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JerryScript

An ultra-lightweight JavaScript engine for the Internet of Things

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Overview

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- Introduction
- Demo
- Questions

Introduction

What is JerryScript?

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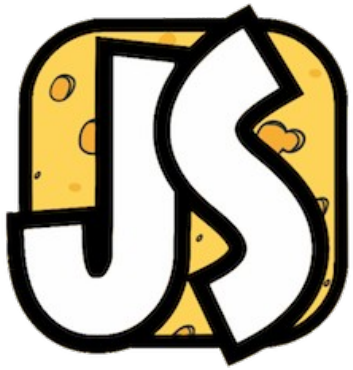

- A really lightweight JavaScript engine
- Has a base footprint of ~3KB of RAM
- Optimized for microcontrollers
- Originally developed from scratch by Samsung
- JerryScript is an open source project released under the Apache License 2.0
- Actively developed on GitHub

Why JavaScript on microcontrollers?

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- There's a huge pool of JavaScript developers
- Opens up the possibility for web developers to easily write software for embedded devices
- Performance overhead of JavaScript less of an issue for control tasks
- Increased productivity, shorter time to market
- Ability to load code dynamically over the network

JerryScript

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- Heavily optimized for a low memory footprint
- Interpreter-only
- Compact object representation
- Compressed pointers
- No AST, directly creating byte code
- Compact byte code heavily optimized for low memory consumption

JerryScript

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- Written in pure C99
- About 91KLOC
- Code size at 133KB when compiled with GCC in LTO mode for ARM Thumb-2
- Implements the entire ECMAScript 5.1 standard, passes 100% of the test262 conformance test suite
- C API for embedding JerryScript
- Byte code snapshot feature

JerryScript Portability

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- Extremely portable
- Self-contained
- Small C standard library
- Can run on bare-metal
- Supports the STM32F4, Arduino 101, FRDM-K64F, Photon, ESP8266 (experimental) boards
- OS support: NuttX, Zephyr, mbed OS, RIOT
- Runs on Linux/macOS as well

Target hardware

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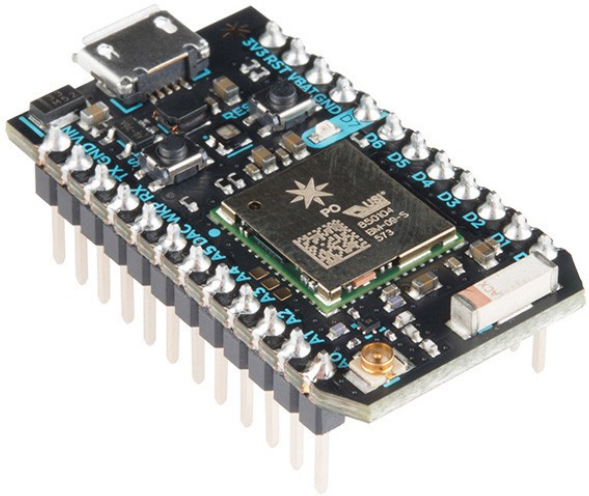
- Particle Photon board
- Cortex-M3 clocked at 120 MHz
- 128KB of RAM
- 1MB of flash memory
- Integrated Wi-Fi
- Small footprint (37mm x 20mm)



