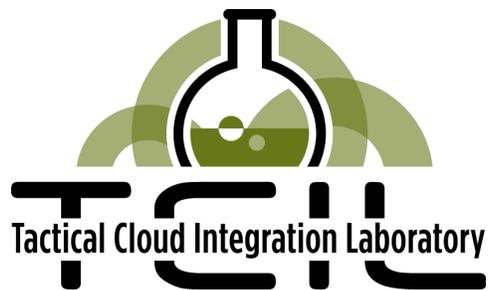


**Intelligence and Information Warfare Directorate (I2WD)
Tactical Cloud Integration Laboratory (TCIL)**

Industry Day White Paper

January 18, 2013



Distribution A: Approved for public Release; Distribution is Unlimited.

1. Industry Day Overview

A. Background

The Intelligence and Information Warfare Directorate (I2WD), Tactical Cloud Integration Laboratory (TCIL) focuses on developing and integrating new capabilities by “bridging” developers, vendors, and solutions with operational users in a cohesive, isolated test environment. Industry partners, internal research and development (IRAD) projects, and other research and development (R&D) efforts work with the TCIL team to develop and integrate capabilities in the lab in order to present new capabilities to end users as part of the user feedback process.

The 2013 I2WD TCIL Industry Day is an opportunity for potential industry partners to learn about the technologies currently used and under development in the I2WD environments. Stakeholders in I2WD have identified technology shortfalls in current capabilities and have requested industry, government agencies, and academia to learn about these shortfalls.

B. Industry Day White Paper

This document gives industry, government agencies, and academia a brief summary of operations and services currently deployed in the I2WD TCIL environment. This document does not contain proprietary information, does not fully detail all TCIL technologies or configurations employed, and should not be considered comprehensive.

C. Industry Day Participation and agenda

All who would like to participate in the upcoming Industry Day need provide contact information and number of attendees to one of these I2WD contacts numbers:

- 443-861-0765
 - 443-861-0714
 - 443-861-0696
- On the day of the event, vendors may enter the facility fifteen (15) minutes before the scheduled presentation time. The presentation from I2WD will begin at approximately 0900 local time.
 - The format will be an overview of current fielded technologies followed by an overview of the future technologies being evaluated. The Analyst Working Group (AWG) will then present capabilities being sought. The briefing will round out with a question and answer session. Industry partners will be given a list with descriptions of the capabilities being sought. The Industry Day will end promptly at 1430 local time.
 - Vendors will then be given a 45 day period to deliver back to the I2WD government staff a white paper with supporting documentation for consideration to come back to demonstrate the capability and how it can be used in the current environment to fill one or more of the capabilities desired by I2WD.

- Within 30 days after, the Government will provide written feedback to each vendor who presented. This feedback will indicate the Government's desire to pursue further discussions and/or invite the vendor back for a more in-depth demonstration, or thank the vendor for his or her presentation.

D. Disclaimer

Receipt of this or any TCIL architecture, design, welcome package, or other documentation or submission of information for the Industry Day does not constitute a guarantee of involvement. This document represents a summary outline of the TCIL's efforts and is not a legal binding contract, guarantee of contract, or guarantee of future involvement.

E. Confidentiality

No product information submitted to the prime contractor or government representative will be disseminated or otherwise shared with competitors or other vendors. Likewise, no information on Distributed Common Ground/Surface System-Army (DCGS-A), I2WD, or TCIL operations or technologies will be shared without the consent of government representatives, the prime contractor, and appropriate non-disclosure agreements in place.

2. Industry Day Location

The 2013 Industry Day will be held at Aberdeen Proving Ground (APG), MD, Building 6000.

- Enter post through the 715 Gate from Highway 40
 - Non- Department of Defense (DoD) Common Access Card (CAC) identification holders will need to stop at the Visitor's Center at gate 715 before entering the base to obtain a visitor's pass
- Turn right onto Combat Drive
- Follow Combat Drive around the bend
 - Make the second or third left into the complex
- Drive to the end large parking lot, building 6000 is the last building (smaller than the rest of the buildings you just passed)
- Enter Building 6000

3. Overview

As part of the DoD command, control, communications, computers, intelligence, surveillance, and reconnaissance transformation, the DoD Distributed Common Ground/Surface System (DCGS) effort provides the framework for the military services to develop a common interoperable family of systems to task, post, process, use, and disseminate ISR sensor data and intelligence products. DCGS-A is the Army component of the overarching DoD DCGS program, and integrates with other service branches' DCGS, as well as with databases and systems owned and operated by the National Intelligence Community. DCGS-A leverages national and Joint ISR capabilities down to the joint task force level, upper echelons (corps, division), and into lower echelon systems, including brigade, future Battle Command System, and Land Warrior. DCGS-A also facilitates information-sharing with coalition partners.

DCGS-A supports numerous components, including targeting, ISR management and synchronization, and exploitation of information through automated and semi-automated capabilities. The program includes the fusion of input from multiple sources and provides tools that improve the analysts' ability to glean valuable information while developing the intelligence picture.

A. Summary

Cloud computing is emerging as the computational and storage paradigm for ultra-scale data and analytics. The Program Manager (PM) DCGS-A has identified the need to establish operational clouds at core, regional and edge nodes to support Army intelligence data collection and analytics capabilities. The primary goal is to establish an infrastructure that supports storage and management of multi-INT data and provides a computational framework that brings analytics to the data. The cloud model effectively provides the ability to ingest data once, move data rarely, and reuse data often. Cloud architecture comprises vast computational resources that allow for rapid configuration while supporting massively parallel processing over petabytes of distributed data. This solution delivers both agility and power at scale.

