DeepComputing

Porting seL4 to the RISC-V SoC, toward a Secure and High-Performance RISC-V AI Platform

Aug 2025

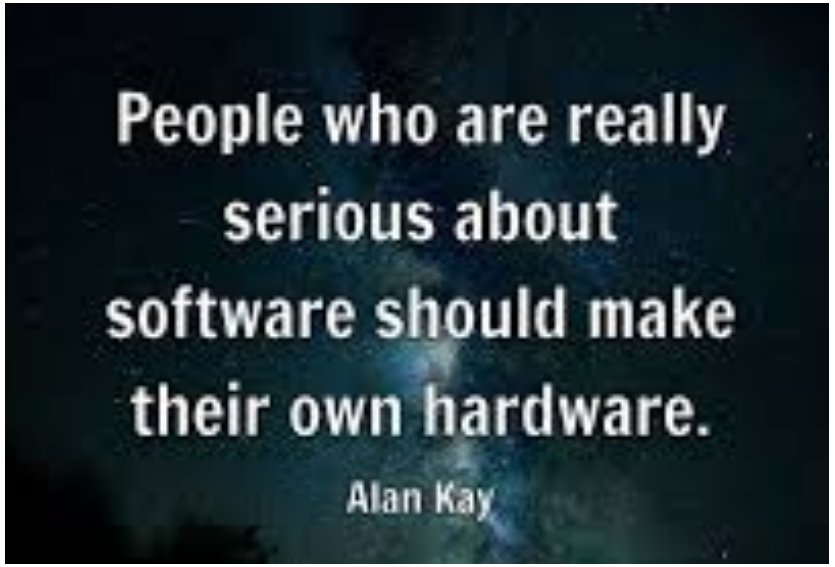
Yuning Liang

Founder

a core software guy

Java VM (J2ME)

Static Compiler/Analysis (MIPS' Open64)



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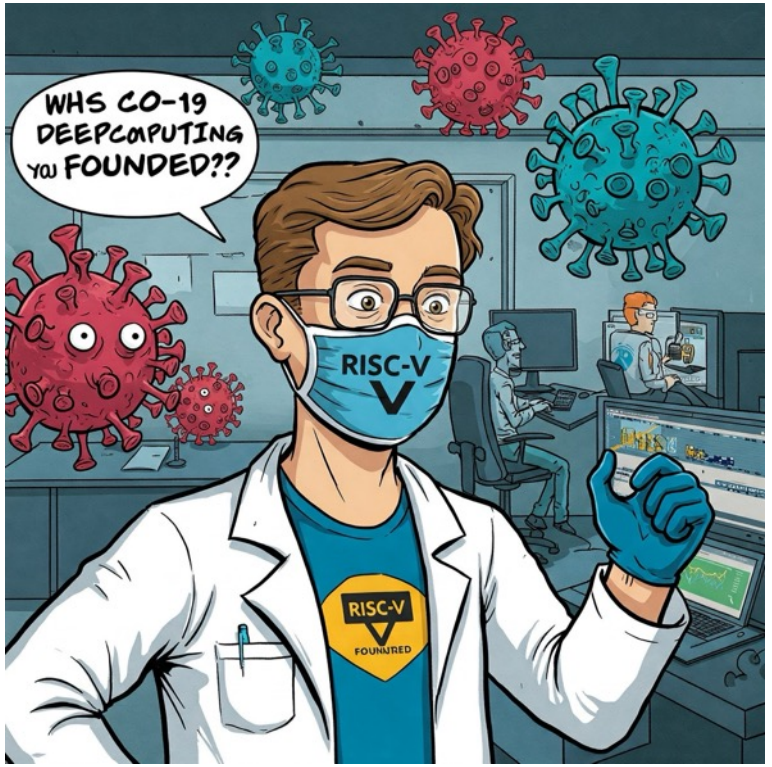

