NEXT GENERATION TRANSPORT MANAGEMENT SYSTEM

Point of View

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> “What does a TMS look like that follows today’s or even tomorrow’s design principles?”

FOREWORD

The transport management systems (TMS) in use at logistics service providers today were developed more than a decade ago. Over time, they have been adapted again and again, but they are still based on design principles of the past.

So, the question is: what does a TMS look like that follows today’s or even tomorrow’s design principles? One that considers resilience, sustainability, and collaboration with its business partners.

To answer this question, we looked at requirements and stakeholders. We derived the building blocks and proposed an architecture for the TMS of the future, the Next Generation TMS*.

Enjoy the read!

* Subsequently we will only use the abbreviation NextGen TMS in this point of view

MANAGEMENT SUMMARY

Keeping the different perspectives of all parties impacted by a TMS in mind, we identified several requirements a NextGen TMS needs to fulfill. We consolidated and grouped them into three areas:

Resilience	TMS technology can contribute to a resilient supply chain and act as a performance enhancer
Sustainability	On the route to more sustainable logistics, a NextGen TMS can be of help
Custom tailoring	B2B companies are now expected to reconsider their approach towards customer and employee experience

We then created three building blocks of NextGen TMS to map these requirements:

Extended enterprise

The NextGen TMS will extend an enterprise to customers and suppliers.

Automation everywhere

The NextGen TMS will allow for data-driven business optimization via automation of not only single processes but also complete workflows.

One-size-fits-all – NOT

The NextGen TMS will offer a tailored experience for users of the platform adapted for and adapting to their needs.

> The NextGen TMS is THE central platform to **inter-connect** internal and external parties involved in optimized **shipment processes**.
>
> It evolves from a system of record to a **user-centric business driver**."

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01 | INTRODUCTION

What should the NextGen TMS look like?

Our approach and focus

We, as a cross-functional team with deep knowledge and experience in the transportation industry, worked together to tackle the challenge and approached the topic - **what should the NextGen TMS look like?** - in three phases:

1. Research and lightning talks provided a **detailed understanding** of the current state, challenges, and business trends that impact Air & Sea third-party logistics (3PL), as well as the needs of different stakeholders (Chapter 2 & 3).

2. In an ideation workshop, we developed ideas for meeting new business requirements, always considering the needs of different stakeholders. **Extended Enterprise, Automation Everywhere, and One-size-fits-all, – NOT** were identified as the three main building blocks of a NextGen TMS.

3. Finally, the ideas were translated to more specific **solution proposals** and combined into an overall vision of what the NextGen TMS should look like. We also proposed an architecture that supports the solution blocks and adapts to the changing conditions (Chapter 4).

We based our approach on the following three assumptions:

AIR & SEA logistics as the main driver of the global supply chain requires a solution that supports global business processes.

3PL logistic service providers bring together several parties due to their higher level, complex services.

B2B is the dominant business relationship in the Air and Sea 3PL market.

02 | CHANGES IN THE FORWARDING BUSINESS

New business requirements

What currently impacts the industry

3PLs operate in a constantly changing environment. Business requirements of the logistics industry change fast, and each change creates new opportunities and challenges. We aggregated them into three categories a NextGen TMS needs to address.

Resilience

TMS technology can contribute to a resilient supply chain and can enhance performance.

Custom tailoring

B2B companies are now expected to reconsider their approach towards customer and employee experience.

Sustainability

On the route to more sustainable logistics a NextGen TMS is of help.

Resilience

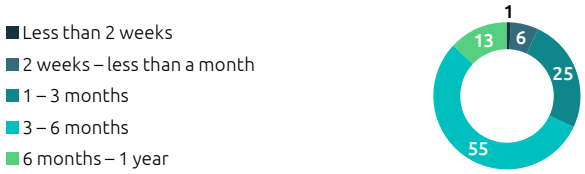
TMS technology contributes to a resilient supply chain and can enhance performance

CURRENT SITUATION

Resilience is the ability to absorb stress and still perform, even if circumstances change. Prior to the pandemic, resilience had only been discussed if things went critically wrong. Now, the attention has shifted; resilience has now become a vital part of a company's supply chain, in order to pro-actively react to disruptions and elevate a company's delivery performance.

How can this be supported by a TMS?

Time to restore operations to a steady state after disruptions caused by the COVID-19 pandemic [1]



OUTLOOK

A smart TMS can help companies become more resilient. It needs intelligent analytics to predict events and to prepare the transportation network for change. This requires flexibility and entails silo-breaking interconnections with all other transport modes as well as access to all players.

