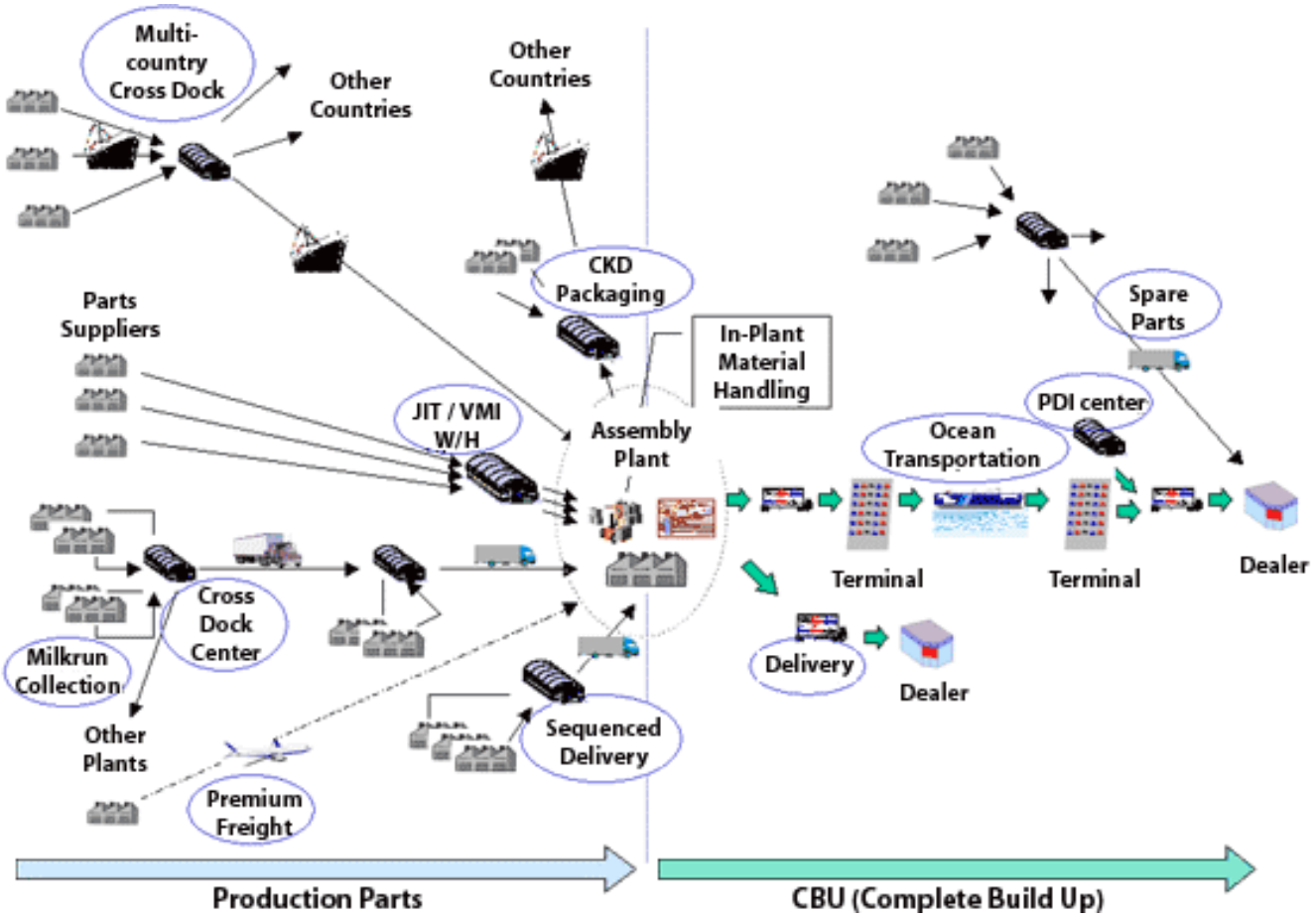
CAT – Complete Auto-logistics Technology

1. Introduction

This article presents a case study of an integrated system for complete built up (CBU) operations operated by NYK group. The system was developed by NYK RORO (Asia) Pte Ltd – Automotive Project team.

The main benefit bought by CAT over other systems are the abilities to adapt operation plans and schedules in response to unforeseen events, and to reduce overall manually coordination. This document gives an overview of the system, the development process and the main experiences and lessons learned.

