BC26-OpenCPU Solution

Presentation

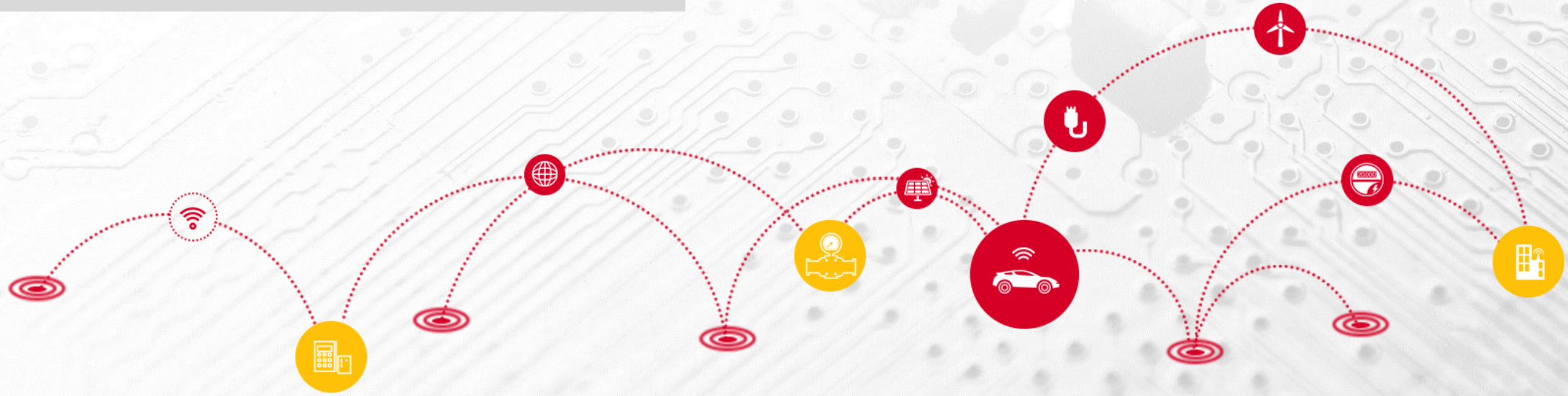
January, 2018

OpenCPU Overview

Resources & Advantages

Software Architecture

Development Requirements



OpenCPU Overview

OpenCPU is an embedded development solution for M2M field. Based on it, customers can conveniently design embedded applications. It enables customers to create innovative applications and download them directly into Quectel modules to run.

In OpenCPU solution, Quectel NB-IoT module acts as a main processor. So, NB-IoT module with OpenCPU solution facilitates customers' product designs and accelerates the application development.

17.7mm × 15.8mm × 2.0mm

BC26-OpenCPU module is a powerful functional multi-band NB-IoT module in LCC castellation packaging. It supports UDP/TCP/CoAP/LWM2M/MQTT/DTLS/OneNET protocols, and is compatible with Quectel GSM/GPRS module M26 in footprint design. These make the module a best choice for applications that have strict requirements on extended functions, cost-effectiveness and low power consumption (PSM and eDRX).

BC26-OpenCPU module can be widely used in M2M fields, such as smart metering, bike sharing, smart wearables, smart parking, security and asset tracking, home appliances, agricultural and environmental monitoring, etc.





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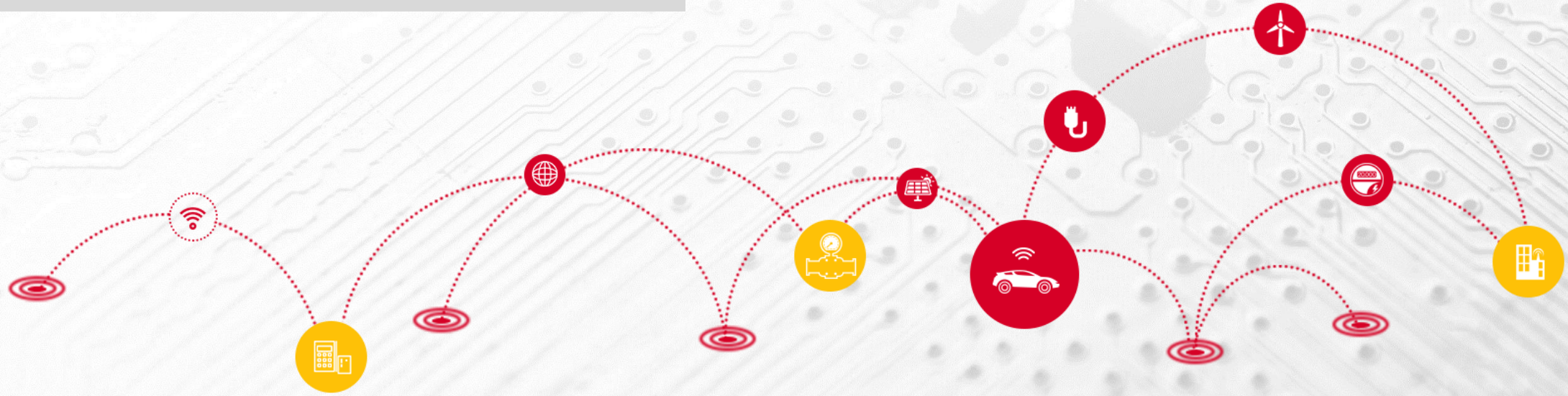


