Nationality: British

Resident: London, England, United Kingdom

Languages: English (Native)

Expertise developed from a passion for computing spanning over 20 years focused on the full software development life cycle, from concept, architecture, and design to delivery of complex performant and scalable desktop, mobile, web and cloud-based applications, and products.

* Many successfully delivered large- and small-scale projects.

# Client Summary

Zeiss, Germany Contract Healthcare - 2 Years

Lexis Nexis, England Contract Legal - 4 Months

Horizon Discovery, Cambridge, England Permanent Healthcare - 2 Years

General Electric Healthcare, Germany Contract Healthcare - 8 Years

LondonLinq, England Contract Healthcare - 1 Year

ED & F Man, London, England Contract Finance - 1 Year

Sony Europe, Basingstoke, England Contract Finance - 1.5 Years

Energyhelpline.com, London, England Contract Energy - 1 Year

Red Letter Days, London, England Contract Media - 1.5 Years

Global Care Solutions (Bangkok, Thailand) Contract Healthcare - 1 Year

Reed Business Information (RBI) Contract Media - 1 Year

Transport for London (TfL) London, England Contract Transport - 1 Year

# Stack Overview (more recent experience highlighted)

## General

**.NET, .NET Core, C#, JavaScript, Typescript, C/C++ Native, C++ Managed**, **Python**, VB.NET, x86 Assembler, .NET IL, ARM Cortex M Assembler + C, COM Interop, Remoting, TPL, Async & Threading, PLINQ, **MQTT**, **MQTTNet**, **MQTT Mosquitto**, HTTPs, WebSockets.

## Client-Side

**Blazor (server side), WPF, ASP.NET Core MVC, MAUI, Angular 6-10, MVVM, CodedUI, MEF, Unity, MFC, Win32**, **WinForms, ASP.NET MVC, JQuery, HTML**, ASP.NET Web Pages**,** Bootstrap, Silverlight

## Server-Side

**Azure, (Cosmos DB (SQL), Service Bus, Container Instances, Batch, SignalR, AD, Durable functions/Functions, Security), EF, EF Core (including Cosmos and SQL Providers), MS SQL Server, MongoDB, WCF, RESTful APIs, ADO.NET, MSMQ**, **NServiceBus,** Multi-dimensional DBs (MDB) – OLAP, data warehousing, WWF, Azure SQL, MySQL, eXist, Tamino, Btrieve, Web API, REST, SOAP, JSON, XML, WSDL, XSD, XSLT

## AI

**Python, TensorFlow/PyTorch, and OpenCV, CNN (image processing), RNN, DQN**.

## Infrastructure

**Azure DevOps, Visual Studio 2019-2022, VS Code, Jenkins, TFS, GIT, Docker, Azure, JetBrains Re-Sharper, CppUTest, MS Test, MS Fakes, NUnit, XUnit, SpecFlow, Google Test/Mock framework (C**, **++), STM32CubeIDE, SEGGER Embedded Studio-ARM, Arduino,** MOQ, TypeMock, Selenium

## Patterns & Practices

**TDD, Serverless, OOD, CQRS, Microservices, DDD (Domain Driven Design), S.O.L.I.D, algorithms & data structures, Big 0 & Time-space Complexity**, N-Tier Client-server, Service-oriented, Monolithic, Clean Architecture

# January 2023– December 2024

**Senior Software Architect and Engineer**

**Zeiss,** Munich**,** Germany

The CORI project (**ZEISS Smart Services)** is a platform designed to enhance business processes for remote services for Carl ZEISS Medical and other Devices. The system comprises three main components: the Gateway, Agent, and Cloud. The Gateway ensures secure data exchange between medical devices and the cloud, while the Agent facilitates this communication. The Cloud provides various management functionalities, including customer onboarding and device management. This platform is designed for both internal Zeiss users and end users at customer sites. It integrates with Zeiss backend systems, enhancing user experience and operational efficiency.

