

Multi Architectural Kubernetes clusters

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Your Speaker Today:

- Reza Ramezanpour – Developer Advocate @ Tigera (Project Calico)
- I like taking long hours to bang my head against the table and figure things out.
- I'm always learning. Let's connect!



Agenda



- Project Calico overview
- What is a multi architectural cluster?
- Demo (EKS multiarch cluster)
- Benchmark

01

Calico overview



What is Project Calico?



PROJECT CALICO

<https://projectcalico.org>

 [@projectcalico](https://twitter.com/projectcalico)

 <https://github.com/projectcalico/community>

 <https://slack.projectcalico.org>

 <https://discuss.projectcalico.org>

6000+

Slack channel members

150+

Contributors

1,000,000+

Nodes powered by Calico every day

02

What is a multi architectural cluster?

What are the benefits?

Different workloads can run more efficiently using different architectures.



What is a multi architecture cluster?

Single architecture cluster

NAME	STATUS	ROLES	AGE	VERSION	ARCH
ip-192-168-21-147.us-west-2.compute.internal	Ready	<none>	2m8s	v1.21.2-eks-55daa9d	amd64
ip-192-168-43-193.us-west-2.compute.internal	Ready	<none>	2m13s	v1.21.2-eks-55daa9d	amd64

Multi architecture cluster

NAME	STATUS	ROLES	AGE	VERSION	ARCH
ip-192-168-21-147.us-west-2.compute.internal	Ready	<none>	19m	v1.21.2-eks-55daa9d	amd64
ip-192-168-43-193.us-west-2.compute.internal	Ready	<none>	19m	v1.21.2-eks-55daa9d	amd64
ip-192-168-71-32.us-west-2.compute.internal	Ready	<none>	13m	v1.21.2-eks-55daa9d	arm64

What is ARM?

ARM Ltd is based in UK



What is the difference between ARM and x86?

C

```
...  
int a = 3;  
int b = 2;  
a = a * b;  
...
```

X86

```
...  
0x00001155 mov dword [var_8h], 3  
0x0000115c mov dword [var_4h], 2  
0x00001163 mov eax, dword [var_8h]  
0x00001166 imul eax, dword [var_4h]  
0x0000116a mov dword [var_8h], eax  
0x0000116d mov eax, dword [var_8h]  
0x00001170 mov esi, eax  
0x00001172 lea rdi, [0x00002004]; const char *format  
0x00001179 mov eax, 0  
...
```

ARM

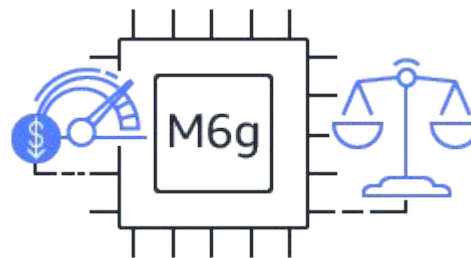
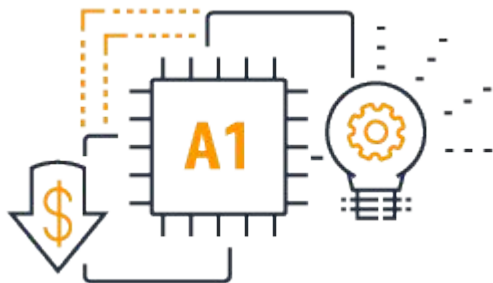
```
...  
0x00000784 ldr w1, [var_18h]; 0x18  
0x00000788 ldr w0, [var_1ch]; 0x1c  
0x0000078c mul w0, w1, w0  
0x00000790 str w0, [var_18h]  
...
```

Who uses ARM?

- Smartphones
- Tablets
- Laptops
- Supercomputers (Fugaku powered by A64FX)

What about the cloud?

