Research on Exchange and Management Platform of Enterprise Power Data Uniftcation Summit

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Abstract. In recent years, due to the continuous expansion of the government, enterprises, and social users for power data sharing applications, as well as the rapid expansion of data service product scope and data service access business volume, along with the continuous advancement of power data sharing interactive services, it is necessary to improve data sharing operation management and control mechanism. At the same time, on the one hand, in order to support the efficient development of the daily operation and maintenance management of data products, standardize the product operation and maintenance, including data catalog management, data product management, product drop-off, etc.; on the other hand, in order to strengthen the operation of the data sharing and interaction process, etc. This paper proposes the design of the data sharing service platform, which meets the following requirements: First, establish access service security guarantee, unified access to government, enterprise and other customers' access requests in different ways The second is to establish a standardized data service demand management, to provide data catalog query services for customers such as governments and enterprises, and to accept the data needs of these customers, forward the business department for processing, and give feedback to customers on data demand processing opinions; The third is to provide unified data Product access services, including data product query, data product application, and data product online access services; Fourth, provide unified data interface services, including data interface query services. The platform guarantees the normal operation of external power data sharing services, establishes an internal data sharing management and control mechanism, and supports the company's data service operation management personnel to carry out data product operation management, data service upload and removal, data service authority control, data service operation monitoring and analysis, etc. Data sharing operation management and control.

Keywords: Enterprise power data · Data sharing · Management platform

1 Introduction

In recent years, with the continuous expansion of the government, enterprises, and social users' demands for power data sharing applications, the scope of data service products and the volume of data service access will also rapidly expand [10]. At present, there

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is a lack of effective prevention and control in data interaction, limited support for access protocols, insufficient security protection [11], lack of data permission control and operation monitoring [6], which brings risks to data security. Therefore, it is necessary to strengthen the ability to support different access protocols of multi-channel users, improve the encryption and security authentication of the data interaction process, and strengthen the safety prevention and control capabilities such as fuse recovery, service current limiting, and anti-replay in the data interaction service process to ensure that Data and application security, improve the efficiency of power data sharing and interaction [1].

At the same time, with the continuous advancement of power data sharing and interactive services [4], it is necessary to improve the data sharing operation management and control mechanism. Data product management, product release and release, etc.; on the one hand, strengthen the monitoring and management of the operation of the data sharing interaction process, and comprehensively control the development of data sharing services; Enhance data security prevention and control, etc. At present, the interface protocols provided by the power grid resource middle station, customer service business middle station, data middle station and other systems are not uniform, and the multi-system mesh connection method is expensive. The data services of these business middle stations and data middle stations need to access data Shared applications will require a lot of investment in transformation costs, and later operation and maintenance costs will be large. Therefore, it is necessary to establish a unified interface management application, promote the unified management of interface services and multi-protocol adaptation, lay a solid foundation for supporting data sharing and interactive services, and support power data integration and efficient external sharing.

From the point of view of management benefits, by building a data sharing platform, the in-depth data sharing application has been completed, the customer service channels on the power side have been expanded, and the internal business power efficiency has been improved. The government side has collected high-quality, multi-dimensional customer user Electric data improves the accuracy of decision-making and further improves the internal work efficiency of both parties. From the perspective of social benefits, by improving the online interactive application between government and enterprises, both parties can carry out more in-depth data and product sharing, assist the government to make economic decisions more efficiently, and at the same time promote people's livelihood business, reduce the number of errands, and achieve mutual benefits and win-win results. Based on the previous government data sharing data and platform construction sequence, there are three modes of data sharing with the government as follows. First, through the government-enterprise data sharing application deployed in the Internet area, the business data in the management information area is dispatched to the government pre-database deployed on the government private network to support government data sharing; the second is.