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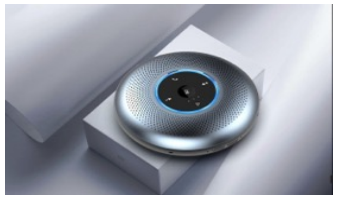
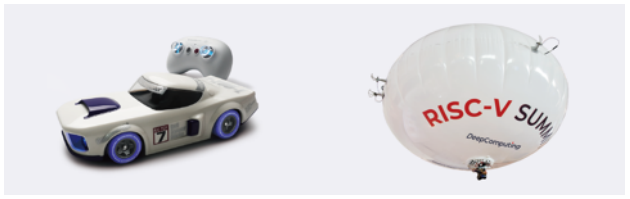
Who are we and What we do

RISC-V Premium Product Pioneer Focusing on

- Consumer Electronics
- Modern Personal Computing Devices
- And Some RISC-V Run & Fun Gadgets



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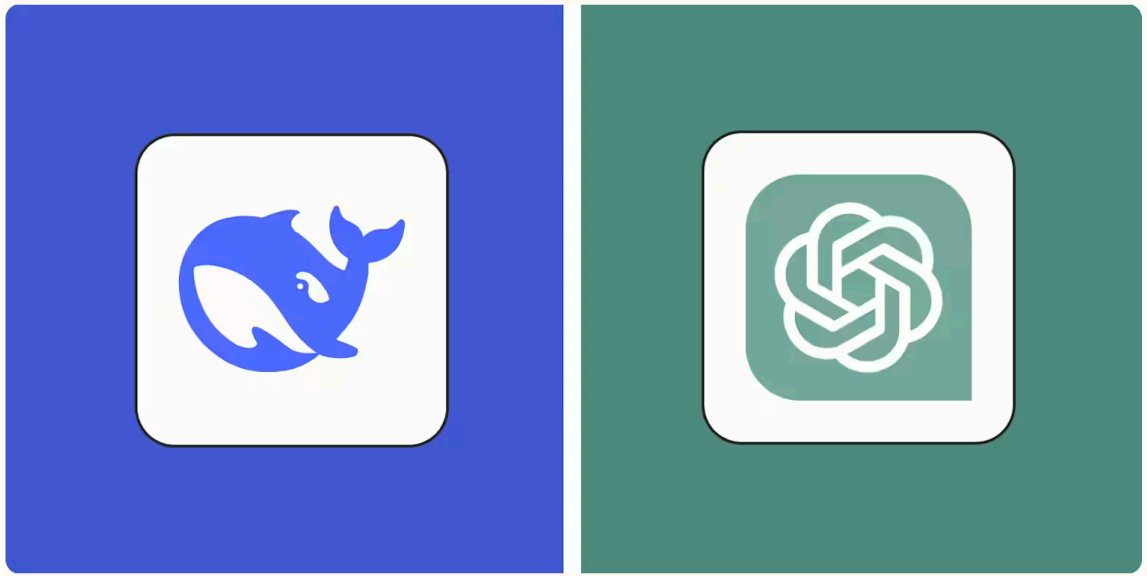
Surge of AI, DeepSeek vs ChatGPT

Where we are now:

- Lower Compute Cost
- Faster Inferencing and Training

What we can do on Local Device

- Single Inferencing for Distill Models
- Multi Local Device Inferencing and Post Train Over Full-Blood Models



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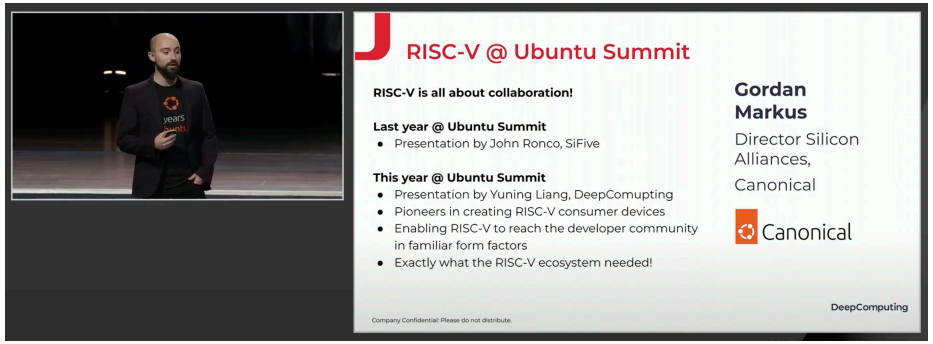
AI PC For RISC-V

