Lars Sundell
Senior Project Manager, Hardware

nRF51 Series introduction

- A brief look at the underlying hardware

NORDIC SEMICONDUCTOR

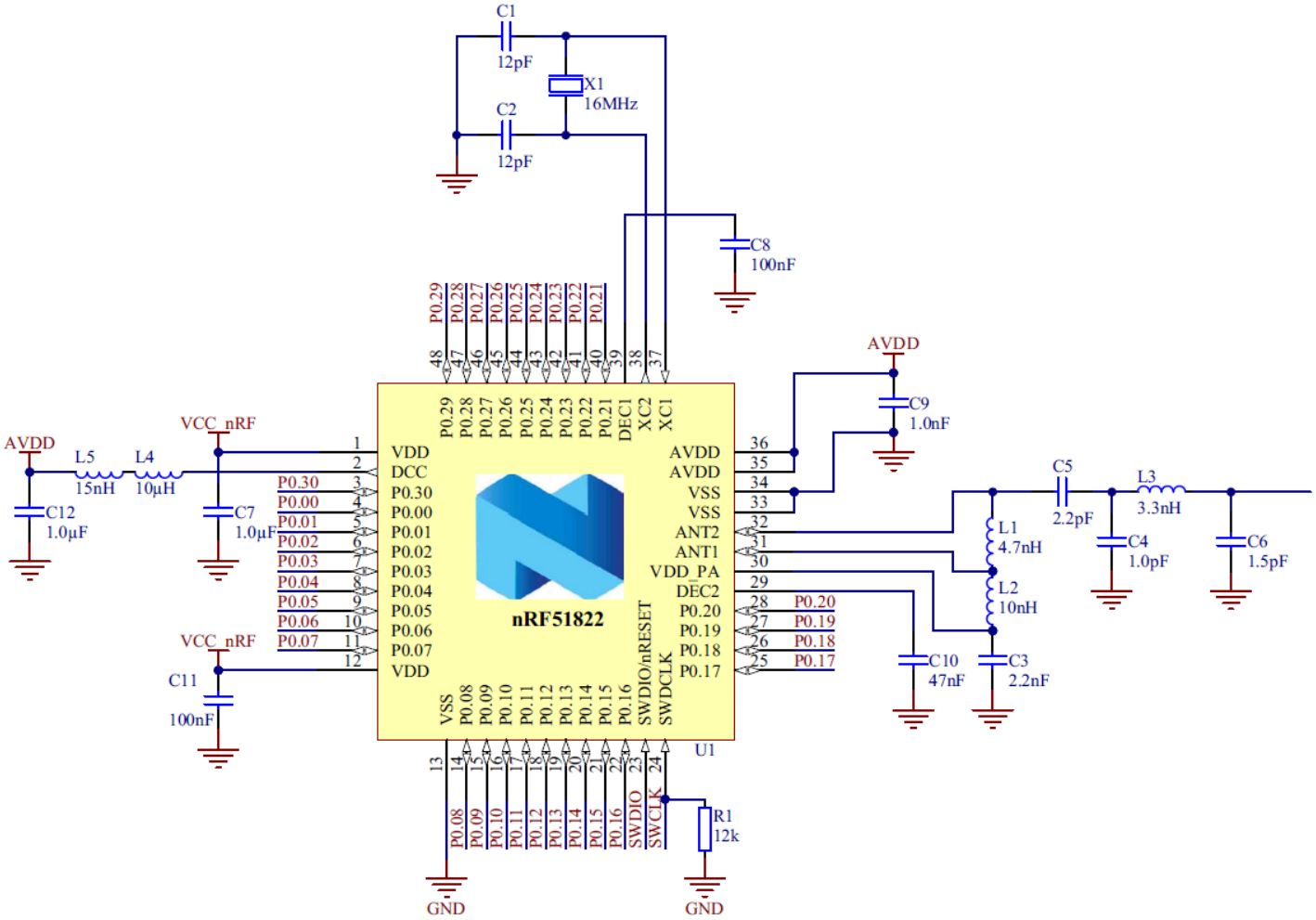
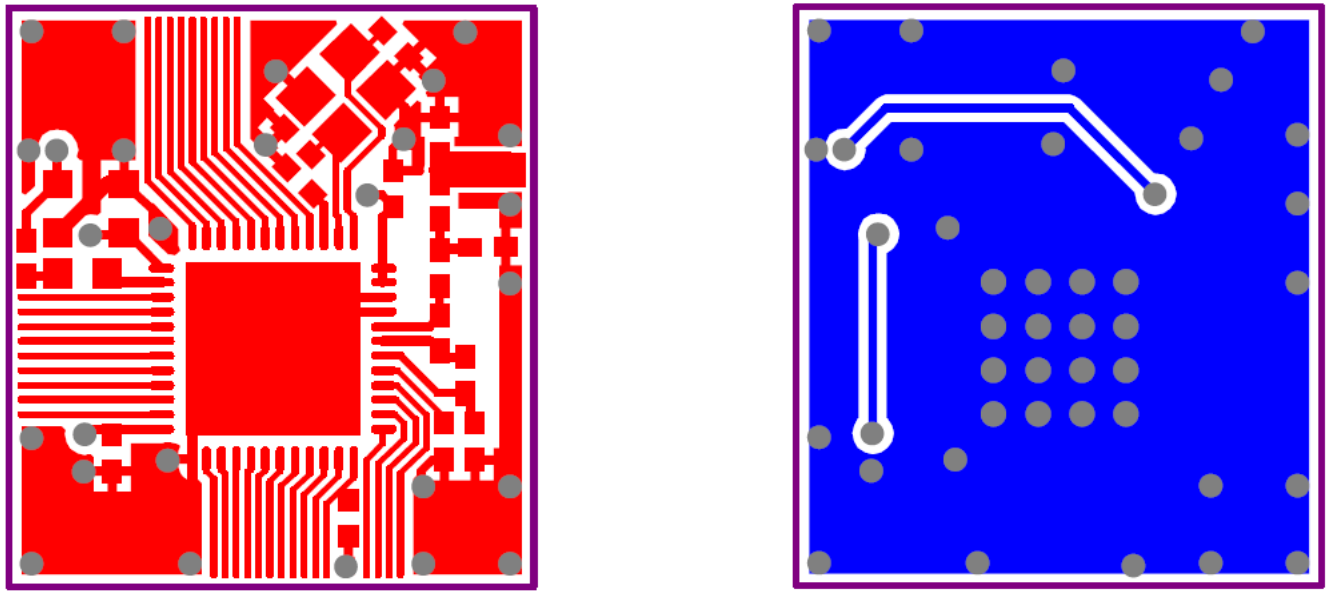


