### MINT – External Manufacturing





## Agenda

- Learn about Supply chain flow
- External Manufacturing transactions
- External Manufacturing configurations(Hands-On)
- Deep dive into the transaction flow

# **Pre-requisites**

- MINT Owner and Partner must exist and have TL SSO enabled
- MINT Owner licensed and routed for Solution Builder, ORD(Opus Reports and Dashboards), Master Data, CTCM, MPC(MINT/MPL) and Company Admin
- Partner <u>licensed and routed</u> for XTT-AWS, CTCM and Company Admin.(Note In the ATS ticket, please request system admin access for your TraceLink root account (for e.g. user@tracelink.com) instead of the tl\_admin account.)
- MINT Owner must have Master Data migrated to Opus
- Access to user accounts with System Administrator rights for MINT Owner and Partner
- Steps to complete <u>https://tracelink.jira.com/wiki/x/fgsZyg</u>
- Install PuttyGen to generate keys for SFTP connection (<u>https://tracelink.jira.com/wiki/spaces/SER/pages/4894065410/SFTP+on+Opus#1.-Create-public-and-private-keys-using-PuttyGen</u>)
- Install FileZilla to send transactions

(https://tracelink.jira.com/wiki/spaces/SER/pages/4894065410/SFTP+on+Opus#3.-Accessing-SFTP-account-using-FileZilla)

### Supply Chain Management Flows



Product



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### **Orchestration Subgroups**







#### **Product Flow**

Processes and teams that focus on the movement of physical product

#### • Procurement

- Shipping/Receiving
- Planning
- Production Staff

#### **Financial Flow**

Processes and teams that focus on the cost and expenses of an organization

- Finance
- Accounting

#### **Information Flow**

Processes and teams related to additional business details

#### • Procurement

- Marketing
- Finance



## External Manufacturing: Orchestrating Processes between Life Sciences Companies and CMOs



### **MINT Transaction Flow for External Manufacturing**







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### **External Manufacturing Information Flow**







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### **Forecast Plan Transaction Overview**

#### Purpose

Used by customers to inform their suppliers of anticipated needs for a certain amount of time Supported Transaction Formats

- EDI X12 830
- IDOC DELFOR.DELFOR02
- EDIFACT DELFOR

#### Direction

Customer or Manufacturer to Supplier/CMO/CPO Frequency

Predetermined frequency (ex: weekly, monthly, quarterly)

#### Usage Notes

Typically followed by the Forecast Plan Response

- Communicating material requirements and schedules enhances planning capabilities for raw material needs with expected production targets
- Insight into future needs help suppliers optimize stock levels
- Suppliers can reduce bottlenecks by reporting capacity needs through Forecast Plan

#### Key Data

- Forecast ID
- Forecast Date
- Forecast purpose code
- Releases against a PO
- Customer party information
- Supplier party information
- Line Items
  - Item Code
  - Item Identifier
  - Quantity
  - Unit of Measure
  - Item Description
  - Forecast version number
  - Forecast date
  - Forecast timing qualifier
  - Location identifier and quantity



### **Forecast Plan Response Transaction Overview**

#### Purpose

Used by a CMO or supplier to confirm the planning schedule with release capability

Supported Transaction Formats

EDI X12 830 IDOC DELFOR.DELFOR02

#### Direction

CMO/Supplier to the Manufacturer/customer Frequency

In response to Forecast Plan transaction Usage Notes

Typically follows the Forecast Plan transaction for Supplier/CMO/CPO to communicate a response or feedback on the received Forecast (Accept, reject, accept with changes, etc) Improves collaboration between customers and

suppliers through standardized formatting and forecast alignment

#### Key Data

- Forecast ID
- Forecast Date
- Forecast purpose code
- Forecast schedule type
- Forecast response type
- Customer party information
- Supplier party information
- Line Items
  - Item Code
  - Item Identifier
  - Quantity,
  - Unit of Measure
  - Item Description
  - Forecast version number
  - Forecast date
  - Forecast period
  - Location identifier and quantity

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• Free text, notes, instructions

### **Batch Creation Transaction Overview**

#### Purpose

Creates a group of items which have the same characteristics

Supported Transaction Formats

**IDOC BATMAS03** 

#### Direction

Typically CMO/Supplier to MAH/Customer Could be Bi-Directional (supplier to customer or customer to supplier) or for internal reporting

Frequency

As batches are created

#### Usage Notes

A batch can represent a wide range of scenarios from a CMO creating a new batch to a manufacturer identifying products in a recall or a selected group of items used in quality testing a receipt at a wholesaler

#### Key Data

- Material Number
- Batch Number
- Location identifiers
- Date of Manufacture
- Shelf Life/Expiration Date
- Batch Status
- Vendor Name
- Last Goods Receipt
- City/Region of Origin



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### **Inventory Balance Transaction Overview**

#### Purpose

Report inventory levels for stock reconciliation of product in different locations.

