

Marco Christoforou

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Profile

I am a software engineer with excellent people and technical management skills established over 25 years of experience in a variety of industries including health care, science, engineering, IT and telecommunications. With a foundation in Physics to Masters Level and by drawing on my experience I am able to quickly add value to any technical challenge.

Employment History

NHS Digital

Software Engineer, Product Development, Exeter, Feb 2017 to date

Initial working on various .NET projects, moving on to .NET core and then joining a new Cloud migration team. We have worked on designing and implementing a hosting platform for migration of current systems and development of new systems to achieve cost saving, resilience and scalability. Principle technologies used and developed good understanding of;

- **Terraform** – For infrastructure as code (IaS) deployment to Amazon Web Services of GitLab, Jenkins, VPN, Bastion, Kubernetes, Splunk (clustered).
- Hosted **Kubernetes** (EKS) – For orchestrating containers, scaling and resilience.
- **Docker** – All applications are being migrated to Docker which I have developed a good understanding of. I have Dockerised Java and .NET core applications, SQL Server.
- **AWS** – Various services, CLI
- **GIT, GitLab** – Including administration and integrations with webhooks
- **Jenkins** – Including Jenkinsfile pipeline scripting for CI and CD. Some experimentation with Jenkins X.
- **Slack, Confluence, JIRA**
- **Monitoring** – Grafana, Prometheus, Pingdom, Slack integrations

South West Ambulance Service NHS Foundation Trust

Principal Software Engineer, September 2016 to Feb 2017

Responsible for a team of three developers, driving the technical design and development of a Platform-as-a-Service (PaaS) architecture reporting platform and data warehouse. Main responsibilities;

- Day to day team management including managing **Agile** Sprints.
- Design of new reporting system and new development environment, including full documentation.
- Configuration of new development environment, covering **GIT** version control, **TFS** work management tool, **Jenkins** continuous integration tool.
- Procurement of appropriate software, systems and technology as required.

Technologies used;

- Microsoft **MVC5 Razor** – Server side web framework.
- **SQL Server** – Including SQL Server Analysis Services (**SSAS**) using **OLAP** cubes.
- **Rest API, Angular 1, Google Charts, Bootstrap and Bootstrap UI, JSON**.
- **Tableau** data visualisation product integration.

NHS Digital

Organisation Data Service (ODS), Exeter

Technical Specialist acting as Development Manager (Hand-on) and Solutions Architect, Nov 2013 - Aug 2016

Designed, developed prototype and managed development of Software-as-a-Service (**SaaS**) architecture, consisting of the following technologies.

- **Mongo DB** – NoSQL database, used in this application for web site administration and user configuration.
 - **Express.js** – JavaScript web framework for Node.js for hosting web site and service.
 - **Angular.js** – Client side MVC architecture for client side UI development.
 - **Node.js** – JavaScript runtime for hosting web service and interacting with server side processes.
- The technologies above are collectively referred to as the **MEAN** stack – full JavaScript technology stack.
- **Bootstrap** – HTML, CSS and JavaScript framework for consistent and responsive client side browser UI.
 - **PUG (formerly JADE)** – Template engine, cleaner feature rich alternative to HTML mark-up.
 - **IIS** – Hosting Node.js web service using IISNode benefiting from support for logging (with remote viewing via browser), Windows Authentication, URL re-writing and always up availability.
 - **SQL Server** – Including **views**, **stored procedures**, **TSQL**, **SQLCLR** for high performance Regular Expressions accessible through SQL.
 - **Team Foundation Server (TFS)** – Version Control, requirements management and project management.
 - **Regular Expressions** - For ease of defining and applying business rules by support (DevOps) team.
 - **NPM (Node Package Manager), Entity Framework, JSON, HTML5, XML and XPath.**

Designed, prototyped and managed the development of the following SaaS components, maximising ease of extensibility for rapid response to user and stakeholder demand.

- **ReST API – Web service** access to server side data and functionality.
- **C# .NET Windows services** – For running data intensive tasks.
- **C# .NET Windows ReST client DLL** for linking in **C# .NET Windows services** allowing communications with web service.
- Express.js web service with ReST APIs enabling **C# .NET** service communications and front end user interaction via browser, **Android** app or **iOS** app.
- Messaging architecture for message exchange between client side UI and server side processes.
- Node.js interface to SQL Server.

Design and integration of software development environment for automated build, testing and deployment of SaaS components, maximising developer productivity and minimising errors.

- **Jenkins** – Continuous integration and continuous delivery. Deployed and configured with scripts for one button deploy of SaaS components, version labelling and automated testing. Fully integrated with JetBrains WebStorm IDE.
- **JetBrains WebStorm** – MEAN stack integrated development environment. Fully integrated with MongoDB, Team Foundation Server and Jenkins.
- **Visual Studio** – C# and database development. Integrated with Jenkins for automated build on code check-in.
- **NUnit** – Automated testing integrated with Jenkins and triggered on builds. Automated emails to developers on failure.
- **Selenium** – Automated UI testing integrated with Jenkins and triggered on builds. Automated emails to developers on failure.
- **Enterprise Architect** – **UML** modelling tool, **OO design and analysis** and diagrams included in design documents.

Designed and developed additional software components for further enhancing developer productivity and maximising quality through the following components;

- Wallboard displaying state of latest builds (latest and latest branch) via Jenkins ReST API.
- Wallboard displaying progress of work in current Sprint. Achieved through server side **C# .NET Windows service** using TFS API.
- Automated versioning and labelling of code on each deploy.

