REQUEST FOR PROPOSALS

Artificial Intelligence (AI) Solutions for Public Sector Entities RFP # 2025-018

Prepared by:

New Math Data, LLC.

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Certificate of Offeror

Certificate of Offeror is attached as part of the Required Attachments.

Statement of Understanding

New Math Data (NMD) acknowledges the requirements outlined in the RFP for Artificial Intelligence (AI) Solutions for Public Sector Entities, including the objectives, specifications, and deliverables detailed within the solicitation.

NMD understands that the purpose of this project is to deliver high-quality AI solutions that address operational challenges faced by public sector entities. The company's proposed solutions will focus on improving decision-making processes, streamlining operations, and enhancing citizen engagement while adhering to all required technical, security, and compliance standards as outlined in Section 5 of the RFP.

Specifically, NMD recognizes the following key elements of the work to be performed:

- **Scope and Objectives**: Deliver AI-driven solutions tailored to address critical operational challenges across public sector domains, including finance, IT, HR, and utility services.
- **Technical Specifications**: Ensure solutions integrate seamlessly with existing systems, maintain high accuracy, scalability, and compliance with data governance and cybersecurity frameworks (GDPR, HIPAA, and other applicable standards).
- **Timely Execution**: Begin work immediately, with a start date no later than the middle of next week, to ensure alignment with project milestones and overall objectives.
- **Continuous Support**: Provide training, updates, and ongoing technical assistance for successful adoption and performance of the solutions.

NMD is committed to allocating senior-level, onshore resources to the project to ensure high-quality delivery within the specified timelines. The company prioritizes collaboration, transparency, and adherence to the highest standards of performance, as expected under the cooperative purchasing framework described in the RFP.

Through its experience and capabilities, NMD is well-positioned to achieve the project's goals and deliver measurable value to the public sector entities it serves.

References

Name of organization: **Nuvola Talent**

- Contact person: Chris McGrouther
- Phone number: 214-399-9646
- Email address: Chris@nuvolatalent.com
- Solution: AI resume scanner for talent optimization.

Name of organization: **Saga Wisdom**

- Contact person: Ruben Amortegui
- Phone number: 403-605-2821
- Email address: ramortegui@sagawisdom.com
- Solution: AI-driven document search and enhanced video content management solution.

Name of organization: **PageVault**

- Contact person: Todd Price
- Phone number: 847-650-3450
- Email address: Todd@page-vault.com
- Solution: Identifying and classifying images based on query.

Name of organization: **PlutonBio**

- Contact person: Spencer Roth
- Phone number: 636-234-7162
- Email address: sroth@plutonbio.com
- Solution: Regulatory approval pre-check by taxonomic names using LLM with Academic Paper Retriever.

Name of organization: **Shell Energy (Inspire Energy)**

- Contact person: RJ Richards
- Phone number: 424-262-4303
- Email address: rj.richardson@shellenergy.com
- Solution: Developed an end to end ML Ops pipeline that performs model training, validation and publishing.

Project-Related Experience and Qualifications

Technical Expertise

New Math Data (NMD), founded in 2018 and headquartered in Houston, TX, is an **Advanced Tier Partner** in the AWS Partner Network (APN). NMD's core values include Service, Integrity and Innovation.

Service is at the foundation of NMD's operations, reflecting its commitment to delivering solutions that provide measurable value to clients and the communities they support. Integrity guides the organization's actions, ensuring transparency, trust, and ethical practices in every project and partnership. By adhering to the highest standards, NMD fosters long-term relationships built on honesty, accountability, and mutual respect. Innovation drives NMD's approach to solving public sector challenges, leveraging advanced technologies such as AI, cloud computing, and data analytics to create transformative solutions. Through creativity and forward-thinking strategies, NMD empowers organizations to enhance efficiency, improve decision-making, and achieve meaningful outcomes. These core values define NMD's mission and ensure its continued contribution to sustainable growth and progress.

New Math Data has demonstrated a high level of expertise, deep technical knowledge, and a strong commitment to delivering successful cloud-based solutions. This status is not just a badge; it reflects rigorous validation through technical certifications, customer case studies, and proven implementations.

Key aspects of being an Advanced Tier Partner include:

1. **Expertise in Technologies**:
   Advanced Tier Partners possess specialized knowledge of products and services, ensuring they can design, build, and deploy scalable, secure, and innovative solutions tailored to customer needs.
2. **Customer Success and Proven Track Record**:
   Partners must provide documented evidence of successful projects, such as detailed case studies and customer testimonials, showcasing their ability to deliver high-value solutions consistently.
3. **Competencies and Service Deliveries**:
   Advanced Tier Partners often hold specific competencies (e.g., Data and Analytics, Machine Learning, Public Sector) and service delivery validations, which require deep technical expertise and successful implementation of key services.

Being an Advanced Tier Partner solidifies New Math Data's reputation as a leader in cloud-based solutions. This partnership not only enhances New Math Data's capabilities but also demonstrates the ability to deliver transformative results.

Well Architected Framework Partner

New Math Data is an AWS-certified partner authorized to conduct **Well-Architected Reviews (WARs)**—a critical foundation for ensuring cloud environments are optimized for advanced workloads, including **AI and machine learning solutions**.

In AI consulting, the underlying cloud infrastructure plays a pivotal role in model training, deployment, and scaling. By leveraging the **six Well-Architected pillars—Operational Excellence, Security, Reliability, Performance Efficiency, Cost Optimization, and Sustainability**.

Specifically:

- **Scalability for AI workloads**: WARs ensure cloud infrastructure is designed to handle the compute-intensive requirements of AI model training and inference.
- **Enhanced Security**: AI projects often involve sensitive data; NMD ensures architecture adheres to security best practices to protect that data.
- **Cost Efficiency**: NMD identifies cost-saving opportunities in the architecture, allowing you to invest more strategically in AI development and resources.
- **Optimized Performance**: AI and machine learning require high-performance computing environments. NMD fine-tunes architecture to meet these demands effectively.

Overview of Expertise in AI Consultancy

New Math Data, LLC is a Houston-based firm specializing in delivering innovative data engineering and artificial intelligence (AI) solutions. As an Advanced Tier Partner, NMD has attained a suite of competencies and service deliveries designed to meet the unique needs of public sector organizations, ensuring operational efficiency, robust compliance, and scalable technology solutions.

New Math Data is proud to hold **two distinguished competencies awarded by AWS**—a testament to NMD's expertise and leadership in driving innovation and delivering exceptional results. Achieving these competencies required us to undergo a rigorous submission process, demonstrating NMD’s deep technical knowledge, proven customer success, and operational excellence.

New Math Data is currently working on designing their work AI framework to bring forward to its customers.

Competencies

Generative AI (GenAI) Competency

This competency underscores NMD's expertise in leveraging **Generative AI** to create groundbreaking tools and applications. From transforming raw data into actionable insights to

automating workflows and driving innovation, NMD's GenAI solutions empower businesses to stay ahead in today's competitive landscape. AWS recognized NMD's ability to deliver scalable, secure, and high-performance GenAI solutions that meet industry-specific needs.

Data and Analytics (D&A) Competency

Earning the D&A competency highlights NMD's end-to-end expertise in managing, processing, and analyzing large datasets. This includes building scalable data pipelines, implementing robust governance frameworks, and ensuring data security. AWS acknowledged NMD's success in enabling customers to uncover patterns, trends, and actionable insights that drive informed decision-making and operational efficiency.

The Competency Program is highly selective, requiring partners to pass stringent evaluations of their technical capabilities, customer outcomes, and alignment with best practices. By achieving both the Generative AI and Data and Analytics competencies, NMD has proven its ability to consistently deliver results that drive innovation and cloud optimization.

These awarded competencies enhance NMD's ability to:

- **Design and Implement Tailored GenAI Solutions**: From strategy to execution, NMD has helped businesses adopt Generative AI technologies that align with their unique goals.
- **Optimize Cloud Environments**: NMD's architecture is ready for advanced workloads, including AI and machine learning.
- **Unlock the Value of Data**: Through NMD's D&A expertise, NMD has helped organizations transform their data into a strategic asset, supporting AI initiatives and beyond.

Service Deliveries

NMD's service deliveries, certified under stringent requirements, include:

- **DynamoDB Service Delivery**: Proficient in implementing DynamoDB for highly scalable, low-latency NoSQL database solutions. Ideal for applications requiring real-time data handling and flexible schema designs, such as public safety or citizen engagement platforms.
- **OpenSearch Service Delivery**: Expertise in deploying OpenSearch for real-time search and log analytics, helping organizations monitor systems, search data sets, and derive valuable insights effectively.
- **EMR (Elastic MapReduce) Service Delivery**: Skilled in managing big data workloads using EMR, enabling the processing of vast amounts of data efficiently and cost-effectively. This service is vital for data-heavy public sector applications, such as traffic flow optimization or predictive maintenance.

Additionally, New Math Data is committed to supporting the public sector with:

- **Public Sector Badge**: Expertise in designing and delivering cloud-based solutions tailored to the unique requirements of government and nonprofit organizations, focusing on compliance, scalability, and cost efficiency.

Workshops

New Math Data is dedicated to empowering organizations by offering comprehensive workshops on Generative AI (GenAI). These sessions are designed to demystify GenAI concepts and provide actionable insights into how this transformative technology can address real-world challenges. Through hands-on demonstrations, tailored use case discussions, and collaborative brainstorming, NMD equips participants with the knowledge to make informed decisions about adopting and implementing GenAI within their operations. By fostering a deeper understanding of GenAI's capabilities and limitations, these workshops enable organizations to align AI innovations with their strategic goals, ensuring ethical and impactful integration into their workflows.

Funding

New Math Data (NMD) provides more than technical expertise for projects by facilitating access to **additional funding opportunities** designed to enhance the value of cloud initiatives. NMD has a demonstrated ability to align projects with AWS funding programs, ensuring customers benefit from financial support while achieving their objectives.

Expertise in Securing AWS Funding

- **In-Depth Knowledge of AWS Programs**: AWS offers several funding mechanisms, including Proof of Concept (POC) credits, Migration Acceleration Program (MAP) incentives, and grants focused on advanced services such as Generative AI or Data Analytics. NMD has extensive experience navigating these opportunities to identify funding for eligible projects.
- **Strategic Project Design**: By designing solutions aligned with AWS best practices and strategic objectives, NMD ensures projects meet the criteria for available funding. This includes developing scalable, secure, and efficient architectures with measurable outcomes.
- **Leverage as an AWS Partner**: Holding AWS competencies in Generative AI and Data & Analytics, NMD maintains strong collaboration with AWS, leveraging this relationship to position customer projects for funding consideration effectively.

Impact of Additional Funding

- **Cost Optimization**: Funding can significantly offset project costs, allowing for the implementation of innovative solutions without overextending budgets.

- **Accelerated Project Timelines**: Additional funding can expedite proof-of-concept efforts, migrations, or solution deployments, ensuring faster realization of results.
- **Broader Adoption of Advanced Services**: With funding assistance, projects can incorporate cutting-edge AWS technologies, such as AI/ML and analytics, to drive greater innovation and outcomes.

Commitment to Value and Excellence

NMD prioritizes financial sustainability and strategic alignment in all AWS projects. By securing additional AWS funding, NMD enhances the feasibility and impact of cloud initiatives, supporting efforts to achieve operational goals and optimize resources. This approach reflects a commitment to delivering cost-effective, high-impact solutions while maintaining adherence to the highest standards of quality and innovation.

Relevant Past Projects

Project experience and relevance will be highlighted in the Technical Proposal section.

Sample Personnel Board

NMD's project leadership structure is designed to ensure clear communication, efficient decision-making, and accountability. Below is an outline of NMD's project leadership and reporting responsibilities. This structured approach ensures that all aspects of the project are managed by experienced professionals, providing a seamless and efficient delivery of AI consultancy services to NMD's public sector clients.

Team Structure

Name	Title	Responsibility
Bernard Hatch	Principal Consultant	Overall project oversight and strategic direction. Ensuring adherence to legal, ethical, technical and regulatory standards.
Scott Peters	Principal Consultant	Overall project oversight and strategic direction. Ensuring adherence to legal, ethical, technical and regulatory standards.
Chris King	GenAI Practice Manager	Design and implementation of data architectures and pipelines. Development and deployment of AI models and algorithms. Ensuring adherence to legal, ethical, and regulatory standards.

