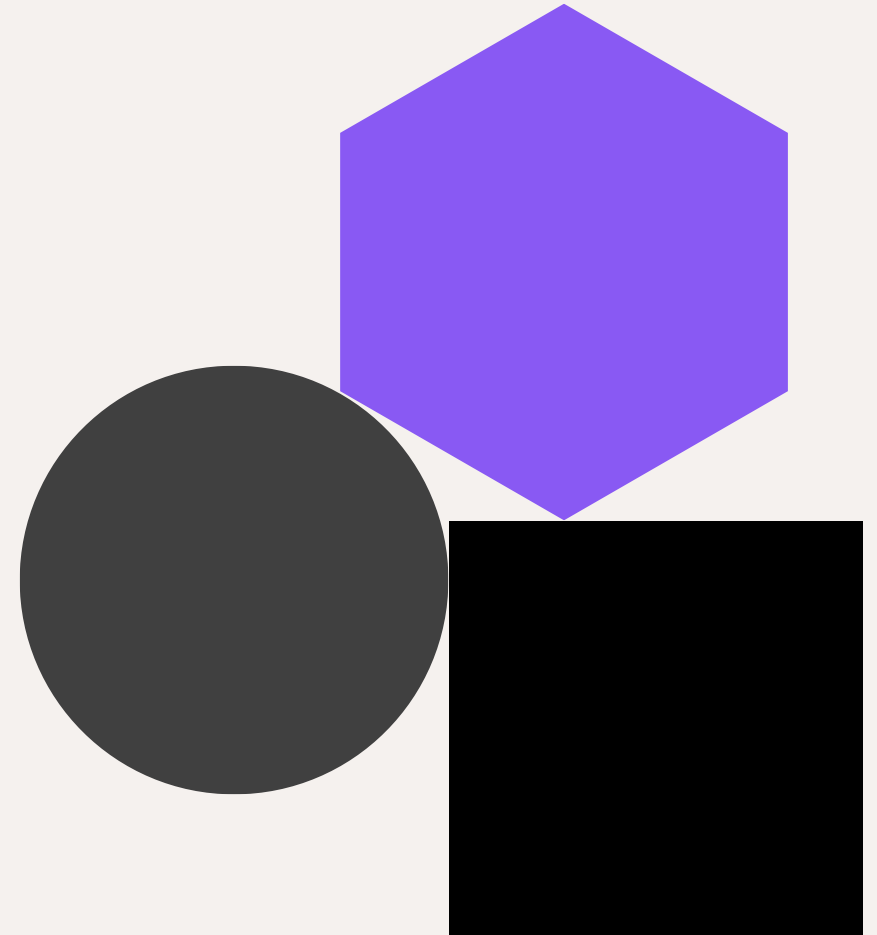




# CHERI performance



Dr Carl Shaw

CHERItech'25, November 2025

→ Product selection



## → Product selection



Ford UK (modified!)

## → Product selection



Fuel efficiency

Speed

Price

Safety

Security

Delivery time

## **"Job to be done" (JTBD)**

People buy products that meet their needs to do something specific

→ Job to be done



Photo by [serjan midili](#) on [Unsplash](#)



Photo by [Caleb White](#) on [Unsplash](#)



Photo by [Philip Myrtorp](#) on [Unsplash](#)

→ Job to be done



Photo by [Gabriel Tovar](#) on [Unsplash](#)



