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<b>Title:</b>	THE IMPACT OF LOCATION BASED ATTACKS ON GEOGRAPHICAL ROUTING PROTOCOLS
<b>Author:</b>	B.MUTHUSENTIL, S.MURUGAVALLI
<b>Abstract:</b>	Several applications of mobile ad hoc networks select geographical routing especially the Greedy Perimeter Stateless Routing (GPSR) protocol due to its scalability, efficiency, and ability to support location based applications. However, there are many security issues in protecting location information, which can easily be abused by attackers. Location based adversarial activities affect the operation and performance of geographical routing protocols. There are only a few works on the literature that studied the impact of location based attacks on geographical routing. This work analyzes the impact of malicious nodes on the GPSR performance associated with fake location. This proposal identifies a set of possible location based attacks and analyzes the local problems that arise from the location based adversarial activities. Finally, it demonstrates the overall impact on the routing performance, by simulating the network in various attack scenarios. This study illustrates the effect of the adversarial activities with respect to the packet delivery ratio, overhead, average end-to-end delay, routing loops, packet dropping probability, and location error rate. The simulation results concluded that the overall routing performance degrades, depending on the type and percentage of adversaries.
<b>Keywords:</b>	Location Based Routing, Location Information, Active Attack, Passive Attack, And Impacts
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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<b>Title:</b>	TMAS-TRIO MEASURE ASSESMENT SCHEME FOR EFFICIENT ROUTING IN WIRELESS SENSOR NETWORKS
<b>Author:</b>	NAVANEETHAN.C, MUTYALA V.S.RATHNA KUMARI, THAMARAI SELVI.V, N.D.VIKRAM
<b>Abstract:</b>	Wireless sensor networks have become one of the buzzwords in the field of networks. The challenging issue in wireless sensor networks is to design energy efficient routing in wireless sensor networks which is mainly focuses on increasing the network lifetime that emphasizes on main aspects namely residual energy, link condition, network lifetime. We introduced an appealing mechanism that supports for energy efficient routing titled as ♦ Trio Measure Assessment Scheme for Efficient Routing in Wireless Sensor Networks ♦. In TMAS algorithm prioritized transmission count (PTX) is used for calculating node status and link quality in addition to this we will balance the load for enhancing the network life time. The main intention to introduce the scheme of load balancing is that sensor nodes that are closer to sink carries more inter-cluster traffic and hence deplete their energy faster than far away sensor nodes, So, by assessing the node status and link quality and load balancing we will get maximum results for efficient routing which will increase the network life time . Our Simulation results on TMAS prove that it outperforms the network lifetime and efficiently maintains the link quality among the clusters.
<b>Keywords:</b>	TMAS,PTX ,Node Status, Link Quality, Network Lifetime, Inter-Cluster Traffic.
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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<b>Title:</b>	A SURVEY ON REPUTATION BASED SELFISH NODE DETECTION TECHNIQUES IN MOBILE AD HOC NETWORK
<b>Author:</b>	S.SENTHILKUMAR, J.WILLIAM
<b>Abstract:</b>	Mobile Ad hoc Network (MANET) is well known for its limited transmission range of wireless network interface. Hence, multiple hops (multi-hops) may be needed for exchanging the information from one node to another across the network without any base stations or routers. In MANETs, as there is no hierarchy among nodes, every node is responsible for forwarding packets to its neighbouring nodes. Due to severe resource constraints like memory, computing power, energy, bandwidth and time, some nodes may not participate in forwarding the packets for saving its resources. The presence of selfish behaviour

