

26 March 2026



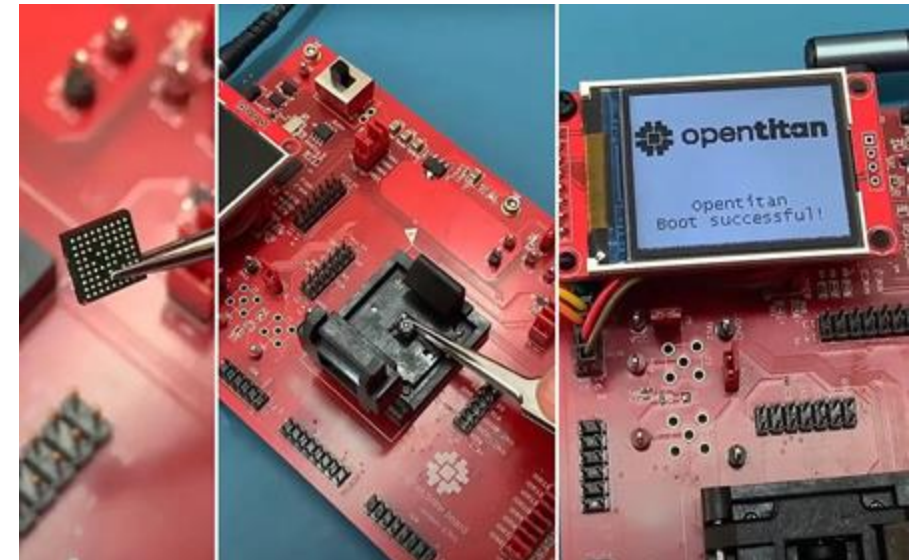
CHERI Mocha

An open-source, memory-safe compute subsystem

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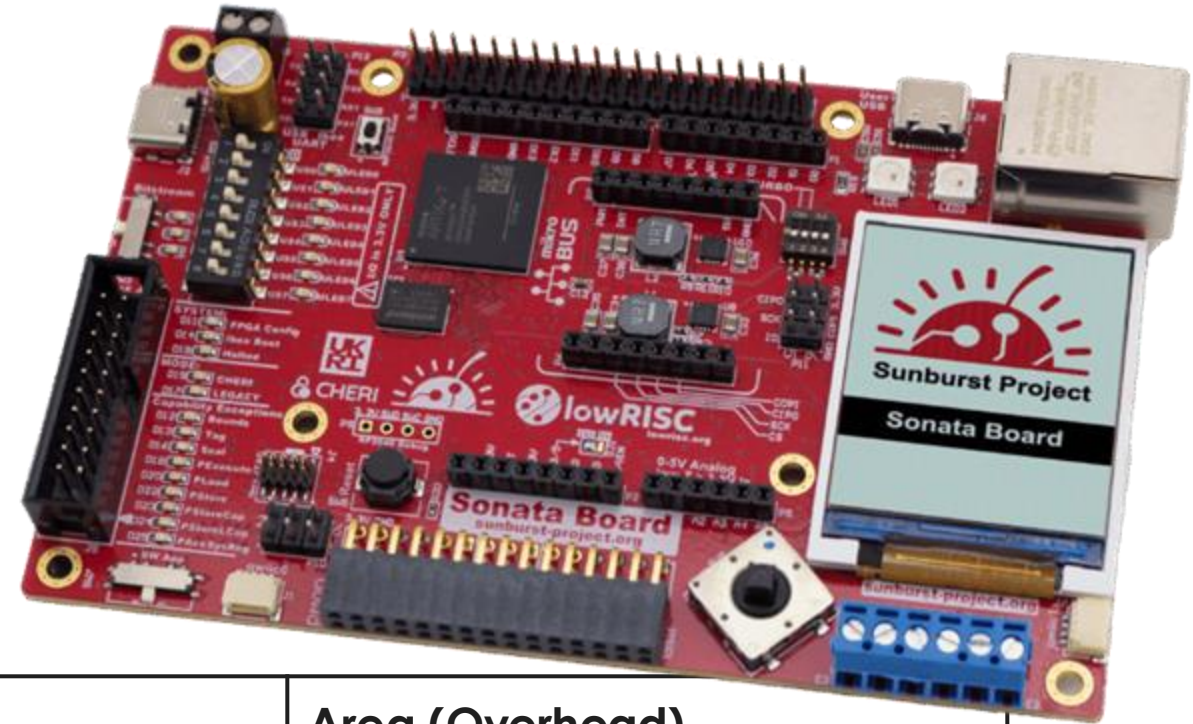
Open designs for technology deployment