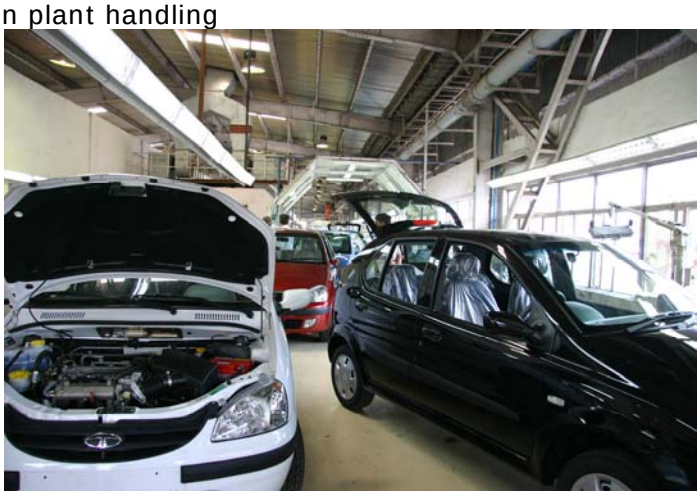


In 2003, NYK Car Carrier Group was incorporated into the Comprehensive Logistics Headquarters to which the logistics division belongs; further accelerating efforts to strengthen the comprehensive logistics service for finished cars so that NYK can better meet the diverse customer demands. Automotive Project team handle only CBU related operations that is from factory of completed cars to shipping to final destination, the dealer. The following are the operations by various countries:

Country	In plant handling	Ocean transport	PDI Center	Storage	Land Transport
Malaysia			☑	☑	☑
China				☑	☑
Thailand					☑
India	☑	☑		☑	☑
Philippines	☑	☑	☑	☑	☑
Singapore		☑			

Type of operations:

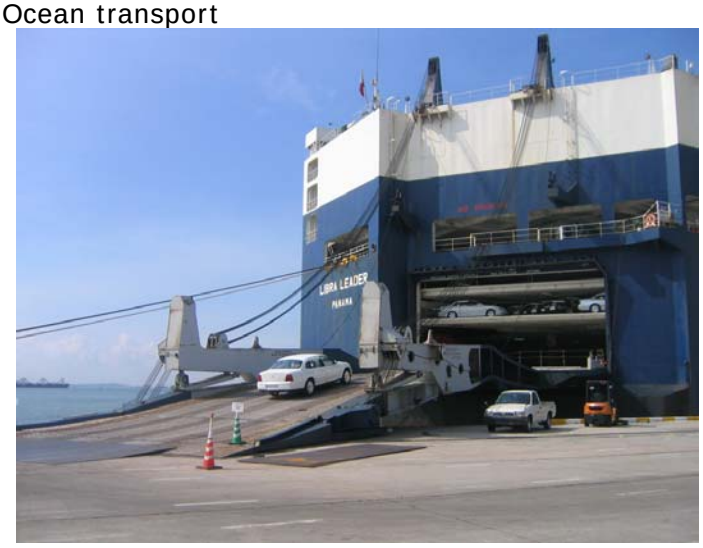
a. In plant handling



When the vehicles first rolled out from the factory, it will be move to an inspection area to inspect the vehicles road readiness. Once passed, the vehicle will be sent out from the factory.

NYK tasks: At the factory, we will received the cars from the factory and perform inspection on it. The inspection covers from paint defect/damage to functional of parts. Only cars without damages will be passed and sent to port/storage yard for further processes.

b. Ocean transport



NYK has the world's largest car-carrier fleet and with more than 20 new-buildings on order for delivery by 2009, fleet renewal is progressing steadily.

NYK tasks: At port upon unloading of vehicles at port, NYK will store the transit center at port. Once vessel docks and ready for loading, our stevedores will load the cars into the vessel. The map before show our vessels routes.

c. PDI Center

PDI Center or Pre-Delivery Inspection Center is where the cars are checked and ready for delivery to dealer.

NYK tasks: Our operations at PDI includes technical services, paint/body repair of defects/damages, installation of accessories such as leather seat, radio, reverse sensors, etc, washing, test drive, etc.

d. Storage

Storage usually consists of warehouses, distribution centers, transit centers at port, etc.

NYK tasks: We have an extensive range of distributions center with full covers and protected with high end security cameras. Aside of vehicle storage, we also perform maintenance such as battery and tire.

e. Land Transport

Land transport or inland transport involves car carrier transporting cars from factory/port to port/dealer, etc.

NYK tasks: Our inland transport include inland distribution –

a. from port to vehicle processing center (VPC)
b. from VPC to dealer – end customer
c. from port to dealer
d. from port to port
e. from factory to port
f. from factory to dealer
g. etc

NYK Group has vast experience in automotive related logistics; we are currently servicing major manufacturers with all the above operations. Our customers include Toyota, BMW, Honda, GM, Nissan, etc.

