

HOW TO BUILD YOUR NEXT SUPERCHARGED EMBEDDED UI ON THE I.MX RT1060

HOSTED BY NIK SCHULTZ (CRANK SOFTWARE) AND SHELBY UNGER (NXP)

MAY 23, 2019



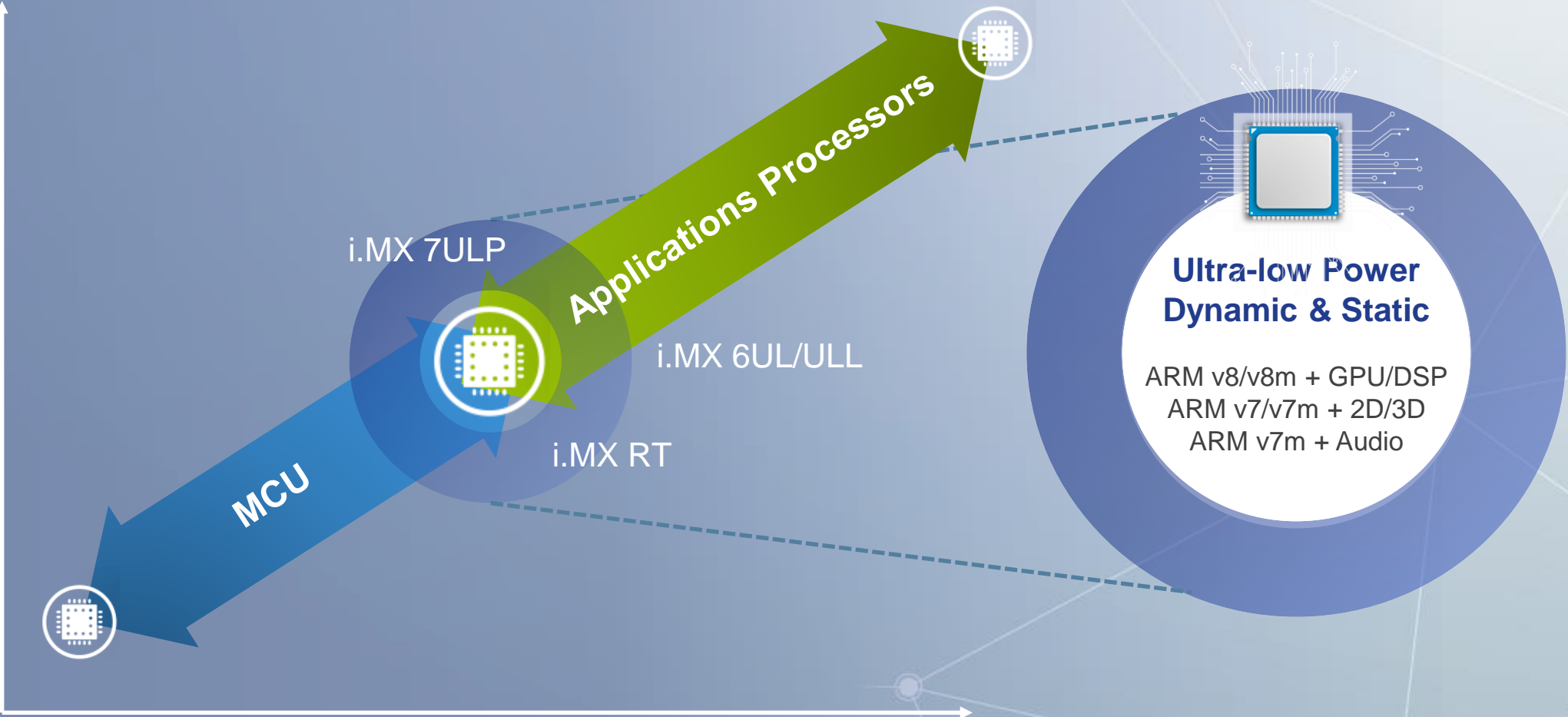
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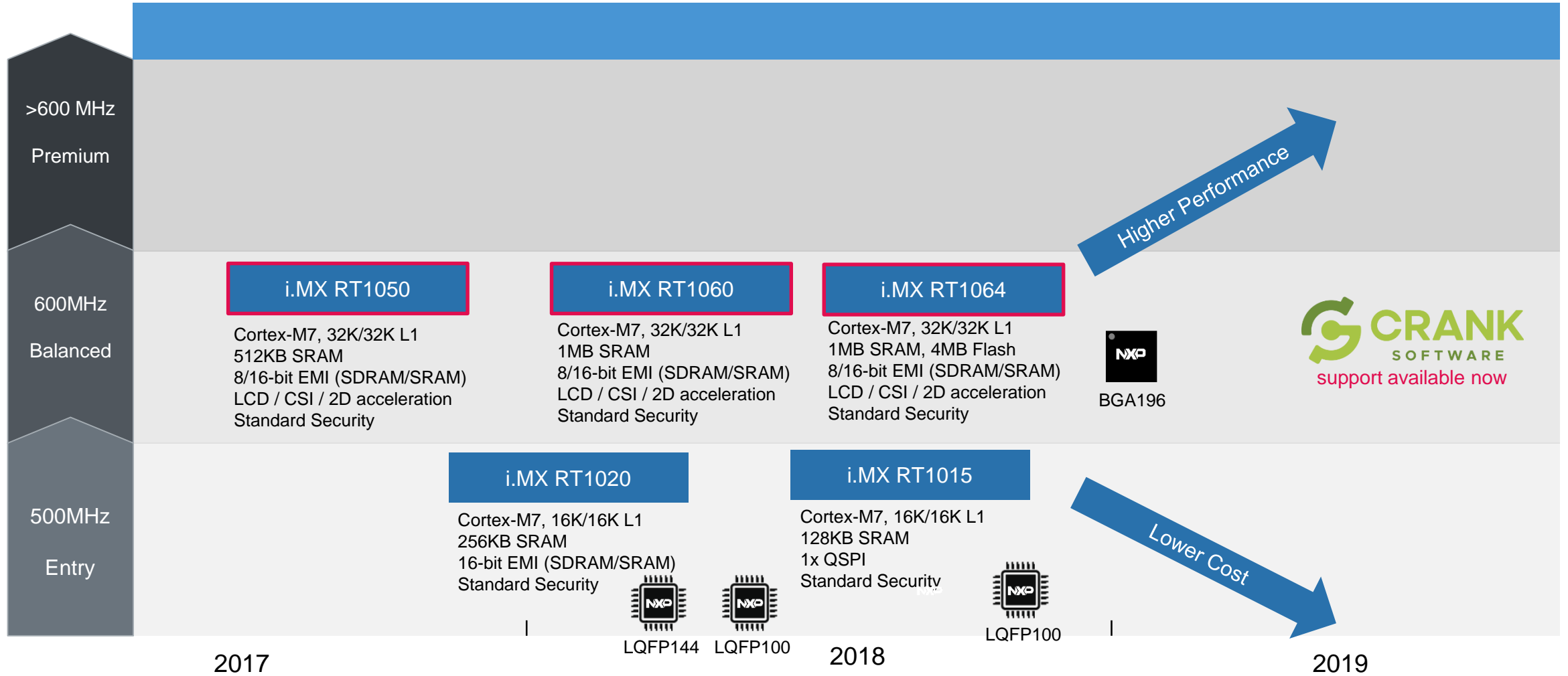
SECURE CONNECTIONS
FOR A SMARTER WORLD

