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***ASTI***

***... an E-Business Solution  
Provider ...***

**ASTI**

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# ASTI E-Business Solutions for the “Net-centric” Age

*ASTI, an international software tool development company, has recognized the impact of the Internet technologies on the way companies conduct business. ASTI's rich software tool development experience is driven by the demand for solutions to business problems brought about by the introduction of everchanging technologies. This experience has also compelled ASTI to provide software solutions for customers who must consider building their business operation and customer services based on network centric, powerful strategic information systems. ASTI worked closely with the Nanyang Industries Company in Taiwan to achieve their business goal.*

## **E-Business: A Car Sales Company Example**

The Nanyang Industries Company, located in Taiwan, historically operated as a car sales company, basing the car sales business model on the car. Recently, Nanyang analyzed its business strategy and opted to migrate toward a customer-based car sales business model.

Nanyang is a large car sales company in Taiwan, employing thousands of employees and more than 200 sales and services stores. The courage and determination to make a change in business conduct by a big company like Nanyang are significant. Building the C & S system is only part of the change. One of the biggest hurdles faced with the development of the C & S system was that the development and implementation of the Nanyang C & S System required all levels of management in the company to adapt to new concepts, to change the ways they usually conduct business, and to utilize new information technologies—a change in the company's information technology environment and business procedures of more than 20 years!

*...In a knowledge economic, netcentric computing era, adopting an information-based electronic business model is the key for any company to stay ahead and to compete in business. The winners will be those who are ahead in controlling the information and knowledge in their business arena. The emergence and proliferation of the Internet has also created new marketing channels and new ways of providing customer services...*

## **Nanyang C & S System Objectives**

ASTI worked closely together with the Nanyang Industries Company to analyze the business requirements and design a Customer Service System (C & S System).

The new business opportunities brought about with the emergence of the Internet has prompted car sales companies like Nanyang to consider building their business operation and customer services based on network centric powerful strategic information systems. The following objectives were set for the C & S project:

- *Blend new business concepts and objectives of providing information in a timely, flexible, and expandable manner to make better business decisions into the business' existing information system*
- *Exploit the network to provide the linkage and integration of all distributed information systems, locally or remotely, within a company to support decision making and strategic planning for current & future business needs*

The progress made in the information technologies has made drastic changes both in quantity and quality of the computer applications in business industries. The information systems of a company must no longer be limited to the support of the daily operation as most of the MIS systems in the past. In addition, the clustered and separate MIS systems designed for supporting business operations must be geared toward an integrated system framework to support decision making and strategic planning. One of the main objectives of the C & S system is to build a multi-tiered network centric system to support the car sales company's Intranet/ Extranet and Internet applications to meet current and future business needs.

*Having the proper information system that possesses the ability to access the newest information and knowledge for the business and to derive strategic decisions to face a business challenge or to grasp a business opportunity may be the determining factor in winning or losing a business battle.*

The Nanyang C & S System was ASTI's first successful example that utilized the modern net-centric Intranet and Internet and data warehousing technologies to help a big industrial company upgrade its company's Information Technology and to enable the company to conduct its business in the network centric computing era — a significant symbol of the change in the company's business model and focus.