Supported Transaction Formats

EDI X12 846 IDOC INVRPT01 EDIFACT INVRPT

#### Direction

3PL/CMO/Suppliers to MAH/Customer

Frequency

Recurring schedule (such as daily, weekly, monthly, etc)

#### Usage Notes

Provides real time inventory visibility for products across storage facilities and locations

#### Key Data

- Company Information
- Reporting Location Information
- Transaction Date
- Line Items
  - Item Code
  - Item Information
  - Lot Number
  - Expiration Date
  - Quantity
  - Quantity Type (ex: On Hand, On Order)
  - Unit of Measure
  - Location



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### **External Manufacturing Product Flow**



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### **Purchase Order Transaction Overview**

#### Purpose

Used by customer to place order for goods or services to the supplier, with items, quantities, price, shipping details, shipping terms, payment terms

#### **Supported Transaction Formats**

EDI X12 850 EDI EDIFACT ORDERS IDOC ORDERS05

Direction

Customer to Supplier/CMO/CPO

Frequency

Upon Order submission by customer Usage Notes

Typically followed by Purchase Order Acknowledgement transaction for Supplier/CMO/CPO to communicate response to the received PO (Accept, reject, accept with changes, etc)

#### Key Data

- PO Number
- PO Date
- PO Type
- Processing Function Code
- Customer Information
- Supplier Information
- Ship-To Information
- Billing and Remit-To Information
- Payment Terms
- Delivery Terms
- Free Text Note/Instructions
- Line Items
  - Item Code
  - Item Information Quantity, UOM
  - Pricing Information
  - Delivery Schedule Quantities, Dates
  - Ship-to Information
  - Payment Terms
  - Delivery terms
  - Free text Note/Instructions

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### **Purchase Order Acknowledgement Transaction Overview**

#### Purpose

Used by supplier to confirm receipt of the purchase order and provide line-item details on potential changes needed to the originating purchase order

#### Supported Transaction Formats

EDI X12 855 EDI EDIFACT ORDRSP IDOC ORDERS05

Direction

Supplier/CMO/CPO to Customer

Frequency

Upon Order submission by customer Usage Notes

Typically follows the Purchase Order to communicate response to the received PO (Accept, reject, accept with changes, etc)

#### Key Data

- PO Number
- PO Date
- Acknowledgement Type
- Estimated Ship Date
- Carrier Details
- Buyer Information
- Seller Information
- Carrier Information
- Free Text Note/Instructions
- Line Items
  - Item Code
  - Item Information
  - Quantity, UOM
  - Pricing Information
  - Quantity Changes Made
  - Date Changes Made



### **Inventory Update Overview**

#### Purpose

Modify recorded inventory levels and status to reflect actual inventory on hand

**Supported Transaction Formats** 

EDI X12 947 IDOC MBGMCR or WMMBID

#### Direction

3PL/CMO/Suppliers to MAH/Customer

#### Frequency

Triggered by an inventory adjustment event Usage Notes

Sent after cycle count or as inventory levels increase from returned product or decrease due to various reasons (expired, damaged, consumed, etc)

#### Key Data

- Transaction Type
- Transaction Date
- Transaction Number
- Line Items
  - Item Code
  - Item Information
  - Adjustment Type
  - Adjustment Qty
  - Adjustment Reason Code
  - Location Information
  - Free Text/Note



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### **Advanced Ship Notice Transaction Overview**

#### Purpose

Used by supplier to communicate contents of a shipment to a trading partner. Typically contains tracking numbers, order level information, and pack level details.