**Key responsibilities:**

* Enhanced business processes for remote services by refining the communication aspects of the CORI platform, a system designed to facilitate secure data exchange between medical devices and the cloud.
* Played a key role in the improvement of the architecture of the CORI system, ensuring optimal design and implementation of new functionalities.
* Led the development processes, improving overall workflow and efficiency.
* Requirements capture and negotiation with and between medical device teams

**Key Achievements:**

* Successfully improved the CORI system's architecture, resulting in enhanced user experience and operational efficiency.
* Implemented the MQTT messaging protocol, which was crucial for delivering services to IoT-based medical devices and for processing device telemetry.
* Contributed to the implementation of new functionalities, playing an instrumental role in customer onboarding and device management.
* Promoted a culture of testing and resilience within offshore development teams by integrating these practices as core components of the development process, rather than additional tasks. Provided technical guidance to support this cultural shift.

**Technical Skills:**

* Expertise in languages such as C#, C, C++, and Java.
* Proficiency in .NET framework and Microservices architecture, and the Serverless computing model.
* Profound knowledge of Azure IoT Hub and Azure IoT Edge for the management and operation of IoT Edge devices.
* Extensive experience with MQTT, MQTTNet library, and the Eclipse Mosquitto MQTT broker/client lib for IoT communications and AsyncAPI for defining event-driven APIs.
* Proficiency in Test-Driven Development (TDD) methodology to ensure the deliverability of high-quality software.

# October 2022–January 2023

**Senior Software Engineer**

**Lexis Nexis,** London**,** England, UK

**Responsibilities & Achievements:**

* Developed an Entity Framework Core model and migration mechanism for a core Lexis Nexis product, enabling seamless extension of product databases through migrations.
* Utilized a deep understanding of Entity Framework Core, C#, and .NET to implement robust and scalable solutions.
* Employed Test-Driven Development (TDD) methodologies to ensure high-quality code and reliable functionality.
* Collaborated with clients to accommodate their specific requirements and integrate requested product extensions.
* Leveraged the Git API and C# Source Generators from the .NET Compiler Platform ("Roslyn") SDK to provide developer tools to manage database snapshots and migrations effectively.
* Contributed to the enhancement of the overall product architecture and maintained code quality standards.

**Technical Proficiencies:**

* Programming Languages: C#, SQL
* Frameworks and Technologies: .NET, Entity Framework Core
* Version Control: Git
* Development Tools: Visual Studio, .NET Compiler Platform ("Roslyn") SDK
* Testing Frameworks: xUnit
* Software Development Methodologies: Test-Driven Development (TDD), Agile

# December 2020–October 2022

**Senior Software Engineer**

**Horizon Discovery,** Cambridge**,** England, UK

## Automation for cell-line engineering and manufacturing workflow

**Responsibilities & Achievements:**

* Developed a cloud-based automated cell line manufacturing workflow, significantly enhancing precision and efficiency of the process.
* Orchestrated the integration of robotics, incubators, and imaging equipment, bolstering the company's capability in automation and IoT.
* **Designed and implemented a (Convolutional neural Network) CNN-driven image processing pipeline** for growth and clonality analysis, utilizing Python, TensorFlow/PyTorch, and OpenCV to enhance accuracy and automation
* Successfully designed and implemented a resilient, robust system capable of recovering from equipment failures, minimizing downtime, and reducing the need for human intervention.
* Leveraged Microsoft Azure services including Service Bus, Cosmos DB, Batch Services, SignalR, durable functions, File and Blob storage, Managed identities, containers, and Event Grid in the development process.
* Applied .NET Core 3.x - 6.0, C#, and Blazor in building the frontend, enabling scientists and lab technicians to monitor the cell line manufacturing process in real-time.
* Implemented a Test-Driven Development (TDD) approach throughout the project, ensuring the reliability and functionality of the system.
* Ensured seamless integration with third-party laboratory software and equipment such as Benchling, Green Button Go, and CellMetric, demonstrating adeptness in interoperability.