	among nodes may lead to network partitioning and makes a major negative impact in throughput and the network operation. To avoid such circumstances selfish node deduction is very important. Already many selfish node detection mechanisms have been developed and still exist. And this survey is to evaluate some of the reputation based selfish node detection mechanisms and to analyze its merits and demerits. This paper compares different methods based on QoS metrics as well as on node's behavioral analysis for reducing the effect of selfish nodes in mobile ad hoc networks.
<b>Keywords:</b>	MANET, Multi-Hops, Selfish Nodes, QoS
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	CONCEPTUAL MODEL OF IT GOVERNANCE FOR HIGHER EDUCATION BASED ON COBIT 5 FRAMEWORK
<b>Author:</b>	HERU NUGROHO
<b>Abstract:</b>	Effective governance in an organization does not happen by coincidence. The success of implementing effective governance in an organization associated with the right pattern or fit for the organization so that they can be a complement or supplement of organization's strategic focus. Information technology (IT) governance is not a static concept but rather processes inherent in the organization. Decentralized organizations such as a university need a regular review to renew the IT governance structure to take account of changing business and technological environment. However, the mechanism IT governance in an organization will depend on the characteristics and needs of the organization. ISO/IEC 38500 help the people at the highest levels in the organization to understand and fulfill their legal obligations, regulations and ethics in relation to the use of IT in their organizations by providing key principles. COBIT 5 framework provides guidance how IT governance should be built by taking into account the area of enterprise governance and management of governance areas that both have their roles within the scope of IT governance. Conceptual model of IT governance is built based on the main principles that should exist in the process of governance with COBIT 5 framework guide as a reference how the governance of IT must be organized with attention to area governance and management areas, each rendered in a particular domain so that it will be a guide for higher education for developing IT blueprint that not only seen as supporting the IT aspects of academic and non-academic activities but look at the overall aspects of the scope of university governance.
<b>Keywords:</b>	ISO/IEC 38500, IT Governance, COBIT 5 Framework, University Governance, key Principles
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	S-MSE: ASEMANTIC META SEARCH ENGINE USING SEMANTIC SIMILARITY AND REPUTATION MEASURE
<b>Author:</b>	P. VIJAYA , G. RAJU , SANTOSH KUMAR RAY
<b>Abstract:</b>	In order to increase web search effectiveness, Meta search engines are invented to combine results of multiple search engines as a result of larger coverage of indexed web. Meta search engine is a kind of system which is useful for internet users to take advantage of multiple search engines in searching information. Recently several approaches were developed using ontology and ranking measures. Accordingly, Meta search engine is developed here using ontology and semantic similarity measure. In order to bring semantic in keyword matching, a semantic similarity measure (SSM) is developed. Here, every concept sets are matched with the title sets using SSM that consider the hyponyms and hyponyms of the keywords presented in the title sets. Along with three different ranking measures relevant to contents, title sets and raking value given by the standard search engines are effectively combined to improve the effectiveness. Finally, the experimentation is carried out using different set of queries and the performance of the meta-search engine is evaluated using TREC-style average precision (TSAP) measure. The proposed semantic meta-search engine provides 80% TSAP which is high compared with existing search engine and meta-search engine.
<b>Keywords:</b>	S-MSE, Search Engine, Semantic Similarity, Reputation Measure, TREC, TSAP
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	PATTERN REPRESENTATION MODEL FOR N-ARY RELATIONS IN ONTOLOGY
<b>Author:</b>	VINU P.V., SHERIMON P.C., RESHMY KRISHNAN, YOUSSEF SAAD TAKRONI

<b>Abstract:</b>	The vision of Semantic Web is to make web resources more accessible to automated resources. Here the role of ontology is to provide vocabulary for metadata description with computer-understandable semantics. The main components of ontology are concepts, relations and individuals. The most common type of relation is binary relation that maps between a single subject and a value. Sometimes there exist n-ary relations in ontology. W3C provides several patterns to represent n-ary relations. In this paper we discuss the issues in n-ary relations, the concept of RDF reification and provide an appropriate pattern to represent the n-ary relations. The examples of n-ary relations are taken from Seafood Ontology we developed earlier.
<b>Keywords:</b>	N-Ary Relations, Reification, Semantic Web, OWL, RDF
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	THE BLOCK STORE OF BLOCK-BASED PROGRAMMING APPROACH
<b>Author:</b>	MUSTAFA ALMATARY, MARINI ABU BAKAR AND ABDULLAH MOHD ZIN
<b>Abstract:</b>	Block-based Programming approach is an software development approach that makes programming task easier by enabling end user programmers to develop applications by integrating software blocks. In order for block based programming approach to be successful, there is a need for a large number of blocks to be developed in various application domains. These blocks must be developed based on a certain standard so that they can easily be combined with other blocks to create applications. These blocks must also be distributed and shared so that they are available for end users. This paper describes the concept and implementation of block store, which is a web based repository system that enables blocks to be managed and shared.
<b>Keywords:</b>	End-User Programming, Software Repository, Block-Based Software Development, Component-Based Software Development.
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	REAL CODED GENETIC ALGORITHM (RCGA): A NEW RCGA MUTATOR CALLED SCALE TRUNCATED PARETO MUTATION
<b>Author:</b>	SIEW MOOI LIM, MD. NASIR SULAIMAN, ABU BAKAR MD. SULTAN, NORWATI MUSTAPHA, BIMO ARIO TEJO
<b>Abstract:</b>	This paper presents a comparison in the performance analysis between a newly developed mutation operator called Scaled Truncated Pareto Mutation (STPM) and an existing mutation operator called Log Logistic Mutation (LLM). STPM is used with Laplace Crossover (LX) taken from literature to form a new generational RCGA called LX-STPM. The performance of LX-STPM is compared with an existing RCGA called LX-LLM on a set of 10 benchmark global optimization test problems based on a few performance criterions to investigate the reliability, efficiency, accuracy and quality of solutions of both optimization algorithms. The final outcomes show that LX-STPM is far superior than LX-LLM at all aspects.
<b>Keywords:</b>	Real Coded Genetic Algorithms, Mutation Operator, Crossover Operator, Global Optimization
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	A CRITICAL OVERVIEW OF EXISTING QUERY PROCESSING SYSTEMS OVER HETEROGENEOUS DATA SOURCES
<b>Author:</b>	Naoual MOUHNI, Abderrafaa EL KALAY
<b>Abstract:</b>	In the past, to answer a user query, we generally extract data from one centralized database or from multiple sources with the same structure. then things have been changed and we are facing the fact that in some cases, it is necessary to use a set of data sources to provide a complete information. these sources are physically separated, but they are logically seen as a single component to the final user. Besides the structure heterogeneity, there is another important point for what specialists are trying to find a solution which is the semantic heterogeneity of data sources. In this paper we are going to provide a list of different approaches that treated the query processing problem on heterogeneous data sources under different angles
<b>Keywords:</b>	Query Processing, Heterogeneous Data Sources, Ontology, Data Warehousing, Federation

