TriggerWare™ Virtual Database

Next Generation Data Integration and Internet Search Technology

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Which Data Integration Problems Can I Solve with TriggerWare™ ?

Several data integration problems require formalisms to correlate information from a variety of different, semi-structured data sources. If the data sources are completely unstructured (natural language , pictures, etc.), TriggerWare™ is not an appropriate solution. However, if you know that the data sources do indeed have some "structure" to them, and you know how to describe and/or extract this structure, TriggerWare™ can provide you a viable data integration solution. Indeed, TriggerWare™ has been used successfully to tackle many data integration and Internet search problems over semi-structured data sources.

Just What is a Virtual Database?

A simple and intuitive concept is needed to allow users to view a variety of data sources through the same prism. TriggerWare™ uses the notion of First-Order Logic *relations*, a generalization of the concept of relation or table in traditional relational databases as the common abstraction mechanism. TriggerWare™ offers several core capabilities that prove to be crucial in data integration and Internet search problems:

Abstraction of the Concept of a Relation: The platform allows addition of new relational representations by supplying a set of interface methods (e.g., to test or generate the tuples of the relation under different conditions). Note that, unlike a traditional database, it is *not* required that all the tuples of a relation be fully generable.

Ability to View Many Computations as Relations: The interfaces above are generic enough that many computations (such as mathematical functions) can be viewed as relations. In addition, this flexibility allows a huge variety of data sources to be abstracted as relations (e.g., log files, web forms, and so on) in the virtual database.

Consistency Checking and Trigger Compilation: For transaction-oriented applications, TriggerWare™ provide a transition language to describe data constraints, triggers over complex conditions in the virtual database, and several event correlation primitives. Automatic compilation of triggers supports the construction of applications that react rapidly and dynamically to real-world conditions that affect key decisions.

Query Optimization: TriggerWare™ provides a query language over all the relations in the virtual database, independent of representation, thereby offering a foundation for data integration. The TriggerWare™ compiler is able to operationalize queries, constraints, and triggers, and can be guided to select more efficient algorithms using compile-time annotations supplied by the programmer. This features supports performance tuning of an application.

How Does the TriggerWare™ Solution Work ?

Step1: Analyze and Understand the Data Sources: The first step is to make sure that every data source of interest has *structure* that can be extracted through automated software. Data sources could be web pages, web forms, documents, and even other databases – *any* artifact from which one can **programatically** derive useful data.

Step 2: Define the Virtual Relation Metadata for Data Sources: The second step involves formally specifying the set of relations for each data source of interest. A data source can provide many different relations. Several examples and building blocks of metadata specifications show you how to define the data sources properly.

Step 3: Install the Metadata Definitions Into the TriggerWare™ Server: The metadata definitions need to be submitted to the TriggerWare™ server. The descriptions can be immediately verified and validated using simple TriggerWare™ queries over the virtual relations that are submitted directly to the TriggerWare™ server.

Step 4: Build Applications to Utilize the Data: TriggerWare™ provides a HTTP interface and direct sockets based interfaces to make the TriggerWare™ data available to application programs. In particular, applications that need asynchronous notification are supported by TriggerWare™ using the sockets-based API. Client programs can be written in a variety of languages, as convenient to the customer.

Model of Customer Engagement

In almost all real-world cases, data integration is a non-trivial problem, requiring deep technical analysis, where the devil is in the details. It is usually not easy for customers to determine if any proposed solution will actually produce the results they expect at the outset. CS3 will provide you with technical assistance (pre-sales) on all the steps described above as you evaluate whether TriggerWare™ can resolve your specific data integration problems. If necessary, reasonably priced consulting is available to help clients build a rapid prototype to establish feasibility and viability of the TriggerWare™ solution within the span of a week or two.

TriggerWare™ server can be purchased as a product to be installed/administered within the customer's network. It is also possible to have CS3 administer the server and offer TriggerWare™ using an SaaS model of deployment.

TriggerWare™ Technical Specifications

Operating Systems / Host Hardware Supported:	• Linux (any variant); BSD and Other UNIX variants; or Windows; • 32 bit version or 64 bit versions; • Multiple processors supported in Linux
Server parameters:	• Dedicated Pentium-based host preferred for best performance • User data capacity depends on configuration parameters • Ease of replication for high-performance ,"read-only" applications
Server Software Details:	• About 25 Megabytes (exclusive of database files); Available through download upon execution of engagement agreement. • Implemented in Common Lisp (multi-threaded Clisp or Allegro) • Source made available for server customizations and extensions
Query Language, Server Protocols	• Query language based on first-order logic; Similar to SQL; • Server side languages include PHP, Java, C++, C#, PERL, etc. • HTTP, HTTPS, direct socket-based interfaces available for clients to access TriggerWare data • Standard data exchange protocols (XML, JSON) supported • Sockets-based notification interface for message "push" clients

Questions? Comments? Want more details? We welcome your email at info@cs3-inc.com or call us at (310) 337-3013. You can find white papers and material at http://www.triggerware.com. Or, contact us, and let us set up a demonstration online to show you the features and benefits of TriggerWare™ when it comes to data integration and Internet search.