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Twenty-five years experience designing commercial, financial and scientific applications:

- Extensive fluency in C, with Fortran, light IBM and DG assembler, and various other languages.
- Excellent design and analysis skills.
- Considerable experience writing proposals, functional and design specifications, and system documentation. Excellent verbal and written communication skills.

Ten years consulting on VAX under VMS in C. Fully familiar with the VMS development environment:

- Extensive use of system services and runtime library, DCL, RMS, DECnet (and Excelan TCP/IP), and VT terminal features.
- Light FMS, Datatrieve, CDD, Rdb, etc.

Five years additional Unix development experience including:

- IBM RS/6000, Sun, DECstation, HP/Apollo, and PC/Linux workstations.
- VMS-to-Unix ports of “legacy” systems, in addition to enhancement/maintenance and new development.
- Various GPL projects, including mimeT_EX(see www.forkosh.com/mimetex.html).

HARDWARE EXPERIENCE

DEC VAX, Microvax, VAXstation
IBM RS/6000, Sun, DECstation 5000, Apollo 10000
IBM PC and Compatibles
DEC PDP-10
DG MV/8000, C/330, Nova
Univac 1108
IBM 4341
Amdahl V6, IBM 360/95
IBM 370/168, 360/30,40,50
IBM 1130, IBM 1620

SOFTWARE EXPERIENCE

VMS,DCL,RMS,System Services,C
Unix, C
Linux, MS-DOS, Windows, C
TOPS-10, Fortran, Macsyma
AOS/VS, AOS, RDOS, Fortran, INFOS
Exec-8, DMS, Fortran, SPSS
VM/CMS, Wylbur, Fortran
SSS(home-grown), Fortran
OS/MFT,PC,Fortran,BAL,PL/1,Jovial
Fortran

INDUSTRY / APPLICATION EXPERIENCE

Banking / Fixed Income Trading System
FX Credit Management System
Mortgage Pricing and Hedging
Home Banking
FX Performance System
Money Transfer
Expatriate Tax
Loan Syndication
Travelers Cheques
Network Communications
Messaging
Y2K Remediation
Financial Services / Consolidated Ticker
Automated Trading
Portfolio Valuation
Page Distribution
Back Office Trading
Marketing Research / Decision Support
Broadcasting / Election Graphics
Program Distribution
Audience Research
Pharmaceutical / Inventory Control
Government / Atmospheric Modelling
Linux Installation

CLIENT COMPANIES

Chase Manhattan Bank
Chase Manhattan Bank
Chase Manhattan Bank
Chase Manhattan Bank
Manufacturer's Hanover Trust
Bankers Trust
Chemical Bank
Barclays Bank
Barclays Bank
Citibank
Societe Generale
Credit Lyonnais
Citibank and Merrill Lynch
Security Pacific
Prudential Securities
Cantor Fitzgerald
Refco
CBS
CBS News
Home Box Office
NBC
Warner-Lambert
NASA, Columbia University
City of New York

EMPLOYMENT HISTORY

1/00— *Refco (Soft, Inc.)* *Unix/C, VAX/VMS/C*

Consultant: Refco is porting its VMS-based back office system (BOSS) to a Unix-based package (Spectrum) provided by third party FSS. Many components seamlessly migrated to Spectrum's facilities, but various BOSS screens and reports (and occasionally data elements needed to generate them) had to be rewritten and tied into Spectrum's front end. I participated in this task.

- Reprogrammed confirmations for equities, bonds, swaps, options, futures, and various other trades. Migrated RMS access to Sybase, added data elements required to calculate commissions, etc.
- Responsible for reprogramming various Refco statements, including Account Activity, Trades Cancelled, Open Position, Margin Deposit, etc.
- Programmed various utilities to facilitate data migration from RMS to Sybase, and reconciliation between BOSS and Spectrum during parallel testing.

2/99—11/99 *Credit Lyonnais (Computability)* *Unix/C, VAX/VMS/C*

Consultant: Modified GADS (general ledger adjustment system) for y2k compliance, and added various functional enhancements that had accumulated. GADS provides for manual entry and authorization of accounting movements that can't be accommodated by CL's automated accounting system (Clouseau).