Through the data exchange deployed in the Internet area. The server, the indicator platform of the dispatching management information area, the electric energy service management platform and other business data are sent to the government pre-database deployed by the government private network to support the sharing of government data; the third is that the provincial government directly deploys it in the province of the Internet area through the Internet call The interface server of the Economic and Information Commission obtains power data and supports real-time government calls. Realize data sharing applications with enterprises through the energy big data platform (the energy big data platform has an external network database).

The first two models have the same technical route, and the third model is direct interaction on the Internet. The data sharing service is to provide data services for the government, enterprises and other customers, so that the government and enterprises can access data services in different ways, and manage the data service requirements and data product requirements of the government and enterprises. The data sharing that has been carried out mainly adopts the following three modes: one is to synchronize business data in real time through the data interface, the other is to synchronize the data regularly through the data exchange service, and the third is to provide data access services for the Provincial Economic and Information Commission through a fixed interface. In order to support the establishment of a more flexible, open and secure power data interactive sharing capability, rely on the Internet to create a unified external data sharing interactive service, expand the data service access mode, support the unified access of user data services from external network channels such as government enterprises, and provide unified access to data services. Data sharing security is protected to provide support for data sharing applications.

The data sharing service platform proposed in this paper meets the following business requirements: First, establish access service security guarantee, unified access to the access requests of customers such as governments and enterprises in different ways, establish data interaction security encryption measures, and prevent data transmission process. security issues, and establish data service guarantee measures such as anti-replay protection measures, fusing protection, and current limiting protection to ensure stable and secure data service provision; the second is to establish standardized data service demand management to provide data for customers such as governments and enterprises. Catalog query service, accept the data requirements of these customers, forward the business department for processing, and give feedback to customers on the processing of data requirements; the third is to provide unified data product access services, including data product query, data product application, and data product online access services The fourth is to provide unified data interface services, including data interface query services, data interface application, and data interface invocation services for the business systems of customers such as governments and enterprises.

In addition, in order to ensure the normal operation of external power data sharing services, establish an internal data sharing management and control mechanism to support the company's data service operation management personnel to carry out data product operation management, data service uploading and dropping off, data service authority control, data service operation monitoring and analysis and other data sharing operation management and control work. Among them, data product operation management

supports operators to carry out data catalog management and data product definition; data service de- listing supports data product release, product de-listing, and product preview; data service authority control supports operator account authority management and abnormal account management, data product access rights control, etc.; data service operation monitoring and analysis support operators to monitor data service status, user registration, etc.

2 Related Work

The development of social media technology and Internet of Things (IoT) technology has resulted in a massive increase in unstructured data obtained from various sensors, cameras, digital surveillance equipment, video conferencing, and VoIP telephony. According to the International Data Corporation (IDC), this data volume will double every two years, and by 2020 we will generate and replicate 44 ZB (or 44 trillion gigabytes) of data annually. The term "big data" is used in the context of the aforementioned explosion of data to describe the enormous amount of data. Literally understood, the concept of big data seems relatively simple at first, but it is actually a relatively abstract concept, and there is no unified definition yet. In its report "Big Data: New Frontiers in Innovation, Competition, and Productivity," the McKinsey Global Institute defines big data as a vast collection of data that is too large to capture, storage, management and analysis [7]. In addition, there is a similar definition in academia, which was proposed by Dumbill (2013) [5], "Big data refers to data that exceeds the capacity of traditional database systems, not only in huge quantities, but also at a very fast rate of change, and its structure cannot be Adapt to the existing database architecture. In order to obtain valuable information from these data, new and alternative methods must be adopted to process these data." According to the above definition, for enterprise organizations, new analytical tools and models must be adopted to deal with the above Huge and complex data. This means that companies need to develop new capabilities to facilitate the flow of external and content information, and to turn data into strategic resources for designing, producing and delivering innovative products and services that meet new and growing customer demands. This new capability needs to properly handle the five basic characteristics of big data in order to truly tap the huge value behind big data [3].