In combination with a risk dashboard that combines internal information and supplier data, the TMS can facilitate a higher ratio of on-time delivery and optimize lead times.

[1] **Source:** Capgemini Research Institute, Supply Chain Survey, August–September 2020, N=807 organizations from the consumer product, retail, discrete manufacturing and life sciences sector that faced a negative business impact due to the crisis.

[2] **Source:** Capgemini Research Institute, Supply Chain Survey, Aug–Sep 2020, N=1,000 organizations

Custom tailoring

Good end-to-end user experiences in B2C raise the expectations in B2B

CURRENT SITUATION

The focus on a good end-to-end user experience in B2C transactions raises the expectations of business partners and employees for B2B interactions. Both expect customized, easy-to-navigate applications without friction points. These can confuse customers and employees and keep them from completing transactions and service requests.

Freight forwarders operate in a highly competitive market where price and service are very important for customer satisfaction and long-term partnerships. Digital freight forwarders have raised expectations in terms of usability and connectivity in recent years. Creating a seamless experience tailored to each stakeholder's personal needs across the entire customer journey is the key for the future TMS and the whole organization.

OUTLOOK

The evolution from selling a service or a product to offering a complete end-to-end service is underway and becoming even more important. Technology and IT systems should be ready to enable this, rather than create a bottleneck. Besides, most of the time, TMS is built as expert systems. Process steps, functions, and dialogs are complicated, which makes it difficult for employees to perform the required actions efficiently and without errors. Especially training of new employees takes too much time. Intuitive systems can play an important role to shorten the onboarding period.

Sustainability

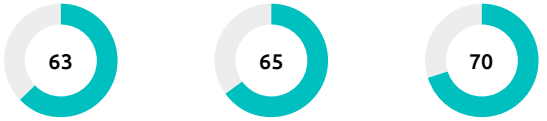
On the route to more sustainable logistics a NextGen TMS can be of help

CURRENT SITUATION

The awareness regarding sustainability has been increasing. Consumers have started to move away from brands that ignore their environmental footprint, boycott products that are not produced CO_2 friendly, and shame companies on social media for endangering the environment. Therefore, establishing a sustainable supply chain is vital for the industry. It is a key task for all logistics companies around the globe.

For Capgemini, becoming carbon neutral is business critical and at the heart of the priorities of our Group. For most of our clients, this topic is one of the most pressing issues of our time as well.

To what extent will your organization prioritize supply chain sustainability efforts in the following areas, post COVID-19? [2]



OUTLOOK

3PL companies must assess their sustainability issues beyond brand image improvement. Many elements of the supply chain cause unwanted carbon emissions. Haulage is believed to have the biggest impact.

As a consequence, sustainable logistics focus a lot on replacing vehicles with more eco-friendly ones, since they have the biggest impact on CO_2 emissions.

Although this is a challenge outside the scope of this PoV (TMS in Air/Sea), we nonetheless evaluate how a TMS can be of any help in this area, for example, by optimizing route planning.

03 THE IMPACT ON TRANSPORT MANAGEMENT SYSTEMS

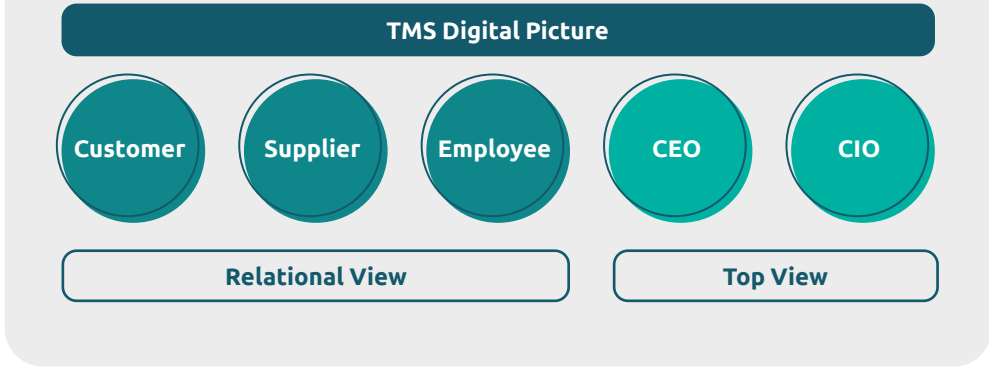
Current expectations towards a TMS from the perspectives of different stakeholders

In order to summarize the current state-of-the-art of transport management systems, we applied a Capgemini method called Digital Picture. Following this approach, we looked at the topic from different perspectives to gain a holistic view.