2024 Start Partnering Linux OS

- Linux Kernel Fellow
- Ubuntu Official Support
  - 25.10 for < RVA23
  - 26.04 for > RVA23
- Fedora Official Support
  - 47 for > RVA23



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Challenges Faced for RISC-V SoC

- **Unknown Target Market**
- **Unknown Required Compute Power**
- **Limited Resource Constraint**
- **Limited Time Constraint**
- **Time to All in AI?**

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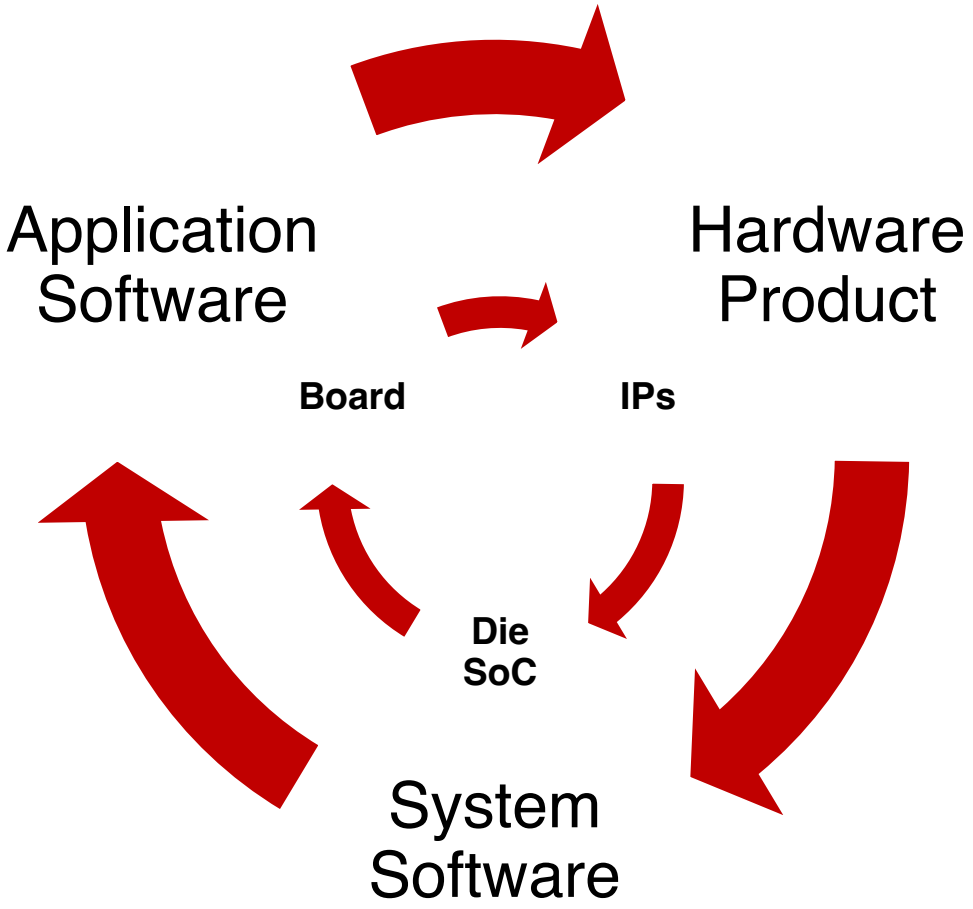
Long Painful Journey Towards Mass Production

A full development cycle for high end SoC

from IP to SoC, Board
System Software, Application,
to a mass produced end user product,

takes 5-7 years!!!