<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	THE ROAD AHEAD FOR THE INDIAN IT AND ITES INDUSTRY CONSIDERING ITS SERVICE OFFERINGS, DOMESTIC MARKET AND TECHNOLOGY TRENDS
<b>Author:</b>	LALIT S KATHPALIA, DR. R RAMAN
<b>Abstract:</b>	Offshoring has been a popular mantra over the past two decades. The Indian Information Technology (IT) companies are finding ways and means to retain their competitive advantage by changing delivery locations and giving value added services offering. This paper delves into the current state of the Indian IT services industry and attempts to find out the domestic IT services opportunity from perspective of Indian IT vendors. The paper attempts study the domestic IT market also explores the future of the Offshoring revolution for the Indian IT industry. The papers throws light on the domestic opportunity that are still left untapped and proposes a model for outsourcing, which can be adopted by Indian IT giants for long term sustainability of business.
<b>Keywords:</b>	Outsourcing, IT services, Domestic IT services, Indian IT Industry, Sustainability of Business
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	DESIGN PARAMETER OPTIMIZATION BASED ON ARTIFICIAL BEE COLONY (ABC) ALGORITHM FOR MEMS ACCELEROMETERS
<b>Author:</b>	KRUSHNASAMY V.S, A.VIMALA JULIET
<b>Abstract:</b>	As MEMS technology continue to grow, MEMS device design optimization is becoming an interesting and important research issue. In order to design a MEMS device to meet the given specifications, the relationship between the device performance and various design parameters must be investigated. There are various optimization algorithms that can produce an optimized design of MEMS. Designing of MEMS accelerometer may include the parameters like Beam length, Beam width, Beam depth, Beam mass, proof mass etc. The primary intension of this research is to identify the optimal parameters to design an efficient accelerometer in MEMS. Here the optimization will be done by using Artificial Bee Colony Optimization (ABC) algorithm. This algorithm will overcome the issues of GA and the ABC based design parameter optimization technique will helpful to design MEMs accelerometer architecture. The fitness is based on the parameter die area with specified range. The implementation of the proposed method will be done by MatLab 7.12 and the performance will be analyzed with some existing methodologies.
<b>Keywords:</b>	ABC(Artificial Bee Colony), MEMS,Optimization, Accelerometer,GA
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	PERFORMANCE ENHANCEMENT OF SHUNT ACTIVE POWER FILTER WITH FUZZY AND HYSTERESIS CONTROLLERS
<b>Author:</b>	K.SEBASTHIRANI, K.PORKUMARAN
<b>Abstract:</b>	This paper proposes fuzzy and hysteresis controllers based three phase Shunt Active Power Filter for current harmonic compensation to improve the performance of 3 $\phi$ supply system feeding non- linear loads. The Shunt Active Power Filter is used to eliminate current harmonics. The dc link control strategy is based on the fuzzy logic controller. Gating pulses for the Shunt Active Filter is generated using Hysteresis current controller based Pulse width modulation technique. The proposed model is simulated in MATLAB/SIMULINK. Simulation results show that the dynamic behavior is better than the conventional Proportional- Integral (PI) controller and is found to be more robust for changes in load.
<b>Keywords:</b>	Shunt Active Power Filter(SAPF), Fuzzy Logic Controller(FLC), Hysteresis current controller, Harmonics, Total Harmonic Distortion (THD).
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014
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<b>Title:</b>	A DECISION SUPPORT TOOL FOR MODELING TIME-TO-EVENT DATA IN POWER SYSTEMS
<b>Author:</b>	ABDOLVAHHAB FETANAT

