Paul Shipley

Personal Details

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Date of Birth	6th April 1979
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Employment History

Oct. 2017 -present

BorgWarner PowerDrive Systems, Team Valley, Gateshead
BorgWarner completed their acquisition of Sevcon in October 2017. The existing engineering team remain on staff, now focussed on developing systems for high volume on-road automotive applications.

Aug. 2000 – Sep. 2017

Sevcon Ltd. Team Valley, Gateshead
Sevcon developed a range of customisable and programmable motor controllers for a wide variety of applications, including industrial and automotive systems.

Following my graduation, I joined Sevcon as a junior developer, progressing my career through to that of senior software engineer, gaining extra responsibility and experience on the way. During this time I have overcome many engineering challenges, from low level microelectronics issues, networking, investigations into vehicle performance and physical behaviour, through to PC based solutions for user interfaces and data manipulation.

In 2016 I was promoted to Chief Software Engineer, charged with guiding an international team of software engineers thorough development of Sevcon's Gen5 project, which was to become its flagship motor control platform.

Education

1997 - 2000

University of Newcastle upon Tyne
Graduated with 2:1 honours degree in Computer Science

Key Responsibilities

Technical
- Responsible for overall high level software architecture, specifying how software components are expected to interact in order to produce a working system
- Reviewing and breaking down high level customer and system requirements into requirements for individual software components
- Oversee and guide technical development activities
- Balancing customer requirements against what is technically feasible, advising and providing guidance where necessary
- Arbitration of technical decisions

Managerial
- Evaluation and assignment of technical tasks to appropriate individuals based on their skill sets and abilities
- Coordination of activities from 30 developers globally in order to satisfy the demands of multiple projects
- Time estimation and forward planning using Agile methodologies
- Recruitment of new engineers
- Direct line manager for 10 employees, dealing with development, training, and administrative tasks

Quality
- Authoring and roll-out of improved software management practices to the ASPICE standard
- Monitoring quality of code developed by individual developers, advising and mentoring where required
- Ensuring adequate software and system testing is carried out in order to meet system and customer requirements, and to verify the functional safety aspects of the product being delivered

Skills

Development
- Excellent C programming skills to MISRA standard.
- Design and implementation of complex control algorithms, application of optimisation techniques to allow software to run within limited memory and execution time constraints.
- Experience of using UML for design and documentation of coding patterns.
- Use of various testing techniques, from static analysis, unit testing, integration and full system testing to validate functionality of the final product
- Familiar with a range of other languages, such as Java, C++, C#, and Tcl
- Use of encryption algorithms and configuration of on-chip peripherals to protect IP and prevent unauthorised modification of software functionality

Platforms and Environments
- Familiar with many 16-bit and 32-bit DSP microprocessors, including Infineon TriCore, ARM Cortex-M, TI 2000 series, and Infineon C166 series, and their typical peripheral feature sets
- UDS, XCP, and vehicle diagnostic technologies
- Experience with serial interfaces such as CAN, SPI, RS232, and other UART based interfaces
- Familiarity with .NET
- Standard ISO C applications running in POSIX or Windows environments

Management
- Managed a local team of 14 developers, resourcing as appropriate based on project requirements
- Coordinated development with a further 16 developers working on the same code base across three global locations

DevOps
- Administrator for source code maintained in Subversion
- Administrator for Bugzilla bug tracking software
- Experience using Jira for management and planning of development activities, and logging and handling of defects
- Experience with setting up integration workflows in Jenkins to manage continuous integration
- Experience with configuring and managing static and dynamic analysis coding rule sets for the early detection of bugs
- Familiar with makefile syntax, used to automate and manage build configurations

Major Accomplishments

2019   Involved in the rollout of Bitbucket for source code management globally throughout BorgWarner. This included working with international software teams to determine the best strategy for use, promoting code reuse but allowing for flexibility where required. The new system is expected to be used by up to 500 software engineers worldwide.

2018   Development and deployment of new software change control processes, in line with the requirements of the ASPICE framework. The process includes formal management of all software changes, mandating adherence to the required standard, and enforced through peer reviews.