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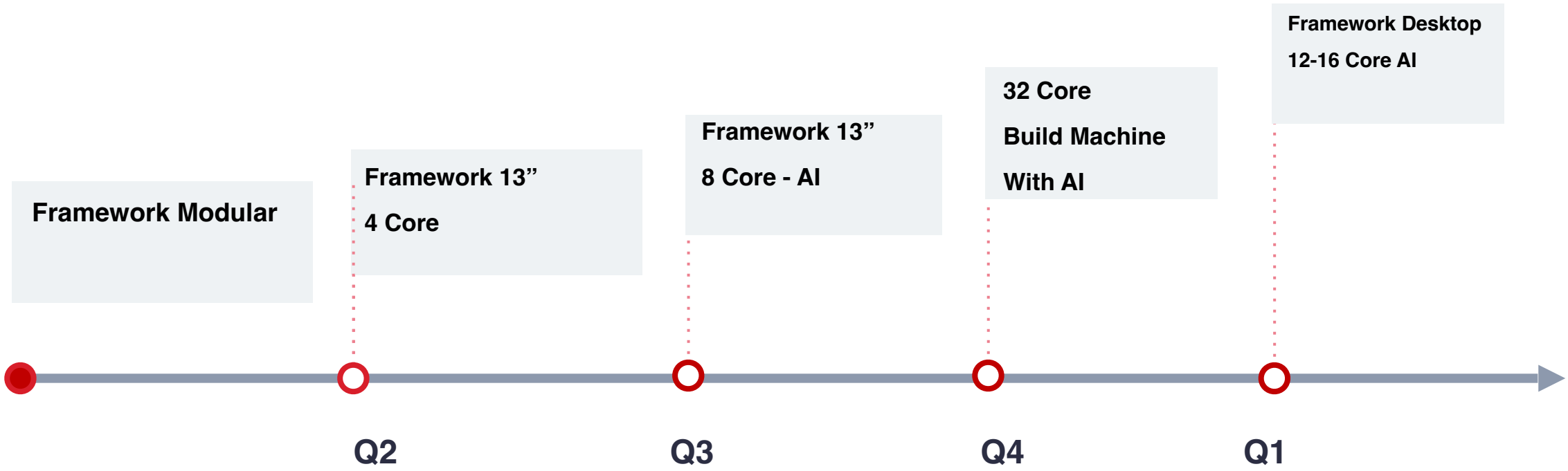
Exciting 2025-2026 Roadmap



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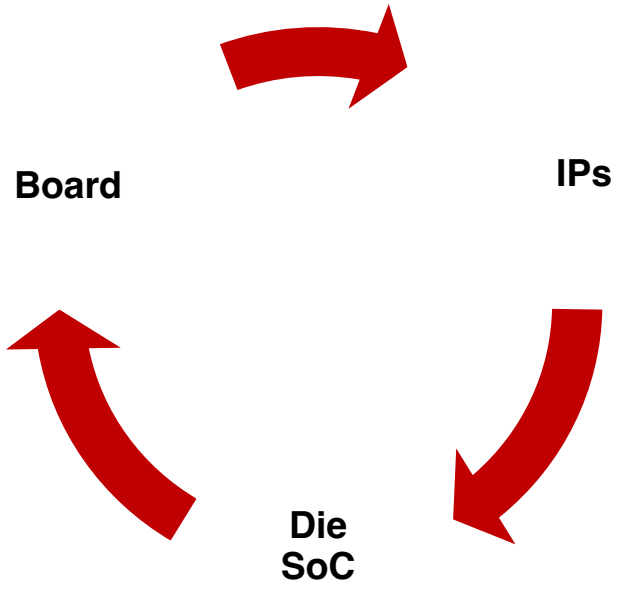
Flexibility for Making RISC-V AI a Successful Reality

- Prepare for the Future Unknown
- A Retro-fit Lego like Approach
- Standard Interface on All Levels
- Modular at all time

  - **IP/Die: Chiplet**
  - **Die/SoC: PCIE Host/Device**
  - **SoC/Board: Type-C**
  - **What Else? End Product Level**



