HOW NETFLIX AUTOSCALES CI

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WHAT DOES CI LOOK LIKE AT NETFLIX

JENKINS @ NETFLIX

- 35 Jenkins controllers
- ~45k job definitions
- ~600k builds per week
- 650-1500 agents
- 1-100 executors per agent

THE SPINNAKER VIEW

- 1 Application
- 35 stacks (Controller Clusters)
- 180 Agent Clusters
- 1+ ASG per cluster
- All workloads on AWS

CLUSTERS AND ASGS

- AWS has Auto Scaling Groups
- Spinnaker calls them Server Groups
- `<Application>-<Stack>-<Detail>-v<Version>`
- `jenkins-unstable-agent-highlander-`

HOW TO PLAN FOR CI INFRASTRUCTURE

INFINITE RESOURCES

- **P**rovision capacity based on known maximum load
- Multiply by a safety factor for good measure
- Monitor and change the capacity as load increases

INFINITE PATIENCE

- **P**lan capacity based on median load
- Builds will sit in queue for long times

INSTANT RESOURCES

- You will get resources as soon as you request for them
- **W**orks well with Containerizable builds
- Not all builds can be containerized
- **D**oes not scale well with large numbers of short-lived builds

AUTOSCALING

- Set up minimum and maximum capacity
- Scale based on some metric

WHAT METRIC TO USE

SYS**TE**M M**ET**RICS

C**PU**/Memory/**D**isk I**O**/Network throughput

- Natively supported by cloud providers and most metrics solutions

Scaling **P**olicies are supported by cloud providers

SYSTEM METRICS

Not very useful for CI

QUEUE DEPTH

Queue **D**epth seems adequately proportional.

However, it is a trailing metric.

AGENT UTILIZATION

For each agent, find [idle, busy, offline] executors.

Sum these up by ASG.

Compute utilization as $\frac{busy + offline}{busy + offline + idle}$

MEASURING AGENT UTILIZATION

AN AGENT'S ASG

When launching agents, use labels to specify the placement of the agent.

CA**PTU**RING M**ET**RICS

We wrote a custom plugin that plays well with Atlas.
You could write one for whatever your metrics capturing service is.