**If two cars meet our needs but one has lower performance and higher fuel costs – would you buy it?**



# → Electronic product development



Fuel efficiency

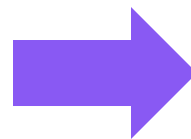
Speed

Price

Safety

Security

Delivery time



**Power**

**Performance**

**Area**

Safety

Security

Schedule

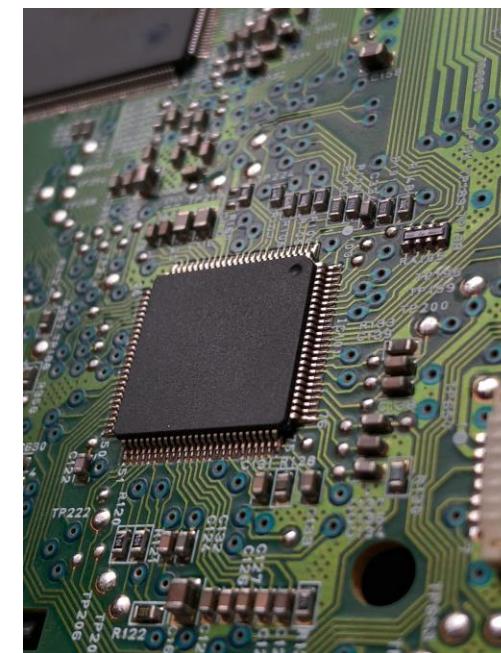


Photo by [alerkiy](#) on [Unsplash](#)

