Multi Architectural Kubernetes clusters

Wed, Dec 08, 2021

Reza Ramezanpour - Developer advocate @ Tigera (Project Calico)

Your Speaker Today:

- Reza Ramezanpour - Developer Advocate @ Tigera (Project Calico)
- I like staring at binary files until I can spot decimal numbers in them.
- I’m always learning. Let’s connect!

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Agenda

- Project Calico overview
- What is a multi architectural cluster?
- Benchmarks
- Demo (Cluster setup)
- How to create ARM containers
- Demo (Preparing for ARM)

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01

Calico overview

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What is Project Calico?

- Free
- Open source
- Networking and security solution
- Much much more!

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PROJECT CALICO

https://projectcalico.org

@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

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02

What is a multi architectural cluster?

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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?

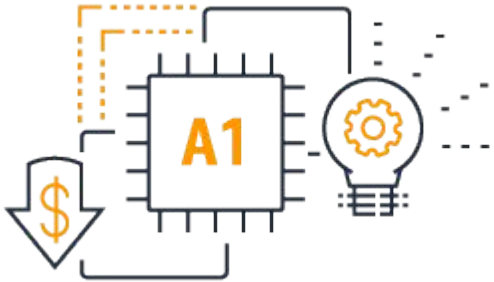
x86 vs ARM

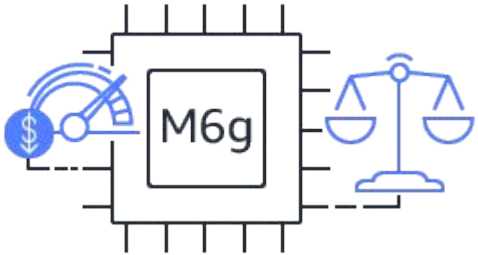
Who uses ARM?

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

What about the cloud?

AWS custom processor is called Graviton





Cost saving

m6g.large

8GB RAM
30GB storage
Up to 10 Gbps

m5.large

8GB RAM
30GB storage
Up to 10 Gbps

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03

Benchmarks

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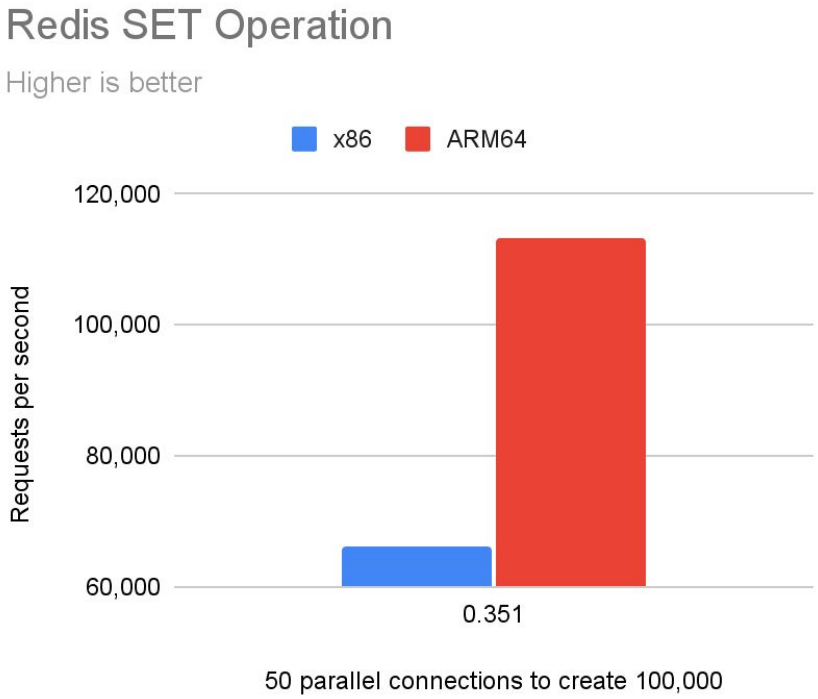
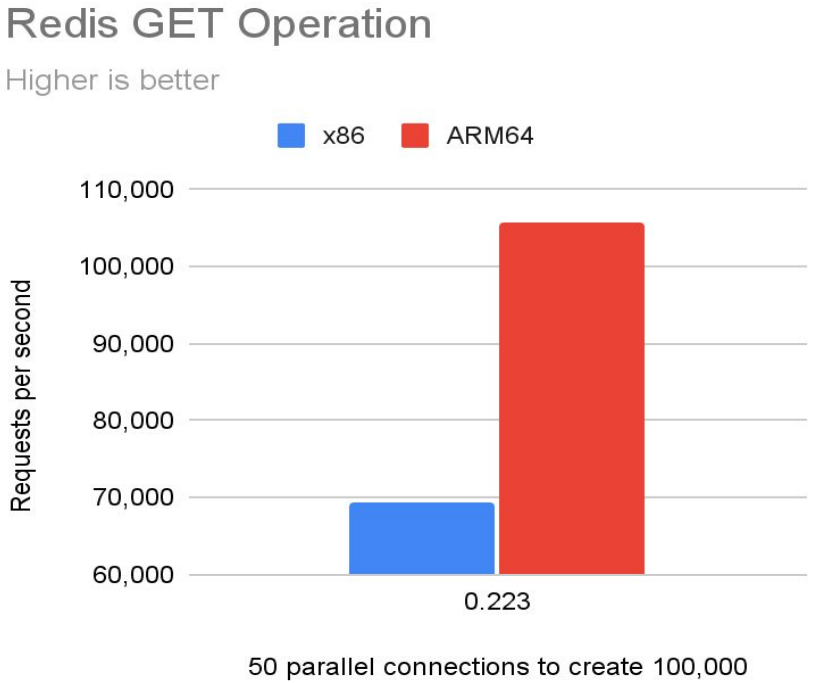
Redis benchmarks





