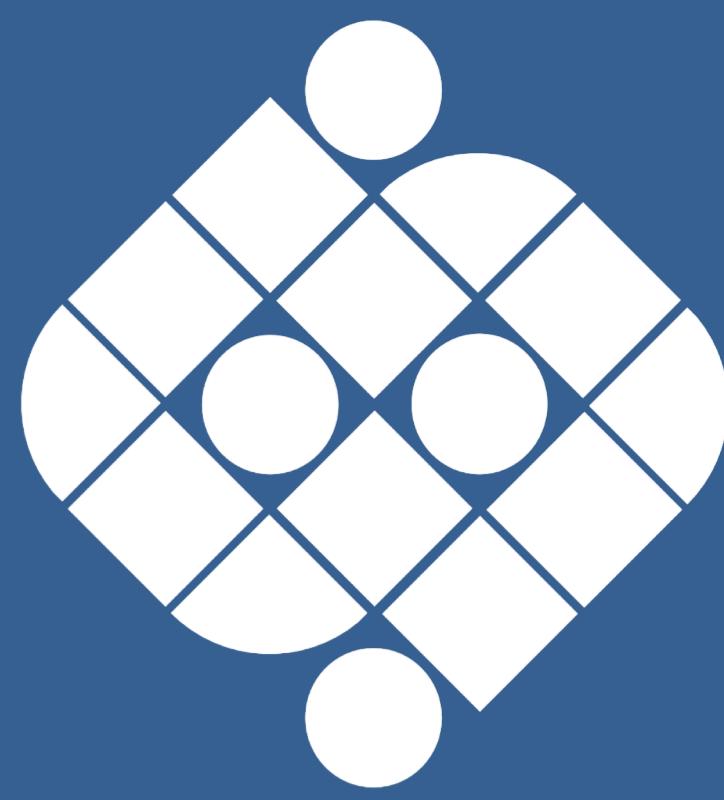




# System Call Interception for Serverless Isolation

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## Introduction

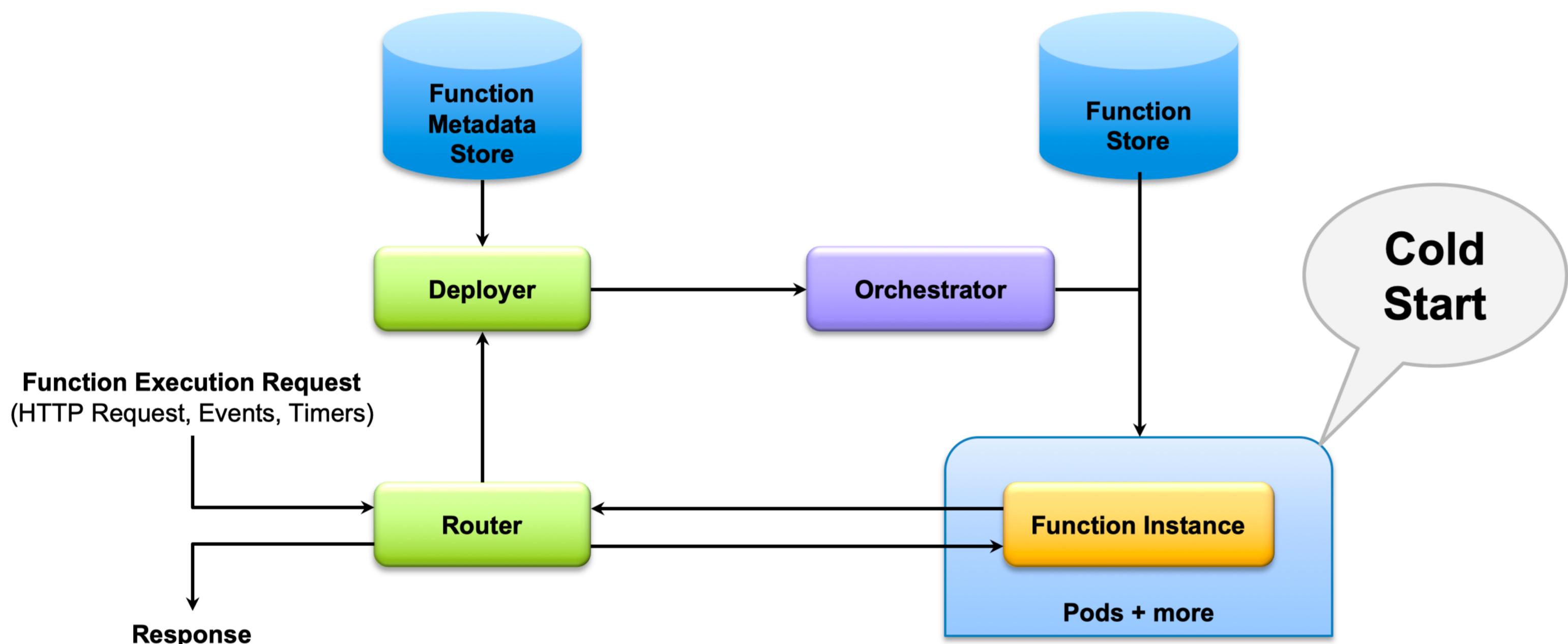
- Majority of Serverless platforms use containers for isolation.
- These type of platforms suffer from *Cold Starts* problem.
- Language based solutions exists but are restrictive.
- Worst case scenario: all requests suffer cold start latency.