### **Important Implementation Considerations for Building Nanyang's C & S System**

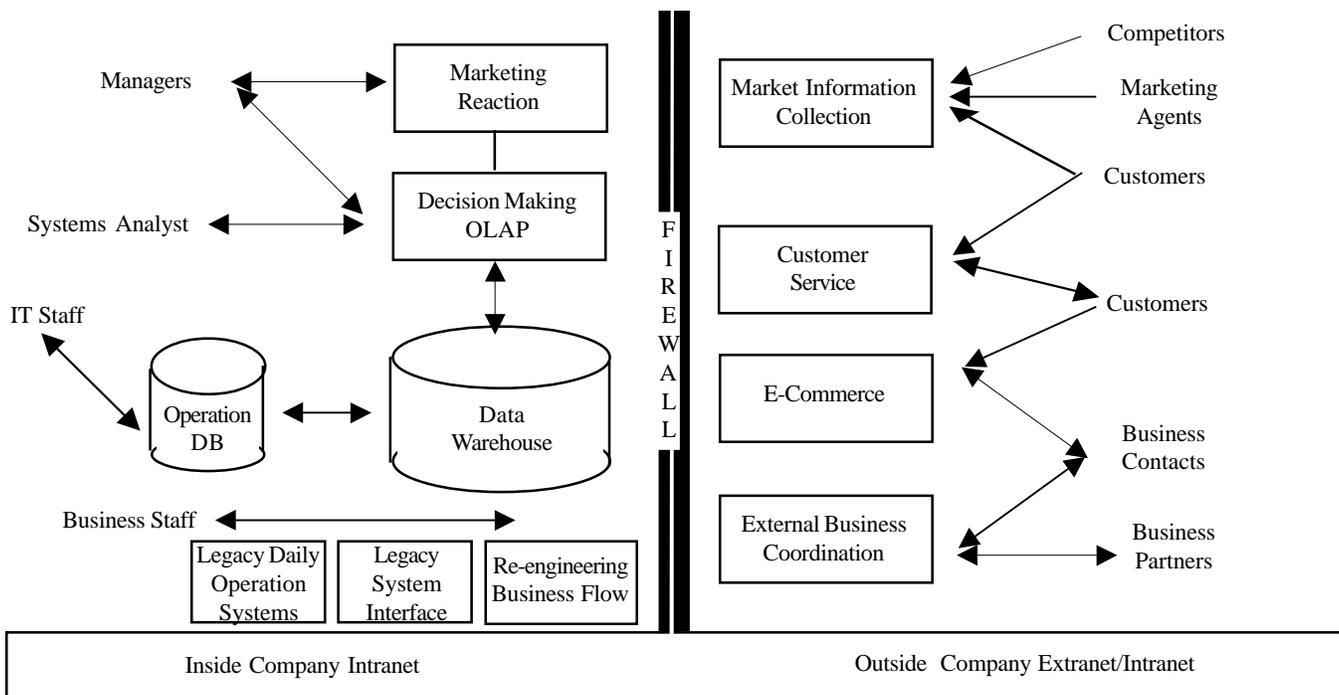
Nanyang realized that changing the business model involves changing the ways business is conducted by employees at all levels. Such change takes time and effort to complete and cannot be accomplished with the building of any one system. Therefore, ASTI determined that the C & S system framework must be expandable and allow new systems to be integrated gradually and incrementally. The "open system" concept is the key to build the C & S system framework (Figure 1.0).

### **Building the Nanyang C & S Framework**

Based on Nanyang's defined C & S System objectives and their plan to implement the C & S system in several phases, particularly targeting computerizing internal company processes as the short term goal and, later, extending the system to support external business processes with outside sales and service contractors, parts suppliers, and business partners, ASTI proposed the following approach for building the C & S framework.

The C & S system framework basically consists of two parts: the internal network and its applications and the external network and its applications. The technical solution proposed for the C & S system is to build the Nanyang internal network and related applications and to build only the foundation required to support the external network support and related applications. This approach allowed the C & S system to meet one of their key short term goals of being able to immediately begin to improve Nanyang's business process and customer services.

The design of the external network is targeted to allow the Nanyang company to conduct e-business and to share information with business industry-like partners. The foundation and framework for on-line car purchase are ready but the timing for offering the on-line purchase of cars in Taiwan is not quite ready yet. Eventually, Nanyang business industry-like partners such as car manufacturers, import cars, car rental, insurance, parts, and car repair service companies will all be able to share related data/information through the "extranet" (external network) or even a virtual private network as a big virtual Enterprise.



**Figure 1.0 C & S Framework**

The technical approach for building the C & S system includes the following key tasks:

- *Establishing the Data Warehouse*
- *Improving the business process based on the newly established Intranet*
- *Interfacing with existing legacy systems*

The implementation strategy for these key tasks must support incremental implementation of new component, enabling Nanyang to take immediate advantage of the effective results at every step.

### ***Establishing the Nanyang Datawarehouse***

Over the years, Nanyang had accumulated more than 500,000 customer records in the customer database, but could not use very much of the data because the data were not clean and no customer information could be extracted. Determined to be a customer-oriented car sales company, establishing a new and useful customer database that assists with controlling and performing analysis of the customer information became essential for the Nanyang company.

The old customer DB was built to support the daily business operations. The new customer DB serves as the original raw data source center to allow various users/analysts to collect customers' information for the management to analyze customer preferences and inclinations for the managers to make sales and promotion decisions and is the company's Data Warehouse (DW) foundation. The establishment of the Nanyang DW prepared Nanyang to migrate from the Management Information System to the Strategic Information System.