Figure 9 nRF51822-QFAA with DC/DC converter - Schematic



Top view

Bottom view

Figure 10 *nRF51822-QFAA with DC/DC regulator - Layout*

Goal with nRF51 Series

Flexibility

Consistency

Low Power

Goal with nRF51 Series

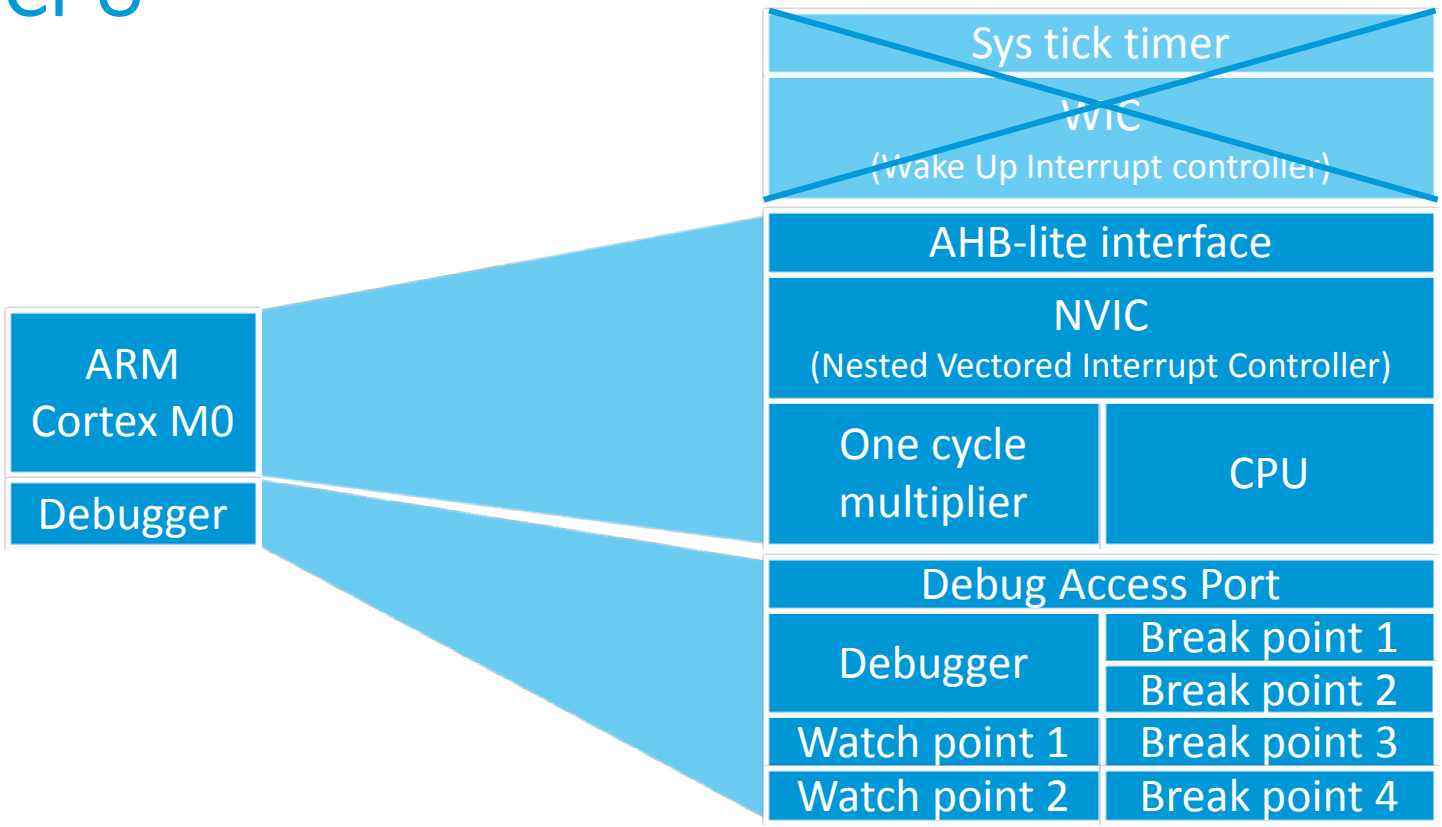
Flexibility

Consistency

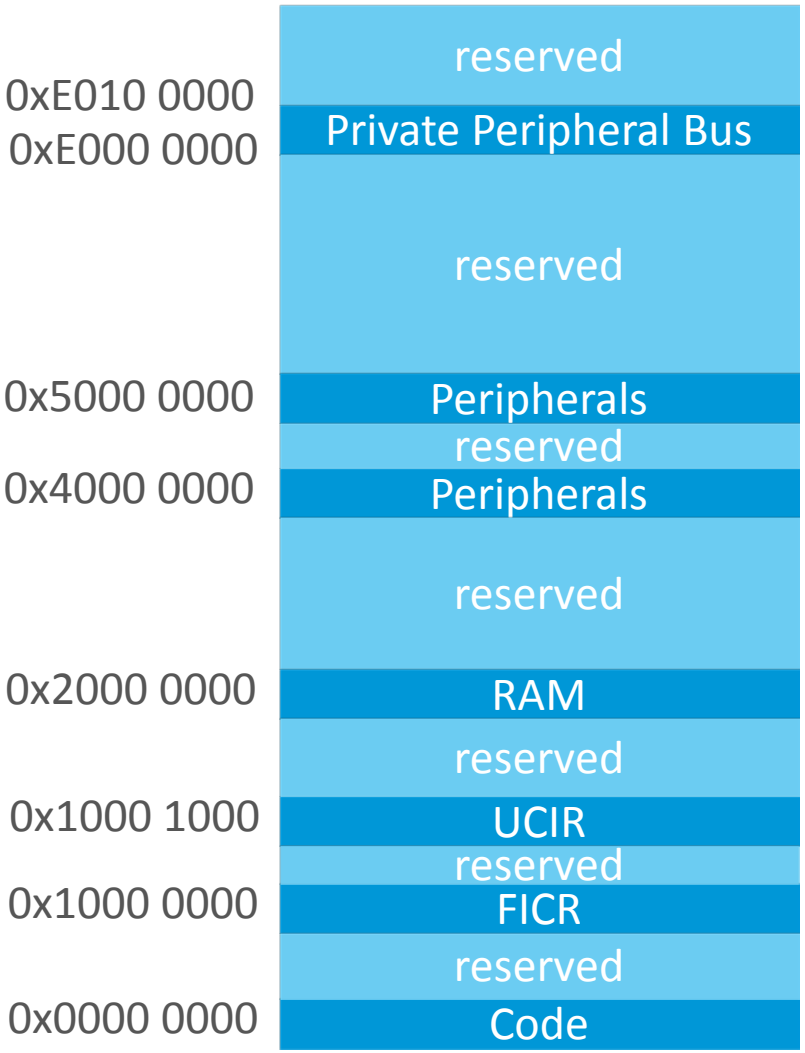
Low Power

Core functions

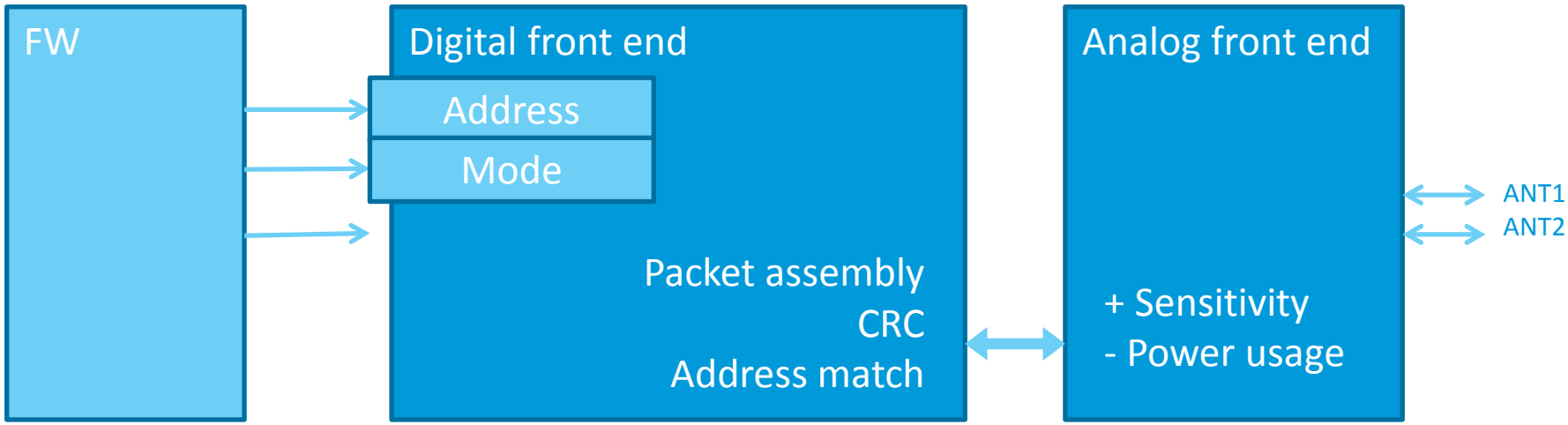
The CPU


Sys tick timer
WIC
(Wake Up Interrupt controller)
AHB-lite interface
NVIC
(Nested Vectored Interrupt Controller)
One cycle multiplier
CPU
ARM Cortex M0
Debugger
Debug Access Port
Debugger
Break point 1
Break point 2
Watch point 1
Break point 3
Watch point 2
Break point 4