SCALABILITY OF EMBEDDED PROCESSING

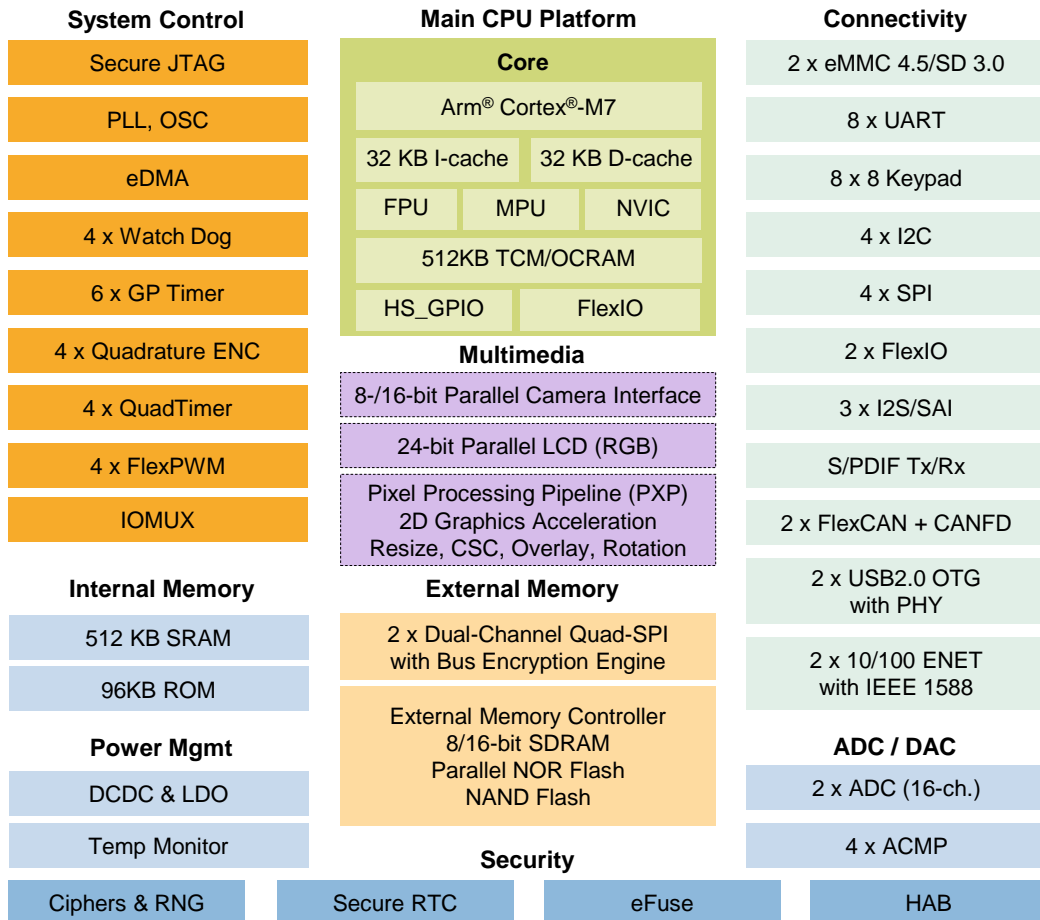
THE NEW NORMAL



Low Power i.MX RT Roadmap



i.MX RT1060: Block Diagram



 Available on certain product families

Specifications

- Package: MAPBGA196 | 10x10mm², 0.65mm pitch (130 GPIOs)
- Temp / Qual: -40 to 105°C (Tj) Industrial / 0 to 95°C (Tj) Consumer

High Performance Real Time system

- **Cortex-M7 up to 600MHz**, 50% faster than any other existing M7 products
- 20ns interrupt latency, a **TRUE Real time processor**
- 512KB SRAM + 512KB TCM/OCRAM

Rich Peripheral

- Motor Control: Flex PWM X 4, Quad Timer X 4, ENC X 4
- 2x USB, 2x SDIO, 2x CAN + 1x CANFD, 2x ENET with 1588, 8xUART, 4x SPI, 4x I2C
- **8/16-bit CSI interface and 8/16/24-bit LCD interface**
- **PXP 2D Graphics Acceleration**
- 2x Quad-SPI interface, with Bus Encryption Engine
- Audio interface: 3x SAI/ SPDIF RX & TX/ 1x ESAI