2. The operation problems

Due to huge operations scope and different customer's business nature, it is difficult to standardize data for meaningful management usage. For example, damage/defect reporting varies from each manufacturer and therefore it is difficult to analyze the damages or caused of damages, therefore the need to have a standard format of reporting is required.

Most off-the-shelf systems cater either one of the operations handle by NYK and not integrated; furthermore those systems are not design for CBU logistics, for example:

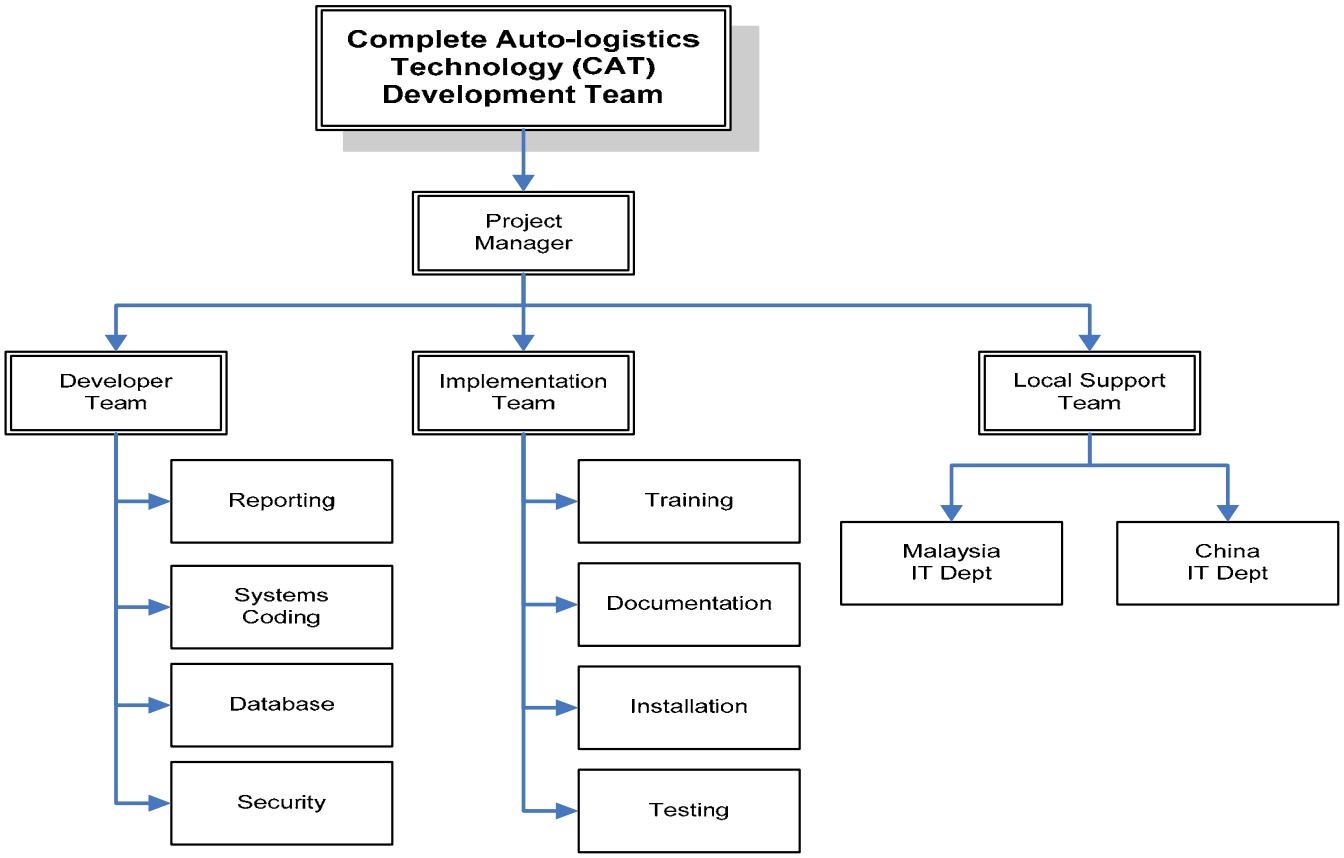
- transport management system (TMS) cater for container based transport
- warehouse management system (WMS) cater for itemize stocks and for complex warehouses

This is because these systems are designed for specific market needs and automotive logistics is not one of the markets. The challenge lies in creating a system that can control the inventory of cars, manage the maintenance/installation of parts, planning of transportation using various truck configurations, and lastly provide a standard reporting tool for manufacturers and NYK to understand all the collected data.

