# VM Analysis – Episode 4

## Wait analysis of virtualized environments using host kernel tracing

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# Agenda

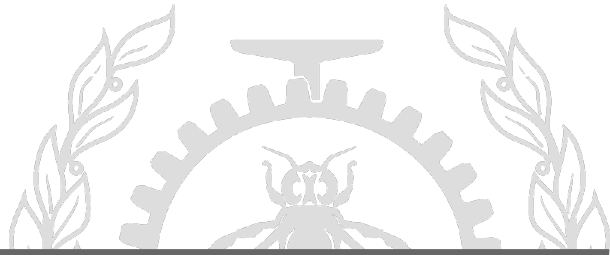
## Introduction

- Research update and research motivation

## New Investigations

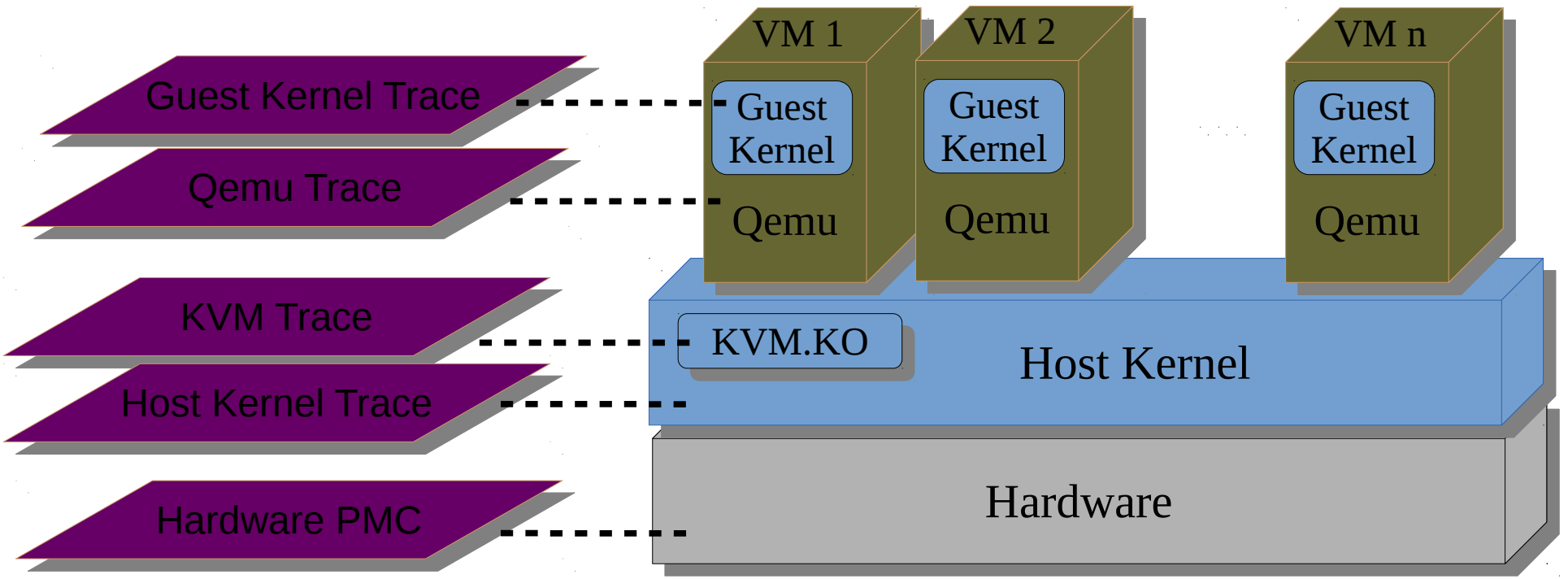
- Wait analysis of virtualized environments using host kernel tracing
  - Sate of the art
  - Proposed Algorithm
  - Demo
- KVM-Tool for eBPF