Only CPU architecture is different.

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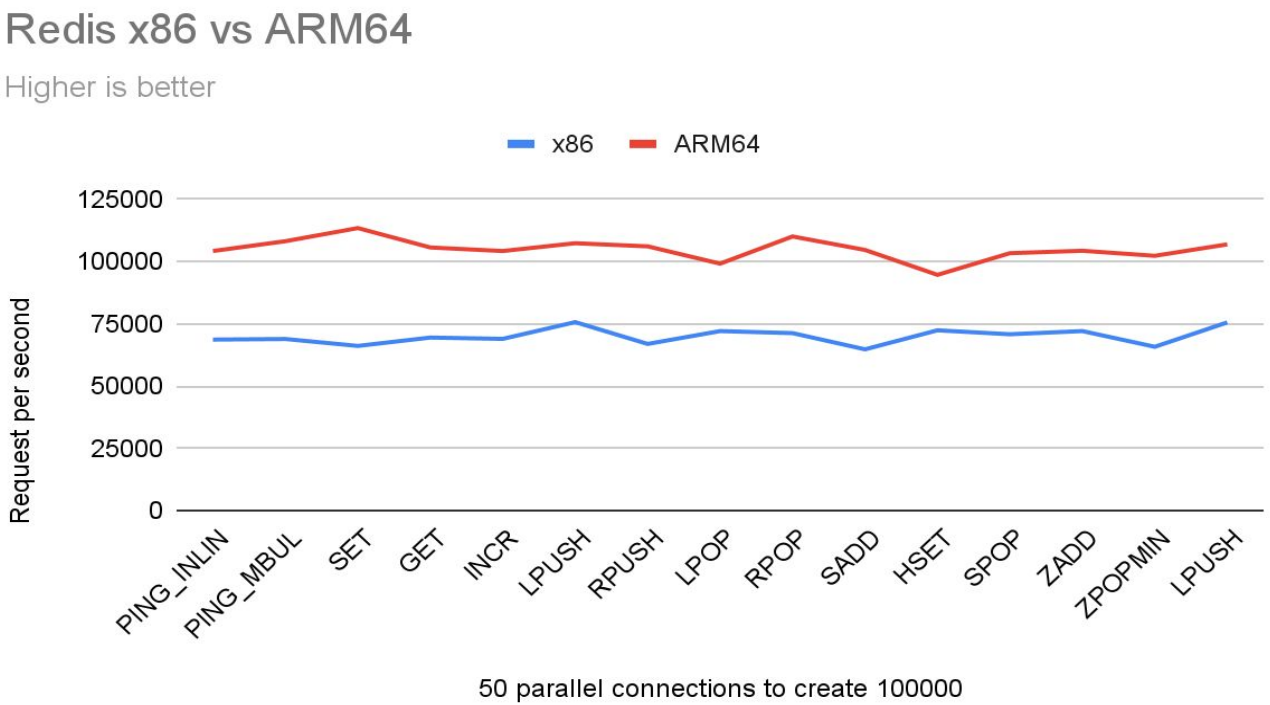
Redis benchmarks



Only CPU architecture is different.

