Joint Service Chain Deployment and Manager Placement in NFV

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Abstract

a) Motivation b) Introduce the problem c) Why is there a research gap d) What have we done e) What are the results

In the old times, Network providers use hardware network functions to create their service chains, but a change in this manner is difficult and may cause many service distribution. SFC and NFV is the solution to this difficulty. By using SFC and NFV, providers can provision chains dynamically and then change them in runtime. One of the main requirements is management and monitoring for the chains. In this research, we consider the chain acceptance problem subject to management resources. In the first step, we formulate problem with ILP and then implement it in CPLEX framework. As we know, ILP problems are NP-Hard, so we need a Polynomial-Time solution to the problem. In this research, we create a heuristic algorithm and compare its result with the optimal solution. In the end, the heuristic solution produces near-optimal results in the polynomial time.

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1. Introduction

a) A general introduction of the context b) More specific context of problem and its importance c) A very brief review of literature and introduce the research gap d) What is the problem e) What are the contributions f) The structure of the paper

2. Related Work

a) Review of related work b) Again emphasize on gap c) What are the differences between this work and the related work

Here we want to review on works that have been done on Service Placement and Resource Assignment in SFC and NFV in these works we emphasize management resources and service placement. In this work, we see resources assignment as assigning the network, computation and memory resources. We assign computation and memory resources to virtual machines to run the services and assign network resources to links for running the virtual links of chains.

2.1. Resource Allocation in NFV

The VNF placement problem has received substantial attention in the literature. Formally the problem is defined as selecting locations for a chain of VNF instances. There are multiple objectives to consider with VNF placement. For Example, In [6] authors want to accept the maximum number of chains by considering only the processing and network resources and types for VNFs to create instances from these types.

2.2. Management Resources in NFV

In the NFV literature, each NFV chain must be monitored and managed by VNFM These types of resources consider management resources in this work. To best of our knowledge [1] and their next work [?] are the only ones that consider VNFM and other management resources in the placement process. In [2] authors try to optimize VNFM placement over a distributed NFVI

Our work considers these problems as a joint problem and wants to place chains and their VNFM at the same time. To best of our knowledge, this work hasn't been done in the literature. By considering the joint problem you may not accept a chain that you don't have any management resource for it or you can accept many chains that have little management resource requirement.

3. System Model and Problem Statement

a) Assumptions b) System model Table of notations c) Problem statement Define the problem in English using the notations and finally give an illustrative example to clarify the problem

4. Problem Formulation

a) Define variables and parameters b) Define objective function c) Define constraints d) Put the objective function and constraints together and define the problem e) State the complexity of the model (NP-Hardness)

5. Proposed Solution

a) Use the top-down approach. At be beginning draw a big picture of the solution steps b) Explain the details of the steps. Emphasize the idea behind the heuristic decisions c) Put all them together as a pseudo code or flowchart d) Analyze the complexity of the proposed solution

6. Evaluation and Numerical Results

a) Simulation settings: Topologies and all other parameters used in simulation it is better to use a table The algorithms which are simulated Parameters used for evaluation b) A subsection per parameter Emphasize on achievements

7. Conclusion and Future Work

a) Review of what we have done b) What is the future step

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Table 1

Ref	Resources				VNF Processing Limit		Online	
#	Other	Mem	BW	CPU	Yes	No	Yes	No
[2]	—	—	✓	✓	—	✓	—	✓
[3]	—	—	✓	✓	✓	—	—	✓
[4]	—	—	✓	✓	✓	—	—	✓
Curr	—	✓	✓	✓	✓	—	—	✓

Ref	Mapping		VNF		Sharing		VNFM	
#	VNF	Link	Single	Dist.	Yes	No	Yes	No
[2]	✓	✓	✓	—	—	✓	—	✓
[3]	✓	✓	—	✓	—	✓	—	✓
[4]	✓	✓	—	✓	—	✓	—	✓
Curr	✓	✓	✓	—	—	✓	—	✓