



HEXAGON

Product Description

Geospatial SDI 2022

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Introduction

Geospatial SDI is a suite of services installed and applied on the server side to manage and serve secure or licensed information using standards-based Web services.

Geospatial SDI is composed of a set of fully configurable Web services that work on top of OGC-compliant services and extend their standard functionality with additional features in order to satisfy business-driven customer requirements, including user authentication and authorization, service quality validation, event logging, and performance monitoring.

Geospatial SDI adheres to Open Geospatial Consortium (OGC®) and International Standards Organization (ISO) standards for Web services and metadata compliance.

Geospatial SDI can extend Web services based on GeoMedia® WebMap, ERDAS APOLLO, or any other vendor's OGC-compliant product to assure the comprehensive set of services required for implementation of custom secure Spatial Data Infrastructure (SDI).

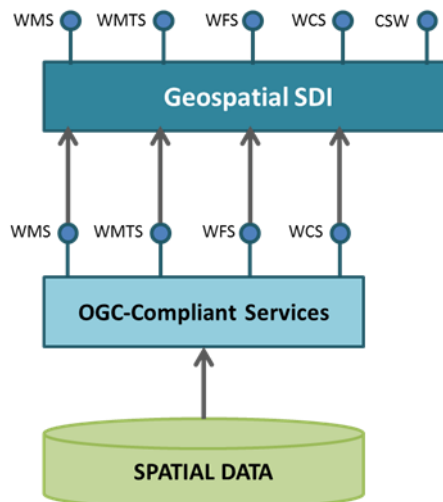


Figure 1. Geospatial SDI – General overview

Geospatial SDI includes the following services:

- CSW (Catalogue Service for the Web)
- WMS Façade (Web Map Service Façade)
- WMTS Façade (Web Map Tile Service Façade)
- WFS Façade (Web Feature Service Façade)
- WCS Façade (Web Coverage Service Façade)

Key Features

Façade Architecture

Geospatial SDI services work as a façade, providing OGC-compliant proxy services over other web services, including Web Map Service (WMS), Web Map Tiling Service (WMTS), Web Feature Service (WFS), and Web Coverage Service (WCS). This architecture is also known as proxy OGC Web Service (proxy OWS).

The key characteristics of façade architecture are:

- Client application (service user) communicates directly with the façade
- Façade filters the request based on the user-granted rights and/or other criteria before passing it to the appropriate underlying OGC services
- Response can be served back to the client application as it was composed by underlying OGC service, or it can be manipulated by façade before return
- Façade architecture also supports the use of Web services from other providers

Security and Authentication Methods

Geospatial SDI enables controlled access to the OGC-compliant services. The access permissions can be granted to:

- Service instance
- Dataset, feature class (in case of WFS service), or layer (in case of WMS service)
- Spatial area

In addition, the access permissions may be granted to a user for a limited time (e.g., time period, weekdays, time of the day) and IP address.

Service Logging

Geospatial SDI provides useful support for logging communication with the services. The service recording can be set for the following items:

- Service requests can be logged for the requested layers, features, BBOX, data format, coordinates system, or username
- Service responses can be logged for the file size, the number of pixels (in case it is WMS service), the number of characters, and the number of objects (in case it is WFS service)

Performance Monitoring

The Geospatial SDI monitoring mechanism allows real-time continuous recording of service performance parameters, including:

- Average response time
- Number of requests per minute or other configured time period
- Time of request initialization and completion

ISO/OGC Standards

Geospatial SDI offers services compliant with ISO and OGC standards. The following interface specifications are supported:

- WMS Façade (Web Map Service Façade)/INSPIRE View Service Facade (Web Map Service Facade)
 - 1.3.0
 - OGC 06-042 OpenGIS® Web Map Server Implementation Specification (ISO 19128)
 - Technical Guidance for the implementation of INSPIRE View Services - version 3.11
 - 1.1.1
 - OGC 01-068r3 Web Map Service Implementation Specification
 - Technical Guidance for the implementation of INSPIRE View Services - version 3.11