#### Supported Transaction Formats

EDI X12 856 EDI EDIFACT DESADV IDOC DELVRY07

Direction

Supplier/CMO/CPO to Customer

Frequency

Upon Order submission by customer

Usage Notes

Typically follows the Purchase Order transaction for Supplier/CMO/CPO to communicate

#### Key Data

- PO Number
- PO Date
- Shipment Type
- BOL/Tracking Number
- Weight/Dimensions of Shipment
- Estimated Delivery Date
- Scheduled Delivery Date
- Customer Information
- Supplier Information
- Carrier Information
- Transportation Method
- Free Text Note/Instructions
- Line Items
  - Item Code
  - Item Information Quantity, UOM
  - Lot Number
  - Storage Information
  - Parent/Child Packing Relationships
  - PO Number
  - Weight/Dimensions of Containers

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Free Text Note/Instructions

### **External Manufacturing Financial Flow**





### **Invoice Transaction Overview**

#### Purpose

Sent by the seller to the customer to request payment for goods or services provided.

Supported Transaction Formats

EDI X12 810 EDI EDIFACT INVOIC IDOC INVOIC03

Direction

Supplier/CMO/CPO to customer

Frequency

Upon Order submission by customer

Usage Notes

Sent in response to receiving Purchase Order as a request for payment of goods or services that have been sold typically after products have been shipped.

#### Key Data

- Invoice Number
- Invoice Date
- PO Number
- Customer Information
- Payment Terms
- Discount Terms
- Shipment Information
- Free Text Note/Instructions
- Line Items
  - Item Code
  - Item Information
  - Quantity Invoiced
  - Unit pricing Information
  - Allowance or Promotion
     Information
  - Free text Note/Instructions
- Total Amount
- Tax Information

### **Remittance Transaction Overview**

#### Purpose

Sent by the customer to the seller to support the payment process for goods or services received. Supported Transaction Formats

EDI X12 820 IDOC PEXR2003

#### Direction

Customer to Supplier/CMO/CPO

Frequency

Upon Order submission by customer

#### Usage Notes

Sent in response to an Invoice or Purchase Order to provide documentation of payments made on good received.

#### Key Data

- Remittance Number
- Remittance Date
- PO Number
- Customer Information
- Supplier Information
- Sender Account Number
- Receiver Account number
- Payment Method
- Payment Date
- Amount Paid
- Free Text Note/Instructions
  - Line Items
    - Invoice Numbers
    - Invoice Amounts
    - Invoice Dates
    - Credit or Debit Memo
    - Free text Note/Instructions



# **External Manufacturing configuration**



### **Understanding the basics**

- Define the supply chain roles
  - Supplier
  - Customer
- Define the Application ownership
  - MINT Owner
  - Partner
- Define the applicable transactions
  - PO/PO Ack/Invoice etc
- Define the File Formats to exchange the data
  - UI
  - Idoc/XML/csv/custom format
  - X12
  - EDIFACT
- Define the preferred B2B method(If not using UI)
  - SFTP
  - AS2
  - SMTP
  - Link Actions





### **Understanding the basics(cont...)**



- Externals systems i.e. ERPs send/receive data to/from **Opus** using B2B
- B2B is the primary interface from external world to Opus irrespective of business applications like MINT, POET etc.
- MPC Owner needs to have XTT-AWS, CTCM, Company, Admin, Master Data and MPC licensed
- MPC Partner needs to have XTT-AWS, CTCM, Company Admin licensed

For our demo/hands-on, The MINT Owner is going to act as a customer and Partner is going to act as a supplier.



# Hands on 1 – Add Master data for Owner and Partner into Owner's Master Data



#### Hands on 2 – Create a Process Network

Best Practices to create a Process Network Create a Process network using Admin UI





#### Hands on 3 – Assign Roles

Assign Roles to Admin User For MINT Owner/Customer

> All Transaction- Owner- Admin Manufacturing-Customer- Expanded Manufacturing-Customer- Standard

Roles required for

XTT-AWS – Application Administrator(Applicable to owner and partner both) CTCM - Transform Member - Expanded Access(Applicable to owner and partner both) Company Admin – System Administrator(Applicable to owner and partner both) Master Data - Full Access, Member - Expanded UI Access



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#### Hands on 4 – Create Link

Create Link between Owner and Partner Roles to be assigned on the link For Partner

All Transaction- Partner- Admin Manufacturing-Supplier-Partner- Expanded Manufacturing-Supplier-Partner- Standard





### Hands On 5 – Create a SFTP Connection

- B2B connections are created based on the Inbound transaction type for Sender and Outbound Transaction type for receiver
- SFTP connections on Opus are authenticated using key file and passphrase for key file.
- To generate Public and Private keys, use <u>PuttyGen</u>
- Create a SFTP connection for sending <u>X12 Inbound</u> in MINT Owner's XTT and receiving <u>Idoc Outbound</u> on Partner's XTT



