepted model. A working group has been set up on purpose on the portal.

This temporary model is to be available on the portal as a set of XML schemas and can easily be extended or modified, as can be the data instances.

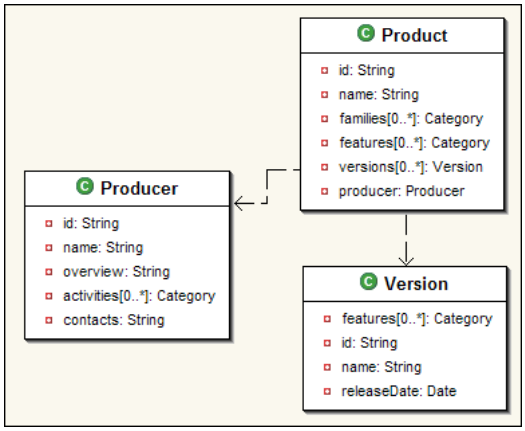

Figure 2 – eCots description model overview

A future version of the model might rely on an ontological scheme illustrated by figure 3. eCots model would then consist in a set of cross-domain ontologies covering topics such as interoperability, security, safety, upgrade support, etc. completed by specific domain ontologies describing software functional families.

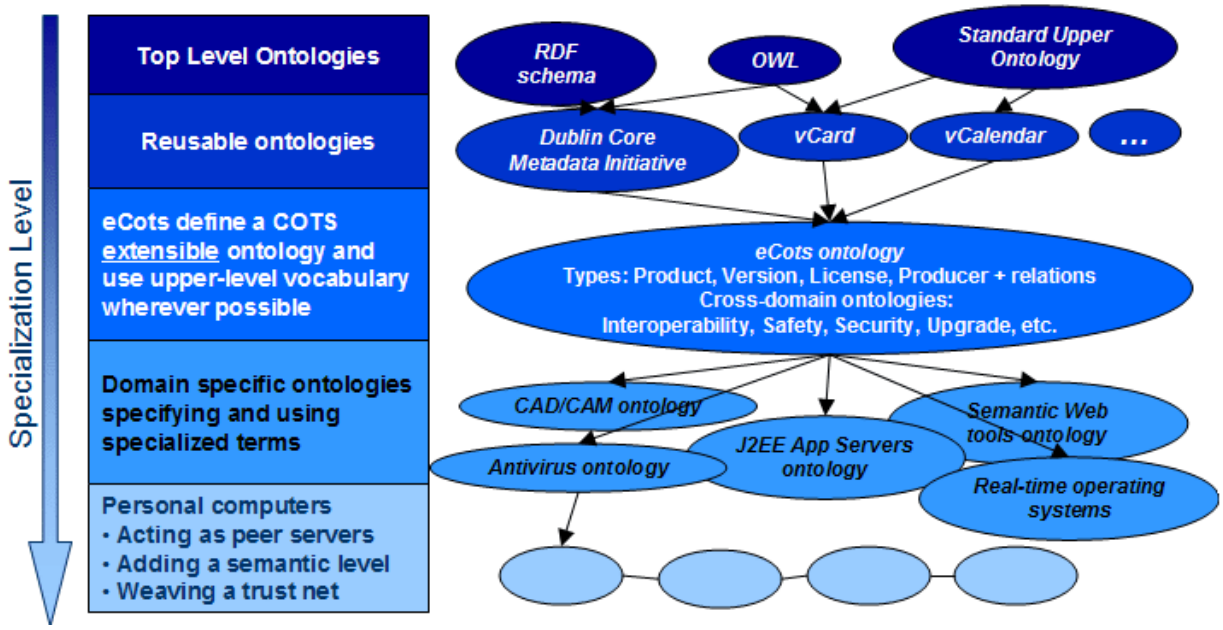

Figure 3 – eCots ontological stack view

4.0 ECOTS PLATFORM SERVICES

eCots platform relies on Jalios JCMS content management system.

4.1 Platform overview

eCots portal is comprised of several main areas: data consultation and search areas, content publication area and working groups areas. Publishing content to the platform requires opening an account (registration is free).

4.1.1 Navigation and search areas

eCots data can be consulted either by navigation per category or by explicit interrogation of the database.

Various types of requests are supported: full text, per content type, per category, per date, per author or per working group along with refinement by intersecting these criteria. The search module makes it possible to find COTS matching specific requirements (query example: "find all real-time operating systems with no identified vulnerability, licensed along GPL license"). Search results can be exported in XML.

Products' description cards contain links toward the producer and the parent product in case of a product's version, a toolbar indicating the author type (working group, editor or individual), the content license and buttons to request a content withdrawal, to print, edit, copy, bookmark or email the content, or to step back to a previous version of the content.

