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# Ontario Cannabis Data Reporting Requirements: Technical Design Review

## Today's OCS Facilitators:



**Michael Kwong**  
Program Manager



**David Shao**  
Product Manager



**Martin Kluchert**  
Platform Architect



**Treydon Teo**  
Director of Product Management

## Housekeeping

1. The webinar is being recorded and a recording (along with the materials) will be made available to invitees.
2. If you have any questions, please type them into the chat box.
3. Q&A will take place after the presentation.



# Agenda



## What will be covered today:

Session	Facilitator	Topics
Project Debrief	Michael Kwong / Treydon Teo	<ul style="list-style-type: none"><li>▪ Project background</li><li>▪ Future state summary</li></ul>
Architecture Overview	Martin Kluchert	<ul style="list-style-type: none"><li>▪ Overview of mandatory and optional APIs</li><li>▪ Authentication mechanisms</li><li>▪ Data validations</li><li>▪ Non-functional requirements</li><li>▪ Platform security</li></ul>
Functional Overview	Treydon Teo	<ul style="list-style-type: none"><li>▪ Integration Portal overview</li></ul>
Timelines & Next Steps	Michael Kwong	<ul style="list-style-type: none"><li>▪ Timeline targets</li><li>▪ Next steps to prepare for the pilot</li></ul>
Q&A	Treydon Teo	<ul style="list-style-type: none"><li>▪ Q&amp;A period</li></ul>



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# Project Debrief

# Project Debrief & Today's Focus

## Background

To effectively execute on their respective government mandates, the Alcohol and Gaming Commission of Ontario (AGCO) and Ontario Cannabis Store (OCS) coordinated in early 2019 to develop a Day 1 framework to collect critical information from licensed retailers without adding significant delays to store openings.

## Where Are We Going?

As Ontario's private cannabis retail network continues to grow, the AGCO and OCS want to enhance the Point-of-Sale (POS) data reporting process. The introduction of a new data platform intends to improve operational efficiencies, reporting accuracy, ensure ongoing network scalability and reduce reporting burden on regulated parties.



### Today's Key Objectives

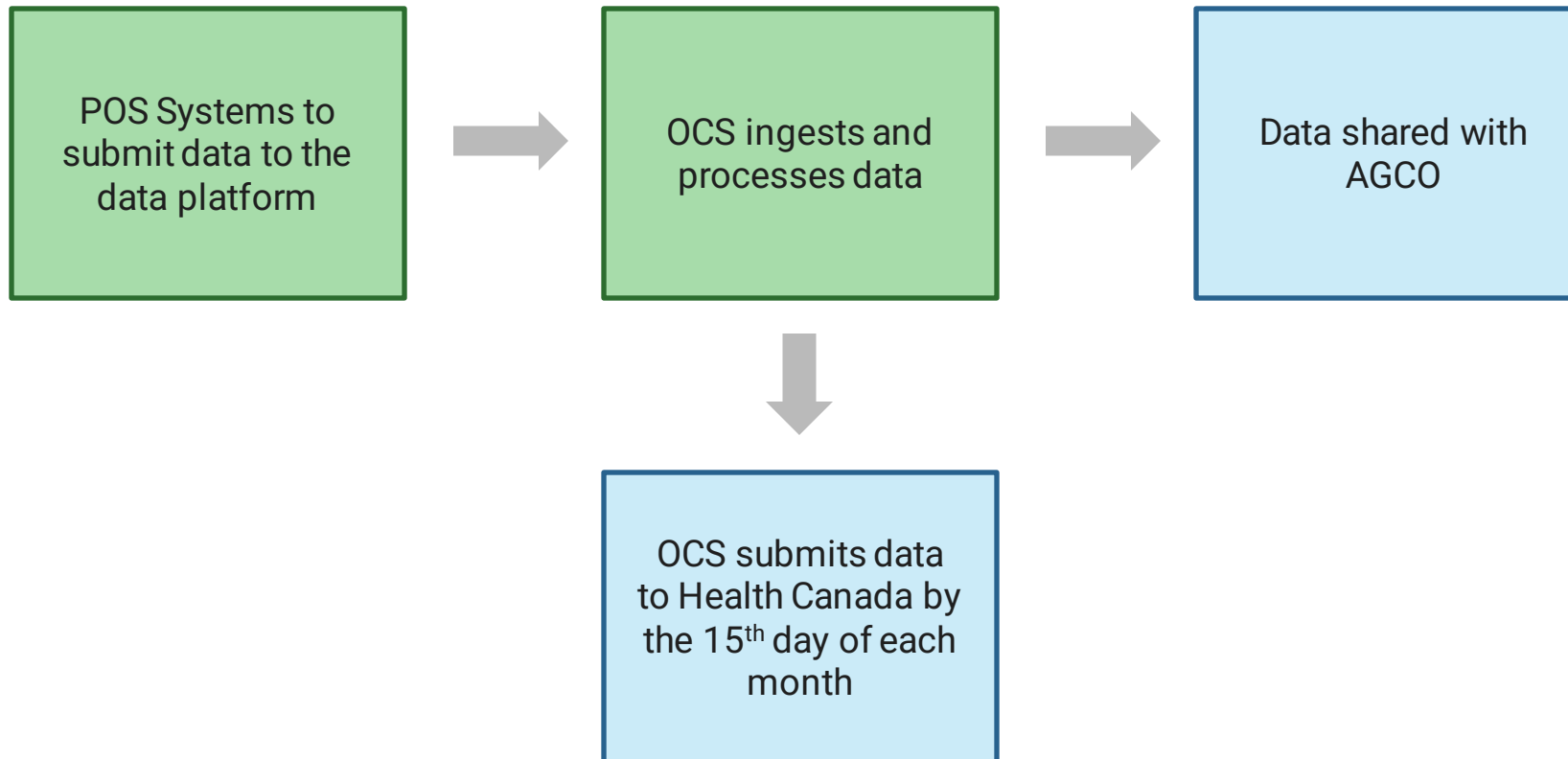
Review High-Level  
Platform Scope &  
Objectives

Discuss Infrastructure,  
Security and Functionality

Discuss Pilot Approach,  
Timeline and Logistics

# Future State Data Flow

Under the future state reporting process, the OCS will receive applicable data from in-store Point-of-Sale (POS) systems and share the data with both Health Canada and the AGCO, in line with both federal and provincial regulatory requirements.