Data sharing refers to the centralized storage of heterogeneous data from different data sources at the logical and physical levels, and the realization of unified access. By realizing data sharing, centralized management and control of resources can be more effectively achieved, and the efficiency of data utilization can be significantly improved. With the rapid development of my country's smart grid, the growth trend of massive heterogeneous data resources in the process of production and operation is growing exponentially, but there are many problems in data sharing, such as data heterogeneous problems [2], data storage problems [9], data mining problems [8] etc. Therefore, this paper studies the problems existing in the data sharing of electric power enterprises in my country. By building a unified and university data integration platform, it aims to help electric power enterprises to effectively achieve high-quality data sharing and provide a powerful tool for electric power enterprises to improve their management and service levels. data support. The system front desk of the enterprise energy consumption data sharing and analysis platform realizes customized function development

according to the business needs of the tower company, and builds cores such as daily electricity consumption analysis, monthly electricity consumption analysis, electricity bill management, energy consumption analysis, threshold setting, and system management. functional module. The backend of the system relies on the power data center to clean the power data of multi-service systems, such as daily electricity consumption and monthly electricity consumption data in the electricity consumption collection system, user electricity bill information and user basic information in the marketing business application system, analysis and processing, complete daily electricity consumption analysis, monthly electricity consumption analysis, electricity bill management [12]. Then, through data interface, data import, data screening, and using advanced information technologies such as big data and artificial intelligence, the relevant data of the tower company's base station energy consumption monitoring system is integrated to build a big data analysis model of tower base station energy consumption. This model is mainly used for Identify abnormal power consumption of tower base stations and realize early fault warning.

3 Proposed Architecture

3.1 Business Architecture

Based on the existing business model and informatization construction results, and on the basis of information security, formulate a reasonable technical architecture and technical implementation plan, standardize the data interaction interface, and realize the data sharing and interconnection of power companies and government big data platforms. The overall business structure is shown in Fig. 1.

3.2 Application Architecture

Build a unified external sharing and exchange platform for electric power data, realize the construction of supporting applications such as the full life cycle of data services, service sharing, monitoring and analysis under the premise of safe and available data services, and create a unified technical support system for enterprise data interaction and sharing, so as to realize the power supply to government users, enterprise users and social users to securely share data. The overall application architecture is shown in Fig. 2. It mainly includes the following three platforms.

Data sharing and exchange application platform (external network) Upgrade the original government-enterprise data sharing extranet application, deploy a unified HUAWEI CLOUD, expand data service access methods, support omnichannel user data service unified access, protect data sharing security, and provide support for data sharing applications.