## Contribution

- Designed novel serverless architecture mitigating cold starts.
- It is also language agnostic in nature.

## Cold Starts?

- After a stipulated time with no request, orchestrator stops the containers serving those requests.
- Any new request needs to wait for the container to start which adds to response time.



## Isolation Guarantees

- Function - Function isolation
- Function - Host isolation
- Limits on resource utilization (Ongoing)

## Epiphany

- “Every resource access goes through syscalls”

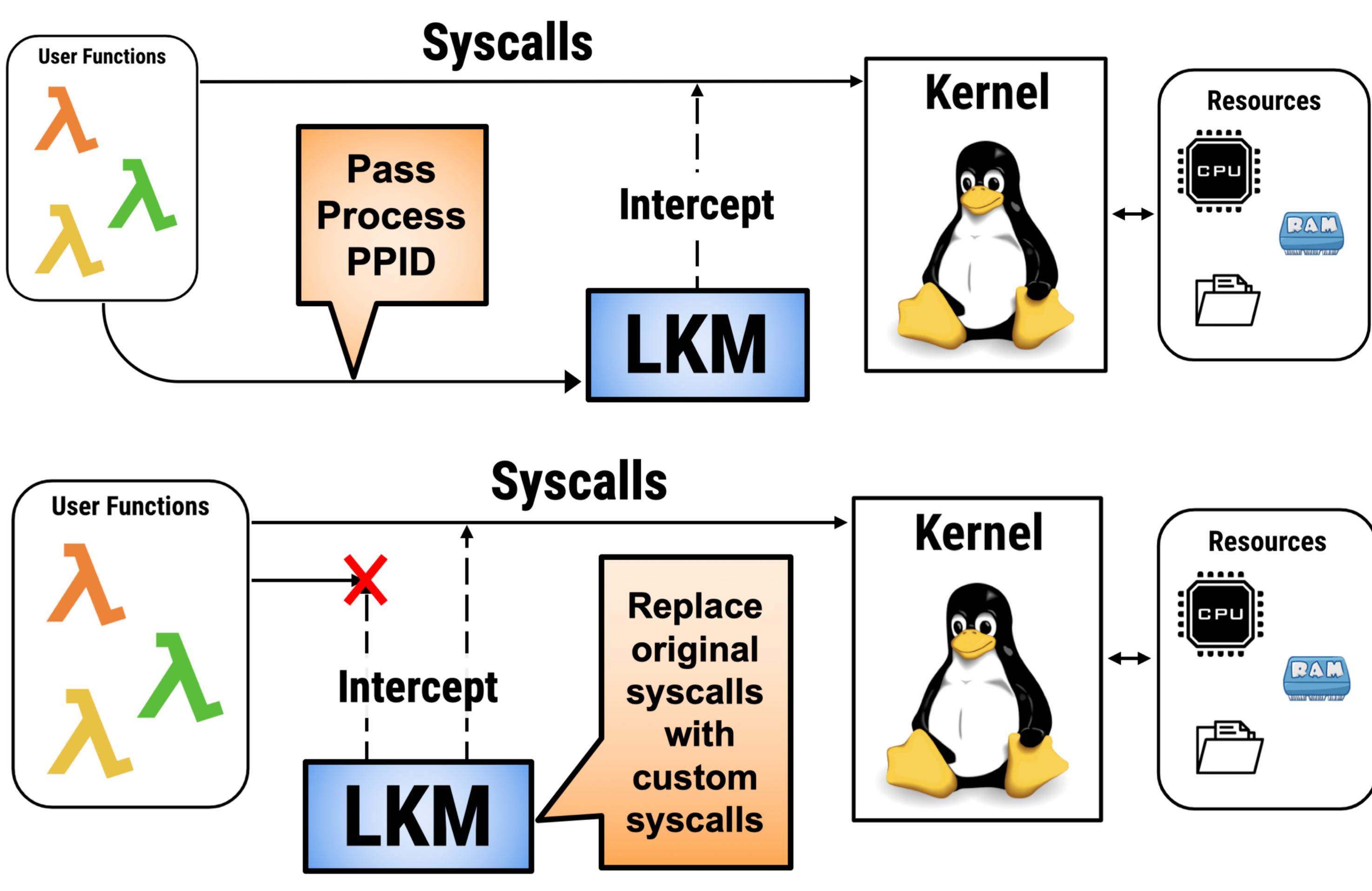
## Proposed System

Our model has 2 components :

