CS 744: RAY
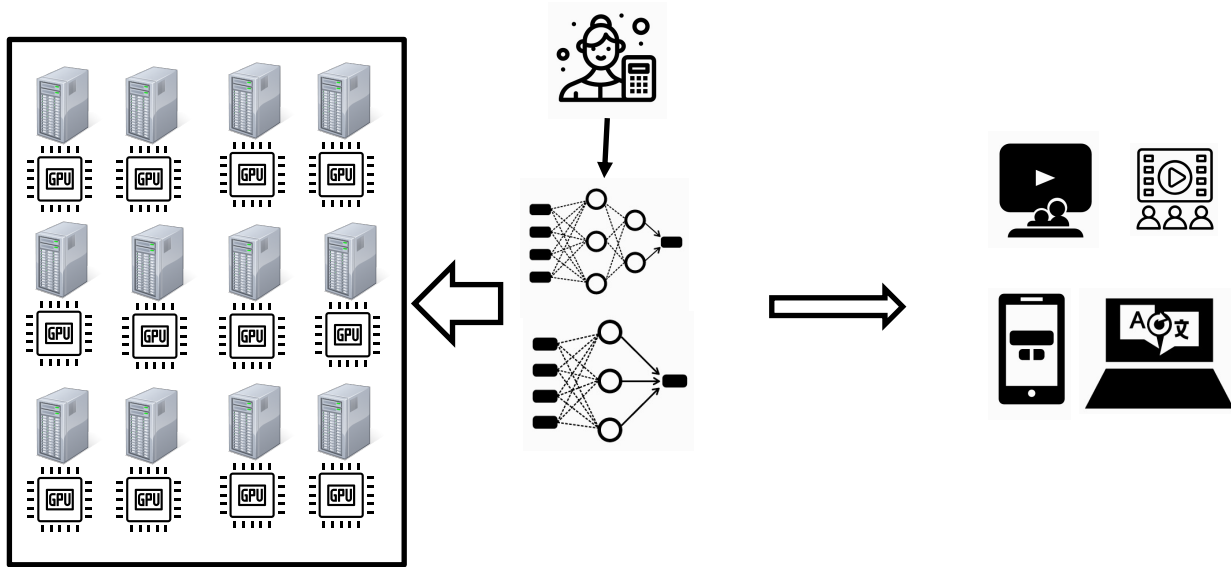
Shivaram Venkataraman

Fall 2021
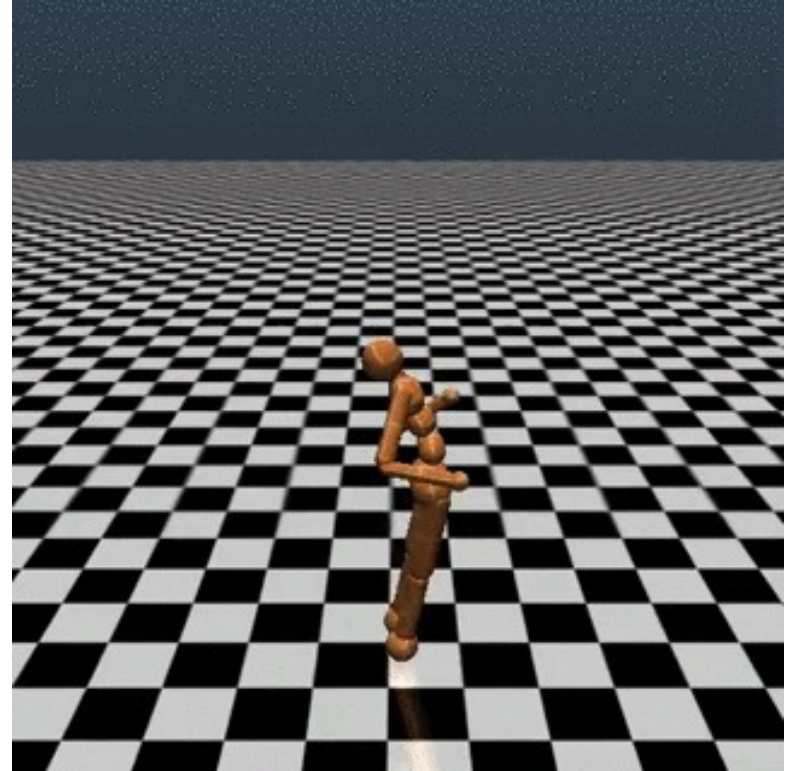
ADMINISTRIVIA

- Assignment Two: Due tonight!
- Project proposal aka Introduction (10/25)

