DATA SHEET

carmenta

Carmenta Engine 5.13

GENERAL

- Software Development Kit (SDK) for rapid development of interactive geographic applications on Windows, Linux and Android.
- High performance visualisation and processing of geographic data, both in 2D and 3D.
- Available in both 32-bit and 64-bit version.
- Fast kernel developed in optimised C++.
- Individually optimised .NET, C++ and Java APIs.
- The .NET API supports both .NET Framework and .NET Core.
- Optimised internally for multi core CPUs.
- Hardware accelerated map rendering that offloads CPU.
- Parallel asynchronous processing that keeps the application's user interface responsive.
- Map controls for WPF, Xamarin, Windows Forms, Qt, Qt Quick, Win32, MFC, X11, Java and Android.
- Supports over 70 geographic data formats natively.
- Different layers can have different coordinate systems, reprojection is done on the fly.
- Maps can be accessed via remote servers (OGC WMS, WMTS, WCS, WFS and CSW).
- Efficient cache mechanism for handling large numbers of moving objects on the map.
- Dedicated radar plot and radar video functionality can handle millions of dynamic plots and be used to create real time PPI displays.
- Component based architecture built around intuitive data flow paradigm.
- Easy deployment using runtime merge modules (.msm) or simple XCopy deployment.
- Built-in profiler for measuring and tuning the performance of map and application layers.
- Built-in tiled map image file cache, suitable for optimising vector layers on low-end hardware.
- Map Package mechanism enables efficient, single-file geodata distribution.
- Presentation of map layers and application layers can be defined in map configuration files using Carmenta Studio, or in runtime using the APIs.
- Geographically correct spatial calculations such as projection, distance, great circle, scale factors, azimuth/angle calculations etc available for all reference systems.
- Multiple windows and views can present the same data with different visualisations simultaneously.
- Supports internationalisation – titles, descriptions and other metadata can be specified in multiple languages.
- Unicode support for rendering non western right-to-left text, such as Arabic.
- Supports scale-correct, high resolution printing of any map.

VISUALISATION

- Supports custom line styles, pattern fills and textures.
- Predefined common map symbols, line styles and patterns.
- Semitransparency is supported on all drawing operations.
- Hardware accelerated map layer effects can perform color adjustments (brightness, contrast, hue, saturation etc.) as well as glow, halos and ambient occlusion.
- Support for animating the visualisation, e.g. to create blinking or pulsating objects.
- Anti-aliasing of text, symbols, lines and polygons removes jaggedness in presentation.
- Raster filtering, bilinear or bicubic, improves visualisation of scanned maps etc.
- Off screen drawing to file or memory.
- Raster symbols from common image files.
- Vector symbols from SVG or font files with halo and outline effects.
- 3D symbols and corridors from common 3D shapes or 3D models.
- Multiple visualisations on objects such as multiple texts and symbols at a point or line.
- Complex line styles with auto-placement of symbols or labels along lines or in nodes, texts or symbols that clip lines etc.
- Level of detail in 2D with automatic switching on/off of map layers based on scale and/or geographic area.
- Vector and raster layers can be arbitrarily mixed. Layers can be combined using normal or multiply blend modes.
- Attribute data controlled visualisation, selection and discrimination.
- Automatic label placement of text and symbols that prevents overlapping and duplication.
- Automatic scale-based aggregation of hierarcical data, e.g. tactical ORBAT structures.
- Visualisation can be configured to automatically adapt to displays with very high pixel density.
- Supports military tactical symbology (NATO App-6, DOD MIL-STD-2525).
- Supports nautical symbology (IHO S-52, NATO AML Portrayal).

EXTENSIBILITY

- Possibility to "plug-in" custom data reading, processing and visualisation code as components that fit seamlessly into the Carmenta Engine data-flow model.
- Custom visualisation can be developed either using native GDI or OpenGL or by using Carmenta Engine high-level graphics API.
- Custom processing written in Python script can be embedded into map configurations.

COORDINATE SYSTEMS AND PROJECTIONS

- Configurable reference systems, projections and geodetic datums, support for EPSG IDs.
- Handles embedded reference system information.
- Supports more than 15 types of projections, including Mercator, Transverse Mercator, UTM, Lambert, Albers, Stereographic, Azimuthal Equidistant and Orthographic.
- Projections for georeferencing using ground control points.

