SEA-LAND SERVICE INC.

Solution Overview

Industry
Services: Transportation

Business Solution
System for automating shipping-terminal operations

Architecture
Windows-based client-server system with core database and interfaces to legacy mainframe systems, local expert systems, and radio-linked, pen-based hand-held computers

Products Used
Microsoft LAN Manager
Microsoft SQLServer
Microsoft Visual Basic
Microsoft Windows
Microsoft Windows for Pen Computing
Microsoft Windows NTServer

Benefits
Increases terminal efficiency through faster and more accurate container handling and by eliminating unnecessary steps and simplifying others; enhances customer service by improving the speed and accuracy of the data moving through the terminal

In the early 1990s the shipping business was in the midst of major change, and the leaders of Sea-Land Service Inc. were determined to be in the forefront of that change. It was only fitting. With annual revenues exceeding $3.5 billion, New Jersey-based Sea-Land (a subsidiary of a Fortune 200 CSX Corporation) was the largest U.S. flag carrier and one of the top three shipping companies in the world. The company employed more than 5000 people and operated 88 container ships and more than 150,000 containers through 130 ports in 80 countries. Sea-Land also happened to be transforming itself from being solely a freight carrier to being an operator of large, complex shipping terminals worldwide.

As Sea-Land leaders saw it, the key to meeting the challenges of such a major change would lie in terminal efficiency. The speed and efficiency with which the company moved containers on and off ships and through its terminals had profound effects on operating costs and profits. Even small improvements in efficiency— such as streamlining communications between container inspectors and administrators or increasing the number of crane lifts—could provide significant savings for port operators.

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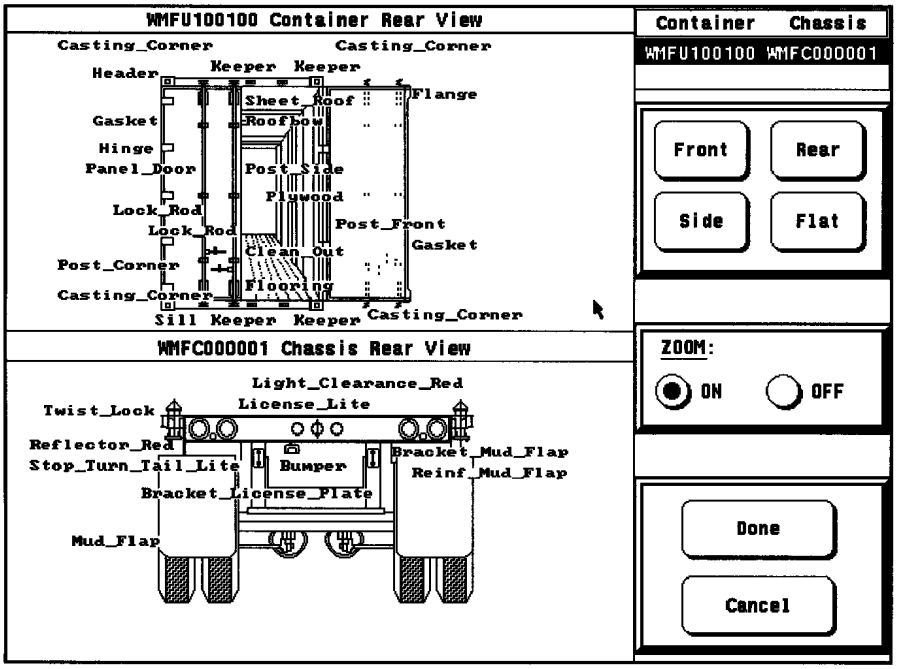
Director of Information Technology
Sea-Land Service Inc.

To maintain Sea-Land's top competitive position, company leaders knew they would need to fundamentally reengineer the company's work processes as well as its approach to information technology. "We determined it would be shortsighted simply to automate existing processes," explains Rick Cerwonka, Director of Terminal Operation Services. "To increase port productivity substantially and for the long term, we would need to change many of the processes themselves."