    Introduction
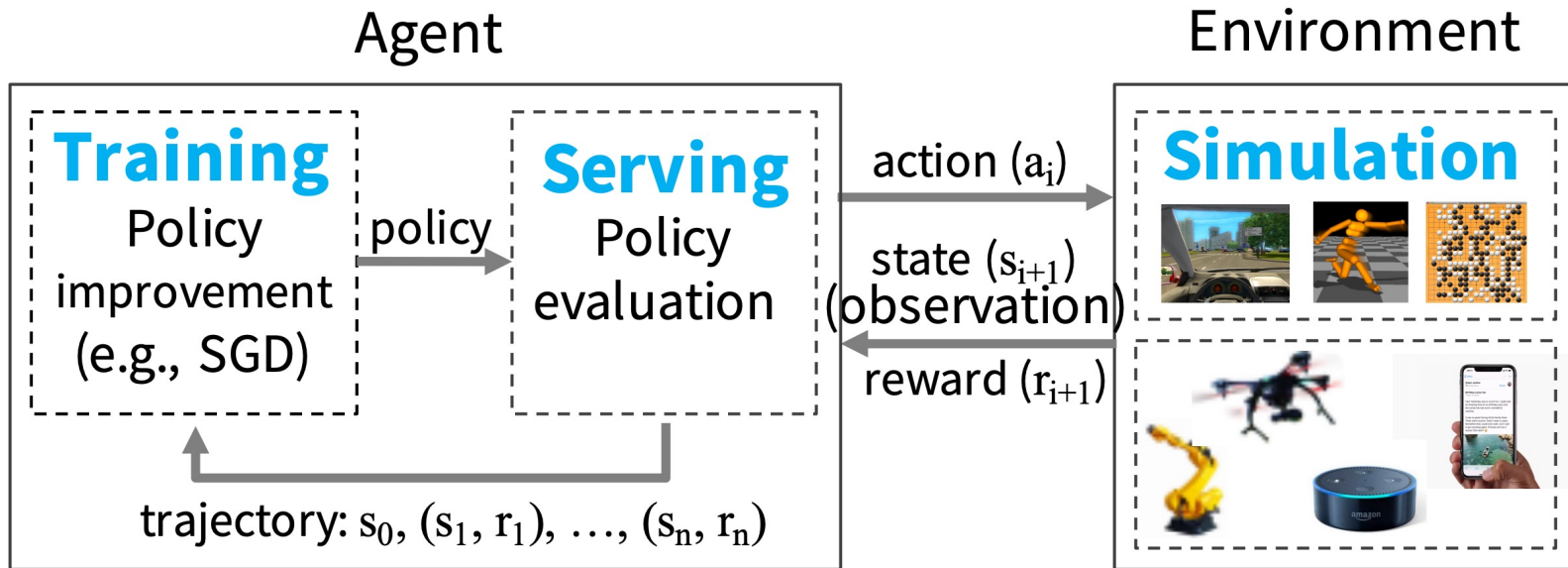
    Related Work

    Timeline (with eval plan)

MACHINE LEARNING: STACK

REINFORCEMENT LEARNING: APPLICATIONS

RL SETUP

Agent

Environment

Training
Policy improvement (e.g., SGD)

policy

Serving
Policy evaluation

action (a_i)

Simulation

state (s_{i+1})
(observation)

reward (r_{i+1})

trajectory: s_0, (s_1, r_1), …, (s_n, r_n)

