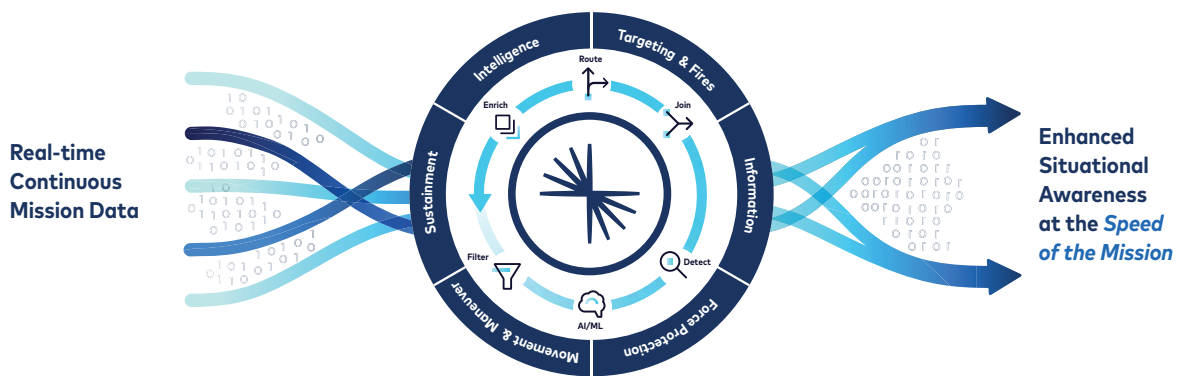


DATA IN MOTION

# If the Mission Never Rests, Neither Should Our Data

*Meeting JADO and JADC2 Objectives with Data in Motion*



Increasingly, battles and wars are fought in multiple spaces simultaneously—land, sea, air, space, and cyberspace. Meeting these threats requires a Joint All Domain Operations (JADO) strategy. Moving to this level of coordinated operations is hard—we must work around 50+ years of siloed systems that hold the data needed for a JADO approach to peer and near-peer threats.

A JADO approach means giving our warfighters and peacekeepers real time data to make decisions in the field. The battlefield is dynamic and is never at rest. Timely and accurate data is the most critical aspect to all of the warfare components. The quality of data drives decisions that are critical for the success of the mission with the fewest amount of casualties. We’ve reached the limits of what we can do with data at rest. Besides, the battlefield is never at rest, why should our data be?

Traditional database structure, even those modernized with data lakes and cloud scale data storage, cannot operate at the speed of the mission. We need to put data in motion. Data mesh architectures help bridge the gap between the systems we have and the decisions we need to support.

Data in Motion gives users access to an event stream that is continually evolving and disseminated to users in real time for use across the warfighting functions. It also helps serve the diverse sets of data consumers and the geographic they work in across military operations from HQ to the mission edge.

When applied to Joint All Domain Command and Control (JADC2) warfare components, a Data in Motion approach is nothing short of transformational.

## ***Fires and Targeting***

Whether it is a kinetic or cyber payload, the accuracy of the fire and the quick re-calculation for post fire adjustments is critical. Staff at each echelon must be able to orient on new opportunities and quickly decide, target, and execute across all domains. With targeting and fires systems separate, there is a real challenge in integrating data in real-time for confidence in outcomes.

A Data in Motion approach allows the DoD to extend existing investments by continuing to use legacy solutions but with a data mesh to connect them. Data is liberated from underlying systems and is available to users and machines in real time. Data streaming enhances decision making because commanders can know the results of a delivery in real-time and adjust appropriately. This is about ensuring a tighter feedback loop between targeting, fires, and battle damage assessment.

Targets never remain in the same place over time. The ability to detect any movement or action in real time is imperative particularly in a joint scenario. An event-driven sensor environment integrated with ISR assets will give commanders an accurate and current picture of the battlefield which leads to effective decision making for mission success and safety.

