

Introducing Carmenta Server 4

A fast and reliable GIS server based on open standards

Carmenta Server provides cost-efficient technology for building large scale network-based geospatial solutions. It simplifies the distribution and the exchange of geographic data with the help of standardized and open web server interfaces.

Version 4 of Carmenta Server represents a new generation of geospatial web servers. It is designed to fully utilize modern hardware architectures and the latest server technology. The new version supports new ways of deploying web services in virtualized and cloud environments. Given very high performance figures and an ability to handle very high loads, a business critical GIS web site can run without high hardware demands and without compromising capacity and availability.

Carmenta Server 4 is designed to deliver:

- **Best Performance**, due to very efficient usage of hardware resources, a high performance map engine core and optimized service interfaces.
- **High Reliability**, due to optimized web service management and automatization of server instance monitoring and re-start.
- **Optimal Interoperability**, based on a broad support for open industry and de-facto standards.

Figure 1 shows a screenshot of the “Carmenta Sverigekarta” in a web browser client. The map is published as a standard Web Map Service (WMS) by a Carmenta Server 4 deployed in an Amazon Elastic Compute Cloud 2 (EC2) cloud environment.

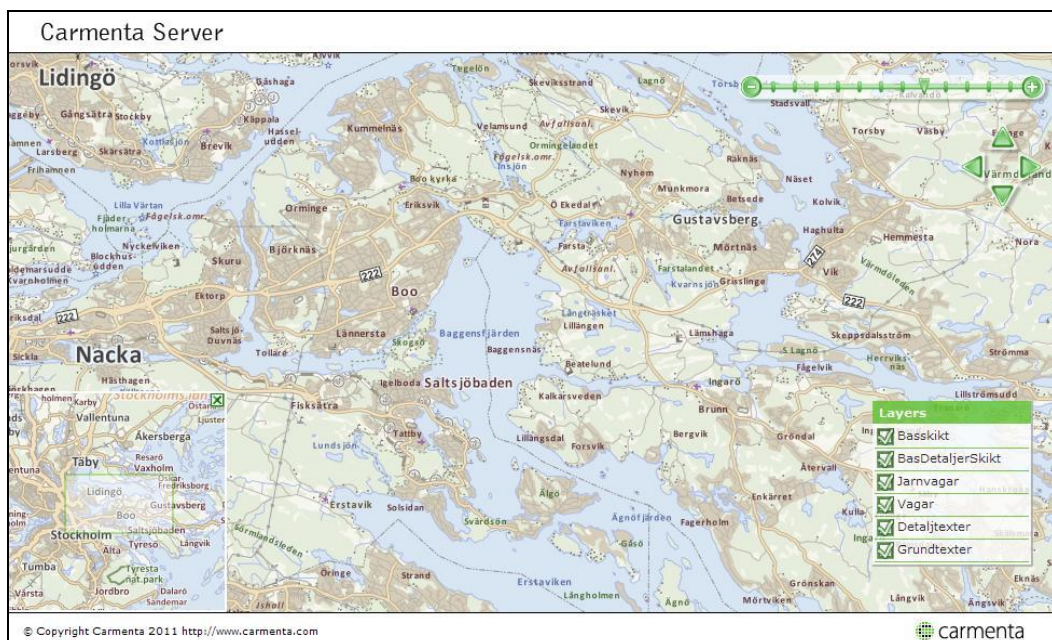


Figure 1. Carmenta’s map product, “Carmenta Sverigekarta” published by a Carmenta Server 4 running as a web map service on Amazon EC2.

The new system core in Carmenta Server 4

The Carmenta Server 4 is built on a new system core and is designed from the ground up to use the latest advancements in hardware technology. Multi-threading and multi-core architectures can now be fully utilized and the new version automatically configures itself for using resources in the most efficient way.

New features and improvements to the system core in Carmenta Server 4 can be summarized as follows:

- The new system core is implemented using Windows Communication Foundation (WCF).
- All GIS functions are performed by the latest Carmenta Engine version. This full-featured map engine is seamlessly integrated in the Carmenta Server, unleashing a multitude of possibilities to use server-based GIS operations and geographical calculations.
- The new server version can run in native 64-bit mode making it possible to allocate more memory and also to operate together with other 64-bit applications (such as 64-bit databases).
- Built-in detection of available CPU cores is used to automatically distribute server instances. This simplifies the setting for optimal utilization of hardware resources.
- Memory management is optimized resulting in very low memory footprint and improved garbage collection.
- Due to the compact nature of the product and the efficient management of services it is the optimal choice for deployment in virtualized and cloud environments.

The figure below gives an overview of the main components of the Carmenta Server 4 architecture. The Carmenta Server Rich Web Client (RWC) is an HTML/JavaScript-based component which uses AJAX technology to communicate with a Carmenta Server over standard Open Geospatial Consortium (OGC) interfaces. It provides a highly interactive map interface which includes a number of predefined GUI components. Customers can also use the popular open source component OpenLayers or other tools to build web-based interfaces on top of Carmenta Server. All clients connect to the Carmenta Server 4 through standard OGC interfaces. There are no proprietary interfaces.

