

INTELLIGENCE PERFORMANCE DASHBOARD FOR NETWORK
INVESTIGATION DEPARTMENT

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DEDICATION

To Allah, for giving me the strengths in embracing life with a positive mind,
To my dearest mom and dad who have made endless sacrifices from day one,
 To my beloved wife who is my pillar of strength and courage,
 To my lovely children who keeps me going and cherish me every day,
To my family and friends, and everyone who had contributed to this journey.

This research is dedicated to you.

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ABSTRACT

The study concentrates on improving the Network Investigation Department's performance by implementing an intelligence performance dashboard. The department is composed of 12 analysts and one department leader. This department currently uses 12 different systems for their everyday analysis operations and requires other intelligent methods to calculate their KPIs. To improve the situation, an intelligence performance dashboard was proposed. However, prior to the intervention, this research evaluated the requirements and elements utilized in the performance dashboards by interviewing stakeholders and understanding the components that will be covered. Then, the study evaluated the analysts' performance after the intervention. By using the performance dashboard, the department's users can monitor each person's performance by referring to the dashboard and efficiently tracking the department's overall performance by referring to the departmental performance dashboard. The first intervention is to connect all 12 systems currently being used by the departments and collect all the essential data to calculate the performance. These intelligence performance dashboards summarised their overall performance in a single dashboard. The second intervention is to add a schedule reminder to remind all the analysts regarding their performance. This research employed a mixed methodology by interviewing to collect the preliminary data. After the intervention of cycle 1, an interview was conducted, and a questionnaire was given to the stakeholder to calculate the interventions' effectiveness. In the second intervention, the department's head was interviewed in order to understand their current performance before the second intervention. Finally, collection data from the system was used to improve their performance for the post interventions data. This research has improved the department performance calculations process by automating it and displaying it into a single dashboard. It also has increased the department's performance by showing them their current performance status and the reminder module to remind them to monitor their performance status from time to time.

ABSTRAK

Kajian ini akan menumpukan pada peningkatan prestasi Jabatan Siasatan Rangkaian dengan melaksanakan Intelligence Performance Dashboard. Jabatan ini terdiri daripada 12 juruanalisa dan seorang ketua jabatan. Pada masa ini, jabatan ini menggunakan 12 sistem berbeza untuk operasi analisis harian mereka dan memerlukan kaedah lain untuk mengira kadar prestasi mereka. Oleh itu, sebelum mencadangkan sebarang intervensi, penyelidikan ini akan menilai keperluan dan elemen yang akan digunakan dalam performance dashboard dengan menemu bual pihak berkepentingan bagi memahami komponen-komponen yang perlu dilakukan. Kemudian, kajian ini akan cuba menilai prestasi para juruanalisa selepas intervensi dilakukan. Dengan menggunakan performance dashboard, pengguna jabatan boleh memantau prestasi setiap orang dengan hanya merujuk kepada dashboard dan melihat prestasi keseluruhan jabatan dengan cekap dengan merujuk kepada performance dashboard milik jabatan. Intervensi pertama adalah untuk menyambung semua 12 sistem yang sedang digunakan oleh jabatan dan mengumpul semua data penting untuk mengira prestasi secara keseluruhan. Papan pemuka prestasi kecerdasan ini akan meringkaskan prestasi keseluruhannya dalam satu dashboard utama. Intervensi kedua ialah menambah peringatan secara berjadual untuk mengingatkan semua penganalisis mengenai kadar prestasi mereka. Penyelidikan ini akan menggunakan metodologi campuran dengan menemu bual untuk mengumpul data awal. Selepas intervensi kitaran 1, satu temu bual akan dijalankan, dan soal selidik akan diberikan kepada pihak berkepentingan untuk mengira keberkesanan intervensi. Bagi intervensi kedua, ketua jabatan akan ditemuduga untuk memahami prestasi semasa mereka sebelum dan selepas intervensi kedua. Akhir sekali, pengumpulan data daripada sistem tersebut juga akan digunakan untuk mengukur kadar peningkatan prestasi mereka untuk data pasca intervensi. Penyelidikan ini akan menambah baik proses pengiraan prestasi jabatan dengan mengautomasikannya dan memaparkannya ke dalam satu dashbaord. Ia juga boleh meningkatkan prestasi jabatan dengan menunjukkan status prestasi semasa setiap juruanalisa dan modul peringatan untuk mengingatkan mereka supaya sentiasa memantau status prestasi mereka dari semasa ke semasa.

