A study on the monitoring model development for quality measurement of internet traffic

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ABSTRACT

The recent trend of integration among new network services such as the long-term evolution (LTE) based on internet protocol (IP) needs reputable analyses and prediction information on the internet traffic. The IP along with increased internet traffics due to expanding new service platforms such as smartphones will reflect policies such as network QoS according to new services. The establishment of monitoring methods and analysis plans is thus required for the development of internet traffics that will analyze their status and predict their future. The paper with the speed of Internet traffic model is developed for monitoring the state of the experiment and verified. The problem is that the proposed service Internet service provider (ISP) to resolve the conflict between the occurrences can be considerably Internet traffic and that the state of data may be helpful in understanding. The paper advancement policy to reflect the network traffic volume of Internet services and users irradiation with increased traffic due to the development and management of the analysis was carried out experimental measurements.

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1. Introduction

The trend of integrating new network services such as LTE based on IP needs analyses and prediction information on the internet traffics that reflect policies such as network QoS of new services [1–3]. The IP comes with increased internet traffics due to expanding new service platforms such as smartphones. Government groups organized by businesses, governments, and research groups utilize periodic monitoring, result analyses, and prediction reports in the preparation of policies in overseas. These groups use basic data to develop the telecommunication industry or provide information by analyzing and announcing the increasing trend of internet traffics and types within countries. They also refer to the trend and status reports of internet traffics used in marketing by disseminating information through the International Telecommunication Union (ITU). This trend is common to the majority of the Organisation for Economic Co-operation and Development (OECD) countries utilizing their own impartial organizations or industries [4,5].

Korea needs the periodic monitoring of internet traffics and prediction reports to understand the status of internet traffics and data. These will fairly solve disputes when service issues occur among ISP providers. Therefore, this thesis defines the classification system, analysis of status, and prediction on traffics that monitor Korea's internet traffics. To achieve these concerns, this study suggests basic directions on each area as a result of the analysis on traffic report cases in overseas.

This study draws a matrix for traffic analyses that conduct various statistical processes based on the traffic properties that analyze the traffic status. Future traffic prediction requires other factors such as the number of

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total users, the number of users per application, the time used per application, and the bit transmission ratio per application. The calculation of the time used can improve its precision which should be the basis for the existing analysis results of traffic status. Therefore, the traffic information required for the traffic prediction should be reflected on the analysis of factors involved in the traffic status. Moreover, the traffic classification system should be provided for the prediction along with the analysis of traffic status. The traffic prediction methodologies should be prepared according to the purpose of traffic prediction data. Korea's traffic classification system for internet monitoring should to be classified by referring to the cases inside and outside of Korea such as the internet service providers.

Therefore, Section 2 in this study investigates overseas policies and industrial trends of internet traffic monitoring. Section 3 proposes a measure for establishing a monitoring model of Korea's internet traffics. Section 4 conducts an experimental measurement of internet traffic monitoring that subjects Dongguk University in Seoul with the proposed model in this thesis. Then, this thesis is completed with a conclusion.

2. Overseas policy and technological trends

2.1. Internet traffic monitoring and policy of the United States

In the US, the monitoring and analysis of internet traffics underway are led by the private industries and research organizations. The US government supports the monitoring technology studies to be utilized in the traffic monitoring and analysis of industries and private organizations [6,7].

2.1.1. Promotion system
The US government manages and announces the monitoring analyses and prediction results led by the private industries and research institutes. The country utilizes the reports of the research institutes such as the Cooperative Association for Internet Data Analysis (CAIDA) and the service providers such as SANDVINE and CISCO VNI in the telecommunication and network sophistication policies for the internet traffic monitoring. Instead of taking the lead, the US government supports the internet traffic monitoring to be autonomically activated through the activities of ISP, equipment manufacturers, and research groups.

2.1.2. Application technology
The US government founded the National Laboratory for Applied Network Research (NLANR) through the National Science Foundation (NSF). The US government has been conducting the traffic monitoring and analysis technologies based on IP flow measurement. The US government draws realistic research results rather than the unilateral analysis results through the research organizations participated by telecommunication businesses and industries other than those led by the government.

2.2. Internet traffic monitoring and policy of Norway

The Norwegian government founded the Norwegian Internet eXchange (NIX), an exchange point of six different IPs for the purpose of an open IP traffic exchange and traffic analyses. It conducts monitoring of internet traffics and uses the results [8,9].

2.2.1. Promotion system
The Norwegian government maintains the network impartiality by allowing compulsory IP traffic exchanges to be done through the established government-led NIX which conducts the monitoring of local and overseas traffics on a permanent basis. NIX secures objectivity through management by the impartial organization (NIX). It focuses on reflecting the reality in establishing the telecommunication service policies through research activities of the work groups that are participated by businesses. NIX constructs an environment that IP traffics can be exchanged among telecommunication businesses and service providers through the third party rather than internet access structure through particular businesses. NIX makes it compulsory that it conducts IP traffic exchanges through various types of businesses such as ISP, contents businesses, web hosting companies, wireless businesses, VoIP businesses, and portals.

2.2.2. Application technology
NIX provides the analysis results by monitoring the internet traffic volume and applying the flow method through the web site. NIX supplies information to the relevant businesses and utilizes the traffic analysis results in dispute solutions among businesses. NIX expects to be helpful in providing policies related to the internet traffics for telecommunication businesses, as the traffic-related information is only available to NIX's clients.

2.3. Internet traffic monitoring and policy of Japan

The Japanese government composed councils such as the internet research council led by the Ministry of Internal Affairs and Communications. The government utilizes this by announcing the method researches of internet traffic monitoring and traffic statistical data [7,8,10].

2.3.1. Promotion system
The Japanese government made the internet traffic monitoring to be supervised by the research organizations (such as WIDE) associated with the government, ISPs, equipment manufacturers, and university research institutes. The monitoring is done through periodic researches and status reports and prediction data, secured users' information protection and objectivity, and announced information through the international technical and standardization organization such as ITU. The Japanese government conducts studies on monitoring and analysis methods through the MAWI working group of WIDE, reflect on the policies using the report data of the traffic status, and utilize these in developing Japan's telecommunication industries and network sophistication researches.