<b>Abstract:</b>	Survival analysis, also known as time-to-event analysis, focuses on modeling waiting times until events of interest occur. This paper proposes statistical flowgraph models (SFGMs) as a suitable decision support tool for survival analysis in power systems. SFGMs are useful for modeling time-to-event data that result from a stochastic process. Analysis from the flowgraph model gives an entire waiting time distribution as well as cumulative distribution function, survivor function and hazard function for any total or partial waiting time. The importance of survival analysis in power system is demonstrated when our power supply is disrupted. Two examples illustrated in this paper demonstrate with clarity, the effectiveness of SFGMs to the survival analysis in power systems. One of the advantages of SFGMs is to reduce the multistate models into an equivalent binary-state model. Based on this study, the authors suggest that the use of SFGMs will help decision makers to identify weak points in the system in order to control system conditions.
<b>Keywords:</b>	Hazard; Power System; Statistical Flowgraph Model; Survival Analysis; Time-To-Event Data.
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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<b>Title:</b>	DESIGN OF 0.92 GHZ ARTIFICIAL MAGNETIC CONDUCTOR FOR METAL OBJECT DETECTION IN RFID TAG APPLICATION WITH LITTLE SENSITIVITY TO INCIDENCE OF ANGLE
<b>Author:</b>	M. ABU, E. E. HUSSIN, A. R. OTHMAN, FAUZI. M. JOHAR, NORHIDAYAH M. YATIM, ROSE. F. MUNAWAR
<b>Abstract:</b>	In this paper, the new structure of Artificial Magnetic Conductor is presented. The AMC is designed to overcome the failure of detecting the RFID tag when placed near to the metal based object. It is too complicated to design an AMC at low frequency due to limitation of size and bandwidth. In this paper, the 0.92 GHz AMC is designed with different sizes and shapes of slots inserted into the square PEC patch. The size of single unit cell of this AMC is 45.5 mm x 45.5 mm. The AMC is designed in stacked layer to increase the bandwidth of single unit cell. The optimized AMC at 0.92 GHz frequency, had increase the performance of dipole antenna by return loss = -21.8 dB, gain = 3.0 4dB and directivity = 5.149.
<b>Keywords:</b>	Artificial Magnetic Conductor, RFID, Metal object detection
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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<b>Title:</b>	NEW INTERACTIVE MULTIMEDIA APPLICATION MODEL USING OBJECTS STORAGE IN A DATABASE
<b>Author:</b>	HASAN HARASIS
<b>Abstract:</b>	This paper presents a new interactive multimedia application model which combines the advantages of object-oriented programming with aspect programming. The model proposes a structure for multimedia applications with a good reutilization of code in other applications and objects storage in databases. As a result, the global time spend for realization of an entire multimedia application is reduced and the size of the executing file is smaller.
<b>Keywords:</b>	Multimedia, Database, Object, Storage, Processing.
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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<b>Title:</b>	APPLYING HYBRID GENETIC ALGORITHMS TO RECOVER FOCAL LENGTH, CAMERA MOTION AND 3D MODELS FROM SILHOUETTES
<b>Author:</b>	AMINE MOUAFI, RACHID BENSLIMANE, AZIZA EL OUAZIZI
<b>Abstract:</b>	In this paper, a hybrid method is applied to recover parameters and motion of camera from a set of silhouettes of an object taken under circular motion. Camera parameters can be obtained by maximizing the total coherence between all silhouettes. Two optimization methods, the Powell optimizer (PO) and the Genetic algorithms (GA), are applied to maximize the silhouette coherence and their performances are compared for several experiments. To take advantage of the strengths of the two methods, we developed a hybrid method that combines the genetic algorithm and the Powell optimizer to improve the performances in term of convergence speed and accuracy. The recovered parameters are used for 3D image-based modeling to obtain high fidelity 3D reconstruction.



	with minimal hardware complexity and maximum reusable interleaver that can support two standards 3GPP WCDMA and 3GPP LTE. The proposed interleaver/ deinterleaver architecture receives an input data stream of any size established by the 3GPP standard and delivers the interleaved or deinterleaved stream depending on the user requirements. Various optimization techniques and novel VLSI architectures are utilized to achieve the proposed hardware interleaver address generation architecture. By introducing the algorithmic level transformations and hardware reuse methodology low complexity reconfigurable architecture is designed. The frequency of operation of the proposed interleaver is 122.46 MHz.
<b>Keywords:</b>	3GPP, Interleaver, Reconfigurable, LTE
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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<b>Title:</b>	DATA EXCHANGE DELIVERY BETWEEN INFORMATION SYSTEM AT LOW BANDWIDTH QUALITY USING MESSAGING
<b>Author:</b>	I MADE SUKARSA, Ni WAYAN WISSWANI, PUTU WIRABUANA
<b>Abstract:</b>	Data exchange is a routine activity in a distributed system. This activity can be done between organizations with equivalent positions or between branches with the head office. Technology is commonly used web development service as additional middleware. In a growing organization, the effort is quite difficult because it requires a connection with a good quality of bandwidth and dedicated server as a service provider. Therefore, the development of messaging-based middleware can be used as a cheap alternative. In the first year, the study is focused to produce a prototype of a middleware that can work on a machine that is homogeneous DBMS MySQL. In the second year, will develop prototypes that can work in heterogeneous DBMS engine. The resulting prototype in the first year can be used to exchange data between applications by utilizing metadata for each homogeneous DBMS.
<b>Keywords:</b>	Data Integration, Messaging, Low Bandwidth, Distributed System, Data Exchange
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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<b>Title:</b>	ODIUM PIPERIS FUNGUS IDENTIFICATION FOR PIPER BETEL PLANTS USING DIGITAL IMAGE PROCESSING
<b>Author:</b>	J.VIJAYAKUMAR, S.ARUMUGAM
<b>Abstract:</b>	The betelvine cultivation is very much affected by diseases and outcome of the farmer is big loss for betelvine cultivation. The aim of this paper is to detection of Powdery mildew disease in the betelvine plants using digital image processing techniques. The digital images of the uninfected or normal betelvine leaves and the digital images of the infected in powdery mildew diseased betelvine leaves at different stages are collected from different betelvine plants using a high resolution digital camera and collected betelvine images are stored with JPEG format. The digital image analyses of the leaves are done using the image processing toolbox in MATLAB. The mean values for all sample leaves are computed and calculated mean values are stored in the system. The mean values of test leaves are computed and compared with the stored values. As the result of this comparison, it is identified whether test leaves are affected by powdery mildew disease or not. Finally this analysis helps to recognize the powdery mildew disease can be identified before it spreads to entire crop.
<b>Keywords:</b>	Piperaceae, Powdery Mildew Disease, Betelvine
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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<b>Title:</b>	MOBILE-ASSISTED INSTRUCTIONAL FOR DOMESTIC MAID (MAID-M)
<b>Author:</b>	TEH PHOEY LEE, GEOFFREY MUCHIRI MUKETHA, GU YIN XIN
<b>Abstract:</b>	Statistics from Immigration Department of Malaysia has shown that the foreign workers have increased tremendously over the past 4 years. Different nationalities of foreign maids usually speak in their own mother languages from their home countries. A certain level of communication barrier between the Malaysia's employers and the foreign workers were identified in the previous study. The misunderstanding of tasks requested to their domestic maid had led to the communication barrier. The study confirmed positively that this communication barrier has occurred between the employer and the maid. In this paper, the Mobile-Assisted Instructional for Domestic Maid (MAID-M) is proposed and

