

# CASE™

## Collaborative Acquisition and Sustainment Environment

A largely neglected requirement of effective system development is the harmonization of the activities of team members and suppliers with the needs of the system integrator (SI). Even such a seemingly trivial process as development of a consolidated logistic database depicting the integrated system has defied industry's best efforts<sup>1</sup>. These problems persist and even deepen in the sustainment phase. Burdened with sub-optimal system design, the sustainment leadership finds itself equally poorly armed with useful processes and tools to manage the supply chain, plan maintenance, insert new technology, manage system configuration and perform all the other tasks necessary to keep modern complex systems running efficiently.

For several years TFD Group has been developing ideas and tools to assist in various aspects of both the acquisition and sustainment phases of a system's life cycle. The earliest tools were focused on the acquisition process – hardware design trade-off, level of repair, spares optimization, life cycle cost. Later, data management became a focus of attention. More recently our attention has shifted to the desirability of introducing the techniques of optimization to the tactical side of the sustainment business. The first product, Support Chain Optimization or SCO, provided tactical optimization decision support to item managers.

On an assignment to assist a prime contractor with the business case analysis for entering into a performance agreement with his customer, we were asked to collect suppliers' and team members' data for use in a total ownership cost (TOC) model. There are almost 100 suppliers on this program, some 40 of whom are concerned with performance-based agreements. It became quickly apparent that, with so many suppliers, development of a reasonably economical system for data collection and validation would be difficult.

Transmission of data between supplier and prime is always a relatively tricky business, cost and proprietary issues being points of contention. A system was devised in which team members and suppliers could use input data forms, get advice and assistance with data validation and even run models on their data before exposing the data to the SI. Furthermore, all this could be accomplished without installing any software on their computers. This idea and the resulting system formed the core capability of what has become CASE.

The first problem that had to be solved in CASE was to guarantee security and privacy of data transmissions from suppliers to CASE, before they were ready for presentation to the system integrator. The underlying problem is easy to state, less so to solve: the supplier naturally wishes to understand how the data he supplies will be interpreted by the SI before he releases it. Determining how the integrator will interpret the data amounts to running the data through the same modeling process the integrator uses. The costs of modeling solely for this purpose, however, are prohibitive<sup>2</sup>, even if the integrator chooses a "free" public domain model. Sensitive to the risks inherent in the use

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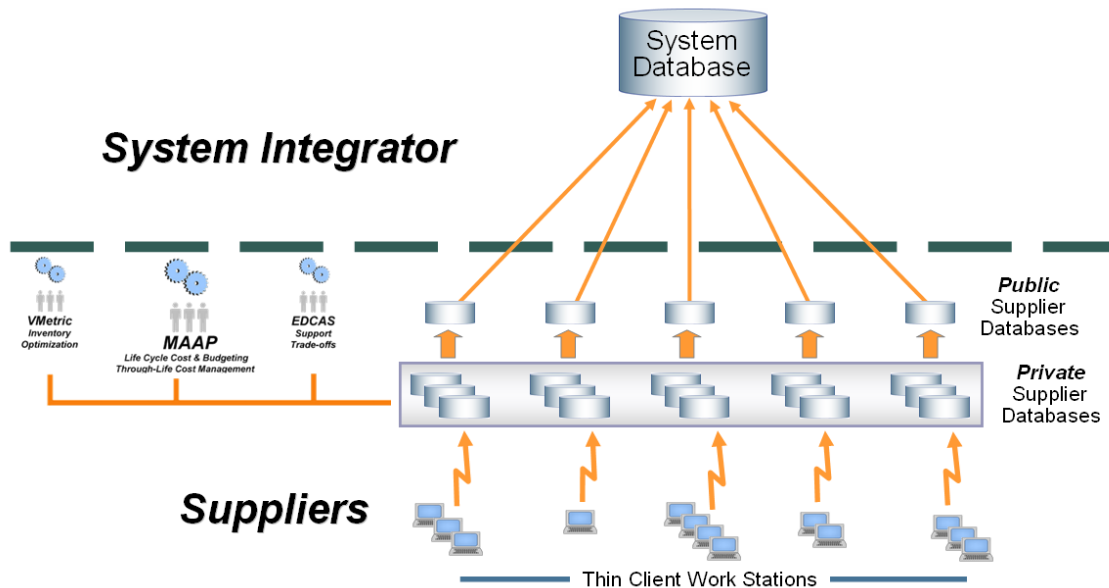
<sup>1</sup> A case in point is that of a modern European system only recently beginning to enter its fielding phase. Team members and suppliers were compiling and transmitting logistic data compliant with MIL-STD-1388 to the prime contractor for almost 15 years. In turn, the prime contractor was spending a significant amount of money to "validate" the data. Nevertheless, in a simple download process to the TFD Database (that checks internal hierarchical consistency in structures and associated aggregating data) about 90,000 errors were found – some 20,000 in the definition of the hardware breakdown structure. Unfortunately, this is more the rule than the exception.

