实时线程操作系统 **0.3.0** RC1

实时线程操作系统（RT-Thread）是国内 RT-Thread 工作室精心打造的开源实时操作系统，历时 4 年的呕心沥血开发，力图突破国内没有小型开源实时操作系统的局面，它不仅仅是一款开源意义的实时操作系统，也是一款产品级别的实时操作系统，它已经被国内十多所企业所采用，被证明是一款能够稳定持续运行数周的操作系统。

实时线程操作系统从 0.2.4 正式版发布以来，目前已经一年多了，0.3.0 开发分支在稳步进行中，亦收到来自国内十数个缺陷反馈、补丁修正，从针对 STM32 的 beta1 版本、beta2 版本到 LM3S 的 beta1 版本，它总是力求发布一个稳定的版本，向着 0.3.0 正式版、稳定版迈进，而现在，就是 RT-Thread 开发工作室献上的 0.3.0 第一候选版，面向 ST STM32 微控制器（ARM 公司的最新 Cortex-M3 构架处理器）。

0.3.0 第一候选版本功能包括:

☒ **完善的实时核心**

- 面向对象方式的实时核心（但依然保留了 C 语言的优雅、小巧风格）；
- 32 或 256 优先级全抢占式多线程调度；相同优先级线程时间片轮转调度；
- 线程间同步机制：信号量和防止优先级翻转的互斥锁；
- 完善高效的线程间通信机制，包括邮箱，消息队列和事件；
- 支持线程挂起和唤醒的固定内存块管理及线程安全的动态内存堆管理；
- 向上层提供统一接口的设备驱动模型；
- STM32 上体积指标：10k ROM，2k RAM；

☒ **FinSH shell 命令行**

- 命令即 C 代码的命令行方式；
- 直接在命令行中调用系统内核函数；
- 直接在命令行中访问系统全局变量；
- 历史记录及命令自动补全；

☒ **面向小型设备的虚拟文件系统**

- 向上层应用提供 POSIX 风格的 API 接口；
- 支持多种具体文件系统实现；
- STM32 上支持带缓存式的 EFSL FAT 文件系统（GPLv2 代码）；
- STM32 上包含了 SDIO，SPI 接口的 sd 卡、MMC 卡驱动；其中 SDIO 驱动支持高速 SD 设备。

☒ **LwIP 轻型 TCP/IP 协议栈**

- 标准的 BSD Socket 接口；
- IP、ICMP、UDP、TCP 标准协议支持；
- DNS，DHCP，PPP 协议支持；
- TFTP、HTTP、FTP 应用协议支持（见 netutil 组件）；
- STM32 上 ENC28J60、DM9000A、STM32F107 以太网驱动支持；（都完成了 50 万 TCP 报文压力测试）
- STM32 上内存占用在 5k 左右。

☒ **开发环境支持:**

- GNU GCC (scons 做为构建工具)
- Keil MDK
- IAR Embedded Workbench for ARM

（netutil 及 RTGUI 组件未在此次发布之列，会在近期另行发布）

RT-Thread RTOS 0.3.0 _{RC1}

The Real-time Thread Operating System is an open source real-time operating system developed by the RT-Thread Studio based in China, after four years' fully concentrated development. It is aimed to change the current situation in China that there is no domestic owned Intellectual Patent (IP) in the small scale open source real-time operating system area. It is a real-time operating system not only on the open source level but also on the commercial standard level. Having been used by more than ten companies in China, it proved to be an operating system running stably for weeks.

It has been one year since our RT-Thread official version 0.2.4 has been released. The version 0.3.0 branch is currently under development. We have received lot of feedbacks from our customers, and have been fixing bugs as well as making big progress. From the beta 1 and beta 2 versions of STM32, to the beta 1 version of LM3S, we kept developing step by step towards the stable official Release 0.3.0. Now, RT-Thread Studio is proud to announce that the first 0.3.0 release candidate edition has been released. It is developed for the ST STM32 microcontroller (the latest processor with Cortex-M3 Architecture developed by ARM).

Major features offered by the first 0.3.0 release candidate edition are:

⊠ **A real-time core**

- Object oriented real-time core (while remaining the elegant and flexible style of C language);
- 32 or 256 priority scheduling multi-thread scheduling; Using the round-robin policy ensures that all threads having the *same priority* level will be *scheduled* equally;
- Synchronization of threads: semaphore and mutual exclusion (mutex) locks to prevent priority inversion;
- Complete and efficient support for communication between threads, including mailbox, message queues, event;
- Static memory management to support thread suspend/resume and thread-safe dynamic heap management;

- A device driver prototype to provide standard interface to high level application;
- 10K ROM, 2K RAM usage on STM32;

⊠ **FinSH shell**

- An accept C Programming Languge Expression command line;
Access system core functions directly via command line like C Programming Language;
- Access system global variables directly via command line like C Programming Language;
- Command history records and automatic complete for the Command Prompt;

⊠ **Virtual File system optimised for small device**

- POSIX style API;
- Support the different implementation of file systems
- Cache enabled EFSL FAT file system(GPLv2 coding) supported;
- Buildin SDIO/SPI interface driver base on ST STM32 standard peripheral library, in which SDIO interface supports MMC cards and high speed SD cards.

- DNS, DHCP, PPP supported
- TFTP、HTTP、FTP supported (refer to the netutil component)

- Buildin ENC28J60 、 DM9000A ， STM32F107 Ethernet driver on STM32 (All have passed 500,000 TCP packets performance test);
- 5k RAM usage on STM32

⊠ LwIP, a lightweight TCP/IP protocol stack
- Standard BSD Socket interface;
- IP, ICMP, UDP, TCP supported

⊠ Development Tools
- GNU GCC (scons as build tool)
- Keil MDK
- IAR Embedded Workbench for ARM

(netuil and RTGUI components is not included in this release, will be released in the near future).