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Free Tools for Teaching & Researching Wireless Networking Concepts

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FREE TOOLS FOR TEACHING & RESEARCHING WIRELESS NETWORKING CONCEPTS*

TUTORIAL PRESENTATION

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ABSTRACT

As wireless networking and security become more prevalent in the market, more and more computer science programs are incorporating courses in wireless networks or at the least, devoting a significant percentage of the advanced networking courses to wireless topics. As a result, in addition to industry practitioners, there is a growing interest among university researchers and faculty regarding tools used for teaching and researching in wireless networking concepts.

This tutorial will demonstrate two free tools, Network Stumbler and ITGuru's wireless module (academic version is free).

INTRODUCTION

Network Stumbler is used for monitoring and assessing security threats for wireless networks. Network Stumbler is a Windows-based tool that allows you to detect Wireless Local Area Networks (WLANs) using 802.11b, 802.11a and 802.11g standards.

Network Stumbler has many uses:

- Verifies that your network is set up the way you intended.
- Find locations with poor coverage in your WLAN.
- Detects other networks that may be causing interference on your network.
- Detects unauthorized "rogue" access points in your workplace.
- Helps aim directional antennas for long-haul WLAN links.
- Can be used recreationally for WarDriving.

Network Stumbler was developed by Marius Milner and runs in a Windows environment. Network Stumbler has an easy to use graphical interface. Information about the tool is given in the website www.netstumbler.com.

Network Stumbler can actively detect wireless networks by periodically sending probe requests. The probe requests are sent approximately every second. Once a probe requests is sent, Network Stumbler listens for any responding probe response frame from any access points within the range.

ITGuru is a powerful simulation environment developed by OpNET Corporation. ITGuru is unique because of its ability to model the entire networking domain, including its routers, switches, protocols, servers, and the individual applications they support. ITGuru improves network researchers' and instructors' ability to identify and solve problems throughout the network. ITGuru assesses application impact, automates diagnostic testing, expedites server capacity planning and consolidation, analyzes failure impact, and enables network growth planning

ITGuru's Application Characterization Environment (ACE) module enables network researchers and instructors to identify the root-cause of end-to-end application performance problems, and solve them cost-effectively by understanding the impact of changes.

The OpNET Corporation provides a FREE academic copy of their simulation environment to universities for both teaching and research. Information about the tool is given in the website www.opnet.com.

TUTORIAL OUTLINE:
- Fundamentals of IT Guru wireless module
  o Network Design
  o Running the simulation
  o Output Analysis
  o Application Characterization Environment (ACE)
- Overview of Network Stumbler

INTENDED AUDIENCE

No experience with ITGuru or Network Stumbler is necessary. Requires minimal knowledge of network devices and protocols. The tutorial will be geared towards computer science and information systems faculty and researchers.

TIME LINE:

The tutorial will be tailored to last 75 minutes.

EQUIPMENT NEEDED

Overhead projector with a computer connection.

INSTRUCTORS' PROFILES

Victor Clincy is currently an Associate Professor of Computer Science at Kennesaw State University. Clincy holds post-graduate, doctorate and masters degrees in engineering from Columbia University, Southern Methodist University, University of Pittsburgh and North Carolina State University respectively.

Ajay Krithi Sitaram is a graduate student at Kennesaw State University in the Masters of Science program in Applied Computer Science.