Accurate and timely Battle Damage Assessment (BDA) is essential to track progress, ensuring that commanders are able to make flexible decisions in dynamic environments. Data streaming will enhance that decision because the commander will know the results of a delivery in real time, letting commanders know of the left and right limits of their next decision.

The targeting process is an on-going circular process that is constantly changing in real-time. Data at rest reduces the effectiveness of the targeting process. Real-time data streaming ensures that the targeting process is running as concurrently as possible with the battlefield making it a more lethal, safe and effective process.

## ***Movement and Maneuver***

To enable joint force movement and maneuver, DoD needs a structure capable of converging effects at a time and place to create multiple adversary dilemmas and supporting friendly freedom of action.

With Data in Motion there is a clear view of where you are going, how you are going to get there and where all of the assets you need to carry out the mission are located. Users need data in geospatial and temporal context, shaped for the application that is going to consume it. Data must also be filtered and enriched for the mission it is supporting.

Incorporating Data in Motion into JADC2, all of the elements of maneuver, tempo, focal point, combined arms, surprise, flexibility, and decentralized command are better supported across all domains.

## ***Force Protection***

A key tenet of JADO is indications and warnings to understand the purpose of enemy actions. Knowing enemy intentions and your visibility to the enemy can together inform proactive efforts to avoid attack or conflict. A modern approach to Force protection will incorporate information from autonomous sensors, ISR, and monitoring of publicly available information. Being able to aggregate this information for presentation in maps, timelines, threat assessments, etc for real-time Force Protection situational awareness is critical. Via a data mesh, this information is available in real-time as events unfold.

## Real-time Mission Insights with Confluent

### Mission Data

Access mission data from disparate repositories and stream using change data capture with **Connect** or connect directly to a customer database

### Ingest & Process

Capture changes with a consistent data structure using **Schema Registry**; develop real-time ETL pipelines using **ksqlDB** and **Streams**; and stream data to downstream services and storage using **Connect**

### Prep, Train, & Deploy Analytics and ML

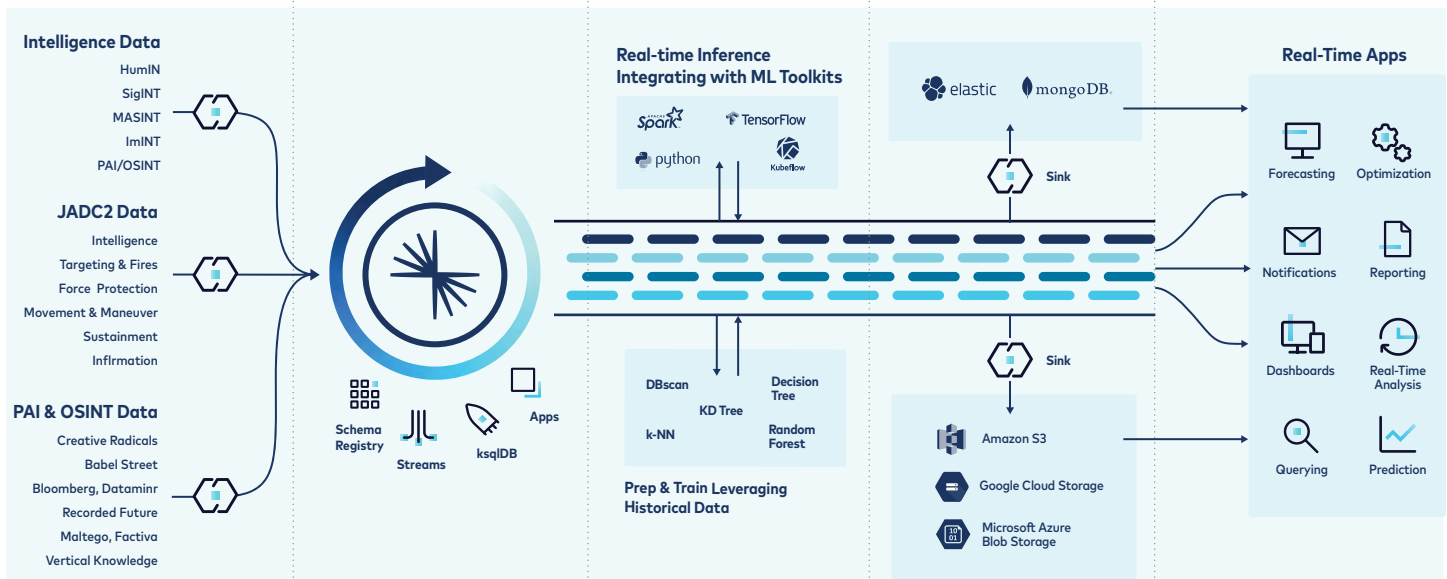
Leverage modern ML toolkits for model prep, training, and deployment; gain deeper insights with real-time inference

