



**SAMSUNG**  
**ARTIK**<sup>™</sup> Modules

**O**

**ARTIK 05x Tizen RT Overview**

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## VERSION HISTORY

Revision	Date	Description
V1.0	November 30, 2017	First release.

## TIZEN RT OVERVIEW

Tizen RT is a platform that includes a compact RTOS with built-in TCP/IP stack and support for Lightweight Machine-to-machine (LWM2M) protocol. The goal of Tizen RT is to extend the device coverage of Tizen platform to low-end devices. Tizen has been commercialized in smart TV, smartphone, wearable devices (Gear S, Gear Fit), and smart home appliances. In addition, there are also the low-end and low-cost IoT devices such as home appliances without LCD and wearable bands with small LCD. Tizen RT is the RTOS-based lightweight platform so that it can fit into these devices which are typically equipped with Cortex-M/R processors with MPU, less than 2MB RAM, and less than 16MB Flash.

Typical RTOS-based development environment has several limitations. First, it cannot load additional modules in runtime. Second, it may be inferior to Linux environment. To tackle these limitations, Tizen RT adopts Linux-style development environments including POSIX API, BSD Socket API, Shell, and Kconfig build configuration. This helps Linux developers easily build their business logics on the top of Tizen RT. In addition, Tizen RT will adopt the lightweight JavaScript environment which consists of JerryScript and IoT.js in 2017.

Tizen RT consists of lightweight RTOS called TinyAra, IoT Protocols like IoTivity and LWM2M, and JerryScript/IoT.js. TinyAra project was started in 2015, based on NuttX which is a real-time operating system (RTOS) with an emphasis on standards compliance and small footprint. While maintaining the kernel architecture, TinyAra has grown by building up IPv4/IPv6 network stack, File System, lightweight database called AraStorage, device monitor, and IoT protocols such as IoTivity (OCF) and LWM2M. The combination of AraStorage and IoTivity has TinyAra easily collect/store/deliver IoT sensor data. The mixture of device monitor, which observes the status of connectivity, power, and error, and the lightweight M2M promotes TinyAra as a large-scale device management solution. TinyAra have evolved into Tizen RT by stacking multiple frameworks required for IoT scenarios in 2016 and will have adopted the lightweight JavaScript environment called JerryScript and IoT.js in 2017.