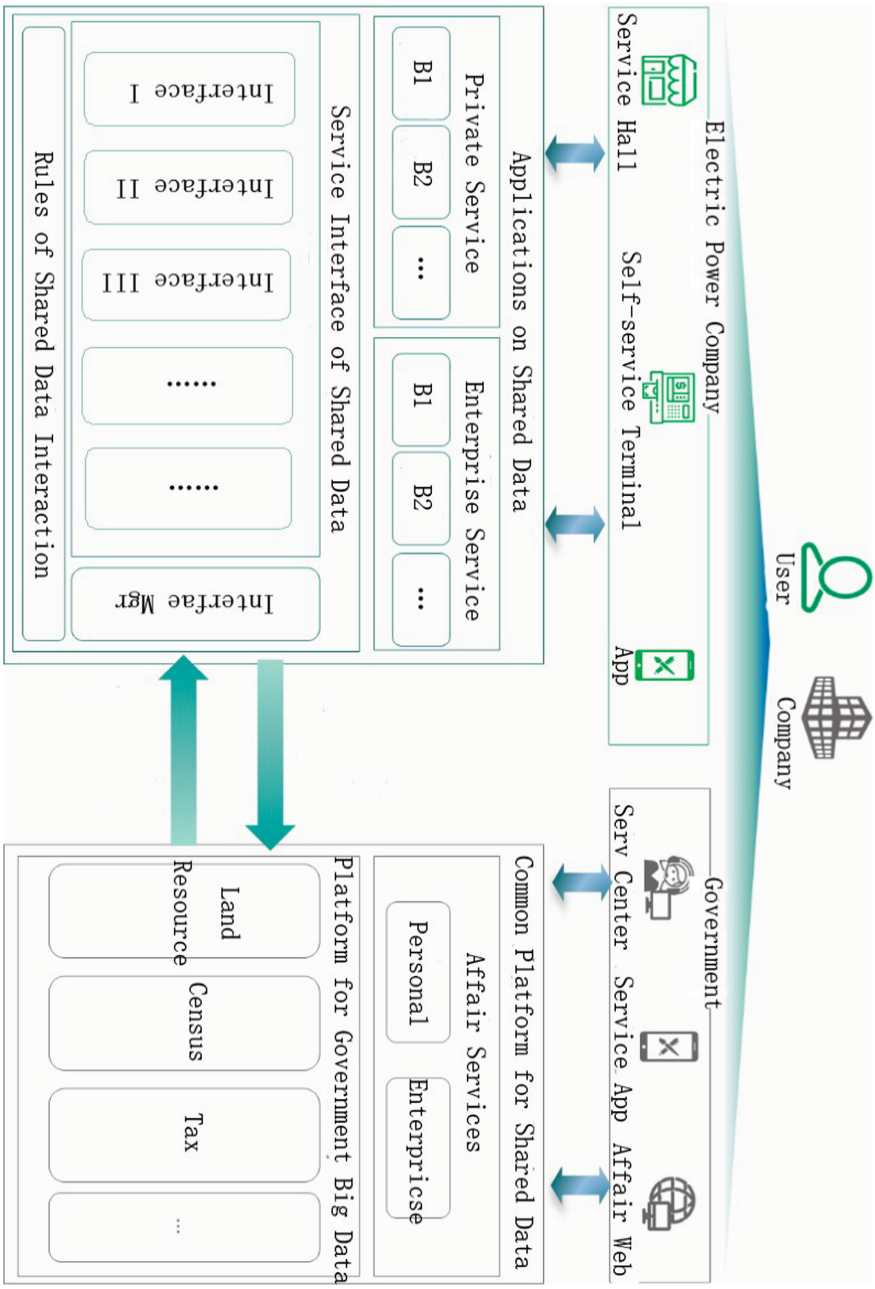

Fig. 1. The total business architecture

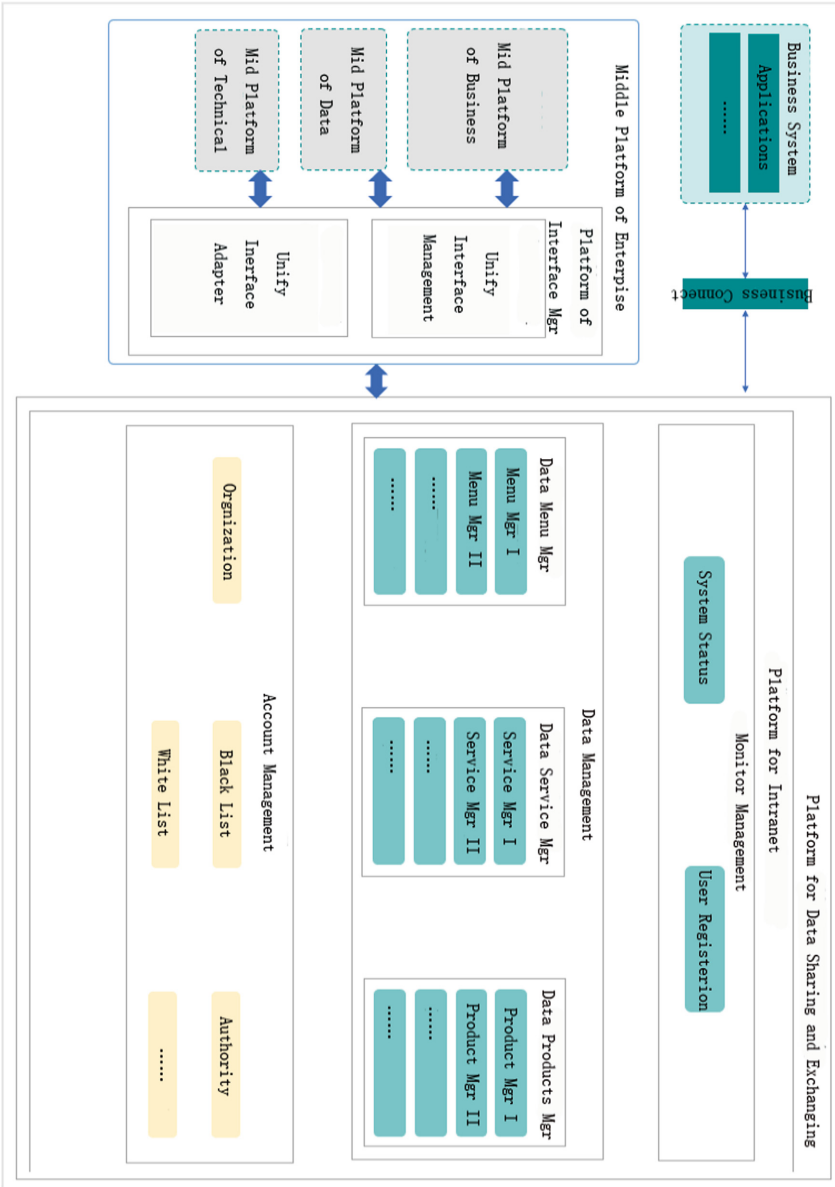

Fig. 2. Application architecture

Data sharing and exchange application platform (intranet)It supports internal management applications through three functions: authority account management, data management, and monitoring management. Account authority management: Through the integration with the energy big data platform, user accounts are managed, including account registration review, account authorization management, and dynamic account

management, adding security risk accounts to the blacklist. At the same time, it controls data rights, including data service rights control for users, black and white list control, data desensitization control and other data rights control processing. Data management: Unified management of data provided by the system, including data catalog registration, review, release control, and resource hooking, and support for data collection management, including database tables and custom data service management. Service access management: Manage and control the release process links of data services and data products, such as access, testing, and release, and support unified access to data services and data products. Monitoring and management: From the perspective of operators and maintenance personnel, monitor the operation of the system to ensure the orderly operation of the system.

Interface management platform. The new enterprise-level interface management platform realizes the service connection with each business center, data center, and technology center through applications such as interface management, interface adaptation, service orchestration, service routing, and service monitoring, and supports the original interface service agreement. Change or less change, quickly access the data exchange sharing management application.

3.3 Technical Architecture

Follow the company's enterprise technology architecture, absorb and draw lessons from advanced architecture experience at home and abroad, based on cloud platform and data center, refer to the software architecture of Pace-Layered Application Strategy and SOLID principles. See Fig. 3 for details. These include:

The IAAS layer is based on the cloud platform, providing servers, networks, storage, operating systems and firewalls, etc., and provides underlying resources and services for the deployment and operation of micro-services and front-end applications, and the company provides resources and components uniformly.

The PASS layer uses relational databases and big data platforms to provide data storage and computing services for the service layer.

The business service layer is composed of micro-services with different functions, providing services such as business logic processing and data processing for the application layer, and providing functions such as registration/discovery, load balancing, routing, and configuration between micro-services.

3.4 Data Architecture

On the data sharing interactive application platform (external network) side, user accounts, permissions and access data are cached, and business data is not retained; on the data interactive application platform (intranet) side, management permission data and related log data are persistently retained. See Fig. 4 for details.

