Transportation Management with SAP TM 9

A Hands-On guide to Configuring, Implementing, and Optimizing SAP TM

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Contents at a Glance

Introduction

Globalization has played a crucial role in the expansion of supply chains across countries and continents into ever-changing worldwide networks. Manufacturers, driven by the desire to produce cost-effective, high-quality products are continuing to extend their supply-demand chains, introducing new challenges to these networks. This seismic shift has lead to the phasing out of internal logistics functions, and a move towards third-party logistics providers (3PLs), enabling manufacturers to focus on their core business areas. 3PLs are challenged daily by demanding customers, changing regulations, compliance standards, and gaps between their information technology (IT) maturity and customers' expectations. Hence, 3PLs have started to simplify, modernize, and standardize their IT systems. The aim is to build a system landscape that can address all of their requirements, while replacing most of the existing complex and fragmented systems with a robust platform. In particular, applications that deal with critical functional areas, such as order management, transportation planning, execution, warehousing, finance, billing, and pricing and costing are in need of attention. TMS (transportation management systems) has therefore emerged as one of the critical areas, if not the most critical one.

Implementation of a TMS is key. If executed well, a good TMS can deliver many benefits to an organization in terms of optimization, improved efficiency, reduced errors, and increased revenue. However, a number of projects fail to achieve these objectives for a host of reasons, including incorrect product selection, overcustomization of the system, lack of standardized processes, and little support from management. In realizing the maximum benefit from a TMS, the product selection process and implementation methodology play significant roles.

This book provides insights intended to make the SAP Transportation Management (SAP TM) journey more relevant and fruitful. With a proven evaluation framework and solid recommendations, the book is useful for executives, pre-sales teams, and implementation and rollout teams. Furthermore, it can help decision makers, such as chief intelligence officers (CIOs) and chief experience officers (CXOs), with the important tasks of selecting a product, creating a business case for management approval, and designing a future road map for the organization. Combining the results of research and analysis and knowledge gained from experience working with industry leaders, the book helps to advance the understanding of SAP TM, and it serves as a step-by-step implementation and rollout guide.

This book is structured as follows:

- Transportation Industry Overview: 3PL Perspective

- The Need for TMS: Challenges and IT Landscape

- TMS Product Landscape: Vendors, Product Overview, Plans, and Comparison

- SAP TM: Overview, Architecture, and Road Map

- TMS Selection Framework

- Industry Best Practices for Implementation, Rollout, and Maintenance of SAP TM

- Team Composition and Skill Matrix Required for TM Engagement and How to Build Competency in TM

- Transformation Impact of SAP TM Implementation

- New Dimension Products: HANA, Mobility, and Analytics—Their Impact on Transportation Management

- Process Mapping End-to-End Freight Life-Cycle Scenarios

- Step-by-Step Guide to Configuring and Implementing SAP TM 9.0

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Transportation Industry Overview: 3PL Perspective

In this chapter, we will discuss the following:

- How the third-party logistics provider (3PL) industry evolved

- Services offered by 3PLs

- Expectations of 3PLs' customers in terms of technology and service offerings

- The way forward

A few decades ago, it was normal practice for freight owners (manufacturers/shippers) to deliver their products to wholesalers and retailers using their own in-house fleet of vehicles. Often, products did not reach customers on time, owing to the unavailability of these vehicles, resulting in loss of opportunity and revenue, not to mention customer dissatisfaction. When manufacturers/shippers started selling their goods internationally, this issue became more serious. During this time, many organizations engaged local road carriers owning one or two trucks/trailers to supplement the work of their fleet. They discovered that such outsourcing was cost-effective and flexible and allowed them to be free of capital investment and the hassle of maintaining aging assets. Soon, using hired or contracted vehicles became a universally accepted method of inland transport. Furthermore, freight owners instituted use of long-term contracts with these types of carriers to avoid any uncertainty regarding services and transportation costs. Carriers owning one or two vehicles increased their fleet sizes and introduced different vehicle types to qualify for these long-term contracts that awarded them a committed volume of business.

As international trade flourished, products began crossing borders. Manufacturers/shippers recruited professionals with import/export and international ocean and airfreight-forwarding experience to manage the movement of their products. To obtain customs clearance, contact and book carriers, provide documentation, and handle the various legal aspects of international shipping, a team of tens to hundreds was required, depending on the size of the business and the location and nature of the freight. Yet, setting up transportation on other continents remained a major challenge. The unpredictable increase in business on some trade lanes and the laws of the importing country added to the complexity of the transportation business.

Globalization forced manufacturers/shippers and retailers to produce products that were cost-effective but high quality. Many well-known and established brands were being challenged by new brands in terms of lower customer prices because the new brands had operation costs comparatively lower than those of their competitors. All aspects of cost contribution that were increasing expenditures in the supply chain were analyzed. Extended supply chains, reduced inventories, shortened product life cycles, and increased freight cost and handling charges were a few factors leading to an increase in the cost of supply chain operations. Outsourced logistics was a new idea that emerged during this time. Manufacturers/shippers started focusing on their core areas, while transferring logistics functions to outsourced 3PLs.

As 3PLs took on these new clients, the greater freight and handling costs compelled the 3PLs to venture into organizing transportation activities, such as:

- Consolidation of small freight with freight from other manufacturers/shippers to build volume and thereby get better rates from air and ocean carriers

- Customs clearance

- Rate negotiation with inland carriers

- Carrying out part of the documentation

- Arranging for temporary storage of freight

Initially, manufacturers/shippers watchfully assigned 3PLs a relatively limited number of services, such as transportation needs and managing warehouses, but subsequently started employing 3PLs to do more. In this way, 3PLs gained experience and expertise in delivering core and associated services, thereby gaining customers' confidence.

Manufacturers/shippers that chose not to use 3PLs at that time did so for the following reasons:

- Logistics operation requires core competency and hence cannot be outsourced; furthermore, meeting level of service was perceived as a risk.

- Outsourcing was not seen as cost saving.

- Logistics experts in their organization did not want to lose their importance and control.

- Difficulty of integrating the organization's Internet technology (IT) systems with those of the 3PL.

- Freight security was their concern.

- Inhibition of relationships with 3PLs.

- Insufficient geographical coverage of 3PLs.

- Bitter experience in the past.