### ***Improving the Business Process based on the newly established Intranet***

Nanyang's old MIS systems have demonstrated their limitation and inefficiency in handling the daily operations and are not capable of improving the business process and workflow or getting information required for providing better customer services.

The C & S project is targeted to build the company internal network to improve their business process and workflow. The initial exercise of business process analysis alone revealed many inefficient and inadequate business operation areas within the company. The C & S system targets linking all departments and regional Nanyang offices together via Intranet to allow management and departments to share information and application resources, to

monitor and to coordinate work flow for a much improved business process within the company. The C & S Intranet based business improvement process will bring the OA applications into the Nanyang company to another level — a necessary business computerization step aimed at the Intranet/Internet level.

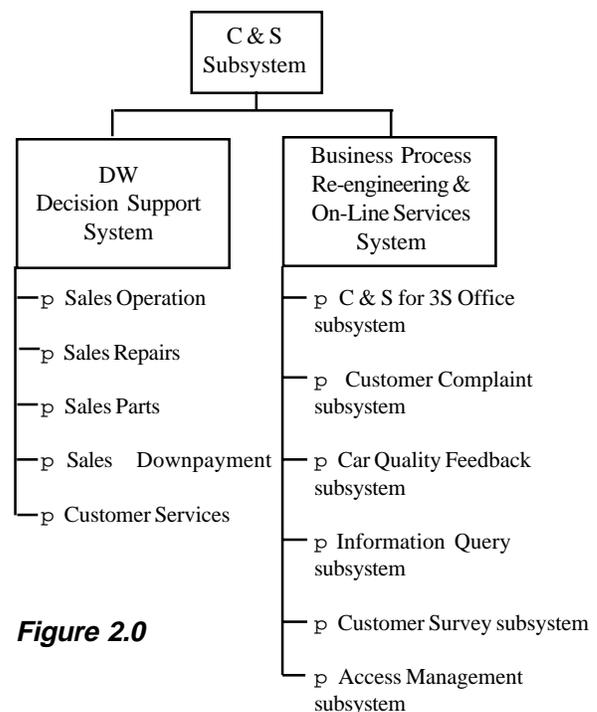
### ***Interfacing with Existing Legacy Systems***

Another important design consideration for the development of the Nanyang C & S System was to keep the existing old systems in operation for a certain time period such that the installation and availability of the C & S System would not interrupt the current daily operation. Since the C & S system was also designed to handle the daily business operations, related data and information will be shared by both the new and existing systems until some future time when the Nanyang company makes the decision to switch over to the new C & S system that will handle both strategic and operational information for the company.

Older existing systems were all AS400 platforms, unlike the C & S System — a PC based system. To achieve the goal of data and information sharing between the old existing MIS systems and the new C & S system, the new system must solve the data interface problem between two different platforms.

### ***System Components***

Figure 2.0 illustrates the two key components of the C & S System and their respective subsystems.



**Figure 2.0**

### *...The Data Warehouse & the Decision Support System*

Building the Data Warehouse for Nanyang is a typical example of the application system's incremental implementation strategy. ASTI did not propose to build a complete Data Warehouse for Nanyang to handle every aspect of all of the DW applications. At the beginning of the C & S project, neither Nanyang nor ASTI knew all of the information that should be extracted from the DW. Now that the C & S system is complete, we still don't know all data required. What we did learn is that no data warehouse can or should be built at one time. The established DW should be used to gain a better understanding of what information can be extracted and analyzed.

ASTI's DW building approach identified some particular, or the most desirable subjects, to begin the DW build. This is a basic strategy for building a "Data Warehouse". Next, based on the identified subjects, develop some decision support application systems to allow the target users (i.e., upper management at the Headquarters and business analysts), to perform analysis that will help in making sales and promotion decisions. The business analysis phase revealed five initial subjects to serve as the starting point for building the DW and Decision Support System of the overall C & S system. These five subjects all relate to the sales business: operation, repairs, parts, down payments, and customer services.

Data is the ultimate basic unit for the DW. Collection, organization, and modeling of data have direct impacts on how to access the required information. Data arrangement is reflected in the data categories used for the Nanyang's DW. We have classified these data as Basic data, Event data, Collective data, and User data. The Basic data include the basic data related to cars and their owners. The basic data as well as historic changes of the basic data are saved in the DW. Event data includes all of a car owner's events over the past two years. A typical event might be a car's repair service record. In addition to this data, the DW also stores some data collected monthly and the analyst users' data.

