AccessionIndex: TCD-SCSS-V.20190910.013
Accession Date: 10-Sep-2019
Accession By: Dr.Brian Coghlan
Object name: Portable Tools for Interoperable Grids
Vintage: 2009
Synopsis: Tordsson, J., PhD Thesis, ISBN 978-91-7264-754-1, Univ.Umea, Sweden.

Description:
This item is a Ph.D. thesis by Johan Tordsson from the University of Umea, Sweden, on the modular architectures and software for job and workflow management on computing Grids. For background literature on the worldwide computing Grid, see elsewhere in this catalog.

Many thanks to Brian Coghlan for donating this item.

The homepage for this catalog is at: https://www.scss.tcd.ie/SCSSTreasuresCatalog/
Click *'Accession Index'* (1st column listed) for related folder, or *'About'* for further guidance.
Some of the items below are more properly part of the other categories of this catalog, but are listed here for convenience.

Accession Index	Object with Identification
TCD-SCSS-V.20190910.013	Tordsson, J., Portable Tools for Interoperable Grids, PhD Thesis, ISBN 978-91-7264-754-1, Univ.Umea, Sweden, 2009.
TCD-SCSS-V.20190910.001	Ed: Foster, I., and Kesselman, C., The Grid: Blueprint for a New Computing Infrastructure, ISBN 978-1-55860-475-8, 1st edition, Morgan Kaufmann Publishers, San Francisco, 1999.

References:

1. Wikipedia, *Grid computing*, see:
https://en.wikipedia.org/wiki/Grid_computing
Last browsed to on 10-Sep-2019.

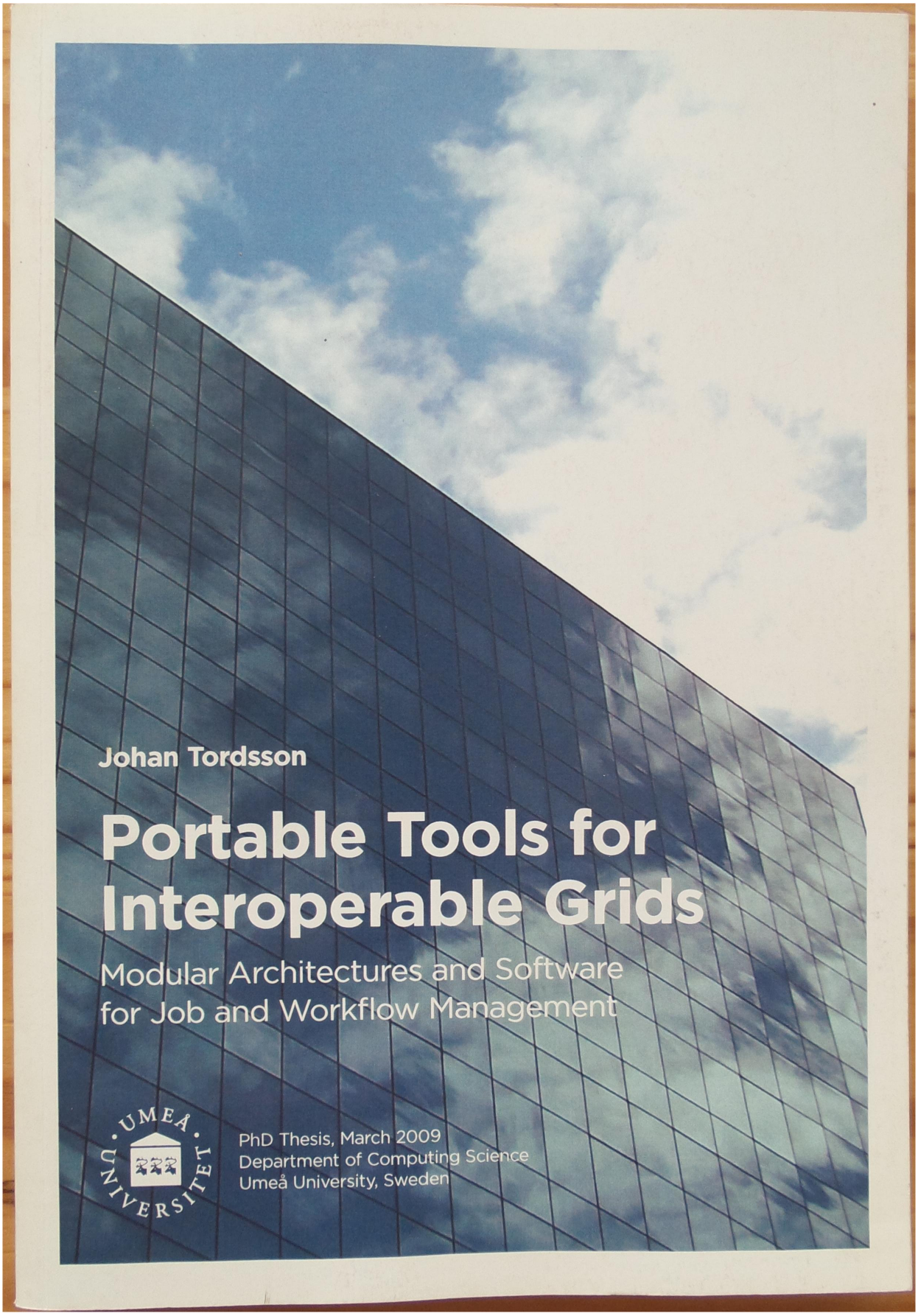

Figure 1: Portable Tools for Interoperable Grids, Front Cover

Portable Tools for Interoperable Grids

Modular Architectures and Software for Job and Workflow Management

Johan Tordsson

PhD Thesis, March 2009
Department of Computing Science
Umeå University
Sweden

Figure 2: Portable Tools for Interoperable Grids, Title Pages page 1

Department of Computing Science
Umeå University
SE-901 87 Umeå, Sweden

tordsson@cs.umu.se

ISBN 978-91-7264-754-1
ISSN 0348-0542
UMINF 09.08

Printed by Print & Media, Umeå University, 2009

Figure 3: Portable Tools for Interoperable Grids, Title Pages page 2

Abstract

The emergence of Grid computing infrastructures enables researchers to share resources and collaborate in more efficient ways than before, despite belonging to different organizations and being geographically distributed. While the Grid computing paradigm offers new opportunities, it also gives rise to new difficulties. This thesis investigates methods, architectures, and algorithms for a range of topics in the area of Grid resource management. One studied topic is how to automate and improve resource selection, despite heterogeneity in Grid hardware, software, availability, ownership, and usage policies. Algorithmical difficulties for this are, e.g., characterization of jobs and resources, prediction of resource performance, and data placement considerations. Investigated Quality of Service aspects of resource selection include how to guarantee job start and/or completion times as well as how to synchronize multiple resources for coordinated use through coallocation. Another explored research topic is architectural considerations for frameworks that simplify and automate submission, monitoring, and fault handling for large amounts of jobs. This thesis also investigates suitable Grid interaction patterns for scientific workflows, studies programming models that enable data parallelism for such workflows, as well as analyzes how workflow composition tools should be designed to increase flexibility and expressiveness.

We today have the somewhat paradoxical situation where Grids, originally aimed to federate resources and overcome interoperability problems between different computing platforms, themselves struggle with interoperability problems caused by the wide range of interfaces, protocols, and data formats that are used in different environments. This thesis demonstrates how proof-of-concept software tools for Grid resource management can, by using (proposed) standard formats and protocols as well as leveraging state-of-the-art principles from service-oriented architectures, be made independent of current Grid infrastructures. Further interoperability contributions include an in-depth study that surveys issues related to the use of Grid resources in scientific workflows. This study improves our understanding of interoperability among scientific workflow systems by viewing this topic from three different perspectives: model of computation, workflow language, and execution environment.

A final contribution in this thesis is the investigation of how the design of Grid middleware tools can adopt principles and concepts from software engineering in order to improve, e.g., adaptability and interoperability.

Figure 4: Portable Tools for Interoperable Grids, Abstract

Contents

Figure 5: Portable Tools for Interoperable Grids, Contents Pages page 1

Figure 6: Portable Tools for Interoperable Grids, Contents Pages page 2