



SAP DWHC PoC at Hydro

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Agenda

- Short intro to Hydro
- Current system landscape in Hydro
- PoC of SAP DWHC



01

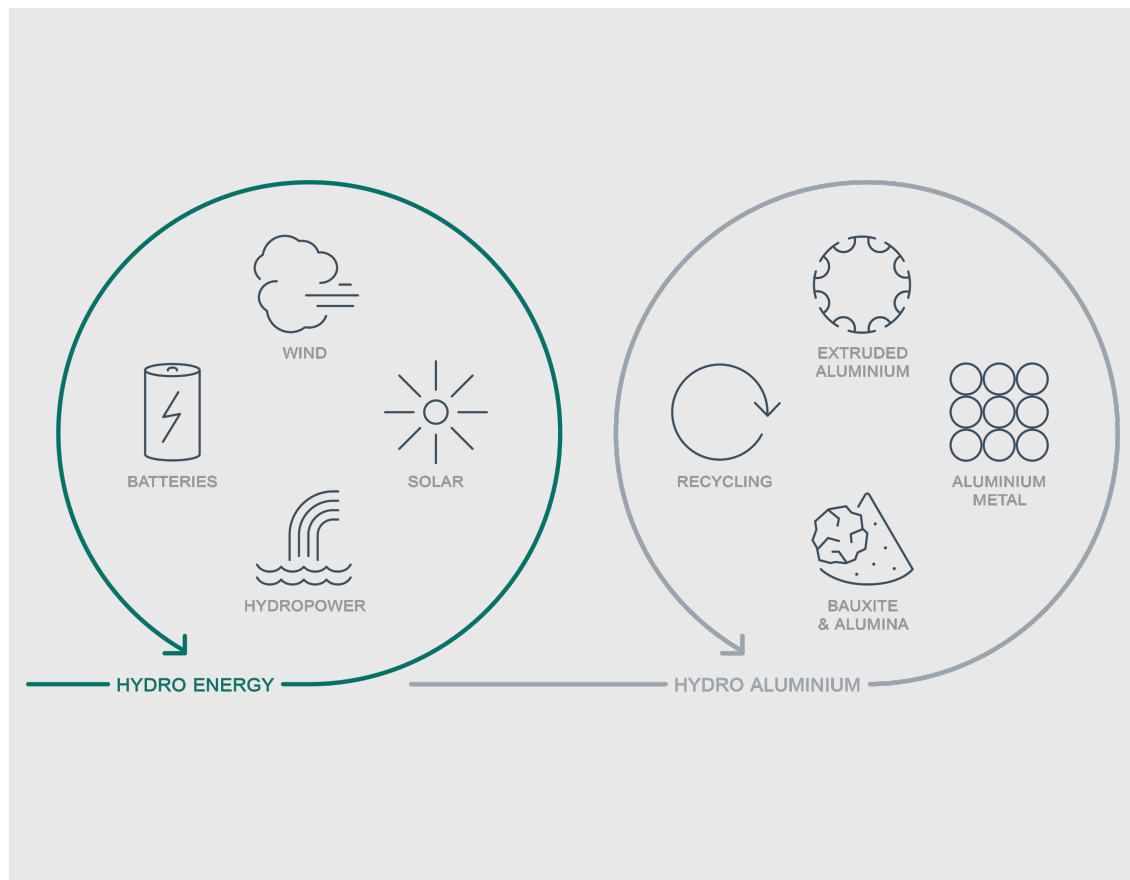
Short intro to Hydro

Hydro value chain



Building businesses for a more sustainable future

A leading industrial company with basis in renewable energy and aluminium



- Global provider of aluminium raw materials, products and solutions and of renewable energy
- First-class operations within renewable energy, raw materials, primary aluminium metal, extruded solutions and recycling
- 30,000 employees at 140 locations in 40 countries
- Market cap ~NOK 130 billion/ ~USD 15 billion^{*)}
- Annual revenues NOK 138 billion (2020)
- Included in Dow Jones Sustainability Indices, Global Compact 100, FTSE4Good