<sup>2</sup> These include obtaining the right to use a model, training in its use, and the skilled labor necessary to do so – all in addition to the inescapable part of the problem, which is collection of the data in the first place. Notice that, even if the model is free, there are significant costs in using it. The biggest cost of such free models is that they don't provide accurate forecasts of costs and logistic resource requirements. This has become especially important in the new risk paradigm associated with performance-based contracting in which the risks associated with forecasts are shifted from buyer (traditionally an auto-insurer) to seller (presumed to be a profit maximizer).

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of free models, virtually all built for the benefit of the buyer rather than the seller, the customer in this case preferred to use TFD's models.

To solve the problem, a web portal was created that allowed suppliers to visit through a web browser, use any one of a number of data input devices (including expert help from TFD Group analysts), and see how their data would be interpreted by the TOC model in use<sup>3</sup>. A general picture of the CASE suppliers' network is shown in Figure 1, below.



**Figure 1: The CASE Network**

From workstations located at the supplier's facilities, data can be entered into any one of a number of databases the supplier may wish to maintain on the server. These are all private databases, hosted by TFD Group on behalf of the supplier. Data can be entered directly into the relevant model, into import spreadsheets or simply posted as a file on the web site with instructions for TFD Group to do the data validation and import work. The data assembly and validation process goes on as long as supplier and integrator wish it to. When the supplier is satisfied that the data properly describe his hardware, he transfers the data into his public database. Once in the public database, it can be imported into the integrator's consolidated database<sup>4</sup>. The consolidated system database is then used to perform a variety of logistic analyses related PBL business case analysis, spares optimization and management, maintenance planning and other functions that require a complete data picture of the system.

CASE is an evolving idea and tool set. While the fundamental task of protected data exchange between suppliers and the system integrator was the first step, it was immediately obvious that the idea was of wider benefit. A number of functions, both for the system integrator and for the team members and suppliers, can be exercised through the network. These are catalogued in Table 1.

<sup>3</sup> TFD Group's MAAP<sup>®</sup> model was selected as the standard for this system and is used for all business case analysis (BCA) on the program. There are two separate strains of BCA. The first is the BCA required by the integrator's management to measure the cost issues that arise in accepting and negotiating a performance agreement with its customer. The second is used to measure cost realism of supplier proposals to enter into performance-based agreements with the integrator.

<sup>4</sup> It may appear that the Public Suppliers Database is a redundant instance of the databases. This is due to a rule of data organization used by TFD software, namely, that no data source is allowed to *export* to a TFD Database. Instead, any instance of the TFD Database may *import* from any source. This prevents data corruption from unwanted sources and also necessitates a neutral storage place from which the integrator may import the data.

