Transportation Management in SAP S/4HANA vs. LE-TRA

THE BEST RUN **SAP**

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Comparing processes of LE-TRA and basic Transportation Management

How do LE-TRA processes work in basic Transportation Management?

Legend

- **LE-TRA** stands for the transportation component in Logistic Execution module

- **basic Transportation Management** stands for the basic functionalities within SAP S/4HANA Transportation Management module

- **The words in yellow** means planning only - subject to change.

- The words in blue means that **basic Transportation Management** has the **advantages** over **LE-TRA**.

• Planning Only • basic TM advantage over LE-TRA

Overview of the processes
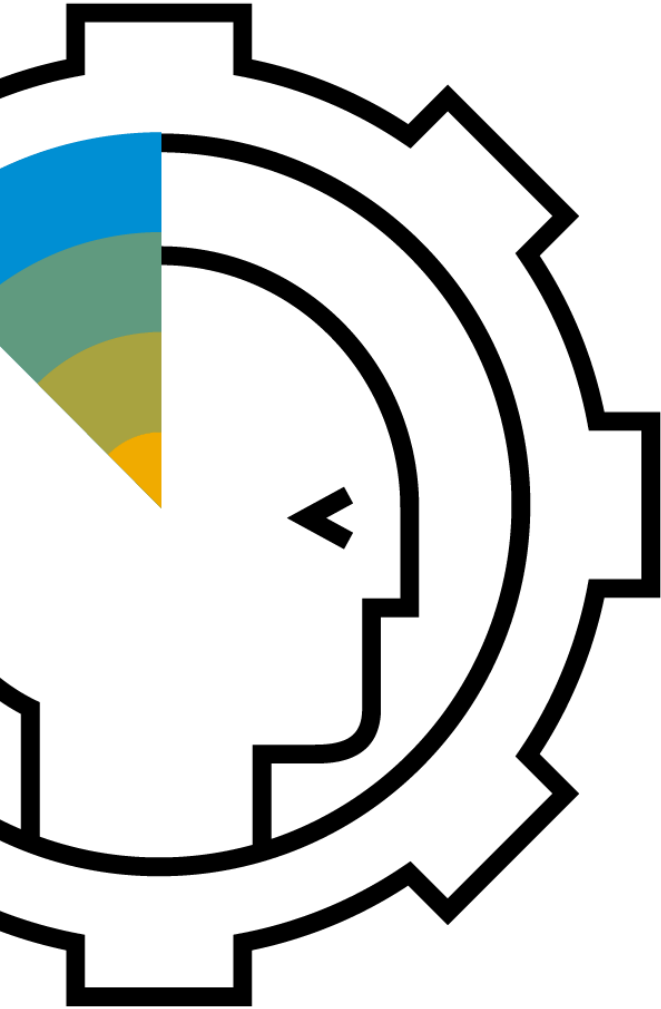
- ❑ Basic Settings

- ❑ Transportation Planning

- ❑ Shipment Execution

- ❑ Monitoring Shipments

- ❑ Shipment Cost Processing

- ❑ Interfaces

- ❑ Miscellaneous
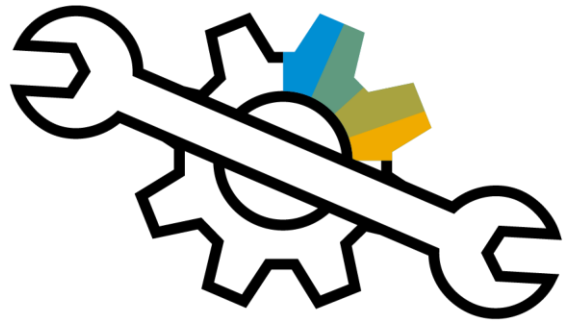
Basic Settings

Enterprise Structure

LE-TRA

basic Transportation Management
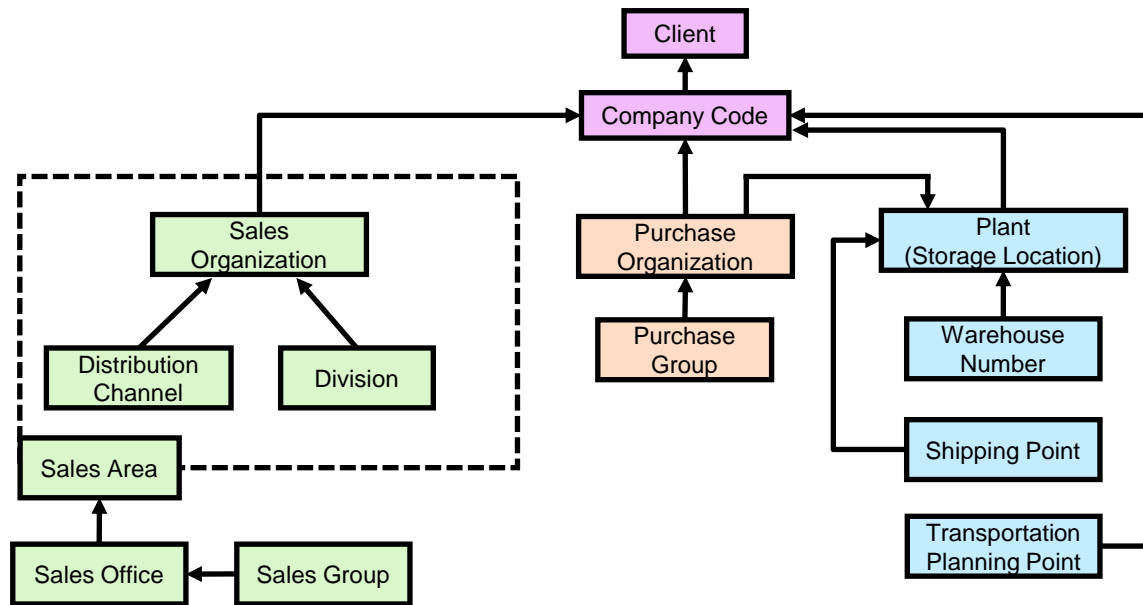
- A Company Code is a legal entity & independent accounting unit.

- Sales Organization distributes goods & services.

- Purchase Organization is responsible for external procurement.

- Warehouse Number, Shipping Point and Transportation Planning Point are organizational units in Logistics Execution.
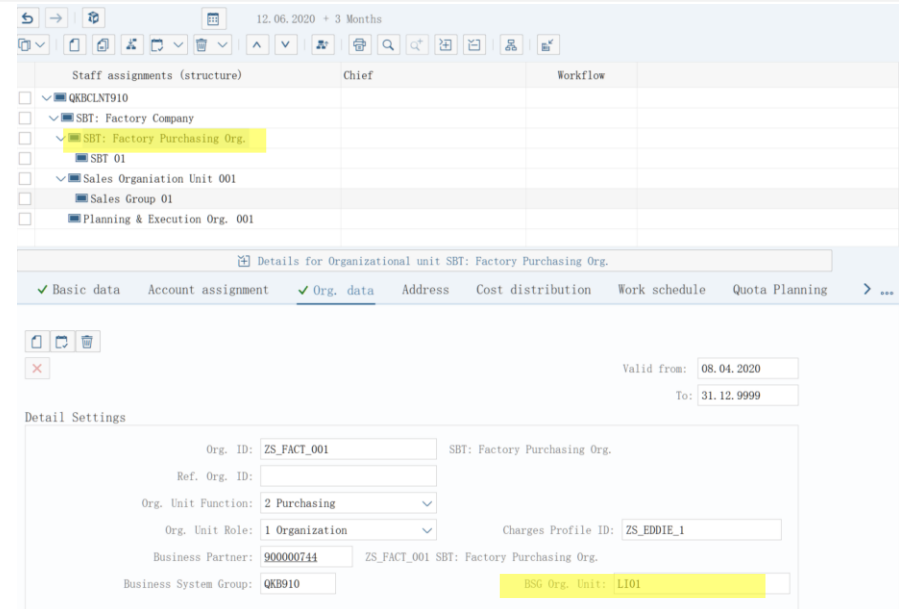
- In S/4 TM, the organizational structure can be based on the structure of a connected S/4 ERP system:
  - Corporate Organization
  - Company Organization
  - Sales Organization, Office and Group
  - Purchase Organization and Group
  - Planning and Execution Organization and Group

- S/4 TM maps its own Org. Units with S/4 ERP Org. Units through the field "BSG Org. Unit."

