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SDN Traffic analytics in a WAN distributed settings

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Problem statement

- 1)How to allocate resources in the data centres?
- 2)What is the effective way to find the most appropriate place for a VM?
- 3)How to implement loadbalancing inside a data centre and among the data centres in WAN?

Reasons

- 1) Resource demanding applications are urging for more resources
- 2) These applications are communication intensive
- 3) Providing resources to those applications may hamper the performance of other applications

Challenges

- (1) How to model the communication behaviour of VMs as well as applications?
- (2) How to collect sufficient data from the network traffic and network device to derive accurate models for making fast placement and migration decisions?
- (3) How to solve the 'black box' problem?

Solution approach

A framework

- i. For making faster decisions to place and migrate VMs
- ii. In a cloud data centre and multi-cloud data centres
- Objective functions
- i. Efficient consumption of network resource
- ii. Energy optimisation
- iii. Cost optimisation
- Metrics
- i. Historical communication traffic traces combined with real-time traffic of the VMs
- ii. performance characteristics of the switch capabilities and topology

Solution approach continues..

- Targeted (simple) application domain
- i. Computation intensive
- ii. Long-time running
- iii. Rather predictable traffic behaviour
- iv. Batch applications

Solution approach continues..

- Analyze the communication behaviour of a couple of different applications
- In order to allow decisions in realtime if an additional VM is overbooking the capacity available the model needs to be very simple
- Initial model assumes
 - Traffic behaviour can be described as a set of discrete states (for example no traffic, 250kbit/s, 1Mbit/s) and its probability for changes using a markov model

rate

Overlaying the individual states of all VMs results in a combined state model



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Work Steps

Step 2 Validate the optimizaiton level of the models

Step 3 Traffic model simulation in multiple cloud data centres connected by WAN