# Information Advantage: Powered by SAP

# Data Management Framework (DMF)

Data is a critical, strategic asset required to address the increased threats to U.S. National Security and its global interests. The success of information and decision advantage for Intelligence Community and Department of Defense (DoD) priorities, such as Project MAVEN and/or the Combined, Joint, All-Domain Command and Control (CJADC2) and its enablement of global, military integration(s) based on common regional approaches, hinges on successfully deploying a data layer that enables secure access and sharing from authoritative sources.

To ensure operational information and decision advantage, Intelligence Analysts and Warfighters require hybrid approaches leveraging open source, non-proprietary & proprietary software components that must integrate and perform with existing and emerging government data repositories, libraries, and systems, within multi-cloud, multi-tenant, multi-domain, common and unique environments.

SAP National Security Services (SAP NS2) is a long-term industry partner to the IC and DoD, providing platform, data, data analytics, and applications solutions within the most sensitive, operational environments, built on the foundational tenants and guiding principles of the DoD Data, Analytics, and Artificial Intelligence Adoption Strategy, as well as the IC Data Strategy 2023-2025.

Building upon decades of successful, highly sophisticated, and secure data exchanges and transactions across global markets using its world class Enterprise Resource Planning (ERP) solutions, SAP NS2 is rethinking where/how SAP products can be assembled to provide mission specific, solutions and force multiplying value.  In other words, "best in class business applications, tailored to meet mission need".

Thus, SAP NS2 has established its **Data Management Framework (DMF)**, Figure 1 below, designed to provide standardized, common governance for the IC, Combat Support Agencies, (CSAs), Services, and Joint operations, through a platform that enables interconnected, decentralized operations and data use/consumption that is scalable, secure, compliant, and cost effective. DMF is a force multiplier, using AI integrated tools to configure components to ingest and/or access any data source...wherever it may reside, enabling rapid development, deployment, and integration of applications, algorithmic services, capable of operating across various data streams and products within/across decentralized environments.

This means, regardless of an organization's data architecture (e.g., lake, mesh, fabric), their data contribution and consumption are multiplied in a manageable way, allowing for shared and unique application development and management or analyses delivery, to strengthen real-time information and decision advantage.

**DMF allows true Multi-INT integration, saving the analyst valuable time to easily discover and combine discrete intelligence information to combine/validate and turn a piece of intelligence into true, actionable verified intelligence.**
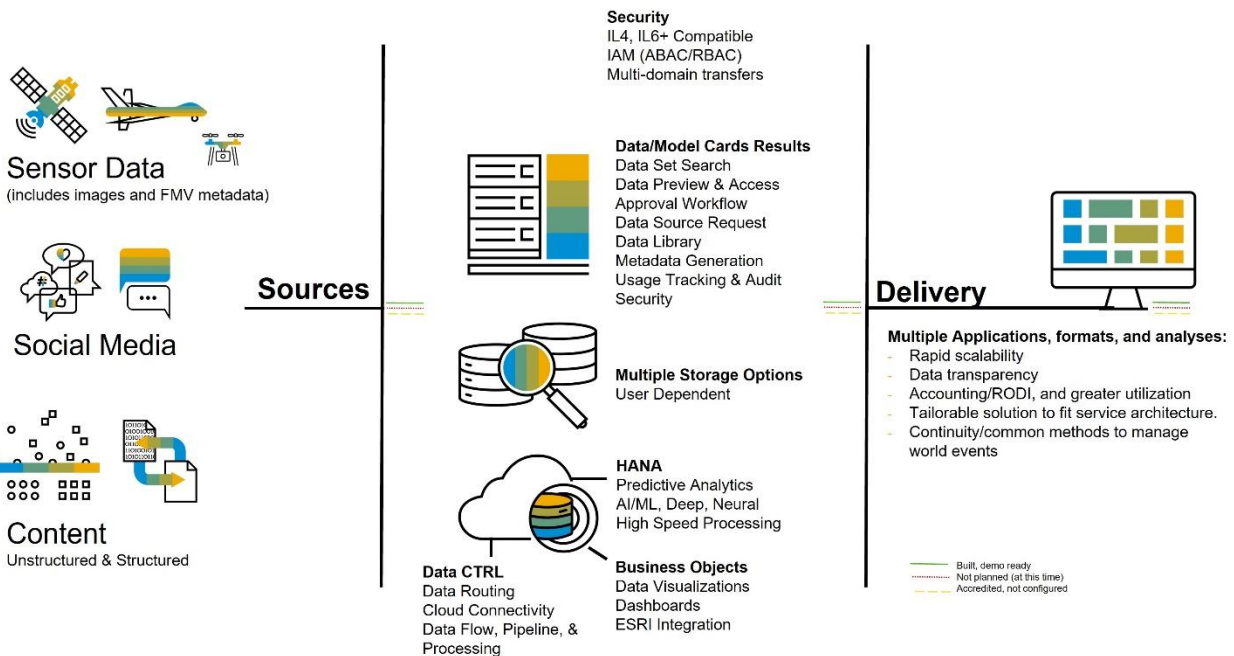


