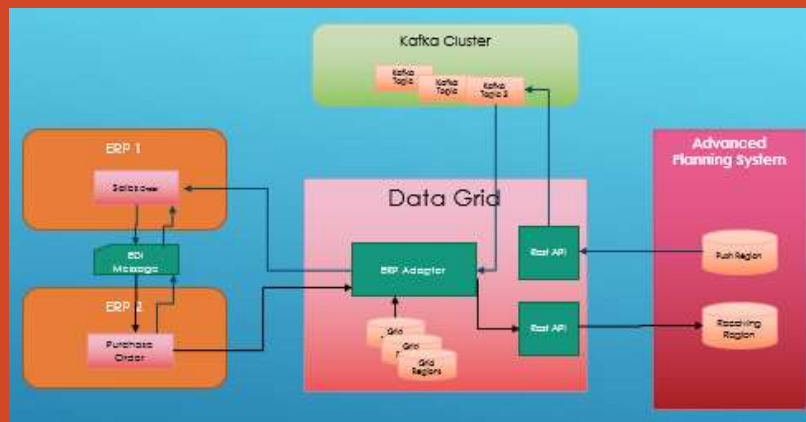


Supply Chain - Inventory optimization using pull and push process using Enterprise Data Grid



By Subhamani Javadala

SCM Solution Architect

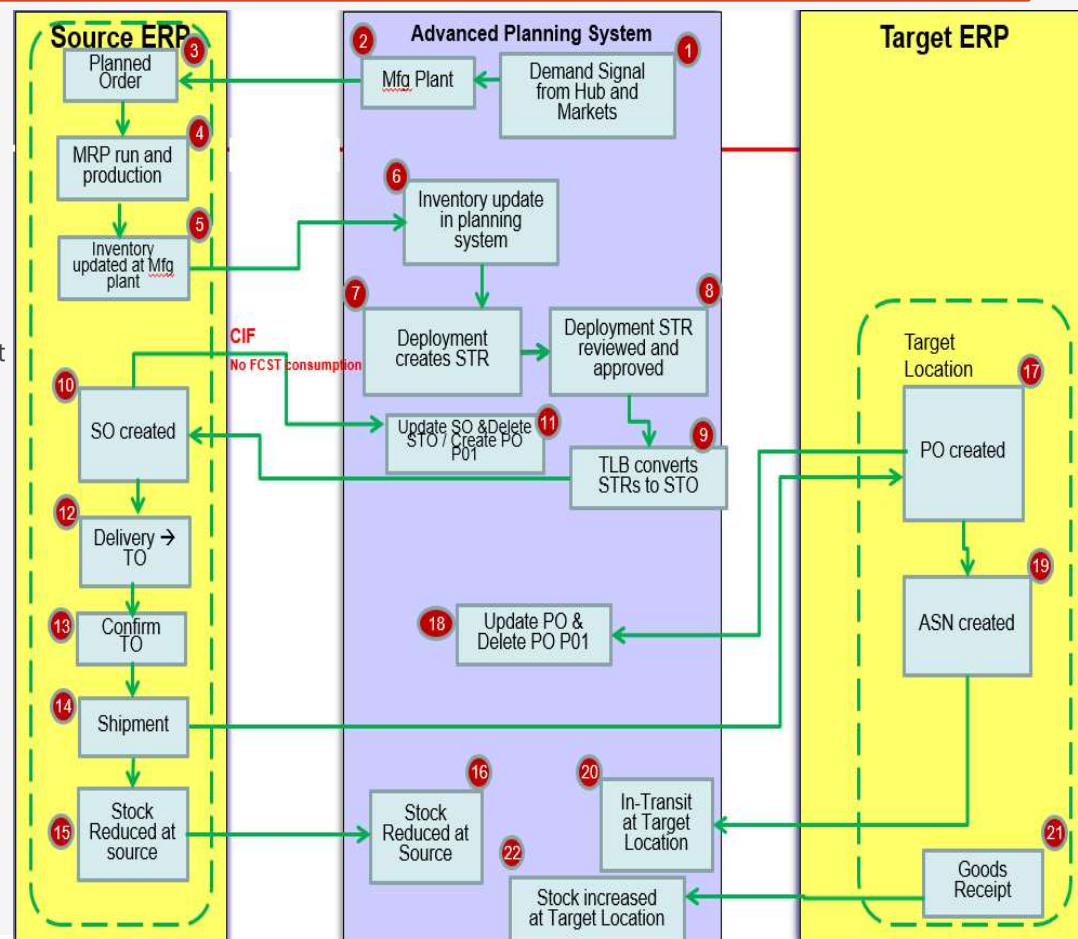
Introduction

- In Supply Chain, one of the time-critical and complex process is to give the right manufacturing signal to the manufacturing plant and transferring the inventory from manufacturing plant to Distribution centers(DCs) and then to the markets and end customers. In the case of FMCG(Fast moving the consumer products) and pharmaceutical companies these processes need to be configured in multiple business systems and processes like S&OP, Demand planning, Supply planning and transportation signal process, Inventory push process and pull process. In this paper, we will be covering the inventory transfer using Push process and Pull process using advanced planning systems, ERP and Data Grid.
- One of the core requirements for the pull and push process is to send the high volume planning and deployment signals to the ERPs Real-time, error-free and data recoverable in case of failures and reprocess. To achieve these requirements we will integrate the Advanced planning system to the ERP using Enterprise data grid and messaging server Kafka.
- This session will be focused on connecting multiple ERPs with advanced planning system to generate the deployment signal from multiple Distribution Centers and Manufacturing plants across the world and generated an accurate signal to transfer the inventory using the PULL and PUSH process. This session also focused on handling high volume of data and transfer the data in real time using data grid.

Inventory Transfer Using PUSH Process - High Level Design

How it works:

- 1 Forecast, Customer sales order demand coming from distribution hubs and Markets to manufacturing plant
- 2 3 Planning run will generate the Planned order and transferred to Source ERP system and run Material Reservation Planning(MRP)
- 4 5 and once production is a complete inventory updated in ERP
- 6 7 Inventory updated in the planning system and run the deployment process to PUSH the inventory from source ERP to the Target ERP
- 8 9 location and once planner approves the order then the order will
- 10 11 be pushed to source ERP to create a sales order and get the response back to planning system.
- 12 13 Once inventory allocated to a sales order, subsequently steps delivery, transfer order, shipment and PGI(Post Goods Issue). As
- 14 15 part of these steps, reduced inventory signal will be sent to the
- 16 17 planning system and Shipment record will send an EDI signal to
- 18 19 create a purchase order in Target ERP location and subsequently Advanced shipping notification(ASN).
- 20 21 PO and ASN information will be transmitted to the planning
- 22 system and once inventory successfully received in target ERP location and goods receipts performed then inventory position will be updated in the planning system.



Inventory Transfer Using PUSH Process - Detailed Level Design

To implement Push process to transfer the inventory from Source ERP to Target ERP in the enterprise business system process, we need Data Grid to collect the Stock transport message from Advanced planning system using Kafka messaging server.

How it works.

Steps 1a, 1b, 1c: Advanced planning system collects the message packets grouped around 1000 stock transport orders and push to Kafka message server using rest API. Kafka once successfully received the message package it sends the confirmation back to the planning system.