During the initial phases, 3PLs offered a maximum of two types of service, such that the manufacturer/shipper might get only trucking, only customs clearance, or only warehousing and rate negotiation with carriers. Geographical coverage was also limited. 3PLs were mostly local, proprietary firms with small teams. However, the demands of the manufacturing/shipping community and growing world trade soon created longer and more complex supply chains and their associated logistics processes. To address this demand, 3PLs began to partner with other logistics companies in different countries, with specialization and expertise. These arrangements gave the 3PLs time to establish themselves. However, differences in culture, level of development, and technology were major impediments in such relationships. 3PL industry leaders started phasing out these business relationships by opening their own offices in some countries. Moreover, increasingly global manufacturers/shippers wanted a single point of contact for their outsourced logistics. Large and global manufacturers/shippers were often looking for large, financially stable 3PLs that could provide all services and wider geographic coverage. Geographic and portfolio expansion, therefore, remained a priority for 3PLs. Large 3PLs began exploring opportunities to acquire partners where the 3PLs did not have a presence. The period 1996–2006 witnessed major acquisitions and mergers.

After a set of initial hiccups, parent 3PLs and acquired 3PLs started working together as a single company. Standardizing the process across the organization would remain a major challenge for many years. Business-process mapping, analysis, and automation helped achieve some movement toward standardization. Training helped standardize organizations further. Incorporating local requirements and ways of working into standard, global processes was a Herculean task. Today, most leading 3PLs have documentation regarding their processes. However, technology consolidation has continued to be a major problem area. 3PLs use different applications, most of which are homegrown. These applications not only have scalability and integration issues, but also are functionally poor. 3PLs are working on rationalizing their technology landscape to reduce the gap in IT expectation experienced by

their customers, something that is being discussed in every logistics forum. Some 3PLs are looking at their technology landscape holistically, but in most cases, it is still project focused and more tactical. Manufacturers/Shippers want 3PLs to offer comprehensive and easily integrated solutions; to do so, 3PLs need to have a clearer picture of the manufacturer/shipper supply chain. A collaborative approach between manufacturer/shipper and 3PL remains the only way to improve manufacturer/shipper satisfaction with the 3PL's IT capabilities and the relationship between manufacturer/shipper and 3PL. Today, most manufacturers/shippers believe that their 3PLs should have the following execution-oriented enablers and tools:

- Network modeling and optimization

- Order management

- Collaboration portals for booking, tracking, and payment

- Collaboration tools (SharePoint, Lotus Notes, video conferencing, and so on)

- Electronic data interchange (orders, advance shipment notices, invoicing)

- Transportation management: planning, sourcing, and execution

- Yard management

- Warehouse management

- Event management and track and trace

- Supply chain event management

- Bar coding

- Radio frequency identification (RFID)

- Global trade management tools

- Advanced analytics and data-mining tools

The large 3PLs are expanding their portfolio and coverage. There are more than a dozen organizations globally, with annual turnover in excess of five billion dollars. The revenue of the 3PL industry has been growing continuously as a result of more and more manufacturers/shippers' opting for outsourcing rather than insourcing. Furthermore, manufacturers/shippers are also considering a reduction in the number of 3PLs engaged by them.

3PLs are major employers in many countries. 3PLs have been elevated to partner status, which essentially means that they have exceeded their customers' expectations. These 3PLs have visibility in the manufacturer/shipper supply chain, which helps them forecast and plan their resources/operations more effectively and offer cost advantage and superior service to their customers. Moreover, 3PLs play an important role in network planning and streamlining supply chain operation. Manufacturers/Shippers are satisfied with the updated information shared by 3PLs and regard these companies as sufficiently agile and flexible. Manufacturers/Shippers largely view these relationships as successful and have gained incremental benefits yearly.

Having spent time with many industries, in diverse locales, and experienced complexity in the supply chain, 3PLs forecasted a huge demand for their services. 3PLs learned, adopted, and built offerings that help manufacturers/shippers reduce their logistics costs, giving them time to market and increase the quality of their services. The 3PL advantage lies in its commitment to surpassing customer expectations and maintaining a can-do attitude.

Today, 3PLs have mature offerings in the following areas:

- Ocean and airfreight forwarding

- Transportation execution

- Freight bill payment

- Negotiation with carrier

- Merging freight while on the move

- Letters of credit

- Freight insurance

- Consolidation

- Deconsolidation, breaking bulk

- Nonvessel operating common carrier operations

- Track and trace

- Cross-border services

- Value-added services

- And more!

Some of the leading 3PLs have further elevated themselves to lead logistics service provider (4PL). These companies coordinate activities and monitor the performance and contracts of other logistics companies on behalf of manufacturers/shippers. 4PLs also provide technology know-how to manufacturers/shippers and, at times, undertake their business processes. 4PLs are seen as a partner that helps large manufacturers/shippers gain supply chain efficiency. More and more Fortune 100 organizations are using 4PLs.

In addition, growing prosperity in Southeast Asia is causing consumer markets to boom. Eyeing the opportunities, the leading global 3PLs from the rest of the world have already ramped up their operations in this region.

While the 3PL industry is trying to expand its portfolio, increase revenues, and move into different regions, it is under tremendous pressure to survive among growing competition. The industry is challenged by

- Demanding customers

- Changing regulations and compliance standards

- Lack of skilled/experienced labor resources

- Gap between IT maturity and customer requirements/expectations

Let's take a look at the industry's existing technology landscape. In many cases, it is the result of one or more of the following:

- Underdeveloped IT strategy, onboarding, system retention (of acquired organizations)

- Decentralized development responsibilities

- Deficient technology: multiple applications providing similar functionalities, old technology platforms, one-to-one integration, poor functional coverage

- High maintenance costs, lack of support

- Unavailability of systems, nonscalable transaction-capturing systems

- Merged entities' continuing on with individual legacy systems

- Poor return on investment

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Summary

In this chapter, we explained the evolution of 3PLs and the problems and challenges they face. 3PLs need to focus on rationalizing their application landscape, particularly applications that deal with critical functional areas, such as order management, transportation planning, execution, pricing and costing, warehousing, finance, and billing. These applications have to be looked at holistically, as 3PLs do not have time to deal with them individually. Every day that goes by in which a company lacks integrated, technically sound, functionally rich, architecturally well-designed, user-friendly applications (preferably on a single platform) to address these critical functions is a day in which that company is falling behind the competition. A transportation management system (TMS) covering these business functionalities remains a top priority for 3PLs.

