

LATINCOM 2012

Thursday, November 8, 2012

11:15AM-12:15PM

WS1 - Next-generation access network

Chair: Julio Armas

Municipal Open Access MAN and Democratization of Broadband Access in Brazil

José Umberto Sverzut, Gean Davis Breda, Bruno Bogaz Zarpelão, Leonardo de Souza Mendes, *School of Electrical and Computer Engineering, University of Campinas (UNICAMP), Campinas, Brazil.*

Abstract: Broadband access is an important factor in the development of a country. In Brazil, broadband penetration rates are low. In this paper, we propose the construction of Municipal Open Access MAN to improve the broadband infrastructure in Brazilian cities, democratizing the access to broadband services. Details about the Open Access MAN of Pedreira, Brazil, will be presented. The proposals discussed in this paper also bring strategies to allocate frequencies in the Brazilian radio electrical spectrum in order to provide wireless connectivity in Municipal Open Access MAN with high quality and low cost.

Performance of optical modulation formats in a XG-PON Scenario

Claudia Carmona Rodríguez, *Facultad de Ingeniería de Tecnologías de información y comunicación. Universidad Pontificia Bolivariana.*

Ana María Cárdenas Soto, *Maestría en Ingeniería de Telecomunicaciones. Universidad de Antioquia. Medellín, Colombia.*

Abstract: An evaluation of different optical modulation formats in XG-PON scenario, under criteria of tolerance to linear effects introduced by optical channel, is shown. Duobinary and DPSK formats, against OOK and DQPSK formats, shown better performance to increase coverage and capacity in optical access networks.

Optical Combs configuration for WDM and OFDM access networks

Hernán Darío Yepes Montoya, *Electronics and Telecommunications Engineering Dept., University of Antioquia, Medellín, Colombia.*

Ana María Cárdenas Soto, *Electronics and Telecommunications Engineering Dept., University of Antioquia, Medellín, Colombia.*

Abstract: Simulation results of two techniques for generating OFCGs (Optical Frequency Comb Generator) are presented, and the sensitivity of its parameters with respect to carrier separation, power variation, total bandwidth and equalization between carriers, in order to use the carriers in WDM systems and OFDM.

2:45PM - 4:25PM

WS2 - Transmission and access

Chair: Katty Rohoden

A Naive Approach to the Probability of Success Call Completion from a Three Stages Handoff Procedure

Huber Nieto-Chaupis, *Facultad de Ingeniería Electrónica y Mecatrónica, Universidad Tecnológica del Perú, Esq. Petit Thouars - 28 de Julio, Lima1, Perú.*

Hernán Salas-Asencios, *The Graduate Program of Telecom and Networking, Technological University of America, Vice-Provost, 3700 Cononut Creek, FL 33066, USA.*

Abstract: In this report an expression denoting the probability of success call completion (PSCC) by including up to three stages during the action of handoff by a mobile station or end user is derived. The obtained expression consists in the integration of various probability functions which give information about the stages during the handoff and handover actions between a mobile user and two cells or base stations (BS). These methodologies are applied to the concrete case when a mobile user is in a scenario of a rush hour in typical working days. After of simulating a data of travelers which are attempting to make a connection to a nearly cell, a fitting onto the simulated data is performed in order to extract a mathematical shape of the phenomenon. It serves to built the probability distributions functions for the three stages procedure. The obtained results are coherent with that of the past, in particular that of the Meo-Ajmone model [1] despite of the fact that the present study contemplates failures on the handoff probabilities. However, a non-negligible sensitivity of the parameters used in the formulation of the PSCC is found. The mathematical procedure presented in this report would serve to reconfigure soft and hardware in BS targeting to allocate adequately resources in view of optimizing and keeping a excellent quality of service (QoS) as requeried by communications regulators.

DSL Phantom Mode Transmission: Cable Measurements and Performance Evaluation

D. A. Gomes, G. Guedes, A. Klautau and E. Pellaes, *Electrical Engineering Department, UFPA Institute of Technology, Belém, Pará – Brazil.*

Chenguang Lu, *Ericsson Research, Kista, Sweden.*

Abstract: Phantom mode (PM) transmission aims at increasing the total rate of DSL when multiple copper pairs are available. This paper brings results and significant insights on PM mode usage and performance. It discusses procedures for performing PM measurements over frequencies from 100 kHz to 300 MHz. Novel results are presented concerning direct channel, far-end crosstalk and mode conversion for a 50-meter Cat5e cable. Among other facts, the results show that mode conversion increases up to approximately 30 MHz and becomes almost flat over frequency afterwards. They also show that unrolling the cable significantly improves the PM measurements. The bit rate of PM transmission is also estimated, indicating that it can be increased by 60% when PM is used with vectoring.