# Current State vs. Target State Retailer Data Collection Method

This Solution will effectively eliminate the need for retailers to manually extract data from their POS terminals to complete the existing Excel-based reporting template.

Data Set	Data Set Description	Data Classification	Data Points	Current State Data Collection Method	Target State Data Collection Method
Federal	Used to meet the Health Canada and Statistics Canada reporting requirements.	Inventory	<ul style="list-style-type: none"> <li>Monthly Change in Inventory by:                             <ul style="list-style-type: none"> <li>Sold</li> <li>Purchased</li> <li>Returns</li> <li>Destroyed</li> <li>Other</li> </ul> </li> </ul>	Data File Sent to AGCO	POS Integration
AGCO Regulatory Reporting	Supports AGCO's overall monitoring process to ensure compliance by retailers.	Inventory	<ul style="list-style-type: none"> <li>Descriptive Details and Retailer Commentary on Inventory SKU Quantity Changes</li> </ul>	Data File Sent to AGCO	Not Collected
Commercial	Used by OCS to provide data-driven insights to both OCS and retail partners.	Inventory	<ul style="list-style-type: none"> <li>Inventory SKU Quantities by:                             <ul style="list-style-type: none"> <li>Month Starting Inventory Position</li> <li>End of Day Inventory Position</li> </ul> </li> </ul>	Data File Sent to AGCO	POS Integration
	The data collected is also used by the AGCO for regulatory purposes.	Sales	<ul style="list-style-type: none"> <li>Quantity Sold at Retail Price</li> <li>Quantity Sold at Markdown Price</li> <li>Total Sales Value</li> </ul>		

# High Level Pilot Plan

<b>Objective</b>	<ul style="list-style-type: none"> <li>To validate the end-to-end POS integration, system performance, and the related operational processes in a controlled manner (i.e., by limiting the number of retailer participants) prior to onboarding all retailers.</li> </ul>
<b>UAT Phase</b>	<ul style="list-style-type: none"> <li>Prior to the pilot phase, there is a UAT environment available to POS providers.</li> <li>POS Providers will use this environment to develop their end-to-end integration.</li> <li>POS providers will need to satisfy a checklist which OCS will provide, and once all criteria has been met on the list, OCS will work with POS provider to migrate into PROD environment with select retailers.</li> <li><b>If POS provider is unable to meet all the criteria on the list, OCS will not allow the POS provider to commence the pilot phase.</b></li> </ul>
<b>Pilot Phase</b>	<ul style="list-style-type: none"> <li>During the pilot launch phase (Groups 1-2), the participating retailers will continue to submit their data through the existing manual report for 2 full monthly reporting cycles               <ul style="list-style-type: none"> <li>The manual report will be validated against the report produced using the POS integration data to confirm integration success</li> <li>If there are data inaccuracies after the first month we will assess if a further reporting period is required before transitioning the retailers to the integrated platform</li> <li>Once the integration has been validated with the pilot participants, it will be enabled for all remaining retailers for that POS provider</li> </ul> </li> </ul>
<b>Pilot Participants</b>	<ul style="list-style-type: none"> <li>POS providers will be segmented into Groups for onboarding; with subsequent groups featuring a growing number of providers</li> <li>In order to participate as part of one of the pilot groups, a POS provider must be able to support feature flags (or similar mechanism) to differentiate which retailers are enabled on the integrated platform</li> <li>In each pilot group we will establish gating criteria between phases; if a POS provider is not ready by a given date, they will be removed from the Pilot group and prioritized for the next round</li> </ul>
<b>Documentation</b>	<ul style="list-style-type: none"> <li>POS providers will be provided the implementation documentation (API specs and specifications Overview) that the OCS Technology team puts together.</li> </ul>





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# Architecture Overview

# Data Platform API Integration Overview

The data platform uses RESTful APIs to receive inventory data from retailers through their POS Provider.

## Mandatory API Endpoints for POS Providers

- There are two primary endpoints that POS Providers need to integrate with to provide inventory events and inventory position to the data platform:
  1. **POST Inventory Events:** Allows POS Providers to report data on inventory at the SKU level when a sale, purchase, return, destruction, or other event type occurs
  2. **POST Inventory Position:** Enables the reporting of inventory position (book value and quantity) at the SKU level

