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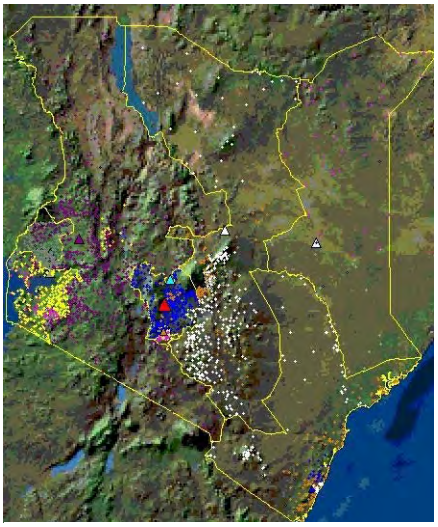
Quarter 3, 2009

Supply Chain Management Newsletter



A map showing Supply Chain Guru test sites in Kenya.

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AUGUST 2009

This publication was produced for review by the U.S. Agency for International Development. It was prepared by the USAID | DELIVER PROJECT, Task Order 1.

U.S. Agency for International Development
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Welcome to the Quarter 3, 2009 installment of the quarterly USAID | DELIVER PROJECT Supply Chain Management E-Newsletter. The e-newsletter includes articles on supply chain best practices, public and private sector supply chain technology, project topics, and descriptions and evaluations of pilot programs. The e-newsletter is also available on the USAID | DELIVER PROJECT website at www.deliver.jsi.com under Resources>Publications>Logistics Briefs and Success Stories>Supply Chain Management E-Newsletter: Quarter 3, 2009.

The team welcomes your input! To submit an idea for a future newsletter, or to share information with our readers, please contact Kelly Hamblin, Program Officer, at khamblin@jsi.com.

Supply Chain Guru: Applying Supply Chain Design Technology to Improve Medical Supply Distribution Networks in Kenya, Ethiopia, and Lesotho through World Bank Financing

Over the last year, through the support of the World Bank, successful network design projects have been accomplished in Kenya, Ethiopia, and Lesotho using Supply Chain Guru. SC Guru is a commercial supply chain analysis software tool that looks at all parts of the supply chain, integrating transportation, inventory, warehousing, and procurement into a single model. See the full article below.

Computer Assisted Packaging Evaluation (Cape)

Computer Assisted Packaging Evaluation (CAPE) was developed by CAPE Systems, Suite G03, The Perfume Factory, 140 Wales Farm Road, London; it has been utilised by supply chain and packaging practitioners in its various evolutionary forms for some 25 years. See the full article below.

Vehicle Routing Software

Vehicle routing is one of the most critical elements in managing a supply chain. As routing becomes more complex, software

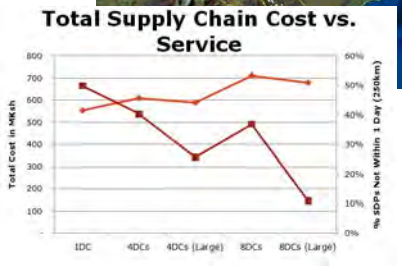
applications can be used to help the transport manager or the supply chain manger come up with a good routing plan to move the flow of resources as they are transported on vehicles. See the full article below.

Supply Chain Guru: Applying Supply Chain Design Technology to Improve Medical Supply Distribution Networks in Kenya, Ethiopia, and Lesotho through World Bank Financing

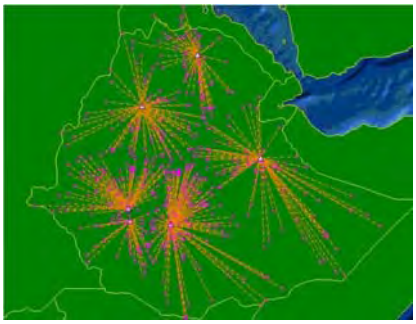
Contributed by Donald Hicks, President and CEO, LLamasoft, Inc.