4.1.2 Publication area

Registered members can publish various types of structured information and can categorize resources along eCots taxonomy. Contributors are encouraged to leverage collaboration and reuse by using a set of open-content licenses inspired by Creative Commons initiative. Published content can be restricted to specific groups of users.

4.1.3 Working groups

eCots standardization effort is supported by online working groups that cover either a specific COTS management topic or COTS functional families.

Current working groups topics include COTS classification, COTS assessment and COTS life-cycle management, NATO COTS specific issues. Software families working groups range from J2EE Application Servers to Real-Time Operating Systems, Web Content Management, Mail servers and others.

Dedicated areas are at working group members' disposal on the portal on which documents, Web links, glossaries and other resources can be shared. Members are also welcome to use forums and mailing lists.

4.2 Replication service

The replication service aims at allowing eCots Association members to use eCots platform on their intranet and to keep confidential information in a replicated database. Figure 4 illustrates the basic mechanism of the service, that is available under a variety of network protocols.

eCots platform has been installed within Thales intranet and is poised to be connected to Thales Business Units information systems. Web services will be developed on top of the platform to ease integration between eCots in-house database and internal applications such as the buyers' system.

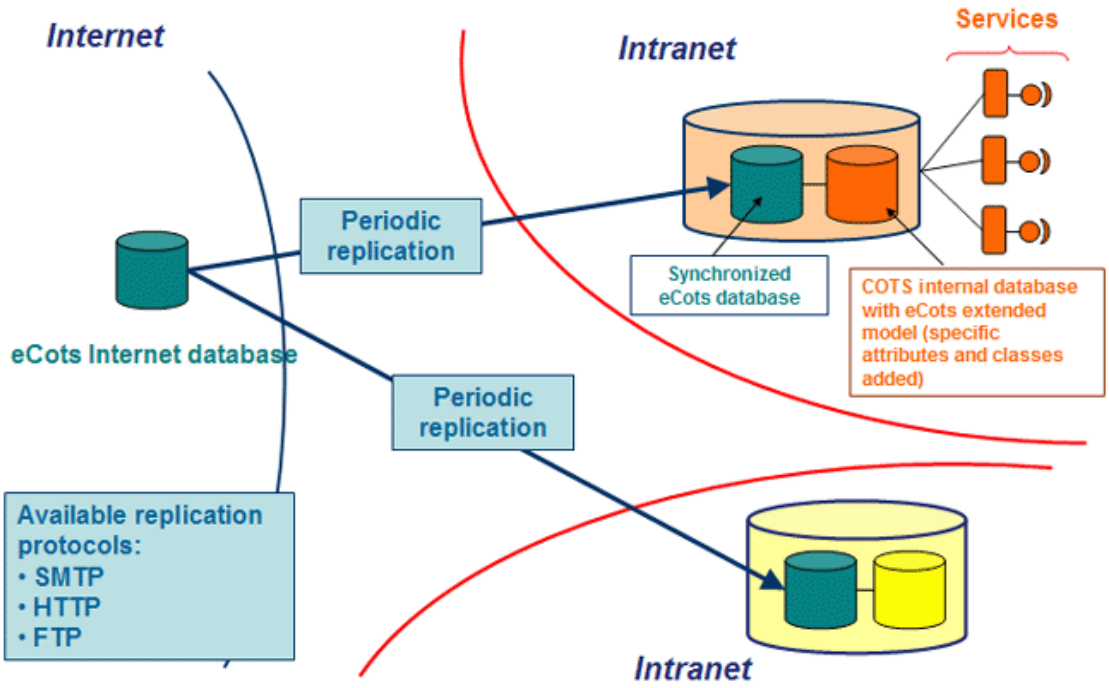

Figure 4 – eCots replication service

5.0 ECOTS.ORG DATA STATUS

eCots community counts for now around 200 registered members. 550 products have been referenced in more than 250 COTS families. Among these products, 300 have at least one version's detailed description. A large part of this data has been produced by MILOS EUCLID project [7]. Several working groups have also been setup on the portal.

6.0 FUTURE WORK

eCots objectives for next years mainly consist in increasing considerably the volume of its database, in promoting the elaboration of a standard COTS product identification method and a standard COTS description model, in increasing eCots Association scope by recruiting new institutional members and in prototyping new COTS related services.

In the mid-term, eCots application aims at becoming a packaged software asset management application combining a set of COTS related services including a COTS selection service, a COTS life-cycle management service and a pool of connectors toward PDM and ERP tools. The idea is to provide a generic COTS information management platform that could be seamlessly extended by external plug-ins. Various tool-selection models could then be implemented on top of the platform, as well as many other services, either by research groups or by commercial vendors.

7.0 REFERENCES

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