**Note:** Please refer to the provided technical specifications package for details on each of the endpoints.

## Optional API Endpoints for POS Providers

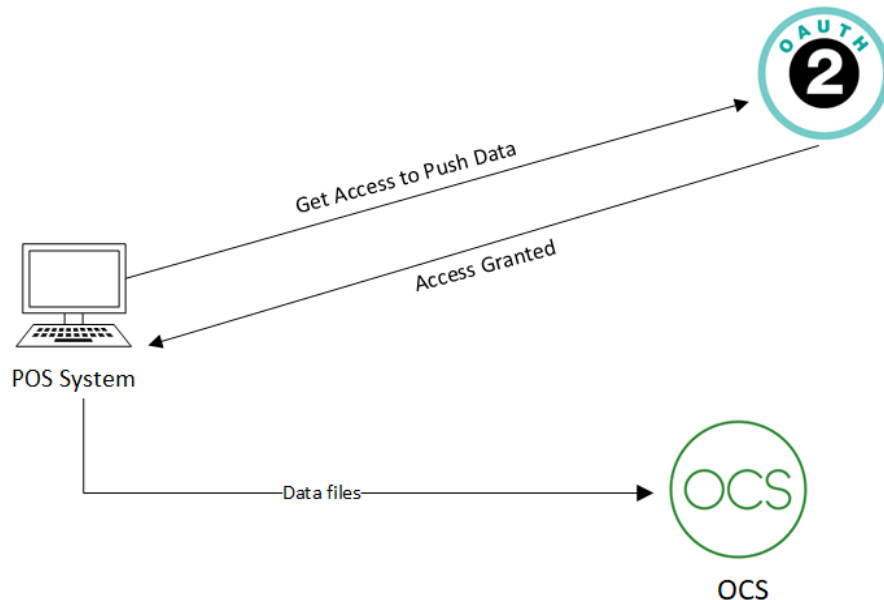
- The following API endpoints are optional to the data platform as they are not critical to the essential functionality
- The purpose of exposing the APIs to the POS systems is to prevent the occurrence of data reconciliation errors in the transactional data
  1. **GET ASN:** Used to provide retailers with their ASN details so that they can systematically add their ASN data to the POS system
  2. **GET OCS Retail Item Catalogue:** Used to provide retailers with a copy of the aspects of the OCS Item Master so that the Retailer's POS system can accurately track and report products from the OCS
  3. **GET Inventory Events:** Only available in the UAT environment. Used to provide POS Providers the ability to retrieve Inventory position data for validation and testing purposes.
  4. **GET Inventory Position:** Only available in the UAT environment. Used to provide POS Providers the ability to retrieve Inventory position data for validation and testing purposes.

# Authentication Using API Key OAuth2

The data platform uses an OAuth2 token-based architecture to authenticate users.

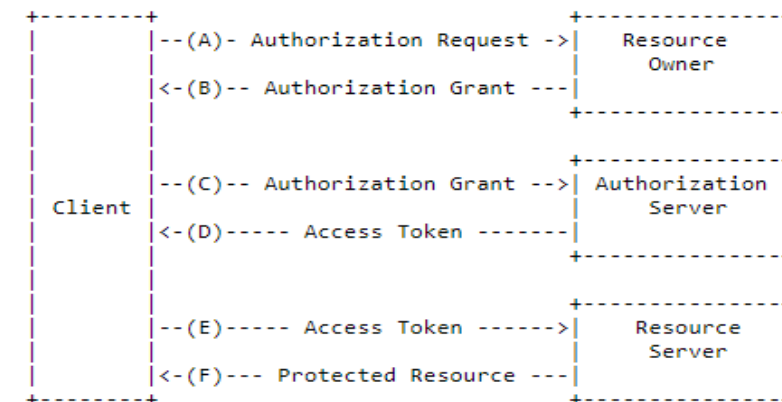
## OAuth 2 Authentication Summary

- POS Providers give OCS an identity that they will use to authenticate. OCS adds the identity to Azure AD. The identity is then used to participate in the OAuth 2 Orchestration.
- OAuth specifies mechanisms where an application can ask a user for access to services on behalf of the user and receive a token as proof that the user agreed



## OAuth 2 Orchestration Summary

- Client requests authorization from the resource owner. The authorization request can be made directly to the resource owner, or preferably indirectly via the authorization server
- Client receives an authorization grant, which is a credential representing the resource owner's authorization
- Client requests an access token by authenticating with the authorization server and presenting the authorization grant
- Authorization server authenticates the client and validates the authorization grant, and if valid, issues an access token
- Client requests the protected resource from the resource server and authenticates by presenting the access token
- Resource server validates the access token, and if valid, serves the request



# Hash Key Generation

The Retailer Hash Key's purpose is to provide confirmation to the data platform that a POS Provider has received authorization from a Retailer to submit POS Data or retrieve Retailer data on a Retailer's behalf.

## Retailer Hash Key Flow

Using Integration Portal, a Retailer can see the following:

1. Users will see a list of their CRSAs and the corresponding Hash Key
2. Users will have a page that provides the ability to view and to copy their Hash Key
3. Users will see a brief informational description of the Hash Key and its purpose to provide their authorization to a Retailer POS system to submit POS data on their behalf



The data platform supports two categories of data validations that are referred to as data verification and data reconciliation:

	1) Data Verification	2) Data Reconciliation
<b>Purpose</b>	<ul style="list-style-type: none"><li>Ensures that the inventory data received from POS Providers matches the expected data shape and data types of the API contract</li></ul>	<ul style="list-style-type: none"><li>Ensures that all the inventory data that has been successfully collected is logically sound and consistent on the transactional and aggregate (daily and monthly) levels</li></ul>
<b>Stage of Data Submission Lifecycle</b>	<ul style="list-style-type: none"><li>At the time of data submission using APIs</li></ul>	<ul style="list-style-type: none"><li>Conducted as part of data ingestion and processing phase</li></ul>
<b>Communication Timing</b>	<ul style="list-style-type: none"><li>Provides immediate feedback to POS Providers as part of API Response when the data shape or data types do not match the specifications using HTTP response codes</li></ul>	<ul style="list-style-type: none"><li>Consolidated report emailed twice a week to retailers</li></ul>

# Non-Functional Requirements Overview

The OCS and AGCO will not prescribe how POS Providers implement the reporting integration capability but want to ensure that all inventory data is transmitted to the data platform in a timely and accurate manner. Each POS Provider has the autonomy to determine how they intend to address each of these requirements.