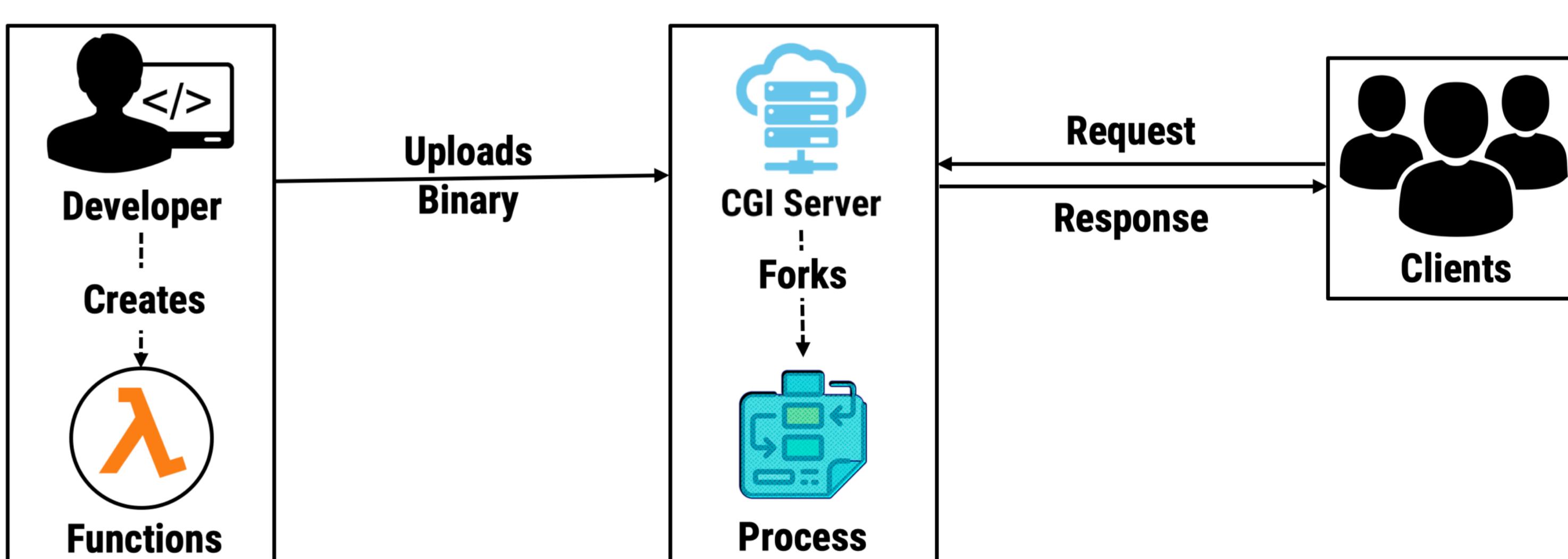
- NOVA Interceptor
- NOVA Gateway

### NOVA Interceptor

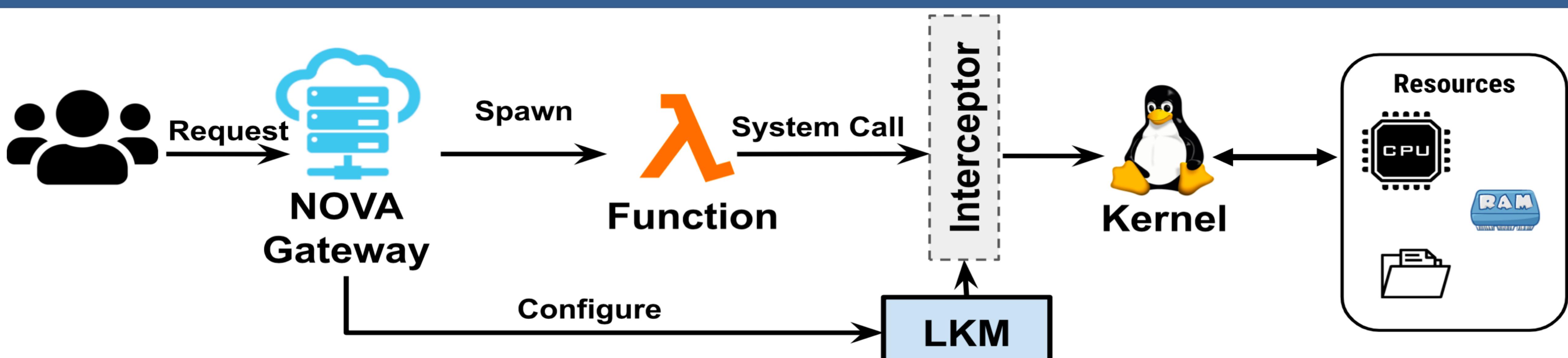
- Replaces syscall table entries with custom syscalls (LKM).
- Intercepts syscalls selectively based on process PPID.
- Custom syscalls act as wrapper over original syscalls.



