

# Generating Network Maps and their Path Characteristics

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## 1 Introduction

The Internet is becoming an increasingly important component of modern day communication and information exchange. Yet, the applications which use the Internet in general do not have much information about the underlying path(s) from the source to the destination far less the characteristics of the paths. The layering concept has isolated applications from the network related information with the result that network applications such as FTP, WWW, Mirroring etc. are presently operated with little or no knowledge about the routes and their characteristics. It is clear that these applications could operate more efficiently if the routes and their characteristics are known and/or are made available to the concerned application.

## 2 Generation of Network Maps

Network configuration information, referred to as *network map* in the following, comprises of information about network objects. Gateways, routers, bridges, end-workstations, ethers, interfaces, etc. as well as networks themselves are network objects. The Map information will primarily cover the interconnections between the various network elements. It will also show properties and functions e.g. speed, charge, protocol, OS, etc. of the various network objects and the interconnections.

Other information that may be covered by the map are geometric and geographical. The geometric information describes how the map information will be displayed to a user. The geographical information describes the geographical location of the various network objects and can be used for showing the map in the context of a geographical map [2].

## 3 Capturing Network Characteristics

Networks have dynamic characteristics: at times, it gets heavily loaded when a number of applications

attempt to use the limited network resources, while, at other times its resources remain under-utilized. To address these concerns, we have attempted to estimate the network characteristics by analyzing network application logs and network traffic data. We have introduced a method to calculate **throughput** of a network path by analyzing network application logs and by analyzing network traffic, we have estimated the network congestion pattern [1].

## 4 Present Status and Future Directions

We have captured the congestion and throughput pattern of different network paths. A framework, NDWH (Network Data Ware House) is proposed where these network characteristics are made available to the concerned applications and users.

We examine the different sources of network information and examine how network configuration of networks ranging from small scale intranets to the whole Internet can be generated. We are considering applications of the network maps and the obtained characteristics in the areas of fault management, network congestion detection and management, network security management, scheduling of network applications (network conferences, mirroring).

## 参考文献

- [1] Ahmed Ashir, Glenn Mansfield, Norio Shiratori, "Estimation of Network Characteristics and Its Use in Improving Performance of Network Applications," IEICE Transactions, Vol.E82-D No.4, pp.747-pp.755, 1999.
- [2] Glenn Mansfield, K. Jayanthi, Ahmed Ashir, Norio Shiratori, "Network Maps: Synthesis and Applications," International Conference, AP-SITT99, August, 1999, Mongolia.