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### Hands on 6 – Configure Transforms/Post Processing Transforms

<u>Configure Transform Set</u>
<u>Configure Post Processing Transform Set for MINT Owner</u>
1. Customer/MINT Owner will send <u>Purchase Order in X12 Format Inbound</u> to MINT B2B\_EDI\_X12\_850\_PurchaseOrder\_IB\_V4
2. Partner will send the <u>Purchase Order in Idoc Format Outbound</u> from MINT B2B\_IDoc\_ORDERS05\_PurchaseOrder\_OB\_V5
3. Partner will respond with <u>PO Ack in Idoc Format Inbound</u> to Owner's MINT B2B\_IDoc\_ORDERS05\_PurchaseOrderAcknowledgment\_IB\_V4
4. Owner will receive <u>the PO Ack in X12 Format Outbound</u> to from MINT B2B\_EDI\_X12\_855\_PurchaseOrderAcknowledgment\_OB\_V5

Associate the Transform Set to the SFTP connection.





### **Post Processing Transform - Concept**

**Orchestration** - Orchestrations are the coordinated and seamless execution of multiple business processes across various transactions, each with its own defined workflow, to represent a broader business relationship. It connects supply networks by facilitating the flow of various business processes, across multiple companies, within the supply chain. By linking different systems and Partners on the TraceLink Network, it enhances digital collaboration, leading to improved supply chain efficiency and transparency.

Orchestrations are crucial for managing complex supply chain operations, enabling companies to quickly adapt to changes, ensuring compliance, and optimizing overall performance through real-time data exchange and collaboration.

**Process Network** - The network provides the space for collaboration within your company and with specific Partners.

- A Purchase order from an external system coming to Opus is a Purchase Order without the information of the Orchestration and the Process Network where the transaction should be routed.
- Business Applications(Ex MINT) need to know the correct process network and the orchestration (i.e. PO for External Manufacturing vs PO for Commerce)
- Post Processing Transforms are an additional step(applied to an inbound canonical) to modify/update the canonical to include Process network names and subtypes(more information of subtypes on the following slides)



#### **Post Processing Transform - Most common usage**

- 1. To resolve the Process Network name where a transaction should get processed.
  - a. If there is only one Process network per application then B2B can resolve the process network and send it to the correct one.
  - b. If there are more than 1 Process network per application then the Process network needs to be explicitly added in the canonical so that business application knows where to process the transaction.
- 2. To resolve the correct subtype for the transaction
  - a. If a PO is sent then is it for External Manufacturing or for Commerce?
  - b. The PO is sent by a MINT Owner or a Partner?
- 3. For STE transactions, deciding if a transaction should get processed for a specific Ship to Country
  - a. MINT supports STE transactions for certain countries(Ex SA, BH etc)
  - b. If the customer uses MINT to send the STE transactions for 'SA' only and they do not want that shipments for 'BH' to appear on MINT then the PPT can be configured not to send transaction to MINT for Ship to Country 'BH'



#### **Post Processing Transform**



#### **Post Processing Transforms - Identify the Process Network**

Post processing Transforms are JAVA script codes Identification of Process networks

- 1. If a Company has only one Process network Post Processing Transform does not need to resolve the Process Network
- 2. If a Company has more than 1 Process Network and every Network has unique Partners linked to it.
  - a. The Process Networks are resolved based on the Partner.
  - b. Ex Medivonic has 2 Process Networks and Partner with GLN 111111111111111 is linked on MINT For Commerce Process Network and Partner with GLN 22222222222222 is linked on MINT For Ext Mfg Process Network



### **Post Processing Transforms - Identify the Subtype**

We know the correct orchestration so now define where the transaction would appear on MINT menu(with correct roles)

```
transactionTypeName: 'MPC_PURCHASE_ORDER',
EXTERNALMFG: {
    sentSubtype: "ext_TRACELINK_externalManufacturingSentPurchaseOrder",
    receivedSubtype: "ext_TRACELINK_externalManufacturingReceivedPurchaseOrder"
},
COMMERCE: {
    sentSubtype: "ext_TRACELINK_commerceSentPurchaseOrder",
    receivedSubtype: "ext_TRACELINK_commerceReceivedPurchaseOrder"
}
```

