Michael McGarrah

Data Scientist & Cloud Architect
Email: mcgarrah@gmail.com
Phone: +1 (919) 807-1057
Resume: https://www.mcgarrah.org/resume
LinkedIn: https://linkedin.com/in/michaelmcgarrah

CAREER PROFILE

With over thirty years in IT, my background includes work in data science & analytics, cloud computing, development, database & multi-platform platform management, security and compliance, networking, and R&D. That diverse experience makes me rapidly effective in your business.

EDUCATION

Masters of Science in Computer Science   2014 - 2019

Georgia Institute of Technology   GPA: 3.63

Beginning the Fall of 2014 while working full-time, I completed my Machine Learning focused curriculum in the Spring of 2019. My focus area was Interactive Intelligence, Machine Learning and Perception Systems. While in school, I have pursued guided independent study research projects and worked to present papers at conferences to extend my academic credentials.

- NWAV 46 Conference Presentation "155. Introducing NordFA:Forced alignment of Nordic languages. Nathan J. Young & Michael McGarrah"

- Abstract: Forced alignment for Nordic languages: Rapidly constructing a high-quality prototype. (PDF)

- LG-FAVE Software Repository

Bachelor of Science in Computer Science   1990 - 2011

North Carolina State University   GPA: 3.42

I completed my Bachelor of Science in Computer Science May of 2011 graduating with Honors while working full-time and raising a family.

- Member Association for Computing Machinery (ACM)

- Member Institute of Electrical and Electronics Engineers (IEEE)

- Member Association of Information Technology Professionals (AITP) (archive)

- Upsilon Pi Epsilon (UPE): International Computer Science honor society

EXPERIENCES

Lead Principal Engineer (Cloud & ML Focus)   Oct 2021 - Present

Envestnet, Inc., Emerald Isle NC (Remote)

Building large scale cloud platforms for financial services and data science initiatives. A combination of AWS cloud and data center infrastructures are included in the architecture allowing for flexible integration between on-premise and cloud services. An automation first attitude pervades this work. Containerized cloud-first technologies (AWS & Kubernetes) to support new initiatives are current focus areas.

- Envestnet upSWOT
- Envestnet Data & Analytics

Unified Portfolio Accounting (UPA)

UPA is a portfolio accounting platform using bleeding-edge cloud-native technologies for a highly scalable service to maintain, balance, adjust, and validate financial data from custodian platforms and trusted connections to existing platforms like UMP and Tamarac along with our clients. Some resources of the system include EKS with integrations for vEMR (Hadoop), Airflow (MWAA) and custom workflows. This system utilizes containerized microservices managed on a service-mesh deployed from managed CICD pipelines with IaC managed infrastructure.

Small and Medium Business Portal (SMB Portal)

SMB Portal provides a platform to empower businesses to make important decisions more easily and take actions based on data. The integrated portal includes the apps that most SMBs use to run their businesses and provides greater opportunity for growth and partnership between SMBs and banks. The software was implemented with cloud-native containerized microservices which was migrated to AWS managed cloud services as part of a migration. IaC (infra as code) and conversion from on-premise and alternate cloud vendors was a major hurdle to implementation and bringing the product to a managed state.

Data Science Initiatives (DSI)

Multiple internal projects with data engineering and management using a variety of methods including serverless machine learning (Lambda/Step) development and SageMaker with container deployment mechanisms. These projects include finding the data in the enterprise and providing repeatable data feeds which are a considerable challenge. Providing cloud compute platforms for data scientists to do evaluations of the data and promoting as production models continues to be an interesting and difficult process that we are continuously refining.

Data Marketplace

External vendor web-application with internal compute and storage for a data management platform in the financial services space. Integration with the internal system via managed processes and managing security concerns were the primary concerns and issues with implementation.

Principal Data & Analytics Platform Engineer   Apr 2019 - Oct 2021

Blue Cross and Blue Shield of NC, Raleigh-Durham NC (Remote)

Building a data science platform incorporating a data-warehouse, data-lake and data-execution environment using containerized cloud-first technologies (AWS & Kubernetes) to support our mission of data driven decision to provide for a value-based healthcare approach. A public example includes the media example below:

- Medicare Guided Selling

Cloud-First Platform (AWS)

Built a complete multi-account AWS platform managed via CloudFormation (CF) stacks from the ground up. All aspects of the platform from VPC to IAM/Policy moving towards the higher-level components like shared RDS clusters, EKS clusters, EMR and associated dependent services like S3, ACM PCA, EFS with CSI integration to EKS, Route53 integration with enterprise Infoblox and other services as necessary were all managed via CF stacks. This had overhead but allowed for a highly consistent and managed cross-account environment working together. This implementation included writing Lambda functions and CF Custom Resources for several services when CF did not offer a mechanism to manage a service completely.

Containerized Development (Kubernetes)

Implemented local standardized Kubernetes development with Docker for Windows/Mac and managed AWS EKS Kubernetes cluster per AWS account. Local development initially used docker-compose for deployments to Kubernetes in Docker (KinD) with a migration to Helm3 Charts. The EKS deployments were managed with a shared cross-account CICD Pipeline giving developers full control over build and deployments. Spot-instance CPU & GPU enabled EC2 worker nodes with zero-scaled nodes for GPU to reduce cost allowed for a cost-effective execution platform. The EKS managed Kubernetes and associated AWS resources (EFS/Route53/ACM/VPC/etc) were all managed via CloudFormation stacks (or scripted configuration changes) with synchronized infrastructure deployment environments for development stages. Some of the major inclusions for the K8S clusters were helm chart managed External-DNS, Nginx-Ingress with NLB, Cluster Autoscaler, Nvidia device plugin, Prometheus with resource metrics, KubeWatch and EFS CSI drivers. K8S Service Account (KSA) permissions via AWS IAM Role/Policy at the container level rather than node level offered additional security for managed access to AWS resources. Extensions using AWS Fargate container execution are enabled in a non-HIPAA environment while working out compliance requirements.

Medicare Guided Selling Tool (MGS)

The Plan Finder Tool offers an easy way for members to use their claims data to recommend a plan that best fits their needs. This is for members who are moving from a Blue Cross NC commercial plan to a Blue Cross NC Medicare plan. The public accessible interface for the recommendation engine can be found at MGS Landing. My involvement was to implement the initial recommendation system in May 2019 before our AWS platform was ready for general use. I quickly created a fully integrated and managed Serverless Framework (SLS) implementation using

an AWS API-Gateway backed with Lambda functions written in Python3 providing a REST API for WebUI developers which pulled content from a DAX/DynamoDB datastore populated by a custom built containerized event-driven ETL process also written in Python 3.6. This implementation has been live on the above public URL since June 2019 and will be decommissioned 3Q2021 in favor of the new CICD Pipeline and ETL processes implemented in 2Q2020. I have been heavily involved in transitioning the above and building out the cross-account CICD Pipeline (Jenkins) and data engineering tooling (ETL) to support broader development and data engineering practices across the company. As a first-stage developer of a public accessed service, I was in a unique position both as an infrastructure implementer and consumer of both the development and data engineering services the platform team provided to the enterprise.

Drug Lookup and Calculation (DLC)

The DLC project was an investigation into a standard enterprise-wide REST API that would allow for fast drug lookups via sub-strings for ease of search in a web-ui, validation of drug information with parameters, and cost calculations when member details were available to map against plan benefits. The pilot REST API was implemented rapidly as part of the MGST for 2Q2021 deliverables and then made available across the enterprise as the value was broadly recognized.

CarePath (Machine Learning) Models

CarePath is a software framework developed by Blue Cross NC that acts as a deep learning model factory. It constructs state-of-the-art deep neural networks which learn and then recognize the patterns in sequences of claims which eventually lead to particular health events. This enables Blue Cross to accurately identify members at risk for a wide range of preventable events.

We used this in-house general framework to build specific health related models to identify member level risks and possible health impact to focus our care management programs on those members at greatest risk and improve their health outcomes. Production examples of this include:

- Complex Case Management (CCM) models for predicting both potential hospital initial admissions and separate readmissions after care using claims and other historical data to target members at risk with the goal of improving health outcomes. These two models have had a measurable impact on member health.

- Hospital to Home (H2H) model to identify members at high risk for readmission who need support transitioning from inpatient care to their homes.

- Additional models for Cardiovascular disease, Diabetes

The CCM model was recognized with an Excellence In Service Innovation Award from the International Society of Service Innovation Professionals (ISSIP) and the H2H model with an Innovator Award from Healthcare Innovation.