- Identified and rewrote all y2k-sensitive date calculations and displays in the 50K lines of code comprising GADS.
- GADS links with several company-wide CL libraries, and needed modifications for compatibility with current versions.
- Added several new business entities/branches, and new "GADS Guides" (templates for accounting movement entries), to reflect CL's current structure and business requirements.
- Found and fixed various known bugs that users had documented over the past several years.

7/98—11/98 *Societe Generale (Integrated Systems Solutions)* *Unix/C, VAX/VMS/C*

Consultant: Modified various SG applications to use IBM's MQSeries for queueing/dequeueing messages. This replaces existing inhouse messaging mechanisms, allowing applications to interoperate. Societe Generale is in the process of standardizing data processing across its international divisions. My work was part of a pilot project to assess the feasibility of implementing MQSeries as an enterprise standard.

- Wrote `sg.queue()` and `sg.dequeue()`, a glue layer to encapsulate low-level implementation details, including queue initialization, commit/rollback, etc. These provide a consistent interface to MQSeries for subsequent application-level modifications.
- Swift messages generated by money transfer applications are routed using VMS "task-to-task communications" (similar to Unix pipes). I rewrote the task-to-task code as a callback function that's passed to `sg.dequeue()`, and processes messages one-by-one as they're dequeued.
- Direct deposit applications generate and store messages in RMS files. I first wrote a small C library to encapsulate RMS I/O (the applications being written in Vax Business Basic). Then I queued the messages, and wrote a detached VMS process (Unix daemon) to poll the queue and pass messages along to their original destination(s).

6/97—4/98 *Bankers Trust (Computability)* *DEC VAX/VMS/C*

Consultant: Enhanced BTC's money transfer system, SPS, to provide multicurrency capabilities, primarily for Swift MT102 "bulk file" messages. SPS (Single Pay Stream) is a front end that accepts payment instructions in many different formats, and then translates, validates, and reroutes them to appropriate application(s). The MT102-component of SPS converts an incoming MT102 to a sequence of outbound payment MT100's and funding MT202's, along with reversals as necessary. The multicurrency project required enhancements to the debit/credit/beneficiary account information in these messages, to their value dates, their routing, etc. New functionality emitting outbound MT102's to multicurrency Partner Banks, and/or files containing Commercial Check payment instructions, was also required.

- Wrote application-level code (and accompanying Rdb tables) to calculate transaction fees, adjust value dates, etc., and to build all required outbound messages and files.

- Modified code generating envelopes for messages submitted to BCo's inhouse communication facility, CNS, to implement new routing requirements.
- Developed subsystem that automatically builds IFT parameter files required to transmit outbound MT102's, and then submits them to IFT. Modified SPS processing (and recovery procedures) to checkpoint state information, to wait for ACK from Partner Bank before funding payments, etc.

11/95—2/97 Cantor Fitzgerald (Aegis Software)

DEC VAX/VMS/C

Consultant: Ported Recon_RPC_Server (an RPC front end to Cantor's publish-and-subscribe page distribution system) from Cantor's London office to New York, and provided ongoing support for it. The RPC server allows clients under different architectures (Unix, NT, OS/2) to almost transparently access publish-and-subscribe services provided by the VMS-hosted page distribution system. The port accommodated Cantor staff changes that made further London-based maintenance inconvenient.

- Located all application, support and library code for Recon_RPC_Server on Cantor/London systems. Re-compiled, linked, and tested it on those machines, to benchmark functionality. Moved all code to New York, and repeated benchmarks, still using original London library sources to rebuild executables.
- Wrote glue layer to accommodate API and functionality differences between London and New York libraries. Similarly, modified VMS global sections, associated code, etc, to accommodate London/New York differences. Rebuilt and benchmarked, now using New York libraries.
- Integrated RPC server and support programs into New York production environment. Worked with users (application programmers using RPC services) to solve various end-to-end problems not uncovered by my offline testing. Provided support and maintenance until these tasks were handed off to New York staff.