Security

- TRNG&PRNG(NIST SP 800-90 Certified)
- 128-AES cryptography
- Bus Encryption Engine: Protect QSPI Flash Content

Ease of Use

- **MCUXpresso with SDK**
- FreeRTOS

Low BOM Cost

- Competitive Price
- Fully integrated PMIC with DC-DC
- Low cost package, 10x10 BGA with 0.65mm Pitch
- SDRAM interface

MCUXpresso Software and Tools

UNIFIED SUITE OF
TOOLS FOR EASY
DEVELOPMENT
WITH NXP MCUs



LEARN MORE >



MCUXpresso Software and Tools

for LPC & Kinetis MCUs and i.MX RT crossover processors



MCUXpresso IDE

Edit, compile, debug and optimize in an intuitive and powerful IDE



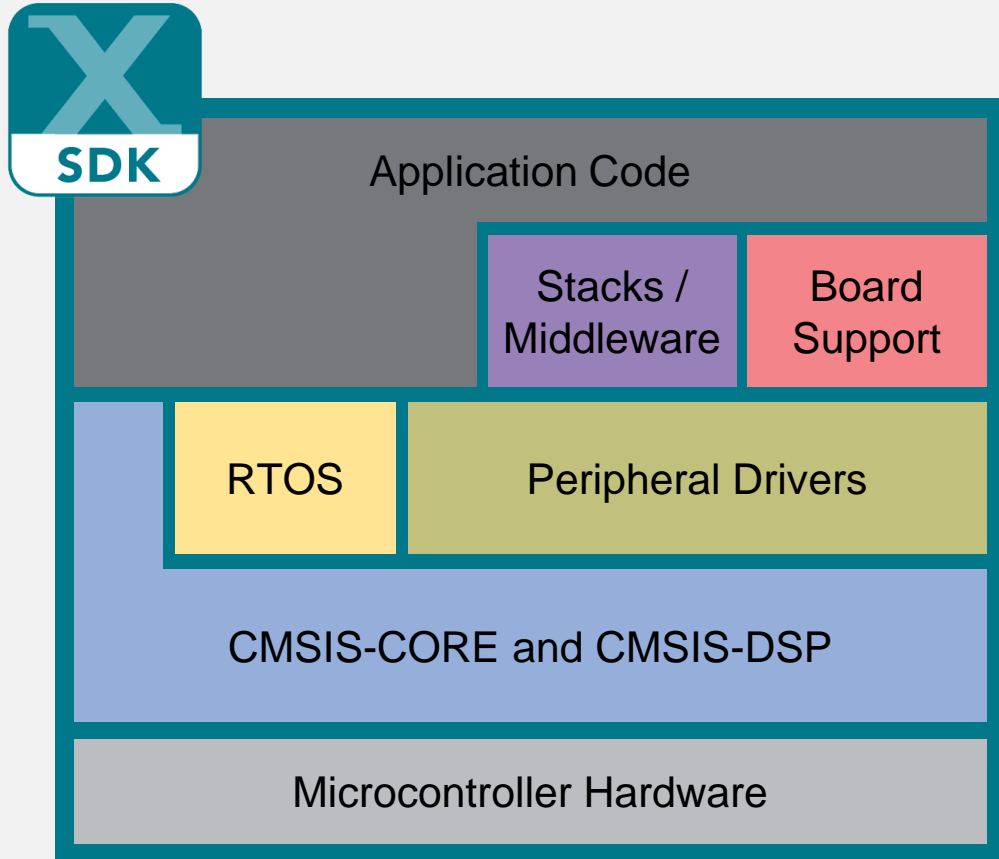
MCUXpresso SDK

Runtime software including peripheral drivers, middleware, RTOS, demos and more



MCUXpresso Config Tools

Online and desktop tool suite for system configuration and optimization



MCUXpresso SDK

Software Framework and Drivers

Architecture:

- CMSIS-CORE compatible
- Single driver for each peripheral
- Transactional APIs w/ optional DMA support for communication peripherals

Reference Software:

- Peripheral driver usage examples
- Application demos
- FreeRTOS usage demos
- IoT connectivity examples

License:

- Clear BSD 3-clause for startup, drivers, USB stack

Integrated RTOS:

- Amazon FreeRTOS
- RTOS-native driver wrappers

Toolchains:

- MCUXpresso IDE
- IAR®, ARM® Keil®, GCC w/ Cmake

Integrated Stacks and Middleware:

- USB Host, Device and OTG
- lwIP, FatFS, LittleFS
- Crypto acceleration plus wolfSSL & mbedTLS
- AWS IoT and Azure IoT
- SD and eMMC card support

Quality:

- Production-grade software
- MISRA 2004 compliance
- Checked with Coverity® static analysis tools



Open Source Initiative

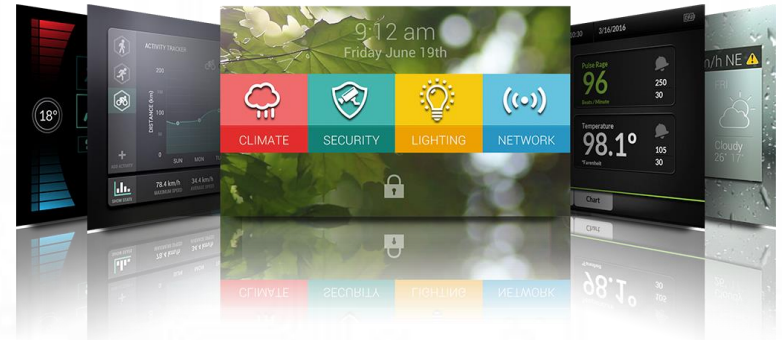
Information on NXP Devices and Enablement

- Visit nxp.com for information on devices
 - i.MX RT range of crossover processors: nxp.com/imxrt
 - MIMXRT1060 evaluation kit: nxp.com/mimxrt1060
 - i.MX Processor Community: <https://community.nxp.com/community/imx>
- MCUXpresso Software and Tools Web Pages
 - MCUXpresso Software and Tools: www.nxp.com/mcuxpresso
 - MCUXpresso SDK: www.nxp.com/mcuxpresso/sdk
 - MCUXpresso IDE: www.nxp.com/mcuxpresso/ide
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Introducing Storyboard™ - Embedded GUI Design Software

- Canadian owned and operated
- Since 2007, over 500 customers
- Developers of Storyboard GUI design software for embedded systems, and professional engineering and design services
- >1,00,000 in-field products with Crank GUIs
- Significant domain expertise in industrial, smart kitchen, consumer appliances, and medical devices

Crank Software » Storyboard



Brands That Trust Crank



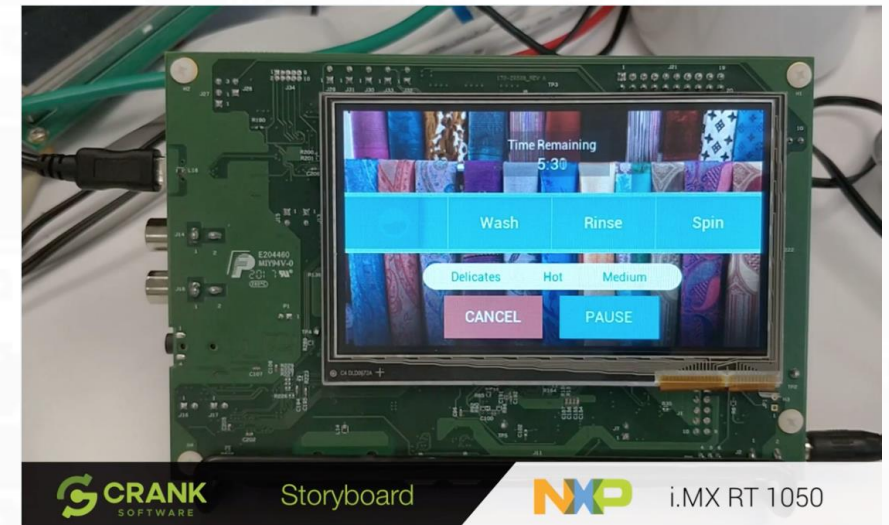
A high-angle, close-up photograph of a group of people in a meeting. They are gathered around a table, looking at a laptop and several sheets of paper. One person is pointing at a document, while another holds a pen. The scene is dimly lit, with a focus on the hands and the documents. A semi-transparent dark banner is overlaid across the middle of the image, containing the text 'Why Crank and NXP?'.

