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REIMAGINING ARCHITECTURE ASSET MANAGEMENT: TOOL-SUPPORTED MODELS AS CATALYSTS FOR INNOVATION AND COMPETITIVE ADVANTAGE

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ABSTRACT
As digitalization continues to evolve, information system architecture has progressed from single applications to integrated systems and, more recently, to micro services. This evolution has introduced numerous challenges for subsequent digital construction and management. On one hand, diverse system architectures, development technologies, and integration routes coexist, demanding significant human resources to handle complex functions and interfaces. This complexity results in technology accumulation, maintenance difficulties, and delayed responses to business needs. On the other hand, the absence of architecture asset data and tool support necessitates technology roadmap development and duplicate construction inspection to rely heavily on expert experience, resulting in a cumbersome workload and reduced efficiency.
To address these challenges, this paper introduces an innovative digital architecture asset model grounded in tool support within the realm of architecture asset management. This novel approach offers fresh insights into enterprise architecture asset management, enhancing the quality and efficiency of enterprise digital construction management.

Keywords: Digitalization, Information System Architecture, Microservices, Architecture Asset Management, Enterprise Digital Construction Management

Introduction

With the evolution and development of digitalization, information system architecture has developed from single application to integrated application to microservices, which has brought many challenges to the follow-up digital construction and management. On one hand, multiple system architecture, development technologies, integration routes, etc. coexist, which requires a lot of human resources to deal with complex and diverse functions and interfaces, leading to technology accumulation and maintenance difficulties and slow response to business needs. On the other hand, due to the lack of corresponding architecture asset data and tool support, the technology roadmap and duplicate construction inspection in the process of digital construction mainly rely on expert experience, which is heavy workload and low efficiency. In view of these problems, this paper proposes a digital architecture asset model innovation based on tool support from the perspective of architecture asset

management, provides new ideas for enterprise architecture asset management, and improves the quality and efficiency of enterprise digital construction management.

1. Advantages of Enterprise Architecture Methodology

Firstly, the enterprise architecture is based on the business strategy and focuses on key business issues of the enterprise. The strategic vision describes the expectations for integration and standardization across business units, while the architecture delineates the key processes, systems, and data composing the core of a company's operations [1]. Secondly, the enterprise architecture focuses on business and changes the thinking mode of employees. Enterprise architecture clearly describes the specific performance of "enterprise chess game", so that business can have a clearer understanding of strategic objectives. Thirdly, architecture could be a carrier to promote deep integration of business and technology. Enterprise architecture usually includes an organic combination of business architecture, data architecture, application architecture, and technical architecture to build a good communication channel for business and technological convergence. Fourthly, taking practice as an opportunity to support the cultivation of composite talents. Through the practice of enterprise architecture, the awareness of the concept of digital transformation of all staff is constantly improved [2].

In conclusion, enterprise architecture can resolve the problem of multiple system architecture, complex system interfaces, slow response to business needs, duplication, etc. during digital construction management [3].

2. Definition of Digital Architecture

As the top-level design of the digital construction, enterprise architecture is a global, systematic and basic work, which can effectively link business strategy with digital construction, and establish a unified standard and common language between business and information technology. In the process of digital economy development and digital transformation, digital architecture is a narrow understanding of enterprise architecture, mainly including digital architecture design and digital architecture management and control. Digital architecture design is a comprehensive interpretation of business strategy and needs, utilizing digital technology to form the current situation, needs, and blueprint for digital construction. Digital architecture management and control is the continuous updating management processes and systems, ensuring that the overall strategy, business requirements, and digital construction are consistent.

Digital architecture asset management involves multiple aspects, including asset identification, asset classification, asset storage, asset release, asset usage, asset evaluation, asset optimization, etc. These contents require developing corresponding strategies and methods based on specific enterprise situations and architectural goals.

3. Principles of Architecture Asset Management

The purpose of architecture asset management is to improve the value and efficiency of enterprise architecture, reduce the cost and risk of enterprise architecture, and enhance the adaptability and sustainability of enterprise architecture. In order to achieve these goals, architecture asset management needs to follow the following principles:

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a) Business oriented, measured by value. Architecture asset management should be based on meeting business needs and creating business value, rather than technology as its own goal.

b) Governance as the core and process as the guarantee. Architecture asset management should establish a sound governance mechanism and process, clarify the ownership, responsibility, authority, evaluation, approval, and change of assets, which ensure the quality and consistency of assets.

c) Based on the principle of sharing and the goal of reuse. Architecture asset management should promote asset sharing and reuse, avoid duplicate construction and waste of resources, and improve asset utilization and efficiency.

d) In a continuous approach, driven by improvement. Architecture asset management should adopt a continuous approach, regularly evaluating, optimizing, updating, and eliminating assets to adapt to the constantly changing business environment and technological development.

4. Design and Development of Architecture Asset Management Tool

In response to the question of unclear digital architecture assets, a 2D digital twin visualization interaction mode is adopted to provide a panoramic display capability of enterprise level architecture assets, covering the fields of business, data, applications, and technology, and connecting enterprise level, domain level, system level, and project level.

5.1. Business Architecture

According to the business domain designed according to the architecture framework, showcasing the overall situation of all business domains from a business perspective, including primary, secondary, and tertiary business functions, supporting management to quickly grasp the construction situation of various business systems in different business domains. The page prototype is shown in Figure 1.

