[Satellite Ads Inc.]

# Cloud-Based Automation System

[D085 - Automation and Scaling Tools]

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[Version 2.0]



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#### A. INTRODUCTION OF SOLUTION

# **Purpose**

The purpose of this solution is to provide a scalable and highly-available platform for Satellite Ads, Inc.'s (Sad\_INC) second wave of advertising satellites by implementing a cloud-based automation system.

#### **Goals and Objectives**

The goals and objectives of this solution are to meet the scaling needs presented by SAd\_INC to facilitate the deployment of new second generation satellites to broadcast SAd\_INC's advertisements. The automation system should be elastic to ensure that the cloud-based back end can handle the advertising loads and be continually monitored. . SAd\_INC requires the ability to scale to critical events based on the lessons learned from the initial launch and the projections for updated. To meet these goals the following solution will leverage AWS OpsWorks to create a Chef Automate server, create an AWS Auto Scaling group, and then create a Lamada function for the termination of EC2 instances once an Amazon EventBridge rule is triggered.

## Scope

After the initial deployment of the baseline cluster Amazon EventBridge will track the ClusterScale rule and if the satellite usage reaches 300 satellites, then the AWS Auto Scaling group will trigger the deployment of an additional cluster. When this is triggered, it will also generate an AWS SQS message to the help desk ticketing system at helpdesk@satelliteads.com.

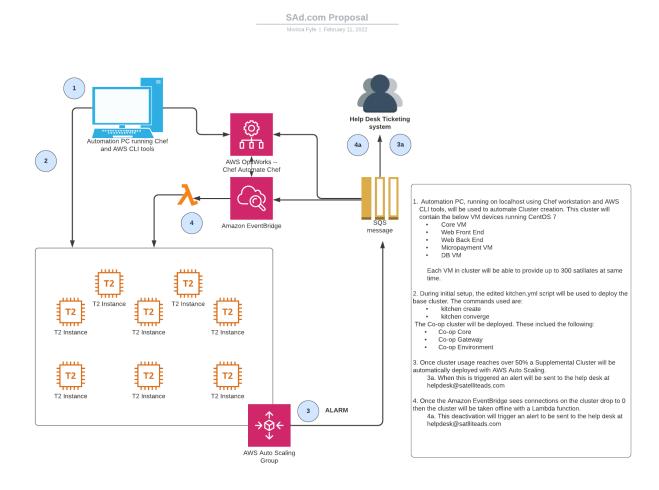
Once resources are no longer needed then the AWS EC2 Autoscaling will trigger another alert to run a Lambda function to terminate the unneeded clusters. This will also generate a AWS SQS message to the help desk ticketing system at <a href="helpdesk@satelliteads.com">helpdesk@satelliteads.com</a>.

#### **Functionality**

There are few tools being used to scale this solution. The Chef cookbooks will be initially triggered from the Automation PC. Then once the initial cluster is in production the EC2 instances will be enabled as a part of the AWS Auto Scaling Group along with the CloudWatch rules. Alerts will be sent to the help desk for any errors and scaling events that occur for tracking and informational reasons.



# B. VISUAL REPRESENTATION



## C. AUTOMATION SCRIPT

1. Copy your automation script from part C here (text only):

#Monica Fyfe Student ID: #000467874

#default driver used to create cookbook testing instance; will be using AWS

driver:

name: ec2
network:

- ["public\_network"]

customize:

memory: 512



```
#how will Chef run, chef_zero simulates a local server
provisioner:
  name: chef_zero
 product_name: chef
  product_version: 14.12.9
# application used when running automated tests
verifier:
  name: inspec
# OS of VMs
platforms:
  - name: centos-7
#collection of the virtual test environment
suites:
#core services
  - name: sattest1_core
    driver:
      vm_hostname: sattest1.SAdcore.com
    run_list:
      - recipe[learn_chef_httpd::default]
    attributes:
#front-end web images
  - name: sattest2_webfront
    driver:
      vm_hostname: sattest2.SAdwebfront.com
    run list:
      - recipe[learn_chef_httpd::default]
    attributes:
#back-end web images
  - name: sattest3_webback
    driver:
      vm hostname: sattest3.SAdwebback.com
    run list:
      - recipe[learn_chef_httpd::default]
    attributes:
#data services
  - name: sattest4_db
    driver:
```



```
vm_hostname: sattest4.SAddb.com
    run list:
      - recipe[learn_chef_httpd::default]
    attributes:
#micropayment transaction services
  - name: sattest5_mirco
    driver:
      vm_hostname: sattest5.SAdmicropayment.com
    run list:
      - recipe[learn_chef_httpd::default]
    attributes:
#CoopPlayCore
  - name: sattest6_playcore
    driver:
      vm_hostname: sattest6.SAdplaycore.com
    run_list:
      - recipe[learn_chef_httpd::default]
    attributes:
#CoopPlay-gw
  - name: sattest7_playgw
    driver:
      vm_hostname: sattest7.SAdplaygw.com
    run_list:
      - recipe[learn_chef_httpd::default]
    attributes:
#CoopPlay-env
  - name: sattest8_playenv
    driver:
      vm_hostname: sattest8.SAdplayenv.com
    run_list:
      - recipe[learn_chef_httpd::default]
    attributes:
```

