Johnson & Johnson SAP Demand Planning & Reporting - Lessons learned & best practices

SESSION CODE: 0409

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Learning Points

- Key things to consider when starting a Demand Planning/Reporting project
- Special considerations for high volume implementations and improving performance
- Best practices & tips to optimize your Demand Planning design & reporting.
So what will we review?

- Who are we?
- Background & Landscape
- Demand Planning Architecture Evolution
- Analytics & Reporting
- Things to Remember
Johnson & Johnson Background

Our Company
Caring for the world, one person at a time... inspires and unites the people of Johnson & Johnson. We embrace research and science - bringing innovative ideas, products and services to advance the health and well-being of people. Employees of the Johnson & Johnson Family of Companies work with partners in health care to touch the lives of over a billion people every day, throughout the world.

Our Family of Companies comprises:
- The world’s premier consumer health company
- The world’s largest and most diverse medical devices and diagnostics company
- The world’s fourth-largest biologics company
- And the world’s seventh-largest pharmaceuticals company

We have more than 250 operating companies in 57 countries employing 117,000 people. Our worldwide headquarters is in New Brunswick, New Jersey, USA.
"We believe our first responsibility is to the doctors, nurses and patients, to mothers and fathers and all others who use our products and services."
In 2006, the Johnson & Johnson Consumer Companies began a multi-year SAP supply chain re-engineering Project that spanned supply chain business functions & multiple locations within North America.

The scope of the initiative included Analytics and Reporting which included all functional Supply chain areas.

We’d like to share with you today our North America APO/BW Demand Planning solution and hopefully equip you with some lessons learned and best practices to take home.
Flashback to 2007… Demand planning is born!

Like the rest of our BW solutions, Demand Planning(DP) grew and matured as additional Consumer business units were added to SAP.

2007: Baby BW…Baby APO

2008: BW & APO Teenage Twins …Yikes!

2009 - 2011: Young Adults BW & APO

2011 - 2012: Mature Adults BW & APO
Demand Planning
Backend Architecture and Design
Architecture – Demand Planning
The stork delivers…Baby APO, BW …and we do our initial implementation
We set up **BW as a data hub** making it a mission critical part of the Demand Planning process.

**BW insulates APO from:**
- Data source changes
- Mapping complexity
- Data processing demands that impact performance
Architecture – Demand Planning

APO design drives BW design...

So what do we need to keep in mind about APO Design?
APO Demand Planning Design Considerations

• Confirm the business process(s) that need to be managed.

In our case:

- Open Stock Planning
- Display Planning
- Affiliate Planning
- Annual Planning

- Know your Characteristic Value Combination (CVC’s): Material, Franchise, Distribution Center, Brand, etc and establish your Planning Granularity (Material, Distribution Center, Customer and Week)

- Many Key Figures. Some of key ones are Shipments(qty/dollars), Different Forecast type (qty/dollars) spread over 2 planning areas (Open Stock & Display)

- Estimate long term APO volume. We have 3 Years History / 2 Years Forecast.
Architecture – Demand Planning

APO & BW need to speak the same language

BW Feeds APO:
- Master Data
- Open Orders,
- Shipments

APO Feeds BW…
- Demand Forecast

So what do we need to keep in mind about APO/BW integration?
Integrating APO & BW

Back up DP Planning Area in live cache to APO backup cube and extract into BW.
Architecture – Demand Planning

The BW design must incorporate design considerations related to ECC 6, Legacy, APO and Reporting.

Let’s take a look at the BW data architecture & discuss some fundamental things we learned as new parents to Baby BW.
Conceptual BW Demand Planning Model

Multi Provider (Current DP results plus Actuals)

Multi Provider (Forecast accuracy – Allows Multiple Lags comparison)

12 Forecast Snapshot Cubes (split by Month Period)

Full Refresh

Full Refresh

Delta enabled

Shipments Open Orders

POS CPFR

Full Refresh

Forecast

ECC Master Data

ECC Transaction Data

Legacy (Flat files)

APO
When starting out on your BW DP design…

- Get a **BW resource experienced** with APO BW. Just any BW resource won’t do.
- **Plan on customization.** There is limited business content.
- **Expect higher volumes** due to forecast snapshots & shipment history.
- Plan for the **phasing in/out legacy data** from your model.
- Keep BW model design flexible. **Shipments & Forecast** need to be combined for reporting in many ways across reports.
  - frequently at **different levels of granularity**
  - typically users want to select forecast **snapshots** (expressed as **lags**) and/or shipments they want to compare.
  - calculations of forecast accuracy may be required to occur at different levels. This may make **exception aggregation** necessary in queries
APO & BW become Teenage Twins – Yikes!
Additional business units are added to SAP landscape
All Customer to Cash processes are migrated to ECC 6.

How to address batch coordination & cycle time?