#	NFR Category	Non-Functional Requirement
1	Performance	POS system must be able to send all inventory events within a day of the event occurring
2	Security	POS systems need to have the ability to use OAuth 2.0 for API Keys and authentication
3	Robustness	POS systems must have a re-try mechanism for unsuccessfully sent Inventory Events in the situation that the data platform is unavailable
4	Interoperability	POS system needs to be able to integrate with RESTful APIs
5	Throughput	POS system needs to be able to report Inventory Positions and Inventory Events on a daily basis <b>Recommendation:</b> Sending inventory events throughout the day in batches.

## Architecture

- The architecture has been designed on the principal of loose coupling.
- System components share Azure resources but are separately secured.
  - API / API Management
  - Cloud Storage (blob)
  - Database & Data processing
- Permissions are segregated and are not shared across the platform.  
(i.e. access to an API will not include access to any other artifact).

## Database

- Data is encrypted at rest and in-transit.
- Raw data is stored separately from processed data.
- Ledger based tables require logic understanding to make sense of them.

## API's

- Secured using the industry standard OAuth 2.0
- Retail locations each have a location specific hash key (SHA256).
  - Shared only with the retailer.
- Retailer specific end points are only accessible with a valid hash key.
- Retailers can only pull (GET end-points) their subset of data.

## Logging / Auditing / Monitoring

- Ingested files are logged and stored
- Ledger tables are fully auditable (CRUD)
  - No transactions are ever removed from the table
- Infrastructure monitored through ELK stack



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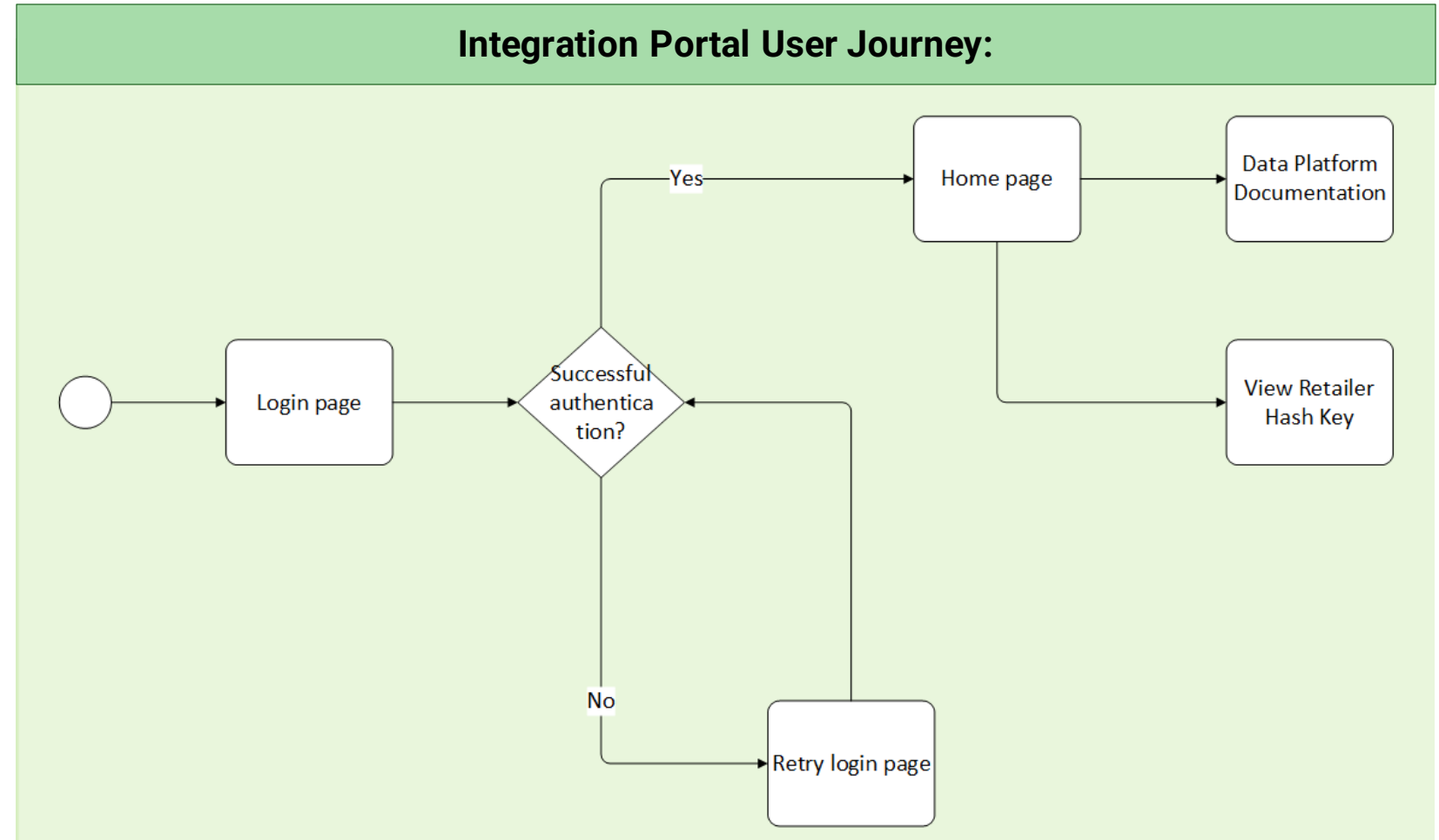
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# Integration Portal Overview



# Integration Portal Functional Overview

The purpose of the Integration Portal is to provide a centralized platform so that retailers can gain access to integration documentation and the Retailer Hash Keys. The login credential management for the portal will use Azure Active Directory business-to-business, thus retailer's will be able to use their company email as the username. AGCO will provide retailers with training on the Integration Portal.