	presented both conceptually and physically. Feedbacks of the proposed application is collected and tested.
<b>Keywords:</b>	Mobile Assistant, Mobile Development and Mobile Application.
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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<b>Title:</b>	A HYBRID INDEXED TABLE AND QUASIGROUP ENCRYPTION APPROACH FOR CODE SECURITY AGAINST VARIOUS SOFTWARE THREATS
<b>Author:</b>	Dr.N. SASIREKHA, Dr. M.HEMALATHA
<b>Abstract:</b>	Security is of fundamental importance in digital communication. The system should be secure against brute force attacks and impersonation by the eavesdropper. Code and the sensitive data should only be accessed and understood by legitimate user/authority. Software in recent scenario has been highly susceptible to various attacks and threats. Reverse engineering is one of the key technique by which an intruder can understand the inner working of the software. Most of the existing software protection techniques do not provide reliable security against various attacks. Cryptographic approaches are observed to be very efficient in providing security and authentication to the software. Encryption of the code in the software has received much attention in the software engineering domain and various researches are being done in that area. This paper proposes a novel hybrid software protection code encryption scheme based on the index table. This approach uses a novel and efficient encryption technique for encryption the indexed table. The encryption technique used is the quasigroup approach which provides least resemblance of the original data when encrypted. The performance of the proposed approach is evaluated based on the time cost and space cost and it is observed that the proposed approach provides significant results and performance.
<b>Keywords:</b>	Cryptography, Decryption, Encryption, Quasigroup, Index Table, Reverse Engineering, Software Protection.
<b>Source:</b>	Journal of Theoretical and Applied Information Technology 20 February 2014 -- Vol. 60. No. 2 -- 2014

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## DATA EXCHANGE BETWEEN INFORMATION SYSTEM AT LOW BANDWIDTH QUALITY USING MESSAGING

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### ABSTRACT

Data exchange is a routine activity in a distributed system. This activity can be done between organizations with equal positions or between branches and the head office. Technology commonly used as middleware is web service. In a growing organization, the effort is quite high because it requires an inter or intranet service with a good quality bandwidth and dedicated server as a service provider. Therefore, the development of messaging-based middleware can be used as a cheap alternative. The first year study is focused to produce a middleware prototype that can work on a DBMS engine, that is homogenous DBMS MySQL. In the second year, prototypes that can work in heterogeneous DBMS engine will be developed. The first year prototype result can be used to exchange data between applications by utilizing meta data for each homogeneous DBMS.

**Keywords:** *Data Integration, Messaging, Low Bandwidth, Distributed System, Data Exchange*

### 1. BACKGROUND

When an organization began to grow, new branches are spreaded in different geographical areas. The organization began to exchange data and information between branches in the context of real-time, near real-time or offline mode (batch processing). Data exchange for various operation and management needs, such as circulation control of goods between branches, inter-branch withdrawal, and sending sales report from branches to head office. The information obtained through various channels such as telephone, email, courier delivery, and middleware applications.

Recent middleware technology that has been widely used for exchange data is web services. Web service is a service that is built on a server that provide data exchange between applications. When applications are geographically dispersed, it takes a public IP and a reliable internet connection so that communication between various nodes and web service applications work well. Web service development, integration with applications, IP purchase and provision of bandwidth services are expensive.

In the growing company, as a group of micro or small financial institutions, the funds allocated for IT spending are usually not enough to meet the cost. Most are still focused on the application development to support branch

operations and some new improvement about application integration between branches. It is revealed from a preliminary study conducted at a financial institution.

This institution has several business units such as workshops, online electrical checkouts, savings and loan business, and development plans, which are located at few mini markets scattered in several areas. Management also intends to provide savings and loan services in some areas by leveraging existing business office in a few places, but is hampered in terms of data integration between headquarters and branch offices. Management's current operational difficulties is to control activities in real time. This same thing will also happened to the other growing institutions. Therefore, it is necessary to develop alternative low-cost middleware in both phases of development and operation.