The cloud revolution and the new agile development approach being adopted by PM DCGS-A for its cloud initiative makes it possible to more efficiently incorporate new technologies and capabilities into the baseline effort. The current deployed production environment, DCGS-A Standard Cloud (DSC), manages rapid development, integration, deployment, and sustainment in an interconnected cloud environment. The complexity of this solution is a significant gap that affects performance and has the potential to impact the ongoing mission.

The Intelligence and Information Warfare Directorate (I2WD), as executor of this initiative, has established a development and test environment to facilitate integration of new capabilities. This environment, the TCIL, will help close the technology gaps that exist in the current system while expediting the ability to meet the needs of analysts in theater.

B. Mission

The TCIL is focused on agile development and integration of new capabilities by “bridging” developers, vendors, and solutions with operational users in a cohesive isolated test environment. Industry partners, IRAD projects, and other R&D efforts work with the TCIL team to develop and integrate capability in the lab. This will provide opportunities to present new capabilities to end users as part of the user feedback process. To establish rapid evaluation of candidate capabilities, the PM DCGS-A and United States Army Intelligence School & Center at Fort Huachuca, AZ, plan to have personnel access the DSC at APG, MD, from the Intelligence Battle Lab, and Kelly Ops on a recurring basis. The TCIL team, by engaging stakeholders in the development process, ensures that the developed capabilities are aligned with the needs of analysts. The TCIL is tasked with supporting analysis and assessment of evolving operational and technical architectures; investigating emerging cloud hardware, software stacks, analytics, and security; and accelerating the sharing of data across services and agencies.

Current TCIL efforts include video processing, predictive analytics, semantic processing, geospatial, collection management, cloud performance, and edge node development. As work efforts are developed and matured, the TCIL teams will work with the DSC systems engineering team to identify and develop the maturity plan to integrate features into the DSC baseline. Such features will include architectural modifications, incorporation of security, and development of workflows and dataflows to ensure smooth and holistic integration of capabilities with the evolving baseline development effort.

The Army, by providing a framework for third-party developers to integrate unique solutions into the TCIL, will enable industry partners to provide specific capabilities over black box solutions. The Army will validate the need for specific capabilities before adoption, and the TCIL effort will reduce the integration time with the baseline and provide opportunities to refresh technology at a more rapid pace than previously possible. The TCIL serves as a forum for the development, vetting, and testing of multi-INT analytics as the DSC program matures and new data types are ingested. The process is described in Figure 2.

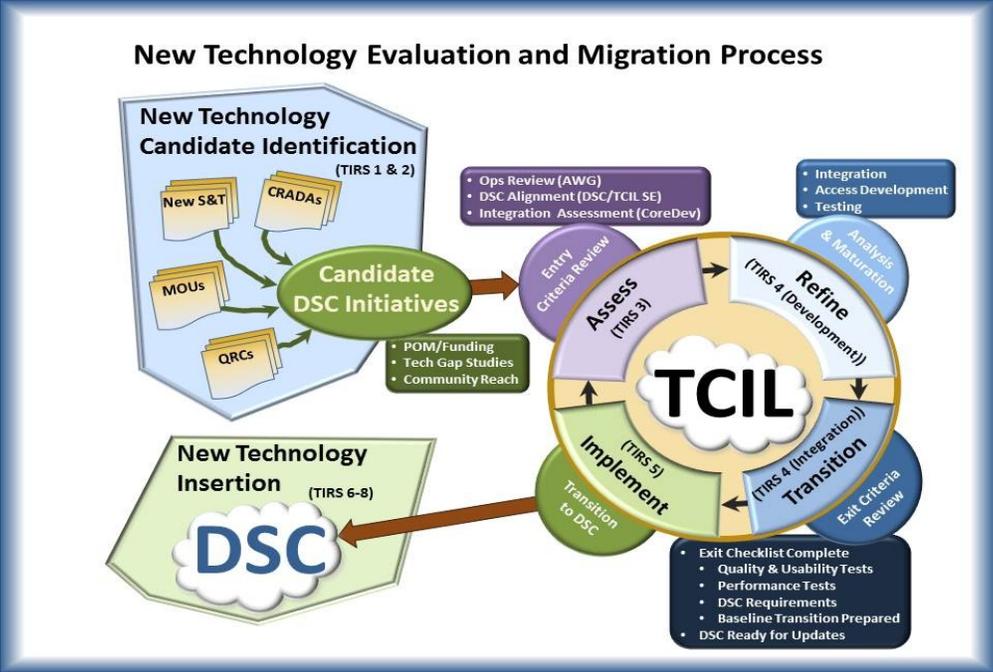


Figure : I2WD TCIL Evaluation Process

C. TCIL Cloud

The TCIL environment comprises several open-source cloud technologies leveraged in a unified configuration that can be adapted to the capabilities and needs being evaluated. The cloud-based solution is designed to exist on industry-standard hardware in a traditional rack configuration that can be mounted inside a secure shipping container and deployed anywhere in the world.

The TCIL system comprises the following core components:

Product	Description
Hadoop Distributed File System (HDFS)	An open-source version of the Google file system capable of scaling easily to the exabyte level
Hadoop Core Parallelization Infrastructure	An open-source version of the Map/Reduce programming model capable of parallelizing tasks across a large number of computer nodes
Cloudbase	Provides capabilities similar to Google’s BigTable design; sits atop Hadoop and stores structured data at the petabyte level
Condor	An open-source management infrastructure for cloud computing environments that support elasticity
Puppet	Provides system automation capable of software configuration and deployment, updates, inventory tracking, and system management for the cloud