

SAP Analytics Cloud Integrating with SAP BW - Best Practices

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CUSTOMER



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Agenda

Best Cloud integration with SAP BW

Technical overview

- Backend version pre-requisites
- Data connectivity options
- Supported BW query concepts

Best practices considerations for SAP BW live connections



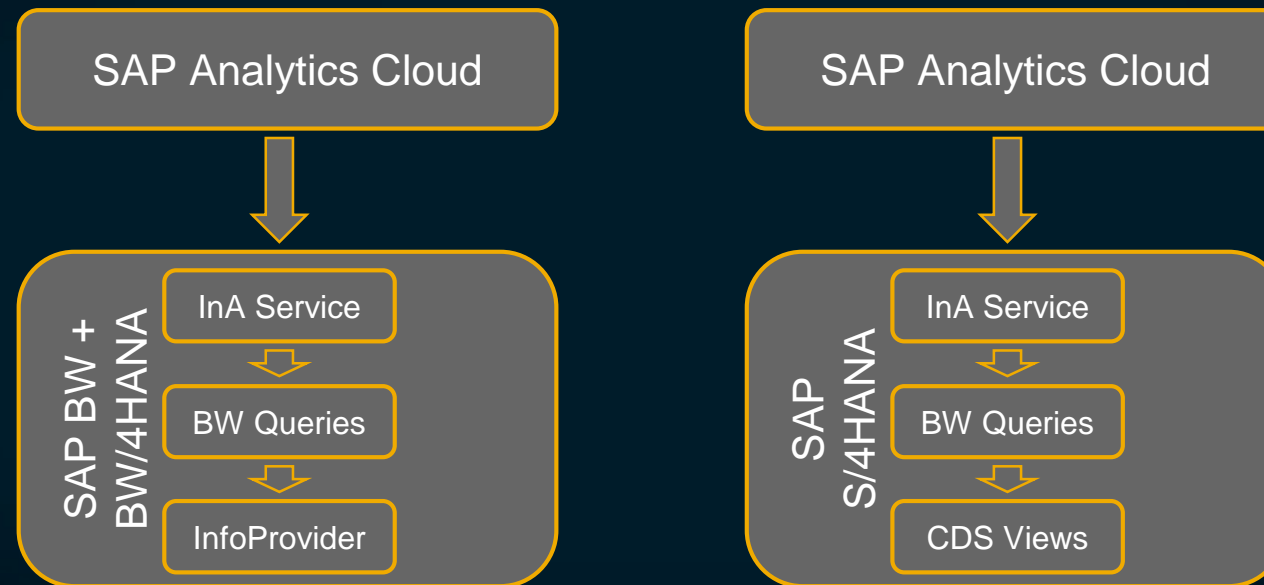
SAP Analytics Cloud

**Best Cloud integration with SAP Business
Warehouse**

Preface: BW Live Connectivity

“BW Live” embraces live connectivity to BW, BW/4HANA and S/4HANA

- SAP Analytics Cloud connects to the BW Query Interface (“InA Service”) available in all those systems to consume live data
- In S/4HANA systems, CDS Views are exposed through automatically generated BW Queries for analytical live data consumption
- In this document, for readability, we will use the term “BW Live Connectivity” to denote live connectivity to SAP BW, SAP BW/4HANA and SAP S/4HANA altogether



SAP Analytics Cloud Integration with SAP BW and BW/4HANA

Unique Direct Connectivity With BW Leveraging Best-In-Class SAP Interfaces

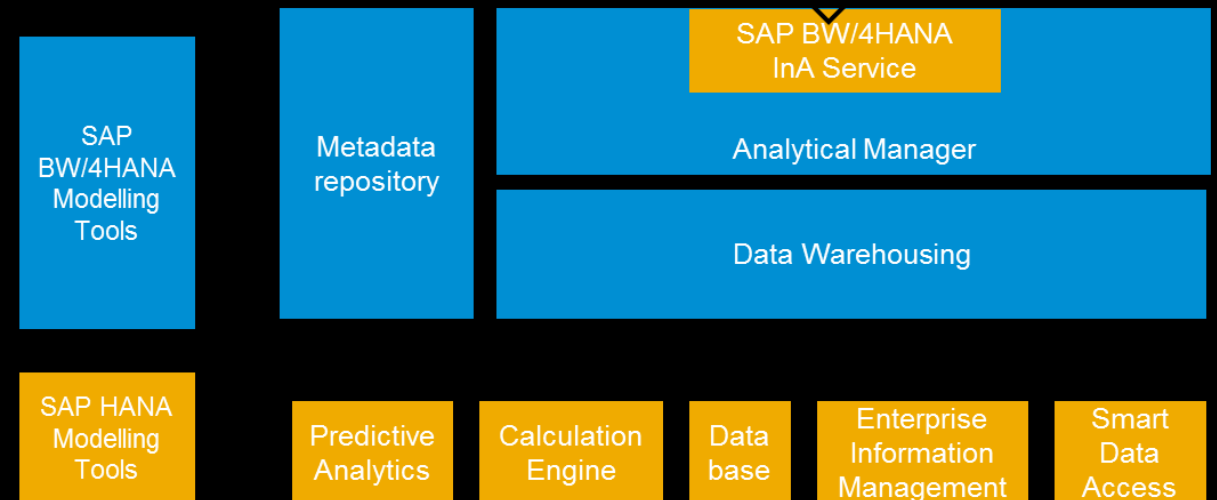
Direct. Secure. Simple.

- Simply connect to BW Queries or generated HANA views in your on-premise BW systems
- No additional modeling in SAC needed (renaming and grouping of measures and dimensions is possible, but optional)
- No data replication into SAC
- Data remains behind your corporate firewall all the time when running queries and displaying results
- No authorization replication needed: BW authorizations are fully respected



Best Possible End-to-End Integration.