**Technical Proficiencies:**

* Languages: C#, Python, YAML, XML
* Tools: .NET Core 3.x - 6.0, .NET Framework, WPF, Blazor, Docker, GIT, Azure DevOps, MS Teams
* Platforms: Microsoft Azure (Service Bus, Cosmos DB, Batch Services, SignalR, Durable and Standard Functions, File and Blob Storage, Managed Identities, Containers, Event Grid)
* Concepts: Microservices, Serverless, Azure function apps, Azure durable functions, Azure Container Instances, Azure AD, Azure Service Bus, Azure Event Grid, WebSockets/ SignalR
* Laboratory Software and Equipment: Benchling, Green Button Go, CellMetric

# January 2020–October 2020 (10 Mths)

**Senior Software Engineer**

**LondonLinq,** England, UK

## Infrastructure-less ranging for contact tracing device

Not my normal area of work, this role stemmed from my ongoing hobbyist interest and work with IoT, embedded devices and related technologies.

* Delivered research and feasibility study for development of a low-cost wearable contact tracing device based on the use of a UWB radio chip for ranging, Bluetooth Low Energy (BLE) and ultrasonic technologies to provide more accurate contact encounter events than is possible with current smart phone technology.
* Evaluation of Ultra-Wide Band radio chips (UWB), development boards and tool chains.
* Development of a prototype device to demonstrate infrastructure-less ranging between multiple UWB equipped devices, the key feature, within power consumption, accuracy, and device density requirements.
* Development of a .NET Framework backend to collect test data from devices via Bluetooth Low Energy (BLE).
* Development of a simple .NET Core MVC web application to demonstrate the infrastructure-less ranging capability visually.

This was a collaboration in response to the global pandemic aimed at securing funding for the further development of such a device.

**TDD, CppUTest, C, C++, C#, .NET Core MVC, .NET Framework, Embedded, JTAG/J-Link and SWD GDB Debugging, ARM Cortex M4, ARM Mbed RTOS, Nordic nRF52840 DK, ST NUCLEO F429ZI DK, Decawave Ultra-Wide Band (UWB), DWM1001-DK, STM32, Bluetooth LE, TensorFlow Lite for Microcontrollers, AZURE DevOps, GIT, MS Teams**

## Nutritional intake planner and monitoring system for both individual and household

The design and development of several .NET Core based RESTFul microservices to support:

* Calculation of nutritional values for recipes based on ingredients using multiple data sources.
* A recipe storage service searchable in such a way that a planning tool can provide intelligent selections given target macro nutrients, food exclusions and recipe adjacency.
* A service to facilitate building and managing individual or household weekly food plans targeted to satisfy daily or weekly nutritional requirements for individuals in a household.
* Integration support to a third-party recipe and shopping list management provider to provide grocery list generation supermarket integration allowing costing and purchase.

**TDD, C#, .NET Core MVC, AZURE DevOps, GIT, MS Teams, MongoDB, SQL Server, containers**

# January 2017–September 2019 (3 Yrs)

**Senior Software Engineer and Architect**

**General Electric** **Healthcare** Dornstadt (Ulm), Germany

Successful delivery of a global “Digital Twin” diagnostic and monitoring platform for GEs medical software systems and devices, including release and change management workflows, advanced analytics, and the use of ML to predict failures and cluster incident causation, and integration with Salesforce.

## Diagnostic and monitoring platform

* Development of a concept to migrate and extend an existing system and manual process to a .NET based, n-tier, service-based architecture using common design patterns and technologies such as WCF, WPF, MVVM, Entity framework (EF), Microservices, CQRS, Event Sourcing and MSMQ
* Introduction of MongoDB in addition to SQL Server
* Development of a reference architecture and application modules
* Facilitate architecture and .NET trainings
* Mentoring of engineering team
* Introduction of GIT
* Introduction of Unit Testing and TDD
* Facilitate the handover to a maintenance and global rollout team

## Release and change management application

* On-boarded and managed several remote Angular web developers.
* Worked with business analysts and users to establish domain models.
* Incremental development of SQL database schemas and their Entity Framework Core implementation, population, and deployment procedures.
* Implemented Linq-to-SQL style library to integrate with Salesforce Object Query Language (SOQL)
* Implementation of all backend processes required to populate/migrate SQL and MongoDB databases.
* Implementation of all security aspects of the application using an IdentityServer4 implementation.

