

Application of HTML5 Technology in Big Data Application Development

Liu Hongying

Guangzhou College of Technology and Business, Department of computer science and engineering,
Guangzhou, China

E-mail: 327147616@qq.com

Keywords: HTML5; big data; data storage

Abstract: The applications of big data are playing an increasingly important role in people's lives. In order to adapt to the growing demand for big data applications, a large number of applications based on HTML5 technology emerged. This article presents the new features of HTML5 technology in the development of big data, analyses the current situation of HTML5 technology application in big-data applications, and finally discusses the problems that HTML5 technology still needs to be improved.

1. Introduction

Big data is the most popular IT word after the Internet of things and Cloud computing. From the source, development, status quo and tendency of big data, we can understand every aspect of it. Big data is one of the most important technologies around the world and every country has their own way to develop the technology. Big data is a data set with a large volume and a large data category. It refers to a data set that cannot be captured, managed and processed by traditional data viewing tools in an affordable time range.

HTML5 is a new technology standards of Web application, includes technology such as HTML, CSS3, JavaScript, Web Application API, Device API and so on. At the same time, it based on the web platform, cross platform, not restricted by terminal products and operating systems, users can use different mobile devices efficiently and quickly. A large amount of data from mobile terminals can be used to store users' information in the server through HTML5 technology. Including friends circle information, personalized customization information, personal basic information, service configuration information, implementation of data insertion, modification, query and delete operations, and be able to cross platform operation.

2. New features of HTML5

More and more big data application developers and cloud computing service providers use HTML5 technology to develop web. Thanks to the new features of HTML5, contains succinct, efficient and good graphics performance.

2.1 Web socket duplex working

One of the new features of HTML5 technology is web socket, it can be used to connection server, client and browser, and to push data in time, and the connection is stopped when receiving explicit instructions. Depending on web socket users can chat online by browser, such as msn, QQ and other instant messenger tools, as long as the server and the client understand the web socket protocol, the web socket connection can be successfully established. In the era of HTML4, browsers can only realize one-way communication based on HTTP. Under such restrictions, developers have design reverse Ajax, polling, long polling and comet technologies to create event-driven web applications. On the server side, applications update can be timely pushed to the client side. Comet technology can simulate bidirectional communication to some extent, but in fact, it is inefficient and requires support from the server side to be effective. Web socket draws on the idea of reverse Ajax

technology, which is a new full-duplex communication mechanism. This technology can transfer web socket protocol data frames in full duplex mode between two ends after the connection is established successfully. During the session, the connection will remain active, which can greatly save communication overhead when only short data validation is required. Web socket has powerful functions, bidirectional and low latency. Especially for real-time, event-driven web applications, unnecessary network traffic and latency are significantly reduced, communication efficiency and application performance are greatly improved.

2.2 Canvas drawing function

HTML5 provides users with a large number of API to draw various dynamic elements, introducing Canvas elements can help Web developers not use any third party plug-ins, such as flash, Silverlight, etc. directly uses JavaScript script to draw various elements in real time on Web page, avoids instability and inefficiency of plug-ins such as flash. Canvas drawing can use the context of the Canvas element (rendering context), to draw various 2D objects in canvas, and also draw 3D graphic elements through WebGL technology. The new canvas can be regarded as a specific rectangular area. It is less difficult to insert canvas elements into the web pages, which is basically equivalent to inserting common attribute tags. Then, the graphics and shapes can be drawn without Flash software or other plug-in tools. As an image tag supported by HTML5, canvas uses scripts to render graphics in browsers, through Java scripts drawing graphics directly into canvas containers. Drawing graphics using API in Canvas has the advantage of fast rendering of millions of spatial objects and providing client optimization solutions for visualization of large data.

2.3 Multimedia function

Video and audio tags in HTML5, provide developers with a set of multi-function API for audio and video processing, decoding audio and video by hardware can play without third-party support, saving resource usage and battery power consumption. Through these two tags, any audio and video can be played smoothly without specific tools and plug-ins. For example, ShowTime, YouTube and other well-known video websites across the flash software at the same time, bring users a shocking audio and video experience, including instant playback, instant pause and other highly humanized application functions, this is due to the HTML5 standard's audio and video tags. In addition, the preload attribute of HTML5 can also realize the pre-loading of audio and video. Users only need to decide whether to load the page while carrying out the pre-loading of audio and video, which is simple and convenient to operate.