As Cerwonka and other Sea-Land managers understood it, to implement such a change would require a comprehensive terminal-automation system. They also understood that such a system could provide additional advantages of its own, particularly a streamlined method of communications regarding shipments—a major factor in customer satisfaction.



Envisioning a Powerful and Versatile Solution

At the time, Sea-Land was using computerized systems heavily to run its worldwide operations. These systems included ADABASE and DB2® databases on two IBM® 3090™ mainframes, 3270 terminals, and personal computers used as terminals. Connections were provided through a sophisticated network of satellite links, leased lines, and routers. The systems were performing well, and the company had begun developing

Microsoft®

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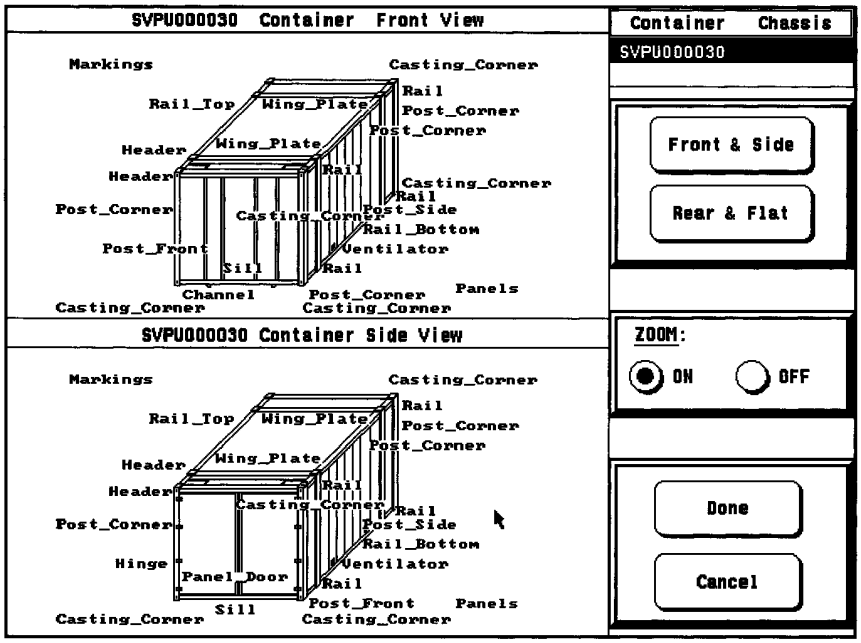
terminal-management solutions to automate operations at its Hong Kong and Rotterdam ports.

However, it turned out that these solutions were too closely modeled on the unique conditions of their respective locations to form the basis of a corporatewide solution. Such a solution would need a powerful core functionality so that Sea-Land could consistently track cargo at all times and in all places. At the same time, the solution would need to be highly versatile—capable of handling different languages, plant layouts, labor activities, and even radio frequencies—to be deployed successfully at Sea-Land terminals around the world.



To meet these requirements, the solution would need to be able to run primarily on locally based hardware—including pen-based, hand-held computers along with their desktop counterparts. The solution also would need a more flexible and open architecture than that provided by the company's legacy systems. To reduce the potential for integration problems, the solution would need to rely predominantly on software from a single vendor.

Finding the Right Tools

To define and develop an outline for the solution, Sea-Land management selected Ed Tuosto, Director of Information Technology, to work with Cerwonka. Responding to the specifications, they selected the Microsoft® BackOffice family of systems and tools. As Tuosto points out, "We saw that Microsoft had the software for every part of the system we envisioned, from the network operating system to the development tools."

Among the products attractive to Tuosto and Cerwonka was Microsoft Windows® for Pen Computing, which they figured would help simplify usage of the solution's hand-held computers. What's more, they were familiar with Microsoft products. For various applications Sea-Land already was using the Microsoft Visual Basic® programming system, the Microsoft Windows® operating system, and Microsoft LAN Manager.

For the primary hardware platforms, Tuosto and Cerwonka selected 486- and Pentium™-based servers and 486-based clients from AT&T-Global Information Solutions. "Our criteria for a hardware vendor included not only performance but also support," he says. "We chose AT&T-GIS as much for its worldwide technical support of both the hardware and the Microsoft products as we did for its products' benchmarks." For the hand-held computers, Tuosto and Cerwonka selected Fujitsu® systems.

