CubeWerx Technology Brief Stratos Platform

Short company bio and overview of the flagship product

The Company

Originating from the Oracle Spatial division in 1996, CubeWerx was established with the mission to tackle the complex challenges associated with big data in the geospatial domain.

Initially concentrating on innovations within geospatial databases, CubeWerx strategically delved into standards development and web services to better position itself among the industry giants. This effort was pivotal in shaping the landscape of standards-based web mapping.

Today, CubeWerx's technology portfolio is a testament to its origins, featuring an advanced scalable data storage architecture alongside a comprehensive array of high-performance geospatial web services.

The Team

Our core team, a cohesive unit of engineers and architects, has been collaborating for over a quarter of a century. This collaboration began at Oracle, within a strategic research and business unit dedicated to the development and launch of the Spatial Data Option (Oracle Spatial).

As trailblazers in the realm of open data management and interoperability, our team members have played leading roles in more than 30 Open Geospatial Consortium (OGC) test beds and initiatives throughout the past two and a half decades. Their expertise is not only reflected in their leadership but also in their substantial contributions to the development of numerous standards that today form the backbone of modern web mapping technologies.

Stratos Geospatial Platform

The flagship product is a mature, open standards-based commercial platform for managing and distributing large archives of aerial and satellite imagery (as well as vector data). It is targeted primarily at data providers or resellers who want to provide streaming access to their holdings. It is comprised of the following components:

Data Management

At the heart of the Stratos Geospatial Platform lies CubeSTOR, our innovative data management layer. This hybrid solution extends the MariaDB database engine with additional capabilities and storage options. Vector data is seamlessly loaded into the database, while raster data is stored in cloud object or network-attached storage, all cataloged within the database registry.

Our data model goes beyond MariaDB's basic geospatial functionalities, offering a comprehensive solution for managing raster and vector data, diverse coordinate systems, and map tiling. This model is the cornerstone of our platform, ensuring scalability and optimal performance for web services, capable of handling vast quantities of geospatial data without compromise.

CubeSTOR uses a reference-based loading system for large datasets, such as aerial imagery mosaics, facilitating the creation and management of indexes, image overviews, and map tile pyramids within the database. It ensures data integrity, with automatic updates in the database for any modifications or deletions to registered images.

Learn more: https://www.cubewerx.com/data-management/

Web Services

The Stratos Geospatial Platform ensures that direct access to its data layer by client applications is securely managed through a suite of web services, adhering to the Open Geospatial Consortium (OGC) standards. This includes full support for all protocol versions, up to the latest REST/JSON-based frameworks.

CubeSERV, the platform's services layer, boasts exceptional optimization and scalability. It can manage hundreds of simultaneous connections with ease, even on a modest 8 vCPU node setup. This layer is responsible for delivering web maps, map tiles, direct downloads, and data through standard interfaces that are universally compatible with geospatial frameworks and desktop applications.

A standout feature of CubeSERV is its cascading functionality. This allows it to integrate with other map servers, assimilating their capabilities and presenting them as its own. It can seamlessly incorporate layers from these servers into a unified map view, overcoming any limitations of the downstream servers, including discrepancies in protocol versions. CubeSERV enhances the capabilities of connected servers by adding support for additional coordinate systems and image formats, ensuring a comprehensive and seamless user experience.

Learn more: https://www.cubewerx.com/web-mapping/

Security and Access Control

A key differentiator of the Stratos Geospatial Platform is its enhanced security and access control mechanism. This module is spatially-aware, designed to scrutinize each request by comparing it against a detailed set of predefined rules before permitting access to the data. This level of scrutiny ensures a secure, controlled environment for data access and manipulation.

The system is highly customizable, allowing for the application of rules based on individual users, roles, IP addresses, or any mix thereof. This granularity extends to the types of web services accessed, map layers, feature types, map scales, image resolutions, the application or watermarks and restriction to specific geospatial regions. These capabilities allow for the delivery of tailored web services to each client, based on their unique identity and access rights.

This sophisticated approach to security and access control not only underscores the platform's commitment to data protection but also positions it as a uniquely adaptable solution in the geospatial market, catering to a wide range of client needs with precision and efficiency.

Learn more: https://www.cubewerx.com/security-and-access-control/

Usage Tracking, Analytics and Quotas

The services layer meticulously tracks all requests, capturing detailed usage data down to the individual pixel, and stores this information in an analytics database. This data, organized in a MariaDB schema for easy integration with external tools, includes comprehensive metrics such as user details, request specifics, geospatial footprint, CPU seconds consumed, bytes returned, and more. This rich dataset enables deep insights into usage patterns, system performance, and user engagement.

The platform also features an integrated quota management system, enabling administrators to set usage limits for users or groups based on various metrics like bytes served, CPU time, and the number of web maps or tiles requested.

This combination of detailed analytics and quota management provides a robust framework for monitoring platform usage and managing resources efficiently, offering administrators valuable insights and control over the system's operation.

Learn more: https://www.cubewerx.com/analytics/

Dashboards and Command Line Tools

Stratos includes a complete set of modern, mobile-friendly dashboards for administrators to manage all aspects of the platform.

Additionally, all functionality available through the platform can be accessed by a suite of command line tools, for easy integration into existing architectures and workflows.

Find out more about CubeWerx at www.cubewerx.com or drop us an email at info@cubewerx.com today.

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