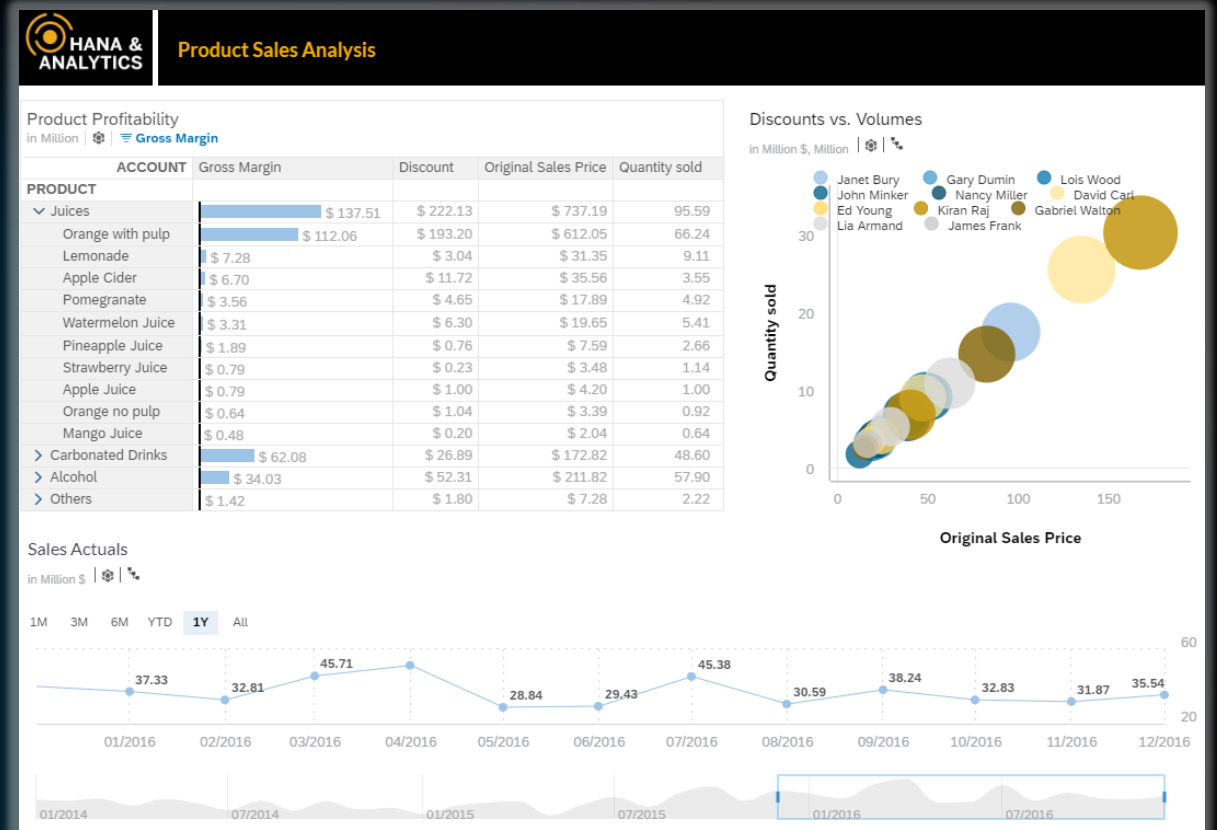
- Use of unique best-in-class query interface (Firefly) to BW and HANA engines
- Ability to access BW and HANA features that cannot be accessed through standard query interfaces (SQL, MDX)
- Firefly interface is continuously enhanced alongside BW and HANA engine enhancements



SAP Analytics Cloud

Value Proposition for SAP BW Customers

- Great looking dashboards with BW live data out-of-the box
 - Can be created by end-users in a self-service fashion without help from IT and without scripting / coding
 - Linked Analysis: Simply define filter relations between charts and tables without scripting
 - Use Powerful visualizations not available in on-premise clients, e.g. time-series charts, in-line charts in tables (sparklines)
- Powerful options to enrich BW Query data, e.g.
 - Blending of live BW Query data with local / acquired data
 - Restricted Measure calculations on-the-fly
- Consolidation of heterogeneous landscape with SAP on-premise tools such as Bex Web / WAD, Design Studio, Lumira, BI Platform.



Technical overview

Backend version pre-requisites

Live data connectivity to SAP BW

Technical prerequisites

Supported SAP BW releases

- SAP BW 7.5 SP8+
- SAP BW 7.4 SP17+
- SAP BW/4HANA 1.0 SP4+

Upgrade to SAP BW/4HANA 2.0 and SAP BW 7.5 support is fully recommended for best integration experience.
See [SAP Note 2715030](#) for details.

Supported deployments

- SAP BW running on any DB
- SAP BW running on SAP HANA
- SAP BW/4HANA

Support live connection to the BW queries

Live data connectivity to SAP BW

Planning ahead with SAP BW technical prerequisites

Which SAP BW versions are recommended?

- SAP BW/4HANA and SAP BW 7.5 support is recommended over SAP BW 7.4 support.
- Best support for upcoming roadmap features planned for SAP Analytics Cloud will be provided with SAP BW 7.50 SP16 or SAP BW/4HANA 2.0. Customers are recommended to plan for a respective upgrade once those BW versions become available.
- Be aware of certain upcoming roadmap features planned require SAP HANA (i.e. SAP BW on HANA) as part of the overall best support experience.
- Refer to [SAP Note 2715030](#) for more details.

Should I still apply SAP Notes (reference SAP Note 2541557)?

- Yes, if you are not yet on BW 7.50 SP16 or SAP BW/4HANA 2.0, continue to follow the process of SAP Notes application via the BW Note Analyzer report.
- SAP Note 2541557 will discontinue after BW 7.50 SP16 or SAP BW/4HANA 2.0.
- Be aware upcoming roadmap features will only be available starting from BW 7.50 SP16 or SAP BW/4HANA 2.0.

Data import connectivity to SAP BW

Technical prerequisites

Supported SAP BW Releases

- SAP BW 7.3+
- SAP BW 7.4+
- SAP BW 7.5+
- SAP BW/4HANA 1.0 SP4+ (SP4 requires application of SAP Note 2440670. Not required for SP5+)

Supported deployments

- SAP BW running on any DB
- SAP BW running on SAP HANA
- SAP BW/4HANA

Support data import connection to both the BW queries and BW InfoProviders

Technical overview

Data connectivity options

SAP Analytics Cloud and SAP BW

Data connectivity options

Live Connectivity: Direct. Deep. Secure. Simple.

