Michael Dawson

General Experience Summary

- Strong technical expertise and ability to learn new technologies and software languages quickly
- Ability to work at all levels of abstraction from hands on development to conceptual architecture design
- Ability to contribute to and lead in large Open Source projects and communities ranging from technical contributions to representing projects as a member of the OpenJS Foundation board
- Strong communication skills and business awareness including the ability to contribute in the full range of business and development activities
- Ability to lead, manage and work as part of development teams across the complete spectrum of hands-on development to the implementation of processes and procedures for a development organization
- Comfortable in working with and leading distributed teams across several locations and countries including the US, Canada, the UK, China and India
- Imaginative and innovative with 56 patents and numerous papers published in collaboration with University research and internal project teams (https://scholar.google.ca/citations?user=6CBaUJcAAAAJ&hl=en)
- Able to lead/contribute to long term efforts including research efforts with Universities, open source projects and internal teams
- Experienced in CVE management, vulnerability triage and security processes for open source projects
- Regular conference speaker (https://github.com/mhdawson/resume/blob/main/conferences.md)
- Regular blogger on Node.js topics (https://github.com/mhdawson/resume/blob/main/blog-posts.md)
- Continuously learning at work and through personal projects (https://github.com/mhdawson?tab=repositories)

Technical Experience Summary

- Node.js, Javascript, Java, C and C++, and go development in Windows, Linux and embedded environments
- Node.js runtime internals, development and deployment best practices
- Node.js native add-on development
- JavaScript package development
- Use of LLM client libraries like Langchain, Langraph, Llamindex, and Ollama with RAG and agents
- Virtualization and virtualized environments including Docker and Kubernetes
- Internet protocols, applications, and standards including MQTT, Kafka, HTTPS, SMTP, FTP, Telnet, etc.
- Threading and Concurrency
- Automated testing and unit testing in support of iterative development (ex junit, cunit, and home grown)
- Databases with SQL including JDBC with Oracle and ODBC with MS SQL databases
- Low level Java development including Java Class Libraries (JCL), Java natives (JNI) and Real-Time Java
- Enterprise application development using JAVA on both Unix and Windows platforms
- Electronic Commerce tools in order to enable on-line business including Electronic Invoicing
- Credit card processing through payment clearinghouses (GPS, FDC)
- Public and private key cryptography to protect communications.
- Public key infrastructure technology including Entrust
- Electronic commerce based on ANSI X12 EDI (Electronic Data Interchange) standards
- CGI and FASTCGI for the creation of Internet based applications
- General experience with Security: COMSEC, EMSEC, Physical security and risk assessment

Education

Queen's University - Kingston, Ontario
Masters of Science in Engineering (Electrical Engineering)
Thesis was on design criteria for cryptographic algorithms

University Of Waterloo - Waterloo, Ontario
Bachelor of Applied Science (Computer Engineering)

Experience Summary

Red Hat, Remote (2020-Present) – *Node.js lead for Red Hat and IBM*

Technical lead for the team responsible for Red Hat's Node.js efforts (~7-10 people). Defined missions and goals and guided the contributions of the team to the Node.js and V8 open source projects. Worked closely with the Red Hat Enterprise Linux (RHEL) teams shipping Node.js to deliver Node.js in RHEL and to support customers and internal teams using the Red Hat Build of Node.js. Developed content and worked with sales to position Red Hat as the best partner for Node.js deployments. Some key accomplishments included:

- Ensured continued support for Node.js on s390 and PowerPC through leadership and hands on contributions
- Published learning content and podman ai lab recipes for using LLMs with Node.js
- Introduction of ubi support for Paketo buildpacks and elected as Paketo Node.js, stacks and builder maintainer
- Definition of the Red Hat and IBM Node.js reference architecture
- Introduction of Node.js ubi minimal images to allow smaller footprint Node.js containers based on ubi
- Content generation for Red Hat Developers Node.js topic page including being author of 66 blog posts
- Promotion of Red Hat at your best partner for Node.js deployments through 24 public talks
- Leadership of the community node-api team delivering node-addon-api npm that has > 20M downloads/week
- Active contribution in the Node.js project including 408 Pull requests to Node.js core, leadership in many working groups and team.
- Broad contribution to the Node.js project, in 2024 alone contributed to over 1350 issues
- Elected as chair of the Node.js Technical Steering Committee(TSC) 2017-present
- Elected as OpenJS board member 2019-2022 representing OpenJS Cross Project Council (CPC)
- Definition of the Node.js projects technical priorities and values through the Next-10 effort

This work required hands on ability in contributing to open source projects, development in C/C++/Javascript/go, Node.js internals, LLM client libraries like Lanchain/Langraph/llamindex/ollama, security triage and vulnerability management, GitHub and GitHub actions, cloud environments, OpenShift, Jenkins, JSON, Kafka, SQL, containers, Kubernetes, as well as Linux, Windows and other operation systems supported by Node.js.