We looked at TMS from the perspective of:

- the **Customer** who books a shipment and expects the transport as well as associated processes to be properly managed by the forwarder he indirectly depends on the performance of the TMS
- the **Supplier** providing a part of the overall service, which requires exchange of information with the TMS about how the services are executed
- the **Employee** who works with the TMS on a daily basis in order to plan and execute the shipments, as well as use it as a basis for collaborating with different parties
- the **CEO** as the sponsor of the TMS, which is the core operative system of the business
- the **CIO** as the chief responsible person for delivering the right TMS to the business

For each of the above personas, we also summarized the pain points most have regarding a TMS.



Customer

A seamless, tailored flow of information throughout the processes is key to a resilient and sustainable supply chain.

TMS VIEW

One of the reasons customers use services of a freight forwarder is to place the complexity of transporting goods around the globe in the hands of a specialized company.

The forwarder's customers do not directly interact with a TMS, but they indirectly rely on its performance:

a. they trigger various transport processes managed with the TMS via EDI layers, mail, calls or a customer portal.

b. They operate their own systems to support their own processes and require specific information that is managed with the TMS.

PAINS

Customers suffer from a non-seamless flow of information. It results in a lack of real-time data throughout the process from quoting to invoicing. Instead of email, phone calls and paper-based documentation, which are often the primary means of communication, they want to access information more easily and over a channel of their own choice.

Customers want to work together with their suppliers to manage the business and build a resilient and sustainable supply chain. In addition, they need a 3PL to cater for their industry-specific requirements and address their challenges.

Supplier

The seamless integration of processes between supplier and 3PL is the key to taking digitalization in logistics to the next level.

TMS VIEW

Currently, suppliers indirectly interact only with the TMS by receiving orders or providing information about the supplied services. As such, they have a limited view of the supply chain.

They currently foster digitalization by providing APIs. This enables the 3PL to make the transport transparent for their customers.

But a lot of information is still shared only via phone calls, fax documents or e-mails.

PAINS

Suppliers and regulators often face similar problems when interacting with 3PLs: Data is transformed by being sent through several electronic data interchange (EDI) layers which leads to information loss and latencies. In addition, onboarding to EDI is time-consuming and cumbersome.

As for the customer, non-digital communication leads to loss of time and data inconsistencies due to multiple entries of the same data.

To achieve operational efficiency and reduce costs, all processes need to be integrated seamlessly.

3PL employee

The TMS should enable us to work more efficiently and effectively, so the employees can focus on serving the customers' real needs.

TMS VIEW

The TMS is the daily operating tool, and the most vital part of an employee´s work. However, current TMS are often based on concepts from a decade ago and designed as systems of record for specialists.

The employee typically spends a lot of time entering data manually. He primarily communicates by email and telephone.

PAINS

Employees are forced to work reactively rather than proactively, and are chasing information constantly due to:

- less or no integration with customers´ and suppliers´ systems
- information loss and latencies between various systems
- manual data entry across key process steps, this causes inconsistencies

In addition, employees often work with systems that are not very user-friendly.

CEO

The NextGen TMS needs to transform from being a mere cost-intensive commodity to becoming a true enabler for our business strategy.

TMS VIEW

For the CEO, the TMS is substantial for business execution. It secures operations and provides key data to the management.

As such, it supports and contributes to the overall business goals and strategy. Any change in the business due to market drivers or regulations requires to adapt the TMS.

PAINS

In a service-oriented business, time should be spent on creating value and not on dealing with dispensable or allocatable tasks.

Today, the TMS is only an administrator of data, its potential to drive the business is not utilized, e.g., by:

- implementing a data driven business strategy
- increasing attractiveness of business partnerships (long-term and newbiz)
- addressing changing expectations of market and customers

The TMS is a cost driver and adaptations typically require a lot of time. This can impact the achievement of business goals.

CIO

The NextGen TMS needs to become a central platform enabling fast development of new services.

TMS VIEW

For the CIO, the TMS is the most important mission critical system of the application landscape. It is the backbone of the business or the ERP of this industry. All information required will originate at or pass through it – from booking to various status changes to invoicing the customer.

Thus, the implementation of a new TMS is still a high-risk program for most CIOs. Implementations that fail will likely become public and cause costly rollbacks.

