Open architecture of SuperMap GIS

This article will discuss the meaning of the concept of open platform, the components of SuperMap GIS architecture and the platform values for developers. It also will introduce the multiple extension technologies for SuperMap platform and technical route for GIS application.

1. Open architecture introduction

Dedicating to building architecture with more support, compatibility, adaption, flexibility and extensibility is the goal that GIS basic software provider pursuing.

2. Concept of open platform

Open platform realizes API of system through standard methods, letting more people accessing the functions of system platform, allowing better integration and customization, fulfilling the needs of users.

Open platform is not just realized by making source code or system function open, it requires more efforts to complete user experience of data integration, function integration and process integration to make the system open. Being an open platform, it requires the following 5 points.

Firstly, the open platform must have a core value. Like GIS basic platform, it is complicated itself, highly cost to develop, difficult to maintain. But the developers can use the basic universal function and extension flexibility to decrease the development cycle, lowering the development cost, and acquired good technical support and version upgrade, realizing rich function and stability of the system.

Secondly, open platform needs stable architecture framework. GIS basic platform has to consider Operation System, network technology, database, middle ware, development language, development environment, application environment, using habit and history, then carefully design and choose suitable technical route.

Thirdly, open platform needs to be stable. A true open platform is live, it can improve itself, but has to maintain the stability of core architecture and consistency of development, can lower the technical change from different technologies.

Fourthly, open platform has to comply with standard interface. Open platform has to have open standards, the open standards has be complied by all the developers and make sure the same of interfaces among different systems technically.

Fifthly, open platform has to realize open in both ways and multi-layer. Open platform needs component objects model and service API, it also needs the extension on storage format, data architecture, algorithm module, also needs to consider the consistency of objects and service
programming model. GIS basic platform needs to set a mature architecture, users can extend and enhance the architecture; it also provides development component and service module, realizing business integration; meanwhile, it needs to extend on data access, service engine, basic algorithms, the extension has to have full function support and flexibility, also it needs to be simple and stable for easy development and long-time use.

The advantage of using of open platform is obvious. The construction of application system costs less, is being built faster, architecture and interface are stable, unified, multiple systems, modules, services can be better integrated and coordinated, can be used in function extension, allowing upgrading with the changes of new technology.

3. SuperMap GIS architecture

Since the beginning of the development of SuperMap GIS, it is positioned as an open platform, its internal is micro-internal architecture, external is multi-layer open architecture. After years of development, its system has improved its completeness, robustness of function, openness of architecture, interface standards, it has become the mainstream GIS basic platform.

3.1. SuperMap GIS kernel

The bottom layer of SuperMap GIS is comprised by GIS core data structure and algorithm kernel. SuperMap GIS kernel has SFC series for Windows OS and UGC for multiple OS, which is formed by technical development, SFC is the MFC library based on Microsoft, so it is hard to transplant it to other platforms, but UGC is based STL (Standard Template Library), which supports multiple OS. Also UGC supports all the Windows OS, therefore SuperMap has developed products with UGC kernel.

3.2. Component products

Based on GIS kernel, the upper layer has encapsulated components products with mainstream component technologies including COM, .Net and Java. And can use Visual Studio, Eclipse and other IDE to quickly develop. Given the fact COM technology has been suspended by Microsoft, the focus of components will be Objects.NET and Objects Java. The 2 products already have multiple platform versions, Java version can run on Linux, Unix, AIX. There is another advantage of .NET and Java, which is register sheet no longer being needed, it can be deployed by copying, and multiple versions can co-exist in the same system, which improved the usability, security, management.
3.3. Desktop products

Components can conveniently create business application. On many occasions, users also need install-and-use GIS software.

SuperMap GIS has 2 desktop products, one is Deskpro, which is used in data processing, editing, supporting C++ plugin development, it has rich embedded functions but difficult to develop; the other one is Deskpro .NET new desktop GIS software, which is not only a desktop tool, but a powerful extensible desktop architecture, supporting multi-language plugin extension based on .NET, also it can customize interface and construction of modules. It also can upload, download and install through network plugin center, providing technical support for cooperation and massive production in the groups, also it set the bridge between module developers and users.
3.3.1. Integration between component and desktop

Desktop application extension package include SuperMap Objects .NET/Java for professional application development and SuperMap Deskpro.NET for deep interface and module customization. Using Objects component is used for deep application integration development, allowing creating integration application and 100% professional user interface.

