

ECE Departmental Seminar

Trends in Network Steganography

Krzysztof Szczypiorski
Warsaw University of Technology, Poland

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4:00–5:00pm ENGR 3507

Abstract:

Network steganography is the youngest branch of information hiding. It is a fast-developing field: recent years have resulted in multiple new information hiding methods, which can be exploited in various types of networks. The exploitation of protocols belonging to the Open Systems Interconnection (OSI) reference model is the essence of network steganography. This family of methods may utilize one or more protocols simultaneously or the relationships between them — relying on the modification of their intrinsic properties for the embedding of steganograms.

Network steganography is on the rise because embedding secret data into digital media files (old school of information hiding) has been found to possess two serious drawbacks: it permits hiding only a limited amount of data per one file and the modified picture may be accessible for forensics experts (for example, because it was uploaded to some kind of server). Network-level embedding changes the state of things diametrically; it allows for leakage of information (even very slow) during long periods of time and, if all the exchanged traffic is not captured, then there is nothing left for forensics experts to analyze. As a result, such methods are more difficult to detect and eliminate from networks.

The talk will give a general overview in this area and will be a chance to present algorithms proposed by Network Security Group (secgroup.pl) from Warsaw University of Technology, Poland.

Short bio:

Krzysztof Szczypiorski is a Professor of Telecommunications at Institute of Telecommunications, Faculty of Electronics and Information Technology (FEIT), Warsaw University of Technology (WUT), Poland. His research interests include: theory of observing change, network security, digital forensics, open-source intelligence, and wireless communications. He holds M.Sc. (1997, with honours), Ph.D. (2007, with honours) and D.Sc. (habilitation, 2012) all in Telecommunications from FEIT, WUT. He also finished the postgraduate studies in Psychology of Motivation (2013) at the University of Social Sciences and Humanities (SWPS), Warsaw, Poland. He graduated from Budapest Tech (now Óbuda University), Hungary in Advanced Networking (2003) and from Hass School of Business, University of California, Berkeley (2013). A visiting research scholar at: University of California, Berkeley (2013) and George Mason University, Fairfax, VA (2014). A founder and a head of International Telecommunication Union Internet Training Centre (ITU-ITC – <http://itu-itc.pl/>) established in 2003. A research leader of Network Security Group at WUT (<http://secgroup.pl/>). He was a principal investigator leading R&D projects funded by: US Armed Forces (including US Army and US Air Force), European Union (FP7), The National Centre for Research and Development (Poland) and Fonds National de la Recherche (Luxembourg). He is the author or the co-author of 180+ publications including 130+ papers, 2 patents (one is pending) and 50+ invited talks. For 20+ years he also serves as the independent consultant in fields of network security, telecommunications and computer science for many entities including: Cisco, Hewlett-Packard, Ministry of Finance (Poland), Oracle, Orange, Parliament of Republic of Poland, Polkomtel (Polish mobile operator), PwC, T-Mobile. Senior Member of IEEE (Institute of Electrical and Electronics Engineers). Personal web page: <http://krzysiek.tele.pw.edu.pl>