- Lower the barriers to adoption
 - Cost
 - Technology risk
 - Business risk
- Coordinate efforts
 - RISC-V standardization
 - Implement once, use many times
 - Platform for SW/HW integration



Open silicon and impact on CHERI

- IP: CHERIoT-Ibex
- Reference design
- Eval board: Sonata
- Software stacks, benchmarks
- Finally... chips



| Configuration | Area (kGE) | Area (Overhead) |
|---------------|------------|-----------------|
| Ibex | 57 | Baseline |
| Ibex+PMP | 81 | Baseline +42% |
| Ibex+CHERIoT | 90 | Baseline +57% |

COSMIC project

- CHERI-enabled, OS capable, 64-bit secure enclave
- Kicked off in Oct 2025

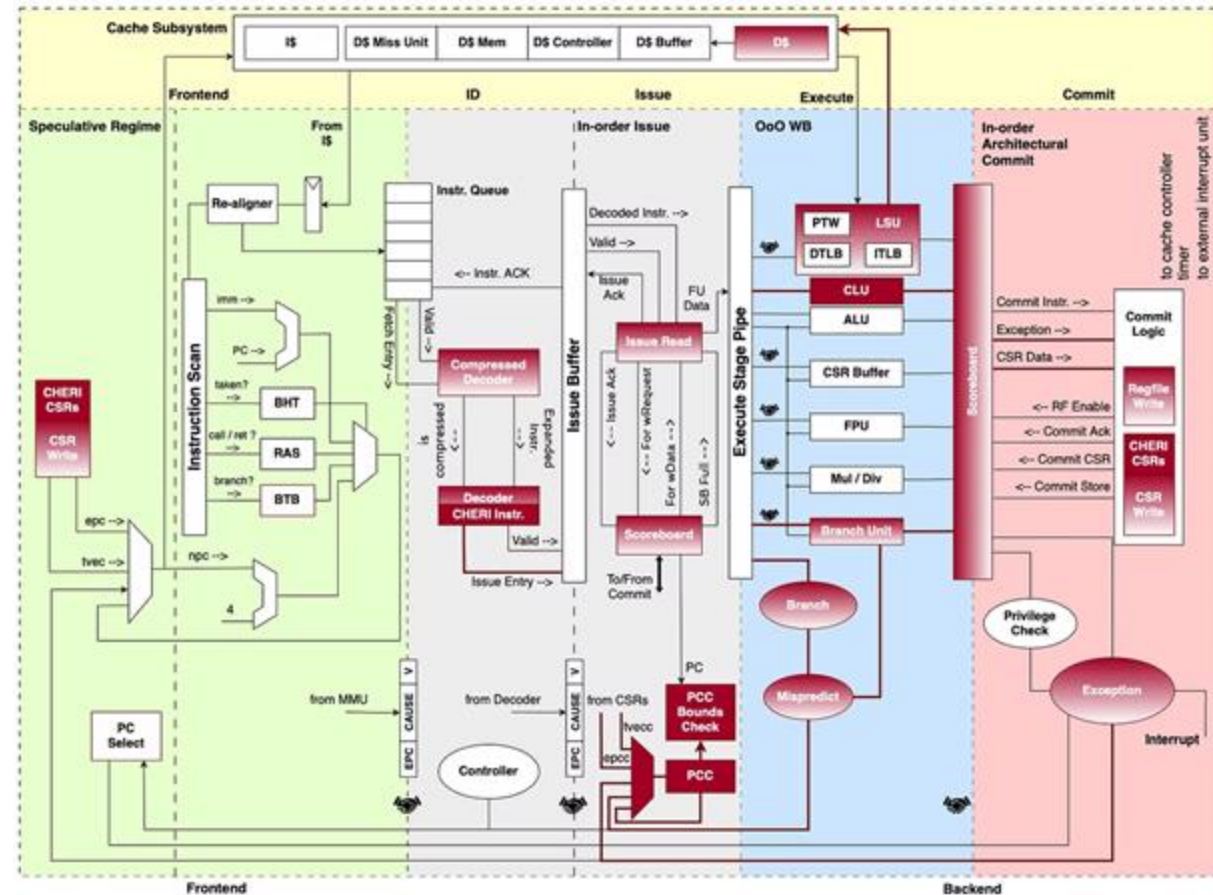


UK Research and Innovation



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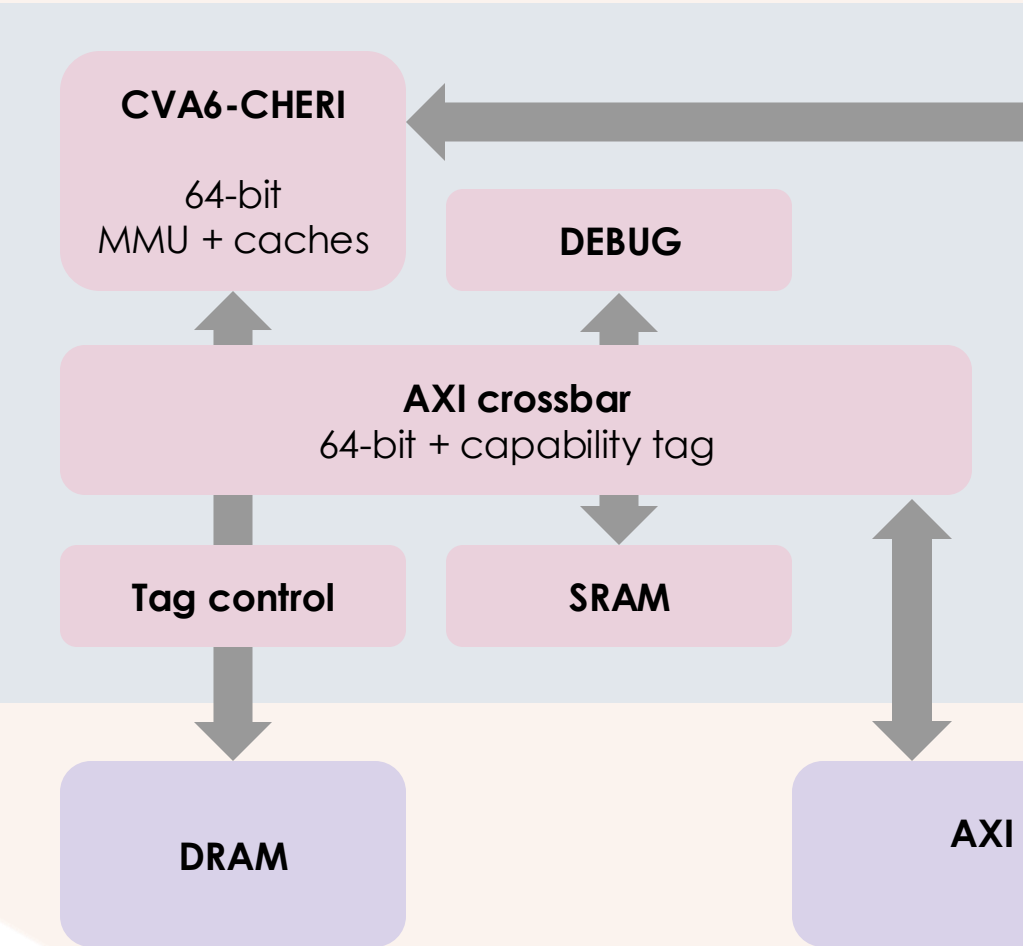
CVA6-CHERI block diagram
courtesy of Capabilities Limited



