

Data Bullets for the Warfighter

Coming in 2022

by Maj Richard Witt

Marine Corps Logistics Information Technology (LOG IT) data exists in silos across the enterprise. Data-driven organizations must enact strategies to exploit information, enable commanders to make accurate logistical predictions, gain deeper insights, boost information accuracy and speed, improve metrics, and enhance customer experience. A central repository for logistics data is required for the Marine Corps to make enterprise-wide data-driven decisions. Logistics Integrated Information Solutions—Marine Corps (LI2S-MC), an acquisition element of the Marine Corps Systems Command and the Program Executive Office for Manpower, Logistics and Business Solutions with Deputy Commandant (DC) Installations and Logistics (I&L) advocacy will seek to fulfill the Marine Corps Net-Centric Data Strategy through the Logistics Data Service (LDS). LDS promotes data as a shared resource, data independence, and data/information exchange from applications/systems and establishes net-centricity as a requirement. LI2S-MC will create a data service where applications and analysts can access data from across the Marine Corps enterprise in raw and prepared forms.

The LI2S-MC team's effort supports the fulfillment of the *38th Commandants Planning Guidance* outlining the gap in the Marine Corps' ability to collect, process, analyze and leverage data to man, train, and equip the force. LDS enables the Marine Corps to utilize data as a weapon through strategic investment in data science and machine learning, providing a platform for Marines at all decision-making levels to transform

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communal enterprise data into actionable insights, decisions, and results.

By understanding data and analytics as strategic assets supporting the Department of the Navy's DON Information Superiority Vision (ISV), LI2S-MC will provide a single interface for logistics data visibility and analytics through the LDS program. This single interface will ensure that the entire leadership chain from the battalion supply chiefs to the Commandant of the Marine Corps is looking at one source of truth.

vice quickly while improving the performance of the data service to meet present and future Marine needs as the solution continues to mature. The LDS solution provides the foundation for the Marine Corps to make better decisions faster by decreasing latency between observation and action at all enterprise levels. LDS tightens the OODA (Observe, Orient Decide, and Act) loop for Marine Corps Logistics, increasing lethality. These advanced capabilities will provide leadership with precise and reliable information to support

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By instituting collaborative productivity services and applications with data security, LI2S-MC enables interoperability, availability, and integrity through standardization, consolidating the Marine Corps portfolio, and achieving Operation CATTLE DRIVE imperatives. As a result, LDS will accelerate the transformation of legacy IT capabilities and ensure the Marine Corps maintains a competitive advantage in data superiority over adversaries.

The LDS project enables the Marines Corps to field a viable data ser-

materiel readiness and maintainability during peacetime training to wartime engagement. LI2S-MC delivers a single source of Marine Corps LOG IT data and demonstrates an alignment of data capabilities across the Department of Navy enterprise logistics.

LI2S-MC enables enterprise services and cloud-native software architectures, which provide transparency and LOG IT data standardization to enhance the workforce and warfighter ability to address technical data needs through more efficient process flows to the tactical