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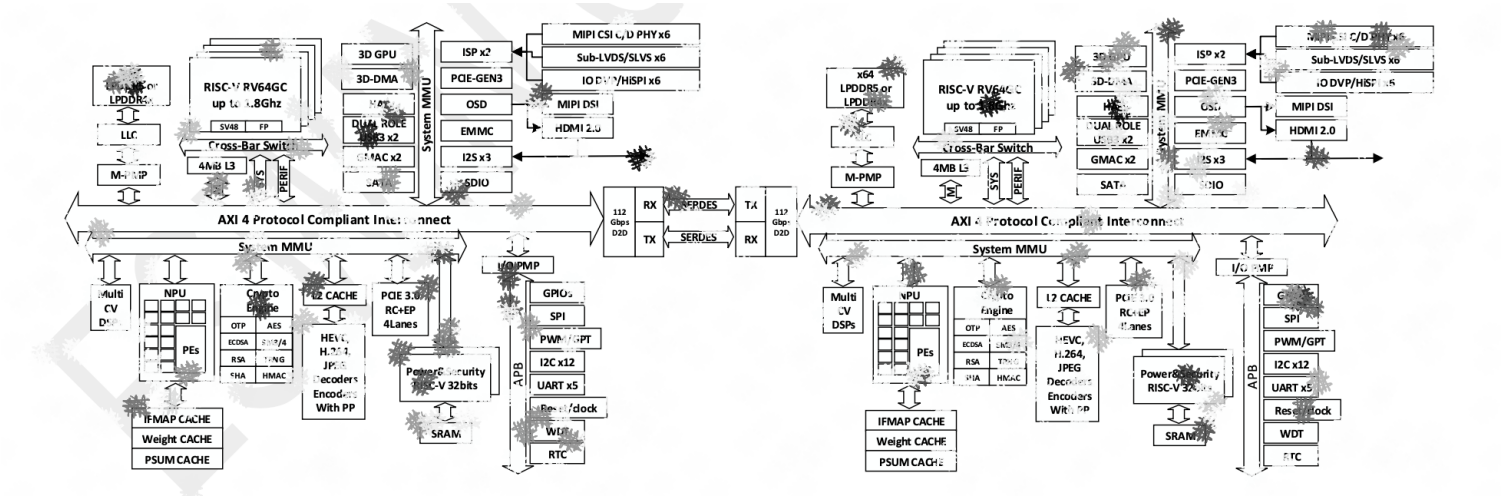
Chiplet Solution: an ESWIN 7702



First RISC-V Chiplet AI SoC in the world.

- **Chiplet 2-DIE, 2GHz 8-Core.**
- **64G LPDDR5**
- **50 TOPS AI (NPU+GPU+CPU)**
- **8K@50fps Encoding**
- **RVV 1.0 on DSP**

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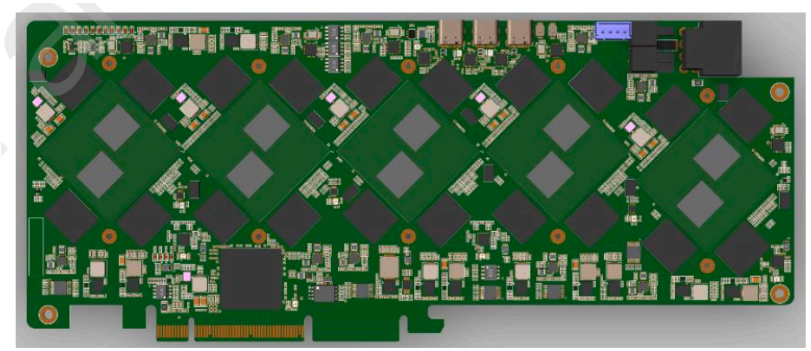
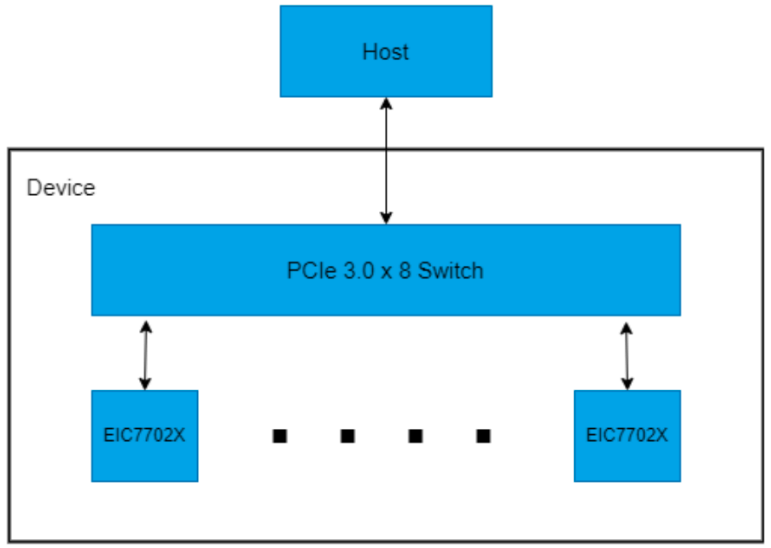
PCIE Solution:An example: ESWIN 7702X

