SAP Forecasting & Replenishment – Unified Demand Forecast Integration

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Unified Demand Forecast (UDF) is a sophisticated statistical forecast in SAP CAR.

UDF combines strengths of various forecasting methods to supply predictive information to all Retail applications. This includes SAP Promotion Management for Retail, SAP Assortment Planning for Retail, and all future consuming applications on the SAP Customer Activity Repository.

SAP HANA gives the appropriate technology base to run ad-hoc simulations with in-memory performance.

Calculates the impact of historical factors that influence demand like promotions, calendar events, seasonality or price elasticity, then uses Bayesian statistics to fill in the gaps of knowledge of what happened in the past.

Calculates a forecast per product / location / channel / promotion / day – flexible multichannel data model is introduced

Supports what-if forecasting capabilities to compare multiple scenarios, or production forecasting capabilities for ongoing/analytic access

Visualization tools available
Why it makes sense to integrate SAP F&R with UDF

- SAP CAR Integration – Single Source of Truth
- Consistent Forecasts Across Retail Processes
- Improved Basic Forecasting Features
- New Listings and Lifecycle Products
- Early Knowledge Ramp - Up
- Strong roadmap - Strategic Product in Retail
- SAP F&R/UDF Integration available
Why it makes sense to integrate SAP F&R with UDF

- **Consistent Forecasts Across Retail Processes**
- **Improved Basic Forecasting Features**
- **New Listings and Lifecycle Products**

**SAP CAR Integration – Single Source of Truth**

- Data from Planning Applications
- POS data
- Master data

**Events**

**Promotions**

**Seasonality**

**Trend**

**Ramp up**

Early Knowledge Ramp-Up

**Strong roadmap - Strategic Product in Retail**

2016 2017

**SAP F&R/UDF Integration concept available**
SAP Customer Activity Repository

Visualization with SAP UI5 or SAP Business Information Platform

Customer Activity Repository

SAP Retail Data Model

In-memory computing:

- POS Data Transfer & Audit
- Inventory Visibility
- Multichannel sales transactions
- OSA Algorithms
- Inventory
- Article Availability
- Pricing
- Repository/Engine

SAP for Retail

- Master Data
- Customer Orders
- Inventory

POS

- POS Transactions

CRM

- Master Data
- Customer Orders
- Inventory

SAP CRM Interaction Center

SAP Promotion Management for Retail

SAP Assortment Planning

SAP Hybris Marketing

SAP Sales Insights for Retail

SAP Netweaver BW (Optional)

Partner Applications

Fashion Management Solution

SAP Merchandise Planning for Retail*

Article Availability*

Pricing*

Repository/Engine*

Allocation*

*Not yet available
Why it makes sense to integrate SAP F&R with UDF

SAP CAR Integration – Single Source of Truth

UDF
- Data from Planning Applications
- POS data
- Master data

PMR APR F&R
AMR ...

UDF

Consistent Forecasts Across Retail Processes

Improved Basic Forecasting Features

New Listings and Lifecycle Products

Events Promotions Seasonality Trend

Ramp up

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SAP F&R/UDF Integration concept available

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Assort.-Planner needs forecast to select the best options for the assortment list based on financial KPIs.

What If Calls:
- Validity Period
- Option
- Store cluster
- Horizon: 6-12 m

Set Listing

Focus on new products

DDF

UDF Data

Data sources
- POS data
- Synd.data
- Sales Orders
- Shipments
What If Calls:
- Promotion Period
  - Product Group
  - Store Cluster
  - Horizon: 1-3 m

What If Calls:
- Validity Period
- Option
- Store cluster
- Horizon: 6-12 m

Assort.-Planner needs forecast to select the best options for the option plan based on financial KPIs.

P-Planner wants to optimize promotion attributes and promotion periods based on financial KPIs.

Focus on new products

Set Listing

Set Offers

Data sources
- POS data
- Synd.data
- Sales Orders
- Shipments

DDF

UDF Service

UDF Data
Assort-Planner needs forecast to select the best options for the option plan based on financial KPIs

P-Planner wants to optimize promotion attributes and promotion periods based on financial KPIs

D-Planner needs forecast as base for the creation of a demand plan

What If Calls:
- Promotion Period
- Product Group
- Store Cluster
- Horizon: 1-3 m

What If Calls:
- Validity Period
- Option
- Store cluster
- Horizon: 6-12 m

Production:
- Day/Week
- Product
- Location
- Horizon: 1-3 m

Events
- Ignore DIFs
- PC corr.

Set Offers

Set Listing

Focus on new products

Data sources
- POS data
- Synd.data
- Sales Orders
- Shipments

UDF Data

DDF

UDF Service

Preview

Preview

Demand Plan
Assort.-Planner needs forecast to select the best options for the option plan based on financial KPIs

P-Planner wants to optimize promotion attributes and promotion periods based on financial KPIs

D-Planner needs forecast as base for the creation of a demand plan

All-Planner needs forecast/demand plan as base for the initial allocation strategy and the in-season fill in scenario.

UDF Data

POS data
Synd.data
Sales Orders
Shipments

Data sources

DDF

APR
Set Listing

PMR
Set Offers

DP
Events Ignore DIFs PC corr.

