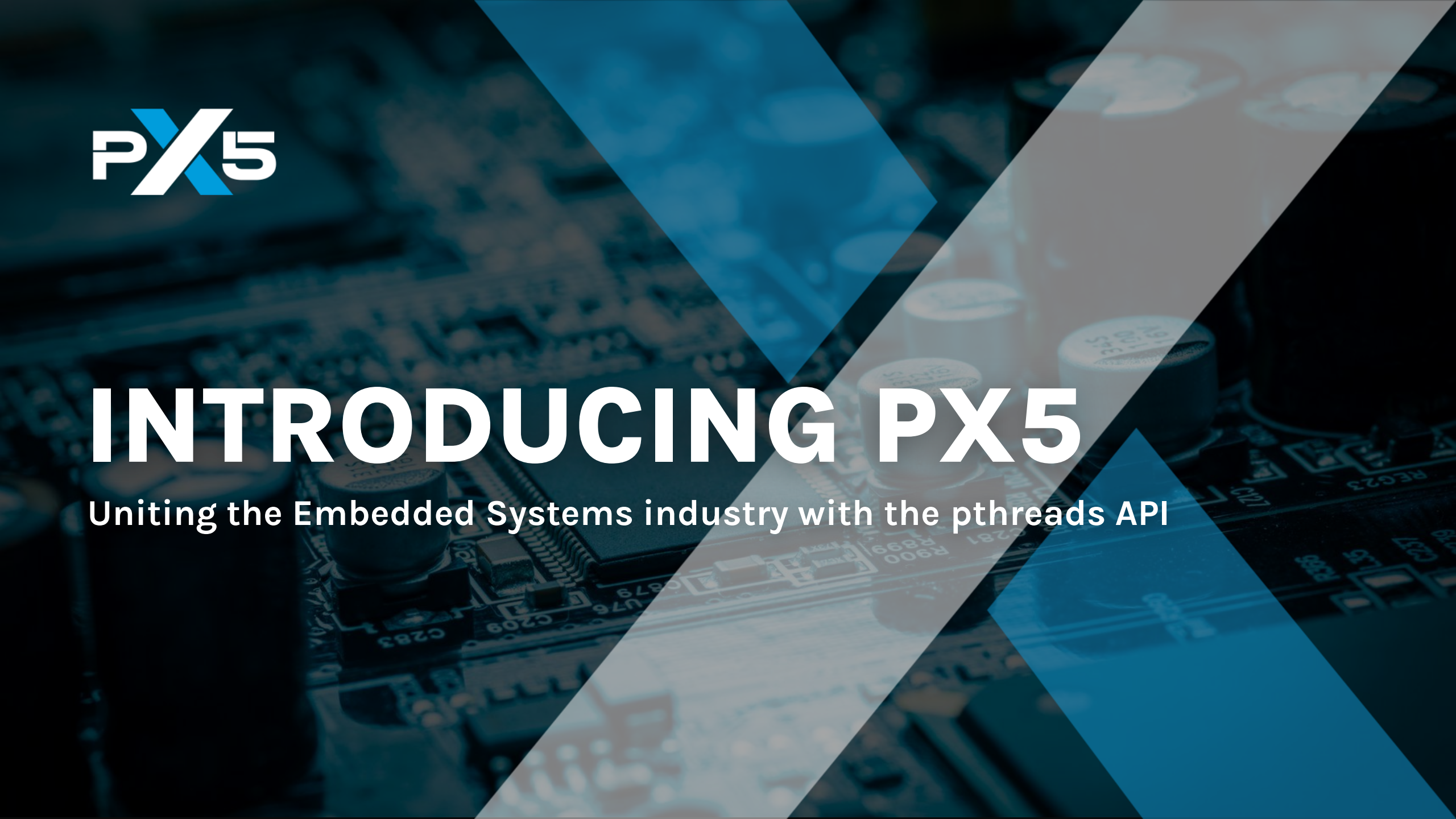



# INTRODUCING PX5

## Uniting the Embedded Systems industry with the pthreads API

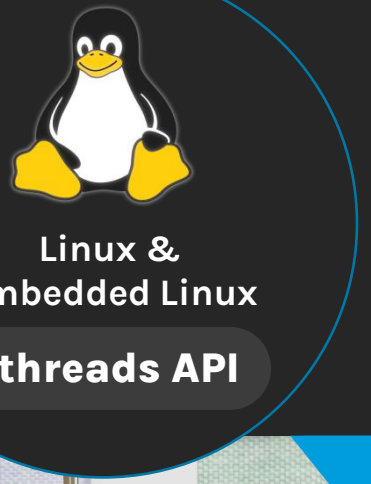
# LINUX

**With over 3 billion users, Linux is one of the most popular operating systems in the world!**

And, in the demanding Embedded Systems industry,
Embedded Linux accounts for roughly 70% of embedded designs.