## Conclusion and in-progress



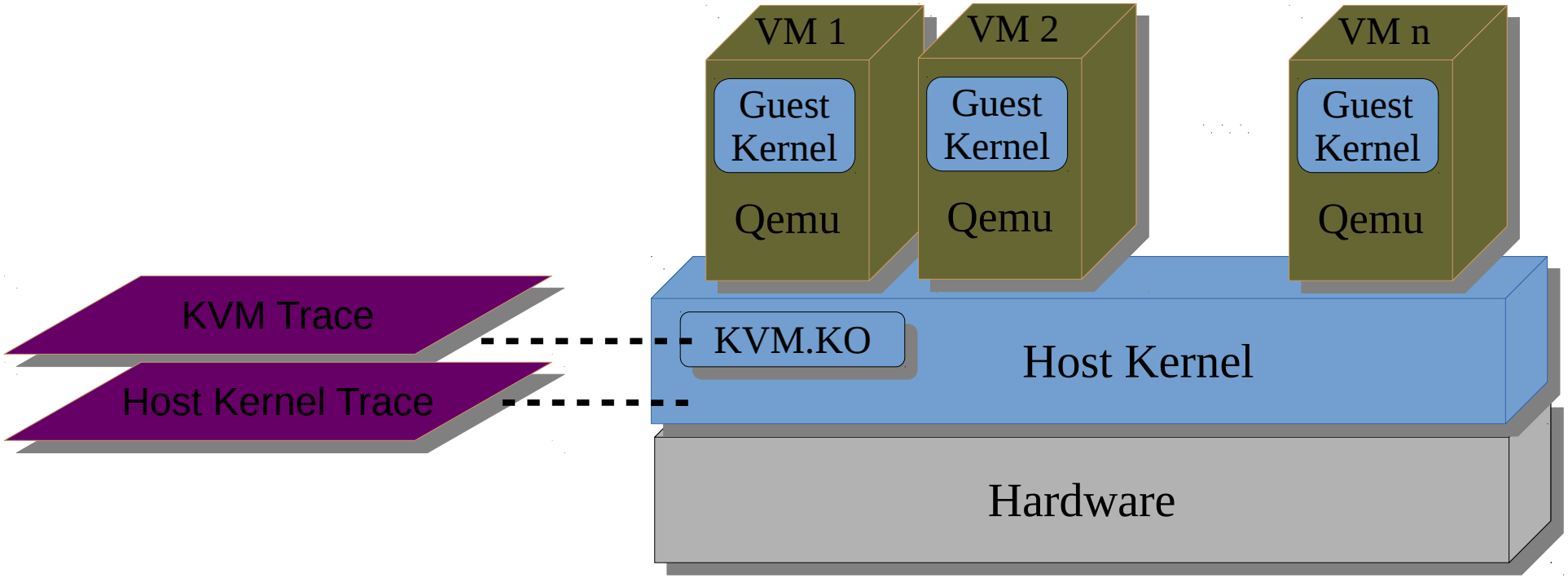
# Previously on “VM Analysis”