Modular Design for Targeted Functionalities

Tuosto and Cerwonka enlisted a number of consultants to help design and develop the system, including AT&T-Global Information Solutions, Microsoft Solution Provider August Design, Communications Technology for Business, and Nettech Systems. Microsoft Consulting Services also contributed to the solution by helping Sea-Land reengineer inter-

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nal information-support processes. Working with the developers, Tuosto and Cerwonka built a solution known as TAS (Terminal Automation System), which consists of four modules:

Gate, for expediting the movement of containers in and out of a terminal

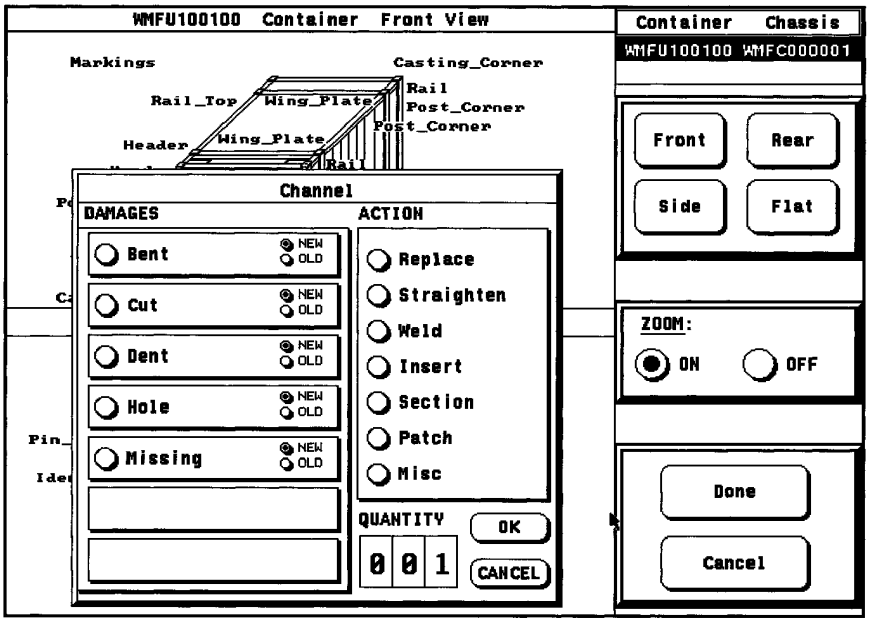
Yard, for streamlining the inventory and placement of containers in a storage yard

Marine, for automating the loading and unloading of vessels

Maintenance Repair and Control, for identifying damages in real time, estimating repair costs, and preparing repair schedules

In addition, TAS includes a custom, rules-based expert system used to help managers determine the optimum parking location for a container, based on its contents and destination.

Developers released the first production version of TAS in the form of the Gate model. "Because gate efficiency largely drives terminal efficiency, we decided to phase in the Gate module first," Cerwonka explains.



Tight Integration Boosts Communications

At the heart of TAS is a Token-Ring LAN running the Microsoft Windows NT™ Server network operating system and hosting a Microsoft SQL Server™ database. A typical TAS installation has 8 to 10 servers and 50 to 75 client workstations, all linked to the company's data center in Jacksonville, Florida.

Within TAS, the server and client computers are tightly integrated with gate activity through the hand-held computers, which include wireless-radio modems. With these computers, container inspectors throughout the terminal have instant online access to information stored in the client-server system. As a result, the inspectors have a handy, graphical way to display information concerning the location and nature of any container damage.

In TAS, information is passed between the local system and the legacy IBM 3090s using DCAand MDI gateway technology. Through this link, for example, terminal managers can expedite the ordering of repairs for a damaged container. In less than 10 minutes, systems on the mainframe can determine the location and availability of repair parts, schedule the repair, and download a repair estimate to be included in the inspection report and printed for drivers before they depart the yard.