The most likely alternative is to build a messaging-based middleware. Currently there are several messaging applications that are free and have been used widely in the community such as Yahoo Messenger (YM). This application can be used to perform two-way communication between accounts with relatively longer content compared to the Short Message Service (SMS) and it does not require large bandwidths. By conducting a series of research, YM likely to be used as a transport



vehicle message/data to be exchanged between applications from various places.

## 2. THEORITICAL BACKGROUND

### 2.1 System Integration

Information integration is the process of bringing together information using the data displayed through a single interface to see all the data of an organization. The purpose of information integration is to display data to the user using single interface from various data sources. Integration is one of the solutions for an organization in order to compete in the information age because the information available is over whelming not only within the organization but also from outside organization. Integration of information can reduce data management costs because the complete information that is fast and easy to obtain, actually, is already available. Separated application in the absence of centralized integration cause complicated distribution of data and information for the organization. Integration will be able to overcome the data duplication a one to another location so that the resulting data will be consistent[6].

### 2.2 Message Oriented Middleware (MOM)

Message Oriented Middleware(MOM) is a flexible system mechanism to exchange data between applications in different platforms[2]. In case of integrating data, it can be done by making changes to their associated systems. This will spend more time and be expensive. MOM implementation into without making changes to the systems that will be integrated becomes a solution. [3]. Although MOM has a number of benefits, MOM also has some disadvantages. In terms of the speed of message delivery, the MOM could spend many minutes. Another disadvantage, the messages sent can not be as curtailed to be read and there is no certainty in delivery time of the message. It depends on the receiver of the message

### 2.3 Database Management System (DBMS)

Database Management System (DBMS) is an application used to manage large amounts of data, consisting of the storage, editing, and data retrieval. Utilization of DBMS engine can improve efficiency, scalability, and robustness. DBMS also allows simultaneously access by several users at once[8].

### 2.4 Metadata

Metadata is structured information that describes and explains the information in order to make the information easy to find again, used, or maintained. Metadata is often called data about data or information about information. Metadata contains information about the contents of a file [7]. If the data is in the form of text, metadata is usually a description of the field name, field length, and field type. For the image data, metadata contains information about who took it, when was it shoot, and camera settings at the current time. If the type is a collection of files, metadata is the file names, file types, and the name of the administrator of the files

### 2.5 Related Research

Distributed system is a computer network system that the components of the system such as a database engine, the application, and the data are physically separated by location of branch offices[12]. Therefore, it is necessary to develop a model for exchanging data between applications. Models are commonly implemented by building a middleware for interaction and communication between different applications through APIs (Application Programming Interfaces) [1].

Recent efforts for exchanging data is done by building a web service. Utilization of web service for the benefit of data integration has been carried out [5] to propose a model of integration of web-based business data service. In Indonesia, this effort was also made by the Higher Education in the database development project[11]. Implementation of web service requires a public IP and the availability of high bandwidth that can not be financed by small organization.

As an alternative, had developed a model-based architecture for data exchange messaging or better known as MOM (Message Oriented Middleware) as a middleware that enables communication via messages. MOM provides variety capabilities in sending a message, including point-to-point messaging model and publish-subscribe, message filtering, transactional messaging, and message delivery once-and-once-only. In general, the MOM service is similar to the postal service, the message was delivered to the post office and the postal service will then have the responsibility to make the process of sending secure message to the destination (Edward C, 2004).

Messaging technology commonly used is SMS. Several studies have been done including the use of SMS to build a data input for the media classified ads on mobile applications[10]. Through

this application, users can input, edit, and delete data on the server by using SMS. Another technology used is Yahoo Messenger for purchasing prepaid phone credit[13]. Recent research conducted by Sukarsa[10], which makes MOM design that can be implemented in social media is Yahoo Messenger. This study is a continuation and an evaluation of existing design to be developed into a prototype with additional capabilities to exchange data between applications and business process integration.

### 3. SYSTEM OVERVIEW

#### 3.1 RESEARCH METODOLOGY

There are a few steps that will be implemented in this research. These steps will be described in detail, as follows:

##### 1. Literature study

This study was conducted to understand the messaging programming techniques, the study of hardware and programming language to be used

##### 2. Preparation of design

The design of the model will include several subactivities, which are:

- The design of the system architecture
- Design database using data normalization techniques and ERD(Entity Relationship Diagram)
- Designing metadata to handle data integration between applications with homogeneous DBMS platform
- Design of the Graphical User Interface (GUI) for messaging applications to exchange data
- Preparation of SOP ( Standard Operating Procedure ) for the implementation of the system

##### 3. Implementation of the model

Implementation of the model performed on a desktop based application design model that has been created

##### 4. Testing and preparation of the final report

Testing is done to ensure whether the model has been implemented to provide correct results and the results compiled in the final report of the work

Overall phase of the study may be presented in the flowchart in Figure 1 .

