Accelerate your Business Data Modeling and Integration Issues by CCTS Modeler Warp 10

Applies to:
SAP NetWeaver.

Summary
For those of you who may have seen the DemoJams in Vegas and Munich, or read the blogs elsewhere on SDN, you have gotten a taste of CCTS Modeler Warp 10. For those of you who missed the events, or haven’t seen the blogs, get ready for exciting news. This article is the first in a series of blogs, articles, and demos that will give you inside information on a revolution that is about to happen in data integration, modeling, and mapping.

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Author Bio
Gunther Stuhec
Since his master's degree (MSC, 1993) Gunther Stuhec has worked with communications and EDI technologies. As a consultant in a software house for middleware and EDI systems he developed strategic concepts for customers and was responsible for various EDI projects. He joined SAP SI as a consultant in 1999, where he was responsible for implementing XML/EDI projects in conjunction with SAP systems. Since 2001 Mr. Stuhec works for SAP AG as a Standards Architect and has been involved in standardizing business standards on both semantic and syntax levels. Gunther is the chair of the UN/CEFACT Techniques and Methodologies Group (TMG) that is responsible for the development and maintenance of overall methodologies for the development of collaborative business processes and business data on semantic oriented but technical syntax neutral level. He is also the chair of the UN/CEFACT project team that develops the CCTS standard. Furthermore, he is a member of various international and national standardization bodies, such as UN/CEFACT, ISO TC 154, and DIN. He is actively involved in developing standards and serves as an interface between these bodies and SAP, introducing SAP’s requirements into their work and incorporating their latest findings into SAP’s development activities.

Mark Crawford
Mark Crawford joined SAP in October 2005. He is an architect in the ECO Industry Standards Group focusing on industry standards and methodologies. Prior to joining SAP, Mark was a Senior Research Fellow for a Washington D.C. government think tank where he specialized in XML, eBusiness standards, and Semantic Data Modeling. Before that he spent 23 years as a U.S. Naval Officer with extensive experience in Logistics, IT, Supply Chain, Procurement and Finance. Mark has been involved in both cross and vertical industry business standards, and the underlying methodology standards that support them. He is actively involved in UN/CEFACT standards activities as Chair of the Applied Technologies Group and Project Lead for the UN/CEFACT XML Naming and Design Rules specification, Editor for UN/CEFACT CCTS, Lead for the UN/CEFACT Core Components Harmonization Project, and Co-Chair of the ISO 15000-5 Core Components Technical Specification project in ISO TC154. He previously was involved in the X12 Communications and Controls Subcommittee, Vice Chair of the OASIS Universal Business Language Technical Committee, Vice Chair of the X12 XML Working Group, and Chair of the joint X12/CEFACT Core Components initiative.
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Overview
Do you have data integration issues? Is it difficult to establish eBusiness connectivity with your business partners? Are you tired of spending time doing tedious mappings to different eBusiness standards? Not sure what your partner’s data means or how to use it? If the answer to any of these question is yes, then we have good news for you. SAP Research in partnership with GEPG Industry Standards has developed a prototype for a new data integration, data modeling, and data mapping tool that streamlines and automates these functions for you in a manner that is significantly more efficient and flexible than what you are doing now.

This new SAP tool is CCTS Modeler Warp 10. Warp 10 is the first step in creating what we call Web 3.0 – a combination of Web 2.0 and Semantic Web technologies. The Warp 10 architecture is based on SAP NetWeaver tools and offers both the smooth integration and extension of SAP GDTs as well as the mapping to any other logical data model regardless of source – systems, enterprises, trading partners, or standards development organizations. Warp 10 fits nicely into any software engineering environment such as the one of SAP

Today's Interoperability Barrier
The biggest barrier to data interoperability today is the semantics of the data – the naming, definitions, and understanding of data types. Why? Because most data modeling solutions and standardization efforts are more focused on the technical interoperability based on formats for structured communication (e.g., XML, SOAP...). This solves connectivity, but not interoperability. Compounding the problem are the different life experiences (training, language, personal preferences, system) in which different designers create data models, and the different life experiences of the data consumer and the data designer. The end result are disparate data models who can only be understood and become interoperable with a significant level of effort on the part of the data consumer.