→ CHERI compute  
performance

## → The Hardware

### Microarchitecture

- **Design for CHERI, don't retrofit**

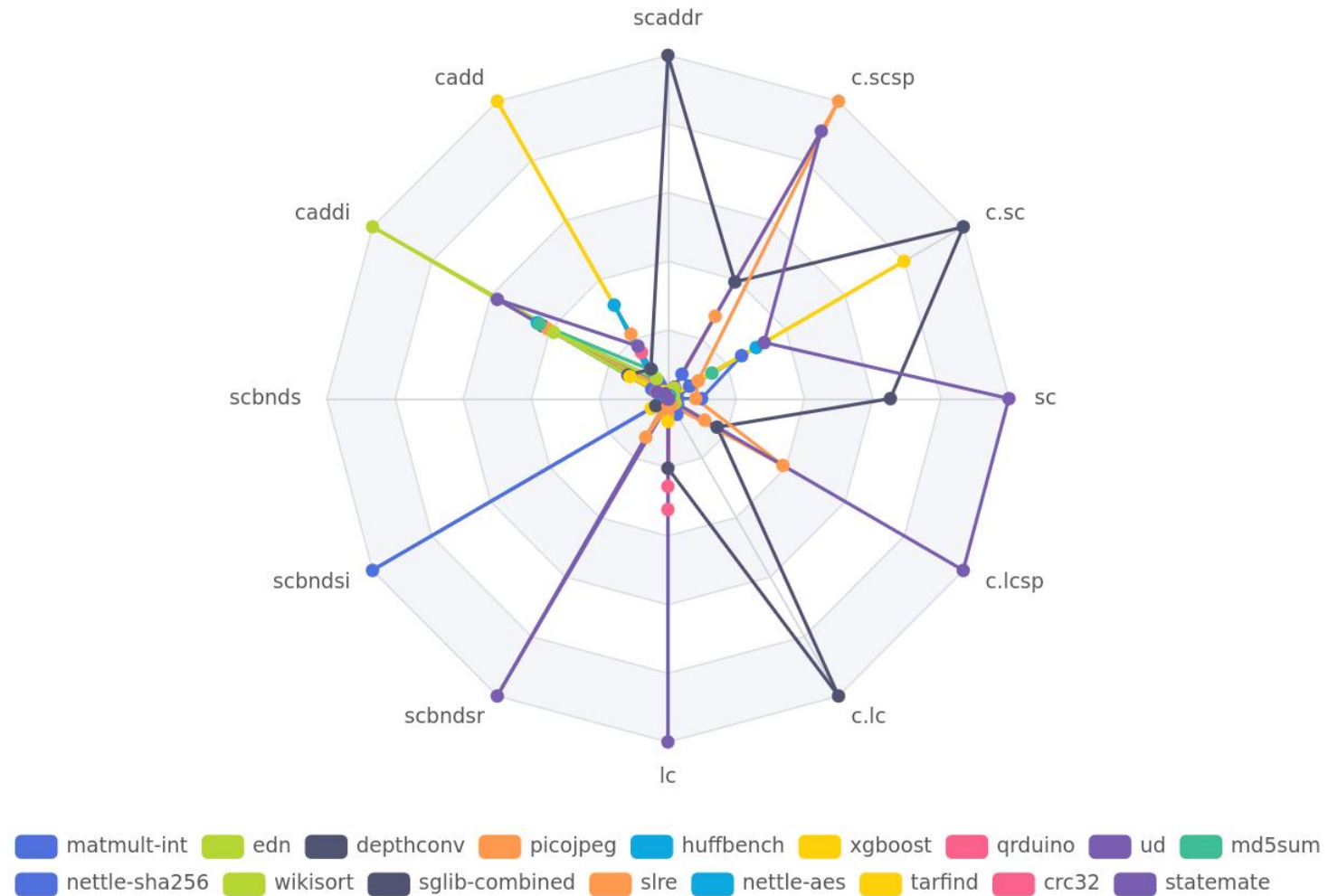
- Design
- Model
- Iterate

Make data-driven decisions

## → The Hardware

### Microarchitecture

CHERI instruction use in embench 2.0



## → The Hardware

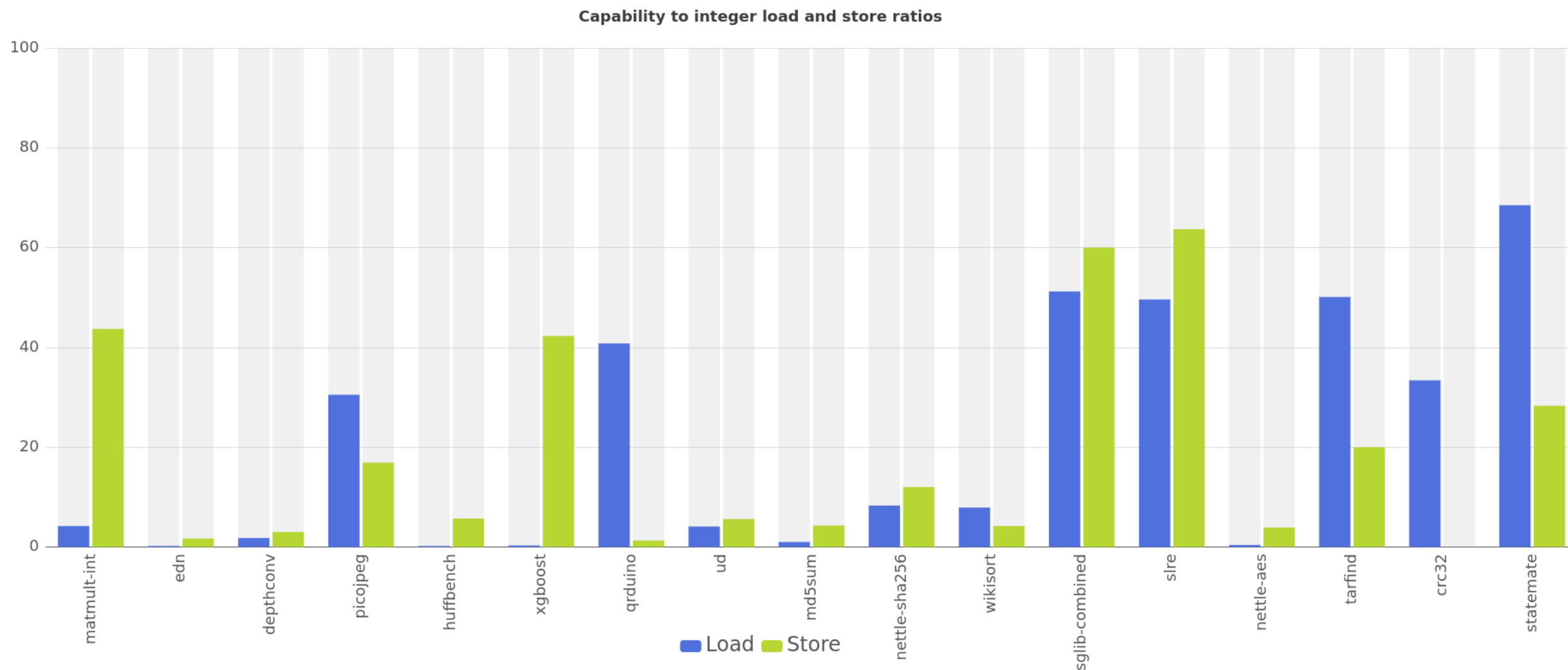
- **CHERI is not just the core**

- Memory tagging
- Revocation

Microarchitecture

System architecture

