

Building infrastructure capable of supporting tiered networking services

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Motivation

- We want to learn more about how cloud providers use cold-potato routing and hot-potato routing, and collect the detailed measurements between these two.
 - Google Computer Engine recently provided two network service tiers with different performance. The main difference between these two is that Premium Tier uses cold-potato routing while the Standard Tier uses hot-potato routing. Google claims that the throughput with the one using cold-potato routing is $\sim 1.7x$ times the one using hot-potato routing. We want to exam if this is correct
 - Other questions about hot vs cold potato routing
 - Are there direct, measurable advantages of hot vs cold potato routing?
 - Are there scenarios where one is more beneficial than the other?

The Challenges

- Measurement experiments typically have a limited view
 - We can only treat measured system as a sandbox since we cannot access their operational network.
 - We can only do experiments from a client perspective and cannot dig more into the cloud and get more details about the routing technology and effects.
 - Client-side perspective is usually performed via measurements taken from inside a browser
- No real-world existing solution for conducting experiments like this

Solutions

- Create an architecture with tiered network service and control system capable of supporting experiments in both client and server view.
 - Expand capabilities of existing testbed
 - Set up servers and cloud environment for our system
 - Develop a control system to manage egress and ingress traffic and make it similar to how Google created tiered networked services.
 - The control system needs to set up cold and hot potato routing.
 - The system needs to be capable of conducting experiments for control systems (ex: EdgeFabric) to enhance cloud internal routing.
- Use existing network measurement tools to evaluate the performance
 - Ripe Atlas/ PlanetLab/M-Lab

Solutions

- Measure GCE performance from the open source platforms
 - Provides more than typical client side perspective
 - We know the routing technologies in place at each tier
 - We can also control the server side since GCE
- Dig into our system and do more measurements. Then we can solve the questions we ask in our motivations.
 - Since both sides of the connection are under our control, we can get additional details from both client and server perspective. We can learn more about the difference between hot vs cold potato routing