RL REQUIREMENTS

Simulation

Training

Serving

RAY API

Tasks

Actors

```
futures = f.remote(args)
```

```
Class.remote
actor.method.remote
```

```
objects = ray.get(futures)
ready = ray.wait(futures, k,timeout)
```
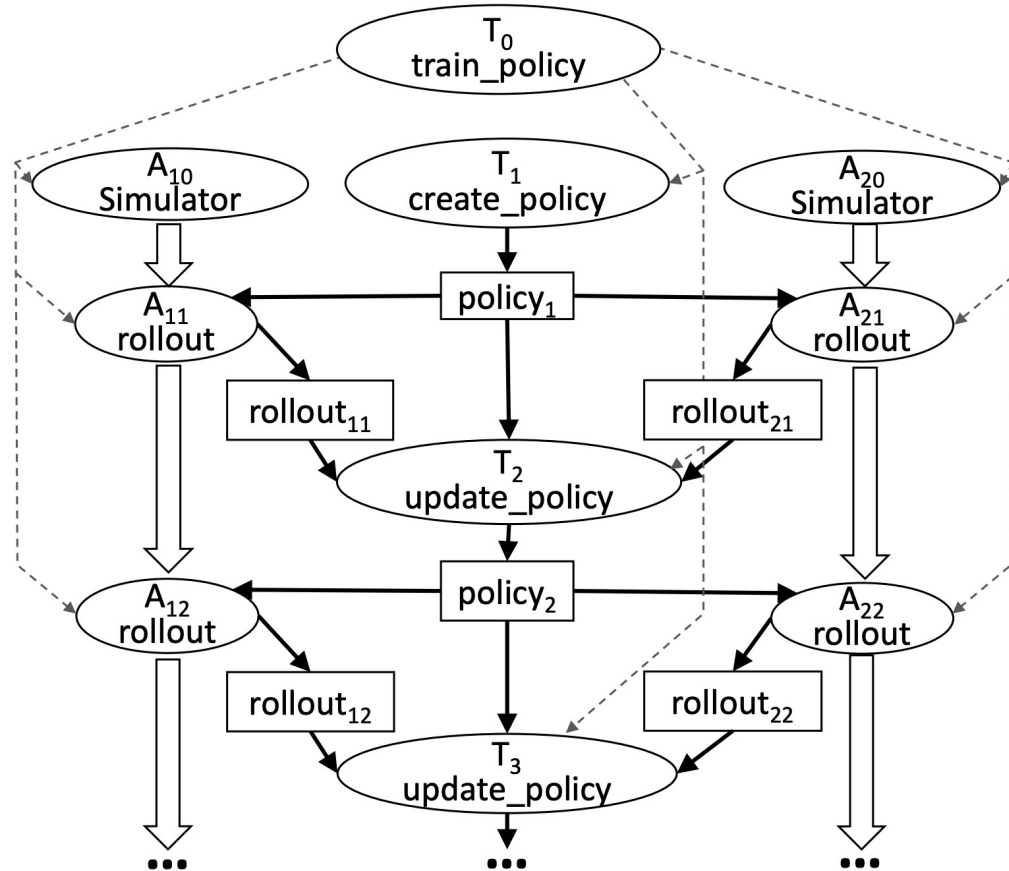
RAY API