Analysts for Nanyang can access the stored data with the Nanyang DW to perform analysis to help the management understand, control, and make proper responses and decisions for the business in the areas of Sales Operation, Sales Repairs, Sales Parts, Sales Downpayment, and Customer Service.

The following examples highlight the Sales Operation and Customer Service areas:

#### **Sales Operation**

- Determine a customer's purchase pattern based on the customer's characteristics and preference on the purchased car.
- Find the sales factors from sales promotion activities and results.
- Find the special characteristics of the most easy to sell and most difficult to sell car from the car inventory statistic data.

#### **Customer Service**

- Find the potential customer source.
- Find current customer's characteristics from the data of customer age, profession, income, family situation, hobby, purchased car's model, color, and number of car owned.
- Determine the customer's contribution to the company based on the car's repair records.
- Find the reasons and factors for customer's complaint.
- Find the correlation of the number of times of complaint and response time for each complaint.

The five business areas and their content under the C & S project's DW and Decision Support system clearly indicate the need for incremental development and implementation as more subjects and data will be added in the future. The implementation experience also revealed that the most time consuming process for building the Nanyang Data Warehouse is the collection and the cleansing of the basic data. Building Nanyang's DW created the opportunity for the company to cleanse their customer and car data for the past twenty years.

*One of the biggest hurdles faced with the development of the C & S system was that the development and implementation of the Nanyang C & S System required all levels of management in the company to adapt to new concepts, to change the ways they usually conduct business, and to utilize new information technologies*

**...The Business Process Re-engineering and On-line Service System**

Targeted to change a large industrial company's business model and to allow the company's IT department to catch up with the latest information technologies, ASTI proposed to utilize the most up-to-date technologies, techniques, and software tools for the development of the C & S system. From the technical point of view, the proposal has utilized and integrated many modern information technologies.

Technologies used include:

- *Data Warehouse, Data Mining/OLAP*
- *Enterprise Information Infrastructure*
- *Multi-tier Architecture*
- *Internet/Intranet/Extranet*
- *Web enabling Enterprise*
- *E-Commerce*
- *Computer Supported Collaboration/Workflow Management*
- *Business Process Re-Engineering & Improvement*
- *Strategic and Cooperative Information Systems*
- *Interface with Legacy systems*

The improvement of business process is accomplished through the use of on-line services. The C & S System

Business Process Reengineering & On-Line Services System consists of six (6) subsystems. The subsystem functionality and benefits are described in Table 1.0 below.

**ASTI's Solution**

ASTI, employing the most modern Inter/Intranet and Data Warehousing technologies, and tools, spent only 18 months (just about 150 man/month's efforts) to complete one of the few attempts to build such a strategic information system for a big industrial company such as Nanyang to prepare itself to conduct electronic business in Taiwan and China.

ASTI was responsible for proposing technical solutions and making proper hardware and software facilities and tools recommendation while Nanyang made the hardware/software facilities and tools purchase decisions.

Basically, the C & S project is a PC-based network system for both its clients and servers. Although ASTI recommended the use of a UNIX server for the C & S system, that recommendation was not accepted by the Nanyang company. Nanyang's decision on using PC for both clients and servers is based on the considerations of the cost, the existing MIS