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# Timelines & Next Steps

# Preparing for the Pilot & Next Steps

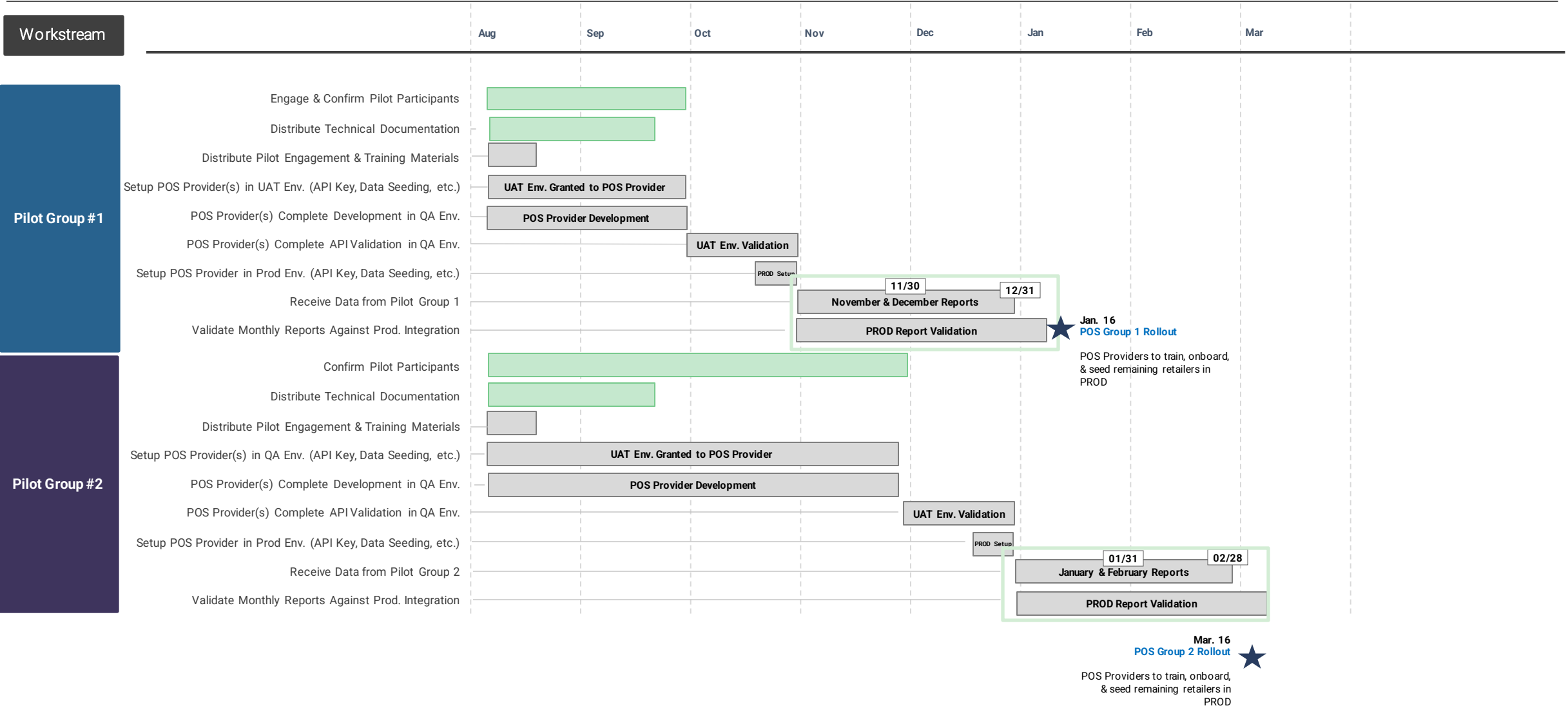
## When Should I Be Ready to Integrate?

- We are starting a controlled and staggered pilot towards the end of September 2022. This pilot will include POS Providers based on their readiness and a subset of their respective retailers (based on willingness to participate).

## How Will the Integrations Be Validated?

- OCS will provide POS providers with access to an integrated test environment to support validating the API connectivity and functionality, however it is expected that each POS provider will be able to provide test data in order to appropriately simulate the various daily and monthly test scenarios.
- During each pilot phase, the data captured through the integrations will be validated against the manual reports that will continue to be provided by retailers. Only once we have a high-degree of confidence in the integration will we transition retailers of a POS Provider to solely relying on the integrated feed.