My role was to validate the framework and models along with assisting in making the code-base production ready. I was also the primary implementer for creating an enterprise production capable platform for the final product. The platform implementation was initially on local laptops and later an AWS EC2 instance. I performed code reviews and

changes for the framework source code, individual model data-prep and code, enterprise processes and data management as we moved out of the internal POC. I rewrote sections of the framework and model code to allow migration to scalable cost-effective containerized managed Kubernetes (K8S) deployment using our multi-stage secure cloud-native development platform that provided for a fully self-managed developer experience via a cross-account CICD Pipeline. This allowed for fast cycle times for the development. Further improvements I added included zero-scaled K8S GPU nodes instantiated via resource taint/toleration, scalable and highly available scoring access for the daily public model releases and secure access to managed internal only datastores for the model generation.

Data Engineer   Nov 2017 - Apr 2019

United States Postal Service, Raleigh NC

As part of the Advanced Analytics Group in Enterprise Analytics Program of the USPS, Engaged in advanced analytics with multiple platforms. Primary focus on a SAS 9.4 and SAS Viya in-memory cluster with linkage to Hadoop Datalake inching up on 1Pb of data. Exploring machine learning and big data. We work with Tb not Gb of data in a high security environment.

Advanced Visual Analytics - SAS Viya

Stabilize SAS analytics platforms for data scientists group. Administer, document and configure the in-memory clustered analytics platform across a 25-node cluster with 26Tb of RAM and remote connectivity to a 50+ node Hadoop DataLake. Limited documentation from initial installation was a priority to remedy immediately. Stabilization of services and a plan for platform upgrade became the next concern. Technology stack includes Ansible 2.2.1/2.3.2 automation for platform installation and configuration with a custom quickly built Python Fabric 1.14.x extension for system administration automation and management to provide a standardized method for administration tasks. A combination of R and Python 2.7/3.6 are used extensively for scientific computing by data scientists and support for those provided. A heterogeneous Linux platform including RHEL, SUSE and CentOS comprises the base OS platform. Integration with multiple LDAP & Kerberos directory services for authentication and authorization. SAS Visual Analytics (VA) proof of concepts and demos.

Analytics Programming Platform - SAS 94M5

Stabilize platform and provide administration run books and best-practices to UNIX sysadmin staff. Configure programming platform for remote connectivity to Hadoop DataLake, TeraData, and Oracle. Reverse engineer and document installation. Technology includes R and Python integration with scientific and machine learning libraries support. Provide a plan for upgrade of services.

Python Fabric: A Framework for Admin Automation @ USPS

A CISO compliant method for system administration automation at the USPS. Provide a demonstration of services to system administrators and extend for multiple services.

Hadoop & SAS Integration – HIVE / HDFS

HIVE and HDFS integration with multiple LDAPS authentication providers for HortonWorks Hadoop and SAS Platforms. Integration methods include customized PAM/SSSD with work towards Kerberos integration.

Hadoop Development Platform

Built a complete Hadoop DataLake Platform using HortonWorks Ambari to provide a replication of the production USPS DataLake as a test environment for the preparation of an upgrade plan for the multiple interdependent production services. Platform incorporated the USPS CISO standards and utilized a beta local USPS IaaS Cloud (early adopter) offering based on the VMware vRealize Suite. A custom combination of Linux based OpenLDAP & Microsoft AD for authentication and authorization to replicate production Hadoop DataLake complexities was created. The base OS for Hadoop used RedHat Linux 7.4 with USPS OS extension. Implemented a NFS Server to provide both a system level distributed shared file system for HA and creation of a shared home directory for PAM/LDAP based UNIX accounts.

Cloud Architect   Jul 2016 - Sep 2017

American Kennel Club, Raleigh-Durham, North Carolina Area

Oversee the design and execution of the cloud computing strategy including the cloud adoptions plans, cloud application design, and cloud management and monitoring. Provide expertise in the definition, design, implementation, adoption and adherence to enterprise architecture strategies, processes and standards. This role at AKC was focused on expertise in the Amazon cloud technologies.

Cloud Services and Architecture

Oversee the design and execution of the cloud computing strategy including the cloud adoptions plans, cloud application design, and cloud management and monitoring. Provide expertise in the definition, design, implementation, adoption and adherence to enterprise architecture strategies, processes and standards. This role at AKC is currently focused on expertise in the Amazon cloud technologies.

Rebuild and redesign the primary www.akc.org website to use Amazon Web Services in a rapid migration from a hosted vendor environment. A lack of existing documentation, standards, and procedures for this rapid migration impeded earlier efforts at a seamless transition. No customer impact for the migration I led and completed in a break-neck six-week period. A similar exercise for a large consumer transaction website marketplace.akc.org was completed in a period of two weeks with a contracted partner assisting in the effort. Again, done with no customer impact for these transitions.

Reduction in overall website costs from approximately $30,000 USD per month to less than $5,000 USD. Plans for additional reduction in cost to bring total under $3500 per month. Improved uptime, reduced TTFB (time to first byte), and reduced variability of web page responses all contribute to a better user experience. Continued

improvements for caching, database optimization and deep application monitoring continue to be implemented for improved user experience.

End-to-end CI/CD implemented for the primary website with additional integration testing frameworks being provided to improve the developer effectiveness and increase the rate of deployments.

Application Modernization from legacy ColdFusion, PERL, and Java applications to move to a MEAN development stack and utilize AWS for the new environments. Design and implementation of the new infrastructure proceeds. Varied solutions for the legacy migration include Amazon EMR, ELK log management, ElastiCache, CloudFront, Beanstalk and various other AWS services. Impediments include a monolithic Oracle database structure and legacy desktop applications accessing the same data in real-time.

Programmer

Build an Amazon EMR implementation for use by the Application Modernization effort. ELK log management for use by individual application monitoring and management.

Evaluate website architecture and develop plans for implementing opcache with php-fpm to accelerate processing of dynamic PHP content. Redis and Memcache implementations are not optimized for short span session content.

Rewrote sections of the PHP based Expression Engine 2.9.3 (CMS) to be fully compliant with PHP 5.6 enabled with warning as errors. Reduced load times on scripts noticeably.

Varnish Caching server implementation requires a re-write of the HTTP session and redirection rules. Current design allows for replay of session actions for invalid responses.

Redirection/Rewrite Rule proliferation includes six locations for a rule to be enacted with the possibility of looping redirections. Building a separation of the rule's evaluation with logging into an ELK implementation to assist in understanding the scope of the challenge. Current implementation has over twenty-six thousand (26,000) rules.

Designing a method for domain root flattening that does not include the AWS Route 53 but remains highly available.

Software Architecture

Recent Hybrid Cloud work with Azure/Amazon integration with a software architecture for our new service-based software platform using a micro-services implementation and a serverless POC implementation. Everything is in the context of merging Amazon to a local data center network hosting multiple data sources including Oracle and MongoDB. The intelligent load balancer transition and rules implementation across multiple isolated networks.

Provide architecture and implementation of a modernization of the interactive web application platform to use a MEAN (Javascript) based development stack and DevOps workflow pipeline supporting this platform development with multiple dev workflows.

Design a Hybrid Headless Wordpress implementation for future merged and integrated public facing websites redesign to include a highly scalable AWS Service based implementation

Deploy updated and enhanced Gitlab, Phabricator, SONAR, Ansible, and Jenkins platforms in AWS for existing development with extensions using AWS specific tools for IaC CloudInit and CloudFormation

Enterprise Architect for Strategic Initiatives   May 2015 - Jul 2016

North Carolina Department of Information Technology, Raleigh NC

Accountable for developing, maintaining and overseeing the execution of formalized technology, application, platform, and systems integration strategies. Conduct enterprise-wide analysis, collaboratively establish technology road maps, champion critical changes and negotiate statewide standards and policies in the form of Enterprise Architecture. Ensure the successful development and effective execution of IT strategies. Systematic management of enterprise IT standards, policies and strategies for a portfolio of technology platforms, products, and practices. Initial focus on converged technologies to include software defined networks (SDN) and software defined infrastructures (SDI).

Architecture

Accountable for developing, maintaining and overseeing the execution of formalized technology, application, platform, and systems integration strategies. Conduct enterprise-wide analysis, collaboratively establish technology road maps, champion critical changes and negotiate statewide standards and policies in the form of Enterprise Architecture. Ensure the successful development and effective execution of IT strategies. Systematic management of enterprise IT standards, policies and strategies for a portfolio of technology platforms, products, and practices.

As part of the evaluation during the Network Modernization program, clear issues with the existing security policy and state-wide architectural standards emerged. In cooperation with the State Risk Officer, we are releasing a Request for Proposals (RFP) for a rewrite of the security standards with an emphasis on modernized practices based on NIST and DoD standards.

Plans for revisions of the state-wide architectural standards began with an outline of critical sections requiring position papers for new technologies. I began revisions of the firewall, hosting and n- tier architecture completing drafts.

Cloud Initiatives

Investigation of statewide data center Cloud usage with external and hybrid Microsoft Azure VM (compute) services. Also involved in work done with RedHat OpenShift (backed by AWS VMs) and a direct Amazon engagement.