Tasks

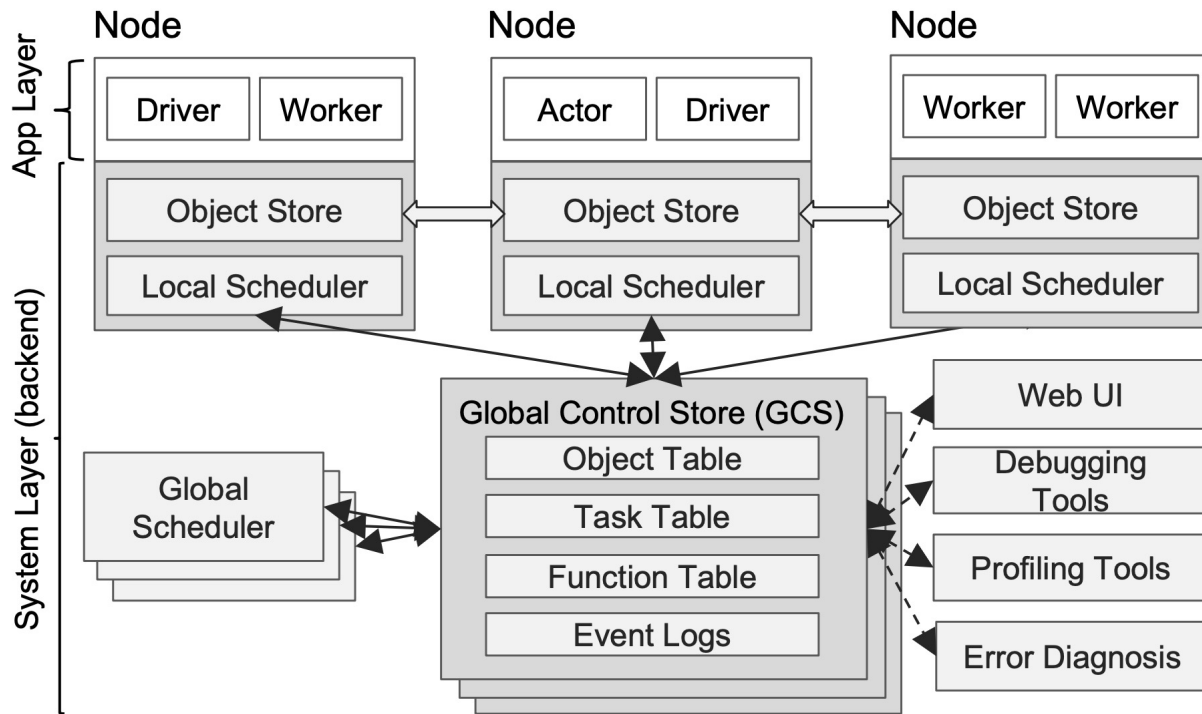Actors

```
futures =
  f.remote(args)
```

```
actor = Class.remote(args)
futures = actor.method.remote(args)
```

```
objects = ray.get(futures)
ready = ray.wait(futures, k,timeout)
```
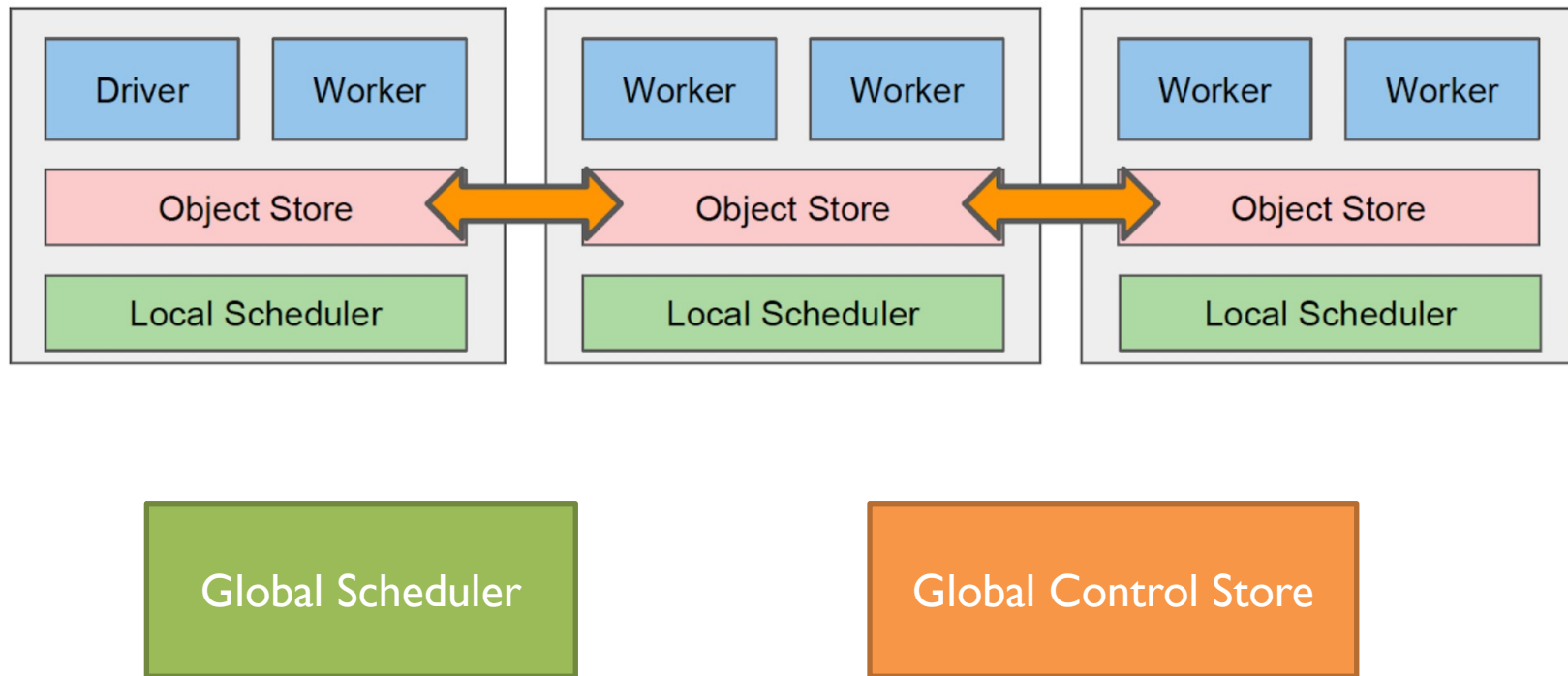
COMPUTATION MODEL

