LLD for Automating Inventory Movements from AWS Owned Inventory to Data Centers via GIME

> The document outlines how SCos plans to move AWS owned inventory from central VMI warehouses to AWS Data Centers. Initially addressing the network loose gear inventory, it also highlights the broader applicability of the architecture for any AWS owned inventory movement from VMI/Bison warehouses to AWS Data Centers, aligning with Project Bison goals

Glossary - Glossary

EDI Signals - Associated EDI Signals

HLD - SCos Inventory Management - Movement of AWS owned Inventory to Data Centres

Overview

Currently, there is a problem with excess networking gear inventory at data centers. Of the $660 million worth of inventory, only 30% is available [$198 M], with the rest reserved [$462 M], and 62% of the reserved inventory [$288 M] is over six months old, leading to an excess. The excess inventory issue is attributed to forecasting, ordering methods, and the absence of a just-in-time fulfillment model. To address this problem, Project Bison is proposed. It involves introducing Bison Nodes to the supply chain to reduce lead times and space constraints. These nodes will stock more inventory and deliver it within 24-48 hours.

The immediate goal is to repurpose the excess inventory, and the ultimate vision is to transition to a just-in-time fulfillment model. Manual efforts have only reduced $12 million of the excess inventory, leaving approximately $276 million inventory. The plan is to relocate this excess inventory to central nodes manually from time to time and automate its use for future demands. This approach will also be extended to manage excess inventory in other categories. Additionally, this plan helps to reduce reliance on data centers and central warehouses, favoring a centralized VMI Warehouse approach for inventory replenishment and just-in-time fulfillment.

This document explains the flow of automating the inventory movements from VMI to DC via GIME. The approach mentioned in this document is more like a general approach which should be followed for all inventory movements from VMI to DC irrespective of inventory types with slight modifications as per needed.

High Level Flow

PHASE - 0 (WITHOUT SCOS BOOKINGS INTEGRATION)

1. ***RP Instruction Batches:***
    a. Based on demand, VMI inventory (EDI-852), and in-transit details, RP issues weekly IBs prioritizing inventories at DC > CW > VMI > ODM.
2. ***Instruction Types: Two Types***
    a. 'Prepare for MOVE' (pertaining to supplier-owned inventory, involving PO creation, and no GIME interaction).
    b. 'MOVE' (related to AWS-owned / PO submitted inventory, utilizing EDI transactions with 3PLs through GIME).“
3. ***EP:***
    a. Develops a strategy to manage 'MOVE' Instruction Batches (IBs) for VMI to DC movements and will invoke GIME for the processing of these IBs.
4. ***GIME:***
    a. Ingests and validates EP input.

    b. Invokes WMS ship API for processing IBs.
    c. Encumbers source VMI inventory.
    d. Sends EDI 940R to DBS to reserve inventory.
    e. Processes EDI 940RC by DBS for reserved quantities and updates encumbrances.
    f. Processes EDI 852 by DBS for consuming encumbrances.
    g. Sends EDI 940W to DBS to ship confirmed inventory.
    h. Processes EDI 940WC by DBS for confirming exact inventory quantities.
    i. Processes EDI 945 by DBS for ASN generation.
    j. Processes receive signal from recipient DC and marks WOs as completed.
5. ***Shipments:***
    a. Receives ASN from GIME, creates Shipment Entities and sends EDI - 856 to SCos Receive
6. ***SCos Receive:***
    a. Ingests & registers the 856 ASN sent by shipments.
    b. Sends a receive signal against an ASN based receive
7. ***SCos Inventory:***
    a. Ingests 852 & project all inventory reported as On-Hand under supplier 'AWR' as LBO inventory pool.
    b. Queries WOs to get in-transit inventory details.

PHASE - 1 (WITH SCOS BOOKING INTEGRATION - GIME GAINS VISIBILITY INTO SHIPMENTS)

1. ***DBS:***
    a. Creates bookings manually using SCOS Bookings portal against 940 warehouse orders after EDI - 940WC.
2. ***Shipments:***
    a. Validates DBS bookings exclusively against valid 940 reference IDs, facilitated by GIME.
3. ***GIME:***
    a. Provides interface (API) for shipments to validate 940 reference IDs.
    b. Listens to shipment events, extracts Booking IDs, and updates corresponding WOs.

PHASE - 2 (WITH SCOS BOOKINGS AUTOMATION - UNDER DISCUSSION)

1. ***DBS:***
    a. Attaches packing info for EDI - 940WC bookings.
2. ***GIME:***
    a. Extracts packaging info during EDI-940WC processing.
    b. Generates bookings against EDI-940 using extracted details
3. ***Shipments:***
    a. Provides interface for GIME to create bookings

Out Of Scope

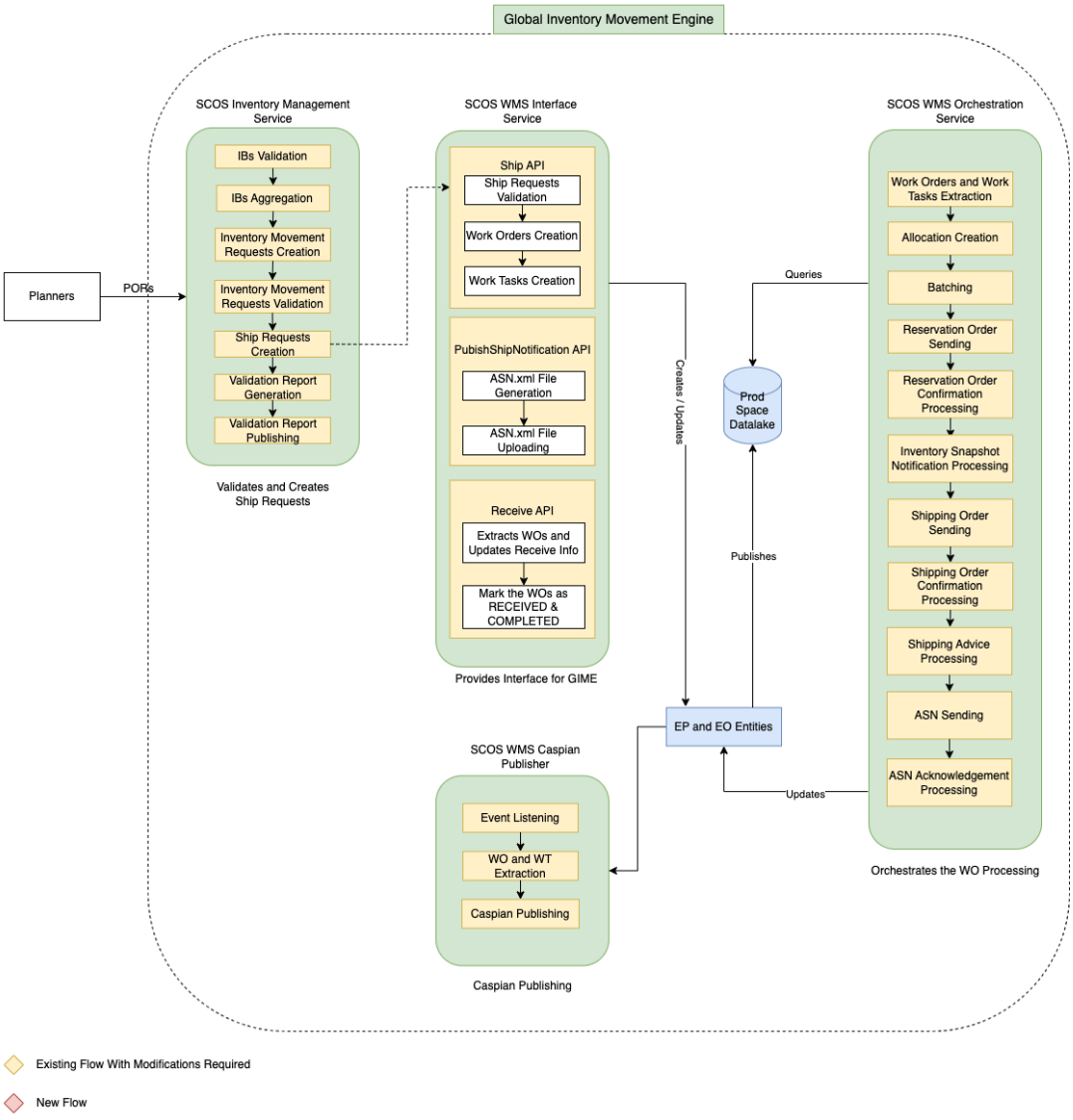
1. Movement of supplier-owned inventory at VMI warehouses.
2. Inventory Movements from DC → VMI; the business prefers handling it as a one-off manual process.
3. Supplier/OEM to AWS transfer-ship processes at VMI/Bison nodes; part of Project Bison
4. Document focuses on automated AWS-owned inventory movement to DC using planners. GIME excludes manual

processes via Inventory Movement portal for now; not covered in this document.

Work Flow

HIGH LEVEL INVENTORY MOVEMENT AUTOMATION VIA PLANNERS IN GIME

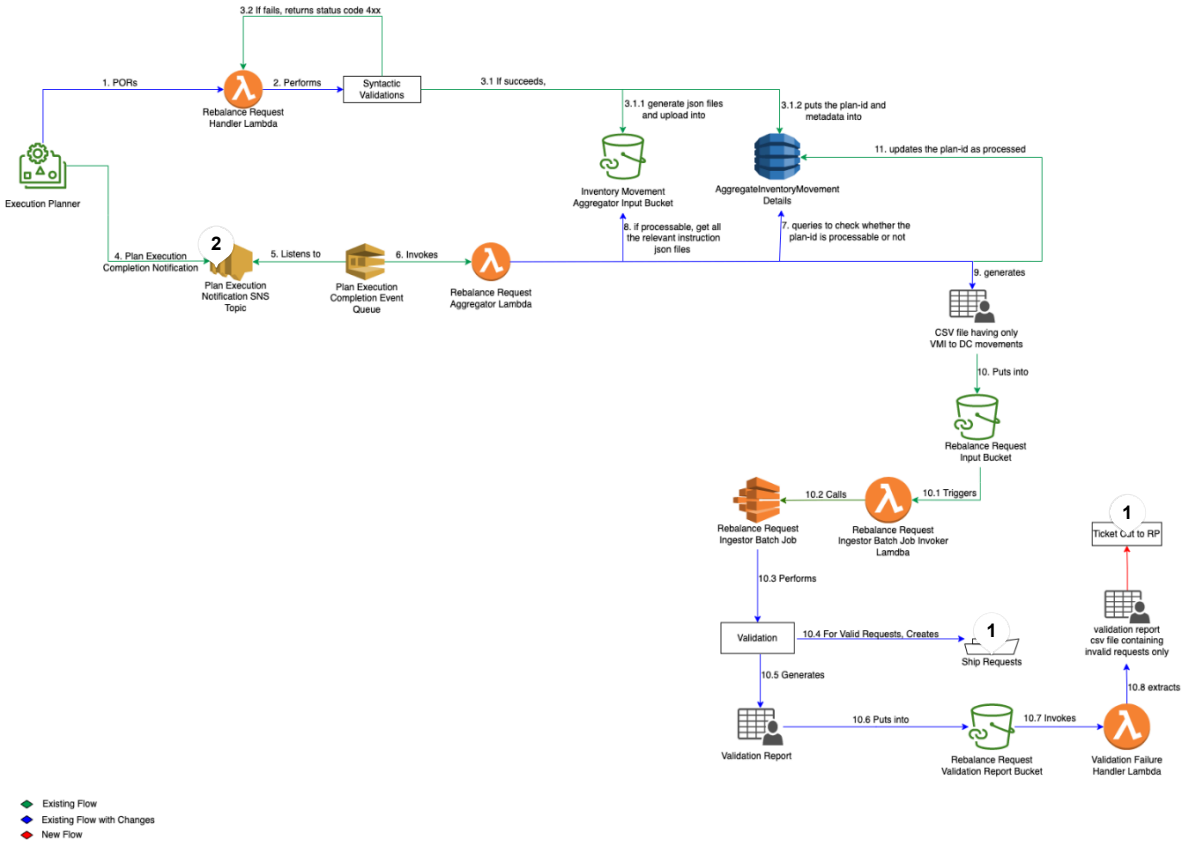
This diagram illustrates the comprehensive high-level workflows of the services that are integral to GIME