The Need for TMS: Challenges, IT Landscape

In this chapter, we will cover

- The need for a transportation management system (TMS)
- Why third-party logistics providers (3PLs) should invest in TMS product selection
- Benefits of the software as a service (SaaS) model
- What TMS offers
- The role of software systems integrators (SIs)

The growth of the 3PL industry is dependent on the performance of overall trade. The 3PL industry has grown every time the trade industry has performed better. The present economy has created growth and profit challenges for the industry.

When asked, how they plan to expand their business, moving forward their responses usually include one or more of the following strategies:

- **Global expansion**: Asian markets are performing better than those on other continents. Increased consumption by Asians, ready availability of skilled resources at reasonable rates, and cost-effective production are among the primary reasons for the growth of these markets. In the past, European 3PLs looked to North America for growth, and vice versa. Today, all 3PLs have their sights set on Asia. Most of the leading 3PLs have created a wider network that provides all kinds of logistics services and value-added services that customers in European and North America regions enjoy.

- **Introduction of new lines of service**: In the last decade, most 3PLs have started offering a range of services as part of their growth strategy. This change is a result of consolidation and customer demand. Today, you will find warehousing organizations that have transportation services; freight forwarders that supply customs brokerage services; and road transport companies that furnish value-added services, warehousing, and freight forwarding by air, ocean, and rail.

- **Targeting new industry segments**: 3PLs that began their operations by serving a particular industry created expertise for that industry's needs over a period of time.3PLs are now looking to leverage their capabilities in order to grow in other industries with similar customer requirements.

- **Penetrating the small and medium-size markets**: The vast majority of companies that work with 3PLs are tier 1 enterprises (annual revenues exceeding one billion dollars). However, this market segment is almost saturated, so 3PLs have started offering logistics services to small and medium-size businesses as a means of sustaining growth. There was less reason for 3PLs to focus on this market segment years ago, when there were plenty of multiyear, multimillion dollar contracts available from large customers. But, such large-scale opportunities are relatively few these days; an increasing number of the requests for proposals (RFPs) received for services are smaller in scale and scope than in the past. To maintain their already slim profit margins, service providers have to offset these smaller revenue opportunities with lower operating costs.

- **Merger and acquisition**: There have been many mergers and acquisitions in the 3PL industry over the past decade. This allows 3PLs to continue to reach out to newer regions and industry segments and to acquire expertise in other services.

One of the key constraints in achieving merger and acquisition goals is the existing Internet technology (IT) landscape. However, many companies have started to simplify, modernize, and standardize their IT systems, recognizing that the existing landscape is becoming an impediment to their growth.

In 2001 we were a part of a team that developed a TMS for India's leading logistics company. Modules included registering business entities (customers, vendors, partners), contract capturing, order management, execution, billing, and reporting. Furthermore, we integrated these with SAP, FICO, SD, and vehicle-tracking systems. Work continued for more than a year, during which we followed the software development life cycle religiously. The team size at peak was close to seventy associates. After moving on to another project and subsequently to another organization, we remained in touch with some of our colleagues who were supporting the TMS we developed. One day, we heard that the management had decided to invest in a best-of-breed TMS product. They called a few product vendors for a demonstration. One of the vendors started carrying out a proof of concept for them. None of the products could meet the organization's requirements. However, this vendor agreed to bridge the gaps identified in its product during a joint evaluation. A road map was drawn. Then, we learned that the second attempt did not materialize and that the company had gone on to explore yet another option.

We were sad to know that the system we had built over several months was not being used. A lot of money and time were invested in a sincere effort by stakeholders and the project team to make a system that would go a long way—a system we had basically conceptualized as an enterprise resource planning (ERP) system for a road transportation business in India. So, what went wrong? Who should be held responsible? Why had the opportunity been lost? Many more unanswered questions troubled us for months, after which we attended a seminar on TMS. Our questions were answered as we consulted international logistics players. Whereas we had just started developing TMS for Indian companies, others had already been on a similar journey; our experiences were not any different from theirs. For many, the aim was to build a system that could address all the company's requirements and replace most of the existing landscape. In reality, many initiatives went on hold because of budgetary constraints; some kept missing deadlines, and others concluded with their scope reduced to less than half its original size. In contrast, a few developers took a narrow view, creating systems for their business unit, location, and functional areas. Others tried their hand at products. Partially available functionalities and unclear and sometimes noncommittal product road maps forced 3PL companies to live with whatever they got. They kept building systems around these products or continued doing many things manually or inefficiently.

3PLs are under tremendous pressure to survive among growing competition. They are challenged by demanding customers, changing regulations and compliance standards, a lack of skilled/experienced labor resources, and gaps between their IT maturity and their customers' requirements/expectations. In many cases, their existing technology landscape is the result of an underdeveloped IT strategy, onboarding, system retention (of acquired organizations), and decentralized development responsibilities. The current landscape therefore has characteristics such as deficient technology, multiple applications providing similar functionalities, old technology platforms, one-to-one integration, poor functional coverage, high maintenance costs, lack of support, unavailability of systems, and nonscalable transaction-capturing systems. Moreover, many product vendors did not invest in upgrading their products. Some discontinued support for them. Mergers and acquisitions added to the problem, with merged entities retaining their

systems. Absence of a corporate IT strategy created a worsening of the situation as well: business and IT managers built systems for their needs; as a result, 3PLs have hundreds of systems in their inventory. Maintenance costs are high, and return on investment is very poor. In a landscape such as this, companies cannot achieve objectives such as these:

- Ability to manage transport logistics networks in a holistic fashion in order to reduce operational costs and ensure high use of assets and better multi-modal planning

- Understanding of cost structures

- Exceeding customer service levels

- Compliance with all regulations and policies

- Improved freight consolidation

- Efficient appointment management

- Greater partner collaboration

- Increased visibility throughout the freight life cycle

- Better decision making

- Tighter control across the entire transport management business, from quoting, to planning, to execution, to monitoring, to settlement

As discussed in Chapter 1, the 3PL industry has largely delayed its rationalization journey. The industry needs to makerationalizing its application landscape a priority. Applications that deal with critical functional areas, such as order management, transportation planning, execution, warehousing, finance, billing, and pricing and costing, are in particular need of attention. TMS therefore emerges as key. Without integrated, technically sound, functionally rich, architecturally well-designed, user-friendly applications (preferably on a single platform) to address these critical functions, 3PLs will find it difficult to compete.