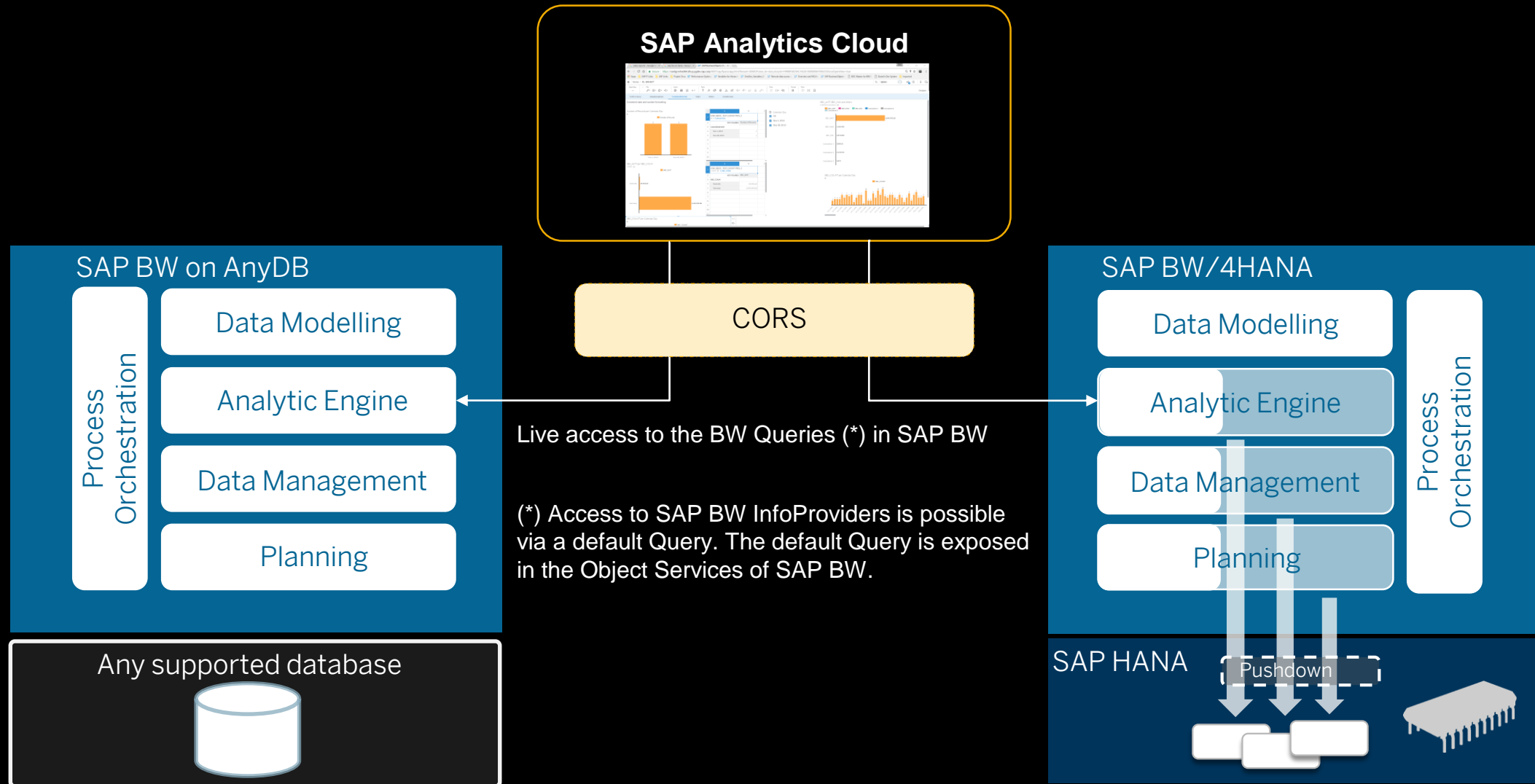
- No data replication
- Always report on latest information in BW
- Leverage all data authorizations from BW
- Leverage all investments in BW Queries and other meta data such as hierarchies
- Seamless drill-down from aggregated data to lowest data granularity in BW
- Best-in-class query interface to SAP BW: Access SAP BW features that cannot be accessed through standard SQL or MDX query interfaces
- When connecting from the corporate network, data is kept behind your firewall. No sensitive data will be moved to the Internet
- Support of BW Queries with two structures and cell calculations
- Support of all BW variable types
- Support of multiple BW parent-child hierarchies
- Parallel execution of BW Queries

Import Connectivity

- Import BW Query data into SAP Analytics Cloud local models
- Use all SAP Analytics Cloud features that are available with local models (e.g. Smart Assist features)
- Might provide a performance edge for overview dashboards with highly aggregated data and limited in-dashboard drill-down (drill-through to dashboards with live connectivity possible)

Live data connectivity to SAP BW

High level architecture



Live data connectivity to SAP BW

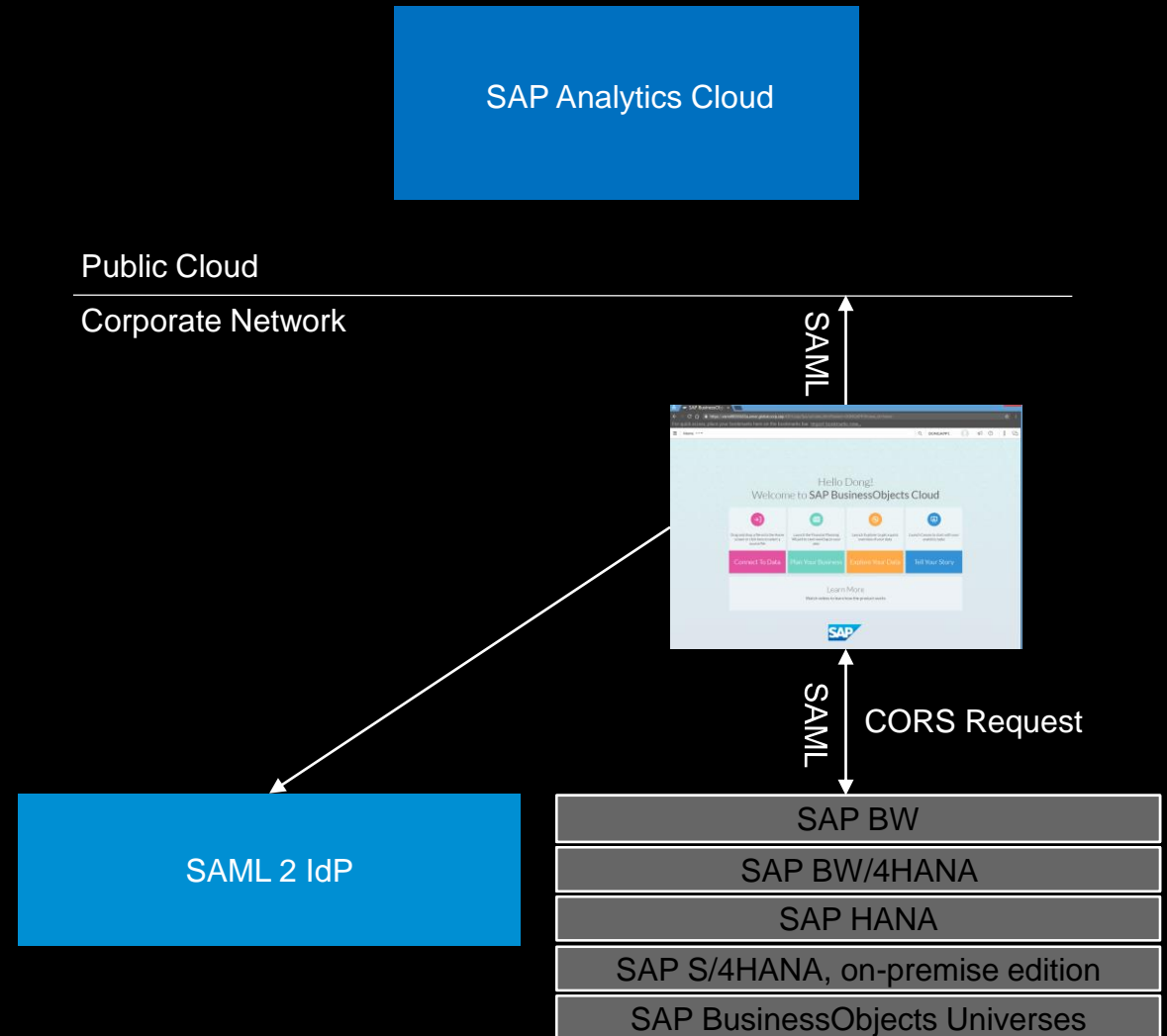
Deployment option: access data behind corporate firewall

Access on-premise data via Cross-Origin Resource Sharing (CORS)

- Best suited for connection to on-premise data behind the corporate firewall.
- No additional hardware requirements to deploy and maintain if public internet access is not required.
- Embedded scenarios are supported.