PAINS

The central, monolithic nature of the current TMS makes it difficult to support fast market changes. This became evident when digital solutions for quoting and booking needed to be integrated with complex TMS.

The implementation of new requirements led to a bi-modal IT as seen in other industries: The TMS is updated in long cycles, whereas other solutions are updated much more often.

The critical challenge for the CIO is to quickly adapt the TMS to new requirements, while operating and maintaining it in a stable and secure way.

The current state-of-the-art of transport management systems

Most TMS were built more than a decade ago and are consequently based on concepts, which do not meet current or future requirements. They are built as systems of record: expert information systems for the core operative processes of a forwarder and only directly used by its employees.

However, nowadays digitally native solutions are expected. Customers as well as suppliers want to interact and collaborate digitally and seamlessly, with the information and access tailored to their needs. This is one of the pre-requisites for establishing resilient supply chains. At the same time, employees need to have the most accurate and up-to-date information to handle exceptions to the best of their customer's interest, which is the foundation for more sustainable planning and execution of shipments.

We see a high risk that the current TMS will not be able to meet these expectations without a fundamental transformation. Enhancing the current systems of record will not turn them into enablers of future business. Likewise, the often centralized, monolithic architecture will not be flexible enough to meet future demands.

When setting out on a transformational journey, companies need goals. In the next section, we will present our vision of a NextGen TMS, which will meet the expectations.

04 | A VISION OF NextGen TRANSPORT MANAGEMENT SYSTEM

The future shipment process

Shipments will be triggered much earlier in the future. At an automotive supplier, for example, the process will already be initiated when the ERP detects increasing demand.

This information is transferred directly to the TMS of the 3PL, which then proactively triggers a shipment request for the right goods and reserves capacity for the transport based on estimates. Based on previous orders, the majority of the shipment creation process can be handled automatically. The customer views the shipment via a portal, and enters and confirms some missing information, which triggers further automated processes until the shipment is on its way onboard a vessel.

After departure, the weather forecast predicts a storm that will cause the ship to be significantly delayed. The NextGen TMS detects the delay and enables digital collaboration among all parties involved, including other customers and suppliers affected. Based on similar incidents in the past, it offers standard workaround options (e.g. goods being transferred to a different mode of transport).

Due to further exceptional conditions, the transport is delegated to specialists who receive comprehensive data. Based on simulations involving the customer's ERP, the optimal, most sustainable solution is selected together with the customer.

During the entire duration of the transport, the customer can track the shipment both over the web portal and his ERP.

Resilience  Custom tailoring  Sustainability 

The NextGen TMS

Evolution of the TMS to meet new logistics requirements

Three major building blocks are needed in order to make the future shipment process possible. Together they form the NextGen TMS:

Extended enterprise — A platform that extends your enterprise into the enterprise of your customers and suppliers.

Automation everywhere — A solution that allows for data-driven, pro-active business and process optimization.

One-size-fits-all – Not — An experience tailored to the needs of the users of the platform.

Each of these building blocks are described in more detail on the following pages and are marked with icons indicating the requirement addressed. A summary is given at the end of the chapter.

Extended enterprise

The NextGen TMS extends your enterprise into the enterprise of your customers and suppliers.

Instead of being encapsulated within the 3PL application landscape, the NextGen TMS follows a different paradigm. It is open and accessible to lower the boundaries for exchanging information between the parties involved and thus enables them to collaboratively innovate for more sustainability.

Instead of being a system, it is a platform on which the parties involved can collaborate whenever and wherever needed. Thus, processes can be tailored to each other, allowing for more resilience in response to disruptions.

1 The Infiltrator

Nowadays, the integration of a forwarder into the supply chain processes is handled via classical EDI or, in modern enterprises, even APIs. The integration is done by pre-defined, standardized process steps, without knowing the overall business process of the customer.

Customers and suppliers often use standard ERPs. Some of these offer mechanisms to extend business processes* the NextGen TMS can leverage to interweave processes to gain speed, reduce integration costs, and identify disruptions faster. Systems on both sides can send triggers to each other and provide all information available.

Examples

- Demand forecasts of an ERP are utilized to prepare shipments with a TMS, based on templates for standard re-supply scenarios
- Availabilities and other information of the TMS is updated directly in the ERP

2 The Extendable

Most TMS follow the system-of-record pattern in that they store and retrieve information. The TMS remains a closed shop, exchanges data with the outside world, but still governs the process logic.

