

国家重点基础研究项目

微网实时数据库系统研究

丁明,解添,毕锐

教育部光伏系统工程研究中心(合肥工业大学), 安徽省 合肥市 230009

摘要:

微网是一种新的分布式能源组织方式和结构。微网的结构特点和运行控制方式对微网能量管理系统(microgrid energy management system, MEMS)中实时数据库系统的实时性和可靠性提出了更高的要求。为此首先根据公共信息模型(common information model, CIM)扩展导则和微网的特点, 扩展了微网CIM类的描述, 并利用面向对象的实时数据库直接存储CIM的方法构建遵循标准的系统, 以避免模型转换和数据映射, 便于维护数据和提高实时数据库的访问效率。对实时数据库内部结构进行了研究设计和优化, 提出一种双实时库的外部结构。最后给出了该实时数据库系统的工作流程并进行了性能测试, 结果表明所设计的实时数据库完全适用于微网能量管理系统。

关键词:

Research on Real-Time Database System for Microgrid

DING Ming, XIE Tian, BI Rui

Research Center for Photovoltaic System Engineering (Hefei University of Technology), Ministry of Education, Hefei 230009, Anhui Province, China

Abstract:

Microgrid is a new organization mode and structure for distributed energy resource. The structural features of microgrid as well as its operation and control modes make higher requirements for real-time performance and reliability of real-time database system in microgrid energy management system (MEMS). For this reason, firstly, according to the extension guidelines of common information model (CIM) and the characteristics of microgrid, the descriptions of CIM class in microgrid is expanded and by use of the method that CIM is directly stored in object-oriented real-time database the system following the standard is constructed to avoid model transformation and data mapping, thus it is convenient for data maintenance and improve the access efficiency of real-time database; secondly, the internal structure of real-time database is researched, designed and optimized, then an external structure of dual real-time database is put forward; finally, the work flow of this real-time database is given and the performance test of this database is carried out. Results show that designed real-time database is completely applicable to MEMS.

Keywords:

收稿日期 2010-04-16 修回日期 2010-06-22 网络版发布日期 2010-11-13

DOI:

基金项目:

国家863高技术基金项目(2007AA05Z240); 国家自然科学基金项目(50837001)。

通讯作者: 解添

作者简介:

作者Email: xietian0309@163.com

参考文献:

[1] 陈海勇, 王倩. 基于CIM模型的SCADA系统实时数据库[J]. 铁道运输与经济, 2008, 30(11): 91-94. Chen Haiyong, Wang Qian. SCADA real time database based on CIM model[J], Railway Transport And Economy, 2008, 30(11): 91-94(in Chinese). [2] 国际电工委员会第57技术委员会. IEC 61970 301-2004 能量管理系统应用程序接口(EMS-API)第301部分: 公共信息模型(CIM)基础[S]. [3] 汪华. 基于公共信息模型的电网建模[J]. 电网技术, 2008, 32(2): 186-188. Wang Hua. Power network model based on

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(377KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