- The Subtypes are always based on the MINT Owner.
- If a MINT Owner is sending the PO Inbound then the subtype would be setup as "Choreography" (External Manufacturing) and 'sentSubtype' = ext\_TRACELINK\_externalManufacturingSentPurchaseOrder
- This subtype correspond to the role -> Manufacturing Customer Expanded/Standard on Owner side
- On Partner side this subtype would be available with Role Manufacturing Supplier Partner -Expanded/Standard



### **Modified Canonical**

```
"schemaId": "multienterprise-process-connect:canonicalPurchaseOrder",
"schemaVersion": 9.
"objectType": "canonicalPurchaseOrder",
"data": {
  "controlFileHeader": {
   "b2bWrapperSubType": "ext_TRACELINK_externalManufacturingSentPurchaseOrder",
   "fileControlNumber": "0000000120250514",
   "fileReceiverNumber": "GLN:
   "sapControlFileHeader": {
     "senderMessagePartnerTypeCode": "LS",
     "sapMessageUsageCode": "PRODUCTION",
     "senderSystemPort": "MUNRO LTD",
     "serializationSequentialIdentifier": "20250514035832",
     "sapClientIdentifier": "010",
     "idocReleaseNumber": "740",
     "receiverSystemPort": "Alpenstock"
   "recipientCompanyIdentifier": "8feee37f-9477-4def-98ae-20c89f13b31d",
   "senderNetworkNodeIdentifier": "d25ab887-247f-4147-b8f1-36ff70ccd594",
   "senderCompanyIdentifier": "d25ab887-247f-4147-b8f1-36ff70ccd594",
   "recipientNetworkNodeIdentifier": "8feee37f-9477-4def-98ae-20c89f13b31d",
   "fileDateTime": "2025-05-14T03:58:32.000",
   "linkIdentifier": "Ext Mfg Orchestration",
   "b2bTransactionTypeName": "MPC_PURCHASE_ORDER",
    "ownerNetworkNodeIdentifier": "d25ab887-247f-4147-b8f1-36ff70ccd594"
```



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#### How to setup Post Processing Transforms

- Post processing Transforms are created by TEI team.
- Post processing Transforms are deployed into customer's CTCM(Private Catalogue) by ATS.
- Company Admins would upload the post processing transform set similar to a standard transform sets.
- Post Processing Transform set would be associated to Business application for Inbound Message Settings(Standard Transforms are associated to a B2B connection or location)
- Information wiki page <u>https://tracelink.jira.com/wiki/x/gALjMQE</u>



### Hands On 7 – Connection Association

- When a transaction is sent by the external system(such as ERP) inbound to a B2B connection, B2B needs to know for which network node id(Company or location entity) this transaction is sent.
- When a transaction is to sent to external system <u>outbound from a B2B connection</u>, B2B needs to know to which network node id(Company or location entity) this transaction should be sent.

**Connection Association** 





### Hands On 8 – Inbound Configuration for Owner

- Any Inbound transaction is sent to Opus on B2B.
- A canonical is generated and passed through a Post Processing Transform before it gets delivered to a business application such as MINT.
- The Output of the Post Processing Transform is modified canonical with added information about Process network, Subtype of the transaction (i.e. Ext Manufacturing sent Purchase Order) and any additional logic to modify canonical if required.
- Post Processing Transform are associated to a business application such as MINT unlike the transform sets which are associated to a B2B connection or an entity.
- For Normal transforms
  - For Inbound
    - Input is customer format(iDoc, X12 etc) and output is canonical
  - For Outbound
    - Input is canonical and output is Customer format
- For Post Processing Transform
  - Input and output both are canonicals





### Ready to send you first transaction?

<u>Access the SFTP account created via Filezilla</u> Since the Inbound format is X12, place the file under Inbox-> XTT\_X12 Transaction

See the results!!!

- If the Inbound File is successful then it will move from Inbox->XTT\_X12 folder to Accepted
   -> XTT\_X12
- If the file was not successful then it will move from Inbox->XTT\_X12 folder to Rejected -> XTT\_X12
- You could also verify the response on XTT -> Search B2B messages



### **B2B On Opus - The Heart of Transaction Processing**

- B2B Transaction Processor (B2BTP) is the only Opus application that allows exchange of messages between different companies.
- B2B Transactions are either inbound or outbound, never both<sup>1</sup>.
- B2B Transactions are always between an owner and a partner or an owner and themselves. Never partner-to-partner<sup>2</sup>.