Open Resources (1)

System Resources on BC26-OpenCPU Module

- **CPU**

  32-bit ARM® Cortex®-M4 RISC 104MHz with FPU and MPU

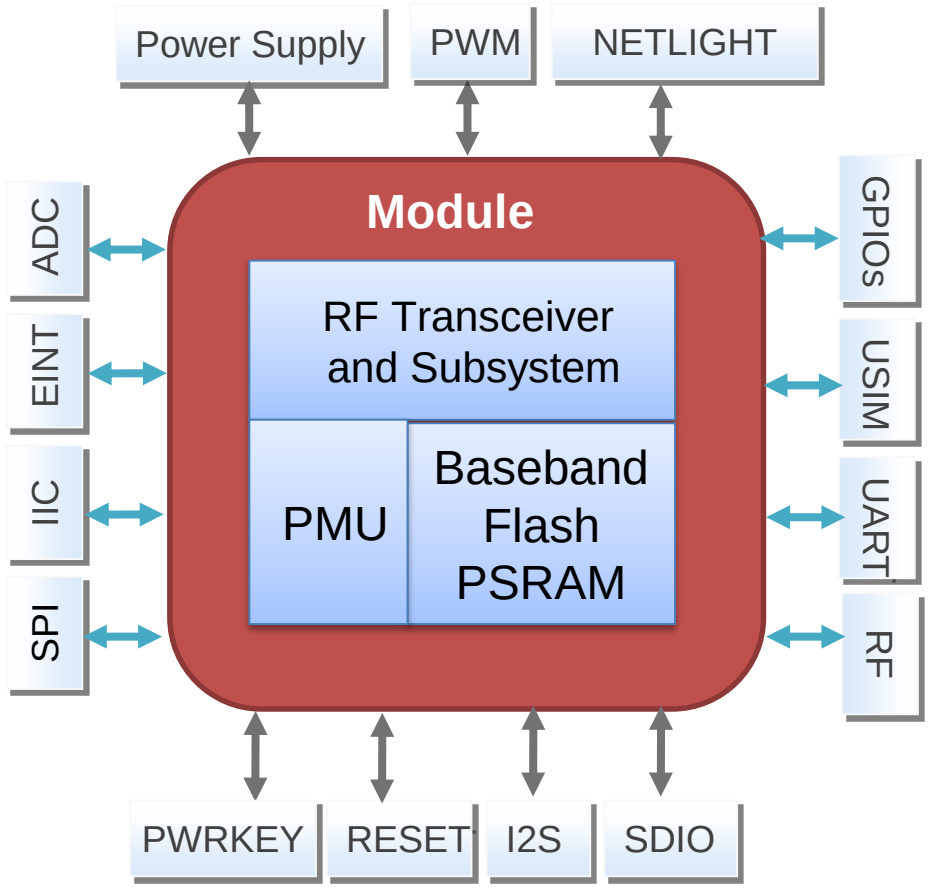
- **Memory (4MB Flash + 4MB RAM)**

  - Code Region: 100KB [1)] space for APP image bin
  - RAM: 100KB [1)] static memory and 300KB [1)] dynamic memory

[1)] *means the space may be adjusted according to product features.*

Open Resources (2)

Hardware Architecture



Hardware Resources

- Power supply
- USIM interface
- GPIO interfaces
- EINT interfaces
- IIC interfaces
- SPI interfaces
- SDIO interface
- I2S interfaces
- UART interface
- NETLIGHT interface
- PWM
- ADC