Tatiana Meleshko	Data/ML Engineer	Design and management of cloud infrastructure. Ensuring data governance, security, and operational efficiency. Integration of machine learning models into production environments.Overseeing testing and quality assurance processes.
Ben Martin	Data/ML Engineer	Design and management of cloud infrastructure. Ensuring data governance, security, and operational efficiency. Integration of machine learning models into production environments.Overseeing testing and quality assurance processes.
Ashleigh Westle	Project Manager	Day-to-day project management, client liaison, and coordination of team efforts.
Andy Wadden	Infrastructure Engineer	Management and optimization of cloud and on-premises infrastructure, ensuring high availability, scalability, and performance of all deployed systems.

Bernard Hatch
Principal Consultant
Bernard Hatch brings extensive expertise in managing complex projects, steering strategic initiatives, and ensuring that all work adheres to the highest ethical and regulatory standards. His role involves providing executive-level guidance, fostering collaboration among stakeholders, and ensuring the project's overall direction aligns with organizational goals.

Scott Peters
Principal Consultant
Scott Peters contributes deep insights into strategy execution, emphasizing compliance with all legal and ethical frameworks. With his extensive background in consultancy, Scott ensures project milestones are met efficiently, serving as a key advisor to the team and a reliable point of contact for strategic decisions.

Chris King
GenAI Practice Manager
Chris King specializes in crafting innovative AI solutions, focusing on the architecture and execution of robust data pipelines and cutting-edge AI models. His role demands a balance of technical acumen and foresight, ensuring that every solution complies with ethical guidelines and addresses the specific needs of the client.

Tatiana Meleshko
Data/ML Engineer

Tatiana Meleshko plays a pivotal role in overseeing cloud infrastructure, ensuring seamless integration of machine learning models into operational workflows. Her focus extends to upholding data integrity and security, while her attention to detail ensures rigorous testing processes for high-quality delivery.

Ben Martin
Data/ML Engineer
Ben Martin complements Tatiana's efforts with his expertise in building scalable cloud solutions and implementing secure data systems. He actively monitors and improves operational processes, ensuring machine learning models are effectively deployed and thoroughly evaluated for performance and accuracy.

Ashleigh Westle
Project Manager
Ashleigh Westle orchestrates the team's daily activities, acting as the primary liaison between clients and the project team. Her ability to coordinate complex workflows and maintain open communication ensures that project timelines and deliverables are consistently met with precision.

Andy Wadden
Infrastructure Engineer
Andy Wadden ensures the seamless operation of infrastructure by maintaining optimal system performance and scalability. His role involves proactively managing both cloud and on-premises environments, safeguarding system reliability, and implementing solutions to support the project's evolving demands.

Resumes

Detailed resumes of skills and work experience are located in the Appendix section of the document, listed in the order presented above.

Technical Proposal

Challenge Objectives: How GenAI Would Address Each Deliverable

New Math Data proposes the following solutions for each of the below challenge areas.

a. Administration

Generative AI can synthesize large datasets and provide actionable insights for governance:

- **Report Generation:** GenAI automates the creation of detailed reports by summarizing complex datasets and highlighting trends.
- **Policy Simulation:** By analyzing historical data, GenAI generates policy scenarios, predicting outcomes for various administrative actions.
- **Meeting Summaries and Notes:** AI listens to recorded meetings, generating concise, accurate summaries for stakeholders.
- **Citizen Sentiment Analysis:** GenAI processes social media and survey data to generate sentiment reports on public policies.

Generative AI for Data Aggregation and Reporting in City Services

AWS has implemented the following solution, which New Math Data can utilize to enhance data-driven decision-making in public sector organizations:

- **Solution Overview:**
  - A data aggregation and reporting tool that uses generative AI to synthesize insights across city departments.
- **Key Features:**
  - **Cross-Departmental Data Integration:** Collects and processes data from various municipal services.
  - **Dynamic Report Generation:** Provides customized, easy-to-read summaries for stakeholders.
  - **Trend Analysis:** Identifies patterns and dependencies across service areas.
- **Technical Implementation:**
  - **Generative AI Models:** Synthesizes large datasets into actionable insights.
  - **API Integration:** Ensures compatibility with existing municipal systems.
  - **AWS Cloud Hosting:** Supports high data throughput and secure storage.
- **Outcomes and Future Potential:**
  - Improves transparency and operational efficiency in city governance.
  - Offers opportunities to integrate with state or federal databases for broader impact.

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b. Development Services

GenAI enhances development workflows by automating and simplifying communication and operational tasks:

- **Interactive Chatbots:** GenAI-powered assistants can handle real-time permit inquiries and status updates, simulating human-like interactions.
- **Document Drafting:** Automatically generates permit drafts and inspection reports from templates, reducing human error and processing time.
- **3D Models and Renderings:** Using textual or CAD inputs, GenAI can create conceptual 3D models for proposed developments, aiding in visual approvals.

Generative AI for Automating City Operations and Citizen Engagement

AWS has implemented the following solution, which New Math Data can adopt to improve automation and citizen engagement in city operations:

- **Solution Overview:**
  - A generative AI-based automation platform designed to improve efficiency in municipal operations while enhancing engagement with citizens through personalized communication.
- **Key Features:**
  - **Automated Workflow Management:** Uses generative AI to automate routine tasks such as permitting, scheduling, and citizen requests.
  - **Citizen Communication:** Provides AI-driven, personalized responses to citizen inquiries via chatbots or email.
  - **Real-Time Insights:** Generates reports on city service performance and citizen feedback to guide decision-making.
- **Technical Implementation:**
  - **NLP-Powered Chatbots:** Integrates with municipal websites or apps to handle inquiries, reducing response times and improving satisfaction.
  - **Data Integration:** Connects with existing city systems through APIs to consolidate information and streamline workflows.
  - **AWS Hosting:** Ensures scalability and security, allowing municipalities to handle high volumes of requests efficiently.
- **Outcomes and Future Potential:**
  - **Enhanced Citizen Engagement:** Provides timely, accurate responses to citizen concerns while offering easy access to public services.
  - **Operational Efficiency:** Reduces the workload on staff by automating repetitive tasks, freeing resources for high-priority initiatives.
  - **Scalability:** Suitable for use across cities of different sizes, with potential to expand into state-level governance.

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c. Event Center

Generative AI optimizes event planning and attendee engagement:

- **Personalized Outreach:** GenAI creates personalized marketing emails, social media posts, and event descriptions tailored to different audience segments.
- **Dynamic Scheduling:** Automatically generates optimal event schedules based on availability and attendee preferences.
- **Content Creation:** Generates promotional materials like videos, banners, and articles to boost event visibility.

Slack-Powered AI Chatbot for Collaboration

NMD developed an AI-powered chatbot integrated into Slack to enhance collaboration and streamline team workflows. This internally built chatbot utilizes a foundational language model to provide intelligent responses, execute queries, and support operational tasks.

Solution Overview

- **Natural Language Interface**: Users accessed insights and executed tasks directly via Slack.
- **Custom Workflows**: Tailored responses and automation catered to specific business needs.
- **Scalable Architecture**: Designed to handle increasing interactions efficiently.

Key Outcomes

- **Increased Productivity**: Simplified information retrieval and task execution reduced effort.
- **Improved Collaboration**: Streamlined communication and enhanced team efficiency.
- **User-Friendly Design**: Accessible through familiar tools for an intuitive user experience.

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d. Economic Development

GenAI supports economic initiatives through advanced data modeling and communication tools:

- **Investment Proposals:** Automatically generates professional investment opportunity summaries based on regional data and economic forecasts.
- **Market Trends Reports:** GenAI synthesizes economic indicators into easily digestible reports for stakeholders and potential investors.
- **Communication Support:** Produces multilingual proposals and marketing materials to attract international business partnerships.

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e. Finance and Budget

GenAI streamlines financial management by automating complex analytical and reporting tasks:

- **Budget Forecasting Models:** Generates detailed, scenario-based budget forecasts, identifying potential gaps and opportunities.
- **Anomaly Detection Explanations:** Summarizes flagged anomalies in understandable terms for financial managers, offering actionable insights.
- **Interactive Financial Reports:** Produces customizable, real-time visualizations and textual summaries of financial performance.

Sentiment Analysis for Informed Investment Decisions

New Math Data developed an AI-powered sentiment analysis solution to provide deeper insights into market trends and inform investment strategies. This internally built system processes vast amounts of news and social media data, delivering actionable intelligence for financial decision-making.

Solution Overview

- **Sentiment Analysis Models**: Advanced AI models were used to quantify market sentiment.
- **Data Integration**: Seamless integration with analysis platforms for real-time insights.
- **Custom Dashboards**: Visualized sentiment trends to guide informed investment decisions.

Key Outcomes

- **Enhanced Decision-Making**: Real-time sentiment data offered a competitive edge in strategy development.
- **Risk Mitigation**: Enabled early detection of potential market risks through trend analysis.
- **Increased Efficiency**: Automated data processing reduced reliance on manual analysis.

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f. Human Resources (HR)

GenAI transforms HR processes through personalized interactions and automation:

- **Resume Matching:** Analyzes job descriptions and generates shortlist recommendations, highlighting the alignment between roles and candidates.

- **Onboarding Materials:** Creates personalized onboarding kits, including training schedules, FAQ documents, and instructional videos.
- **Engagement Analysis:** Generates insights from employee feedback surveys, identifying trends in satisfaction and areas for improvement.

Client Example: Revolutionizing Resume Processing for Talent Acquisition

A talent acquisition firm implemented a generative AI-powered solution to transform its resume processing and candidate matching workflows. The solution leveraged advanced natural language processing (NLP) to integrate resume vectorization and improve decision-making in recruitment processes.

Solution Overview

- **Resume Vectorization**: NLP techniques transform resumes into searchable, comparable formats.
- **Automated Candidate Matching**: Generative AI algorithms improved the precision of job-candidate alignment.
- **Scalable Querying**: Efficient querying enabled faster shortlisting and enhanced user satisfaction.

Business Transformation

- **Traditional Approach**: Resume processing was time-consuming and lacked the precision needed for optimal candidate-job matching.
- **Generative AI Transformation**: The integration of generative AI significantly decreased processing times while improving matching accuracy, leading to better recruitment outcomes.

Key Outcomes

- **Time Savings**: Drastically reduced resume processing time, enabling faster candidate selection.
- **Higher Recruitment Success**: Enhanced matching accuracy improved hiring outcomes.
- **Improved Scalability**: Automated workflows supported increased hiring volumes without added effort.

HireBot: Streamlining Talent Acquisition

NMD designed and implemented **HireBot**, an AI-powered virtual recruiter, to revolutionize talent acquisition processes. This solution leveraged conversational AI to automate candidate engagement, initial screenings, and matching processes, enhancing overall efficiency, it is categorized as intelligent document processing (IDP).

Solution Overview

- **Conversational AI**: A virtual assistant powered by natural language processing enabled seamless candidate interactions.
- **Automated Screening**: AI analyzed resumes and responses to identify qualified candidates.
- **Enhanced Matching**: Machine learning algorithms improved candidate-job alignment precision.

Key Outcomes

- **Time Savings**: Automated workflows reduced the time required for manual evaluations.
- **Improved Candidate Experience**: Personalized interactions enhanced satisfaction and engagement.
- **Higher Recruitment Efficiency**: Optimized workflows supported larger hiring volumes.

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g. Information Technology and Cybersecurity

Generative AI enhances IT operations and security with intelligent automation:

- **Help Desk Support:** Creates dynamic FAQs and conversational AI that solve common IT issues without human intervention.
- **Threat Playbooks:** Automatically generates security playbooks to respond to identified cybersecurity threats, including step-by-step remediation guides.
- **Documentation:** Creates technical documentation for IT systems based on logs, code repositories, and user interactions.

Client Example: Enhancing Metadata Processing for Legal and Compliance Needs

A client specializing in capturing and preserving web content for legal and compliance purposes sought a solution to improve the processing of file metadata. The objective was to augment the metadata with additional information, enabling more robust search and retrieval capabilities. The processed metadata was indexed in a scalable search platform and made queryable through a Retrieval-Augmented Generation (RAG) agent powered by generative AI.

Solution Overview

- **Metadata Augmentation**: Additional metadata fields were integrated to improve search precision and retrieval speed.
- **Advanced Querying**: A RAG agent enabled natural language search capabilities for seamless interaction with metadata.
- **Scalable Processing**: The metadata processing pipeline was containerized to ensure scalability and efficiency.
- **Secure Storage**: All files and metadata were securely stored and managed.