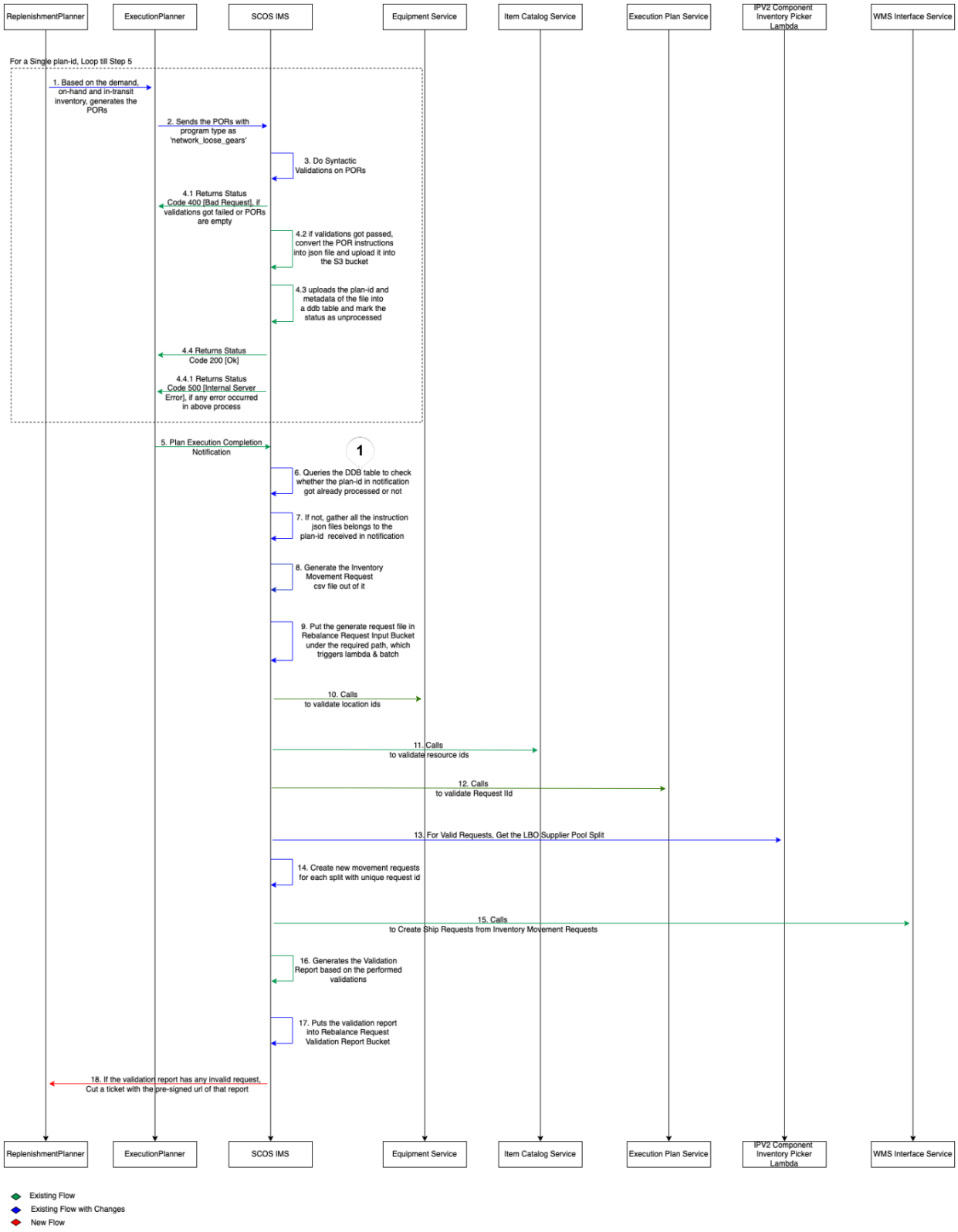
SCOS INVENTORY MANAGEMENT SERVICE

This service is the initial layer of GIME, responsible for validating inventory movement requests, creating ship requests for valid movements, and generating a detailed validation report

Resource Diagram



Work Flow Diagram


ReplenishmentPlanner
ExecutionPlanner
SCOS IMS
Equipment Service
Item Catalog Service
Execution Plan Service
IPV2 Component Inventory Picker Lambda
WMS Interface Service
For a Single plan-id, Loop till Step 5
1. Based on the demand, on-hand and in-transit inventory, generates the PORs
2. Sends the PORs with program type as 'network_loose_gears'
3. Do Syntactic Validations on PORs
4.1 Returns Status Code 400 [Bad Request], if validations got failed or PORs are empty
4.2 if validations got passed, convert the POR instructions into json file and upload it into the S3 bucket
4.3 uploads the plan-id and metadata of the file into a ddb table and mark the status as unprocessed
4.4 Returns Status Code 200 [Ok]
4.4.1 Returns Status Code 500 [Internal Server Error], if any error occurred in above process
5. Plan Execution Completion Notification
1
6. Queries the DDB table to check whether the plan-id in notification got already processed or not
7. If not, gather all the instruction json files belongs to the plan-id received in notification
8. Generate the Inventory Movement Request csv file out of it
9. Put the generate request file in Rebalance Request Input Bucket under the required path, which triggers lambda & batch
10. Calls to validate location ids
11. Calls to validate resource ids
12. Calls to validate Request IId
13. For Valid Requests, Get the LBO Supplier Pool Split
14. Create new movement requests for each split with unique request id
15. Calls to Create Ship Requests from Inventory Movement Requests
16. Generates the Validation Report based on the performed validations
17. Puts the validation report into Rebalance Request Validation Report Bucket
18. If the validation report has any invalid request, Cut a ticket with the pre-signed url of that report
ReplenishmentPlanner
ExecutionPlanner
SCOS IMS
Equipment Service
Item Catalog Service
Execution Plan Service
IPV2 Component Inventory Picker Lambda
WMS Interface Service
Existing Flow
Existing Flow with Changes
New Flow

Work Flow

- ***Inventory Movement Instruction Batches Issuance Process:***
  - RP issues IBs to move inventory (VMI to DC) based on demand, inventory status, and transit details.
  - Inventory Priority: DC > CW > VMI > ODM.
  - EP invokes GIME - Rebalance Request Handler lambda for processing received IBs.
- ***GIME - Rebalance Request Handler Lambda:***
  - Validates and converts instructions to JSON, uploading to S3.
  - Returns status codes: 4xx (validation failed), 2xx (success), 5xx (processing error).
- ***Inventory Rebalance Request Aggregator Lambda:***
  - Listens for Instruction Completion Notification for a plan-id.
  - Retrieves instruction files, generates inventory movement request file, uploads to S3.
- ***Rebalance Request Ingestor Lambda & Job:***
  - Triggers on inventory movement request file upload to S3.
  - Parses CSV, conducts semantic validations, transforms valid requests into Ship Requests .
  - Semantic Validations Approach:
    - Location Id Validation: API call to equipment service.
    - Resource Id Validation: API call to item catalog service.
    - Request Id Uniqueness Validation: API call to Execution Planner service.
- ***Validation Failure Handler Lambda:***
  - Triggers on validation report upload to S3.
  - Creates CSV of failed requests, stores in S3.
  - Raises a ticket to RP team's CTI with CSV pre-signed URL.

Idempotency Handling:

- ***Aggregating Instructions based on Plan ID:***
  - Leverage DDB table - AggregatedInventoryMovementDetails
- ***Processing Inventory Movement Requests:***
  - Phase - 0 Approach: Use Execution Plan service API.
  - Phase - 1 Approach: Leverage DDB - RequestIdInfo.

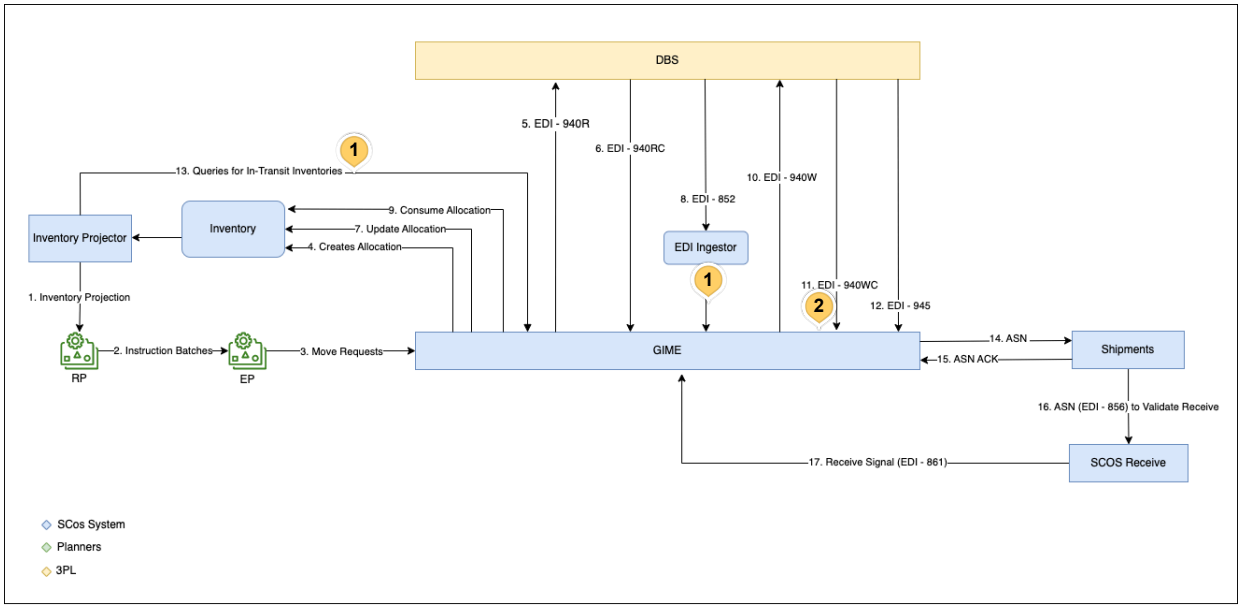
Failure Handling:

- ***Lambda & Batch Job Execution Failures:***
  - Result in AutoCut ticket under CTI (AWS → Supply Chain Management → WMS General Issues), utilizing metrics and CloudWatch (CW).

SCOS WAREHOUSE MANAGEMENT SYSTEM INTERFACE

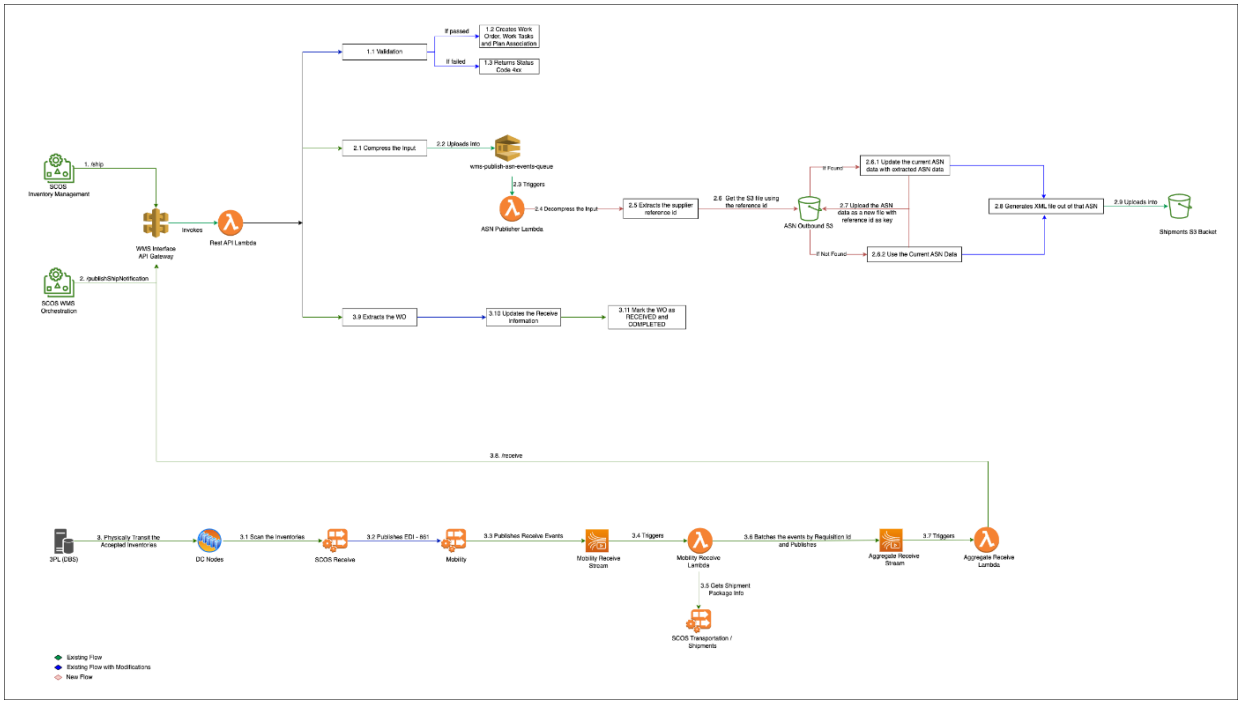
This service acts as GIME's abstraction layer, streamlining warehouse functions for seamless inventory movement. Its unified API abstracts WMS details for consistency in inventory operations across the supply chain

EDI Flow Diagram

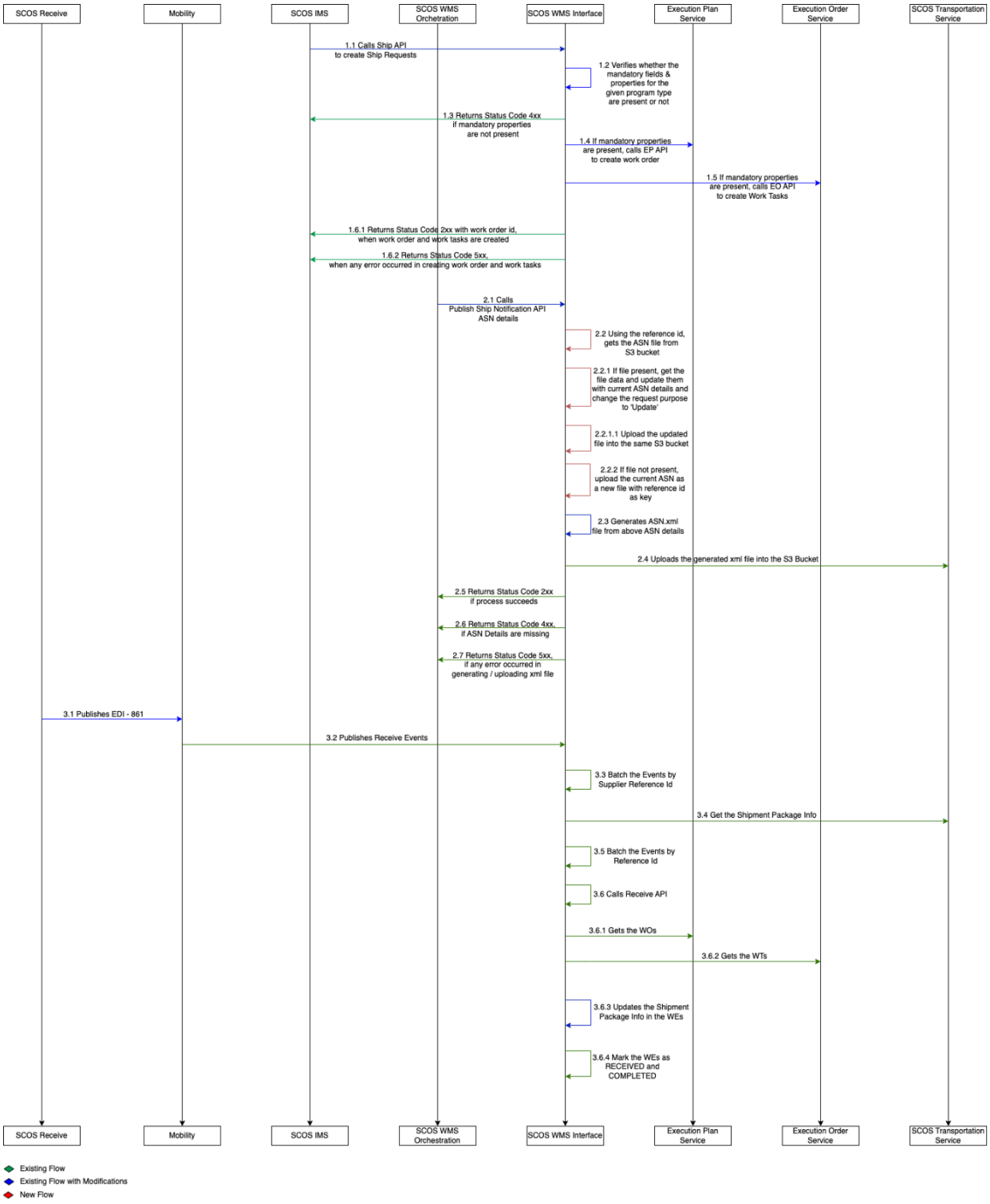


For EDI specs, refer here

Resource Diagram



Work Flow Diagram



Work Flow

- ***Mobility Receive Lambda:***
    - Receives 'Receive Events' from Kinesis Stream.
    - Batches Events by Supplier Reference Id.

