William Godfrey

Senior Software Engineer

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Professional Summary

- Senior Software Engineer with experience in distributed systems, cloud architecture, high-availability systems, protocol design, and long-term platform evolution.
- I specialise in simplifying complex systems, modernising legacy platforms, and building reliable services designed for long-term maintainability.
- I enjoy taking fragile or overly complex systems apart and replacing them with simpler solutions featuring clear architecture and separation of responsibilities.
- Outside of my day-to-day work, I explore new ideas in system architecture, networking, and distributed systems through independent projects and technical writing.
- I use modern AI-assisted development tools when appropriate, allowing me to focus on system design, problem understanding, and engineering judgement.
- I enjoy mentoring developers, sharing knowledge, and helping teams understand the reasoning behind engineering decisions.
- I tend to be calm and methodical when problems are difficult and enjoy working collaboratively to find practical solutions.

Core Skills

- **Languages & Platforms:** C#, .NET 10, Python, SQL Server, Postgres
- **Cloud & Infrastructure:** AWS, Azure, Docker, Linux, distributed systems, high-availability services
- **Architecture & Design:** API architecture, protocol design, microservices
- **Security:** Authentication protocol design, secure API design, AWS Secrets Manager
- **Engineering Practices:** Git workflows, debugging, root-cause analysis, refactoring, AI-assisted development (Claude Code)

Experience

Celaton (acquired by ADVT Group) — Senior Software Engineer *2007 – 2026*

- Migrated the company's platform from a physical data-centre server to AWS, improving operational flexibility and providing a foundation for future growth.
- Helped plan secrets management and applied AWS Secrets Manager across the cloud services.
- Took part in the service's annual penetration test, helping to address the findings.
- Maintained services across Windows and Linux servers. Led architectural work to evolve the platform towards a microservice-oriented architecture.
- Modernised legacy systems by simplifying deployments, removing technical debt, and improving long-term maintainability.
- Led investigations into complex customer issues, identifying root causes and implementing durable long-term fixes.
- Introduced git-based development workflows, structured debugging practices, and clearer documentation, improving engineering consistency across the team.

Bookham Technology — Embedded Systems Engineer *2002 – 2006*

- Engineered low-level embedded systems in C for hardware with constrained memory and strict industrial timing requirements.
- Collaborated with hardware engineers and field technicians to ensure stability under real-world electrical and environmental conditions.
- Deployed firmware to on-street substations, telecoms infrastructure, and industrial facilities.
- Delivered production firmware across multiple hardware generations while maintaining compatibility with existing deployments.

Projects

HashBack — Server-to-Server Authentication

Designed an authentication protocol that removes the need for servers to store long-lived secrets: each side verifies the other through a callback over TLS, with no shared keys or tokens to manage or leak. Built a public demonstration service, with the aim of standardising the protocol as an RFC. See HashBack.dev for more information.

Customer Data On-Boarding — Distributed Polling Service

Refactored a fragile collection of single-machine bespoke polling services into a unified, distributed service that balances work across multiple servers. The service detects jobs on customer file services and injects them into the processing database. It integrates with the provisioning system, which ensures that sufficient processing capacity is available when needed. Eliminated manual restarts, improved reliability, and enabled horizontal scaling.

Automatic Document Conversion — Robotic Automation Pipeline

Built a resilient document-rendering pipeline that generates consistent PDF documents from Office files, scanned white-mail, HTML, and email messages. Integrated with a separate OCR service to add text extraction and annotations to the output PDF files. The service seamlessly detects input file types and routes bad files that can’t be processed back to the customer.

Simplified Document Processing API

Designed and prototyped a new service API where customers may inject documents for data extraction (such as key fields from an invoice) and retrieve the results, without having to first go through full customer on-boarding. The interface was designed to shield users from the internal details of the underlying service and instead expose a simple web-based interface with public swagger documentation.

SixGate — IPv6 Public Gateway Proposal

Proposed SixGate as a mechanism for servers hosted on IPv6-only networks to be accessed by IPv4-only clients, using DNS for discovery. See billpg.com/sixgate for more information.

A Primer on Distributed Computing (2002)

Wrote an introduction to distributed computing projects such as RC5-64 and SETI@home. The document has been cited on Wikipedia and in academic papers.

SpartanHttpClient — NuGet Package

Developed my own HTTP client library when I found that the dot-net standard library’s component would not let the caller control the IP address lookup, which my project required for security reasons. To resolve this I wrote this library, which speaks HTTP requests and responses directly over the standard library’s TCP and TLS components. I later published this component on NuGet. See github.com/billpg/SpartanHttpClient for source code and documentation.

Sod’s Law — Logic-Only Minesweeper

Designed a Minesweeper variant that removes all luck: every square opened must be provably safe from the numbers already on the board, enforced by a constraint solver. If no safe move exists, the board reveals one; if a player opens a square that could contain a mine, the board rearranges its remaining mines to place one there. See sodslaw.billpg.com for more information.

owl.billpg.com — Technical Essays

A collection of essays on software engineering, distributed systems, networking, protocol design, and long-term maintainability. Topics include system architecture, operational simplicity, Internet infrastructure, and emerging technologies.