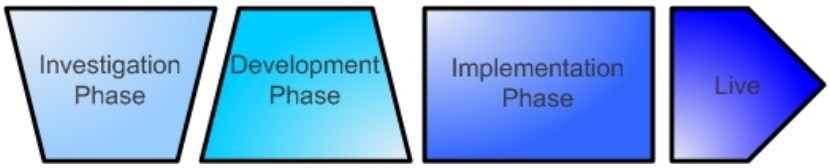
3. NYK RORO (Asia) Pte Ltd – Automotive Project (NYK-AP)

NYK RORO (Asia) Pte Ltd is part of NYK Group, which specializes in finished vehicle sector covering from owning PCC/RORO vessels and car carriers and transit/distribution centers. The IT project team was established in July 2002 to handle the regional IT matters for all automotive projects.

The team consists of:



4. Development process



a. Investigation Phase

The project started with three-month investigation phase, aimed at analyzing the business and technical requirements, to evaluate different solutions and to establish the value of in-house value in comparison with existing TMS and WMS.

In this stage, it is important that NYK-AP could deliver both standard large IT projects, successfully addressing complexity and scalability requirements, as well as providing dynamic optimization in real-time.

From perspective, NYK-AP proposed a detailed business case containing projections of cost and Return on Investment (ROI), for a subset of the business operations of the customer. In technical terms, CAT was compared with traditional TMS and WMS technology. The main advantage of CAT is that it provides automatic and optimized operation support and automatic integration with customer's SAP. While some systems also address the optimization problem, they use either linear programming or standard industry software packages for logistics. Moreover, traditional systems are designed for medium size logistics companies and therefore the optimization addresses only the local requirement and not regional level. In addition, some of them are only single user applications.

b. Development Phase

A six-month period followed in which the system specification was developed, through collaboration between NYK-AP and the customer, involving frequent face-to-face meetings (up to two or three times weekly) with local business and technical representatives.

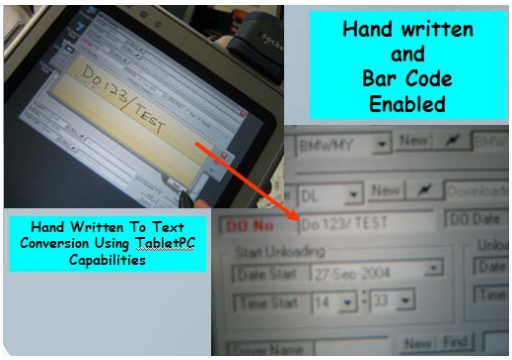
During the development process, one key aspect addressed was system usability and stability. To ensure easy adoption and operational of the final system, CAT user interfaces had to share functionality and design features with the user interfaces of traditional systems, both in terms of static features and features that allow the user to design and change the interface elements such as bi-lingua, etc.

In additional, the system needed to have only an assisting role, with an operational staff retaining full control over the information, given the experimental nature of the project. The operational staff thus needed to be able to override, at any time, system decisions and have the visual and functional facility to move into manual mode, thus falling back on the electronic switchboard.

c. Implementation Phase

The first implementation selected for the project was BMW distribution in Malaysia and China. The customers requirement was storage, in-storage maintenance and in-land transportation (plant/port – VDC – dealers).

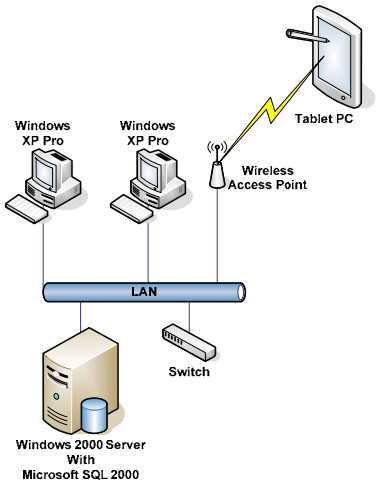
For our testing purposes, we planned two method of data entry, first is batch processing in China as the volume is higher and much more inventory, while in Malaysia, we will be using online data entry.



TabletPC was selected because of the size and the nature of data entry. It has built in wifi and light.