Mentor for research project at the University of new Brunswick with a focus on improving performance, scaling and problem determination for Node.js in Cloud environments.

IBM Software Lab, Ottawa, Ontario (2005-2020) - *Senior Software Developer*

Node.js Runtime Technologies Technical Lead (2014 – 2020)

Technical lead for the team delivering IBM's Node.js runtimes for internal and external use (10-20 people across Ottawa, Toronto, Hursley England and Bangalore India). Worked with both the Node.js Open Source community as a collaborator and Technical Steering Committee (TSC) member and internal teams to provide community support for IBM's platforms (linux PPC, zLinux, AIX and z/OS) , deliver and support IBM vetted Node.js binaries for bundling into IBM products, Cloud platforms and external customer use, as well as to add general functional enhancements to the Node.js runtime based on community and internal need. Key accomplishments included:

- delivery of IBM's Node.js runtimes at a pace matching community releases.
- active participation/leadership in the community including work in the build, lts, api, post-mortem and benchmarking workgroups leading to improvements in the stability and consumability of the Node.js runtime.
- acceptance of ports of V8 (a key component of Node.js) for PPC and s390 into the google repositories.
- acceptance of the changes need to support Node.js into the Node.js community repositories.
- sourcing and adding pLinux, AIX and zLinux hardware to the Node.js community CI resulting in the availability of binaries for these platforms on the community download pages.

This work required hands on knowledge of C/C++/Javascript, Node.js internals, cloud environments, Jenkins, git workflows, as well as Windows, Linux and other operation systems supported by Node.js.

Recognized as “Master inventor” by IBM. Member of the invention development team managing disclosures for compiler group.

Mentor for a number of research projects at the University of new Brunswick with a focus on improving performance, scaling and problem determination for Node.js and Java in Cloud environments.

Cloud/Virtualization Java Teams (2012 – 2014)

Joined and later became the lead for the teams developing IBM's Java for Cloud and Virtualized environments. (6-10 people at different times across Canada, Bangalore, Hursley and China). Worked with the cloud team to bring incubator level code up to production readiness through hands on development in C and Java, leading the design/review for new features, introducing automated testing and working with team members as we dealt with complex issues. Worked with the virtualization team to introduce new features to have the JVM expose additional information in virtualized environments. Accomplishments included delivery of cloud/virtualization features in the Java 8 beta release as well as in our latest Java 7 releases, guiding the work of 2 students, and acting as mentor for successful extreme blue project. This work required knowledge of C/Java, TCP/IP socket communication, java threading/synchronization, java agents, JMX, JNI, JVM internals, virtualization technologies (ex hypervisors like vmware, powervm), and cloud environments.

Mentor for 3 research projects and primary technical contact for the research collaboration with the University of new Brunswick focussed on multi-core systems (http://www.cs.unb.ca/casa/)

Continued to act as one of the core jvm team leads as well as threading/concurrency lead as described below.

Core JVM Team (2008 – 2012)

Primary developer and co-lead for VM proxy initiative. Implemented initial proof-of-concept and subsequent extensions working in C/C++ and Java across windows, linux, AIX, and Z/OS. Code written/modified included a remote procedure layer using using TCP/IP, thread and process management across machines, Java Virtual Machine (JVM) internals, a unique Java Native Interface (JNI) implementation and unit tests using JUnit and CUnit. Successes included working closely with IBM research to quantify and demonstrate the value of the technology, key ideas and implementations for optimizations that made the technology feasible, acting as a mentor for an extreme-blue project, filing 5 patents, and guiding the work of the VM proxy team member in Bangalore.

Threading/Concurrency lead for the core JVM team. Responsible for the ongoing development for the JVM thread library and Java level threading services written in Java/C/builder(which is used to generate assembler). This required knowledge of threading APIs (pthreads and windows APIs) and an understanding of thread concepts (monitors, mutexes, thread priorities, deadlock etc) at both the Java and native platforms levels. Successes included implementation of new optimizations (adaptive spinning, lock nursery), supporting and resolving a number of customer issues and filing 2 patents.