6/93—9/95 Prudential Securities (Quintessence)

IBM RS/6000 Unix, DEC VAX/VMS/C

Consultant: Enhanced ALPS, a portfolio valuation system, and ported it from VAX/VMS to Unix. ALPS (Asset/Liability Pricing System) generates cashflows, market prices, durations, and other analytics for publicly traded and privately placed securities and mortgage loans. It also prices embedded options in these issues. The system provides back-end analytics for various Prudential databases and reports, processing holdings valued in excess of \$100 billion on a daily basis.

- Redesigned front-end input system to accommodate new Prudential format requirements. Wrote table-driven parsing routines, allowing ALPS to simultaneously interpret old and new formats.
- Wrote cashflow generation and analytics for mortgages and various other instruments priced by the new system. Also integrated an in-house implementation of the First Boston prepayment model into ALPS (and later replaced it by a Prudential-developed prepayment model).
- Wrote portable library to emulate various VMS system services, allowing ALPS to be ported to RS/6000. The same code now runs transparently under both environments.

9/91—1/93 Chase Manhattan Bank

DECstation, HP/Apollo Unix C

Consultant: Solely responsible for the development of a Mortgage Pipeline Pricing and Hedging System for Chase Home Mortgage Corporation. CHMC's pipeline model is based on the binomial tree pricing algorithm, which is a numerical approximation to Black-Scholes that guarantees arbitrage-free pricing against any other security valued on the same yield curve. CHMC uses this model to hedge their warehoused mortgage pools (before they're securitized as Fannie Mae pass-throughs).

- Designed and coded a library of binomial tree functions to allocate and address trees, to provide various mathematical operations defined on them, to display trees in a visually intuitive manner, etc. The library allows application-level code to treat binomial trees as a new C data type.
- Wrote numerical code to (a)construct a rate tree, with any requested volatility, from a given yield curve, (b)construct a tree of zero coupon bond prices from this rate tree, (c)construct a prepayment tree by modelling mortgage prepayments from the preceding trees and from various ad hoc functions describing historical prepayment behavior, and (d)construct a mortgage price tree from the preceding trees using the binomial tree pricing algorithm.

- Wrote additional functions to match the boundary conditions of a 360-period monthly tree (for 30-year mortgages) to a finer mesh 180-period daily tree, permitting more accurate modelling of cash flows while CHMC is warehousing the mortgage pool.
- Wrote high-level functions to (a)price various cash flows (strips) using the preceding algorithms, (b)iteratively determine option-adjusted yield curve spreads (OAS) to match any target price, (c)value deals and hedge them against other securities, and (d)drivers providing a portable front-end user interface and various back-end reports.

4/91—6/91 Barclays Bank (Comtex)

DEC VAX/VMS/C

Consultant: Designed enhancements to Loan Syndicator, a system purchased from Precision Software (a third-party vendor) by Barclays Bank to manage their loan portfolios. The Loan Syndicator application is built on top of an ISAM package (ctree) and a forms package, both of which were independently ported from PC to VAX for this project.

- Wrote a layer of low-level routines to encapsulate ctree initialization and file I/O, so that application-level code can use the access method without the usual housekeeping. Also added functions to simulate ctree indexes in memory, so that record access on non-indexed fields can be performed as if the fields were indexed.
- Wrote various report generators (Transaction Journal Report, Trial Balance Report, etc), and modified Loan Syndicator user interface so that these reports can be requested by users. Also wrote several “database extract” programs to drive existing offline reports from information in the Loan Syndicator database.

8/90—12/90 Manufacturer’s Hanover Trust (Comtex)

DEC VAX/VMS/C

Consultant: Solely responsible for the design and development of the Currency Performance Fund (CPF) System for Manufacturer’s Hanover Trust. CPF consists of various report generators (and drivers) to monitor the positions, profits and losses, etc, of FX traders hired by MHT to act on behalf of its large corporate customers. It interfaces with various existing MHT systems and databases to determine the deals done by these traders, the spot and forward rates needed to measure their profits and losses, etc. The system also keeps track of month- and year-to-date trading information, as well as MHT commissions and trader fees.