<sup>1</sup> MINT's concept of a transaction is different from B2B – when partner exchanges a document with an owner, it first flows inbound from the partner's ERP to the owner's MINT, then flows back <u>outbound</u> to the owner's ERP.

<sup>2</sup> In MINT, an owner location can send a transaction <u>inbound</u> which can be then be delivered <u>outbound</u> to another location, so from the MINT perspective, the transaction may appear to be between two partners.



### B2B 101

#### Inbound and Outbound



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#### Pause : Learn Network Node IDs on Opus

- On the Opus platform, every entity, including owner company, owner company locations, partner company, and partner company locations, is identified by a unique Network Node ID.
- These IDs are 36 characters long and are conceptually similar to an IP address for a PC on the Internet.
  - Unlike IP addresses, which can be assigned dynamically, Network Node IDs are static and cannot be changed.
- An example of a Network Node ID is "c9afafd6-ec81-4b38-b182-515c50edecd2"
- When we say a Company for Example Merck licenses MINT, it is the Merck's Company level network node id that license MINT.
- If there are other Merck locations(with NNID different than Company) they do not license MINT separately. They are treated as Partners.



### **B2BTP – Processing Steps**

- B2BTP follows one set of processing steps for all inbound transactions and another set of processing steps for all outbound transactions.
- B2BTP uses a guiding principle that accepts what has been provided and if the information has not been provided, computes or derives the required information.
- Within a B2B Transaction, there are three key pieces of information that B2BTP uses or computes as part of its processing steps:
  - sending network node this is the logical entity that is initiating either an inbound or outbound transaction.
  - recipient network node this is the logical entity that is the transaction is addressed to
  - owner network node the is the owner of the business application that is responsible for the processing of the business document. As previously mentioned, B2B transactions are always between an owner and a partner or an owner and themselves.



### Step 1: Identify the transaction type (B2B gateway only)

- Any document arriving at a B2B gateway must have some way to identify what transaction type it represents.
- Each gateway and each B2B connection type may accomplish this in a different manner.
  - SFTP connections have transaction-specific drop folders
  - AS2 connections utilize the AS2 subject or transmitted file name
  - Link Actions are individually coded to fetch only a specific transaction type or to be able to identify the transaction type by interacting with the ERP
  - Email will utilize different email addresses for different transaction types
  - In the case of EDI, we are able to look inside the message for transaction information as it is a known format



#### Step 2: Transform the document (if necessary)

- B2BTP <u>always</u> delivers a canonical representation of a business document to an Opus application.
- If the inbound transaction does not have a canonical attached, B2B transforms the customer formatted document into a canonical.
  - Documents arriving from a B2B Gateway application will be transformed by looking up the transform set that has been associated with the B2B Connection in which the document arrived.
    - By associating a transform set with a B2B Connection, this allows customers to support any number of different formats. For example, a customer's Chicago branch may use an ERP system that produces IDoc for purchase orders, but the Boston branch transacts in X12.
    - This connection is always owned by the sender so the sender can either use Marketplace (global) transforms created by TraceLink or custom-created transforms created by the partner.
  - Documents that are sent between Opus applications will typically transmit canonical files, but because B2BTP follows the same processing rules, applications can take advantage of B2BTP's built in support for transforms by providing a "customer format" document and specifying a transform to be used – this reduces replicating the same code and testing in each business application.



#### **Step 3: Sender and Recipient Identification**

- Business applications sending a document between Opus applications will define the sending network node and also the receiving network node.
- From a B2B gateway application and specific B2B Connection:
  - The sending network node will always be specified through configuration of the individual connection.
  - A gateway may also identify the receiving network node, depending on the gateway and the document format. XTT (AWS) must read the receiving network node from the identifiers within both X12 and EDIFACT documents in order to generate acknowledgments back to the sending ERP system.
  - If the receiving company has not already been identified, B2B examines the "Link Settings" (B2B Partner config). In every canonical file (since the document was transformed in Step 2), there is a control file header which has a fileSenderNumber and fileReceiverNumber. B2BTP takes the fileReceiverNumber and compares it against each Link Setting for each partner to determine which is the matching receiving network node.



### **Step 4: Routing**

- Since B2B transactions are always between an owner and themselves or an owner and a partner, once B2BTP knows both the sender, receiver, and transaction type, it uses simplified routing rules to determine where to send the document:
  - if the sending company has licensed the business application, send it to their business application
  - if the sending company has not licensed the business application but the receiving company has, send it to the receiving company's business application
  - If neither has licensed the application, this is not a transaction between an owner and themselves or a partner and an owner, so the transaction fails.