First RISC-V Chiplet AI SoC in the world.

- First RISC-V Chiplet AI SoC in the world with PCIE HOST and DEVICE support simultaneously.
- Ethernet Over PCIE





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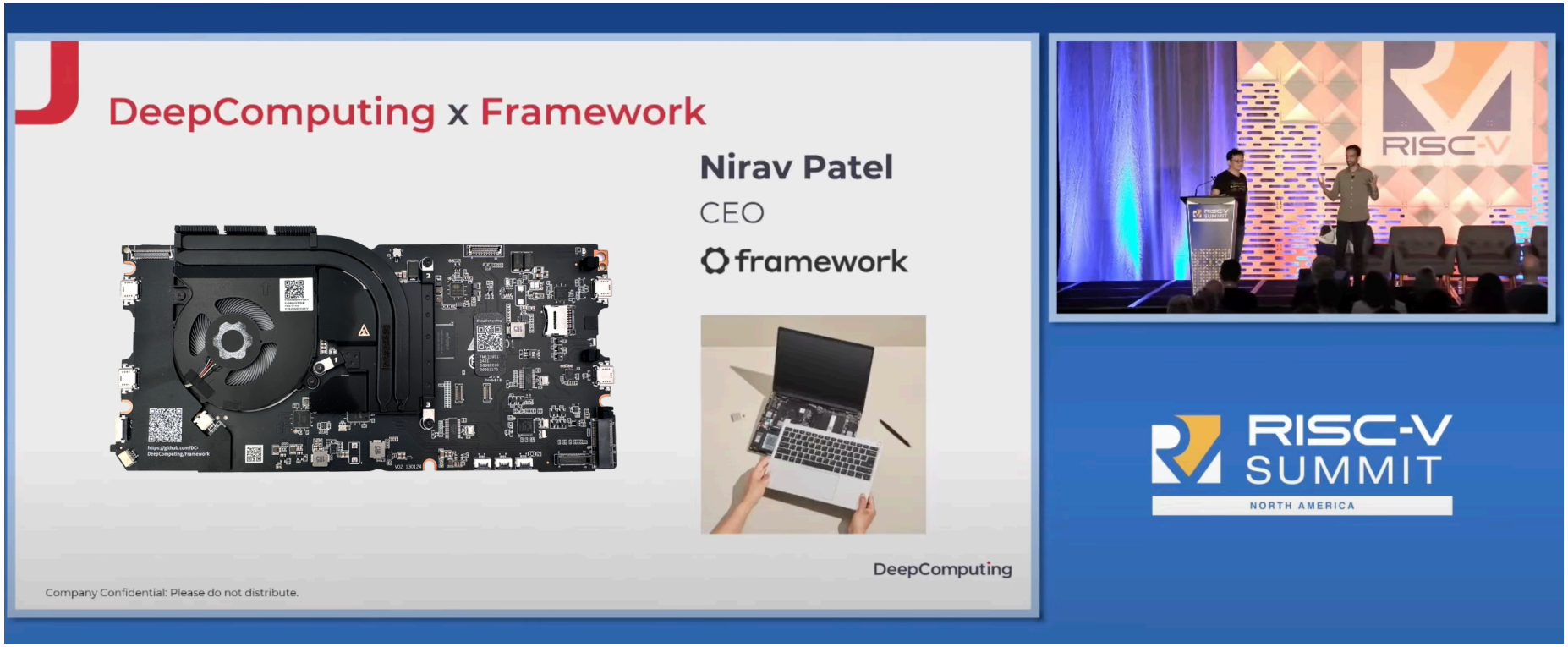
Framework RISC-V AI-PC Product Portfolio