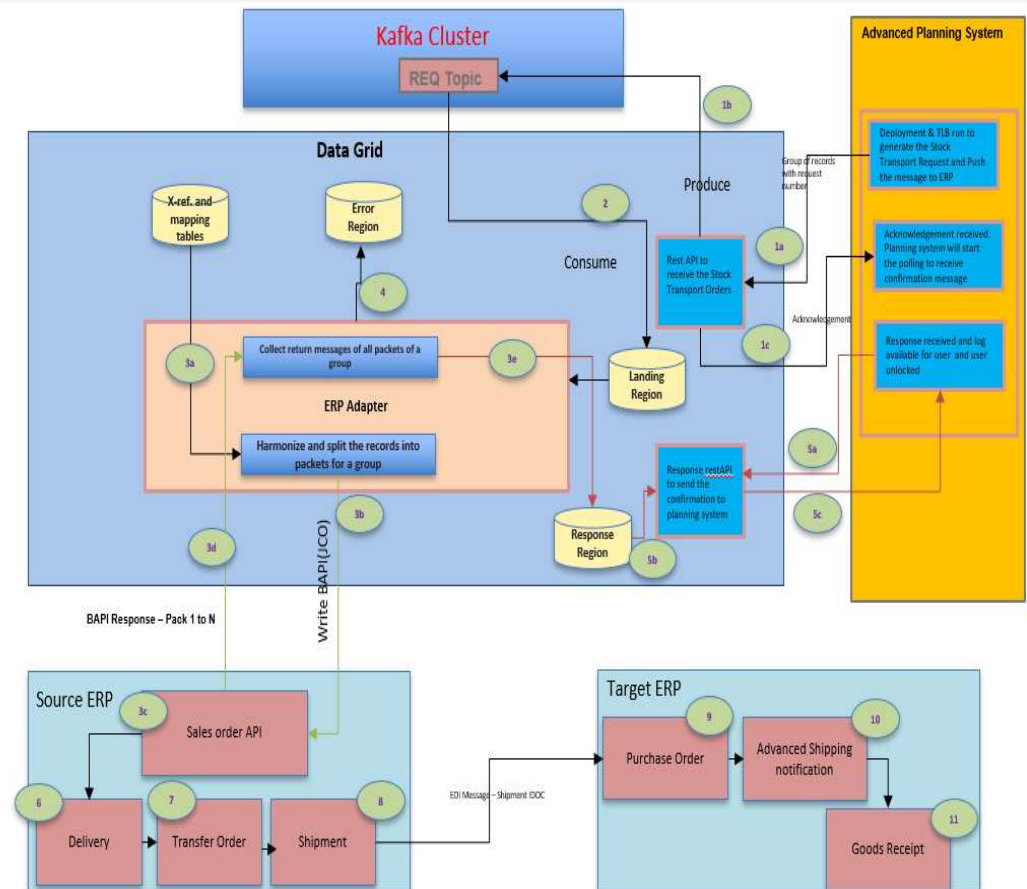
Step 2: Kafka delivers the data into landing region and gets the confirmation back as part of the Consume process. Subsequently, Consume process will push the data to ERP adaptor to harmonizing and prepare the data for ERP.

Step 3a, 3b, 3c, 3d: As part of these steps Data Grid will push the data to ERP using parallel threads and sends the data to Source ERP to create a sales order and get the response back to Data Grid and stores the info in response region.

Step 5, 5b, 5c: ERP response will be pulled by the advanced planning system from the response region and closes the loop.

Step 6, 7, 8: Sales order in source ERP subsequently will be pick/packed using steps delivery, transfer order, shipment to push the feed to target ERP to create subsequent document using EDI message (IDoc).

