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OUTAGES NOTIFICATION SYSTEM

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This report is submitted in partial fulfillment of the requirements for the Bachelor of
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FACULTY OF INFORMATION AND COMMUNICATIONS
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MALAYSIA 2004

DECLARATION

I hereby declare that this project report entitled
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is written by me and is my own effort and that no part has been plagiarized
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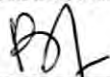
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DEDICATION

To my beloved parents...

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ABSTRACT

Current methods of distributing outage notifications are mainly through emails, websites, voicemail, SMS and technology forums. These methods require a lot of manual filtering, which takes a lot of time and efforts. This thesis proposes an alternate solution to how an outage notification and remedial actions are distributed. The alternate method developed in this thesis tries to minimize manual work carried out by end-users. A client server architecture is initiated and the method to be undertaken needs to be fully implemented. This method involves having providers and consumers. The consumers being end-users that wants to know about outages and providers being distributors of notifications. Apart from that, there are detailed process of the system which will be defined for the interior of the design. The comprehensive design enables the understanding of the system much deeper. A standard form is also designed to describe network outage as presently there is none. This thesis involves developing software for both consumers and providers, whereby the software will be able to display relevant notifications that might affect end-users and. This thesis could potentially be extended to involve other forms of notifications and not just network outage.

ABSTRAK

Pada masa kini, cara untuk memaparkan suatu notis seperti bekalan elektrik terputus atau gangguan rangkaian computer adalah dengan menggunakan perkhidmatan yang sedia ada seperti email, laman web, "voicemail", SMS dan forum teknologi. Selalunya, penggunaan kaedah-kaedah ini juga membebankan pengguna dimana pengguna terpaksa menapis maklumat-maklumat tidak berkaitan dan keadaan ini hanya merugikan masa dan tenaga kerja. Tesis ini mencadangkan satu cara baru yang harus dipraktikkan bagi memaklumkan pengguna tentang perkhidmatan yang terbegkalai dan cara yang di gunakan untuk mengatasinya. Tesis ini membuka cara alternatif bagi mengurangkan tenaga kerja dilakukan dari segi kerja manual. Inisiatif diambil bagi merekabentuk satu senibina bagi sistem ini iaitu "client server" dan kaedah tersebut dipraktikkan. Terdapat dua kategori iaitu "provider" dan "consumer". "Consumer" merupakan pelanggan yang ingin mengambil tahu tentang perkhidmatan tersebut dan "provider" merupakan pihak yang menghantar notis tersebut. Penjelasan yang lebih terperinci akan diberikan bagi proses sistem yang komprehensif. Perisian yang dibentuk akan mengintegrasikan kedua-dua "provider" dan "consumer". Sistem juga menggunakan perisian tersebut untuk membezakan notis yang relevan dengan notis yang tidak relevan dan paparan outputnya pada pengguna. System ini juga boleh digunakan untuk memaparkan maklumat-maklumat lain yang penting selain system rangkaian.

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CHAPTER 1

INTRODUCTION

1.1 Project Background

Many types of systems experience outages, but the focus of this thesis is on outages that affect distributed information systems, example power, network and server outages. Outages may be of two types which is scheduled outages, example for maintenance, or unscheduled outages, example due to a component failure. The impact of a scheduled outage can be minimized by notifying interested parties before the event. Notifying users about unscheduled outages can help users plan their use of the service, avoiding it when it is unavailable, and using it after the service is expected to resume. At present, notifications are mainly made through emails, mails, telephone, websites, voicemail, SMS and technology forums. These notifications are normally done blindly as they target a large group of all possible users and not individually. Thus, the individual has to manually filter out all the received notices. A lot of time and efforts goes wasted if user receives many irrelevant notices.

This thesis will focus on deriving a standard form to describe an outage and how to effectively notify interested parties about the outage. Knowing which end-users are interested in the notices is the challenging part of this thesis, and it's actually where most current method lacks. Then software designs and implementations will be

explained in the later sections. The result of tests carried out will be discussed toward the end of the report. Finally, the last section is the conclusion and future improvement of this thesis.

1.2 Problem statement(s)

When an end-user receives an outage report or notice through email, SMS, voicemail, websites etc, there is a great possibility that the outage is not relevant to that end-user because the notification is so broad. Thus an end-user needs to spend a lot of time filtering out those unwanted notices, which is not desirable and a waste of time. There is also no standard form for an outage notification, which results in some notifications missing important key information.

The notification systems that are normally being implemented aren't being authenticated nor integrated well with user requirements. The system is arguably not meeting the basic user needs and diverts from its main mission such as the main notices that should be displayed, the type of users that are to receive the details, the instantaneous of receiving notices and so on.

There are difficulties to look upon the outdated notices as the old ones are normally not archived. Users couldn't be able to browse the received notices and there isn't any convenient way for searching through all notices. This will be hard for users to encounter outages as they won't be prepared to face it abruptly.

Notices are sometimes generated without knowing the identity of the person who sent them. Therefore, we can't verify if the report is tempered during transit consequently making the system vulnerable to breaches. Besides, the interfaces of systems are sometimes too sophisticated or complex which gives a hard time for the users to understand the system functionalities.

