

Chapter 6

Preventing Health Risks Caused by Unhealthy Air Quality Using a CEP-Based SOA 2.0

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ABSTRACT

Air quality has been a recurrent issue in recent years since it can seriously impact citizens' health and their life quality. Nowadays, the different ways to provide end users with air quality information do not provide real-time data and lack accessibility. Besides, they do not automatically adapt to the particular circumstances of each citizen. In this chapter, an event-driven service-oriented architecture is proposed for detecting air quality changes in real time as well as making this information available to end users in a user-friendly way, notifying them with customized alerts upon detecting any potentially hazardous level for their health, thereby helping to prevent health risks.

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INTRODUCTION

Because of pollution, among other factors, air quality plays an essential role in citizens' health. Particularly, air quality may improve or worsen the effects of certain illnesses and even cause the death of specific risk groups (WHO, 2013). In this regard, air quality monitoring is a fundamental aspect for a significant increasing number of citizens, such as elder people, people doing sports outside, children playing outdoor, or people who suffer from heart disease or allergies to certain substances that they may inhale while breathing. Although these are risk groups, air quality affects all citizens in general to a greater or lesser extent in everyday life.

As well as the weather does, air quality changes very frequently. This is why being informed about the quality of air in real time is essential to prevent personal risks. Three major factors should be addressed when informing citizens about air quality:

1. Information should be available in real time,
2. Information should be accessible in an easy and user-friendly way,
3. Information should be customized depending on the specific circumstances affecting the person receiving it, e.g. pollution does not affect the same way allergic people than healthy young people without respiratory problems.

Currently, most providers of information about air quality are characterized by not supplying this information in real time (minute by minute), not offering information easily accessible to citizens or not providing information customized to the user context (CITEAIR, 2016; Comunidad de Madrid, 2016; CPCB - India, 2014; Department for Environment Food & Rural Affairs - UK, 2016a; EPA - US, 2016b; Government of Canada, 2016a; Travel China Guide - China, 2016). In order to tackle all these challenges, this chapter proposes that the citizens can reach information in a comfortable and easy way, also adapting such information to their particular needs.

To achieve this goal, the Event-Driven Service-Oriented Architecture (ED-SOA or SOA 2.0) defined by the authors in (Boubeta-Puig, Ortiz, & Medina-Bulo, 2015a) is adapted to prevent health risks from air quality by processing data coming from multiple information sources all over the world and notifying alerts to end users in real time when a health risk is detected. Based on the authors' experience in other application domains (Boubeta-Puig, Medina-Bulo, Ortiz, & Fuentes-Landi, 2012; Boubeta-Puig, Ortiz, & Medina-Bulo, 2014a, 2014b; Boubeta-Puig et al., 2015a; Gad, Boubeta-Puig, Kappes, & Medina-Bulo, 2012), they firmly believe that the use of technologies such as Internet of Things (IoT) and Complex Event Processing (CEP) and their integration with SOA 2.0 is key to address such challenges.

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