The NextGen TMS is more open. Due to open APIs and event-driven mechanisms published, third parties can provide add-ons which customers can buy on a marketplace. The NextGen TMS is a platform for managing transport services end-to-end, extending the 3PL market footprint.

Examples

- An alerting service provides special monitoring capabilities tailored to the needs of a specific industry and proposes handling options for the alerts
- Route selection is based on sustainability aspects
- Suppliers and forwarders collaborate to reduce carbon footprint by eliminating empty haulage trips
- Specific trade lanes can be provided with alternative, external customs solutions

3 The Communicator

The COVID crisis has immensely increased digital communications. The NextGen TMS takes advantage of this and takes communication to the next level, reaping the benefits of exchanging information quickly.

Each party involved can use its own communication platform. The NextGen TMS acts as an integrator merging data from various platforms. As a result, all parties always have the same information.

For the employee, communication with external parties will become transparent. He can initiate a chat and even a video call with just one click, fostering the personal relationship if needed.

4 The Exception Handling Swarm

A resilient transport chain requires collaboration within the 3PL organization. An event like the Suez Canal congestion typically effects multiple organizational units.

The NextGen TMS detects such events and automatically opens up collaboration spaces for the organizational units affected. This allows to exchange information and identify solutions and synergies. A more restricted version of that space is made available to external parties such as customers and suppliers.

In addition, the information shared and actions taken are documented and analyzed for the TMS to automatically support users if such an event occurs again.

5 One Face

In today's IT landscapes, customer portals and underlying TMS are often separate systems with separate data. The NextGen TMS creates a single source of truth. Since each party has different responsibilities and access rights, interfaces are tailored to each user group.

They can view and enter information like actions to be taken in exceptional situations or special handling instructions. Since all parties work with the same data, misunderstandings and information loss can be prevented.

Examples

- In case of a delay on the main transport leg, an employee can prepare different solutions for the customer to choose from
- Pictures of damaged packages can be shared with the consignee to receive handling instructions

6 The Customizer

For international forwarding each party needs a multitude of information. Therefore, a TMS provides extensive configuration options to tailor processes to the needs of customers, suppliers and employees.

Providing external parties with restricted access to the TMS opens up the possibility for each party to configure its own processes. It reduces the workload of 3PL´s employees and at the same time equips the respective party with more control. Providing incentives for customers can increase the attractiveness of such self-servicing.

The NextGen TMS is a solution that allows for data-driven business optimization.

From smart defaulting and pro-active suggestions to automated execution: system intelligence will support employees´ daily task completion and allows to reduce interactions with the TMS, freeing up time for more service-relevant interactions.

The NextGen TMS offers predictive, cost-efficient optimization and enables collaboration across all parties involved, shaping a new way of working – internally and across enterprise boundaries.

Automation everywhere

1 The Default

The goal of the NextGen TMS is to offer data by default. Based on historical data enriched with AI, workflows and processes can be automatically identified and data prefilled. The user becomes the 'data keeper' instead of a pure 'data feeder.'

Users will benefit from this smart defaulting during the whole shipment processing cycle.

Examples

- auto-filtering of inputs during shipment booking
- smart suggestions for more efficient and sustainable routing
- offer of resolution options during exception handling

This results in a decrease in the amount of interaction needed – the click ratio. Still necessary workflows are enhanced through better UX/UI and better display of tasks and necessary actions

2 The Crystal Ball

Based on activities of a customer the TMS can detect patterns in bookings and predict future shipments or haulages.

The creation of a shipment can be anticipated before it is needed. The system can initiate the booking of carrier space and connect it to predicted pre-shipments, including cancelling and redistributing the volume if the shipment is not executed. This can even go as far as pro-actively scheduling pickup and delivery runs.

3 Automate via IoT

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4 The Cheerleader

Cross-enterprise collaboration throughout the supply chain has become increasingly important in the past and will become even more important in the future with the use of data-driven technologies such as machine learning and automated workflows. The NextGen TMS should motivate ('cheer') customers and suppliers to provide more accurate and better-quality data as this is necessary to feed the algorithm and improve the automation of shipping processes.

As of today, the main incentive to provide better-quality data is the optimization of collaborative processes. With a data-driven NextGen TMS the potential cost savings could be shared as an additional monetary incentive. This accelerates the digitalization in logistics.

5 Touch When Needed

The goal of the NextGen TMS is that shipments require very little or no human interaction - because spending less time on simple, repetitive tasks frees up more time to further improve services and increases customer and employee satisfaction.