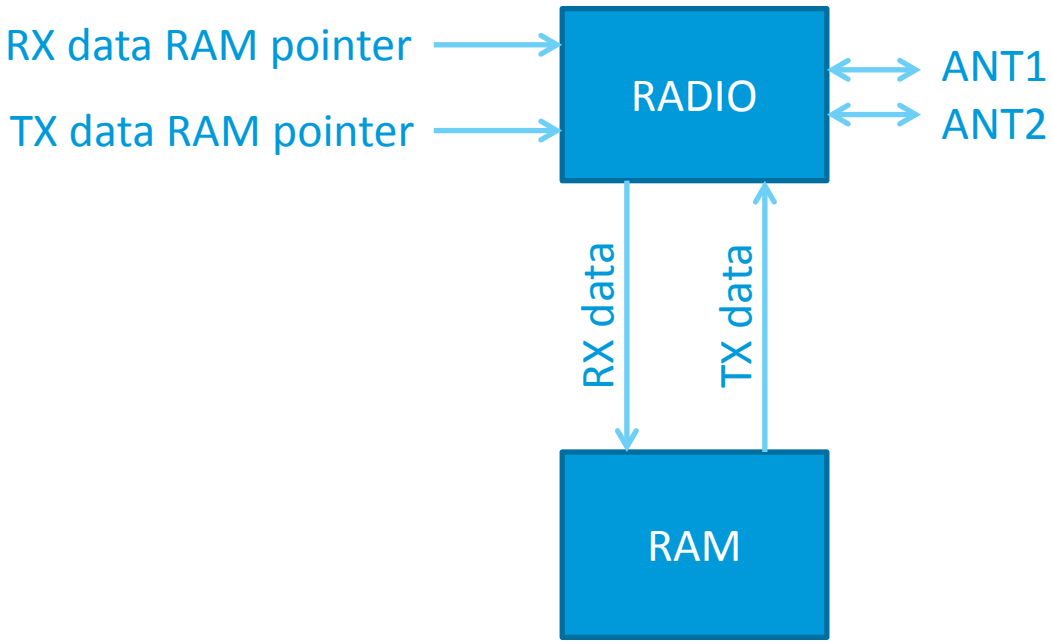
Address map


reserved
0xE010 0000
Private Peripheral Bus
0xE000 0000
reserved
0x5000 0000
Peripherals
reserved
0x4000 0000
Peripherals
reserved
0x2000 0000
RAM
reserved
0x1000 1000
UCIR
reserved
0x1000 0000
FICR
reserved
0x0000 0000
Code