**TDD, DDD, C#, .NET Core, ASP.NET Core MVC, Entity Framework Core, NET Framework, WCF, WPF, WebAPI, Microservices, RESTFul + HATEOAS, OData, Angular, TypeScript, JavaScript, SQL Server, MongoDB, MySQL, OAuth, OpenID Connect, CQRS, Event Sourcing, Message Queue, Salesforce API, (Some TensorFlow 2.0 & Python) , GIT, Jenkins (CI), Swagger, Web API, SISENSE Analytics, Rally Project Management, SCRUM, Agile, XML Schema Definition (XSD), XML, DTD, Visual Studio Code, Visual Studio 2019, Salesforce Object Query Language (SOQL), IdentityServer4**

# January 2015 – December 2016 (2 Yrs)

**Senior Software Engineer and Architect**

**General Electric Medical Systems Information Technologies GmbH** Freiburg, Germany

## CardioSoft® - Cardio Diagnostic Acquisition Systems

I love a challenge and despite my inexperience with some the technology being used (MFC, Btrieve etc), I was asked by GE to join an established team of software engineers working on an advanced clinically precise diagnostic, data acquisition and management product allowing users to acquire, analyse, store and transport resting ECG, exercise stress tests, ambulatory blood pressure and spirometry measurements. My initial role was to modernise the look, performance, and functionality of the application itself as well as, it turned out, the development process itself.

* Researched and evaluated testing frameworks for **C** and **C++** development and Introduced test driven development (**TDD**) using the **Google Test/Mock framework** to the team.
* Added unit testing and automated integration testing to continuous integration on **TFS**.
* Introduced **C++** templating and the concept of generic programming to the team.
* Introduced a variation of the MVP pattern to make new UI code testable.
* Implemented **Microsoft Active Accessibility (MSAA)** for existing custom-built UI controls to support UI test automation tools such as Coded UI and Ranorex.
* Researched possibility of making use of **WPF** within the **MFC** application and produced prototype to demonstrate the option.
* Introduced a new data access layer with support for both the existing **Btrieve** database and proprietary examination file-based storage and a new **SQL Server** based provider.
* Introduced UI themes using the **CodeJock** **MFC** Toolkit library.
* Improved UI performance issues when dealing with large in memory data sets by implementing virtualization to several custom controls (see above).
* Helped implement and integrate the completely new Spirometry modality (module) to provide lung function testing.
* Improved UI experience by making all data access consistently asynchronous.
* Improved UI experience by making all long running processes (such as export and report generation functions) asynchronous and user cancellable and to display progress in consistent manor.
* Adapted the custom drawn graph drawing routines (the ECG trace for example) to be DPI aware in order that the application could be used on large high-resolution monitors using a higher DPI setting if required.
* Adapted various other custom drawn controls to be DPI aware.
* Rebuilt the main navigational toolbar so that it could be manually scaled independently of screen resolution and DPI settings.
* Implemented a new web-based UI component using **Angular 2** (**TypeScript** to **ES5**) with a **Node.JS** (**TypeScript** to **ES6**), **Express.JS** and **SQL Server** backend to replace a legacy **ISAPI** implementation and add new functionality.
* Built an asynchronous **C++ Node.JS** add-on/module using the **V8 API** via **Node.JS/Nan** allowing us to expose some of our **C++** functionality to **Node.JS** as a module for use in the web application.
* Made use of **x86 SIMD** (Single instruction, multiple data) capabilities to improve performance of some of the legacy Digital Signal Processing (DSP) functions such as Fast Fourier Transforms (FFT) etc.

