UNIVERSITÀ DI PISA

DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

Dottorato di Ricerca in Ingegneria dell'Informazione

Doctoral Course

Multimedia over IP (MoIP)

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Short Abstract: The Multimedia over IP (MoIP) is related to applications and services based on the transport of various types of media using the IP packets. Typical media examples include voice, video and messaging. The main goals of the course are the description of the design issues to consider during the development of a MoIP system and the problems of Quality of Service and Security of these systems. The course refers the standards that define architectures and protocols used by MoIP systems. In particular, the Session Initiation Protocol (SIP) is considered as a reference concerning both the protocol and the system architecture. The IP Multimedia Subsystem (IMS) is then presented as an example of MoIP service platform based on SIP protocol. In MoIP services, the perceived quality of service (PQoS) is of paramount relevance. On this key aspect, the course presents techniques for the measurement and the monitoring of the PQoS. In particular, the course presents some experimental studies aimed at finding relations between the PQoS and the different problems of the transport service. These studies are focused on the delivery delay, the delay jitter and the packet loss introduced by the IP network. Another key aspect of the MoIP service is the reliability of the system, which depends on the reliability of a large number of devices and their interaction, necessary to provide the different functions related to the offered service. The last part of the course presents some notes on the risks related to the security threats of these systems.

Course Contents in brief:

- Introduction to Multimedia over IP
  - Telephone services over IP Networks
  - Evolution towards Multimedia over IP (MoIP) services
  - Design issues for protocols and MoIP service architecture
  - SIP Architecture
  - IP Multimedia Subsystem (IMS) Architecture
  - RTP/RTCP protocol
  - Experimental analysis of IMS and SIP signalling traffic
- Design Issues of MoIP systems
  - Definition of Perceived Quality of Service in MoIP systems
  - Techniques for PQoS estimation
  - Techniques for the design of systems with guaranteed PQoS
- Security issues of MoIP systems
  - Security threats in MoIP systems
  - Solutions for the security threats of MoIP systems

Total # of hours: 20 hours

References:

[1] H. Sinnreich, A.B. Johnston, R.J. Sparks, "SIP Beyond VoIP: The Next Step in the IP Communications Revolution", ed. VON Publishing LLC, 2005

[2] Sofiene Jelassi, Gerardo Rubino, Hugh Melvin, Habib Youssef, and Guy Pujolle, "Quality of Experience of VoIP Service: A Survey of Assessment Approaches and Open Issues", IEEE COMMUNICATIONS SURVEYS & TUTORIALS, VOL. 14, NO. 2, SECOND QUARTER 2012

[3] Tiesong Zhao, Qian Liu, Chang Wen Chen, "QoE in Video Transmission: A User Experience-Driven strategy", IEEE COMMUNICATIONS SURVEYS & TUTORIALS, VOL. 19, NO. 1, FIRST QUARTER 2017

[4] D. Endler, M. Collier, " Hacking Exposed VoIP", ed. McGraw-Hill 2007

CV of the Teacher

Rosario Giuseppe Garroppo is Assistant Professor at the Dipartimento di Ingegneria dell'Informazione of the University of Pisa. In 1995, he received the M.S (Laurea degree) "cum laude" in Telecommunications Engineering, and in 1999 the Dottorato di Ricerca (PhD) degree in Information Engineering (Ingegneria dell'Informazione) from University of Pisa. His expertise is on networking and his main research activities are focused on experimental measurements and traffic modelling in broadband and wireless networks, MoIP systems, traffic control techniques for multimedia services in wireless networks, network optimization, and green networking. On these topics, he has published more than 100 peer-reviewed papers in international journal and conference proceedings, and won a Best Paper Award at the 4-th International Workshop on Green Communications (2011). He is a co-author of the book "IP Telephony Cookbook" (TERENA, 2004) and the author of the book "Voice over IP (VoIP): Aspetti architteturali e di progettazione" (Ed. Plus - Pisa University Press, 2006). Dr. Garroppo is a co-founder of NetResults srl, a spin-off company of the University of Pisa working on MoIP solutions and products. He is IEEE member since 1997.

Room and Schedule

Room: *Aula Riunioni del Dipartimento di Ingegneria dell'Informazione, Via G. Caruso 16, Pisa – Ground Floor*

Schedule:

11/12/2017 – 9.30-12.30 – 15.00-17.30

13/12/2017 – 9.30-12.30 – 15.00-17.30

14/12/2017 – 9.00-13.00 – 15.00-17.00

15/12/2017 – 9.30-12.30