- Plant and Shipping Point are created as Locations in S/4 TM

• Planning Only • basic TM advantage over LE-TRA

Transportation Planning Point

LE-TRA

basic Transportation Management

- The transportation planning point is an organizational unit, which consists of a group of employees responsible for organizing transportation activities.

- Planning and Execution Organization is responsible for transportation planning.

- Purchasing Organization is responsible for procuring the necessary services from the carriers.

- Derived from Purchasing Organization, Company Code is enabled on Freight Documents relevant for subcontracting (in release 2020).

Transportation Relevance

LE-TRA	basic Transportation Management

- Shipments do not need to be planned for all deliveries.
- The delivery type, the delivery item category, and the route in the delivery uses transportation relevance to control whether a shipment can be created or not.

- Activation of S/4 TM integration for deliveries is controlled by the combination of Shipping Point, Delivery type and Shipping Condition.

• Planning Only   • basic TM advantage over LE-TRA

Non-stock Material

LE-TRA	basic Transportation Management

- Delivery with non-stock material can be planned in the LE-TRA Shipment.

- Freight Unit will not be created for the non-stock material in the standard system.

- Use BAdI /SCMTMS/BADI_LOGINT_CHG_TTRQ to change the standard logic and set transportation relevance for non-stock items.
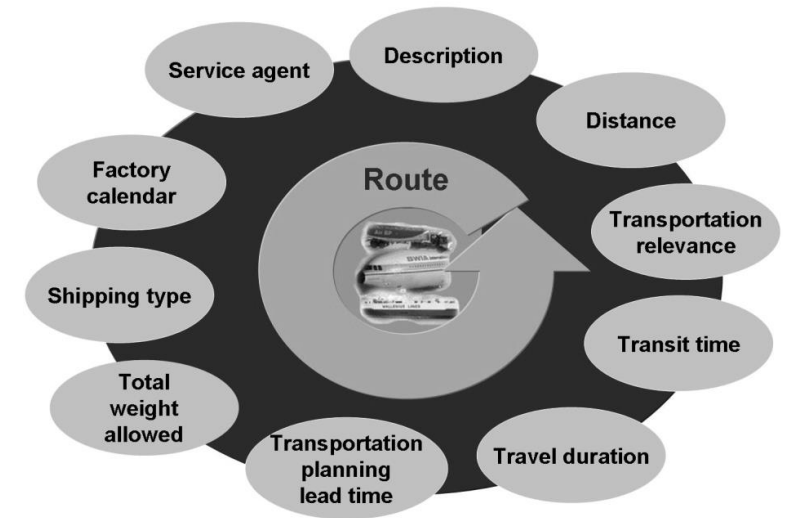
Information Relevant for Transportation

LE-TRA	basic Transportation Management

LE-TRA

- Mode of Transport

- Shipping Type

- Transportation Connection Point

- Shipping Conditions

- Transportation Groups

- Route and Route Determination by Transportation Zone / Shipping Condition / Transportation Group / Weight Group

- Route Schedule

- Material Freight Groups

- Freight Code Sets and Freight Codes

basic Transportation Management

- Transportation Mode (TM specific)

- Transportation Mode Category

- Location

- Shipping Conditions

- Transportation Groups

- No specific Route object, route definition via Transportation Lane, Default Route

- Road Carrier Schedule

- Material freight groups / Product Freight Groups(SCM Basis)

- Freight Code Sets and Freight Codes (SCM Basis)

LE-TRA: Route

- A route is the journey to be covered between a departure point and a destination point. A route can be defined in great detail and consists of individual stages, but it can also be a quite general description or even simple a destination area.

- A route can contain many pieces of information that are important for the shipment, such as distance, transportation lead time, travel duration, shipping type, service agent, and so on.

- Route determination:

  - The system determines the route for each order item.

  - The route can be adopted from the order item or redetermined in the outbound delivery.

  - In the shipment, a different route can be entered. This route does not have to be identical to one of the routes in the deliveries. It is also possible to transfer the route from the deliveries to the shipment (if it is the same for all deliveries).

Route Information

Route Determination

• Planning Only • basic TM advantage over LE-TRA
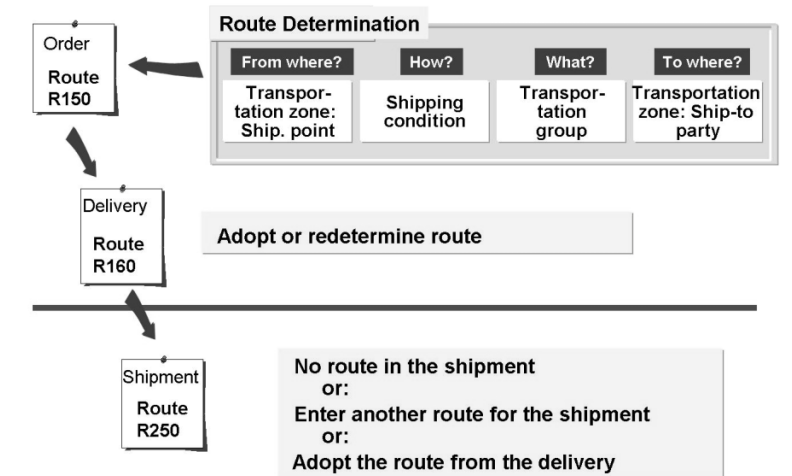
basic Transportation Management: Default Route

- A default route defines a location sequence for a given source and destination, which can be locations or zones.

- For a transport from a source to a destination, the default route serves as a template guiding the transportation through the network. For example, for the intermodal transports, default routes can predefine the sequence of transhipment locations.

- In the default route, you can specify the transportation mode, carrier, and so on, for each transportation stage.

- During freight unit building, freight unit stages can be automatically generated based on a default route. Then the freight unit stages are created according to the default route's location sequence.

Default Route defined in S/4 TM

Default Route applied in the Freight Unit

basic Transportation Management: Transportation Lanes

- Transportation lanes describe the reachability of locations within the transportation network. A valid transportation lane indicates that the destination can be directly reached from the source with certain means of transport and certain carriers.

- A transportation lane can be maintained between:
  - Two locations
  - A location and a transportation zone
  - Two transportation zones
  - A transportation zone itself

- Information assigned to a transportation Lane:
  - Start location and destination location
  - Means of transport
  - Carrier per means of transport

Distribution Center

Transportation Lanes

Location

Customer

Supplier

Transportation Zone

Transportation Lane defined in S/4 TM

• Planning Only   • basic TM advantage over LE-TRA

Partner Determination

LE-TRA	basic Transportation Management

LE-TRA

Partner Functions in Procedure

	Part.Det.Proc	Partn.Funct.	Name	Not Modifiable	Mandat.Funct
☐	TR	CR	Forwarding Agent	☑	☑
☐	TR	TF	Freight service agt	☐	☐
☐	TR	TL	Loading supervisor	☐	☐
☐	TR	TR	Cleaning firm (T.)	☐	☐
☐	TR				

Partner Determination Procedure Assignment

	ShipmentType	Name	Part...	Name
☐	0001	Indiv.Shipmt – Road	TR	Shipment header gen.
☐	0002	Collct.Shipmt – Road	TR	Shipment header gen.
☐	0003	Collective Shipment	TR	Shipment header gen.
☐	0004	Prelim. leg by road	TR	Shipment header gen.
☐	0005	Main leg by sea	TR	Shipment header gen.
☐	0006	Subseq. leg by road	TR	Shipment header gen.

basic Transportation Management

Part. Det. Prof.: CSI1

Description: Partner Determination Profile

Assign Partner Functions

	Function	Name	Sequence	Edit Level	Srce Type	Source PF	Name
☐	SP	Sold-To Party		Choose from List ∨	Partner Function ∨		
☐	DR	Driver		Choose from List ∨	Partner Function ∨		
☐	PE	Payee		Choose from List ∨	Partner Function ∨		
☐	BP	Bill-to party		Choose from List ∨	Partner Function ∨		
☐	PY	Payer		Choose from List ∨	Partner Function ∨		
☐	PI	Invoicing Party		Choose from List ∨	Partner Function ∨		
☐	T5	Addtnl. Notify Party		Choose from List ∨	Partner Function ∨		
☐	T6	Prepaid Agrmt. Party		Choose from List ∨	Partner Function ∨		
☐	T7						

Partner-Related Settings

Partner Determination Profile: CSI1

Default Carrier Selection Settings:

Carrier Selection Condition:

- To define the rules that should be used to perform automatic partner determination.

