

# Thoughts on the Application of Layered Technology in Computer Software Development

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**Abstract:** With the tremendous development of China's social and economic level, the relevant requirements for the application of science and technology in various fields of production have been continuously improved. At present, computer applications have already penetrated into all aspects of people's life, study and work. Among them, diversified software development technologies have played a role. The crucial role of this paper is to focus on the analysis of layered technology in computer software development, and to explore the application of two-layer technology structure, three-layer technology structure, four-layer technology structure and five-layer technology structure. In the hope of benefiting from the relevant practices of computer software development.

## 1. Introduction

The vigorous development of information technology promotes the application of layered technology in computer software development. The application of this technology in software design is of great significance to the optimization of design structure and the deepening of software development hierarchy. Therefore, attaching importance to the extension of the application scope of layered technology in the field of software development is an important topic for computer innovation research. It relies on layered technology to continuously optimize the functions of software systems, thereby improving the design level of software and better serving. People's social and economic life is the main purpose of studying the application of layered technology. This paper starts with the development stage of layered technology in software development, and through the analysis of the application of layered technology at different levels, it achieves in-depth understanding of layered technology and provides some reference for the relevant practice of developers.

## 2. Overview of Computer Software Development Layering Technology

### 2.1 Analysis of the Connotation of Layered Technology

In the process of computer software development, layered technology is an important technical point. Its most remarkable feature is to give the software system a clear and complete design framework in the form of vertical structure. Of course, in order to achieve the effect of such vertical structure design, it is necessary to realize the depth of different concepts, schemes and technologies. Fusion, and in the construction of software vertical structure system, all levels of distribution are equal in status. With the continuous upgrading and iteration of computer software, great changes have taken place in the application of hierarchical technology. The overall development architecture presents a trend toward a higher level and more in line with the needs of users. The traditional single-layer structure gives way to the double-layer structure with more enhanced performance, and the higher-level structure generates phase in the operation of the double-layer structure. In response to the problems, there has been progress in development. The application of hierarchical technology shows the characteristics of dynamic development.

In addition, the layered technology also plays an important role in the design of computer software system. It combines the physical hardware of computer with the underlying construction in a more close way, and optimizes the software performance from the overall structure. It should be noted that the completeness of computer software system directly determines its security during

operation. Compared with the limitations of previous single-layer structure in incorporating complex content, hierarchical technology embeds highly complex content into software system in an Abstract way, which greatly improves the load performance of software. At the same time, the layered technology further promotes the development process of software convenient operation, which makes the software system present distinct structural characteristics, and facilitates developers to optimize and adjust the software system according to the actual operation status at any time.

## 2.2 Advantages of Layered Technology

The application of layered technology in the development of computer software system has yielded remarkable results. Specific performance in the following aspects: First, the hierarchical technology in software development expands the original layer of the system in a very effective way, and this kind of expansion is carried out under the background of not affecting other hierarchical structure of the software system. Through the construction technology, the hierarchical structure of the software is separated and set up, according to the differences of hierarchical attributes. It can be divided into high-level and low-level, which strengthens the software performance. Secondly, the layered technology makes the way of dealing with software problems more refined, and the extension of the structure in turn strengthens the improvement of the overall performance of the software. In the past, the limitation of setting up single-layer structure in localization and detail has been effectively alleviated. Thirdly, the application of layered technology in the field of computer software development promotes its penetration into other fields. At present, layered technology is widely used in network connection expansion, remote record processing and other aspects, which opens up a new direction for the diversified development of layered technology.

## 3. Hierarchical Technology Application in Computer Software Development

### 3.1 Two-tier Technical Structure

The two-tier technology structure, also known as the two-tier technology structure, is the initial form of the application of hierarchical technology in the development of computer software, that is, the technical category realized by the two-terminal (client-server). Its corresponding operation process is as follows. On the one hand, the creation of data information environment is carried out by the client, and thus, the application of the two-tier technology in the development of computer software is carried out. In addition, the client also has the ability of logical connection, which can deal with some application problems in the software system in time. On the other hand, the server receives the relevant data information from the client and the corresponding database relies on it. According to different user needs, the transmission will be short after intelligent processing, thus forming a complete process data transmission. It should be noted that the application efficiency of the two-tier technology is affected by the following factors: the stability of the server is the fundamental premise of the application of the two-tier technology, which requires the server to limit the number of users while ensuring its own quality. If these two conditions are not guaranteed, the application effect of the two-tier technology will be greatly reduced. Therefore, the application of the two-tier technology has obvious limitations. Therefore, the innovation and development of the layered technology has become inevitable. (Figure 1 is a comparison of two-tier technologies)

Table 1 Comparison of two layers of technology

Comparison Item	XSTP	CSS/iStack	SVF	TRILL	VXLAN
Line utilization	low, some lines are blocked	high, limited to star networks	high, able to support	high	high
Layer 2 loop problem	XSTP protocol closed loop needs to run	Request to build a star network	Implemented via a proprietary internal protocol	Run internal ISIS protocol closed loop	IP protocol implementation path calculation
Reliability	general	high	general	high	high
Scalability	General, the number of nodes and depth restrictions have a greater impact	general, only supports dual devices	General, limited by device implementation	well, capable of large network	well

