Notice of the Final Oral Examination
for the Degree of Master of Science

of

MATTHEW HEMMINGS

BSc (University of Victoria, 2014)

“Thin Client Collaborative Visualizations Using the Distributed Cloud”

Department of Computer Science

Thursday, June 23, 2016
9:30 A.M.
Engineering and Computer Science Building
Room 468

Supervisory Committee:
Dr. Ulrike Stege, Department of Computer Science, University of Victoria (Co-Supervisor)
Dr. Yvonne Coady, Department of Computer Science, UVic (Co-Supervisor)
Dr. Rick McGeer, Department of Computer Science, UVic (Member)

External Examiner:
Dr. Niky Riga, GENI Project Office, Raytheon BBN Technologies

Chair of Oral Examination:
Dr. Jane Ye, Department of Mathematics and Statistics, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

This thesis describes the research, design, implementation, and evaluation of a collaborative visualization system that models large data sets in thin clients using the Lively Web development environment. A thin client is a computing device with light resources, depending heavily on remote computational resources for any large scale data processing. A thin client could be a cellular phone, a tablet or a laptop with insufficient resources to perform heavy computing locally. The applications of this technology form part of a new class of application where large data sets are being visualized and collaborated on with low latency where the users are geographically separated. The primary motivation of this research is to show that large data sets can be viewed and interacted with on any device, regardless of geographic location, in collaboration with other users with no setup required by the user. In addition, it shows the strengths of the Lively Web in developing impressive thin-client visualizations in a flexible, straight-forward manner. For deployment, Lively Web servers are brought up using docker containers on the distributed cloud using virtual machines allocated by the Global Environment for Network Innovations (GENI) and Smart Applications on Virtual Infrastructure (SAVI) networks.