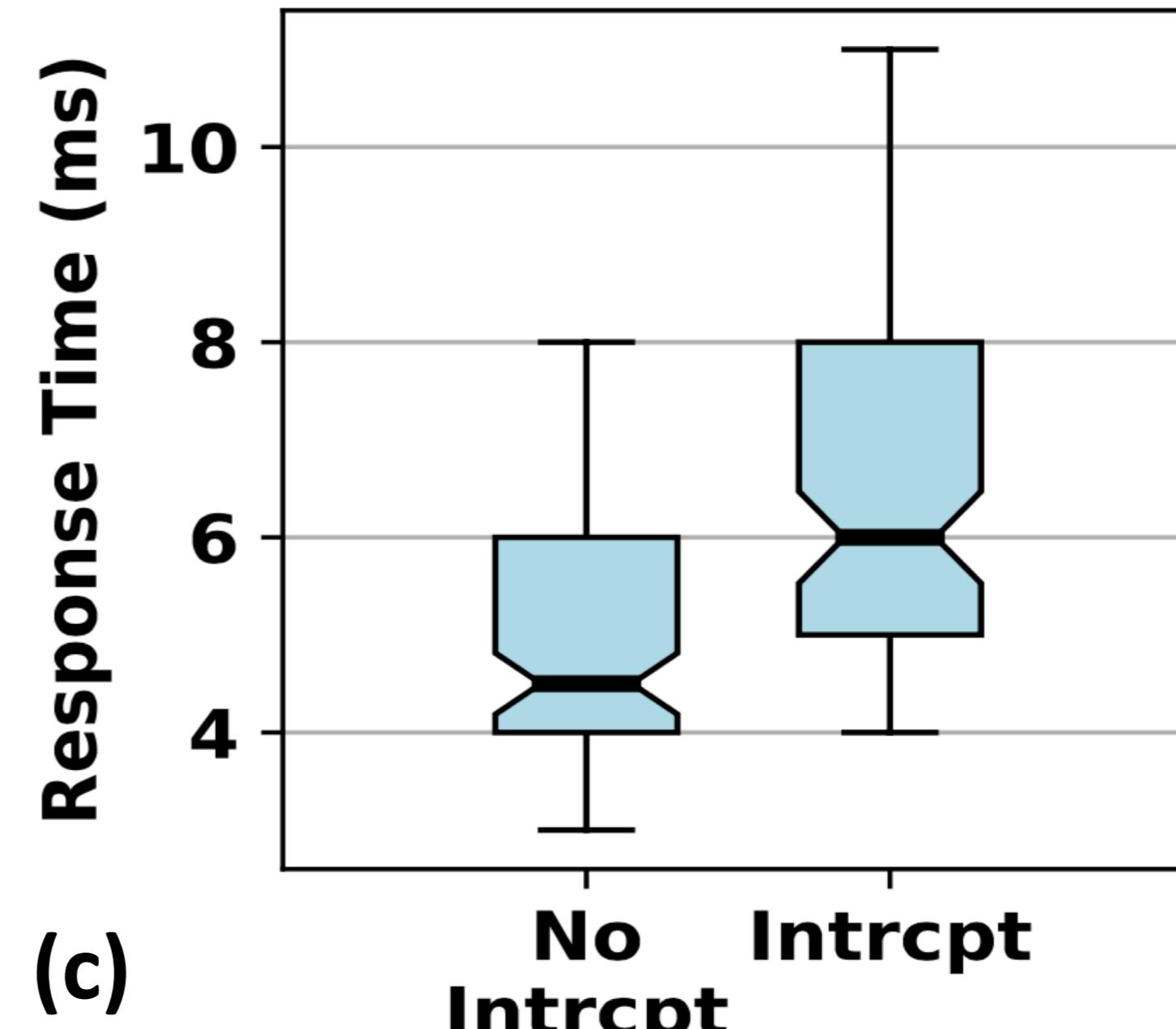
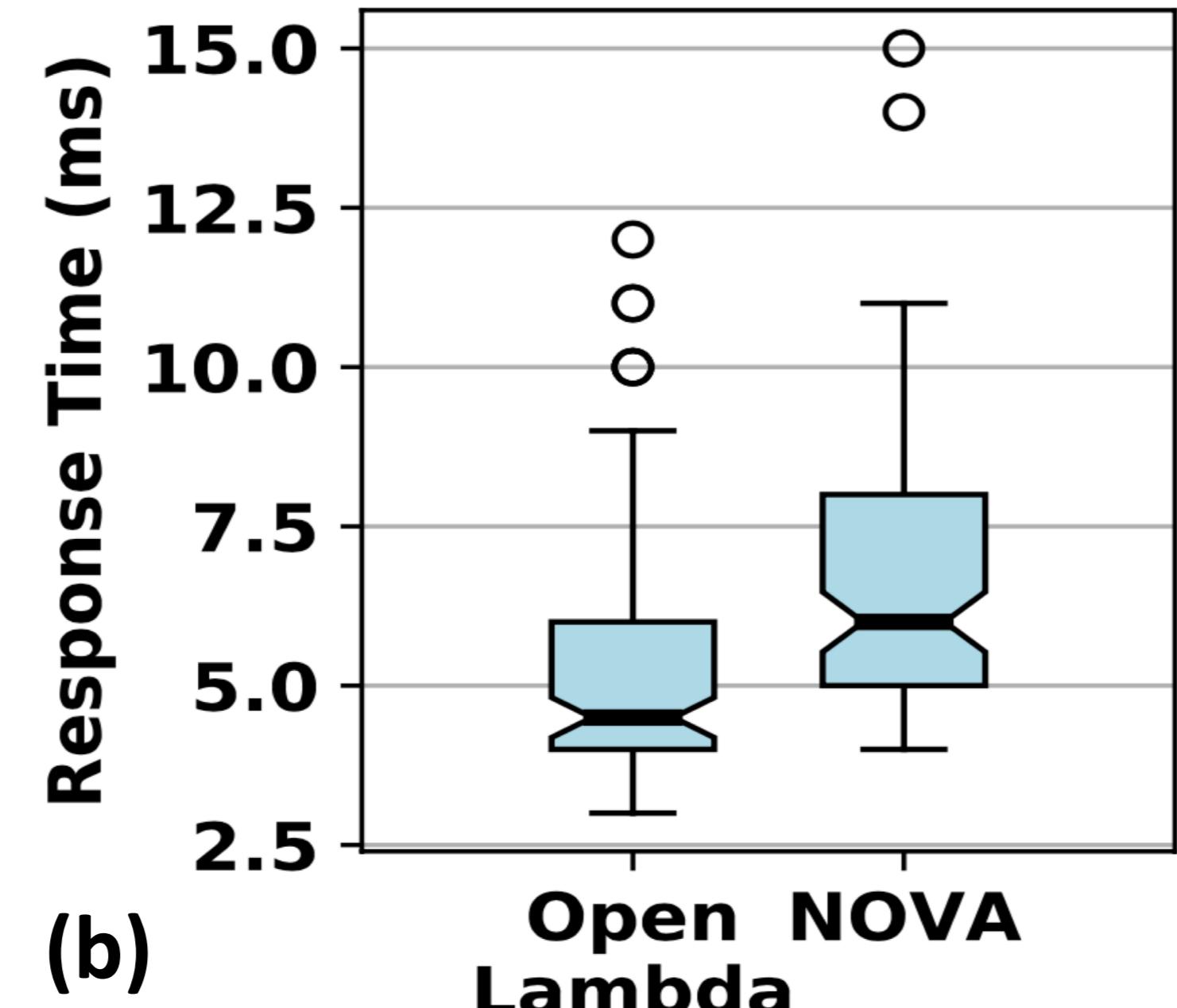