# POS Data Transformation Pilot Kick-Off Timelines



## What Comes Next?

We ask that each POS Provider take back the details shared in the [Technical Specifications Package](#) and today's webinar and think through their solution approach and timelines

If you have any questions, please do not hesitate to reach out to our shared inbox: [dataplatfom@ocs.ca](mailto:dataplatfom@ocs.ca)





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# Q&A Period



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# Appendix Materials



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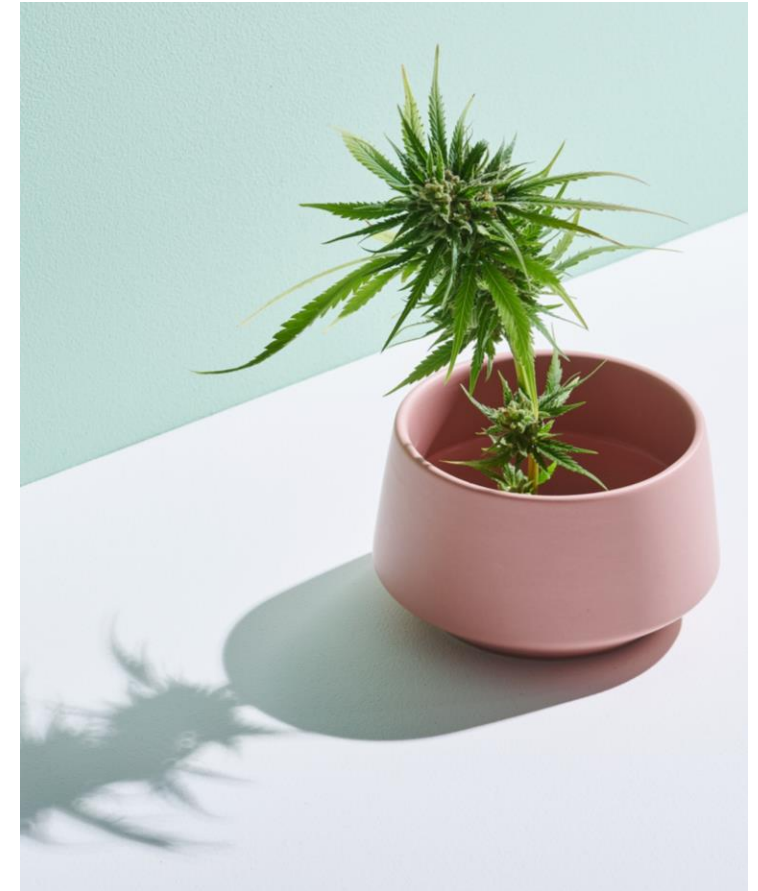
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# Process on Date Details & Example Scenario



# Why Do We Need Process on Date?

1. **Reduce Manual Effort:** Reduce manual effort by eliminating the use of adjustments via Excel. Process on Date allows us to eliminate Excel which is considered cumbersome and error prone.
2. **Maintains POS Providers as Source of Truth:** Using the manual adjustments via Excel makes OCS the source of truth as it would be the only system that retains the complete picture. One of guiding principles for this project is for the POS systems to be the source of truth.
3. **Offers Greater Reporting Accuracy:** The Process on Date can be used to indicate when a transaction physically happened as opposed to when it was entered into the POS system. For example, a large shipment is received on a Monday, the paperwork matches the delivery, but no one enters the delivery into the system until Thursday.



# Example Scenario: Inventory Transactions Entered Out of Sequence

## Scenario:

An Authorized Store receives a large shipment from OCS prior to the last day of the month. The store manager does a quick check to ensure the delivery matches the paperwork and the inventory is made available for sale.

The store manager puts the delivery paperwork on his desk with the intention of dealing with it later. It's a busy couple of days at the store leading up to the long weekend and the manager doesn't get to the paperwork until the beginning of next month. This means the receipt of the delivery is recorded in the wrong month. In the meantime, the store sells a lot of new products from delivery. Without a delivery to offset the sales this creates a reporting issue as the inventory goes negative from a reporting perspective.

The OCS reconciliation system identifies the negative inventory and sends a notification to the store. The store manager goes back into the system, searches for the receiving transaction and adds a 'Process on Date' to the original transaction that indicates the date when the delivery was physically received. The modified transaction, with the Process on date, flows up to OCS where it is reprocessed. Using POS Transaction ID/Transaction Line ID the OCS ledger recognizes the transaction as a new version of an existing transaction that needs to be reprocessed. When the OCS ledger processes the transaction, it uses the 'Process on Date' instead of the original POS Transaction date effectively moving the receipt back in time. With the receipt being processed using the Process on Date the negative inventory position is corrected.

## Original OCS Ledger with the Receipt on the Wrong Date

Store	SKU	Transaction Date	Qty Open	POS Qty Sale	POS Qty Return	POS Qty Destroy	POS Qty Adjust	POS Qty Receipt	Qty Close
S001	SKU02	2021-04-27	0	-8	1	-1			-8
S001	SKU02	2021-04-29	-8	-12	1	-1			-20
S001	SKU02	2021-04-30	-20	-10					-30
S001	SKU02	2021-05-01	-30	-5				100	65

*An example of the OCS' ledger without having a 'Process on Date' to manage the sequencing of inventory events. The lack of a 'Process on Date' results in the Qty Close being a negative value for the month closing quantity which would result in a Data Error for reporting purposes*

## OCS Ledger After the Receipt is Processed with the Process on Date

Store	SKU	Transaction Date	Qty Open	POS Qty Sale	POS Qty Return	POS Qty Destroy	POS Qty Adjust	POS Qty Receipt	Qty Close
S001	SKU02	2021-04-26	0					100	100
S001	SKU02	2021-04-27	100	-8	1	-1			92
S001	SKU02	2021-04-29	92	-12	1	-1			80
S001	SKU02	2021-04-30	80	-10					70
S001	SKU02	2021-05-01	70	-5					65

*An example of the OCS' ledger that uses a 'Process on Date' to manage the sequencing of inventory events. Though the Purchase Order was entered in the following month, the 'Process on Date' meta field enables the OCS ledger to correctly sequence the Purchase Order to the date it was received and not the date that the transaction was entered into the POS. Consequently, the Qty Close values are all positive.*