## Available Trace-Points in different layers



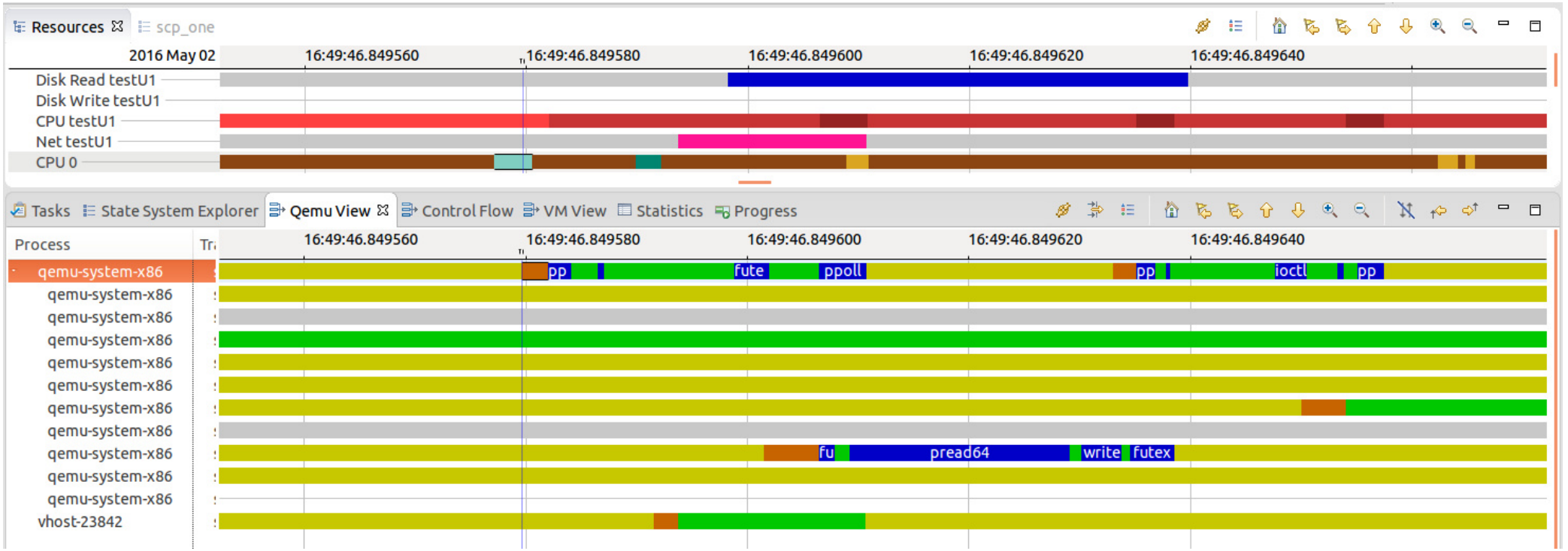
# Previously on “VM Analysis”

## Available Trace-Points in different layers



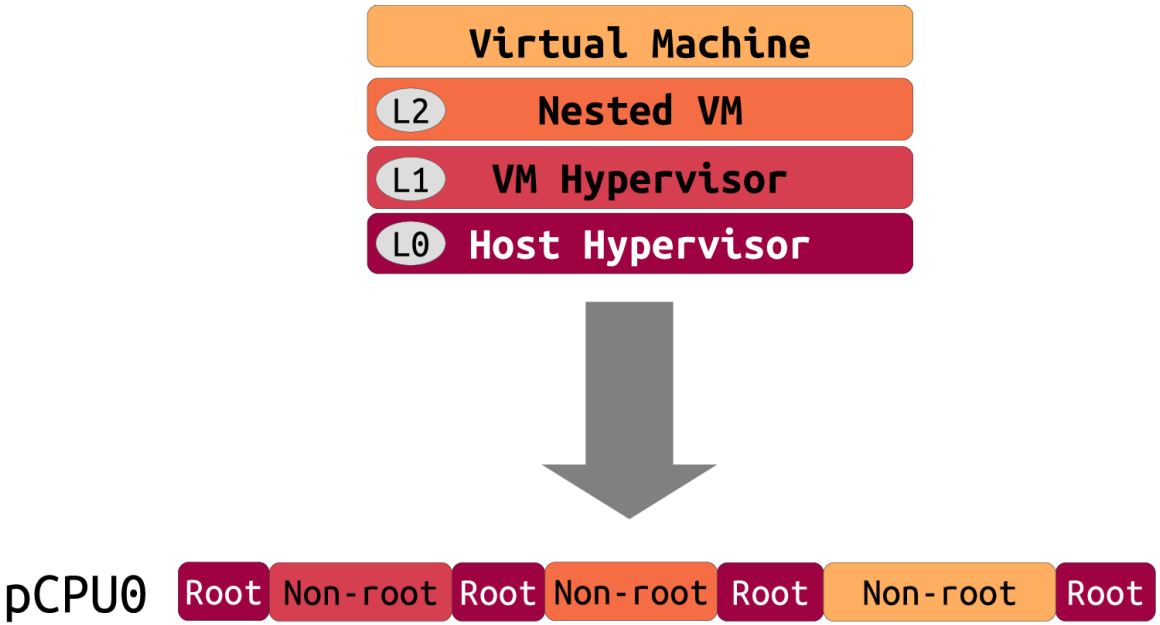
# Previously on “VM Analysis”