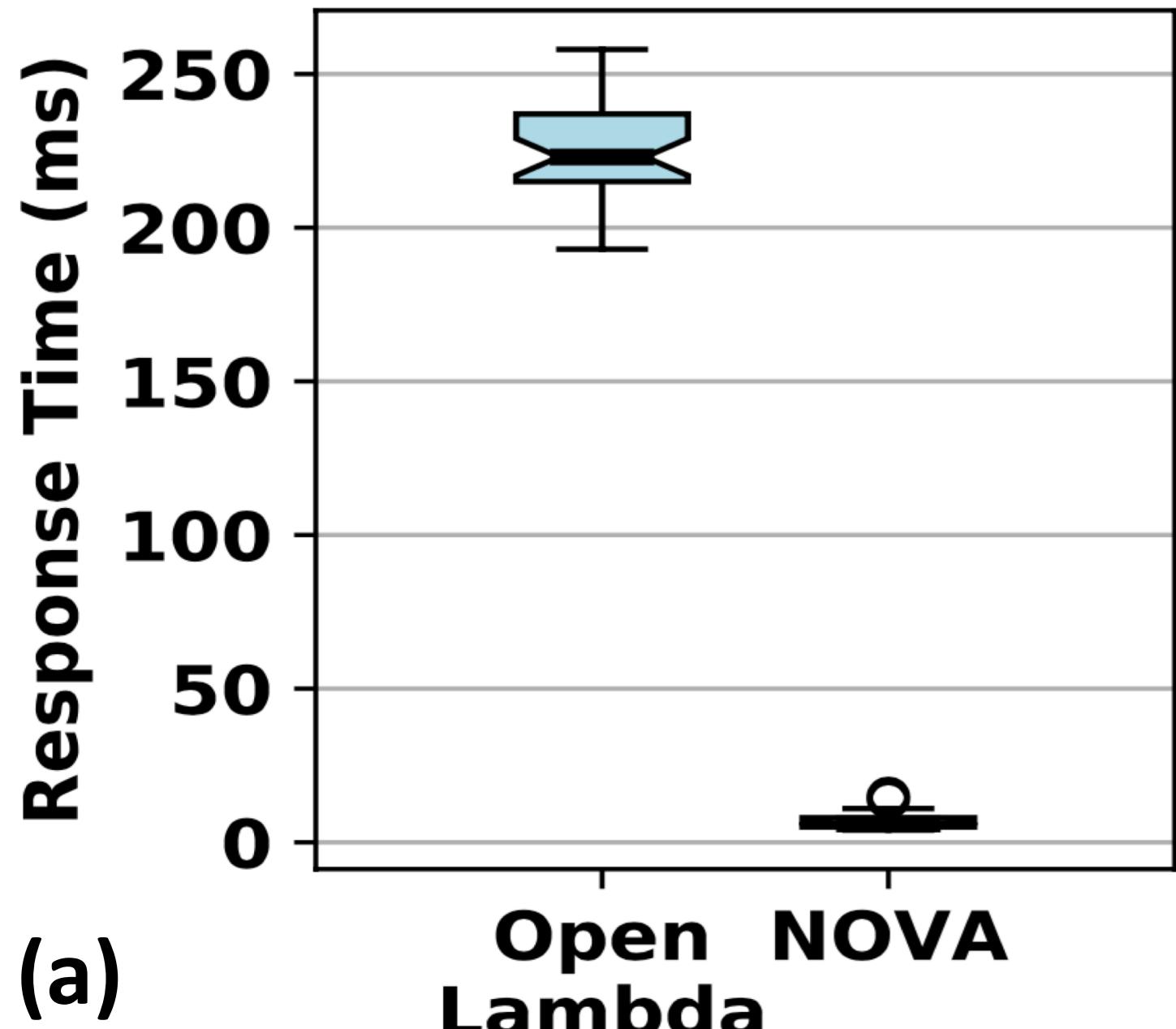
### NOVA Gateway



## Complete Picture



## Preliminary Results



Response time during  
(a) cold-start and  
(b) normal operations;  
(c) Overhead due to  
system call interception