Therefore, the NextGen TMS offers default configurations defining which workflows are automated. Default configurations can be modified, either manually or enhanced through AI, for example by learning individual thresholds for decision making based on value of goods or shipment frequency.

Users are able to focus on value-adding tasks and on minimizing the impact of disruptions. And when alerts are triggered or exceptions occur, the system can suggest solutions and can even apply them automatically – or request approval for changes first – depending on the context and user preference.

One-size-fits-all – Not

The NextGen TMS provides users with a tailored experience adapted and adapting to their needs.

Instead of using a 'one-size-fits-all' approach, the NextGen TMS is flexible and configurable. It supports the users in the best way when completing their day-to-day tasks by being adaptable to process-related tasks, to customers' standards or product needs.

Having a user-supporting platform following a community approach lowers the barriers to learn system functionality and to complete complex tasks by accessing the knowledge of all. It motivates users to work with the NextGen TMS.

1 WYWantIWYG

Today, most TMS provide only very limited features to adapt the system to users' needs. This often leads to an overloaded user interface. Several functionalities are only used for processes related to dedicated customers or processes with additional requirements, e.g., handling of dangerous cargo.

The NextGen TMS needs to be adaptable to the user's needs related to different dimensions, e.g. products, tasks or customers.

The users need to be able to change the UI to his/her needs by re-arranging dialog elements or hiding blocks not needed. It needs to be possible to apply those adaptions to the different dimensions mentioned above.

In addition, the NextGen TMS follows the state-of-the-art UX standards and corresponds to the user's expectations when working with a modern application. As a benefit, it motivates the user to work with the application.

2 WYNeedIWYG

The NextGen TMS learns which data is needed by whom in which part of the shipment process and adjusts accordingly – providing only the data required.

It also learns, which data is entered during which process step and highlights the related fields accordingly. Automatically re-arranging fields or hiding elements is an option which the user can enable.

The NextGen TMS provides guidance to the user according to the experience level - from beginner to expert - based on user decisions or user interactions with the TMS.

3 The WTF!

Continuously improving the TMS is one of the main characteristics of the NextGen TMS. This is done based on users' needs and behaviors. It lowers the barrier to provide feedback, thus getting the users' honest opinions about TMS functionality. In addition, analytic tools can be used to create transparency about which functionality is used and how.

With a NextGen TMS new functionality can be tested in production by activating functionality only for dedicated users or in dedicated areas, e.g., countries.

4 The Tribe

Due to the complexity of modern TMS, users often need the help of experienced key users who have a deep understanding of the TMS to complete tasks which are rarely executed or need specialized knowledge.

To overcome the limited availability of key users, the NextGen TMS can be integrated with a community for users to raise questions and find solutions to problems already solved.

Also, users have the possibility to forward tasks to other users, which have special knowledge or are experienced in using the TMS. This can, but need not, be limited to the company using the TMS. It can include customers, suppliers, regulators or authorities. This sense of community can turn users into ambassadors of the solution.

5 The Gamer

A 'simulation' mode enables users of NextGen TMS to evaluate the result of their actions. The simulations can be used to train challenging or exceptional scenarios (gamification of training).

The system could analyze the simulated actions as well and provide feedback to motivate the users.

6 The Voice

The NextGen TMS has a 'character'. It provides feedback to the user in case he/she enters unusual information.

The feedback is integrated on different layers, based on user's preferences and the importance of the feedback.

Having the possibility to communicate with the TMS helps users solving problems by just 'asking' the TMS and getting an explanation in response. This functionality is very beneficial during training of new users.

New requirements in logistics

Building block	Resilience	Custom tailoring	Sustainability
Extended enterprise	Reacting fast to disruptions by coupled processes, communications, and views, and providing open collaboration spaces	Interweaving the forwarding process with the business process of the customer at all levels, while being open for further customizations	The open extension mechanism allows to provide innovative services for optimizing the carbon footprint and evaluate other sustainability dimensions via the open extension mechanism
Automation everywhere	Integrating much more IoT-based as well as high-quality customer data leads to high automation, solution patterns in case of disruptions, and gives the employee time to handle tricky cases	Tailored defaulting and prediction for maximum automation of the forwarding process focusing on specific, real value-adding services	Optimization and automation of processes to lower carbon footprint gives employees more time to focus on other improving sustainability initiatives
One-size-fits-all – Not!	Supporting problem-solving and decision-making processes by simulating actions and connecting to communities of specialists across the organization	Considering individual user needs and preferences in the best possible way by being adaptable to process-related tasks, customer standards, or product requirements	Facilitating the developments of sustainable solutions rather than providing them

05 | NextGen TMS ARCHITECTURE

Building blocks of a NextGen TMS

The functional building blocks of the NextGen TMS need to be implemented and orchestrated to build a flexible, extendible solution. We present a high-level architecture providing a technical foundation for such a solution.