- WFS Façade (Web Feature Service Façade)
 - 2.0.0
 - OGC 09-025r1 OpenGIS Web Feature Service 2.0 Interface Standard (ISO 19142)
 - Technical Guidance for the implementation of INSPIRE Download Services - version 3.1
 - 1.1.0
 - OGC 04-094 Web Feature Service Implementation Specification
 - Technical Guidance for the implementation of INSPIRE Download Services - version 3.1
- WMTS (Tile)/INSPIRE View Service Façade (Web Map Tile Service Façade) (1.0.0)
 - OGC 07-057r7 OpenGIS® Web Map Tile Service Implementation Standard
 - Technical Guidance for the implementation of INSPIRE View Services - version 3.11
- WCS (Coverage) Service Façade (Web Coverage Service Façade)
 - 1.0.0
 - OGC 03-065r6 Web Coverage Service (WCS), Version 1.0.0
 - Technical Guidance for the implementation of INSPIRE Download Services using Web Coverage Services (WCS) 1.0
 - 2.0.1
 - OGC 09-110r4 Web Coverage Service (WCS) Version 2.0.1
 - Technical Guidance for the implementation of INSPIRE Download Services using Web Coverage Services (WCS) 1.0
- CSW (Catalogue)/INSPIRE Discovery Service (Catalogue Services for the Web) (2.0.2)
 - OGC 07-006r1 OpenGIS® Catalogue Services Specification
 - OGC 07-045 OpenGIS® Catalogue Services Specification Version 2.0.2 - ISO Metadata Application Profile
 - Technical Guidance for INSPIRE Discovery Services - version 3.1

Compatible with any OGC-Compliant Client

Geospatial SDI services can be consumed by any OGC-compliant client application while at the same time ensuring secured access control. Geospatial SDI enables:

- Ubiquitous communication via OGC-standard interfaces
- User authentication using IP address or IP address range

Additionally, Geospatial SDI services can provide the Vendor Specific Parameters (VSP) on top of underlying web services, including user and password information. This information can also be incorporated into the HTTP header. Similarly, the IP address can be interpreted and revised by Geospatial SDI. The additional information provided by the VSP query is compatible with most OGC client applications.



INSPIRE-Ready services

Geospatial SDI services have been adjusted to meet the most recent INSPIRE Directive technical specifications. The INSPIRE Technical Guidance for View Services, Download Services, Discovery Services, and Coordinate Transformation Services were followed and implemented.

Geospatial SDI Web Services

Geospatial SDI provides service templates along with configuration files, which are used to instantiate the services. The templates are given for the following services:

Web Map Service (WMS) Façade

WMS Façade is an independent Web service that can be established on top of any OGC-compliant WMS service to extend its basic functionality with additional non-functional features. WMS Façade can modify the requests to and responses from an underlying WMS service based on the actual façade configuration, in particular: access management, logging, and performance measurement.

The façade extensions do not affect the implementation of its underlying service. Instead, WMS Façade hides the underlying service interface operations from direct access and masks them by using the corresponding operations provided by the façade.

WMS Façade operations are accessible through the HTTP/GET, HTTP/POST, and SOAP protocols.

Web Feature Service (WFS) Façade

Like WMS Façade, WFS Façade is an independent Web service that connects to its underlying OGC-compliant WFS service in order to modify the requests to and responses from the service based on the actual façade configuration. The façade extensions do not affect the implementation of its underlying service. Instead, WFS Façade hides the underlying service interface operations from direct access and masks them by using the corresponding operations provided by the façade.

WFS Façade operations are accessible through the HTTP/GET, HTTP/POST, and SOAP protocols.

Web Map Tile Service (WMTS) Façade

WMTS Façade, an independent Web service, connects to its underlying OGC-compliant WMTS service in order to provide additional access management, logging, and performance measurement functionality. The façade extensions do not affect the implementation of its underlying service. Instead, WMTS Façade hides the underlying service interface operations from direct access and masks them by using the corresponding operations provided by the façade.

WMTS Façade operations are accessible through the HTTP/GET protocol.

Web Coverage Service (WCS) Façade

WCS Façade is the Web service that connects to underlying OGC-compliant WCS service to enable additional features over a standard service interface by modification of the requests to and responses from the underlying service.

WCS Façade operations are accessible through the HTTP/GET, HTTP/POST, and SOAP protocols.

Catalogue Service for the Web (CSW)

The geospatial metadata describes the geospatial datasets, dataset series, and services to facilitate searching of the information on the resource content, availability, or spatial extent. In turn, the CSW service aims to support discovery, access, and maintenance of the geospatial metadata collected in the catalogue.