One of the team leads responsible for leading the team including planning iteration content, prioritizing work, guiding and helping team members to overcome obstacles, and ensuring team members follows our processes. As a team member also responsible for development (C/C++, Java and some assembler) including handling new feature work, addressing internal and customer defects and creating tests across our supported platforms (windows, AIX, Linux, Z/OS). Accomplishments included successful delivery of multiple JVM releases, leading the effort to define/document/implement the team's design process, implementation of an approach for capturing code coverage data, on-boarding 2 new team members, guiding the work of 5 students, and writing a developer works article on the Java Native Interface (JNI).

Responsible for managing the incoming defect queues for the J9 team, interfacing with external teams located in Ottawa, Toronto, Hursley, Bangalore, and China. Successes included optimizations to the process used to handle defects and proposing the creation of a triage team to more effectively triage incoming defects and then leading this remote team which ranged from 2-5 members located in Hursley and Bangalore.

Websphere Real-Time Development Team (2006-2008)

Wesphere Real-Time (WRT) Java Class Library (JCL) development team lead and overall WRT tech lead/release manager coordinating development across JCL, Virtual Machine (VM), Garbage collector (GC), Just-in-time compiler (JIT) and Reliability-Availability-Serviceability (RAS) teams.

As Real-Time JCL development team lead, estimated, planned, implemented and guided Real-Time JCL development work and defect takedown for a team that ranged up to 4 developers to achieve the successful delivery of the initial GA and 3 service releases. This role required hands on detailed knowledge of the Real-Time Specification for Java (RTSJ – JSR1), the RTSJ compliance kit (TCK), development in C and Java on Linux and Windows using Eclipse, the creation of JNI natives, the creation of JUnit test cases, implementation of automated testing, design and team lead skills and knowledge of the local team's iterative development process.

As overall WRT technical lead/release manager coordinated development across distributed development teams (~10 people total spread across Ottawa, Toronto, England and India), managed defect queues, local Real-Time lab hardware, worked closely with WRT project manager, QA, Build team, service team, Linux Technology Center (LTC) and key customers to ensure successful delivery of 3 service releases. Additional key successes include filing

1 patent, implementation of check-in sanity testing, improving the scope of the daily automated testing and helping to raise the level of information documented for key team processes like build monitoring and defect management.

When the Real-Time JCL work was transferred to Bangalore, developed 4 days of hand over presentations, went to Bangalore to deliver this training, and managed follow on training for the Bangalore team when they later came to Ottawa in order to complete a successful handover.

Embedded Java Class Library Team (2005-2006)

Senior member of the 2 person team that implemented the CDC 1.1 and Foundation 1.1 network java class libraries which supported a number of new networking features including IPV6 across a number of platforms including Windows (CE, XP, 2000) and Unix (Redhat Linux, MVL Linux, AIX, including 32 and 64 bit variants and a number targeted at embedded devices). This work included cross platform C development in order to interface to network libraries in the target operating systems, creation of Java natives to expose the C functionality to the java class libraries and Java development to implement the java network APIs. It also included JUnit based testing (remote and local) across windows CE, Unix and windows platforms. It required knowledge of IBM's J2ME Java class libraries, cross platform development in C and Java based development.

Designed, documented and implemented IBM's base implementation of JSR177 (Security and Trust Services API for J2ME – SATSA). The design was modular so as to separate GUI development from the core as well as to facilitate support for new hardware cryptographic devices through the use of well defined interfaces. Completion of this task required knowledge of cryptographic techniques, IBM's J2ME class libraries, IBM's J2ME cryptographic supporting classes and JUnit testing. Support was provided for MIDP2.0, Foundation 1.0, Foundation 1.1, CDC 1.0, CDC 1.1 and Foundation 1.1 with a JCE optional package

DEVRUS Technologies, Ottawa, Ontario (2005) - *Senior Consultant*

As consultant led the creation of the technical section for Emergis' RFP response for the NFLD Drug Information System RFP. This response required collaboration with several consortium members, co-ordination between a technical team of 5 as well as co-ordination with other teams such as sales. This RFP response was a key element that allowed the Emergis consortium to be selected as the single organization out of a large field of bidders with which negotiations were held. The creation of the RFP required knowledge of Emergis' SOA based infrastructure, which is based on Java and webMethods technologies.