Legacy ERP

External data files

APQ SCM 5 Planning Areas

SAP

Enterprise Portal 7

ECC 6

Master Data, orders, shipments

Orders, shipments, POS & CPFR

Orders, Shipments

Orders, Shipments, POS & CPFR

CIF
Too many batch jobs… Too little time!
We needed to manage the traffic and teenage drivers!
Batch Scheduling Tool - Advantages

- Business process automation
- 24x7 production monitoring, alert notification and escalation by Operations
- “One stop shop” for all job scheduling
- Single interface for job monitoring
- Streamline scheduling without custom coding
  - Triggers
  - Internal/external job dependencies (successors/predecessors)
  - Custom calendars (ex: last Saturday of the month, Monthly/C+3, first day of each quarter, first business day of the month)
- Manage cross-platform workloads (SAP and non-SAP jobs) and interdependencies
Too much data, reports are not being delivered on time!

So what to do about the cycle time?

External data files

POS CPFR

Master Data Cubes Queries

Enterprise Portal 7

BW 7

ECC 6

APO SCM 5

Planning Areas

SAP

CIF

Forecast
**Best Practices – BW Load Cycle Time Performance**

- **Load Balancing & index creation with Basis and DBA teams**
  - Use **Load Balancing** across application servers to speed loads.
  - Rebuild **statistics and indexes** very often. With DBA, assess if additional indexes are needed. Delete fact table indexes prior to loads.

- **Backend Optimization**
  - Use **parallel loads** to improve performance; split Infopackages & DTP’s by time horizons and plant selections. Parallel processing improves data extraction, but also the insertion of data into data targets.
  - **Buffer SID number ranges** when loading high data volume at once.
  - **BW Cube Compression** with zero elimination after data loads is our best friend to reduce the size of fact tables.
  - Use **Write-Optimized DSO** for dump/refresh processes. It only has active table; eliminates activation time.

- **ABAP and Coding Improvement**
  - For BW Start/End Routines, **avoid nested LOOP statements**.
  - Define internal tables as **HASHED tables** (they use less memory).
APO & BW are now grown up and working hard. But when an additional business with many products is integrated BW reporting performance is impacted.
Best Practices – APO/BW Model
Optimize model for front end access

- **Partition** Shipments & Forecast Snapshot cubes and **combine them dynamically** for reporting based on user time period/lag selections.
- **Decouple DP history data.** Keep most current results and previous history in separate Info cubes.
- Create many small dimensions versus a few large dimensions. Dimension table should be < 10% of fact table size. If dimension > 20% of fact table, use **Line Item Dimensions**.
- **Create BW aggregates** to improve query performance. Run regularly.
APO & BW have matured …

Prior to integrating another large business unit, the team proactively models APO to improve performance & eliminate risk.

So what was done to address performance & reduce risk for display & open stock planning?
APO planning area improvement strategy

Split planning to two main US Base Planning areas each with its own Master Planning Object Structures (MPOS) to manage CVC’s more efficiently

- **Open Stock PA**
  - 8 Characteristics
  - No DP BOMs
  - Dependent Demand
  - Key Figure Reduction

- **Displays PA**
  - 11 Characteristics
  - DP BOMs
  - Dependent Demand
  - Key Figure Reduction

Dependent History (Daily refresh)

Dependent Demand (Daily refresh)
So why was the APO planning book split?

There were advantages to dividing Display & Open Stock to separate smaller planning areas.

Advantages:

• Each planning book containing only relevant key figures
• Define multiple Data views from each Planning Book to ensure they contain only a small number of Key figures
  ▪ Improved performance and scalability
  ▪ Ensure consistency of DP Master Data (CVC’s)
  ▪ More macro background jobs can be run in parallel
  ▪ Parallel archiving of the two Planning Area Data
  ▪ Smaller structure of the Planning Areas – only needed key figures are included and managed in each.
  ▪ Better Performance from Real time reports from Livecache
  ▪ Automatic creation of CVCs for new product introduction/launch.
APO & BW Integration was preserved the same

Weekly process

Open Stock

- Open Stock Archive

Displays

- Display Archive

APO Backup: Separate Archive cubes created for each planning area for Data recovery

Consolidated APO Demand Cube for BW includes the Key figures for reporting.
- Only necessary characteristic/Key figures for reporting were added.

APO

BW
Best Practices – BW & APO in harmony

- **APO & BW Teams must be BFFs** 😊 and experienced.

- Leverage **BW as a data hub** between internal & external systems and APO

- Use a robust **batch scheduling tool** to manage batch dependencies internally & externally.

Demand Planning
BW Analytics & Reporting
Demand Planning Analytics

- SAP ECC
  - Transactions
  - Shipments
  - Master Data
  - Materials
  - List Price
  - Customer
  - Plant
  - Etc.

- SAP BW
  - Forecast Snapshots
  - Current Forecast
  - Shipments And Orders
  - POS
  - CPFR

- SAP APO
  - Transactions
  - Forecasts

- SAP Portal

Demand Planning KPIs

- Forecast (Statistical (Stat), Sales and Operation (S&OP), Override, Promo, Statistical, CPFR) in any UOM and $ (by using gross list price)

- Shipments, Cuts, POS, Open sales Orders in any UOM and Invoice $

- Different MAPE/BIAS with reason coding

Reason codes

- Planners
- Affiliates
- Supply Chain

Real Experience. Real Advantage.
Enable demand planners to measure forecast accuracy, identify exceptions and implement required forecast adjustments.