Evaluation of a Balanced Antipodal Vivaldi Antenna Behavior

Roberto Boris Martínez Aguilar, Martha María Molina Alvarez, Patricia Raquel Castillo Aranibar, *Ingeniería de Telecomunicaciones, Universidad Católica San Pablo, Arequipa, Perú.*

Abstract: Due to the many breakthroughs in the field of antennas development, and seeing as how most of these are related to the use of computers, researchers are now focusing on the development of intelligent antennas, which is why 'adaptive arrays' cannot be left aside. It is a permanent goal to develop devices which are qualitatively superior to those already in existence. Thus, regarding ultra bandwidth antennae, this tendency becomes clear now that it is relevant to manufacture them in such fashion that they are not limited to radiating in a determined frequency; this opens up a bunch of new possibilities for application. This paper attempts to focus on the aforementioned improvements to test the design functionality of a balanced antipodal Vivaldi antenna based array, with aims to achieve upgrades in performance and facilitate its conversion to an adaptive array. Currently there is no research on adaptive arrays that work with this type of antenna; therefore observation of this experiment behavior becomes possible.

Distortion analysis of nonlinear phenomena in optical fiber applied to SCM-WDM link

William S. Puche, Ferney Amaya and Javier E. Sierra, *Gidati Research Group, Universidad Pontificia Bolivariana, Medellin, Colombia.*

Abstract: The nonlinear distortion is one of the most harmful effects occurring in the multi-carrier systems for optical links or Radio over Fiber (RoF), allowing the generated information signal significantly degrade considering certain length of fiber used for the link. Consequently, it is necessary to understand the behavior of the signal and know that effective modulation techniques can be implemented for the optimal management of information in an optical link. In this paper we analyze and simulate the phenomena of nonlinear distortion in a fiber link SCM-WDM considering the composite harmonic distortion (CSO) of second and third order (CTB) with external modulation and without external modulation on a section of the link 30 to 40 km.

Optical System using VHGT Filter for Wavelength Division Multiplexed (WDM) Hybrid Optoelectronic Receiver

Julio Armas, Vítězslav Jeřábek, David Mareš.

Abstract: This paper is about the design of three micro modules in a new circle topology and measurement of the optical micro module which uses a micro optics hybrid integration technology with collimation lenses and a volume holographic Bragg grating triplexer (VHGT) filter for wavelength multiplexing/de-multiplexing. The collimation system is represented by a ray matrix model and the focal distances obtained in the matrix are verified experimentally. The optic focal system: "collimation lens- PIN photodiode (PD)" is characterized to be found in the relationship between the diameter of the beam collimated and the active area covered in the PIN PD. The optical micro module with a VHGT filter and two optoelectronic receiver micro modules are for receiving download information (internet and digital TV signals).

4:55PM - 6:15PM

WS3 - Wireless communications I

Chair: Jose Vergara

Concerns on using RSS for distance and angle measurements

Muswieck, Bruno de S., *Department of R&D, Eletroeste Tecnologia & Automação, Uruguaiana, Brazil.*

Russi, Jumar L; Heckler, Marcos V.T., *Department of Electrical Eng. and Telecommunication, Federal University of Pampa, Alegrete, Brazil.*

Abstract: The present paper proposes the utilization of RSS for distance and angle measurements in open field, where it could be used to develop a localization system in a wireless sensor network (WSN). Since RSS values suffer from different sources of influences, in this paper several tests are performed in order to determine them. A prototype was developed enabling to run the necessary tests in the field. Preliminary results show that is possible to measure distance and angle by using RSS values, but some concern must be taken to enable the system operation with a reliable performance.

An evaluation of strategies to improve the message delivery reliability on WSN without the use of acknowledgement messages

González Ricardo, *Departamento de Computación y Tecnología de la Información, Grupo Greta, Universidad Simón Bolívar, Caracas, Venezuela.*

Huerta Mónica, *Departamento de Electrónica y Circuitos, Grupo Greta, Universidad Simón Bolívar, Caracas, Venezuela.*

Abstract: The wireless sensor network technology is actually used in a lot of different applications fields. The appropriate delivery of its collected data is a very important feature in this kind of network. A set of different strategies are being reported to deal with this fact, and we are interested specifically in simulate some of these strategies at the same time, and in the same controlled environment, to establish a fears comparison of all of them in order to select the more effectives ones, for further developments. This work only perform a comparison against strategies that do not use acknowledge messages because they are more simple to implement and to be included in simulation models. Further works would consider acks strategies. The first results of this research show that it is possible to reach a high level of reliability on message delivery, but also that any strategy cannot achieve real improvement in the desired performance levels.