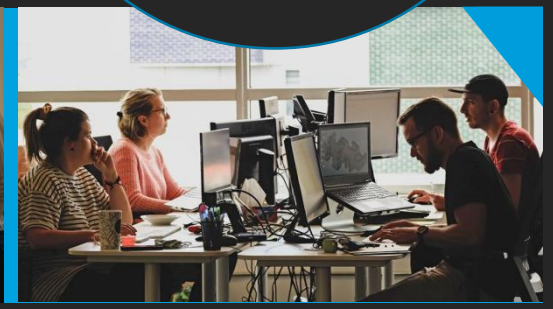
# THE POSIX pthreads API

- The POSIX pthreads API is a standards-based API for multithreaded applications developed using C/C++
- It's included in all Embedded Linux distributions
- Most developers familiar with pthreads
- The POSIX pthreads API helps with code re-use









# SO, WHY DO WE NEED A NEW EMBEDDED OS?

## Embedded Linux is not ideal for all embedded applications

- Not hard real time (interrupt latency, determinism, context switching, service overhead)
- Too large and complex for use on MCU devices with limited resources (memory, CPU power, battery life, no MMU)

## Other aspects of Embedded Linux often present additional challenges

- Lack of accountable professional support
- Legal issues (open source, code sharing, liability)

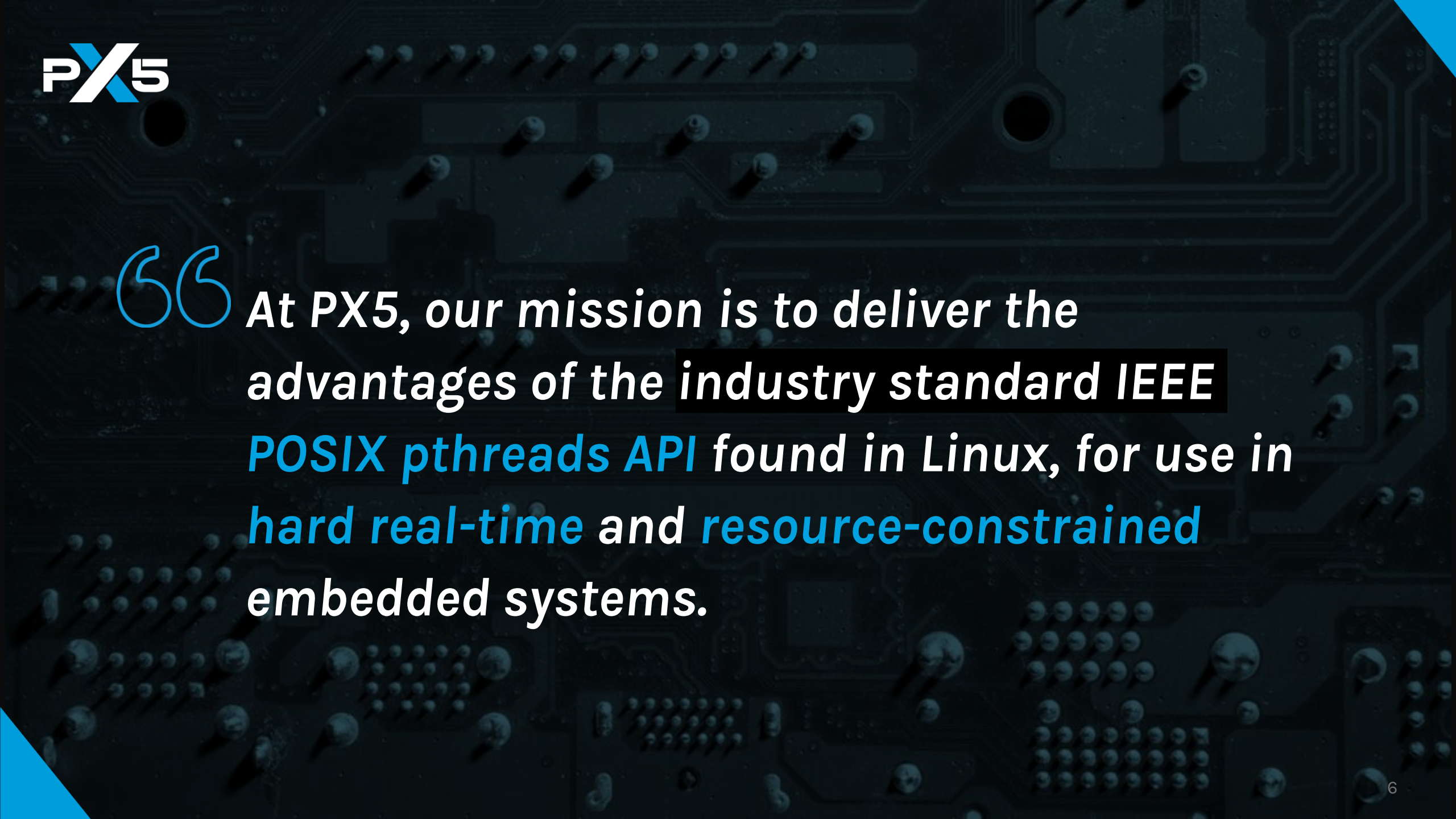
# WHY NOT USE AN EXISTING RTOS?