ARCHITECTURE

GLOBAL CONTROL STORE

Object table

Task table

Function table

RAY SCHEDULER

FAULT TOLERANCE

Tasks

Actors

GCS

Scheduler

SUMMARY

Ray: Unified system for ML training, serving, simulation

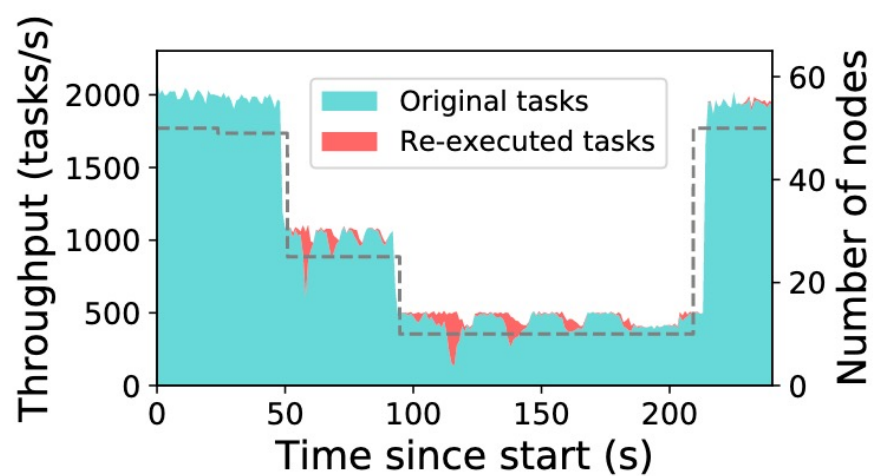Flexible API with support for

      Stateless tasks

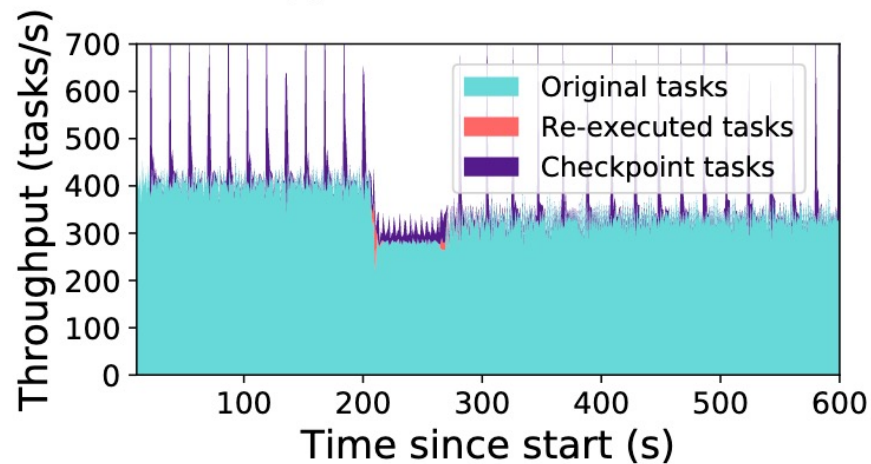   Stateful Actors

Distributed scheduling, Global control store

DISCUSSION

https://forms.gle/MnsCJA87CVhMmShs8

Consider you are implementing two apps: a deep learning model training and a sorting application. When will use tasks vs actors and why ?

(a) Task reconstruction

(b) Actor reconstruction

NEXT STEPS

Next class: Pollux