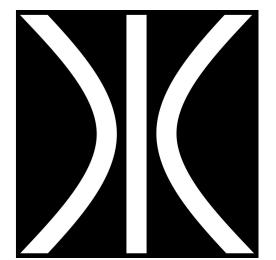


Agent-Oriented Programming for Modern Cyber-Infrastructures

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Introduction

- Importance of data in all domains of human activity has brought the requirement for more complex data-sharing Cyber-Infrastructures.
- These Infrastructures exhibit the double status of *computational* and *social* systems and regulating them requires higher level reasoning.
- Agent Oriented Programming (AOP) is extensively studied and used for modeling and simulation of social systems.
- The AgentScript Cross-Compiler (ASC) is built to bridge the modelling power of AOP with operational requirements

Summary

This work introduces AgentScript Cross-Compiler (ASC):

- Provides a high level DSL agent programming language
- A Cross-Compiler to translate the Agent DSL into executable code.
- Allows use of modern development tools such as Testing, Debugging and Profiling.
- Enables seamless deployment into modern infrastructures with minimum runtime dependencies and transport-layer agnostic communication.

of modern Complex Cyber-Infrastructures

AgentScript's Compile, Build and Deploy Process

Agent's Script

Off-the-shelf development tools • Test tools: JUnit, ScalaTest, etc.

- Debuggers
- Profilers: Flight Recorder, etc.

High Level Logic-Based DSL motivated by AgentSpeak(L)

• Intuitive modelling of social agents

- Readable and Verifiable DSL
- Enables logical reasoning

• Off-the-shelf build tools: o sbt, maven • Standard CI/CD operations

Scala/Java Presentation of the Agent's Script

• Stand-alone Application • Only Requires a JVM to execute

• Can use containerization tools for seamless deployment: docker, k8s

JVM-Based ByteCode Presentation of the Agent's Script

Verifiable via ByteCode verification tools: JPF

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• Agent's communications are Transport layer agnostic • Enables plugins for interoperability rest, amqp, kafka, etc.

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