<b>Subsystem</b>	<b>Functionality</b>	<b>Business Benefit</b>
Sales Representative subsystem	<ul style="list-style-type: none"> <li>• Share the top sales person's knowledge with other sales people</li> </ul>	<ul style="list-style-type: none"> <li>• Increased sales</li> <li>• Access to up-to-date customer information</li> <li>• Improved customer care</li> </ul>
Customer Complaint subsystem	<ul style="list-style-type: none"> <li>• Alert responsible staff to customer problem, or even anticipate a problem and alert the responsible staff before the problem occurs</li> </ul>	<ul style="list-style-type: none"> <li>• Improved customer satisfaction</li> <li>• More Efficient Customer Complaint tracking/handling</li> </ul>
Car Quality Feedback subsystem	<ul style="list-style-type: none"> <li>• Automate the manual quality control procedures to allow the repair service centers to provide better information to the car manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>• Early car defect detection</li> <li>• Improved Car Manufacturer quality</li> </ul>
Information Query (Call Center) subsystem	<ul style="list-style-type: none"> <li>• Facilitate customer information access to the customers For example, operators answer questions regarding a car repair record, car insurance information</li> </ul>	<ul style="list-style-type: none"> <li>• Centralized customer information</li> <li>• Improved information sharing</li> <li>• Increased customer satisfaction</li> </ul>
Customer Survey subsystem	<ul style="list-style-type: none"> <li>• Allow car sales company representatives to properly select candidates for conducting meaningful business surveys</li> <li>• Enter topics and questionnaires of the survey with the maximal flexibility</li> <li>• Provide multiple methods for conducting surveys</li> <li>• Store survey results into a survey db</li> <li>• Generate various statistical reports based on survey db data</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of flexible, objective survey data collection</li> </ul>
C & S Management subsystem	<ul style="list-style-type: none"> <li>• Control access authority levels</li> <li>• Provide user authentication</li> <li>• Provide information updates on C &amp; S system</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain Data integrity</li> <li>• System Security</li> </ul>

**Table 1.0 Business Process Reengineering & On-Line Services**

environment, the existing legacy systems, and the size of the initial C & S system. As the result of Nanyang's decision, the PC was the main hardware platform for both the development environment and the execution environment, at least at the initial phase of the C & S project.

The major facilities at the development and execution environments are:

- a. *Domino Notes for e-mail and workflow server*
- b. *TCP/IP for both Intranet/Internet/Extranet*
- c. *DB2 for both operational and data warehouse DB/E*
- d. *IBM Visual Warehouse for DW*
- e. *Netdynamics for Intranet development tool*
- f. *IBM OLAP Server and Cognos PowerPlay/Impromptu for DSS development*
- g. *Programming Languages: C++, Java, HTML, Notes Script, SQL*
- h. *ASTI's FormNet Tool for Inter/Intranet Development*

### **ASTI's Technical Approach**

The business processing improvement for the Nanyang C & S project focuses on optimizing the business operations and workflow. Rather than simply automating the manual business operations, ASTI proposed a process-driven approach method to help the Nanyang company analyze the company's business improvement requirements -- establish the C & S project's functional requirements.

ASTI suggested Nanyang focus on certain specific key business entities and their processing flows initially. To facilitate the business process requirements analysis process, ASTI developed the Application Solutions Technologies Integration for electronic business method (ASTI method) for customers such as Nanyang or any other customers who desire to migrate to a new, network-based business model to conduct business.

This approach allows a company's to identify a specific business objective and to analyze its business entity and its processing cycle within the company, from start to finish. Using this method, the consistency, the redundancy if any, and the relationship with other business entities within the company can be checked to optimize the business flow of a particular business entity. The optimization analysis may result in organizational change.

The ASTI method focuses on using explicit expressions to indicate business process flow stations and their communications: For example, this method requires the analyst to specify: *Where* – from which department or business unit, *Who*—the related staff or managers, *When* – process order, the pre and post conditions for entering

this process, *What* – the contents of the process, and *How* – the method, application tools, and programs used for each business process,.

A simple application of this analysis method gave a direct, useful, and simple notation in recording the business analysis results to help the ASTI developer and Nanyang ITstaff understand the functional features required.

### **Establishment of the Nanyang Inter/Intranet Framework**

Establishing the Inter/Intranet network for the Nanyang company, an important task in the C & S project, was done using the standard Internet protocol of TCP/IP. This enabled communication among various departments, possibly running different platforms, to share information and business resource within the company while also providing for future expansion.

#### *...The Logical Network Framework for C & S System*

Managers or business analysts may access the decision analysis server via a PC either through the direct decision making analysis supporting software on the PC or Web browser through indirect Web server.

#### *...The Physical Network Framework*

Nanyang's C & S system's physical network is being built in a selective manner based on cost and readiness of the targeted users. Selected offices include the president, vice president, departments at the Headquarters, regional offices, and some selected 3S centers.

ASTI's solution has exceeded Nanyang's expectations. ASTI is seeking customers requiring assistance with e-business solutions. ASTI provides software services, ranging from working with customers to analyze their requirements, to designing, developing, installing, and even training customers on the newly installed software systems. ASTI is headquartered in Rockville, MD and can be reached at [asti\\_usa@asti-global.com](mailto:asti_usa@asti-global.com) or at (301)424-1228.

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