

# RuyiSDK: 让RISC-V变得简单有趣

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# RuyiSDK 是什么?

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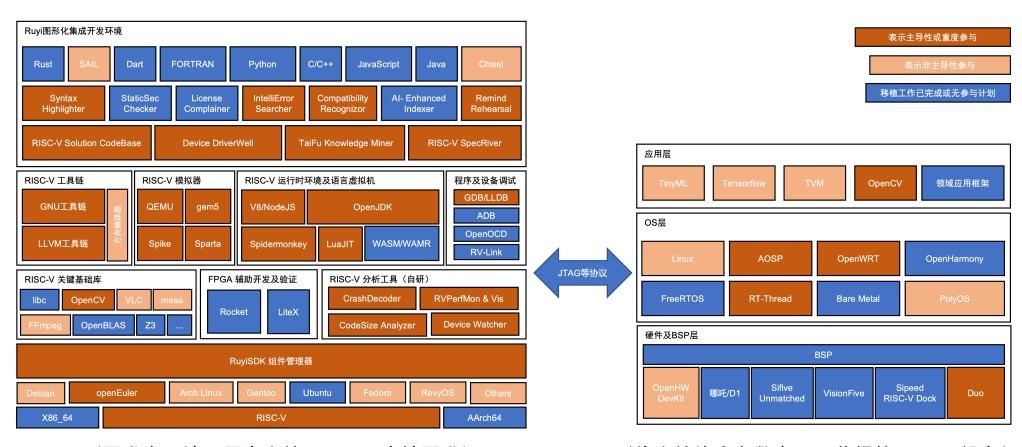
#### RuyiSDK 定位与愿景

RUYISDK 是一个旨在提供一个一体化集成开发环境的产品计划。从 2023 年开始筹备,计划用三年时间为 RISC-V 开发者提供一个完整的、全家桶式的全功能开发环境。

- 1.开发者购买了(几乎)任何一款 RISC-V 开发板或模组,都可以通过 RUYISDK 系统获得硬件资料说明、 固件/软件更新、调试支持等。
- 2.开发者可以指定任何常用的 RISC-V 扩展指令集架构组合,都可以通过 RUYISDK 系统生成客户所需的操作系统、工具链、语言执行环境(运行时或虚拟机)、计算库、应用框架等。如当前已经大规模 硅化的草案 标准 (or 厂商定制扩展): Vector 0.7.1/1.0 和 RVP 0.5.2 等。
- 3.培育运营一个活跃全面的开发者交流社区。

#### RuyiSDK 组成

#### 从技术组件的角度:



(开发者环境,原生支持 RISC-V 本地开发)

(将支持绝大多数市面可获得的RISC-V设备)

#### RuyiSDK 组成

#### 从功能模块的角度:

- 包管理器
  - 在线软件源:中心化的RISC-V开发资源软件设施,集中托管了RISC-V开发所需的编译工具链、调试器、模拟器、相关工具、OS Image等资源。
  - 包管理工具:为用户方便的获取如意软件源资源;提供软件源资源查询、软件包信息查询、软件包安装、卸载等服务,此外还有软件包的依赖分析等;
- 设备系统安装器:针对RISC-V开发板,提供向导式系统安装服务
- 集成开发环境(IDE): 针对各种不同型号的RISC-V开发,集成源码管理与编辑、编译构建、调试、模拟运行等一体的集成开发环境
- 技术社区:
  - 网站
  - 技术论坛