Through desktop framework, a standard running framework and plugin supporting mechanism can be set, which is easy to customize, can see the effects right away, also can realize new function adding and group management through plugin extending and plugin sharing, which is suitable for productive users and high level consultancy projects.

3.4. Server GIS platform

Based on component, SuperMap also developed heavy-light GIS products, which server GIS platform-SuperMap iServer allows users control remote GIS service like in component, using web browsers or mobile terminals is fine, all the data is on the server, no need to install on the client, which is easy to deploy.

SuperMap iServer, basing on UGC kernel, supports Java and mainstream development tools like Eclipse, JavaBuilder, JDeveloper, also it supports rich client side. SuperMap iClient products not only supports mainstream Web RIA development tools like AJAX, Flex, Silverlight, it also supports 3D GIS application development on browsers and HTML5, which allows using GIS functions on more mobile devices.
3.4.1. Web development extension

Web application is run by SuperMap iServer, the development of browser application is mainly through SuperMap iClient. iClient can be developed by multiple RIA technologies like AJAX, Flex, Silverlight, etc., realizing object model. Users can start web application development using the provided API, also can use extension bottom layer function. For instance, to realize new raster map accessing extension, it also can load other picture map services. In addition, HTML 5 not only supports latest W3C standard and latest browser technology, simplifying web application and increasing security, also it supports smart phones with browsers, increasing GIS application range.
3.5. Mobile products

In order to fully support mobile applications, SuperMap GIS provides iMobile series products which is designed for mobile original GIS application, which is suitable for more professional GIS application development, it supports mobile devices, vehicle devices, cellphone and tablets supports OS like WinCE, Android, iOS.

From component to desktop, from server to web terminal and mobile terminal, since version 2012, SuperMap GIS has become the most completed GIS software in the globe, which means users can construct GIS service platform and service systems according to their needs, also means transforming applications from desktop to mobile terminal, or extending the current system to meet the requirements of the business, to be suitable for different application technologies and application scenes.

3.6. Spatial database engine

Data is the foundation for application. The design concept of Spatial database engine(SDX+) of SuperMap is highly consistent with IT architecture. With the development of SDX+ spatial database technology, it can maintain the integration with mainstream database technologies, providing unified technical solution for users, which can be used in simplifying, managing, also can migrate among different databases. Meanwhile, unified database storage can meet the requirements of components, desktop, server, web and mobile devices.
3.7. Cloud GIS platform

With the development of cloud computation, cloud GIS and GIS cloud service have been the hotspots in the GIS industry, new technology, platform and applications have developed rapidly, SuperMap also provides GIS platform software and GIS cloud solution, and set SuperMapCloud online service platform. SuperMap will realize full use of cloud calculation technology with users, developers, etc.

Through SupermapCloud service, the cloud service application can be developed. SuperMapCloud acquired SuperMap GIS basic software to construct, therefore, SuperMap iClient and iMobile can all be SDK for development, including web applications like 3D, JavaScript, AJAX, Flex, Silverlight as well as mobile device application like Android, iOS (iPhone/iPad). SuperMap is the geo-information online service platform that supports largest amount of types.
Besides web and mobile applications, components and desktop can also visit SuperMapCloud service, users can store and retrieve the maps from SuperMapCloud, developing extension functions, associate linking use between local data and function, or use multiple services to complete.

The API used by the developers is the same with software development, basically no need to learn to do the GIS application development, also can transplant the old GIS server to the cloud service platform after simple editing.

4. Prospect on GIS application

In the tool GIS era, SuperMap led component GIS industry to a rapid integrated, widely applied era through SuperMap Objects.

In the network era, SuperMap released SuperMap IS.NET to let users access geo-spatial information through browser.

In the SOA concept era, SuperMap released SuperMap iServer to realize full-position GIS service storing and integration; with the development of web technology, SuperMap iClient SDK covers mainstream RIA development technologies.

With cloud calculation and mobile terminal, SuperMap provides platforms for high-efficiency, high usability and high parallel GIS sharing application and cloud service system basing on Heterogeneous Cluster and service cluster server products.

The open SDX+ spatial database technology is also improving with the development of big database technology, providing solid support for GIS applications.