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## System Integrator Functions

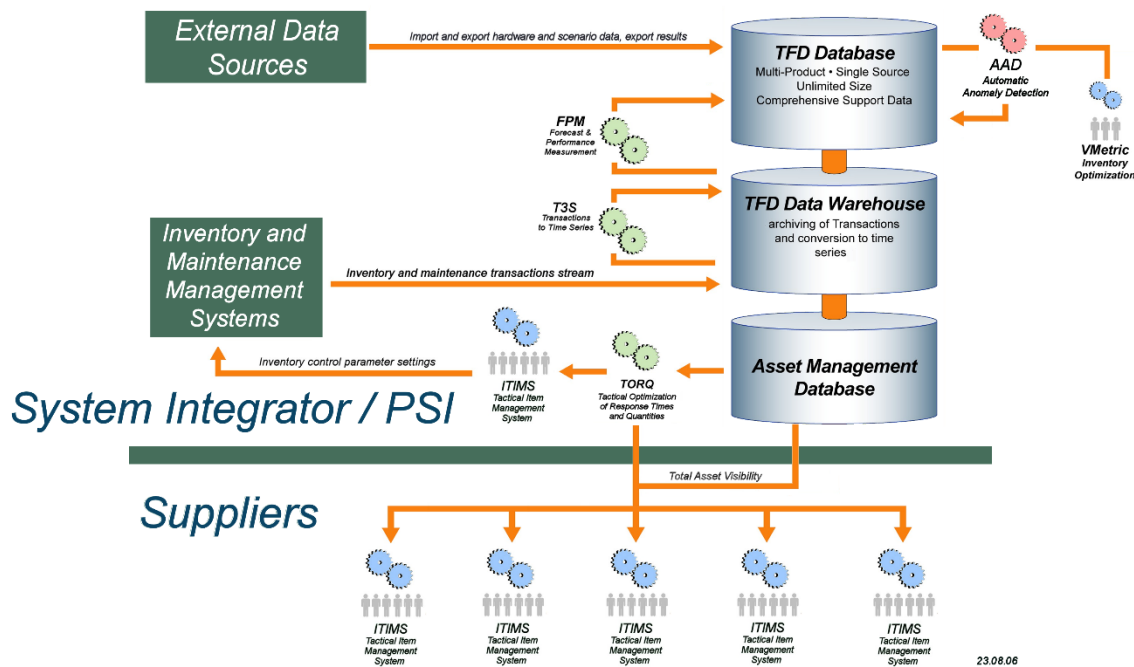
- Monitor performance against metrics
- Business case analysis
- Spares optimization and management
- Assemble and validate system data
- Command model runs
- Explore alternative designs
- Solicit proposals
- Issue alerts
- Request priority changes
- Provide total asset visibility data
- Transmit optimal supply tactics
- Broker exchange of incentive metric budgets

## Supplier Functions

- Monitor performance against metrics
- Business case analysis
- Spares optimization and management
- Assemble and validate data
- Command model runs
- Explore alternative designs
- Develop and communicate proposals
- Command data transfer to public
- Strategic planning
- Level of repair revisit
- Plant efficiency studies
- Reliability studies

**Table 1: CASE Network Functions**

An important application of the CASE Network is to foster collaborative behavior in the supply chain. This can be accomplished by the distribution of both total asset visibility data and optimized item management recommendations from TFD’s Support Chain Optimization system, as illustrated below in Figure 2.