2.4 Geolocation

Mobile devices can be manipulated through HTML5 related API, make full use of IP address, RFID, WIFI hotspot and Bluetooth MAC address, call terminal functions such as telephone, SMS, mail, camera, geographical location and file storage, use this API to make geolocation more accurate and flexible, the defects of only GPS location and base station location were successfully overcome. HTML5's geolocation is an alternative to precisely locating users, use both the `getCurrentPosition` and `watchPosition` methods. `GetCurrent Position` is used to get the user's current location, `watchPosition` is used to observe user's location, and continue to pay attention to the location of users at a certain time interval, once the change occurs, the relevant methods are used to replace the location.

2.5 Data storage

Traditional client storage methods include cookie, global Storage under Firefox, Flash plug-in's own storage methods, etc. But all they have their limitation. For example, the operation procedure of cookie is complicated and the grammar is not satisfactory, and browsers have strict limits on the number and capacity of cookies, which cannot meet the requirements of today's Web applications.

HTML5 accepts local data storage. The web storage API can implement functions similar to cookies, but without capacity limitation. The API can also be used to deploy offline apps. Using the cache manifest cache list, the web app is prompted to download the resource file in the cache in

advance when working offline, so as to ensure the normal operation of the program, and overcome the limitation of offline operation and paralysis in the past. Caching supports both automatic and manual update methods. Indexed DB is used to store relatively complex data, and users can operate on the database through JavaScript on the client side. Web storage is the terminal storage mechanism of HTML5. In the past, in order to store some configuration and login information on the client, only cookie or flash shared object can be used. Its limitation is that the allowable capacity is small, or additional libraries are needed to take effect. HTML5 web storage enables web applications to store up to 5M of data on the client side, and it is also more convenient to read and write. HTML5 web storage adapts to the running requirements of RIA rich client applications, enhances the data storage capacity of the local computing environment, reduces the burden on the server side, and improves the performance of web applications.

2.6 Multithreaded application

HTML5 refers to the concept of threading, and uses Web Workers to support multi-threading of the Web. It ensures that it can perform long-time computation in the background, and has good internal friction and startup performance, and the page can respond to users in a timely manner. The working principle is to define one or more new threads for the main thread of the current page script, adopt independent data exchange interface and callback function, so that the effect of execution is not blocked each other, and the problems of crash and unexpected page freezing under high load are basically solved. Each script execution thread in Web Workers does not interfere with each other. It is managed by JavaScript engine in browser to ensure the independence and security of thread work.

3. Application of HTML5 technology

Because the new features of HTML5 adapt to the current development of popular Web applications, with the development of the Internet and the increasing amount of information on the Web, through the mining of the Web, we can use the massive data of the Web to analyze, collect political, economic, policy, science and technology, finance, various markets, competitors, supply and demand information, information about customs and so on. Concentrate on the analysis and processing of the external environment information and internal business information which have significant or potential significant impact on the enterprise. Based on the analysis results, find out the various problems in the process of enterprise management and the possible precursors of crisis. Analysis and processing this information in order to identify, analyze, evaluate and management crisis. At present, most browsers such as Safari, Chrome, Firefox, Google and IE10 support HTML5 technology, among which Chrome support is the best. On mobile devices, Apple's iPhone, Google's Android and Windows Mobile also support HTML5 technology. In web application, the main audio and video websites abroad and in China support HTML5 audio and video media. Web application development platform and framework based on HTML5 technology are more and more popular among developers, including Phone Gap, Sencha Touch and jQuery Mobile.

Phone Gap is a lightweight open source framework that can be used with Dreamweaver to develop cross-platform HTML5 and JavaScript scripts for mobile applications, including Android, iOS, Blackberry, Symbian, Samsung BaDa and Windows Phone. Because of the convenience of mobile devices, HTML5 games can be designed and loaded through mobile application interfaces and browsers to play anytime and anywhere. Phone Gap, which can be packaged and distributed, is the HTML5 mobile development framework that supports the largest number of platforms at present. The main feature of Phone Gap is to provide an interface between JavaScript and Native applications, so that applications of Phone Gap can directly invoke the application interface of the original device platform. At the same time, Phone Gap provides users with self-expanding interface plugin to obtain more application resources when application interface is insufficient.