All Carmenta Server settings are stored in a single Settings database (db) and a user friendly Administration tool is used to do all settings.

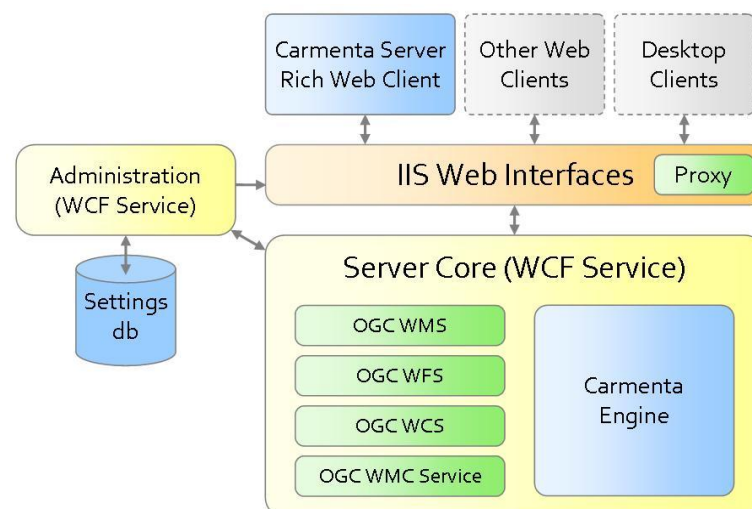


Figure 2. The Carmenta Server 4 architecture.

The OGC Web Map Service (WMS) support

Carmenta Server is one of the most certified products on the market based on OGC specifications. Carmenta Server is for example certified to follow the latest specifications for the WMS standard. The following features have been improved or extended in the new WMS interface:

- Handling of map layers on the server has been improved to support display of hierarchical layers, control the drawing order, set transparency and do other operations on map layers.
- Map legends with advanced cartographic features can now be automatically generated and published through either the standard request; OGC GetLegendGraphic, or as an ordinary layer for clients that does not support this request. Figure 3 shows an example of a dynamically generated map legend.

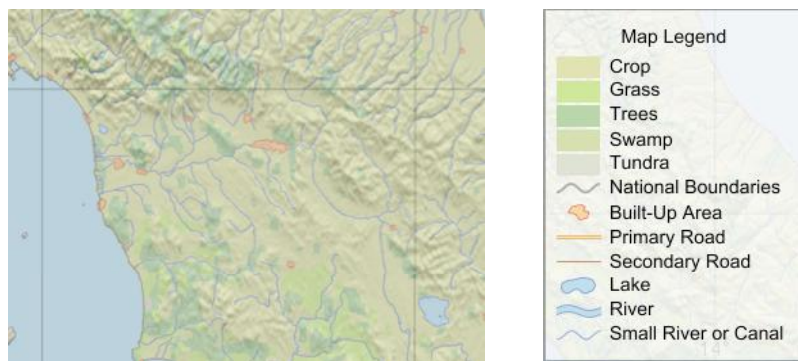


Figure 3. Map legend automatically generated from map cartography configured on the server.

- The tile handling and caching functionality embedded in the WMS service has been updated to support standardized schemas (WMS-C).
- The OGC Styled Layer Descriptor (SLD) support has been improved to allow multiple visualizations for the same map.

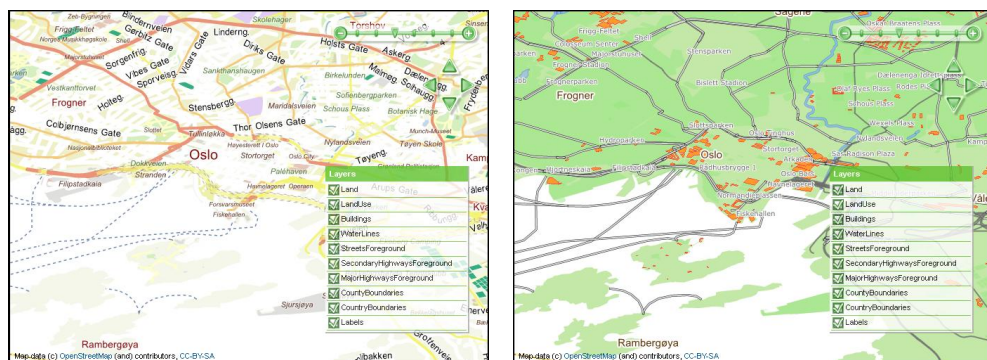


Figure 4. OpenStreetMap data visualized in two ways based on different SLD:s.

- Improved Feature Portrayal Service for better performance, GML 3.2.1 support as well as support for reading GML geometries from more complex XML dialects such as AIXM.
- The support for the OGC WMS 1.1.1 and 1.3.0 specifications are ready for certification in the new Carmenta Server version.