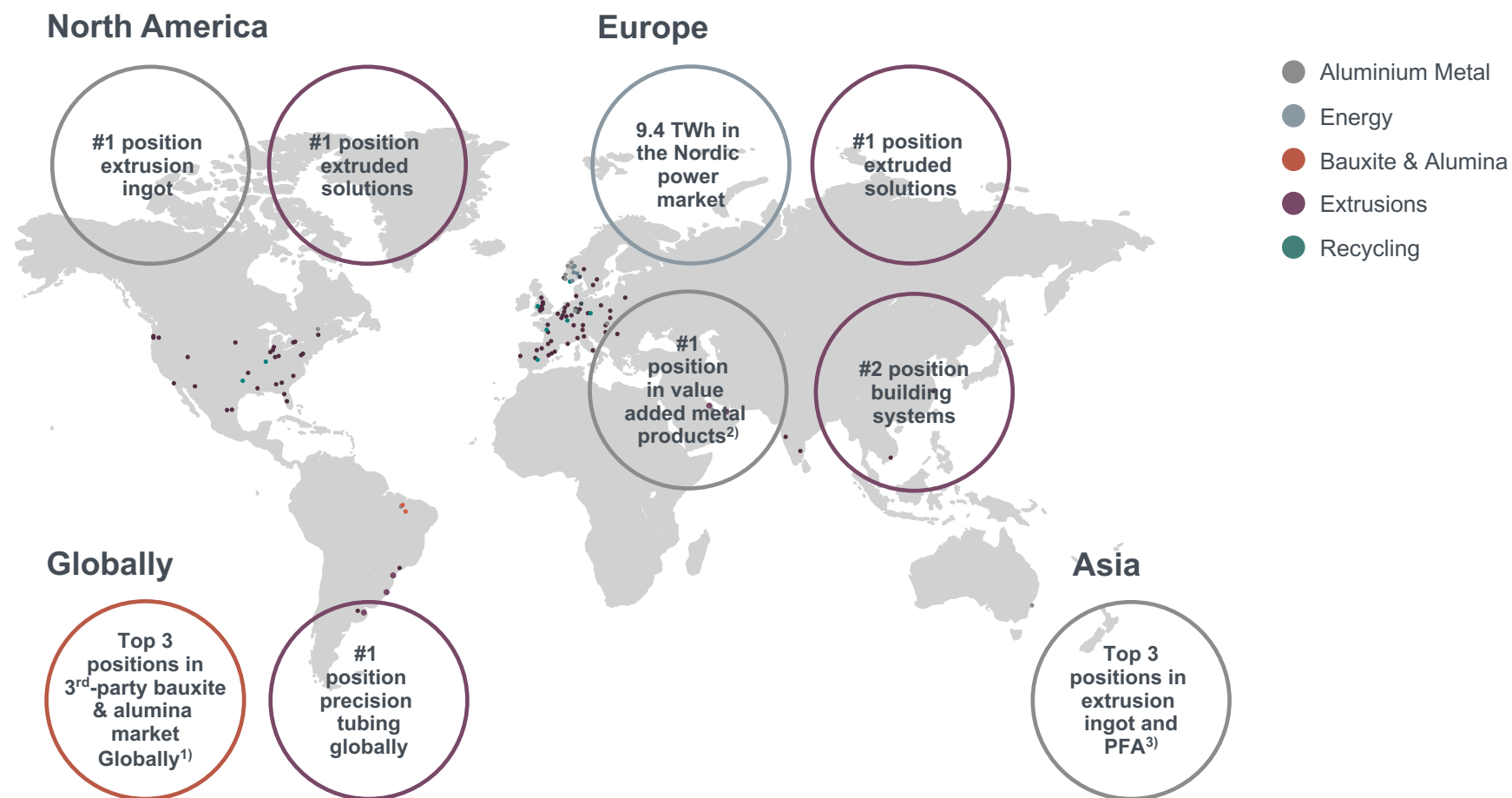
^{*)} 1) As per October, 2021

Global reach, local presence

Built on market understanding, customer closeness and competence

The aluminium and energy company

- High-quality bauxite and alumina production in Brazil
- Primary production in Norway, Germany, Qatar, Slovakia, Brazil, Canada, Australia
- 9.4 TWh captive hydropower production (operating 13.4 TWh renewables production)
- World leader in aluminium extruded profiles
- Remelting in the U.S., European recycling network
- Unparalleled technology and R&D organization