Authentication

- End to end SSO accomplished via SAML 2.0.
- Data security implemented at the source data is respected.



Live data connectivity to SAP BW

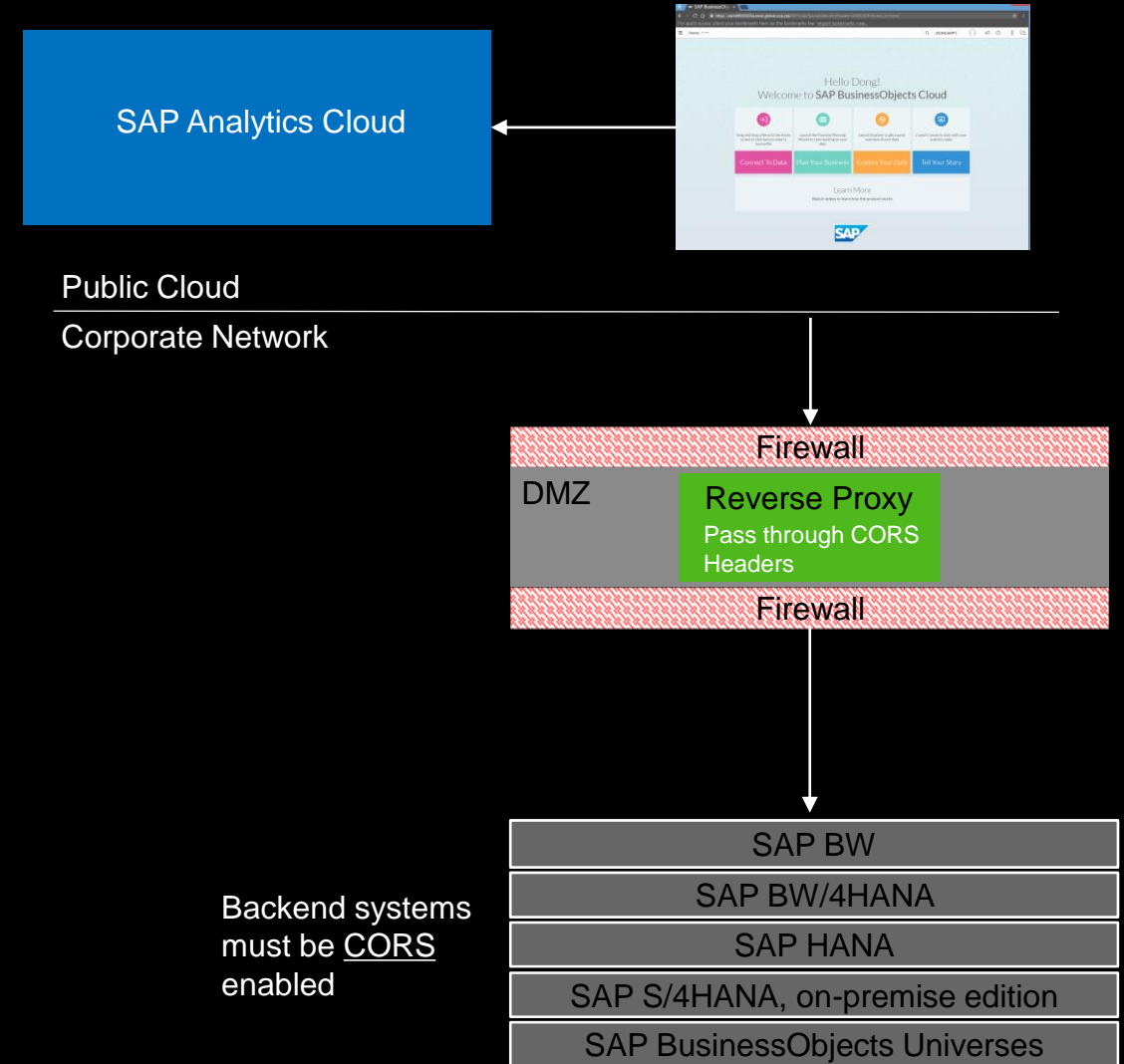
Deployment option: access data from public internet

Access on-premise data via public internet

- Best suited for analytic scenarios based upon mobile.
- Connection to on-premise data required where VPN into corporate network is not available.
- Recommend adding a reverse proxy within the DMZ, in addition to CORS configuration. Sole purpose is to publish the on-premise system to the internet.

Authentication

- End to end SSO accomplished via SAML 2.0.
- Data security implemented at the source data is respected.



Live data connectivity to SAP BW

Enabling CORS: Technical prerequisites

With the following NetWeaver AS ABAP versions, SAP provides built-in native support for CORS