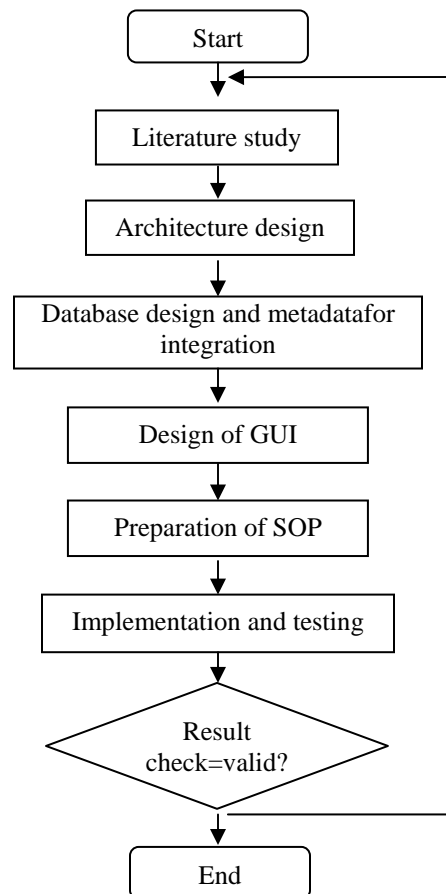


Figure 1 Research Flowchart

#### 3.2 System Overview

System architecture that developed in this research is by building a messaging-based middleware (MOM) as an interpreter between the existing systems that already exist as shown in Figure 2. MOM is designed to have a connection to the MOM database and external databases. MOM database contains metadata for a business process to exchange data between applications. External database is a database that is used by the existing system. MOM will treat external database as a source for exchanging data to another applications through the MOM embedded in other systems.



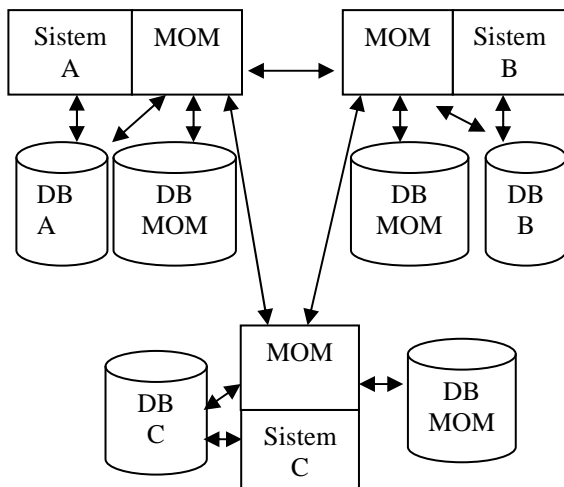


Figure 2 System Overview

## 4. DATABASE DESIGN AND USER INTERFACE

### 4.1 Database Design

This section describes the results of a database design using normalization techniques. The resulting design can store metadata associated with existing systems so that dynamically open the opportunity to be applied in various cases without changes to the programming level. Changes can be done at configuration level

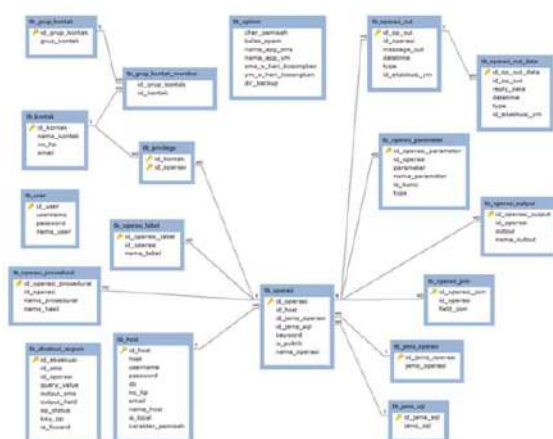


Figure 3 Database Relationship

Here is an explanation of each table in figure 3 :

1. tb\_eksekusi\_respon : used to store queued data of YM execution operation in this application
2. tb\_grup\_kontak : used to store data for a group of contacts in this application
3. tb\_grup\_kontak\_member: to store data for contact group members in this application.
4. tb\_host : to store the data host/server that will be the source of the data from the application to be exchanged
5. tb\_inbox\_ym : to store data into the message that is sent by an application prototype client
6. tb\_jenis\_operasi : to store the types of operations that are served by the server prototype
7. tb\_sql : to store the types of operations that are served by the server prototype
8. tb\_operasi to store a variety of database operations that can be performed on this prototype
9. tb\_operasi\_join to store a variety of database operations that can be performed on this prototype that requires a join operation between tables
10. tb\_operasi\_out database for storing the various operations that can be performed remotely
11. tb\_operasi\_out\_data to store the results of operations performed remotely in the form of groups of data
12. Tabel tb\_operasi\_output to store the non-remote operating results in the form of groups of data
13. Tabel tb\_operasi\_parameter to store various parameters that are used in the data exchange
14. Tabel tb\_operasi\_prosedural to save various database operations performed by executing procedure
15. tb\_operasi\_tabel contains the metadata of the tables as source of database operations
16. tb\_option to store application configuration
17. tb\_privilege to store the privilege (access rights) of each user listed as contacts in this prototype
18. tb\_sent\_ym to store messages/data that have been sent to their requesting client service
19. tb\_user to store user data

### 4.2 User Interface Design

This section will explain some important menu contained on this prototype.