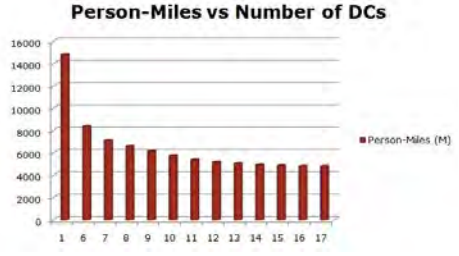
Over the last year, through the support of the World Bank, successful network design projects have been accomplished in Kenya, Ethiopia, and Lesotho using Supply Chain Guru. SC Guru is a commercial supply chain analysis software tool that looks at all parts of the supply chain, integratingtransportation, inventory, warehousing, and procurement into a single model. The tool enables optimization and simulation, providing a "big picture" of the current and future network changes.

In Kenya, the Kenya Medical Supplies Agency (KEMSA), a parastatal, faces many challenges in achieving its mandate as the leading supplier of quality and affordable essential medical commodities to health facilities in Kenya. Supply Chain Guru was used to model the national distribution network and helped establish adequate ministry financing as the most important priority for improving access to supplies. Guru also determined the effects of decentralization on accessibility to supplies for the entire population.

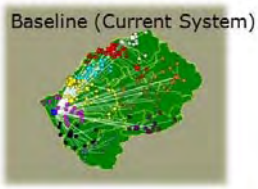


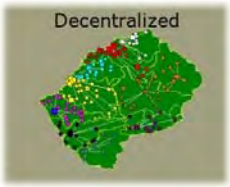
Ethiopia is currently planning to expand its national network of warehouses. By incorporating population data, transportation, and warehousing cost estimates and actual road distances, Supply Chain Guru helped refine warehouse locations and produced the priorities about which warehouses would have the biggest effects on health, which villages would be served by which warehouse, and how big the warehouses would need to be.

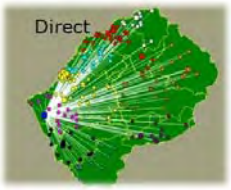




Finally, in Lesotho, a relatively small country facing some of the steepest HIV infection rates in Africa, the focus was on inventory: how much inventory is needed to achieve the high availability rates needed for uninterrupted access to critical antriretrovirals (ARVs)? By profiling demand variability and supplier performance, analysts using Supply Chain Guru were able to target variability in supplier replenishment times as the key to improving service and reducing







stockouts. When lead times can vary from 3–12 months, inventory levels have to be impossibly high to ensure availability!

Supply chain network design is a standard, widely utilized approach to strategic planning for large multinational companies and logistics providers. Network design hasn't been applied as much in the public health sector, mostly due to a perceived lack of data and tools that can tolerate missing data. Additionally, while public health supply chains focus on service, access, and equity, commercial supply chains largely focus on financial measures, such as cost and profit.

Recent advances in geographic data access, adoption of warehouse management systems (WMS) and enterprise resource planning information technology (ERP IT) systems, and improved network planning software tools opened up a whole new way to look at supply chain problems, making network design and strategy a powerful and highly relevant new approach for looking at the "big picture."

By looking at the entire supply chain as a single system, we can see what kind of service the network is "designed" to deliver and what the highest priority leverage points are in the supply chain. All improvement projects can help public health supply chains perform better, but Supply Chain Guru can clearly help figure out which projects will have the most impact in the long term, not just the short term.
The data for the three country studies were provided by the World Bank.

Editor's Note: The USAID | DELIVER PROJECT is authorized to use Supply Chain Guru to perform supply chain analyses. To request an analysis of your system, please contact the project at askdeliver@jsi.com.

COMPUTER ASSISTED PACKAGING EVALUATION (CAPE)

Contributed by Andrew Hayman, Pharmaceutical Healthcare Distributors (An SCMS Partner).

CAPE was developed by CAPE Systems, Suite G03, The Perfume Factory, 140 Wales Farm Road, London; it has been utilised by supply chain and packaging practitioners in its various evolutionary forms for some 25 years.