1) Outside China
2) Extrusion ingot, sheet ingot, primary foundry alloys and wire rod
3) Primary Foundry Alloys

02

Current system
landscape in Hydro



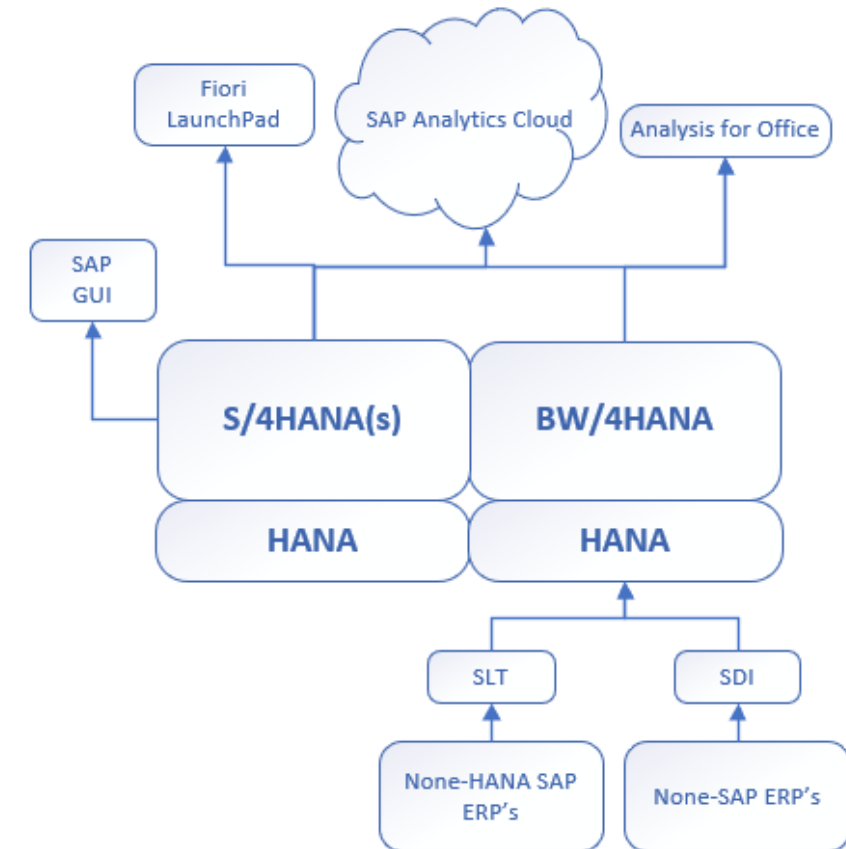
Current system landscape

Main SAP systems

- On-prem production systems:
 - SAP S/4HANA: 1909 (1) and 2020 (2)
 - SAP ECC: Multiple versions (3)
 - Others: BW/4HANA 2.0 (1), SLT (1), PO (2), Solman (1)
- Cloud solutions:
 - SuccessFactors
 - Ariba
 - Asset Strategy and Performance Management
 - Concur
 - SAP Analytics Cloud
 - SAP BTP
 - CPI
 - cFiori Launchpad
 - HANA Cloud
 - Etc.
- 120 SAP internal resources plus consultants