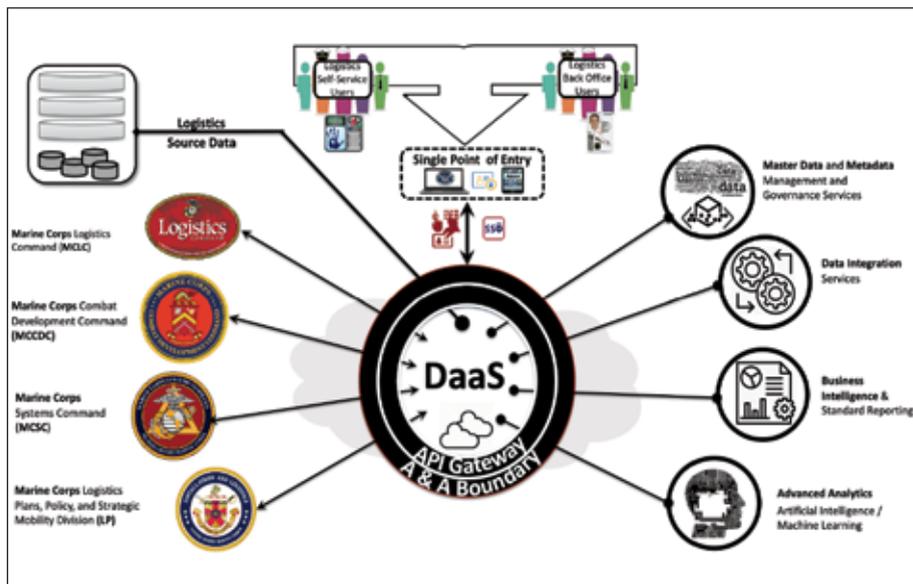


Figure 1. LDS operational view. (Figure provided by author.)

edge. The capability provides Marine Corps' governance over the data and aggregation to support data quality, exploratory data analysis, data visualization, enhanced analytics such as forecasting, and generates insights to inform automate decisions and actions in relevant cases.

Program Management Warfare-230 Data Environment and Integration has partnered with Marine Corps' Business Operations Support Service (MCBOSS) to help build a secure Amazon Web Services (AWS) Government (GOV) Cloud LDS data hub to ingest, store, and serve the Marine Corps' Logistics data from a core platform (Figure 1).

While the MCBOSS based AWS GovCloud is the present target platform, a generic reference architecture defines LDS high-level concepts and logistic data services not specific to a Cloud Service Provider. This adaptability enables other Marine Corps functional area mission owners to utilize the scalable reference architecture in different cloud environments. Additionally, the MCBOSS hosting platform and LDS application scale support future Marine Corps logistics applications. Further, the solution leverages open source initiatives such as Apache Kafka, NiFi, Python, and Anaconda to avoid vendor lock-in and leverage mature and modern codebases.

LDS has strived for complete alignment through Marine Corps IT services from inception. The program is partnered with MCBOSS as AWS GovCloud hosting provider, with fully integrated MCBOSS and LDS team structure alignment. This alignment of resources facilitates direct relationships at the team interpersonal level, thereby exploiting the Agile principle of valuing

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personal relationships. Further, LDS is aligned across the Marine Corps enterprise to include I&L, Combat Development and Integration (CD&I), and command, control, communications, computers (C4) intelligence, surveillance, and reconnaissance. These alignments result in LDS's ability to build a cloud-based architecture to support logistical information to Marines.

LDS dramatically expands the capabilities of Marine forces by providing a cohesive, consistent, and validated picture of logistics readiness through asset availability via an application with authoritative data repositories. The solution offers other Marine Corps

functional mission owners the ability to utilize a proven cloud-based data reference architecture that supports enterprise-level data analytics. The solution benefits the DON by providing complementary and compatible capabilities aligned to DON data goals. The LI2S-MC Agile acquisition process advances and matures increased data accessibility and trust throughout the enterprise by utilizing standard data access mechanisms, increased integration, and interoperability between application services, along with improved data management and governance practices.

LDS serves as the foundation of the Marine Corps Data Science needs. The Marine Corps infantry composes a relatively small but vital portion of the total force and relies on the rest of the MAGTF to support artificial intelligence, machine learning, and advanced analytics for its data intelligence. The data-centric combat capabilities of the Marine Corps rely on iterative data gathering, ingestion, and curation to support the preparation of analytics products; estimates typically indicate that 80 percent of data science needs are in preparation for analytics, as represented by the lower four sections of

the hierarchy in Figure 2. LDS provides these functions so that subject matter experts and analysts with domain expertise can spend more time providing direct value to Marine Corps decision-makers and less time cleaning and preparing data. Even more importantly, having a consolidated space for prepared data becomes a force multiplier by allowing analysts to benefit from previous efforts, thereby increasing the efficiency and effectiveness of the Marine Corps' data as a weapon.