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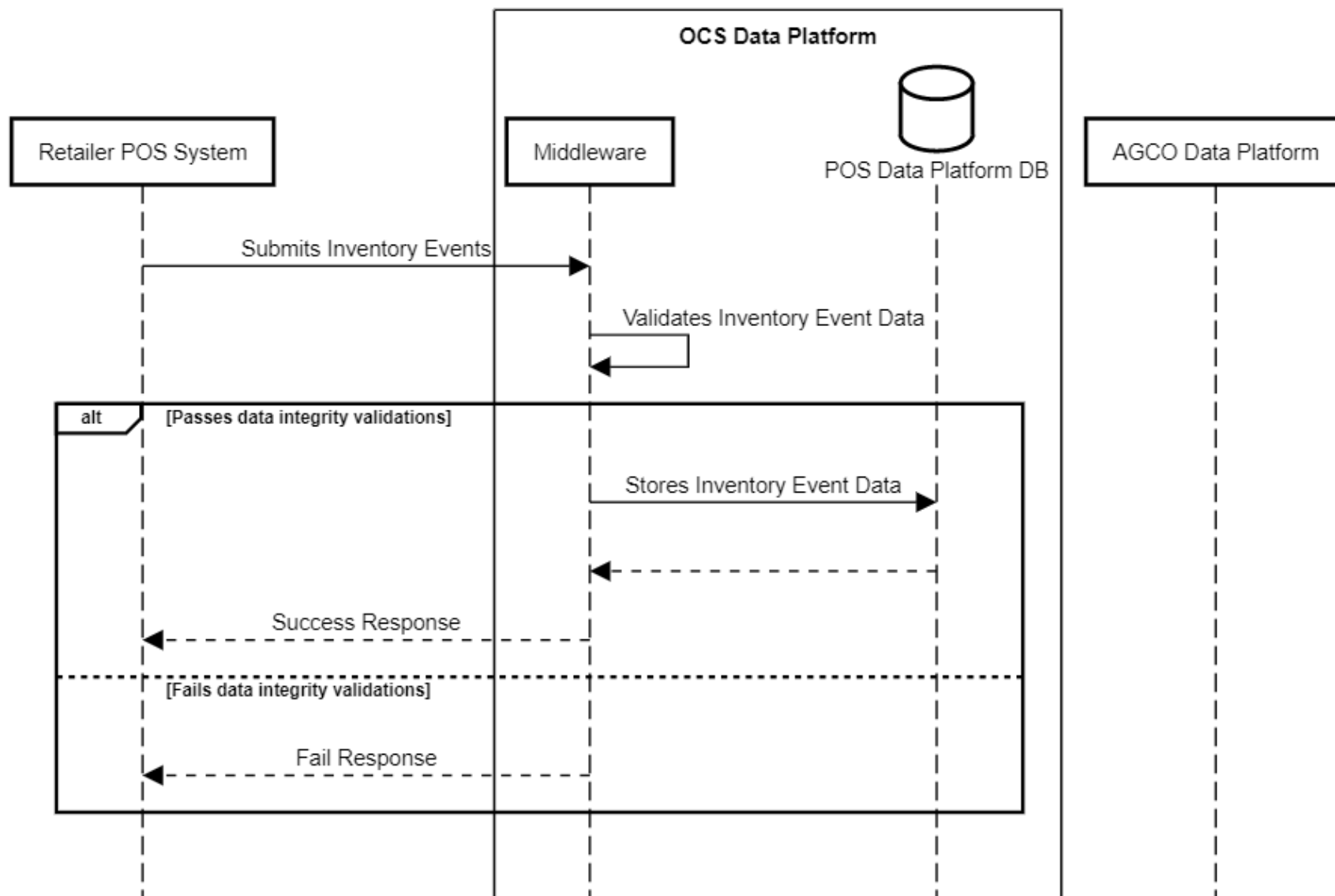
# API Sequence Diagrams