**TDD, C++ (11), STL, XAML, C, Boost, Ranorex & CodedUI, MASM (x86 assembler), SQL Server, TFS, Visual Studio 2013, SQL/ T-SQL, Visual Assist (C++), MFC, Btreive, CodeJock MFC Toolkit, Win32, ASP.Net MVC 5, C#, Google Test/Mock (C/C++ Unit testing), MFC/WPF/.NET Interoperability, WPF, Angular 2, Node.JS (C++ modules with Node.JS/Nan), Express.JS, JavaScript (ES6 + Babel)/TypeScript**

# January 2013 – December 2014 (2 Yrs)

**Senior Software Engineer / Technical Lead**

**General Electric** **Information Technology GmbH** Freiburg, Germany

## Cardio Workflow System

Responsible for development of the system and software architecture of a complex enterprise IT solution used in the cardiology department using standards, like DICOM, HL7, TLS, based on .NET 4.0, WCF, WPF, EF, Infragistics, MEF, IIS, Unity, MS SQL Server

Responsible for ensuring non-functional requirements such as web-enabled, security, performance, audit/logging, fault tolerance, interoperability, maintainability, data privacy, reliability, and testability where all met.

* Rectification of performance issues with the existing implementation of the dynamic UI framework and proposed a re-architecting of the existing dynamic UI framework to meet performance targets.
* Re-architected the dynamic UI framework while maintaining compatibility with existing UI layout and storage definitions.
* Helped to bring the team along with **Test Driven Development** (**TDD**).
* Evaluated and introduced Microsoft Fakes as the unit testing framework.
* Evaluated and introduced the **Coded UI automation** testing to test team.
* Added ability to seamlessly incorporate legacy **WinForms** and **Win32**/**MFC** screens into the **WPF** application (to be gradually replaced by custom **WPF** implementations or dynamic framework specifications).
* Implemented various **WPF** custom controls designed specifically for medical data acquisition needs and use within the dynamic framework.
* Added nested many-to-many and many-to-one layout support to dynamic UI framework and storage, including backend support.
* Added ability to specify formulas and scripting into UI layouts.
* Implemented a graphical form layout and data designer.
* Worked on integration with **HL7** and **DICOM**.
* Implemented many custom forms that couldn’t be built using the dynamic UI framework. Many requiring interactive graphics.
* Built a prototype web base frontend with support for a subset of the dynamic UI framework layout capabilities. This was built as an **ASP.NET MVC 5** application.
* Collaborated on technical architectures.
* Reduced technical debt which had become a problem.
* Acted as mentor and provided guidance, particularly in respect to **TDD** and architecture.
* Evaluated and introduced **Googles Protocol Buffers** (**Protobuf-net**) **.NET** into the **WCF** service to maximise performance.
* Maintained some of the legacy WinForms and MFC code base still used in the application.

**TDD, C#, .NET 4.0, SQL Server, XAML, Unity/MEF, SQL/T-SQL, TFS, WPF, WWF, WCF, Fakes (Unit Testing), Visual Studio 2010/13, TDD, MVVM, Multithreading/TPL, Reactive Extensions (Rx), Re-Sharper, Entity Framework 4.0, C++ (11), SQL/ T-SQL, C, Win32, Google Proto-buf, ASP.NET MVC (5), SCRUM, DICOM, HL7, TLS**

# January 2012 – January 2013 (1 yr)

**Senior Developer/ Architect**

**ED & F Man** London, UK

## Risk Management System, Commodities Trading Acquisition System

Successful delivery of new Commodity Trade Risk Management (CTRM) system to monitor and manage risk more effectively.

MasteRisk was centred on the extraction of daily global trade position data from a legacy system (**ITAS**) individually operated by some of ED & F Man’s many trading entities around the world and to develop a trade capture application for those trading entities that were using manual means (spread-sheets and email) to report their trade position weekly to the risk team. The goal of this initial stage was to enable the production of daily position reports.

The second stage of the project involved the capture of pricing and risk factor data to produce daily global VaR (Value at Risk) reports at various organisational levels. It also involved capturing position volume and value limits at various organisational levels to enable alerts to be generated.

* Worked with domain experts to develop a data model.
* Captured requirements for the trade capture application.
* Incrementally designed and built the trade capture application using **Silverlight 5** (**MVVM**) and **WCF RIA** (**Rich Internet Application**) Domain Services using **POCO** entities and **MEF** (**Managed Extensibility Framework**).
* Built batch processing procedures and scheduler to extract trade data from ITAS **SQL Server** instances globally.
* Implemented organizational structure and limits capture into the application and data model.
* Working with the quantitative finance team, added capture of pricing and risk factor data into the application and data model.
* Worked on automated pricing and risk factor data acquisition from third party data providers.