There are three main areas of use, being—

PALLET LITE: An entry level palletising program that helps the user create pallet patterns

Enter the case dimensions, select a pallet type, then input the maximum height and weight of the pallet. PALLET LITE will provide the user with a range of palletising reports that can be printed, emailed as a pdf file, or interfaced with another program application.

CAPE PACK: Improve the efficiency of a product, from design to delivery

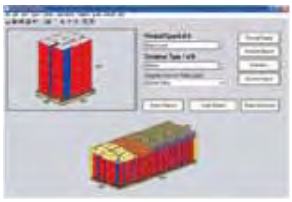
For a modular suite of programs to help determine the best product size, case count, case size, and pallet load, start with an existing case size, an existing product size, or even use the program to determine a new product size.

TRUCKFILL: Easy to use load planning software

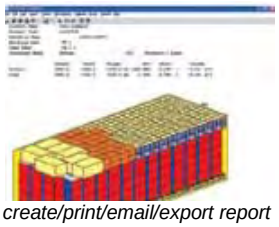
Select the size of the container or truck you wish to load. Enter the dimensions and quantities of your product or pallet loads. Define any loading restrictions, such as priority codes, stacking rules, or loading sequences. TRUCKFILL will calculate a plan for you, or you can create your own custom load using the 3D editor.

Select items & quantity

select container/truck



view loads on screen



create/print/email/export report

From a practical perspective, the main utilisation on Supply Chain Management System (SCMS) projects has been in the area of product palletisation although, as will be demonstrated, examples have been produced for the utilisation of CAPE PACK to evaluate how carton and case-fill changes could optimise the pallet fill for a product, with a view to reducing costs and increasing efficiencies.

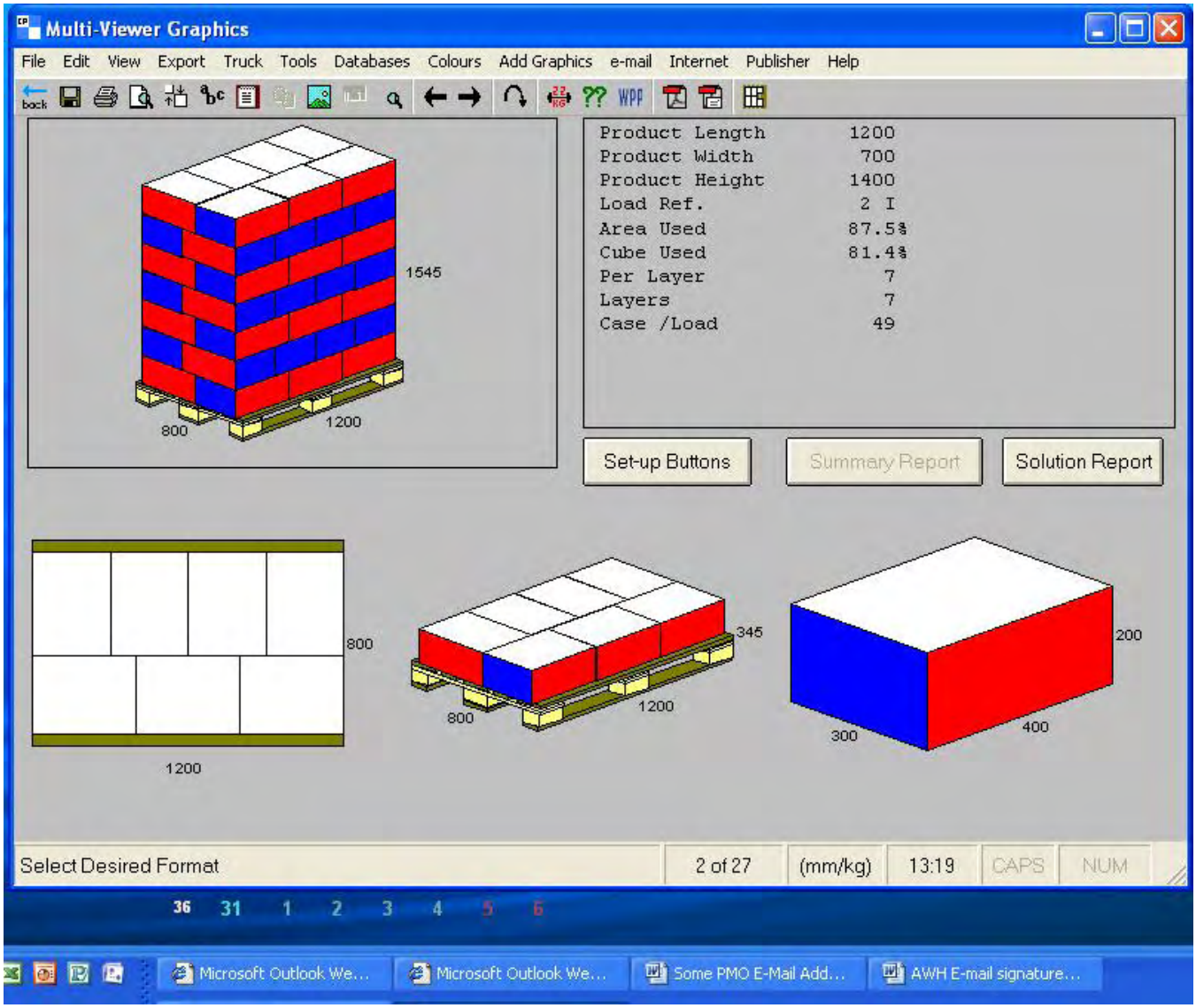
For Rwanda and Mozambique, more than 700 pallet patterns for each country have been produced to assist the warehouse operatives in creating the optimum pallet fill.