    - Retrieves Shipment Package Info from SCos Shipments/Transportation.
    - Publishes batched Events into AggregateReceive Stream.
- ***Aggregate Receive Lambda:***
    - Listens to Aggregate Receive Stream one event at a time.
    - Calls Receive API for each Event.
    - For more info on WMS Receive, refer here
- ***Rest API Lambda:***
    - ***/ship API:***
        - Validates ship requests with non-null checks on key properties.
        - Initiates creation of work entities, including Move Work Order and four Work Tasks.
        - Creates Plan Association to link Work Order and Work Tasks.
    - ***/publishShipNotification API:***
        - Compresses input and publishes as a message in SQS (wms-publish-asn-events-queue), invoking ASN Publisher Lambda.
    - ***/receive API:***
        - Extracts Work Entities for the given request id.
        - Updates Work Entities with High-Level Receive Information.
        - Marks Work Entities as 'RECEIVED' and 'COMPLETED'.
- ***ASN Publisher Lambda:***
    - Decompresses the message, gets ASN data and extracts supplier reference id.
    - Tries to get the ASN data json file from S3 based on reference id.
    - Updates existing ASN data with file ASN data if file found and change the requestPurpose to ‘Update’
    - Uploads ASN data as a json file in the above S3 using reference id as key
    - Generates xml file from ASN details and uploads into Shipments S3 bucket.

Idempotency Handling:

- ***Ship Requests Creation:***
    - Use Execution Plan service API to check for existing ship requests with the given ship reference id.
    - New ship request won't be accepted if ship requests already exist for the specified ship reference id, ensuring idempotency.

Failure Handling:

- ***In Lambda Execution:***
    - Result in AutoCut ticket under the CTI (AWS → Supply Chain Management → WMS General Issues), utilizing metrics and CloudWatch (CW).
- ***Processing API Requests:***
    - **Success (2xx):** Return with appropriate response.
    - **Invalid Input (4xx):** Return with details of failure.
    - **Error in Processing (5xx):** Return with relevant error messages.

Additional Insights:

Work Tasks For Network Loose Gears:

- Reservation Order Task: Created to track Allcoations and Reservation Orders (EDI - 940R & EDI - 940RC).
- Shipping Order Task: Created to track Shipping Orders (EDI - 940W, EDI - 940WC).
- Shipping Advice Task: Created to track Shipping Advice (EDI - 945), ASNs (EDI - 856) & ASN ACKs.
- Receive Task: Created to track Receive Events (EDI - 861)

Work Entity State Transition Life Cycles:

- Work Entity State Transition Life Cycles:

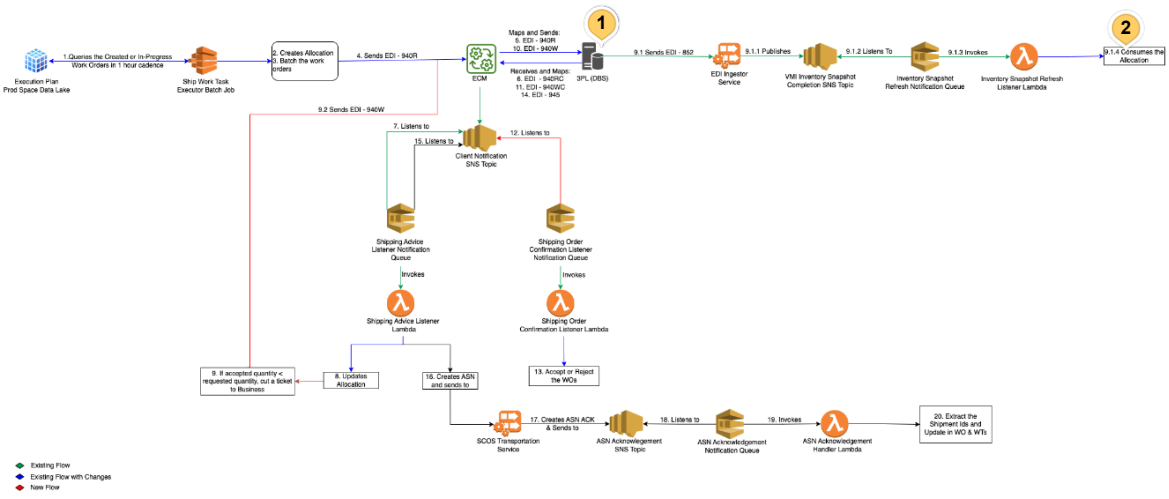
Phase 1:

- SCOS Warehouse Management System Interface

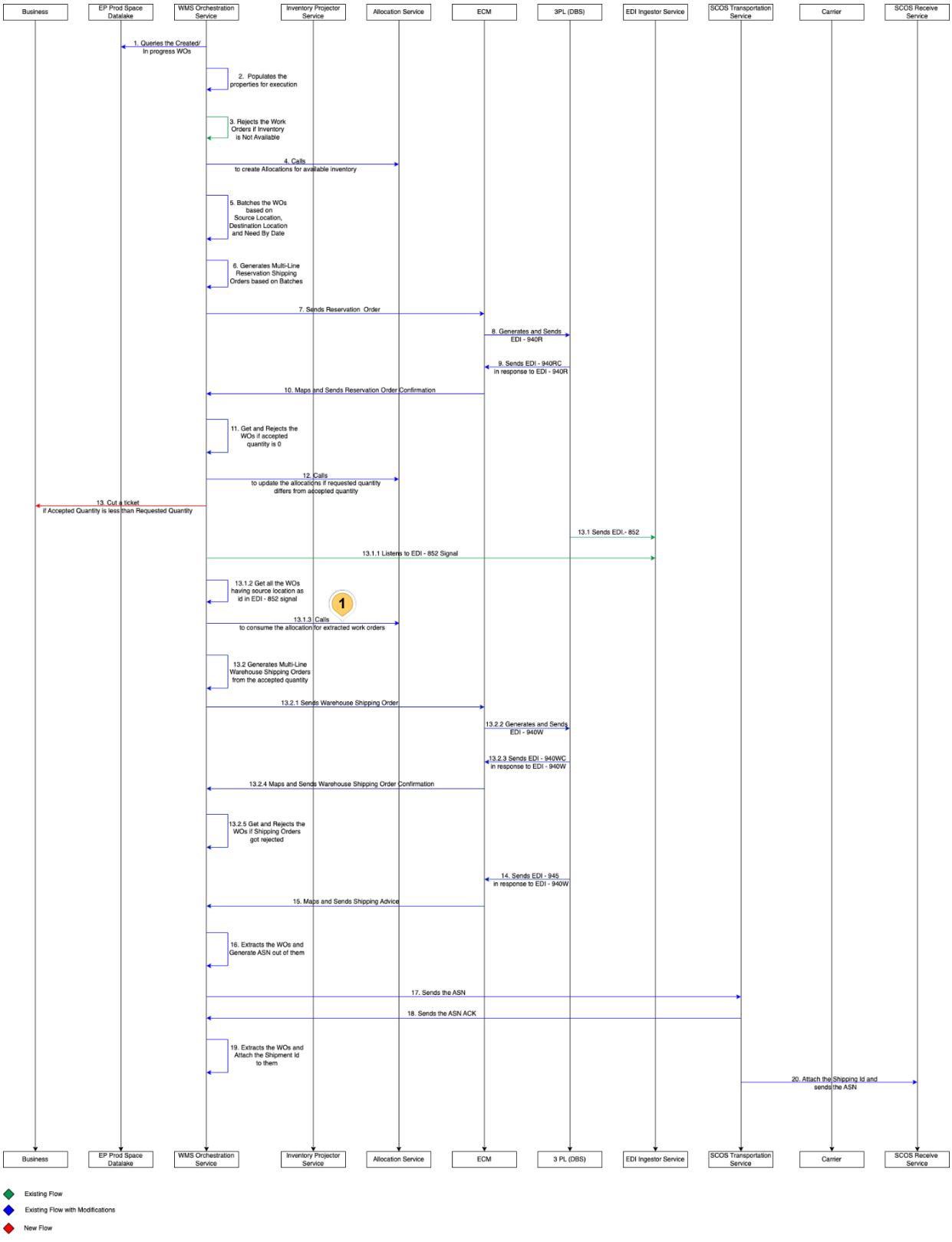
SCOS WMS ORCHESTRATION SERVICE

This service, GIME's Execution Layer, orchestrates allocation creation, manages EDI signals for inventory movements, and oversees task execution, ensuring streamlined inventory management in the broader GIME framework.

Resource Diagram



Work Flow Diagram


Business
EP Prod Space Datalake
WMS Orchestration Service
Inventory Projector Service
Allocation Service
ECM
3PL (DBS)
EDI Ingestor Service
SCOS Transportation Service
Carrier
SCOS Receive Service
1. Queries the Created/ In progress WOs
2. Populates the properties for execution
3. Rejects the Work Orders if Inventory is Not Available
4. Calls to create Allocations for available inventory
5. Batches the WOs based on Source Location, Destination Location and Need By Date
6. Generates Multi-Line Reservation Shipping Orders based on Batches
7. Sends Reservation Order
8. Generates and Sends EDI - 940R
9. Sends EDI - 940RC in response to EDI - 940R
10. Maps and Sends Reservation Order Confirmation
11. Get and Rejects the WOs if accepted quantity is 0
12. Calls to update the allocations if requested quantity differs from accepted quantity
13. Cut a ticket If Accepted Quantity is less than Requested Quantity
13.1 Sends EDI - 852
13.1.1 Listens to EDI - 852 Signal
13.1.2 Get all the WOs having source location as id in EDI - 852 signal
1
13.1.3 Calls to consume the allocation for extracted work orders
13.2 Generates Multi-Line Warehouse Shipping Orders from the accepted quantity
13.2.1 Sends Warehouse Shipping Order
13.2.2 Generates and Sends EDI - 940W
13.2.3 Sends EDI - 940WC in response to EDI - 940W
13.2.4 Maps and Sends Warehouse Shipping Order Confirmation
13.2.5 Get and Rejects the WOs if Shipping Orders got rejected
14. Sends EDI - 945 in response to EDI - 940W
15. Maps and Sends Shipping Advice
16. Extracts the WOs and Generate ASN out of them
17. Sends the ASN
18. Sends the ASN ACK
19. Extracts the WOs and Attach the Shipment Id to them
20. Attach the Shipping Id and sends the ASN
Existing Flow
Existing Flow with Modifications
New Flow

Work Flow

- **Ship Work Task Executor Batch Job (Runs hourly):**
    - Extracts 'CREATED' or 'IN_PROGRESS' entities from EP Prodspace Datalake using Move Work Orders Query.
    - Retrieves Move Work Order, Plan Association, and Work Tasks for each entity.
    - Changes state of Work Orders to 'IN_PROGRESS.'
    - Adds properties for execution, creates allocations, and updates task states.
    - Batches the work entities based on properties, creates multi-line reservation order and sends it as EDI - 940R
    - Updates Work Orders & Reservation Order Work Task state to 'RESERVATION_ORDER_SENT.'
    - Updates root level reference id in Work Orders and Work Tasks - Reservation Order & Shipping Order.
- **Shipping Advice Listener Lambda:**
    - Processes EDI - 940RC sent by DBS, in response to EDI - 940R
    - Gets associated Work Entities.
    - Validates line items, reject WEs if accepted quantity is 0 after deleting the allocations
    - Cuts a ticket for Business if accepted quantity < requested quantity
    - Updates WO and Reservation Order WT state to ‘RESERVATION_ORDER_CONFIRMED’
    - Creates multi-line warehouse shipping order from EDI - 940RC and sends it as EDI - 940W signal to DBS.
    - Updates states of Work Orders and Shipping Order WT to 'SHIPPING_ORDER_SENT.'
- **Inventory Snapshot Refresh Listener Lambda:**
    - Processes EDI - 852 sent by DBS for every 2 hours
    - Gets work entities with source location id from signal.
    - Filters work orders with program type 'network_loose_gear' and specific WO states ['RESERVATION_ORDER_CONFIRMED' or 'SHIPPIING_ORDER_SENT'].
    - Consumes allocations, updates task state, and adds fulfillment ids.
- **Shipping Order Confirmation Listener Lambda:**
    - Processes EDI - 940WC sent by DBS, in response to EDI - 940W
    - Gets associated Work Entities.
    - Validates line items, rejects WOs if 940W got rejected.
    - Updates states of Work Orders and Shipping Order WT to 'SHIPPING_ORDER_CONFIRMED' if 940W got accepted.
- **Shipping Advice Listener Lambda:**
    - Processes EDI - 945 sent by DBS, in response to EDI - 940W
    - Gets associated Work Entities.
    - Validates line items, updates states, creates ASN, and updates Shipping Advice WT state.
    - Updates WO state to ‘SHIPPED’ and Shipping Advice WT state to ‘ASN_SENT’
- **ASN Acknowledgement Handler Lambda:**
    - Process ASN ACK sent by Shipments, in response to ASN
    - Validates the Acknowledgement, cuts a ticket for 'FAILURE,' and executes processes for 'SUCCESS' or 'SUCCESS_WITH_WARNINGS.'
    - Gets Shipments Entity Id from ASN and adds it to the Shipment Advice Task as fulfillment ids.
    - Updates the Shipping Advice WT state to 'ASN_ACK_RECEIVED.'

