

Carmenta Server Core 2024.0

GENERAL

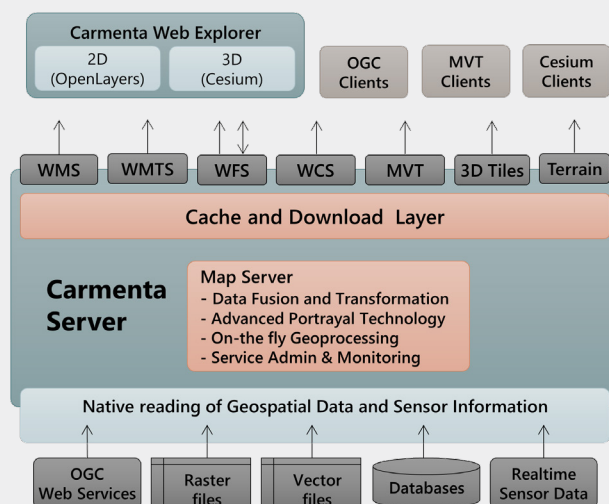
- Carmenta Server Core provides a complete solution for making geospatial data available through standard web services on Docker containers or Podman.
- It has broad support for open industry and de-facto standards with certified compliance for many Open Geospatial Consortium (OGC) interface specifications.
- Designed for use in mission-critical solutions, it has a proven record of reliability and is used in a number of 24/7 installations.
- Powered by a very fast map engine core and with efficient use of hardware resources, it delivers excellent performance when deployed in high-capacity websites and cloud environments.

TECHNICAL FEATURES

- Native reading of geospatial data from more than 80 GIS file formats, spatial databases and sensor data sources. No need for offline format transformations.
- Built on top of the powerful map engine Carmenta Engine capable of performing advanced on-the-fly geoprocessing. Terrain analysis functions such as Slope and Line-of-Sight calculations are performed server-side with high performance, using both raster and vector data from multiple data sources simultaneously.
- All system administration tasks are carried out either with a scriptable settings interface, used when creating new container images based on Carmenta Server Core or at run time when containers are started, or with a powerful REST API.
- A service list web page allows monitoring and verification of published services. Maps created and maintained by common desktop GIS tools are easily imported and published. ISO metadata is automatically generated when publishing new services.
- A smart disk and memory tile caching utility is fully integrated that allow map tiles to be dynamically generated from any geodata source. All settings, such as tile-size and tiling schemes are easily configured and time constraints can be set on the cache to automatically re-load tiles.
- A built-in proxy utility can be used to “cascade” data from external OGC services and re-publish as hosted services.

“White-lists” of authorized services are used to ensure that only trusted sources are connected.

- Support for Kubernetes readiness and liveness probes, as well as various resource metrics for use with Prometheus and Grafana.
- Integrated map viewer based on open-source libraries, Openlayers for 2D and Cesium for 3D. The map application is used for previewing published map services and also contains sample tools for interaction with analysis services.
- Below is an overview of the Carmenta Server Core Architecture sketching out important system parts and emphasizing the dataflow from source to user.



• For high performance vector maps, Carmenta Server Core supports tiled vector data following the Mapbox Vector Tile (MVT) specification. Tiled vector data is compressed and encoded using the Google Protobuf (PBF) format and is fully cacheable by the caching utility.

• Cesium 3D Tiles and Terrain mesh services allow 3D web map clients based on the Cesium open-source library to present realistic and high-resolution 3D maps, including detailed city models.

• A full-featured Software Development Kit (SDK) is available for rapid map website development and configuration. It contains documentation, sample projects and “Carmenta

Studio”, Carmenta’s powerful map configuration tool that is used to set all parameters that control map rendering and connections to data sources. The tool is also used to set scale intervals for layer visibility in clients and uses a graphical data-flow tool to setup and configure geoprocessing “pipelines” for more advanced services.

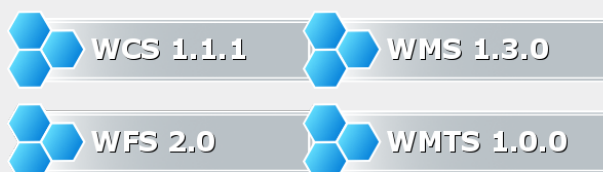
- Styling of vector features defined in the server-side configuration can be applied in Openlayers and Cesium based map clients using symbol and visualization services.

RELIABILITY AND SECURITY

- The security framework is a vital part of the Carmenta Server Core product. It uses a central administration server to handle the login process for all Carmenta Server Core components.
- Forms login with ticket/cookie-based sessions from a web client can be used for authentication.
- All security settings are easily managed from the scriptable settings interface. It is possible to restrict user access to map services, or even layers in a service based on user roles. Services that are unavailable to a user are hidden and don’t appear in any of the web interfaces.
- Extensive logging and data collection is performed in runtime to monitor server performance, with the possibility to log and trace server usage and cache performance.
- Published services can be monitored via the service list web page. Services can be published and unpublished by simple file copying to a running container’s mapped file volume, without the need to restart the map server container.
- Carmenta Server Core is optimized to take full advantage of multithreading and multi-core processor architectures. It is well adapted for deployment in virtual and cloud environments and supports both Linux and Windows container host Operating Systems.

INTEROPERABILITY AND STANDARDS

- Carmenta Server Core offers compliant support for the following OGC standards:



- A high-performance Web Map Service (WMS) can be setup for publishing geodata from any GIS data source. Carmenta Server Core has support for OGC WMS 1.3.0 and 1.1.1 with flexible layer control and auto-publishing of dynamic legends. It has an integrated Feature Portrayal Service (FPS) capable of rendering features from external feature services. Styled Layer Descriptor/Symbol Encoding (SLD/SE) can be used to update map portrayal from clients.



- Tiled Map Services are fully supported with the OGC WMS-C and WMTS interfaces, as well as a general XYZ interface supporting OpenStreetMap Slippy Maps. These interfaces benefit greatly from Carmenta Server Core’s built-in tile caching utility.
- WMTS and WMS services configurable to meet requirements of DGIWG profile for respective standard.
- Geodata from any vector data source can be published through a very flexible Web Feature Service (WFS). It has support for the OGC WFS 2.0.0 and 1.1.0 service interfaces. The WFS can publish feature data, either as GeoJSON, GML or binary objects, which is easily controlled via settings in the map configuration. Multiple vector data sources can be read simultaneously, and all data model and coordinate transformations are done on-the-fly.
- INSPIRE compliant download services can be easily launched through the WFS interface, and the product contains a framework for setting up automatic transformations from customer specific data models to the Data Theme models mandated by INSPIRE requirements.
- Web Coverage Services (WCS) can be used to retrieve or download raster or matrix data such as elevation data, meteorological grids or maritime depth data. Carmenta Server Core has support for the OGC WCS 1.1.2 and 1.1.1 service interfaces. It automatically transforms any source raster format to those mandated by the WCS specification. GeoTIFF is normally used as a transport format.



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