- Wrote low-level routines (one per MHT database) to encapsulate all RMS file I/O so that application-level code can request records by key (or sequentially), without initializing and maintaining RABs and FABs, etc.
- Wrote a library of linked-list and binary tree routines to permit memory-resident storage and manipulation of trading data required for report generation.
- Wrote the report generators and drivers required by the functional specifications, using the above libraries (and some string-handling routines) to perform generic tasks. Helped generate a suite of test data to validate the reports.

9/88—12/89 Chase (Princeton Information)

DEC VAX/VMS/C

Consultant: Solely responsible for the design and development of Basis, a fixed income matrix pricing system for government and corporate bond traders at Chase Manhattan Bank. Basis consists of a workstation process run by each trader, and a detached server process that updates each trader’s screen with quotes received from all other traders. The server also checkpoints prices and positions to disk every 15 minutes, and is capable of generating a consolidated ticker.

- Ported and enhanced a window management subsystem originally written for PC/MS-DOS to VAX/VMS. It generates and updates overlapping windows on trader screens, and manages context-switching and data transfer between them. The port and enhancement of this particular package was requested due to its existing use at Chase.
- Wrote a communications subsystem for sending TCP/IP datagrams between trader processes and the remote server. Datagrams are asynchronously trapped and buffered by the receiving process, which also sets a corresponding event flag that signals it to begin deblocking and interpreting messages in the buffer. ACK/NAK logic and message sequence numbers insure detection of transmission errors, although retransmission requests were not implemented.
- Wrote main state machines to implement trader workstation and server processes.
- Wrote all code necessary to support application-level functionality, including price, yield and basis spreads from on-the-run to off-the-run issues.

- Modified the existing bond calculators, primarily to make them more robust, and also to accommodate corporate bonds.
- Wrote detail design document describing the design and internals of Basis.

9/87—6/88 Chase (AGS Information Systems)
DEC VAX/VMS/C

Consultant: Senior VMS/C programmer designing Chase Manhattan Bank's Global Exposure Monitoring System, GEMS, which manages worldwide credit lines for Chase's commercial FX customers and their subsidiaries.

- Wrote primitives for navigation through customer records, providing application-level code with a logical view of the GEMS database, and hiding the coding details of its interface with INTACT (a third-party ISAM package used for physical I/O).
- Wrote additional tools for window management, simplifying the interface with JYACC (a third-party package for VAX windowing), and providing a higher level of functionality customized for our application needs.
- Wrote application functions which allow for the entry and editing of information about Chase customers and their credit limits.
- Wrote a variety of batch reports (spawned off when requested from a GEMS window) to duplicate the functionality of earlier credit systems with which the FX traders are already familiar.

5/87—7/87 Security Pacific (Princeton Information)
DEC VAX/VMS/C

Consultant: Project leader for the development of Security Pacific's Fully Automated Security Trading System, FAST. Began detailed design and coding from existing functional specifications for the project. Due to budget constraints, the Montreal Exchange (Security Pacific's client) decided to cancel the project in July.

- Designed and coded a generic Shell as the main C function for each FAST process, including application-level tools to access VMS services. The Shell manages a global section for information sharing and manages message switching between all FAST components, thereby providing application code with a transparent interface to VMS mailboxes, to PAMS (a third-party package), and to other system services.
- Wrote library routines to manage memory-resident binary lists and linked lists, and wrote a Shell-based process using these routines to maintain FAST's issue lists and order lists.

12/86—3/87 Citibank (Kearns-Melloy Associates)
Stratus/VOS/C

Consultant: Designed modifications for the front-end ticker plant of Citibank's StreetSense to capture securities transactions from new information providers. Separately, wrote a batch update system to populate the StreetSense database with Dow Jones news stories.

- Designed specifications for parsing messages from Chicago Mercantile, London and Telekurs, and for updating StreetSense's database using this information. Identified new data elements and corresponding coding changes required to support these ticker lines.
- Wrote programs to deblock and translate IBM vb-formatted tapes containing archival news stories supplied by Dow Jones. Converted the news stories on tape to standard StreetSense "ticks", and then transparently queued them to the database update process.