### Store

Keep your events in a storage service using **Tiered Storage**  
Write to databases, blob storage, or indexes using **Connect**

### Mission Insights

Gain real-time insights into streaming data; visualize information and analytics using intuitive dashboards generate customer specific reports



## Sustainment

Providing forces with the resources they need to complete their missions when they need it is a focus of JADO. JADO critically links maneuver and sustainment functions to support the logistics involved in moving through contested environments. If one looks at a few of the key principles of sustainment—Integration, Responsiveness, Economy, Survivability, Continuity, and Improvisation; a Data in Motion architecture supports them all.

- **Integration** Via data streaming you can establish aggregated feeds providing users the ability to view and work with data pulled from multiple siloed and legacy systems
- **Responsiveness** An event-driven architecture supports notifications and alerts as soon as something changes.
- **Economy** Data Mesh's reduce reliance on point to point integration and the considerable operations and maintenance costs associated with sustaining disparate systems.
- **Survivability/Continuity** Data in Motion architectures build in failover, replication, and high availability even in the face of Delayed, Intermittent, or Latent communications.
- **Improvisation** Data in Motion architectures let you see the "whole board". From a sustainment viewpoint, this means understanding the dependencies, sequences, and risks. By establishing common sustainment data mesh, in the face of supply challenges, leadership has the best chance to improvise.

## Summary

Data in Motion allows for real time understanding and visibility of all of the warfare components. Joint All Domain Operations and the C2 capabilities to enable it requires a new data-centric path forward. Data in Motion and implementation patterns like Data Mesh will greatly help in this crucial transformation for defense organizations.

### The Principles of a Data Mesh

<p><b>1</b></p> <p><b>Data</b> ownership by domain</p>	<p><b>2</b></p> <p><b>Data</b> as a product</p>	<p><b>3</b></p> <p><b>Data</b> available everywhere, self serve</p>	<p><b>4</b></p> <p><b>Data</b> governed wherever it is</p>
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## Get Your Data Moving

A Data in Motion approach will allow DoD and intelligence organizations to:

- Reduce data latency
- Receive timely dates
- Work with continually fresh data
- Place situations in temporal context

Getting your data in motion requires careful planning and the right partner. Confluent powers event streaming platform with the needed flexibility, durability, and security required for complex, large scale mission operations. Confluent is a high-speed, cloud-native, and complete platform for data in motion and event streaming.

Within the DoD, Confluent is already in use at programs such as Space Systems Command, , IPPS-A, AFRL, various USAF and USSF Software Factories, US Navy NOBLE/LOG-IT, NAVY SMIT, USCC ESIEM, DISA UCSA, and GSM. It has been deployed in production on classified networks, across security guards, in DIL network environments, been through the STIGs process, and granted ATO on various programs and customers. Confluent is also available as the only secure streaming solution deploying hardened containers (continuously scanned) on Iron Bank under the DoD Enterprise DevSecOps Initiative (DSOP).

**Ready to get started? Contact a Confluent expert today**  
 Email us at [publicsector@confluent.io](mailto:publicsector@confluent.io) | Or visit [www.confluent.io/government/](http://www.confluent.io/government/) for more details