The CAPE system utilises the parameters of product carton dimensions, weight, pallet dimensions, maximum weight on the pallet, and maximum load height, all of which are relative to utilising the pallet racking space to its maximum. The weight of the pallet has to be restricted to what the racking beam can bear as a load factor. If the maximum beam load factor is 2,500 kgs, then the three Europallets can only be loaded to a maximum of 800 kgs each; this restriction the system takes into consideration.

If the pallet racking aperture height is restricted to 1.7 metres (1700 mm), then the system will only load the pallet to that height—including the height of the pallet itself.

The system allows the user to view all the potential pallet patterns and to determine and select whichever one provides the greatest stability to ensure less risk of the pallet load falling over when being moved. The printed pallet patterns from the saved solutions can then be used as training documents for the warehouse operatives.

Example 1 – Cape Pallet Pattern

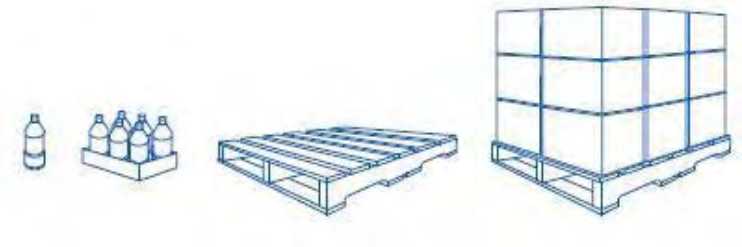


As can be seen, the layers 2; 4 & 6 have been reversed to provide greater stability. This is a feature of the software that provides the user with the ability to create a more stable load.

To create the above final result, literally takes a few minutes and, therefore, provides the user with a major time-saving opportunity.