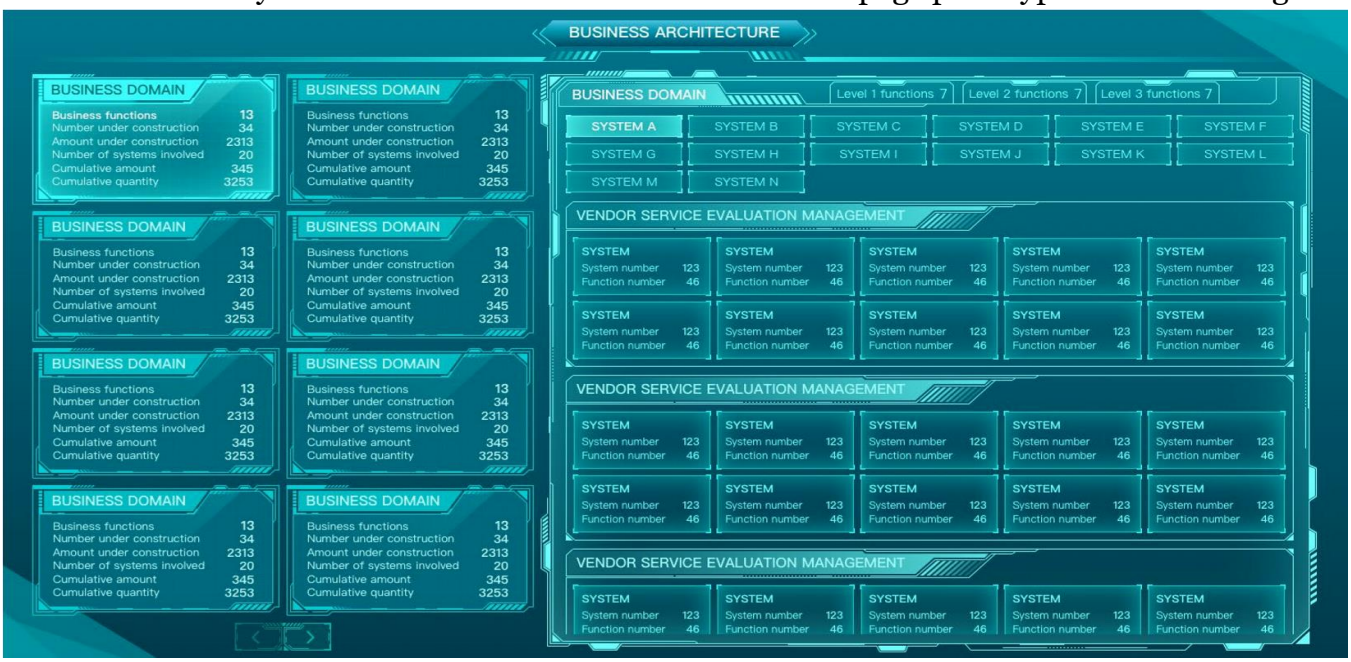

Figure 1: Visual display of business architecture

5.2. Application Architecture

It is divided into two major parts: “assets already constructed” and “assets under construction” (i.e., “assets already constructed” displays the architectural asset status of running systems; “assets under construction” displays the architectural asset status of planned, designed, and constructed systems). Display the distribution of system construction in various business units, and reflect the number of suspected duplicate functions in system construction in the form of hotspots, supporting management to quickly clarify the relationship between business capacity building and application construction, and providing data support for investment and construction.

5.3. Data Architecture

According to the data model, import all subject domains and data objects of subordinate data subjects into the tool, and associate them with application architecture of systems.

5.4. Technical Architecture

According to the architecture strategy, collect and organize technical platforms (components) such as artificial intelligence platforms, business platforms, technology platforms, and data platforms, as well as their integration relationships and system support.

6. Application Practice of Architecture Asset Management Tool in Power Grid Enterprises

6.1. Application Architecture Governance

Based on architectural asset data, verify the business coverage and architectural compliance of existing systems (or platforms). Compared the enterprise architecture with the system architecture, if there are functional deficiencies in the business support, functional supplements should be made. If there is partial overlap of functions within the system itself, split the function points. If there is a complete overlap of functions within the system itself, merge the functions points. If multiple systems have duplicate functions, keep the commonly used system functions for users, and take other system functions offline. Through these application architecture governance measures, realize system integration and improvement.

6.2. Data Architecture Governance

By organizing and improving the data architecture, achieve one-to-one correspondence between the data domain, data theme, data entity, data properties, data flow, data distribution of the data architecture with the data domain, data theme, data model, data flow, data storage and distribution of the system. For those without corresponding relationships, the relevant content of the system data model should be modified based on data architecture, to ensure that all data indicators of the system comply with the data architecture, thereby improving the quality of the system data.

6.3. Technical Architecture Governance

By collecting data such as integration scenarios, integration designs, hardware environments, and other information of each system, and comparing them with relevant documents such as feasibility study reports, conceptual design reports, and online trial run reports in the project management system, the software/hardware usage difference analysis is completed, support grasp the growth of data resources and hardware resource utilization of each system, which further optimize system hardware resources,

achieve “slimming and fitness” of the information system, and provide prediction basis for the expansion of software and hardware resources.

7. Conclusion

With the gradual deepening of digital transformation of enterprises, the importance of enterprise architecture has become increasingly prominent. The digital architecture asset management tool provides tool support for further exerting the value of enterprise architecture asset data. Through building a panoramic view of assets, one key maintenance of assets and other functions, and through application practice in power grid enterprises, the enterprise system “downsizing”, data quality improvement and technical architecture optimization have been achieved, which improve the quality and efficiency of enterprise digital construction and management, and further consolidate the foundation of enterprise digital transformation.

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