CloudNets: Virtual Networking Cloud Resources (Prototype, Algorithms, Economics)

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1. Vision & Use Cases

CloudNets as flexibly specifiable, semi-atomic and adaptive virtual networks connecting heterogeneous resources.

2. FleRD: A Flexible CloudNet and Resource Description Language

Specification, communication and internal representation of CloudNets requires a Resource Description Language (RDL). Our FleRD language is flexible (removable) and allows for vagueness and omission. Hiding of details. Specification flexibility is exploited during embedding.

3. Optimizing Long-Lived CloudNet Embeddings with Migrations

Our CloudNet embedding algorithm supports very general CloudNets. Currently, it supports all kinds of links (e.g., full-duplex, half-duplex, or symmetric links), various migration cost models, and also different objective functions (e.g., for load balancing or energy consumption). We believe that after a more rigorous and inter-consumption optimization may pay off for long-lived CloudNets. Our approach is based on Mixed Integer Programming.

4. Online Algorithms and Competitive Analysis: Dealing with Demand Uncertainty without Predictive Algorithm Models!

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Fig. 1. CloudNet request over two providers.

Fig. 2. Realization over two providers.

Time complexity of embedding depends on load, CloudNet size as well as the flexibility in the CloudNet specification.

5. Business Roles, Prototype and Migration Demonstrator

Current prototype based on VLANs. Demonstration video server to improve QoS on YouTube: http://www.youtube.com/watch?v=llJce0F1zHQ

For further information

Please contact Stefan Schmid (stefan.schmid@tu-berlin.de). This paper as well as more information on this and related projects can be obtained at our project website: http://www.net.tu-berlin.de/~stefan/virtu.shtml

Literature


Fig. 3. CloudNet request over two providers.

Evaluation: Deterministic worst-case guarantees compared to optimal solution where entire demand is known in advance! And simulation...