- Fully automated single click automated deploy using Jenkins including build, automated regression testing using **NUnit** and Selenium with success or failure displayed on wallboard.
- Automated generation of change history for inclusion in Windows service 'About' functionality through use of **TFS API**.
- Full **JavaScript** stack development using **Model-View-Controller (MVC)** architecture pattern on client and server side.

Work practices and methodologies employed;

- **Requirements capture** through end user and stakeholder engagement and feedback through requirements documentation.
- All work was designed, peer and stakeholder reviewed and documented as appropriate to task, including **high level and detailed design documents, user guides, software and environment description documents** version controlled in SharePoint.
- **Agile** work practices. Regular Sprint meetings identifying blocking issues, dissemination of new skills and experience, and prioritisation and allocation of work.
- All code changes associated with TFS user story and/or task and code check-in comments enforced by policy.
- **Design patterns** used where appropriate, including repository pattern, ReST concept such as CRUD, façade pattern, Model-View-Controller etc.
- **SOLID** principles enforced at all times through reviews.
- **Requirements capture** analysis and design using **Object Oriented techniques**, including UML diagrams, in particular **use case, class and sequence diagrams**.

Key additional completed projects;

- Designed and developed **C# .NET** application for synchronising Spine **LDAP** data with SQL Server database.
- Designed and developed **C# .NET** Windows service using **Microsoft Exchange Server API** for monitoring of data received from stakeholders by email.

Maestro Data Services Ltd.

Owner, fixed price and time and materials freelance software and electronic engineering and independent product development, from 1999, on-going

Development of NHS data delivery web service, supporting ReST API for access of data made publically available by NHS Digital via the TRUD, using the following technologies and approaches. See dmd-data.online.

- Automated download of latest data from NHS Digital TRUD service via FTP.
- Automated generation of bulk insert definition files for bulk load of downloaded data in SQL Server database.
- Automated differencing and timestamping of data changes.
- Automated upload to database on hosting service.
- Design of ReST API to allow rich querying of the data and paging.

Development of miniature piezo electric pump with Android UI, using the following technologies, techniques and processes. See ipump.co and ipump.org.uk.

- **Bluetooth 4.0** low energy stack – for Android UI to pump communication and control.
- Chip firmware development in C.
- Power management, including wireless charging and user feedback for charge status and low battery state.
- Micro fluidics for accurate dose delivery.
- Understanding of FDA principles and requirements.

Development of continuous glucose monitoring system consisting of iPhone app, JavaScript firmware on chip, Bluetooth LE, Near Field Communication and machine learning backend for predictive alerts. See cgm.ai.

Various other key contracts.

- Weather predication model framework architecture for Met Office.
- Design and development of telecoms conferencing functionality for Alenia-Marconi's telecoms switch based on a **Finite State Machine (FSM)** architecture using IBM Rational-Rose real-time and C programming language.
- Dimensions **change control** software integration and customisation for Serena Software using C API for various third party customers including BT Syntegra Spine project. (See www.serena.com, now part of Micro Focus)
- Remote meter reading software development and integration for renewable energy company.

BluGem Communications Ltd.

Co-Founder/Owner, Technical Director and Development Manager, Dec 2004 – Oct 2013

Design and development of BluGem's product for mobile network revenue assurance using the following technologies and principles. (For company details see blugem.com)

- **Android** service for communications over Bluetooth with Windows service in order to convey Android phone **GSM** module status giving access to accurate call timings and phone events.
- Integration of third part hardware for remotely serving SIM card images, using XML interface.
- Distributed network of phones communicating call details back to server using custom protocol over **TCP/IP**.
- Fully event driven architecture.
- Client server architecture.
- Multi-threaded server and client side, one thread per phone.
- Real-time data collection of phone activity sent back to server for persistence in an SQL Server database.
- Remote control of phones for DevOps customer support.
- Winforms Desktop application developed in **C++ .NET** with sophisticated WinForms user friendly and response UI.

Other Key Experiences (pre 1999)

- C++ using Rogue Wave STL and IPC on UNIX platform design and development of financial transaction system for London Clearing House.
- Software support and bug fix on telecommunications switches for Nortel. Fixes developed and applied in machine code at customer sites with high level language fixes completed later.

Other Skills and Experience and Publicly Available Evidence of Work

- **Teaching Physics** to A-level standard
- **Voluntary work** assisting in development of diabetes diagnosis web site for RD&E Hospital: <http://www.diabetesgenes.org/content/mody-probability-calculator>
- **Company Directorships**: <https://companycheck.co.uk/director/906468076>
- **Met Office work**: <http://slideplayer.com/slide/9084574>
- **YouTube Channel**: <https://www.youtube.com/playlist?list=UU56hKcDJhibEeqpoS53TsAg>
- **Patent Held**: www.ipo.gov.uk/p-ipsum/Case/PublicationNumber/GB2427328
- **Thesis**: books.google.co.uk/books/about/Algorithms_for_Automatic_Scene_Interpret.html?id=Qd5CYAAACAAJ
- **Search Google**: "Marco Christoforou" for more

Qualifications

M.Phil., *Algorithms for Automatic Scene Interpretation of Digitised Images*, Physics Department, King's College, University of London, 1995 (Search for title in Google Books).

B.Sc. (Hons.), Physics, 2(1), University of Newcastle-upon-Tyne, 1987

Interests

- Telemedicine and Medical Telemetry
- Politics, current affairs and education

- Science and Technology
- Film and media
- Family