



Installation LTE-SIM

Simulation du réseau 4G (LTE-SIM) en vue d'optimiser les ressources spectrales de l'opérateur.

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I Introduction

Ce projet s'inscrit dans le cadre de simulation d'un réseau de télécommunication basé sur la norme LTE, cette simulation sera faite à l'aide d'un logiciel appelé LTE-SIM qui permet d'évaluer les performances d'un réseau de télécommunication LTE.

Le logiciel LTE-SIM, logiciel Open Source SIM a été conçu pour faire des simulations des stratégies d'ordonnancement en lien montant (UL) et descendant (DL) dans des environnements multi-cellules/multi-usagers prenant en compte la mobilité des usagers, l'optimisation des ressources radio, la réutilisation des fréquences, la modulation adaptative (AMC) ainsi que d'autres aspects significatifs pour l'industrie et la communauté scientifique.

Il permet de simuler un réseau de télécommunication selon les scénarios que l'utilisateur lui définit, par exemple la simulation d'une transmission dans un milieu urbain macro cellules prenant en compte l'aspect multiutilisateurs, multiservices, la mobilité des utilisateurs.

Dans ce document nous allons en mettre en place la procédure d'installation du logiciel LTE-SIM sous les environnements Windows et Linux pour limiter les risques a l'indisponibilité de certaines librairies.

II Procédure d'installation de logiciel LTE-SIM sous Windows

Pour installer le logiciel LTE-SIM sous Windows, il faut suivre les deux grandes étapes :

1. 1ère étape:

a. Il faut s'assurer qu'un compilateur c/c++ est installé.

On test l'existence de compilateur **Cygwin** (compilateur c/c++). On Tape sous **COMMAND LINE WINDOW** les commande suivantes : **cygcheck -c cygwin cygcheck -c gcc**

CiVM/indousc) custom 22	and ava			
C:\windows\system32	cmd.exe			
Microsoft Windows	[Version 6.1.76	00]		*
Copyright (c) 2009	Microsoft Corp	oration. All rights r	eserved.	=
C:\Users\DR-SAADE:	>cygcheck −c cyg	win		
Cygwin Package Int	Formation			
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cygwin	1.7.17-1	ок		
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Package	Version	Status		
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C:\Users\DR-\$AADE:	>			

b. Si non, on installe les compilateurs GNU, make, et le débogueur



gdb depuis cygwin.com

1. Télécharger le programme <u>setup.exe</u> de Cygwin en cliquant sur l'icône Install or Update Now!(il faut aller vers le milieu de la page).

Current Cygwin DLL version

The most recent version of the Cygwin DLL is 1.7.17-1. Install it by running setup.exe.

Use setup.exe to perform a fresh install or to update an existing installation.

Note that individual packages in the distribution are updated separately from the DLL so the Cygwin DLL version is not useful as a general Cygwin release number.

2. Lancer le programme setup.exe

Cygwin Setup	
	Cygwin Net Release Setup Program This setup program is used for the initial installation of the Cygwin environment as well as all subsequent updates. Make sure to remember where you save at it. The pages that follow will guide you through the installation. The pages that follow will guide you through the installation provide the page of the page of the page of the page of the page page of the page of the page of the page of the page of the page page of the page of the page of the page of the page of the page page of the page of the page of the page of the page of the page in the future to add, remove, or upgrade packages as necessary.
n 19 19 19	Setup.exe version 2.774 Copyright 2000-2012 http://www.cygwin.com/

Acceptez tout par défaut jusqu'à ce que vous atteigniez la page Select votre Internet Connexion. Sélectionnez l'option dans cette page qui est la meilleure pour vous. Cliquez Next.

Select Your Interne Setup needs to k appropriate settir	at Connection now how you want it to connect to the internet. Choose the igs below.	E
	Direct Connection Use Internet Explorer Proxy Settings Use HTTP/FTP Proxy: Proxy Host	
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Sur la page Choose Download Site, choisissez le site de téléchargement que vous pensez être le plus proche de vous. Cliquez Next.

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User URL:		Add

Sur la page Select Packages sélectionnez les packages à télécharger. Cliquez le signe + proche de Devel pour étendre la catégorie des outils de développement. Vous pourriez avoir à redimensionner la fenêtre pour en voir plus en une fois.

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Sélectionnez chaque package que vous voulez télécharger en cliquant Skip à coté de lui. Au minimum, sélectionnez :

gcc-core: C compiler, gcc-g++: C++ compiler, gdb: The GNU Debugger,

make: the GNU version of the 'make' utility.

The following packages are required to satisfy dependencies.	Resolving	Dependenci	es				
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3. Maintenant ajouter le répertoire du compilateur à votre path(chemin):

Ouvrez le panneau de configuration (Démarrer > Paramètres > Panneau de configuration) et double-cliquez sur le programme System

	Control Panel P All Contro	n Panel Ite			search Control Panel	-
٩djus	t your computer's settings				View by: Large icons -	
	Personalization	4	Phone and Modem		Power Options	
	Programs and Features		Recovery	5	Region and Language	
	RemoteApp and Desktop Connections		Sound	O	Speech Recognition	
	Sync Center		System		Taskbar and Start Menu	
	Troubleshooting	-	User Accounts		Windows Anytime Upgrade	
3	Windows CardSpace		Windows Defender		Windows Firewall	
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Sélectionnez l'onglet Avancé et cliquez Variables d'environnement.