本文作者相关文章

PubMed

CIM[J]. Power System Technology, 2008, 32(2): 186-188(in Chinese). [4] 周宁, 丁琦. 开放实时数据库及其在调度自动化系统中的应用[J]. 电网技术, 2006, 30(增刊2): 171-175. Zhou Ning, Ding Qi. Open real-time database and its application in dispatching automation systems[J]. Power System Technology, 2006, 30(S2): 171-175(in Chinese). [5] Marnay C, Rubio F J, Siddioui A S. Shape of the microgrid [EB/OL]. [2007-01-01]. <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=3379&context=lbl>. [6] ENGLEDM CERTS proves two grids are better than one[EB/OL]. [2007-03-01]. http://certs.lbl.gov/press/distributedenergy/de_0503_certs.html. [7] 郑漳华, 艾芊. 微电网的研究现状及在我国的应用前景[J]. 电网技术, 2008, 32(16): 27-31. Zheng Zhanghua, Ai Qian. Present situation of research on microgrid and its application prospects in China[J]. Power System Technology, 2008, 32(16): 27-31(in Chinese). [8] Benjamin K, Robert L, Toshifumi I, et al. A look at microgrid technologies and testing, projects from around the world[J]. IEEE Power and Energy Magazine, 2008, 6(3): 41-53. [9] 伍磊, 袁越, 季侃, 等. 微型电网及其在防震减灾中的应用[J]. 电网技术, 2008, 32(16): 32-36. Wu Lei, Yuan Yue, Ji Kan, et al. Microgrid and its application in earthquake prevention and disaster reduction[J]. Power System Technology, 2008, 32(16): 32-36(in Chinese). [10] 丁明, 张颖媛, 茆美琴. 微网研究中的关键技术[J]. 电网技术, 2009, 33(11): 6-11. Ding Ming, Zhang Yingyuan, Mao Meiqin. Key technologies for microgrids being researched [J]. Power System Technology, 2009, 33(11): 6-11(in Chinese). [11] 刘崇茹, 张伯明, 孙宏斌, 等. 包含直流输电系统的公用信息模型的扩展[J]. 电力系统自动化, 2004, 28(20): 52-56. Liu Chongru, Zhang Boming, Sun Hongbin, et al. The extension of the common information model to analysis and control of AC/DC power system[J]. Automation of Electric Power Systems, 2004, 28(20): 52-56(in Chinese). [12] 李荔芳, 刘东, 陈清鹤. 公共信息模型在配电网建模工具中的应用[J]. 电力系统自动化, 2005, 29(24): 55-59. Li Lifang, Liu Dong, Chen Qinghe. Application of CIM in distribution grid modeling tool[J]. Automation of Electric Power Systems, 2005, 29(24): 55-59(in Chinese). [13] 刘念, 张建华, 熊浩, 等. 面向电力仿真系统异构性的CIM扩展方法[J]. 电网技术, 2008, 32(21): 58-62. Liu Nian, Zhang Jianhua, Xiong Hao, et al. An extension method of common information model oriented to heterogeneity of electric power simulation system[J]. Power System Technology, 2008, 32(21): 58-62(in Chinese). [14] 柳明, 何光宇, 卢强. 网络分析应用中的公用信息模型[J]. 电网技术, 2006, 30(17): 51-58. Liu Ming, He Guangyu, Lu Qiang. Common information model in network analysis applications[J]. Power System Technology, 2006, 30(17): 51-58(in Chinese). [15] 丁明, 张征凯, 毕锐. 面向分布式发电系统的CIM扩展[J]. 电力系统自动化, 2008, 32(20): 83-87. Ding Ming, Zhang zhengkai, Bi Rui. Distributed generation system oriented CIM extension[J]. Automation of Electric Power Systems, 2008, 32(20): 83-87(in Chinese). [16] 郭力, 王成山. 含多种分布式电源的微网动态仿真[J]. 电力系统自动化, 2009, 33(2): 82-86. Guo Li, Wang Chengshan. Dynamical simulation on microgrid with different types of distributed generations[J]. Automation of Electric Power Systems, 2009, 33(2): 82-86(in Chinese). [17] 王宁, 叶锋, 许文庆, 等. 支持CIM的实时对象数据库管理系统[J]. 电力系统自动化, 2006, 30(16): 93-96. Wang Ning, Ye Feng, Xu Wenqing, et al. A CIM-supported object-oriented real-time database management system[J]. Automation of Electric Power Systems, 2006, 30(16): 93-96(in Chinese). [18] 潘毅, 周京阳, 李强. 基于公共信息模型的电力系统模型的拆分和合并[J]. 电力系统自动化, 2003, 27(15): 45-48. Pan Yi, Zhou Jingyang, Li Qiang. The separation/combination of power system model based on CIM[J]. Automation of Electric Power Systems, 2003, 27(15): 45-48(in Chinese). [19] 姚阳春, 柴世友, 吕行, 等. 新一代分布式面向对象实时数据库管理系统[J]. 电网技术, 2007, 31(增刊2): 284-287. Yao Yangchun, Chai Shiyong, Lü Xing, et al. New generation of distributed object-oriented real-time database management system[J]. Power System Technology, 2007, 31(S2): 284-287(in Chinese). [20] 刘云生, 吴绍春, 李国徽, 等. 一种实时内存数据库组织与管理方法[J]. 计算机研究与发展, 1998(5): 18-21. Liu Yunsheng, Wu Shaochun, Li Guohui, et al. Data organization and management of real time main memory database[J]. Computer Research and Development, 1998(5): 18-21(in Chinese). [21] 王志南, 吴文传, 张伯明, 等. 基于IEC 61970的CIS服务与SVG的研究和实践[J]. 电力系统自动化, 2005, 29(22): 65-68. Wang Zhinan, Wu Wenchuan, Zhang Boming, et al. Study and implementation of CIS and SVG based on IEC 61970 [J]. Automation of Electric Power Systems, 2005, 29(22): 65-68(in Chinese).

本刊中的类似文章