Memory consumption/ Performance

SunSpider 1.0.2 - Memory consumption

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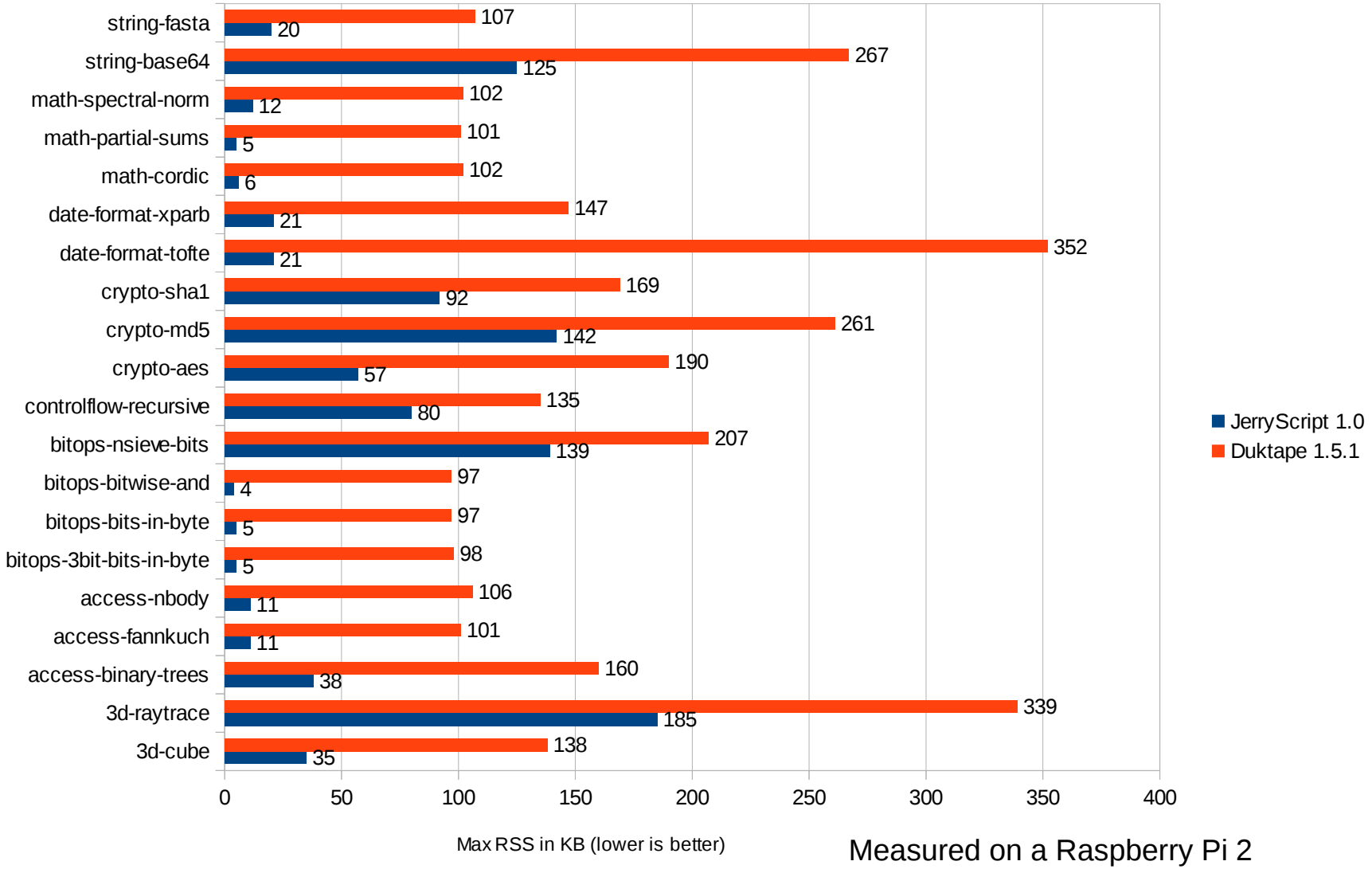