3/86—12/86 CBS (Software Design Associates)
DEC VAX/VMS/C

Consultant: Senior consultant among a team of four programmers responsible for developing the CBS News Electronic Display System, used for the on-air management of animated graphics during sports and election broadcasts.

- Wrote Detail Design Specification for the project, including structure charts, function descriptions, pseudocode, data dictionary, etc.
- Designed and programmed asynchronous communications front end and concentrator, to handle VMS terminal I/O between the EDS application layer and all video devices, control terminals, etc.
- Wrote state-driven command interpreter to capture operator dialog at control terminals, and to translate their commands to a standard internal format.

- Wrote RMS database server to handle all requests for updates and retrievals from the “Race Database” during election coverage.
- Wrote drivers to generate and download command sequences for controlling video animation devices (Chyron and Abekas) attached to the system.

11/85—3/86 Citibank (Cambridge Computer Associates)

DEC VAX/VMS/C

Consultant: Solely responsible for the development of ARCScomm/Phoenix, a system to automatically update route code tables at each node of Citibank’s CitiSwitch communication network.

- Wrote Detail Design Specification for the project.
- Designed and programmed client/server tasks, using DECnet to send route code updates to each switch in the network.
- Wrote application tasks to reconcile route code updates with existing records, request validation for exceptional cases, perform database updates, produce audit trail reports, etc.

4/85—11/85 HBO (Data Architects)

DEC VAX/VMS/C

Consultant: Participated in the development of a system to manage the scrambling and distribution of HBO cable programming to licensed subscribers.

- Wrote interprocess control task to synchronize Rdb database updates between affiliate computers and HBO host.
- Wrote lock manager to prevent Rdb deadlocks induced by concurrent database updates.
- Wrote programs for lexical analysis of Datatrieve procedures to help optimize execution.

8/83—3/85 Chase (Systems Strategies)

DEC VAX/VMS/C, IBM PC C

Consultant: Participated in the development of Chase Manhattan Bank’s videotex home banking system, SPECTRUM, consisting of a VAX communications front end running VTX, with applications residing on a 4341 back end.

- Wrote asynchronous communications handler for the terminal control program, including ACK/NAK logic, timeouts, and CRC error checking.
- Wrote graphics preprocessor and “ASCII frame stripper” to expand NAPLPS macros, optimize command sequences, and support non-graphic terminals.
- Wrote menu-driven DCL procedures for full and incremental backup/restore of VTX database.
- Wrote gateway between VTX and Rose & Company financial services.
- Wrote functional specifications for Electronic Mail and for “News & Marketplace” applications running on the back end.

Also: Solely responsible for the development of an Expatriate Tax System for Chemical Bank employees stationed overseas. System includes data entry and archiving of tax tables and employee account data, and report generation of federal and state forms.

6/82—7/83 Statistical Research, Inc.

DG MV/8000 AOS/VS Fortran

Consultant: Solely responsible for the development of decision support software to analyze radio and television audience estimates (ratings).

- Designed ISAM-like DBMS and report generators to archive and report Arbitron radio listening estimates, and to interactively combine them with hypothetical ratings projections and station affiliations. Used by CBS management to study the acquisition of independent stations.
- Wrote proposal for similar Nielsen-based television system.

5/80—6/82 Goddard Institute for Space Studies

IBM 4341 VM/CMS Wylbur

Senior Scientific Programmer: Developed algorithms to model the physical processes responsible for solar heating and infrared cooling of the atmosphere. Used by NASA to study causes of climatic change, particularly the effects of increased atmospheric carbon dioxide produced by burning fossil fuels.

- Developed radiation transport algorithms and interfaced them to General Circulation Model (GCM). The opacity of gases, clouds, and aerosols is evaluated offline and stored for interpolation by the GCM. During execution, these tables are integrated over an atmospheric column to determine heating rates at each vertical level of the model grid.
- Wrote offline, one-dimensional simulations to validate the techniques developed for the GCM.

7/77—5/80 National Broadcasting Company

Univac 1108 Exec-8 Fortran

Administrator of Research Systems: Managed the data processing requirements of NBC's Research Department by developing and maintaining systems in-house, or by coordinating their development with corporate MIS.

