A Community of e-services for syndromic surveillance and early warning within the French Forces

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OBJECTIVE

Syndromic surveillance for early warning in military context needs a robust, scalable, flexible, ubiquitous, and interoperable surveillance system. A pilot project fulfilling these aims has been conceived as a collaboration of specialized web-services.

RATIONALE

In comparison with civilian syndromic surveillance systems, military syndromic surveillance is mainly characterized by mobility of the target population and a collaborative activity that involves many actors with supplementary activities and skills in several distant places (even different continents). A natural response is a network-centric architecture gathering the main functionalities of this kind of system, which are data acquisition and organization, data integration, confidentiality, and outbreak detection.

Taking in account these requisites and a specific activity analysis, the system has been framed into an agent-based distributed architecture. Four kinds of agents has been identified and implemented as web services in a dedicated and secured network: epidemiologic receivers (epidemiologic data servers), information processing devices (statistical or symbolic processing services), graphical user interface clients, and integration devices (interoperability services). The system benefits from several advantages of a web services architecture: system scalability, system heterogeneity, dynamic modifications, and resources optimization. In this architecture, epidemiological information remains on distant servers and is fetched as required by surveillance processes, with no need to store data in a main database before processing.

SYSTEM DESCRIPTION

A schematic overview of our pilot system, named ASTER ("Alerte et Surveillance en TEmps Réel"), is shown in Figure 1. It encompasses several surveillance networks, including "2SE FAG", which is installed within the Armed Forces in French Guiana (3000 people), even in mission in equatorial deep forest, since October 2004 [1]. The services are distributed across several locations dispersed worldwide.

This system uses the current standards for web services: XML, SOAP, WSDL and WSMO. Medical data exchange is based on the European standard ENV13606 and on specific ontologies.
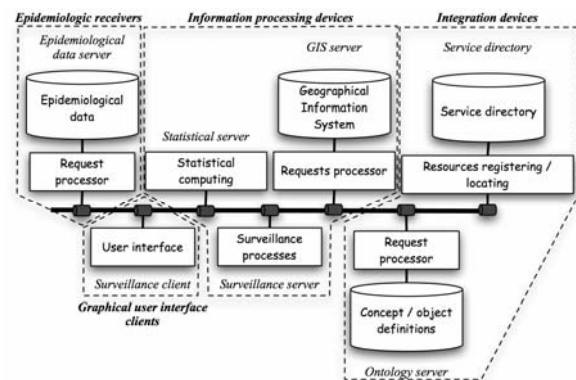

Figure 1: Schematic overview of CS³ showing the different categories of services.

Information processing devices gather services related to epidemiological event definition, surveillance orchestration and warning, temporal and spatial statistical analysis, and geographical representation.

RESULTS

This pilot system has been operational for several months. This system made possible a near real time surveillance of the population with a maximum of 10 minutes between a case declaration and its integration in the surveillance results. It has already allowed the early detection of several outbreaks, including two of dengue in last August and in last January, 15- 25 days before their confirmation by the local civilian Health Administration, and one of malaria, 1 week before its detection by the conventional military surveillance system.

REFERENCES

[1] Chaudet H., Meynard J.B., Texier G. and al. (2005). Distributed and Mobile Collaboration for Real Time Epidemiological Surveillance during Forces Deployments. Stud Health Technol Inform. 2005;116:983-8.

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