The focus of this architecture is to define the major components required for the next generation TMS as well as their relationships. The purpose is to provide an idea of how the visionary concepts above can be brought to life. As such it is meant as a reference architecture blueprint and needs to be adapted to the requirements of a 3PL in case of implementation.

TMS Services Platform

The core component of the NextGen TMS provides the required forwarding business capabilities through loosely coupled vertical services and exposes them via a well-designed business API. In addition, all business events are published via an event platform.

TMS Data Platform

The data platform provides various data products based on information published by business services.

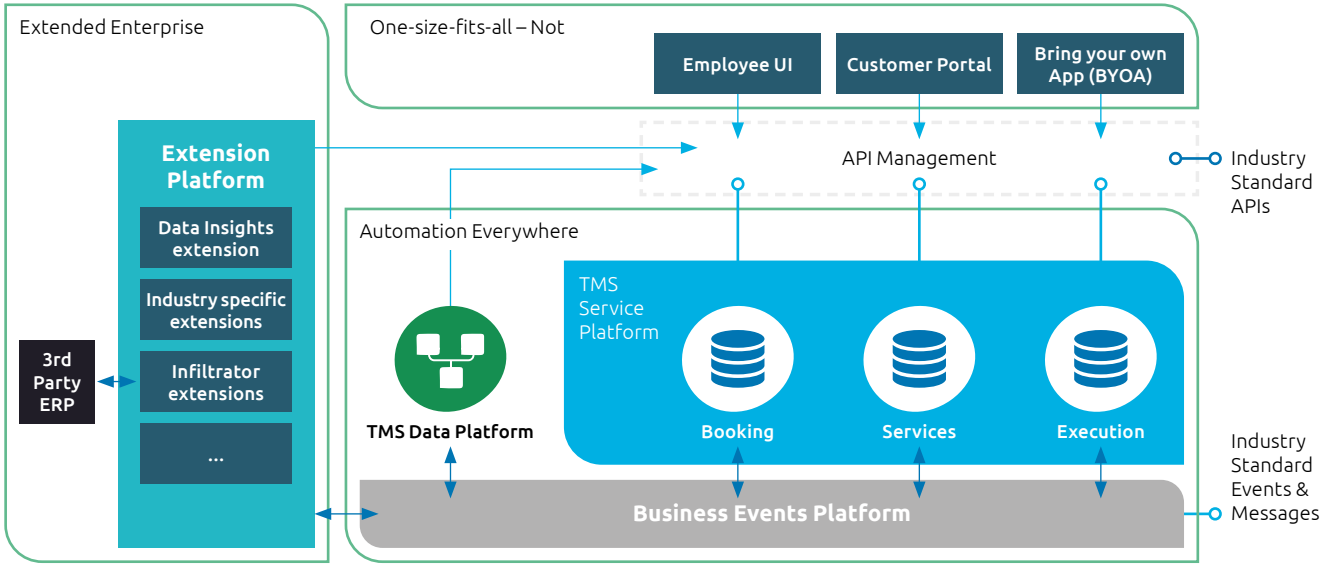
TMS Apps

APIs will be used heavily by different applications interacting with business services. Employees, suppliers or customers – all will access the same set of APIs, of course highly secured and restricted per role. This allows for TMS Apps to be implemented where needed.

Extension Platform

APIs will also be heavily used by extensions of the TMS developed on an own platform reusing the exposed APIs and events, as well as contributing own implementations. The platform will also provide a foundation for ‘infiltrator’ extensions coupling the ERP or a customer / supplier, enabling the TMS for higher level information exchange.

High Level Architecture of the NextGen TMS



Underlying Architecture principles

The proposed high-level architecture follows modern, state-of-the art architecture principles addressing especially the needs of the CIO as the chief responsible for the platform.

Microservice architecture is the architecture style for all building blocks. It allows for much faster implementation of new requirements driven by measurable business KPIs. The externally exposed services can be scaled independently and provide resilience to the overall platform.

Business APIs follow the API first principle and are easy to integrate with different apps and extensions. These APIs require a proper API management solution including collaboration, traffic management and security capabilities.