Ensure the successful development and effective execution of IT strategies. Manage enterprise IT standards, policies and strategies for a portfolio of technology platforms, products, and practices. Initial focus on converged technologies with focus on network modernization with software defined networks (SDN).

SDI (software defined infrastructure) strategy for the state with the SDS (storage) SDN (network) VM (compute) and orchestration of the services.

"Utility-based computing" for state agency usage with both a technical and financial model

Virtual Desktop (VDI) for state desktop replacement (infrastructure and financial). Includes external cloud based services for cloud desktops. This includes network analysis of the services.

Networking

Assist in developing and defining a program for the modernization of the State of North Carolina data center networks. Refined the existing understanding of network infrastructure by multiple stakeholders into a document outlining the known state of the data center networks. The current network is overly complex with many features that are static and resist rapid change or automation. The configuration of the individual network segments and network services lack in standardization which results in complex configurations prone to failures during change events.

In response, lead a group in writing a Request for Information (RFI) to ask third parties to assist the State in understanding how to modernize our data center networks to embrace new concepts such as cloud, third party hosting, mobility of services and incorporate flexibility into the State network to allow for adding new methods of doing business.

As part of the evaluation during the Network Modernization program, clear issues with the existing security policy and statewide architectural standards emerged. In cooperation with the State Risk Officer, we are releasing a Request for Proposals (RFP) for a rewrite of the security standards with an emphasis on modernized practices based on NIST and DoD standards.

Senior Systems Programmer & Administrator (AI Technologies)   Apr 2013 - Jul 2015

Measurement Incorporated, Durham, NC

Systems Administration for Linux and Windows on Cloud platforms. Implement integration of Active Directory with UNIX authentication & authorization. Provide support for PostgreSQL, MySQL, & SQLServer database environments. Systems programming with optimization of low-level machine learning support libraries such as CBlas, LPSolve, Shogun and others. Expand network topology. Implement virtualization with VMware ESXi, AWS, KVM, & Xen. Implemented a AWS clone using the Eucalyptus 3.4 platform compiled from source with iSCSI shared storage on FreeNAS. AWS Services cloned included: EC2, EBS, IAM, S3, AMI, Autoscaling, Elastic Load Balancer, and Cloudwatch with a local Ceph & RiakCS S3 test.

AI Technologies

Implement a custom MIT Star Cluster for distributed computing to a combined AWS and Eucalyptus environments.

MXE – cross platform compilation of tools and libraries necessary for AI & ML tools. Some of those include: gcc and associated toolchain, ATLAS, LPSolve, CBlas, Eigen, ColPack, ARPrec, Ccache, LAPack. Patches and modifications contributed back to open source communities. SHOGUN is ported to native Microsoft Windows platform using the above MXE cross- compilation environment. Porting of Machine Learning Toolkit (MLT) to both a 64-bit Cygwin environment and native Linux packaging.

Analytics Server – Build an analytics server providing Octave, R, Shiny, and rStudio server, SAGE Notebook / IPython Notebook, and MySQL for the AI researchers. Developed an interactive interface and shared environment for use between applications.

Cloud Computing

Advise software development teams on architecting and designing infrastructures that safely and efficiently utilize a cloud computing environment. Amazon Web Services (AWS) investigation for use in distributed high performance AI computing workloads. Manage AWS account activity, project usage and billing.

AWS development stack includes Java, C#, Python, Groovy (Grails), Perl, and C. Built AWS DotNet SDK in Mono on Linux and developed proof of concept examples for evaluation. Developed a Grails S3 web browser application as proof of concept. Contributed to open source Eucalyptus 3.3.0 project.

Eucalyptus 3.4 implementation with iSCSI shared storage platform (FreeNAS) in multi-tier platform to provide local services providers of AWS Services including: EC2, EBS, IAM, S3, AMI, Autoscaling, Elastic Load Balancer, and Cloudwatch. Implemented test platform for S3 local service utilizing Ceph & RiakCS integrated with Eucalyptus 3.4 IAM. Extended a local SNS implementation using Scala in-memory implementation. Extended a local SNS stub provider for mock providers of web service.

Investigated OpenStack, CloudStack, and AWESOME technologies for AWS compatibility with mixed results. Each had areas of excellence but Eucalyptus 3.4 mapped the greatest number of AWS SDK features necessary for distributed scoring platform.

Machine Learning

Implement in Python a knowledge-based AI agent using generic learners to find solutions to the Raven's Progressive Matrices visual intelligence test. Applied machine learning from natural language processing (NLP) methods to the image recognition and pattern recognition in generic non-domain specific attribute based evaluations. Implementation involved both identification of shape matching and transformations of shapes between frames. Weighted models of attributes or feature values were used to determine features that impacted identification of important transforms.

A simplified example of the proposition is to solve A is to B as C is to # from the figure below. Human cognition will quickly identify figure 5 as the solution with a 45° rotation of the shapes. An AI Agent requires identifying the mapping between shapes in A & B then the transforms performed on B to make them match A.
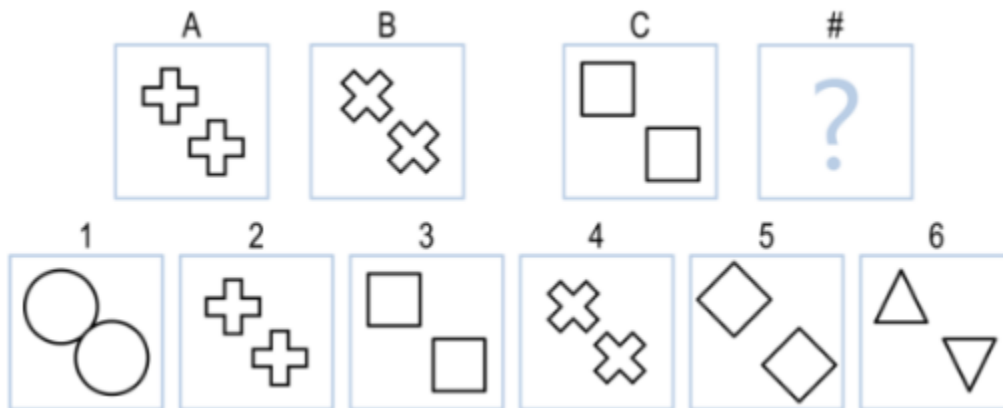
Software Defined Networking

Python implementation of several network simulations to model and test changes using a custom built Python, Mininet and Linux virtual machines environment. The projects included building:

- A learning switch with a customized weighted finite state machine (FSM)

- A combined firewall and intrusion prevention system (IPS) using an OpenFlow controller and sFlow monitoring

- A TCP Fast Open implementation using original Google research paper and IETF RFC 7413

- Lastly a Multi-Path TCP (MPTCP) implementation using Linux kernel modifications and TCP stack updates using IETF RFC 6824 as a recommendation for implementation

Brought these projects back to the company network to assist in work on production networking challenges for our large scale web services deployment. The modeling of latency issues for remote education institutions in rural Canada. TCP Fast Open for Chrome has had impacts on server builds for our flagship web-based testing platform. Network modeling is being used as other network issues are encountered.

Virtualization Technologies

Implemented Xen and KVM virtualization environments that supported both Linux and Windows virtual machines to provide a reliable environment for development and investigation of technology. Progression of investigation migrated to the Eucalyptus cloud environment.

Performed hardware maintenance for existing servers, including equipment replacement and capacity planning. Researched alternatives and implemented a VMware ESXi 5.5 server purchasing hardware to allow for migration of legacy applications and servers from physical to virtual machines (P2V). P2V conversion process included legacy OS environments.

Implementation of ESXi server included integration of AD permission models with developer access to virtual machine management. Windows 2003/2008/2012, Red Hat Enterprise Linux, CentOS and Ubuntu virtual machines are all supported in the environment. An advanced understanding of IP, Sub-Nets, VPNs, vLAN, Network routing, firewalls, load balancing and switching as related to the VMware platform were required for implementation. Storage configuration includes iSCSI both in client and on ESXi software. Troubleshooting of ESXi server and virtual machine related performance issues was performed as necessary.

UNIX Systems Administrator

Implemented Kerberos and LDAP integration in a combined Windows & Linux environment to support shared environments. Linux based integration uses a customized PAM configuration with LDAP & Kerberos providing standardized authentication and authorization (A&A) for Linux services. This allows for single sign-on from the users primary Windows AD accounts. Production environments are primarily Ubuntu LTS but support for other Linux versions are provided as required.

Upgrade several production Ubuntu systems from legacy LTS releases to 12.04 and planning migration to LTS 14.04. Implemented Linux Desktop initiative bringing several users into the Linux environment providing support for email, file sharing, development, source control, and integrated A&A. File sharing incorporates Samba 4 integration. Likewise, support for CentOS & Red Hat Enterprise Linux as required by projects.