Open Resources (3) Programmable Multiplexing Pins

Pin No.	Pin Name	Default Mode	Mode 0	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7
3	SPI_MISO	0	GPIO	SDIO_SLV0_CLK	SPI_MST0_MISO	I2S0_MCLK				EINT
4	SPI_MOS	0	GPIO	SDIO_SLV0_DAT3	SPI_MST0_MOSI					EINT
5	SPI_SCLK	0	GPIO	SDIO_SLV0_DAT2	SPI_MST0_SCK					EINT
6	SPI_CS	0	GPIO	SDIO_SLV0_DAT0	SPI_MST0_CS	I2S0_CK	PWM1			EINT
16	NETLIGHT	0	GPIO	UART1_RTS	I2C0_SDA	I2S0_RX		PWM0		EINT
20	RI	0	GPIO	SDIO_SLV0_DAT1		I2S0_WS	I2C0_SCL			EINT
21	DCC/SIMDET	0	GPIO	SDIO_SLV0_CMD		I2S0_TX	I2C0_SDA	PWM1		EINT
22	CTS_AUX	0	GPIO		SPI_SLV0_MISO	UART1_RTS	UART3_RXD			EINT
23	RST_AUX	0	GPIO		SPI_SLV0_SCK	UART1_CTS	UART3_TXD	PWM2		EINT
26	I2S_MCLK/GPIO3	0	GPIO	I2S0_MCLK	UART2_RXD					EINT
28	RXD_AUX	0	GPIO		SPI_SLV0_CS	UART1_RXD				EINT
29	TXD_AUX	0	GPIO		SPI_SLV0_MOSI	UART1_TXD	PWM2			EINT
30	I2S_CK	0	GPIO	I2S0_CK	UART2_CTS	UART3_TXD				EINT
31	I2S_WS	0	GPIO	I2S0_WS	UART2_RTS	UART3_RXD		PWM3		EINT
32	I2S_RX	0	GPIO	I2S0_RX	UART1_RXD					EINT
33	I2S_TX	0	GPIO	I2S0_TX	UART1_TXD					EINT
38	RXD_DBG	0	GPIO			UART2_RXD	UART1_CTS			EINT
39	TXD_DBG	0	GPIO					UART2_TXD		EINT

Advantages - Low Cost & Fast Time-to-market

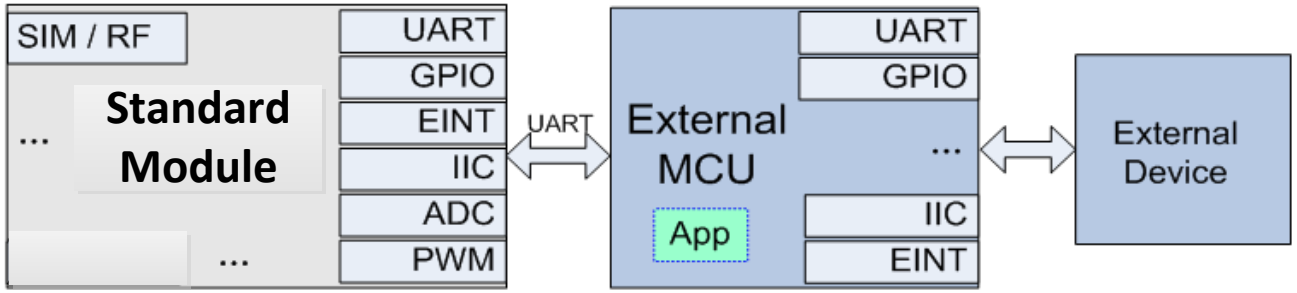
- Reduced product development time
- Simplified circuit design and reduced cost & power consumption
- Decreased product size
- Upgrade firmware remotely via LWM2M or DFOTA *
- Decreased total cost and enhanced competitive advantages