## Most RTOS do not support the pthreads API

- Each RTOS has its own proprietary native API
- Legacy requirements make it difficult to re-code the native API

## Some RTOS offer a pthreads API "Adaptation Layer"

- An Adaptation Layer is significant extra code to convert calls from the pthreads API to the RTOS's native API
- An Adaptation Layer adds significant overhead – increasing code size, increasing execution time for all services, delaying real-time response, and reducing system performance
- An Adaptation Layer's code is often developed as a "quick and dirty" solution, and might not have the same quality, style, or standards as the RTOS's main body code.


At PX5, our mission is to deliver the advantages of the industry standard IEEE POSIX pthreads API found in Linux, for use in hard real-time and resource-constrained embedded systems.

# INTRODUCING THE PX5 REAL-TIME OPERATING SYSTEM

## Industry standard, familiar IEEE POSIX pthreads API

```
int pthread_create(pthread_t * thread_handle, const pthread_attr * attributes,
                   void * (*start_routine)(void *), void *arguments);
```

## Native RTOS implementation for enhanced speed and efficiency

- Non-layered, efficient, direct implementation of all services
- Sub-microsecond API service performance
- Sub-microsecond context-switching
- Deterministic, hard real-time response

## MCU-sized small memory footprint

- 1KB - 10KB (typical) code footprint, with as little as 1KB RAM

# PX5 RTOS ENHANCES

- **RTOS Performance** and small memory footprint
- **MCU/MPU-based Systems** with constrained resources
- **Programmer Productivity** with the familiar pthreads API
- **Time to Market** with reduced development time and risk
- **Developer Support** with learning tools and tracked support
- **Your ROI**

# PX5 RTOS SIMPLIFIES

## LEARNING & USING

- Familiar API
- Multiple free learning tools
- Full source code

## INSTALLATION

- Simple 3-step Installation in minutes

## DEVELOPMENT

- Manages scheduling of multiple application threads
- Development tools of choice available from tools partners

## CUSTOMIZATION

- Modular structure enables simple changes and additions

## SUPPORT

- Live support, tracked response

# PX5 RTOS UNITES

## The popular pthreads API and Embedded Systems

An already familiar programming model, found in all Embedded Linux distributions, used by over 70% of Embedded Systems developers

A hard real-time RTOS for resource-constrained MCU/MPU devices, with sub-microsecond response for demanding hard real-time systems

Full commercial licensing, with user indemnification

Full-time support from PX5 staff engineers, with ticketed accountability and transparency

# PX5 IS SAFE AND SECURE

- 100% statement and branch condition tested and verified
- Unique Pointer/Data Verification (PDV) technology for memory corruption detection and mitigation
- Clean static analysis of entire code base
- MISRA compliant (with few exceptions)
- Safety certifications arriving in 2023
  - IEC 61508
  - IEC 62304
  - ISO 26262
  - And more ...

# PX5 IS EASY TO USE

## Simple to Learn and Use for Fast Time-To-Market


Familiar API


Easy auto convert of application's C "main" program to the first thread


Broad development tools support


Embedded User Guide


Instructive tutorials, white papers, and "How-To" videos


Full source code

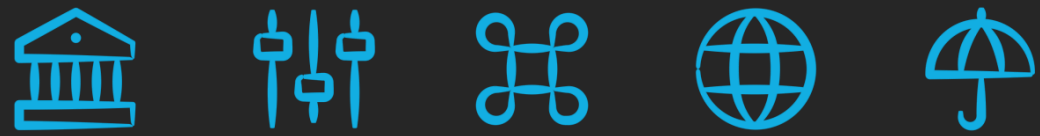
# PX5 BUSINESS MODEL

## Royalty-free, commercial-friendly licensing

- Unlimited volume
- User Indemnification
- Range of licensing models

## Professional, accountable, ticketed support from PX5 engineers

- Rapid response from PX5 staff engineers
- Unlimited calls
- Full status available 24/7



# HOW TO GET STARTED

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Telephone
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Webinars

See us at industry events

Thank You!