The CSW service key features include:

- Support for ISO/OGC standards on metadata for datasets, dataset series, and services
- Functions for creating, editing, importing, exporting, managing, and storing geospatial metadata records that conform to ISO-compliant and other ISO-based metadata profiles
- Discovery of metadata over several federated catalogues



CSW comes unprotected by its nature as the OGC service dedicated strictly to informing about available resources. Secondly, it is the only OGC-compliant service offered in Geospatial SDI suite that directly accesses the source database to support discovery and access to geospatial metadata describing available datasets and services.

The operations of this service are accessible through the HTTP/GET, HTTP/POST, and SOAP protocols.

Authorization Bridge

Authorization Bridge is an independent Web service that facilitates the authorization of Geospatial SDI services. It serves as a “bridge” between the SDI services and external security systems. The Authorization Bridge connects to the database to verify the user permission to read data from the SDI service.

The operations of this service are accessible through the SOAP protocol.

Security Token Service (STS)

STS provides a common access and authorization control infrastructure. It is the ideal solution in situations where the Web services need to verify the identity of client applications and their rights to access the data in heterogeneous environments using many different security domains, user databases, and so forth. The key features of STS are as follows:

- Deployed as a separate Web service that issues tokens over SLL protocol (HTTPS)
- Evaluates user credentials (of any type)
- Issues Security Tokens that are an undeniable confirmation that the user is valid
 - Tokens are used for communication between the client application and services
 - Tokens are secure (signed and encrypted)
 - Tokens contain claims that store any user data including personal information, roles, permissions, etc.

Supplementary Services

Geospatial SDI extends the key served functionality with additional Windows services.

CSW Periodic Harvest Service

The CSW (Catalog Service for the Web) Periodic Harvest service is a standalone windows service that periodically invokes the Harvest operation of the local CSW service. This lets you populate and synchronize the metadata catalog with the metadata records obtained from external CSW services.

CSW Periodic Harvest Service keeps the scheduled jobs in RAM by default, but also supports saving of job schedules in a database store, which gives cluster support.

Basic Log Service

The Basic Log Service is a standalone Windows service for high-level logging of OGC services usage. It provides a set of predefined logging capabilities, including the service performance, request details, and service errors. The service collects the information on the OGC services usage by listening on the standard Microsoft MSM Queue. The service can be customized to collect and process other usage details by applying the “cartridge” concept.

The Basic Log Service can be running on any computer in a cluster environment (not necessarily on the OGC service or MSM Queue host).

Configure many sets of basic cartridges for many different queues so that one Basic Log Service can handle the processing of log messages for different sets of OGC services.



Administration Console

Provides the means for creating and configuring all aspects of server-side engines, web services and web applications in one place.

Web service instances (for any type of service) can be created, configured, and removed.

The following features can be configured:

- Service source for the facade (depending on service type)
- Metadata configured for WMS, WMTS, CSW, and WFS
- Service logging capabilities (can be turned on and off)
- Service performance monitoring capabilities (can be turned on and off)

Catalogue Editor Utility

Catalogue Editor Utility (CEU) provides the functions for creating, editing, importing, and exporting ISO-compliant geospatial metadata records. With these commands, users connect to geospatial catalogue databases and query for catalogue records of interest. CEU can be configured to support ISO-compliant catalogue records that conform to different ISO profiles. The CEU user interface for creating and editing records can be configured to support those profiles.

- Manage, create, and modify connections to metadata catalogues
- Manage metadata records
- Manage reusable metadata elements
- Import and export of metadata in a form of XML Files

Catalogue Administrator Utility

Catalogue Administrator Utility (CAU) supports management of metadata catalogue functions. An authorized catalogue user can use CAU to connect to different geospatial metadata catalogue databases and to configure security aspects of a catalogue database, such as which records can be viewed or modified by which groups of users.

- Configure roles and users
- Administer record collections and operations
- Authorize administrative operations
- Create or modify records collections
- Authorize operations on metadata records for users and roles

Cloud Deployment

All Geospatial server products can be deployed to the cloud (for example, via Amazon Elastic Compute Cloud [EC2]).



Contact us

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About Hexagon

Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector, and mobility applications.

Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

Hexagon's Safety, Infrastructure & Geospatial division improves the performance, efficiency and resilience of vital services. Its Safety & Infrastructure solutions enable smart and safe cities. Its Geospatial software leverages the power of location intelligence.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 21,000 employees in 50 countries and net sales of approximately 3.8bn EUR. Learn more at hexagon.com and follow us [@HexagonAB](https://twitter.com/HexagonAB).