Windows Systems Administrator

Microsoft Windows Administration of services including: Active Directory, RADIUS, Kerberos, LDAP schema extension and DHCP/DNS integration. User and Group account administration. Develop procedure for provisioning of new employees (onboarding) and exiting of employees. Document UNIX tools integration of UNIX services for windows including Xming, PuTTY, and WinSCP software.

Upgrade and document the CruiseControl.Net Continuous Integration (CI) build server used across the Software Products division. Refactor configuration to reduce local settings in build scripts. Update software versions for all modules and dependencies. Document installation process and known issues.

Plan migration of Active Directory from Windows 2003 to Windows 2008 R2. Procure hardware for migration.

Network Administrator

Migrate Checkpoint DHCP services off device to AD. Migrate private IP ranges to expand addressable space for separation of services: servers, network, cloud, and desktop devices. Manage and configure HP ProCurve switch and F5 Load Balancer. Implement evaluation Nagios monitoring across Linux and Windows services.

Researched available software tools for replacement of CheckPoint VPN services. Evaluate a OpenVPN-ALS SSL-VPN solution with Apache reverse proxy and shared certificates with Java applet clients and the Guacamole Clientless Remote Desktop integrated with Active Directory for use in a secure environment.

Database Administration

Identify, recommend, and implement new database technologies for distributed AI Scoring System. Responsible for MySQL and PostgreSQL logical and physical database design, implementation, and maintenance on Linux platform.

Create new databases and users: set up backups, export, and other monitoring scripts as necessary. Provide support for database maintenance and disaster recovery across both Windows and UNIX environments.

Involved in all phases of database development, from needs assessment to QA, design, and support. Migration and upgrade of SQL Server 2008 to 2008R2 for legacy systems. Built and maintained SQL Server 2012 servers for use in Streaming Scoring web service and distributed AWS processing platform. Technology investigation of Hadoop for use in model building.

Systems Administrator   Aug 2011 - Mar 2013

SAS Institute, Inc., Cary, NC

Systems administration for Windows, Solaris, AIX and Linux for SAS Solutions OnDemand with a focus on validated systems for the pharmaceutical industry. SAS Drug Development (SDD), Clinical Data Integration Studio (CDI) and SAS Clinical Standards Toolkit are my primary product focus. SAS Retail and Fraud are a secondary focus area. Provided customers with automation solutions and POC extensions as necessary. Certification in several SAS product lines.

Disaster Recovery Implementation

Designed the first production Disaster Recovery (DR) capable multi-tier SSO system for a clinical trial customer. This included a SAS Drug Development (SDD), Clinical Data Integration (CDI), a custom web application server with multiple custom applications and Axway Cyclone server for a total of seven servers along with a bank of eight load balanced Windows Terminal server client systems. The mirroring allowed for a full replication of the OMR (metadata), Oracle (database), file-systems and external transport along with all software client configurations being mapped across every defined period. Extensive scripting and architecture work were required to accomplish this comprehensive solution.

Development

Design, develop and train users on a custom extension to DI Studio allowing for lookup and harmonization processes to be managed for a non-SAS Content Server by clinical trial end users. Wrote design specifications for management of metadata path information in OMR for Xythos servers.

Perl, Java, Clojure, shell script, SAS Base and SAS Macro programming as necessary to implement business solutions and automation for customers across the range of SAS Solutions.

VMware ESXi with vFabric tcServer integration to SAS Drug Development 4.2. Built a VMware ESXi 5.1 VM only system for a full three-tier platform as demonstration of technology.

Documentation

Write documentation for repeatable processes and run books to allow for other team members to support systems. Update validated installation and maintenance documentation. Review and update over one thousand Change Requests (CR) in support of audit compliance for customers.

ITIL

Designated to evaluate "Service Operations" and "Service Transition" as pertains to the SAS operations. Reviewed existing processes and documentation and provided feedback on changes to facilitate the transition to ITIL best practices for validated systems environments.

Certification

Rapidly completed certifications in all areas of SAS Solutions:

- SAS Certified Platform Administrator for SAS 9
- SAS Certified Base Programmer for SAS 9
- SAS Certified Clinical Trials Programming Using SAS 9
- SAS Certified Data Integration Developer for SAS 9
- SAS Certified BI Content Developer for SAS 9
- SAS Certified Statistical Business Analysis Using SAS 9

SAS Platform Administration

Provide for all SAS Solutions as required for customer requirements. Design, install and manage multi-tier SAS architectures for over 80 SAS customers each in unique configurations. These are mostly three tier environments that include a mid-tier (web), compute-tier (SAS), and storage-tier (database).

Configurations designed included LSF Grid implementations, load-balanced mid-tiers(web), load-balanced compute-tier(SAS) and variations on these configurations. Design of the plan and architectures are part of the Platform Administrators role at SAS.

Validated Systems

Primary responsibility included expert level response for SAS Drug Development (SDD), SAS Clinical Data Integration (CDI), and Clinical Trial support services. Perform validated installations for systems participating in clinical trials to meet CFR Part 11 Compliance. Practices for performing all actions in the validated environments are reviewed as pertains to audit-ability. This documentation intensive task is restrictive but provides traceable action for all activities in the environment as required by FDA.

SAS Fraud and Retail Systems

Transitions to a flat model of support for Platform Administrators included installing and managing non-Validated environments. This included SAS Fraud Framework and SAS Retail Solutions. Brought across the validated documentation mind-set to the non-validated solutions and implemented repeatable installation processes and run-books for standardized management.

Systems Administration

Administer operating systems for Microsoft Windows Platforms to include Servers from 2000, 2003, and 2008 in both an old style NT domains and Active Directory (AD) directory service with integration services for UNIX using LDAP(SSL) and Kerberos authentication. Windows platform integration with SAS Metadata Server authentication and authorization.

Administer UNIX operating systems to include RedHat Linux, Oracle Linux, IBM AIX, Oracle/Sun Solaris, and HP-UX. Integration with authentication and authorization services from Microsoft platform and independent A&A services. Evaluate cfEngine and assist with final Puppet implementation for SDD 4.2.

Local infrastructure support for backups, storage, database, patching, auditing, networking, and all other administration tasks were supported on an as needed basis. External Remote Managed Service (RMS) offerings included support for external infrastructure as provided by customers. Database administration tasks as required for Oracle, MySQL and PostgreSQL.

Application and Network Security Specialist   Mar 2007 - Aug 2011

NC Department of Revenue, Raleigh NC

Review compliance to required state and federal policies. Review security requirements and adherence for the agency. Provide risk assessments. Respond and document security incidents. Document security procedures. NIST, FISMA, FIPS, and ISO are some standards I actively reviewed during my tenure.

Project Management

Perform multiple roles in project management. Perform and prepare feasibility and risk assessments, gather business requirements, develop project plans, organize, manage and allocate resources, and monitor and control progress. Participate as a key stakeholder in multiple critical agency projects. Primary goals as a security professional are to manage risk, provide impact & probability analysis while tracking progress on projects.

Other projects as a core team member: Online Filing and Payment (OFP), Fuel Tax Services (FTS), IRS Secure Data Transfer (SDT), Financial Institution Data Match (FIDM), Financial Institution Record Match (FIRM), NC3 eFile, Network Segmentation (NS2), Wireless 802.11 assessment, eDORSA (FTI data access reporting), ITIL Configuration and Asset Management lead for IT Security, Taxpayer Kiosk assessment, IPSec to SSL VPN conversion, Network Controls assessment, PKI assessment, and yearly legislative tax update review.

Tax Information Management System (TIMS) project member for numerous committee and functional groups planning for the replacement of the existing mainframe based tax administration system. Engaged in the RFI (request for information), RFP (request for proposal), and contract review process prior to project initiation. Active reviewer and documenter of security requirements. Provide rapid risk assessments for evolving systems. Certify compliance to state, federal and PCI standards.

Development

Software Development Life Cycle (SDLC)

Document development processes and provide a detailed assessment to close gaps in policy before November 2007 IRS audit. Assessment implementation included the addition of manual and automated code reviews for web development. Defining coding best practices and coding standards improved code quality. Addition of web application vulnerability scanning improved PCI and IRS compliance.

Actively promoted the removal of administrative and root access for all development staff. Removal was done to improve development processes and segment activities between groups. Maintaining the subset of access necessary to perform software installation in non-production and provide a standardized build environment improved software quality.

Promoted the replacement of legacy Microsoft SourceSafe source control system with the open source Subversion and associated reporting and administrative tools. Implementation allows for the addition of technical writers, business users, development and testers access to documentation and software. Defect tracking and source code changes are linked and related.

Security reviews and sign-off were integrated into each step of the DOR SDLC process from business requirements to the completed production release. Integration of security reviews and sign-off into each step increased compliance and decreased re-work costs from the prior methodology.

Audit

Manual code reviews for multi-tier J2EE web applications in WebSphere and JBoss and vulnerability testing both automatic and manual performed as part of the security review process for all web applications. SPI WebInspect, custom Perl scripts, WebScarab, Metasploit extensions, and manual testing were performed for all web applications released. Local desktop java applications are also reviewed as necessary.