LDS serves the needs of many different users. First, Marine Corps leadership will access pre-made dashboards to inform decisions. Second, individual Ma-

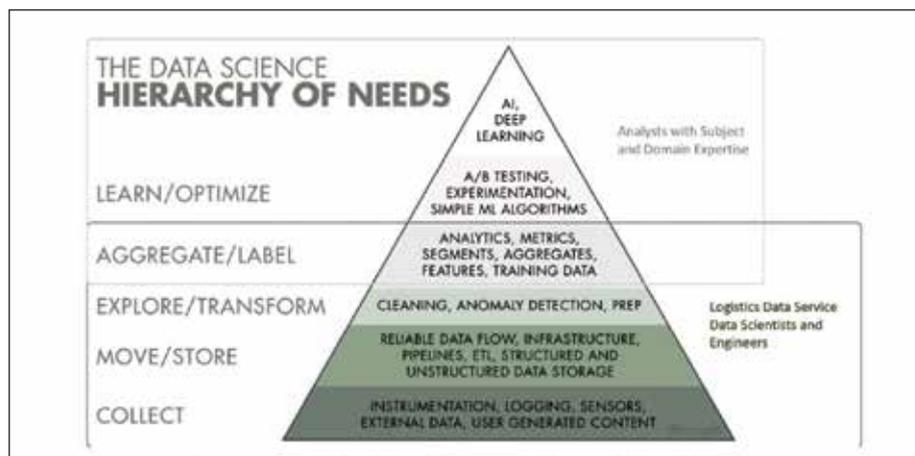


Figure 2. The data science hierarchy of needs. (Figure provided by author.)

rines will be able to create and publish their reports. The Marine can also propose that their created report, with business rules, is officially approved through a governance board to the rest of the Marine Corps. This approach leverages the expertise of Marines who best know the data while providing command and control over crowd-sourced efforts. Third, data scientists will access

leveraging of lessons learned, efficiencies from cybersecurity inheritance, and software reuse developed by other programs. LDS learned from experience with TDM-CATALYST development and has leveraged the actual tools that TDM CATALYST utilizes by tailoring them to fit LDS. This knowledge-sharing within LI2S-MC directly benefits the MCBOS AWS GovCloud hosting

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raw data to develop machine learning and artificial intelligence products. LDS provides the backbone required to create enterprise-wide predictive and prescriptive analytics through machine learning. Finally, Marine Corps governance boards will govern data exposure to ensure that data products are available, accessible, and secure.

LDS is both the beneficiary and contributor to the single hosting platform known as MCBOS. This AWS Cloud-based platform is crucial to the modernization of the Marine Corps data as a weapon effort as it allows cross-program

environment and is not readily achieved in an on-premise solution. Lengthy cybersecurity timelines often delay government IT development schedules. LDS did not encounter such delays, as the cyber security control inheritance model approved by Information, Command, Control, Communications, and Computers (IC4) assured that the LDS application inherited controls approved from the MCBOS authorization to operate (ATO). This cyber security control inheritance model is now part of the MCBOS Platform-as-a-Service offering for LDS and is available to future

Marine Corps application development. The LDS team's efforts will result in substantial future application development cost savings for the Marine Corps, making the force more agile and adapting to future mission requirements.

LDS utilizes a reusable framework for other application teams throughout the Marine Corps to rapidly build new solutions without deploying a new technology stack or re-accrediting architectural components. This reusable development framework, now part of the MCBOS Platform-as-a-Service, will significantly reduce the time and manpower required to attain an application ATO. This framework substantially reduces the accreditation timeline by up to 90 percent for any future Navy or Marine Corps application development hosted in the MCBOS environment, allowing future teams to develop software that enhances warfighting capability with a smaller documentation footprint.

By the end of 2022, the Marine Corps will have created a minimally viable product: a cloud-based data hub that retains current Enterprise Ground Equipment Maintenance governance board-defined business operations of Environmental Data Repository and Mainframe Data Repository and is accessible via a Marine Corps Enterprise Network laptop. LI2S-MC, in concert with MCSC, Program Executive Office for Manpower, Logistics and Business Solutions, DC CD&I, DC I&L, DC IC4, and the operating forces remain integral to the plan to create and sustain a flexible, scalable, and portable IT environment that can accurately interpret and leverage data to make confident decisions for equipping the force to train for battle and to sustain and win during combat operations.