Sencha Touch is the first mobile App framework based on HTML5 in the world. The framework implements beautiful user interface components and rich data management, all based on the latest HTML5 and CSS Web standards, and is fully compatible with Android and Apple iOS devices.

jQuery Mobile is an open source code hosted directly on the Internet and available free of charge. There is no need to install any software on the development machine. It only needs to include various *. JS and *. CSS files directly into the web page to use jQuery Mobile. Easy to learn, cross-platform, good running speed, is a component of the jQuery framework, built on the mature and excellent jQuery framework, mainly provides jQuery core library for mobile device platform. jQuery Mobile provides a complete and unified framework of jQuery mobile UI, which supports high-end and low-end mobile devices such as mobile phones, tablets, e-readers, desktop computers and so on.

Developers can choose which framework to use depending on the situation. Firstly, consider whether the framework is open source. More people will maintain and propose modifications to the open source development framework. Secondly, considering the ownership of the framework, generally large companies maintain and update relatively fast and relatively stable; Thirdly, consider the performance of the Web technology framework on mobile terminals. For example, the speed of operation is a problem of great concern to users. In addition, the friendliness of interface interaction should also be considered. Finally, consider whether the development framework is easy to master and learn, and consider the cost of maintenance and learning.

4. Technology remains to be solved

HTML5 is an ideal platform for building a new generation of Web applications. The exciting new features associated with it, such as CSS3, Web socket, Web storage and multi-threading mechanism, can significantly improve the functional level of applications while reducing coding complexity. At the same time, HTML5 allows users to access hard disk, database, camera, map, etc. In the future, many software will be cloud-based, but due to the limitations of these technologies, HTML5 faces diversified risks and challenges. At present, HTML5 technology is used to develop some products, because of the lack of uniform data interaction standards, weak data interaction ability, low performance, user experience is not friendly, because more functions and more power consumption, developers need to improve the problem and test as fully as possible before implementation.

Compatibility: Because of many new features of HTML5, data acquisition includes transaction data, human-generated data, mobile data, machine and sensor data, etc. Developers need to test more when developing, fully considering the characteristics of poor compatibility. Fewer data types and poor timeliness limit the compatibility of the system. Application system development estimates more than millions of pieces of information and occupies tens of TB of space. Most of the data types are relational data, but there are few data such as image, video and text. Structured data are mostly indirect data with low usable value. The small proportion of unstructured data leads to the small scope of its mining. Because the way of data acquisition mainly depends on enterprise reporting, compared with sensors and other Internet of Things technologies, real-time data processing has poor timeliness.

Security: Because HTML5 is the standard of web pages, displaying content in an open environment may lead to the problem of content protection. Data security risk is mainly determined by human resources, which is easily affected by subjective factors, and it is difficult to define the state of security and danger, with poor reliability. Because of the lack of effective analysis tools and the lack of understanding of the rules of system security, every link of big data construction needs to be completed by professionals. The key link of data analysis is based on predictive modeling or future trend analysis. Traditional data analysts do not have the skills to develop predictive analysis application models, and fewer and fewer people who know how to develop safely. Today's big data analysts must be familiar with the principles of statistics and econometrics, use C++, Java and other mainstream programming languages, and use advanced statistical analysis software, such as R, SAS and SPSS. They must understand the principle of distributed computing, be familiar with map reduce and Java, and have rich imagination. This kind of development talent is very scarce in the market.

Performance: There are still some gaps between HTML5's current performance and native app. Safety supervision responsibilities of construction, transportation, railway, civil aviation, civil

explosion and other industries in China are in the industry management departments, non-coal, dangerous, industrial, mining, and commercial and other industries. There is no unified standard for accident information, supervision information and other databases established by various departments, which leads to great limitations in data cohesion. Due to the lack of uniform standards for collection and lack of dynamic audio and video data, HTML5's performance is limited by the optimization of hardware and browser. If the browser is built in for hardware optimization, the speed of the web app will have a qualitative leap.

5. Conclusion

At the current stage, HTML5 is still not fully mature. Although big data applications can be quickly implemented through HTML, CSS and JavaScript, a large number of applications with low performance requirements are transplanted to the HTML5 platform, and there are still many problems in hardware and software that need to be solved. With the maturity of HTML5 technology standards, improvement of hardware performance and optimization of browsers, it is believed that in the near future, most web applications in the direction of big data will directly use HTML5 technology development, and will also support the implementation of web3.0 well.

References

- [1] Xiong yameng. Application research of HTML5 in mobile Internet [J]. Wireless Internet technology, 2016, 11
- [2] Song Guanmin Web front-end development trend [J]. Jiangxi building materials. 2017, 2
- [3] Huang Yonghui HTML5 application prospects in mobile application development [J]. computer technology and development, 2013, 4
- [4] Zhang Jian. New features and safety of HTML5 [J]. information security and communication secrecy, 2013, 5