#### **Step 5: Owner Routing & Customization**

- Before delivering the transaction to the owner's business application, B2BTP invokes the Routing transform (post-processing transform or PPT)
  - The PPT allows an owner to customize:
    - the assigned process network based on the sending network node, receiving network node, and transaction type (and any other information that is available in the canonical document)
    - the sub type of the transaction, e.g. externalManufacturingSentPurchaseOrder vs externalManufacturingReceivedPurchaseOrder
    - ignoring the transaction (SOM to MINT use case, for specific originating countries)
- B2B when delivering from a partner to an owner will examine the links and if the sender only belongs to a single process network, it can automatically select the process network if the PPT has not set it.
  - If the sender belongs to multiple process networks, then the PPT is the only mechanism for the owner to determine which of the process networks each transaction needs to be routed to.



#### **Step 6: Delivery**

- The last step is to use the message processing framework (MPF) to publish a message to the message type and message service that the business application specified when defining the transaction type.
- B2BTP, using the information provided by the transaction type definition, will publish the message using the specified schema name (b2bWrapperType) and subType provided by PPT.
- When a business application implements their transaction type handling using Transaction Workflow, these two pieces of information will invoke the correct workflow and sub-workflow based on the schema and subType. For MINT, the schema is the BTO object and a subType might be externalManufacturingReceivedPurchaseOrder.
- The receiving business application will process the transaction and eventually return a response indicating whether the transaction was processed successfully or resulted in a failure.



#### Making sure our Inbound transaction is successful

What happens next? The transaction should be available on the Process Network under All -> Business Transaction





### **MINT & Transaction Workflow**

A feed is delivered to XTT and then to MINT. As shown in the following diagram:



MINT has partitioned the processing of the B2BTransaction for the feed into a set of workflow steps. Associated with each step is a handler (BTPA) that does some work.

The workflow is as follows:





#### **MINT and EDI Transactions**

• Customers use MINT to share EDI Transactions.

When we refer to EDI here we are discussing Electronic Data Interchange not a specific data format such as X12, IDoc, EDIFACTS

- Examples include a "Purchase Order".
  - $\circ$  A purchase order may have a "purchase order #".

MINT does not attempt to create business objects for each "thing" that may be referenced by an EDI Transaction.

Customers may exchange several EDI Transactions about the exact same "purchase order #".

MINT makes no attempt to create a single view of the purchase order



### **MPC, EDI Transaction & Transaction Object**

MINT creates a transaction object for each B2BTransaction that it receives.

MINT calls these transaction objects a mpcBusinessTransactionObject

There is a one to one relationship between the B2BTransaction received and a mpc Business Transaction Object

The mpcBusinessTransactionObject is a modeled object

Base type:

- B2BTransaction typedef
- Transaction Details Subtype:
- is 'transaction specific' it contains the visualization of the EDI document



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### **MINT Transaction Workflow**



B2BTP receives the B2BTransaction, processes it, and sends a transaction request to MPL

TWR receives the transaction request. TWR creates the subtyped mpcBusinessTransactionObject



### **How MINT leverages Transaction Workflow**

There are 5 core steps that MINT B2BTransactions normally go through. They are:

#### **Prepare-Inbound**

store customer provided data and canonical in s3 and link to transaction object as file attachments

#### **Process-Inbound**

use transforms to generate the ux representation of the edi document captured in the canonical and populate the subtype portion of the mpcBusinessTransactionObject

#### **Prepare-Outbound**

given an inbound canonical create one or more base outbound canonicals

#### **Process-Outbound**

given instructional data in the transaction object and an outbound canonical send an outbound B2BTransaction and record the success/failure in the mpcBusinessTransactionObject

#### **Conclude-Outbound**

complete processing



TWR controls the workflow but the BTPA's return in the transaction response information about what was completed.