Idempotency Handling:

- ***Work Orders and Work Tasks States:***

    - States act as identifiers for idempotency.
    - Serve as checkpoints to prevent duplicate processing.
- ***Processing of Work Orders:***
    - Initiates hourly to address data sync delays.
    - Properties and states updated within the hour for synchronization.
    - Updated states prevent duplicate processing.

Failure Handling:

- ***Lambda and Batch Job Execution:***
    - Result in AutoCut ticket under CTI (AWS → Supply Chain Management → WMS General Issues), using metrics and CloudWatch.
- ***Processing Work Orders and EDI Signals:***
    - Failures result in published metrics for exceptions.
    - A ticket is created to address specific issues.
- ***Stuck Work Orders:***
    - Defect Monitoring System identifies stuck work orders.
    - Triggers SLA Tickets and Automated Emails for EDI Failures/Missing [Under Debate].
- ***940W Warehouse Shipping Order Rejection:***
    - Rejection in EDI - 940WC needs cancellation of Reservation Order
    - A single line item Reservation Cancellation EDI Signal will be sent to DBS and updates the Reservation Order Task state to ‘CANCEL_RESERVATION_ORDER_SENT’
    - Will update the Reservation Order WT state to ‘CANCEL_RESERVATION_ORDER_CONFIMED’ and ‘REJECTED’, once the corresponding EDI - 940RC is received,

Additional Insights:

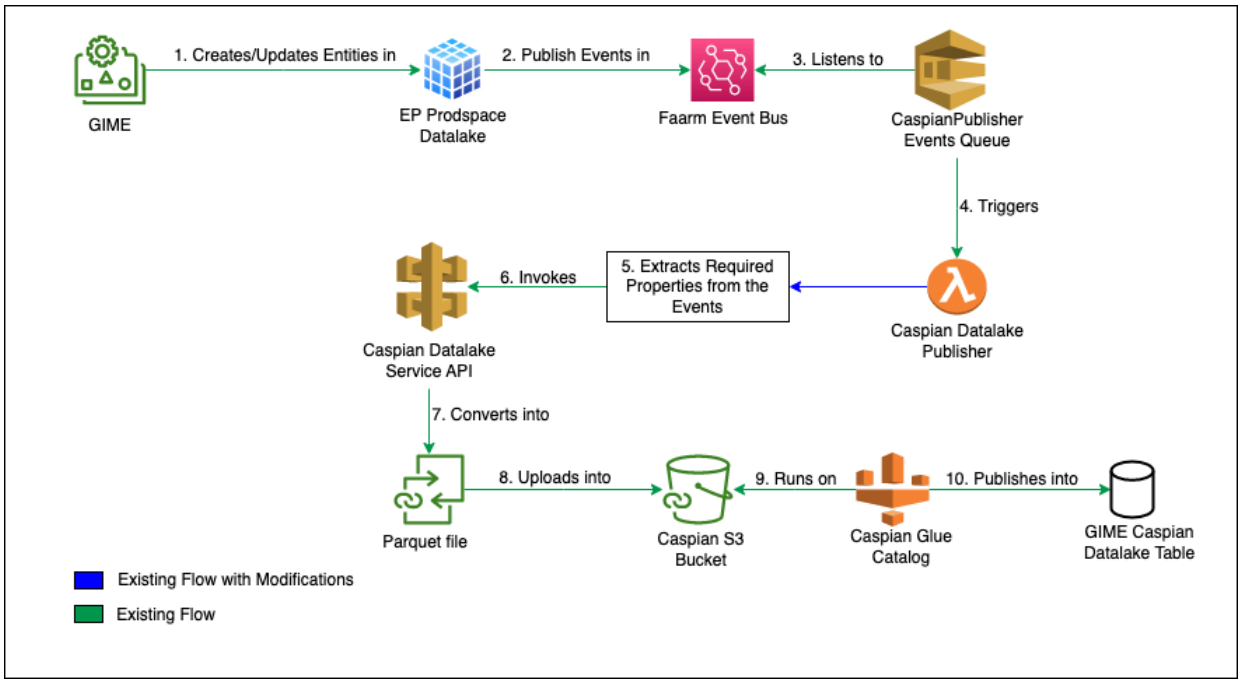
Phase 1:

- SCOS WMS Orchestration Service

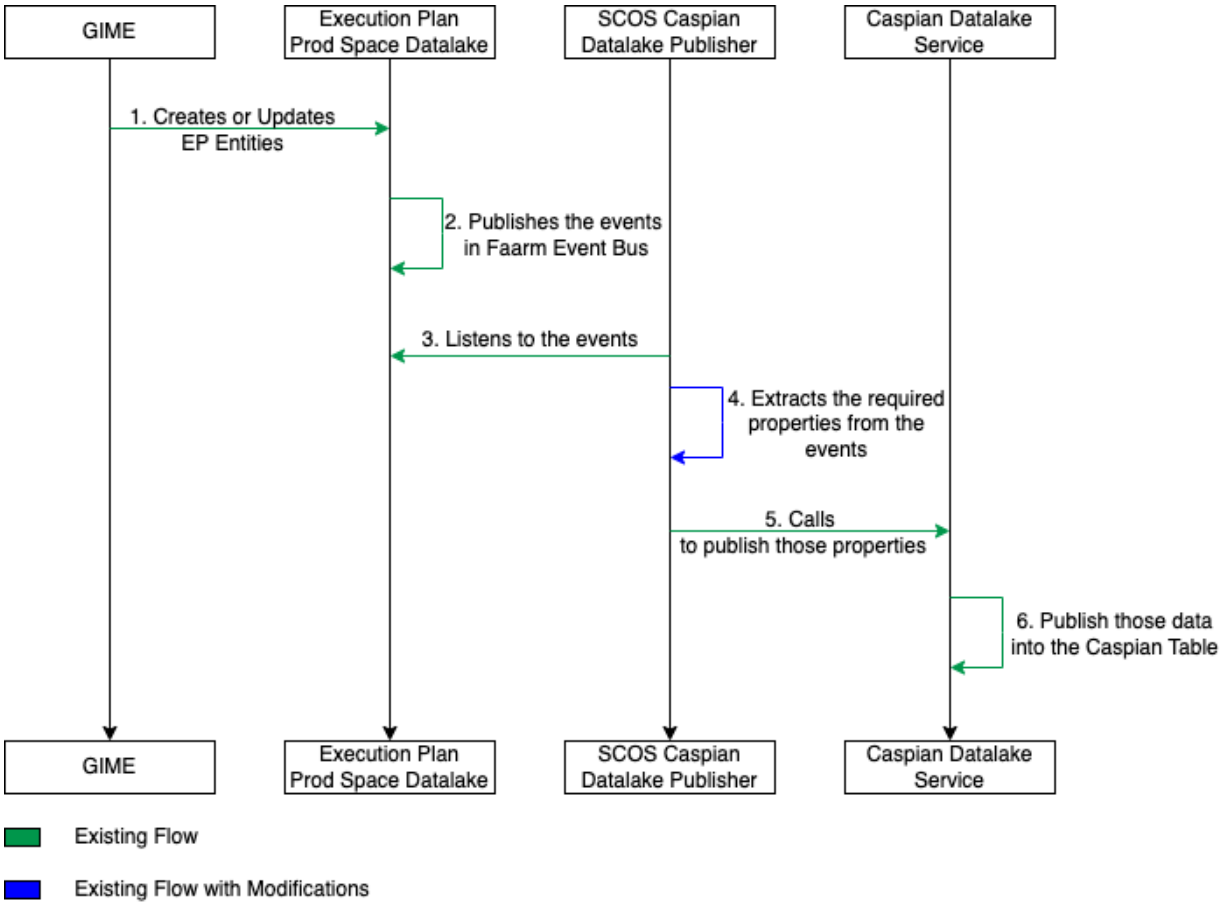
SCOS WMS DATALAKE PUBLISHER

The final GIME layer extracts key properties from Work Orders (WOs) and Work Tasks (WTs), publishing this crucial information into the Caspian Datalake for comprehensive analysis and management.

Resource Diagram



Work Flow Diagram



Work Flow

- ***Event Generation:***
  - Updates in Execution Plan prod space datalake trigger events.
  - Published via Faarm Event Bus.
- ***Caspian Publisher Events Queue:***
  - Subscribes to events via Rule Engine and triggers Caspian Datalake Publisher Lambda.
- ***Caspian Datalake Publisher Lambda:***
  - Extracts properties and calls Caspian Datalake Service.
- ***Caspian Datalake Service:***
  - Uploads data into Caspian Table - wms_move_work_order_details_events.

Failure Handling:

- ***Lambda Execution:***
  - Result in AutoCut ticket under the CTI (AWS → Supply Chain Management → WMS General Issues), utilizing metrics and CloudWatch (CW).

Additional Insights:

- ***Required Properties:***
  - confirmed_quantity
  - destination_location
  - destination_location_code
  - ipn
  - need_by_date_utc
  - requested_quantity
  - shipped_quantity
  - external_reference_id_type
  - external_reference_id_value
  - external_reservation_id
  - program_type
  - received_quantity
  - request_id
  - source_location
  - source_location_code
  - state
  - supplier_code
  - supplier_id
  - work_order_id
  - work_order_version

ADDITIONAL INSIGHTS - PROJECT LEVEL:

ASN Based Receive Process at DC

Upon physical receipt of shipments, DC logistics will scan the pallet barcode to identify the unique supplier reference ID associated with the shipments. Using the supplier reference ID, the corresponding ASN is extracted. Subsequently, the items within the shipments are scanned, and their serial numbers are matched with those present in the ASN for verification.

Reason for ASN Updation Requirement:

The reason for the ASN updation requirement is rooted in the ground-level shipping process of DBS, where shipments occur at the pallet level. A truck can contain multiple shipments, each comprising multiple pallets associated with various 940 warehouse orders. These shipments are identified by a unique identifier, the supplier reference ID or shipment ID.

In contrast to other programs, DBS sends EDI 945 against the 940W warehouse order, not the entire shipments. This results in duplicate shipment IDs in the 945 signals. Since ASNs are generated from the 945s and use the Supplier Reference ID for

identification, and multiple 945s can share the same ID, the ASN needs to be updated each time a duplicate reference ID is identified to maintain accurate records.

Need for 940R, 940RC

The requirement for EDI-940R and EDI-940RC stems from challenges encountered when sending EDI-940 with requested quantities. Due to a round-off logic at the DBS end based on carton size and the delayed receipt of EDI-945, there is potential for inventory projection discrepancies.

To address this, EDI-940R is utilized to reserve inventories before shipping, with the subsequent EDI-940RC confirming these reservations with accepted quantities within 30 minutes. This approach ensures a more accurate snapshot of available inventories, facilitating effective inventory management during the delay in EDI-945 receipt.

Additionally, EDI-940R aligns with future plans for the transit of Supplier-Owned Inventories, requiring precise PO cutting for exact quantities slated for shipment.

Need for 940WC

The EDI-940WC plays a vital role as an acknowledgment for the EDI-940W shipping order signal. Its importance lies in confirming the acceptance status of the sent EDI-940W, providing crucial feedback on the execution of the shipping order.

Reason for Not Checking Transition Lanes Availability before Processing

As project requirements, the Business opted to establish transit lanes from the Bison node to all DC nodes. Refer here for more information - Pre-setups: NW Loose Gear Inventory Reduction - v4.0.