<table>
<thead>
<tr>
<th>Query</th>
<th>Description</th>
<th>Freq</th>
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</thead>
<tbody>
<tr>
<td>Shipment Trending</td>
<td>Notify planner ASAP of potentially inaccurate forecasts (Shipments, sales orders, POS vs. forecast)</td>
<td>Daily</td>
</tr>
<tr>
<td>Open Stock &amp; Display Forecast</td>
<td>See real time data from APO DP Planning books (Live cache). Very useful for S&amp;OP meetings</td>
<td>Real Time</td>
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<tr>
<td>Forecast Changes</td>
<td>Tracks the forecast changes over time by using the user defined exceptions.</td>
<td>Wkly</td>
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<tr>
<td>Tactical</td>
<td>Identify under/over performing products in a standard format (used in Tactical meetings).</td>
<td>Wkly</td>
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## Demand Planning Reports continued

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<thead>
<tr>
<th>Query</th>
<th>View...</th>
<th>Freq</th>
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</table>
| Affiliate Forecast Changes Reporting | Affiliate forecast changes…... with user defined exceptions.  
….when forecast vs. orders is significantly different                                                                                     | Weekly       |
| Display Component                    | • Display Demand - Independent Forecast  
• Dependent Demand -Open Stock Components tied to the display.                                                                                   | Weekly       |
| Forecast Comparison Report           | Highlight forecast differences related to user defined exceptions. Key figures: Stat, Stat Override, Final OS Override & CPFR Forecast Qty                                                              | Weekly       |
| LRCP & AP Reports                   | Long Range Capacity & Annual Planning Key figures(Qty & $)                                                                                                                                             | Annual       |
| MAPE Report (varieties)              | Evaluate Mean Absolute Percent Error (MAPE) over different time horizons (user defines upper and lower MAPE limits for exceptions) with reason codes.                                                       | Monthly /Weekly |
Consider creating a BW virtual cube that points to live cache to enable Planners to see real time reports. There should be minimal transformation if any. Also limit user access.
Conceptual BW Demand Planning Model

Multi Provider (Current DP results plus Actuals)

Remote Real time

Multi Provider (Forecast accuracy – Allows Multiple Lags comparison)

12 Forecast Snapshot Cubes (split by Month Period)

Current +2 Years Forecast

Plant
Customer
Material

Full Refresh

Delta enabled

Shipments
Open Orders
POS
CPFR

Full Refresh

DSO
DSO
DSO
DSO

DSO
DSO
DSO

ECC Master Data
ECC Transaction Data
Legacy (Flat files)

APO

Real Experience. Real Advantage.
We set up virtual cubes / reports per planning area:
Open stock & Display Forecast – Real Time reporting

High level steps to build solution:

- Generate export Data Sources from PA's in APO
- Replicate Data Sources from APO in BW
- Assign the Data Sources to Info Sources
- Assign communication Structures to transfer Structures
- Create BW Remote InfoCubes
- Create BW Queries for reporting

Ensure that the APO Livecache & BW characteristics (ex. 18 vs 40 char) are declared exactly the same away to avoid reading entire data set from Livecache.
Standard queries are secured by folder.
Power users can save queries here.

Your favorite queries...only visible to you.
Favorites can be organized to folders.

BW reference information:
Data dictionaries
Quick Ref Card

Training Information:
BW Overview
How to save a favorite
Sample query: Monthly MAPE report

Query Prompts
An end user may be prompted for information before a query runs. This enables a user to pre-filter or customize their report. Preferences can be saved as a variant for future use.

For example:
**Monthly MAPE Report** - variants
- Select UOM desired - defaults to EA
- Select time period for comparison
- Define up to 6 lag periods for comparison
- Define other characteristics (optional)
- Define upper and lower Bias limits
- Define MAPE threshold

**MAPE calculation:**
\[
\text{abs(Shipments - Forecast)/Shipments}
\]
**Sample Query: BEX Web Functionality**

**Query Functionality Highlights**
- Filter or sort your results
- Alter your report layout
- Set conditions & exceptions
- Export to excel
- Print
- Display as a chart
- Save your query as a favorite

**Additional Characteristics available for analysis**

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<tr>
<th>Nav:</th>
<th>Key Figures</th>
<th>Query Functionality Highlights</th>
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Best Practices – Analytics & Reporting Performance

- Use **OLAP cache** in queries to improve query performance. Leverage previously run results in cache.
- Use the query read mode “**H-read when navigating and expanding hierarchies**” (RSRT)

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- Use **inclusion cause instead exclusion** in queries
- Use **BEX Broadcasting** for big reports that have high level of data granularity (many pages).
What’s next?

- Establishing Data archiving strategy
- Crafting long term Architecture roadmap
- Expanding reporting capabilities
- Onboarding additional Business Units
- Continuing to optimize for performance
Thank you for participating.

Please remember to complete and return your evaluation form following this session.

For ongoing education on this area of focus, visit the Year-Round Community page at www.asug.com/yc