GEOGRAPHIC DATABASES AND FORMATS

- Can generate low resolution variants (”pyramids”) for all raster data sources to improve performance.
- Support for spatial database queries.
- Spatial indexing for efficient reading of large datasets.
- Full-text attribute indexing for fast text search functionality, e.g. address search.
- Supports reading Raster Attribute Tables for thematic data sources.
- Supports reading geospatial metadata according to the French GéoBase Défense and TopoBase Défense standards NEW.
- Reads directly (conversion is not needed) from a large number of formats:

ADRG	GeoJSON	OGC GeoPackage
AML[2 4]	GeoSoft raster	OGC KML
ARINC 424 [2 4]	GeoTIFF [1]	OGC WCS
ASRP	GIF [1]	OGC WFS
AutoCAD DXF [4 6]	GridASCII	OGC WMS
AutoCAD DWG [4 6]	GPX	OGC WMTS
AUX	HDR	OpenFlight
BIL, BSQ, BSP	IHO S-57 [2 3 4]	Oracle Spatial [4 6]
Bing Maps NEW	IHO S-63 [2 3 4]	PNG [1]
BSB Nautical	Intergraph raster	PolGASP
BMP [1]	Japanese DEM	PostGIS [4 6]
CADRG [4]	CM93 C-MAP [3 4 5 6]	Raw
CEOS (Spot)	JPEG (.jpg) [1]	RPF [4]
CIB [4]	JPEG2000 (.jp2)	SDTS DEM
CMRG (PCMap) [4]	Mapbox Vector Tiles (MVT)	SQL Server [4 6]
COLLADA	MapInfo TAB	SRTM HGT
DEM	MapInfo MIF	TIFF [1]
DFAD [4]	MBTiles	Tiled Map Servers NEW
DTED	MFF	USGS ASCII
ECW	MFF [2]	USGS DOQ
Envisat N1	MrSID [6]	USRP
ESRI Shape (.shp) [1 2]	MySQL [4 6]	VTP BT elevation
ESRI Binary ADF	NITF	VPF [2]
ESRI ASCII Grid	NOAA	VMAP [2]
ESRI File Geodatabase		VVOD [2]
Erdas IMG		WVS [2]
Erdas LAN/GIS		WMO GRIB

[1] Reads and writes
[2] Uses advanced spatial indexing technology for fast access of large files
3 With optional IHO S-52 nautical chart presentation
[4] Functionality available as an additional Carmenta Engine Extension
[5] Not available in Carmenta Engine Linux version
[6] Not available in Carmenta Engine for Android

INTERACTION

- Flexible API for querying geographic objects on screen.
- High-level interaction tool interface that developers may use to ”plug in” their own interaction handling.
- Separate visualisation can be configured for selected and hovered map objects.
- Tools for navigating 2D and 3D maps.
- Tools for creating and editing 2D and 3D points, lines and polygons.
- Tools for creating and editing circles, ellipses, circle sectors, rings etc. NEW.
- Tools for multi-touch interactions such as pinch-to-zoom and twist-to-rotate.
- Overview window functionality.

DATA PROCESSING “ON THE FLY”

- Buffer zone generation for raster data and vector data.
- Clipping of geographic points, lines, polygons and meshes by geographic polygons or viewing area.
- Connection / desegmentation of lines and polygons.
- Data reduction through line and polygon ”thinning”.
- Geographic, UTM/MGRS and GARS grid generation.
- Generate circle and ellipse objects from point + radius.
- Generate concentric range circles and radial lines around objects or at the center of the map NEW.
- Generate 3D volumes (e.g. boxes, spheres and pipes) from 2D objects.
- Hill shading with dynamic sun position.
- Slope and aspect calculations.
- Detection of ridges, valleys, peaks and basins NEW.
- Isoline, e.g. elevation contours calculation.
- Real time line-of-sight calculation in both 2D maps and 3D city environments.
- Merging heterogenous rasterdata with different resolutions into homogenous data.
- Rasterisation of 2D vector layers.
- Reprojection of vector and raster data.
- Resampling of raster data.
- Accessibility analysis and routing calculations for terrain vehicles.
- Transformation of line objects to polygons and vice versa.
- Smoothing of line and polygon shapes.
- Vertical Profile Calculation which can cut through both terrain, land use and vector data.
- Vertical clearance and terrain warning calculation for flight routes based on terrain and vector obstacles.
- Projection of full motion video onto the ground based on camera parameters.
- Dynamic generation of point density rasters for heat map presentation.

SOFTWARE DEVELOPMENT KIT CONTENTS

- Carmenta Studio – a visual editor for map configurations.
- Carmenta Explorer – a map configuration viewer.
- Comprehensive documentation, including tutorials, technical articles and API documentation.
- Many sample applications with source code in C# for Windows Forms, WPF and Xamarin, C++ for Qt, MFC, Win32 and X11 as well as Java for Swing and Android.
- Sample maps and map configurations.

carmenta

For further information, please contact us:
+46 31 775 57 00, info@carmenta.com
carmenta.com