DeepComputing x Framework Partnership

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Framework RISC-V AI-PC Product Portfolio

Desktop and Laptop 12”/13”/16”

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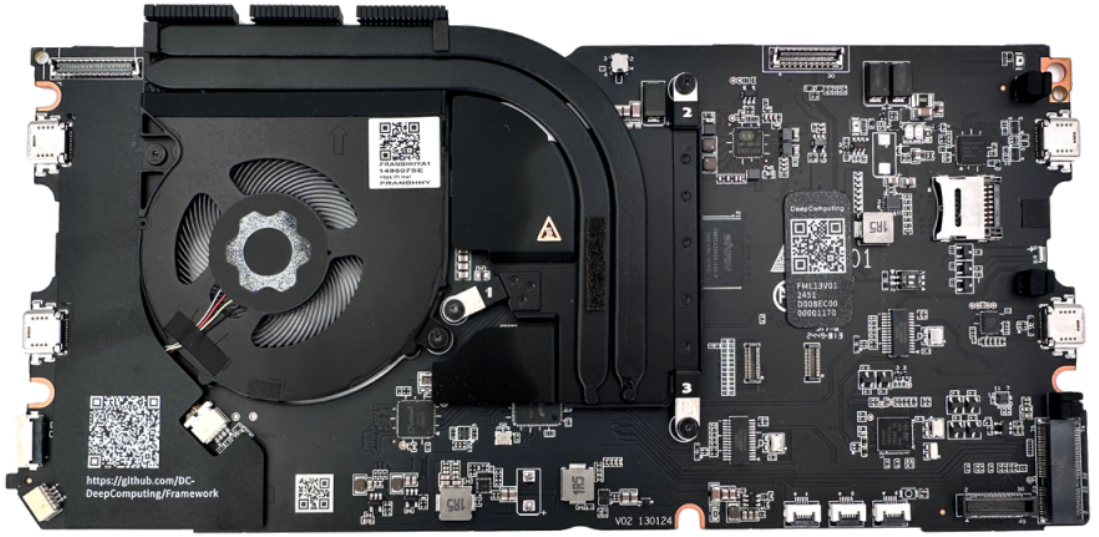
Framework RISC-V AI-PC Product Portfolio



Laptop 13” RISC-V

- 8 Core 2GHz, 128G LPDDR5+
- 50 TOPS AI Local Compute
- **June, $300+**

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Framework RISC-V AI-PC Product Portfolio

Framework 16” RISC-V Extension

- 8 Core 2GHz, 128G LPDDR5
- 100 TOPS AI Local Compute
- **Q3, $300+**

Framework 16” Extension Example ONLY

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Framework RISC-V AI-PC Product Portfolio

Desktop RISC-V

- 16 Core 2GHz, <256G LPDDR5+
- 100 TOPS AI Local Compute
- **Q4, $700+**

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So Far SeL4 Progress on RISC-V

- No Virtualisation until RVA23 in 2026
- Not likely seeing any current SeL4 application fully ported
  - Automotive (Horizon, Nio, Li Auto)
    - SeL4 + Linux
  - AI Box (any idea?)
    - SeL4 + LLM

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ESWIN Platform

1. OpenSBI → Uboot Booting, OK!
2. SeL4Test
   - Image and dtb → OK!
   - Loading → OK!
   - Running → Not OK! Minor Failure on Timer, TIMER0001
3. SeL4 Kernel, some Random Crashing!
   - Need some body help cracking on.