Figure 1 - Disparate Data Semantics

If you compare the content of these data models, you discover that in reality, much of the content is the same. The question is – how can we painlessly identify these touch points in different data models?

First and foremost we must have a common grammar for describing our conceptual and logical data models consistently, regardless of application, user, organization, or business domain. This grammar should be like the grammar of a natural language. Why? Because a natural language approach enables us to formalize our data model information in a manner that both humans and machines can unambiguously understand.

Fortunately, the joint ISO 15000-5 and UN/CEFACT Core Components Technical Specification (CCTS) defines a set of naming, structuring and context categorization conventions that enable us to create exactly this type of natural language expression of data models and business information exchanges. SAP is using this standard for developing our GDTs (Global Data Types) which are the basis for our business objects and enterprise service definitions. Others, such as Oracle, are also using CCTS to structure their own internal data models. Many standards organizations, such as UN/CEFACT, OAGi,
ACORD, CIDX, UBL, B2MML and ANSI ASC X12 have also committed to, and are implementing, CCTS to achieve cross domain interoperability.

However, it should be noted that although CCTS is a major step forward in the area of semantic data modeling, CCTS alone is insufficient to achieve a semantic based, interoperable, data environment that supports federation and maximizes the benefits of eSOA. What is also needed is a tool that can be used via the web in a wiki-based environment, is rich in semantic support, handles data integration, modeling, and mapping, and leverages CCTS to maximize reuse and sharing of core component artefacts in real time.

This is exactly the architecture of CCTS Modeler Warp 10. Warp 10 is an Semantic Web ontology-based data integration, modeling and mapping tool that leverages the semantics of meta data by implementing the semantic-based approach described in ISO 15000-5 Core Component Technical Specification (CCTS). The Warp 10 modeling environment is wiki-based, collaborative, evolutionary, and autonomous. Warp 10 uses CCTS, the Core Component Library of UN/CEFACT, and the SAP GDT catalogue to create and maintain data content ontologies for further reuse. The Wiki nature of the tool for the first time enables CCTS users to view the design time modeling activities of their counterparts to maximize reuse and minimize duplicative efforts.

Warp 10 is the first step to the future Web 3.0 – a combination of Web 2.0 and Semantic Web technologies. Warp 10 is based on SAP NetWeaver tools and offers both, the smooth integration and extension of SAP GDTs as well as the smooth integration and consolidation of existing investments in data integration and mapping through its semi automatic mapping approach. The figure 3 shows you the high level architecture in where you can see the closed combined "semi automatic" and "context driven" components, which will especially accelerate the data modeling and data integration issues. Therefore, Warp 10 not only has the capability to integrate with both vertical standards and cross-industry standards, it can go beyond the limitations of these boundaries. Warp 10 will seamlessly integrate data models, regardless of source, with existing application landscapes. In other words, very large business applications will for the first time close the gap that exists between themselves and individually designed, non-semantically oriented application to application communication expressions. All content will be semi automatically consolidated and stored in a central repository. Modelling focused users will be able to apply instantly and use the tool. Business oriented users will be able to concentrate more on content related topics to get IT aligned to serve the business’ strategic objectives.
Figure 3 - High Level Architecture

Warp 10 Handler

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context Driven Query of Business Data Interfaces using semantic-based taxonomy/ontology</td>
<td></td>
</tr>
<tr>
<td>Business Interface Assembly result in a given Context</td>
<td></td>
</tr>
<tr>
<td>Context Specific Modification and Extension</td>
<td></td>
</tr>
<tr>
<td>Semi Automatic Consolidation and Harmonization</td>
<td></td>
</tr>
<tr>
<td>Representation of Mappings to appropriate Nodes of Other B2B Standards</td>
<td></td>
</tr>
<tr>
<td>Context Driven Serialization of UN/CEFACT XMNDR-based XML Schemas</td>
<td></td>
</tr>
<tr>
<td>Context Driven Semi Automatic Mapping of any Internal Format or External B2B Format or Standard</td>
<td></td>
</tr>
<tr>
<td>Statistics and Trend Analysis of Runtime Usage of Elements</td>
<td></td>
</tr>
</tbody>
</table>

