

Observer® selected by Czech Republic's Brno University of Technology

Award-Winning Protocol Analyzer used for Laboratory Exercises in Practical Teachings of Network Troubleshooting Courses

Brno University of Technology, the second oldest and largest university in the Czech Republic, covers the whole spectrum of technical sciences: machine, civil and electrical engineering, architecture, chemistry, computer science, business and management, and design. With a student population of 15,000 and eight different technical faculty departments, the Brno University of Technology is known as the leading technical university in the Czech Republic.

The faculty at Brno University continually evaluates their course offerings to ensure students are receiving the correct blend of practical and theoretical instruction. To teach principles of network and networking analysis, the department uses the Observer protocol analyzer as their tool of choice for practical applications.

Networking courses are taught within the Department of Telecommunications, which belongs to the Faculty of Electrical Engineering and Communication (FEEC). This department, which studies predominately fixed and wireless data network technologies, is the largest at Brno University. Assistant Professor Karol Molnár teaches classical theoretical courses and practical-based courses in network engineering.

"Our department, which studies predominately fixed and wireless data network technologies, is the largest at Brno University," said Molnár. "The volume of practical oriented courses has gradually increased over the years, much to the delight of our students. 'Information Network Practice', a course that focuses on solving real problems of data networks, began in 2002. A significant part of this course is based on laboratory exercises where students use the Observer protocol analyzer. With Observer, we are able to teach our students how to understand and solve real-world networking problems."

The 'Information Network Practice' course contains laboratory exercises that can be divided into three main groups of activities. The first group introduces the basic functions of Observer. For example, students learn that when the Observer console is first initiated, they immediately receive vital network data for understanding network health.

"First we introduce the basic tools available in Observer, their basic configurations, and situations where these tools can be useful and problems these tools are able to solve," said Molnár. "These lab exercises mainly focus on network monitoring tasks, like finding Top Talkers, Communication Pairs, checking Bandwidth Utilization, Protocol Distribution, etc."


The second group of lab exercises deals with short-term and long-term analysis. For example, students learn to use Observer to recognize network trends and perform deeper error analysis. With Observer's robust filtering capabilities, students can easily sift through packet data and decodes for faster problem resolution.

"During these exercises, the use of Observer's filters – both capture filter and post-filter – is examined in detail," said Molnár. "Different types of address and protocol filters and their logic combinations are configured and evaluated."

The third group of exercises concerns capturing and decoding network traffic. Once the packet capture is performed, students are taught what packet features are important and worthy of further investigations.

"The students examine the packet capture tool, setup options, memory management options, implementation of filters in detail" said Molnár. "Traffic decoding makes up the most significant part of the laboratory exercise. This exercise is combined with other network service oriented exercises like installation and configuration of ftp and http servers. As a result the students have the possibility to analyze network traffic generated by their colleagues in the laboratory. The operation of basic control and end-user network services is analyzed. The corresponding messages are filtered out first and then the communication flow and protocol related data are examined at length."

By using Observer in the labs, the staff at Brno University is able to better illustrate the finer points of network troubleshooting and analysis. Molnár plans to continue using Observer and hopes to expand the networking courses.

"Since laboratory exercises based on Observer are so popular among students, we plan to extend the use of this application," said Molnár. "There are two more fields where we plan to implement Observer. The first one is complex WLAN network analysis and the second is utilization of the traffic generator tool available in Observer. The traffic generator will be used to stimulate Quality of Service related issues in our labs." 



Students study the Observer Packet Decode screen where packet conversations can be examined in detail. This screen shows packet header, decode and raw packet information. Observer offers the ability to view the packet decode in real-time for instant analysis.



With Observer's Pair Statistics Matrix, students can view all network conversations in one convenient map. The thickness of each line indicates the amount of data flowing between the stations.

About the Department of Telecommunications at Brno University of Technology

The department is responsible for education in the general subjects of the specialization Telecommunication Technology: communication theory, communication networks and systems, fundamentals of data communication, and programming of large-scale systems. In addition to these basic courses the teaching activities of the department cover transmission networks and their switching. Research activities are focused on telecommunication networks diagnostics, data communication systems, and digital signal processing. Research is also pursued in processing and transmission of signals for end telecommunication systems. Staff of the department are involved in the development of digital systems for defense and special filters for cable TV. The main fields of interest are: digital filters and applications of signal processors, conversion of analog and digital signals, security coding of digital signal transmission, low velocity transmission of speech signals with regard to nature and recognizability of the speaker, combined signal transmission via ISDN channel, synthetic high-order circuit elements, transmission networks based on ATM technology.

The main courses offered are: Signal Processing, Data Communication, Transmission Systems, Switching Systems, Telecommunication Systems Control and Programming, Microprocessor Application in Telecommunications, Measurement and Maintenance in Telecommunications, Transmission Lines and Optical Fibre Communications. Students work in laboratories and measurements are carried out on up-to-date telecommunication systems. Most courses also include computer work (digital signal processing, printed-circuits architecture, telecommunication systems and transmission systems architecture, modeling of the function of telecommunication systems and computer-aided circuit design).

About Network Instruments

Networks Instruments is the industry leading developer of distributed, user-friendly, and affordable network management, analysis and troubleshooting solutions. The award-winning Observer family of products combines a comprehensive management and analysis console with high-performance Probes to provide integrated monitoring and management for the entire network (Ethernet, Gigabit, Wireless, and WAN). All Network Instruments products are designed utilizing Distributed Network Analysis (NI-DNA™) architecture. With NI-DNA, the Observer solution set simplifies network troubleshooting and management, optimizes network and application performance and scales to meet the needs of any organization. Founded in 1994, Network Instruments is headquartered in Minneapolis, Minnesota with offices in London, Paris and throughout the USA with distributors in 50 countries. More information about the company, products, innovation, technology, NI-DNA, becoming a partner and NI University can be found at www.networkinstruments.com.

About the Brno University of Technology

Brno University of Technology (BUT) is the second largest and the second oldest technical university in the Czech Republic. It was founded in 1849 for technical, agricultural and commercial specializations. The languages of instruction were Czech and German. Electrotechnical disciplines were first taught in 1905. Since 1959, when the independent Faculty of Power Engineering was founded and subsequently transformed into Electrotechnical Faculty, over 22,000 students have graduated from the Faculty. When in 1993 the structure of the FECS was changed, it received a new name – Faculty of Electrical Engineering and Computer Science (FE ECS). BUT has seven technology facilities. The Faculty of Electrical Engineering and Computer Science became the third largest after the Faculty of Technology and the Faculty of Management joined to establish Tomáš Baťa University in Zlín.

A number of historical decisions were taken at FE ECS in 2001 in connection with the intended foundation of a new Faculty of Information Technology (FIT) and transformation of the Faculty of Electrical Engineering and Computer Science (FE ECS) into the Faculty of Electrical Engineering and Communication (FE EC). Organizational and economic activities concerned with the foundation of FIT and transformation of FE ECS into FE EC were crowned by the decision of the Rector of BUT to appoint Professor Radimír Vrba Acting Dean of FE EC and Professor Tomáš Hruška Acting Dean of FIT to 1 January 2002.

Students at the Brno University of Technology use the Observer protocol analyzer to analyze and review network traffic generated by colleagues. Practical Laboratory Exercises such as these better prepare students to deal with real-world networking issues.



(Photos Courtesy of Brno University)

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