Frequencies Assignment in WiMAX Networks

Miguel Sanchez Meraz, Carlos Sosa Paz, Duarte Calderon Alizari, *Departamento de Telecomunicaciones ESIME Zacatenco Instituto Politécnico Nacional, México City, México.*

Abstract: This paper propose a methodology based on Integer Linear Programming to perform the frequency assignment in WiMAX networks. In a first step the frequency reuse distance is calculated. The obtained results for the performance of WiMAX networks using the frequency assignments obtained with the proposed methodology are similar with those obtained with frequency assignment obtained from professional radio planning tools.

Hardware and Software Open Technologies for a Communication System that fits to Emergency and Disaster Scenarios using cellular terminals GSM

Manuel Quiñones, Rommel Torres and Katty Rohoden, *Department of Computer Sciences and Electronic, Universidad Técnica Particular de Loja, UTPL, Loja, Ecuador.*

Abstract: When there is a natural disaster or military conflict, conventional communication systems are prone to partial or total failures. Based on the background, these environments require a rapid deployment system for helping people and relief groups. This research proposes the implementation of a cellular mobile communication system, GSM, using OpenBTS, knowing the high penetration of this technology today, using open technologies, hardware and software, that suit in these scenarios.

Friday, November 9, 2012

11:15AM - 12:15PM

WS4 - Wireless communications II

Chair: Boris Ramos

A study of adaptive application development for 802.11g networks

Danillo Vaz Borges de Assis, *CPGEI, Federal Technological University from Paraná – UTFPR, Curitiba, Brazil.*

Luiz Nacamura Júnior, *CPGEI, Federal Technological University from Paraná – UTFPR, Curitiba, Brazil.*

Abstract: After the launch of the wireless networks, IEEE 802.11, many companies has adopted wireless networks as their way to connect computers. There are many sub-patterns of the IEEE 802.11 LAN, also called Wifi networks. By the point of view of application development, a little or nothing was developed that takes advantage this pattern's specificity. This is due the differences that Wifi and Ethernet have on the Physical layer and MAC sub-layer. All the other layers remain the same as Ethernet. For this reason, the Ethernet developed applications are also running on Wifi environments without any modification. The goal of this work are to study the Wifi behavior; identify some characteristics of this networks that could be taken in account on application development; and to study some application development techniques that could be used to know the behavior of the WiFi networks in terms of throughput, signal quality, signal noise, among others metrics.

Spectrum Occupancy Measurements in an Urban Area of Bogota Colombia

Felipe Forero, *Msc(s) at Distrital University, Engineering Faculty, Bogota, Colombia.*

Luis Fernando Pedraza, *PhD(s) at Nacional University of Colombia and Distrital University Professor, Bogota, Colombia.*

Ingrid Paez, *Nacional University of Colombia Professor, Engineering Faculty, Bogota, Colombia.*

Abstract: The present paper shows the first part of the results obtained from a spectrum measurement campaign that has been conducted in order to accurately determine spectrum occupancy around an urban area in the city of Bogota (Colombia). A summary of the figures (duty cycle) obtained from measurements taken on a 50-MHz-span basis is provided. The measurements are organized according to different wireless technologies. The scope of this study required 4 months of measurements to cover spectrum usage from 54MHz to 6GHz. Results suggest that there is severe spectrum sub-utilization in all bands measured, which represents potential opportunities for future implementation of dynamic spectrum allocation policies in urban areas in Colombia.

Energy Efficiency Comparison of Routing Protocols for Mobile Ad Hoc Networks in Emergency Scenarios

Manuel Quiñones and Rommel Torres, *Departamento de Ciencias de la Computación y Electrónica, Universidad Técnica Particular de Loja, UTPL, Loja, Ecuador.*

Abstract: When a natural disaster or military conflict exists, conventional communications systems are prone to failure, then a rapid deployment, secure and mobile system is required, these characteristics belongs to the mobile ad hoc networks. In this research, a comparative analysis of energy consumption of AODV, DSDV and CBRP routing protocols is performed, through simulations in a disaster area scenario, using open scientific software for network simulation and a mobility model that describes an emerging environment. CBRP shows the best behavior when the number of connections increase.

2:45PM - 4:25PM

WS5 - Green, user-centered, and security

Chair: Fabrizio Granelli

Efficiency Applications for Vehicular Networks: Towards Green Transportation Systems

Ana María Orozco, *Universidad Icesi, Cali, Colombia, i2T Research Group.*

Gonzalo Llano, *Universidad Icesi, Cali, Colombia, i2T Research Group.*

Roger Michoud, *Swiss Federal Institute of Technology Lausanne, EPFL, Switzerland.*

Abstract: Recent research efforts of academia, automotive industry and transport government sector point to Green Intelligent Transportation Systems (G-ITS) as a key technology for improving road safety, traffic efficiency and comfort driving. Vehicular Ad Hoc Networks (VANETs) have significant potential to enable applications in order to enhance traffic safety, efficiency transportation and sustainable mobility. The interaction among vehicles and infrastructure allows real-time communications that provide information to drivers in hazardous situations, traffic jams and road events. This article provides an overview of vehicular ad hoc networks; we describe the fundamental concepts, communication standards and vehicular applications. In addition, this paper presents a survey on routing protocols for VANETs.