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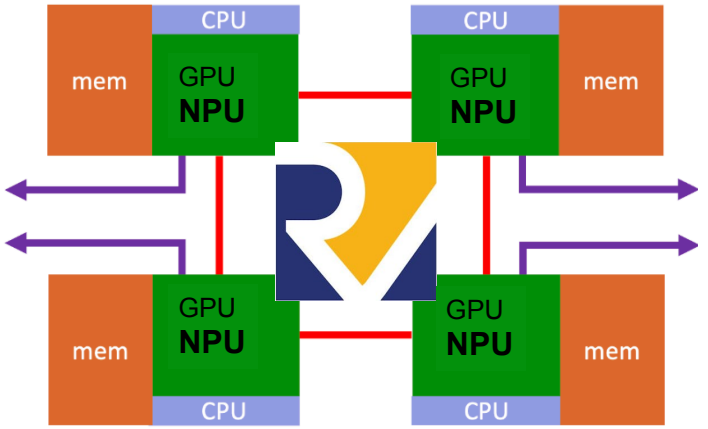
RISC-V Autonomous Platform

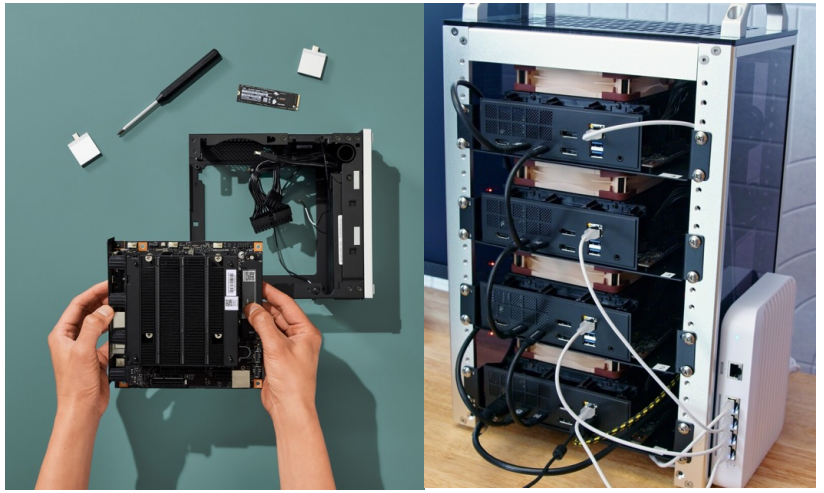
Horizon J5 + ARM RK 3588

→ Horizon J5 + RISCV ESWIN 7702X

AI BOX Platform

1. 4 x ESWIN 7702 SoC Chiplet
   - PCIE Ring Topology
   - 4GB/s upstream, 4GB/s downstream
   - 4 x (8-core CPU/NPU/GPU), 200 TOPS
   - 256G DDR
   - <200B LLM models @ 10 Token/S
2. Unlimited node ring expansion
   - 4 x Board, DeekSeek 671B
- Any Idea on applying SeL4?





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100
Open Community Project RISC-V Sponsorship

- **1000 New Contributors Awareness and RISC-V Membership**
- **100 Excellent RISC-V Contributors**

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Sponsorship

RISC-V + Framework

- **Free Framework Devices**
- **Award for Excellent Contribution**
- **Speeches Opportunities on RISC-V Summit and Workshop**

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100
AI Startups
RISC-V Sponsorship

- **1000 New AI Contributors Awareness and RISC-V Membership**
- **100 Excellent RISC-V AI Contributors**

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Sponsorship

RISC-V + Framework + AI Accelerator

- **Free Framework Devices with AI Compute**
- **Award for Excellent Contribution**
- **Speeches Opportunities on RISC-V Summit and Workshop**

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Thank You

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