## Resource View for VM without tracing the VM



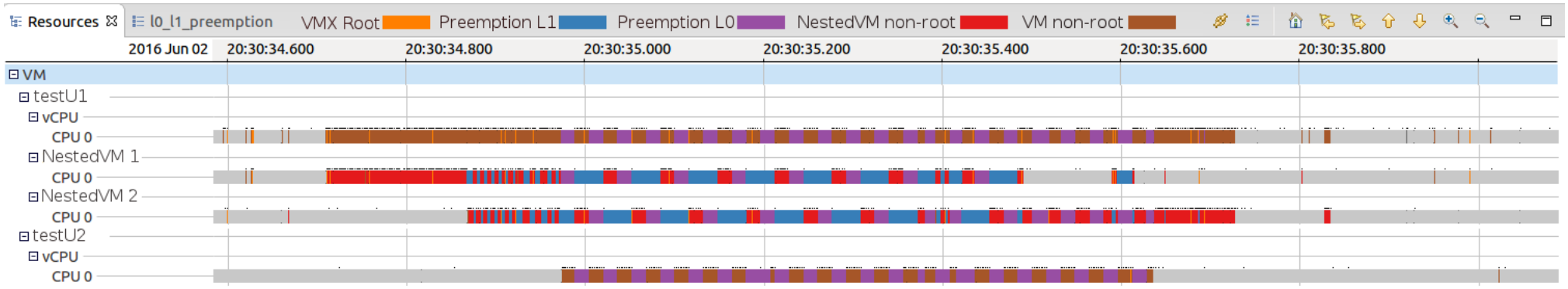
# Previously on “VM Analysis”

## VirtFlow: Execution Flow Analysis of Virtual Machine



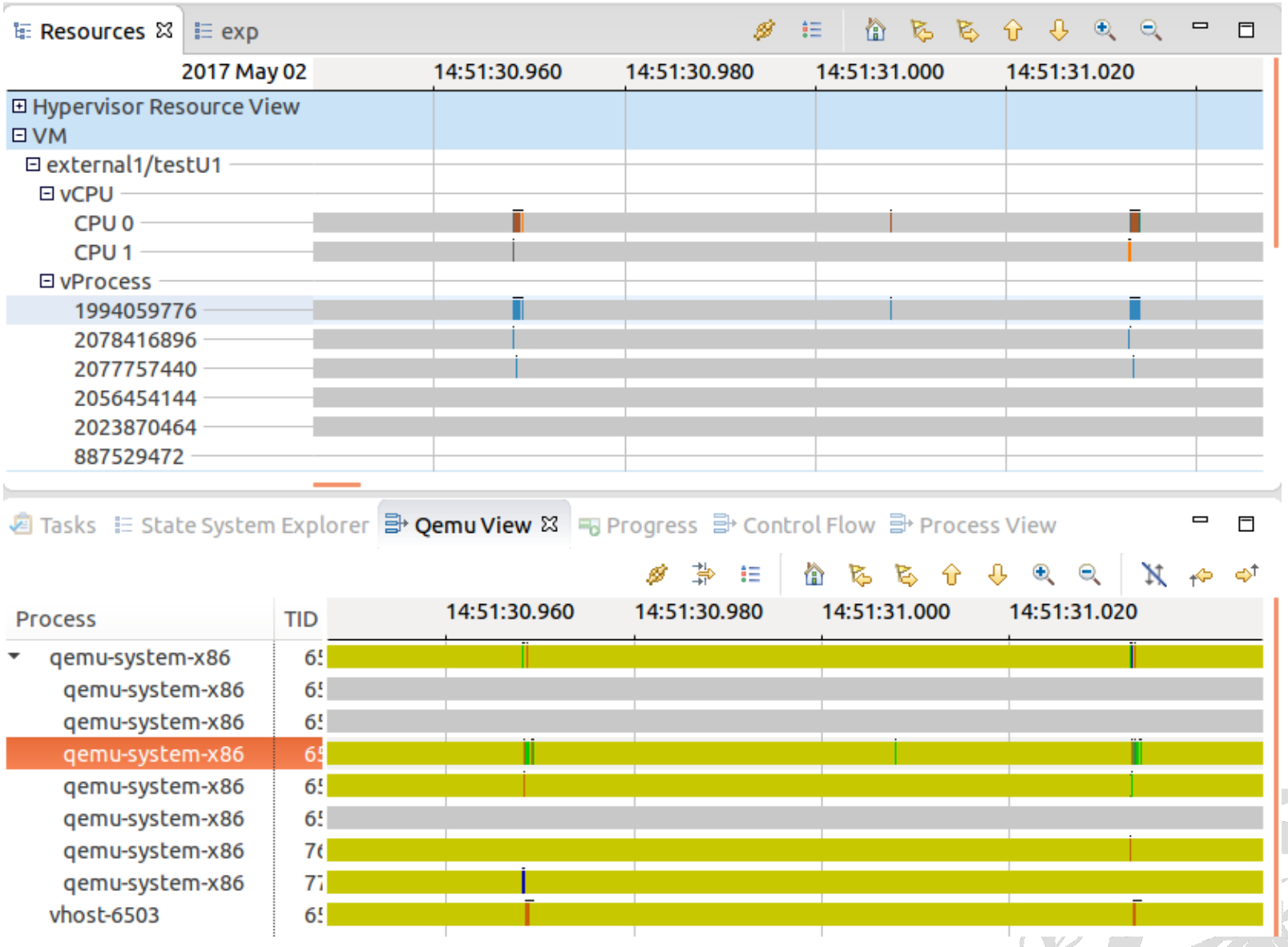
# Previously on “VM Analysis”