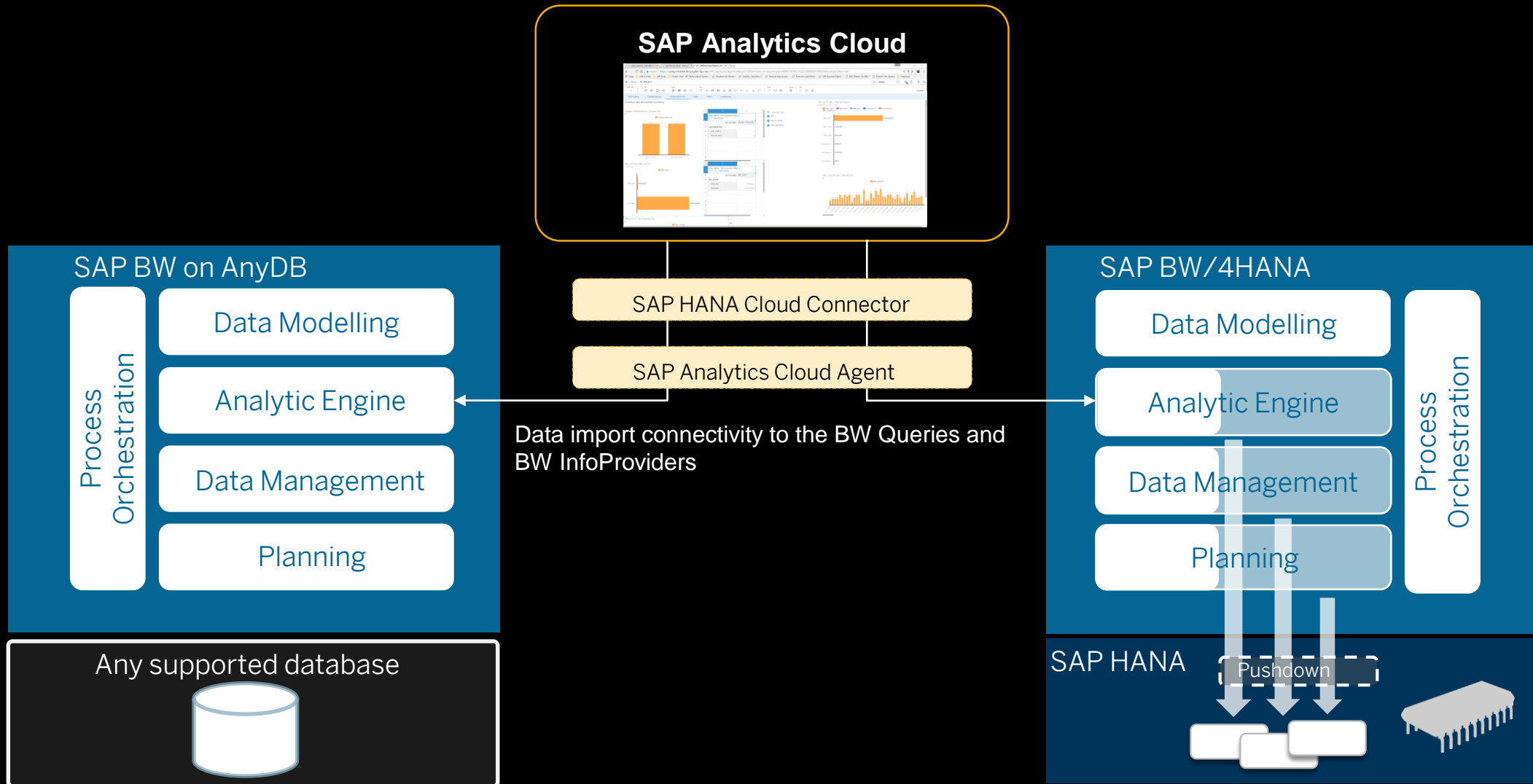
- NetWeaver AS ABAP 7.52 SP02
- NetWeaver AS ABAP 7.51 SP06
- NetWeaver AS ABAP 7.50 SP12
- NetWeaver AS ABAP 7.40 SP20

Helpful resources relating to live connectivity setup with CORS

- https://www.sapanalytics.cloud/guided_playlists/live-data-connection-sap-bw-live-cors-icm-script/
- https://www.sapanalytics.cloud/guided_playlists/live-data-connection-sap-bw-native-cors-unified-connectivity/

Data import connectivity to SAP BW

High level architecture



Data import connectivity to on-premise data

Easy installation of Cloud Connector and Cloud Agent via [SAP Analytics Cloud Simple Deployment Kit](#):

- <https://blogs.sap.com/2016/05/11/enable-sap-cloud-for-analytics-for-data-acquisition-from-on-premise-systems/>

SAP HANA Cloud Connector

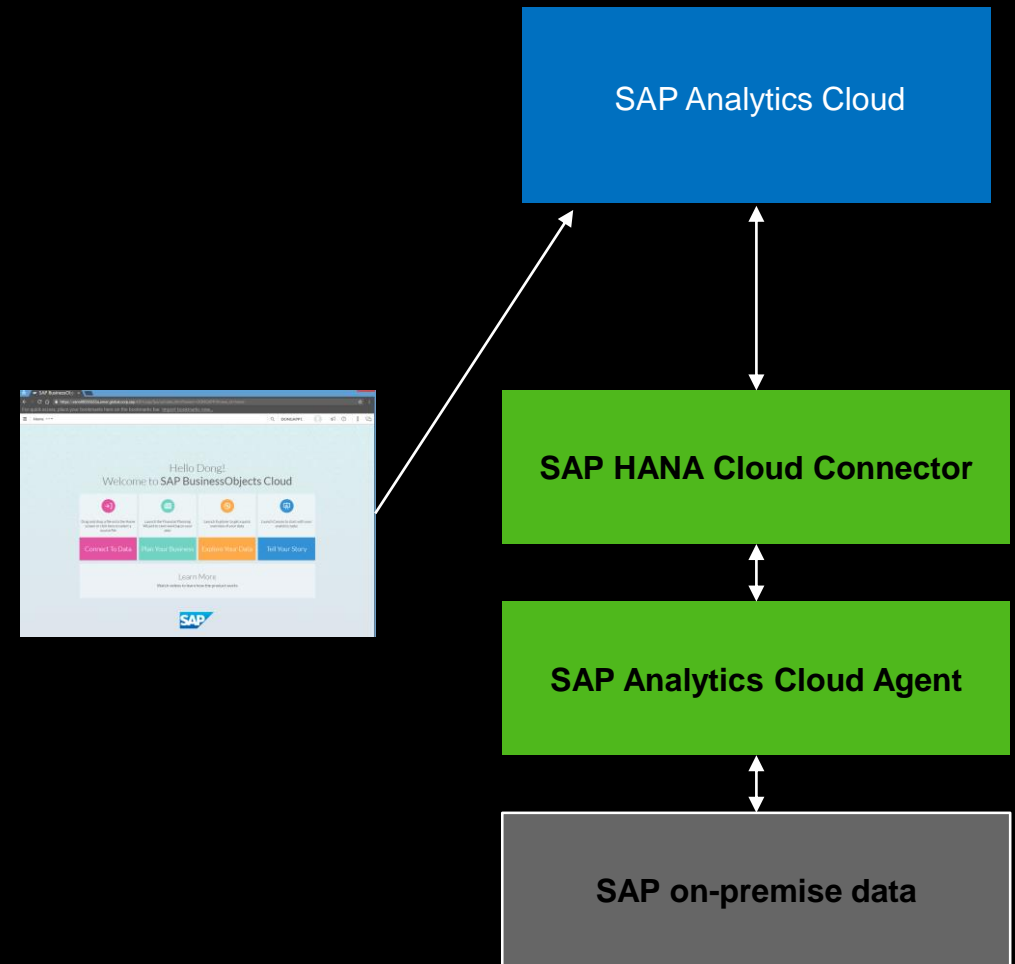
- Securely transfer data between the on-premise data source and SAP Cloud Platform (TLS encrypted).

SAP Analytics Cloud Agent

- Manage connections, and sending query requests to the on-premise data source.

Supports JCO libraries

- Used for connection to your SAP BW system.



Technical overview

Supported BW query concepts

BW query integration

Live connection vs Data Import connection

Live connection guidelines against BW queries:

SAP Analytics Cloud provides strong product integration with core BW query features:

- Leveraging BW specific concepts: Hierarchies, Time Dependency, Structures, Cell Editor calculations, Data Authorizations, etc.
- Leveraging logic concepts like variable prompting, filtering.
- Investments in key presentation concepts. In many cases, SAP Analytics Cloud will offer equivalent or similar presentation concepts as native functionality.

Data import guidelines against BW queries:

SAP Analytics Cloud is leveraging selective BW query feature concepts relevant to data import:

- Once the data is imported into SAP Analytics Cloud, the calculation engine will be HANA. The BW OLAP engine is no longer tied to the imported data set.
- Imported data can be kept up to date via scheduled refresh.