Why Crank and NXP?

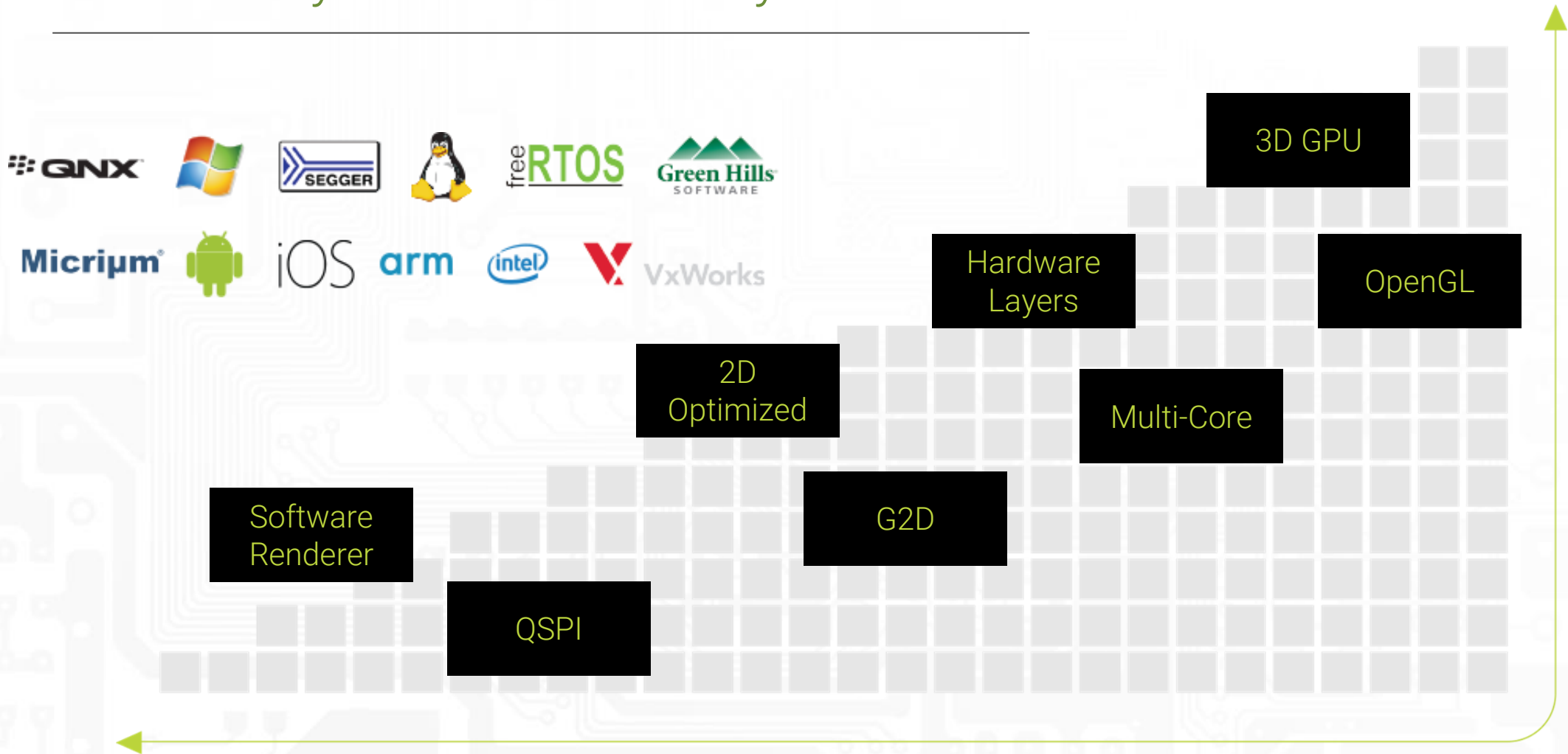
An NXP Proven Partner

- NXP partner for over a decade
- Extensive i.MX series experience
- Major trade show demo collaboration
- Deliver graphics training - NXP Tech Days
- Offer extensive support of NXP evaluation hardware platforms

We help NXP customers experience **true scalability** with **maximum graphics performance** on embedded systems



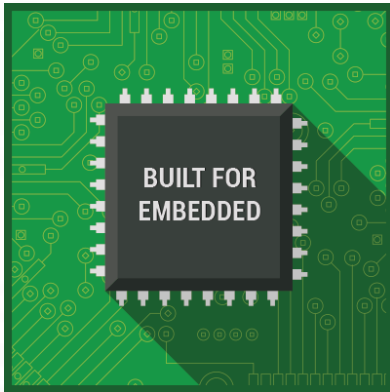
Crank Storyboard & Scalability





The Storyboard Difference

Crank Storyboard is Different



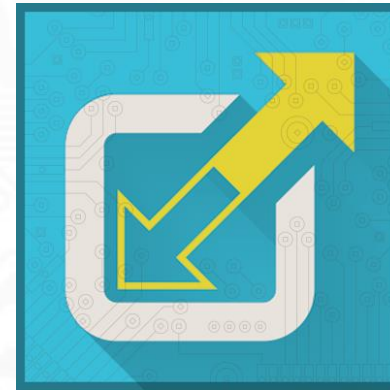
Built **exclusively** for **embedded** systems so performance is optimal



Facilitates **50% faster, and easier**, iterative design changes and development cycles



Engineers and designers **work concurrently more effectively** using their tools of choice