# → The Hardware



## → The Architecture

- **Optimise the ISA**

- CHERI-RISC-V specification
- Evolving use cases

Microarchitecture

System architecture

ISA

CHERI needs hardware/software co-design



## → The Compiler

- **Optimise the compiler**

- Best use of ISA
- Microarchitecture specific

Microarchitecture

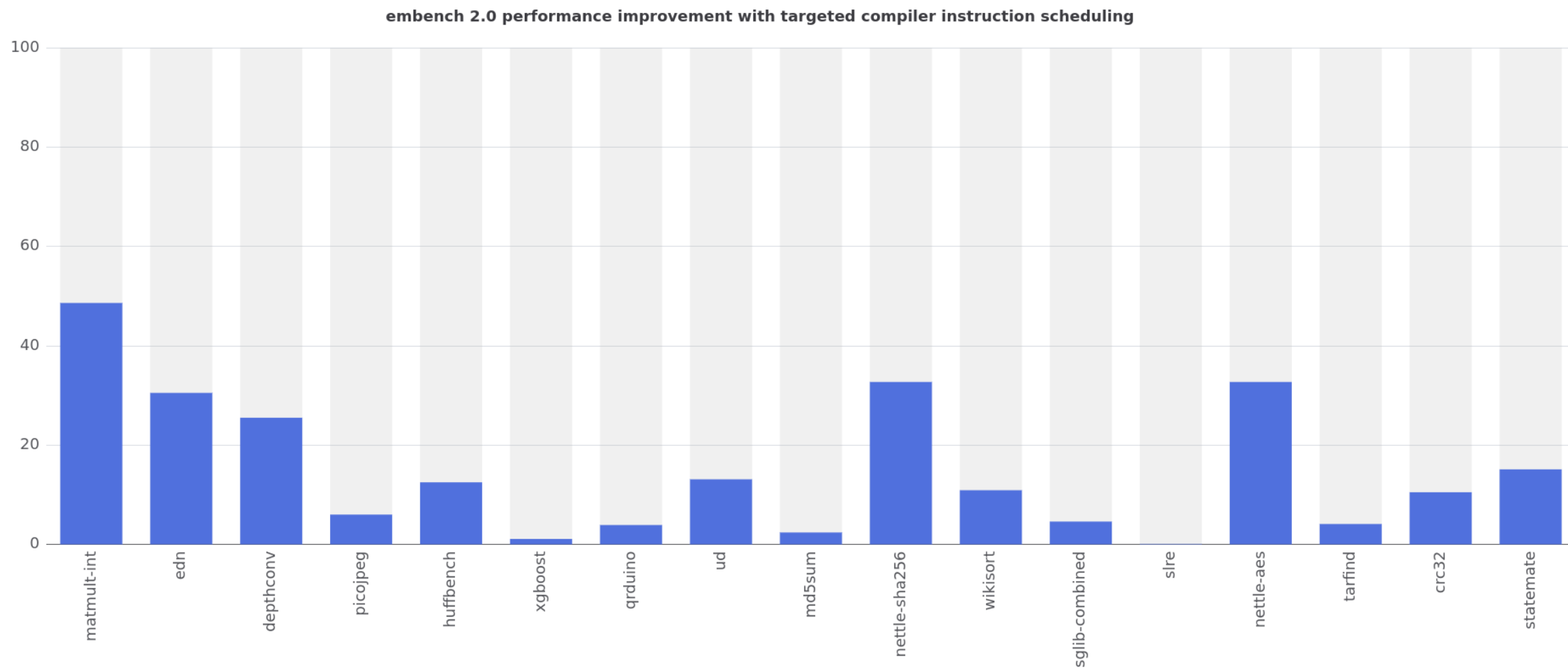
System architecture

ISA

Compiler

Can we use the hardware more effectively?