Supported BW query concepts (Live vs Data Import)

Metadata support

BW Query Feature	Live connection	Data import	General Notes
Characteristics - NUMC	Yes	Limited	[Data Import] Dimension members imported as data type String, not Number
Characteristics - CHAR	Yes	Yes	
Characteristics - DATS	Yes	Limited	[Data Import] Dimension members can be manually mapped as data type Date during import
Characteristics - TIMS	Limited	No	[Live] Visualizations / input controls do not support sorting based on data type Time. Dimensions of Time data type can not be leveraged in Time Series Charts
Free Characteristics	Yes	Yes	
Key Figures - Amount / Quantity	Yes	Yes	
Key Figures - DATS	Yes	No	[Live] Measures of type DATS can be leveraged as part of Table visualization. Native sorting as DATS data type is not supported
Key Figures - TIMS	Yes	No	[Live] Measures of type TIMS can be leveraged as part of Table visualization. Native sorting as TIMS data type is not supported
Restricted Key Figures	Yes	Yes	
Calculated Key Figures	Yes	Yes	

Supported BW query concepts (Live vs Data Import)

Metadata support

BW Query Feature	Live connection	Data import	General Notes
Display Attributes	Yes	Yes	
Navigational Attributes	Yes	Yes	
Characteristic Structure	Yes	Yes	
Hierarchical Characteristic Structure	Yes	No	
Key Figure Structure	Yes	Yes	
Hierarchical Key Figure Structure	Yes	No	
2 Structure Support from BW Query	Yes	No	[Data Import] Import from queries with 2 structures is not allowed [Live] Explorer does not support queries with 2 structures
Compounded Characteristics	Yes	Yes	There is no option to show the compounded key value
Static Filters	Yes	Yes	
Dynamic Filters	Yes	Limited	[Data Import] Dynamic filters are treated like static filters are part of data import

Supported BW query concepts (Live vs Data Import)

Variable Types support

BW Query Feature	Live connection	Data import	General Notes
Optional Variables	Yes	Yes	
Mandatory Variables	Yes	Yes	
Characteristic Value Variables	Yes	Yes	
Formula Variables	Yes	Yes	
Hierarchy Variables	Yes	Yes	
Hierarchy Node Variables	Yes	Yes	
Hierarchy Version Variables	Yes	Yes	
Key Date Variables	Yes	Yes	
Text Variables	Yes	Yes	

Supported BW query concepts (Live vs Data Import)

Variable Processing Types and Presentation

BW Query Feature	Live connection	Data import	General Notes
User Entry / Default Value	Yes	Yes	
Replacement Path	Yes	Yes	For the variable processing type Replacement Path: Variables with replacement from the query result are not supported when the second query also has variables that are configured as ready for input.
Customer / SAP Exits	Yes	Yes	
Authorizations	Yes	Yes	
Single Value	Yes	Yes	
Multiple Single Value	Yes	Yes	
Internal / Range Value	Yes	Yes	
Selection Option	Yes	Yes	
Selection Option - Contains Pattern	No	No	
Selection Option – Include / Exclude	Yes	Yes	
Pre-calculated Value Set	Yes	Yes	

Supported BW query concepts (Live vs Data Import)

Variable Processing Types and Presentation

BW Query Feature	Live connection	Data import	General Notes
Support for single Key Date	Yes	Yes	
Support for multiple Key Date	Yes	Yes	
Cascading Hierarchy / Hierarchy Node variable dependency	Yes	Yes	
Cascading variables for Compound Characteristics	Yes	No	
Support for Variable default values	Yes	Yes	
Support for BW Variants	Yes	No	
Support for BW Personalization	Yes	N/A	
Support for Manual Entry	Yes	Yes	
Support for Merge / Un-merge	Yes	N/A	

Supported BW query concepts (Live vs Data Import)

BW query functionality

BW Query Feature	Live connection	Data import	General Notes
Currency / Unit Conversion	Yes	Yes	
Conditions in Rows	Yes	Limited	[Data Import] Once the BW dataset is acquired to SAP Analytics Cloud, the OLAP engine is no longer involved. Hence, the user must be careful in dealing with the BW dataset in SAP Analytics Cloud, as the context of the BEx condition support is no longer applied.
Conditions in Columns	Yes	No	
Conditions for fixed set of characteristics	Yes	Limited	[Data Import] See above note for Conditions in Rows
Conditions for independent characteristics	Yes	Limited	[Data Import] See above note for Conditions in Rows
BEx Exceptions	No	N/A	
Constant Selection	Yes	No	
Cell Editor Calculation	Yes	No	
Local calculations	Yes	No	
Exception Aggregation	Yes	No	
Zero Suppression	Yes	Limited	[Data Import] Zero suppression defined along the rows is applied at time of data import. Zero suppression along the columns is not supported.

Supported BW query concepts (Live vs Data Import)

Display settings

BW Query Feature	Live connection	Data import	General Notes
Scaling Factor	Limited	No	
Reverse Sign (+/-)	Yes	Yes	
Number of Decimals	Yes	No	
Hide / Show the Element	Yes	No	
Sort Characteristics	Yes	N/A	
Display Options for Characteristics (Key, Key & Text, Text)	Yes	Yes	[Data Import] Can be achieved through metadata mapping upon import of data
Result Rows (Show, Suppress)	Yes	N/A	
Placement of subtotal (Above / Below nodes)	Yes	N/A	

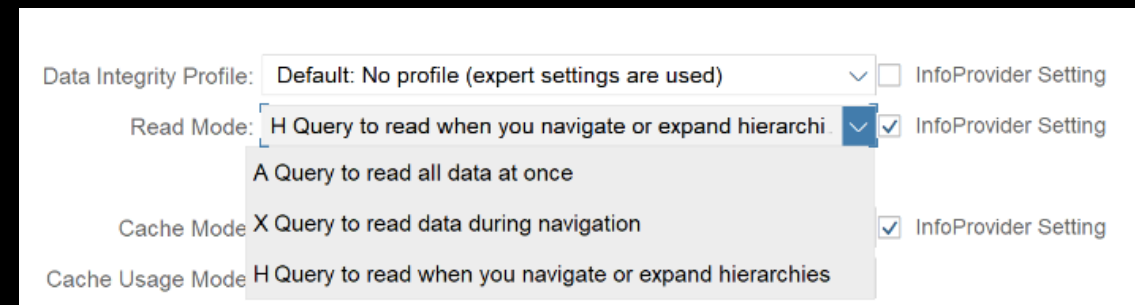
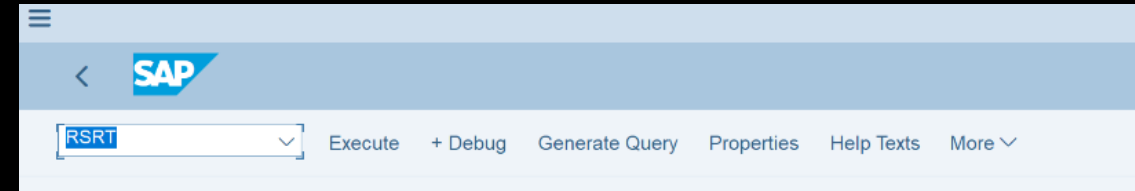
Best practices considerations for SAP BW live connections