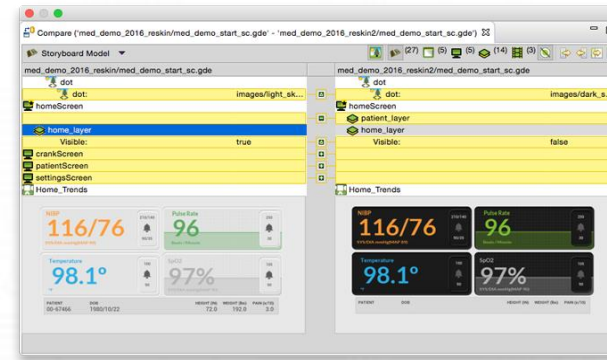


Smaller memory footprint meaning reduced Bill of Materials (BOM) costs

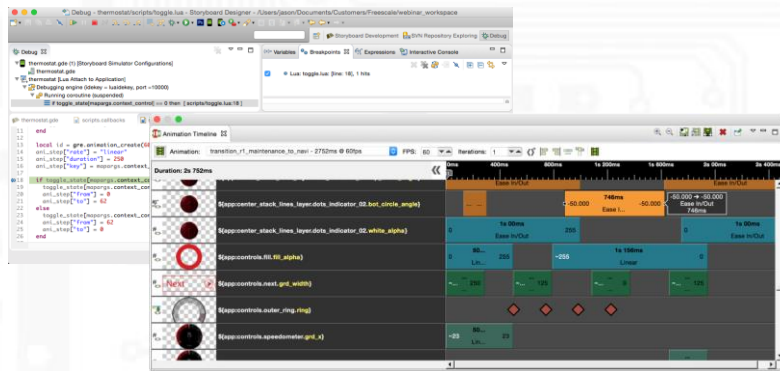
Key Features of Storyboard



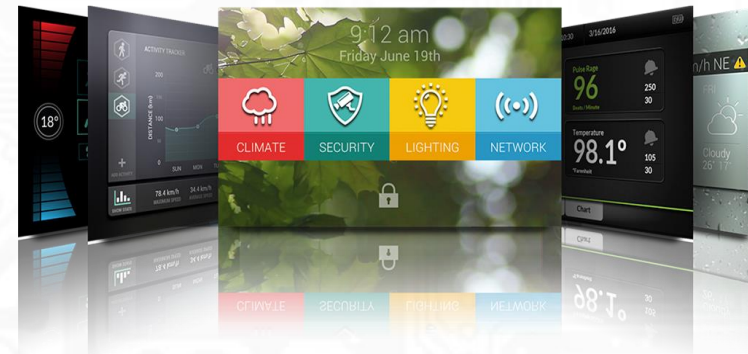
- Import designs directly from Photoshop
- Update easily with PS re-import



- Compare and merge specific changes between versions



- Animate quickly via timeline
- Add behavior via Lua scripting



- Rapid validation and testing on simulator or real hardware
- One tool from prototype to deployment

Crank Customer Showcase

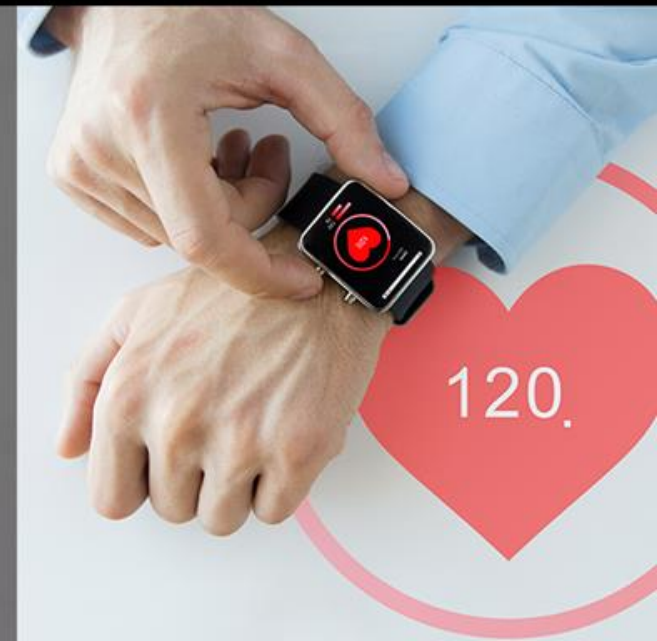
Coca-Cola Freestyle

Coca Cola required an UI update for existing infield devices along with a solution for new product development





Crank Storyboard Demonstration



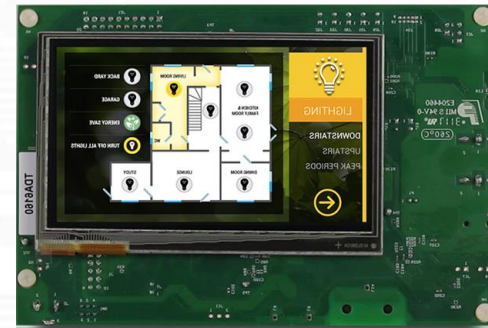
What Next?

Join Crank in graphics training

- NXP Connects - June 12-13, 2019
- NXP Tech Day Irvine - Aug 27, 2019

DOWNLOAD the free
Crank Storyboard trial

www.cranksoftware.com/free-trial



“When we build our next product, we’ll use Crank without hesitation. They provided the best 3rd party development team I’ve ever worked with. They delivered on their promises, and ensured our product launched on time.”



Rishi Siravuri
Chief Engineer, Electronics
Emerson Thermostat





Thanks for joining

www.cranksoftware.com