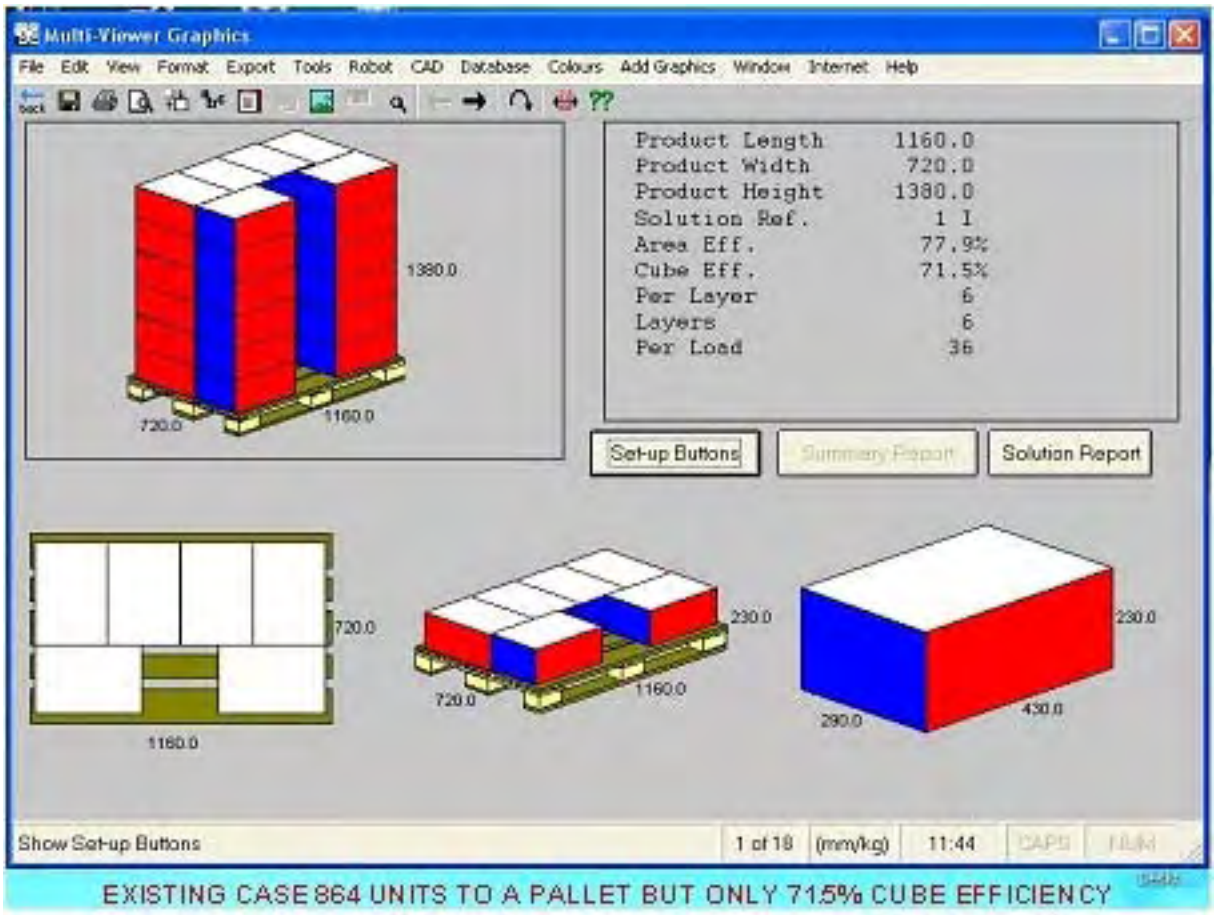
One of the major challenges in our work is that very few of the suppliers in Africa actually configure their case dimensions to fit the Europallet, which is the main type of pallet used. This pallet has dimensions of 1200 mm x 800 mm x 145 mm.

Here is where one of the system functions can be used to identify what would be the best case dimensions to optimise the utilisation of the Europallet.