## Two Nested VMs and One VM are preempting each other



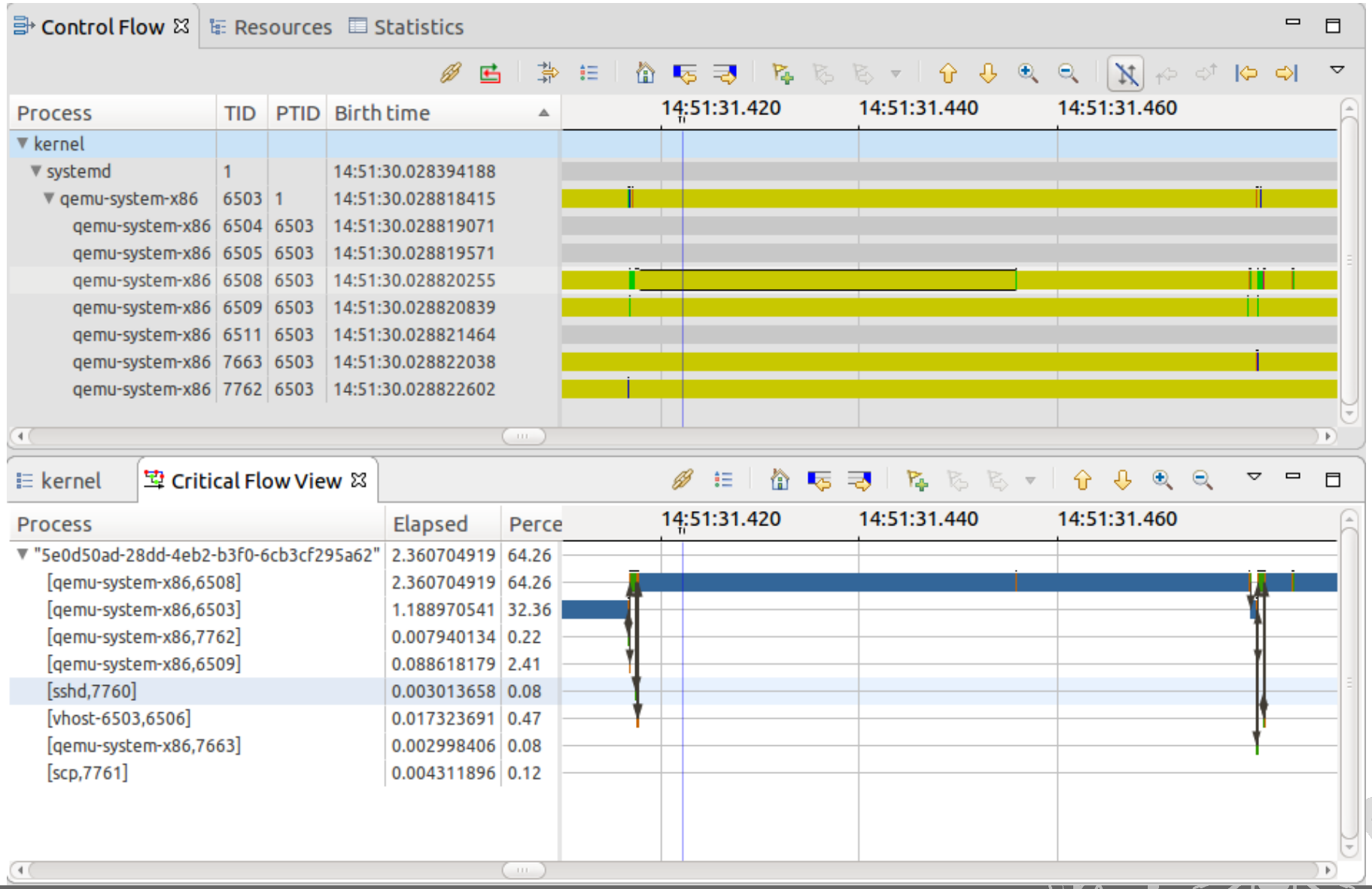
# Motivation

## Why the VM is waiting?