# → The Compiler



## → The Software

- **Optimise the software**

- Common functions and libraries
- It must be easy for people to use

Microarchitecture

System architecture

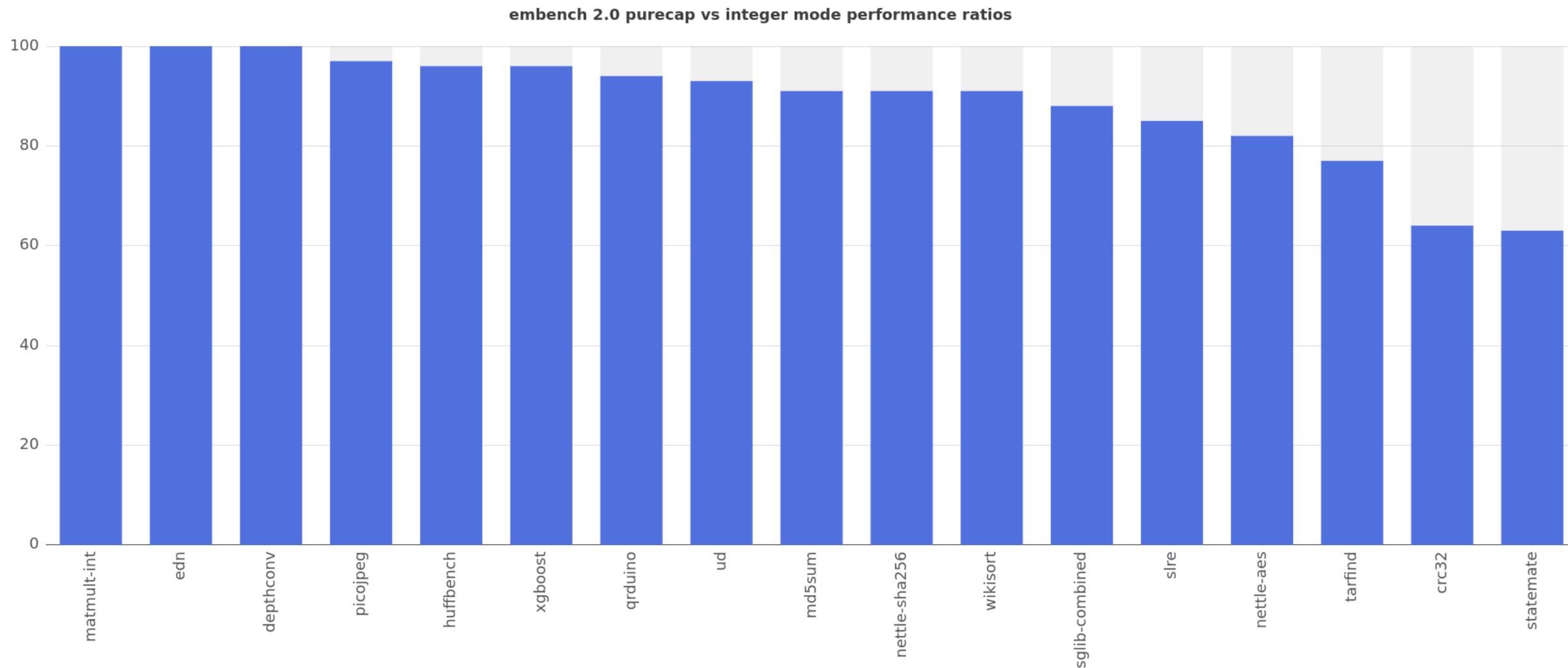
ISA

Compiler

Software

What can we remove from software when we have CHERI?

# → The Results



→ Change how we do things

- **Is modern hardware and software up to the job?**

And how can CHERI help ?

Microarchitecture

System architecture

ISA

Compiler

Software

**Evolve**



Thank you!

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