

Chapter 17

e-Infrastructures for Cultural Heritage Applications

Giuseppe Andronico
*Italian National Institute of
Nuclear Physics – Catania,
Italy*

Antonio Calanducci
*Italian National Institute of
Nuclear Physics – Catania,
Italy*

Alessandro De Filippo
University of Catania, Italy

Giuseppe De Gregorio
University of Catania, Italy

Gaetano Foti
University of Catania, Italy

Giuseppe La Rocca
*Italian National Institute of
Nuclear Physics – Catania,
Italy*

Giuliano Pelfer
University of Florence, Italy

Ferdinando Portuese
IR&T engineering srl, Italy

Monica Saso
University of Catania, Italy

Federica Tanlongo
Consortium GARR, Italy

Domenico Vicinanza
DANTE, UK

Roberto Barbera
*Italian National Institute of
Nuclear Physics – Catania,
Italy & University of Catania,
Italy*

Graziana D'Agostino
University of Catania, Italy

Francesco De Mattia
*Conservatory of Music of
Parma, Italy*

Alberto Falzone
NICE srl, Italy

Giulia La Ganga Vasta
University of Catania, Italy

Salvatore Simone Parisi
IR&T engineering srl, Italy

Pier Giovanni Pelfer
*Italian National Institute of
Nuclear Physics – Florence,
Italy*

Federico Ruggieri
*Italian National Institute of
Nuclear Physics – Roma Tre,
Italy*

Salvatore Scifo
Consorzio COMETA, Italy

Enzo Valente
Consortium GARR, Italy

ABSTRACT

e-Infrastructures, made of high-speed networks and geographically distributed multi-domain computing and storage resources, are nowadays supporting many virtual research communities from various scientific disciplines all over the world, allowing their applications to run at a scale of complexity which

DOI: 10.4018/978-1-60960-044-0.ch017

allows unprecedented studies of very important multi/inter-disciplinary problems. In this chapter the authors show how such platforms can also be beneficial for arts, humanities and cultural heritage at large. Some exemplary hardware infrastructures, middleware services, and software applications will be shown, in order to provide the readers with updated information on the state of the art approaches.

INTRODUCTION

Since the onset of the 21st Century, the way scientific research is carried out in many parts of the world is rapidly evolving to what is nowadays called e-Science, i.e. a “scientific method” which foresees the adoption of cutting-edge digital platforms known as e-Infrastructures throughout the process from the idea to the production of the scientific result. The e-Science vision is depicted in Figure 1.

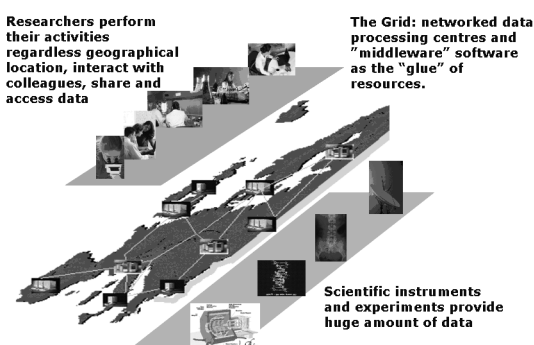
Scientific instruments are becoming increasingly complex, and produce massive amounts of data which are in the order of a large fraction of the whole quantity of information produced by all human beings through all means. These data often relate to inter/multi-disciplinary analyses and have to be studied by ever-increasing communities of scientists and researchers, called Virtual Organisations (VOs), whose members are distributed all over the world, and belong to different geographical, administrative, scientific, and cultural domains. The computing model which is emerging as a “de facto” standard to turn the above vision into reality is the so-called “Grid”,

i.e. a large number of computing and storage devices, interconnected by very high-bandwidth networks, on which a special software called middleware (acting as an interface between the hardware and the operating system and the codes of the applications) is installed, and make them behave as a single distributed supercomputer. Such virtual computing facility “dissolves” in the fabric of the Internet and can be accessed ubiquitously through virtual services and high-level user interfaces.

In this chapter, we will discuss e-Infrastructures and general purpose middleware services to create and operate digital repositories. The description of some exemplar use cases will help demonstrating the benefits their exploitation can bring to Arts, Humanities, and Cultural Heritage at large.

The chapter is organized as follows. Next section “e-Infrastructures and Their Services” will provide the definition and some declinations of the concept of e-Infrastructure. General purpose middleware services for high level user access, data management, and digital repositories’ creation and maintenance will be described in sections going from “The GENIUS Portal: a Grid Gateway for e-Science” to “The Transactional Grid Storage Access Framework”. Some success use cases, belonging to the Cultural Heritage domain, will be presented in sections going from “The ASTRA Project” to “The ArchaeoGRID Project”. Conclusions will then be drawn at the end of the chapter.

Figure 1. The “vision” of e-Science



E-INFRASTRUCTURES AND THEIR SERVICES

The grid and the underlying network constitute together what it is commonly referred to as an e-Infrastructure (see Figure 2).

27 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/infrastructures-cultural-heritage-applications/50278

Related Content

Resistance to Internet Banking Adoption in Tunisia: A Grounded Theory Approach

Wafa M'Sallemand Mohamed Nabil Mzoughi (2014). *International Journal of Technology and Human Interaction* (pp. 32-43).

www.irma-international.org/article/resistance-to-internet-banking-adoption-in-tunisia/119427

The Influence of Information Control upon On-line Shopping Behavior

Linwu Gu, Milam Aiken, Jianfeng Wang and Kustim Wibowo (2011). *International Journal of Technology and Human Interaction* (pp. 56-66).

www.irma-international.org/article/influence-information-control-upon-line/49668

Societal-Level Cross-Functional Matrix Management: With Artificial Intelligence Support

Shalin Hai-Jew (2020). *Maintaining Social Well-Being and Meaningful Work in a Highly Automated Job Market* (pp. 57-70).

www.irma-international.org/chapter/societal-level-cross-functional-matrix-management/253107

Development and Validation of the Technology Adoption and Gratification (TAG) Model in Higher Education: A Cross-Cultural Study Between Malaysia and China

A.Y.M. Atiquil Islam (2016). *International Journal of Technology and Human Interaction* (pp. 78-105).

www.irma-international.org/article/development-and-validation-of-the-technology-adoption-and-gratification-tag-model-in-higher-education/158143

Leading Change in Organizations by Incentivizing Teachers to Stimulate Motivation

Delia Elena Mateias (2013). *International Journal of Applied Behavioral Economics* (pp. 1-14).

www.irma-international.org/article/leading-change-in-organizations-by-incentivizing-teachers-to-stimulate-motivation/79134