*Figure 1: Data Management Framework (DMF) OV-1 leverages SAP innovations to provide data management solutions.*

**DMF is a multi-domain, tailorable solution**, consisting of several components that work together to provide an accelerator to build a dynamic data mesh or data fabric capability. Through SAP's software data management products, DMF efficiently helps organizations overcome data challenges by accessing data from the source, building catalog entries for the items discovered and populating the entries with extracted metadata, derived labels, and tags. DMF's automated metadata extraction and data tagging minimizes the movement of content to reduce redundancies.

**CONSIDER:** Compute, processing, and storage impacts to sponsoring or gaining organizations, should be considered throughout the DIL Architecture conceptualization and design, particularly as cost efficiencies have been noted as a top DoD CIO priority over the next Future Years Defense Program (FYDP) and current/anticipated funding sources.

DMF core components include SAP **HANA**, SAP NS2 **DataCTRL**, and SAP **Business Objects**. All components can be deployed on-premises or cloud based and are accredited and in use across multiple domains today.

# SAP HANA

The SAP HANA Platform (Figure 2) is a singular solution for database management, application development, advanced analytic processing, and data integration and quality verification and serves as the core for DMF.

# S A P   H A N A   P L A T F O R M

**APPLICATION DEVELOPMENT**

Web Server · JavaScript · Fiori UX · Graphic Modeler · Application Lifecycle Management

**ADVANCED ANALYTICAL PROCESSING**

Spatial · Graph · Predictive · Search · Text Analytics · Streaming Analytics · Series Data · Business Functions

**DATA INTEGRATION & QUALITY**

Data Virtualization · ELT & Replication · Data Quality · Hadoop & Spark Integration · Remote Data Sync

**DATABASE MANAGEMENT**

Columnar OLTP+OLAP · JSON Document Store · Multi-Core & Parallelization · Advanced Compression · Multi-tenancy · Multi-Tier Storage · Data Modeling · Openness · Admin & Security · High Availability & Disaster Recovery
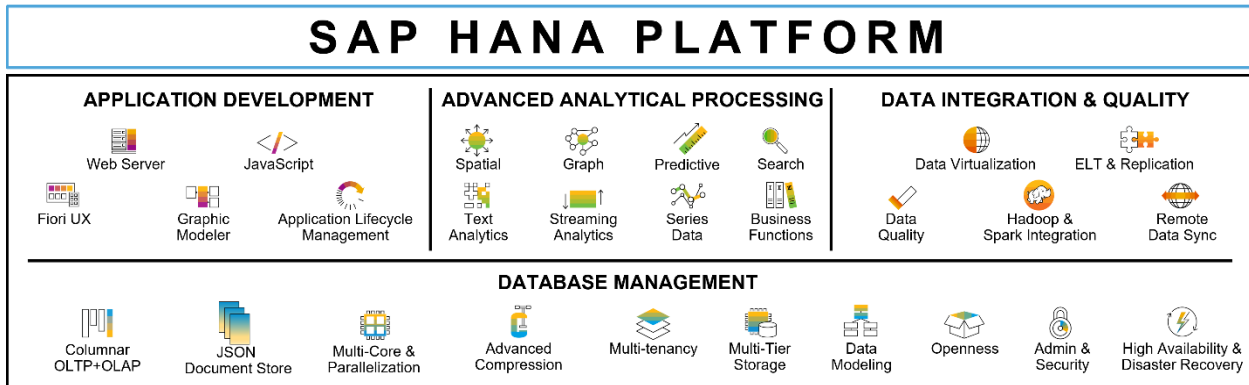
*Figure 1: SAP HANA enables simplicity for convergence and performance for data (streaming, static, structured/unstructured), applications and devices.*

Within DMF, HANA serves as a multi-model database that stores data in its memory instead of keeping it on disk. The column-oriented in-memory database design allows you to run advanced analytics alongside high-speed transactions in a single system, in real time. It provides advanced analytics including spatial, graph, and machine learning.

**CONSIDER:** Whether on prem or within a secure cloud environment, HANA's open standard configuration makes it compatible within SAP NS2's IT Cloud Enterprise that is **paired with any hyperscaler** delivering services via the Joint Warfighting Cloud Capability (JWCC) or the Commercial Cloud Enterprise (C2E).

SAP HANA stores the enhanced metadata catalog that is populated by the AI/ML microservices running in the DataCTRL platform (defined below). The configuration data that decides what AI/ML microservices to run against data products is also kept here. Data Stewards can configure what microservices to apply to different product types. The results of microservices processing can also be stored as new data products and data provenance and lineage is captured.

