On-Demand bandwidth Implementation

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Introduction

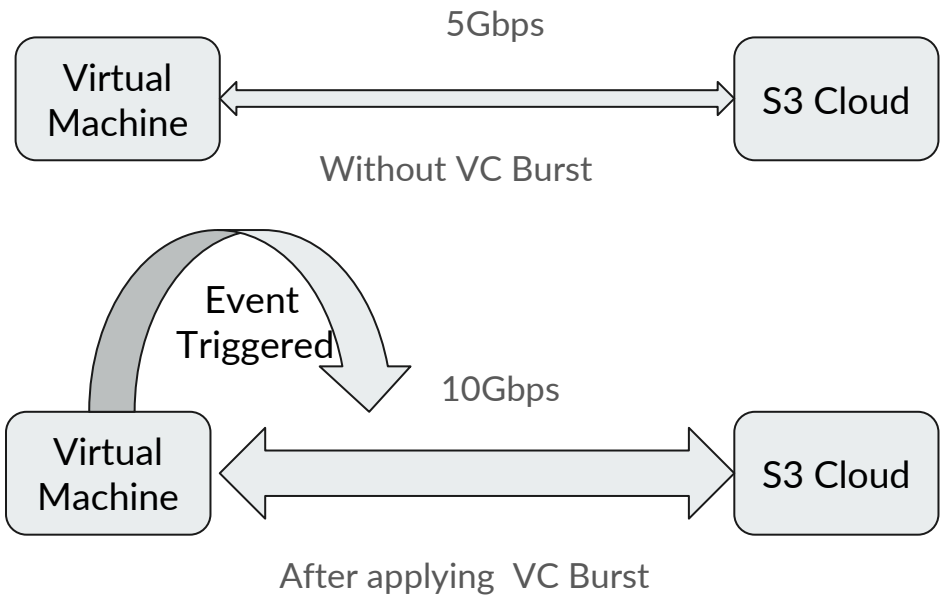
- Worked as an Infrastructure Engineer in HPC team at Guardant Health
- Responsible for networking and building HPC clusters
- Got an opportunity to implement On-demand Network bandwidth using GPFS and Packetfabric REST APIs

Problem

- Network bandwidth is expensive and once provisioned whole bandwidth is at our disposal whether we use it or not.
- We are restricted by the non flexibility of physical network infrastructure which ultimately leads to spending money for the network bandwidth we will use once in a while.

Proof Of Concept

- IBM Spectrum Scale : Provider of parallel file system
- Packetfabric: Provider of Network Infrastructure
- Seagate: Cloud storage provider
- Implementation:
    - Installed and created GPFS cluster on one of the Virtual Machines
    - Used GPFS REST APIs to evict/send the file from the VM to the cloud
    - Eviction of file initiates Virtual Circuit Burst to provide extra bandwidth
    - Script checks if the the file was uploaded to S3 bucket and once it does the VC burst was destroyed


5Gbps
Virtual Machine
S3 Cloud
Without VC Burst
Event Triggered
10Gbps
Virtual Machine
S3 Cloud
After applying VC Burst

Future Possibilities

- Dynamic Network Infrastructure
- Application dependent network provisioning
- Data backup and recovery
- Sending logs to the cloud
- Metadata caching etc

Conclusion

- Provisioning and implementing network resources is tedious , time consuming and expensive affair.
- On-demand network bandwidth based on different triggers gives us predictability and visibility in network traffic.
- Guardant health has integrated GPFS AFM file system with packetfabric and it proved that On-demand bandwidth can be achieved in automated fashion using REST APIs.