- To enable the system to automatically determine the business partners in different business document types.

• Planning Only   • basic TM advantage over LE-TRA

Transportation
Planning

LE-TRA: Creating Shipments

- Shipments are collections of inbound or outbound deliveries that are shipped together, according to different grouping criteria.

- Transportation-relevant information is stored for each order item, as agreements made with the customer regarding the shipment. The same data can be defined in the header of the delivery document.

- The transportation-relevant information is copied from the order to the outbound delivery header, and thus provides the split criteria for outbound deliveries.

- The transportation-relevant information can be used as selection criteria when creating shipments. The information can also be copied from the outbound deliveries to the shipment, if it is unique.

- System contains different options for creating shipments:
  - Manual creation using the "create shipment" function (TA: VT01N)
  - Use a collective processing run to create shipments automatically
  - If the shipments are created and optimized by an external transportation planning system, you can link this to the ERP system with an interface.
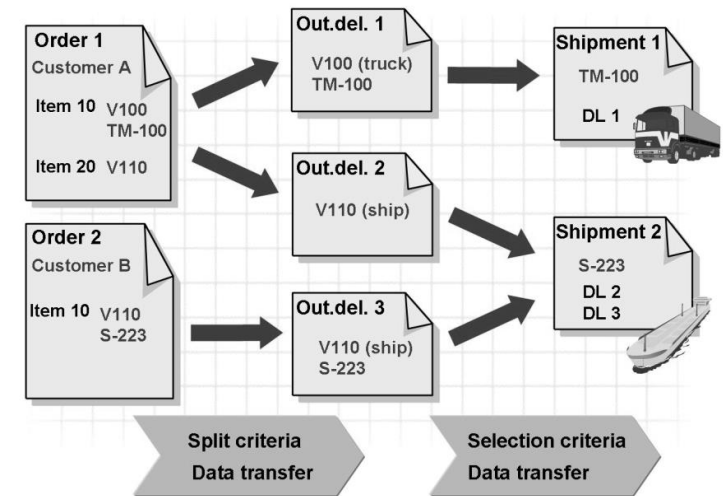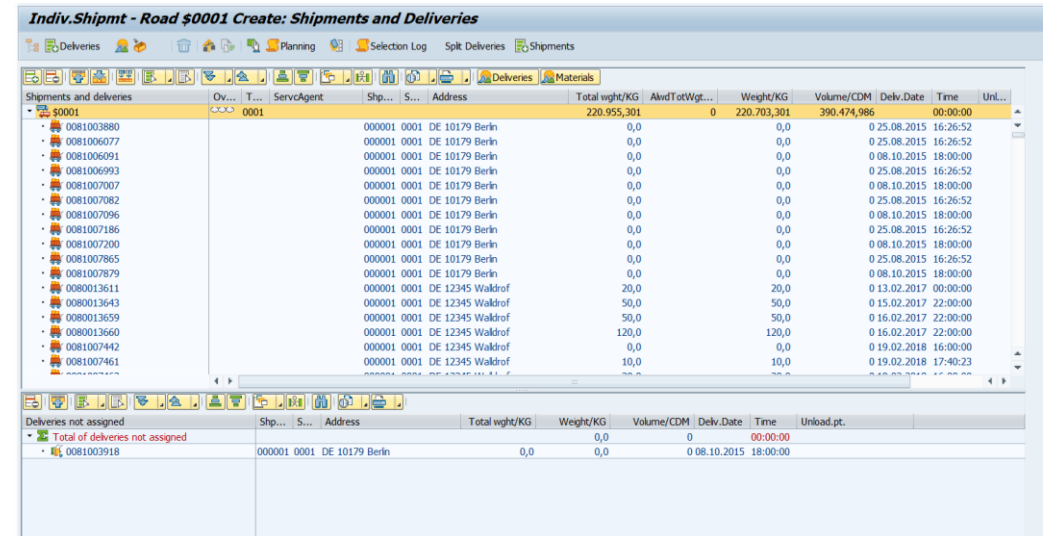
Copying Transportation-Relevant Information
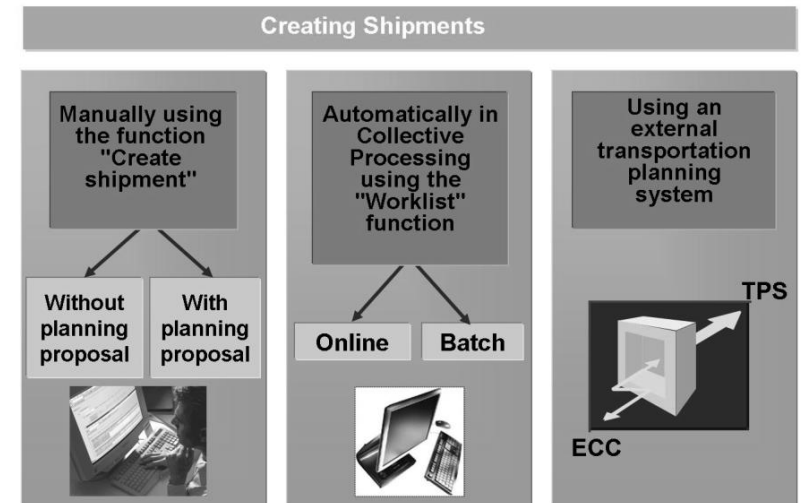
Options for Creating Shipments

LE-TRA: Manual Planning

- Create shipments by combining outbound <u>or</u> inbound deliveries

- Manually plan deliveries that are chosen using different selection criteria. Define selection variants to simplify the selection procedure

- Selected delivery documents are listed in the shipment screen. Manually assign shipments.

- Manual shipment creation with planning proposal:

  – Select deliveries due for transportation manually

  – Combine selected deliveries in shipments

  – Change or edit the created shipments manually before saving

LE-TRA shipment screen

• Planning Only   • basic TM advantage over LE-TRA

basic Transportation Management: Freight Order Creation

- Plan a Freight Order by assigning Freight Units. Freight Unit can either be derived from outbound <u>or</u> inbound deliveries. (No combined inbound and outbound delivery.)

- Manually plan via personal worklists *(POWL).*

- System default Freight Order type will be applied.

- Choose selection criteria via query

• Planning Only • basic TM advantage over LE-TRA

basic Transportation Management: Planning

- **Pre-defined Layout (Minimized Working Interface)** of Freight Unit and Freight Order view only

Insert additional Capacity Document into Planning Screen

LE-TRA

basic Transportation Management

- Insert additional shipment into shipment delivery planning screen

  – Button 'Shipments' (Ctrl+F7) can select and add further shipments into the screen

  – Button 'New Shipment' can create a new shipment document

- In a Minimized Working Interface

  – 'Insert' button can add additional Freight Orders / Freight Bookings

  – 'New' button can create new Freight Orders / Freight Bookings. Freight Order type is defaulted as the definition in the Planning Profile and can be manually overwritten.

Move Deliveries

LE-TRA

basic Transportation Management

- Move deliveries from one shipment to another via:

  – Drag and drop

  – Using functions in TA VT01 / VT02

  – Re-sort functionality

- Freight units can be moved from one freight order to another in a Minimized Working Interface via:

  – Drag Freight Units to another Freight Order

  – Drag Freight Order to another Freight Order

  – Select Freight Units and Freight Order, then choose 'Reassign' button

Remove Deliveries from a Shipment

LE-TRA

basic Transportation Management

- To remove a delivery from a shipment:

  – Drag and drop

  – Use button 'Remove delivery from shipment'

- Delete the Freight Units from the Freight Order

• Planning Only   • basic TM advantage over LE-TRA

Subsequent Delivery Split in Shipments

| LE-TRA | basic Transportation Management |

- The split can be carried out in outbound deliveries

- The delivery split could also take place during loading or transportation planning. The system automatically generates further outbound deliveries for the split quantities when saving the shipment

- The delivery split can be done in S/4 ERP and trigger the required changes in S/4 TM

- The delivery split and update can also be triggered by S/4 TM based on planning changes. Partial quantities of the Freight Unit items can be manually split to create new Freight Unit. If Freight Units of a delivery are planned on different Freight Orders with respect to their first or last stage, an automatic delivery split will be triggered in S/4 ERP after relevance check.