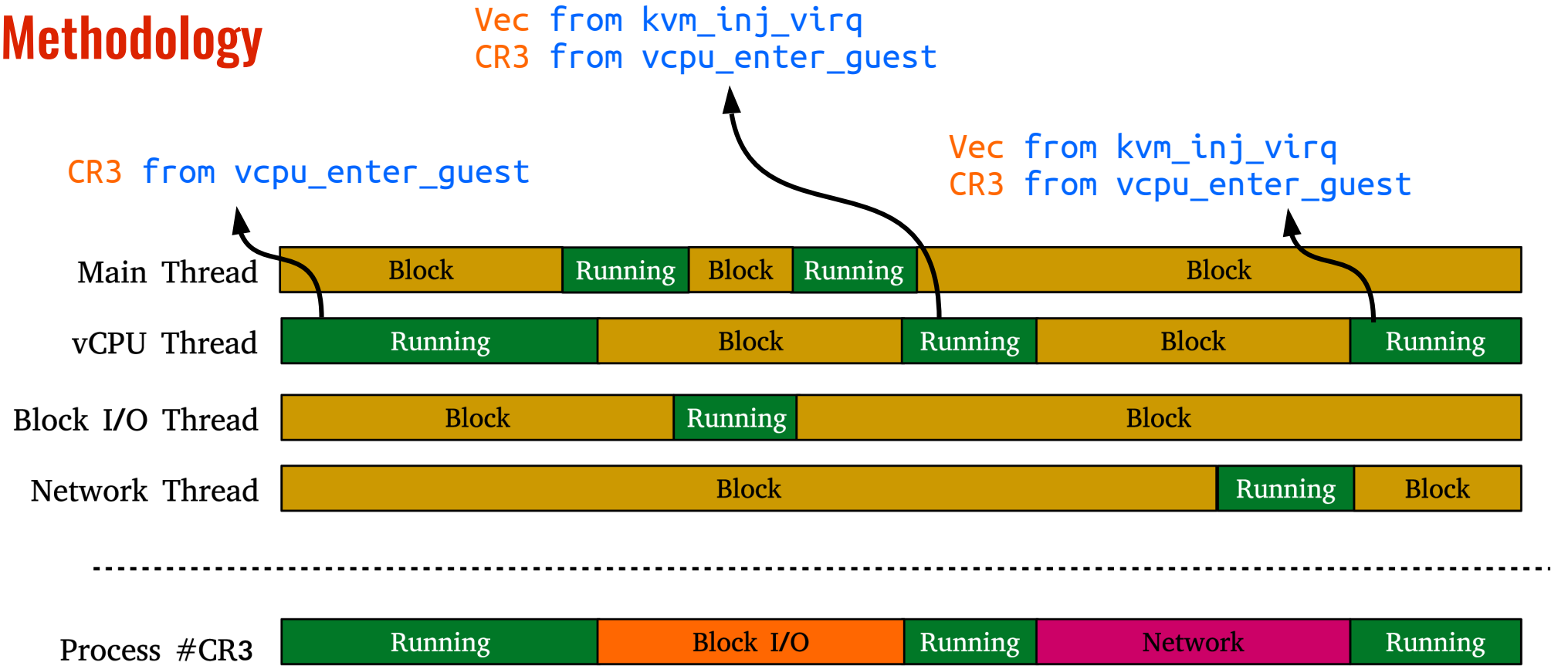
# Motivation

## Let's use the Critical Flow view of Trace Compass?



# Investigations

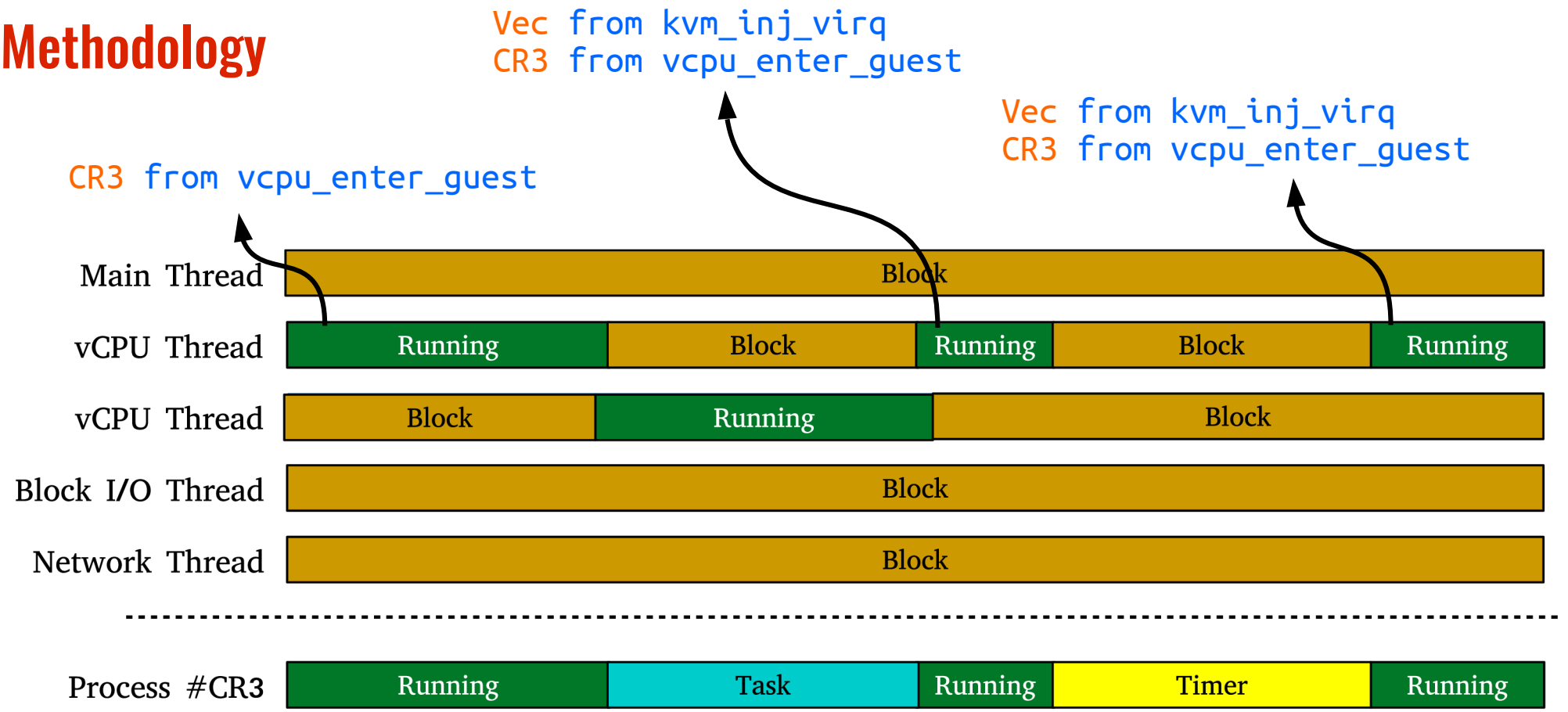
## Methodology




```
If (Vec == (Block I/O irq)) {
    Block State = Block I/O State
} else if (Vec == (network irq)) {
    Block State = Network State
}
```