Multi Protocol Radio



Easy DMA


RX data RAM pointer
TX data RAM pointer
RADIO
ANT1
ANT2
RX data
TX data
RAM

Goal with nRF51 Series

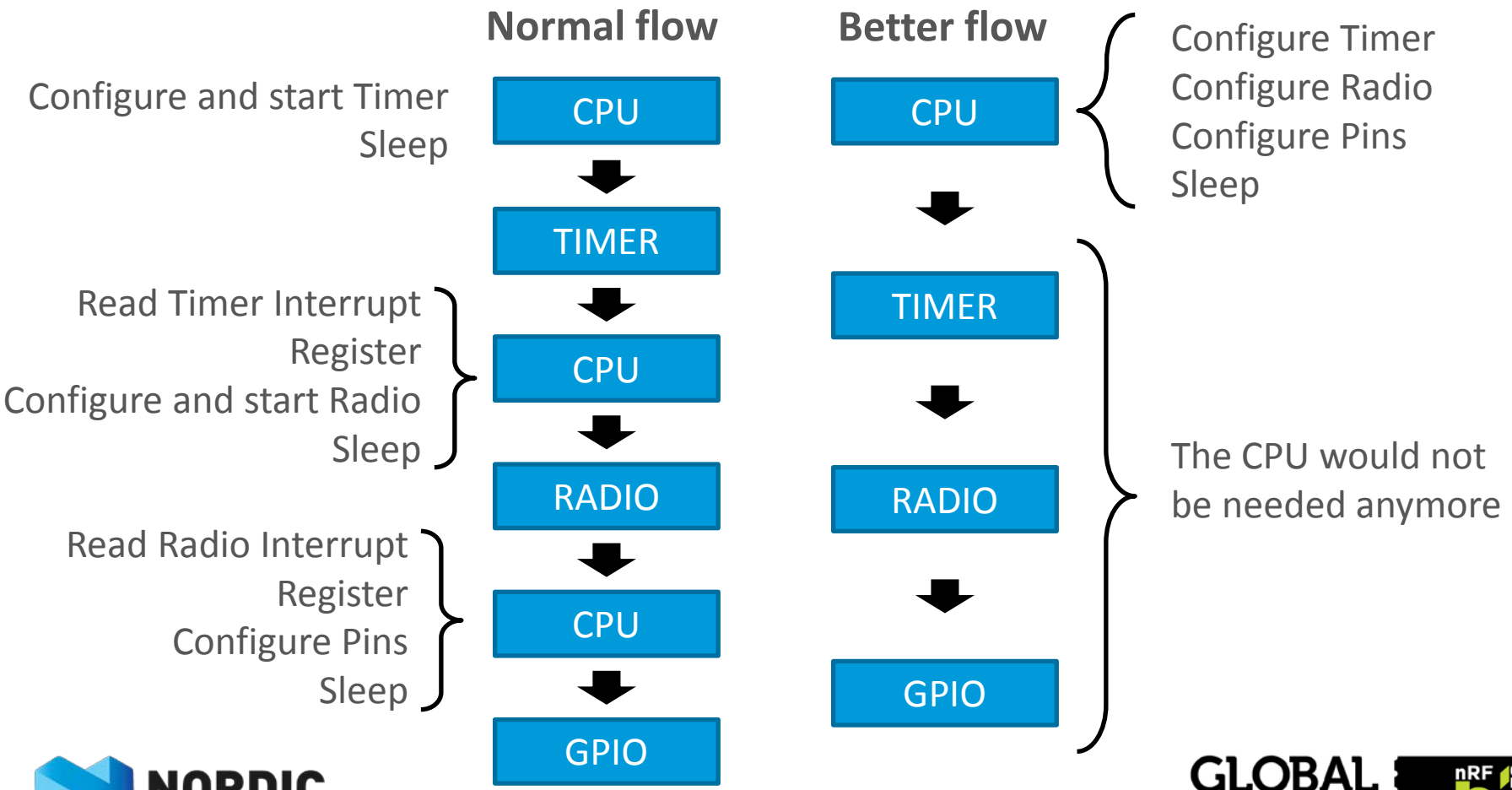
Flexibility

Consistency

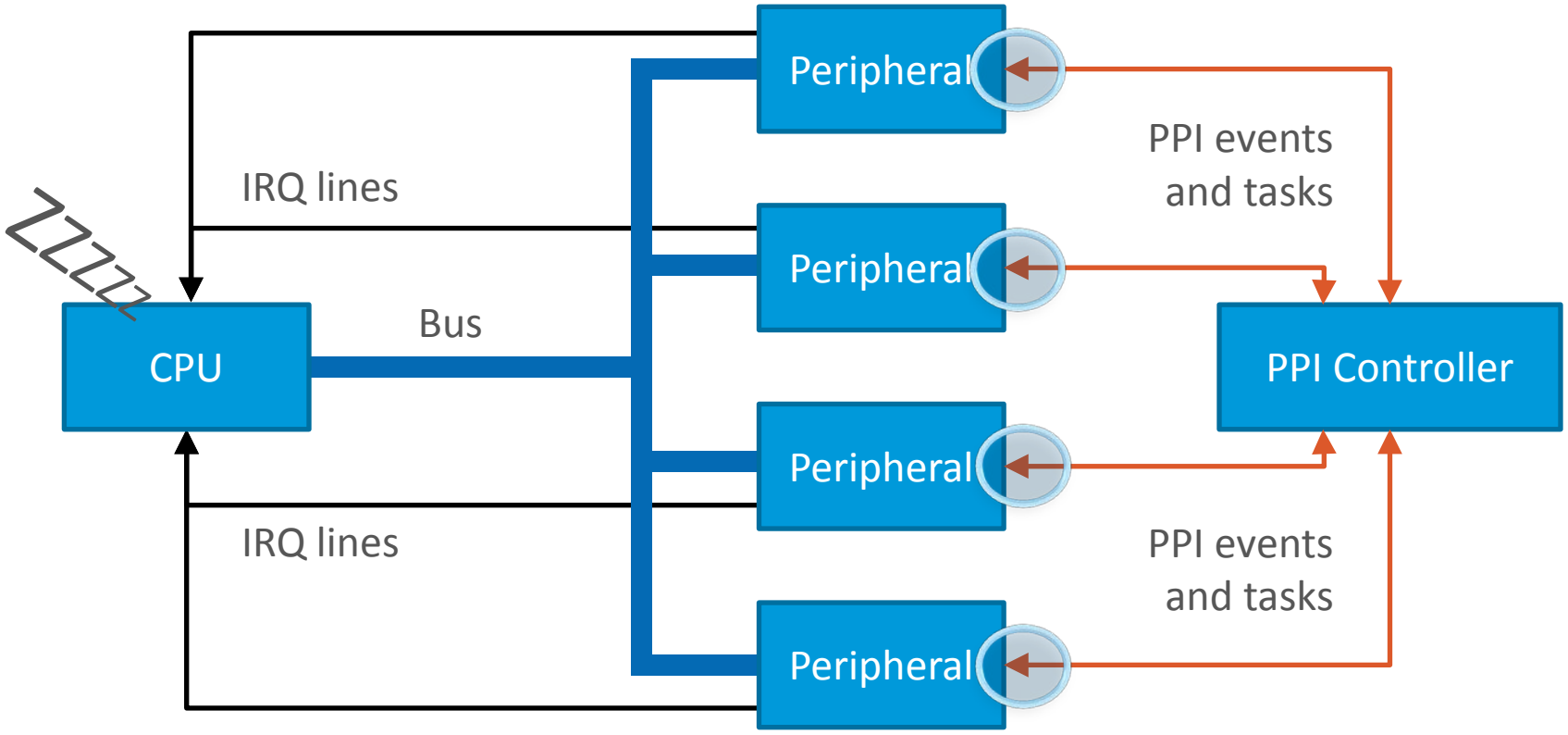