Review Perl and shell script automation for UNIX systems. Prototyping in MS Access for data imports, reporting and data analysis reviewed. C code written and reviewed for several custom developed components as necessary.

Programming

Wrote the complete specification for the automation of an authorization tracking system called EDORSA. Designed an automated system to incorporate business rules, automated approval routing, integration with SAP system (NC

BEACON), and ITIL CMDB. The agency FTI data access tracking and reporting system is critical to federal audit requirements.

Committees

ETAAC: A member of the Electronic Tax Administration Advisory Committee (ETAAC) sub-committee on computing security that reports to Congress annually. The ETAAC provides for discussion of electronic tax administration issues in support of the goal of paperless filing. Provided input into third-party tax preparer security standards based on moderate level controls from NIST 800-53. A Congressional report applied these controls as a baseline.

IRS TAG-SS: Active participate in IRS Tactical Advisory Group Security Sub-group (IRS TAG-SS) which is a partnership between the IRS and state taxation agencies enabling state agencies to have input into the IRS Publication 1075 (1075). The 1075 are security guidelines to provide safeguards for protecting federal tax information.

FBI InfraGard: Participated in both the national Cyber Storm II and III for NC Dept of Revenue. Maintain membership in good standing and review varied information provided to membership.

Security

Risk Assessment & Vulnerability Management

Write vulnerability and risk assessments for agencies both on requests for new projects and from managing existing infrastructure risks. Engage with technical staff in the implementation of mitigating controls for vulnerabilities assessed. Report monthly to senior management on outstanding vulnerabilities and risks for the agency as well as yearly summary.

IRS SafeGuard Audit (Dec 2007)

Part of a five person team that passed the IRS SafeGuard's audit for the NC Dept of Revenue. This federal audit was a significant assessment requiring seven month preparation and a delivered report of over 1300 pages covering all aspects of the IT computing infrastructure for the agency. The lack of noteworthy audit findings was acknowledged as a significant achievement by the IRS auditors. Continue with yearly updates on the original report while implementing the TIMS mainframe replacement project.

NC State Auditor's Office

Provide the NC Auditor's Office with information as required for yearly IT audits. No significant findings from these audits. Symantec Security Services provided an assessment for use by the Auditor's Office in 2006. This comprehensive report and findings including vulnerability scans of internal networks and services found minimal issues. Some findings required architectural modifications and continue to be mitigated and resolved.

Policy Frameworks

Utilize several security frameworks including IRS Publication 1075, NIST 800-53, ISO/IEC27002, PCI-DSS, FIPS 140-2, NC STA (North Carolina Enterprise Technical Architecture Standards), and other varied standards as appropriate. Frequently reference Department of Defense (DoD) standards with moderate level controls. Apply new standards, policy and statues as appropriate. Work with NC Attorney General Offices as necessary.

ITIL

Active member of the IT FIT (Information Technology Framework for IT services) as part of the ITIL (Information Technology Infrastructure Library) business and process analysis. Active in Incident, Change, Configuration, and Asset Management process reviews. Core member for Incident process review of BMC Remedy implementation for the existing DOR HelpDesk functions. Part of the Pink Elephant 2007 and HP 2009 assessments for agency ITIL maturity.

Administration

Microsoft Windows

Windows systems administration and troubleshooting across a diverse set of systems including Windows 2000 thru the most current Microsoft operating systems. Active Directory, Kerberos, and LDAP (with SSL) integrated authentication and authorization for cross-platform single sign-on is a main focus along with a secondary role in application deployment, patch management and desktop policy enforcement. The new TIMS system increases the Windows server environment significantly. VMware ESX 4 was utilized to allow for rapid deployment of new servers.

Database

Oracle, IBM DB/2, Sybase, TcX MySQL MS SQL Server and MS Access are all used in the agency and assessed for compliance to relevant security standards. Review the configuration and information management for each individual system and database. Oracle dominates the new environment with DB/2 dominating the legacy. Ad-hoc projects in MS Access with business users allow for prototyping and writing solid specifications to be migrated to other database systems.

UNIX

Audit and provide assistance managing Novell SuSE Enterprise Linux, RedHat Enterprise Linux and IBM AIX 5L and 6L series for the agency. Review scripting in Perl, Python and various shells for automation tasks. Audit for security policy compliance and assist in bringing systems into compliance. Limited evaluation of VMware ESX 4 for Linux hosts.

Network and Firewall Systems Admin

Management of combined Cisco and Nortel switches, routers and firewalls. Access both GUI and CLI interfaces for audit and review on a periodic basis. Review and certify all firewall rule changes. Assist developers and network

administrators in meeting business requirements while meeting security standards for network configuration requests and changes.

Environment management includes multiple public exposed DMZ zones that include load balancing, SSL acceleration, IDS/IPS and complex firewall rule-sets. Nortel Alteon, Nortel Passport 8600, Nortel 5520, Cisco ASA 5500 series and a Cisco NAC are some of the network equipment in the environment.

Review and respond to NC ITS Foundstone scans and alerts. Manage local WebSense URL monitoring system.

Congressional Subcommittee Member   Mar 2009 - Mar 2011

ETAAC Security Subcommittee, Washington DC

As a member of the Electronic Tax Administration Advisory Committee (ETAAC) subcommittee on computing security, I provided significant input into third-party tax preparer security standards based on a subset of the moderate level controls from NIST 800-53. This furthered the mission of the ETAAC who reports to Congress annually provides for discussion of electronic tax administration issues in support of the goal of paperless filing. The final Congressional report applied these controls as a baseline for this industry.

IT Engineer (IT Director)   Mar 2006 - Mar 2007

BD Biosciences, Durham, NC

Provide for all IT services at the BD Treyburn manufacturing plant located in Durham NC. Skills utilized include Microsoft Windows admin, Lotus Notes admin (email), Oracle DBA (8.x and 9i), Microsoft SQL Server 2000 DBA, Sun Solaris 8 and UNIX admin, network admin (Nortel and Cisco devices), system programmer and some work with Allen & Bradley ControlLogix PLC. Some work in Project Management and Six Sigma.

System Programming

Maintain existing systems including a report generation system, and CAPA incident tracking system.

A new barcode label printing system critical to manufacturing of pipet production line was implemented in Visual Studio 2005 and SQL Server 2005. This same system is being designed to later incorporate all label printing including Tissue Culture and Tube product lines.

Project Management

Begin training in BD PMM (Project Management Mastery) program in preparation for PMP (PMI certification). Three major projects (one being a Six Sigma greenbelt).

Explore the feasibility, gathered requirements, and determined project plans for two infrastructure upgrades. Review design of existing stalled projects and provide a written project plan to close them out or bring them back online.

UNIX Systems Administrator

Debian (on Sun UltraSPARC) server for use in network management, automated backup services, and basic system automation services. Solaris 8 system conforming to BD standard used for automation systems.

Allen & Bradley PLC Programming

Training in ControlLogix and RSLogix to allow for extracting data points from PLC (Programmable Logic Controllers) from automation complexes on the manufacturing floor. MicroLogix and SLC controllers are also used and learned in independent study.

RSMACC implementation started for two PLC complexes. Implementing under Active Directory. Implementation may be converted to a new AB product line called Asset Manager.

Microsoft Windows Systems Administrator

Administer Windows NT 4.0, Windows 2000 and 2003 servers. Decommission Windows NT 4.0 domain and migrate to Active Directory. Implement SMS 2003 for all server and desktop systems for software installation and patching. Services on servers include web servers, File and Print services, DHCP, SMS, Oracle, FlexNet MES, and Lotus Notes. Audit of software and hardware.

Oracle Database Administrator

MES (Manufacturing Execution System) are running both on Oracle 8 and 9i. Web interface includes Crystal Reports and custom Apriso software. A re-implementation of the backup system was done to improve restoration time and reliability. Further integration with control systems required PLC programming.

Lotus Notes Administrator (Email)

Primary email administrator for over two-hundred users. Server upgrade, quarterly patching, updated server virus scanning capacity. Performed a capacity assessment and upgraded system. Complete audit of users and implement quotas. Server side compression of database and network implemented.

Network Administrator

Management of Cisco and Nortel switches and routers. Added GUI interface to allow for simplified administrator using the Nortel Device Manager using SNMP in read-only and read-write. Allow other non-technical people access to read-only views of network devices. Fully documented existing network infrastructure for ITIL infrastructure documentation. Added a new wiring closet for plant expansion.

Desktop Support

Provide desktop support for 140 desktop and laptop systems. Includes monthly patching, software installation, and common application support.

Systems Programmer   Jan 2005 - Mar 2006

Sun Solaris and IBM AIX systems administrator, UNIX programming in Perl and shell, and write technical documentation for colleges on system tasks. Network and OS support for colleges.