AWS custom processor is called Graviton



Cost saving

m6g.large

Amazon EC2 estimate

Amazon Elastic Block Storage (EBS) total cost (monthly)	8.99 USD
Amazon EC2 On-Demand instances cost (monthly)	56.21 USD
Total monthly cost:	65.20 USD

Cancel

Add to my estimate

8GB RAM
30GB storage
Up to 10 Gbps

m5.large

Amazon EC2 estimate

Amazon Elastic Block Storage (EBS) total cost (monthly)	8.99 USD
Amazon EC2 On-Demand instances cost (monthly)	70.08 USD
Total monthly cost:	79.07 USD

Cancel

Add to my estimate

8GB RAM
30GB storage
Up to 10 Gbps

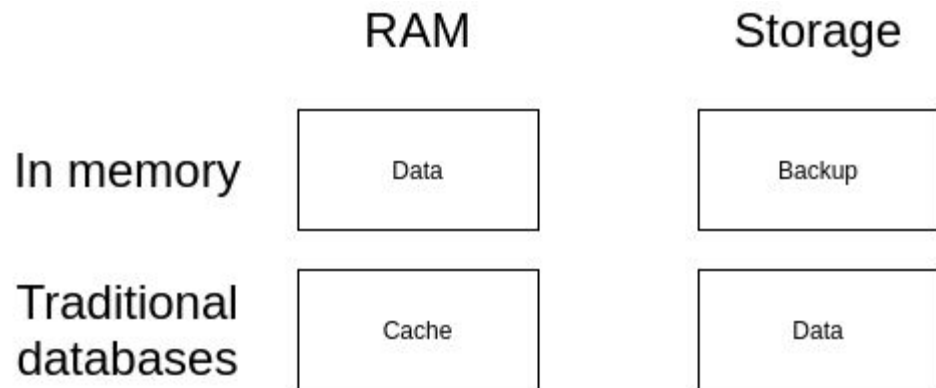
03

Demo

04

Benchmark

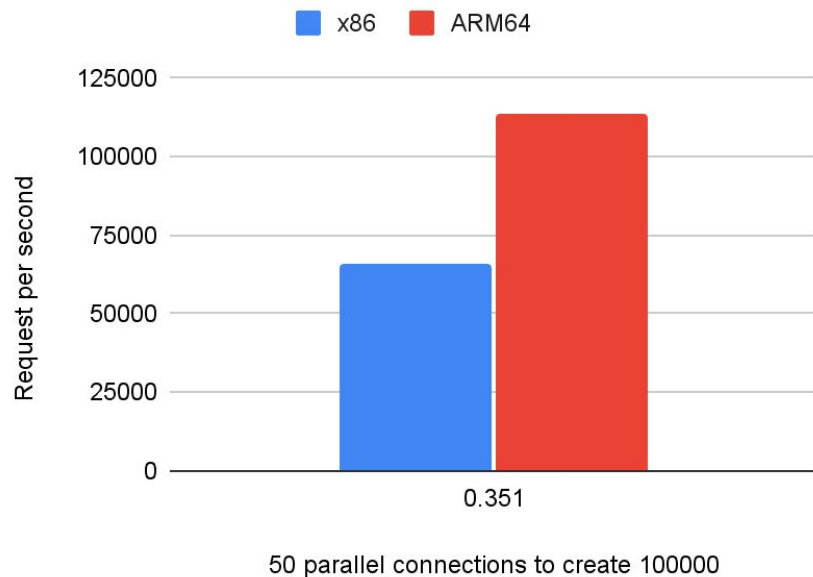
In memory databases vs Traditional databases