Business Transformation

- **Traditional Approach**: The manual process of managing metadata was time-intensive, introducing inefficiencies and limiting scalability.
- **Modernized Workflow**: By transitioning to a generative AI-powered approach, the client reduced metadata retrieval times by up to 80%, enabling faster response times and improved user satisfaction.

Key Outcomes

- **Efficiency Gains**: 80% reduction in metadata retrieval time.
- **Cost Optimization**: Automated metadata processing reduced operational costs.
- **Improved Client Experience**: Enhanced metadata accuracy streamlined workflows and improved user satisfaction.

Generative AI for Risk Assessment and Management

AWS has implemented the following solution, which New Math Data can leverage to improve risk management in public sector operations:

- **Solution Overview:**
  - An AI-powered tool designed to identify risks in real-time and suggest actionable mitigation strategies.
- **Key Features:**
  - **Predictive Modeling:** Analyzes historical data to forecast potential risks and incidents.
  - **Real-Time Monitoring:** Identifies vulnerabilities across systems or activities as they arise.
  - **Interactive Dashboards:** Provides actionable insights through user-friendly visualizations.
- **Technical Implementation:**
  - **Predictive Analytics:** Employs machine learning to detect patterns and recommend interventions.
  - **Cloud-Based Hosting:** Ensures scalability and secure management of sensitive risk data.
- **Outcomes and Future Potential:**
  - Enhances situational awareness and response capabilities.
  - Scalable for implementation across universities, municipalities, or larger state-level organizations.

Generative AI as a Force for Good in Facilitating Cyber-Resiliency

AWS has implemented the following solution, which can be adopted by New Math Data to enhance cyber-resiliency for public sector organizations:

- **Solution Overview:**
    - An AI-driven tool that conducts natural language interviews based on the NIST 1.1 framework to assess and improve an organization's security posture.
- **Key Features:**
    - **Natural Language Interviews:** Conducts conversational assessments to evaluate cybersecurity readiness.
    - **Customizable Detail Levels:** Accommodates both high-level overviews and detailed analyses tailored to the organization's needs.
    - **Framework Alignment:** Provides support for frameworks such as HIPAA and CJIS, ensuring compliance with various security standards.
- **Technical Implementation:**
    - **Cloud Hosting:** Hosted on AWS, ensuring secure and scalable deployment.
    - **Core Services:**
        - **Amazon Bedrock and Claude v2** for advanced natural language processing.
        - **Amazon RDS** for secure data storage and triage.
        - **AWS Lambda and API Gateway** for seamless backend processing.
    - **Authentication and Privacy:** Uses **Amazon Cognito** to authenticate users and maintain data security.
- **Outcomes and Future Potential:**
    - Facilitates regional cyber support through tailored assessments.
    - Offers an expandable framework for adoption in other regions or industries.

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h. Library Services

GenAI personalizes library services and makes information retrieval more efficient:

- **Personalized Book Suggestions:** Based on borrowing history and preferences, GenAI generates custom reading lists for users.
- **Catalog Search Enhancement:** Converts user queries into precise search commands for better catalog navigation.
- **Digital Content Creation:** Automatically generates summaries or translations of books and documents in the library’s collection.

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i. Municipal Courts

Generative AI simplifies court operations by automating routine processes:

- **Legal Document Drafting:** Creates drafts of motions, subpoenas, and other legal documents based on input data and case details.
- **AI Legal Assistant:** Responds to citizen inquiries about case procedures or hearing schedules with conversational accuracy.
- **Case Analysis:** Summarizes lengthy legal documents and extracts relevant case details for quicker review.

Generative AI FactBot for Enhanced Information Delivery

AWS has implemented the following solution, which can be leveraged by New Math Data to improve user interactions with public sector information systems:

- **Solution Overview:**
  - **FactBot:** A generative AI service that provides concise, fact-based responses to user queries by leveraging pre-verified data.
- **Key Features:**
  - **Real-Time Summaries:** Synthesizes and delivers answers derived from validated datasets.
  - **Content Matching:** Matches user queries with the most relevant information from existing records.
  - **Transparency Indicators:** Alerts users when data is insufficient or unverified.
- **Technical Implementation:**
  - **AI Models:** Employs natural language generation to produce accurate and contextual responses.
  - **AWS Cloud Hosting:** Ensures secure access and rapid response times for real-time queries.
- **Outcomes and Future Potential:**
  - Improves transparency and accessibility of public information.
  - Can be scaled for use in government communication platforms or public records databases.

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j. Parks and Recreation

GenAI improves service delivery and engagement in recreational activities:

- **Activity Recommendations:** Analyzes user preferences and generates personalized activity suggestions.
- **Content Creation:** Produces promotional materials such as newsletters, flyers, and social media content for upcoming programs.

- **Registration Insights:** Summarizes registration trends, highlighting popular programs and identifying opportunities for new offerings.

Client Example: Simplifying Data Management in Agricultural Operations

An agricultural cultivation company enhanced its data management and decision-making processes through a generative AI-powered solution. The implementation focused on simplifying database queries, replacing traditional SQL-based approaches with natural language processing capabilities.

Solution Overview

- **Natural Language Querying**: Large Language Models (LLMs) enabled chat-based querying of databases, eliminating the need for SQL expertise.
- **Scalable Processing**: Containerized environments ensured efficient handling of metadata at scale.
- **Enhanced Accessibility**: Non-technical users gained the ability to query and analyze data independently.

Business Transformation

- **Traditional Approach**: Manual SQL querying required specialized knowledge and significant time to retrieve and organize data.
- **Generative AI Transformation**: NLP-driven queries reduced data retrieval time and accelerated decision-making by empowering all staff, not just technical teams, to access critical insights.

Key Outcomes

- **Faster Data Retrieval**: Reduced query response times enabled quicker operational decisions.
- **Increased Decision-Making Speed**: Simplified data access for non-technical users accelerated workflow efficiencies.
- **Cost Reduction**: Automation reduced the need for extensive SQL training and lowered staffing costs related to data management by 20%.

---

k. Parks Maintenance

GenAI ensures proactive and efficient maintenance operations:

- **Predictive Maintenance Summaries:** Creates maintenance schedules based on equipment usage data, forecasting failures before they occur.

- **Resident Communication:** Automatically generates updates on maintenance schedules and progress reports tailored to community members.
- **Resource Allocation Plans:** Suggests optimal distribution of staff and materials for maintenance tasks based on historical data.

---

l. Public Works

Generative AI supports project management and communication in public works:

- **Project Timelines:** Creates Gantt charts and work schedules based on input parameters like resources and deadlines.
- **Resident Notifications:** Produces personalized project update emails, texts, and social media posts for stakeholders.
- **Visual Planning Tools:** Generates visual aids and schematics for proposed public infrastructure projects.

---

m. Utility Billing

GenAI improves the utility billing process with automation and communication tools:

- **Customer Support Chatbots:** Provides real-time, natural-sounding assistance for billing inquiries and payment setups.
- **Usage Summaries:** Generates easy-to-read reports of individual utility usage trends, empowering customers to make informed decisions.
- **Payment Reminders:** Automatically generates and schedules personalized reminder messages for overdue payments.

Generative AI for Campus Procurement and Scope of Work Creation

AWS has implemented the following solution, which can be utilized by New Math Data to streamline procurement processes in public sector organizations:

- **Solution Overview:**
    - **ScopeBuilder:** An AI-powered application to assist procurement specialists in creating detailed, standardized, and compliant Scopes of Work (SOW).
- **Key Features:**
    - **AI-Powered SOW Generation:** Analyzes historical SOWs to create drafts with consistent structure and compliance.
    - **Guided Workflow:** Provides step-by-step assistance to users, reducing errors and ensuring policy adherence.

    - **Compliance Automation:** Ensures alignment with public procurement policies and regulatory standards.
- **Technical Implementation:**
    - **NLP Models:** Utilizes generative AI to convert user inputs into structured SOW documents.
    - **AWS Infrastructure:** Ensures reliability and security with scalable cloud solutions.
- **Outcomes and Future Potential:**
    - Reduces time spent on procurement documentation.
    - Adaptable for use in state, federal, or international procurement processes.

---

n. Visitors Bureau

Generative AI enhances visitor experiences by creating personalized and engaging content:

- **Itinerary Builders:** Generates customized travel itineraries based on tourist preferences, travel history, and local events.
- **Interactive FAQs:** Chatbots answer visitor queries in real-time, simulating conversational exchanges about attractions and amenities.
- **Marketing Content:** Automatically produces travel guides, blog posts, and video scripts promoting local tourism.

---

o. Other Government Entity Departments

Generative AI empowers departments to optimize operations and improve service delivery:

- **Workflow Automation:** Generates detailed workflows to standardize operational tasks.
- **Scenario Simulations:** Produces hypothetical scenarios for policy testing and planning.
- **Citizen Engagement Materials:** Creates tailored communication strategies, including public announcements and newsletters.

AI-Powered Solution for Wind Farm Operations

NMD created an AI-driven system to optimize wind farm operations by enhancing turbine performance monitoring and enabling predictive maintenance. This solution leverages machine learning to analyze performance data and deliver actionable insights for engineering teams.

Solution Overview

- **Performance Monitoring**: AI models identified inefficiencies and anomalies in turbine operations.
- **Predictive Maintenance**: Machine learning algorithms forecasted maintenance needs to reduce downtime.
- **Real-Time Insights**: Engineers accessed actionable data to optimize wind farm output.

Key Outcomes

- **Operational Efficiency**: Proactive maintenance improved turbine performance and minimized downtime.
- **Cost Reduction**: Addressing issues preemptively reduced maintenance costs.
- **Sustainability Gains**: Enhanced energy production supported greener and more efficient operations.

Scope of Work

a. Solve the outlined challenges in various departments.
New Math Data will design and implement tailored AI solutions for each operational challenge presented in Section 5.1.

---

b. Integrate seamlessly with existing systems and databases.
New Math Data will ensure that all solutions are designed to integrate seamlessly into existing infrastructure:

- **API-First Design:** Solutions will expose robust APIs to interact with legacy systems (e.g., case management, HR systems, utility billing). Middleware solutions will be developed for systems without API access.
- **Data Standardization:** Existing data formats (JSON, XML, CSV) will be converted into AI-compatible structures. This ensures efficient information flow between systems.
- **Security Frameworks:** New Math Data will integrate with critical IT infrastructure, such as:
    - **Mobile Device Management (MDM):** Secure access for on-the-go systems.
    - **Identity Access Management (IAM):** Role-based permissions for data access.
    - **Security Information and Event Management (SIEM):** Logging, monitoring, and auditing system performance.

---

c. Are user-friendly and accessible to all stakeholders.
New Math Data will prioritize accessibility and user-friendliness:

- **Intuitive Interfaces:** Solutions will feature clean and simple interfaces, enabling non-technical stakeholders to easily navigate systems and extract insights.

- **Multi-Language Support:** NLP capabilities will allow tools to support multiple languages, ensuring inclusivity for diverse populations.
- **Responsive Design:** Platforms will be optimized for mobile, tablet, and desktop devices.
- **Accessibility Compliance:** Solutions will adhere to **WCAG 2.1** accessibility guidelines, ensuring compatibility with screen readers and adaptive devices.

---

d. Include comprehensive training and ongoing support for staff.
New Math Data will provide robust training and support programs to maximize solution adoption:

- **Customized Training Modules:** Staff will receive role-specific training to ensure comfort and proficiency with the AI tools.
- **Onboarding Workshops:** Live and virtual workshops will guide teams through solution features, setup, and troubleshooting.
- **Documentation:** Comprehensive user manuals, FAQs, and troubleshooting guides will be provided for easy reference.
- **Ongoing Support:** A dedicated support team will offer:
    - **Helpdesk Support:** Assistance for technical issues.
    - **Periodic Reviews:** Scheduled check-ins to optimize AI tool usage and address evolving needs.
    - **Knowledge Base:** An updated repository of insights, tips, and best practices.

---

e. Provide maintenance, updates, and ensure compliance with data security and privacy standards.
New Math Data will offer ongoing maintenance and ensure compliance with all relevant regulations:

- **Regular Updates:** AI models will be retrained and updated as required, incorporating the latest data and user feedback to ensure optimal performance.
- **Patch Management:** Security patches and software updates will be implemented on a regular schedule to protect against vulnerabilities.
- **Compliance Management:**
    - **GDPR and HIPAA Compliance:** Data encryption (AES-256), anonymization, and secure processing workflows will safeguard sensitive information.
    - **Auditing and Monitoring:** Real-time monitoring systems will ensure compliance with all data regulations.
- **Disaster Recovery Plan (DRP):** New Math Data will implement redundancy measures and automated backup systems for data protection.