APPENDIX

Required POR Instruction Batch Format

Note: For now, GIME and EP will follow the existing contract for sending IB. The exisiting format will be updated based to below format post launch and the updated format will be used for all the programs that requires EP-GIME integration.

```
{
  "executionId": {
    "value": "<Instruction_batch_id>",
    "type": "INSTRUCTION_BATCH_ID"
  },
  "planId": "1223-3423-2324",
  "isAtomic" : "false",
  "programType": "network_loose_gear",
  "requisitions": [
    {
      "requisitionId": "<instruction_id>",
      "sourceLocationId": "6eb057a8-a301-4266-b160-a30d2aa5a751",
      "destinationLocationId": "df224164-febd-41f0-9550-769592bbb886",
      "quantity" : "8.0",
      "resourceDefinition": {
        "resourceType": "<RESOURCE_ID_TYPE>",
        "resourceId": "<resource_id>"
      },
      "properties": {        "needByDate": "1685094977000"
      }
```

```
      }
    ]
}
```

Inventory Movement Request CSV Format

execution_id_value	execution_id_type	is_atomic	request_id	site_from	site_to	recommended_transfer_qty	resource_type	resource_id	program_type	need_by_date
005d91d5-0b1d-4ee1-aa64-9aefba2aa125	INSTRUCTION_BATCH_ID	FALSE	401b9d1e-5c56-4934-994f-533cab295c08	d3452d4d-767d-4291-b809-392baed98f92	2debbf44-1e6c-4639-9c07-ce3a37d01879	12	MATERIAL_DEFINITION	ITMVRQONQ	network_loose_gear	1.70E+12

Sample Ship Request

```
{
    "referenceId": "SBKPFOX2310060B-4D0", // base 64 encoded request id after supplier
    "quantity": {
        "value": 3461,
        "unitOfMeasure": "EA"
    },
    "sourceLocationId": "59d31082-a276-482d-ab1f-850db3b0deb4",
    "destinationLocationId": "SCTR5OB6SII",
    "needByDate": 1696809600000,
    "externalReferenceIds": [
    {
        "type" : "RequestId",
        "value" : "SBKPFOX2310060B-4D0"
    }
    ],
    "properties": [
        {
            "name": "externalReferenceId",
            "value": {
                "valueString": "SBKPFOX2310060B-4D0",
                "dataType": "String"
            }
        },
        {
            "name": "supplierCode",
            "value": {
                "valueString": "0000000419",
                "dataType": "String"
            }
        },
        {
            "name": "supplierId",
            "value": {
                "valueString": "AWR",
                "dataType": "String"
            }
        },
        {
            "name": "ipn",
            "value": {
                "valueString": "212-000560-002",
                "dataType": "String"
            }
```

```
        },
        {
            "name": "programType",
            "value": {
                "valueString": "network_loose_gear",
                "dataType": "String"
            }
        },
        {
            "name": "requester",
            "value": {
                "valueString": "RP_Planner",
                "dataType": "String"
            }
        },
        {
            "name": "fromLocationCode",
            "value": {
                "valueString": "AWSSG",
                "dataType": "String"
            }
        },
        {
            "name": "toLocationCode",
            "value": {
                "valueString": "0000000585",
                "dataType": "String"
            }
        }
    ],
    "resourceDefinition": {
        "resourceType": "MATERIAL_DEFINITION",
        "resourceId": "ITMGMZS3E6YIZHE"
    }
}
```

AggregatedInventoryMovementDetails

aggregationId	programType	createdAt	executionDetails	isProcessed	lastUpdatedAt

Request Id Info Table Schema

Request Id	Program Type

Move Work Order

```
{
    "executionPlan": {
        "id": {
```

```
      "id": {
        "value": "608e956d498b46a1afc0b0e823475735"
      },
      "version": 1
  },
  "typedExternalRefIds": [
      {
          "id": "SBKPFOX2310060B-4D0",
          "idType": "RequestId"
      }
  ],
  "classIds": [
      {
          "id": {
              "value": "MOVE_ORDER"
          }
      }
  ],
  "lifeCycleGraphId": "MOVE_ORDER_LIFE_CYCLE_GRAPH",
  "properties": [
      {
          "key": "fromLocation",
          "value": {
              "valueString": "34ce9c36-4e73-43eb-9866-c72c316d28e9"
          }
      },
      {
          "key": "toLocation",
          "value": {
              "valueString": "SCTW7U7BV6W"
          }
      },
      {
          "key": "resourceType",
          "value": {
              "valueString": "MATERIAL_DEFINITION"
          }
      },
      {
          "key": "resourceId",
          "value": {
              "valueString": "ITMTGMZH6RDK3DW"
          }
      },
      {
          "key": "requestedQuantity",
          "value": {
              "valueString": "224.0"
          }
      },
      {
          "key": "needByDate",
          "value": {
              "valueLong": 1697673600000
          }
```

```
        },
        {
            "key": "externalReferenceId",
            "value": {
                "valueString": "SBKPFOX2310060B-4D0"
            }
        },
        {
            "key": "supplierCode",
            "value": {
                "valueString": "0000000419"
            }
        },
        {
            "key": "supplierId",
            "value": {
                "valueString": "AWR"
            }
        },
        {
            "key": "ipn",
            "value": {
                "valueString": "208-000974-001"
            }
        },
        {
            "key": "programType",
            "value": {
                "valueString": "network_loose_gear"
            }
        },
        {
            "key": "requester",
            "value": {
                "valueString": "RP_Planner"
            }
        },
        {
            "key": "fromLocationCode",
            "value": {
                "valueString": "AWSCV"
            }
        },
        {
            "key": "toLocationCode",
            "value": {
                "valueString": "0000000905"
            }
        },
        {
            "key": "confirmedQuantity",
            "value": {
                "valueString": "230.0"
            }
        }
```

```
    ]
}
```

Reservation Order Work Task

```
{
    "id": {
            "id": {
              "value": "EO-2027b5f75ce84d9a8dac3fb46191db94"
            },
            "version": 1
    },
    "classId": {
        "id": {
            "value": "RESERVATION_ORDER_TASK"
        },
        "version": 1
    },
    "clientReferenceId": "S-GPU-SYN-231018-104",
    "properties": [ // The Properties will be added in the Orchestration Layer
         {
            "id": {
                    "value": "requestedQuantity"
                },
                "description": {},
                "value": {
                    "valueString": "224.0"
                }
         },
         {
            "id": {
                    "value": "confirmedQuantity"
                },
                "description": {},
                "value": {
                    "valueString": "230.0"
                }
         },
         {
            "id": {
                    "value": "externalReservationId"
                },
                "description": {},
                "value": {
                    "valueString": "0000003587"
                }
         },
         {
            "id": {
                    "value": "acceptanceStatus"
                },
                "description": {},
                "value": {
                    "valueString": "Accepted"
```

```
                }
            }
        ],
        "items": [],
        "lifeCycleGraphId": "SHIPPING_ORDER_TASK_LIFECYCLE",
        "state": {
            "name": "CREATED"
        },
        "fulfils": {
            "id": {
                "value": "S-GPU-SYN-231018-104"
            },
            "version": 1
        },
        "fulfilsIds": [
            {
                "id": {
                    "id": {
                        "value": "S-GPU-SYN-231018-104"
                    },
                    "version": 1
                },
                "type": "RequestId"
            },
            {
                "id": {
                    "id": {
                        "value": "3a7e398d-f557-4866-97cc-89b34cb5c78c"
                    },
                    "version": 1
                },
                "type": "AllocationId"
            },
            {
                "id": {
                    "id": {
                        "value": "3a7e398d-f557-4866-97cc"
                    },
                    "version": 1
                },
                "type": "ReservationOrderId"
            }
        ]
    }
```


Shipping Order Work Task


```
{
    "id": {
            "id": {
              "value": "EO-2027b5f75ce84d9a8dac3fb46191db95"
            },
            "version": 1
    },
```

```
    "classId": {
        "id": {
            "value": "SHIPPING_ORDER_TASK"
        },
        "version": 1
    },
    "clientReferenceId": "S-GPU-SYN-231018-104",
    "properties": [ // The Properties will be added in the Orchestration Layer
         {
            "id": {
                    "value": "requestedQuantity"
                },
                "description": {},
                "value": {
                    "valueString": "230.0"
                }
         },
         {
            "id": {
                    "value": "orderedDate"
                },
                "description": {},
                "value": {
                    "valueString": "1689889200000"
                }
         },
         {
            "id": {
                    "value": "requestedDeliveryDate"
                },
                "description": {},
                "value": {
                    "valueString": "1697673600000"
                }
         },
         {
            "id": {
                    "value": "confirmedQuantity"
                },
                "description": {},
                "value": {
                    "valueString": "230.0"
                }
         },
         {
            "id": {
                    "value": "priority"
                },
                "description": {},
                "value": {
                    "valueString": "Normal"
                }
         },
         {
            "id": {
```

```
                    "value": "acceptanceStatus"
                },
                "description": {},
                "value": {
                    "valueString": "Accepted"
                }
         }
    ],
    "items": [],
    "lifeCycleGraphId": "SHIPPING_ORDER_TASK_LIFECYCLE",
    "state": {
        "name": "CREATED"
    },
    "fulfils": {
        "id": {
            "value": "S-GPU-SYN-231018-104"
        },
        "version": 1
    },
    "fulfilsIds": [
        {
            "id": {
                "id": {
                    "value": "S-GPU-SYN-231018-104"
                },
                "version": 1
            },
            "type": "RequestId"
        },
        {
            "id": {
                "id": {
                    "value": "3a7e398d-f557-4866-97cc-89b34cb5c78c"
                },
                "version": 1
            },
            "type": "AllocationId"
        }
    ]
 }
```

Shipping Advice Work Task

```
{
    "id": {
            "id": {
              "value": "EO-2027b5f75ce84d9a8dac3fb46191db96"
            },
            "version": 1
    },
    "classId": {
        "id": {
            "value": "SHIPPING_ADVICE_TASK"
        },
```

```
        "version": 1
    },
    "clientReferenceId": "S-GPU-SYN-231018-104",
    "properties": [ // The Properties will be added in the Orchestration Layer
        {
            "id": {
                    "value": "confirmedQuantity"
                },
                "description": {},
                "value": {
                    "valueString": "230.0"
                }
         },
         {
            "id": {
                    "value": "orderedDate"
                },
                "description": {},
                "value": {
                    "valueString": "1689889200000"
                }
         },
         {
            "id": {
                    "value": "requestedDeliveryDate"
                },
                "description": {},
                "value": {
                    "valueString": "1697673600000"
                }
         },
         {
            "id": {
                    "value": "shippedDate"
                },
                "description": {},
                "value": {
                    "valueString": "1696673600000"
                }
         },
         {
            "id": {
                    "value": "shippedQuantity"
                },
                "description": {},
                "value": {
                    "valueString": "230.0"
                }
         }
    ],
    "items": [],
    "lifeCycleGraphId": "SHIPPING_ADVICE_TASK_LIFECYCLE",
    "state": {
        "name": "CREATED"
    },
```

```
    "fulfils": {
        "id": {
            "value": "S-GPU-SYN-231018-104"
        },
        "version": 1
    },
    "fulfilsIds": [
        {
            "id": {
                "id": {
                    "value": "3a7e398d-f557-4866-97cc-89b34cb5c78c"
                },
                "version": 1
            },
            "type": "ShipmentId"
        }
    ]
 }
```

Receive Work Task

```
{
    "id": {
            "id": {
              "value": "EO-2027b5f75ce84d9a8dac3fb46191db97"
            },
            "version": 1
    },
    "classId": {
        "id": {
            "value": "RECEIVE_TASK"
        },
        "version": 1
    },
    "clientReferenceId": "S-GPU-SYN-231018-104",
    "properties": [ // The Properties will be added in the Interface Layer
        {
            "id": {
                    "value": "shippedQuantity"
                },
                "description": {},
                "value": {
                    "valueString": "230.0"
                }
         },
         {
            "id": {
                    "value": "receivedQuantity"
                },
                "description": {},
                "value": {
                    "valueString": "230.0"
                }
         },
```

```
          {
             "id": {
                     "value": "shippedQuantity"
                 },
                 "description": {},
                 "value": {
                     "valueString": "230.0"
                 }
          }
    ],
    "items": [
        {
           "externalReferenceId":{
                     "id":{
                         "value":"APN/IPN"
                     },
                     "version":1
                 },
           "serialNumbers": ["SerialNumber-1", "SerialNumber-1"]
        }
    ],
    "lifeCycleGraphId": "RECEIVE_WORK_TASK_LIFECYCLE",
    "state": {
        "name": "CREATED"
    },
    "fulfils": {
        "id": {
            "value": "S-GPU-SYN-231018-104"
        },
        "version": 1
    },
    "fulfilsIds": [
        {
            "id": {
                "id": {
                    "value": "3a7e398d-f557-4866-97cc-89b34cb5c78c"
                },
                "version": 1
            },
            "type": "ShipmentId"
        }
    ]
}
```

Plan Association

```
[{
   "id": {
        "id": {
            "value": "8effd6aa74004a7891cb097b26bbd463"
        },
   "version": 1
   },
    "fromEntity": {
```

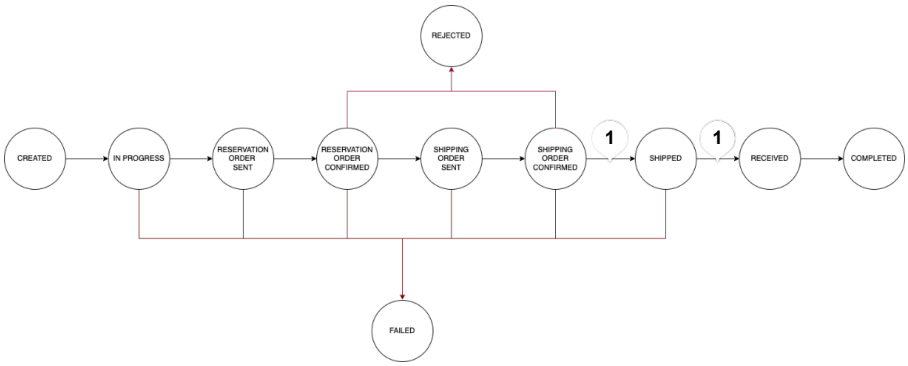
```
        "id": {
            "id": {
                "value": "608e956d498b46a1afc0b0e823475735"
            }
        },
        "type": "EXECUTION_PLAN"
    },
    "toEntity": {
        "id": {
            "id": {
                "value": "EO-2027b5f75ce84d9a8dac3fb46191db94"
            }
        },
        "type": "EXECUTION_ORDER"
    },
    "createdAt": 1680774789743,
    "updatedAt": 1680774789743,
    "state": {
    "name": "ACTIVE",
    "version": 1
    },
    "lifeCycleGraphId": "PLAN_ASSOCIATION_GRAPH_ID"
},
{
    "id": {
        "id": {
            "value": "8effd6aa74004a7891cb097b26bbd464"
        },
    "version": 1
    },
    "fromEntity": {
        "id": {
            "id": {
                "value": "608e956d498b46a1afc0b0e823475735"
            }
        },
        "type": "EXECUTION_PLAN"
    },
    "toEntity": {
        "id": {
            "id": {
                "value": "EO-2027b5f75ce84d9a8dac3fb46191db95"
            }
        },
        "type": "EXECUTION_ORDER"
    },
    "createdAt": 1680774789743,
    "updatedAt": 1680774789743,
    "state": {
    "name": "ACTIVE",
    "version": 1
    },
    "lifeCycleGraphId": "PLAN_ASSOCIATION_GRAPH_ID"
},
{
```

```
    "id": {
        "id": {
            "value": "8effd6aa74004a7891cb097b26bbd465"
        },
    "version": 1
    },
    "fromEntity": {
        "id": {
            "id": {
                "value": "608e956d498b46a1afc0b0e823475735"
            }
        },
        "type": "EXECUTION_PLAN"
    },
    "toEntity": {
        "id": {
            "id": {
                "value": "EO-2027b5f75ce84d9a8dac3fb46191db96"
            }
        },
        "type": "EXECUTION_ORDER"
    },
    "createdAt": 1680774789743,
    "updatedAt": 1680774789743,
    "state": {
    "name": "ACTIVE",
    "version": 1
    },
    "lifeCycleGraphId": "PLAN_ASSOCIATION_GRAPH_ID"
},
{
    "id": {
        "id": {
            "value": "8effd6aa74004a7891cb097b26bbd466"
        },
    "version": 1
    },
    "fromEntity": {
        "id": {
            "id": {
                "value": "608e956d498b46a1afc0b0e823475735"
            }
        },
        "type": "EXECUTION_PLAN"
    },
    "toEntity": {
        "id": {
            "id": {
                "value": "EO-2027b5f75ce84d9a8dac3fb46191db97"
            }
        },
        "type": "EXECUTION_ORDER"
    },
    "createdAt": 1680774789743,
    "updatedAt": 1680774789743,
```

