Measuring the measurer

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http://packetfilters.cs.iit.edu/patchwork/

Introduction

Objective: To analyze the resource consumption of the Patchwork measurement system and compare its impact on the global FABRIC system. The goal is to ensure efficient resource utilization and accurate data collection while minimizing any adverse effects on the global FABRIC infrastructure. Additionally, to provide a tool that alerts us when resource usage exceeds a specified threshold.

Tools: MFLib: Library for monitoring FABRIC slice resource usage. Patchwork: Measurement tool on the FABRIC system. Prometheus: A tool for collecting system metrics. FABRIC: The global infrastructure whose available resources we measure.

Motivation

Optimized Measurement Systems: Ensuring that measurement systems are efficient and that the overhead for running does not impact the performance of the programs being monitored.

Approach

1. Set up MFLib on the slice running Patchwork and installed prometheus to collect metrics.
2. Compare Patchwork's resource metrics with global resources available in FABRIC to assess efficiency and identify improvement areas.
3. Established user-specific thresholds to let us know when the activity on a certain port of a site on FABRIC goes over acceptable limits.

Future work

We plan to use MFLib to include metrics specific to applications. This would allow for more detailed insights into resource use and help improve measurement systems further.

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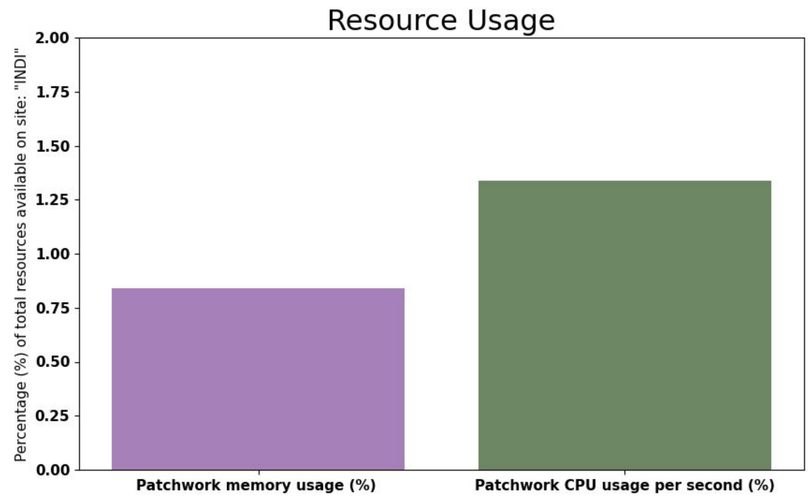
HundredGigE0/0/0/19 on site WASH and at time 2024-09-18_17-27-31 went over the threshold of 8500000000.0 bps and had the value 13509120033.33 bps
```

Fig 1: Threshold console output

Result

The analysis revealed that Patchwork's resource usage consistently remained below 2% of the resources available on the site patchwork is running for both cpu and memory used. It also showed that network port load occasionally exceeds Patchwork's limit of 8.5 Gbps, leading to packet drops and information loss. This result highlights our ability to measure the global system's performance while ensuring its availability for critical operations. By establishing user-specific thresholds, we can strategically schedule measurements, optimizing measurement accuracy and resource use without affecting overall system performance.



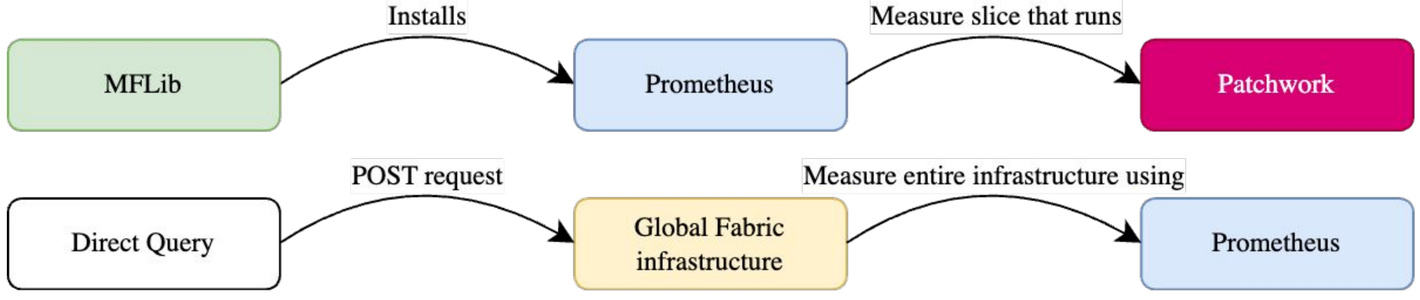


Fig 2: Overview over how the tools interact

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