Low Power

Signalling and Connectivity

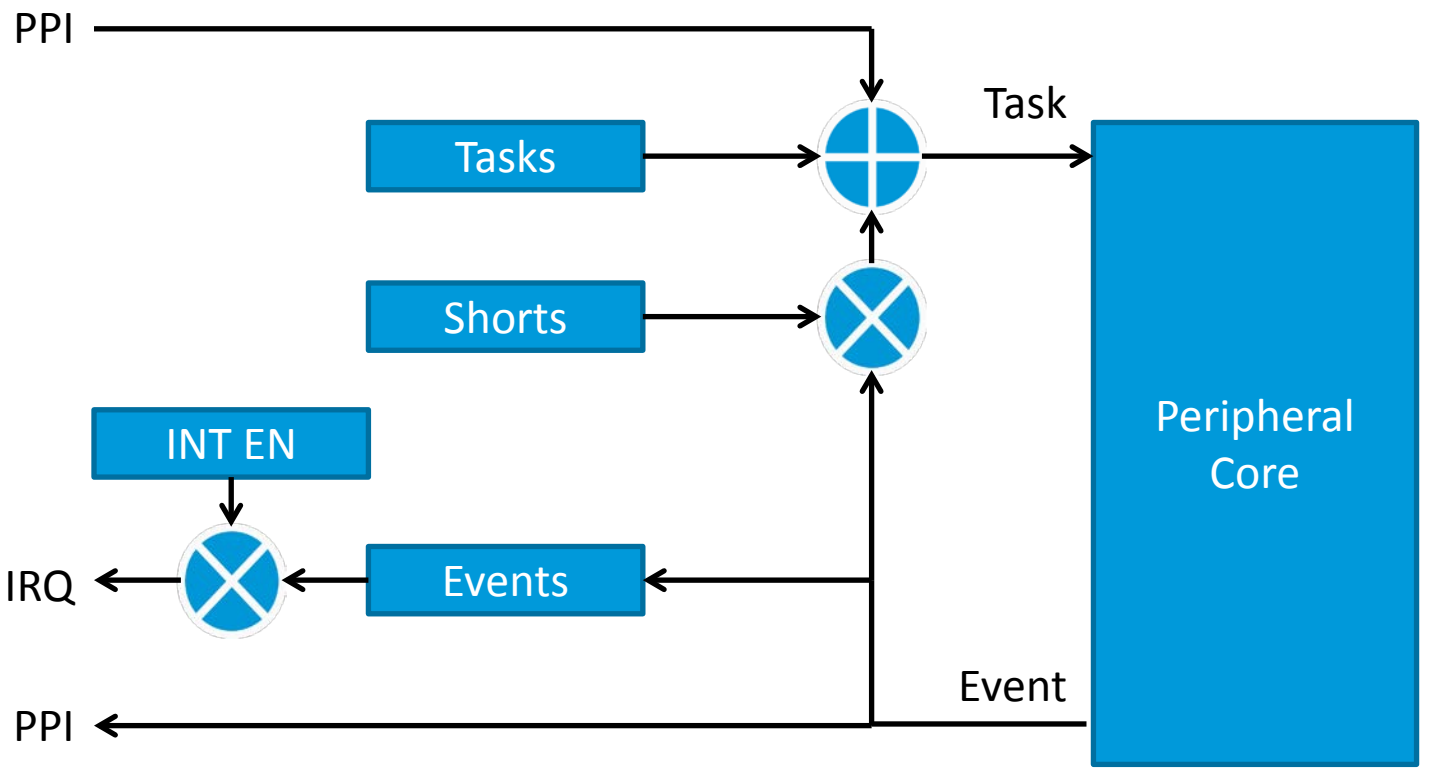
Signalling flow between peripherals



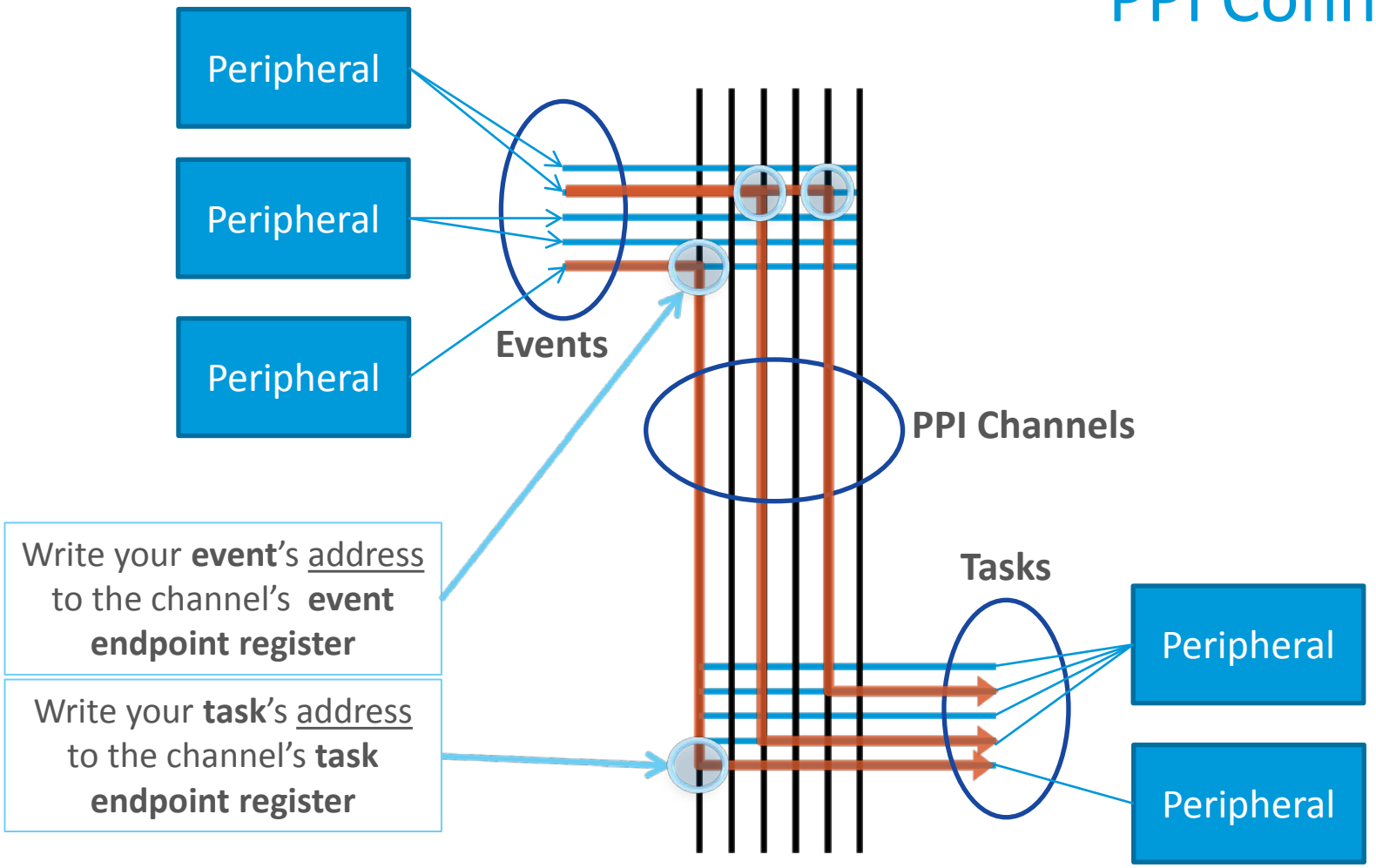
IRQ vs Programmable Peripheral Interconnect (PPI)



