carmenta
geospatial innovations

Carmenta Engine Linux 4.7

General

- Software Development Kit (SDK) for development of interactive geographic applications.
- Easy embedding into applications via C++ or Java APIs.
- Integrated raster and vector data handling.
- 2D and 3D visualization and interaction.
- Generic UI Map Control base class for integrating map views into user interface frameworks
- Ready-to-use QT Map Widget and QT application sample
- Ready-to-use 2D and 3D map navigation tools, such as zoom or pan.
- Efficient methods for simultaneously moving large numbers of map objects.
- Map presentation is defined in map configuration files, and can be changed in runtime using the APIs.
- Component-based architecture built around intuitive "data-flow" paradigm.
- Supports over 70 geographic data formats natively.
- Plug-in architecture allows users to extend functionality.
- 3D hardware accelerated 2D visualization optimized for dynamic presentations. Smart caching on graphics card (GPU) suitable for "moving maps" and head-up displays.
- Low memory footprint thanks to modular architecture where only active modules are loaded into memory.
- Vector and raster data reprojection on the fly; different layers can have different coordinate systems.
- Geographically correct spatial calculations such as projection, distance, great circle, scale factors, azimuth / angle calculations etc available for all reference systems.
- Efficient support for multi core and multi processor systems. Map layers can update in separate threads, leaving the main thread free to do time-critical tasks.
- Interactive fly-throughs in 3D with dynamic loading of visible data.
- Automatic on the fly generation of 3D worlds straight from 2D/3D GIS data, no CAD or 3D modeling is needed.
- Maps can use both locally stored GIS data and layers that are accessed via remote servers (OGC WMS and WCS).

Software Development Kit Contents

- Graphical map configuration tool and viewer.
- Comprehensive documentation, including tutorials, technical articles and API documentation.
- Sample applications with source code in Java and C++.

Interaction

- User extendable interaction tool concept.
- Interactive overview map windows.
- Picking and querying in 2D and 3D.
- Create and edit points, lines and polygons in 2D and 3D.

Geographic databases and formats

- Tile handling with the ability to create seamless map layer presentation from many individual files.
- Can generate low resolution variants ("pyramids") of raster data to improve reading performance.
- Application developers can add support for additional formats with their own read/write data plug-ins.
- Support for spatial database queries.
- File indexing for efficient reading of large datasets.
- Reads directly (conversion is not needed) from a large number of formats:

ADRG	JPEG2000	Raw
ARINC [2]	Leica ECW	RPF
ASRP	Lizardtech MrSID	SDTS DEM
Autodesk DXF	MapInfo TAB	TIFF [1]
Autodesk DWG	MapInfo MIF	USGS ASCII
BMP [1]	MFF	DEM
CADRG	MFF2	USGS DOQ
CIB	MySQL [1]	USRP
ESRI Shape (.shp) [1] [2]	NIMA VPF	VTP BT elevation
ESRI Shape 3D [2]	NIMA DFAD	CEOS (Spot)
ESRI Binary ADF	NIMA DTED0	ELAS
ESRI ASCII Grid	NIMA DTED1	AUX
Erdas IMG	NIMA DTED2	Envisat N1
Erdas LAN/GIS	NITF	BIL [1]
GeoSoft raster	NOAA	BSQ [1]
GeoTIFF [1]	OGC WCS	BSP [1]
GIF [1]	OGC WMS	HDR [1]
GridASCII	Oracle Spatial [1]	BSB Nautical
Intergraph raster	CMRG (PCMap)	SRTM HGT
Japanese DEM	PolGASP	WMO GRIB1
JPEG (.jpg) [1]	PNG [1]	WMO GRIB2

[1] Reads and writes

[2] Uses advanced spatial indexing technology for fast access of large files

Reference Systems and Projections

- Configurable reference systems, projections and geodetic datums, support for EPSG IDs.
- Handles embedded reference system information for the most commonly used data formats.
- Supports more than 15 types of projections, including Mercator, Transverse Mercator, UTM, Lambert, Miller, Azimuthal orthographic, equidistant and equal area.
- Polynomial projections for georeferencing using control points.

Visualization

- Visualizes points, lines and polygons in 2D and 3D. Meshes (TIN) in 3D. Handles different kinds of dashed lines, pattern fills and textures.
- True transparency and alpha handling on all drawing operations, including raster data.
- Anti-aliasing of text, symbols, lines and polygons removes jaggedness in presentation.
- Raster filtering, bilinear and bicubic, improves visualization of scanned maps etc.
- Multiple windows and views in 2D and 3D can present the same data with different visualizations simultaneously.
- Off screen drawing to bitmaps, files or memory that can be further processed (PNG, GIF, JPEG and BMP).
- Handles raster data in 1-bit through 32-bit.
- Raster symbols from file (TIFF, PNG, GIF, JPEG and BMP).
- Resizable, rotatable vector and font symbols. Halo and outline effects.
- Multiple visualizations on objects such as multiple texts and symbols at a point or line.
- VRML and 3DS (3D Studio) objects can be used inside 3D maps.
- 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.
- Level of detail in 3D terrain and VRML-objects based on distance from the "observer".
- Flexible layer handling controls the drawing order of layers in run-time. Ability to mix raster and vector layers in arbitrary order.
- 3D parameters such as camera position, camera angles and fog can be dynamically set.
- Attribute data controlled visualization, selection and discrimination.
- Animation support with double/triple buffering for smooth window updating when displaying dynamic data and editing objects.
- Automatic label placement of text and symbols prevents overlapping.
- Textures from geographic data or image files. Any result from a geographic function can be draped over a 3D surface.
- Multi pass/multi texture effects with full control over texture blend modes.

Geographic functions "on the fly"

- Isoline calculation, e.g. elevation contours from gridded data.
- Hill shading with dynamic sun position.
- Buffer zone generation for raster data and vector data.
- Visibility, view shed, line of sight and shadow analysis.
- Clipping of geographic points, lines, polygons and meshes by geographic polygons.
- Vertical profiles; intersection along a line in elevation data.
- Geographic and UTM/MGRS grid generation.
- Rasterizing vector points, lines and polygons.
- Reclassification of raster values and vector attributes.
- Raster resampling and operations such as minimum, maximum, addition, weighted addition and overlay between layers.
- Reprojection of vector and raster data.
- De-segmentation of vector lines.
- Transformation of line objects to polygons and vice versa.
- Automatic 3D building and fence generation from 2D lines and polygons.
- Random point generation (e.g. for creating individual trees in a 3D forest).
- Size calculations - polygon area/perimeter and line length.
- 3D mesh (e.g. ground) generation from raster heights, 3D lines and points.
- Terrain accessibility analysis for terrain vehicles.
- Data reduction through line and polygon "thinning" and triangle decimation.
- Automatic clipping of data outside the viewing area.
- Intelligent caching increases performance when re-reading data.

Installation

- Flexible generic distribution that can be adapted to almost any Linux variant.

System requirements

Red Hat Enterprise 5.4, Ubuntu 8.04 LTS and SUSE Linux Enterprise Server 10 SP3

gcc and C++/C runtime libraries of version 4.1.2 or later

For 3D and 2D hardware accelerated graphics OpenGL 1.1 is required and these drivers are supported:

Ubuntu:	Nvidia, driver version 169.12
Red Hat:	Nvidia, driver version 190.53
SUSE:	Nvidia, driver version 185.18.36

Minimum 256 MB RAM, and 1.5 GB (for SDK) or 120 MB (for Runtime) of hard drive free space.