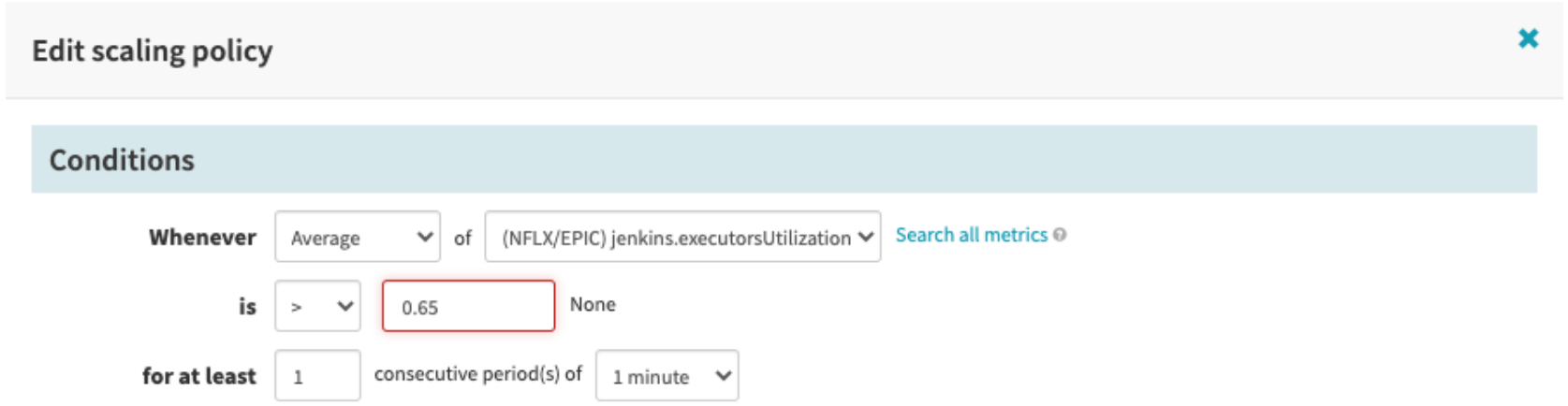
AUTOSCALING

HOW TO AUTOSCALE

AWS offers 2 ways to scale

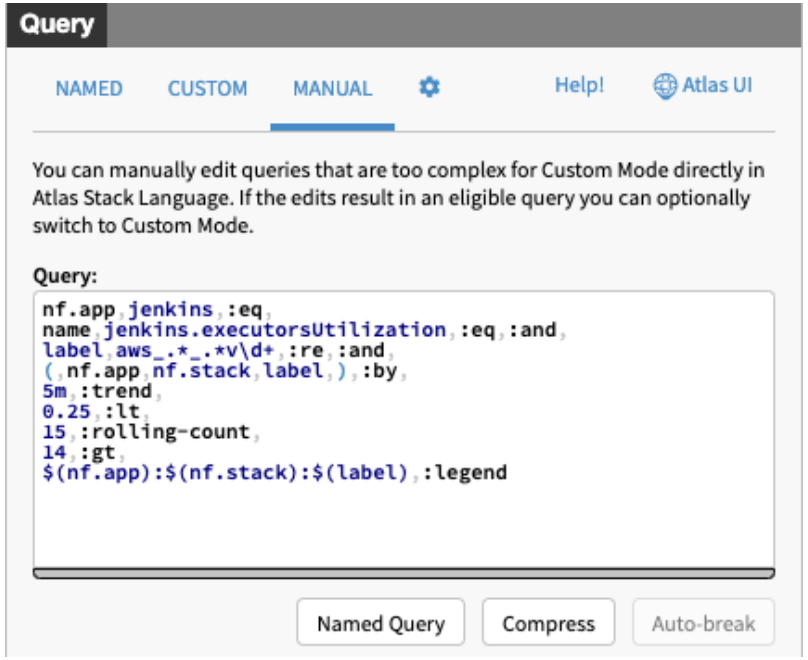
- Target Tracking
- Step Scaling

WHEN TO SCALE UP



HOW TO SCALE UP

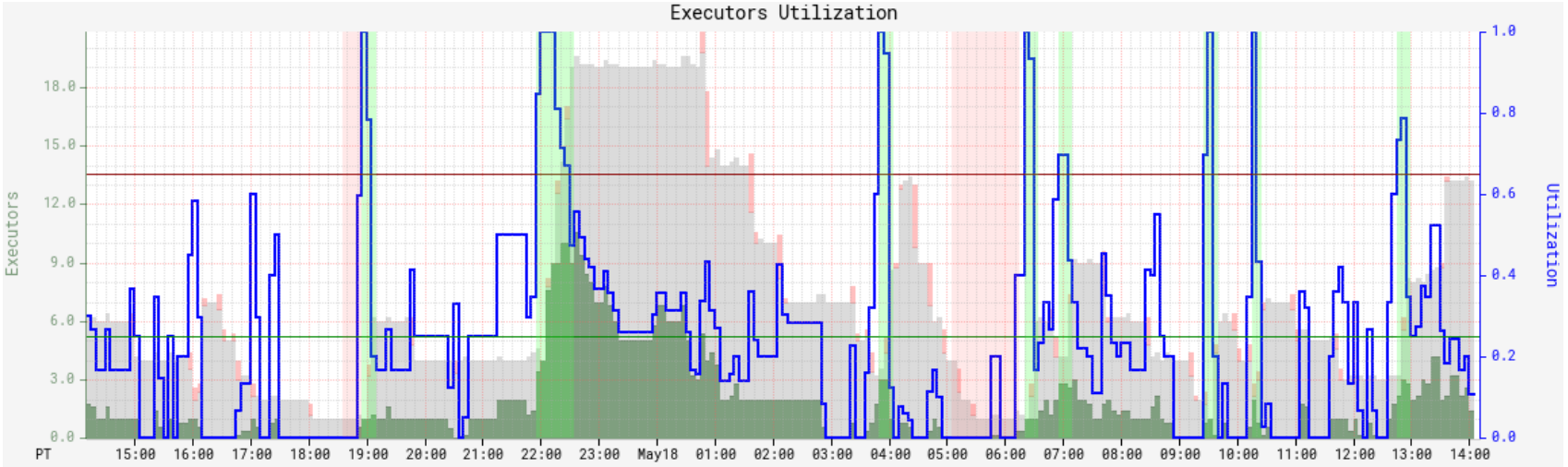
WHEN TO SCALE DOWN



HOW TO SCALE DOWN

Controller	ASG	Exception	Idl	Tot	Rto	IC	TC	ZC	Count
jenkins/mce	test/us-east-1/jenkins-mce-bionic_classic-1-v020		19	20	6	6	6	6	6
	OK i-091aa9055f8dac251								
	OK i-08aeaf14573f2653d								
	OK i-04414343adb901c59								
	OK i-06a513fe9d989f10a								
	OK i-0f6e7eec07f0c3421								
	OK i-007fe724966b114bc								
	Terminate and shrink 6								

RECAP



Axis 0: Executors

busy
Max : 10.600 Min : 0.000
Avg : 1.663 Last : 1.400
Tot : 477.300 Cnt : 287.000

idle
Max : 16.000 Min : 0.000
Avg : 5.206 Last : 11.800
Tot : 1.494k Cnt : 287.000

offline
Max : 3.800 Min : 0.000
Avg : 176.539m Last : 0.000
Tot : 50.667 Cnt : 287.000

Axis 1: Utilization

Utilization
Max : 1.000 Min : 0.000
Avg : 242.190m Last : 107.692m
Tot : 69.509 Cnt : 287.000

Scale Up Threshold
Max : 650.000m Min : 650.000m
Avg : 650.000m Last : 650.000m
Tot : 187.200 Cnt : 288.000

Scale Down Threshold
Max : 250.000m Min : 250.000m
Avg : 250.000m Last : 250.000m
Tot : 72.000 Cnt : 288.000

Scale Up Zone
Max : 1.000 Min : 0.000
Avg : 97.222m Last : 0.000

WHAT WE LEARNT

- This improved support experience
- This improved the experience for spiky workloads

THANK YOU!

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