Creating Shipment Documents for Individual Deliveries

LE-TRA

basic Transportation Management
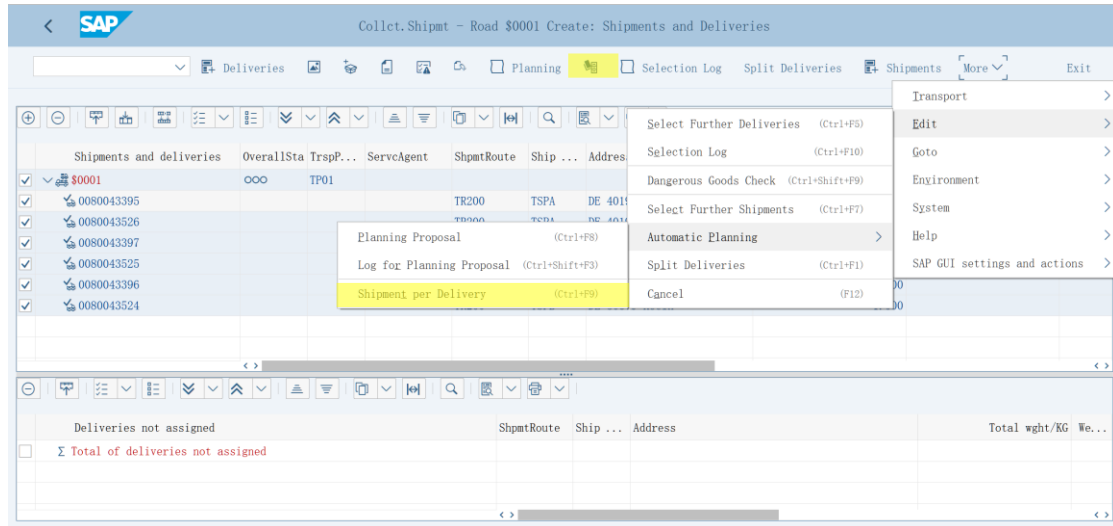
- To create one shipment document for each delivery
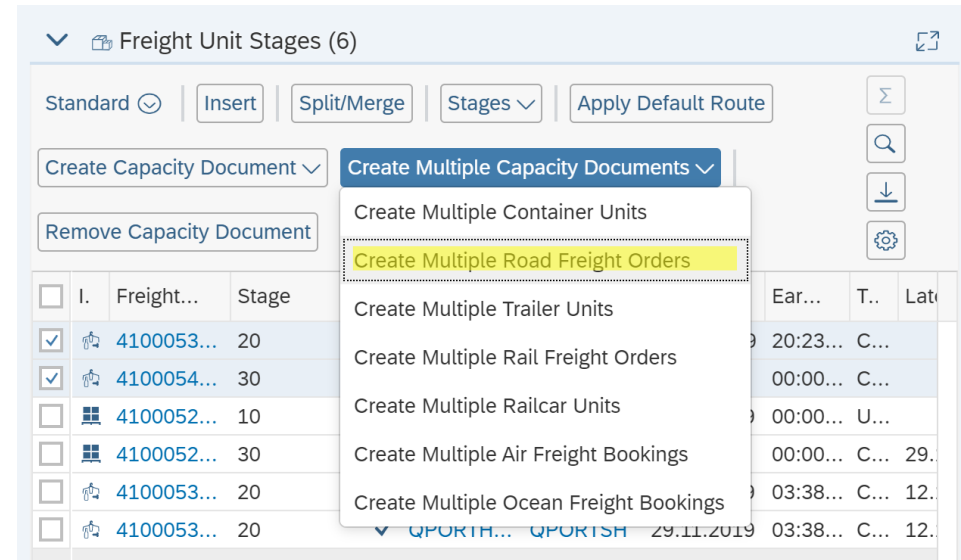
- Set up the freight building rule to ensure 1 v.s. 1 relationship between delivery and Freight Unit
- Create multiple Freight Orders for the selected Freight Units

• Planning Only • basic TM advantage over LE-TRA

LE-TRA: Planning with collective processing

- From shipment screen select deliveries and create desired shipments based on specific rules

- Specify rules determine:
  - type of shipments
  - selection of deliveries
  - creation of the shipments: grouping deliveries, data and options etc.

- Determine sort order of the deliveries within the shipments and consequently the itinerary (sort order through leg determination)

- Within collective processing, you can also define a transportation chain consisting of multiple shipments to be created. For example, all selected deliveries are grouped together into main leg, preliminary and subsequent leg shipments.

• Planning Only • basic TM advantage over LE-TRA

LE-TRA: Manual Shipment Creation with Planning Proposal

- The process is that first select the deliveries manually, then choose the planning proposal, which engages the system to automatically combine the selected deliveries in the shipment and complete them with data.

- Unlike Collective Processing, you can change or edit the created shipments manually before saving.

- The planning proposal arises from a planning profile saved in Customizing.

- The profile variants is shared for planning profile and collective processing, as the planning profile is regarded in technical terms as a variant of Collective Processing for creating shipments.

basic Transportation Management: Automatic Planning

Currently no solution available

- To create the report to adopt standard methods for the creation of Freight Orders/Freight Bookings after defining the rules how deliveries (Freight Units) are to be grouped together (either in the foreground or background). Need two options: save directly after the report run, and have an intermediate result display so that user can edit and save manually.

• Planning Only • basic TM advantage over LE-TRA

Automatic Leg Determination according to the Itinerary
Leg Determination Category 1

LE-TRA	basic Transportation Management

- The goods are sequentially picked up at the shipping points and sequentially delivered to the ship-to parties.
  - The itinerary is derived from the sort sequence of the deliveries in the shipment document
  - The sequence can be changed in a dialog box
  - No intelligent route determination with geographic optimization

- Sequence of Freight order stages is "Defined and Linear"
  - By default, stop sequence are automatically determined according to the shortest route (via heuristic ABAP program).

Automatic Leg Determination for preliminary and subsequent leg
Leg Determination Category 2 & 3

LE-TRA	basic Transportation Management

S...		Departure point	Destination	FwdA...	Forw. agent	S..	Shippin...	Distan
☐	�d	Wiesloch/69168/DE/Shipping Point A	Duesseldorf/40191/DE/T Customer 201			01	Truck	
☐	�d	Wiesloch/69168/DE/Shipping Point A	Aachen/52074/DE/Customer 206			01	Truck	
☐	�d	Walldorf/69190/DE/Shipping Point B	Koeln/50679/DE/Customer 205			01	Truck	

🔍 👥 Deliveries ⋮☰ ⋮☰ 🚚 🔺 ⊖ ⊝ 📊   Leg Determination

- Non-linear stage FO cannot be created via planning (manual and automatic)

- Leg determination 2 & 3: Preliminary leg per loading point, subsequent leg per ship-to party.

- When there are several points of departure, a preliminary leg is created for each point of departure, which links the point of departure to the beginning of the main leg.

- Similarly when there are several destination points

• Planning Only   • basic TM advantage over LE-TRA

Transportation Chain in a single shipment

Leg Determination Category 2, 3, 4

LE-TRA

basic Transportation Management

- Leg determination categories 2,3,4 can form a transportation chain to be illustrated in a single shipment.

- Limitation that the outputs (also the shipping units, texts, dates, etc.) must be defined for the whole shipment.

- Recommend to use several shipments of the separate legs to form a transportation chain.

Different objects of Freight Orders / Freight Bookings for varied transportation mode, e.g. road, rail, air and ocean.

We have different modelling concept: need to create a set of FOs / FBs to represent the transportation chain, that's how S/4 TM model the multi-modal transportation.

For automatic creation of the set of documents, please refer to slide 35.

Create Transportation Stages manually

LE-TRA

basic Transportation Management

- Entering stages manually in the shipment document
  - Leg
  - Load transfer point
  - Border crossing point

- Freight Order stages can be maintained manually
  - Insert new stages
  - Merge the existing stages
  - Remove stages

• Planning Only   • basic TM advantage over LE-TRA

Assignment of Deliveries to Stages

LE-TRA	basic Transportation Management

- The deliveries in a shipment may only to be assigned to a few rather than all stages of the shipment

  – The system analyzes the point of departure and destination for each delivery, one after the other.