Tips and Tricks

Backend considerations

Query Read Mode

- Configuration setting in BW where the Read mode determines how the OLAP processors handles data during navigation
 - Recommend setting “Query to read when you navigate”
- Run T.code RSRT
 - Read mode can be configured through the Query “Properties”



Tips and Tricks

BW query design considerations (1/2)

BW query consumption guidelines:

- Continue to leverage existing BW query assets with SAP Analytics Cloud. No query re-design as the objective for seamless consumption.
- SAP Analytics Cloud does not leverage the “Allow External Access to this Query” flag in the BW query. This setting is not relevant to SAC.
- Continue to follow existing best practices with BW query design: minimize downstream development.
- Consider the advantage of leveraging variables as part of your BW query:
 - Story based input controls can not be shared across
- Leverage all necessary complex calculations, restricted measures, calculated measures as part of your BW query: minimize downstream development
 - Allows for sharing across multiple Stories
 - Take advantage of the horsepower in your BW system
- Leverage the data level security in your BW system
 - Use BI authorizations

Tips and Tricks

BW query design considerations (2/2)

Units and scaling

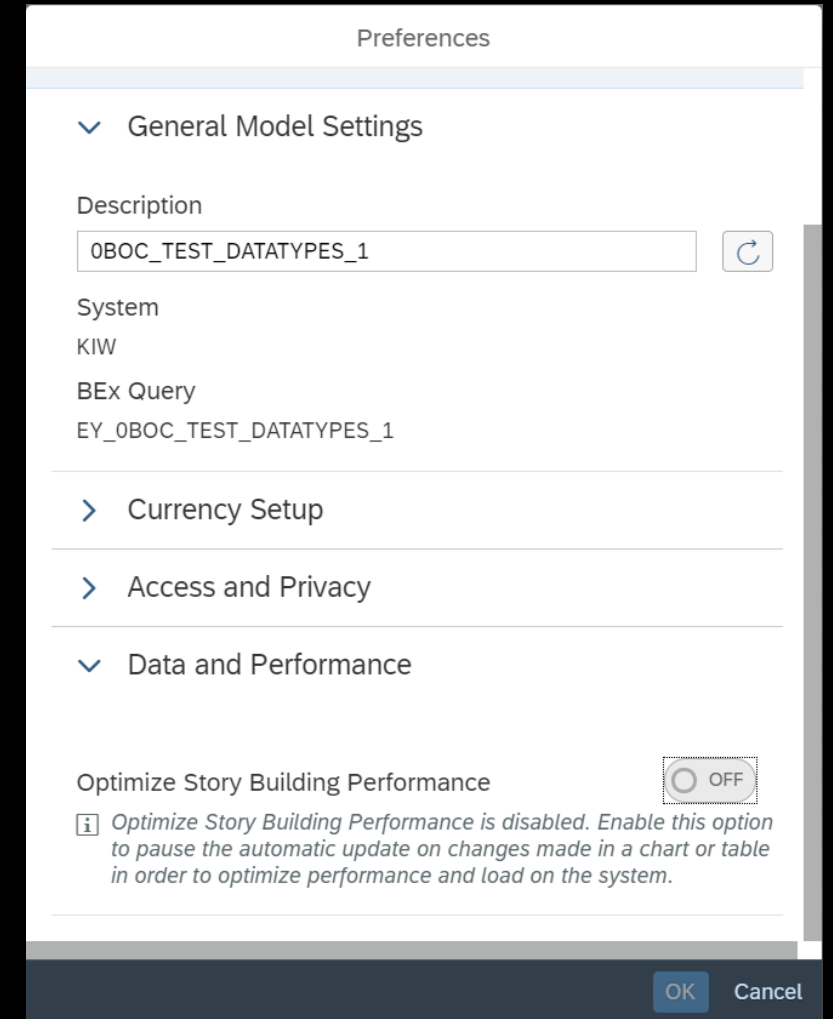
- Stories in SAP Analytics Cloud currently allows users to configure the following scaling options:
 - Thousand
 - Millions
 - Billions
- User would expect that already configured scaling factors in the BW query are transferred to SAP Analytics Cloud in case of a Live / Import data set. However, this can only happen for supported scaling factors:
 - The raw number is shown for un-supported scaling factors
 - Take into consideration it may make sense to set the KPI / measures in the BW query as un-scaled, to avoid user confusions

Tips and Tricks

Story building performance considerations for live connections

Enhance Story Building performance

- By default, modification to your table or chart during Story design will send a query to the BW server, resulting in an immediate update to the table or chart.
- Use option “Optimize Story Builder Performance” in the Model in situations where response time is slow
 - Network bandwidth is slow
 - BW server is under heavy load



Tips and Tricks

Reduce metadata retrieval in Model for live connections

Dimension Hide / Show settings in Model

- BI Administrators can determine which business metadata will be made available in Models for content creators
- For BW queries with large number of dimensions, it may make sense to limit showing only the metadata that is important to the business
 - Hidden dimensions in Model will not be retrieve as part of metadata load while opening a Story

The screenshot displays the SAP Analytics Cloud interface. On the left, a table lists dimensions with their IDs and descriptions. A 'Hide' column is visible on the right side of this table, with a red box highlighting the 'Hide' header and the checkboxes for several dimensions. The dimensions listed are:

ID	Description	Hide
OBC_COUN	OBC_COUN	<input type="checkbox"/>
OBC_CUST	OBC_CUST	<input type="checkbox"/>
OBC_CUST__OBC_COUN	OBC_CUST__OBC_COUN	<input checked="" type="checkbox"/>
OBC_CUST__OBC_POST		<input checked="" type="checkbox"/>
OBC_CUST__OBC_REG		<input checked="" type="checkbox"/>
OBC_FIELD		<input checked="" type="checkbox"/>
OBC_FIELD__OBC_POST		<input checked="" type="checkbox"/>
OBC_REG		<input checked="" type="checkbox"/>
OBC_TYPE		<input checked="" type="checkbox"/>
OFISCPER		<input checked="" type="checkbox"/>
OFISCVARNT		<input checked="" type="checkbox"/>
OFISCYEAR		<input checked="" type="checkbox"/>

The main interface shows the 'Builder' tab with the 'Chart Structure' panel open. The 'Chart Structure' panel includes options for Comparison, Trend, Distribution, Correlation, Indicator, and More. The 'Chart Orientation' is set to 'Horizontal'. The 'Measures' section has a '+ Add Measure' button. The 'Dimensions' section has a search bar and a list of dimensions with checkboxes: OBC_COUN, OBC_CUST, and '+ Create Dimension Input Control...'. The 'Properties' section has a 'View Mode' dropdown and an 'Enable Explorer' checkbox.