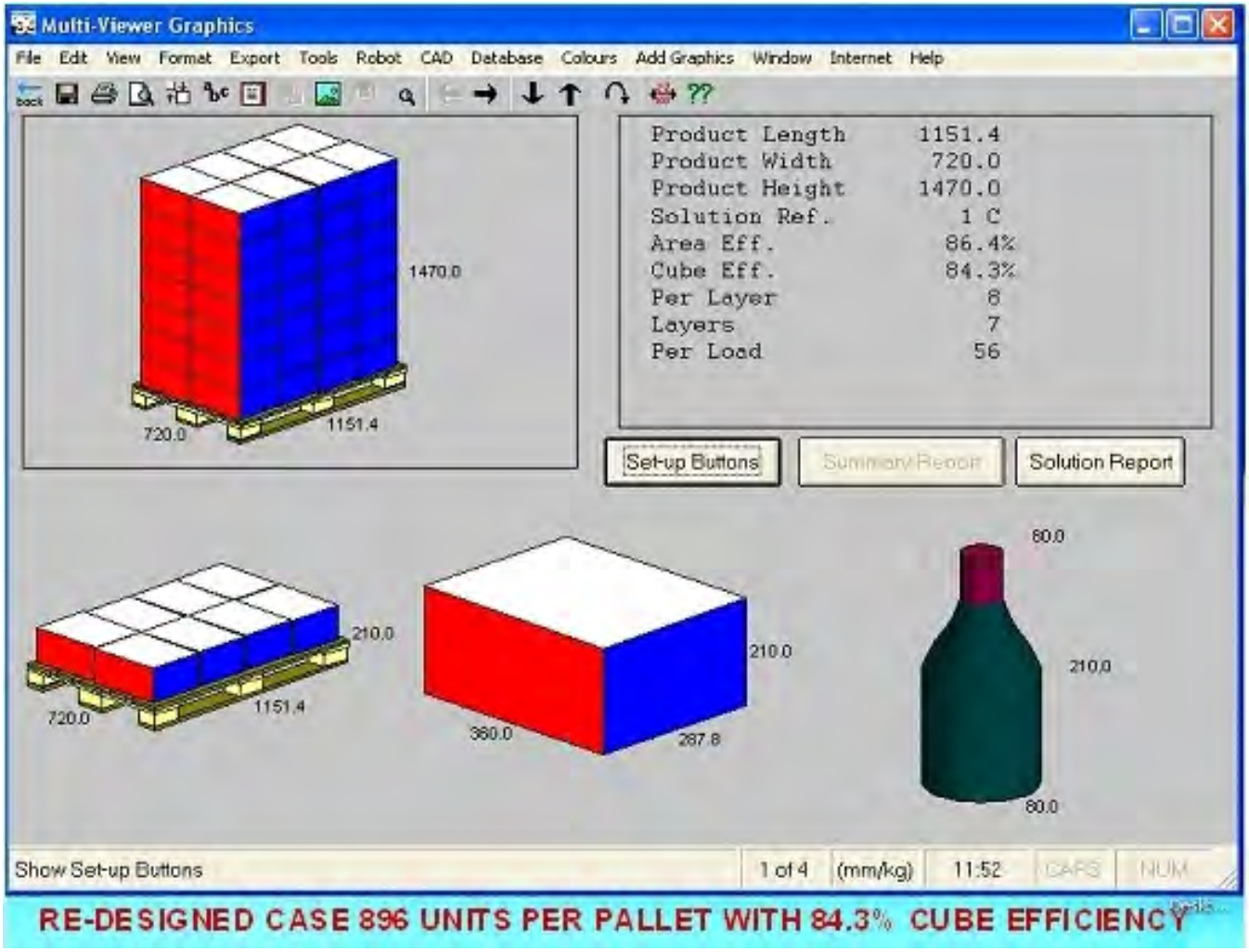


Taking the primary pack and working back from the pallet dimensions to establish how many of the primary pack should be in the case in order to optimise the cube and, from there, the pallet-fill.

This example is of an I.V. fluid—10% glucose.



When the system is requested to calculate the best possible primary pack to case to pallet correlation the difference in pallet fill can be demonstrated in the following schematic and analysis.