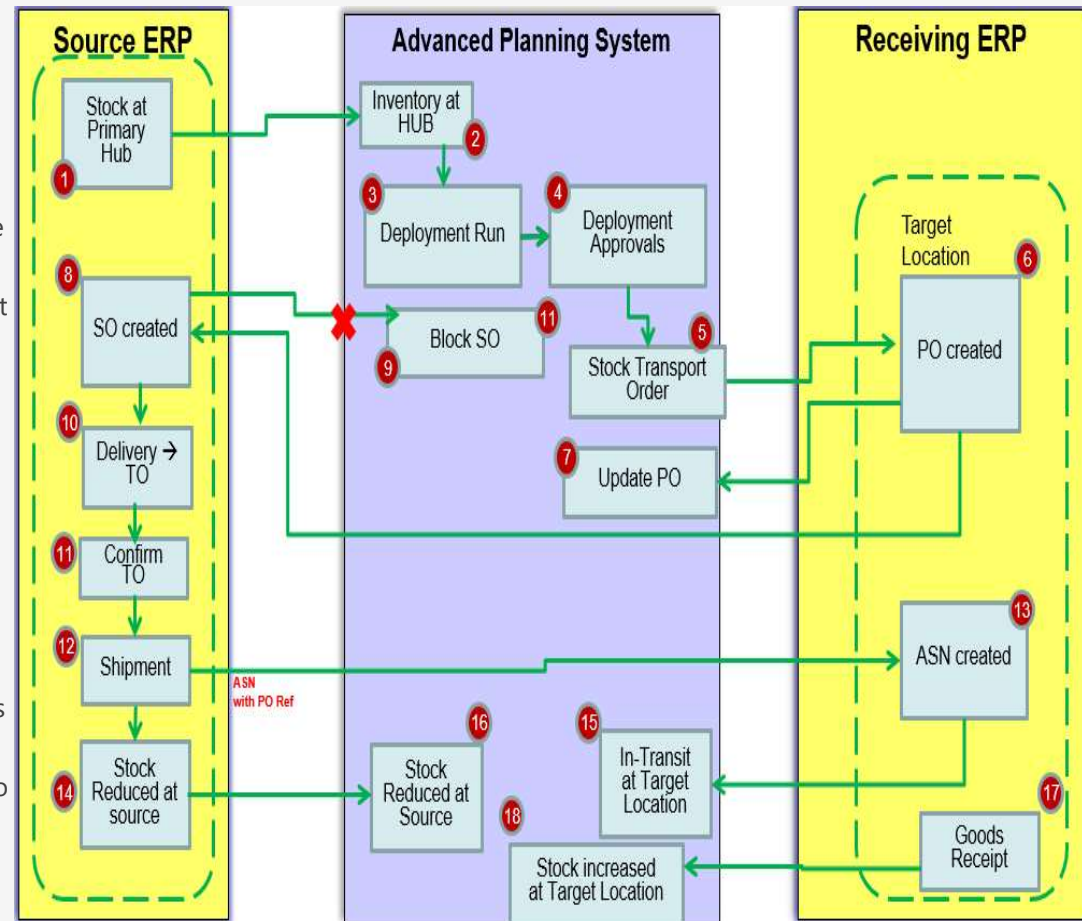
Step 9, 10, 11: EDI message will create a Purchase order in Target ERP and subsequent process ASN and once inventory physically received then good receipt.



Inventory Transfer Using PULL Process - High Level Design

How it works:

- 1 Inventory at primary Distribution Center(HUB) is updated in the planning system.
- 2 3 Based on receiving ERP location demand using fair share logic deployment run will generate the deployment order to transfer the inventory from Hub to secondary the hub in receiving ERP. Once these orders are approved, it will be converted into Stock Transport order
- 4 5 Stock transport order will be pushed to receiving ERP to create a Purchase order. Receiving system purchase order will be pushed to source ERP to create a Sales order. In this process receiving ERP is pulling source ERP inventory. These messages will be transmitted using Intermediate document(IDOC). A purchase order will be updated into the planning system and sales order will be blocked so that there is no double demand at the source location.
- 6 7 Inventory will be pushed from source ERP sing step Delivery, Transfer orders, Shipment and PGI. Once Post goods issue(PGI) this will trigger feed to the planning system to reduce the inventory at the source location. Shipment process will trigger message(Idoc) to create Advanced shipping notification(ASN) in receiving ERP and this information will be updated in the planning system.
- 8 9 Once inventory received and good receipt(GR) in receiving ERP, GR information is updated in the planning system.
- 10 11
- 12 13
- 14 15
- 16 17
- 18



Inventory Transfer Using PULL Process - Detailed Level Design

To implement Pull process to transfer the inventory from Source ERP to Target ERP in the enterprise business system process, we need Data Grid to collect the Stock transport message from Advanced planning system using Kafka messaging server.

How it works.

Steps 1a, 1b, 1c: Advanced planning system collects the message packets grouped around 1000 stock transport orders and push to Kafka message server using rest API. Kafka once successfully received the message package it sends the confirmation back to the planning system.