---

f. Ensure data security and privacy compliance.
New Math Data will maintain the highest standards of data security and privacy:

- **Encryption Standards:** End-to-end encryption (in transit and at rest) using **AES-256** ensures data remains secure.
- **Access Controls:** Role-based access controls (RBAC) and **multi-factor authentication (MFA)** will limit system access to authorized personnel.
- **Data Anonymization:** Personal Identifiable Information (PII) will be anonymized to comply with GDPR, HIPAA, and similar laws.
- **Regular Audits:** Continuous auditing of data usage and access logs ensures adherence to best practices.
- **Incident Response Protocol:** A detailed protocol for responding to breaches will be implemented, including regular testing and staff training on security awareness.

Conclusion

New Math Data is committed to designing, developing, and deploying AI solutions that are tailored, integrated, and secure. Through user-friendly systems, comprehensive support, and rigorous compliance practices, we ensure that public sector entities can harness AI to achieve greater operational efficiency and service excellence.

Technical Requirements

a. Challenge-Specific Functionality
New Math Data will design customized AI solutions that address specific operational challenges identified by each entity:

- **Use Case Alignment:** Each solution will be tailored to functional challenges such as permit processing, case management, and utility billing. Our AI-driven applications will map real-world needs to features like **workflow automation**, **predictive analytics**, and **real-time alerts**.
- **Iterative Design:** New Math Data will adopt agile methodologies to co-create solutions with public sector stakeholders, ensuring functionality aligns closely with operational priorities.
- **Testing Protocols:** All solutions will undergo rigorous challenge-specific testing to validate accuracy and ensure a seamless user experience.

---

b. Scalability
New Math Data's AI solutions will be developed with a focus on scalability, ensuring that systems handle increased data volumes and user interactions efficiently:

- **Cloud-Native Architecture:** Solutions will leverage cloud platforms like AWS or Azure, enabling rapid scaling based on demand.
- **Load Balancing:** By implementing automated load-balancing mechanisms, we will maintain consistent system performance during peak usage.
- **Elastic Databases:** Integration with cloud databases (e.g., Amazon RDS, DynamoDB) ensures flexible and adaptive data storage.

---

c. Integration
Seamless integration with existing systems is a key focus for New Math Data:

- **API-First Design:** Our AI solutions will provide RESTful or GraphQL APIs to ensure compatibility with case management, HR, billing, or library systems.
- **Security Integration:** We will support frameworks like Mobile Device Management (MDM), Identity Access Management (IAM), and Security Information and Event Management (SIEM) to align with enterprise-level IT governance.
- **Legacy System Compatibility:** Solutions will include middleware to bridge existing systems (e.g., SQL-based systems) with modern AI capabilities.

Example: A chatbot solution for library services will integrate with the existing database to provide real-time book availability and user assistance.

---

d. Real-Time Analytics
New Math Data will integrate AI-powered analytics for real-time monitoring and decision-making:

- **Dashboards:** Custom dashboards will visualize KPIs, trends, and system performance.
- **Predictive Insights:** AI models will analyze historical data to generate predictions, such as permit approval times or resource utilization forecasts.
- **Automated Reports:** Stakeholders will receive AI-generated reports summarizing system usage, anomalies, and key insights.

---

e. Data Security and Privacy
Ensuring compliance with regulations like **GDPR** and **HIPAA** is central to New Math Data's design approach:

- **Encryption:** End-to-end encryption (AES-256) will protect data in transit and at rest.

- **Role-Based Access:** Implementing Role-Based Access Controls (RBAC) ensures only authorized personnel access sensitive information.
- **Audit Trails:** AI systems will log all interactions for compliance and reporting.

---

f. Natural Language Processing (NLP) Capabilities
Advanced NLP will allow systems to engage users effectively and respond to diverse queries:

- **Chatbot Functionality:** AI assistants will provide real-time answers to FAQs, automate workflows, and offer multi-lingual support.
- **Contextual Understanding:** Leveraging deep learning models, the solutions will understand context to improve response relevance.
- **User Feedback Loop:** Continuous feedback will improve NLP model accuracy over time.

---

g. Accuracy
New Math Data will ensure high levels of accuracy in AI outputs through the following strategies:

- **Model Training:** AI models will be trained on clean, labeled datasets tailored to the public sector.
- **Performance Monitoring:** Automated systems will monitor accuracy in outputs using metrics like F1-score and error rates.
- **Continuous Validation:** Regular validation cycles will ensure AI-generated responses align with end-user needs.

---

h. Algorithm Transparency
Transparency in AI algorithms is critical to ethical adoption:

- **Bias Mitigation:** AI models will incorporate fairness algorithms and debiasing techniques to avoid discriminatory outcomes.
- **Documentation:** Algorithms used will be well-documented with validation protocols.
- **Explainable AI (XAI):** Solutions will include features that explain how decisions are made, ensuring accountability.

---

i. Continuous Improvement
AI systems deployed by New Math Data will adapt and improve over time:

- **Reinforcement Learning:** Feedback from user interactions will continuously retrain and optimize AI models.

- **Model Monitoring:** Real-time monitoring tools will detect degradation in model accuracy and trigger re-training as needed.
- **Version Control:** AI solutions will support versioning for easy rollback or updates.

---

j. Interoperability
High interoperability ensures integration with digital infrastructure:

- **Adherence to Open Standards:** Solutions will comply with standards like JSON, XML, and OpenAPI.
- **Data Compatibility:** Our systems will support common data formats and enable seamless data exchange between platforms.
- **Interoperability Testing:** Solutions will undergo extensive interoperability testing, ensuring smooth communication with third-party systems.

---

k. Quality Control
To ensure consistent performance, New Math Data will:

- **Implement Validation Checks:** Use automated testing frameworks to verify input-output accuracy.
- **Benchmarking:** Benchmark system performance against predefined KPIs.
- **Regular Audits:** Conduct scheduled audits to maintain high quality and operational standards.

Conclusion

New Math Data's AI solutions will address each technical requirement with a robust, scalable, and ethical approach. By focusing on security, interoperability, and continuous improvement, we ensure that public sector entities can achieve greater efficiency, transparency, and citizen engagement through AI-driven innovation.

Data Governance

a. Data Integrity and Accuracy
New Math Data will implement mechanisms to ensure the accuracy and integrity of data throughout its lifecycle:

- **Validation Protocols:** AI solutions will include input validation tools to prevent errors and maintain data consistency. Every data point will be checked against pre-defined rules to ensure compliance.

- **Error Detection and Correction:** Leveraging machine learning algorithms, real-time anomaly detection will identify errors and inconsistencies in datasets. Automatic correction mechanisms will fix minor errors or flag critical ones for manual review.
- **Audit Logs:** Systems will maintain immutable audit logs to track all changes made to data, including updates, deletions, and user modifications. Logs will enable full traceability of errors and corrections.

---

b. Data Privacy and Compliance
New Math Data will adhere to global and regional data privacy laws, such as **GDPR**, **CCPA**, and **HIPAA**:

- **Data Anonymization and Pseudonymization:** Sensitive user information will be anonymized or pseudonymized wherever necessary to comply with privacy regulations.
- **User Consent Management:** Systems will include consent management tools, ensuring user data is only collected and processed with explicit approval. Consent records will be logged securely.
- **Data Usage Transparency:** Dashboards will allow stakeholders to monitor how data is collected, processed, and shared, maintaining transparency and compliance.
- **Compliance Frameworks:** Solutions will incorporate predefined compliance standards and frameworks (NIST, ISO 27001) to ensure continuous adherence.

---

c. Data Access Controls
New Math Data will implement strict role-based access controls (RBAC) to limit access to sensitive data:

- **Role-Based Permissions:** Access to data will be determined based on user roles and responsibilities. Sensitive data will only be accessible to authorized personnel.
- **Multi-Factor Authentication (MFA):** Solutions will require MFA to secure user logins, reducing the risk of unauthorized access.
- **Granular Permissions:** Systems will allow fine-grained access control, such as restricting write permissions while allowing read access to specific datasets.

---

d. Data Retention and Disposal
New Math Data will enforce comprehensive data retention and disposal policies:

- **Retention Policies:** Retention schedules will define how long data will be stored, ensuring compliance with legal and regulatory requirements.
- **Secure Disposal Mechanisms:** Upon reaching the end of its lifecycle, data will be permanently deleted using secure, industry-standard techniques (e.g., DoD 5220.22-M for overwriting data).

- **Automation:** Data retention workflows will automate archival and deletion, minimizing manual errors.

---

e. Data Auditing and Monitoring
New Math Data will include robust auditing and monitoring capabilities to track data usage and changes:

- **Real-Time Monitoring:** AI-driven tools will continuously monitor data access and activity to detect anomalies and unauthorized behavior.
- **Detailed Logs:** Systems will maintain tamper-proof logs of data usage, including timestamps, user details, and the nature of access or changes.
- **Regular Audits:** Automated and scheduled audits will ensure compliance with security and governance frameworks, providing full transparency for stakeholders.

Cybersecurity

a. Threat Detection and Response
New Math Data will implement AI-driven cybersecurity tools to detect and mitigate threats in real-time:

- **Threat Intelligence Models:** Machine learning models will analyze network traffic, user behavior, and system logs to identify suspicious activities or breaches.
- **Automated Incident Response:** Systems will include pre-configured playbooks to automate responses to detected breaches, including containment, isolation, and notification protocols.
- **Identity Verification:** Solutions will feature robust identity verification mechanisms to prevent unauthorized access to systems, including biometric authentication and MFA.
- **Incident Protocols:** Incident response plans will be regularly tested and updated to adapt to evolving security threats.

---

b. Encryption
New Math Data will ensure industry-standard encryption protocols for securing data:

- **End-to-End Encryption:** All data in transit and at rest will be encrypted using **AES-256** or equivalent encryption algorithms.
- **Key Management:** Encryption keys will be securely managed using tools like AWS Key Management Service (KMS) or Azure Key Vault.
- **Secure Communication Channels:** Solutions will utilize **TLS 1.3** to encrypt communications between servers, applications, and endpoints.

---

c. Vulnerability Management
New Math Data will continuously monitor for vulnerabilities and address them proactively:

- **Vulnerability Scanning:** Systems will undergo regular automated vulnerability scans to identify weaknesses in the infrastructure.
- **Penetration Testing:** Comprehensive penetration testing will be performed periodically to evaluate system resilience against cyberattacks.
- **Timely Patching:** An automated patch management system will ensure timely updates to address discovered vulnerabilities.

---

d. Security Governance Framework
New Math Data will establish a structured security governance framework to outline responsibilities and policies:

- **Security Policies:** Policies for data access, encryption, incident management, and risk mitigation will be clearly defined.
- **Compliance Standards:** Solutions will align with **NIST**, **ISO 27001**, and other relevant standards to ensure best practices in security.
- **Continuous Compliance Audits:** Regular audits will verify compliance with evolving security regulations and policies.

---

e. Risk Management
New Math Data will provide comprehensive risk assessment and mitigation strategies:

- **Risk Assessments:** AI-powered tools will identify, quantify, and prioritize risks associated with data, infrastructure, and processes.
- **Mitigation Plans:** Tailored strategies will address identified risks, including implementing firewalls, AI-driven anomaly detection, and disaster recovery solutions.
- **Disaster Recovery Plans (DRP):** DRPs will include failover capabilities, automated backups, and rapid restoration protocols to minimize downtime during incidents.

---

f. Training and Awareness
New Math Data will provide training programs to ensure staff are equipped to handle cybersecurity challenges:

- **Cybersecurity Training Workshops:** Interactive sessions will educate staff on best practices for protecting data and identifying phishing or malware threats.

- **Simulated Threat Drills:** Simulations will prepare staff for real-world incidents, such as ransomware attacks or phishing attempts.
- **Ongoing Awareness Campaigns:** Regular updates and newsletters will keep staff informed about evolving threats and prevention techniques.

Conclusion

New Math Data will address the data governance and cybersecurity provisions outlined in Section 5.4 with a robust, multi-layered approach. By combining AI-driven tools, advanced encryption, risk mitigation strategies, and continuous training, New Math Data ensures that public sector entities have secure, compliant, and resilient solutions for managing their data and systems.