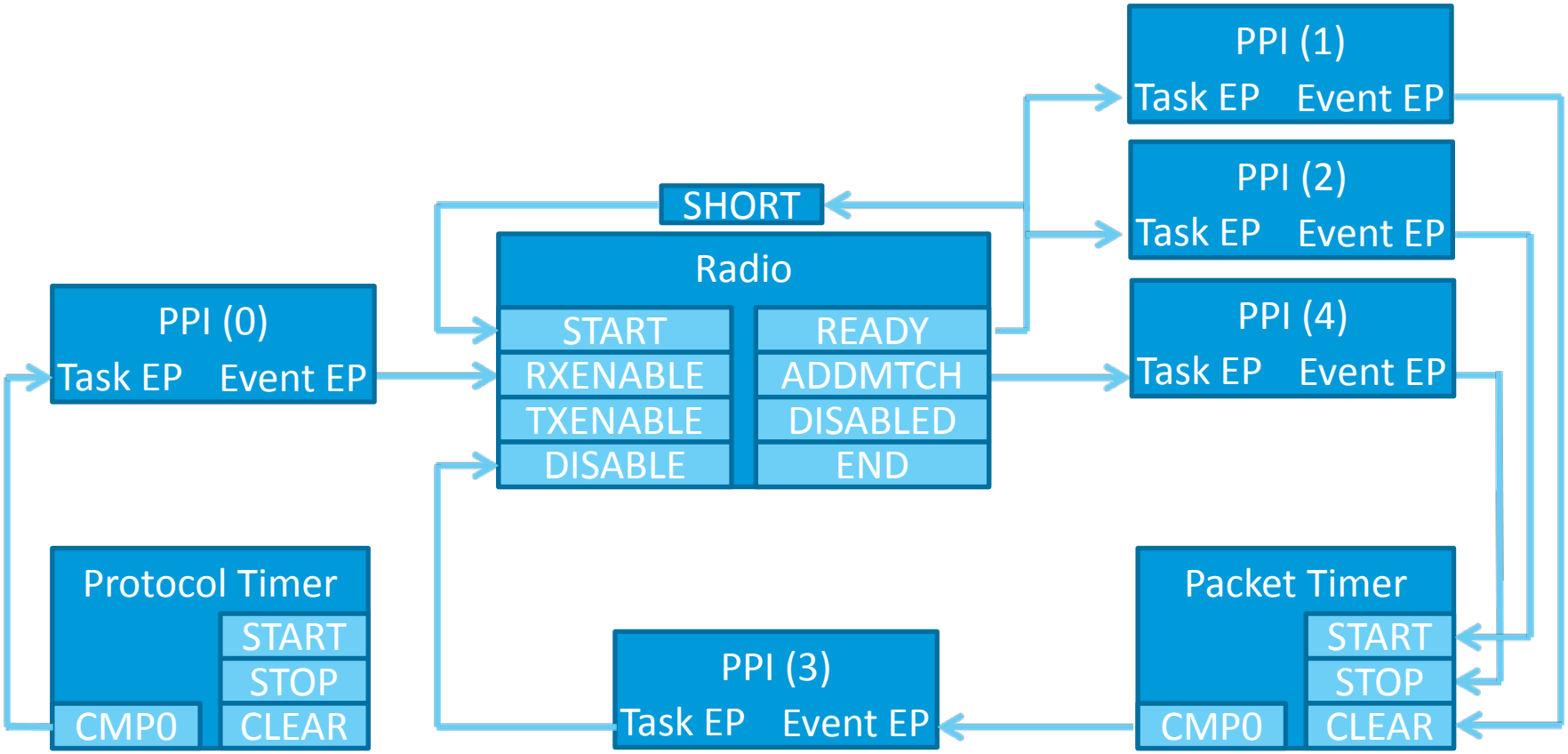
PPI - Block Diagram



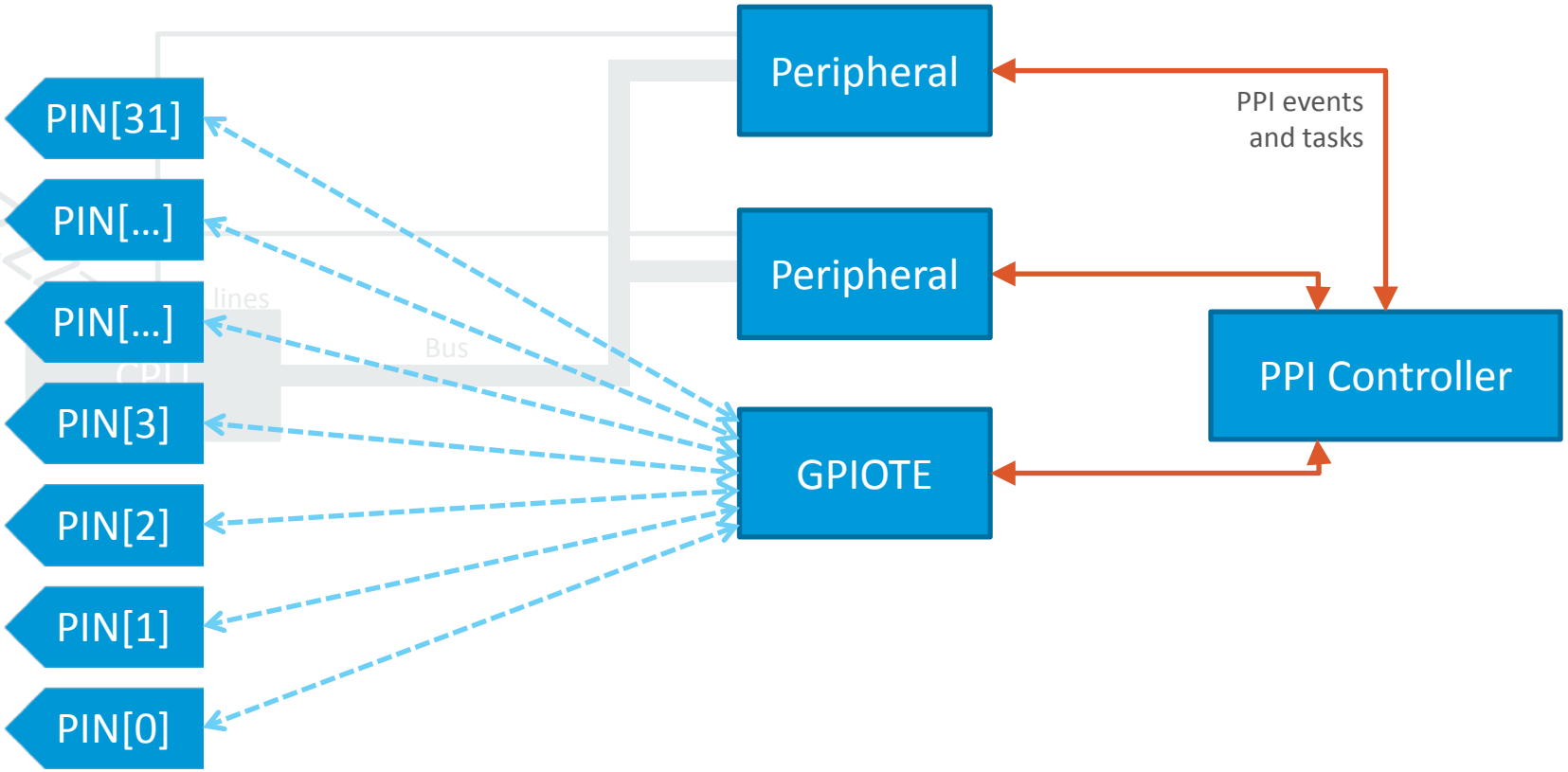
PPI Connections



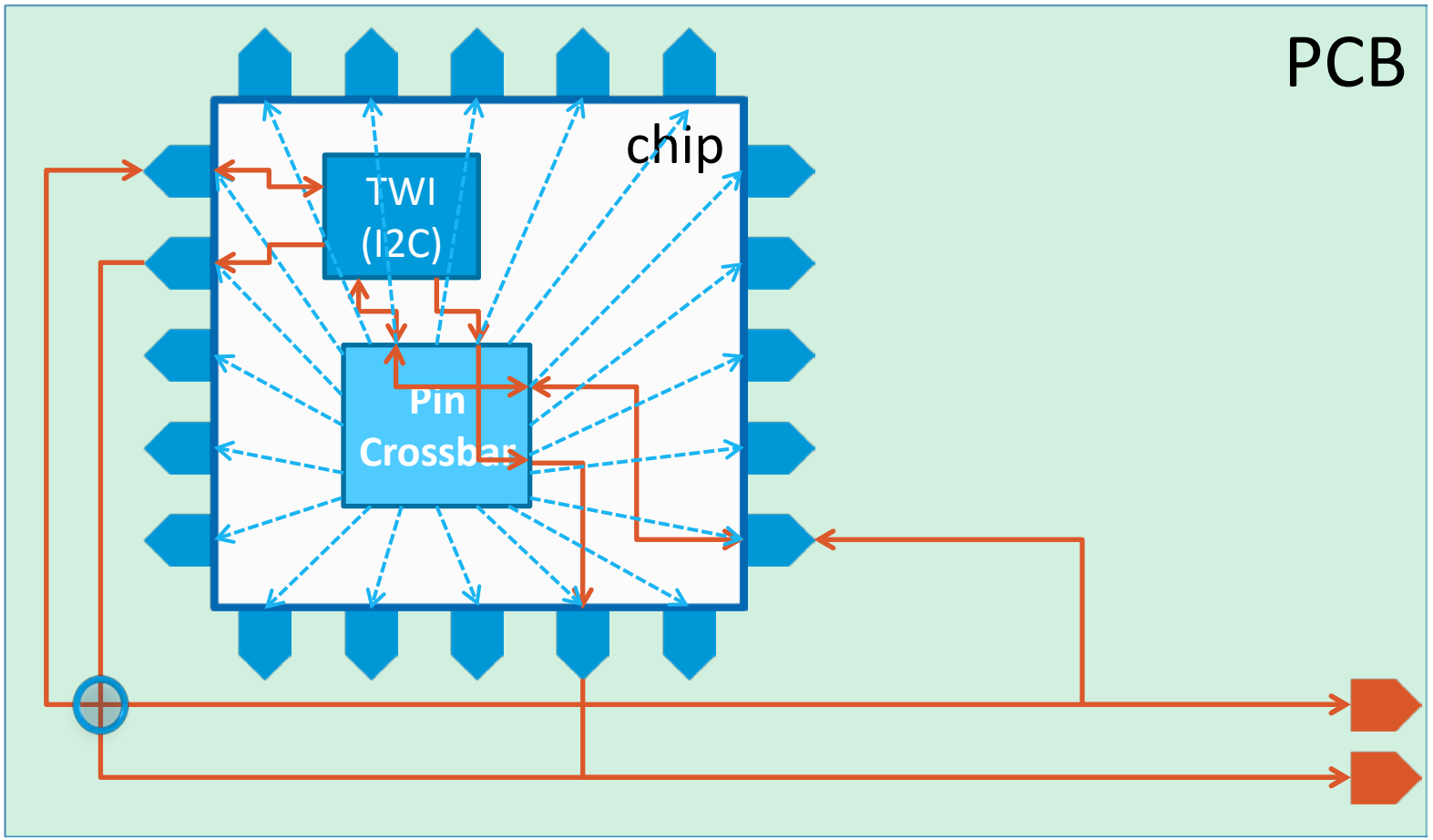
PPI - Real-life example



GPIOTE (GPIO Tasks and Events)