UNIX Systems Programming and Administration

Administer Sun Solaris 2.6, 8.0, and 9.0 systems and IBM AIX 5L series for 58 North Carolina Community Colleges. Wrote and provided documentation to colleges on basic Solaris system administration tasks such as OS patch, performance monitoring, user creation and review, file system permissions, and security auditing.

Build scripts in Perl, Python and shell script to automate installation and maintenance tasks for local system administrators. Provide development staff with expertise on install/uninstall techniques for UNIX. Review contracted scripting before deployment. Korn shell (ksh) and Perl scripting to provide specialized automation tools for the UniData environment. These tools automatically maintain file system and database integrity. Scripted solution provided for a reduction of manual efforts for each of the 58 local college system administrators.

Cross-platform Programming (Java)

Review, document and standardize the Java development environment for North Carolina Community College System Office. The three major Java projects under review were in Java Runtime 1.2, 1.3.1_09, and 1.4.2_08. Apache Ant, GNU make, and custom shell and batch script were used to allow for portability.

Back ported tools and utilities from open source HypersonicSQL 1.8 code base to a legacy HSQL 1.7 system to automate database maintenance tasks for 58 colleges. Deployment of the toolkit allows recovery of damaged databases and maintenance tasks that took significant support resources.

Low-level debugging without Java source available using a combination of Solaris system-call tracing and Java debugging to find a mutex bug in core JSEE library for loading of SSL certificate trust-stores.

Project Management

Gather business requirements, develop project plans, organize, manage and allocate resources, and monitor and control progress on Sun Solaris 9 upgrade for 58 heterogeneous college systems. Provided management with impact & risk analysis weekly while tracking progress on the project completion. Wrote training manuals and technical bulletins for upgrade. Detailed configuration repository built for hardware, software, and individual local configuration changes for each college. A successful upgrade for all colleges was accomplished while maintaining services to all business users and students.

Windows System Programming

Administer three Windows 2003 Servers running FTP, IIS6, SQL Server and Merant PVCS. Duties include: administering users and groups; managing data storage; monitoring access to resources; audit access to resources; patch management and security reviews, and back up and restore of files and folders.

Database Administration (UniData/SQL Server)

Provide UniData database administration services to college staff in data recovery, system maintenance, licensing evaluation, and security auditing services. Review and provide analysis of data retrieval and reporting of financial and student records from the Colleague system. Provide second level support to development staff in UniData integrated database programming for both base PICK BASIC and Envision GUI environment. System level diagnostics and tracing for more difficult problems. Extend the UniData environment to allow for Solaris OS interaction.

SQL Server Administrator for Merant PVCS system utilized as primary data repository for NC Community Colleges development. System contains over 6GB of source and documentation providing content to over 120 staff members in 60 diverse geographic locations.

Network Management

Assist local system administrators in diagnosing network and firewall issues. Individual firewall solutions at colleges include BorderWare, WatchGuard, and Cisco PIX. Provide secondary support for Cisco PIX firewall and Cisco switches for Systems Office in Raleigh. Configure and troubleshoot various firewall and network issues in production WAN/LAN environments.

Data Storage Administrator

Provide backup services for Veritas NetBackup installation on Windows 2003 and Sun Solaris 2.6 and 8.0. Ufsdump backups remote dumped to custom tape repository. Backup services are utilized across training, QA, and development servers. Since the current implementation was deployed, all data restore requests have been honored. Provide disaster recovery facilities and services to 58 community colleges on demand.

Presentation

Written and oral lecture with notes and CD with shell scripts for Solaris 8 and 9 security and automation methods to IIPS Users Group at NC Community College System. Targeted solutions for a Colleague UniData environment.

Systems Engineer   May 2004 - Jan 2005

Hosted Solutions (Springboard Hosting), Raleigh, NC

A senior UNIX & Windows systems and network administrator with an emphasis on storage technologies. I also provided guidance to off-shift personnel in three separate operation centers.

UNIX Systems Administrator

Provide senior level UNIX administration and assistance for UNIX systems including various brands of Linux (Red Hat, SuSE, Debian), Solaris (SPARC & Intel), FreeBSD, and OpenBSD. Senior systems administration included paid consulting services.

Enterprise Data Storage Administrator

Enterprise data storage administrator using multi-site BakBone NetVault services running on Red Hat Linux servers. Provide BakBone NetVault client services for Windows, Solaris, FreeBSD, and Linux. Analyze and administer backup services for 200+ customers on a diverse configuration of Windows and UNIX environments. Robotic tape units managed by software include ATL P1000's and Sun StorEDGE L11000's. Administer and review status for all junior administrator procedures on the system daily. Provide enterprise reporting for billing and planning.

Microsoft Windows Systems Administrator

Windows systems administration and troubleshooting across a diverse set of systems including Microsoft Windows NT 4.0 thru the then current Windows Server 2003. Consulting and troubleshooting in custom environments for individual customer setups including domain and active directory.

Hostmaster/Postmaster (DNS/Email)

Provide a postmaster role on a diverse email system including Exim, Microsoft Exchange, and Sendmail servers. Hostmaster role processing change requests for DNS on BIND 9.2.1 nameservers. BIND servers are on Sun Sparc hardware running Debian Linux to provide additional levels of security. Assists customers with change requests in their DNS records both hosted and non-hosted.

Network Management

Provide junior level configuration and management of Riverstone, Cisco and Dell switches and routers. Configure and troubleshoot various firewall products in production environments including both CheckPoint and OpenBSD firewall systems. Configure and diagnose load balancing on F5 systems and other custom load balancing solutions.

Off-shift Supervisor

Provide supervision for 2nd & 3rd shift for the three operation centers (Charlotte, North Raleigh, and Cary). Duties include scheduling, project management, and evaluation of work.

Training

Train junior staff members in procedures and policy. Write internal documentation, policy, procedures and training material as necessary. Provide customer documentation on procedures for collocated customers.

Programming

Maintain existing systems written in PHP, Perl and shell script. Projects include customer ticketing system, DashBoard (external web interface for customers), report generation system, and extensions to hardware/software inventory system.

Project Management

Explore the feasibility, gather requirements, and determine project plans for infrastructure upgrade projects. Review design of existing stalled projects and provide a written project plan to bring back on track.

Installations

Install hardware, OS builds, patch installation, deployment tools and utilities. Installation includes physical network pulls (cabling), configuration of network hardware (switches), and client machines configuration to customer specifications. Customer specifications include software installations such as Exchange, SQL Server and other applications as required.

Systems Engineer

Provide senior level support to operations technicians. Plan, manage, schedule and execute company wide projects such as deployments of new software, upgrades to infrastructure, and customer deployments.

Systems Engineer (DevOps/Agile)   Jun 2002 - May 2004

NetIQ, Inc. (Ganymede Software, Inc.), Morrisville, NC

Brought a broad background in UNIX and Windows programming and administration to the new UNIX agent services for the flagship AppManager product. Managed the lab and was the primary systems administrator and quality engineer for the UNIX services and also maintained and extended network testing facilities.

Systems Integration (Windows NT/UNIX)

Consolidate and integrate management of UNIX services into existing Microsoft Windows infrastructure.

Network Test-bed Management

Manage and maintain existing VoIP test beds containing fourteen Cisco routers and switches of various models and configurations. Improve network services for testing Web-RT products and disk imaging services for Windows servers.

Installation Facilities

Built an imaging/reinstall service for some UNIX systems allowing for automated rebuild of servers in 20 minutes or less to mirror existing Wintel service. Previous UNIX installs require 45 to 60 minutes per machine with manual intervention during install.

Built an early version of what later would be called cloud-like services to automate re-use of hardware for quality testing of software and providing build services, automated testing, and daily automated software releases. Using combinations of VMware ESX virtual machines, Intel hardware x32/x64 and ia64 (Itanium) with PXE boot, Sun Solaris 32-bit and 64-bit with OpenBoot, HP-UX with Ignite, and IBM AIX Netboot.

This API driven system using virtual machines (VM) and network booted hardware that could be reconfigured automatically, allowed for a full automated build and regression test every night. This made my later transition to API driven cloud and fully automated development pipelines such as modern CI/CD easier to accept and pursue.

UNIX System Programming (consultation)

Provide a UNIX perspective on issues and to provide an objective opinion on UNIX and Windows issues as a systems programmer from both platforms. Product development focused on continuity between platforms.

Systems Administration

Primary UNIX system administration for Sun Solaris, Red Hat Linux, IBM AIX, and HP-UX servers.

Quality Engineer

Built automated testing facilities for new products. This included network setup and service setup and documentation.

Systems Programmer II   Nov 2000 - Jun 2002

North Carolina State University, Raleigh, NC

Programmer and administrator for College of Engineering financial systems. Also secondary duties in Solaris and Windows NT systems administration. Participated in NCSU open source initiatives and became Red Hat certified (RHCE). Provide technical assistance for upgrades of Engineering server room network infrastructure.

