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INVESTIGATION ON ONLINE VNF SCALING IN A CLOUD DATACENTER USING ILP

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Abstract– NFV is the advanced technology in present situation. Online VNF Scaling in a cloud datacenter under multi-resource constraints were consider for formulating mathematical model. A new novel ILP Scaling algorithm works based on the regularization technique and dependent rounding.
Keywords- VNF Scaling, ILP, Online algorithm, NFV.

I. INTRODUCTION

Network function virtualization is trending technology in present days. Number of VNFs are commonly combined together to provide a network service. Web Application, which is in sequence, is "NAT -> Firewall -> IDS -> Load Balancer" for access control in web service is example for Network. The main aim of NFV is to reduce the operation cost, as compared to using traditional hardware-based middle boxes.

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II. RELATED WORK

In NFV, There are large number of researches done to place the VNFs in a datacentre to provide efficient operation. According to those studies, we place the VNFs in a datacentre. Cohen et al designed approximation algorithm used to minimize the cost between clients and VNFs.

In Existing system, in the offline setting traffic rates in all time slots are known, difficulties in this online scaling was unknown network traffic rates in future time slots. Network traffic in the current traversed VNF in a service chain also changes due to advance technologies, which developed to efficient utilization of datacentre. Existing system placement challenge for NFV middle boxes with different configurations for example totally ordered, partially ordered middle boxes sets.

III. PROPOSED WORK

In proposed system, we aim that minimize the requirement of physical resources for the system design. We design an approximation algorithm to minimize the cost of operation of VNFs. In this proposed system, we design VNF scaling algorithm with consideration of multi resource constraints. This algorithm gives efficient utilization of resources takes place. This will resolve the single problem into multiple sub-problems and each can solved using single algorithm.

In this designed fractional online algorithm is to remove the correlation of our objective function between time slots t-1 and t, which will gives the efficient utilization of resources because of previous developed VNF instances for network traffic in the past time instances were closed, for new traffic according to the traffic VNF instances was developed.

IV. PROPOSED RELATED WORK

In original VNF service chain scaling was implementing in two levels, in first we design scaling algorithm for single service chain with different number of constraints. In the next level the obtained results were taking as reference, we adopted it for multiple constraints.

In past method two algorithms were used they are i) Online algorithm for single service chain and ii) Online Algorithm for multiple service chains. Online algorithm for single service chain inputs were n(t) , n(t-1) , S, x(t-1) and Output was x(t). if $n_i(t) \geq x_i(t-1)$ then switch all the idle VNF instances to running, Eject all elements from Si and then place all the instances of ni(t) to xi(t-1) instances on respective servers. This case was opposite to previous one we switch all the idle I VNF instances to running. If they marked as running in previous time slot counter to be zeroed. If counter greater than deadline remove from the server, finally insert the server id into si.

Next step algorithm for multiple service chains patterns returned by Bin packing and patterns multiplicities returned by Bin-pickings. Set of service chains were taken for single service chain algorithm S1={X1, X2 ….., XU}; S2={P(1), … , P(p)}; wij=[S2(j) –S1(i)]+; x(t)=Minimum weight matchings (S1,S2,W);

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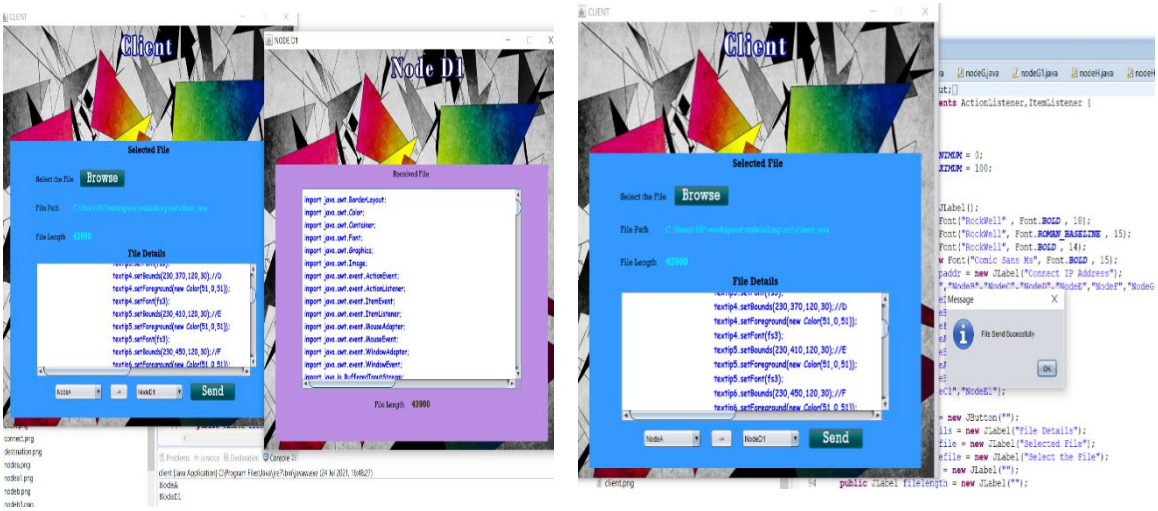
In the proposed algorithms Online Regularization Based Fractional Algorithm, Rounding algorithm for fractional numbers rounded to nearest value and complete online algorithm for scaling of service chain. In complete online algorithm, first we set our function $\bar{x}(0)$ value to zero, In the second step Initialize the system for t€[T] then calculate x*(t)=ORFA($\bar{x}$(t-1),M,N,O,D,C,c,u,€); after that calculate $\bar{x}$(t)=RA (x*(t), M, N,O,D,c,c). Where RA means rounding algorithm and ORFA means online regularization of fractional algorithm.

V. COMPARATIVE RESULTS



VI. CONCLUSIONS

In the fast development of NFV enables flexible network function deployment, new challenges introduced that require a more dynamic algorithm for VNF scaling. The Proposed work target online VNF scaling in a cloud data center under multi-resource constraints.

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