This thesis tries to develop an alternate method to save time filtering out unwanted notices by minimizing manual work carried out by the end-users. In order to develop this alternate method, a standard form for describing a network outage must

first be created. This standard form plays an important role in an outage notification because it ensures that there is no key information being left out.

1.3 Objective

The motivation behind this thesis is to further improve network understanding and solve current network problems. There seems to be a great need for an automated outage notification system. Therefore trying to solve this problem will be quite challenging, yet interesting. The thesis goals are:

- i. Create a standard form for describing outage notices to end-users where all key information will be described in this form.
- ii. Filter out unwanted notifications which deliberately save end-users time and effort in filtering out unwanted notices manually.
- iii. Enable end-user to verify the integrity and authenticity of received notices.
- iv. Improve network dependability for end-users if end-users know about an outage in advance, they can work around the time of outage. Thus making network more reliable and dependable.
- v. Ability to digitally sign the notices to secure its content and minimize people sending out fake notices.
- vi. It comprises user friendly approaches whereby the system is easily understood and manipulated with normal English grammar medium usage and the program interface is not too complex.

1.4 Scopes

The solution to the above aspects will be carried out in software, but before a practical solution can be formulated a requirement analysis is carried out and the important key requirements are listed below:

- i. The environment that the system will be working on is in the Local Area Network (LAN).
- ii. The system notifies end users about outages on network and power by sending out notices. The notice file is transferred and later stored from the server to client in an XML form.
- iii. The system displays notices in HTML form to end users seeking information. Even displays urgent messages by selecting the scale.
- iv. Java programming language will be used as the initial and foremost platform of embedding fully the system functionalities all over.
- v. Provider will be able to handle multiple consumers' requests and send notices to consumers requesting them using the consumer and provider program. The network administrator will be the provider while the consumers will be the end users such as lecturers and staffs.
- vi. The provider will send notices to many consumers requesting them. Consumers may also have many providers to seek information. It is a two way interaction and uses the many to many cardinality.
- vii. The system has authentication aspects implemented and security is at its best.

- viii. Filtering process, the process of sending out the notices automatically and storing them will be done using the program.
- ix. System able to perform multicasting whereby the data can be sent to many clients at the same time by using minimum packet.
- x. After a notice file is generated, a signature should also be generated to identify who created the notice using the program. This can also be used to verify if the report is tempered during transit.
- xi. The platform used is Windows operating system because it is most widely used and acceptable by the clients.

1.5 Project significance

The project will enable the end-users and the network operators to have a well organized interaction of the system notification system whereby it will be used automatically and not manually. We will be able to understand more on the network capabilities through detailed case studies. There are a few networking protocols and several technical terminologies used in this thesis which will be researched and given thorough description. If end-users know about an outage in advance, they can be prepared for the outage. Besides, notifications can be archived and users will be able to search them instantly while filtering will be easier for end-users and time will be saved. The relevant notices are generated to the correct users acquiring them based on the departments which they are attached to. Templates are used to generate notices that enable network administrator to generate notices without retyping the same notice all over again. Overall, it is user friendly and the project will deliver a commercial value and the implementation will be of something new.

1.6 Conclusion

The importance of this thesis is to provide a stable automated notification system with all the capabilities which implies that the system has a good run in the current network market. Alongside giving the best outcome for satisfactory needs, the system must be user friendly and hopefully will be able to adapt with the end-user requirements.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

The literature review presents the method of searching, collecting, analyzing and drawing conclusion from all debates and issues raised in relevant body of literature. Most of the reviews are done based upon the facts and findings on the internet and few from printed media. The study is basically from the books, journals, technical reports, proceeding conferences and so on. The methodology being used is the waterfall life cycle model method. It caters all the basic requirements such as system engineering, requirement analysis, design, construction, testing, installation and finally the maintenance.

2.2 Fact and findings

There is no software implementation that allows automatic outage notification and notifications filtering, but the idea for automatic outage notification is not new. There are implementations for automatic notification and mainly it is in the electricity

industry. Electricity also affects network devices, so it's important to consider electricity when talking about network outages.

The most widely used methods for notifying end-users of an outage would be email and websites. Email dominates other forms of notification because it's fast and convenient. Within large businesses and organizations, email is a preferred method for distributing outage notices because more people can be notified at once and users can check at their own time. However, this method does not offer any automated filtering for end-users, which in turn means that user has to make decision on every notice.

2.2.1 Network Outages and Announcements using E-mail.

Emailing is a convenient way for notifying end-users of outages and here is the example of outage notification emails:

ap | 14 April, 2005 15:21 Network Upgrade

On Saturday, April 16th, from 8:00 to 10:00 a.m., the Networking department will be performing maintenance and an upgrade on the network in the GeorgeR.Brown building. The network in the building should be considered unreliable and unavailable for the duration of the outage. When complete, this upgrade should provide faster aggregate connectivity for the entire building and faster connectivity to the Rice network core and the internet for users in the eastern half of the building. [1]

In the above example, it's very handy and convenient to advertise notification using emails. However, there is one common problem, they're addressed to a group of possible users, which means that many people receiving those emails probably don't want to know about the outage. Therefore, the current system which is going to be developed has to address the relevant users accordingly. Users must request the type of notices they are interested and the task of sending the desirable notices will be left to the providers.