DCGS Integration Backbone (DIB) v4.0 Overview

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14. ABSTRACT

Purpose: To explain new features included in the Distributed Common Ground / Surface Systems (DCGS) Integration Backbone (DIB), version 4.0. DCGS Integration Backbone (DIB): The DIB is a cohesive set of modular, community-governed, standards-based data services focused on enterprise information sharing. DIB provides a common framework to enable the construction of cloud services such as Platform as a Service (PaaS) type of services for data exposure and transformation, and for enabling applications and users to discover and access information from a wide range of distributed sources.

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DIB v4.0 new features: The latest version of the DIB is scheduled for release on 27 March 2012 and introduces several major improvements. DIB v4.0:

1. Componentizes development and delivery to simplify the integration of new web service components and data sources.

    a. Separates DIB capabilities (e.g., portal, service registry, metadata catalog) to facilitate integration of individual components, as needed. Provides both cost avoidance (no need to maintain expensive, single-solution, interface adapters), and data exposure to a larger set of applications, analytics, and user interfaces (e.g., widgets, portals).

    b. Decreases dependence on specific software products such as JBoss, Oracle WebLogic, and Oracle Database.

    c. Maximizes value of agile development by moving "away from high-risk waterfall product release processes towards lower risk, incremental feature releases".[1]

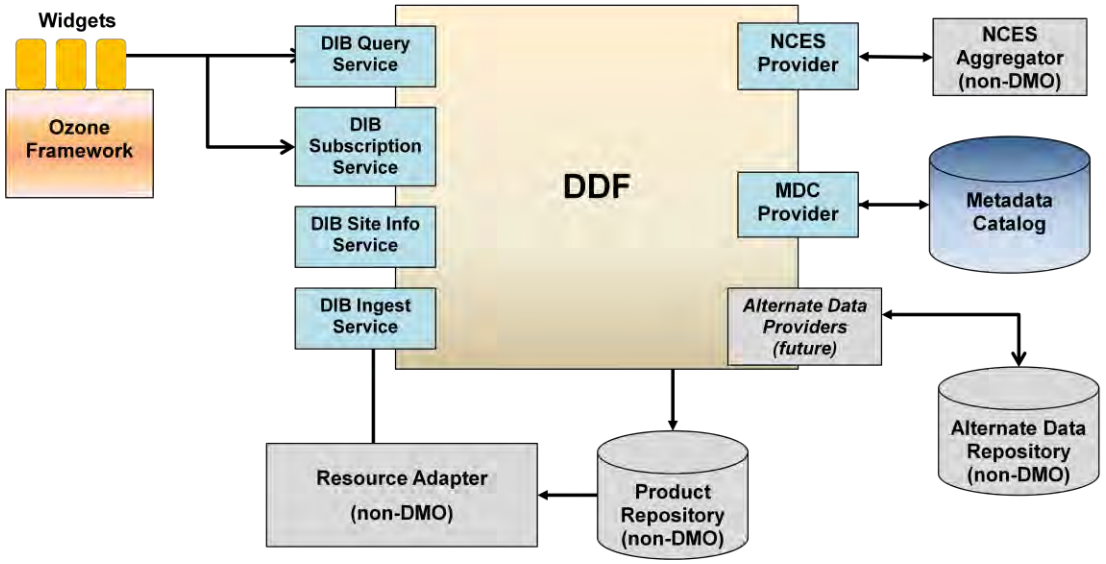
2. Incorporates new Department of Defense/Intelligence Community (DoD/IC) Content Discovery & Retrieval (CD&R) specifications, broadening the scope of DIB's existing exposure, search, discovery and retrieval capabilities by embracing the community's standards.

3. Provides the option to improve the performance of DIB node interactions in low-bandwidth environments through the use of Efficient XML Interchange (EXI).

4. Continues support for Attribute-Based Access Control (ABAC) security capability, using either the security services Reference Implementation (RI) from DIB v2.0, or any third-party RI-conformant security services implementation.

5. Introduces the Distributed Data Framework (DDF) as a means to evolve the legacy DIB Metadata Framework (MDF) to abstract services and business logic from underlying data structures and expose heterogeneous data sources (e.g., NCES).

[1] (OSGi And The Enterprise - Business Whitepaper, OSGi Alliance, dated 23 June 2011, p.9)



Distributed Data Framework (DDF): The greatest DIB v4.0 improvement over v3.0 is the introduction of the Distributed Data Framework, which becomes the core of DIB v4.0 and beyond. The DDF:

1. Provides a flexible integration framework with Advanced Programming Interfaces (APIs) to facilitate customization of queries and results (e.g., sorting preferences, KML conversion), while maintaining interoperability. The APIs provide a defined and extensible set of interfaces to support quick and easy integration with a variety of data repositories and/or applications.

