Télécom ParisTech
Promotion 2017
Sylvain DASSIER

# RAPPORT DE STAGE

# Étude de l'apport du protocol MPTCP dans l'optimisation du trafic

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| **Département :** | *Département d'Informatique* |
| **Option :** | *INFRES* |
| **Encadrants :** | *M. Luigi IANNONE, M. Antoine FRESSANCOURT* |
| **Dates :** | *18/07/2016 - 17/01/2017* |
| **Adresse :** | *Télécom ParisTech, 23 Avenue d'Italie, 75013 Paris* |

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2. Que je suis l'auteur de ce rapport.
3. Que je n'ai pas utilisé des sources ou résultats tiers sans clairement les citer et les référencer selon les règles bibliographiques préconisées.

Je déclare que ce travail ne peut être suspecté de plagiat.

30 juin 2016 Signature : Sylvain Dassier

# *Abstract*

English

# *Résumé*

Français

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# 1 Introduction

## 1.1 Context

Introduction

## 1.2 Document Outline

In section 2 we have described how to set up ***The MPTCP Linux kernel implementation***. In section 3 we trace the path taken by a packet during its journey using the protocol ***MPTCP***.

## 2 The MPTCP Linux kernel library compilation :

The following figure illustrates the

### 2.1 Faliures :

The following section describes our attempts to put in place a debugging system for **MPTCP** so that we are not required to copile a kernel version everytime, which can take quite long.

1. LibOS with NUSE
2. LibOS with DCE

#### 2.1.1 LibOS with NUSE

#### 2.1.2 LibOS with DCE

LibOS with DCE is put in place in the following manner :

(a) **Install the dependencies :**

sudo apt-get install vim git mercurial gcc g++ python python-dev qt4-dev-tools libqt4-dev bzr cmake libc6-dev libc6-dev-i386 g++-multilib gdb valgrind gsl-bin libgsl0-dev libgsl0ldbl flex bison libfl-dev tcpdump sqlite sqlite3 libsqlite3-dev libxml2 libxml2-dev libgtk2.0-0 libgtk2.0-dev vtun lxc uncrustify doxygen graphviz imagemagick texlive texlive-extra-utils texlive-latex-extra texlive-font-utils dvipng python-sphinx dia python-pygraphviz python-kiwi python-pygoocanvas libgoocanvas-dev ipython libboost-signals-dev libboost-filesystem-dev openmpi-bin openmpi-common openmpi-doc libopenmpi-dev libncurses5-dev libncursesw5-dev unrar unrar-free p7zip-full autoconf libpcap-dev cvs libssl-dev wireshark

(b) **Build DCE using bake :**

i. hg clone http ://code.nsnam.org/bake bake

ii. export BAKE_HOME=‘pwd‘/bake

iii. export PATH=$PATH :$BAKE_HOME

iv. export PYTHONPATH=$PYTHONPATH :$BAKE_HOME

v. mkdir dce

vi. cd dce

vii. bake.py configure -e dce-ns3-1.8

viii. bake.py download

ix. bake.py build

(c) **Build the *mptcp_ trunk_ libos* branch of *net-next-nuse***

   i. git clone -b mptcp_trunk_libos https ://github.com/libos-nuse/net-next-nuse.git

   ii. cd net-next-nuse

   iii. make menuconfig ARCH=lib

   iv. make library ARCH=lib

(d) **Build *iproute2* version *2.6.38***

   i. Download the compressed source code from
   *https ://kernel.googlesource.com/pub/scm/linux/kernel/git/shemminger/iproute2/+archiv*
   , extract it and rename the folder to *iproute2-2.6.38*.

   ii. cd iproute2-2.6.38

   iii. patch -p1 -i ../ns-3-dce/utils/iproute-2.6.38-fix-01.patch

   iv. $(KERNEL_INCLUDE) should point to the liblinux.so directory ( for me it is $HOME/net-next-nuse )
   Hence I modified the following part in the Makefile :
   *Config :*
   *sh configure /home/lawrence/net-next-nuse*
   *# sh configure $(KERNEL_ MODULE)*

   v. LDFLAGS=-pie make CCOPTS='-fpic -D_GNU_SOURCE -O0 -U_FORTIFY_SOURCE'

(e) **Set the *DCE_ PATH***
export DCE_PATH=$HOME/net-next-nuse :$HOME/iproute2-2.6.38/ip

(f) **Build *ns-3-dce* with**

   i. hg clone http ://code.nsnam.org/ns-3-dce -r dce-1.8

   ii. cd ns-3-dce

   iii. ./waf configure –with-ns3=$HOME/dce/build –enable-kernel-stack=$HOME/net-next-nuse/arch –prefix=$HOME/dce/build

   iv. ./waf build

   v. ./waf –run dce-iperf-mptcp

# 3 The MPTCP Linux kernel implementation setup :

The following figure illustrates the

# 4 Packet path using MPTCP :

a

## 4.1 Hypothesis

a

## 4.2 Procedure

# 5 Results

This section

## 6 Conclusion

Conclusion

## 7 Further developements

In the above experiments

# 8 Acknowledgements

Acknowledgement

## 9 Bibliography

### Références

## 10 Appendix

Here we have the different

## 11 Glossary

| | |
|---|---|
| RA : | *Département d'Informatique* |
| IETF : | *Internet Engineering Task Force* |
| L2 : | *Layer 2/Link Layer of the OSI model* |
| L3 : | *Layer 2/IP Layer of the OSI model* |
| DHCP : | *Dynamic Host Configuration Protocol* |
| DNS : | *Domain name system* |
| MLD : | *Multicast Listener Discovery* |
| IP : | *Internet Protocol* |
| RFC : | *Request for Comment* |
| ARP : | *Address Resolution Protocol* |
| VLAN : | *Virtual local area network* |
| AP : | *Access Point* |
| RS : | *Router Solicitation* |
| NS : | *Neighbour Solicitation* |
| NA : | *Neighbour Advertisement* |
| mDNS : | *multicast Domain Name System* |
| LLMNR : | *Link-Local Multicast Name Resolution* |
| SLAAC : | *Stateless Address Autoconfiguration* |