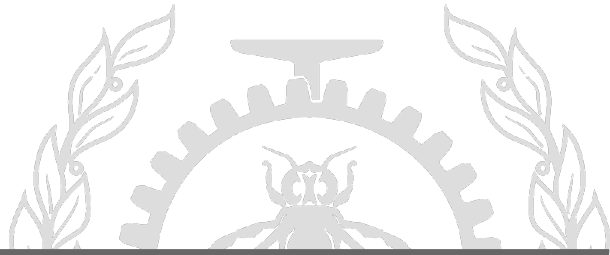
# Investigations

## Methodology




```
If (Vec == 239) {
    Block State = Timer
} else if (Vec == 251) {
    Block State = Task
}
```

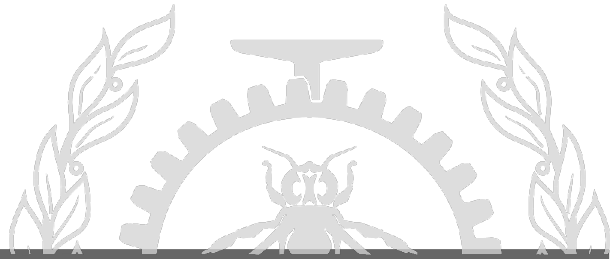
# Demo



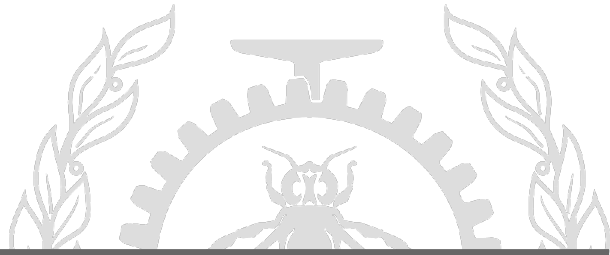
# Investigations

## What do you need to test this project?

- Access to **Host** only
- Run **LTTng** on Host with my new added tracepoint (vcpu_enter_guest)
- Clone **TraceCompass** from my github (virtFlow)
  - https://github.com/Nemati
- Open Resource View of TraceCompass



# One More Thing ...



# KVM-Tools

## For

# eBPF

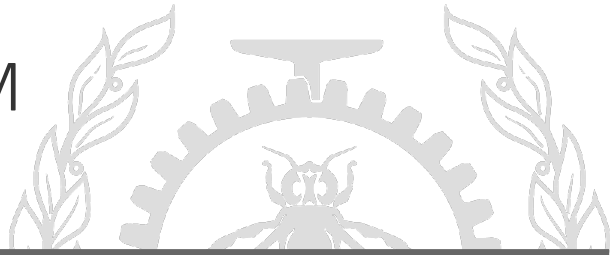
# Conclusion and in-progress

## Inferences

- Wait Analyzing of process inside VM
  - A process is waiting for
    - A Block request to finish
    - A network packet to receive
    - Another process
    - A timer to fire

## What you will see in Episode 5

- Wait Analyzing of process inside  Nested VM



# Questions?

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*https://github.com/Nemati*