Project Management Approach

New Math Data's project management approach is rooted in a balance of structured methodologies and adaptable practices, ensuring projects are delivered with precision and flexibility. We leverage Atlassian's robust suite of tools, including **Jira** for agile task management and sprint planning, **Confluence** for centralized documentation and collaborative knowledge sharing, and **Trello** where lighter workflows are required. These tools enable us to establish clear timelines, prioritize deliverables, and provide stakeholders with transparent, real-time updates throughout the project lifecycle.

By integrating various customizable dashboards and automated workflows, we ensure efficiency in tracking progress, identifying bottlenecks, and proactively managing risks. Teams across New Math Data utilize these tools to align daily activities with long-term goals, facilitating seamless collaboration between technical teams, account managers, and stakeholders. Our adaptive approach means we can quickly adjust plans based on evolving project needs, ensuring every initiative is not only on track but also aligned with client expectations for innovation and excellence.

Performance Metrics

New Math Data (NMD) will utilize a structured approach to measure success and performance, employing well-defined Key Performance Indicators (KPIs) for each deliverable. This approach ensures transparency, accountability, and continuous improvement:

1. **Key Performance Indicators (KPIs):**

    - **Accuracy:** Measured by precision and recall for AI outputs (e.g., predictive models and automated workflows).
    - **System Reliability:** Monitored through uptime metrics
    - **User Adoption:** Tracked via engagement metrics such as user interactions, feedback scores, and task completion rates.
    - **Efficiency:** Evaluated through reductions in processing times or manual workloads, benchmarked against pre-deployment baselines.
2. **Ensuring Accuracy and Reliability:**
    - **Model Validation:** Routine validation against test datasets ensures performance consistency.
    - **Feedback Integration:** A continuous user feedback loop allows for iterative improvements to AI models.
    - **Automated Monitoring:** Real-time system health checks and anomaly detection maintain operational reliability.
3. **Continuous Improvement:**
    - **Performance Dashboards:** Custom dashboards display KPIs, enabling stakeholders to monitor performance trends.
    - **Regular Reviews:** Quarterly performance reviews identify areas for enhancement.
    - **Model Updates:** Periodic re-training and fine-tuning of AI models ensure adaptability to evolving data patterns.

Risk Management

NMD proactively identifies and mitigates risks associated with AI solution development and deployment to ensure seamless project execution:

1. **Potential Risks:**
    - **Data Security Risks:** Unauthorized access to sensitive data.
    - **Model Bias:** Risk of unfair or inaccurate predictions due to biased training data.
    - **Integration Challenges:** Difficulty aligning with legacy systems.
    - **Budget Overruns:** Risks of cost escalation due to unforeseen complexities.
2. **Risk Mitigation Strategies:**
    - **Security Measures:** Implement robust encryption (AES-256), multi-factor authentication (MFA), and secure API gateways to protect data integrity.
    - **Bias Mitigation:** Incorporate fairness algorithms, conduct regular audits, and use diverse training datasets.
    - **Integration Testing:** Perform comprehensive compatibility tests with existing systems before deployment.
    - **Budget Controls:** Employ agile methodologies to manage scope creep, with milestone-based reviews to track progress and costs.
3. **Monitoring and Response:**

- **Real-Time Alerts:** Automated systems flag potential risks, enabling rapid response.
- **Incident Response Plans:** Predefined protocols address breaches or failures effectively.
- **Disaster Recovery:** Implement failover systems and regular backups to ensure business continuity.

Compliance and Standards

NMD is committed to adhering to all relevant regulations and standards to ensure data privacy, security, and legal compliance:

1. **Data Privacy:**
   - **GDPR and HIPAA Compliance:** Data anonymization and pseudonymization are implemented alongside secure processing workflows.
   - **Consent Management:** Systems collect and log explicit user consent, ensuring transparency in data usage.
2. **Regulatory Standards:**
   - **Framework:** Solutions align with internationally recognized frameworks for cybersecurity and data governance.
   - **Audit Logs:** Immutable logs track all system interactions, supporting accountability and compliance.
3. **Ongoing Compliance Measures:**
   - **Training:** Staff receive regular training on evolving data privacy laws and cybersecurity protocols.
   - **Monitoring and Reporting:** Automated tools continuously monitor compliance, and reports are shared with stakeholders for transparency.
   - **Regular Audits:** Periodic compliance audits validate adherence to standards and identify areas for improvement.

Warranty and Guarantee

New Math Data's warranty statement:

The Parties acknowledge that an engagement may involve analysis, judgment and other performance from time to time in a context where the participation of the Parties or others is necessary, where answers often are not certain or verifiable in advance and where facts and available information change with time. New Math Data represents and warrants that: (a) any Deliverable will conform to any applicable Specifications; (b) the Services will be performed by appropriately qualified and trained Personnel; and (c) it has all rights necessary for (and is not subject to any restriction, penalty, agreement, commitment, law, rule, regulation or order which is violated by) its execution and delivery of an Agreement and performance of its obligations under an Agreement. The warranty extends for sixty (60) days after receipt of any Deliverable or Services pursuant to that SOW. Should any Deliverable or Services not comply with the foregoing warranty, Client will provide written notice of a breach of this warranty and New Math Data shall use commercially reasonable efforts to bring such Deliverable or Services into compliance. This remedy shall be the sole and exclusive remedy of the Client for any breach of the warranty set forth.

Pricing

The hourly rate card and detailed pricing structure for all roles involved in the project are illustrated below, and are attached as a spreadsheet, in the form of a supplementary document.

The following pricing model includes a 5% discount on hourly rate.

Figure 1

Description	Add additional description if necessary:	Unit Price	% Discount	Notes/Comments
1. Software Licensing and Subscription Costs: *Provide the cost breakdown for software licenses, subscriptions, or any other software-related fees.*	**N/A**	**N/A**	**N/A**	**New Math Data does not anticipate using Licensing or Subscriptions**
2. Implementation and Customization Costs: *Outline the costs related to the implementation of the AI solution, including setup, integration with existing systems, customization, and deployment.*	**Discounted hourly costs are presented in Figure 2 of this document.**	**Presented in Figure 2**	**5%**	**NMD operates on a time and materials - SOW bases, for which hourly costs are presented.**
3. Training and Support Costs: *Include costs for training government staff, technical support, and customer service, both during and after implementation.*	**Discounted hourly costs are presented in Figure 2 of this document.**	**Presented in Figure 2**	**5%**	**NMD operates on a time and materials - SOW bases, for which hourly costs are presented.**
4. Ongoing Maintenance and Updates: *Provide costs for ongoing software maintenance, updates, and any regular services required to keep the AI system running smoothly.*	**Discounted hourly costs are presented in Figure 2 of this document.**	**Presented in Figure 2**	**5%**	**NMD operates on a time and materials - SOW bases, for which hourly costs are presented.**
5. Optional Add-Ons or Features: **List any additional features or services available that are not included in the core proposal but can be added at an additional cost.**	**N/A**	**N/A**	**N/A**	**New Math Data does not anticipate using Licensing or Subscriptions**
6. Total Cost of Ownership (TCO): **Summarize the Total Cost of Ownership (TCO), which includes all costs over a defined period (e.g., 3 years or 5 years). This should reflect software, implementation, support, maintenance, and optional add-ons.**	**Discounted hourly costs are presented in Figure 2 of this document.**	**Presented in Figure 2**	**5%**	**NMD operates on a time and materials - SOW bases, for which hourly costs are presented.**
7. Additional Costs (if applicable): **List any additional costs not covered in the above sections that are relevant to the proposal, such as travel costs, setup fees, or other miscellaneous charges.**	**N/A**	**N/A**	**N/A**	**New Math Data does not anticipate using Licensing or Subscriptions**

Figure 2

Artificial Intelligence (AI) Solutions			
Item	**Description**	**Price**	**Notes**
1	Principal Consultant	$261	
2	GenAI Practice Manager	$190	
3	Data/ML Engineer	$157	
4	Project Manager	$86	
5	Infrastructure Engineer	$157	
6	Off-Shore Resources	$71	Off shore and/or near shore resources are available for projects on an as needed basis. Resumes are presented to stakeholders prior to onboarding.

Proposed Value-Add

New Math Data provides unique capabilities and expertise that drive efficiency, performance, and innovation for public sector organizations. Each section highlights distinctive value propositions.

.NET Modernization: Enhancing Legacy Applications

NMD provides exceptional value through its AI-powered approach to modernizing .NET applications. Leveraging advanced code transformation tools and deep domain expertise, NMD ensures legacy .NET applications are seamlessly upgraded to newer versions, such as .NET 6, .NET 8, or .NET 9. This modernization process enhances application **performance, security, and scalability**, ensuring alignment with evolving technologies.

NMD streamlines code refactoring by automating upgrades, optimizing deprecated APIs, and introducing new performance features specific to advanced .NET environments. Through AI-assisted performance tuning, NMD identifies bottlenecks, fine-tunes application response times, and ensures compliance with security best practices.

As a value-add, NMD also emphasizes **knowledge transfer** and documentation, ensuring in-house teams understand the enhancements and can manage the system independently. By future-proofing applications and ensuring long-term support, NMD drives sustainable modernization that enhances public sector service delivery and resource efficiency.

Data Warehouse Modernization: Unlocking Data-Driven Insights

NMD offers robust value through its expertise in refactoring legacy data warehouses, such as Teradata, into modern cloud-native platforms like Spark SQL, Redshift, and Athena. By leveraging AI-powered tools for automated SQL translation, schema conversion, and optimization, NMD reduces the complexity, cost, and timeline of modernization projects.

NMD delivers exceptional **scalability** by enabling cloud-based platforms that can handle growing data volumes and complex queries with ease. The solutions prioritize **cost-efficiency** through serverless and pay-as-you-go models, which significantly reduce operational costs while maintaining performance. Additionally, AI-based optimization ensures queries are fine-tuned for the target platform’s capabilities, delivering faster results and actionable insights.

As a value-add, NMD empowers public sector organizations with **cloud-native integrations** for data ingestion, transformation, and visualization. These capabilities allow agencies to leverage their data more effectively for evidence-based decision-making, improving citizen services and operational agility.

Java Refactoring: Enhancing Efficiency and Security

NMD's expertise in Java refactoring provides public sector organizations with a streamlined approach to upgrading legacy Java applications to the latest versions, such as Java 17. Through the use of AI-powered code transformation tools, NMD automates complex tasks such as updating language constructs, APIs, and libraries, reducing manual effort and ensuring error-free upgrades.

A key value-add lies in **enhanced performance** and **security**. Modernizing applications unlocks new Java performance optimizations, such as improved JVM efficiency and garbage collection. Security risks associated with outdated libraries and patches are mitigated, ensuring compliance with security standards critical for public sector systems.

Moreover, NMD drives developer productivity by automating refactoring processes, freeing up time for innovation and feature enhancements. The inclusion of **comprehensive testing and validation** guarantees functional parity, while detailed documentation and knowledge transfer equip in-house teams for sustainable application maintenance.

Spark to PySpark Refactoring: Enabling Scalable Data Processing

NMD delivers exceptional value through its AI-powered approach to refactoring Spark applications written in Scala into PySpark 3.0. By automating code translation, API mapping, and schema optimization, NMD accelerates the migration process while ensuring performance and functionality are retained.

This modernization enables public sector organizations to leverage **PySpark's flexibility** and a broader developer ecosystem. PySpark 3.0's enhancements, such as compatibility with Iceberg tables, unlock features like ACID transactions, schema evolution, and high-performance data management. These improvements simplify maintenance while enhancing scalability and processing speed for big data workloads.

As a value-add, NMD optimizes workflows for large-scale data pipelines and integrates PySpark with modern data platforms. The result is a **cost-effective, scalable solution** that improves public sector data processing capabilities, enabling faster insights and informed decision-making. Detailed documentation and knowledge transfer ensure teams can continue to innovate post-implementation.

Unique Value Proposition Summary

New Math Data's approach to modernization offers unique value-adds across all solution areas. By combining AI-driven automation, performance optimization, and security enhancements, NMD ensures that public sector organizations achieve significant improvements in efficiency,

scalability, and cost management. NMD's emphasis on **collaborative engagement**, **knowledge transfer**, and **future-ready systems** positions public sector agencies to deliver enhanced citizen services and achieve long-term digital transformation goals.

HUB Bonus

New Math Data LLC is not a Historically Underutilized Business (HUB), Minority, Women-Owned or Disadvantaged Business Enterprise.

Appendix

Resumes of key personnel are presented on the subsequent pages.

Traey Hatch

Cloud Architect

Cloud Architect and Big Data Engineer with significant Development and Infrastructure experience. Azure or AWS, solutions architecture, and containerization.

