

retailsolutions UDF Analytics Suite

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Glossary of Terms

rs UDFAS	retailsolutions UDF Analytics Suite
SAP UDF	SAP Unified Demand Forecast
SAP DDF	SAP Demand Data Foundation
SAP PMR	SAP Promotion Management for Retail
SAP BW	SAP Business Warehouse
SAC	SAP Analytics Cloud
KPI	Key Performance Indicator
Prodloc	Product Location

Introduction

The purpose of this document is to describe the retail solutions UDF Analytics Suite (UDFAS) solution; the implementation approach, objects contained within, the process to execute programs to populate relevant tables and how to view/interrogate data in SAC.

SAP Unified Demand Forecast (UDF)

SAP Unified Demand Forecasting (UDF) is a solution that enables businesses to forecast consumer demand accurately and efficiently. UDF allows for the integration of data from various sources, including the SAP Demand Data Foundation (DDF) layer and other systems, to provide a comprehensive view of demand data.

UDF seamlessly integrates with other applications on the CAR platform, such as SAP Promotion Management for Retail (PMR), to enable users to forecast the impact of promotions on demand. By providing a more accurate demand forecast, UDF enables businesses to reduce overstocks, minimize wastage, and improve their supply chain efficiency. This helps businesses to optimise their inventory levels, reduce carrying costs, and minimise the risk of stockouts, leading to improved customer satisfaction and increased sales.

Business Challenges with SAP UDF

A standard implementation of SAP UDF can have several business challenges, specifically, when trying to understand and analyse how accurately UDF is forecasting, namely:

- **Lack of Statistical Key Performance Indicators (KPI's)**

SAP UDF does not provide any statistical KPI's such as wMAPE (weighted mean absolute percentage error). Using the Analyse Forecast Fiori application, you can only visualise sales and forecast values. To be able to calculate statistical KPI's, an organisation would need to extract data from the underlying SAP DDF tables and manually create calculations.

- **Data Volumes**

SAP UDF contains master data and timeseries data. Timeseries data such as sales, forecast values and model values can number in the billions of records which inherently causes problems when trying to extract or aggregate.

- **Identifying Problems**

SAP UDF, being a solution with large data volumes, can lead to organisations struggling to identify areas of concern or improvement. Analyse Forecast app allows you to view product location information, or hierarchical, however, there is no method to easily view data at a higher

summarised level. Therefore, there is no easy method to visualise and identify areas quickly and easily within the organisation that should be the point of focus.

- **Manging Time effectively & Prioritising Effort**

Having to extract data from tables and manually creating KPI's can lead to wasted time and effort, when time is better spent analysing the data itself. Not having a clear area to prioritise effort can also lead to wasted time and in most cases, allow poor forecasts to get worse.

How can rs UDFAS overcome business challenges?

UDF Analysis Suite is a solution to automate the necessary processes to allow an organisation to monitor its SAP UDF implementation, focusing on forecast/model accuracy and batch job and exception monitoring. The solution consists of processes to aggregate data and the ability to monitor accuracy with several forecasting statistical KPI's.

- **Organise Data**

Due to high data volumes within a UDF implementation, analysing data on the fly is not recommended. UDFAS contains processes that extract relevant data and pre-aggregate to several summarised levels that are most commonly analysed by organisations with forecasting solutions, e.g. KPI's by Product Location. This allows users of the solution to be able to view data quickly and easily in a performant manner putting less stress on the SAP CAR platform.