Systems Programming (UNIX)

Built tools for administering Sybase servers. Update and write cron jobs used to import campus data. Design a new system for reporting on server activity. Developed expertise in Red Hat Linux and earned an RHCE (Red Hat Certified Engineer) certification.

Systems Integration (Windows NT)

Built Novell Zenworks application packages to deploy software for use in the EOS/Unity NT which is an AFS, Kerberos IV & V, Hesiod, NDS enabled environment.

Web Development

Built web servers that integrate with NCSU campus infrastructure using Kerberos 5, AFS, and custom web authentication service (WRAP). Built Apache web server tools using PHP and Perl. Integrated and ported Apache modules for use in College of Engineering web servers.

Financial and Human Resource Systems Integration

Improved support for services in Peoplesoft and legacy financial systems. Maintain a custom import system to campus data.

Database Administration

Database administration for Sybase 11.0.3/11.9.2 servers running under Solaris 2.6 providing backend financial services. Building an open source database environment using PostgreSQL 7.1 and TCX MySQL 3.2.23 under Red Hat Linux 7.1 (AFS/Kerberos) for use in college wide web development and student projects.

NCSU Realm Linux (Red Hat distribution)

Participated in the NCSU Linux distribution (NCSU Realmkit) development particularly in the areas of web services, DBMS and mobile computing.

Application Programming (Perl, Java)

Maintain mission critical financial applications for use by the College of Engineering.

CVS Project

Identified a need for a cross-platform source control system for the College of Engineering. Prototyped and managed a CVS server with Kerberos (GSSAPI) and SSH authentication.

Senior Operations Technician in NOC (part-time 32+ hrs week)   Feb 2000 - Oct 2001

Interpath Communications, Raleigh, NC

Senior weekend operations technician for Network Operations Center. Supported a diverse server and network environment including Cisco network equipment, Solaris and Windows NT. Worked with following products: Veritas NetBackup 3.1.1, SAP R/3, BMC Patrol, Remedy, and HP OpenView. Provided first line diagnostics for Cisco devices, network connectivity and Windows/UNIX servers.

Weekend Supervisor

Helped to develop policies and procedures for weekend and night shifts for Operations Center. Offered flexibility in scheduling in order to cover staff absences. Initial goal for hiring was to reduce overtime for permanent staff members and excessive off-hour paging of UNIX/Microsoft Engineering staff.

Process Automation

Automated processes such as backup reports and web monitoring. HP OpenView automation to automatically open and change status on Remedy tickets and report generation on status of all outstanding issues.

Backup Management

Pool manager on weekends for SAP backup system using a Sun StorEDGE L1000 robot with Veritas Netbackup 3.1.1. Manage off-site shipment of backup media. Responsible for generating management level reports on SAP resource usage. Documented first visual manual for the complete backup and restore process as well as diagnostic procedures for backup failures.

Utilize Veritas NetBackup 3.1.1 software with separate ATL P1000 tape robots for backups of critical internal data. Wrote extension to backup scripts and provided up to date documentation.

Performed backups of several non-standard, non-robotic backup systems on co-located servers.

Solaris and Windows NT Administration

Provide first level diagnostics and support for Solaris 2.5.1/2.6/7/8 and Windows NT 4.0/2000 servers.

Network Diagnostics and Monitoring

Monitored customer's connections and services to Interpath Communications network services through the use of HP OpenView, BMC Patrol, Intermapper, and custom network monitoring software. Respond proactively in the event of an alarm to determine and isolate issues. Connect to various network devices including Cisco switches in order to examine the port interfaces to detect outages or throughput issues. Developed familiarity with Cisco IOS and other network CLI environments from these diagnostic sessions.

Telecommunication Contact

Contact and arrange Telco agents to dispatch technicians when necessary to visit customer sites and resolve issues. Through the use of trouble tickets, tracked the progress of client's outages until they are brought back online. Effectively communicated with Telco agents and onsite technicians to quickly resolve customer's troubles. Spoke with customers to explain why their router or circuit were not working and described the steps being taken to resolve their trouble.

Network Hardware

Assisted Network Engineering in provisioning Netopia and Flowpoint routers for deployment to customer sites on weekends and off peak hours. Basic knowledge of router installation, configuration and maintenance. Worked on and provisions Cisco 2600 routers.

Hostmaster/Postmaster

Maintain and manage primary and secondary DNS servers and custom automation tools. Process queued requests received for DNS and email servers. Assists customers with change requests in their DNS records

Development Manager / Operations Manager   Jan 1999 - Nov 2000

North Carolina State University, Raleigh, NC

Managed development and primary architect of NC LIVE web services. Implemented statewide remote access and authentication system used by all North Carolina public libraries, community colleges, and both public and independent universities. Managed Cisco 4700 using Distributed Director product to provide load balancing and redundancy of service. Provide senior level guidance to UNIX systems administrators. Acting Operations Manager for NC LIVE server sites.

Acting Operations Manager

Served as the acting Operations Manager for the NC LIVE server site. Responsibilities included running day-to-day operations, purchasing and attending committee meetings. Manage staff at multiple physical NCLIVE sites at:

- North Carolina State Libraries, Raleigh NC
- UNC Chapel Hill Libraries, Chapel Hill NC
- State Library of North Carolina, Raleigh NC

Dynamic NC LIVE Content

Migrate the NC LIVE service from static to dynamically generated content from a MySQL database using a combination of Perl, C, and shell scripts. Designed the tools for maintaining the new services.

NC LIVE Session Manager Designed and implemented a general solution for statewide remote access to NC LIVE web resources. Presented sessions on non- proxy authentication solutions at 1999 NC Library Association (NCLA) and EDUCAUSE 99. Authored and presented several statewide and a national technical session.

Rapid Content Expansion

Tripled the number of service providers in the twelve-month period. This was made possible by extensive automation and overall redesign of the NC LIVE service to provide a scalable and extensible system.

Extend Network Infrastructure

Enhanced and maintained the network infrastructure for failover systems. The basis for the NC LIVE failover system was Cisco Local and Distributed Directors installed on two Cisco 4700 routers. This installation was the first production installation of the product. The Cisco documentation had the NC LIVE configuration files including the IP addresses in their first revision of the manual.

Network Monitoring and Email Services

Extensively customized Sean MacGuire's Big Brother 1.3/1.4 monitoring system to monitor NC LIVE services. Provided twenty- four hour coverage and paging for service outages. Setup email servers and failover services for NC LIVE mail.

Student Programming

Recruited, hired and trained CSC/CPE student programmers to write an SGML engine for Chadwyck-Healey poetry collection and a web interface to aid in administering NC LIVE systems.

Open Source NC LIVE Initiative

Launched an open source port of NC LIVE service. Research project utilized Red Hat Linux 6.2, Apache 1.3, Perl 5.005, and TCX MySQL 3.22. Pilot project was a successful re-implementation that reduced cost and increased flexibility and scalability of the NCLIVE platform.

Application Analyst Programmer   Jun 1998 - Jan 1999

North Carolina State University, Raleigh, NC

Rapidly migrate College of Engineering financial services from failing hardware to new platform. Migrated and maintained financial applications. Assisted with integration of Windows NT into NCSU UNIX campus-computing environment. Provide assistance on network infrastructure upgrades for labs.

Database Administration (Sybase 4.9.2 and 11)

Database Administrator for legacy Sybase 4.9.2 server running IBM AIX 3.2 and a Sybase 11.0.2 server running Solaris 2.5.1.

Data Recovery and Migration (Sybase 4.9.2 to Sybase 11.0)

A legacy system had an undiagnosed hardware failure in the SCSI controller, for at least a year prior to my employment that corrupted data and compromised the system integrity. Performed a rapid migration from the legacy system to the Sybase 11 server. Documenting existing usage, ported legacy applications, re-implemented legacy connections to mainframe systems, and built a custom data export mechanism.

Application Programming (PowerBuilder, Perl, Java)

Design and implement mission critical financial applications for use by the College of Engineering in a cross platform environment.

Systems Integration (Windows NT)

Consulting for the NT migration and integration group for the College of Engineering for both college administrative staff and engineering student labs.

Systems Programmer (Sybase and UNIX Tools)

Projects to allow for easier administration of Sybase servers:

- Enhanced existing Sybase 4.9.2 stored procedures to run in both Sybase 4.9.2 and 11.0.2.
- Built a utility to scan Sybase 4.9.2 for conflicting object names on Sybase 11.0.2

- Rewrite and document data import shell scripts

- Built activity report and monitoring system for servers.

- Port SQSH utility to NCSU Solaris environment

Systems Programming (Windows NT)

Designed and implemented an application to track device and process activity on Windows 32-bit environments as an ongoing project in Industrial Engineering's Ergonomics Lab at NC State University. This program has been used in a NIOSH study and several NCSU research projects.

