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作物模型系统Web服务集成方法

Web service integration method of crop model system

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中文摘要:

针对作物模型系统的多样性和异构性，研究了基于Web服务的作物模型系统集成方法。通过分析作物模型系统的组成结构及各功能体之间的交互特征，以面向服务的技术为基础，探讨作物模型系统的服务切分，并采用"契约先行"的Web服务开发技术实现了服务封装。文章详细描述了基于Web服务契约优先方法的建模过程，并采关工具实现了Web服务契约文档和服务代码框架的自动生成，通过引用作物模型Web服务组件的方式，实现了模型系统的内部业务逻辑，完成了小麦管理知识模型系统于Web服务的复用集成。试验结果表明，该作物模型系统集成方法采用统一的模型服务契约，提高了系统集成的复用开发效率，最大限度地解决了异构系统的互操作性题。研究结果为作物模型系统集成提供了方法指导。

英文摘要:

Abstract: On the diversity and heterogeneity of crop model system, the integration method based on Web service was studied. By analyzing the architecture of crop model sy and interactive features between function module, service partitioning based on service-oriented architecture (SOA) was studied. Combining with Web service identification and segmentation principle, the partition and the service combination structure of crop model based on Web service was proposed. Then the model system was divided three Web se including Web service of model calculation, Web service of weather data and Web service of soil data. The service package using "contract first" Web services development technology was designed. The modeling process based on web services contract-first (WSCF) was described in details and the automatic generation of Web services description language (WSDL) Deed and services code framework was achieved by use of related tools. The knowledge model system for wheat management as an instance was reused throu four steps based on Web services, and the concrete package steps were service data modeling based on crop model metadata, service information modeling, service operation an interface modeling, and service implementation using C# language under VS2008 ASP.Net platform. Taking the reused knowledge model system for wheat management based on service as the testing target, the effectiveness was verified in a real network environment. The output solution of the system was consistent with the result of the original knowle model system for wheat management using weather data and soil data of 75 cities at prefectural level of Jiangsu province in year 2010. It showed that the crop models system integration method adopts unified model service contract, making full use of the cross platform and cross programming language advantage, which promoted the efficiency of the model system integration, which solves the problem of interoperability between heterogeneous systems. The crop model system of Web service encapsulation, making full use of crop model resource of software components, the development of relevant documents and other resources, which improved the reuse level of crop model resource. Analysis from point of view of model of business functions, reassignment and development services were independent, and the designment of the service through the WSDL addressed specifi requirements, which shielded the underlying technical details and related agricultural domain specialized knowledge and improved the application of crop model. These results pr a methodological guideline for crop model system integration.

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