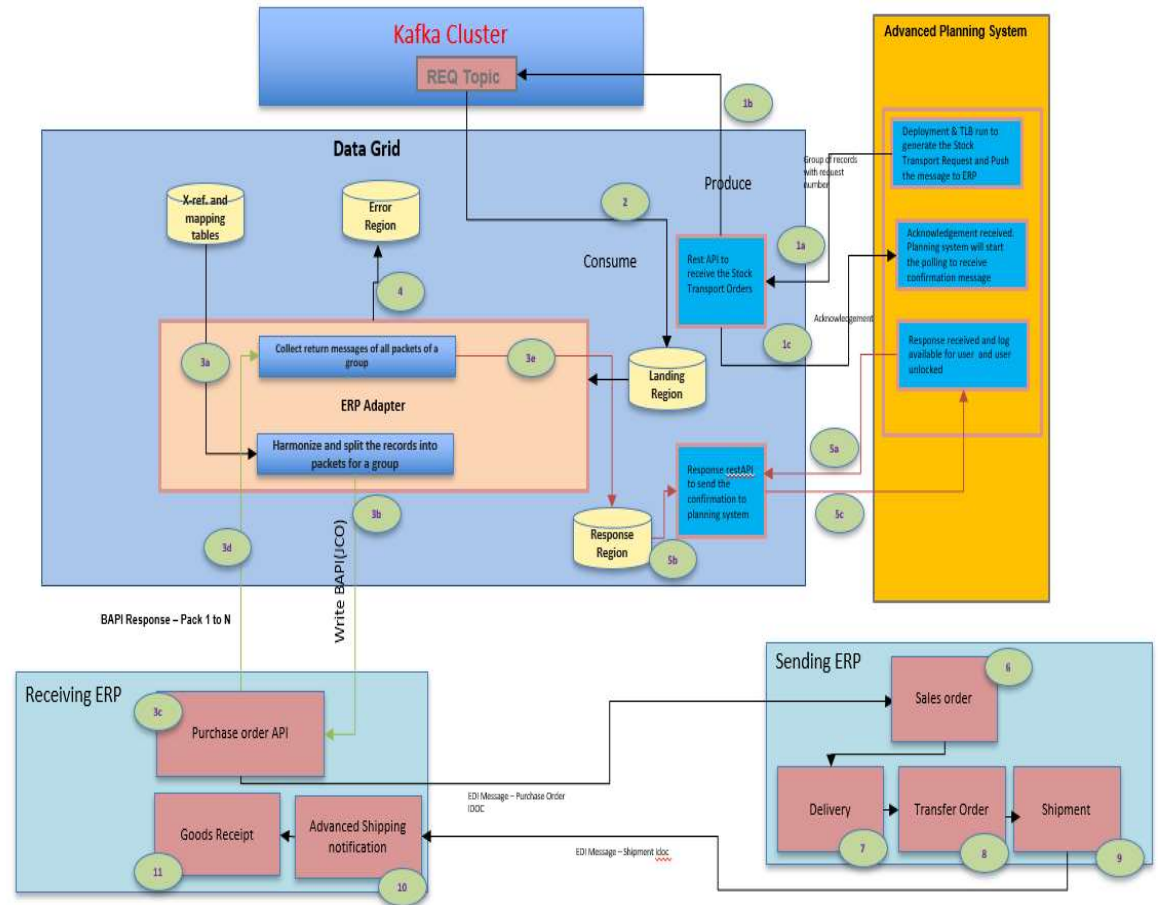
Step 2: Kafka delivers the data into landing region and gets the confirmation back as part of the Consume process. Subsequently, Consume process will push the data to ERP adaptor to harmonizing and prepare the data for ERP.

Step 3a, 3b, 3c, 3d: As part of these steps Data Grid will push the data to ERP using parallel threads and sends the data to Receiving ERP to create a Purchase order and get the response back to Data Grid and stores the info in response region.

Step 5, 5b, 5c: ERP response will be pulled by the advanced planning system from the response region and closes the loop.

Step 6, 7, 8, 9: Purchase orders in receiving ERP subsequently will send the Purchase order EDI to create a sales order in Sending ERP. Sending ERP will push the inventory to the receiving ERP using steps delivery, transfer order, and shipment. Shipment process generates EDI message to the receiving system.

Step 10, 11: Shipment EDI message will convert the purchase order to ASN and once inventory physically received, a good receipt will be performed in receiving ERP



Conclusion

Based on business need to connect multiple Distribution Centers and Manufacturing plants in across the world and generated accurate S&OP, Demand planning, supply planning and deployment signals and transfer the inventory using PULL or PUSH process using enterprise business systems. Using the data grid, one place for data harmonization and optimized to transfer the data to ERPs. Error handling, Notifications and data recovery build in the data grid for reporting and performing corrective actions.

About the Author

Currently working as SCM Solution Architect with 15 years of experience in ERP and Advanced Planning Systems. Designed multiple standalone tools to optimize business process worldwide.