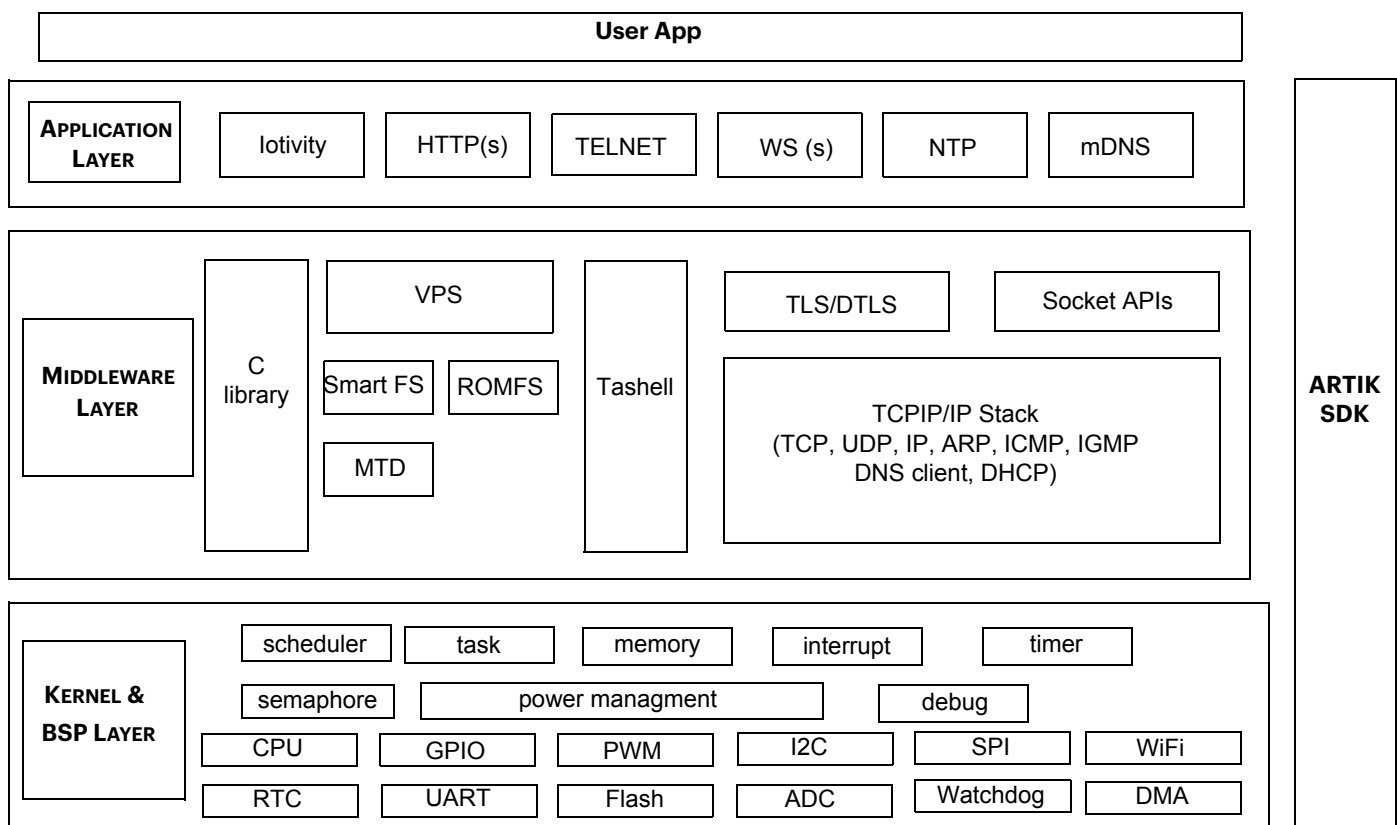


Figure 1. Tizen RT Software Architecture Block Diagram

## Tizen RT Features

*Table 1* contains a list of supported features for ARTIK 05x modules.

Features	Functionalities
WiFi Stack	<ul style="list-style-type: none"> <li>• SoftAP Provisioning</li> <li>• Authentication: WPA, WPA2, WEP</li> <li>• Encryption: AES, TKIP</li> </ul>
Transport & IP Layer	<ul style="list-style-type: none"> <li>• TCP &amp; UDP Stack</li> <li>• IPv6 Support</li> <li>• ICMP</li> <li>• BSD Socket API</li> </ul>
Transport Layer Security	<ul style="list-style-type: none"> <li>• TLS/DTLS v1.2</li> </ul>
Application Layer	<ul style="list-style-type: none"> <li>• mDNS</li> <li>• DNS Client</li> <li>• NTP Client</li> <li>• DHCP Client</li> <li>• DHCP Server</li> <li>• WebSocket Client</li> <li>• WebSocket Server</li> <li>• MQTT Client</li> <li>• HTTP Client</li> <li>• HTTP Server</li> <li>• RESTful Client</li> <li>• RESTful Server</li> </ul>
Connectivity Frameworks	<ul style="list-style-type: none"> <li>• IoTivity 1.3.x Stack with Base Layer Support</li> </ul>
Software Update Mechanism	<ul style="list-style-type: none"> <li>• Over-the Air (OTA) Client</li> </ul>
Security Libraries (s-modules)	<ul style="list-style-type: none"> <li>• Secure Boot</li> <li>• Secure Storage</li> <li>• JTAG Disable</li> <li>• True Random Number Generator</li> <li>• Hardware Accelerated Encryption</li> <li>• Key &amp; Certification Management</li> </ul>
System I/O Drivers	<ul style="list-style-type: none"> <li>• GPIO, PWM, UART, SPI, I2C, ADC</li> <li>• I2S (ARTIK 055s)</li> </ul>

*Table 1. Supported Feature List for ARTIK 05x Modules*

For more information on Tizen RT and the NuttX Real Time Operating System, refer to the following:

- <https://source.tizen.org/documentation/tizen-rt>
- <http://nuttx.org/>
- <http://nuttx.org/doku.php?id=documentation:userguide>

## ARTIK SDK Support on Tizen RT - What's Supported

The current released version of SDK is 1.7, and it is running on Tizen RT 1.0.

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