# RuyiSDK如何让RISC-V开发变简单

#### 3.RuyiSDK如何让RISC-V开发变简单

从用户使用需求出发, 在开发环境和运行环境提供便利。

#### 开发环境

- 工程管理(集成编译工具链交叉编译)
- 源码编辑
- 编译/构建
- 运行:模拟运行/远程访问
- 调试:远程调试/模拟调试
- 远程:设备连接/数据传输

运行环境

■ 安装RISC-V版本操作系统

设备系统安装器

安装软件: RISC-V版本语言执行环境所需的语言 虚拟机和运行时环境、RISC-V版本应用框架软件

OS/如意包管理器

- 运行目标可执行程序
- 调试:远程调试客户端

IDE

# RuyiSDK 当前成果与进展

- ■成果
- 进展

#### RuyiSDK 成果

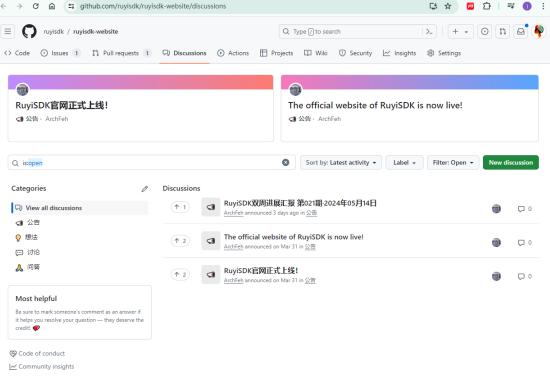
- 如意网站正式上线:https://ruyisdk.org/
- 包管理器原型已经完成,具备了包管理器的常用功能: https://github.com/ruyisdk/ruyi/releases
  - 如意软件源:集成了GNU (upstream、plct、plct-xthead、plct-rv64ilp32-elf)、LLVM编译工具链(upstream、plct-xthead)、QEMU模拟器(upstream)、dynamorio-riscv等基础软件和工具;
  - 包管理工具:
    - 功能上:已经能够支持常用的查询、安装、卸载等功能
    - 兼容性:目前支持超过7种主流的操作系统:Ubuntu、Debian(和RevyOS)、openEuler、Fedora、ArchLinux、Gentoo、openkylin
- 操作系统支持矩阵: https://github.com/ruyisdk/support-matrix/
  - 形成 37款开发板×24种系统 二维矩阵
  - 流程:设备型号收集→RISC-V设备待集成清单→设备操作系统调研+采购设备→验证→集成→测试
- 设备安装器
  - 设备数:目前集成了28款开发板
  - 厂商: milkv、矽速科技、沁恒微电子、嘉楠科技、赛昉科技、全志(部分)厂商

#### RuyiSDK 网站

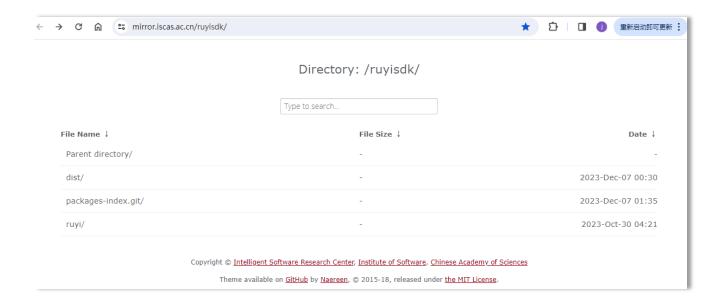


https://ruyisdk.org/

#### https://github.com/ruyisdk/ruyisdkwebsite/discussions



#### RuyiSDK 在线软件源



# Directory: /ruyisdk/ruyi/releases/ Type to search... File Name ↓ Date ↓ Parent directory/ 2024-May-14 12:00 2023-Dec-14 17:25 0.3.0/ 2024-Jan-16 16:52 2024-Jan-16 16:52 -

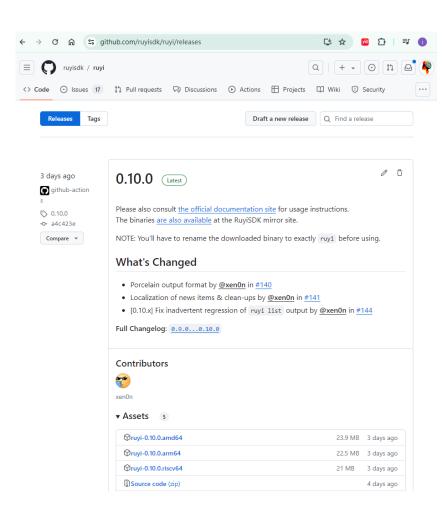
#### 如意repo: https://mirror.iscas.ac.cn/ruyisdk/

Type to search.