The **case dimensions will change**

FROM : Length 43 cm, Width 29 cm, Height 23 cm

TO : Length 36 cm, Width 28.78, Height 21cm

And from 24 units to a case to 16 units to a case24 units to a case to 16 units to a case

OVERALL IMPROVEMENT in the number of bottles to the pallet—from 864 to 896 or 4 percent

Which means 4 percent less pallets to be used, 4 percent less pallet spaces are required to store the product, 4 percent less handling for this product involving human and materials handling equipment resources, and 4 percent less delivery vehicle space required.

The power and flexibility of the CAPE system offers the ability to look at packaging from a different perspective. If pharmaceutical manufacturers developed a packaging solution for Africa that optimized the Europallet fill then the cost reductions to African nations would be quite significant. There are very high volumes of product going to service the various health needs of the African continent and, therefore, from a manufacturing perspective, the on-cost to create an "AFRICAN" solution would be minimal. CAPE can be

obtained by contacting sales@capesystemseuro.com. For those affiliated with SCMS, contact SCMS for additional information.

Vehicle Routing Software

Background

Vehicle routing is one of the most critical elements in managing a supply chain. Vehicle routing can be applied in various settings and usually consists of freight routing (shipments), service routing (dispatching of repair technicians) and passenger routing (people). We will focus on the first type, e.g., freight routing, where goods located at a central depot or intermediate depot need to be delivered to customers who have placed orders for these goods. In its simplest form, freight routing determines how many vehicles should be on the road, where they should deliver/pick-up, and the sequence of delivery/pick-up. It can also determine at what time the vehicles should arrive at each stop and what time they should start and return to their depot.

The purpose of vehicle routing is to organize transport resources as efficiently and effectively as possible. With many customers, different route options and a set number of available vehicles, the task of coming up with an optimized routing plan can be daunting. In most organizations, vehicle routing is carried out by a person or persons working in the dispatch unit, with dispatchers having many years of local knowledge. But as routing becomes more complex, software applications can be used to help the transport manager or the supply chain manger come up with a good routing plan to move the flow of resources as they are transported on vehicles.

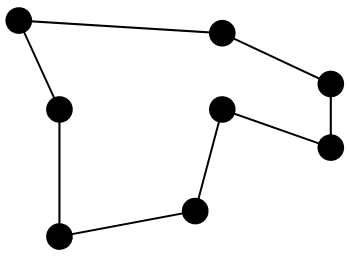
Routing software

Routing software has three basic functions—

- assignment of work (shipments) to drivers and terminals
- sequencing stops on routes
- scheduling stops.

Routing cannot and should not follow a "one-size-fits-all" formula. Routing software is usually customized to reflect the operating environment, the customer needs, and characteristics of a geographic area.

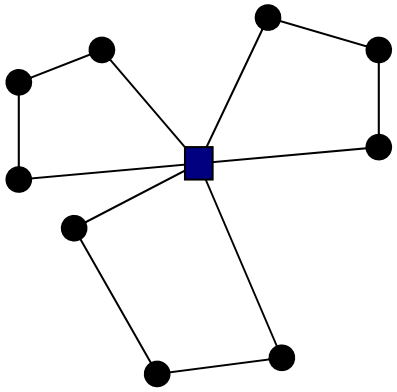
There are several models to choose from depending on the need:



Traveling Salesman Problem

The objective is to find the shortest route through a set of sites, visiting each site exactly once and returning to the starting point.

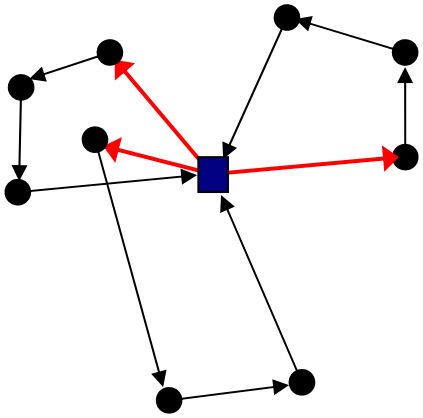
The type of decision: routing.



Vehicle Routing Problem

In this case, a number of vehicles located at the central depot have to serve a set of geographically dispersed customers. Each vehicle has a given capacity and each customer, a given demand. The objective is to minimize the total distance traveled.