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LIST OF ABBREVIATIONS

NID	- Network Investigation Department
MCMC	- Multimedia Communication Malaysia Commissioner
LEAs	- Law Enforcement Agencies
ED	- Enforcement Department
CMS	- Case Management System
API	- Application Programming Interface
BAU	- Business As Usual
MCO	- Movement Control Order

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This first chapter of this research provides an overview of the research that begins with a review of the background history of the Network Investigation Department (NID) from the Multimedia Communication Malaysia Commissioner (MCMC). Then, it examines the research background before moving on to the issue description and problem diagnosis. The research aims and objectives are then described in detail, as are the major research questions and the importance of the research's findings.

1.2 Background

The Network Investigation Department (NID) is a department in MCMC that has been acting as the technical support to assist Law Enforcement Agencies (LEAs) and MCMC's own Enforcement Department (ED). ED will assist NID in the technical investigation to investigate cases related to social media and online crime investigation by providing the first information required for further enforcement actions. NID plays a vital role in identifying a person behind a particular social media account before the case can be investigated and produces intelligence profiling reports. Therefore, particular skills and knowledge are needed to deliver its tasks.

In NID, there are a lot of requests to identify the owner of a social media account, especially when the posting under investigation was made online through a specific account. The perpetrator's details must be given as quickly as possible to guarantee that the posting and the account that made the posting do not vanish from the Internet, thereby terminating the inquiry. Additionally, there are also have requested to assist the National Security Council,

particularly when a cyber-attack occurs in one of the Critical National Information Infrastructure. The support required is to conduct an investigation within the company and within their network to determine the damages done to their infrastructure and the source of the event.

In 2016, NID developed the Case Management System (CMS) to ensure staff efficiency in its daily tasks while delivering high-quality reports for the prosecution. This version of CMS had gone through several improvement cycles, including digitising the entire process from receiving a request from LEAs/ED right up to sending back the analysis report to the respective Investigating Officer. As a result, the system significantly reduced the turnaround time to complete one particular task.

Therefore, in CMS Version 2.0, this research will add on the additional requirement by developing the performance dashboard for the current CMS. It is expected that this service could facilitate the Internal Investigation Department and assist other Law Enforcement Agencies in Malaysia. This department is pioneering the social media investigation because more and more crime is committed online, especially when the Internet is expanding. The perpetrator does not always appear as what they are seen on the screen. The outcome from this Department will determine whether it is worth mobilising resources to start the investigation. For example, when the perpetrator is not identifiable, no investigation shall carry on. Thus, saving time and operational cost.

Furthermore, the HOD of the NID Department anticipates that the performance dashboard will benefit the management of resources within the Department by guaranteeing efficiency in its operation. This performance dashboard will also allow monitoring of each individual's workload, enabling management to determine how effectively to deploy resources to ensure the Department can complete its tasks within the specified timeframe. Moreover, the performance dashboard serves as a one-stop shop for all of the tools that everyone in the department uses. This feature will help in the analysis process and ensure that the analyst remains focused on the case. The performance dashboard also serves as a reference point for previous situations that have been examined. As a result, reference to previous incidents will also assist in speeding up the procedure. Besides that, it retains all easily retrievable

information, especially when top management needs to refer to specific situations due to complaints and discontent.

This project focuses on the implementation of a performance dashboard system for the NID department that can measure, monitor, and manage business operations while achieving strategic goals. The Yii framework is being used to develop this project because of its security and performance.

1.3 Problem statement

Nowadays, the Internet has become a necessity for people all around the world to explore and communicate. The Internet has evolved into the primary platform that is extensively utilised by people of all ages, from teenagers to adults. Since the Internet has made it easier for people to communicate, particularly through social media platforms such as Facebook, Instagram, YouTube, and Twitter, it seems to have had many negative consequences instead of positive consequences.

Therefore, it is needed for NID to do by providing the first information required for further enforcement actions. NID plays a vital role in identifying a person behind a particular social media account before investigating the case and producing intelligence profiling reports.

a. A lot of redundant and duplicate processes and tasks

Since the establishment of this department, NID has embraced several systems by having computer-aided analysis capabilities, including those in-house developed systems emphasizing security. A total of 14 systems have been developed to cater to the department needs that consist of Change Management System (CMS) as the primary system and another 13-standalone system with each specific unique user interface and different login authentication mechanisms. To do their Business As Usual (BAU) daily task, the analyst needs to get information from all 13 systems to complete their task.

