go/v10r-up1-testresults

UP1 Test Results

1. HSA Test Acceptance:
    a. Code for adherence to meta-TDD standards
    b. Review of tests
    c. Resolution of discrepancy between PRD and delivered code
2. HSA Metrics:
    a. ATC
    b. SCS

ATC and SCS

Steps		*Step-1*	*Step-2*	*Step-3*	*Step-4*	*Step-5*	*Step-6*	*Step-7*	*Step-8*	*Step-9*	*Step-10*	*Total*
Task		*Create Firewall Rules*	*Create DB Instance*	*Create Shared Storage*	*Create VM Instance*	*Set up XWiki (No UI)*	*Create Instance Image*	*Create Instance Template*	*Create Autoscaling Group*	*Set up Load Balancer*	*Set up DNS*	
GCP	*Service*	VPC	Cloud SQL	Filestore	Compute Engine	Removed				Cloud Load Balancing	Cloud DNS	6 services
	Study (hrs)	1	2	1	1	0	1	2	7	8	1	24 hrs
	SCS	24	42	14	28	0	42	20	49	36	14	269
	Manual ATC	0:05:20	0:12:00	0:05:50	0:07:10	0:25:00	0:09:20	0:03:00	0:07:30	0:08:00	0:02:00	1:25:10
	Auto ATC (Mean)	0:00:29	0:06:17	0:03:15	0:00:36	0:01:00	0:03:59	0:00:28	0:00:54	0:00:25	0:00:20	0:17:42
	Auto ATC (STD)	1.7	14.2	10.7	1.5	0.0	25.2	2.1	4.9	0.6	0.7	26.8
	Auto ATC (STD / Mean)	5.94%	3.78%	5.50%	4.08%	0.00%	10.55%	7.60%	9.01%	2.53%	3.72%	2.53%

- **ATC:** Average Time from Signup to Completion
- **SCS:** Sign-up to Completion Steps

- Web automation implemented by Selenium.
  Executed 20 times for each cloud

- **STD/Mean:** Coefficient of variation

Terraform ATC and SCS

	Terraform Resource	VM Image (Packer)	Networking	Database (HA)	Shared Storage	VM Instance	Load Balancer	DNS	Total	Total (hh:mm:ss)
GCE	*Auto ATC (Mean)*	0:03:45	0:00:26	0:07:22	0:02:49	0:00:20	0:01:59	0:00:04	0:09:15	9 min 15 sec
	Auto ATC (STD)	13.9	4.0	11.6	21.2	5.8	1.0	2.1	22.6	
	Auto ATC (STD / Mean)	6.17%	15.56%	2.62%	12.60%	29.15%	0.87%	47.67%	4.07%	

- **ATC:** Average Time from Signup to Completion
- **SCS:** Sign-up to Completion Steps

- Terraform automation executed 20 times for each cloud
- STD/Mean: Coefficient of variation

Load Test Configuration

- **GCE (VM x6):**
  - OS: Ubuntu 20.04 LTS
  - VM Spec: 4 vCPU / 16G Mem
  - Storage: 30G SSD
  - Location: us-west (Oregon)

- **GCP CloudSQL (MySQL HA)**
  - Spec: 2 vCPU / 4G Mem / 20G Storage
  - DB engine: MySQL 8.0

- **GCP JMeter (c2-standard-4) x1:**
  - VM / OS: Ubuntu 20.04 LTS
  - Location: us-west (Oregon)

- **Load Balancer Type:**
  - Global HTTP(S) Load Balancer

- **Auto-scaling Settings**
  - Threshold: CPU utilization at 60%
  - # of autoscaled VMs: 4 (in 2 zones)

- **JMeter Settings**
  - Ramp-up time: 55 seconds
  - Number of client threads: 55
  - Total duration: 24 hours

Load Test / Failover Result

- **Failure Simulation Strategy**
  - Database failover:
    Trigger the DB failover every hour at 45 minutes
  - VM failure:
    Delete or shutdown all VMs in the selected zone every hour at 15 minutes

	GCE (Load Test)	***GCE (failure simulation)***
1. Total HTTP Requests	*5,476,697*	*4,752,423*
2. Total Successful Requests	*5,476,625*	*4,749,736*
3. Avg. HTTP Throughput (Request per second)	*62*	*54*
4. Avg. Response Time	*884 ms*	*1070 ms*
5. Min. Response Time	*748 ms*	*752 ms*
6. Max. Response Time	*1.28 seconds*	*2.31 seconds*
7. Total Timed Out Requests	*107*	*2,687*
8. Total Server Errors (HTTP 500)	*43*	*37*
9. Total Failed Requests (Timeout + Server error)	*150*	*2,724*
10. Number of Failures / Million Requests	*27*	*573*
11. Avg. Throughput Recovery Time (VM failure)	*N/A*	*12 - 15 mins*
12. Avg. Throughput Recovery Time (DB failover)	*N/A*	*2 mins*
13. Avg. VM CPU Utilization Decline Rate	*N/A*	*- 4%*
14. Avg. DB CPU Utilization Decline Rate	*N/A*	*- 10%*
15. Avg. HTTP Throughput Decline Rate	*N/A*	*- 13%*
16. Total Successful Request Decline Rate	*N/A*	*- 13%*
17. Avg. Response Time Increase Rate	*N/A*	*+ 21%*

Estimated Cost For Load Test (24 hours)

	GCE (Specification and rate)
VM Instance	GCE (c2-standard-4) vCPU: 4 Memory: 16 GiB Used Instances: 6 Hourly rate: $0.2088 **24-hour test usage: $35.82** **(VM + disk + network)**
Database	CloudSQL MySQL (db-lightweight-2) vCPU: 2 Memory: 4 GiB Storage: 20 GB Hourly rate: $0.23 **24-hour test usage: $5.54** **(DB + network)**
Shared Storage	Filestore (BASIC_HDD) Capacity: 1TiB Used size: 100GB / month **24-hour test usage: $6.82**
Networking	Cloud Load Balancing **24-hour test usage: $3**
24-Hour Test Usage	**$51.18**