  – The system then looks for the legs that connect these two locations.

- The assignment is automatically determined in the stage details of the Freight Order.

Scheduling

LE-TRA	basic Transportation Management

- The system determines the LE-TRA Route for each order item

- The LE-TRA Route can be re-determined in the outbound delivery. The shipment can adopt the route from the delivery or a route can be manually entered.

- Scheduling is based on LE-TRA Route (through customizing in LE-SHIP)

- System can propose planned deadlines for individual shipment activities. They are copied from the outbound deliveries belonging to the shipment via copy routine

- The Freight Unit contains the start location derived from plant and destination location derived form consignee

- The Freight Unit contains delivery date

- During scheduling, the system considers a set of constraints, to adjust the departure and arrival dates/times in the Freight Order and determines the loading/unloading dates/times for the related Freight Units

- ABAP scheduler can be used for Freight Order scheduling in basic Transportation Management(release version 2020 onwards)

Assigning Service Agents in the Shipment Document

LE-TRA

basic Transportation Management

- Service Agents can be maintained in the shipment:
  - At header level
  - At stage level

- Carrier can only be maintained at the header level of the Freight Order.

- Different Executing Carriers can be maintained at the stage level in rail Freight Order, but not possible in other types of Freight Orders. It is not a gap due to different modelling concept in S/4 TM.

• Planning Only   • basic TM advantage over LE-TRA

Tendering for Service Agents

LE-TRA

basic Transportation Management

- A created shipment can be subcontracted and offered to a service agent.

- Shippers and service agents communicate for the shipments acceptance, rejection and further information if necessary.

- To use direct tendering process to send a road Freight Order directly to a specific carrier without creating a freight RFQ.

Automatic Assignment of the Service Agent

LE-TRA

- Route can be transferred from the deliveries to the shipment (if it is the same for all deliveries). When the status is set to "planned" in the shipment document, the route and some other information, e.g. service agent, are copied.

basic Transportation Management

- Via the default route, the carrier can be determined to the Freight Unit stage, and taken over to the Freight Order after Freight Units assignment in the freight order.

- S/4 TM randomly chooses one if there are multiple applicable default routes. Implicit enhancement can be done in the method VSR_ROUTE_DEF_POST of class /SCMTMS/CL_SCH_PLN to include decision parameters such as zones, shipping condition, transportation group and weight.

Mass changes

LE-TRA

basic Transportation Management

- Mass changes enables to change the data in several shipment documents at once
- Select the shipments required according to certain criteria and make the changes at header level

- Select multiple Freight Orders from the POWL and apply Mass Change

• Planning Only • basic TM advantage over LE-TRA

Packing in the Shipment Document

LE-TRA

- The packing hierarchy, which is setup in the delivery, is continued in the shipment document.

- Delivery items packed into crates and loaded on pallets can be packed into containers and loaded on trucks in the shipment document.

- Cross delivery handling units is supported.

basic Transportation Management

- S/4 handling units can be integrated to create the packaging information in S/4 TM (as package items).

- Further package items can be created in Freight Unit, Freight Order.

- Cross delivery package items can be supported manually.

Delivery Item Generation in the Shipment

LE-TRA

- Packaging material are mostly cost items and are managed as stock. For goods receipt from supplier and goods issue to customers, it is important to generate delivery items for the packaging materials so that these can be seen in the delivery note, posted in stock, and then invoiced as required.

- System can automatically generate separate delivery items for packaging materials that are only yet in planning for the shipment.

- Some information:
  - Delivery items generated from packaging materials are not updated if there is a change to the handling unit(plant, weight , and son on).
  - Generated delivery items are deleted only if the handling unit is deleted
  - The generation of packing materials in deliveries already posted for goods issue is not possible.
  - Any change in the HU content does not affect the generated item, even if the new contents do not have any reference to this delivery.
  - For technical reasons, the delivery update can only be called up during the update of the shipment. Issuing a log is no longer possible at this point.

basic Transportation Management

- If an ASN is received with the packaging material, it is possible to automatically create the packaging material in the freight unit and in the corresponding LE inbound delivery (when the customizing is done).

Maintaining Texts in the Shipment Document

LE-TRA

basic Transportation Management

- Texts are maintained manually at header level in the shipment document.

- Texts are maintained on the Notes tab page in the Freight Order.

• Planning Only   • basic TM advantage over LE-TRA

Output Control

LE-TRA	basic Transportation Management

- The Logistics Execution application uses output control for printing and interfaces.

- S/4 TM uses output management to print, fax, email documents and sending information via EDI.

• Planning Only   • basic TM advantage over LE-TRA

Dangerous Goods Check

LE-TRA

basic Transportation Management

- The dangerous goods check applied is part of the standard dangerous goods management package in the SAP System.

- The check happens automatically or can be initialed manually.

- The system checks dangerous goods in different ways and at different process steps to ensure safety precautions are observed.

- The system also prints the required dangerous goods information if required settings is made.

Completing Transportation Planning

LE-TRA

basic Transportation Management

- You can set the Planned status in the shipment header after completing all the necessary planning activities.

- The shipment document is then ready for shipment completion.

- The status 'Ready for Transportation Execution' can be manually set in the Freight Order.

- The system runs condition check of readiness for starting transportation execution.

**Shipment
Execution**

Activity Profiles

LE-TRA	basic Transportation Management

LE-TRA

- With the activity profile, when you set the status of a shipment document, the system executes activities and check for certain data automatically.

- Possible activities include:
  - Add to the data in the dialog box for completion
  - Post goods issue for the deliveries
  - Calculate the shipping costs
  - Create invoices for the deliveries in the shipment
  - Print certain outputs

basic Transportation Management

- Status 'Ready for Execution' can be checked via condition.

- Goods movement (GI / GR) of deliveries can be automatically triggered when a customizable expected event is set in the Freight Order.

- Automatic charge calculation can be enabled when saving the Freight Order.

- Print documents via PPF output profile with condition check.

- Might be technical feasible to check fields completion, billing creation with PPF methods.

Setting a Status

LE-TRA	basic Transportation Management

- When transportation activities such as planning, checking in, and loading are finished, you can set a status

- When transportation activities such as planning, departure/arrival, and loading/unloading are finished, you can set a status

• Planning Only   • basic TM advantage over LE-TRA

Tracking Events

LE-TRA	basic Transportation Management

- Recording planned and actual deadlines for planning, checking, loading, shipment start, shipment end at header level of shipment
- Planned data taken from deliveries
- Actual dates are executed manually or coming from Eventhandler

- Events and actual event dates are executed manually in the Freight Order Execution tab.
- When Freight Order Execution Status is set, the related event will also be derived automatically.

• Planning Only   • basic TM advantage over LE-TRA

Posting Goods Issues for Shipments

LE-TRA	**basic Transportation Management**

- The system can automatically selects all the deliveries belong to the shipment and then posts goods issue for them.

- Trigger goods movement (GI / GR) of deliveries when expected event is set in the Freight Order.

Monitoring
Shipments

Shipment Information in List Form

LE-TRA

- Different list types for shipment processing:
  - Transportation planning list
  - Utilization list
  - Free capacity list
  - Tendering status list
  - Check-in list
  - Shipment completion list
  - Change list

basic Transportation Management

- Query, filtering and personalizing the Freight Orders Worklist
- Tendering Worklist
- Freight Orders can be queried via administration data of 'Changed By' and 'Changed On'.