However, since all systems are not interconnected and communicating with each other, thus, the analyst's routine becomes longer and troublesome. This atmosphere provides more nuanced ways of using them for the analyst to use the systems more efficiently and effectively. Furthermore, gathering data and measuring technical analysts' key performance indicators (KPI) becomes even more complicated with these various systems being used.

b. The longer turnaround time to complete a task

Currently, the NID department is receiving more than three thousand requests from all LEA's yearly. With a workforce of eleven technical analysts and one Head of the department, NID needs a good analytical data presentation that can be customisable according to their requirements to monitor its KPI's and the analyst's requirements.

Furthermore, due to the COVID-19 pandemic situation, NID had received more requests regarding social media, especially in politics, religion and Sultan, than before the pandemic, which required analysts to provide the perpetrator's details as soon as possible in order to ensure that the posting and the account that made the posting do not vanish from the Internet, thereby terminating the investigation later.

c. Imbalance work segregation between analysts

Additionally, since tasks are given to analysts at random without the use of a load balancer, the workload is uneven across analysts. As a result, one analyst may receive a greater number of request assignments than others. Furthermore, with the existing dashboard, NID is restricted by the static form of the report, yet managements occasionally need to examine the report or statistic from a different perspective.

Therefore, by having a performance dashboard, it is hoped that the finding can help to monitor and calculate analyst performance while maximising analyst time and effort is important for NID. Further ore, NID may personalise the report to be seen

from multiple perspectives. Moreover, implementing the automation approach may increase overall efficiency and production.

1.4 Research Question

The research questions for this study were chosen based on the issue of the present dashboard in relation to analyst performance, which is the primary focus of this study. The following research questions are based on the gaps identified in the problem statement:

1. What are the strengths and weaknesses of NID's existing system and practice?
2. What are the additional performance dashboard features that can be added to the dashboard and system for NID usage?
3. How effective is the new performance dashboard in improving the performance of NID's analysts?

1.5 Research Objective

The main objective of this research is to investigate the usefulness of a performance dashboard for NID analysts in terms of minimizing the time and effort required to obtain information within the dashboard. In addition, to measure the performance dashboard's effectiveness, the performance dashboard will be built as part of this project. Thus, based on the research question discussed above, the following research objectives are as stated below:

1. To study and understand the current system and practice of reporting and analysis of the NID system by defining the strengths and weaknesses.

2. To design and develop a framework for Performance Dashboard in NID which can ease the process in NID

3. To measure the effectiveness of the performance dashboard in improving the performance of NID's analysts

1.6 Significance of the Research

In the future, this performance dashboard system is expected to benefit NID to improve the analysts' performance. Some of the benefits are,

a. Reduce turnaround time

These studies' primary purpose is to design and examine the performance dashboard's effect on the NID staff department. Some procedures can be automated, and redundant processes and tasks are eliminated with this performance dashboard development. Therefore, with a performance dashboard, NID could measure their performance in detail and directly assist them in tracking, controlling, and managing the key activities and processes required to achieve business objectives successfully. Furthermore, having a performance dashboard will encourage their target transparency, enhancing the department's productivity and effectiveness.

b. Improve analysts' performance

Moreover, as described in the problem statement, looking at 14 systems that NID has already used, this research aims to design and build a performance dashboard system. This performance dashboard can correlate all the 14 unique systems into one central system that analysts can use to perform their daily routine tasks. This would benefit analysts to do their job more efficiently and more quickly. Developing this performance dashboard could be of interest

to other departments that could use the same framework as the NID or incorporate a different system to match this performance dashboard in the future.

1.7 Scope of the study

This research will study the current data, system, and NID workflow process by interviewing the Head of department and one of the NID senior analysts . Based on the data and specifications gathered, this research will design and develop a performance dashboard system that can meet the user requirement by correlating 14 systems together in one system. Lastly, in this research, the impact of having the Performance Dashboard on NID's staff based on the performance dashboard framework built in this study by making performance comparisons between before and after the dashboard system's intervention will be uncovered.

1.8 Limitation of the study

Amongst all this, several limitations that may affect the quality of data reliability may be discussed in this study. First, with the NID's 14 systems, it is difficult for this study to correlate all 14 systems in a shorter period. This is because all of these 14 systems have very sensitive user data that might require high-level authorisation and access authority for each system. This may lead to a more extended time for approval.

Secondly, this department has a tiny staff of eleven technical analysts and one Head of the department. So, this research could not have a quantitative data collection approach. Instead, this research will only have qualitative data collection, which can only be collected through interviews and focus groups. Consequently, it may lead to a less relevant explanation in the context of the research problem.

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