BCE Emergis, Ottawa, Ontario (2001 -2004) - *Senior Solution Architect*

eHeath 2004

Member of the eHealth solution architecture team. This role involved working with the architecture and sales teams and taking a lead role in defining and documenting the technical direction for Emergis' Drug Information System (DIS) initiatives. Major accomplishments included the definition of the proposed Drug Information System solution architecture along with the creation of development estimates for the target jurisdictions. Through this work experience was gained with the Infoway EHRS blueprint, DIS solutions in BC and Alberta, HL7v3 concepts, Service Oriented Architecture (SOA) based design, Pharmacy management software, Emergis' health integration platform, webMethods' Java based suite of tools (enterprise integration, workflow, broker, glue, fabric), access management and authentication security technologies, and data warehousing concepts.

eFinance 2001- 2004

Solution Architect for Emergis' web based Business-to-Business eInvoicing product. This product presents invoices, helps to resolve disputes and supports on-line payments through electronic debit and credit cards. It supported large US and Canadian businesses and met significant performance and availability requirements. It was a multi-lingual and multi-country Java J2EE (JSP, Servlets, Struts, Session and Message driven EJBs, JDBC, JMS) based application using Weblogic, Oracle, XML, XSLT and other open source components. As Solution Architect led a team of senior architects/developers to guide and direct the development of this existing product at a technical level. This role involved working with internal development teams, product management, delivery and other outside teams, defining development standards and approaches, completing functional and detailed designs as well as hands on development in Java. Major accomplishments included helping to mature the development process and team and introducing key technology innovations to the product. Improvements to the development process included the introduction of configuration management for the product's document base (functional design, detailed design, development standards, process, etc.) and the definition and implementation of the requirements management process as part of the group's CMM effort. Key technology innovations included the introduction of the plug-in approach in order to support modularity/customization/re-use, restructuring of the security role/privileges framework, the design of the framework for paging/printing/exporting very large invoices and a flexible reporting page generation framework that is configured with XML and can be enhanced with report specific java objects. Through this work hands on technical experience was gained in Java, J2EE technologies (JSP, Servlets, EJBs, JMS, Weblogic 6.1, Performance tuning), the MVC pattern(Apache Struts), XML technologies including DOM and SAX parsing(Xerces) and XSLT (Xalan), JDBC with Oracle, the ANT build tool, Apache FOP for PDF generation,

JCE(for encryption of sensitive data), Internationalization and localization, UML for design, and the Capability Maturity Model (CMM).

Chrysalis-ITS, Ottawa, Ontario (2001) - *Senior Software Architect*

Team member designing and developing Chrysalis' next generation security platforms. Responsible for design and development of embedded software for the next generation product. Led the design/implementation of the hardware abstraction layer and core service layer. Required knowledge of C/C++, Motorola Power PC Processors, Java, TCP/IP communications, FIPS 140-1 and Common Criteria requirements as well as security technologies including public/private key encryption, SSL, certificate usage and Public key infrastructures.

BCE Emergis, Ottawa, Ontario (2000 – 2001) - *Lead Developer*

Managed/led the team that developed a gateway between the Ariba Network and BCE's EDI systems. This involved development on Windows NT using C++, COM, SQL Server 7, XML and IIS4. This gateway accepted HTTP posts with messages in XML format, processed them and then forwarded them to the EDI systems through FTP. It also processed acknowledgements from the EDI network that were picked up through FTP and posted back to the Ariba network as an XML message using HTTP over SSL.

Lead developer for the creation of Java/Internet based Request for Proposal platform based on Ariba's dynamic trade auction system. A full GUI was built to front-end the core system and many additional functional elements were added to the system itself. Development included the use of Java, Weblogic 4.6 (JSPs and EJBs), the Java based Dynamic trade APIs as well as Oracle. Development was done in both Unix and Windows environments.

DEVRUS Technologies, Ottawa, Ontario (1997 – 2000)- *Senior Consultant*

Contracts of Interest:

BCE Emergis

Lead developer for BCE's Internet based credit card processing front end. This front end linked to BCE's Transact Electronic Commerce system and required development in C/C++ and Javascript using CGI and FASTCGI applications, Transact APIs as well as COM objects. In addition, as part of a development team, developed a payment Agent to allow credit card transactions to be processed through Global Payment Systems (GPS).