Dans le panneau Variables système de la boite de dialogue Variables d'environnement, sélectionnez la variable Path et cliquez Modifier.

/ironment vari	
User variables fo	or DR-Saade
Variable	Value
TEMP	%USERPROFILE%\AppData\Local\Temp
TMP	%USERPROFILE%\AppData\Local\Temp
J	
	New Edit Delete
	New Eoit Delete
System variable	New Lait Delete
System variable Variable	value
System variable Variable OS	Value
System variable Variable OS Path	Value Windows_NT C:\app\DR-Saade\product\11.2.0\dbho
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Ajoutez le chemin vers le répertoire *cygwin*\bin à la variable Path , et cliquez OK. Par défaut,

le répertoire *cygwin* est C:\cygwin\bin. Les noms de répertoire doivent être séparés par un point-virgule.

NB : ajouter sans supprimer les autres.

are system van	able
Variable name:	Path
Variable value:	\100\DTS\Binn\;C:\cygwin\bin;
/stem variables	
ystem variables Variable	Value
vstem variables Variable OS	Value Windows_NT
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Cliquez OK dans la boite de dialogue Variable d'environnent puis dans la boite de dialogue Propriétés système.

2ème étape:

1. Télécharger et installer ECLIPSE WITH C++ IDE. ECLIPSE WITH C++ IDE Version 32bits. (sous Windows 32 bits)

ECLIPSE WITH C++ IDE Version 64bits. (sous Windows 64 bits)



2. Télécharger LTE-Sim R4.0

Main Menu	LTE Simulator
 Home People Research Projects Publications Teaching Intranet Search 	LTE-Sim is an open source framework to Simulate LTE networks. The developed LTE Simulator, LTE-Sim, encompasses several aspects of LTE networks, including both the Evolved Universal Terrestrial Radio Access (E-UTRAN) and the Evolved Packet System (EPS). It supports single and heterogeneous multi-cell environment, GOS management, multi users environment, user mobility, handover procedures, and frequency reuse techniques. Four kinds of network nodes are modeled: user equipment (UE), evolved Node B (eNB), Home eNB (HeNB), and Mobility Management Entity/Gateway (MME/GVV). Four different traffic generators at the application layer have been implemented and

Ouvrez ECLIPSE et créez une nouvelle Projet C++ et nommée "LTE-SIM"



Copie/Coller le dossier SRC du dossier LTE-SIM déjà télécharger. Compiler le projet LTE-SIM:



Ouvrez le **COMMAND LINE WINDOW** et testez le SIMULATOR Dans le répertoire LTE-SIM\Debug on tape LTE-Sim –h



L'exécution de cette commande nous donne la figure suivante :

C:\Windows\system32\cmd.exe

LTE-Sim
is an open source framework to simulate
LTE networks.

run test suites:
./LTE-Sim test
run examples:
./LTE-Sim SingleCell radius nbUE nbVoip nbVideo nbBE nbCBR sched_type f
rame_struct speed maxDelay videoBitRate seed(optional)
> ./LTE-Sim SingleCell 1 1 0 0 1 0 1 1 3 0.1 128
./LIE-Sim SingleCellWithI nbCells radius nbUe nbUoip nbUideo nbBE nbCBR
sched_type frame_struct speed maxuelay videoBitRate seed(optional)
./LIE-SIM SINGLECTIMITITI I I I 0 0 1 0 1 7 3 0.1 120
tune frame struct sneed maxDelau uideoRitRate seed(antional)
> ./LTE-Sim MultiCell 7 1 1 0 0 1 0 1 1 3 0.1 128
./LTE-Sim SingleCellWithFemto nbBuildings BuildingTupe activityRatio ma
cro_cell_radius nbUE nbFemtoUE nbVoip nbVideo nbBE nbCBR sched_type frame_struct
<pre>speed accessPolicy maxDelay videoBitRate seed(optional)</pre>
> ./LTE-Sim SingleCellWithFemto 2 0 1.0 1 1 1 0 0 1 0 1 1 3 0
0.1 128

Cette figure nous affiche les exemples de test de scénarios créés dans le logiciel et les paramètres d'entrées correspondant à chaque exemple.



Ici nous avons une légende qui nous explique quelques informations pour le bon choix des paramètres.

Et ainsi le LTE-SIM est bien installer dans Windows

III Procédure d'installation de logiciel LTE-SIM sous Lunix

Nous présentons dans cette partie la procédure d'installation sous Ubuntu, qui est une distribution de Linux présentant plusieurs avantages : la sécurité, la simplicité etc.

Pour installer le logiciel LTE-SIM sous Lunix (Ubuntu), il faut suivre deux étapes:

1. 1ère étape

Télécharger LTE-SIM depuis http://telematics.poliba.it



2. 2^{ème} étape

Il faut s'assurer qu'un compilateur c/c++ est installé en tapant "gcc" ou " g++"dans un terminal

si non, tape **sudo apt-get install build-essential**

Installer LTE-Sim en utilisant la commande "make"

Tout d'abord il faut décompresser le fichier obtenu et se rendre dans le répertoire courant.





Comme le pouvons le voir dans cette figure, le LTE-SIM est bien installé sous Linux.