Current analytics setup

- Business processes and analytics is be done using S/4HANA
 - S/4HANA Analytics enables real-time operational analysis
- Consolidated and none-HANA solutions use BW/4HANA
 - BW/HANA run as a side-car for older SAP systems enabling real-time analytics
 - BW/HANA consolidate data from multiple SAP systems in real-time
- State of the art analytics and planning tools
 - SAP Analytics Cloud (SAC)
 - Analysis for Office (AfO)
- Reuse existing authorization concept in S/4HANA
 - All authorization is managed by SAP Authorization team processes



03

PoC of SAP DWHC



PoC of SAP DWHC

Reasoning

- Current on-prem data warehouse (BW/4HANA) technology is “outdated”
- Additional requirements to new data warehouse technology:
 - Skilled business users to model and develop in a secure and compliant environment
 - Data science capabilities for advanced analysis and machine learning
 - Data warehouse for cloud solutions
 - Storage service for high performance read-API's
 - Storage service for high performance apps in BTP
 - Tight integration to Azure services like DL, SQL, O365 SharePoint, etc

PoC of SAP DWHC

Business case

Hydro's SAP analytics concept is based around the use of S/4HANA, BW/4HANA and the analytical front-end tools SAP Analytics Cloud (SAC) and Analysis for Office (AO). This is the backbone for SAP enterprise analytics and highly governed by IT (CDS views in S/4 and calculations views in BW/4). The front-end tools SAC and AO enable business users with flexibility in terms for self-service visualization and light weight "modelling" functions.

But we also have some more advanced users (not IT) that are skilled in SQL and general data modelling. Today we do not have an environment for these users to do their own modelling, prototyping and data science tasks. The process today is mainly based on data dumps and local processing which is not optimal.

We would like to investigate and validate if SAP Data Warehouse Cloud could be an agile business user data warehouse for our advanced business users. S/4HANA Analytics and BW/4HANA as enterprise solutions and SAP Data Warehouse Cloud as an agile add-on to our on-prem analytical capabilities.