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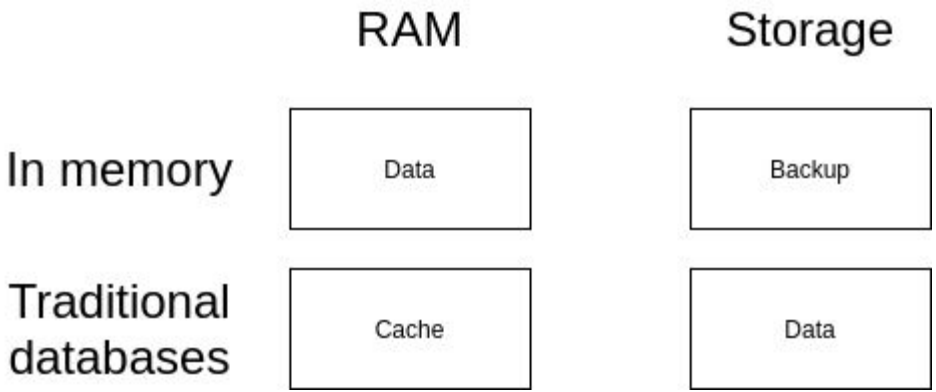
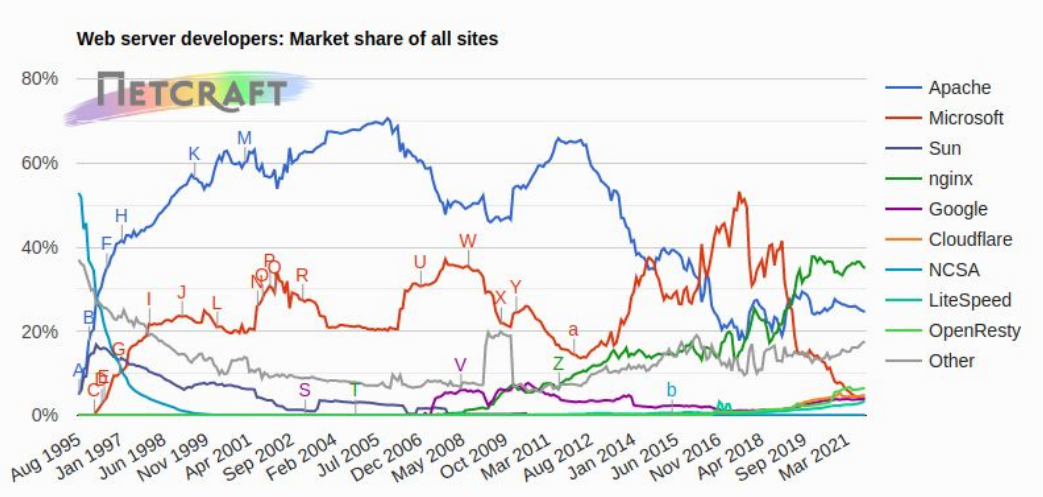
In memory databases vs Traditional databases

