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Design and Application of a Service Outsourcing Cloud for the Insurance Industry

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ABSTRACT

With the development and maturity of cloud computing technology, many cloud-based solutions for specific industry applications are also rapidly emerging. This study designed and implemented a *Service Outsourcing Cloud for the Insurance Industry (SOC-II)* for China's huge market demand, especially for *Business Process Outsourcing (BPO)* companies serving the insurance industry. Firstly, this research presents the cloud computing ecosystem, conducts SOC-II needs analysis, and then proposes the system architecture and logical architecture of SOC-II. Secondly, this paper introduces an image processing case in a SOC-II production operation system, and gives the operating mode and management mode of SOC-II. Thirdly, we summarize the main features of SOC-II and the new changes that SOC-II brings to the insurance industry. Finally, the article discusses the challenges of cloud computing.

CCS Concepts

• Applied computing → Enterprise computing → Business process management → Business process management systems.

Keywords

BPO, Service Outsourcing Cloud, Insurance Industry.

1. INTRODUCTION

After nearly a decade of development, cloud computing technologies and solutions entered a mature stage in 2015 [1]. With the maturity of cloud computing solutions, the competitive advantage of cloud computing over traditional information technology models is more prominent. Companies of all types are paying more attention to how they can access and use IT resources more cost-effectively. As a new method that can improve resource utilization, save total cost of ownership, and enhance IT flexibility and efficiency, cloud computing is being studied and applied more and more widely [2].

At present, there are 120 insurance institutions in China, including 8 insurance groups and holding companies, 47 property insurance companies, 56 personal insurance companies, 9 reinsurance companies and 10 insurance asset management companies. In addition, 52 insurance companies in 15 other countries and regions have established 277 business organizations in China. There are also 2,538 insurance professional intermediaries in China, 1,903 insurance professional agencies, 378 insurance brokerage companies, 156,000 agencies, and 3.02 million

insurance salespersons. The registered capital of China's insurance intermediaries reached 7.303 billion yuan, and the total assets reached 10.721 billion yuan. China's insurance market has achieved a compound annual growth rate of 20% in the past 10 years. China's insurance market has broad prospects and potential. The internal driving force of China's economic growth is still strong, and the economy still has favorable conditions for achieving stable and rapid growth, which has laid a solid foundation for the development of China's insurance industry [3].

Cloud computing has great potential in China's insurance industry, especially in the midst of a recession, cloud can provide a more economical way to access IT and application IT for *business process outsourcing (BPO)* [4] companies serving the insurance industry.

2. CLOUD ECOSYSTEM

In the cloud computing ecosystem, there are three core roles called users, providers, and builders. Users are end users of various cloud computing services, including individual consumers, government users, educational users, and corporate customers. Providers are providers of various cloud computing services, including *software as a service (SaaS)*, *platform as a service (PaaS)*, and *infrastructure as a service (IaaS)* [5]. Builders are suppliers that provide a variety of basic resources, solutions, and services, such as information security providers, payment providers, and network providers.

Users of cloud computing may be both organizational users and individual consumers. Organizational users mainly include various social organizations, especially various enterprises. These companies are looking for IT solutions that meet their needs in the cloud computing ecosystem. The main purpose of such enterprises is to solve internal management problems such as inventory management and sales management, as well as external management issues such as supply chain management and customer relationship management. As enterprise users, they are also likely to directly seek cloud services in the cloud computing ecosystem as a dynamic complement to their own data centers or existing IT infrastructure [6]. Individual users mainly refer to the public. They are direct consumers who enjoy services in cloud computing cloud applications. They perform personal operations such as document editing, spreadsheet calculations, online games, webmail, online storage or editing videos, photos, etc. on the cloud platform.

The overall cloud ecosystem is shown in Figure 1.