TWR then writes the transaction object to WV/S3 and determines what the next step to send a message to based on data in the transaction object



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- TWR persists Transaction Object it gets from B2BTP MPC Step 1, Prepare Inbound, then starts populating 'Transaction Details'
- 3) 4)
- MPC Step 2, Process Inbound, populates subtype UX Attributes In further MPC Steps the Transaction Details are augmented related to outbound processing



Each MPC Transaction Workflow BTPA (handler) can set attributes in the 'transaction details' portion of the mpcBusinessTransaction Object:

- resultStatus
- resultTimeStamp
- resultDetails

Thus when the BTPA encounters an error talking to an external app or Opus Technology the BTPA sets these attributes and then sets the Transaction Workflow 'processStatus to PAUSED\_WITH\_ERROR

This will cause the Transaction Workflow to be interrupted.

The BTPA handlers are designed to be idempotent such that a step that gets an error, the customer can interact with the UX and re-execute the step



The Process-Outbound BTPA has been designed such that if a customer customizes the workflow to add an additional message recipient then MINT can send multiple outbound messages.

Ex: Send a ship notice to a partner and partner location that are two different network nodes

This leverages the Transaction Workflow looping technology which enables a single BTPA to be executed multiple times.

This is a fabulous technology to use when you want a write operation to occur between each execution cycle thereby improving resiliency.



#### **Standard Patterns for Transaction Workflow**

Transaction Workflow can be used whenever we need to generate or process new data that normally would be processed in the background that could fail.

Upon failure, the transaction workflow can be paused, or interrupted.

Users then interact with the transaction workflow to retry and/or resume processing.

The generation and processing of compliance documents is a good use case. (Think US Compliance and the generation of T2's)

The generation, processing and submittal of compliance reports to government systems is a good use case

For use cases where there is a one to one mapping between the transaction and the business object the mpcBusinessTransactionObject concept is applicable.

Call to Action: Transaction Workflow is your friend. Use it.



#### **Step 1: Delivery Rules**

- By default no transactions are delivered outbound to either an owner or a partner.
- Each partner configures how to receive outbound transactions in one of three ways for each transaction type.
  - No processing. The transaction will be marked as successful be returned to the business application.
  - Transform only. B2BTP will determine the routing and transform the document according to which connection the transaction would have been delivered to.
  - Transform and deliver. B2BTP will transform and deliver the transaction to a B2B Connection serviced by the owning B2B gateway application
- The delivery rules also allow a partner who is also an owner to specify whether their licensed business app will receive the specific transaction type or whether it should bypass their application and be delivered only to the B2B gateway application.



#### **Step 2: Route Determination**

- Based on the delivery rules and whether the partner is also an owner, B2B will either:
  - Send the transaction back inbound to the partner's business application (the partner's application will typically then forward it outbound to the partner's B2B Connection)
  - Send the transaction to the configured B2B Connection and B2B gateway application
- Based on the transaction type and receiving network node, B2B queries network objects for the Connection Associations created in Company Administration. Each partner can designate different connections to be used based on the receiving network node and transaction type. This allows for a variety of different use cases such as:
  - A partner wants all their documents to go to their corporate ERP by default.
  - Their Madison branch is from an acquisition and has their own ERP, so documents addressed to the Madison network node should go to a different B2B connection until the merger is completed.
  - Ship notices, no matter which location they're addressed to, alway go to their hub in St. Louis.



### **Step 3: Transform**

- Once the route has been determined, B2B knows which B2B connection the document must be sent to.
- Similar to inbound transactions, a partner will associate a transform set to their connection.
- Looking up the specific transaction type in the transform set, B2B will convert the canonical to the correct format for the specified B2B connection.



#### **Step 4: Delivery**

- Once the document has been transformed, B2B looks up the message service and message type specified by the B2B gateway application when the B2B connection was created in network objects.
- B2B publishes a message using MPF to the B2B gateway.
- The B2B gateway will receive the message, deliver the transformed file according to the gateway and the connection type and return a response indicating a successful delivery or failure.
  - Success or failure may have different criteria depending on the gateway.
    - With a SFTP connection, XTT-AWS simply places the document on the TraceLink SFTP site of the customer there is no guarantee that the customer will ever retrieve the file.
    - AS2 receives a positive message delivery notification
    - A Link Action will typically push it directly to the customer's ERP system.



# Differences in setting up and Owner and Partner to exchange business transactions

- Owner creates Process Network
- Owner links Partner on the process network and assign correct roles for a link
- Owner sets up the post processing transform
- Owner creates Outbound message settings for Partner(Partner would be able to set up their own Outbound settings once Admin Gen2 is out)
- All the other configurations we discussed would be in context of a Transaction Sender and Receiver(not Owner and Partner).



### Recap



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# **Questions?**

