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**DERIVATION OF INITIAL DATA
WAREHOUSE STRUCTURE BY
MAPPING OPERATIONAL
DATABASE ON TRANSACTION
PATTERNS**

AMINA KHALFE

College of Computer Sciences

PAF - Karachi Institute of Economics and Technology, Pakistan.

E-mail: aminakhalfe@yahoo.com.

Data warehouses improve the quality of integrated information in the organization for decision making. The data for the data warehouse comes from online transaction systems. These online transaction systems generate vast quantities of products, customers and market data and are not well suited for supporting decision-support queries or business questions that managers typically need to address. The fundamental reason for building a data warehouse is to improve the quality of information in the organization.

Data warehouse designing for any business is a complex, expensive and tedious process requiring understanding of the longer-term business requirements in addition to

the user requirements. Typically, an involved process of analysis precedes the actual design phase of a data warehouse. There is also lack of guidance for the requirements of the engineering part of the data warehouses development process. Senior business analysts who are well versed in business issues and understand the market sector, and senior technical architects who understand the technical and design issues of decision support systems and data warehouses do this. The analysis process becomes more difficult because of the costs involved in hiring experienced staff and the privacy issues arising from the use of external consultants. The analysis and design of even a basic data warehouse structure may require months of effort. Inexperience is one of the main causes of failure in DW projects. The difficulty in gathering relevant information from the domain experts is solved by earlier researchers who have a number of patterns aimed for use during the analysis and design of a wide range of business domains from sales, purchases and production of physical products to travel, insurance and other professional services.

The thesis of this research is that the mapping of the operational databases on the transaction pattern facilitates the derivation of initial data warehouse structure. During the mapping process, the relationships, roles and attributes of the players defined by the transaction pattern help us in identifying the instances of the pattern in the database. Through these instances, we can then derive the initial data warehouse structure i.e. the attributes of the fact and dimension table(s). the data warehouse structure thus derived reduces the need for an extensive information analysis of the needs of the user and the dependency on the experienced personnel for data warehouse development.

The proposed methodology consists of a six step derivation methodology that is illustrated using a case study of an organization's operational database. The attributes of the fact table derived from the methodology are; keys of transaction pattern players; transaction, transaction line-item, place, participants and items. Each of the transaction players contributes in making the dimension tables as well. The initial data warehouse structure can be derived for the whole range of business domains where transaction patterns are used.

PERFORMANCE EVALUATION OF MANET ROUTING PROTOCOLS USING SCENARIO-BASED MOBILITY MODELS

Shams-ul-Arfeen
College of Computer Sciences

Mobile Ad-Hoc Network (MANET) is a multi-hop wireless network without a fixed infrastructure. Many routing protocols have been proposed for MANETs and are tested under various traffic loads and speeds. However, the simulations results of such routing protocols usually do not consider the nomadic velocities and pause-time intervals witnessed in real world scenarios, which may have significant impact on the performance of MANET routing protocols. In this thesis, four scenario-based mobility models, namely, Fast Car Model (FCM), Slow Car Model (SCM), Human Run Model (HRM) and Human Walk Model (HWM) are designed to test the performance of Destination-Sequenced Distance Vector (DSDV) and Ad-Hoc On-Demand Distance Vector (AODV) routing protocols. The simulation results indicate that both DSDV and AODV protocols work well for HRM and HWM models. Moreover, the DSDV protocol outperforms the AODV protocol for protocol overhead, whereas, the AODV protocol performed significantly better for average end-to-end delay for all models. Lastly, the throughput for both protocols suffers throughout the simulation, especially in high mobility environment.

ENHANCEMENT IN PPP-MP FOR IMPROVING QoS IN UMTS ALL IP ARCHITECTURE

Tahir Ali

College of Computer Sciences
PAF-Karachi Institute of Economics and Technology
E-mail: tahirali45@yahoo.com

In ALL IP network architecture of UMTS, ATM is replaced by IP. Unlike IP, ATM provides committed QoS. However, due to widespread IP adoption, networks are switching over to IP. There is, thus, a need to enhance the capabilities of IP for the better support of QoS in UMTS ALL IP Architecture.

In UMTS ALL IP architecture, a PPP session is established between RNC and SGSN routers for transmission. For supporting multiple services, multiple sessions have to be created. Creation of these multiple session influences QoS negatively. PPP-MP is an extension of PPP that manages multiple links in a single session. This thesis proposes

modifications to PPP-MP that establish and manages multiple virtual links in a single session of UMTS ALL IP Architecture. The proposed modifications provide a better support of QoS in UMTS ALL IP Architecture.

In UMTS, the applications are QoS sensitive. If ' n ' services are being provided through PPP, then the connection establishment time becomes n -fold. Our proposed modification to PPP-MP resolves this problem by creating n -virtual links over one physical link. Creation of a virtual link takes only a fraction of physical connection establishment time. The connection establishment time of the PPP-MP is more than the PPP connection establishment time and PPP-MP header is larger than the PPP header, and so it puts extra load on network but the data analysis results of this research indicate that the proposed modified PPP-MP is a feasible solution for UMTS ALL IP Architecture. This is so because for multiple services PPP-MP, establishes and manages multiple virtual links in a single session.

Modified PPP-MP can also support a large number of users. However, the increased number of users is at the expense of QoS because of the decrease in the bandwidth of physical connection. Even though there is decrease in bandwidth, which creates congestion in network, the modified protocol is still capable of managing the congestion.

My solution replaces PPP connection between RNC and SGSN with an enhanced PPP-MP. Our proposed enhancements meet the requirements of UMTS and provide better support of UMTS in ALL IP Architecture. For this enhancement, reserve bits of PPP MP are used. Two of the reserved bits are used for service class, three of the reserved bits are used for service type, and one reserved bit is used as priority bit for congestion management. Enhanced PPP-MP enables multiple virtual links in a single session, as PPP-MP has the capability to provide multiple virtual links in a single physical link and provides additional capability to manage the congestion.

This proposed protocol is tested on five cases and in each case different type of services are taken and observed (the results of these cases). In the case where only one service type is using PPP is the better solution but where there are multiple services PPP-MP is the feasible solution because PPP-MP provides approximately the same throughput but one remarkable difference is connection establishment time.