AMR
Demand Plan:
Day
Product
Location
Horizon: 1-3 m

Production:
Day/Week
Product
Location
Horizon: 1-3 m

What If Calls:
Validity Period
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Store cluster
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Preview

Focus on new products

Public 11

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**Assort-Planner needs forecast to select the best options for the option plan based on financial KPIs**

**P-Planner wants to optimize promotion attributes and promotion periods based on financial KPIs**

**D-Planner needs forecast as base for the creation of a demand plan**

**All-Planner needs forecast/Demand plan as base for the initial allocation strategy and the in season fill in scenario.**

**R-Planner needs quantile forecast/demand plan for demand/target periods as base for order quantity calculation. Automation - No optimization goal**

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**What If Calls:**
- Promotion Period
- Product
- Store Cluster
- Horizon: 6-12 m

**Production:**
- Day/Week
- Product
- Location
- Horizon: 1-3 m

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**Focus on new products**
- Set Listing
- Set Offers

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**UDF Data**
- POS data
- Synd.data
- Sales Orders
- Shipments

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**Data sources**
- POS data
- Synd.data
- Sales Orders
- Shipments

---

**Demand Plan**
- Week
- Product
- Location
- Horizon: 1-3 m
Why it makes sense to integrate SAP F&R with UDF

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Improved Basic Forecasting Features

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Data from Planning Applications
POS data
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PMR
APR
AMR
...
UDF

No History

Early Knowledge Ramp - Up

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SAP F&R/UDF Integration concept available
Some Basic UDF Features

F&R Model

UDF: Mixed Additive Multiplicative Model

Automated detection of the best fit ramp-up and ramp-down curve out of the history for each product-location-public holiday combination
Price and Day of week in UDF

**Price elasticity** denotes the percentage change in demand caused by a (small) percentage change in price.

Retail sales usually depend strongly on the **day of week**.
UDF Demo

Analyze Forecast App
Intraday Forecast

Use cases examples:
New intraday forecast can be used for
• Intraday stock projection
• Triggering back-stock activity to avoid out of stock situations
• Scheduling food production
• Planning labor resources around peak activity times

Key Features:
• Configurable time granularity (ex. 15 min forecasts)
• Science will utilize category and store data if there are insufficient product-location transactions

Technical Details:
• Feature will be part of SAP Customer Activity Repository
• Lumira* can be used to visualize the results, see example screens

Demo Intraday Forecast
*Lumira visualization is not part of the product
Why it makes sense to integrate SAP F&R with UDF

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- **Consistent Forecasts Across Retail Processes**
  - UDF
  - PMR
  - APR
  - AMR
  - ...  

- **Improved Basic Forecasting Features**
  - Events
  - Promotions
  - Seasonality
  - Trend
  - New Listings and Lifecycle Products
  - No History

- **Early Knowledge Ramp-Up**
  - Ramp up
  - 2016
  - 2017

- **Strong roadmap - Strategic Product in Retail**
  - SAP F&R
  - SAP CAR/UDF

- **SAP F&R/UDF Integration concept available**
New listings and seasonal products

NEW PRODUCTS

UDF uses a Bayesian methodology with so-called “priors”.

We can forecast things we haven’t seen before
– New promotions, calendar events, price changes
– Seasonality even before a year is over
– Completely new items!

SEASONAL PRODUCTS

Seasonal/Livecycle Product

Recurrent
Completely newly listed product gets forecast
…using HPR from other products from the category
Potentially Seasonal Product (short history) without HPR
...gets a season...
…using HPR from other products from the category
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SAP F&R/ UDF Integration concept available

No History

SAP F&R

SAP CAR/ UDF

2016 2017

2016 2017

2016 2017
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Strong roadmap - Strategic Product in Retail

SAP F&R

SAP CAR/UDF
SAP's strategy and possible future developments are subject to change and may be changed by SAP at any time for any reason without notice.
Why it makes sense to integrate F&R with UDF

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SAP F&R

SAP CAR/UDF

SAP F&R/UDF Integration available
How does the integration look like…

**Solution Sketch:**

- UDF could be used by SAP F&R as an alternative forecast for selected categories to calculate the replenishment orders without changing the established SAP F&R implementation.
- UDF is operated independently from SAP F&R (no data supply from SAP F&R).
- SAP F&R will read required forecasts from SAP CAR in a pull process.
- Integration of UDF forecast into SAP F&R will be available with SAP F&R 5.2.
- Integration of UDF forecast into SAP F&R will be delivered via Note.

With SAP Forecasting & Replenishment powered by UDF the integration of SAP CAR/UDF with SAP F&R is supported.

It can be leveraged without disrupting the established replenishment processes.
Summary of Limitations

Known functional limitations:

- No support of variable season
- No DIF schema specific variances
- No Weighting Profile
- Traceability in respect to forecasts will be provided by UDF itself
- Restricted product substitution
- No Generic DIF concept *
- No possibility to exclude “bad” observations from history (in SAP F&R possible via IGNORE DIF)*

*currently in development
Thank you

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