CROSS DOMAIN SPATIAL DATA INFRASTRUCTURE

CHRIS TUCKER LOOKS AT SPATIAL DATA INFRASTRUCTURE IMPLEMENTATION ACROSS DOMAINS

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For years, the same spatial data has been repeatedly replicated and hosted on multiple security domains so that users with different security authorizations could access it. This has led to complicated and costly schemes for upward and downward synchronization of data. Moreover, it has required the acquisition of multiple hardware and software instances, for which each require individual operations and maintenance (O&M) budget.

Interoperable Solution

The emergence of label secure database technology, sophisticated high assurance security appliances as well as changes in security policy now make it possible to avoid such costly implementations, which drastically reduce mission latency. Ultimately, this brings more timely data to operators, analysts and support personnel.

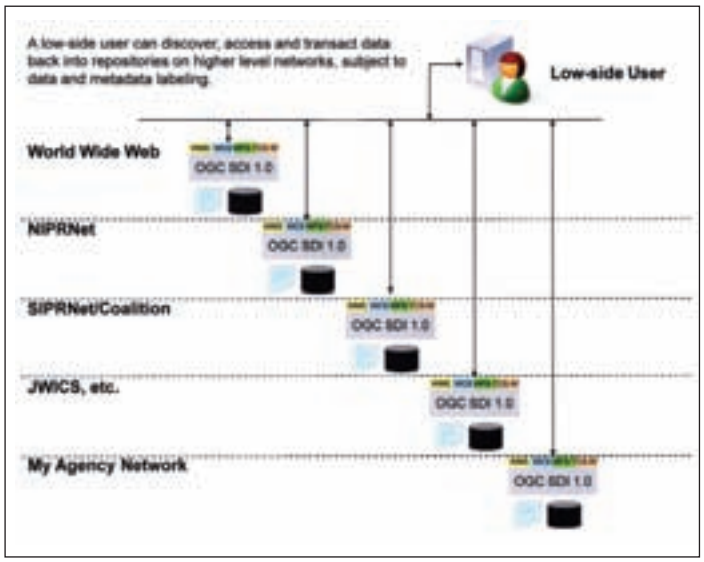
Open Geospatial Consortium (OGC) compliant web services designed to support Oracle Label Security, also thereby support Oracle's Cross Domain Security Solution (CDSS). This label secure environment enables data of different classifications to reside in the same database, enabling users with different roles and clearance levels to access the same database, and only the data needed.

User Scenarios

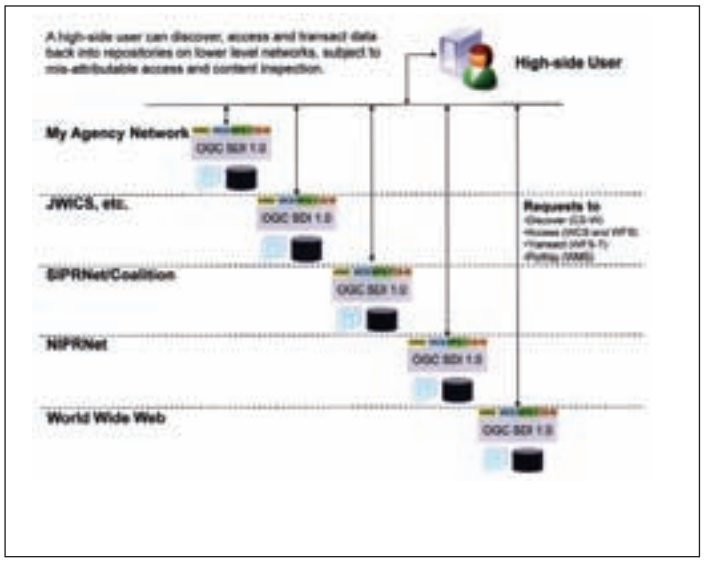
The most advanced Cross Domain Spatial Data Infrastructure solutions allow four distinct user scenarios:

- ***Reach Down***: A client application or user on a high-side network transparently requests data from a low-side web service.
- ***Transact Down***: A client application or user on a high-side network transacts data from the high-side via a low-side web service into a low-side database.
- ***Reach Up***: A client application or user on a low-side network requests data from a low-side web service fronting a high-side, label-aware database.
- ***Transact Up***: A client application or user on a low-side network transacts data via a low-side web service into a high-side, label-aware database.

A few geospatial technology companies offer web services support for label secure database solutions, such as CDSS, making user cases ***Reach Up*** and ***Transact Up*** possible. However, additional technologies are often necessary to accomplish user cases ***Reach Down*** and ***Transact Down***. It is important that Cross Domain Spatial Data Infrastructure leverage OGC compliant web services and support Oracle Label Security, within the larger context of Safe Harbor Systems' Common Cross Domain Framework (CCDF). A constellation of high assurance technologies enables users to transparently consume geospatial data from any network, subject to the security level of the



Low-side user capabilities.



High-side user capabilities.

data and the target network.

CCDF utilizes a controlled interface acting as a proxy between two networks, allowing auditable, transparent access by paired, known identities on either network. Furthermore, CCDF can process data from a cross-domain enabled database. In this instance, CCDF makes use of Oracle's CDSS to store and protect data. The CCDF databases will label content with the appropriate security label.

As connections to the database are being established, environmental factors will be taken into consideration to determine access and release of the stored content. For example, in the ***Reach Up*** and ***Transact Up*** cases, only data for the same security level as the network being accessed from will be retrieved from the database; regardless of the user's clearance.

In a ***High-to-Low*** scenario, a 'reverse proxy' technique is utilized. Proxy and reverse proxy are mirror images for what they are intended to protect. For a proxy environment, a controlled interface acts on behalf of a network client. A low side identity or address is mapped to a high side identity or address. This technique is important for the ***Low-to-High*** user case. In contrast, the reverse proxy acts on behalf of the server. Auditing is still accomplished on both sides and can be correlated for forensic purposes.

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