Event-driven architecture is the architecture style for loosely integrating the building blocks wherever possible (i.e. where no synchronous response is required). It makes the platform easily extendable and much more resilient. It requires a dedicated event platform for providing traceability and monitoring capabilities.

06 | CALL TO ACTION

Let’s take the TMS to the next level

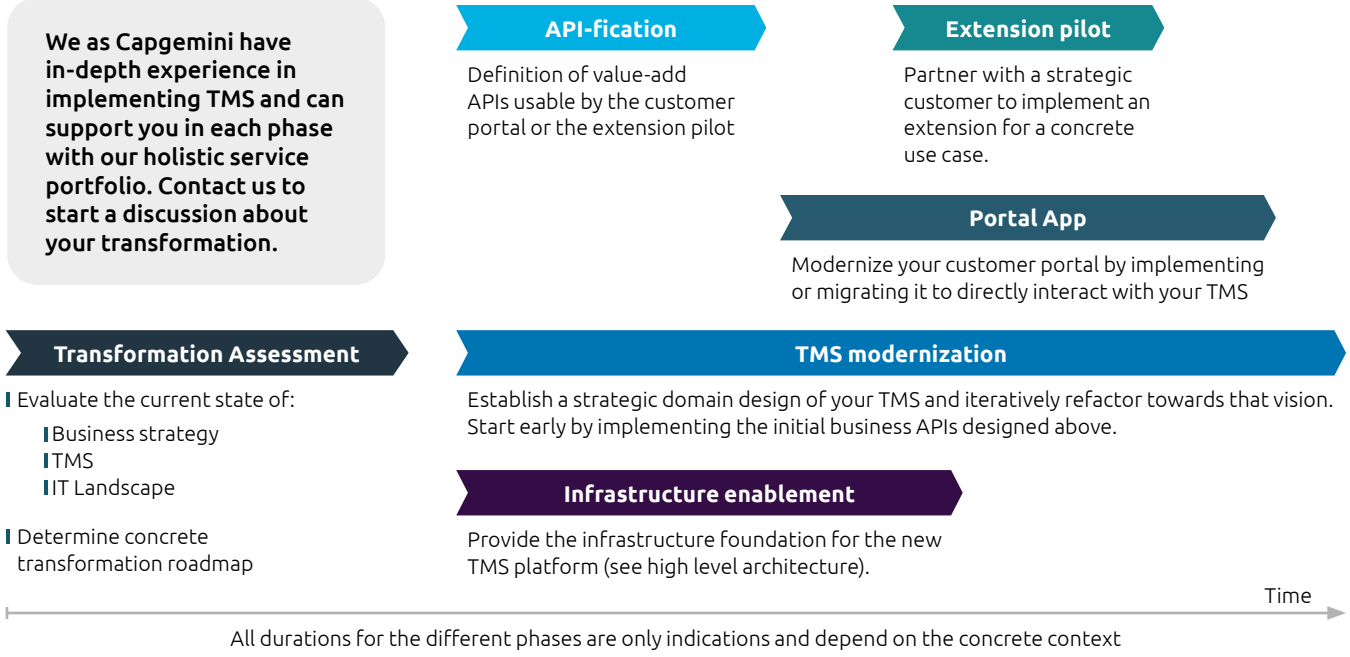
The logistics market is facing tough challenges in the coming years. The TMS as the core operative system in logistics needs to address these challenges and transform from a system of record to an intelligent, open, and fully automated platform.

In this point of view, we have given an overview of the building blocks required as the core ingredients of such a platform. We are aware that building it will require a substantial investment in these systems, but we are convinced that this vision can provide orientation for the journey ahead.

Let’s take the TMS to the next level and drive digitalization in logistics.

We propose the following approach for the transformation towards the next generation TMS

We as Capgemini have in-depth experience in implementing TMS and can support you in each phase with our holistic service portfolio. Contact us to start a discussion about your transformation.



All durations for the different phases are only indications and depend on the concrete context

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About Capgemini

Capgemini is a global leader in partnering with companies to transform and manage their business by harnessing the power of technology. The Group is guided everyday by its purpose of unleashing human energy through technology for an inclusive and sustainable future. It is a responsible and diverse organization of over 350,000 team members in more than 50 countries. With its strong 55-year heritage and deep industry expertise, Capgemini is trusted by its clients to address the entire breadth of their business needs, from strategy and design to operations, fueled by the fast evolving and innovative world of cloud, data, AI, connectivity, software, digital engineering and platforms. The Group reported in 2021 global revenues of €18 billion.

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