2. Screenshot showing that the automation script executes without errors (from part D):



```
Waited 35/300s for instance <1-015dc86dabeb2bb54> to become ready.
Waited 40/300s for instance <1-015dc86dabeb2bb54> to become ready.
Waited 45/300s for instance <1-015dc86dabeb2bb54> to become ready.
Waited 50/300s for instance <1-015dc86dabeb2bb54> to become ready.
EC2 instance <1-015dc86dabeb2bb54> ready (hostname: ec2-18-21/50-145.compute-1.amazonaws.com).
Waiting for SSH service on ec2-18-212-60-145.compute-1.amazonaws.com:22, retrying in 3 seconds
Waiting for SSH service on ec2-18-212-60-145.compute-1.amazonaws.com:22, retrying in 3 seconds
Waiting for SSH service on ec2-18-212-60-145.compute-1.amazonaws.com:22, retrying in 3 seconds
[SSH] Established
Finished creating <sattest8-playenv-centos-7> (1m55.01s).
----> Test Kitchen is finished. (16m27.93s)
```

## D. DIAGNOSIS REPORT

Data Description	Optimal Range	Data and Results	Automation Script Used to Extract Data (text only)	Screenshot of Result of Script
peak global usage) based on	15-30 minutes for	One cluster = 16m.28s 200 clusters = 16m.28s * 200 = 3256 minutes (54 hours)	kitchen list kitchen create kitchen converge	PS Ollaram-cher/combooks/larm_cher_https Witches list Dattect



Time to register a cluster and then quench connections to the load balancer, taking the cluster offline (start-up, operation, shutdown)	connection quench, start of cluster launch, and part of time to scale cluster, can be tracked separately as a quench	4m2s	kitchen destroy	PS D'Llearn-cher/cookbookslearn_cher_nttpd> kitchen destroy
Peak load averages per system at 200, and 300, satellites per cluster	60% of CPU triggers new cluster launch; if reaching core load at 200 satellites, launch new cluster on 60% CPU loads	Load average: 0.00, 0.06, 0.07	kitchen exec sattest1-core- centos-7 -c 'top'	Name
Write times to the diagnostic data drive	<30 millisecond s	1 byte (1 B) copied, 0.000140971 s, 7.1 kB/s	kitchen exec sattest1-core- centos-7 -c 'dd if=/dev/zero of=WriteSpeedT est.txt bs=1 count=1'	P. Dilares Certicosbookilares, Cert, Chitob .
Pull time from the game instances (1 Satellite Terminal Server, 1 Web Server, 1 Database, and 1 time server) and initialization time	launch 15- 30	16 m.28s	kitchen create kitchen converge	Dollaren-deficionissosiales, m.def.https://doi.org/16/17/presport_last.Action_last.Processor_las