• Planning Only • basic TM advantage over LE-TRA

Graphical Shipment Information

LE-TRA	basic Transportation Management
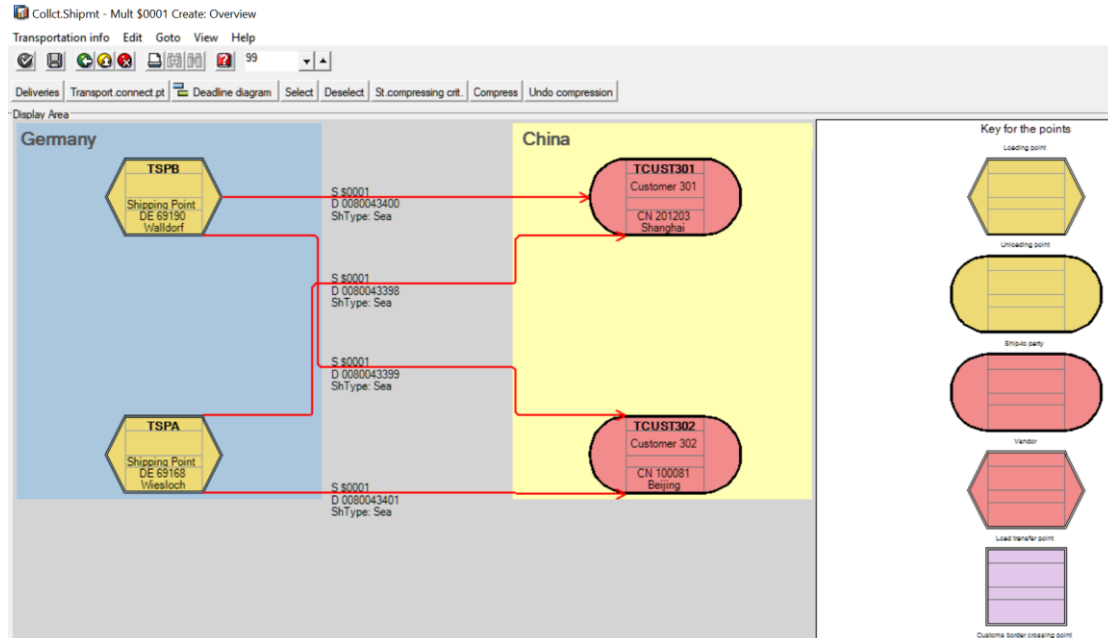
- The information of the itinerary or the transportation network for the shipment can be displayed graphically or in the list form.

- Further details can be shown for selected objects.

- This information can be called up from within the order, the delivery or the shipment.

- Predecessor and successor documents are displayed in the tab 'Transportation Dependencies' of the Freight Order.

- The list of stops for a Freight Order is displayed in the tab 'Overview'.

- 'Cross-Document Time Conflicts' can be checked in the Freight Order.

• Planning Only   • basic TM advantage over LE-TRA

Transport Execution Monitor

LE-TRA	basic Transportation Management

- To monitor the processing status of shipment documents for a specified time span.
- To provides an overview of how much potential work is required based on the number of shipment documents.

- Personalization settings in the Freight Orders Worklist

• Planning Only • basic TM advantage over LE-TRA

Shipment Tendering Status Monitor

LE-TRA

- To monitor the tendering status of shipment documents for one or more transportation planning points.

basic Transportation Management

- Personalization settings in the Tendering Worklist

• Planning Only • basic TM advantage over LE-TRA

Transportation Information System (TIS)

LE-TRA

- Various analysis and statistics on shipments
  - General shipment characteristics
  - Shipment routes
  - Means of transport
  - Transportation shipping data
  - Stages of shipment
  - Transportation Material

basic Transportation Management

- Personalization settings in the Freight Orders Worklist

• Planning Only • basic TM advantage over LE-TRA

Displaying Transportation Change Documents

LE-TRA	basic Transportation Management

- If an existing shipment is changed, a change document is created when those changes are save.

- All changes made to a Freight Order can be viewed on the tab page "Change Documents"

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Shipment Cost Processing

Shipment Cost Document

LE-TRA

basic Transportation Management

- Shipment Cost Document
  – Create individually from front end
  – Collective processing online
  – Collective processing in Background

- Freight Settlement Document
  – Create individually from Freight Order
  – Create from Freight Order worklist (multi-selection)
  – Create Freight Settlement documents via background processing

Shipment Cost Type and Item Category

LE-TRA	basic Transportation Management

- Shipment Cost Type
  - Number ranges
  - Status requirements of the shipment document for creating a shipment cost document

- Shipment cost items
  - Refer to shipment header
  - Refer to shipment stage

- Freight Settlement Document Type
  - Number ranges
  - Multiple FSDs can be created for one FO to split the charges.

- Charge calculation level
  - Calculation at header level
  - Calculation at stage level

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Shipment Cost Calculation

LE-TRA	basic Transportation Management

- Pricing procedure determination
- Pricing procedure
- Condition type
- Condition tables and condition records
- Scale
- Calculation base
- Multidimensional shipment rates (max. 3 scales)

- Freight Agreement determination
- Calculation Sheet (TCCS)
- Charge Type
- Rate table
- Scale
- Calculation base & resolution base
- Rate table with up to 3 scales

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Consistency Check for Freight Costs

LE-TRA	basic Transportation Management

- Check certain settings in the price determination control for consistency. A warning message will be issued if an inconsistency found:
  - Check for all condition types: Do the access sequences and calculation base match? (Condition tables stored in the access sequence must not contain any fields that are not known for the calculation based used.)
  - Check for all pricing procedures: Is at least one condition type entered whose calculation base is not ''? (Otherwise, no shipment costs subitems can be created.)

- Consistency check during charge master data maintenance.

- Consistency check and veto for freight agreement release.

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Additional Functions in Shipment Cost Calculation (1)

LE-TRA	basic Transportation Management

LE-TRA

- Shipment Comparisons

- Break Weight

- Representing Geographical Aspects
  - Distances
  - Location and Zones (address data & tariff zone)

- Pricing date & Settlement Dates

- Tax Countries

basic Transportation Management

- Line item selection of "Compare High/Low Value"

- Break-Weight calculation method

- Different calculation bases
  - Actual Distance, Aerial Distance
  - Source/Destination Location, City, Region, Country, Postal Code, Transportation Zone, etc.

- Calculation date & Settlement date

- S/4 TM enables tax code determination and calculation in S/4 ERP via condition types for tax

Additional Functions in Shipment Cost Calculation (2)

LE-TRA	basic Transportation Management

- Bulky Goods and Minimum Weights for shipping units

- Bulkiness Factor

- Freight Codes and Freight Classes

- Calculation rule with volume and minimum value, or with condition

- Dimensional weight profile and chargeable weight

- Product freight group; Commodity code

Freight Cost Estimate

LE-TRA

basic Transportation Management

- The transportation planner can execute a freight cost estimate during shipment processing.

- Charges are calculated in the Freight Order and displayed on the tab 'Charges'

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Shipment Cost Document List: Calculation and Settlement

LE-TRA	basic Transportation Management

- Calculation list: shipment cost documents which have not yet been completely calculated or if you still have questions regarding calculation.

- Settlement list: shipment cost documents which have note yet been completely transferred.

- Freight Settlement worklist

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Scales List

LE-TRA	basic Transportation Management

- Gain an overview of which scales already exist for master data, in case these are needed.

- Scales worklist

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Shipment Cost Settlement with Service Agent (1)

LE-TRA	basic Transportation Management

LE-TRA

- Account Assignment
  - G/L account determination in Financial Accounting
  - Assignment for Cost Accounting

basic Transportation Management

- Freight settlement integration with standard SAP S/4HANA Financial Accounting via objects mapping:
  - Assign freight settlement document information to purchasing information in MM, in order to create purchase order in purchasing
  - Assign charge type information to a service master record and an account assignment category used for posting in Financial Accounting

- Mapping for Cost Distribution:
  - Activate freight cost distribution to the order/delivery item
  - Assign charge types to condition types
  - Posting to SAP S/4HANA ERP using Settlement Management (earlier version Agency Business Document)

Shipment Cost Settlement with Service Agent (2)

LE-TRA	basic Transportation Management

LE-TRA

- Transfer to Financial Accounting
  - Purchase order determination
  - Creation of the service entry sheet
  - Accrual establishment

- Invoice creation
  - Credit memo procedure (ERS procedure)
  - Manual Invoice verification

basic Transportation Management

- Posting freight settlement document to S/4 ERP, freight settlement document is with status 'Accruals Posted' after S/4 ERP successfully created the PO and SES.

- Standard invoice creation in S/4 ERP
  - Self-billing (ERS procedure)
  - Manual Invoice verification

Shipment Cost as delivery cost

LE-TRA	basic Transportation Management

- Delivery costs can be considered for both standard purchase orders and stock transfer orders.

- The determined shipment costs are not directly transferred to the accounting department, but are included in the MM goods receipt document and added to the respective material.

- Perform cost distribution at the level of ERP item in the freight settlement document.

