**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 of modern Complex Cyber-Infrastructures

### 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.

### AgentScript’s Compile, Build and Deploy Process

- **Off-the-shelf development tools**
  - Test tools: JUnit, ScalaTest, etc.
  - Debuggers
  - Profilers: Flight Recorder, etc.

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

- **Verifiable via ByteCode verification tools:** JPF

- **Scala/Java Presentation of the Agent’s Script**

- **JVM-Based ByteCode Presentation of the Agent’s Script**

- **Agent’s Script**

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

  - Intuitive modelling of social agents
  - Readable and Verifiable DSL
  - Enables logical reasoning

- **Agent’s communications are Transport layer agnostic**
- Enables plugins for interoperability
  - rest, amqp, kafka, etc.

- **Stand-alone Application**
  - Only Requires a JVM to execute
  - Can use containerization tools for seamless deployment: docker, k8s

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