MPACT Immedia

Led Integration and development efforts with MPACT's Transact Electronic Commerce system. Developed a custom notification extension to the Transact system. Integrated a number of customers with the Transact system so as to allow on-line shopping. Developed a CGI based application in C++ to link Bell Canada's Web site to the MPACT Electronic Commerce system for the purpose of processing credit card transactions. Validated a custom EDI addition to MPACT's Transact Electronic Commerce system. The software developed ran under Solaris and Windows NT operating systems.

Bell Global Solutions

As part of the @commerce implementation team, developed and deployed Internet based communication software to allow customers to interact with the @commerce electronic commerce offering through FTP and FAX. This software running on Solaris based systems interacts with a number of Firewalls, and Netscape's ECXpert EDI product. In addition to its core functionality, it provides alerts through SNMP traps in order to ensure system mangers are alerted before customers experience difficulties.

Netscape Professional Services

As a subcontractor to Netscape, designed and developed the software for a gateway that connected the customer's electronic Commerce system and their EDI value added network. This gateway software, which was written in C and runs under the Sun Solaris UNIX operating system, transferred EDI messages using the FTP protocol over dial-up and permanent communication lines and generated appropriate billing information.

GeoTrain Corporation

As an associate with GeoTrain, conducted training courses on Entrust Technologies' suite of cryptographic toolkits.

DMR

Provided support and technical expertise in support of DMR's application of the Entrust Technologies security toolkits and SAGUS mainframe security toolkit for one of their customers.

SAGUS Security Inc.

Under contract to SAGUS, provided support to Motorola in respect to their use of Entrust Technologies' MSP toolkit within the MMHS proof-of-concept they developed for the Canadian Federal Government.

SAGUS Security Incorporated/DOMUS Software, Ottawa, Ontario (1994-1997)

Director of Product Development (1996 - 1997) [SAGUS]

Responsible for product development including Development Group, Test Group, Evaluation Group and technical writing staff and contractors (total of 12). Managed and had hands-on involvement in the development of SAGUS's Defensor product line. Product line included Defensor/Gateway (Based on Data General Trusted Unix), Windows based Defensor/Client (3.1, 95 and NT), Unix based Defensor/Server (Sun,AIX, Windows NT, HP), and Defensor/Mainframe security cryptoserver. All products incorporated Public and Private key cryptography and TCP/IP based communications. Responsibilities included:

- Setting development priorities based on interaction with those responsible for sales and marketing.
- Project scheduling and tracking using Microsoft Project in cooperation with Team leaders.
- Establishing the Product development processes.
- Providing hands-on guidance to each of the three development teams including working directly with and developing software in C/C++ in Unix, Windows (3.1, 95 and NT) and Mainframe environments.
- Researching new product opportunities and developing high level specifications for these products.

Manager of Product Development, Network Technology Group(1995-1996) [DOMUS]

Responsible for product development within the Network Technology Group. Managed and led three development teams and contractors working on the group's products (Total of 8-9 at peak). Managed and had hands-on involvement in the development of DOMUS's secure gateway, Windows Defensor Client and ongoing development of the mainframe security product. Responsibilities included:

- Establishing the Product development, configuration control, and quality assurance methodologies for all projects.
- Task decomposition, estimating the required level of effort for each task and defining the project schedules using Microsoft Project.
- Completing the top level design for both new products.
- Providing hands-on guidance to each of the three development teams including working directly with and developing software in C/C++ in Unix, Windows and Mainframe environments. Development of the Windows client required knowledge of Internet protocols including SMTP, POP3, HTTP, TELNET, FTP, etc. as well as Windows WINSOCK programming. Development of the gateway product required knowledge of UNIX socket programming, Trusted operating systems, Internet protocols and firewall technology.
- Setting development priorities based on interaction with those responsible for sales and marketing.
- Managing and tracking the progress of programmers assigned to each project, supporting sales and marketing activities and coordinating all aspects of the three development efforts

Project Manager/Team Leader (1994-1995) [DOMUS]

Responsible for managing, leading and providing guidance to programmers within the Network Technology Group. Responsibilities include the investigation of new product opportunities, management of ongoing development activities and providing technical guidance and direction.

Managed and led a team of five developing a security product targeted for validation at FIPS 140-1 level 2. The development included both Unix and IBM Mainframe platforms with development being undertaken in C and assembly language. Technologies integrated in the product include Public and Private Key Cryptography, Real-time Unix to mainframe I/O, X.500 Directory access, TCP/IP communications and Entrust Technologies Entrust key management products. Responsibilities included:

- Establishing the Product development, configuration control, and quality assurance methodologies and plans for the project.
- Task decomposition, estimating the required level of effort for each task and defining the project schedule using Microsoft Project. Development of an Unsolicited Proposal to solicit R&D funding.
- Writing project documentation including: product specification, functional specification, top level and detailed design, product verification plan, build specification, product production plan, and problem reporting procedures.
- Managing and tracking the progress of programmers assigned to the project, supporting sales and marketing activities and coordinating all aspects of the development.

