DEMAND PLANNING
Umoja Demand Planning and Supply Network Planning Solution
SUMMARY

UCS Training Team
Overview
Annual Supply Chain Planning

Develop Demand Plan
Develop Source Plan
Develop Acquisition Plan
Develop Delivery Plan
Finalize Annual Supply Chain Requirements
Gross Demand/Net Demand

**GROSS DEMAND**
Total requirements for goods and services per entity and budget year

**Projected Inventory Holdings**
Current Holdings + Goods in Inventory Pipeline - Forecasted Planned Consumption (from the current date till the end of FY) - Goods Return (writes off, obsolete, passed life expectancy).

**NET DEMAND**
Net Requirement for goods and services. Unconstrained Net Demand

- **Gross Demand reflects:**
  - Total requirements for goods and services
  - Alignment with mandate activities

- **Net Demand reflects:**
  - Net requirements for goods and services
  - Unconstrained
Source Planning

**Source** = Modalities to prioritize and fulfill demand according to available sourcing options

Source is done from the following sourcing options

**Commercial:**
- System Contracts
- Turn Key Contract
- Existing Contracts
- New Procurements

**Non-Commercial:**
- LOA
- MOU, LTA
- LTA

**In Sourcing:**
- SDS
- Surplus
- UN reserve
**Definition:**
- The IBP meeting is a decision-making forum where stakeholders from the Demand (often Service Delivery Units) and Supply Chain Management Pillar and Procurement are convening.
- The IBP meetings take place at local, global and HQ level.

**Goals:**
- To review and agree on a consensual Net Demand and ensure alignment between forecast and reality.
Demand Planning is done at the fourth levels hierarchy of UN Standard Products and Services Code

- Segment
- Family
- Class
- Commodities
- Products
Demand Planning can be done at category, subcategory or commodities level.
MM Hierarchy – Planning structure

- Family
- Commodity
- Product

- Plant
- Planning Group
- Sub Location
Planning Levels

- Planning for the whole Mission (PLANT)
- Planning for a group of Storage Locations or Fund Centers (PLANNING GROUP)
- Planning for a Storage Location or Fund Center (SUB LOCATION)
- Planning for a storage location
DPSNP Solution
Process of planning the Gross Demand

1. **Historical Data** *(Consumption and Sales Data)*
2. **Classification**
3. **Data Cleansing**
4. **Segmentation**
5. **Statistical Forecast**

**GROSS DEMAND**

- Entity Priority Project
- Additional Demand
Consumption History from Umoja Production

1. Historical Data. Analyze and Adjust (Consumption and Sales)

2. Classification *Done by the system

Cleansed History

3. Data Cleansing

Final History
Planning the Gross Demand 2 of 2

4. Segmentation *Done by the system

5. Statistical Forecast

Final Statistical Forecast

Cleansed History

Input

Output

Entity Priority Project Demand

Gross Demand

Additional Demand

Equipment Demand

Gross Demand
Process of planning the Gross Demand

GROSS DEMAND

- Final Statistical Forecast
- Additional Demand
  - Equipment
  - Other products/services
- Entity Priority Project Demand
Historical Data
1. Historical Data

- Historical Data
  - Consumption History of each Material and Service
  - Consumption Data Adjustment (if needed)
  - Final History*

* Final History consists of both Consumption and Sales (if any) Data
What is Consumption History

Good issue
Material From Inventory

Good Receipt
Material order for consumption

Service Entry Sheet

CONSUMPTION HISTORY

Material Movement Documents
Goods receipts (Consumption)
Goods Issues (Inventory)
Service Entry Sheets
EFMS (Fuel)

*Other movements are considered (i.e. Reversal)
Accurate Forecast needs an accurate baseline history for the Material and Services that reflects real consumption.

Consumption History from Umoja Production might differ from real consumption because:

- Incorrect Posting Data
- System Failure
- Consumption History
Classification and Data Cleansing
2. Classification

The purpose of this pre-process step is carrying out a statistical analysis on the Final Consumption History, and classifying the time series according to various criteria such as seasonality, trend, intermittence etc.

The characteristics, called “Time Series Classification” are:

- Continuous
  - Continuous with seasonality
  - Continuous with seasonality and trend
  - Continuous with trend
    - Intermittent
    - Intermittent with seasonality
    - Intermittent with seasonality and trend
    - Intermittent with trend
3. Data Cleansing

3. Cleansing Data

3. Data Cleansing

Input

Final History
Only Time Series classified as Continuous

1st Substitute Missing Value
(Continuous)

2nd Outlier Correction
(Continuous)

Cleansed History
The process of identifying gaps and replace them applies only when Data Series are:

- Continuous
- Continuous with seasonality
- Continuous with seasonality and trend
- Continuous with trend

BUT NOT WHEN DATA CLASSIFICATION IS:

**Intermittent**
Outlier Correction

What is an Outlier
Value, a data point of a series, that differs significantly from the other observed values of the same series.