Source: Authors make their own based on references

### 3.2 Three-layer Technical Structure

The three-tier technology structure originates from the two-tier technology structure, which is the supplement, development and extension of the two-tier technology structure. Its innovation lies in the introduction of application server side on the premise of continuing the two-tier technology server and client side, which further improves the related performance of the computer software system. Specifically, the three-tier technology structure includes three aspects: user interface, business processing layer and data structure layer. By constructing three-tier structure ports, the client is completely liberated and the new application form of interpersonal interaction is promoted. The main function of using interface layer is to collect user's requirement information for software use efficiently and hand these aggregated information to business processing layer. Business processing layer processes the aggregated information and then pushes it into data layer, which corresponds to the internal information of database. Processing is pushed into the business processing layer. Finally, the business process layer feeds back the relevant information to the user interface layer for the user interface layer to select and use the relevant information. Through such settings, the content needed for data analysis of the whole system has been simplified, and the efficiency of the ports has been significantly improved. Figure 2 shows the three-tier technical structure.

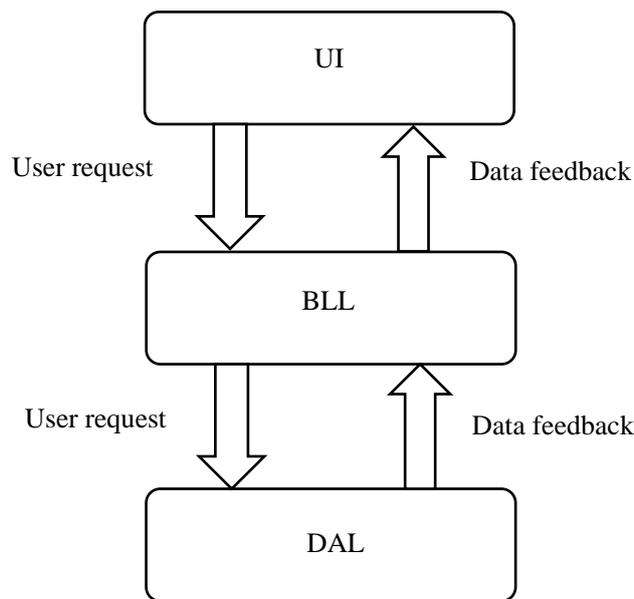


Figure 1 Computer software development three-layer technical structure diagram

### 3.3 Four-layer Technical Structure

At present, with the rapid development of all kinds of frontier information technology, the characteristics of the era of “information explosion” are becoming more and more obvious. The diversification of information dissemination channels makes the amount of information that people can access increase geometrically. The links closely related to software development, such as database, logical layer, storage layer and web layer, are facing unprecedented challenges. Some pressure, in this context, four-tier technology structure came out. The most prominent part of the four-tier technology structure is the setting of the hidden data processing layer. By embedding the data layer and the web layer, the technology successfully achieves the synchronization of information transmission in the cloud network and breaks down the barriers of data information transmission. Moreover, the great innovation of the four-tier technology is also reflected in the realization of data exchange. There are always obstacles in the connection of data in the past hierarchical technology. The four-tier technology coordinates this problem well. The unique advantages of the concluding data layer and the web layer greatly enhance the security of data

information.

### **3.4 Five-layer Technical Structure**

Five-tier technology structure is mainly embodied in the J2EE environment. By extending the classical three-tier technology structure, it can be expanded into five parts: client layer, web application layer, business layer, integration layer and resource layer. Customer layer and web application layer mainly correspond to the client side in the three-tier technology structure, and play a specific role in supporting software users'persistent access to data information; integration layer and resource layer correspond to database. Under the further refined hierarchical structure, the system is divided into several components, which are set on different devices.

### **3.5 Application of Middleware Technology**

The application scope of middleware technology is mainly distributed computer environment. Its main function is to realize interconnection and information sharing between systems. The application of middleware technology in computer software development, the most important role is to shield the high complexity of technical details generated by heterogeneous and distributed integration, thereby reducing the difficulty of development. According to the different roles of middleware technology in software systems, middleware can be classified into MOM, PRC, OOM and so on. There are always some problems between practical software and data. The application of middleware technology optimizes the relationship between them, which greatly saves the time needed for software development and speeds up the efficiency of software development.

## **4. Conclusion**

The continuous development of computer technology has greatly promoted the innovation process of software development. However, the current environment facing software development is becoming less and less attractive. As an effective means to improve the overall performance of software, layered technology can effectively improve the quality of software development while ensuring the security of information data transmission. And efficiency, therefore, the vast majority of developers should pay attention to the innovative application of layered technology in their practice, actively promote the continuous innovation of layered technology, give full play to the tremendous role of this technology on software performance, and achieve the expansion and extension of performance.

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