I also did some remedial work to resolve some design issues on an existing project built to manage counter party risk (CPRS). This was a large complex **ASP.NET MVC** project.

I also evaluated messaging systems, implementing a prototype based on **NServiceBus** and **MSMQ**. Initially this enabled limits from CPRS and MasteRisk to be pushed into ITAS, however the messaging system was mainly intended as an integration point between systems such as the MS Dynamics AX system.

**TDD, C# (4.0), Silverlight 5.0, MEF (Unity IoC), MS SQL Server, Re-Sharper, MVVM, ASP.NET MVC, MSMQ, NServiceBus, Visual Studio 2010, Telerik Controls, ADO.NET Entity Framework 4.0, WCF RIA Services (POCO)**

# June 2010 – November 2011 (1.5 Yrs)

**Lead Developer/ Architect**

**Sony Europe** Basingstoke, UK

## Commercial Investment Management System

I worked on the development of a high-profile commercial investment management application.

The application helps Sony better understand its commercial relationship with wholesale and retail customers. By offering an array of tools to set up, manage, dissect, compare and understand the contractual terms. The application lends Sony the facilities to utilise the most effective and profitable incentives, and to enforce business practice across the European markets, thereby realising a greater margin on goods sold.

The application is designed for SONY's pan European operations and integrates with SONY's financial SAP systems.

The core application was of a modularised **WPF** n-tier design using **WCF** and **PRISM**. Some smaller client facing web-based applications were also developed using **ASP.NET MVC**.

**TDD, Agile, Scrum, Object oriented design, C# (4.0), WPF 4.0, Windows Workflow 4.0, Unity IoC, MVVM, WPF-PRISM, WCF Services, WCF Telerik Controls, Mingle (Thoughtworks), Visual Studio 2010, Re-Sharper, FX Cop, NCover, Expression Blend 4, TDD, Continuous integration (TFS), Team Foundation Server (TFS), ASP.NET, Telerik JustMock, LINQ to SQL, ADO.NET Entity Framework 4.0, MS SQL Server, ASP.NET MVC 2.0**

# Prior Contracts

From 2002 my contracts were in the publishing, media, energy, healthcare, and transport sectors and centred on Microsoft .NET technologies – mainly web based but also with WinForms. Prior to .NET I was focused on VB3-6 (COM and DCOM) desktop application development, VBA (EXCEL) development and some C++ with MFC desktop application development. Most projects involved work with relational databases such as SQL Server and MS Access.

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| --- | --- |
| **Reed Business Information (RBI) (Sutton, England) – Publishing**  **(Reed Elsevier Business Publishing Group)**  November 2009 – April 2010  CONTRACT - Senior Developer/Team Lead | **TWI Interactive (London England) – Media**  January 2004 – May 2005  CONTRACT - Senior Developer/Analyst |
| **Fundraising Innovations Limited (London, England) – Energy**  August 2008 – August 2009  CONTRACT - Senior Developer/Architect and Team Lead | **Warner Brothers (London, England) – Media**  August 2000 - December 2003  CONTRACT – Developer |
| **Red Letter Days (London, England) – Energy**  April 2007 – June 2008  CONTRACT - Senior Developer/Architect and Team Lead | **Pilat Media Limited (Division of Pilat UK Limited) (London, England)**  February 1995 - August 2000 (2nd Contract)  CONTRACT – Analyst/ Programmer/ Consultant |
| **Global Care Solutions (Bangkok, Thailand) – Healthcare**  October 2006 – March 2007  CONTRACT – Senior Developer |  |
| **Reed Business Information (RBI) (East Grinstead, England) – Publishing**  (Reed Elsevier Business Publishing Group)  April 2006 – October 2006  CONTRACT – Senior Developer |  |
| **Transport for London (TfL) (London England) – Transport**  June 2005 – April 2006  CONTRACT – Senior Developer/Analyst |  |