Low Cost & Fast Time-to-market

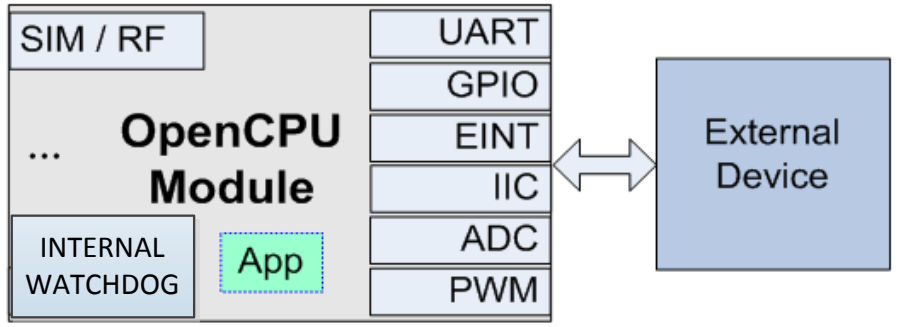
Advantages - Easier Hardware Design

As compared with traditional solutions, OpenCPU solution can make hardware design easier for developers. The following is a comparison between traditional and OpenCPU solutions.

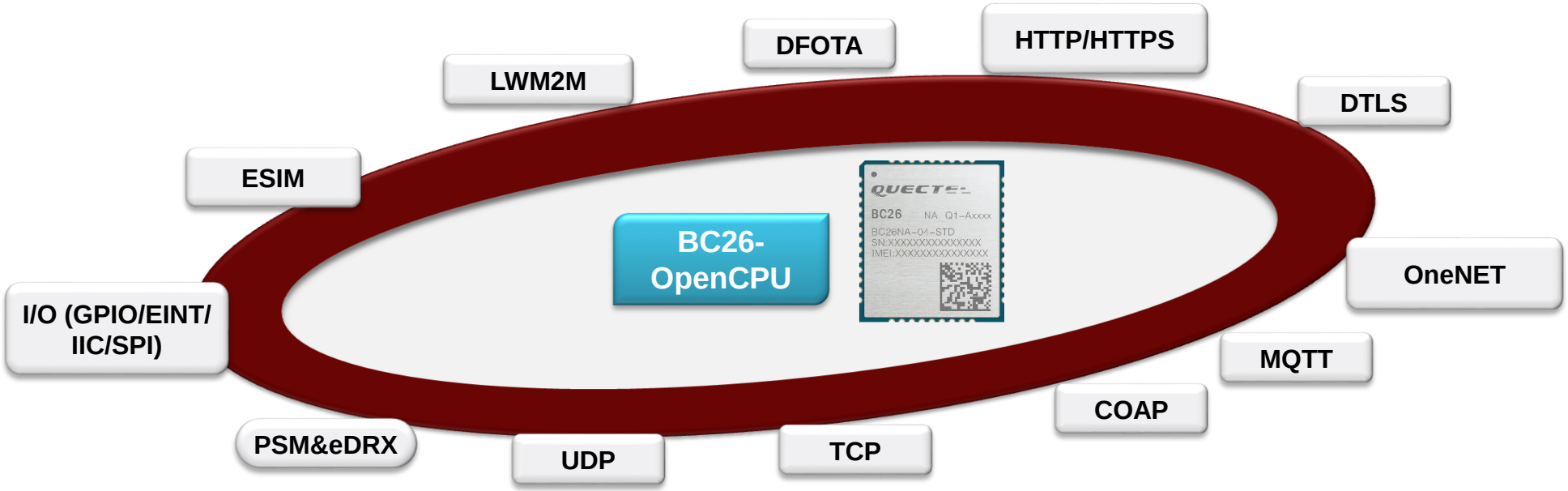
Traditional Solution



OpenCPU Solution



Advantages – Enhanced Technology



Quality Guarantee

- Abundant network protocols
- Multi-band supported
- Low power consumption (PSM & eDRX)
- Rich I/O interfaces