In the last five years, we have seen midsize to large 3PLs undertake some big initiatives. Organizations have been gearing up to roll out TMS as the core system of their transportation business unit. There are still many functional gaps in the TMS offered as off-the-shelf products. However, road maps drawn by these 3PLs with TMS product companies appear realistic and within reach. If these initiatives are realized, many 3PLs can reduce their system inventory by tens to hundreds, depending on its current state.

Leading TMS products have functionally evolved and continue to evolve in breadth and depth. Gone are the days of buying individual pieces of TMS functionality from multiple vendors. You can now source solutions for your needs from a single source. Many vendors have begun offering tools for planning and execution. These tools were used by the shipping community for internally controlling and managing costs of the transportation of raw materials and finished goods. Over the years, these solutions found some relevance for transportation service providers, and current solutions are being used by 3PLs for order allocation, load consolidation, routing, transport mode selection, carrier selection, tendering, freight audit, track and trace, and payment and settlement. The newer add-ons are visibility; load building; and event, carrier, and performance management.

TMS is a category of software that deals with the planning and execution of the physical movement of goods across the supply chain. TMS is used by manufacturers/shippers, multimodal operators, assets, and non-asset–based 3PLs and 4PLs. TMS is expected to support all modes of transportation, including road, rail, intermodal, air, and ocean. Manufacturers/Shippers use TMS to manage freight sourcing, planning, execution, and settlement. 3PLs use it for planning and execution. Planning here involves load consolidation, routing, mode selection, and carrier selection; execution entails tendering loads to carriers, shipment tracking and tracing, and freight audit and payment.

Acquiring tools to reduce freight costs continues to be the main reason for investing in a TMS for both manufacturers/shippers and 3PLs. This, along with a desire to improve overall efficiency during the entire freight life cycle, has forced TMS vendors to expand their TMS suite (TMS Integrated with other required systems); offerings now include strategic planning, carrier selection, execution, visibility, performance management, freight payment services, and audit capabilities.

Multiple subcomponents make up comprehensive multimodal TMS solutions across sourcing, planning, optimization, execution, audit and settlement, track and trace/visibility, and performance management. These are some of the capabilities provided:

- Strategic network design and planning

- Tactical planning

- Multimodal, multileg transportation planning and optimization

- Transportation execution

- Freight rating and contract management

- Asset and freight routing, scheduling, and dispatching

- Freight audit, payment and settlement

- Visibility and event management/business activity monitoring

- Analytics, performance management, scorecards and management dashboards

- Global trade management

- Sound architecture, adaptability, flexibility, usability and deployment options

- Ease of use

- Enabled workflow

To accelerate implementation of TMS solutions, today's TMS vendors have established integration with leading ERP systems. Post implementation, these integrations mean less manual work and higher assured quality of data. Some of the common integrations are as follows:

- **Integration with ERP**: Performs transportation planning and execution of ERP orders and deliveries in TMS and invoicing and invoice verification of TMS settlement documents in ERP. Data are transferred using enterprise services. Also integrates TMS with ERP shipment processing.

- **Integration with track-and-trace application**: To help monitor the execution status of transportation.

- **Integration with global trade management (GTM):** Performs customs processing of TMS business documents (e.g., requesting export declarations for freight orders or freight bookings). Data are transferred using enterprise services.

- **Integration with environment, health and safety (EHS)**: To ensure the safe transportation of dangerous goods, in accordance with legal regulations.

- **Integration with business intelligence (BI)**: Makes use of integrated query and analytic tools for evaluating, analyzing, and interpreting business data.

- **Integration with a geographic information system (GIS)**: For data required from a location-based-services perspective.

Most of the customers implementing TMS have also built in integration between TMS and their portals. TMS gives freight status to portal users, and orders received from portals are planned and executed in TMS. Further notifications and approvals are managed between the two systems as well.

Recently, we asked 3PLs, which delivery and implementation approach is best suited to your organization? This question would have been unheard of five years ago. Increased maintenance costs and decreased margins have forced 3PLs to look outside purely traditional ownership models. 3PLs want to focus on their core business, leaving systems

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responsibility to systems experts. Many SIs and product vendors offer these next-generation services, such as on-premises service, hosting, on-demand service/SaaS, and TMS-managed services.

These models offer

- cost advantage

- minimal risk

- freedom from maintaining infrastructure

- easy availability of software upgrades

- tried and tested solutions

- access to best practices

(SIs play a big role in TMS implementation, rollout, integration with the ecosystem, and maintenance and enhancement. We recommend that you use SIs, as they bring best practices, accelerators, and tools to all these services. In addition, some SIs have created business-process outsourcing solutions with respect to these services. Service providers set up one or more business-process outsourcing (BPO) centers, depending on the number of customers, in countries where this is cost-effective. These centers, equipped with a TMS suite, receive/access customer orders, consolidate them, route them, book them with carriers, prepare documentation, report freight status, handle claim requests, audit freight, prepare invoices, process bills received from carriers/vendors, measure service levels, and generate reports. This gives 3PLs more time to concentrate on their core activities as well as providing savings in terms of labor resources and system ownership.

Manufacturers/Shippers' greater desire for supply chain optimization and visibility, and continual innovation on the part of TMS product vendors, together have been driving growth in the TMS market. C. H. Robinson Worldwide, one of the largest 3PL companies in the world, with global operations, has developed strong technology for use in its own transportation operations, and this has evolved into its Managed TMS offering, which is deployed by TMC (a division of C. H. Robinson). Other Leading TMS providers include SAP, Oracle, JDA Software Group, MercuryGate International, Manhattan Associates, IBM Sterling Commerce, TMW Systems, LeanLogistics, Transplace, and Interlogistics. See Chapter 3 for more details on these product vendors.

Prima facie, there are many options on the market, but finding which one meets the exact requirements of a given 3PL company requires analysis. Every company has a unique selling proposition (USP) that helps it grow and retain customers. Its processes are accordingly aligned. Therefore, 3PLs must do a careful assessment before deciding to invest in a TMS product. See Chapter 5 for further information on how to make a rational choice.