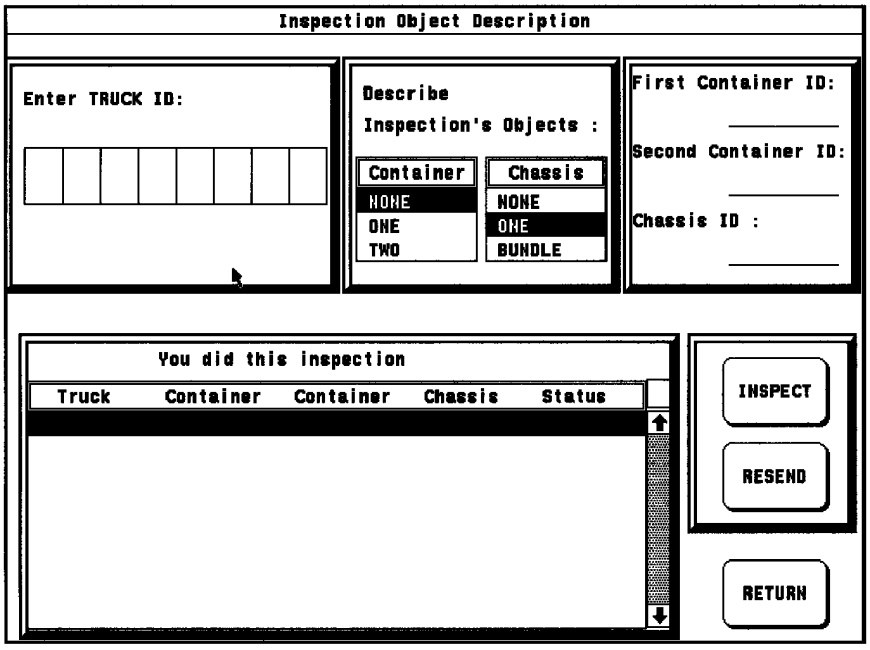
Time Down, Efficiency Up

Even with only the Gate module in full operation, TAS is already enhancing the efficiency of Sea-Land terminal operations. Improvements include a significant reduction in trucker turntimes, elimination of inspection forms, and filing, and faster data input.

One crucial benefit of TAS comes from the hand-held computers, which help expedite communications regarding the inspection and reporting of any damage to containers. "On the spot, inspectors can use the hand-held computer to record information about any damage," Tuosto points out. "Then they can transmit that information, including the container number and the required repair action, to the Microsoft

SQL Server database through the modem."

On the general administrative front, TAS is also helping to save time and steps by replacing paper forms with electronic ones. "For inspections, we were using a five-part carbon form that was awkward and time-consuming to complete and file," Tuosto reports. "Now we generate the same form electronically—it's even signed by the truck drivers right on the hand-held computer."



Going Global with TAS

The next step in the companywide transition to TAS is to complete and test the Yard and Marine modules in the company's Charleston, South Carolina, port. Then Sea-Land will implement TAS in its largest terminal facility, in Elizabeth, New Jersey. Over a three-year period, the company will also deploy TAS at 15 other Sea-Land terminals around the world.

Based on current benchmarking, TAS is expected to significantly boost operating efficiency in one key area at least: increasing the average number of crane lifts per hour. "That alone can directly improve the company's bottom line," Cerwonka notes. This improvement is expected to occur as TAS helps to reduce the time required for truck drivers to enter a facility, go though inspection, drop their containers in a predetermined location, and depart—with or without another container.

Based on the up-to-the-minute accuracy provided by TAS, another expected benefit is the elimination of many nonproductive or even counterproductive operations. "It should mean the end of such problems as placing containers on the opposite side of the yard from their destination ship or placing a container that's first out at the bottom of a stack," Tuosto says.

In a larger sense, by improving the interaction of all data throughout the terminal, TAS is expected to help Sea-Land better serve its customers. "If we can do our job better by removing unnecessary steps and improving our accuracy, the result is better service for our customers," Cerwonka says. Tuosto concurs: "TAS definitely fits the description of a mission-critical application. From an information-technology perspective, we've come a long way, and we're very confident of what TAS can do for us in the long run."

For More Information

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