Directory: /ruyisdk/dist/

	Type to search		
File Name ↓		File Size ↓	Date ↓
Parent directory/		-	-
llvm-plct-17.0.6.ruyi-20240511.amd6	4.tar.zst	399.7 MiB	2024-May-13 17:48
ruyisdk-llvm-project- 544dd2983c6289abfdf72d5372f30d3a	e5bf4cb9.src.tar.zst	181.2 MiB	2024-May-13 17:03
RuyiSDK-20240324-PLCT-Sources-risc gnu.tar.xz	cv64-plct-linux-	239.0 MiB	2024-Mar-26 22:17
RuyiSDK-20240324-PLCT-Sources-HO gnu-riscv64-plct-linux-gnu.tar.xz	ST-riscv64-linux-	231.4 MiB	2024-Mar-26 22:17
RuyiSDK-20240324-PLCT-Sources-HO gnu-riscv64-plct-linux-gnu.tar.xz	ST-aarch64-linux-	227.4 MiB	2024-Mar-26 22:16
RuyiSDK-20240224-PLCT-Sources-RV6 g8c718031673d-riscv64-plct-elf.tar.xz		47.3 MiB	2024-Feb-26 20:07
RuyiSDK-20240224-PLCT-Sources-RV6 g8c718031673d-HOST-riscv64-linux-g elf.tar.xz		42.8 MiB	2024-Feb-26 20:07
RuyiSDK-20240224-PLCT-Sources-RV6 g8c718031673d-HOST-aarch64-linux- elf.tar.xz		40.5 MiB	2024-Feb-26 20:07
RuyiSDK-20240222-T-Head-Sources-Triscv64-plctxthead-linux-gnu.tar.xz	-Head-2.8.0-	308.3 MiB	2024-Feb-23 16:21

#### RuyiSDK 包管理工具



https://github.com/ruyisdk/ruyi

```
phoebe@phoebe-S1-Series:~$ ruyi list
List of available packages:
 analyzer/dynamorio-riscv
  - 10.0.19748-ruyi.20240128 (latest, no binary for current host)
 board-image/uboot-revyos-sipeed-lcon4a-8g
  - 0.20240202.0 (latest)
 board-image/uboot-revyos-sipeed-lc4a-16g
  - 0.20240127.0 (latest)
 board-image/revyos-sipeed-lc4a
 - 0.20240127.0 (latest)
 board-image/revyos-sipeed-lcon4a
  - 0.20240202.0 (latest)
 board-image/debian-fishwaldo-sg200x-sipeed-licheervnano
 - 1.0.0 (latest)
 board-image/uboot-revyos-milkv-meles-4g
  - 1.0.0 (latest)
 board-image/uboot-revyos-milkv-meles-8g
  - 1.0.0 (latest)
 board-image/buildroot-sdk-sipeed-licheervnano
  - 0.20240422.0 (latest)
 board-image/uboot-revyos-sipeed-lc4a-8g
  - 0.20240127.0 (latest)
 board-image/uboot-revyos-sipeed-lcon4a-16g
  - 0.20240202.0 (latest)
 hoard image/buildroot-cdk-milky-due-nython
```