TMS is a core component of a 3PL's IT landscape. Most business activities are centered on this core component. Figure 2-1 shows how TMS is interrelated with other components of the IT landscape.
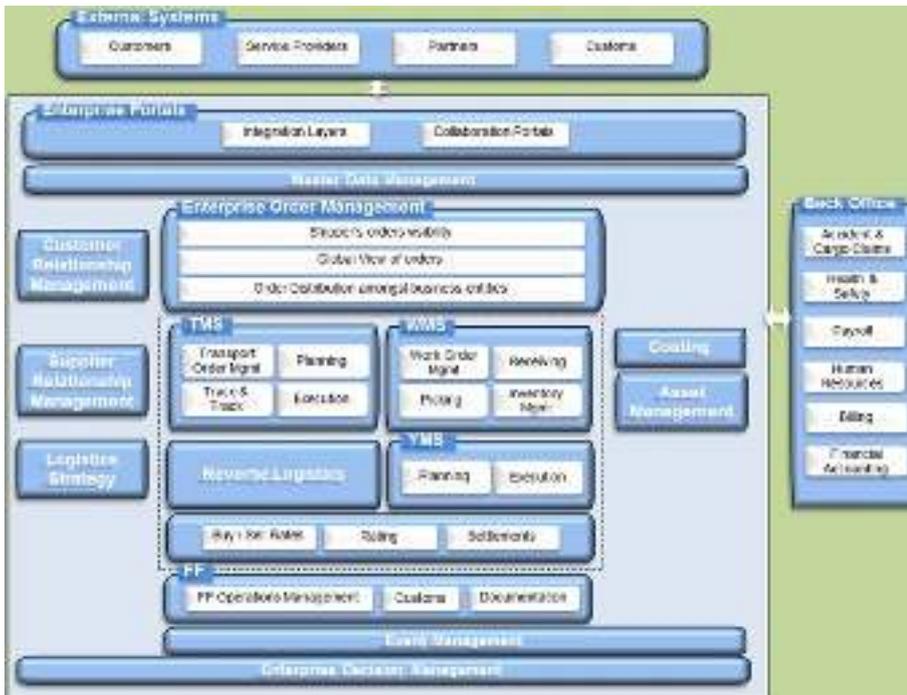
Figure 2-1. *Integrated IT landscape of a 3PL*

As you can see, TMS is integrated with enterprise order management, warehouse management systems (WMSs), customer relationship management (CRM), supplier relationship management (SRM), logistics strategy, costing, asset management, event management, and so on. Because TMS plays such an important role in managing a 3PL's operations, functionally and technically mature TMS helps 3PLs gain a competitive advantage.

Summary

In this chapter, we discussed the importance of integrated TMS for 3PLs and the need to do an accurate assessment before deciding to invest in TMS products. We also noted that 3PLs should also explore available deployment options and the outsourcing of TMS-related business processes in order to gain efficiencies. Finally, we looked at the role of SIs in driving transformation.

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TMS Product Landscape: Vendors, Product Overview, Plans, and Comparison

In this chapter, we will describe the following:

- The transportation management system (TMS) market

- TMS product vendors' strategies

- Key trends in the TMS market

- TMS vendors

The market for TMS is large and growing. Entities in the supply chain—raw material suppliers, traders, manufacturers, distributors, retailers, transport and warehousing 3PLs—all need TMS for their organization. A range of suppliers, from small boutiques to large enterprise resource planning (ERP) vendors, provides TMS products. Furthermore, the TMS market recently witnessed several acquisitions and mergers. Many product vendors started their journey with an additional customer or two, developing basic functionality. Then, together with their customers, they evolved and developed the missing functionalities. Soon, these product vendors started offering these functionalities in the marketplace using, in the initial phase of operation, one or several of the following product strategies:

- **Focus on subindustry**: Some product vendors remained focused on the vertical market with which they were experienced. This gave them reference to potential customers in the same vertical subindustry.

- **Focus on single process**: Emphasis here was on one or two process areas, as available capabilities were limited to capturing transactions in the system.

- **Focus on regions/countries in closer proximity**: These vendors concentrated all their efforts on the areas within their reach so that they could give extra attention and provide quick resolution. Often, this happened because different regions/countries were following their usual processes.

- **Perform everything with one's own resources**: To keep knowledge within the company, some TMS vendors performed all tasks, from development to rollout, on their own. This did not afford them any scale.

- **Give every customer a different TMS**: Certain vendors believed that every new customer required different TMS because each customer has a unique way of working/doing business. This called for a lot of bespoke development, resulting in a need for additional investment and a delay of return on investment of many years.

Soon, product vendors realized that there were markets for TMS in other industries, subindustries, regions, and process areas. In addition, vendors' customers wanted them to implement the same or similar solutions to their operations outside the current region or diversified industry or cater to the other processes in the transportation life cycle. The TMS market started growing, and so did the competition. This increased competition created challenges for these TMS product companies. To address their needs, TMS vendors have revisited their strategies for growth. These are some of their current strategies:

- **Acquire to grow**: TMS vendors are carrying out self-evaluation to identify gaps in their offerings. To bridge the gaps, many are building relationships with other vendors or acquiring them in order to reach larger regions and provide solutions to other industries, functions, and processes.

- **Offer products and services under one roof**: Many TMS vendors have built solutions for other functions of the supply chain, such as warehousing, yard management, and freight settlement, thereby giving customers a single platform for supply chain execution.

- **Target additional processes**: Build or enhance existing products to include more processes in the areas of planning, scheduling, optimization, multimodal operations, global trade compliance, and so on. Over time, product companies have developed a process repository, and subject matter content that the processes handle is more standardized. This helps 3PLs adopt industry best practices when TMS is implemented. For instance, SAP TM is enhancing processes such as air and ocean transportation for 3PLs' businesses.

- **Target a specific industry**: Build or enhance product for a particular industry. Product vendors have gained experience and subject matter understanding of their businesses—challenges, gaps (and hence opportunities), processes, key performance areas, potential to automate, existing technology landscape, and vision for growth. Having understanding of all this has helped many vendors build the most relevant products for specific industries. For example, MercuryGate TMS solutions is integrating with the Integrated Business Solution (IBS) Business Suite, serving customers in key vertical markets, such as 3PL, pharma, auto spare parts, and wholesale. Similarly, SAP is planning TM for railroads, given the company's experience with railroad customers worldwide.

- **Target technology and architecture**: TMS product vendors have identified opportunities in the areas of improving integration capabilities, migrating to a newer platform, use of mobile technology, and adopting service-oriented architecture (SOA). Integration with systems within and outside the organization has remained a priority.