- In case of inbound transportation, use S/4 ERP customizing settings to specify the type of posting as material valuation for the distributed cost.

- The distributed freight cost will flow back to your material level for the purpose of material valuation.

Transferring Shipment Costs to Accounting

| LE-TRA | basic Transportation Management |

- Select the Transfer indicator and save the shipment cost document.

- Posting to S/4 ERP from freight settlement document.
- Posting from freight settlement worklist.
- Transfer freight settlement documents via background processing.

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Billing Shipment Costs to the Customer

LE-TRA	basic Transportation Management

LE-TRA

- To bill the customer for the actual shipment costs based on effective shipment cost calculation. The freight costs appear as additional entry in the customer billing document.

- Shipment costs that are calculated from the delivery items in the shipment cost document are assigned directly to their corresponding billing document items. Costs that are based on other factors, for example, the shipment cost items, are distributed among the billing document items according to the proportional weight of the delivery items.

basic Transportation Management

- Create the Freight Settlement document out of the Freight Order with active cost distribution to the delivery items.

- If the SD billing process is enabled for the delivery items, the system takes the distributed cost from S/4 TM into account when it creates the billing document for the deliveries in SD.

- Transportation costs are now part of the billing document and can be invoiced to the customer.

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Shipment Costs in the Sales Process

LE-TRA	basic Transportation Management

- To have a rough idea of the shipment costs when the sales order is created, in order to give customers relevant information or to compare different transportation options.

- As in normal situations no deliveries, shipments or shipment cost documents exist at this point, simulated version of them can be "created" in the background to enable to calculate shipment costs based on these documents.

Interfaces

1. External Transportation Planning Systems
2. Transportation Planning in Cooperation with Forwarding Agents
3. Shipping Notification
4. Using Express Delivery Companies
5. Communication via Internet

External Transportation Planning Systems

LE-TRA

- Interface from LE-TRA to TPS

  – Transmission of location master data (IDoc TPSLOC01 or TPSDLS01)

  – Transfer of deliveries (IDoc TPSDLS01)

  – Transfer of status values for planned shipments (IDoc TPSSHT01)

- Interface from TPS to LE-TRA

  – Transfer of planned shipments (IDoc TPSSHT01)

  – An exchange of error status (IDoc SYSTAT01)

basic Transportation Management

- Architecture decision not to support IDoc any longer.

- S/4 TM Web Service for the Freight Units and Freight Orders

  – Exchange Transportation Demand (Freight Unit Out)

  – Receive Consolidated Load (Freight Order In)

  – The entire communication is based on the technical web service *TransportationOrderGenericRequest_Out/_In*.

- For the master data transmission, Web Service planned for Internal ID / External ID mapping, and Standard ID registration.

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Transportation Planning in Cooperation with Forwarding Agents

LE-TRA

- Forwarding agent can principally work like an external TPS. The shipper transfer the deliveries to the forwarding agent; the forwarding agent groups these deliveries in his own system and then transfer the planned shipments to the shipper's system.

- Shipper sends deliveries to the forwarding agent:
  - Plan/change/deallocate deliveries (IDoc TPSDLS01)
  - Add/change location master data (IDoc TPSLOC01)
  - Set transportation planning status (IDoc TPSSHT01)
  - Status information about errors (IDoc SYSTAT01)

- Forwarding agent transmits the planned/rejected shipments and changes back to the shipper:
  - Create/change/delete shipment (IDoc TPSSHT01)
  - Status information about errors (IDoc SYSTAT01)

basic Transportation Management

- Architecture decision not to support IDoc any longer.

- S/4 TM Web Service for the Freight Units and Freight Orders
  - Exchange Transportation Demand (Freight Unit Out)
  - Receive Consolidated Load (Freight Order In)
  - The communication is based on the web service *TransportationOrderGenericRequest_Out/_In*.

- For the master data transmission, Web Service planned for Internal ID / External ID mapping, and Standard ID registration.

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Shipping Notification

LE-TRA	basic Transportation Management

- Notification by the vendor to the recipient regarding the pending arrival of goods shipped or about to be shipped. It contains the anticipated delivery date, quantities, and details of the material (or service).

- A shipping notification can be sent in the form of an EDI message.

- Architecture decision not to support IDoc any longer.

- Advanced Shipping Notification interface

- The communication is based on the web service TransportationOrderGenericRequest_Out/_In.

Using Express Delivery Companies

Currently no solution available

LE-TRA	basic Transportation Management

- To model the special requirements of express deliveries using express delivery companies, include:
  - Information specific to the service agent recorded in the delivery, refers to the entire delivery or to the individual parcels.
  - Printing out special labels with the required information.
  - Creating the manifest / delivery list (EDI using standard IDocs and day-end closing)
  - Parcel and status tracking (access information directly from the express delivery company via the Internet)

- Scenario of Courier Express Parcel in S/4 TM.
- Web service needs to be further analyzed by scenarios for the communication with the Express companies (after external transportation planning)

Communication via Internet

LE-TRA	basic Transportation Management

LE-TRA

- Tendering shipments for service agents

- Tracking information monitor
  - A simple tracking for monitoring the shipment status between the shipper and the forwarding agent

- Transportation planning by the forwarding agents through the Internet
  - Shipper offers deliveries to the forwarding agent through a Web interface
  - Forwarding agent receives a list of deliveries
  - Forwarding agent sets up shipments and transmit the planned shipments to shipper
  - Shipper decides whether to accept the planned shipments or to offer the deliveries to another forwarding agent

basic Transportation Management

The following features will be available in basic Transportation Managementif they're used via Logistics Business Network (subscription license) :

- Shipment Tendering - Direct Tendering

- Carrier Response to spot bids via LBN Integration

- Carrier Invoice submission and Dispute Management via Integration with LBN

- Integration to Global Track & trace

- TM Supported Invoice Verification Transactions

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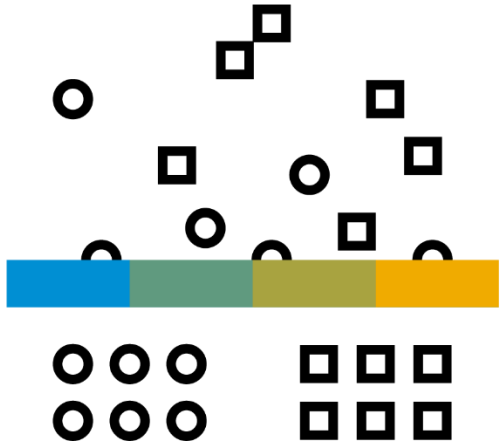
Miscellaneous

Multi-level goods receipt (IS-A-GR)

LE-TRA

- Goods receipt is usually based on the inbound delivery or inbound shipment in the automotive industry, when the goods are not procured using the JIT process.

- The first step in the multi-level goods receipt goods receipt process is to compare the shipping documents with the data received by EDI and make any corrections or additions. The second step involves the comparison of the packages and quantities received with the delivery notes, making any corrections, and then posting goods receipt.

basic Transportation Management

- In Advanced Shipping and Receiving (delivery based FU only), you post goods movement at the warehouse unloading stop level in freight order. The system triggers goods receipt by the warehouse. After the warehouse has successfully processed the request, the system updates the goods movement status in freight order to Completely Processed. If the posting of goods movement by the warehouse is not successful, the system displays the goods movement processing status Posting/Cancellation Failed.
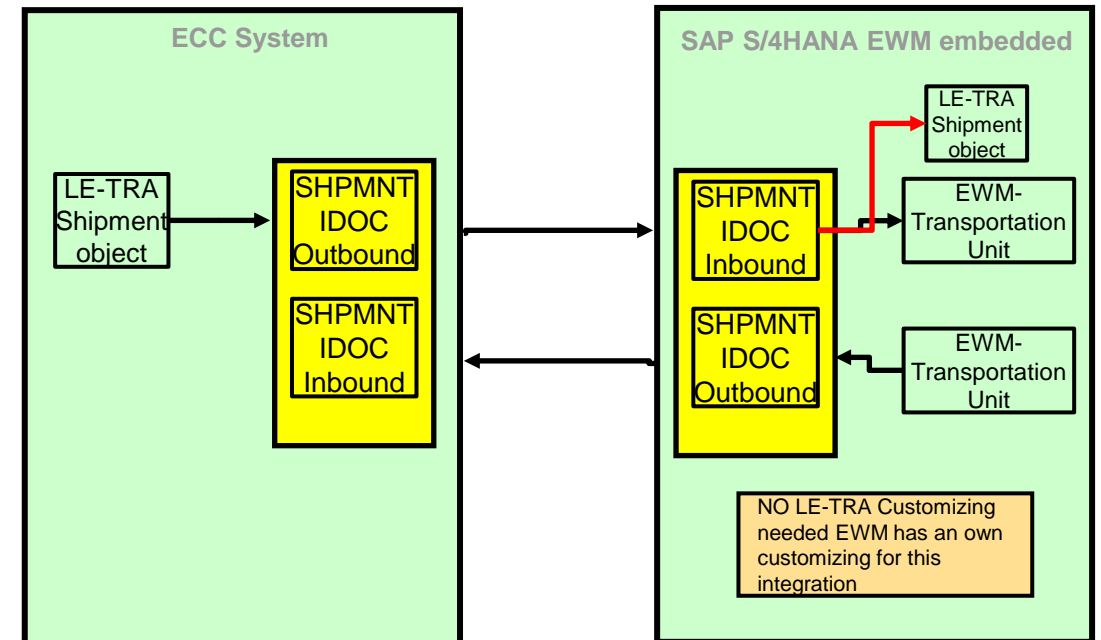
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LE-TRA integration with EWM