Peripheral pin access



Goal with nRF51 Series

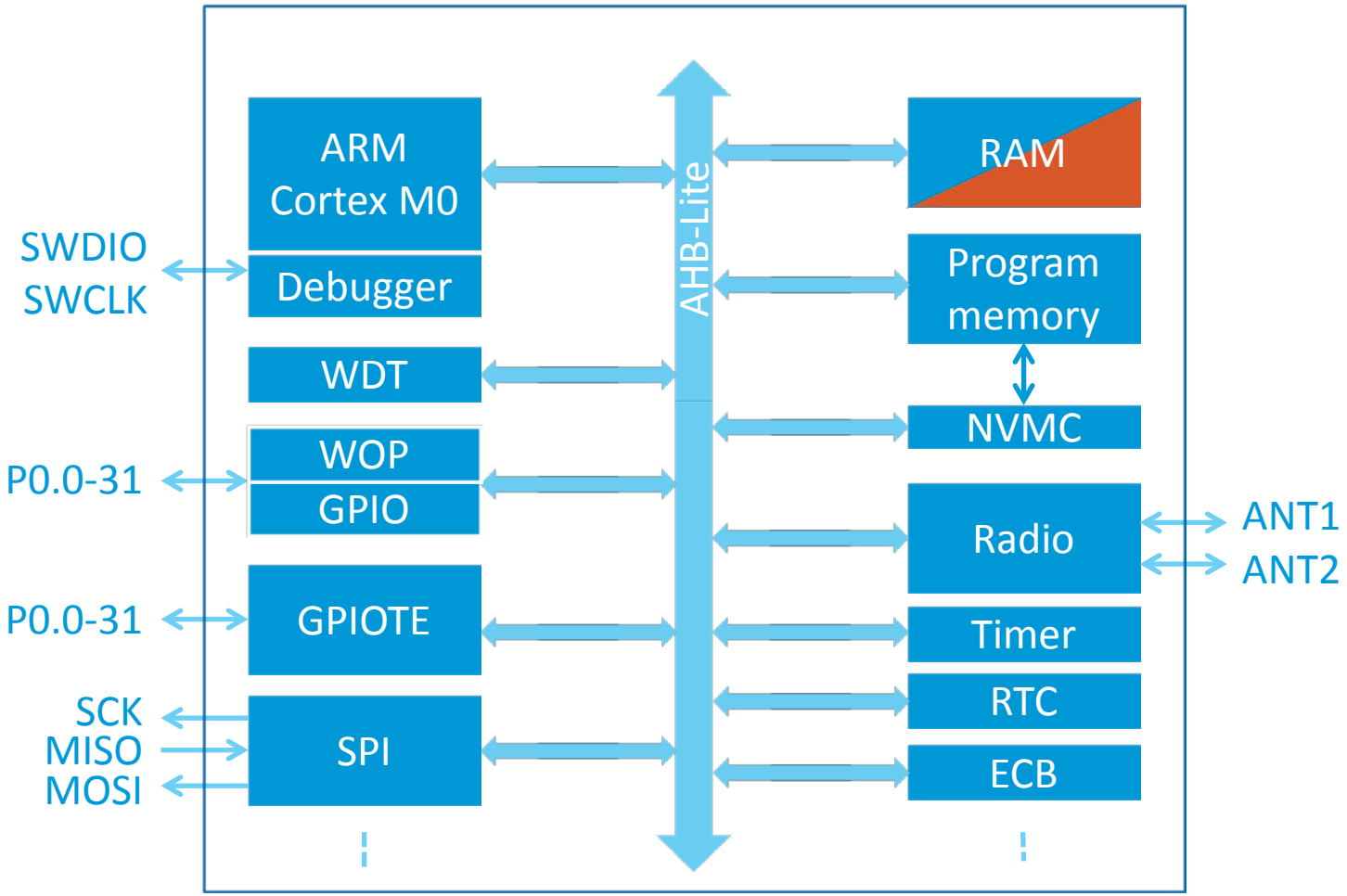
Flexibility

Consistency

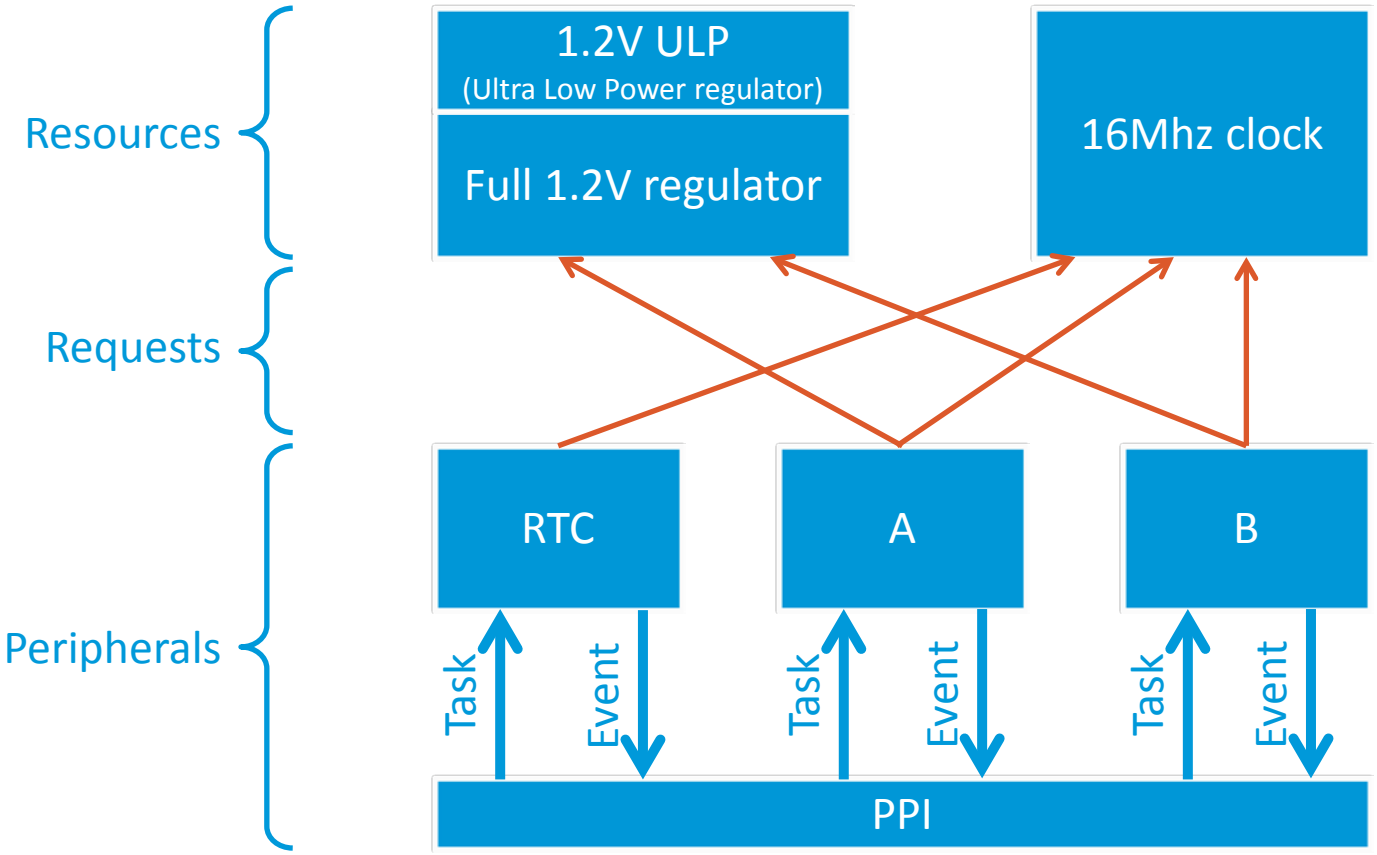
Low Power

Power and Clock

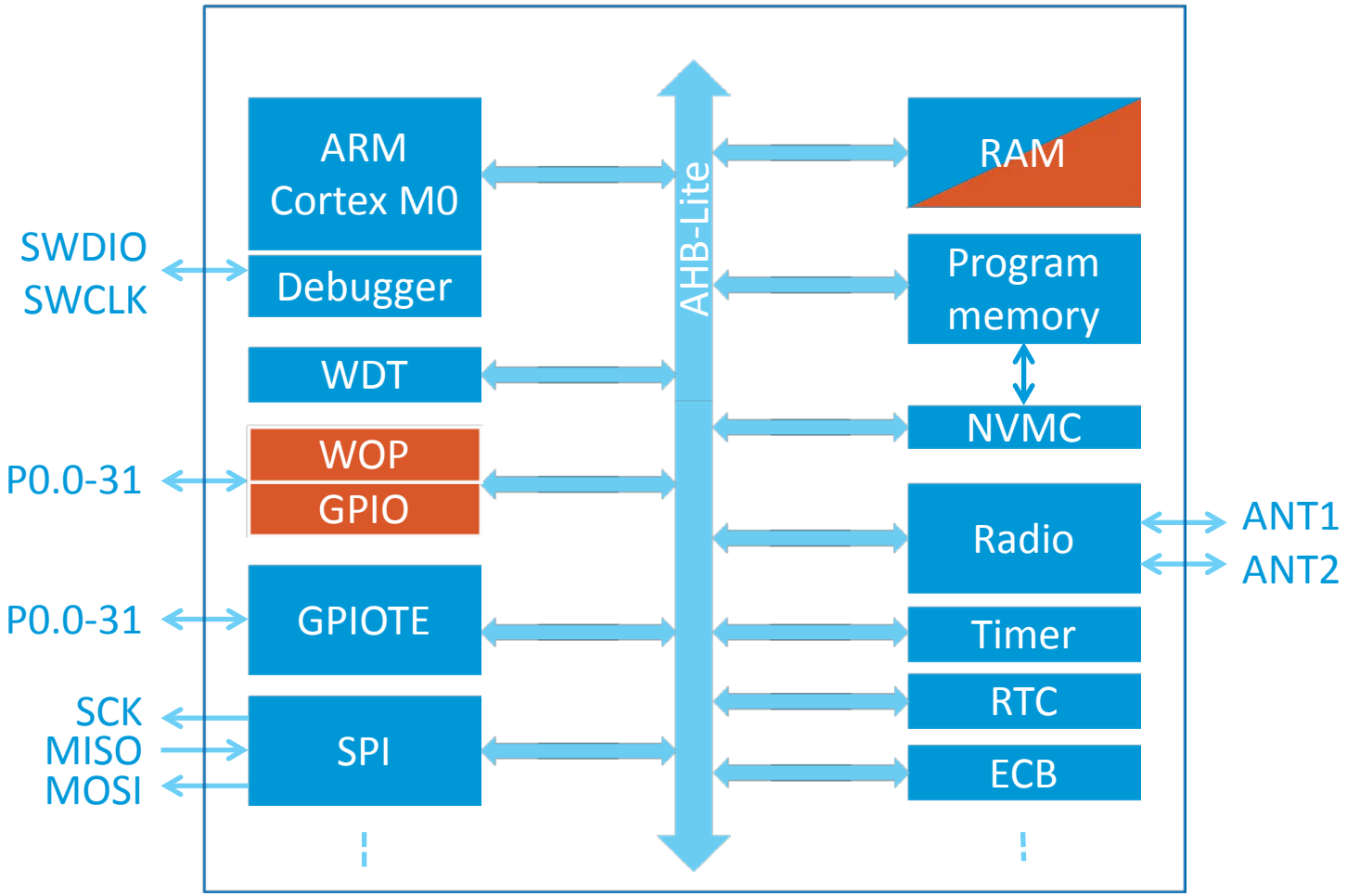
Power Management System Off



Power and Clock



System On


ARM
Cortex M0
Debugger
WDT
WOP
GPIO
GPIOTE
SPI
AHB-Lite
RAM
Program
memory
NVMC
Radio
Timer
RTC
ECB
SWDIO
SWCLK
P0.0-31
P0.0-31
SCK
MISO
MOSI
ANT1
ANT2

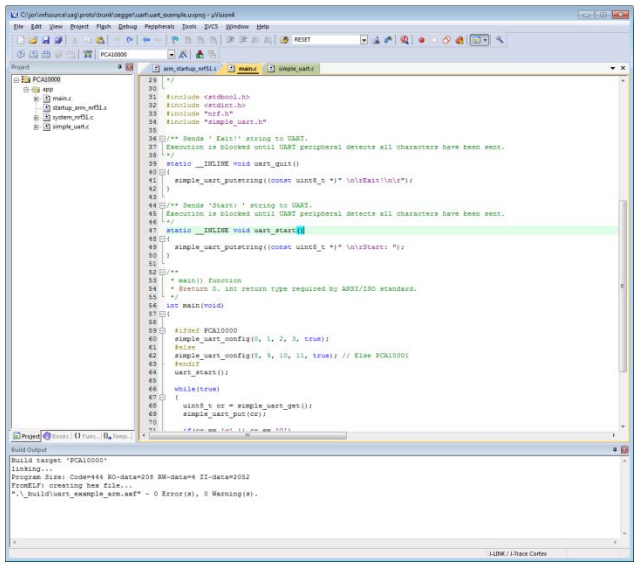