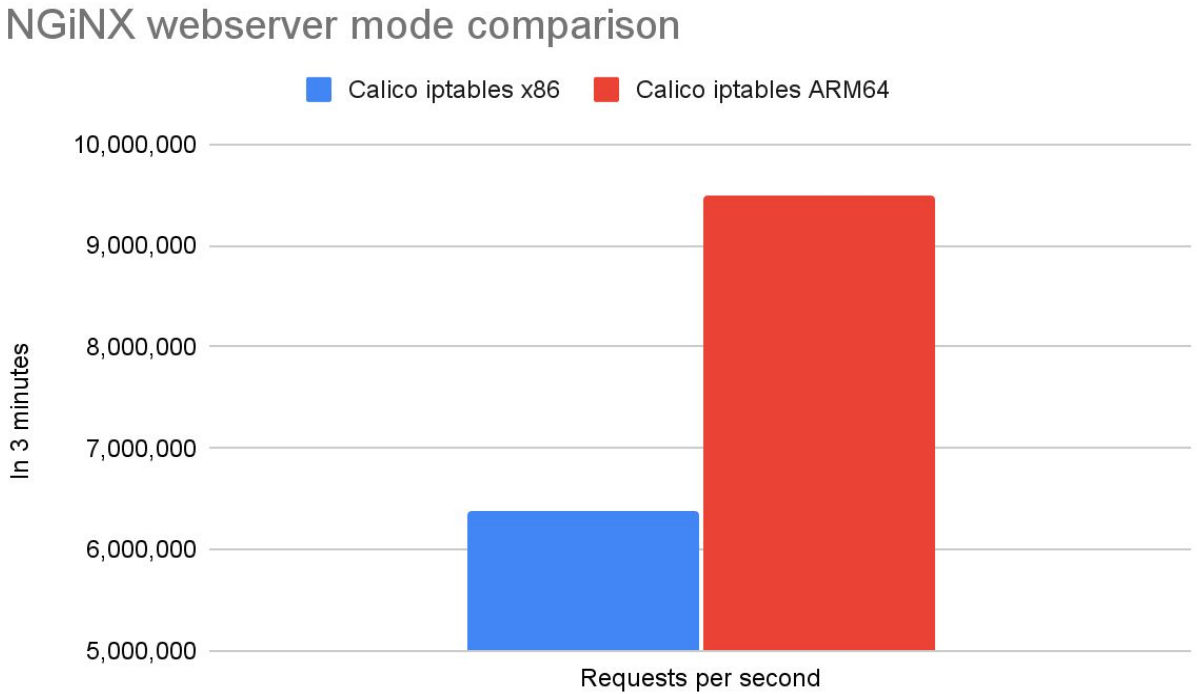


Webserver, Reverse proxy and Caching

- Reverse proxy with caching
- IPv6
- Load balancing
- And much more!



NGiNX benchmarks



Only CPU architecture is different.

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Demo

Cluster setup

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How to create ARM containers

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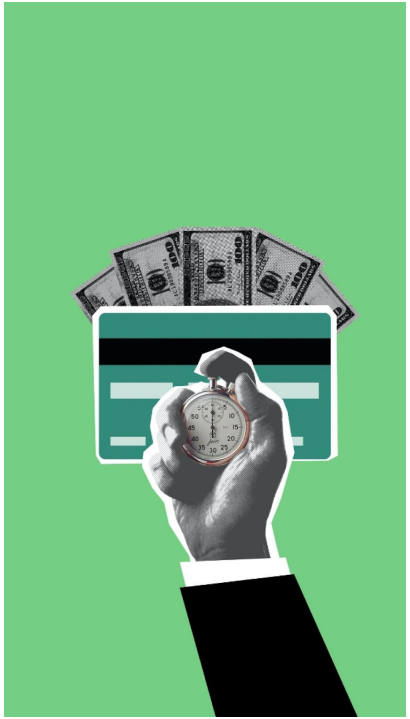
Let’s not start from scratch

Preparing for ARM could be

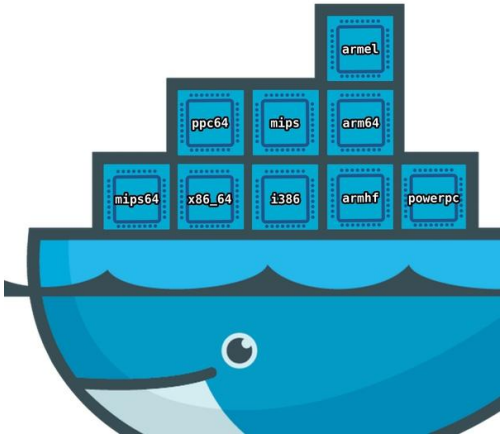
- Fast
- Cheap
- One command away



Linux kernel can solve everything

Linux can run any binary with

- Magic
- Interpreter



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Google microservice demo

Online Boutique is composed of 11 microservices.

frontend	Go
cartservice	C#
paymentservice	Node.js

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Demo again!

Converting Google microservices

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Do-It-Yourself Resources

Stuff used for the demo:

https://github.com/frozenprocess/Tigera-Presentations/tree/master/2021-12-06.CNCF-Multiarch.migration

Stuff to create redis and NGiNX benchmarks:

https://github.com/frozenprocess/Tigera-Presentations

When things are not working:

Github: https://github.com/frozenprocess

Twitter: https://twitter.com/fr0zenprocess

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

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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/

Netcraft NGiNX survey
https://news.netcraft.com/archives/2021/10/15/october-2021-web-server-survey.html
---
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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Questions?
Thank you!

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