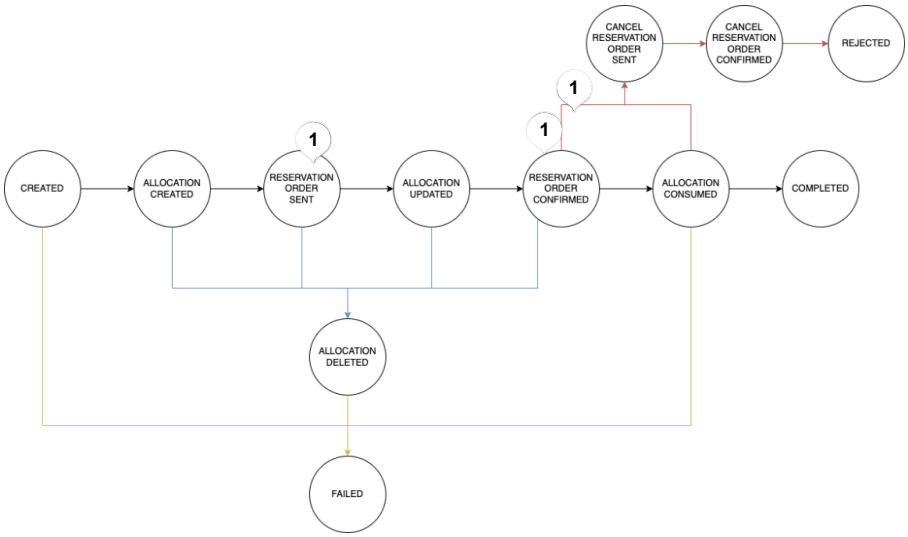
```
    "state": {
    "name": "ACTIVE",
    "version": 1
    },
    "lifeCycleGraphId": "PLAN_ASSOCIATION_GRAPH_ID"
}]
```

Work Entity State Transition Life Cycles:

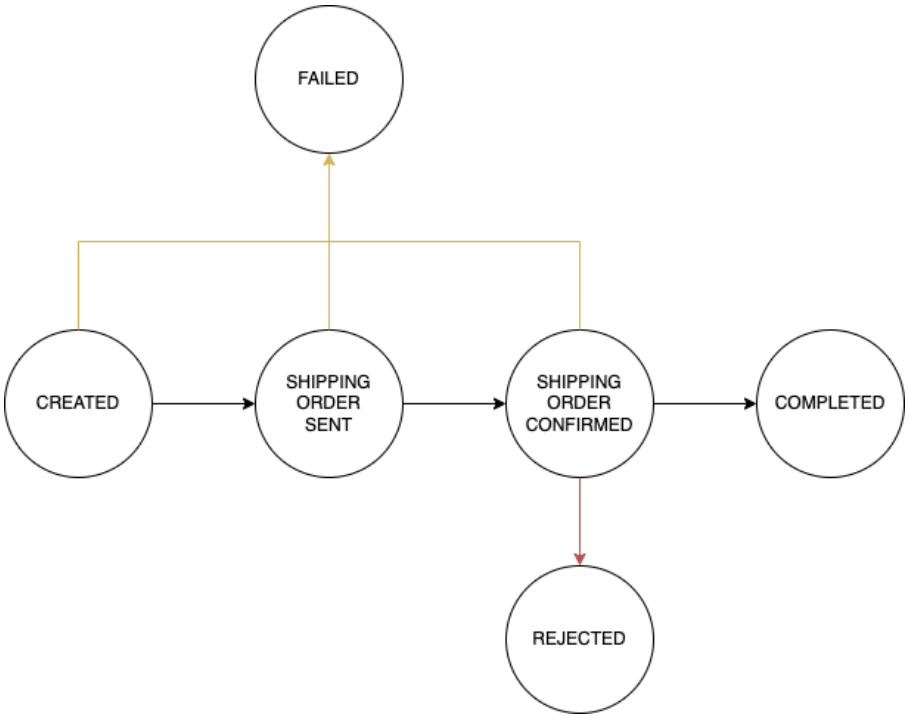
- Move Work Order State Transition Life Cycle



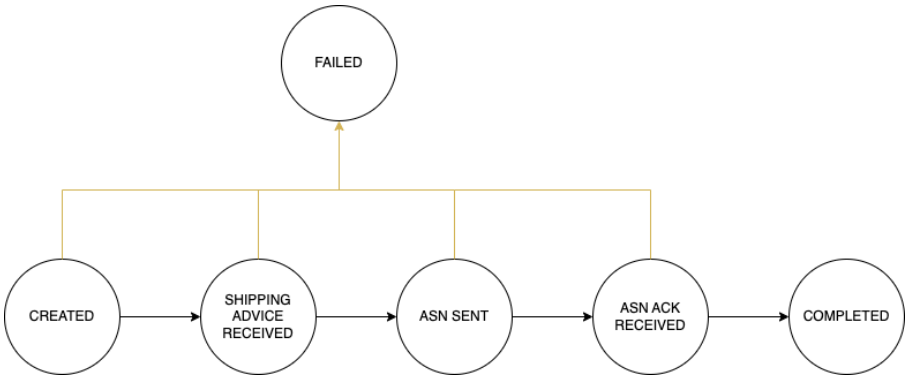
- Reservation Order Work Task State Transition Life Cycle



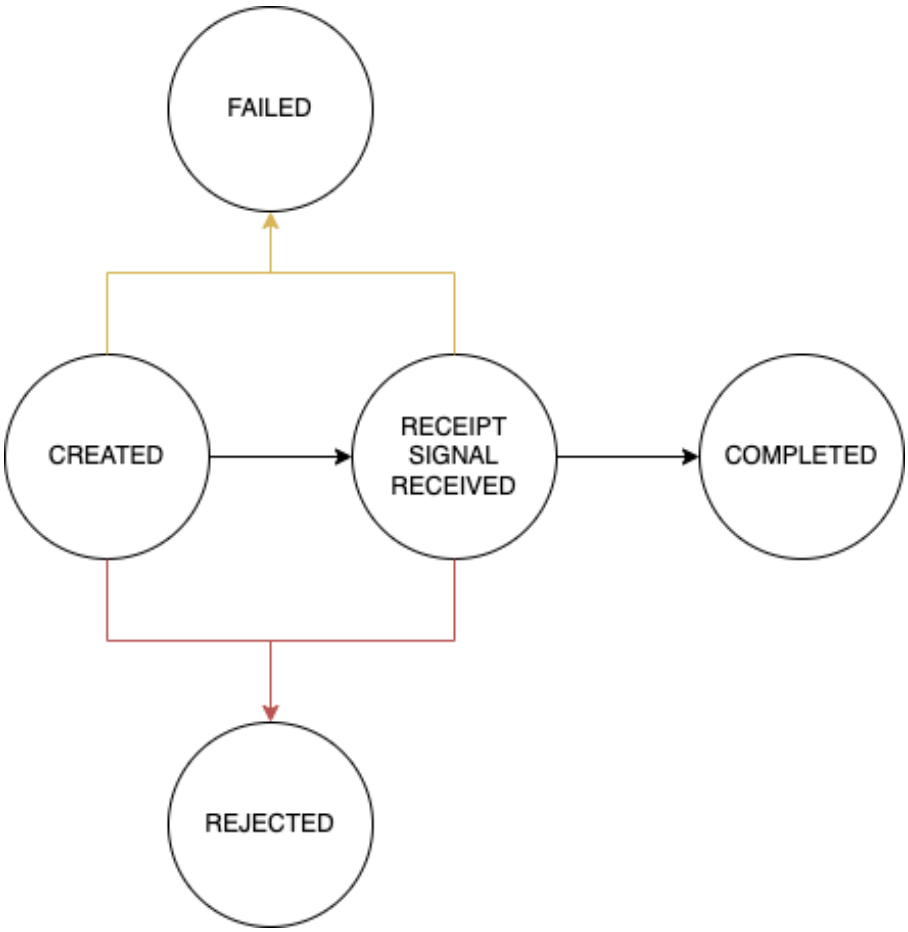
- Shipping Order Work Task State Transition Life Cycle



- Shipping Advice Work Task State Transition Life Cycle



- Receive Task State Transition Life Cycle



Publish Ship Notification API Input [ASN Details]

```
{
    "supplierReferenceId": "1084483",
    "requestPurpose": "Origina", // "Change"
    "carrier": "UPS",
    "shipFrom": {
        "id": {
            "value": "RAD1"
        }
    },
    "shipTo": {
        "id": {
            "value": "IAD119"
        }
    },
    "orderType": "Network_Loose_Gear",
    "pickedUpTime": 1698883200000,
    "estimatedDeliveryTime": 1699056000000,
    "shipmentPackages": [
        {
            "packageId": "1ZF1472Y0118442104",
            "packageType": "PLT",
            "items": [
```

```
                {
                    "itemId": {},
                    "manufacturerPartNumber": "100-000000091",
                    "ipn": "202-001205-001",
                    "itemReferences": [
                        {
                            "serialNumber": "9KH2261W10115_100-000000091"
                        },
                        {
                            "serialNumber": "9KH2261W10117_100-000000091"
                        },
                        {
                            "serialNumber": "9KH2261W10154_100-000000091"
                        }
                    ],
                    "quantity": {
                        "value": 3,
                        "unitOfMeasure": "EA"
                    },
                    "orderNumber": {
                        "id": {
                            "value": "bb7940c8-7949-11ee-b64c-5af610f35221"
                        },
                        "version": 1
                    },
                    "projectId": "IPS-Regular-Break-fix-Spare-PO"
                }
            ]
        },
        {
            "packageId": "1ZF1472Y0118022915",
            "packageType": "PLT",
            "items": [
                {
                    "itemId": {},
                    "manufacturerPartNumber": "MP-00033978-002",
                    "ipn": "210-000560-002",
                    "itemReferences": [
                        {
                            "serialNumber": "G224305H3"
                        }
                    ],
                    "quantity": {
                        "value": 1,
                        "unitOfMeasure": "EA"
                    },
                    "orderNumber": {
                        "id": {
                            "value": "bb7948c0-7949-11ee-b64c-5af610f35221"
                        },
                        "version": 1
                    },
                    "projectId": "IPS-Regular-Break-fix-Spare-PO"
                }
            ]
```

```
        },
        {
            "packageId": "1ZF1472Y0123713972",
            "packageType": "PLT",
            "items": [
                {
                    "itemId": {},
                    "manufacturerPartNumber": "31A56MB0050",
                    "ipn": "205-000186-001",
                    "itemReferences": [
                        {
                            "serialNumber": "TWJS131700259"
                        }
                    ],
                    "quantity": {
                        "value": 1,
                        "unitOfMeasure": "EA"
                    },
                    "orderNumber": {
                        "id": {
                            "value": "bb794398-7949-11ee-b64c-5af610f35221"
                        },
                        "version": 1
                    },
                    "projectId": "IPS-Regular-Break-fix-Spare-PO"
                }
            ]
        }
    ]
}
)
```

Move Work Orders Query

```
SELECT Json_extract_scalar(exec_plan_table.event, '$.serializedobject.executionplan.id
       Json_extract_scalar(exec_plan_table.event, '$.serializedobject.version')  AS ve
       Json_extract(exec_plan_table.event, '$.serializedobject.state.name')  AS state
FROM executionplan_datalake_tip AS exec_plan_table
WHERE Json_extract_scalar(exec_plan_table.event, '$.serializedobject.executionplan.cla
AND Json_extract_scalar(exec_plan_table.event, '$.serializedobject.state.name') IN ('C
AND CAST( array_join(transform(filter(
    CAST( json_extract( exec_plan_table.event, '$.serializedobject.executionplan.prope
    p -> json_extract_scalar(p, '$.key') = 'program_type' ),
    p -> json_extract_scalar(p, '$.value.valuestring') ), '') AS varchar) IN ('network
```

Shipment Event

```
{
  "eventId": {
    "value": "baf5c035-ace4-41db-83a5-598f4b00d334"
  },
  "entityId": {
    "value": "pdx6759403b96234994a5320ece61a25417_Identifier(value=BKGISA7HQ)"
  },
```

```
  "sequenceNumber": 1,
  "timestamp": "2023-10-21T01:01:32.231Z",
  "event": {
    "serializationToken": "ShippingRequestService.EntityCreated",
    "serializedObject": {
      "shippingRequest": {
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        },
        "version": 1,
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            "value": "AWS_SCM_SHIPMENT_STATUS"
          }
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        "shipmentPkgRefs": [
          {
            "id": {
              "value": "PKGPNYM5I"
            },
            "version": 1
          }
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        "shipperReference": {
          "id": {
            "value": "DBS"
          }
        },
        "sourceLocation": {
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            "value": "SCTQS3ND6B6"
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        },
        "destinationLocation": {
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          }
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        "requester": {
          "id": {
            "value": "EDI_INTEGRATION"
          }
        },
        "modeOfTransport": "GROUND",
        "communicationDetails": [],
        "executionDetails": [],
        "shipmentReferences": [
          {
            "id": {
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              {
                "valueString": "IAD10120231017MH63980"
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```
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          {
            "id": {
              "value": "isAsnReceived"
            },
            "value": {
              "valueString": "false"
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          }
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        "currentState": {
          "name": "Submitted",
          "version": 1
        },
        "lifeCycleGraphId": {
          "value": "AWS_SCM_SHIPMENT_ASN_GRAPH_ID"
        },
        "createdAt": "2023-10-21T01:01:32.231Z",
        "updatedAt": "2023-10-21T01:01:32.231Z"
      }
    }
  }
}
```