Goal with nRF51 Series

Flexibility

Consistency

Low Power

Code Reuse



Goal with nRF51 Series

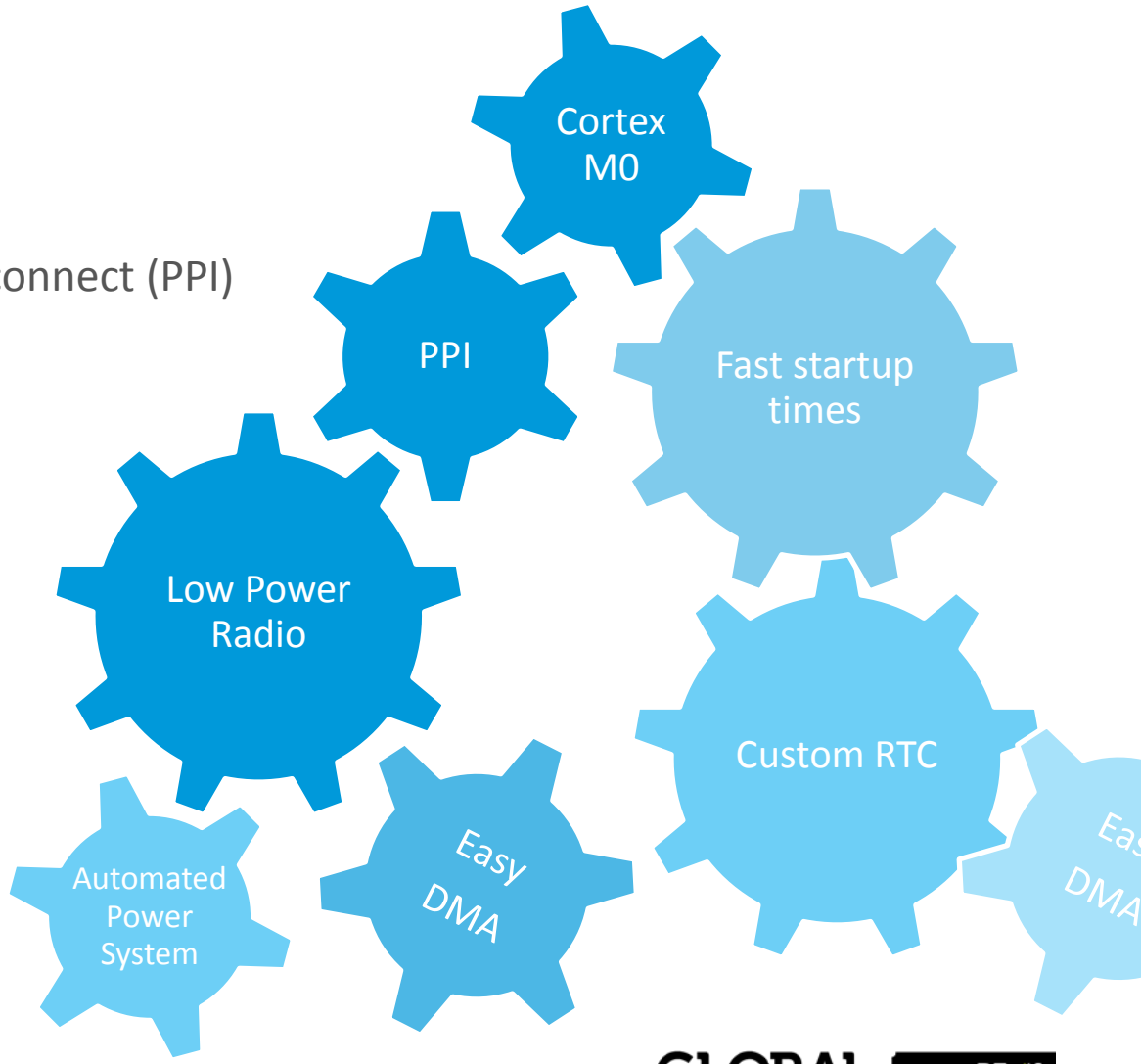
Flexibility

Consistency

Low Power

Ultra low power

- Programmable Peripheral Interconnect (PPI)
- Cortex M0
- Fast Startup Time
- Radio
- Automated Power System
- EasyDMA



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nRF51 Series introduction

Thank you for your attention

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