2. Exists as Government Open Source Software (GOSS) based on a Free and Open Source Software (FOSS) core.

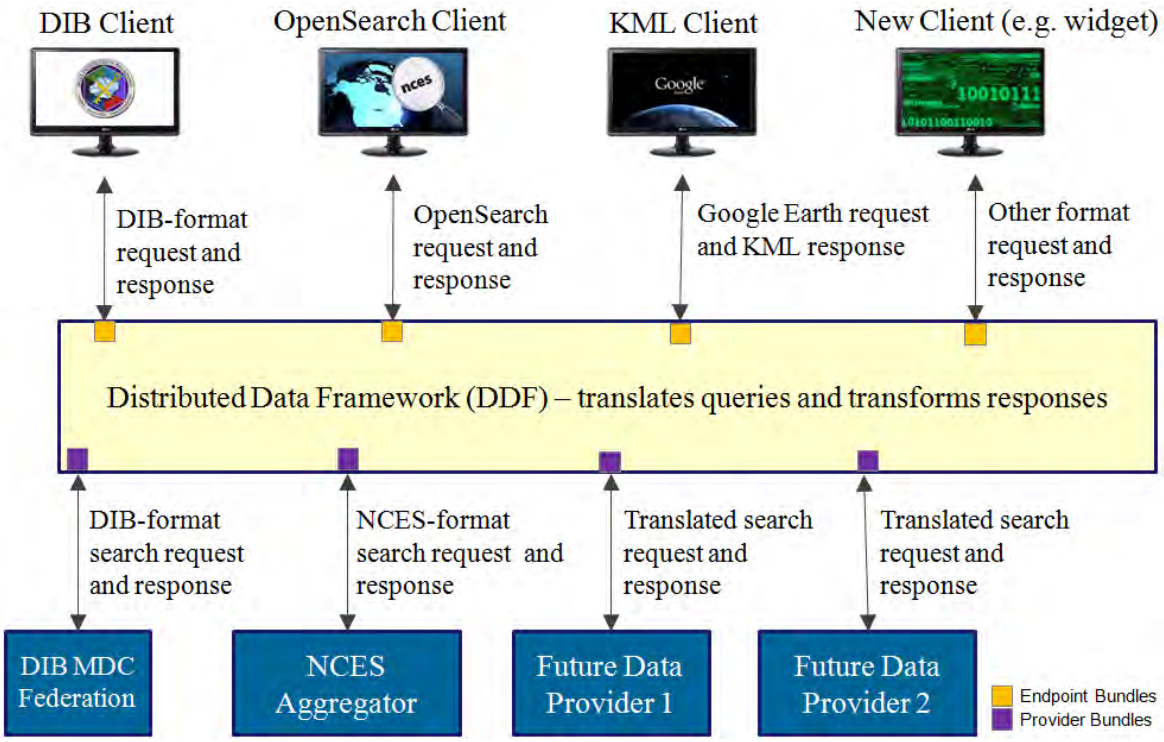
3. Replaces the legacy DIB portal with an Ozone Widget Framework (OWF) interface to leverage on-going community investment in widget development.

4. Re-hosts existing web service interfaces[2] from the legacy Metadata Framework (MDF) that serve as the basis for interoperability and backward-compatibility, while deprecating MDF code.

5. Provides a data abstraction layer, enabling integrators to decouple user interfaces (portals, widgets, etc.) from the underlying data repositories, thereby breaking application „stove-pipes" and facilitating migration to, and maintenance of, a service oriented architecture (SOA).

6. Provides a standard means of interfacing to not only the Metadata Catalog (MDC), the operationally-proven community standard for federated data-sharing that continues to exist as a key DIB feature, but also to a wide range of non-MDC based sources of command and control (C2), Intelligence Community (IC), unstructured, and "big data".

[2] The MDF web service interfaces and capabilities have been established as loosely coupled capabilities on the DIB v4.0 DDF providing higher performance, lower total cost of ownership, and greater deployment flexibility. This facilitates the continued use of legacy applications built against the Metadata Framework SOAP and Java Script Object Notation (JSON) services while migrating to the new DDF.



DIB v4.0, DDF v2.0, and OSGi: Although it is to be released with DIB v4.0, the DDF v2.0 is a separable component that will have its own release cycle.[3] The DDF follows the OSGi set of commercial standards and best practices, governed by a broad-reaching industry alliance, for developing and deploying modular Java code. The OSGi Alliance points out a number of benefits to this approach in their *OSGi And The Enterprise - Business Whitepaper*, dated 23 June 2011.[4]

1. OSGi bundles tend to be small, cohesive and de-coupled, significantly reducing development and debug time.

2. With the appropriate organizational incentives in place to encourage re-use over code creation, further significant efficiencies are realized by...re-use of OSGi Bundles and Services.

3. Current industry trends are collectively shifting away from rigidly coupled, static, opaque environments towards adaptive, loosely coupled systems which are dynamically assembled from well-defined software components that run across a fluid set of compute resources.

4. OSGi is the industry standard for Java modularity.

[3] DDF represents the maturing of an initial OSGi-based capability released with DIB v3.0 known as the Message Translation Service (MTS) v1.0. The use of "v2.0" for DDF versioning is meant to acknowledge its MTS origins while also clearly differentiating DDF as a major ("dot-zero") improvement over its MTS predecessor.

[4] http://www.osgi.org/wiki/uploads/Links/OSGiAndTheEnterpriseBusinessWhitepaper.pdf

Conclusion: The introduction of DDF v2.0 as part of the DIB v4.0 release represents a major leap forward for the DCGS enterprise community. Not only does DDF enable continued improvements in data-sharing and interoperability, but just as critically it ushers-in a whole new level of flexibility, modularity, and standardization for integrating new data sources, data transformation services, and user-facing interfaces including the Ozone Widget Framework (OWF). The DDF component of DIB v4.0 can form part of the "connective tissue" between Application Service Providers (ASP) and Infrastructure Service Providers (ISP) by providing a common approach to mitigating the impact of on-going transitions, while at same time maximizing interoperability with the DCGS community and the larger Defense Intelligence Information Enterprise (DI2E).

For more information about DIB v4.0 please see the video of the DCGS Developers Forum held on 13 Dec 2011 and stored on Intelink-U, iVideo, at: https://www.intelink.gov/go/vKotZE