Caspian Table Schema

	confirmed_quantity	destination_location	destination_location_code	external_reference_id_type	external_reference_id_value	external_reservation_id	extract_timestamp_utc	inventory_pool	ipn	need_by_date_utc	priority	program_code	program_type	project_tag	received_quantity	request_date_utc	request_id	requested_quantity	requested_ship_by_date_utc	requester	shipped_quantity	source_location	source_location_code	state	supplier_code	supplier_id	work_order_id	work_order_version	year	month	day	hour

Glossary

Term	Abbreviation	Description
VMI	Vendor Managed Inventory	This is a commercial arrangement where suppliers retain ownership and stock an inventory of materials at AWS-selected, centralized storage locations. VMI warehouses are typically located in positions that support reduced lead-time access to multiple rack integrators.
DC	Data Center	A data center is a physical location that stores computing machines and their related hardware equipment. It contains the computing infrastructure that IT systems require, such as servers, data storage drives, and network equipment. It is the physical facility that stores any company's digital data.
CW	Central/Cluster Warehouse	Cluster - is a geographical area that contains one or more DCs These clusters have warehouses containing large inventory and are allowed to be transferred to other sites within the same cluster.
RP	Replenishment Planner	Replenishment Planner ensures that customer demand are met with according to the service level defined. It creates a plan of record which utilizes an organization's manufacturing, distribution and procurement capabilities to enable rapid response to changing requirements. Source
EP	Execution Planner	Execution planner is an orchestration system that will coordinate the execution of instructions/instruction batches. It will work with domain systems to break down high level instructions like move, produce to next level of execution commands and executes these commands.
POR	Proof of Records	A POR consists of a list of instructions bucketed into instruction batches for Execuion planner to execute. This is the input for Execution planner. FP and RP are the 2 workflows that generate POR today.
IB	Instruction Batch	An instruction batch is a set of instructions that needs to be executed to complete a use case or a requirement. One instruction batch captures one demand in SCos. An analogy is transaction in SQL world that comprises of multiple statements. Execution planner promises atomicity at an IB level - either all instructions in an IB gets executed or none does.
DBS	DB Schenker	3PL that AWS has partnered with to manage VMI warehouses in CVG, SLC, SIN, and DUB
LBO	Late Bind Optics	Late Bind Optics is a program where we don't populate the base rack with optics when the base rack is installed. Instead, we order optics as and when client racks are ordered, improving optic utilization and saving costs. Refer here for more info
EDI	Electronic Data Interchange	Electronic Data Interchange is the electronic interchange of business information using a standardized format
ASN	Advance Shipment Notice	An Advance Shipment Notice is transmitted via EDI from a supplier to let the receiving organization know that a shipment is coming.
WO	Work Order	Work Order is an Execution Plan entity for tracking the movement from one node to another
WT	Work Task	Work Tasks are Execution Order entities for tracking the tasks that are relavant to MOVE work orders like Shipping Order Sent etc.,
GIME	Global Inventory Management Engine	The Global Inventory Management Engine is a centralized system designed to efficiently oversee and control inventory on a global scale. It provides real-time visibility into inventory levels, streamlines supply chain operations, optimizes inventory allocation, and helps prevent stockouts or excess stock. This system enables organizations to better manage their resources, reduce costs, and ensure products are available when and where they are needed to meet customer demand.
Bison	Project Bison	Aimed at introducing strategically placed warehouse nodes in our supply chain to support just in time fulfillment to our DCs and also reduce Weeks Of Supply (WOS) inventory at our DCs & CWs

Associated EDI Signals

EDI Signal	Name	Description
EDI - 940R	Reservation 940	EDI - 940 signal that will be used for reserving inventories at Logistics level
EDI -940RC	Reservation Confirmation for Reservation 940	EDI - 945 signal (in response to reservation EDI - 940 signal) indicating how much inventories got reserved against requested
EDI - 940W	Warehouse Shipping Order 940	EDI - 940 signal that will be used as an actual warehouse shipping order signal
EDI - 940WC	Shipping Order Confirmation for Warehouse Shipping Order 940	EDI - 940R signal (in response to warehouse shipping order EDI - 940) indicating status of the shipping order (whether accepted or not). It is not an industrial standard signal - custom signal created only for GIME following 940 standards mostly.
EDI - 945	Shipping Advice	EDI - 945 (in response to warehouse shipping order EDI - 940) indicating that the requested inventories got shipped
EDI - 856	Advance Ship Notification	EDI 856 signal is used to communicate one or more fulfillments for a single order, and includes basic shipment information such as the carrier details, tracking numbers, shipping address, and items being shipped.
EDI - 861	Receipt Advice	EDI - 861 signal is used after receiving a shipment to confirm receipt and report any issues with the delivery.
EDI - 852	Product Activity Data	EDI - 852 signal is used to project the inventory picture available at warehouse nodes

TASKS TO DO

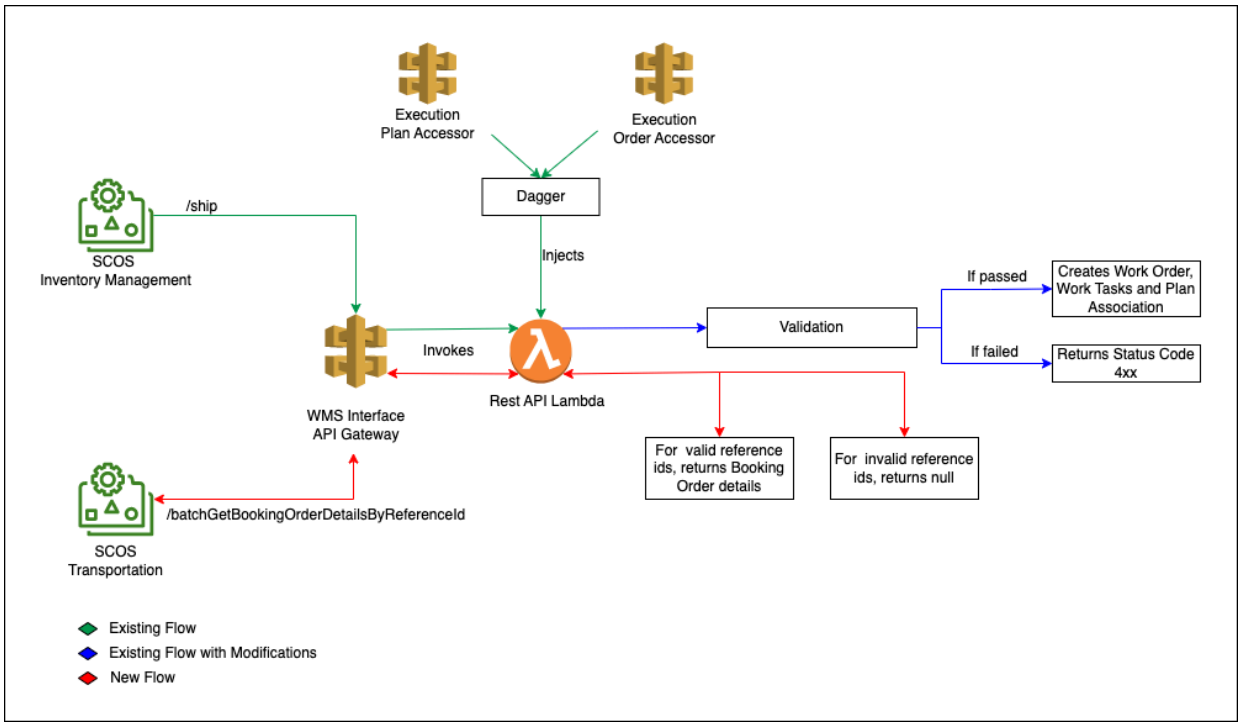
Use-Case	Task	Owner	ETA	Status	Remarks if any
P0 Tasks					
New EDI Specs Creation and Implementation	New EDI Specs Creation	Maman	11/5/2023	Completed	
	EDI Specs Internal Review and Finalization	Zubair, Hemanth, Vipul	11/7/2023	Completed	
	EDI Specs External Review and Finalization	DBS	12/1/2023	Completed	
	EDI Specs Implementation	DBS	2/15/2024	Completed	
Design Doc Creation and Review	Design Doc Creation	Maman	11/24/2023	Completed	
	Design Doc Internal Review	Inventory Management Team	11/27/2023	Completed	
	Design Doc External Review	Partner Team	11/28/2023	Completed	
SCOS Inventory Management Service					
EP - Integration	New Strategy Implementation in Handler Lambda	Zubair	11/22/2023	Completed	
	New Strategy Implementation in Aggregator Lambda	Zubair		Completed	
	New Strategy Implementation in Ingestor Job for VMI to DC Movements: 1. Pojo for New Strategy 2. Parser for New Strategy 3. Validator for New Strategy 4. Transformer for New Strategy	Maman	12/4/2023	Completed	
	Component Picker Lambda Changes	Zubair	12/4/2023	Completed	
	Alarm, Metrics and Ticket Configuration	Maman	2/15/2024	In Progress	
	Testing	Maman, Zubair	2/15/2024	Completed	
SCOS Warehouse Management System Interface					
Ship Request - WO & WT Creation	New Strategy Implementation in Rest Api Lambda for Ship Api	Zubair	01/30/2024	Completed	
	Alarm, Metrics and Ticket Configuration	Zubair	2/15/2024	In Progress	
	Testing	Zubair	2/15/2024	Completed	
ASN Publishing	New Strategy Implementation in ASN Publisher Lambda	Maman	01/30/2024	Completed	
	Testing	Maman	2/15/2024	Completed	
Receive Event Handling	New Strategy Implementation in Mobility Receive Lambda	Maman	01/30/2024	Completed	
	Testing	Maman	2/15/2024	Completed	
SCOS WMS Orchestration Service					

Work Order & EDI Processing	[Ship Work Task Executor] Ship Request Data Populator Strategy Changes	Zubair	1/31/2024	Completed	
	[Ship Work Task Executor] Inventory Availability Handler Changes	Zubair	1/31/2024	Completed	
	[Ship Work Task Executor] Allocation Creation Handler Changes	Zubair	1/31/2024	Completed	
	[Ship Work Task Executor] Batching Handler Changes	Zubair	1/31/2024	Completed	
	[Ship Work Task Executor] Shipping Order Handler Changes to send EDI - 940R	Zubair	1/31/2024	Completed	
	Shipping Advice Lambda Strategy Changes to handle EDI -940RC and send EDI -940W	Maman	12/8/2023	Completed	
	Inventory Snapshot Refresh Listnener Changes to handle EDI - 852	Maman	12/5/2023	Completed	
	Shipping Order Confirmation Lambda Changes to handle EDI -940WC	Maman	12/8/2023	Completed	
	Shipping Advice Lambda Changes to handle EDI - 945 and Send ASN	Maman	1/31/2024	Completed	
	ASN Acknowledgement Handler Changes	Maman	1/31/2024	Completed	
	Alarm, Metrics and Ticket Configuration	Maman	2/15/2024	In Progress	
	Testing	Maman	2/15/2024	Completed	
SCOS WMS Caspian Publisher					
Caspian Publishing	Caspian Publisher Lambda changes to add new properties for caspian pubishing	Maman	12/13/2023	Completed	
Sedi					
JSON→XML, XML->JSON Convertion	Creating Mappers for New EDI Specs and Pubish the converted EDI Data into SNS	Indrasish, Maman	12/15/2023	Completed	
	Alarm, Metrics and Ticket Configuration	Indrasish, Maman	2/15/2024	In Progress	
	Testing	Indrasish, Maman	2/15/2024	In Progress	
OverAll					
Launch Readiness	End To End Test Plan Creation	Maman	1/31/2024	Completed	
	End To End Testing	Maman	2/15/2024	Completed	
	Alarm, Metrics and Ticket Configuration	Maman	2/15/2024	In Progress	
	ORR Doc Creation	Maman	2/15/2024	In Progress	
	ORR Doc Review	Inventory Management		Not yet started	
	UAT	Business		Not yet started	
	Official Launch	Inventory Management		Not yet started	
	After Launch Support	Maman		Not yet started	