Website: **http:/github.com/trejas**

EXPERIENCE

Duke Energy

Jan 2020 - Present

AWS Technical Lead Engineer

- Senior technical resource, with extensive experience designing, implementing and securing applications on AWS. Leads are expected to work closely with product owners and software architects to navigate Company's customers' internal processes for approving and deploying applications. Additionally, Leads are expected to help craft backlog, mentor and lead other engineers, contribute to shared code libraries/frameworks applicable to projects, and perform hands-on development for project stories and deliverables.
- Lead a team of 15 AWS Engineers/Architects
- Hands-on creating design and framework for a multi-account, data fabric approach to Enterprise Data Products
- Created python utilities to increase development velocity for multiple product teams
- Responsibilities and skills include the following:
  - CICD
  - Infrastructure as Code (IaC, either via Terraform or CloudFormation)
  - Python
  - Git/Collaboration process management
  - Architecture design drawing (LucidChart/Visio)
  - Documentation
  - Pyspark
  - SQL
  - Core AWS services
  - Unit and integration testing

New Math Data

Jan 2018 to Present

Owner

- Architected and Implemented an AWS EMR based data processing platform in a large scale enterprise environment. Including:
- Data Access Framework
- Modularized Infrastructure as Code (IaC) approach to Infra design
- CICD deployment of Infra and Product/Project Code
- Maintained and expanded an Airflow-based framework for Data Processing at a Large Medicare Managed Care Provider. Framework responsible for ETL within enterprise and delivering documents and data to healthcare partners.
- Created Data Architecture and Implemented setup of Data Processing Framework in Azure for Start-up Marketing Services software company.
- Created Kubernetes environment for:
  - Deployment of CICD tooling (DroneCI)

    - Deployment of private pypi server
- Designed, deployed, implemented multiple Kubernetes based Airflow (Kubernetes executor) clusters using EKS
- Created Data Lake QuickStart tool, containerized deployment on Kubernetes using AWS EKS, Terraform and Helm (designed and built from scratch)

Rackspace/Onica

Dec 2019 to Feb 2021

Practice Manager - Big Data

Onica's Data Science and Engineering practice provides solutions for data problems across the stack. From application level database migrations/optimizations to high-level machine learning use-cases.

Projects as Practice Manager/Lead Solutions Architect include:

- Payless Shoes - Snowflake - Ground up creation of a Data Warehouse/Data Lake for a large consumer retailer. Including CICD and architecture for secure data access.
    - AWS Architecture for Snowpipe
    - Version control for Snowflake Schema
    - Forked and modified custom tool for Snowflake migrations (https://github.com/trejas/snowchange)
- Innovyze - ML Ops - Created CICD pipeline and tracking system for an AI/ML utility software company deploying hundreds of networked models to production.
    - Created AWS Sagemaker System for Tracking, Training, Hyperparameter Optimization and deployment of models
        - Infrastructure as Code templates for AWS using Terraform and Cloud Formation
        - AWS Architecture including CodePipeline, CodeBuild, and Custom CICD System
        - AWS IAM Roles/Policies to support above
        - Created a "pipeline of pipelines" from Azure DevOps to CodePipeline. Automatically created/updated a new pipeline for a new "customer" location.
        - Connection to MS Teams for approval of deployment
- Marathon Oil - Data Lake - Created greenfield data lakes for multiple customers. Ranging from PoC projects to full production deployments.
    - Spark-based ETL
    - Metadata management
    - s3 Data Lifecycle management
    - Created practice-wide Best Practices document for all aspects of Data Lake creation, operations and administration on AWS
- Spencer Stuart - Data Warehousing - Created greenfield data warehouses for multiple customers. Ranging from PoC projects to full production deployments
    - Version control for schema management
    - ETL design, authoring, and orchestartion using
        - Airflow/DBT, etc.
        - Authored custom Airflow Visual Editor, featured speaker about this project during Airflow Summit 2020 (https://github.com/trejas/chartis)
    - Datamart design and Data Modelling for Star/Snowflake schema data warehouses
    - Data Modelling for Lambda Architecture based CDC in Data Warehouses
- Various - Data Visualization - Created Data Viz systems for customers using:
    - PowerBI
    - AWS Quicksight
    - Looker
    - Tableau
    - Superset
    - Architected and Implemented all aspects of visualization systems including Data Modeling, Aggregations, and Materializing Views

Onica

Sep 2019 to Dec 2019

Lead Solutions Architect

Projects as Lead Solutions Architect include:

- AmWater - ML Ops - Created CICD pipeline and tracking system for an AI/ML utility software company deploying hundreds of networked models to production.
  - Created ML Flow based system Tracking, Training and deployment of models
    - Infrastructure as Code templates for AWS using Terraform and Cloud Formation
    - AWS Architecture including CodePipeline, CodeBuild, and Custom CICD System
    - AWS IAM Roles/Policies to support above
    - Deployed 4 models to production using this system, including model optimization, and training/inference code refactoring

Innowatts

Aug 2018 to Aug 2019

Lead Data Architect/Head of Data Engineering

Founded and managed team of 15 Data and DevOps Engineers, including mentoring, code review and process design.

Authored Jira Workflows and GitFlows to facilitate collaboration in a large development team (20 Engineers).

Negotiated with outside vendors and off-shore teams (contract and in-house) to provide SaaS and data services.

Created Secure Software Development Lifecycle Policy (SDLC) Navigated GDPR Compliance and certification for US/EU Privacy Shield Setup application architecture to conform to GDPR/Privacy Shield

Created a Common Data Model and Application Architecture that reduced data processing time by an order of magnitude: * Setup Apache Airflow development and production environments for parallel scheduling and processing of data workflows * Setup s3 --> Spark --> Hive architecture to facilitate rapid ingestion, processing, and analysis of large datasets

Facilitated rapid iteration for model training pipelines to improve model accuracy.

Created pipelines that met client SLA for delivery of complex forecasting tasks.

Created a data architecture for commonly used Master Data, reducing redundant processing of common data by analysis models

Designed and Managed the Innowatts physical networking infrastructure (Ansible/EC2, eventually migrated to Kubernetes)

Innowatts

Mar 2018 to Aug 2018

Data Engineer

Linux Academy

Apr 2018 to Jul 2018

Course Author I

Created content for prep course for MS-533 exam

Stikley Enterprises

Apr 2013 to Feb 2018

Software Engineer

Trading Data Ingestion and Analysis: Micro-service systems to gather, ingest and analyze data from multiple public and private sources
Jobs queuing system - Hosted on Heroku: • Python • Redis • RQ (Job Queuing) • FTPLib

Periodic scraping - Running on SaaS (scrapinghub.com) : • BeautifulSoup • Scrapy
Database interaction using custom RESTFUL API - Flask / Python /MSSQL Server - Hosted on PythonAnywhere: • Python • SQLAlchemy • PyODBC/PyMSSQL • Pandas • Flask • MSSQL • Intrinio.com (Data APIs for SEC Filings / Security Pricing and Equities Fundamentals
Manual querying of datasets for use in TensorFlow and Cortana Intelligence Studio for trading signal prediction: • Python • Pandas • Numpy • Tensorflow
DevOps:
• Architect and implement development pipeline for in-house tools and programs • Setup successful git branching strategy for developing features, fixing bugs, applying hotfixes and reduce time between feature releases • Full review/staging/production pipeline CI for systems above using CircleCI • Tracking of code coverage/smell/tech debt for system above using CodeClimate
• Created a distributed systems architecture for the trading system and all company infrastructure for resilience, cost and maintainability • IT Management - Migration of all digital assets from on-premise to AWS, initially
• eventually moved to Azure for easy integration with O365
• Simplify security credentials - Azure Active Directory • Improved Disaster Recovery Metrics - using AvePoint Online Services • DNS Hosting - Reduced Cost and Improved Maintainability

Stikley Enterprises

Jun 2010 to Feb 2018

General Manager

As the general/portfolio manager at Stikley, I interact with all parts of our operations team and supervise many aspects of our portfolio management. My daily duties range from fundamental analysis of companies, both public and private, to setting up systems and schedules to handle our operations, including trading, property management, IT and legal review of our various contracts and documents.
Duties:
Data Science Fundamental Analysis Business process setup and review
Data Visualization - Microsoft PowerBI, Power Query, SQL
Development Custom Development of Portfolio Management Software - Python, Ruby, Heroku, SQL, HTML, BootstrapCSS
DevOps IT Management - Migration of office assets from on-premise to AWS/Azure
Architect and implement development pipeline for in-house tools and programs Full review/staging/production pipeline CI using CircleCI
Tracking of code coverage/smell/tech debt using CodeClimate
Distributed systems architecture for resilience, cost and maintainability
General IT ERP Implementation for Portfolio Companies
Office Management
Real Estate Portfolio and Property Management Contracts Review
General P&L Responsibility

TIERRA STUDIOS

Jan 2005 to Jun 2010

PRODUCER/ENGINEER/PROJECT MANAGER

Duties include:
· Coordination of recording, production/duplication, promotion and release schedules for multiple pro-
jects;
· Manage projects with sub-contractors and in-house resources (ie. graphic design, PR, duplication,
photography, mastering, etc.)

· Audition potential label/publishing artists and studio musicians for sessions. Negotiate rates and con-
tracts with work-for-hire musicians, voice-over talent and label artists.
· Technically responsible for producing/engineering recording sessions. Sessions ranged from multi-
track music projects to dialog recording/editing for TV/film;
· Evaluate contracts for publishing placements, American Federation of Musician's Union players and
general publishing/record label business;
· Website design and development using Wordpress as a common platform for project sites;
· Update blogs and social networking sites for publishing/label bands
· Design workflows/naming conventions and business forms for use in recording-facility projects;
WEB PROGRAMMING CONSULTANT; VARIOUS LOCATIONS -- 2000-2005 Projects included:
· Design, Development and Testing Flash-based Teaching Tools;
· Website design and development using standards compliant tools (XML, xhtml, javascript, css)

Stikley Enterprises

Jan 2002 to May 2005

Project Manager

EDUCATION

The University of Texas at Austin

1995 to 2000

Bachelor of Arts - BA

Berklee College of Music

2003 to 2006

DNF

Film Scoring

SKILLS

SQL, Hadoop, Apache Spark, Cloud Computing, Data Analysis, Extract, Transform, Load (ETL), Business Process Improvement, Integration, Machine Learning, Graphic Design, Music, Recording, Studio Recording, Social Media, Marketing, Python, Amazon Web Services (AWS), Microsoft Azure, Office 365, JavaScript, Scala, Ruby, Cascading Style Sheets (CSS), HTML5, Microsoft Dynamics NAV, SharePoint, WordPress, Power BI, Tensorflow, Transact-SQL (T-SQL), Blockchain, Solidity, Ethereum, Microsoft Office, Matlab, R, Management, Data Engineering, Airflow, SQL Azure, Smart Contracts, Git, JSON

LANGUAGES

English

SCOTT PETERS, M.SC.

604.992.6940 | speters@newmathdata.com

Principal Consultant with over 20 years of experience using a variety of technologies and domains including: scalable web systems, asset pipelines, big data platforms, cloud infrastructure and embedded systems.

PRIMARY SKILLS

Languages: Python, Bash, PySpark/Spark, JavaScript, C++, C#

Tools: Docker, Jenkins, Git, Terraform, CloudFormation/CDK, Chef, Sumo Logic, NGINX, Artifactory, Nexus, Databricks, MLFlow

Cloud: AWS Glue, EMR, Redshift, Athena, Quicksight, EC2, Lambda, Route53, API Gateway, ECS, Batch, DynamoDB, ElasticSearch, RDS, SQS/SNS, CloudFormation

WORK HISTORY

07.2021 – PRESENT **NEW MATH DATA**

Founder/Principal Consultant

- Technical solution owner for Advanced Distribution Platform, multiyear program to develop advanced electrical distribution grid analytics data products to drive optimal investment and usage of the electrical grid
- Architect and lead implementation of solutions primarily based on AWS
- Act as technical mentor for several teams, advising on development/test methodology, DevOps best practices, AWS Architecture, project scoping and cost analysis
- Design and communicate strategies and designs for a variety of business applications and for complete solutions including system infrastructure design, microservice decomposition, CI/CD and automated deployment pipelines, automated testing and validation
- Interact with technical and non-technical customer stakeholders to review and coordinate project scope, budget, status
- Lead business value analysis to drive cost effective outcomes for enterprise level programs.