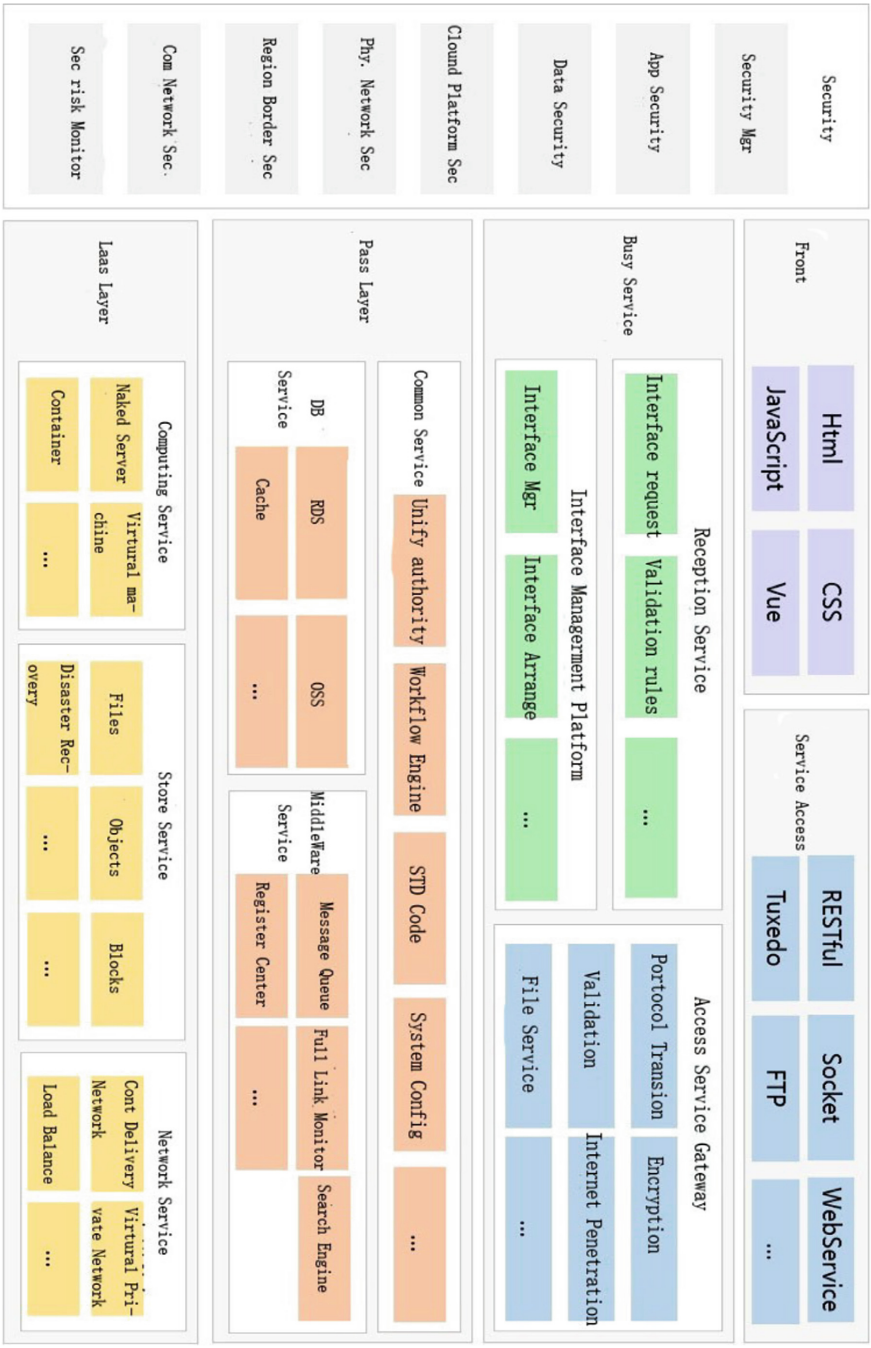

Fig. 3. Technology architecture

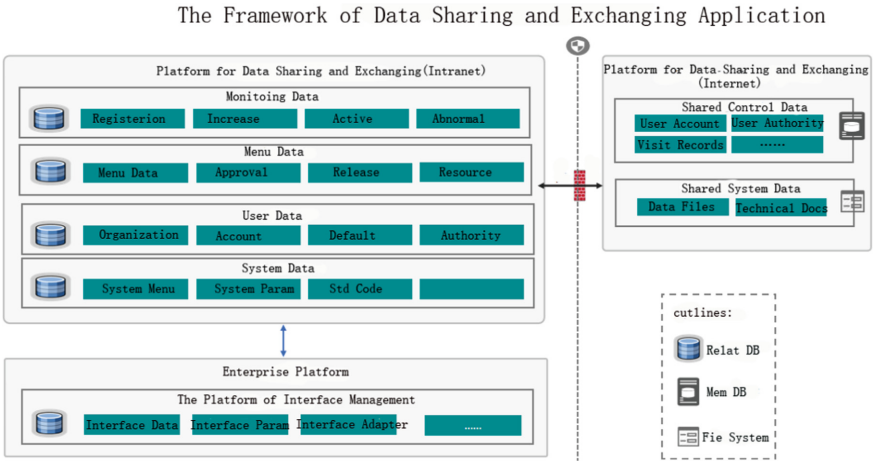

Fig. 4. The framework of data sharing and exchanging application

3.5 Integration Architecture

The interface management platform realizes functions such as interface registration, interface adaptation, interface arrangement, and interface monitoring, and forms the enterprise middle platform together with the business middle platform, data middle platform, and technology middle platform. The follow-up data sharing and exchange platform as a unified channel for data interaction between power companies and the government, enterprises and social users, it is recommended to upgrade the original government-enterprise sharing applications. The data sharing and exchange platform is divided into two parts: the intranet data sharing and exchange management platform and the extranet data sharing and exchange application platform.

The intranet data sharing and exchange management platform integrates with the data API services of various business middle stations and data middle stations through the enterprise-level interface management platform, and performs account authority management and service access management for data interface services, data micro-application products and external shared data, data management, monitoring management, etc.

The external network data sharing and exchange application platform belongs to a sub-application under the energy big data application. The management information area and the Internet area interact through information penetration through the security strong isolation device. The external network data sharing application, on the one hand, relies on the government dedicated line channel to provide the government with data sharing services in a variety of interactive ways, including data push, interface request, etc. Through the firewall, it provides a variety of power data products for Internet users, including government users, enterprise users, and social users.

3.6 Security Architecture