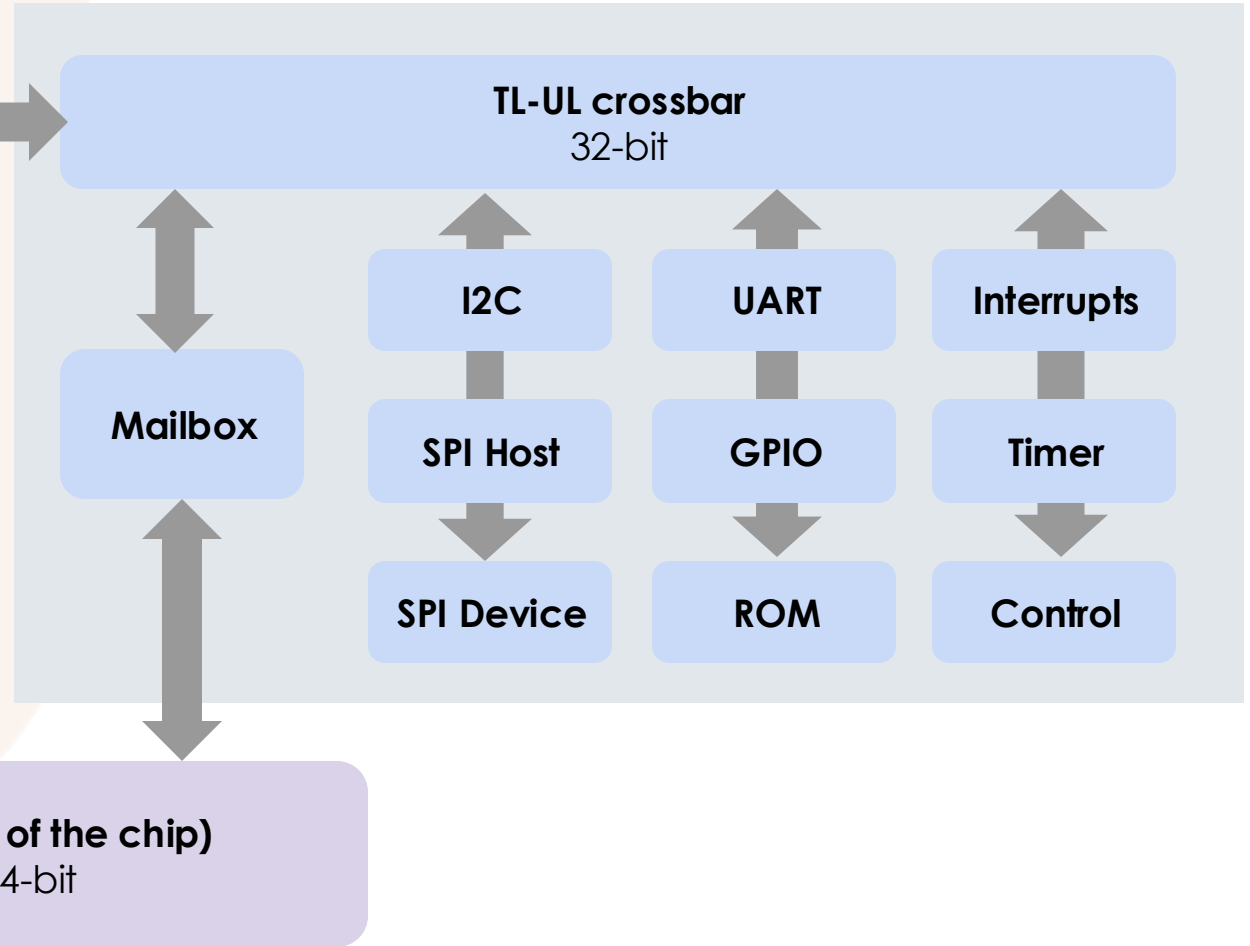
CHERI-Mocha status



CHERI DOMAIN



NON-CHERI DOMAIN



CHERI-Mocha is open now

- Prototype RTL, CI and DV on GitHub
 - Demos available to evaluate CHERI, on RTL simulator or Genesys 2 board
 - Live verification dashboard
- COSMIC continues until 2028
 - Feature completion, verification, quality, documentation
- Efforts to use as reference design for RISC-V “Y” standard for CHERI



Simulation Results: top_mocha_batch_sim

04/03/2026 15:41:40 sha: 3979562
json Branch: main

| Block | Tests | | | Coverage Summary | | | | Code Coverage | | | | |
|---------------|-------|-------|--------|------------------|-------|------------|-----------|---------------|-------|--------|-----------|--------|
| | Pass | Total | % | Overall | Code | Functional | Assertion | Block | Line | Branch | Condition | Toggle |
| RV_TIMER | 3 | 3 | 100.00 | 68.09 | 88.67 | 21.61 | 93.99 | 98.21 | 97.39 | 97.04 | - | 71.59 |
| SPL_DEVICE_2P | 8 | 8 | 100.00 | 68.88 | 65.99 | 61.81 | 78.83 | 93.97 | 93.37 | 88.76 | - | 70.39 |
| TOP_MOCHA_SIM | 10 | 13 | 76.92 | 57.85 | 47.12 | - | 68.58 | 77.11 | 82.71 | 56.47 | - | 37.09 |
| UART | 9 | 9 | 100.00 | 80.80 | 73.89 | 71.96 | 96.54 | 95.24 | 96.94 | 89.87 | - | 83.77 |

○ Interested in CHERI-Mocha?

- Related presentations on Friday
 - 9:30am - COSMIC verification: comprehensive, end-to-end formal proofs of CVA6-CHERI
 - 11:15am - Performance Progress of CVA6-CHERI
- Visit our booth!



github.com/lowRISC/mocha





CHERI

THANK YOU

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