If multiple microservices provide similar AI/ML microservices, the data steward can decide whether to apply more than one of the same type of analytics or a specific one that is based upon a more relatable AI/ML model. For example, depending on the collection platform for video, [e.g., UAVs or low earth orbit (LEO) commercial satellites], a different video annotation microservice may be better at detecting objects in the video. Each data product is assigned an appropriate security label based upon the source connection and Role or Attribute Base Access Control (RBAC or ABAC) is applied for domain specific, user access to all data products. In addition to ABAC, data stewards can control who is able to access individual data products or groups of data products.

## SAP NS2 DataCTRL

DataCTRL is a secure, scalable, data cataloging, data transformation, analytics, and data sharing solution. Within DMF, DataCTRL has two core capabilities, the Metadata Catalog and Streaming Pipeline engine.

The **Metadata Catalog** provides a framework for managing data across an enterprise. It inventories an organization's existing data repositories, tracks new data deliveries and associated files, allows the data steward to browse and search dataset and file information, and can sync catalogs across mission environments.

The **Streaming Pipeline** engine provides a scalable and fault-tolerant data ingestion and transformation engine from any data source and provides a low-code (both Python and Java) framework for rapidly developing distributed and fault-tolerant microservices to apply ETL transforms and advanced AI/ML analysis for source data products. These AI/ML pipelines are used to extract enhanced metadata from both structured and unstructured data products including text tags, geo tags, and temporal tags. The curation of these tags provides enhanced context for a data product and relationships to other data products and allows analysts to quickly find the data they need. Examples of enhanced metadata microservices include video segmentation, image, and video annotation, named entity recognition, and geocoding and reverse geocoding. This architecture provides the flexibility for customers to bring their own models whether they be built in house or AI/ML capabilities provided by commercial vendors such as AWS and Google.

## SAP Business Objects

SAP Business Objects (SAP BO) for Business Intelligence (BI) platform integrates with thee enhanced metadata catalog stored in the SAP HANA in-memory database platform.

SAP BO is aimed at business users and program and/or portfolio decision makers. It consists of several reporting applications that allow users to discover data, perform analysis to derive insights and create reports that visualize the insights for decision makers and acquisition executives alike, thus establishing and maximizing operational "return on data investments" (RODI). RODI is essential to understanding data use, consumption and value as both DoD and IC rethink their collection and data procurement strategies.

**CONSIDER:** Metrics and value reporting are core SAP capabilities, recognized as critical consideration and priority for DoD and IC data management implementations [e.g., U.S. Army Unified Data Reference Architecture (UDRA), CDAO Data Integration Layer, DIA's Machine Assisted Rapid-Repository System (MARS), and NGA's MAVEN program, just to name a few].

SAP BO is intended to make reporting and analysis simple for business users so they can create reports and perform processes such as predictive analytics without needing the input of data analysts. To accomplish this, SAP BO uses a collection of BI tools. SAP BOBI uses drag-and-drop functions (i.e., low code / no code) and allows users to search and analyze data from a wide variety of sources. SAP BO is a front-end BI platform, so the data is not stored at the application level but is integrated from the various back-end sources.

## Additional Enablers

DMF also includes the **Data Mesh REST Application Programming Interface** (API) which is a REST API layer built on top of the enhanced metadata catalog to facilitate search and retrieval of data products to enable external applications. The **Data Mesh Web Client,** a browser-based client provided for search and retrieval of data products. In addition, data stewards can configure end user access to data products and what AI/ML microservices to automatically run against data products for extraction of enhanced metadata.

# Why SAP NS2: Secure, Local, Sovereign

DMF is designed as a solution to support the increasing threats to U.S. National Security and its global interests. SAP NS2 recognizes data is a critical, strategic asset and is committed to improving our Analyst and Warfighter posture.

- DMF provides swift, easy access to key, data driven results for information and decision advantage – providing trusted data with faster insights and tighter OODA loops.
- DMF can be deployed through varying cloud infrastructure providers, at multiple security levels, in any on-prem environment – giving customers the ultimate choice of secure deployment.
- SAP NS2 provides cleared, dedicated experts with deep mission and industry knowledge, bridging both technical and mission-oriented needs.
- SAP NS2 mitigates risk of external threat by protecting in-country deployment and leveraging an enterprise strategy to control the data and resource access within your region.

# About SAP NS2

SAP NS2 was founded to help protect and secure the mission critical operations of highly regulated organizations. As the U.S. sovereign cloud deployment arm of SAP and hybrid-cloud or on prem solution provider for highly regulated and secure domains.

We provide the unique capability for regulated industries to run market leading SAP applications without having to sacrifice security, innovation, or cost. Our team of local, credentialed experts provide the highest levels of security and compliance, deliver world class innovation, and protect critical data across all applications enterprise-wide.

Ready to learn more? Visit [www.sapns2.com](www.sapns2.com).

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