Led the team of two which developed an initial implementation of the Generic Security Services API (GSS-API) for Entrust Technologies. The development was completed in C and C++ and required the knowledge of Abstract Syntax Notation 1 (ASN.1), Public and Private Key Cryptography, and X.500 directories.

AEPOS Technologies - Ottawa, Ontario (1991-1994) - *Engineer/Senior INFOSEC Consultant*

Responsible for the development of an EDI security product and for completing consulting contracts related to Information Security, Risk Assessment, Networking, Computers, and Electronic Data Interchange including the following:

- Key member of the team that developed AEPOS's EDI Security product. This product provided security services in compliance with the ANSI X12.58 and X12.42 EDI standards. This product was written in C and uses either software or hardware to implement the required cryptographic transformations. This product also provides support for X9.17 key management. Responsibilities included:
  - Managing requests for technical information, developing research proposals for product enhancements, and for writing proposals that describe to potential large volume customers the manner in which the product line can be used to secure their EDI systems.
  - Leading the effort to develop an IBM mainframe version of AEPOS's EDI Security product, porting the PC software, testing and production.
  - Design, implementation and testing of components of the PC version of the product written in C.
- Managed the project to develop a gateway that used Electronic Data Interchange (EDI) to exchange CALS files as part of a concept demonstrator established by a government department. This gateway was built using an EDI translator, a windows database package and existing communications software.
- Developed a security risk assessment tool based on a windows database package. This tool reduces the effort required to conduct risk assessments in compliance with applicable standards within DND and other government departments
- Managed and led the effort to develop guidance for use of Electronic Authorization and Authentication (EAA) within the Government of Canada. This project included an investigation of relevant standards, algorithms, policies, research initiatives, products and implement initiatives, an explanation of the relationship between these and existing EDI (X12 and EDIFACT) and Email (X.400 and PEM) standards, and the development of a draft EAA guidance document.
- Managed and led the AEPOS team that developed the Certification and Accreditation package for the CMIS. The CMIS is a network of Sun Compartmented Mode Workstations (CMWs) within the Department of National Defence. The development of the Certification and Accreditation package required a comprehensive assessment of the system security posture, a technical review of the proposed system configuration, and knowledge of DND's security engineering and risk assessment methodologies.
- Member of the committee that defined the risk assessment based network security design and certification methodology for use in the Department of National Defence (CIS/01/6 - Volume 2).
- Lead member of the team that defined the requirements for a gateway to connect unevaluated networks operating in the dedicated mode. Interviewed network administrators to determine functional requirements, interpreted the Government of Canada security policy to define the security requirements for the gateway, surveyed existing products for applicability and assessed the suitability of possible solutions using risk assessment.

Bell-Northern Research - Ottawa, Ontario (1986-1989 5 Work Terms) - *Co-op Student*

- Responsible for the design, simulation, layout, production and testing of a prototype circuit board for a microprocessor based X.25 data security product. Responsible for the design, coding and testing of verification software for this circuit board. These responsibilities provided hands-on experience with microprocessor design (Intel 80C186 and Motorola DSP56001), digital hardware, memory technology, synchronous and asynchronous communication, encryption techniques, hardware development methods, CAD tools, C programming, interfacing software to hardware, real-time I/O and the management of design deliverables.
- Assisted in the design of a semi-custom DMA controller. Responsible for the design, schematic capture and simulation, which provided experience with IC development and CAD design tools.
- Responsible for the development of software for the DMS-100 telephone switch. Designed coded and tested a feature to implement a new message distribution strategy that allowed fast message injection in a run-time system for real-time applications. These responsibilities provided experience with the development of software for large real-time systems, distributed processing, multitasking systems, network communications, Protel (a Pascal-like proprietary language), 68000 assembly language, code management systems, telecommunications and telephony.

Transport Canada - Ottawa, Ontario (1985-1986 2 Work Terms) - *Co-op Student*

Responsible for the development of an enhanced radar simulator based on an existing version and for enhancing software for radar communication devices. Gained experience with embedded programming, 6802 assembler, Pascal, VAX/VMS and synchronous radar communications.