- **Partner to gain scale**: TMS product vendors have begun establishing their businesses in newer regions. For example, Asian markets are increasing in importance for retailers and shippers, and to meet their logistics outsourcing needs, 3PLs have set up their operations in the pertinent countries. TMS vendors see this as a growth opportunity. Moreover, some of the local logistics players in these areas are gaining in size and maturity. They are the next set of target/potential customers for the product vendors. Some TMS vendors are expanding by using an implementation partner model. The vendors have appointed/partnered with systems integrators (SIs) to carry out rollouts and implementation services in these countries. This model provides the vendors scale and flexibility, and they need not have large, permanent teams. In addition, they can concentrate on product development and enhancement, leaving the implementation work to their partners, who are trained in using these products.

- **Offer a flexible costing model**: Besides the typical licensing model, some product vendors are offering software as a service (SaaS), on a pay-per-use or pay-per-transaction basis. This model is attracting many small to midsize 3PLs that were managing these functions either manually or with the help of outdated applications.

These growth strategies have helped TMS product vendors develop their business, while meeting industry expectations. SAP is investing a lot in enhancing the current supply chain execution platform to reach out to new markets, such as railroads, for which they already have a large customer base for their other products.

Key Trends in the TMS Market Affecting 3PLs

The 3PL industry evolved greatly in just a few years, from conceptualization to what it is today. We think that lack of development is one of the key reasons not many product companies paid a lot of attention in early years. But, the industry has grown severalfold and is being seen as having potential for transport management product adoption. However, the dynamics and local aspects of the business require highly flexible, functionally rich, technically sound products to meet industry needs. Here are some of the trends:

- **Custom-Built solutions will continue to be popular, along with TMS products**: TMS vendors still have a few gaps in their offerings when it comes to the requirements of 3PL customers. So long as there are gaps that must be bridged, 3PLs will continue to build solutions themselves. Potential TMS customers believe that if the solution is built in-house, it will take care of all their requirements; moreover, knowledge remains with them. This, however, is not entirely true. We have come across cases in which well before the solution could be developed in-house, the business requirements had changed. We believe that neither product nor bespoke can immediately address a customer's changing requirements. Yet, when it comes to selecting a product option or building a solution in-house, due diligence must be carried out to determine whether the product can cater to ever-changing needs. Also, with bespoke development, one must create an architecture that can accommodate such changes in the shortest possible time.

- **Niche TMS products will continue to find new 3PL customers, along with the leading vendors**: There are many small to midsize 3PLs operating worldwide. These companies have been managing their transportation management solution requirement by using a TMS product from a niche product vendor. Until the leading TMS vendors are able to offer customized solutions and pricing to suit these small to midsize 3PLs, the trend toward buying niche TMS that can cater to their business will continue to prevail.

- **TMS will gain center stage**: It is anticipated that transportation software will be at the center of the landscape and will be integrated with other enterprise solutions, such as global trade management (GTS), warehouse management systems (WMS), business reporting and business intelligence (BI), customer relationship management (CRM), portal, supplier relationship management (SRM), track and trace, ERP, and financial accounting systems. Soon, TMS will serve as the "hub" for all these "spoke" systems. TMS will have to share data both ways to ensure that nothing is deviating from the standard operating procedure.

- **Transportation software will first be used for transportation execution rather than optimization**: 3PLs will continue to leverage TMS for execution rather than optimization primarily for two reasons, the first being the absence of standardized processes at the enterprise level and the second being that these companies are still in the process of setting up the basic technology platforms needed to automate their processes. In the past, many 3PLs purchased TMS products for automatically planning and optimizing their networks, schedules, routes, and carrier assignments but failed and went back to manual planning. This has discouraged these 3PLs from taking a similar journey. Our understanding is that, in most cases, the 3PLs did not have standardized processes before embarking on such a journey. In addition, the 3PLs should have started by capturing execution, gained confidence, and gotten master data in place and processes streamlined and only then used the planning, scheduling, and optimization features.

- **3PLs will continue to invest in visibility and tracking technologies, along with TMS**: Customers serviced by 3PLs have evolved their technology landscape, implementing best-of-breed solutions for their business needs. These solutions have the ability to interface with 3PLs' systems for order sharing, monitoring status of orders, workflows, and payment. The customers therefore expect a total technology conversion between them and their vendors. As a result, 3PLs need to have the necessary technology platforms to provide data related to the order: bill of lading (BL), house bill of lading (HBL), house air waybill (HAWB), status of the order in the execution life cycle, freight costs, accessorial charges, claims, shortages, loss and damage, and any other deviation. In this context, 3PLs will continue to invest in mobility solutions; tracking with Global Positioning Systems (GPS); or item-level to box-level tracking, using radio frequency identification (RFID) or similar technology, along with TMS.

- **3PLs will continue to invest in business intelligence (BI) technologies, along with TMS**: Customers serviced by 3PLs have increased expectations of them. Customers look to 3PLs to work as one of the partners in running their business. This has forced a convergence. Reporting is one of the vital ways to build trust, confidence, and transparency in the business. 3PLs have therefore started investing in BI technologies both to know what is happening within their own organization and to give different views of the business to the customer. This, as well as monitoring key performance Indicators and creating dashboards and "what if?" scenarios, is helping 3PLs engage meaningfully with their customers to improve operations, stay cost competitive, and build healthy relationships for the long term. The majority of TMS products offer a few ready-made reports. However, the expectation is for more. Hence, TMS product vendors are also forming integrations with BI products, and when BI is not available, 3PLs are implementing it, along with TMS products, to gain maximum return on investment.

- **TMS vendors will increasingly provide SaaS solutions**: 3PLs, in their effort to optimize spending on technology, while avoiding noncore functions, such as running the technology function themselves, are looking for reliable partners who can take over these responsibilities from them. In this context, a few TMS vendors have begun providing TMS, using the SaaS model. Although the number of software vendors offering a full-scale SaaS solution is small, it is anticipated that increasingly these vendors will furnish this as a cost-effective solution to the 3PL industry.