An approach to correlation of QoE/QoS metrics over IPTV using a Diffserv Network

Diego J. Botia, Natalia Gaviria G., *Research Group in Telecommunications Applied GITA-ARTICA. Engineering Department. Universidad de Antioquia, Medellin, Antioquia, Colombia.*

José M. Menéndez , David . Jimenez, *Research Group in Applications of Visual Telecommunications - G@TV. E.T.S. Ingenieros de Telecomunicación, Universidad Politécnica de Madrid – Spain.*

Abstract: Network operators increasingly focus their attention on fulfilling the expectations of quality of experience (QoE) for the delivery of video services to their users. Therefore, it is important to analyze the correlation between objective and subjective QoE metrics such as PSNR (Peak Signal Noise Ratio), SSIM (Structural Similarity Index Metric), VQM (Video Quality Metric), and MOS (Mean Opinion Score), and thus to obtain high quality levels of video delivery to the viewer, using schemes of QoS (Quality of Service) through strategies based on active queue management (AQM) to control network congestion like WRED (Weighted Random Early Detection). In this paper we propose an equation to estimate the MOS through correlation of objective QoE and QoS parameters, which is generated by multiple regression statistical analysis. We also present a testbed (operational simulation environment) set with Besteffort and Diffserv networks performed in NS-2, which allows us to compare both objective and subjective quality metrics for different rates of packet loss over a network link and varying encoding parameters like bitrate and GOP (Group of Pictures) length. The results show a high correlation between metrics for video sequences with low and high motion and a better quality of video delivered over QoS network, controlling congestion and reducing loss frames over video delivered.

User-Level Multicast Routing for Real-time Multimedia Communications

Francisco E. Jurado-Monzón, *Center for Research in Mathematics-CIMAT, Guanajuato, México.*

Rogelio Hasimoto-Beltran, *IEEE Member, Center for Research in Mathematics-CIMAT, Guanajuato, México.*

Abstract: When the IP Multicast protocol is not available for real-time multimedia communications (such as voice/video streaming), alternatives must be provided to reduce the excessive bandwidth demand produced by point-to-point networks. Since broadcasting is definitely not a choice, we proposed “Virtual Multicast (VM)” as an excellent solution. In VM, communicating hosts (users) work together to find the best path (visiting all users) that minimizes the overall network delay and cost (total sum of the connected end-node links) subject to the bandwidth constraint capacities per user. We analyze VM under two different restrictions: a) every host can retransmit the received stream to only one host; and b) every host can retransmit the received stream to one or more hosts depending on the available resources per host (which may be different for each host). The proposed algorithms have excellent performance and adjust very rapidly to current network traffic and users incoming/outgoing calls.

Emulation of Malformed XML Using WSInject for Security Testing Against WS-Security

Marcelo Palma Salas, Eliane Martins, *Laboratory of Distributed Systems, Institute of Computing, State University of Campinas, Campinas, Brazil.*

Abstract: Web Services is a technology that provide more connectivity, flexibility and interoperability among their applications. Due to its distributed and open nature, it is susceptible to Malformed XML attack, which inserts malicious code in the SOAP message request. This attack causes errors in the XPath parser in order to generate server failures (crash) that expose

confidential information as part of the response. One countermeasure is to employ Security Testing, which allows the detection of this type of vulnerability and helps to discover new ones, before they are exploited by attackers. Our goal is to use the WSInject fault injector, which emulates Malformed XML attack for Security Testing against WS-Security with Security Tokens, which ensures authentication and authorization of the messages exchanged. The results were compared with a Vulnerability Scanner, which reproduces this type of attack, getting better results with WSInject.

On the Throughput Optimality of Distributed MAC Protocols for Directional Antennas

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Miki Yamamoto, *Department of EEE, Kansai University, Osaka, 564-8680 Japan.*

Abstract: Existing distributed medium access control (MAC) protocols for wireless networks with directional antennas do not achieve the maximum possible throughput. This paper theoretically proves that existing MAC protocols such as those based on tones or IEEE 802.11 may perform arbitrarily worse as compared to a throughput-optimal MAC protocol. Next, we present a distributed scheme for achieving throughput optimality in wireless networks with directional antennas. Simulation results are presented to show the performance improvements facilitated by the throughput-optimal MAC protocol over existing protocols.