	1			
				Message: f624f91a-1eaf-4549-b7a6-d7b8adb6a300 X
*Average		12ms	AWS SQS	Details Body Attributes
messaging	<1 minute			ID   Size   M55 of message body   Sender account ID
time	in queue			Sent
				Message attributes size MD5 of message attributes
				Done
		rtt		[5] Silhase-chericomboniciaen.coef.phtpd: bitchom onc sattest5-mirco-centos-7 -c plug -c 5 google.com
Average latency for the Time server	<30 millisecond s	min/avg/max /mdev =	kitchen exec sattest5-	
Server		6/15.917/0.0 92 ms	mirco-centos-7 -c 'ping -c 5 google.com'	
		rtt	kitchen exec	PS Dillearn-cheficosbooksilearn_chef_mitpd: Eliciben exec sattest3-webback-centos:7 -c 'plng -c 5 localbact'> Execute command on sattest3-webback-centos:7.
Average latency of each cluster	<30	min/avg/max /mdev =	sattest3- webback-	
	millisecond s	0.018/0.025/	centos-7 -c `ping -c 5	5 passes transaction, 5 respirate, 60 passes today, time 1999an
		0.028/0.005 ms	localhost'	
Network data in		rtt min/avg/max	kitchen	8 D:Lizer-cheficosbooks:Learn_chef_httpb: Eltchun zwc sattest3-webback-centos-7 - c _plog - 2 _pugle.com
and out for each cluster	<1 second	/mdev =	exec sattest3- webback-centos-7	ad 1970 Fm 1880000 (0.1000000 mt (15.2000000000000000000000000000000000000
0.0000		0.731/0.750/ 0.761/0.027	-c `ping -c 5	71. 60 r participation — 6, 27 d. 250 d. 261 d. 277 de
		ms	google.com'	top - 10:45:31 up 24 min, 1 user, load average: 0.00, 0.06, 0.07
		Load average:		Tasks: 87 total, ] running, 86 sleeping, 0 stooped, 0 zemble   McDu(0): 0,0 up, 0,0 5y, 0 en,1;00.0 ig, 0,0 up, 0,0 hi, 0,0 si, 0.0 st   Mill Rem : 101302 total, 30/488 free, 125116 used, 505/426 buff/cache   Mill Sump: 0 total, 0 free, 0 used. 712864 avail Rem
Overall CPU		0.00, 0.06, 0.07	kitchen exec sattest1-core-	PR NT VIST RS SHR SKEN VER TIPE-COMMO 1 root 20 0 128840 6564 4180 5 0.0 0.7 012.28 systemd 2 root 20 0 0 0 5 0.0 0.0 0100.00 kthread 4 root 0 -20 0 0 0 5 0.0 0.0 0100.00 kthread
utilization of the environment for		0.07	centos-7 -c	6 root 20 0 0 0 0 5.0.0 0.0 6:80.05 ksoftinad/0 7 root rt 0 0 0 0 5.0.0 0.0 9 roto.05 ksoftinad/0 7 root rt 0 0 0 0 5.0.0 0.0 9 roto.05 mg/minimum (
each cluster			'top'	11 root rt 0 0 0 5 0.0 0.0 0:00:00 watchdog/0 13 root 20 0 0 0 5 0.0 0.0 0:00:00 kdetrhofg/0 14 root 0 -20 0 0 0 5 0.0 0.0 0:00:00 netrs 15 root 20 0 0 0 5 0.0 0.0 0:00:00 netrs
				16 root 20 0 0 0 5 0.8 0.6 0.6 0.10 xenbus 18 root 20 0 0 0 5 0.0 0.0 0 eride.00 khumptaskd 18 root 0 10 0 0 0 0 0 0 0 0.0 0 0.0 0 0 0 0 0
		1 h. +- (1 D)	kitahan ayaa	S Dillarm-cheft/cookbooks/larm_chef_Mtpcb_Mtcoen_exec_quittest1-core-centox-7 -C
*Diagnostic data able to be	Show read/write times <1	1 byte (1 B) copied,	kitchen exec sattest1-core-	*** Descrit common or sattesti-core-center-7,
written by the		0.000140971 s, 7.1 kB/s	centos-7 -c 'dd	
automation to the correct		3, 7.1 KD/3	if=/dev/zero	
cloud bucket	second		of=WriteSpeedT est.txt bs=1	
storage space		rtt	count=1' kitchen exec	PS Diler-theficosbosnilsen_thef_httpb: Nithon exec sattesil-core-centss-7 or plug of localised core-centss-7 or plug of localised core-centss-7.
Scaled Satellite		min/avg/max	sattest1-core-	The control of the co
Cluster latency	<30 millisecond	/mdev = 0.017/0.026/	centos-7 -c `ping -c 5	Describert plag statistic 5 parties typesides, 2 received, 50 aproxi June, time 3999a th storage parties - 2 01/2 place 200 a
	S	0.039/0.009	localhost'	
		ms		
Scaled Satellite Cluster latency	<30	rtt min/avg/max	kitchen exec sattest7-	PS C:\USers\fyfemm\learn-chef\cookbooks\learn_chef_httpd> kitchen exec sattest7- > Excute command on sattest7-erotos-7. PING localnost (127.0.0.1) 56(24) bytes of data. 64 hytes from transhort (137.0.0.1) is no general thind time-0 017 mc
between	S	/mdev =	centos-7 -c	64 bytes from localhost (127.0.0.1): [cmp_seq=1 ttl=64 time=0.017 ms 64 bytes from localhost (127.0.0.1): [cmp_seq=2 ttl=64 time=0.026 ms 64 bytes from localhost (127.0.0.1): [cmp_seq=3 ttl=64 time=0.037 ms 64 bytes from localhost (127.0.0.1): [cmp_seq=4 ttl=64 time=0.025 ms
gateway/scaled clusters and		0.017/0.026/ 0.037/0.007	'ping -c 5 localhost'	64 bytes from localhost (127.0.0.1): icmp_seq=5 ttl=64 time=0.027 ms localhost ping statistics
core		ms		5 packets transmitted, 5 received, 0% packet loss, time 4000ms rtt min/avg/max/mdev = 0.017/0.026/0.037/0.007 ms



Scaled Satellite Cluster latency between scaled clusters and environment	<30 millisecond s	rtt min/avg/max /mdev = 14.838/14.86 6/14.908/0.1 36 ms	playgw-centos-	Ps. Dilearning Price (Control of Control of
Pull time from the scaled clusters and initialization time	15-30 minutes for each cluster	16m.28s	kitchen create kitchen converge	Distance control of Conform Interest Conform Interest Conformation Con