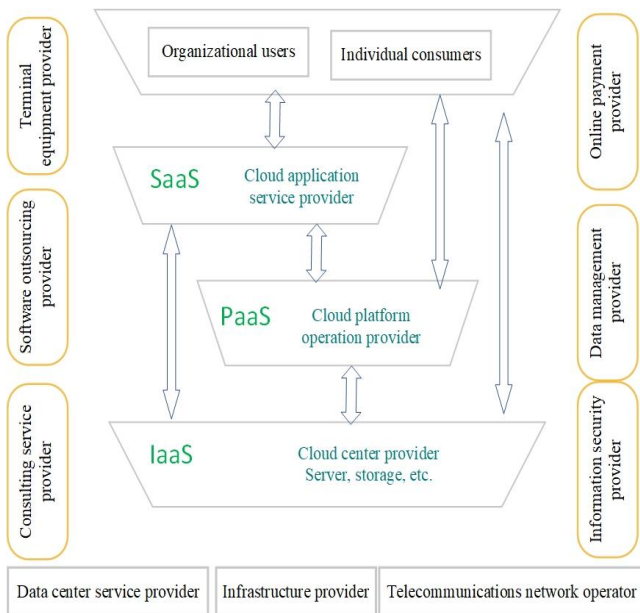


Figure 1: The overall of cloud ecosystem

3. NEEDS ANALYSIS

The long-term goal of SOC-II design and development is to provide various information support services for various service outsourcing enterprises serving the insurance industry, mainly in the following points:

3.1 Support Insurance Salesperson

The main service target is more than 3 million insurance sales staff. Main service content: Provide a complete personal sales management platform for insurance salesmen, which enhances sales ability through every step of sales from potential customer management, sales activity management and sales performance analysis.

3.2 Support Insurance Agency

The main service target is 2,500 insurance agencies. Service content: Provide a complete company business management platform for insurance agents, focusing on the company's sales management, including organization management, team management, customer management, product management, sales activity management, and sales performance tracking and sales statistics analysis.

3.3 Support Insurance Customer Self-service

The main service target is about 10 million insurance customers. Service content: Provide one-stop online self-service for insurance customers of small and medium-sized insurance companies. This type of service mainly provides self-service for insurance

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customers through the Internet, mobile Internet, and call centers, including policy changes and premium renewal.

3.4 Support Vehicle Insurance Online-trading

The main service target is 45 million private car customers. Service content: Provide a complete process of vehicle insurance trading platform for individual vehicle customers. This kind of service enables customers to conveniently and quickly carry out an inquiry, order, payment, delivery and other operations of vehicle insurance through the trading platform.

4. SOC-II DESIGN

4.1 SOC-II Design Principles

Forward-looking. In the process of design and implementation, SOC-II absorbed Microsoft's world-leading Microsoft cloud operation concept and the successful construction experience of many of its platforms. This ensures that the SOC-II overall project design and practice has an international perspective and is forward-looking.

Practical. SOC-II fully considers the IT status of cloud computing platform implementation, which ensures that the design of the solution has strong operability. According to the actual situation, the SOC-II design adopts a step-by-step implementation strategy and takes effective measures to minimize the possible risks in the implementation of the plan. In addition, during the implementation of the project, SOC-II also continuously improved personnel awareness of the project through knowledge transfer, which ensured the operation of the cloud platform after its launch.

Scalability. With the continuous development of SOC-II, the heterogeneity of infrastructure platforms that need to be managed is becoming stronger and stronger, the number of devices is increasing, and the types of cloud services are increasing. Therefore, the SOC-II design fully considers the flexibility and scalability of the platform at the beginning, which ensures that the cloud platform can integrate heterogeneous platforms according to the current situation, can expand functional applications according to service requirements, and can continuously optimize and improve according to management requirements.

Stability. The construction of SOC-II fully considers the smooth migration of the traditional platform of the existing application system to the cloud platform. At the same time, SOC-II adopts technologies such as virtualization and autonomy to provide more efficient continuity and high availability guarantee for business system applications.

Economic. The construction of SOC-II is not a one-time thing. This requires not only reasonable planning of investment in the functional construction of SOC-II, but also requires SOC-II to adopt efficient management tools in management operations. Only in this way can SOC-II be able to minimize the labor and energy costs of operation and maintenance services.

4.2 System Architecture of SOC-II

The first phase of SOC-II is designed to meet the business needs of 100 BPO companies that serve insurance document processing in the individual insurance sales business. The number of online concurrent processing services for each BPO company is within 200. At the same time, SOC-II can configure the business process, processing content, and operation management through the configuration function modules provided by the system. In order to achieve these design goals, the system solution has been

discussed in detail and has been carefully designed. The SOC-II system architecture is stated as follows:

SOC-II is based on the Microsoft .NET Framework platform and is built with Microsoft's cloud computing platform. Logical devices use Hyper-V virtualization technology to provide services and perform unified user identity management through Active Directory.