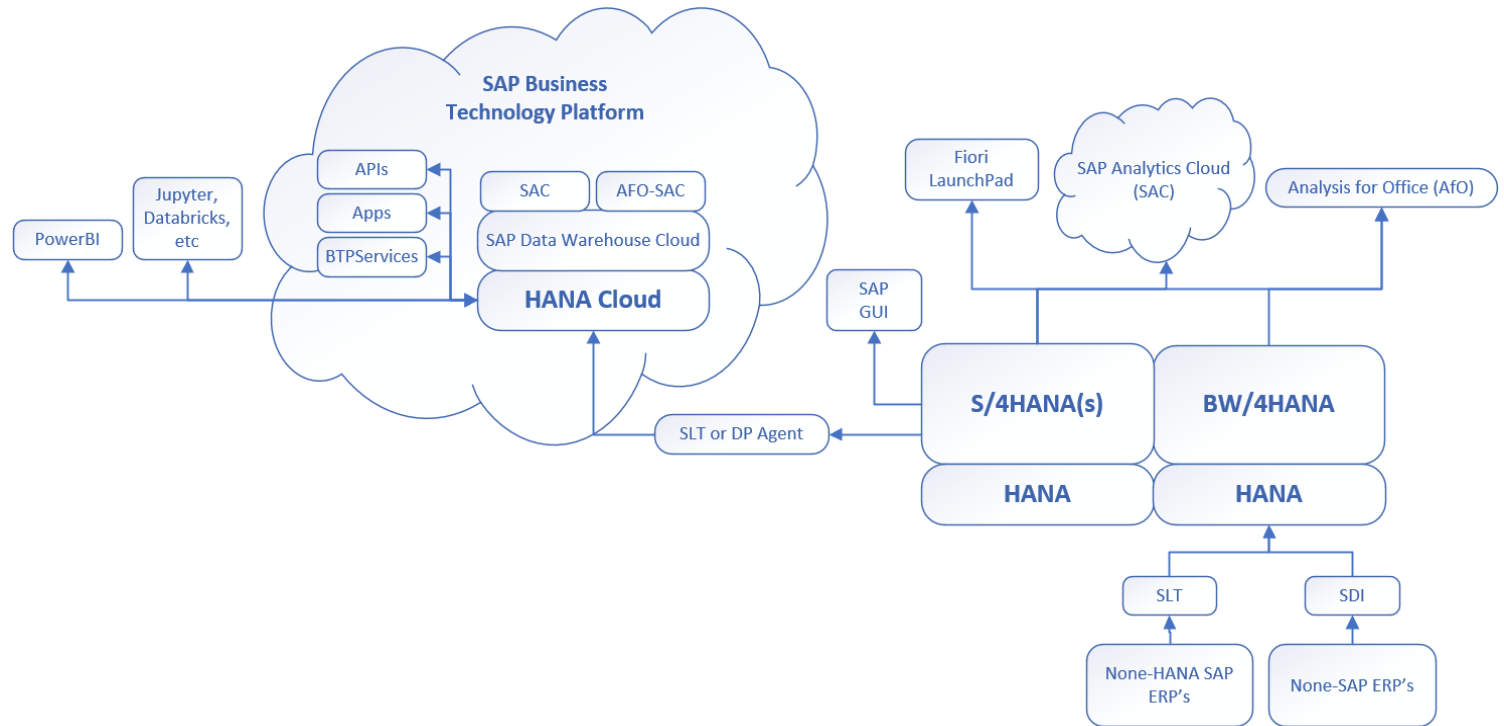


PoC of SAP DWHC



High level architecture

- SAP Data Warehouse Cloud enable real-time access to SAP data in the cloud
 - Keep the core clean!
 - Fast innovation in the cloud
 - Same front-end tools as on-prem is used:
 - SAP Analytics Cloud (SAC)
 - Analysis for Office (AfO)
- Real-time access to semantic objects and not SAP tables
 - S/4HANA 2020 enable real-time replication of CDC enabled CDS views



PoC of SAP DWHC



Scope and open topics

Scope

- Access to real-time SAP data sources
 - CDS view replication using SLT and/or DP Agent
- Access to real-time non-SAP data sources
 - Azure Data Lake
 - Azure SQL
 - SharePoint
- Data modelling
 - Free hand SQL and drag-and-drop modelling
 - ELT flows
- Data access control
- Visualization tools
 - SAC
 - Analysis for Office – SAC version
 - PowerBI
- Data science capabilities
 - Jupyter and Databricks

Open topics

- Use DP Agent or SLT to real-time replication?
- Principal propagation to external sources like Azure services?
- Sync authorization from S/4HANA into DWHC?
- Best way to model hierarchies (only super complex SQL)?
- Best way to logically set up Spaces
 - Authorization control space, data sharing space, etc



Hydro

Industries that matter

Why use SAP Analytics



Real-time analytics

Enable business users to navigate from the most aggregated level down to most detailed document level

Levered on readymade content by SAP for all business processes managed in S/4HANA

Support and development of content by SAP that follow all process development in S/4HANA (optimization and efficiency gains in processes)

Readymade functional Fiori apps that embed analytics and predictive in one business user interface

- Enablement of insight to action (Analytics to process action in one coherent user interface)

Best in class planning solution

- Analytics and planning solution in one system
- Planning calculation engine enabled by in-memory HANA Cloud database

Tight integration between front end clients SAC and AO to S/4HANA

- Support for SAP specific features like hierarchies and navigational attributes
- Pushdown from planning solution into S/4HANA for integrated planning scenarios
- Leverage the in-memory speed of the HANA database

Coherent analytics solution cross all SAP systems like S/4HANA, SuccessFactors, Concur, Ariba, etc for consistent user experience

Enablement of real-time analytics cross multiple source systems using BW/4HANA and/or SAP Data Warehouse Cloud

Reuse already set up authorization concept and support processes

- Work done in SAP role redesign project will automatically be reflected in SAP Analytics

Enable Hydro's strategy to move from on-prem to the cloud

- Support analytics and planning for on-prem, cloud and hybrid processes
- Enablement of data science and predictive scenarios