09.2018 – 06.2021 **ONICA/RACKSPACE**

Practice Manager, Data Science and Engineering

- Responsible for delivering high quality technical solution for client's data platforms, integrating with client's existing infrastructure, tools, and processes
- Produce diagrams, documentation, runbooks and user guides
- Implement designed data platform, including CI/CD pipelines, infrastructure and related source code
- Manage backlog, sprint planning and project roadmap for duration of project

- Prepare and deliver client or prospective client workshops and webinars on data engineering practices and technologies on AWS
- Publish whitepapers discussing data engineering on AWS and technology deep dives such as Amazon Redshift
- Pre-sales engineering discovering business needs of prospective clients, estimating effort, activities and creating project proposals
- Manage and mentor a team performing regular 1:1s, goal planning, performance reviews, and mentorship

EDUCATION

09.2002 – 10.2004 **UNIVERSITY OF MANITOBA**
M.Sc in Engineering

- Thesis: Hardware Implementation of Stochastic Neural Networks

09.1998 – 04.2002 **UNIVERSITY OF MANITOBA**
B.Sc. in Computer Engineering, w/ Distinction

- Thesis Project: Design, Construction and Testing of a 1.1 - 2.2 GHz Ground Penetrating RADAR for use in Landmine Detection

CERTIFICATIONS

06.20124 – Present **AWS DATA ENGINEER, Associate**
ASSOCIATE

05.2017 – 05.2020 **AWS SOLUTIONS ARCHITECT**
ASSOCIATE

Chris King | Engineer

206-430-9432 | cking@newmathdata.com
GitHub
Medium Blog

Objective

A **passionate** data engineering leader with over **15 years** of experience in cloud, data, and software **engineering** seeking an opportunity to continue **honing** leadership and technical **skills** while contributing to growth in people, product and organization.

Certifications

- AWS Certified Solution Architect Professional (2024)
- AWS Certified Data Engineer Associate (2024)
- AWS Certified Solutions Architect (Associate) (2022)
- HackerRank gold star rating in SQL and Python (2021)
- Python Development Associate (2021)
- Certified Scrum Developer (2016)

Open Source highlights

Python_chatgpt: A generative AI command line tool to interact with OpenAI's ChatGPT (3.5turbo and 4) and automatically extract code snippets to the local file system

Python_is_sports: An NLP app and model to identify sports news article headlines developed using spaCy and SciKitLearn

s3-de-identify: A healthcare data de-identification tool, built on spaCy and de-identify, that produces de-identified data for lower environments

Relevant Experience

Generative AI Practice Manager - New Math Data, May 2023 - Present

- Lead AWS data engineering team, delivering complete solution architecture and detailed project plans, conducting interviews, code reviews, pair-programming sessions, and one-on-ones
- Built Generative AI practice, built a team of engineers and solutions architects, delivered genAI solutions for customers and established on-going relationships with clients
- Grew AWS Partnership through Competencies, Service Deliveries, Certifications, Lunch and learns, hands on workshops, and regular communication with AWS Account Managers and Inside Sales Reps

Staff Engineer - CMS.gov, October 2022 - May 2023

- Developed a data de-identification tool in Python using spaCy and de-identify libraries
- Audited data governance and cloud application best practices and produced security gap mitigations plans and cost savings analysis

Lead Data Engineer – Boosted Commerce, November 2021 – July 2022

- Designed and built data platform using Snowflake and Data Virtuality ETL while managing multiple vendors through incident and bug triage cadences
- Interviewed and mentored developers with HackerRank, paired programming sessions and code and design reviews

Senior Data Engineer – TeleSign, May 2020 – July 2021

- Built AWS-based ETL pipelines in Python (PyTest, Coverage.py, Black, Pylama, Git, LocalStack, Poetry, Makefile, and Moto) and Glue PySpark to load S3 data lakes, ElastiCache (Redis), and ElasticSearch using Batch, Step Functions, Lambda, and Kinesis
- Interviewed, trained, and mentored junior and mid-level engineers through code and design reviews, paired programming sessions, and regular 1:1's

Senior Data Engineer - Disney DTCI, October 2019 – April 2020

- Built and supported AirFlow ETL and SnowFlake SQL data model for linear viewership with Nielsen ratings and custom demographics

Senior Data Engineer - Slalom, August 2014 – October 2019

- Developed career growth framework and common engineering templates on AWS and Azure using SQL, SSIS, Informatica, and Python
- Lead 15+ pre-sales engagements and projects ranging from analytics to cloud data engineering across multiple sectors

Service Engineer Lead - Mindtree, July 2012 – August 2014

- Automated a manual cluster verification process, speeding up hand-off from vendor validation, resulting in $80K annual savings for client
- Maintained 99.999% DNS availability using Windows and MSSQL servers, servers, Citrix NetScalers, and F5 Big IP devices while leading a team of 3 engineers through goal setting and service reviews

Tatiana Meleshko

DATA/ML ENGINEER

CONTACT

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Email: tatiana.meleshko@gmail.com
Address: Calgary, Canada
Websites: https://www.linkedin.com/in/tatiana-meleshko

SUMMARY

Data/ML Engineer with experience in Data Engineering, Data Science and Linux System Administration.

WORK EXPERIENCE

Cloud Consultant: Data Engineering and Data Science — May 2023 – present
New Math Data

- Participating in AWS SME program - creating outline and content for AWS AI Practitioner and MLA exams
- Participating in Machine Learning competitions
- Participating in GenAI projects prototyping blockchain, RAG, multimodal, agents
- Took part in two AI hackathons for Gen AI
- Writing technical blogposts (Databricks, Vector databases, DBT)
- Beta tested for Gen AI Exam Databricks (successful)
- Architected and migrated python and Snowflake data pipelines into Databricks
- Improved significantly performance of the ETL pipelines (from several days to 30min)
- Working on data governance (data masking) on AWS
- Using tools: AWS, Glue, Athena, Bedrock, Opensearch, Llama, Langchain, GPT , Databricks, DBT, PySpark, MongoDB, Snowflake, Microsoft Azure, Apache Airflow

Big Data Engineer — Feb 2021 - Mar 2023
Rackspace Professional Services

- Designed complex ETL workflows (AWS Glue) and implemented schema validation/ enforcement (CMI and SSENSE projects)
- Set up CI/CD pipeline (CMI and SSENSE projects)
- Learned and mastered event-driven architecture principles, Kafka and Confluent (South Western Airlines project)
- Set up, tuned and tested Confluent platform connectors, built POC for tuning and using Confluent replicator (South Western Airlines project)
- Set up and tested deltastreamer utility on EMR, tested schema evolution for Hudi based tables (internal Hudi project)
- Researched and tested Hudi compatibility with different versions of Glue and Athena, tested incremental and time-travel queries (internal Hudi project)
- Used Tools: Confluent, Kafka, gitlab, Bitbucket, Kubernetes, AWS Glue, AWS Athena, Apache Airflow, Apache Hudi, AWS EMR, AWS Lambda, AWS CodeBuild, AWS CodeCommit, AWS CodePipeline, DynamoDB, DMS, AWS Quicksight, AWS CloudFormation, terraform

Data Scientist — Sep 2017 - Feb 2021
Cybera

- Participated in NLP project developing document processing engine (similarity search, sentiment analysis etc.) (https://github.com/cybera/policy-browser).
- Created internal project on chat generation based on Slack history
- Setup ETL pipelines and dashboard with statistical analysis for speedtest data for the First Nation communities in Canada(https://www.cybera.ca/connectin/)
- Organized, run and mentored program to help individuals to re-skill and up-skill in DataScience (https://www.cybera.ca/fellowships/)
- Organized and run DS and ML workshops for startups and SMEs in Alberta, worked with startups individually on various ML problems
- Analyzed demand of skills, jobs in coming years in Alberta to provide recommendation for government to better organize PSI programs
- Attended Spark Summit, Computational Linguistics Conference, Big Data London
- Used tools: Python, R, Jupyter Notebook, Tensorflow, Scikit-learn, Neo4j, Solr, Word2Vec, Spacy, Tidyverse, recommender systems (collaborative, content), time series analysis, clustering and forecasting (Prophet, Arima, LSTM, XGBoost), LDA topic modelling , Plotly, Dash, R Shiny, InfluxDB

System Administrator — Apr 2016 - Sep 2017
Cybera

- Configured and performed software and hardware upgrades for the self-hosted private cloud based on OpenStack
- Made POC for configuring OpenStack Sahara (analog of AWS EMR), participated in testing and configuring of IBM Spectrum Conductor, POC for Microsoft Azure
- Attended OpenStack Summit and Azure Conference
- Used tools: OpenStack, Ubuntu, Terraform, RabbitMQ, LXD, Grafana, Nagios, Puppet, Spark

Open-Source Systems Architect — Jun 2012 - May 2014
Guest-Tek

Server Analyst — Jul 2009 - Dec 2011
Shaw Communications

Software Engineer — Jun 2003 - Jul 2008
IBA Group

EDUCATION

Bachelor of Applied Mathematics and Computer Science, Belarusian State University

Specialization: pattern recognition, image filtering

CERTIFICATIONS

- Databricks Gen AI Engineer Associate 2024
- Databricks Certified ML Associate 2024
- Databricks Certified Associate Developer for Spark3.0(python) 2023
- AWS Certified Machine Learning Specialty 2022
- AWS Certified Cloud Practitioner 2021
- AMII DeepLearning/Reinforcement Learning Summer School Graduate 2019
- VCP5.5Certified Professional 2016

SKILLS

- Spark(pyspark, AWS Glue, AWS EMR, Databricks)
- Cloud services (AWS, Azure, GCP, OpenStack)
- Generative AI / LLMs(LLAma, GPT, Langchain)
- NLP(word2vec, LSTM, sentiment analysis, computational linguistics)
- Machine Learning: recommender systems, time series analysis, clustering and forecasting (Prophet, Arima, LSTM, XGBoost), LDA topic modelling
- CI/CD pipelines and version control(Github, Bitbucket, AWS CodeCommmit/CodePipeline/ CodeBuild)
- Data Lakes(AWS S3, Apache Hudi)
- Workflow management(Airflow, AWS StepFunctions)
- Linux system administration and bash shell scripting
- Infrastructure management(Terraform, CloudFormation,Puppet)
- Containers(Docker, docker-compose, Kubernetes)
- Event based architecture(Kafka, Confluent)
- SQL Databases(MySQL, PostgreSQL)
- NO SQL and Graph Databases(MongoDB, Neo4j, DynamoDB)
-

Ben **Martin**

About me

Passionate and innovative professional with an MSc in Computer Engineering, specializing in machine learning and artificial intelligence. Extensive research in electromagnetic imaging and experience in developing AI-driven solutions have consistently pushed the boundaries of science and technology. Committed to leveraging my skills to solve complex problems and drive advancements in the field.

Areas of specialization

Machine Learning • Research • Computational Physics

Interests

Autoregressive Transformers

Inverse Problems

Computational Physics

Research

Data Science

Awards

Two Featured Articles in IEEE TAP - 2024

NSERC-CGSM 2022

EGM Student Achievement - 2022

Price Scholarships - [2017-2020]

Deans Honour List - [2017-2022]

BenMartin94

204-797-1392

References available upon request

Experience

Apr '24–Present

New Math Data
Data Engineer · Remote

- **Research Pipeline Automation with RAG Workflow**
  - Designed and implemented an automated research pipeline for conducting literature reviews on various species.
  - *Technologies*: Retrieval-Augmented Generation (RAG), NLP
  - Enhanced research efficiency by significantly reducing manual effort and time.
- **Student Attrition Prediction Models**
  - Developed and deployed regression models to predict student attrition in higher education.
  - *Technologies*: Machine Learning, Python, Scikit-Learn, Pandas
  - Improved prediction accuracy, enabling proactive retention measures.
- **Data Pipeline for Legal Document Indexing with GenAI**
  - Created a data pipeline for indexing and organizing legal documents using Generative AI.
  - *Technologies*: Generative AI, Data Engineering, Python
  - Streamlined legal document management, improving searchability and access.

May '22 - Aug '24

University of Manitoba
Grad Student · Winnipeg, MB, CA
Conducted research in electromagnetic imaging, applying cutting-edge ML research to the inverse scattering problem.
Proficient in reading scholarly papers and implementing the described methods.
Authored four peer-reviewed articles in high-impact journals, contributing significant findings to electromagnetic imaging and increasing the research group's exposure.