- Wrote an Overnight System to archive and report Arbitron local market ratings for NBC owned-and-operated stations.
- Wrote a "CPM" System (i.e., Cost Per Thousand System) to help standardize NBC's affiliate station compensation policy.
- Wrote a pilotbank system that evaluates audience response to NBC pilots aired on cable TV.
- Redesigned and enhanced existing Shuffler System for manipulating ratings projections, and for comparing them with actual audiences.

1/76—7/77 Monchik-Weber Associates

DG C/330 Nova AOS RDOS Assembler

Systems Analyst: Participated in the development of a Ticker System for Merrill Lynch to provide online clients with a consolidated ticker reporting options trading on the NASDAQ, CBOE, and other participating exchanges.

- Wrote interrupt-driven communications handler to capture and buffer incoming messages at the front end of the ticker plant.
- Wrote lexical scanners to parse these messages and convert them to a standard internal format.

9/74—1/76 Goddard Institute for Space Studies

IBM 360/95 SSS Fortran

Senior Scientific Programmer: Developed algorithms to determine atmospheric temperature and cloud cover from infrared satellite observations. Data from orbiting radiometers is returned as radiation intensities reaching the detectors in 22 frequency bands. From this we have to infer temperatures throughout the atmosphere responsible for producing the observed flux (like estimating the temperature of a candle by analyzing the light it emits). Used by NASA to improve the skill of long-range numerical weather forecasts (n.b., the Department of Agriculture estimates that an accurate six-week forecast can increase global food supply by 25%).

- Developed algorithms to solve inverse radiation transfer problem using published dual-field-of-view techniques.
- Used published parameterizations to simulate heat transport due to eddy flux currents.

ADDITIONAL EXPERIENCE

9/72—9/74 City College of New York Decsystem 10 TOPS-10 Fortran
System manager for the Physics department's Decsystem-10. Installed and maintained TOPS-10 5.04, 5.05 and 5.06 Monitors, and other systems and applications software. Also, wrote a data acquisition system to capture messages generated by A/D converters attached to PDP/lab8E's in physics labs.

10/70—9/72 Columbia University IBM 1130 Fortran
Analyzed and interpreted data to study the propagation of atmospheric disturbances travelling in the ionosphere. Wrote programs to massage raw data, and to calculate power spectra, cross-correlations, and other statistical measures of signal coherence across Columbia's tripartite doppler detector array.

1/70—10/70 Statistical Research, Inc. IBM 1130 Fortran
Programmed an inventory control system for Warner-Lambert to manage some 250 products shipped to 14 warehouses, and to project seasonal sales trends to help adjust their production schedules. Also, participated in the analysis, processing, and evaluation of data arising from various surveys that SRI was hired to conduct.

9/66—1/70 New York University IBM 360/30,40,50 Fortran

From 1/69—1/70, installed and maintained a DBMS and Jovial compiler for the Department of Educational Technology used in a project to study how people learn. Also, wrote various housekeeping programs in Jovial and in PL/1 to maintain the database and support our application.

From 1/68—1/69, designed and programmed a library of routines for the Department of Business Statistics to generate values of various statistical distributions accurate to fifteen decimal digits. Also, participated in a study for the federal government to detect discriminatory practices in industrial hiring requirements, and in a survey for DeCoppet and Doremus (member NYSE) to generate data for their defense in a legal action brought against them by some of their clients.

From 9/66—1/68, wrote programs, installed packages, helped student and faculty users, etc. at the Academic Computing Center, School of Commerce. Also, redesigned a simulation called the University Administrator's Decision Laboratory, and translated it from Cobol to Fortran.

EDUCATION

9/72—6/74 City College of New York M.S. in Physics

9/64—1/71 City College of New York B.S. in Physics

9/61—6/64 Bronx High School of Science

PUBLICATIONS

More Accurate Linear Interpolation, The C Users Journal, **9**, 77–88(May 1991)

Automata Theory As A Quantum Formalism, Il Nuovo Cimento **64**, 503(1976)

Least-Squares Analysis of the Uncertainty Principle, Am. J. Phys. **39**, 425(1971)