The data security protection system is designed and implemented around the security of the full life cycle of data. Improve data security defense-in-depth capabilities at various levels, including the application layer, data resource layer, network layer, and basic platform layer, to ensure the reliability, availability, authenticity, validity, and privacy of data and services.

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4 Conclusion

Due to the continuous expansion of the government, enterprises, and social users for power data sharing applications and the rapid expansion of data service product scope and data service access business volume, along with the continuous advancement of power data sharing interactive services, it is necessary to improve the data sharing operation and control mechanism. Based on this, this paper proposes the design of the data sharing service platform, which meets four requirements: first, to establish access service security guarantee, unified access to government, enterprise and other customers' access requests in different ways; second, to establish standardized data service requirements Management, providing data catalog query services for customers such as governments and enterprises, and accepting the data needs of these customers, forwarding them to business departments for processing, and feeding back data needs processing opinions to customers; the third is to provide unified data product access services, including data product query, Data product application, as well as data product online access services; Fourth, provide unified data interface services, including data interface query services. The platform guarantees the normal operation of external power data sharing services, establishes an internal data sharing management and control mechanism, and supports the company's data service operation management personnel to carry out data product operation management, data service upload and removal, data service authority control, data service operation monitoring and analysis, etc. Data sharing operation management and control jobs.

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