Tips and Tricks

Manage business metadata in Models

Dimension and Measure Settings in Model

- BI Administrators can organize, and harmonize business metadata without dependence on IT
 - Dimension grouping
 - Dimension rename
 - Dimension hide / show
 - Measure rename
 - Measure scale and decimal configuration
- Facilitate business users need for easy downstream development of BI content

ID	Description
OBC_COUN	Country
OBC_CUST	Customer
OBC_CUST__OBC_COUN	Customer Country
OBC_CUST__OBC_POST	Customer Position
OBC_CUST__OBC_REG	Customer Region
OBC_FIELD	OBC_FIELD
OBC_FIELD__OBC_POST	OBC_FIELD__OBC_POST
OBC_REG	OBC_REG
OBC_TYPE	OBC_TYPE
OFISCPER	Fiscal year/period
OFISCVARNT	
OFISCYEAR	

Group

All Dimensions

Model

- KIW_0BICS_C03_BICSTE

Groups

- Customer
 - Customer
 - Customer Country
 - Customer Position
 - Customer Region
- Fiscal
 - Fiscal year/period
 - Fiscal Year Variant
 - Fiscal year

Chart Structure

Comparison Trend Distribution

Correlation Indicator More

Chart Orientation: Horizontal

Measures: + Add Measure

Dimensions

Search

- CUSTOMER
 - OBC_FIELD
 - OBC_FIELD__OBC_POST
 - OBC_REG
 - OBC_TYPE

Expand List...

Tips and Tricks

Story rendering performance considerations for live connections

Parallel processing of BW queries

- BI Administrators can configure the number of parallel sessions allowed on your SAP BW system.
- Stories containing multiple BW queries will be executed in parallel.

Recommended guidelines

- Parallel sessions will introduce additional overhead on SAP BW server resources. Ensure BW server is properly sized to handle increase in session processing.
- Use this option where performance improvement is absolutely required.

The screenshot shows the SAP System Administration interface for configuration. The breadcrumb is 'System / Administration'. The navigation menu includes 'System Configuration', 'Datasource Configuration', 'Security', 'R Configuration', 'App Integration', and 'Notifications'. The main content area is a table with two columns: 'Name' and 'Value'. The table contains the following rows:

Name	Value
Trace Level	Error
Ask for Permission when Uploading Personal Data	<input type="radio"/> OFF
X509 Issuer Name	CN=SSO_CA, O=SAP-AG, C=DE
Reverse Proxy Host	
Allow model import from File Server	<input type="radio"/> OFF
Allow model export to File Server	<input type="radio"/> OFF
Live Data Models: Enable Smart Grouping and predictive forecasting in Time Series C...	<input type="radio"/> OFF
Enable Progressive Chart Rendering	<input type="radio"/> OFF
Remote Session Timeout	30
Number of parallel sessions for BW data sources (values above 12 will be ignored)	0
Disable mobile app password	<input type="radio"/> OFF
Number of days before deleted files are permanently deleted	30

Questions?

Thank you

Appendix

SAP Analytics Cloud

Integration roadmap with SAP BW

Live connections to SAP BW

Q2/2019

Enhanced analytic capabilities

- Browser-based data blending: SAP BW live data models with imported data models
- Waterfall chart
- Variance chart (measure-based)
- Geo maps (except choropleth layers) (1)
- Custom ordering of measures in Table
- Tuple filters: chart to chart filtering based on multiple dimensions (flat presentation) (1)

Integration with BW concepts

- Charts: leverage default text presentation defined in BW query (short / middle / long)

Performance Improvements

Q3/2019

Enhanced analytic capabilities

- Data blending
 - SAP BW live with SAP BW live
- Enhanced variance chart (version- and time-based)
- Enhanced Geo maps: Support choropleth layers (1)
- Enhanced tuple filters: Support for hierarchies (1)
- Prompting enhancements: Date Picker
- Standard pivot-style analysis of BW queries

Integration with BW concepts

- Enhanced support of Queries with two structures
 - Sorting
 - Thresholds based on individual structure member combinations

Performance Improvements

Future Direction

Enhanced analytic capabilities

- Enhanced data blending scenarios
 - Blending of BW Live with HANA Live
 - Blending in BW HANA or other on-premise HANA engine
 - Blending on date dimension
- Custom grouping of dimension members
- Custom ordering of dimension members
- Calculation enhancements: Aggregation calculation (1)
- Enhanced standard pivot-style analysis

Integration with BW concepts

- Ad-hoc currency conversion
- Prompting: Ability to create and edit Variants
- Display of images in table based on BW XXL attributes
- Linked Nodes support in hierarchies

Performance Improvements

Note: Most features on this slide require SAP BW 7.50 or higher and will not be supported with SAP BW 7.40. For more details on feature support see SAP Note [2715030](#).

(1) Requires SAP HANA

This is the current state of planning and may be changed by SAP at any time.

Key links relating SAP Analytics Cloud integration with SAP BW

For customers and partners

Key links

- System Requirements & Technical Prerequisites <https://help.sap.com/doc/00f68c2e08b941f081002fd3691d86a7/2018.12/en-US/11b4e5ff76eb4747bc255d7037be1f01.html>
- Data Import Connections to SAP BW <https://help.sap.com/doc/00f68c2e08b941f081002fd3691d86a7/2018.12/en-US/5dd668839c9f44599d61e6f0016dd553.html>
- SAP Analytics Cloud (BW Support Matrix)
 - Live connection to BW queries <https://help.sap.com/doc/00f68c2e08b941f081002fd3691d86a7/release/en-US/ba7ee8dc6dcd4069b210ec712be52a31.html>
 - Data import connection to BW queries <https://help.sap.com/doc/00f68c2e08b941f081002fd3691d86a7/release/en-US/780967ff44294c01b7f66ef837695f2b.html>
- Generating SAP HANA views from SAP BW
 - Generating views from SAP BW 7.4 <https://help.sap.com/viewer/04030263a0d041309a039fa3ea586720/7.4.19/en-US/6633d851345c4770bd4e523701b9f5b0.html>
 - Generating views from SAP BW 7.5 <https://help.sap.com/viewer/04030263a0d041309a039fa3ea586720/7.5.11/en-US/6633d851345c4770bd4e523701b9f5b0.html>
- General Story design best practices for SAP Analytics Cloud <https://www.sapanalytics.cloud/resources-bi-performance-best-practices/>

Key links for more information

For customers and partners

Key links

- Road maps on sap.com www.sap.com/roadmaps
- SAP Community Network <http://www.sdn.sap.com/>
- SAP Innovation Discovery <http://www.sap.com/innovationdiscovery>
- SAP Analytics Cloud Help <https://help.sap.com/doc/00f68c2e08b941f081002fd3691d86a7/release/en-US/index.html>

Where to go to provide product feedback and ideas

- SAP Idea Place <https://ideas.sap.com>
- Influence programs <http://service.sap.com/influence>
- SAP User Groups <http://www.sapusergroups.com/>

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