Redis benchmarks

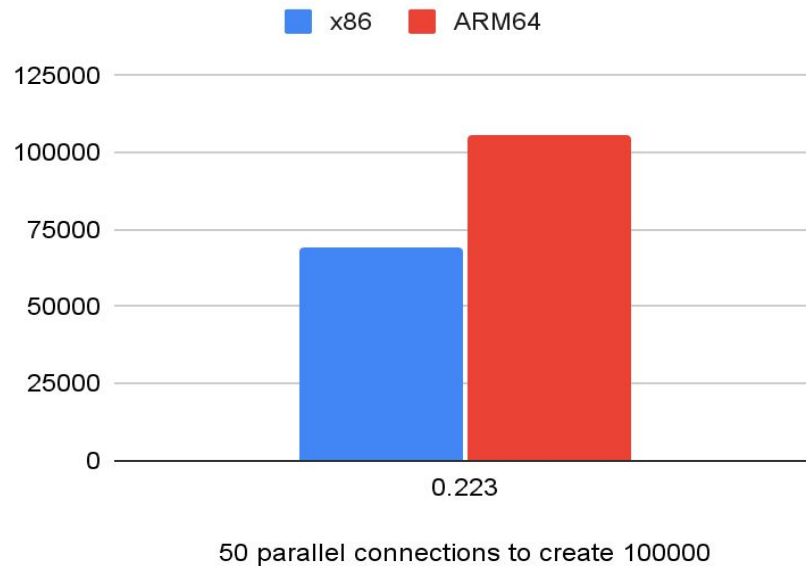
Redis SET Operation

Higher is better



Redis GET Operation

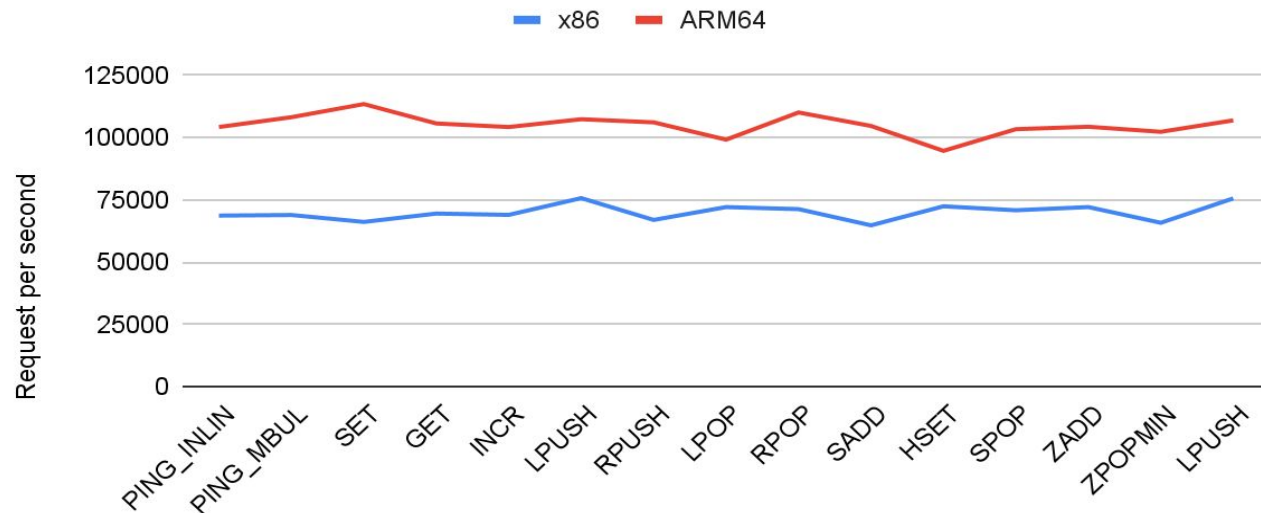
Higher is better



Redis benchmarks

Redis x86 vs ARM64

Higher is better



50 parallel connections to create 100000

Do-It-Yourself Resources

Stuff used for the demo:

<https://github.com/frozenprocess/Tigera-Presentations/tree/master/2021-09-24.Akraino.Multiarch.clusters>

When things are not working:

Github: <https://github.com/frozenprocess>

Twitter: <https://twitter.com/fr0zenprocess>

Linkedin: <https://www.linkedin.com/in/rramezanpour/>



Credits

Price estimation created using amazon ec2 estimation utility

<https://calculator.aws/>

Redis benchmarks created using

<https://redis.io/topics/benchmarks>

Cluster created using eksctl

<https://eksctl.io/>

Binfmt_misc

<https://www.kernel.org/doc/html/latest/admin-guide/binfmt-misc.html>

ARM

<https://developer.arm.com/documentation/102404/latest>



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