Robert MacDonald

Automation and AI Systems Architect: production platforms for pay and HR

PROFILE

Automation, data and AI developer with more than a decade turning Government of Canada pay and HR data into automated, auditable services. Informal technical lead, from 2016 to 2024, of the four-developer team that conceived, built and ran the Pay Centre's tools. Builds systems that outlast their builder: case auto-closure running since 2017, a pay-history analysis tool used by about 2,000 compensation advisors every day. Independently, designs local-first AI and edge systems across a fleet of machines, with verification built in.

EXPERIENCE

Application Developer, HR and Pay AI Program

Feb 2024 – Present

Public Services and Procurement Canada (PSPC), Miramichi, NB

Led the hands-on technical work, in close collaboration with a fellow developer, subject-matter experts and the business, to conceive, engineer and deliver the MVP case-processing tools within the HR branch's AI case-processing project: membership dues, commuting allowance, leave with income averaging and executive performance pay.

- **No transcription, fewer errors**: Aligned the tools' outputs with the Pay Centre's bulk-processing team so transactions, case notes and payment control were entered programmatically rather than retyped.
- **End-to-end data pipeline**: Set up, with the team, the end-to-end process that kept payroll and case-management data current in an Azure SQL database: Azure Data Factory (ADF) pipelines and Oracle GoldenGate database connectivity, with concurrency and error handling, alongside SQL-based data access and control logic for the MVP prototypes.
- **Technical governance**: Provided technical governance for a contracted AI document-processing program: reviewed and signed off on the contractor's technical approach and documentation, flagged gaps, and advised management on whether it was meeting its goals.

Application Developer, Pay Solutions Branch

Feb 2019 – Feb 2024

Public Services and Procurement Canada (PSPC), Miramichi, NB

Informal technical lead of the four-developer team that conceived, built and ran the Pay Centre's analysis and automation tools from 2016: holding the team together, setting direction and carrying each product from idea to adoption.

- **Pay History Analysis Tool**: Drove the pay history analysis tool from idea to adoption: an Excel and VBA analytics tool built on data integration, joining 14 SQL queries of pay data with case details from the case management system into a day-by-day timeline of an employee's pay and career history.
- **Upgrades and web version**: Upgraded the original Excel and VBA tool with new SQL queries written to business requirements and published through change requests, brought its latest version, 4.0, through build and rollout, and led the requirements for its web version (TypeScript, HTML and SQL), available alongside it to every Government of Canada department.
- **Client Information Centre (a compensation tool)**: Co-developed and championed, with its creator, the companion tool for case work: built-in standard operating procedures, automated letters and case notes, and links into the pay systems, used with the analysis tool as one system.

Business Expertise / Data Integrity Analyst

Dec 2015 – Feb 2019

Public Services and Procurement Canada (PSPC), Miramichi, NB

Learned the system to find the leverage -- Mastered the payroll's data, queries, policies and collective agreements well enough to see where automation would pay off most, then built it.

- **Learned the system to find the leverage**: Mastered the payroll's data, queries, policies and collective agreements well enough to see where automation would pay off most, then built it.
- **The foundation the automation was built on**: Built the SQL extracts, data tagging and quality reviews that the team's later case-closure, pay-history analysis and bulk-processing tools were built on.
- **Bulk payment automation**: Delivered a bulk payment automation that cut operational delays and became early proof that RPA could work in traditional pay processing.

> **Earlier career**
> Compensation Advisor, Public Services and Procurement Canada (PSPC) (Dec 2014 – Dec 2015); Distribution Clerk/Client Service Officer, Service Canada (CSD) (Aug 2010 – Dec 2014); Technician, PC Medic (Jan - Sept 2009); Payroll Administrator, Reg Plumbing and Heating (2009 – 2010); Material Purchasing Officer / Technical Support, Benjamin Heating (Feb - Aug 2008); Administrative Assistant, Correctional Services of Canada (2008 – 2009); Technical Support, Rogers Cable (2007 – 2008); Customer Service Representative, Telus Mobility (2003 – 2005); Data Pod Technician / Operations Support Specialist, TeleTech Canada, Orillia (2002-2003 and 2006-2007)

INDEPENDENT ARCHITECTURE AND ENGINEERING

Fleet control plane for AI agents (Project Cockpit) 2026-05
Control plane that runs AI agents and local AI across seven machines as one service: one endpoint for chat, speech and images, routed on measured speed (transcription in 1.9 s instead of 9.3 s by keeping its model loaded), with graphics-card memory scheduled and every worker proving its code is current.

Governing teams of AI agents, verification first 2026-01
Directs AI-agent teams in defined roles, up to seven in parallel, and verifies their findings before trusting them: 3 of 22 failed reproduction in one review, and a claimed 6.8x speed-up that lost up to half the text was blocked.

CodeAtlas: code intelligence across 160+ projects 2026-08
Joins file scans, git history, and dependency and security data for 160+ projects into one inventory, and cross-checks independent figures so a wrong number is caught before anyone uses it; refreshed nightly behind 1,500+ tests.

Ports of Call: a voiced game hosted entirely on Cloudflare 2026-06
Runs on Cloudflare with no server of its own (Pages, D1, R2), with 41,000+ voice clips made 15 times smaller and weak devices lifted from 2-4 to 40-50 frames per second. ship-voyage-4zn.pages.dev |

SKILLS

AI and Automation AI system design, agentic development, large language model integration, OCR and document AI, intelligent document processing, robotic process automation (RPA), workflow orchestration, Model Context Protocol (MCP)

Software and Data SQL (Oracle, IBM DB2), Python, PowerShell, VBA, C#, JavaScript, TypeScript, data integration and synchronization across the payroll, case-management and HR (PeopleSoft) systems, data pipelines, ETL and data migration, Azure Data Factory (ADF), Oracle GoldenGate, data quality and data integrity, validation, data governance (access control, audit trails, retention), DuckDB, FastAPI

Infrastructure and Performance Microsoft Azure, Cloudflare (Pages, Workers, D1, R2, Tunnels), WireGuard and SSH networking, virtual machine administration, GPU computing and capacity planning, cloud cost optimization, distributed test and job scheduling across a fleet of machines, Windows and Linux (WSL)

Delivery and Leadership Product ownership from business need to production, requirements with subject-matter experts and contractors, Agile delivery (sprint planning, backlog grooming), coaching and knowledge transfer, governing AI-agent teams with verification, Protected B security and compliance

EDUCATION AND CONTINUOUS LEARNING

DeVry Institute of Technology: Computer Information Systems (two years of study, the foundation everything since was built on)

Read the full resume. Updated 2026-11-14. Contact details available on request.