- **SIs see TMS as a big and long-term opportunity**: Many leading SIs see the growth of TMS as one of the major opportunities in terms of number, size, and duration of deals with their customers. These SIs have created separate teams to focus on this line of business. They also have a clear go-to-market strategy to target customers. The initial focus is the possibility of picking up a ramp-up customer from their existing customers. In some cases, the solution and the commitment are offered jointly (product vendor and SI). Gaps identified during the blueprint phase are bridged through development of either a joint intellectual property (IP) or next-version system or a system retained for that customer only. Some SIs have moved a step further in closing the gap between them and product vendors. These SIs have identified use cases that the product vendors do not have in their road map and have proposed building these using product platforms, for example, TMS for the shipping industry using a TMS platform. SIs also viewed this as an opportunity to get the integration work required with TMS. Compared with product vendors, SIs are more versatile with regard to implementation and rollout of a product or system. SIs leveraged this capability by becoming implementation and rollout partners for TMS product vendors. SIs trained their teams in using the product and learned configuration and blueprinting by placing these teams as shadow resources with product vendors' teams during the implementation phase. Then, the SIs were on their own. Many 3PLs are present in more than 100 countries. SIs have some presence in most of these countries, and this is helping them gain an advantage over TMS product vendors when evaluated for implementation and rollout of TMS. Furthermore, the cost of engaging an SI

vendor for implementation and rollout is lower than that required for using resources from product vendors. The next big opportunity SIs have an eye on is annual maintenance contracts for TMS as an ongoing revenue stream. Some SIs are also investing in creating TMS platform–based business-process outsourcing solutions.

- **Consolidation has begun**: Other large or similar-size vendors are acquiring TMS products or its vendors. For example, IBM recently acquired Sterling Commerce's TMS. Similarly, JDA acquired RedPrairie's TMS product, and Kewill acquired Foursoft. In the coming years, the 3PL industry is expected to benefit from this, because the acquiring companies are spending more and more money to increase the breadth and depth of their products. These companies have started offering them as a service or on a pay-per-use basis, which will free many 3PLs from up-front investment toward having TMS on the premises.

Product vendors see the potential in offering TMS to the 3PL industry and are working to bridge the gaps between their products and the business requirements and rules of the industry. SAP TM is leading the pack by putting together a comprehensive solution for this industry. Other product vendors are producing leading TMS products as well.

TMS Product Vendors

Following are some of the leading TMS product vendors (apart from SAP TM):

- Oracle
- IBM
- C. H. Robinson Worldwide
- Infor
- JDA
- Manhattan Associates
- MercuryGate International

These vendors offer some of the top products available. You may want to consult the company web sites for overviews as well as new features, acquisitions, and success stories, which are updated regularly. In addition, you can find relevant information on TMS products in "Gartner Magic Quadrant for Transportation Management Systems," an online survey conducted by Gartner every year and available for purchase on its web site (`www.gartner.com`). You can also refer to recent findings of the ARC advisory Group, which presents profiles of TMS vendors and their products on its web site.

Most product vendors support planning, optimization, and execution of multimodal business handled by the 3PL industry, with varying degrees of coverage. Control tower visibility, workflows, predictive analysis, decision-making ability, resource and network optimization, cost optimization, easy integration, and scalability are becoming some of the key capabilities requested of TMS products.

Summary

The TMS market has many small to large players. The leading ERPs, SAP and Oracle, both offer TMS. The TMS market is growing, and so, too, is the competition. TMS vendors have acquired other TMS vendors or their TMS platform in order to reach other regions/countries, subindustries, or process areas. This will continue until the market has three or four big names. TMS as SaaS or on an on-demand basis is an opportunity for small to midsize 3PLs to garner the benefits of using leading TMS product without the burden of capital costs—for building or buying a TMS or for its maintenance and enhancement. The next chapter looks at the details of the SAP TM solution, its architecture and road map.

CHAPTER 4

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SAP TM : Overview, Architecture, Road Map
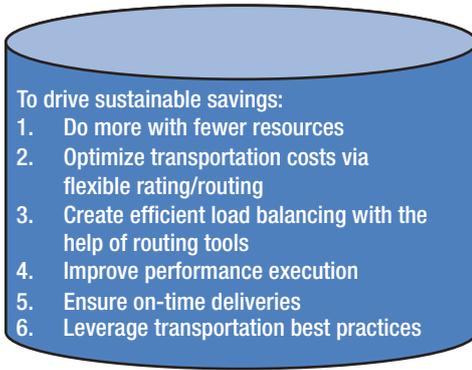
In this chapter, we will cover

- How SAP Transportation Management (SAP TM) has evolved

- The functional focus of every release

- SAP TM for 3PLs

- The use of new technologies, such as Floor Plan Manager (FPM), Business Rule Framework plus (BRFPlus), and Business Object Processing Framework (BOPF)

- Support for an air freight-forwarding scenario

The SAP TM platform has a long history. SAP TM started with shipment execution functionality, primarily for the manufacturing/shipping community, as part of SAP R/2, under Logistics Execution-Transportation (LE-TRA), to capture shipment execution-related transaction data. Then SAP TM was an enterprise-centric transportation solution used by manufacturers/shippers for freight cost and settlement, billing, freight auditing, and direct store delivery as well as simple planning and reporting. Next to arrive was Transportation Planning/Vehicle Scheduling (TP/VS), which provided shipment planning and optimization capabilities. Features such as vehicle scheduling and route guidance, along with enhanced carrier selection and continuous move optimization, gained industry acceptance. SAP Event Management (SAP EM) and and SAP Global Trade Services (SAP GTS) then further strengthened offerings in the area of event management across supply chains and border crossings, respectively.

SCM 5.0, an add-on to TM, was enhanced for capacity planning. Business partner collaboration was key, particularly for booking ocean vessel capacity. A subsequent pilot solution, strategic freight management (SFM), dealt with strategic collaboration and web-based collaboration and had a feature that allowed sharing of requests for quotation (RFQs) for ocean and land rates.

SAP TM 6.0 had many improved features: centralized/decentralized TM, adaptive planning, execution, re-planning, carrier allocation, single-and multiple stop planning, scheduling, routing and optimization, activity-based costing, freight billing, and payment and profit distribution. This solution also provided greater visibility for 3PL-based activities, such as freight quotation and buy-and sell-side visibility.

Enabling the user to make optimal use of existing resources, choose the best carrier and means of transport, determine the most efficient transport plan with the given constraints, and modify plans based on real progress were some of the improved capabilities of SAP TM 6.0. Key drivers for further investment in SAP TM are depicted in Figure 4-1.

