Mapping Unikernels with TAG based architectures



Akilan Selvacoumar

Mathematics and Computer Sciences Heriot Watt University

> Year 1 progression report of: Doctor of Philosophy



Declaration

I hereby declare that except where specific reference is made to the work of others, the contents of this dissertation are original and have not been submitted in whole or in part for consideration for any other degree or qualification in this, or any other university. This dissertation is my own work and contains nothing which is the outcome of work done in collaboration with others, except as specified in the text and Acknowledgements. This dissertation contains fewer than 65,000 words including appendices, bibliography, footnotes, tables and equations and has fewer than 150 figures.

Akilan Selvacoumar October 2022

Acknowledgements

And I would like to acknowledge ...

Abstract

This is where you write your abstract ...

Table of contents

List of figures

List of tables

Introduction

Motivation

Research Questions

Literature Review

The literature review is split into 3 sections. The first section talks about the papers surveyed for Unikernels and the 2nd section talks about papers surveyed for TAG based architectures and the third sections talks about the possible incentives of combining them both which helps answer the research questions stated (TODO: Add reference to research question section).

4.1 TAG based architecture survey

The following was a survey conducted on exisisting TAG based implementations and the recent survey based on TAG based architectures (//TODO add survey reference) published in 2022 was a good staring point to understand about various implementations of TAG based architectures with the high level metrits and limitations. The following section provides our own version of the Survey to help decide the best implementations to answer the research questions (//TODO reference research questions chapter).

According to the TAG based architecture survey (//TODO add survey reference) there are 37 published efforts on TAG based architectures over the past decade and 20 published efforts preceding that.

4.1.1 Timder

Test text ??

4.1.2 ARM MTE

... and some more ...

8 Literature Review

- 4.1.3 **D-RI5CY**
- **4.1.4** TMDFI
- 4.1.5 HyperFlow
- 4.1.6 SDMP
- 4.1.7 Typed Architecture
- **4.1.8** Dover
- **4.1.9** Shakti-T
- 4.1.10 HDFI
- **4.1.11 lowRISC**
- 4.1.12 Taxi
- 4.1.13 Pump
- 4.1.14 CHERI
- 4.1.15 SPARC M7/M8 SSM
- 4.1.16 Low-Fat Pointers
- 4.1.17 **SAFE**
- 4.1.18 DataSafe
- **4.1.19** Harmoni
- 4.1.20 Shioya, et al.
- 4.1.21 SIFT
- 4.1.22 FlexCore
- **4.1.23** Execution Leases
- **4.1.24** GLIFT
- 4.1.25 TIARA
- **4.1.26 DIFT Coprocessor**
- 4.1.27 HardBound

Expirements

Research Goals

Research Timeline

Conclusion