The database uses SQL Server 2012 and Cluster as the technical solution of data storage and data clustering, which guarantees the security and traceability of data storage in the system, and also obtains excellent data access performance and concurrency performance. The system uses the SQL Server Reporting Service, which is closely integrated with the database to obtain good real-time report performance, and provides a rich real-time report representation, which greatly improves the smoothness of the platform and users.

In the business logic layer, the Enterprise Framework is used as the basis for business logic implementation. This framework makes it easy to implement complex programming. At the bottom of multi-tenancy, SOC-II manages and configures cloud resources through a dynamic data center toolkit, which maximizes resource utilization.

At the software design level, SOC-II implements automatic load balancing for business clients. The SOC-II manages and decides on the bearer service through the system, and the newly added services are automatically assigned to clusters with different load bearing capabilities, which enables users to obtain a better user experience.

The presentation layer uses Silverlight and WinForm technology as the way to represent the web and traditional clients. SOC-II deepens the user experience through the application of rich client technology, which makes the operation difficulty of BPO employees greatly reduced. This can also significantly save a lot of training costs and shorten the training cycle.

The communication of each module in SOC-II adopts the PCP protocol with independent intellectual property rights, which makes the life cycle of each service be uniformly scheduled and managed by ASMP protocol. SOC-II implements data exchange and system interaction for outsourced services through automatic protocols, which also ensures data security when data is exchanged in the platform.

4.3 Logical Architecture of SOC-II

SOC-II consists of the following 10 subsystems: BPO integrated control system, production preparation and scheduling system, production resource allocation system, production operation system, operational support pre-analysis system, production operation monitoring system, quality management system, BPO employee skills training system, intelligent data mining system and delivery management system.

These subsystems comprehensively plan the functions of SOC-II from different dimensions such as operational production, operation management, data analysis, data management and communication services. SOC-II fully supports the IT system capabilities that service outsourcing enterprises should have. This also enables companies using SOC-II to quickly acquire the capabilities required to outsource services, thereby helping BPO companies grow rapidly.

The logical architecture of SCO-II is shown in Figure 2.

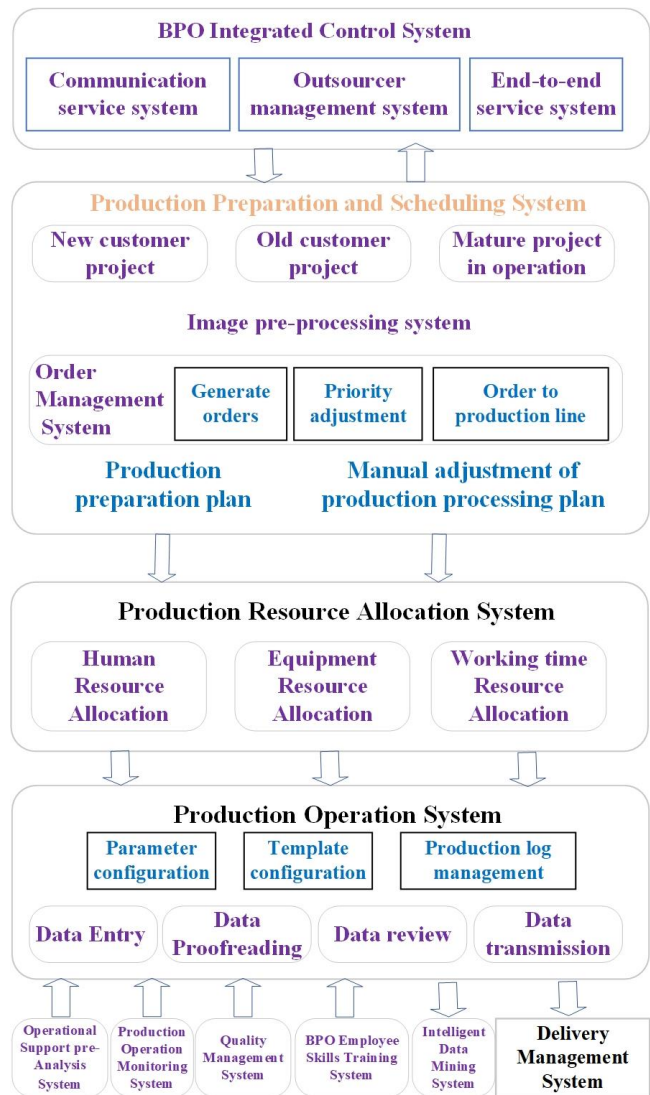


Figure 2: System Architecture of SOC-II

SOC-II follows the infrastructure of the cloud computing platform, and each subsystem is mainly implemented by the data access layer, the business logic layer, and the business presentation layer. The data access layer mainly provides the platform's access to basic data, which ensures the performance requirements and concurrency requirements of multi-person concurrent services in the design goal. The business logic layer mainly implements the business logic interaction and data communication requirements of each business module in the system, which enables the information of each subsystem to be connected and interacted without forming an information island. The business presentation layer uses rich client performance technology to greatly enhance the user experience, which makes SOC-II a very effective system to support BPO enterprises.