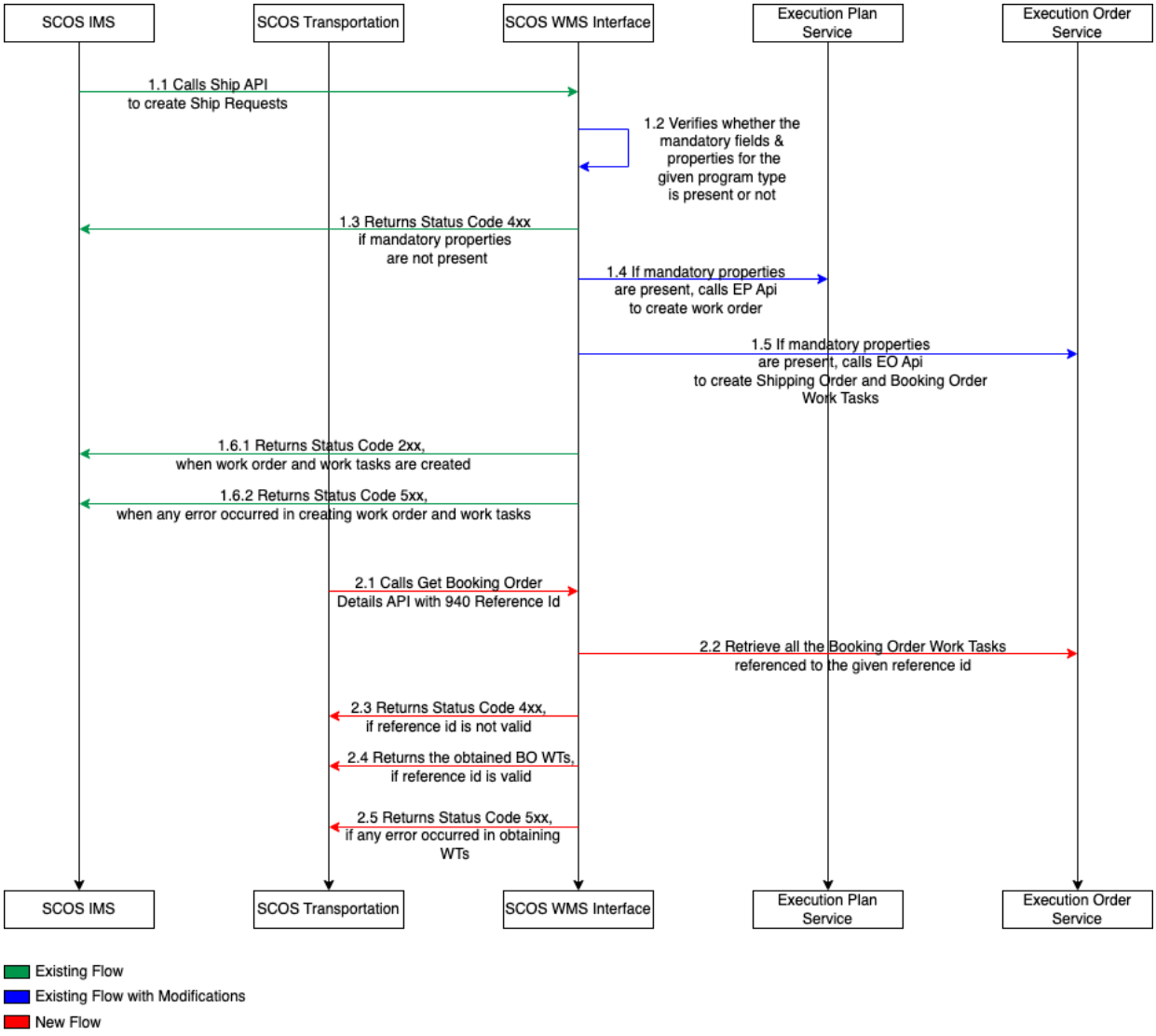
PHASE 1 DETAILS

SCOS Warehouse Management System Interface

Resource Diagram



WorkFlow Diagram



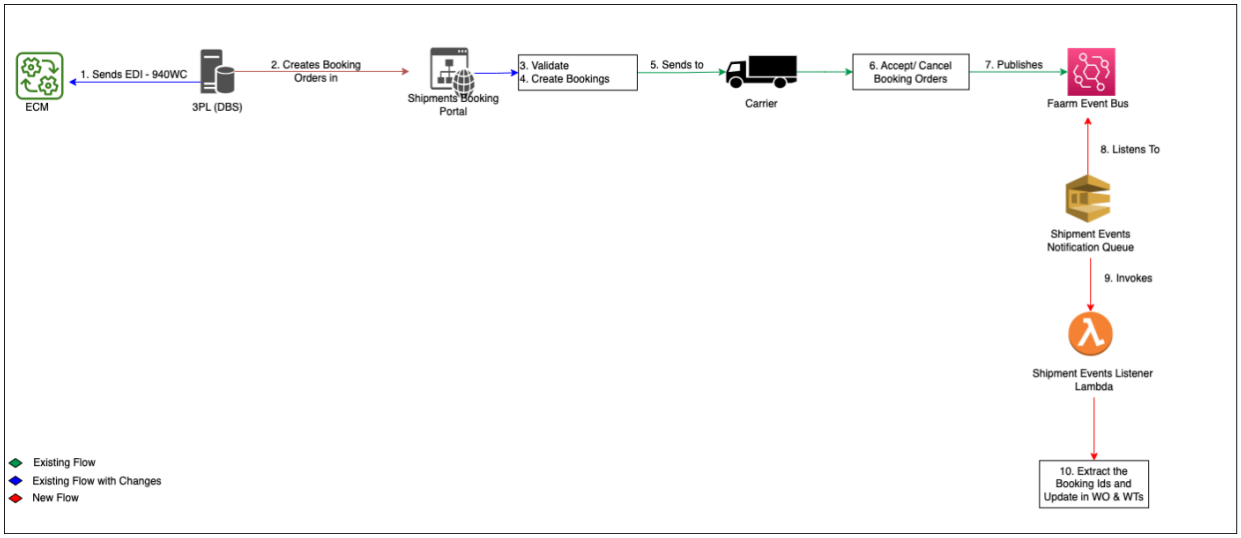
WorkFlow

- **/shipApi:**
  - In addition to existing work tasks, introduce a new work task - Booking Order Task to track Booking Orders. (Life Cycle States are not finalized)
- **/batchGetBookingOrderDetailsByReferenceIds**
  - SCOS Shipments/Transportation calls this API with a list of EDI - 940 root level reference ids.
  - The API invokes a Rest API Lambda, performing the following operations:
    - For each reference id:
      - Attempts to retrieve corresponding Booking Order Work Tasks using the Execution Order Service API.
      - If Booking Order tasks are found, extracts Booking Order details from work task properties and adds them to the response list.
      - If Booking Order tasks are not found, appends an empty list to the response.
      - Request Format: [Not yet finalized]

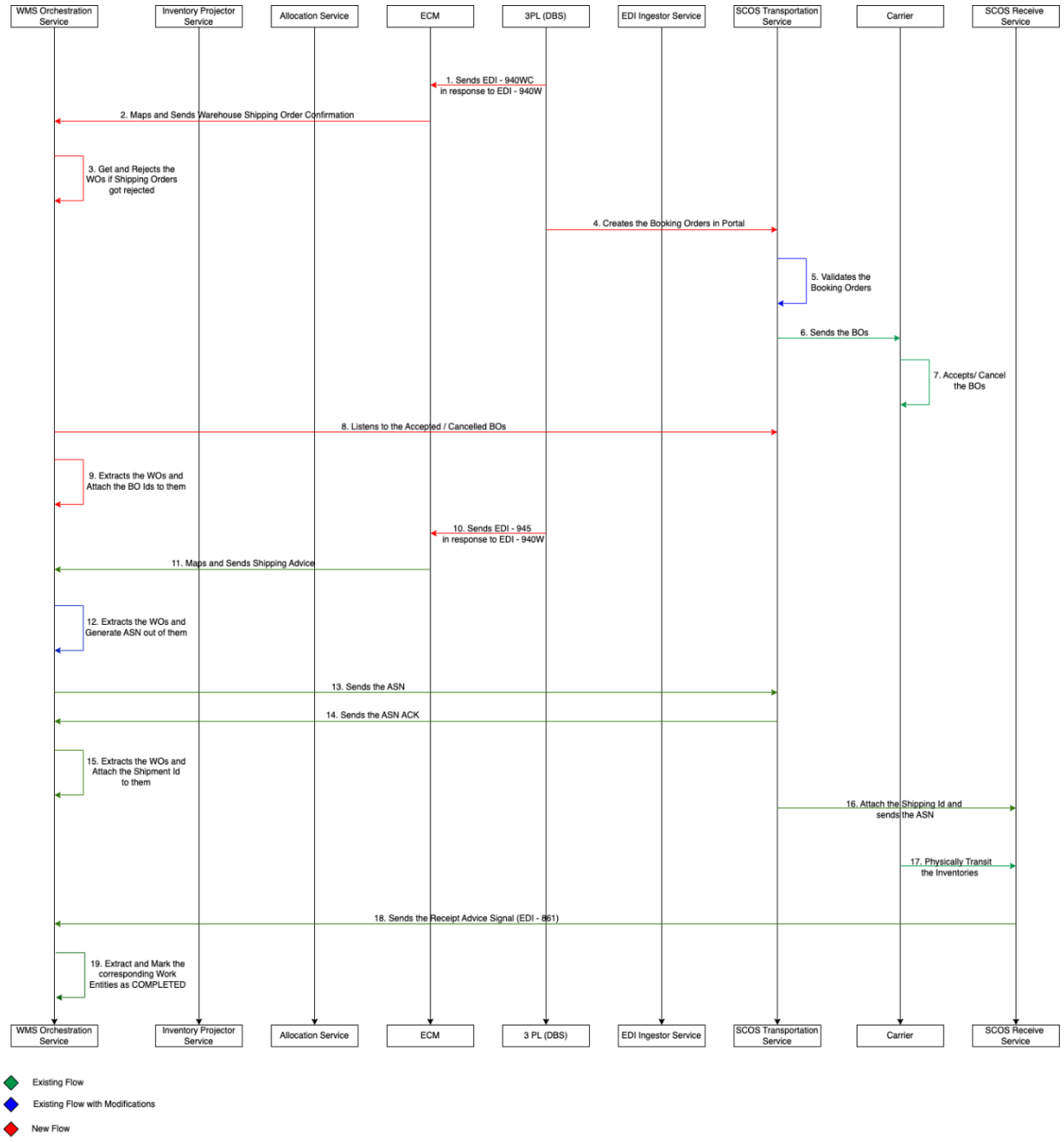
        - Response Format: [Not yet finalized]
    - The API returns:
        - Status Code 2xx with a list of Booking Order details.
        - Status Code 5xx if any error occurs in the process.

SCOS WMS Orchestration Service

Resource Diagram



WorkFlow Diagram



WorkFlow

- **Ship Work Task Executor Batch Job:**
  - Updates shipping order identifiers as external reference id in Booking Order Work Task after sending EDI - 940R.
- **Shipment Events Listener Lambda:**
  - After DBS sends EDI - 940WC, the Shipments Booking Portal is used to create booking orders for the inventories in EDI - 940W using the reference id.
  - Once Booking Order events are created, they go to the Carrier for acceptance or potential cancellation.
  - These events are published into the Faarm Event Bus, and an SQS in WMS Orchestration Service - Shipment

Events Notification Queue listens to these events, triggering a lambda - Shipment Events Listener Lambda.

- The Shipment Events Listener Lambda:
  - Filters Booking Orders with a state of 'BookingAccepted.'
  - Retrieves related work entities using the 940W reference id in the Shipment Events.
  - Validates the Shipment Events, ensuring the state of corresponding work orders is 'SHIPPING_ORDER_CONFIRMED.'
  - Extracts Booking Ids from events with a state of 'BookingAccepted' and adds them as fulfillment ids for corresponding Booking Order Work Tasks.
  - Potentially changes the state of Booking Order Work Tasks to 'BOOKING_ACCEPTED'. [Not Yet Finalized]

PROJECT IMPLEMENTATION Q&A

1. How to get the location code for destination location ids i.e DC node ids ?
   a. *Checking with Casey Cole on this*
2. Currently, RP is sending pseudo IPNs in IBs but DBS needs base IPNs for reserving and shipping items. How are we going to resolve this ?
   a. RP aligns with sending Base IPNs for VMI → DC movements. Relevant doc - LBE RP Instruction Combinations
3. Are we gonna hardcode supplier id or do we need to get it from component inventory picker lambda ?
   a. *For now, we are gonna hardcode the supplier id ("AWR" - 0000000419). Later, we need to use the LBO Supplier Pool in Component Inventory Picker Lambda to get the supplier id*
4. In Supplier Code split, will we receive only 1 supplier pool info - i.e for 'AWR' ? In future, we may get many supplier code splits as similar as AA - so AA logic is planning to be used for creating ship requests - any concerns in that ?
   a. *No, we need to create new startegy which combines AA, Spares and LBO logics.*
5. I am planning on cutting a ticket to RP team for invalid requests (this is a very rare case). Is that fine ? Currently for LBO and AA, we are not doing anything for invalid rebalance request. We are only generating validation report.
   a. *Yes, we need to cut a ticket to them. Need to get the exact CTI from Quylan Mac*
6. Will we use the state - 'PARTIALLY_RECEIVED' ? - for the same inventory, will the shipments be done in a multiple leg ?
   a. *We won't partially receive the shipments since a 940 shippiing orders should not be split into multiple shipments - got it confirmed with Casey Coyle*
7. What is the SLA for Mobility physically receiving the inventories ?
   a. *Checking with Casey Coyle on this*
8. How to handle Booking Cancelled Events ? [Phase 1]
   a. *Need to discuss - not yet started since its a phase 1 item*
9. How the shipment id is affixed to the pallet ?
   a. *Each shipment consists of multiple pallets and are identified by shipment id. The corresponding shipment id is affixed on one of the pallets and we call it as 'Master Pallet'*
10. Is DC okay to do ASN based receive from the Shipment Id on Master Pallet level only ?
    a. *Yes, there are already DC inbounds going on from DBS where they are affixing Shipment Id on Master Pallet level*
11. DBS should send 945 as soon as the items are shipped. Is DBS aligned on that ?
    a. *Yes. That is the current flow as well. Checking with Casey Coyle for double confirmation*
12. What happens when DC receive ASN post delivery or DC doesn't have ASN when delivery happens ?
    a. *There is a SOP present at the DC for these cases. Checking with DC Logistics on the same*

REFERENCES

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- Network Loose Gears BRD Questions and Answers - Network Loose Gear BRD Questions
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- EDI Specs for Network Loose Gears - EDI Specs for Automating N/W Loose Gears Re-balancing via GIME
- Network Loose Gears High Level Plan - Network Loose Gear High Level Plan
- Network Loose Gears HLD - Untitled
- SCOS Transportation and GIME Integration - SC.os Transportation - GIME integration for Network Loose Gears
- Automation Approach for Late Bind Optics - The automation approach for Late Bind Optics (LBO)
- Janus EDI Specifications - JANUS program specific EDI specifications
- LBE RP Instruction Combinations - LBE RP Instruction Combinations
- Automating N/W Loose Gear Movements EDI Specs - EDI Specs for Automating N/W Loose Gears Movement via AWS
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