The paper argues that there is lot of performance uncertainty in NFV environments and there is no systematic framework to identify the root cause of performance problems in VNFs. Although, there is some prior work on improving the performance of VNFs, they are focused on individual elements of NFV infrastructure. The performance problems are mainly at: VNF services, virtual switch, hypervisor, hardware. Moreover, they show that the throughput changes significantly with different network chains or adding more NFs, which makes it hard for network operators to distinguish which VNF is causing the problem.

So, they take an approach that systematically understand the NFV platforms and behaviours of NFV service chains. Then, they create various service chains based on some configurations and resource constraints, which provides insights about performance issues before the VNFs are deployed. Next, they build a comprehensive monitoring and tracing tool for all the NFV entities. Finally, they develop a performance analyzer to understand the root cause of performance issues using the collected traces.

The service chain builder generates all possible combinations of service chains while VNF manager creates these service chains based on all possible resource constraints. The workload manager emulates network workloads based on the given configurations from network operator. The configurations from operators are range of resource constraints, workload configurations, VNF configurations such as type and CPU memory constraints, and lastly service chaining policies such as which VNFs are together or followed by which.

To understand the NFV environment, they examine the VNFs workflow/relation with the underlying hypervisor and service chains. This investigation extracts important tracing points at all entities of an NFV platform, that affect the performance of VNFs. They use three monitors to collect these features and build graph based representation to maintain the workflow synchronization. After collecting the data, they first filter the outliers and then identify the suspicious service chains with anomaly detection (Cook’s distance, regression analysis). Finally, they analyse the performance individual VNFs as well as difference combinations of service chains and reason about common causes of performance issues.