#### 操作系统支持矩阵

Good: 支持图形界面Basic: 能启动运行

• CFH (Call for help): 官方/论坛资料表示支持, 但是未跑通

• CFT (Call for testing): 镜像链接有, 但是缺乏硬件设备验证

• CFI (Call for more information): 官方资料宣称有,但是找不到镜像文件等实际可用的资料

• WIP: 官方宣发操作系统即将/正在对开发板进行支持,但暂未获取到可用的镜像

• N/A: 暂未从官方或者其它渠道获取到开发板的支持信息

	A	В	С	D	E	F	G	Н	I	J	K	L	M	N	0	P	Q	R	S	Т	U	V	W	Х	Υ	Z
1	CPU	产品型号	Arch Linux	Debian/ RevyOS	Fedora	FreeBSD	Gentoo	openAnolis	OpenBSD	openCloudOS	openEuler	openKylin	openSUSE	Ubuntu	Tina-Linux	Android 13	Armbian	BuildRoot	OpenHarmony	FreeRTOS	RT-Thread	Zephyr	OpenWRT	ThreadX	NuttX	Melis
2	SG2042	Pioneer Box	N/A	Good	Good	N/A	N/A	N/A	N/A	WIP	Good	Good	N/A	N/A	N/A	N/A	N/A	N/A	WIP	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	CV1800B	Milk-V Duo (64M)	Basic	Basic	CFH	N/A	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	Basic	Basic	N/A	WIP	Basic	N/A	N/A
4	TH1520	<u>LicheePi 4A</u>	Good	Good	Good	N/A	N/A	N/A	N/A	N/A	Good	Good	N/A	WIP	N/A	N/A	Good	N/A	WIP	N/A	N/A	N/A	Basic	N/A	N/A	N/A
5	JH7100	VisionFive	N/A	N/A	Good	N/A	N/A	N/A	Basic	N/A	Good	Good	Basic	Basic	N/A	N/A	Basic	Basic	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A
6	JH7110	VisionFive 2	Basic	Good	N/A	WIP	Basic	N/A	Basic	N/A	Good	Good	Basic	Basic	N/A	WIP	Good	Basic	WIP	N/A	Basic	CFH	Basic	N/A	Basic	N/A
7	K230	CanMV K230	N/A	Basic	Basic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A	Basic	N/A
8	K510	Canaan K510-CRB-V1.2 KIT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	C906	LicheeRV/AWOL Nezha	N/A	Good	Good	WIP	N/A	N/A	N/A	N/A	Good	N/A	Basic	Basic	Basic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A
10	U740	HiFive Unmatched	N/A	Basic	Good	Basic	N/A	N/A	Basic	N/A	Good	Good	Basic	Basic	N/A	N/A	CFH	N/A	WIP	N/A	N/A	Basic	Basic	N/A	N/A	N/A
11	SG2000	Milk-V Duo S	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	Basic	N/A	N/A	N/A	N/A	Basic	N/A
12	JH7110	Milk-V Mars	N/A	CFT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CFT	N/A	CFT	N/A	N/A	N/A	N/A	N/A	N/A
13	FSL1030M	Milk-V Vega	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CFH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	TH1520	Milk-V Meles	N/A	CFT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	K210	Sipeed Maix-Bit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	N/A	N/A	N/A	Basic	N/A
16	TH1520	Lichee Cluster 4A	N/A	Good	Good	N/A	N/A	N/A	N/A	N/A	Good	Good	N/A	N/A	N/A	N/A	Good	N/A	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A
17	TH1520	Lichee Console 4A	N/A	Good	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	SG2002	LicheeRV Nano	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A
19	AE350	Tang Mega 138K	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	CFH	N/A	N/A	N/A	N/A
20	BL808	Sipeed M1s Dock	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A
21	BL702	Sipeed M0 sense	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A
22	BL618	Sipeed M0P Dock	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A
23	BL616	Sipeed M0s Dock	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	N/A	N/A	N/A	N/A	N/A	N/A
24	CH32V103	CH32V103-EVT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	N/A	N/A	N/A	N/A	N/A
25	CH32V203	CH32V203-EVT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	N/A	N/A	N/A	N/A	N/A
26	CH32V208	<u>CH32V208-EVT</u>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	N/A	N/A	N/A	N/A	N/A
27	CH32V303	CH32V303-EVT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	N/A	N/A	N/A	N/A	N/A
28	CH32V305	CH32V305-EVT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	N/A	N/A	N/A	N/A	N/A
29	CH32V307	CH32V307-EVT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	N/A	N/A	N/A	N/A	N/A
30	CH582F	CH582F-EVT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	N/A	N/A	N/A	N/A	N/A
31	CH592X	CH592X-EVT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Basic	Basic	N/A	N/A	N/A	N/A	N/A
32	GD32VF103	Longan Nano	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CFT	CFT	Basic	N/A	N/A	N/A	N/A
33	GD32VF103	<u>RV-STAR</u>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CFT	CFT	N/A	N/A	N/A	N/A	N/A
34	GD32VF103	Nudei DDR200T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CFT	CFT	N/A	N/A	N/A	N/A	N/A
35	V853	全志 V853 开发板	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CFT
36	V853	100ASK-V853-PRO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CFT
37	V851s	抽木 PI-蜥蜴	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CFT
38	V851se	TinyVision	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CFT
	400136	THIY YISIOTI	11/1	II/A	11/1	N/A	11/1	N/A	11/1	N/A	11/1	11/1	11/1	11/14	11/1	11/15	11/1	11/1	14/2	11/1	11/1	11/1	11/1	11/1	11/1	G I