Based on the typical architecture design, SOC-II is appropriately expanded according to its specific needs. SOC-II is mainly composed of a (User Interface)UI presentation layer and system service layer. The UI presentation layer controls the SOC-II to provide a UI interface for user interaction. The service layer includes the corresponding business logic module, which uses the

workflow engine to implement the business processing of the system. Database access is implemented using the ORM mapping framework of the Entity Framework. At the same time, it also connects different resource virtual layers and implements management of hardware resources of the cloud platform.

5. SOC-II APPLICATION

5.1 SOC-II Image Processing Workflow

We present the workflow as shown in the Figure 3, which illustrates the entire processing flow after an insurance salesperson uploads the scanned insurance contract to the SOC-II platform.

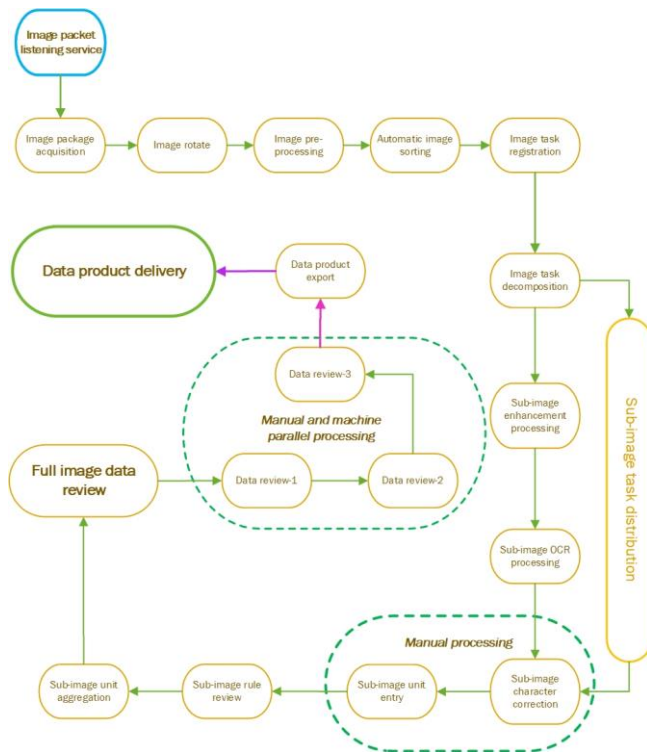


Figure 3: Image Processing Workflow of SOC-II

5.2 SOC-II Operating Mode

For BPO companies, the service outsourcing provided by SOC-II is quite different from the traditional outsourcing services based on local systems. SOC-II-based service outsourcing can provide more types of services and models, and can also be easily configured at the operational and management levels with the help of cloud computing advantages.

Web-based BPO service. SOC-II transforms the traditional client application's BPO service model into a WEB application model. SOC-II cuts the images that need to be processed into at least 8 small parts through the cloud platform, which ensures the security of customer information.

Customized service. SOC-II provides rich and powerful cloud service configuration functions according to the business of BPO enterprises. SOC-II supports the outsourcing of BPO enterprises from various aspects such as service type, business processing, process response, and system operation management. SOC-II has

greatly reduced the running time of new business of BPO companies and greatly improved their responsiveness.

Continuous support operation. SOC-II helps BPO companies monitor the real-time operation of their business. Moreover, in the event of any abnormality in the system, SOC-II can trigger automatic alerts through email, SMS, phone, etc., which helps BPO companies improve their business continuity.

5.3 SOC-II Management Mode

SOC-II provides two major modules of IT management and business management. SOC-II uses these two modules to achieve simplification of IT management and transparency of business operations, which greatly improves management efficiency.

