A Platform for Monitoring Public-cloud Networks

Antonio Montieri¹, Valerio Persico², Antonio Pescapé¹,²
¹NM2 srl (Italy), ²University of Napoli “Federico II” (Italy)
montieri@nm-2.com, {valerio.persico, pescape}@unina.it

Public-cloud Networks and the Need for Monitoring

- An intra-cloud network connects virtual machines (VMs) of the same cloud provider
  - intra-datacenter ➔ VMs are deployed in the same datacenter
  - inter-datacenter ➔ VMs are deployed in different, geographically distributed datacenters
- The CloudSurf Suite
  - CloudSurf is a platform to easily perform network monitoring tasks in public-cloud infrastructures from the general user viewpoint
- Join the CloudSurf community at http://traffic.comics.unina.it/cloudsurf!

Proposed Approach

- Non-cooperative monitoring
  - adopts the point of view of the general cloud customer
  - does not leverage information supplied by the cloud provider
  - provides accurate and trustworthy results on network performance

The Need for Monitoring

- Public-cloud providers supply only qualitative information about the performance of their networks
- Cloud-based user applications can take advantage of accurate information in order to satisfy their requirements and minimize the costs

Preliminary Experimental Results

**Intra-datacenter performance**

- Mean TCP throughput and standard deviation over a 24-hour-long period
- VM size (M, L, XL) strongly affects the achievable throughput
  - Variability is markedly limited (CoV < 0.0004)

**Inter-datacenter performance**

- TCP throughput distribution across different geographic regions
  - Azure performs better on average (+56%)
  - Region pair impacts the throughput variability
  - VM size is non-influential

CloudSurf Architecture

**Main Features**

- One-click setup: a user just needs to configure the credentials of his public-cloud account
- Full customization: a user can choose between a set of preconfigured experiments or customize his own experiments
- Cost prediction: a user can check the estimated cost of his monitoring task before running the experiments
- Shared results: monitoring results are shared with the community in a standard JSON format, and can be interpreted directly by CloudSurf

**Intra-datacenter path characterization and fees**

- Asia Pacific (AP), Europe (EU), South America (SA), USA (US)
- Path tracing between each region pair
- IP-to-ASN (Autonomous System Number) mapping

- ASes external to Amazon are tier-1
- AP and SA are the worst-connected regions
- Different routing policies are adopted for different VM sizes