LE-TRA

- LE-TRA can be integrated with SAP EWM:

  – IDoc communication between SAP ERP and EWM, sending and receiving SHPMNT05 and TPSSHT01

  – Mapping between ERP shipment number and EWM external TU or vehicle number

basic Transportation Management

- Currently under investigation:
  It is planned to get an exception for EWM for the usage of SHPMNT05 for that specific IDOC communication.

ECC System

LE-TRA Shipment object

SHPMNT IDOC Outbound

SHPMNT IDOC Inbound

SAP S/4HANA EWM embedded

LE-TRA Shipment object

SHPMNT IDOC Inbound

EWM-Transportation Unit

SHPMNT IDOC Outbound

EWM-Transportation Unit

NO LE-TRA Customizing needed EWM has an own customizing for this integration

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# System Modifications and Business Add-Ins

LE-TRA

- Business Add-Ins in Transportation:
  - BADI for saving shipments
  - BADI for checks when creating a shipment cost document
  - BADI for creating a shipment cost document
  - BADI for shipment cost account assignment
  - BADI for checks during shipment cost processing
  - BADI for transferring shipment cost items
  - BADI for saving shipment cost documents
  - BADI for the purchase order item determination

## basic Transportation Management

- There are more than 200 BADIs in different areas of S/4 TM version 2020:
  - Master Data
  - Basic Functions
  - **Freight Order Management**
  - Planning
  - **Settlement**
  - Integration

• Planning Only • basic TM advantage over LE-TRA

Business value of Transportation Management compared to LE-TRA
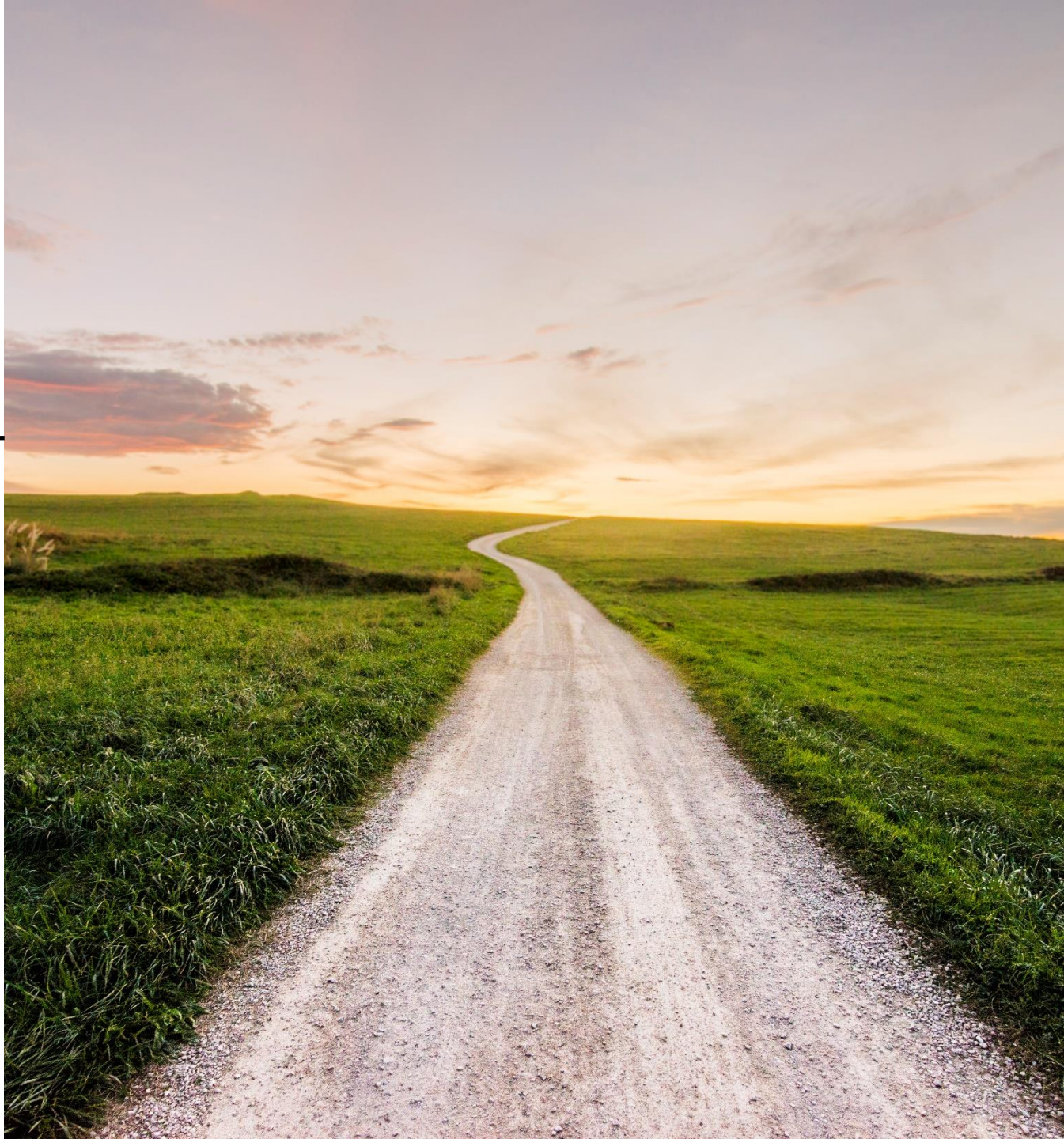
S/4HANA Supply Chain for Transportation Management – Value
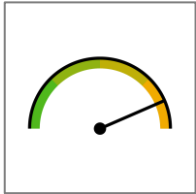
**Reduced Freight spend** and improved service levels

- **Cut down manual processes in planning**
(fully automated planning, carrier selection, tendering), freight capacity procurement, freight status monitoring and freight invoice verification
- Optimized **transportation planning** ensuring cost and resource optimization meeting service levels and all transportation constraints – including load plan, freight consolidation and package building
- Optimized **carrier selection** ensures optimized carrier capacity utilization and lower costs
- Optimal **freight cost negotiation** and freight contracts with simulation and what-if analysis
- Reduction of **expedites and overheads** through real-time transportation status monitoring

E2E transportation **visibility** and **quicker data insights**

- Real-time shipment and order status visibility through **integrated freight execution tracking and event reporting, map-based tracking**
- Freight cost and order visibility through **extensive real-time analytics**

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S/4HANA Supply Chain for Transportation Management – Value
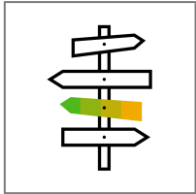
Better **respond to changes**

- Through **real-time status visibility and alerting**
- Dynamic **re-planning capabilities**
- **Realtime integration with warehouse** enabling faster processing of orders
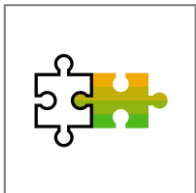
Improved **Usability** and Lower TCO

- Improved **user experience**, administration, and **advanced planning tools** (using map based planning, Gantt chart, load planning)

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Thank you.

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