Chapter 22

Legislation–Aware Privacy Protection in Passive Network Monitoring

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ABSTRACT

Passive network monitoring is very useful for the operation, maintenance, control and protection of communication networks, while in certain cases it provides the authorities with the means for law enforcement. Nevertheless, the flip side of monitoring activities is that they are natively surrounded by serious privacy implications and, therefore, they are subject to data protection legislation. This chapter’s objective is the investigation of the challenges related to privacy protection in passive network monitoring, based on a joint technical and regulatory analysis of the associated issues. After introducing the issue and its special characteristics, the chapter provides background knowledge regarding the corresponding legal and regulatory framework, as well as some related work. It then delves into the description of the legal and regulatory requirements that govern network monitoring systems, before providing an overview of a reference monitoring system, which has been designed with these requirements in mind.

DOI: 10.4018/978-1-61520-975-0.ch022

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INTRODUCTION

“On the Internet, nobody knows you are a dog” according to the famous Pat Steiner cartoon in The New Yorker in 1993, which has been very frequently cited in order to emphasize the potential for anonymity and privacy that the Internet was supposed to offer. However, the reality seems to be rather different and, among the several threats to personal privacy caused by the emerging Information and Communication Technologies, activities related to passive network monitoring hold an outstanding position. While extremely useful and important for purposes such as network operation, management, planning and maintenance, security protection (e.g., in terms of intrusion detection and prevention), scientific research based on real traffic traces, as well as law enforcement, network monitoring not only may lead to privacy violations but it is also surrounded by legal implications (see e.g., Sicker, Ohm & Grunwald, 2007). Indeed, as electronic communications increasingly proliferate in everyday life, privacy with all its facets is increasingly considered as a quality attribute of paramount importance. More than a century after the seminal essay identifying that privacy as a fundamental human right was endangered by technological advances (Warren & Brandeis, 1890), never before in history citizens have been more concerned about their personal privacy and the threats posed by emerging technologies (Gallup Organization, 2008) and, in this context, violations related to passive network monitoring and communications’ surveillance have started hitting the headlines and feed the citizens’ concerns. There are numerous documented mishaps; for instance, consider the U.S. National Security Agency’s warrantless wiretapping, secretly authorized by the Bush Administration (Risen & Lichtblau, 2005), or the major contemporary wiretapping scandal, that took place recently in Greece (Prevelakis & Spinellis, 2007).

As the privacy domain is increasingly becoming a legislated area, the activities bound to passive network monitoring have been the focus of several legal and regulatory initiatives worldwide. In addition, they constitute the subject of regulations that target at leveraging network monitoring in order to increase public security; such regulations often contradict with the requirement for privacy, imposing provisions for communications’ surveillance and data collection and retention and compromising the common expectation for privacy when communicating electronically. In that respect, legislation can have repercussions far beyond privacy concerns and can even damage governments’ reputation, as has been recently the case with the Swedish New Signal Surveillance Act law (Economist, 2008).

This chapter investigates the issue of privacy protection in the context of passive network monitoring from a joint regulatory and technical viewpoint. The next three sections provide some background information regarding, respectively, passive network monitoring and the entailed privacy concerns and challenges, some related work and the applicable legislation. Based on the latter and focusing on the European legislation that comprises the most mature framework worldwide, the chapter continues with the thorough description of the corresponding legal and regulatory requirements that should characterize a monitoring system. Before concluding, the chapter provides the overview of an innovative generic passive network monitoring system that has been conceived on the basis of the legislation and follows engineering practices that reflect the underlying requirements.

PASSIVE NETWORK MONITORING

Opposed to active monitoring that involves the injection of test packets in the network and the consequent measurement of their qualitative characteristics, the approach for communications network monitoring referred to as passive concerns the inspection of the actual network traffic using
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