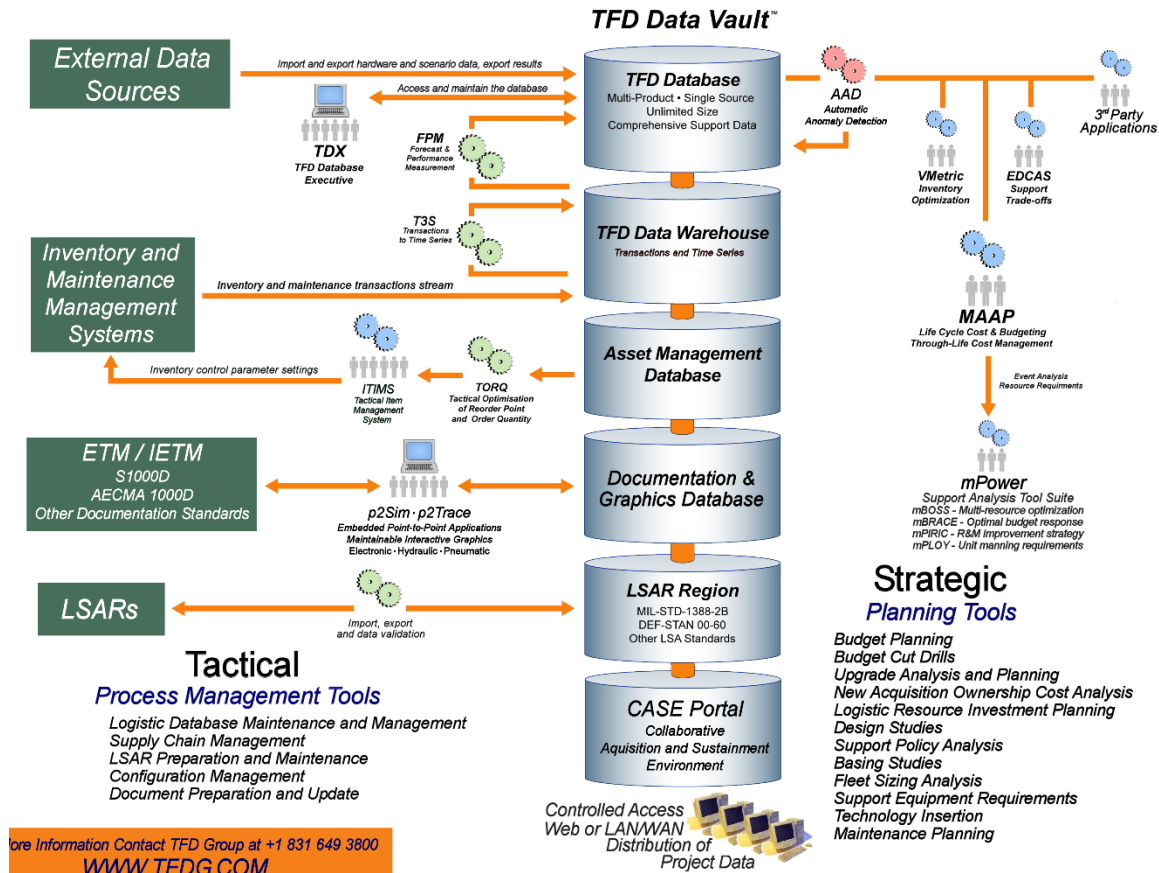
**Figure 2: A Collaborative Extension of SCO Using CASE**

Notice that the data flow from the optimization engine, TORQ, is split between the system integrator’s item managers and those of the suppliers. This joint optimization process is only possible with the system architecture of CASE. Both real-time total asset visibility data and optimization priority metrics (couched in monetary terms) are passed from the SCO system installed at the integrator’s level to the ITIMS work stations resident at the suppliers’ locations. Communications can be served over the same network as the rest of the CASE tools.

The CASE idea extends beyond simple data collection and even supply chain applications. It provides an environment intended to foster collaboration between suppliers and integrator throughout the life

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cycle of any program. In essence, CASE provides an inexpensive way to deliver the use of the most sophisticated logistic strategic planning, data maintenance and logistic process management tools to practitioners at every phase of the product life cycle. Figure 3 illustrates the complete TFD architecture, all of which can be made available at low cost to team members and suppliers in complex programs on an as-needed basis.



**Figure 3: Complete TFD System Architecture**

The CASE Portal outlined in yellow at the base of the TFD Data Vault (TFDdV) stack provides the entry point for all first- and lower-tier suppliers to exchange data with the integrator. Through the use of this architecture, suppliers can gain access to the analytical tools shown to the right of the TFDdV, as well as participate in the use of functionality flowing from the logistic data and process management tools on the left.

Deployment of this system to large numbers of team members and suppliers is low in cost because it eliminates the need for all members of the team to actually make capital investments in software. The central installation and basic CASE architecture must be installed and served to the project community, but use of software is on a fee-for-use basis, rather than through the purchase of a 20-year license.

TFD also provides a corps of skilled analysts and database experts to provide the services that surround the software. From reformatting, importing, validating and verifying the data inputs, to running, interpreting and briefing the results of analysis, these experienced professionals can form a temporary or permanent part of your development and sustainment team.