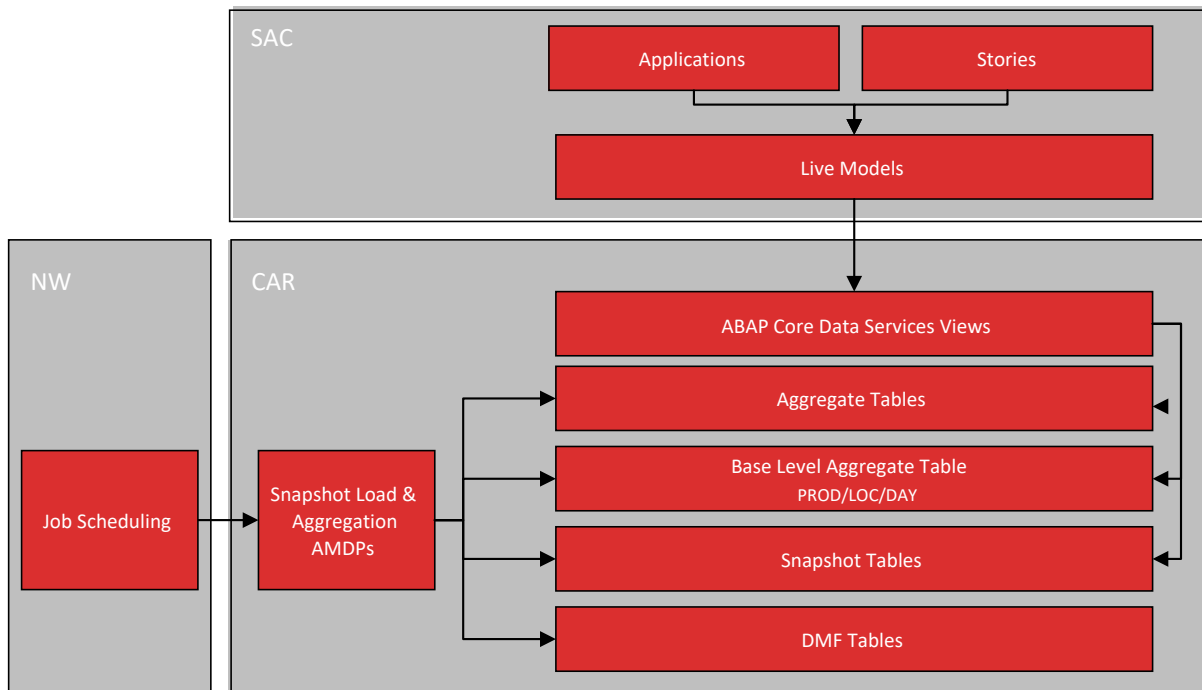
- **Navigate**

UDFAS users can interact with dashboard content to navigate various aggregations levels, drilling down from high-level summarised views to low-level granular data. This allows user to spot potential issues with certain category levels or regional areas (for example), and further drill down to the exact product(s)/location(s) that are causing high errors.

- **Take Action**

Once users have identified potential areas of concern, they can directly jump into the Analyze Forecast app where that can introduce other supplementary information. UDFAS gives the users/planners the ability to quickly and easily pinpoint areas of concern and where they should concentrate their efforts. This minimising time spent digging through data and ultimately reduces wasted time/effort.

High-Level Architecture



UDFAS consists of:

- ABAP CDS views (CDS)**
 CDS views are used to extract data from the SAP DDF layer in addition to being used for loading aggregated data into tables.
- ABAP Managed Database Procedures (AMDP)**
 AMDP's are used to query the underlying HANA database. These queries are used to populate the aggregated data.
- ABAP Objects**
 Various ABAP objects such as CDS views, Tables, Programs, Classes are contained within the solution.
- Job Scheduling**
 ABAP programs to populate the aggregated tables are usually executed via a batch schedule. This can be in SAP Netweaver, or any third party software being used for batch management.
- SAC Models, Applications and Stories**
 SAP Analytic Cloud is used to connect to the embedded SAP BW system in the SAP CAR platform. This provides a live connection to the CDS views which expose the aggregated data. SAC consists of Models which are a 1:1 connection to the CDS queries and Applications and Stories which present the data and allow users to interact with the data.

Aggregation Levels

UDFAS contains various aggregation levels that are most commonly used to analyse data. These are:

- Date
- Product Location
- Date / Location Hierarchy Level Node X
- Date / Location Hierarchy Level Node X / Product Hierarchy L2
- Date / Location Hierarchy Level Node X / Product Hierarchy L3
- Date / Location Hierarchy Level Node X / Product Hierarchy L4
- Date / Location Hierarchy Level Node X / Product Hierarchy L5
- Date / Location Hierarchy Level Node X / Product Hierarchy L6
- Date / Location Hierarchy Level Node X / Product
- Location Hierarchy Level Node X / Product
- Location Hierarchy Node 2
- Location Hierarchy Node 3
- Location Hierarchy Node 4
- Location Hierarchy Node 5
- Product Hierarchy Node 2
- Product Hierarchy Node 3
- Product Hierarchy Node 4
- Product Hierarchy Node 5
- Product Hierarchy Node 6

Where X denotes a specific node of the Location Hierarchy, e.g. Region, Area etc.

KPIs

UDFAS contains the following KPIs that can be used to interrogate the data from different statistical viewpoints. Dashboard content will use wMAPE as the default but allow user to change to any noted below:

Name	Description	Mathematical Formula
wMAPE	Weighted Mean Average Percentage Error	$= 100 * \frac{\sum_{t=1}^n A_t - F_t }{\sum_{t=1}^n A_t }$
MAPE	Mean Absolute Percentage Error	$= 100 * \frac{1}{n} \sum_{t=1}^n \left \frac{A_t - F_t}{A_t} \right $
Total BIAS	Total Bias	$= \frac{\sum_{t=1}^n F}{\sum A}$
BIAS Period	Bias Period	$= \frac{1}{n} \sum_{t=0}^n \frac{A_t - F_t}{ A_t - F_t }$
MAE	Mean Absolute Error	$= \frac{\sum_{t=1}^n A_t - F_t }{n}$
MSE	Mean Square Error	$= \frac{1}{N} \sum_{n=0}^N (A_n - F_n)^2$
SMSE	Scaled Mean Squared Error	$= \frac{\frac{1}{N} \sum_{n=0}^N (A_n - F_n)^2}{\frac{1}{N} \sum_{n=0}^N A_n^2}$
RMSE	Root Mean Squared Error	
SRMSE	Scaled Root Mean Squared Error	