Measured on a Raspberry Pi 2

SunSpider 1.0.2 - Performance

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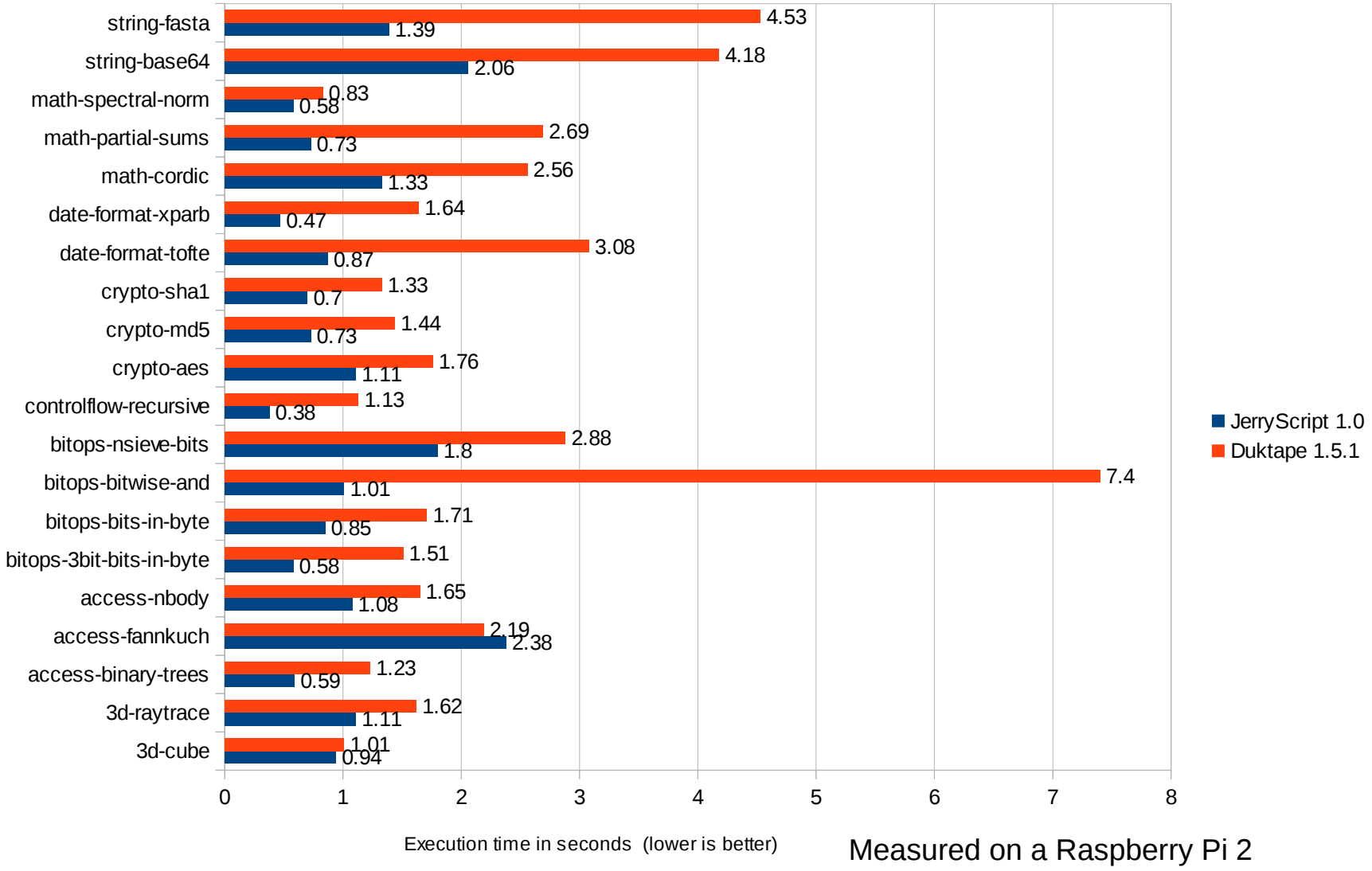

Measured on a Raspberry Pi 2

Demo

JerryScript 6LoWPAN Demo

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- Multiplayer implementation of the classic Pong game
- Each device drives one LED matrix as a display
- Game implemented in JavaScript
- Running on Photon board/Raspberry Pi 2
- Low-power wireless communication via 6LoWPAN
- "AI" opponent running on the microcontroller