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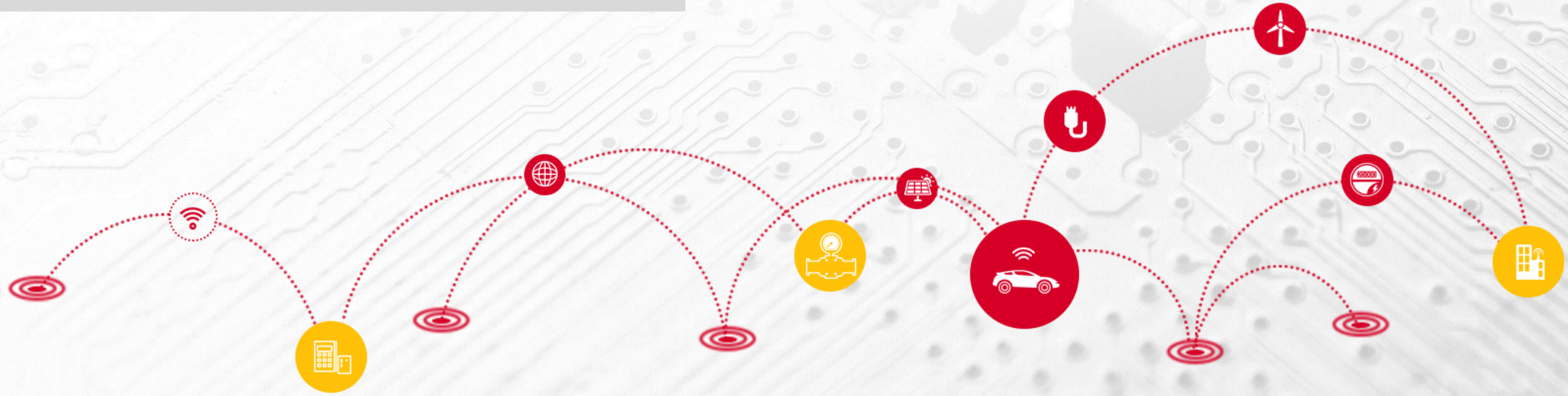
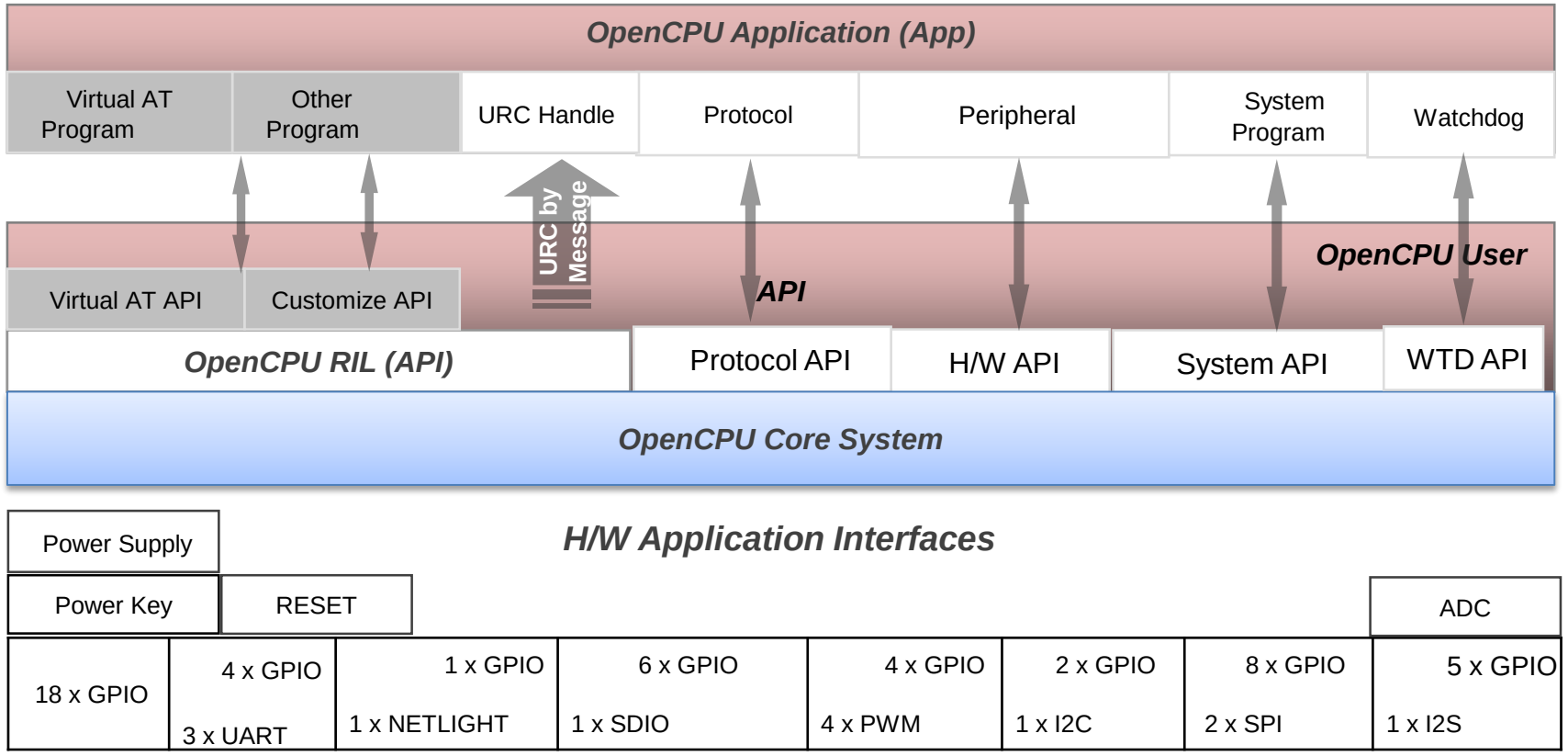