#### 4.2.1 Main Menu

Main menu in figure 4 is the start menu that provides navigation to access the various functions within the application. General menu

contains menus for managing user, profile, database configuration, and command separator character

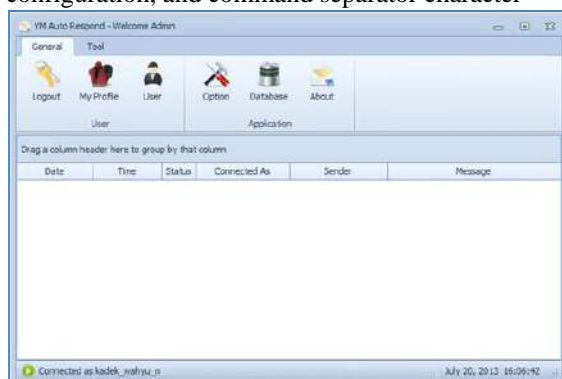


Figure 4 Main Menu

data will be exchanged. This prototype can serve more than one connection to the database

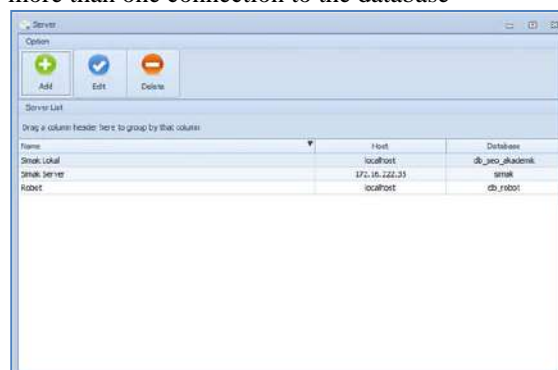


Figure 7 Database Configuration for Application

#### 4.2.2 Database Configuration for MOM

Database Configuration for MOM in figure 5 is used for setting up the connection to the MOM database server consists of an IP address, database name, user name, and password. MOM database is a database that contains all the metadata of the application to be exchanged

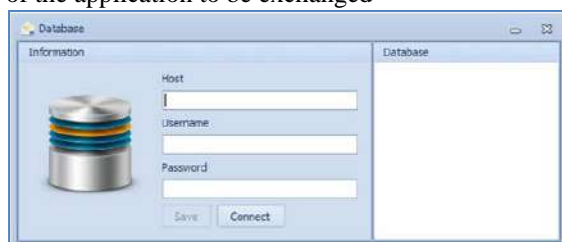


Figure 5 Database Configuration for MOM

#### 4.2.3 Message Monitoring

Menu in Figure 6 is used to monitor the message traffic in and out to know the success level of the prototype

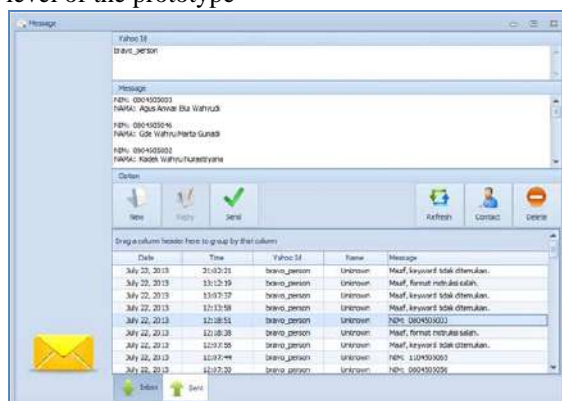


Figure 6 Message Monitoring

#### 4.2.4 Database Configuration for Application

Menu in Figure 7 is used for setting up a connection for various database applications whose

#### 4.2.5 Service at Client

Menu in Figure 8 is the display of data processing required by a client to the prototype. Based on incoming requests, the prototype will be responding by executing the service that have logged in into prototype server.

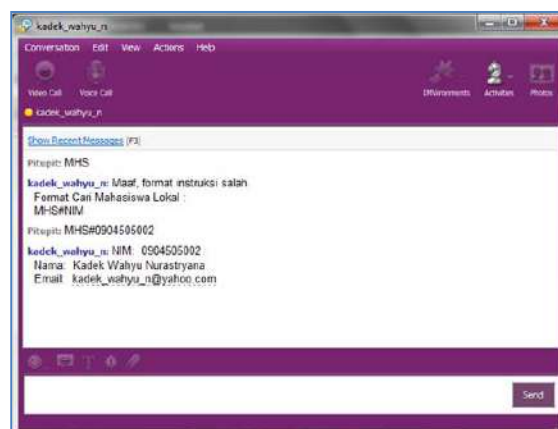


Figure 8 Service at Client

## 5. CONCLUSION

With MOM-based prototype architectural design, data exchange between applications can be done at low-quality bandwidth without requiring public IP that occurs in the web service based platform.

Database design has been successfully modeled for exchanging data by using metadata on each of the existing system. Thus, this prototype will have a dynamic nature and can adopt various applications by simply holding the adjustment in metadata configuration level.



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