Feb '23 - June '23

AGCO
ML Engineer - Term · Winnipeg, MB, CA
Led a project developing a state-of-the-art predictive model for classifying temperature sensor readings inside grain bins to monitor grain height.
Employed a large language model-inspired architecture and deep learning algorithms to capture complex temporal patterns in data.
Achieved 99.8% accuracy in classifying sensor readings as above or below the grain line, significantly improving upon previous methods that reached 80%.

Degrees

Aug '24 **Masters in Computer Engineering**
4.5/4.5 GPA · University of Manitoba

Apr '22 **Bachelor of Computer Engineering**
4.39/4.5 GPA · University of Manitoba

Skills

- **Python** - 8 years
- **C/C++** - 4 years
- **Machine Learning** - 3 years
- **Pytorch** - 2 years
- **TensorFlow** - 3 years

Publications

2024 A Long Short-Term Memory Approach to Incorporating Multi-Frequency Data into Deep-Learning-Based Microwave Imaging. Pending review IEEE TAP.

2023 Experimental Microwave Imaging System Calibration via Cycle-GAN. IEEE TAP.

2023 Autoencoder-Augmented Machine Learning-Based Uncertainty Quantification for Electromagnetic Imaging. IEEE TAP

Talks

Mar '23 "Cycle-GAN-based Calibration of Microwave Imaging Systems ", at: *EUCAP* in Florence, Italy

Mar '24 "Supervised Learning Applied to Microwave Imaging System Calibration ", at: *EUCAP* in Glasgow, Scotland.

Ben Martin benjosephmartin@gmail.com Winnipeg

Ashleigh Westle

778-245-8640
aaewestle@gmail.com

EXPERIENCE

New Math Data— *Operations Specialist/Project Management*

April 2024 - PRESENT

Collaborate with cross-functional teams to streamline operations and ensure smooth workflow management.

Led onboarding for new team members, fostering productivity and alignment with organizational goals.

Streamlined communication channels within teams and stakeholders, improving transparency and collaboration.

HBJR Holdings—Operations Management

Sept 2019 - April 2024

Managed and oversaw day-to-day operations for a multi-million-dollar company ensuring efficiency and Productivity

Managed a team of 7+ employees providing leadership, guidance and support to ensure high levels of employee engagement and performance

Coordinated and executed the successful relocation of two warehouses across the country resulting in a 30% increase in operational efficiency

HBJR Holdings — *Production Lead*

Aug 2017 - Sept 209

Collaborated with cross-functional teams to identify and implement cost-saving initiatives resulting in a 10% reduction in production costs

Collaborated with an internal team of two designers and four factories across China, Taiwan and India

Developed and implemented production plans and schedules, ensuring on-time delivery

EDUCATION, LICENSES AND CERTIFICATION

Various LinkedIn courses (2020 – present)
Certificate, Brand Management: Aligning Business, Brand and Behaviour (2021)
Certificate, Management of Fashion and Luxury Companies (2021)

SKILLS

Operations Lead

Operational Efficiency

Cross-Functional

Teams

Strategic Initiatives

SOFTWARE

ERP System - Xoro Soft

CRM - Hubspot and Sales Forces

Customer Service Support - Gorgias and Zendesk

Websites - Shopify and Wordpress

LANGUAGES

English

Email: awadden@gmail.com

Andrew Wadden

Solutions Architect

HIGHLIGHTS OF QUALIFICATIONS

- Seasoned Solutions Architect/Engineer with broad technical background and strong interpersonal skills with over 20 years' experience in enterprise environments, primarily focused on Cloud solutions using AWS, GCP, and Azure for the past 10 years.
- Extensive experience building deployment pipelines using git, github actions, gitlab, ansible, jenkins, and ingestion pipelines for data collection and ETL using AWS Glue, Kinesis, Lambda, Dynamodb, S3, and many more AWS services
- Motivated technologist with a proven track record of delivering high quality solutions and results in Enterprise IT environments where priorities change quickly.
- Able to think strategically about business objectives, develop solution alternatives fulfilling customer needs in complex situations, motivate & mobilize resources and deliver results.
- Excellent communication skills with the ability to narrate complex technical issues to both technical and business audiences.
- Certifications including AWS SAA, & SCS, Cisco CCNA, VMware VCP and several partner service accreditations.

PROFESSIONAL EXPERIENCE

New Math Data (Oct 2022 – Present)
Solutions Architect/Engineer

- Design and implement various solutions including Snowflake/AWS integration for multiple pipelines, built API interface for managing various ML pipelines, Security Hardening, DB migrations, EKS implementations, and DevOps designs.
- Worked with GenAI, Langchain, and Bedrock for internal projects.
- Performed code reviews for team members.

ADH Technology Inc. (Jan 2022 – Dec 2022)
Solutions Architect/Engineer - Owner/Operator

Mission Cloud - Solution Architect

- Lead multiple AWS projects.
- Design and implement cloud solutions for K8s environment improvements on AWS, Data pipelines, and Security hardening.
- Responsible for approving all project code for the team.

Triumph Technology – Solution Architect

- Designed and helped implement data pipeline solutions for NFT resellers using various AWS services such as DynamoDB, OpenSearch, EMR, Glue, Lambda, IAM, RDS, CloudTrail, Blockchain, and several more.
- Responsible for approving all code produced by the team.
- Worked with stakeholders throughout the project.

Trinimbus /Onica /Rackspace – (Oct 2017 – Jan 2022)
Cloud Architect

- Design and implement cloud solutions for various projects including large migrations, data ingestion pipelines and ETL with Glue/lambda, application development, Security Assessments and Hardening, Landing zones, Networking (hybrid and cloud), Machine Learning, VMware VMC migrations, Big data solutions almost all using Infrastructure as Code to deploy using automation
- Conducted Workshops for AWS Security, General/Custom Cloud training, IaC (Infrastructure as Code), and many other topics
- Worked hands on in Azure, Google, AWS using various Cloud services including VPC, EC2, Serverless, Big Data, Machine Learning, Monitoring / Reporting, Security, Federated access, Directory services, CDN, Networking, and many more.

Email: awadden@gmail.com

Andrew Wadden

Solutions Architect

- Hands on use of tools such as Cloudformation, Terraform, Runway, Stacker, Python, Ruby, GO, Jenkins, Ansible, Packer, CLI's, automating Server bootstrapping, and many more.

ADH Technology Inc. (2004 - 2017)
Solutions Architect / Consultant - Owner/Operator

Lead technical resource for short to medium length projects, some of which include:

- Resolead Consulting **-** Design and implement various cloud environments including Web apps (multi-tier), Bigdata(datalake), POCs, Training environments, and more.

- VMware - BC Ferries – Analysis, Architect/design, and implementation of SRM disaster recovery solution.

- Shoppers Drugmart – Lead Infrastructure projects to upgrade, implement, integrate, migrate infrastructure services and business software applications. Worked with various vendors to complete designs, implementation plans, acquisition of various hardware, software, licensing, and services.
  Develop infrastructure solutions and designs such that they align to the current IT Standards, project requirements, and best practices. Design and implement standards for servers, networking, security standards and processes, storage in local datacenter, and cloud. Projects include Windows 7 Desktop migration, merging of applications, Upgrade of WAN connections to remote locations, virtualization environment analysis, Siebel assessment / upgrade, and more.
- IUOE – Architect, design, document, and implementation of virtual infrastructure, SAN, and migration of physical to virtual servers, cloud implementation, and AD – DNS - DHCP upgrade/migration.

- VMware – ALG (Atlantic Lottery Corporation) – Analysis and completion of virtual infrastructure architecture and design including disaster recovery solution, and automation.

- VMware – Bell Alliant – Architect, design, implementation, of virtual infrastructure environment, and training.

- Sharpe Blackmore - Architect, design, implementation, of virtual infrastructure environment, SAN storage environment, and training.

- SSHA (now E-Health) – Virtualization Consultant, Design VI 3 Environment for Production Environment projects, including solutions for backup**,** disaster recovery, high availability, and security hardening.

- HP / AIMIA - Perform infrastructure analysis and identify all gaps related to availability SLA requirements, security requirements, and best practices for each target cloud datacenter. Create and present solution architecture documents for possible availability solution related to infrastructure, security compliances, and identify new monitoring variables. Plan the development and implementation of chosen solutions for each gap

- Deloitte / Economical Insurance **-** Part of a team architecting, developing and implementing new cloud based products and services including Devops environment, Big data solution, virtual migration environment, and various software evaluations (POCs). Designed and implemented various IaaS, Paas, DWaasS, and SaaS solutions. Design and implement standards for servers, networking, security compliance, IDS/IPS and storage**.** Used various software packages and solutions including VMware vRealize suite, IIS, Apache, Tomcat, WebServices, Java, JBOSS, Git, Github, Docker, Openstack, Chef, Puppet, Ansible, and much more. Created all infrastructure architecture documents including, Infrastructure environnements plan, Infrastructure Blue print, Infrastructure Sizing Analysis, Logical and physical network diagrams, capacity planning, and more. Build / Test infrastructure components, applications, and create build books using such products as Linux, Windows, and Netscaler, Hadoop, Casandra, and a wide range of DevOps software

- TD Bank - Analysis of current mid-range infrastructure for both physical and virtual large enterprise environments including Wintel, Linux, Unix, and AS400. Provide senior level support for the migration virtual and physical environments. Plan architect and design migration solution for all platforms including

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infrastructure, and service oriented applications with major focus on maximizing virtualization environment using such hardware as HP, Cisco UCS, EMC, VMware vRealize Suite etc. Analyze networking requirements, and implement adequate solution to perform long distance migrations while maintaining acceptable user experience. Analyze and determine all migration paths. Responsible for all architectural documentations

- Ministry of Government Services - Analysis of current mid-range infrastructure for both physical and virtual large enterprise environments. Provide senior level support for virtual and physical infrastructure environments. Provide virtualization expertise for RFP creation, and evaluations. Determine and create technical requirements for RFP creation. Worked with vendors to resolve any RFP questions, issues, or concerns. Evaluation and verification of virtualization products and technologies, including VMware VSphere versions 4 & 5, Hyper-V, Cloud, Hyper-V, Citrix, Software and others. Evaluation and verification of management products for virtualization solutions including VMware vcops, SRM, Director, Orchestrator, HP CSA, Operations Orchestrator, Matrix and more. Provided cloud requirements for cloud projects including web site consolidation, and email solution. Provide SME support for acquiring enterprise level management tools

Research In Motion (Mar 2001 – Aug 2004)
Blackberry Operations Administrator

- Our team is responsible for the ongoing operation of the Blackberry (NOC) network operations center, which includes monitoring, troubleshooting, and change management of the Blackberry network.
- Installed and configured both small and large scale servers for various Blackberry and monitoring services (Using Windows NT, 2000, 2003, Linux/Unix).

Education / Training

Computer Engineering Technology
Humber College of Applied Arts and Technology

Self Training
AWS SAA (2017)
CCNA (Since 2000)
VCP (Since 2005)

Technology Skills

Through nearly 20 years of IT experience, the following are some of the technologies and software used:

- Operating Systems include Linux, Unix, Windows (all versions since WinNT), and corresponding management components including LDAP, AD, Email (Exchange, Cloud, and text versions), DNS, DHCP, etc.
- Networking experience includes the use of layer 2 and 3 switched, routers, firewalls, and load balancers, using products from vendors including Cisco, Nexus, VMware NSX, NetScaler, F5, BIG-IP, Checkpoint, and many more for both physical and virtual (NFV/SDN). Experience with latest protocols, and security solutions, DNS, AD, LDAP, DHCP.
- Database experience in RDBMS, and NoSQL with products such as MS SQL, Oracle, Postges, MySQL, Aurora, Maria, DynamoDB, Casandra, Hadoop (EMR), Casandra, and more.
- Virtualization experience is extensive in VMware since version 1.5, and related products, Vcenter, VCOps, Vsphere, SRM, VDI/View/Horizan, VRealize Automation/Orchistration, Veeam products, HyperV, Xen, Citrix, ThinApp, AppV, XenApp, and many more.
- Storage experience consists of various NFS solutions, NAS, SANs, VSANs, archiving using most major vendors and software including EMC, NetApp, IBM, Dell, cloud variants, and much more. Tasks include research/analysis, architect, design, configure, test, and implementation at both physical and virtual levels.

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- DevOps experience consists of the design and implementation of DevOps env, the evaluation and use of such software technology's as Docker, Kubernetes, Jenkins, Chef, Lambda, Puppet, Python, Perl, Bash, GIT, and more.
- Many other software products related to enterprise infrastructure needs, including monitoring, security compliance, security penetration, SSO products, antivirus, change management, CMD, middleware, management tools from most enterprise level vendors.