To drive sustainable savings:
1. Do more with fewer resources
2. Optimize transportation costs via flexible rating/routing
3. Create efficient load balancing with the help of routing tools
4. Improve performance execution
5. Ensure on-time deliveries
6. Leverage transportation best practices

Figure 4-1. *Key drivers for investing in SAP TM*

In many ways, SAP TM 6.0 was a significant improvement over Enterprise Resource Planning Logistics Execution System (ERP LES), TP/VS, and SAP Advanced Planning and Optimization (SAP APO) put together.

The major improvements were

- A single system for transportation planning, execution, and transportation charge calculation

- Transportation planning and execution for shipments from multiple ERP systems

- Support for peer-to-peer broadcasting and being open to all tendering

- Support for the execution of both inbound and outbound transportation

- Support by transportation proposal/routing guide for the same constraints as in planning (e.g., compartments, trucks, trailers)

- Support for master data for standard routes, container, and driver

- Adaptive planning that can be done even after the execution of the transportation activities has begun (e.g., planning new transportation demands for existing shipments)

- No limit on the number of transshipment points, or hubs, used in the life cycle of a shipment

SAP TM 7.0

SAP TM 7.0 had several enhancements in functionality with respect to SAP TM 6.0. The following is a summary of these changes:

- **Shipment request (SRQ) approval:** Condition-based workflow; if SRQ exceeds a specific capacity, it must be approved before it can be processed further. The person who is responsible for approval gets a message in his or her SAP TM business workplace inbox. He or she can accept or reject the approval message.

- **Mode-Specific user interface (UI):** Additional SRQ entry screens for different types (intermodal, air, ocean, land) of shipment requests.

- **Adding existing SRQ to a freight request (FRQ):** Additional functionality to assign existing SRQ in a FRQ.

- **Parcel planning/Tariff planning:** Carrier rate integration with external systems and integration with external rating engines (SMC3, less than truckload [LTL]); tariff cost calculation in SAP TM or procurement of tariff costs from an external system.

- **Routing freight units (FUs) of a SRQ individually:** Proposals (planning profiles) can be created in such a way as to list all possible routes. Users can select different routes for different FUs within SRQ.

- **GTS integration:** Triggers export declaration. Custom status can be considered during the execution of shipments.

- **Inter-and intra-company cost and revenue distribution:** The sales organization is responsible for processing a SRQ and charging the customer (customer freight invoice request [CFIR]). The purchase organization is responsible for subcontracting transportation to a carrier (supplier freight invoice request [SFIR]). Internal charging between the sales organization and purchase organization is possible for profit sharing and cost surcharges.

- **Multi-resource scheduling:** Defining a resource with a means of transport (MTR) that can count available resources (e.g., ten trucks with a 20 ton capacity).

- **Graphical documentation presentation:** All business-related documents appear in graphical format under the Document Flow tab.

- **Customer fact sheet:** Contains a single screen for important customer data and relevant analytic content from business intelligence (BI).

- **Free fields in SRQ, BO, SO:** Custom fields in the aforementioned objects.

In addition to these key features, SAP TM 7.0 also had enhancements in terms of its tendering template (the creation of tendering information as master data), resource less schedule creation, addition of one-time manual stops during manual planning, and personal object work list (POWL) dynamic selection criteria.

SAP TM 8.0

SAP TM 8.0 entered the market in the ramp-up in November 2010 and reached general availability in June 2011. The new release provided these enhancements:

- Improved transportation planning

- Reduced transportation costs

- Improved freight consolidation

- Improved use of assets

- Efficient service-level fulfillment

- Improved partner collaboration

- Increased visibility throughout the freight life cycle

- Improved decision making capability

In SAP TM 8.0 the following product integrations occurred:

- **Integration of SAP ERP with SAP TM:** Performs transportation planning and execution for ERP orders, deliveries in SAP TM and invoicing and invoice verification in ERP for TM settlement documents. The data is transferred using enterprise services. Also integrates SAP TM with ERP shipment processing. In this case, data is transferred using enterprise services and intermediate documents (IDocs).

- **Integration of SAP TM with SAP EM:** To help track events to monitor the execution status of transportation.

- **Integration with GTS:** Performs customs processing for SAP TM business documents in a connected GTS system (e.g., requesting export declarations for freight orders or freight bookings). Data is transferred using enterprise services.

- **Integration with environment, health, and safety (EHS):** To ensure the safe transportation of dangerous goods in accordance with legal regulations.

- **Integration with BI:** Makes use of integrated query and analytic tools for evaluating, analyzing, and interpreting business data.

- **Integration with a geographic information system (GIS):** For data required from a location-based-services perspective.

With SAP TM integrated with SAP ERP, the manufacturing/shipping community finally got an integrated transportation management solution. The introduction of integrated order management made transport planners' lives easier, allowing them to cover order-to-cash (OTC) and procure-to-pay (PTP) processes associated with booking and moving freight, albeit with an emphasis still on ocean freight. The transport planner could now get a single view of the freight to be dispatched. Moreover, both manual and automatic planning and dispatching were made possible. Advanced and dynamic transportation optimization combined inbound and outbound planning features to help manufacturers/shippers optimize their transportation resources. This release came with some additional decision-supporting reports and views that helped manufacturers/shippers improve their service levels at reduced cost. With this release, management was also improved. Integrated global cross-border management and dangerous goods acquisition attracted manufacturers/shippers' attention. In the case of the scheduler workplace, new features were added, and some SAP TM 7.0 features were enhanced; new features included searching for replacement resources for an existing assignment, editing demand splits, automatic scheduling of multiday assignments, copying time allocations, confidentiality of resource names (displaced for authorized users only), connections to external GIS systems (enhanced), container positions saved in the scheduler by user, resource list re-sorting directly in the planning board, and separate dialog boxes for work lists. The planning board now contains a button that allows the user to align assignments.

The web-based planning board introduced resource planning, making optimization possible at the team level, as well as multiday planning, optimization, and appointment booking. A parts availability check was also added to the planning board, along with mass change and assignment.

The development focus for SAP TM 8.0 was customer co-innovation, deep-process integration (OTC, PTP, customs and compliance management, DGR), best-in-class functionality, collaboration, decision making, flexibility, simplicity, and performance.

SAP TM 8.1

The main focus of SAP TM 8.1 was to extend solutions to support 3PLs. SAP TM 8.1 entered ramp-up in August 2011. SAP TM 8.1 extends the core transportation processes covered by SAP TM 8.0 to support enhanced

- Ocean freight management

- Transportation network planning

- Quotation and forwarding order management

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