Software Architecture (1)

System software of OpenCPU consists of 3 layers: Core system, User API and Application.

The following block diagram shows the software architecture of OpenCPU.



Software Architecture (2)

Core System

Core System is a combination of hardware and system software of NB-IoT module. It has a built-in ARM Cortex-M4 processor, and has been built over FreeRTOS operating system which has the characteristics of micro-kernel, real-time, multi-tasking, etc.

OpenCPU RIL

OpenCPU RIL, an open source layer, is embedded into User API layer. With OpenCPU RIL, developers can simply call API to send AT commands and immediately get the response when API returns.

Developers can easily develop some new API functions to implement the AT commands according to the requirements.

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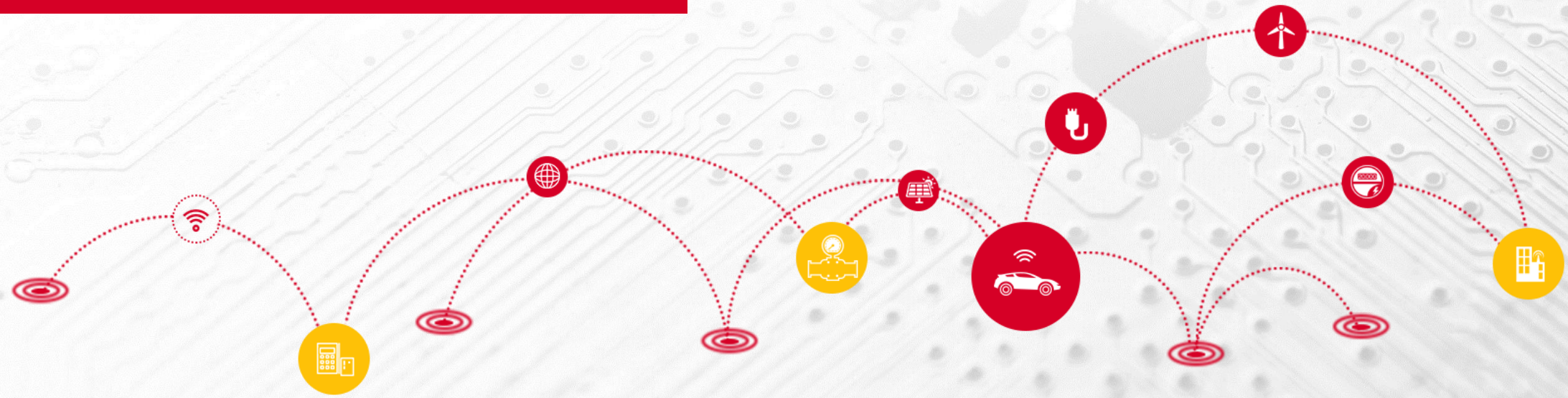

What's New?

GCC Compiler Support

- BC26-OpenCPU supports free-of-charge GCC compiler (gcc-arm-none-eabi V4.8).
- Supported compile in Linux environment and Windows + Cygwins environment

IDE Support

Command-line + Source Insight

Development Requirements (1)

Host System Requirements

The following host Operating Systems and architectures are supported:

- Microsoft Windows XP (SP1 or later)
- Windows Vista
- Windows 7 systems using IA32, AMD64, and Intel 64 processors.

Compiler & IDE Requirements

- GCC Compiler (gcc-arm-none-eabi V4.8)

Development Requirements (2)

Programming Language Requirement

- Basic C-language programming knowledge

SDK and Other Requirements

- Quectel NB-IoT module with OpenCPU solution
- Quectel BC26 TE-B
- OpenCPU SDK
- Firmware download tool (included in SDK)

Thank you!

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