Agile Database Management System

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Siemens Industrial Turbomachinery AB (SIT AB) in Sweden is part of the Siemens Energy Sector. The Energy Sector is the world's leading supplier of products, services and solutions for the generation, transmission and distribution of power and for the extraction, conversion and transport of oil and gas. SIT AB delivers gas turbines, steam turbines, turn-key power plants, service and components for heat and power production. All under one roof – from research and development, manufacturing, marketing, sales and installation of turbines and complete power plants to service and refurbishing. There are today about 2 700 employees in Finspång.

Project Field Experience In SIT AB, a large amount of field experience data is continuously generated in form of various reports from maintenance events, component repair and operation history. These reports include detailed information about the turbine operation history as well as its condition and reported damages on individual components. This field experience data, although noisy, invariably portray environmental factors, measurement errors, and loading conditions, or in short, reality. By establishment of a process to collect and maintain this information in a database format, exploration and knowledge discovery using this data became a subject of high interest. This Master thesis is a part of efforts done to develop advanced data management system to efficiently capture and store this information.

Project description

Maintaining and evolving data warehouses is a complex, error prone, and time consuming activity. One important reason for this is that the traditional relational data management builds on the assumption of rather stable requirements. Moreover, the environment of a data warehouse is in constant change, while the warehouse itself needs to provide a stable and consistent interface to information spanning extended periods of time. The wide gap between the still existing popularity of relational systems and their misfit with current realities in application domains and software development is obvious. This thesis is an effort to close this gap. Its aim is to remove the cumbersomeness and inflexibility of relational database technologies while retaining its strengths, power, standards, maturity, and interoperability.

This Master Thesis project consists of three parts:

I.   Literature survey of relevant agile database modeling techniques in the domain of graph databases

II. Modeling a descriptive schema-comes-second data management system based on technique chosen in I. above along with following requirements:

      a.   Multiple hiearchies: head group, items, article number. Each hiearchy has > 4 levels.

      b.   Can store historized data.

      c.   Store information about both serialized and non-serialized items. Context-defined item instances.

III. Implementation and validation of part II) in a proof of concept test database.

The project is suitable for 1-2 students with good background and great interest in data modelling. The student should have the good knowledge of database management and SLQ. Student will work closely with domain experts.

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