The type of decision: assigning and routing



Vehicle Routing Problem with Time Windows

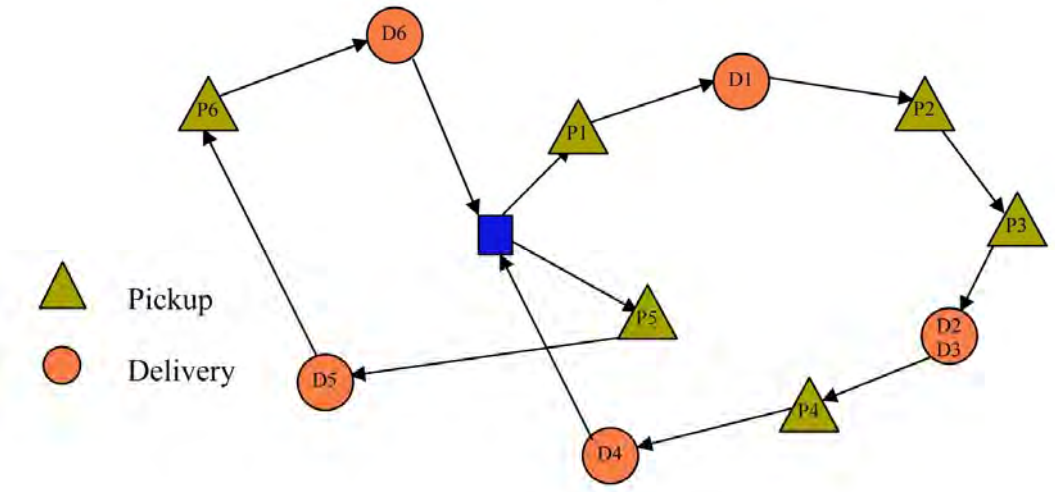
This case is similar to the one above with the addition that each customer has to be served within a given time window.

The type of decision: assigning, routing and scheduling

Pickup and Delivery Problem with Time Windows

In this instance, a number of vehicles serve a number of transportation requests. Each vehicle has a given capacity. Each transportation request specifies the size of the load to be transported; the location where it is to be picked up, plus a pickup time window; and the location where it is to be delivered, plus a delivery time window.

The type of decision: assigning, routing and scheduling.



When choosing the appropriate model and software, there are many practical issues to consider, such as single or multiple depots; types of vehicles and their capacity; driver availability; whether delivery windows are flexible or not; service requirements, such as maximum wait time; fixed or variable regions/routes, etc. New features are now being added to vehicle routing software, such as driving directions using a global positioning system (GPS) and wireless communication.

Advantages of vehicle routing

There are many advantages to using vehicle routing software, the main ones being—

- improved customer service with set delivery schedules
- reduction in the cost of operating fleets
- increase in the productivity of drivers and vehicles
- ability to serve more customers.

But, as with all software, a detailed needs assessment is required, and once this has taken place, you can chose the software application that meets those needs most adequately.

Sources: Vehicle Routing and Scheduling presentation by Martin Savelsbergh of the Logistics Institute, Georgia Institute of Technology, given at the Institute for Mathematics and its Applications at the University of Minnesota, September 9-13, 2002 (www.ima.umn.edu.talks/workshops/9-9-13.2002/savelsbergh/VRP_part1.pdf) accessed July 30, 2009; Operations Research Management Science Today – June 2006 (www.lionhrtpub.com/orms/orms-6-06/frvehiclerouting.html) accessed July 30, 2009; Truck Dispatching Innovations – Dynamic Routing Software (www.tdinnovations.com/routing.html) accessed July 27, 2009; Dynamic Routing Solutions (www.dynamicrs.com/overview.htm) accessed July 27, 2009; Vehicle Routing Problems, Instituto Dalle Molle di Studi sull'Intelligenza Artificiale (http://www.idsia.ch/~monaldo/vrp.html) accessed July 30, 2009.

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