Popper 2.0: A Container-Native Workflow Execution Engine For Testing Complex Applications and Reproducing Scientific Explorations

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Abstract—Abstract

I. INTRODUCTION

II. MOTIVATION

III. POPPER 2.0

A. Background

1) Docker:

2) Singularity:

3) Podman:

4) Slurm:

5) Kubernetes:

B. Workflow Defination Language

C. Workflow Execution Engine

1) Command line interface (CLI):

2) Workflow Runner:

3) Resource manager API:

4) Container engine API and plugins:

IV. CASE STUDY

1) Single-Node local workflow execution:

2) Workflow execution in the Cloud using Kubernetes:

3) Exascale workflow execution in SLURM clusters:

V. RESULTS

A. System Resource Usage

B. Overheads

VI. RELATED WORK

1) Workflow defination languages:

2) Generic workflow execution engines:

3) Container native workflow execution engines:

VII. CONCLUSION

A. Benefits

B. Challenges

C. Learning Curve

VIII. FUTURE WORK

IX. REFERENCES