In order to have a standardize hardware setup, we decided to have all location installed the minimal setup of:

Server	**Windows 2000 Server** Hardware: ■ Pentium Xeon ■ 1GB RAM ■ 100GB Hard disk (with Raid-5)
Database	**Microsoft SQL 2000 Standard**
Client	**Desktop Requirement** ■ Windows XP Pro ■ Pentium IV ■ 512MB RAM **Tablet PC (Recommended HP TC1100)**
Networking	**LAN** ■ 100 Mbps (CAT-5) **Wireless Access Point** ■ 801.1G



As for installation in China, we decided not to install the WiFi access points and TabletPC as those items are not required during the initial phase of the implementation.

NYK also adopted the train-the-trainer approach of SDLC. For a copy of NYK-AP SDLC please contact Mr Lai Teck Chong (email: lai_teck_chong@sg.nykline.com)

5. Lessons and experiences

We at NYK RORO (Asia) Pte Ltd experience the successful adoption CAT depends on several factors, as follows:

a. It was important to help people understand the business value of CAT, to explain to them how the technology works and how to operations problem is approached. However, it was also essential that the system was not over emphasized in relation to other technical features necessary for the system to compare on the market. It was thus necessary to ensure that innovation was introduced only where needed and was balanced by standard features and functionality.

b. In the process of designing CAT, it was useful in attracting customer interest, as it was found intuitive way of modeling the business domain, through the one-to-one mapping between system and business roles.

c. Building a good customer relationship was crucial and required significant effort and cooperation fro both sides. For example, the developers needed time to completely dig into the domain and understand its special challenges in detail.

d. The challenge throughout the project was to deliver a system o industry-standard quality. It was thus important that development and deployment was approached with traditional system engineering methods and standards, traditional project and risk management techniques used for IT implementations.

e. A major challenge was to get users to accept and trust the results, and thus to start using the system on a daily basis.

Comment from Chief Developer – Mr Wong Siew Ken (NSRI)

Many systems failed simply because it is over emphasized on the management requirement and neglect the end user. Most management sees the value of system by the reports that the system generates. On the other hand, the users only need a reliable and efficient system which can assist them in their day to day work. In this relation it is crucial to get feedback from both the management and end user as it will determine the success of the CAT system.

During the development cycle for CAT, we have learned the way to balance between management and end user requirements but not without obstacles along the way. During initial implementation of the CAT, we have received complain from the user stating that the implementation of CAT system increases their workload and slowing down the vehicle receiving operation. We have investigated the complaints and we found there is nothing wrong with the receiving process as it being implemented according to the management requirement. As the implementation schedule getting tighter, we decided the best way of solving this problem is to get to the root of the problem. A team of system analyst is being deployed to work hand in hand with the user to find out the actual cause of problem. Finally after hours of investigation, the cause of the problem is being identified; it is the way the data is being captured. Each vehicle is having a unique identification number called VINNO (vehicle identification number) which consist 17 alphanumeric characters which can't be substituted accordance to the receiving process. Keying the VINNO is time consuming but crucial as a wrong VINNO entered during receiving process will lead to a chain of problems such as the car is not being maintained because the mechanic can't find the vehicle or even disrupt the distribution process. From the system point of view it is not wrong as on each received vehicle the VINNO is being cleared to make way for the next as to avoid duplication. But for the user, keying in the full set of VINNO is a mundane and time consuming job. At last after a thorough study, we have come up with a simple yet ingenious way to solve the problem. It is simply do not clear the VINNO after it is being saved. As the vehicle is being receive directly from the factory there is a high chance that the VINNO will come in sequence where the user will only need to change the last 5 digits of the VINNO. In addition a VINNO duplication check

is being introduced to avoid the user of having fast finger. The system is being modified and implemented straight away the result is astonishing, the data entry for the vehicle receiving has greatly improved.

The use the right tool at the right time is the key to success in many occasions, CAT system is originally being implemented in China where the operation do not need to have a real time vehicle receiving process simply because the vehicle receiving is being done on a common ground where it is neither near the factory nor the VDC. All the data for received vehicle is being keyed in batches. When CAT system being deployed in India a real time vehicle receiving process is being introduced oppose to the batch process in China. The fact is in India the receiving process is done within the factory compound geographically, it is feasible to have the area WIFI. By scanning the barcode (VINNO) of the vehicle the vehicle receiving process is being simplified and thus it is less room for error.

6. Summary

This case study has presented the implementation of a dynamic CBU operations system using latest technology. CAT is a system built by NYK RORO (Asia) Pte Ltd for all NYK Automotive Projects to make the operations more efficient and to reduce running costs. A combination of mechanisms are use to determine best operations practice. The system was used to support planning and also to provide information in real time.

Reference:

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