JerryScript 6LoWPAN Demo

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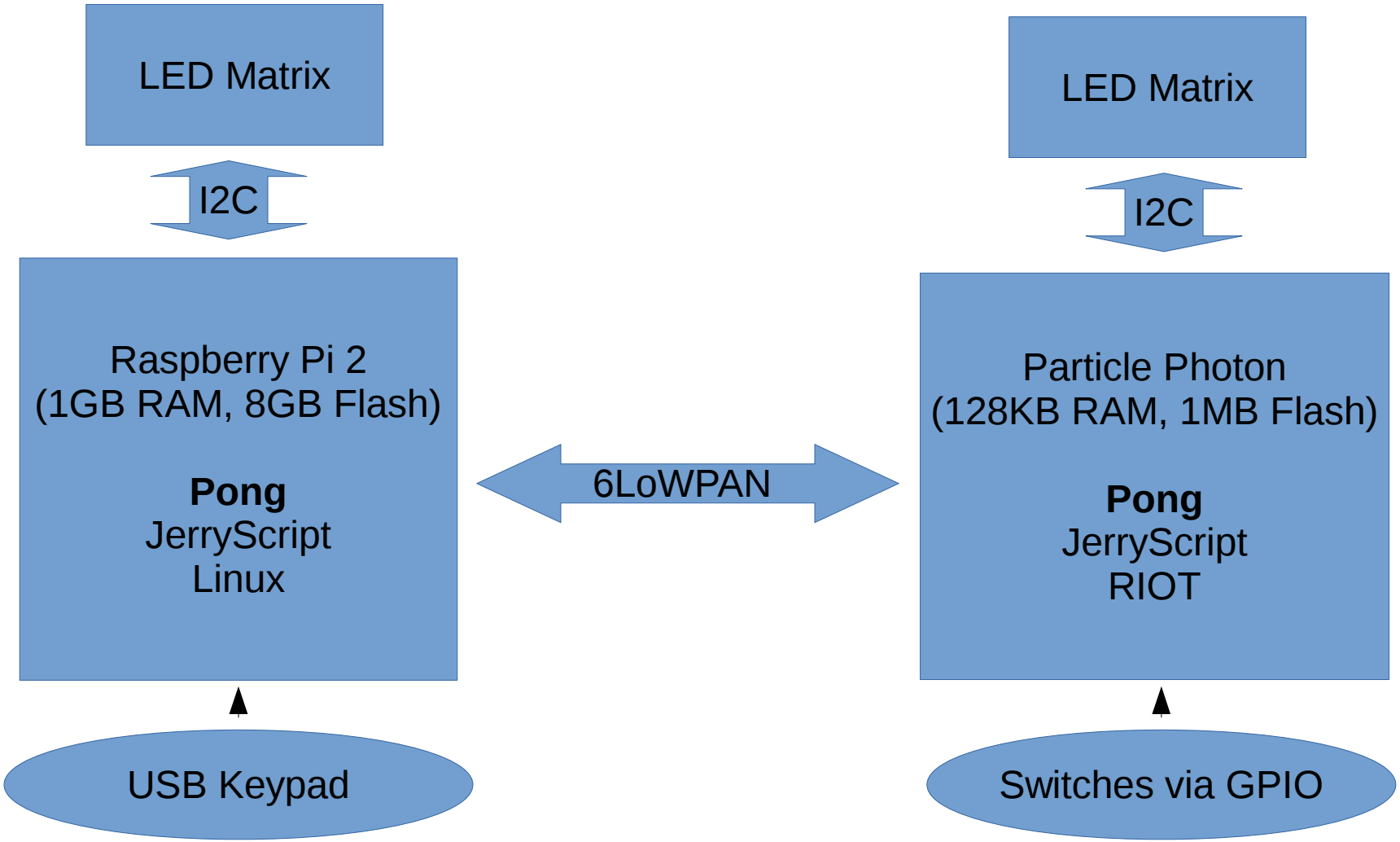

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Thank you.

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