The IT management module manages the resources used by BPO enterprises through a unified system interface, including real-time monitoring of virtual machines, network devices, and software services. At the same time, it can also perform service switching, stopping, and restarting of the system through a unified interface. The SOC-II supports a programming interface that makes it possible to communicate with external systems.

The service management module displays the status of the outsourced service enterprise in real time through the portal mode, and can also provide early warning and prompt for abnormal business processing. Managers are free to choose different dimensions to view and monitor the current operating status of the system, and can manually schedule abnormal services through the system, which ensures timely processing of customer services. When the customer's needs change, SOC-II can adjust the process, content and service through the configuration module and then put it into production operation without reprogramming and resource scheduling, which greatly simplifies the manual operation workload.

6. SOC-II FEATURES

6.1 Standardized Services.

The SOC-II platform makes it possible to standardize the business of BPO companies. BPO companies can quickly integrate into SOC-II for processing similar business needs of different customers. SOC-II reduces the development costs of BPO companies through standardized services, which greatly enhances the customer service capabilities of BPO companies.

6.2 Strong Scalability

BPO companies often face a sharp increase or rapid decline in customer business processing needs. The scalability of SOC-II can easily cope with the peaks and troughs in BPO business changes. SOC-II makes the performance of production and operation systems no longer a technical bottleneck for BPO companies.

6.3 Increased Resource Utilization

Storage devices and data servers in previous service outsourcing processing systems were underutilized due to peaks and troughs in the customer's business processing needs. SOC-II can enable a company's equipment utilization to reach a relatively high level, which makes the equipment's return on investment higher.

6.4 Business Decision Support

SOC-II integrates shared data content through cloud computing and then conducts business intelligence analysis. The results of these analyses can provide BPO companies with business decision support.

7. CHANGES BROUGHT BY SOC-II

7.1 Customer Service is Promoted

The customer care service in the insurance industry suffers from large demand, frequent changes, and difficulty in management. On the software platform, the system mainly requires large data throughput, fast interaction frequency and high concurrency. After the SOC-II platform is built, it not only solves the problems of system load and throughput, but also gives customers a better experience through the combination of call center, online self-service and traditional business hall. SOC-II makes insurance companies more resilient to customers, which makes customers more satisfied.

7.2 BPO Turns to KPO

The traditional BPO mode is limited by technology, storage, network, personnel skills, etc., while its business model is simple and involves the edge of the business. The current BPO model is "simple outsourcing, marginal outsourcing, replication outsourcing, segmentation outsourcing". Therefore, BPO has problems such as business duplication and low profit margin. SOC-II transforms the traditional simple BPO model toward the high-end *Knowledge Process Outsourcing (KPO)* model. SOC-II makes business process outsourcing no longer a simple and rough business model, but a business model that represents technology, knowledge, and thinking.

SOC-II can provide customers with high value-added, high-tech outsourcing services. SOC-II makes outsourcing services a deep outsourcing business model that can identify customer difficulties and solve customer problems.

7.3 Improved Technical Level

The traditional focus of outsourcing services is mainly on the business, but the way to achieve customer needs is simple and lacks advanced technology support. SOC-II integrates technologies such as cloud computing, graphic image processing, and voice intelligent processing. SOC-II realizes outsourcing services based on IT technology, and greatly increases the proportion of technology in outsourcing services, which truly realizes new outsourcing services that are beneficial to technology.

8. THE CHALLENGE OF THE CLOUD

Cloud computing brings huge opportunities, but it still faces many challenges in terms of technology, market and industry.

8.1 Definitions and Standards

The IT industry is generally optimistic about the development trend of cloud computing, but cloud computing has not yet been strictly defined. At the same time, the unified technical standards for cloud computing have not yet been born. Major IT providers have launched their own defined cloud computing products or solutions, which are constantly expanding the connotation and extension of cloud computing technology.

8.2 Data Security

Overall, cloud computing is still in its infancy. Data security issues is one of the main concerns of cloud computing [7]. For users of the cloud platform, they can store and run business data such as corporate information and customer information, or personal privacy data on the cloud platform [8]. However, how to control data security risks is their biggest concern.

8.3 Cloud Computing Reliability

Cloud computing not only requires remote application services, but it also needs to ensure the timeliness and stability of users of the cloud platform [9]. In the cloud computing mode, all business processing will run on the server side. If there is a problem in the server side, all users' applications will not run and the data cannot be accessed. In recent years, a series of network failures has caused people to worry about the reliability of cloud computing [10].

9. ACKNOWLEDGMENTS

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