A HYBRID MECHANISM FOR SIP OVER IPv6 MACROMOBILITY AND MICROMOBILITY MANAGEMENT PROTOCOLS

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ABSTRACT

During wireless communication between users, disconnection may occur during the handover process. The handover process causes handover latency. The high handover latency causes distortion to the wireless communication. Having understood that high handover latency causes disconnection and distortion, this research aims to reduce the handover latency.

Having known that the high handover latency causes distortion to the wireless communication especially during macromobility, we propose to interwork the protocols with the aims of reducing the handover latency. SIP has been proposed to handle the macromobility management. The researchers believe that the session initiation in the application layer protocol has the possibility to reduce the handover latency. Moreover, the researchers have proposed the fast handover and hierarchical mechanisms which also have the possibilities to reduce the handover latency. The combination of fast handover and hierarchical mechanisms namely hybrid mechanism reduces the handover latency. In addition to these previous works, we propose to interwork the protocol of IPv6 mobility management, SIP and hybrid mechanism.

We implement the proposed mechanism in ns-2. After the modification and implementation of these codes in ns-2, we perform the performance study of our proposed protocol. The performance study of these interworking of protocols show which of these interworking protocols work better during the mobility management of the mobile user. The performance analysis and simulation experiment show that our proposed protocol namely SIP over IPv6 macromobility management with hybrid mechanism performs better compared to the other interworking of protocols.

In addition to the performance study of these interworking of protocols, we evaluate the appropriate packet size to send the data over the interworking of protocols network. The duration of handover may increase if the network is sending inappropriate packet size during data transmission. We investigate how different packet sizes affect the handover latency and throughput in these mobility managements. The simulation result shows that 512 bytes is the appropriate packet size to send data over the IPv6 mobility management mechanisms. These investigations provide information to the researchers in selecting the appropriate packet size when sending real-time multimedia applications.

ABSTRAK

Ketika proses komunikasi antara pengguna dalam Internet tanpa talian, talian mungkin akan terputus semasa proses lepas tangan. Proses lepas tangan menyebabkan tempoh lepas tangan yang tinggi. Tempoh lepas tangan yang tinggi menyebabkan gangguan kepada komunikasi tanpa talian. Setelah memahami bahawa tempoh lepas tangan yang tinggi menyebabkan gangguan and talian terputus, penyelidikan ini bertujuan untuk mengurangkan tempoh lepas tangan.

Setelah memahami bahawa tempoh lepas tangan yang tinggi menyebabkan gangguan kepada Internet tanpa talian, kami mencadangkan untuk mengabungkan protokol-protokol dimana ia bertujuan untuk mengurangkan tempoh lepas tangan. SIP telah dicadangkan untuk mengawal pengurusan makro-mobiliti. Penyelidik mempercayai bahawa SIP mempunyai kemungkinan untuk mengurangkan tempoh lepas tangan. Penyelidik juga telah mencadangkan pengurusan mobiliti IPv6 dengan mekanisma cepat lepas tangan dan mekanisma hirarki yang dipercayai mempunyai kebolehan untuk mengurangkan tempoh lepas tangan. Gabungan pengurusan mobiliti IPv6 dengan mekanisma cepat lepas tangan dan mekanisma hirarki yang dinamakan sebagai pengurusan mobiliti IPv6 dengan mekanisma gabungan mengurangan tempoh lepas tangan. Tambahan kepada penyelidikan-penyelidikan yang lepas, kami mencadangkan untuk mengabungkan protokol pengurusan mobiliti IPv6, SIP dan pengurusan mobiliti gabungan.

Kami mengimplemetasikan cadangan mekasima di dalam ns-2. Setelah proses implementasi kod ns-2, kami menjalankan kajian kepada protokol cadangan kami. Kajian kepada gabungan protokol-protokol menunjukan antara mana gabungan protokol yang lebih baik semasa pengurusan mobiliti. Keputusan simulasi menunjukan bahawa cadangan protokol kami yang dinamakan sebagai pengurusan makro-mobiliti IPv6-SIP dengan mekanisma gabungan lebih baik berbanding dengan gabungan protokol-protokol yang lain.

Tambahan kepada pembelajaran ke atas protokol-protokol gabungan, kami menyelidik saiz paket yang sesuai untuk menghantar data diatas gabungan protokol-protokol. Tempoh lepas tangan mungkin akan bertambah jika jaringan memilih saiz paket yang tidak sesuai. Kami menyelidik bagaimana saiz paket yang berbeza boleh memberi kesan kepada tempoh lepas tangan dan *throughput* dalam pengurusan-pengurusan mobiliti IPv6. Keputusan simulasi mempersembahkan bahawa 512 bytes paket saiz sesuai untuk menghantar data ke atas mekanisma-mekanisma pengurusan mobiliti IPv6. Keputusan penyelidikan memberi informasi kepada penyelidik dalam memilih saiz paket yang sesuai untuk menghantar aplikasi-aplikasi multimedia.

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Abbreviations

ACK	Acknowledgment
AR	Access router
BS	Base station
BU	Binding update
CBR	Constant bit rate
CI	confidence interval
CL	confidence level
CN	Correspondent node
CoA	Care of address
DNS	Domain name system
FA	Foreign agent
FN	Foreign network
HA	Home agent
HN	Home network
IEEE	Institute of Electrical and Electronics Engineering
IETF	Internet Engineering Task Force
IP	Internet protocol
IPv4	Internet protocol version 4
IPv6	Internet protocol version 6

ISDN	Integrated service digital network
LAN	Local area network
LCoA	Local care of address
MAP	Mobile anchor point
MIP	Mobile Internet Protocol
MN	Mobile node
MPEG	Moving Picture Expert Group
MSC	Mobile switching center
MTU	Maximum transfer unit
NA	Neighbour advertisement
OTcl	Object-oriented tool command language
PC	Personal computer
PRNG	Pseudo-Random Number Generator
RCoA	Regional care of address
RFC	Request for comment
SIP	Session Initiation Protocol
TCP	Transport Control Protocol
UDP	User Datagram Protocol
WAN	Wide area network

Symbol List

%	percent
+	enque
-	deque
τ	throughput
AR1	access router 1 (old access router)
AR2	access router 2 (new access router)
bps	bit per second
C++	C++ programing language
d	drop
f	wireless node receive
HO_ACK	handover acknowledgment
HO_REQ	handover request
kbps	kilo bit per second
Mbps	Mega bit per second
m	meter
ms	milli second
n	number of runs
N1	node 1
N2	node 2

ns-2	network simulator 2
r	receive
s	second
t_d	handover latency
t_r	time when packet received by receiver
t_s	time when packet sent by sender
tcl	tool command language
x_i	mean value

Chapter 1

Introduction

In recent years, there are increasing demands for wireless Internet. Previous works have discussed the implementation of Internet protocol version 6 (IPv6) into mobile Internet protocol (IP) [2], [3], [4]. Other than solving the lack of IP addresses in the wireless Internet, the IPv6 mobility management enables communication networks to locate mobile users and maintain the connections as mobile users move into a new network. One of the goals of IPv6 mobility management is to ensure continuous connectivity when mobile users move into a new network. The mobile users may move within the same subnet or may move between two different subnets. The intra-domain mobility refers to the movement of the mobile users within the same subnet. Intra-domain mobility management, namely micromobility management, refers to the movement of mobile users across different networks within a same subnet that happens very rapidly. On the other hand, inter-domain mobility, namely macromobility management, is the movement of mobile users across different subnets that happens relatively less frequently. These mobility managements handle the moving processes

The contents of the thesis is for internal user only

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