The support for more OGC services and specifications

As a Technical Committee member of the OGC, Carmenta actively supports international standardization work and strive to use the OGC standards in our products as much as possible. These are examples of improvements and additions to support other OGC standards besides WMS:

- The new version adds support for OGC Web Feature Specification (WFS) 2.0.0 and use the latest Geography Markup language (GML) 3.2.1 version which is an INSPIRE requirement.
- A new OGC WFS-T (Transaction) 2.0.0 interface has been added to support transactions on feature data. This allows for creation, deletion, and updating of features on the server. The OGC WFS-T 2.0.0 support will be certified.
- The support for the OGC WFS 1.1.1 specification will be certified in the new Carmenta Server version.
- It is possible to use "on-the-fly" operations on feature data to enhance the web feature service in a number of ways:
 - Transformation from in-house data models to standardized ISO and INSPIRE data models.
 - Conversion of many vector data formats and sources to standard GML format
 - Filtering of features based on attribute values.
 - Thinning of features to reduce the size of the GML packages sent to clients.
- The new WFS service can use on-the-fly GZIP compression of GML to decrease the data volumes sent to clients.
- Already certified for OGC Web Coverage Service (WCS) 1.1.1, the server now also is prepared to support version 2.0 of the standard.
- Operations may also be used on coverage data to enhance the web coverage service in a number of ways. These operations are performed "on-the-fly" and may involve things like:
 - Re-sampling of raster cell sizes for publishing data in different resolutions.
 - Re-classification of raster values.
 - Transformation of many different data formats to Coverage format.
 - Terrain analysis such as Line-of-Sight calculations, hill shading and other.
- The Carmenta Server has built-in support for Coordinate Transformation Services and this function is inlined in all data service interfaces.

Easy map server administration

It is very straight-forward to install and set up the Carmenta Server 4. New tools have been added to simplify the management of services and minimize time spent on system administration.

The new server version is distributed as a compact package to be installed and upgraded with full control. It is built to maximize the overall service availability through a dynamic managing of services.

- It is possible to add and remove web services without restart and the system is “self-mending” by automatic functions to restart and recycle server instances.
- All settings are done in one web based and user friendly administration tool.

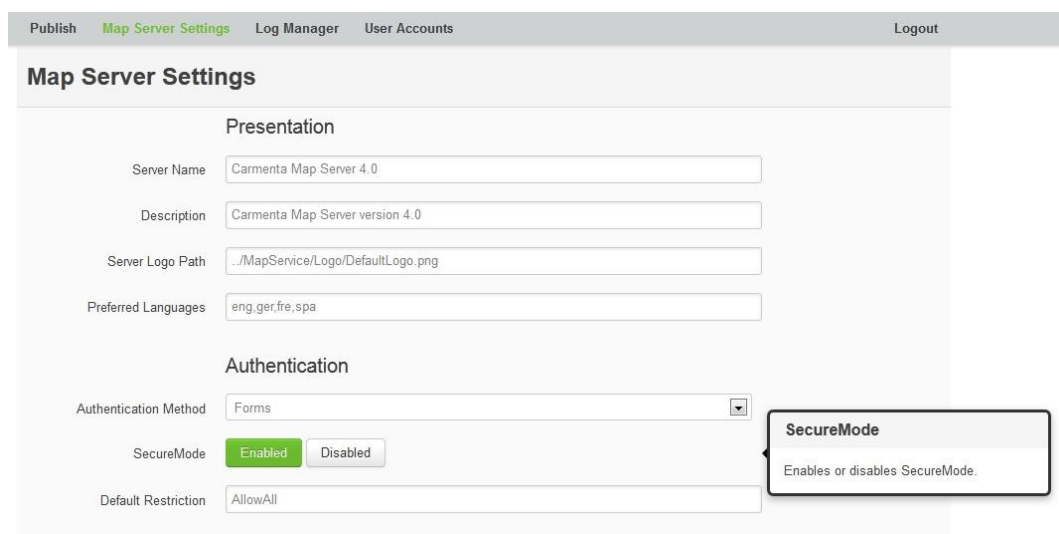


Figure 5. A screenshot showing a part of the server administration web page with context sensitive help messages.

- The new Carmenta Server version also supports a new map package model for adding ready-to-use geodata packages automatically or controlled by the administration tool.
- With the new administration tool it is easy to add and remove data services. This can be done without restarting the map server.
- Automatic monitoring and handling of server instances is included in the Carmenta Server deployment which minimizes the need for manual restarts.
- A number of other new features have been added to make it easy to deploy and administer the server in a virtualized environment and in the Cloud.

Other new features and additions

Below is a list of other general feature additions and improvements made in the Carmenta Server 4 upgrade:

- Improved database connection that increases the speed of the traffic of data stored in databases. The server is also able to automatically re-start database connections to eliminate idleness when a server request times out.
- An overall reduction of memory footprint results in lower resource consumption.
- General performance improvements due to many optimizations of calculations and service interfaces.
- Improved security functions for connections to external systems for authentication as well as built in user and role providers.
- Extended and improved documentation with guides and on-line help which together with Carmenta's qualified support makes it safe to meet any web challenge.
- Simplified licensing and a more flexible license model. A straight-forward and flexible licensing system makes it possible to maximize the return of investment.
- Integrated metadata handling using the ISO19119/19139 standards is supported by all OGC interfaces to simplify metadata publication as required by the INSPIRE directive.

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