2017   Oversee deployment and integration of Gen5 based products on to a range of new applications, including family saloon cars and high performance supercars. This included the successful delivery of initial prototype products, installed on test vehicles in line with projected delivery times, allowing vehicle manufacturers to continue with their vehicle development programmes.

2016   Developed a file-system based on "Flash Emulated EEPROM", allowing for flexible storage of calibration and logging information on Gen5 platform products

2016   Appointed Chief Software Engineer for the Gen5 platform, managing and coordinating development activities for up to 30 developers in multiple locations around the globe

2016   Designed and developed the "block engine", which allowed end users to fully calibrate and configure a number of software "blocks" in an almost infinite combination, enabling them to create their own control schemes

2015   Development of security concept for upcoming TriCore projects, including protecting access via JTAG interfaces, implementation of encryption tools, implementation of AES and CBC algorithms for strong encryption, providing a means of distributing software executables in a secure manner

2015   Configuration of the build environment for upcoming development on Infineon TriCore architecture. Features integration of static and dynamic analysis tools, unit testing environment, easy generation of target files, automatic version numbering and tracking, automatic generation of target executable and support files.

2014   Worked on Sevcon's Dragon8 platform, including implementation of specific custom communication protocols, liaising with customers to agree their requirements and deliver a suitable solution. Also designed and implemented logic to control and protect the internal pre-charge and isolation circuits.

2014   Delivery of a J1939 compatible communication protocol for use on Sevcon's Genus platform, which assisted with and simplified configuration of torque control systems on multi-node vehicle setups.

2013   Designed and implemented low level control code for upcoming Genus platform, including PWM generation, driver layer, and sensor handling, suitable for demanding motor control applications.

2013   Introduced and deployed Subversion within a team of software developers, in response to recognising a need for a new source code management system for the upcoming Genus platform. This remains in use today by over 100 engineers, handling thousands of update and commit requests from several locations around the globe.

2012   Awarded patent GB2490493 for development of a drivetrain oscillation damping algorithm

2012   Development and implementation of a DC voltage control system, designed to generate and maintain a stable DC bus voltage from a generating motor. Work included development of control algorithms to maintain a constant power through the system, responding to step changes in demand within 1/4000th of a second. Work also involved development of an application layer, allowing the system to be deployed in a range of applications. This has since found use on unusual systems, including a diesel-electric hovercraft, and a prototype rail system designed to extend London Underground carriages onto non-electrified track.

2012   Identified deficiencies in the software defect management process. Introduced, deployed and configured Bugzilla in response to this, which is still in use today by over 100 engineers globally.

2012   Development of software for Caterpillar mining equipment, including their SH680 range, with a peak traction output capability of 1MW. Work also included development of a custom steering algorithm designed to complement and work with the vehicle's hydraulic articulation system. Work also included development of custom motor control algorithms, CAN communication, interfaces to user displays, and test environments

2011   Development for the Renault Twizy, including traction control algorithms, vehicle stability algorithms, implementation of Renault's immobiliser standard, CAN communication interface, instrument panel interface, and test environment.

2010   Worked on the Jaguar C-X75, designed and implemented a bi-linear lookup control algorithm which allowed the traction system to maintain torque output to a tolerance of 5%, necessary for yaw control and high performance manoeuvres. The system had to compensate for differences in motor torque constants, and run-time thermal variation.

Personal Interests

CoderDojo   Each month I participate in CoderDojo activities at a local library. This is a voluntary activity that I have participated in since September 2016. The monthly event sees around 30 children of ages 7-16, and their parents, engaging in a variety of coding and development activities. My role is to act as mentor to the children, helping them to develop their skills and inspire a new generation of engineers.

Hobbies   Since moving from a science based discipline at university into embedded software, I have developed an interest in microelectronics and small "computer on a chip" systems, such as Arduino and Micro:bit. I have used these at home to create small devices such as enhanced security systems, LED displays, and simple clocks. I also like to experiment with small home networking systems, usually involving Linux and combining various simple services to develop experimental website systems and network services.