HOW NETFLIX AUTOSCALES CI

Rahul Somasunderam

WHAT DOES CI LOOK LIKE AT NETFLIX

How Netflix Autoscales CI

Rahul Somasunderam, cdCon 2021

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

C**LU**S**TE**RS AN**D** ASGS

- A**W**S has Auto Scaling Groups
- Spinnaker calls them Server Groups
- `<Application>-<Stack>-<Detail>-v<Version>`
- `jenkins-unstable-agent-highlander-v123`

HOW TO PLAN FOR CI INFRASTRUCTURE

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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

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

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 AG**E**N**T’**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

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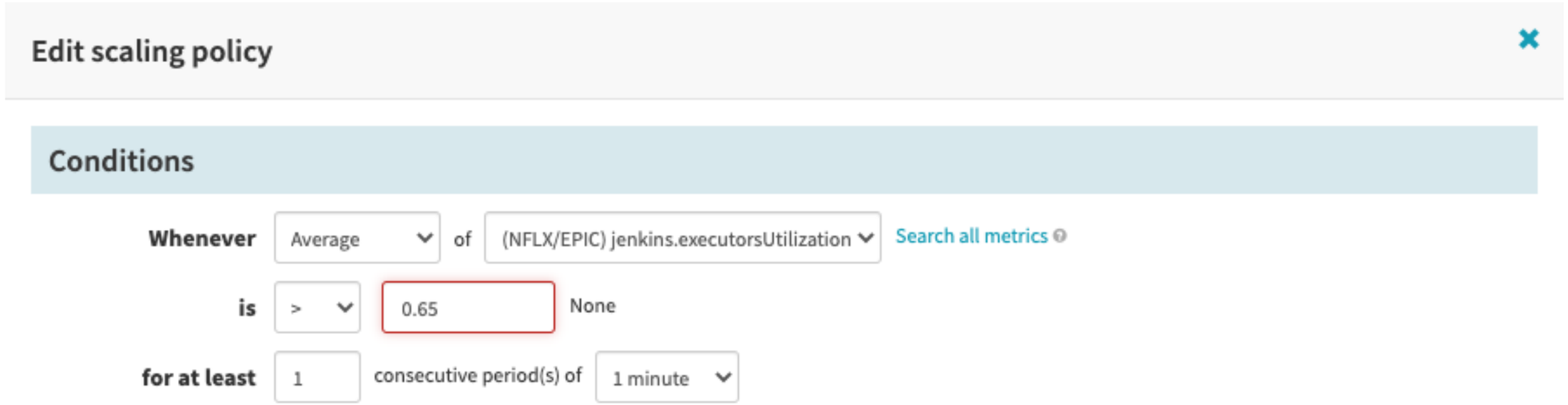
H**OW TO** A**UTO**SCA**LE**

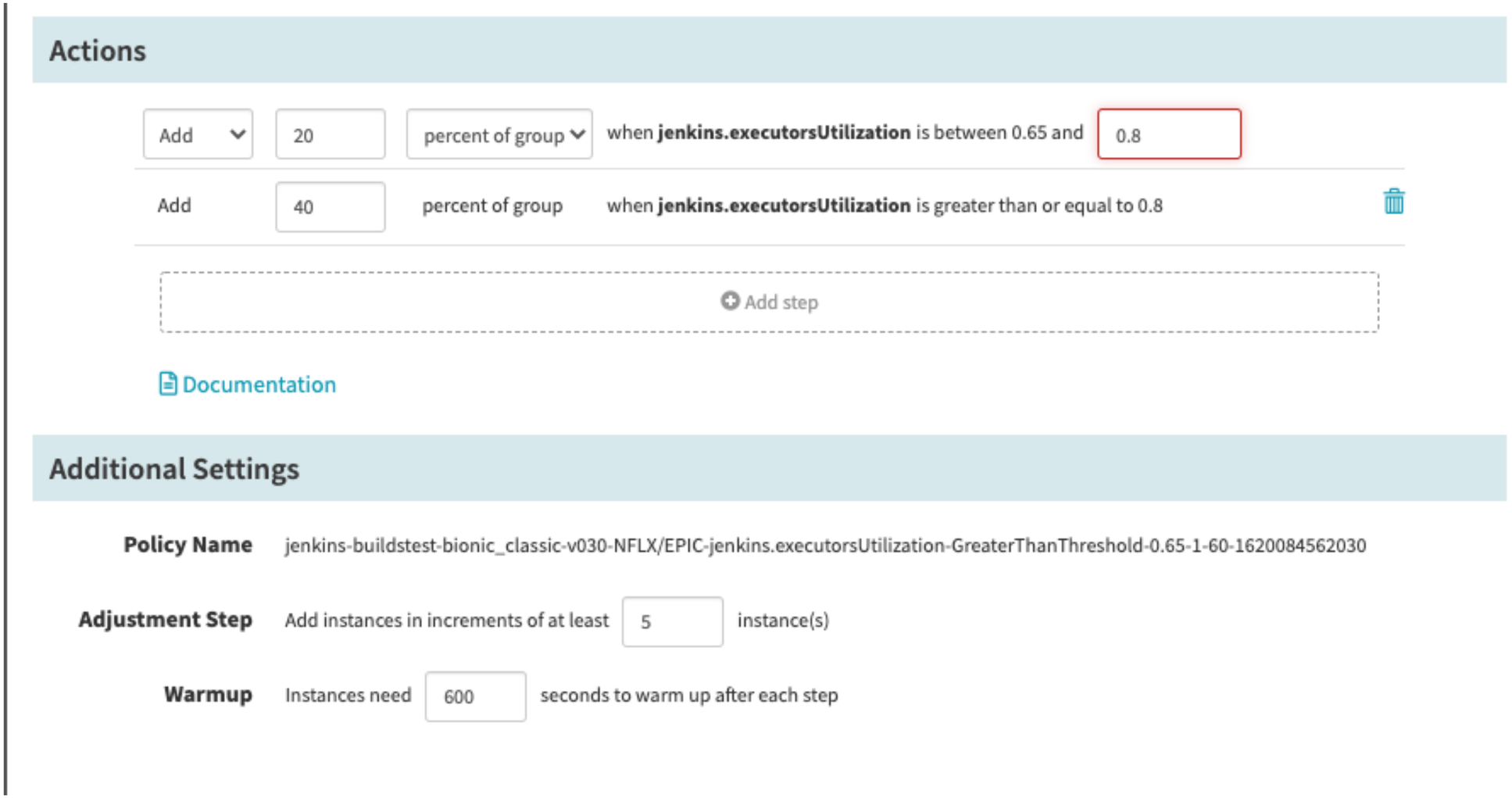
A**W**S offers 2 ways to scale

- **T**arget **T**racking
- Step Scaling

WHEN TO SCALE UP



HOW TO SCALE UP



WHEN TO SCALE DOWN

Query

NAMED CUSTOM MANUAL Help! Atlas UI

You can manually edit queries that are too complex for Custom Mode directly in Atlas Stack Language. If the edits result in an eligible query you can optionally switch to Custom Mode.

Query:

```
nf.app,jenkins,:eq,
name,jenkins.executorsUtilization,:eq,:and,
label,aws_.*_.*v\d+,:re,:and,
(,nf.app,nf.stack,label,),:by,
5m,:trend,
0.25,:lt,
15,:rolling-count,
14,:gt,
$(nf.app):$(nf.stack):$(label),:legend
```

Named Query Compress Auto-break

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

WHAT WE LEARNT

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

THANK YOU!

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