Local Web Browser

- Conceptual (Semantic based) Visualization

Local Filesystem

- XMLNDR based XSD Schema
  - e.g. RosettaNet PurchaseOrder

Warp 10 Wiki Based Repository

Context Driven

- Any-to-Any Mapping
  - (US, AU, BE)
  - (DE, US)
  - (EN, AU)
  - (FR, US, DE)

CCTS Based Ontology

- GDT based Interfaces
- Automatic Integration
- Mapping Rules for Runtime Conversion

Enterprise Services Repository
Using Warp 10

Let's assume, you want to have a specific enterprise interface – purchase order – in your industry – automotive – for your country – United States – and for your specific partner role – manufacturer. You start your preferred web browser, and tell Warp 10 what you are looking for. Like shown in figure 4, you'll do a context specific query of your specific data model. Rather than responding with the typical kitchen-sink like models that you usually get from a standards organization, Warp 10 provides you with a customized model that most closely fits your unique requirements. Figure 4 shows that Warp 10 does this by creating a context specific assembly of the most appropriate reusable building blocks. The result is a tailor made subset designed specifically for your context that is in language you can easily read and understand – thanks to the CCTS naming and structuring conventions!

Although the results are quite reliable, and provide for you both a recommended structure identify for you the percentage of time each element is actually used, a deeper analysis is always prudent. This deeper analysis will determine if in fact the elements identified are appropriate for your context, or if some elements are missing that you require. As shown in figure 4, you can do a online modification in your context and according your business needs. For the elements that you don’t need, the solution is simple. A simple delete action on your part not only removes the item from your model, but also provides valuable intelligence to Warp 10 that is used to improve future results.

For the missing elements, the solution is also quite simple. In the current environment, if you add a data element to an existing structure, you typically struggle to determine the correct name, structure, position and so on. Identifying existing artefacts rather than creating you own is extremely difficult as you have little visibility of what is available. The current solutions simply can’t address these issues for you. Only Warp 10 addresses these issues, and it does so painlessly and seamlessly. You simply have to type in your new business need, and the Warp 10 natural language processor will automatically provide you with a specification conformant name and definition, identify where else it is being used and in what context, and through some in-depth analytical routines, places the element in the most appropriate position in your data model.
Now if you're happy with your data model, you just press a button and Warp 10 transforms it into whatever syntax representation you require –XML Schema, XMI, OWL, RDBMS and so on. You can directly implement these interfaces into your application, as represented in figure 4. Since the transformations are automatic, regardless of the syntax representation required, the same naming and structuring of the underlying data model guarantees the syntax representations are consistent.

But wait a minute, you think. You have already made significant, investments in time consuming, tediously painful mappings and implementations of other interfaces. You wonder if you have to do the expensive and tedious mapping and integration of these models again, or if there is some way you get this information into Warp 10. Relax! Warp 10 will painlessly and rapidly do this for you. Warp 10 has a semi automatic mapping approach that will map all of your schemas to the central CCTS based structure. Whereas currently a mapping can take on average 35 man days, Warp10 accomplishes this in a matter of minutes. You have to only upload your schema and Warp 10 not only shows you how your schema maps to the canonical CCTS format, it also generates maps against any other B2B standard of your choice. In other words, Warp 10 provides an any-to-any mapping function using CCTS as the canonical form. This will make your life in the area of eBusiness much easier, because it helps you doing a new e-business connection with new partners in a very short time, even if they use a different standard than you do.
Going Forward
As we stated at the start of this blog, Warp 10 is currently in prototype phase. We anticipate it will be sufficiently stable to support various CCTS based prototype projects in first quarter 2008, and tool development to be complete towards the end of 2008.

Summary
CCTS Modeler Warp 10 will result in significant savings in terms of resource requirements since its totally new and revolutionary concepts reduce modeling, mapping, consolidation, harmonization, integration and extension efforts. We estimate that Warp 10 will reduce these manual processes by a factor of 20. These level-of-effort savings can be directly transformed into reduced staff, increased capability, increased profits, or any combination determined appropriate by management. More importantly, the quality of data models and their interoperability level – within and across applications, firewalls, and organizations – will significantly improve and will enable a much more effective eSOA environment.
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