Peoplesoft Implementation

Review and document the existing systems for conversion to Peoplesoft. Implemented a data export mechanism for Peoplesoft data into the existing Sybase formats.

Systems Programmer (Benchmark Developer)   Jun 1994 - Jun 1998

Ziff-Davis Publishing, Raleigh, NC

Provided consulting services for internal project development for magazines. Developed industry standard benchmarks for public distribution. These benchmarks included:

- PC Bench©

- Jmark

- Winstone®

- WinBench©

Winstone® Version: 95, 96, 32, 97, 98

Languages used: Visual Basic, C/C++, NT batch

Winstone is an application-based benchmark measuring performance based on application run times. Installation and removal of the applications is done without user intervention.

WinBench© Version: 95, 96

Languages used: C

WinBench is a subsystem benchmark for the Windows operating system testing hard disk, processor, FPU, memory, graphics, video, CD-ROM, and an application playback system to reproduce application activity on each sub-system.

PC Bench© Version: 8.0, 9.0

Languages used: C, C++

PC Bench is a DOS subsystem benchmark testing hard disk, processor, FPU, memory, and graphics card.

JMark Version: 2.0

Languages used: Java, C, Perl, SQL

JMark (JavaBench) benchmark tests both compliance and performance of a Java virtual machine. Designed and implemented a VM independent method to save results using a custom Java database class and server side ISAPI/CGI. Lower level byte-code development similar to assembly code on hardware.

PC Magazine Results Viewer

Designed and implemented a benchmark results viewer for PC Magazine for use on their quarterly CD to display benchmark results interactively.

Installation Technology Study

Extensively studied installation technology as part of Winstone development. Wrote custom installations for Microsoft Office 95/97 applications, FrontPage 97, Microstation 95, AutoCAD r13, Delphi 2.0, Adobe Premiere, Oracle clients, SQL Server clients, and internal tools.

ZDBOp Distribution Database

Reviewed and cleaned up a failed project for Ziff-Davis' product distribution database. An external-consulting group designed the project. The system was set up using an Oracle 7.0 server with Lotus Approach, Q+E technology, and Visual Basic 3.0. Performed a rapid retrofit and cleanup of the final system.

Disk Fragmentation Study

NTFS and FAT32 file systems caused problems for benchmarking results due to an inability to defragment the file system. Full study and investigation to quantify performance penalties involved with disk fragmentation. Also, provided Ziff-Davis custom defragmentation solution for NTFS, FAT32 and long file names.

Web Development

Setup data management tool and front-end for Windows NT Server running IIS 4.0 and SQL Server 6.5.

Operations Technician / Technical Writer (part-time)   Jan 1998 - May 1998

Interpath Communications, Raleigh, NC

Help desk and networking administration for the NOC. Technical writer for SOP on first and second line support. Provided assistance in multiple areas of operations as needed. Contract ended with a company buyout by CP&L/Progress Energy.

Customer Support

Helped customers with Windows, Macintosh and UNIX dialup, ISDN, and DSL accounts with their configuration of TCP/IP protocol properties on their LAN to connect to Interpath POP (point of presence) sites.

Documents all customer troubles and resolutions in a Remedy ticket management system. Coordinates efforts with other departments and follows issues to resolution.

Technical Writing

Helpdesk process and procedure manual for Windows 9x/NT end user setup, diagnostics, and configuration. Graphical sheets to show customer experience for in house staff.

Maintained and enhanced Operation department's intranet site and knowledge base as well as add functionality with web based tools. These included links to web based ping, traceroute and telnet utilities so that technicians could easily perform preliminary troubleshooting while the customer was on the phone.

Consultant (full-time)   Apr 1994 - Jun 1994

DB Basics, Inc., Morrisville, NC

Consulted on a project with Liggett-Meyer porting from a proprietary IBM mainframe database to an Oracle 7 server. Redesigned and ported existing applications to use the new Oracle system.

Technical Services Manager   Jul 1992 - Jun 1994

Pioneer Software, Inc (Q+E Software / Intersolv / Merant / Data Direct / Serena), Raleigh, NC

OEM services and international support manager. Supported over 30 commercial DBMS. Worked, on an as needed basis, for development, quality assurance and technical-writing departments.

OEM Manager

Served as primary contact for over 130 OEM customers including IBM, Microsoft, Borland, WordPerfect, Lotus, Computer Associates, and Powersoft. Primary goal was to assist third party developers in design and implementation of commercial products using Q+E database technology. Royalties from these customers comprised over half the income for Q+E Software.

International Contact

Was the primary contact for foreign subsidiaries technical support staff and consulting staff of fifteen members across the world. This was a third line support position involving contact with development and QA staff to resolve issues. Assisted in the training of new employees in the areas of Q+E's software packages and customer relations.

Technical Writing

Wrote part of and reviewed technical reference for Q+E Database Library 2.0. Developed sample applications that shipped with the final product.

Quality Assurance

Q/A Lab work involved rapid setup of the hardware, operating systems, and all database setup and configuration. Database server installation and setup for SQL Server 4.2b, Sybase 4.6, 4.9 and Sybase System 10, Oracle 5.1-7.x, DB/2 and DB/2000, Ingres 6.4/04, NetWare SQL 3.x.

Technical Support Engineer

Product: Q+E Database Library, Q+E ODBC Driver

Second line support involving more in depth programming issues and environments. Became proficient in programming environments as necessary to solve customer's technical issues.

Technical Support Representative

Products: Q+E Database Editor, Q+E Multi-Link VB

Front line support work for basic database and simple programming question

Computer Consultant (part-time)   Mar 1992 - Jul 1992

Roemer Weather, Inc, Raleigh, NC

Assist in analysis of weather data and purchase of computing resources for the business office.

Evaluated business needs and purchased computer hardware and software. Trained the employees on office automation software. Repaired meteorological data feed from a WSI satellite system. Wrote a data conversion utility in C to convert raw meteorological data to usable format.

Teaching Assistant for Computer Science Department (part-time)   Aug 1990 - Jun 1992

North Carolina State University, Raleigh, NC

As a teaching assistant I taught engineering computing course work.

Taught course work in:

- E115: Introduction to EOS (UNIX)
- CSC110: Introduction to Programming (PASCAL)
- CSC112: Introduction to Programming (FORTRAN)
- CSC114: Introduction to Programming (C++)

Consultant for Library Systems at D.H. Hill Library (part-time)   Aug 1990 - Mar 1992

North Carolina State University, Raleigh, NC

Maintain hardware inventory under service by Library Systems. Hardware services for IBM and Macintosh systems. Software support for IBM, Macintosh and UNIX software packages.

Computer Operator for Computer Science Department (part-time)   Aug 1990 - Jan 1991

North Carolina State University, Raleigh, NC

Assist users with basic usage of computing lab systems

Provide basic support for UNIX systems. Assist users in login, printing, and basic environment support for computing course work. Worked weekends and over-night shifts.

CERTIFICATIONS

ITIL Foundation in IT Service Management v2011 (2016)   2016

AXELOS Global Best Practice (02354900-01-E6V6)   Axelos

Foundation Certificate in IT-Service Management (2006)   2006

itSMF EXIN

AWS Certified SysOps Administrator - Associate   2017 - 2020

Amazon (ZMS5T5T11N1E1XK5)

AWS Certified Solutions Architect - Associate   2017 - 2020

Amazon (QD3RGLB1KNQQQ295)

USPS Analytics University Bronze Certification for Delivery Operations   2018

United States Postal Service

Learning the OWASP Top 10   2022

LinkedIn   LinkedIn

SAS Certified Base Programmer for SAS 9   2012

SAS Institute (BP029145v9)

SAS Certified Clinical Trials Programmer Using SAS 9   2012

SAS Institute (CTP000286v9)

SAS Certified Data Integration Developer for SAS 9   2012

SAS Institute (DID000615v9)

SAS Certified BI Content Developer for SAS 9   2012

SAS Institute (BICD000693v9)

SAS Certified Platform Administrator for SAS 9   2012

SAS Institute (PA000207v9)

SAS Certified Statistical Business Analyst Using SAS 9 - Regression and Modeling 2013

SAS Institute (SBARM000177v9)

Solaris Certified Systems Administrator - Solaris 8 (2003)   2003 - 2005

Sun Microsystems

Red Hat Certified Engineer (2001)   2001 - 2006

Red Hat, Inc.

Microsoft Certified Professional - 70-215 & 70-210 - Windows 2000 (2003)   2003

Microsoft Corporation

Nortel Networks Certified Design Specialist (2002)   2002

Nortel Networks

PUBLICATIONS

Forced alignment for Nordic languages: Rapidly constructing a high-quality prototype

Nathan J. Young & Michael McGarrah

Nordic Journal of Linguistics, 2021

Resume Version: Jul 11, 2024 12:15 AM EDT