

The Crime and Corruption Observatory is part of a broader European project called FuturICT, which was the first of six “FET Flagship” pilots selected by the European Commission as part of the Framework 7 Programme.

The mission of FuturICT is to unleash the power of information for a sustainable future: a Living Earth Simulator will be built to understand and manage complex social systems, with a focus on sustainability and resilience. Within this framework, the Crime and Corruption Observatory will identify the underlying economical, social and cultural mechanisms that influence illegal phenomena, in order to control them at European level.

Addressing important issues, such as fighting against terrorism and organized crime, fraud detection, and maintaining internal and external security, certainly requires the use of modern technology, but this is not enough. Data must be transformed into information and then into knowledge, to reveal the real meaning of the billions of bits gathered worldwide. For this reason, behind Big



From BigData to virtual models of our society (image by courtesy of FuturICT)

Data lie Big Questions: the Crime and Corruption Observatory will identify fundamental issues about the dynamics of crime and their implications, developing solutions and innovative theories at the same time.

Data technology will thus become both responsive and responsible: it will provide not only practical answers but also reliable theoretical tools, since Big Data should always have underlying Big Questions.

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Managing Big Data through Hybrid Data Infrastructures

by Leonardo Candela, Donatella Castelli and Pasquale Pagano

Long-established technological platforms are no longer able to address the data and processing requirements of the emerging data-intensive scientific paradigm. At the same time, modern distributed computational platforms are not yet capable of addressing the global, elastic, and networked needs of the scientific communities producing and exploiting huge quantities and varieties of data. A novel approach, the Hybrid Data Infrastructure, integrates several technologies, including Grid and Cloud, and promises to offer the necessary management and usage capabilities required to implement the 'Big Data' enabled scientific paradigm.

A recent study, promoted by The Royal Society of London in cooperation with Elsevier, reviewed the changing patterns of science highlighting that science is increasingly a global, multidisciplinary and networked effort performed by scientists that dynamically collaborate to achieve specific objectives. The same study also indicated that data-intensive science is gaining momentum in many domains. Large-scale datasets come in all forms and shapes from huge international experiments to cross-laboratory, single laboratory, or even from a multitude of individual observations.

The management and processing of such datasets is beyond the capacity of traditional technological approaches based on local, specialized data facilities. They require innovative solutions able to simultaneously address the needs imposed by multidisciplinary collaborations and by the new data-intensive pattern. These needs are characterized by the well known three V's: (i) Volume – data dimension in terms of bytes is huge, (ii) Velocity – data collection, processing and consumption is demanding in terms of speed, and (iii) Variety – data heterogeneity, in terms of

data types and data sources requiring integration, is high.

Recent approaches, such as Grid and Cloud Computing, can only partially satisfy these needs. Grid Computing was initially conceived as a technological platform to overcome the limitations in volume and velocity of single laboratories by sharing and re-using computational and storage resources across laboratories. It offers a valid solution in specific scientific domains such as High Energy Physics. However, Grid Computing does not handle

