Chapter 17

A Personalized Forest Fire Evacuation Data Grid Push Service: The FFED–GPS Approach

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ABSTRACT

Much work is under way in disaster reduction and emergency management towards the utilization of information and communication technologies (ICT) and the design of relevant services associated with risk management towards sustainable development and livelihood. Recent forest fires occurred in Southern Europe, caused environmental destruction and a number of fatalities. The effective and efficient production of forest fire evacuation plans requires decisions based on integrated data from heterogeneous and distributed sources that change over time very quickly. Recent ICT advances suggest the need for further work in the advanced evacuation systems area. We are particularly interested of how to automatically inform potential victims about the most relevant evacuation routes in the most-timely fashion so they can escape a forest fire safely. With this in mind, this chapter describes the concepts, architecture and implementation of the Personalized Forest Fire Evacuation Data Grid Push Service using data push and next generation grid technologies.

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INTRODUCTION

Recent forest fires in Southern Europe caused serious environmental destruction and a number of fatalities. In such cases, emergency response is very important and the effective and efficient management of response operations requires a number of information and communication technologies (ICT) and relevant collaborative computer-based systems to assist and bring together the intellectual and physical resources of different authorities and the sharing of accurate information in a timely manner. However, several obstacles arise in the design and implementation of such services (Bessis and Asimakopoulou, 2009).

In their report for the European Parliament, Bassi and Kettunen (2008) discussed the significant impact of forest fires in the environment, economy and society, as well as that the most affected state between 2000 and 2006 was Portugal, followed by Spain, Italy, Greece and France. In 2007, the situation was completely reversed. Greece recorded a maximum percentage of burnt area followed by Italy. The situation re-occurred in August 2009 with many fires in Greece, France and Portugal. At the time of writing there was little data available to present relevant to the 2009 destructions. Figure 1 shows the average burnt area between 2000 and 2006 and the total burnt area in 2007.

In previous works, we (Bessis and Asimakopoulou, 2008; 2009 and Bessis et al., 2009a; 2009b) have proposed the development of a grid technologies based service architecture encompassing a number of platform independent features such as support for real time data, resource access and integration from heterogeneous and distributed sources, flexible policies, expert input, assessment processes and simulation tools. To address these issues, this chapter describes the conceptualization, development and implementation of a personalized ‘forest fire evacuation data-based grid push service’ (FFED-GPS) as a means to automate the information integration, access, assessment and matchmaking processes. This in turn, will be used for the production of effective personalized evacuation routes in a timely manner, which can be made available to potential victims and thus, to timely receive and follow these personalized evacuation instructions.

With this in mind, the contributions of the chapter are to: (1) present a brief background review...