# POST Inventory Event Sequence Diagram

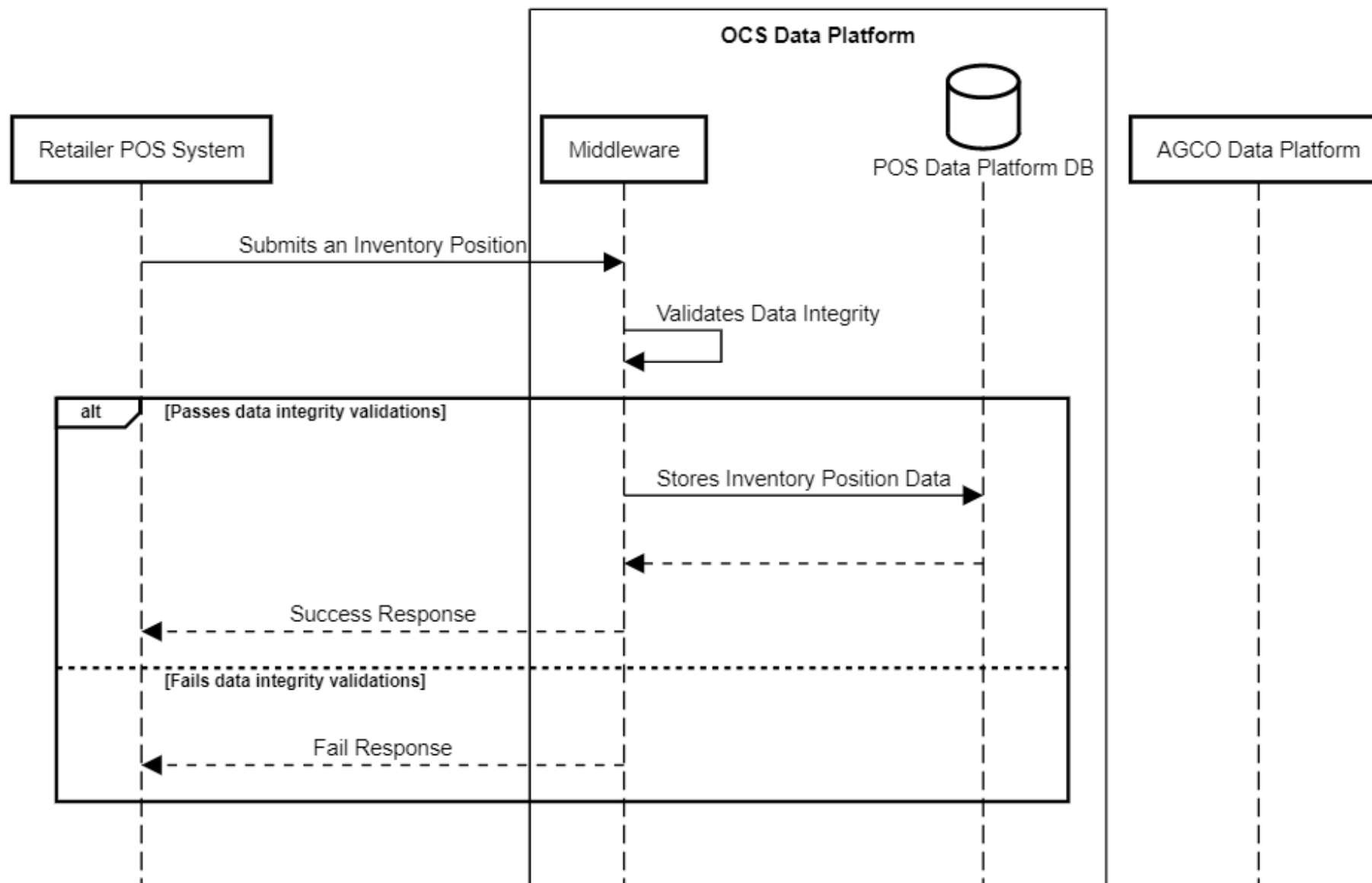


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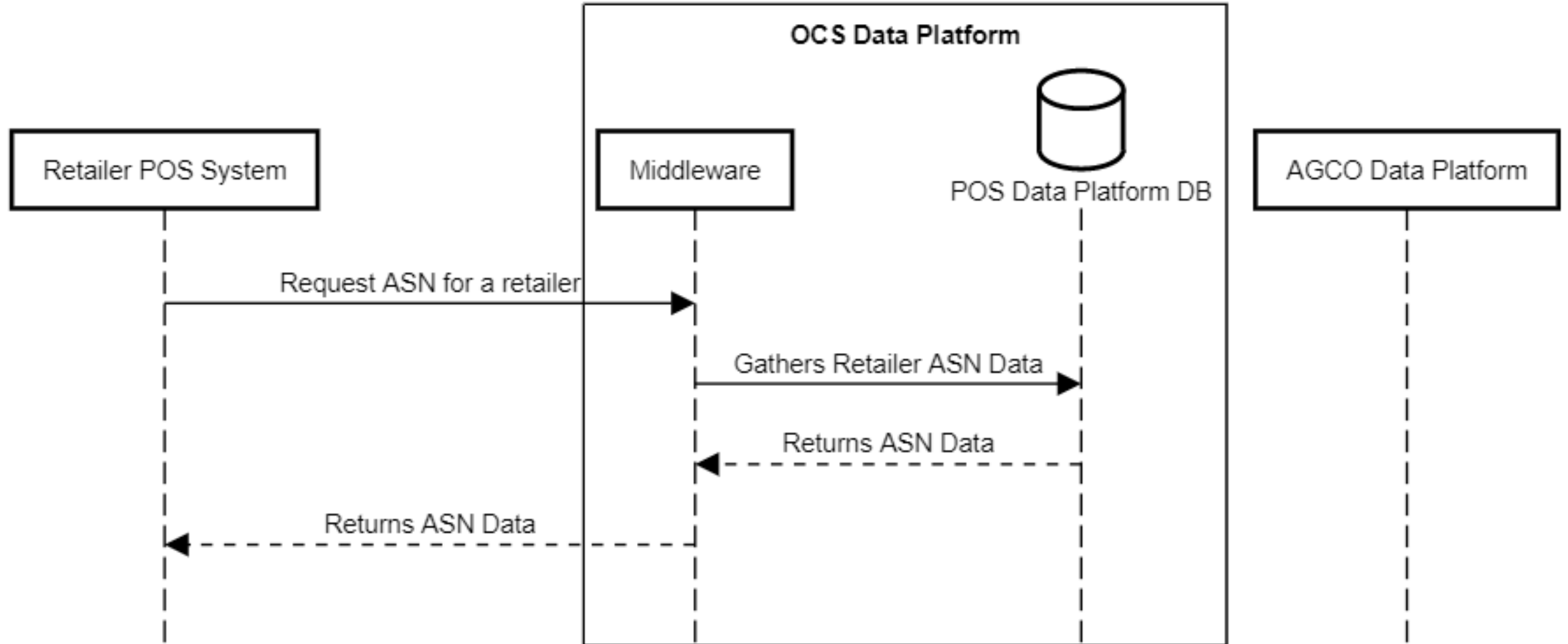
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# POST Inventory Position Sequence Diagram



# GET ASN Sequence Diagram



# GET Retailer Item Catalogue Sequence Diagram