#### 设备系统安装器

phoebe@phoebe-S1-Series:~\$ ruyi device provision RuyiSDK Device Provisioning Wizard This is a wizard intended to help you install a system on your device for your development pleasure, all with ease. You will be asked some questions that help RuyiSDK understand your device and your intended configuration, then packages will be downloaded and flashed onto the device's storage, that you should somehow make available on this host system beforehand. Note that, as Ruyi does not run as root, but raw disk access is most likely required to flash images, you should arrange to allow your user account sudo access to necessary commands such as dd. Flashing will fail if the sudo configuration does not allow so. Continue? (y/N) y The following devices are currently supported by the wizard. Please pick your device: 1. Allwinner Nezha D1 2. Canaan Kendryte K230 3. Canaan Kendryte K510 4. Milk-V Duo 5. Milk-V Duo S 6. Milk-V Mars 7. Milk-V Mars CM 8. Milk-V Meles 9. Milk-V Pioneer Box 10. Milk-V Vega 11. SiFive HiFive Unmatched 12. Sipeed Lichee Cluster 4A 13. Sipeed Lichee Console 4A 14. Sipeed LicheePi 4A 15. Sipeed Lichee RV 16. Sipeed LicheeRV Nano 17. Sipeed Maix-I 18. Sipeed Tang Mega 138K Pro 19. StarFive VisionFive 20. StarFive VisionFive2 21. WCH CH32V103 EVB 22. WCH CH32V203 EVB 23. WCH CH32V208 EVB 24. WCH CH32V303 EVB 25. WCH CH32V305 EVB 26. WCH CH32V307 EVB 27. WCH CH582F EVB

Choice? (1-28)

28. WCH CH592X EVB

#### RuyiSDK 进展

- RuyiSDK技术论坛筹备中
- 包管理器一直在持续完善,不断更新和维护软件源仓库资源
- 操作系统支持矩阵的持续维护与更新
- 设备安装器随着支持矩阵的更新同步更新系统信息,并完善功能,使之更友好
- 基于 VSCode 的插件的集成开发环境开发初步启动

# RuyiSDK 2024 计划

- 计划
- 人才需求

### RuyiSDK 2024 后续计划

- 1. 支持2024年之前发布、2024新上市的所有可购买到的RISC-V开发板。
- 2. 加大IDE方面的投入力度,发布第一版面向用户可用的基于VSCode/Eclipse的RISC-V集成开发环境。

招聘启事:目前需要VScode和Eclipse的插件开发者,欢迎查看详细的岗位介绍,并投递简

历: https://github.com/plctlab/PLCT-Weekly/blob/master/Jobs.md

# 欢迎关注 RuyiSDK,感谢支持!

网站: https://ruyisdk.org/

讨论: https://github.com/ruyisdk/ruyisdk-website/discussions