How the system acts
Replacing the outlier with a tolerance value to be able to prepare a forecast (upper/lower bounds).

How we identify it
We use the Variance and Standard deviation. Variance measures how far a set of numbers is spread out from its average value (mean). Standard Deviation is the mean of the variance of all numbers in the series.

The purpose of this pre-processing step is to identify outliers in the time-series and replace them.

It is done only for Continuous Data and not for Intermittent Data.
Segmentation and Statistical Forecast
Considering that:

- All goods and services have their own demand particularity or characteristic.

Therefore:

- Demand for some products should be forecasted in priority; several factors matter.

The goal of Product Segmentation is:

Prioritize products based on their relative importance within a plant
The concept states that a small percentage of a group accounts for the largest fraction of the impact, value, etc.

Applying the concept to inventory items we could say that 20% of the inventory items may constitute 80% of the inventory value.

The ABC principle states that effort and money can be saved through applying looser controls to the low-dollar-volume class items and focus mainly on high-dollar-volume class items.

Other factors to consider to segment products:

1. Demand characteristics (Consumption Volume, Volatility, etc.)
2. Supply characteristics (Cost, Availability, Location, Reliability, etc.)
3. Internal Organizational Characteristics (Strategic, Critical)
XYZ analyses group of items according to the **volatility** of their demand.

It focuses on how difficult is a product/service to forecast, **being X the easiest** and **Z the most difficult**.

---

**Formula explained:**

- *First we calculate the Average Demand across a period.*

- *Then we calculate the Standard Deviation from the Average Demand.*

- *Lastly we calculate the Coefficient of Variation (CV)*

\[
\text{Coefficient of Variation} = \frac{\text{Standard Deviation of Average Period Demand}}{\text{Average Period Demand}} \times 100
\]
5. Statistical Forecast

- Input
- Cleansed History
- Statistical Forecast
  - Croston
  - Exponential Smoothing
    - Single Smoothing
    - Double Smoothing
    - Triple Smoothing
  - Statistical Forecast Best Fit
    - Forecast Override
  - Final Statistical Forecast
At this time, the system will produce **two Forecast Values**, one as result of applying Exponential Smoothing and the other as result of applying Croston.

The **Best Fit** will be the value between the 2 with the **lowest Mean Absolute Percentage Error (MAPE)**. The calculation of the Error is based on past data.
Process of planning the Gross Demand

GROSS DEMAND

- Final Statistical Forecast
- Additional Demand
  - Equipment
  - Other products/services
- Entity Priority Project Demand
Entity Priority Project Demand
Table 1: Insert Project details
- Title of the Project
- Description
- Functional Business Area
- Start and End date
- ....

Table 2: Populate with Product ID of required items

Enter requested quantity in EPP Template
Equipment and Additional Demand
Additional Demand

It allows to capture new requirements for which there is no historical consumption to use as baseline for forecasting. It also includes Equipment replacement.

- Events
- Products without historical Data

Additional Demand

Equipment Demand
Equipment nearing useful life
Write off Projected
In Repair Projected

Additional Demand

EQUIPMENT demand
Consumption History includes **Goods Receipt for** consumption POs and **Goods issues from inventory**.

The Final History **does not include** the Equipment “in Inventory” and “in Use” that will soon cease to be used and therefore needs to be replaced.

The Final History **does not include** Equipment that will be Written-off or In-Repair in future months.

The **Statistical Forecast** might need to be cross-checked with the **Additional Demand** derived from this Equipment review.
Dollarization and Gross Demand
Formulating the Gross Demand

- Dollarization
- Final Statistical Forecast
- Additional Demand:
  - Equipment
  - Other products/services
- Entity Priority Project Demand
- Reviewed and adjusted
- Snapshot
Dollarization

- The DPSNP Solution facilitates the management of the unit price to calculate the dollar value of the Gross Demand.

- The system retrieves different unit prices from multiple sources and determines the final price according to the below order (Fair Market Value Fixed/variable, Contract, Purchase Order, Moving Average Price).

![Diagram of Final Price Calculation]

\[
\text{Final Price} = \text{Unit of Measure} \times \text{Quantity} \times \text{Dollar Sign}
\]
It allows to save the 24 months Gross Demand Plan monthly and yearly, so it is possible to see the evolution of the Rolling Plan.
Thank you!