

**T4NG-0739: VistA Application Analytics**

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## VOLUME II - Technical

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### Introduction

Consistent improvement of Veteran clinical care is ultimately an effort fueled by data. The Department of Veterans Affairs (VA) is the largest integrated healthcare system in the world, providing care at 1,321 healthcare facilities, including 172 VA Medical Centers and 1,138 outpatient sites of care of varying complexity (Veterans Health Administration [VHA] outpatient clinics) to over nine million Veterans enrolled in the VA health care program. Veterans Health Information Systems and Technology Architecture (VistA) has been synonymous with VA healthcare since 1990, with the journey to VistA Imaging beginning in 1977 with the development of the Massachusetts General Hospital Utility Multi-Programming System (MUMPS). Moving VistA to the cloud is a massive feat offering an analytical path forward for an Electronic Health Record (EHR). The monitoring of VistA traffic offers the opportunity to analyze and assess ongoing care within medical facilities, which then provides chances for improvement in process, providers, and experience.

Sierra7, Inc. (Sierra7) has supported VA across 75 Task Orders (TOs), including leading 36 active VA TOs as the prime contractor maintaining a 4.4 out of 5.0 Quality Assurance Surveillance Plan (QASP) score, with a range of services, including program management, software development and sustainment, testing and evaluation, unified communications, 508 enablement, infrastructure, maintenance, Help Desk, network troubleshooting, and software configuration. Sierra7 brings significant experience in navigating VistA technology on our VistA Blood Establishment Computer Software (VBECS) task order, working with the VA Enterprise Cloud (VAEC) on our Light Electronic Action Framework (LEAF) and Enterprise Security Engineering Compliance and Validation Service Support (ESECVS) task orders, and working with VA data requirements on our Data Discovery, Analytics and Labeling (DDAL) and Office of Enterprise Integration (OEI) Data Acquisition tasks. Sierra7 experience across our support of VA brings a robust capability that can efficiently deliver the technical and clinical skills needed to offer VA the insight needed to improve Veteran care outcomes with the data assessed in this effort.

### Technical Approach (RTEP B.1.1)

**Understanding**: VA has embarked on a critical project aimed at enhancing the quality and effectiveness of healthcare services provided to Veterans. This initiative centers around the VAEC, where all VistA systems have been migrated. A benefit of this migration is being able to leverage the cloud built-in traffic logging capabilities to gain unprecedented insights into the actual clinical workflows at VA medical centers. VA seeks to capitalize on this opportunity by analyzing the communication traffic between VistA clients and servers. The core objective is to generate actionable insights into the current clinical care practices based on real-time data rather than assumptions or theoretical models. This analysis will inform improvements in standards of care, potentially revolutionizing how healthcare is delivered within the VA system. Sierra7 is a partner to VA that is highly capable of delivering critical insights that drive continuous improvement in VA healthcare services.

**Approach**: Sierra7’s approach to the VA VistA Application Analytics task order is rooted in leveraging cutting-edge cloud-based analytics tools to provide detailed insights into the communication traffic between VistA clients and servers. In fulfilling this effort, Sierra7 is tasked with the comprehensive analysis of data traffic between VistA clients and a representative sample of VistA servers hosted in the VAEC. This involves identifying and understanding the patterns of clinical activities, the types of data exchanged, and the efficiency of various processes using non-invasive, and repeatable procedures, allowing VA to apply these methods in future evaluations. **The end goal is to deliver a series of detailed reports that offer concrete recommendations for enhancing the delivery of care to Veterans.** These reports will also guide VA in conducting similar analyses independently, delivering sustained improvements in healthcare quality. This project requires a strong focus on project management, with regular progress reports and a clear plan for capturing and analyzing VistA traffic without disrupting ongoing medical operations. This effort is critical in aligning healthcare practices with actual patient care activities, fostering a data-driven approach to continuous improvement in Veteran healthcare.

Our primary focus is on using the VAEC built-in capabilities for traffic logging, a non-invasive and secure method for capturing data. This traffic data will be captured across a representative sample of VistA systems, including those supporting large integrated medical facilities. The captured traffic, primarily utilizing proprietary Remote Procedure Call (RPC) protocol, will be analyzed using advanced data analytics tools such as AWS Data Analytics services, Python-based scripting, and GitHub for version control and report composition. The analysis will focus on identifying user behaviors, clinical workflow patterns, and any areas of concern that could impact the quality of care provided. The findings will be documented in detailed Traffic Analysis Reports, which will be stored in a VA Enterprise GitHub repository. Our technology stack is available on currently VA-owned assets and on the VAEC.

A key aspect of the approach is the development of a repeatable process for traffic capture and analysis. This process will be documented in a Standard Operating Procedure (SOP) that allows VA to replicate the analysis across other VistA instances or as part of future initiatives. The SOPs will be written into Playbooks which will allow VHA Stakeholders to gather data and perform analysis in a repeatable turn-key fashion. This benefit will allow for self-sufficiency minimizing the need for reliance on contractor staff and realizing an increasing return on investment (ROI). **Table 1** outlines several benefits of Sierra7’s approach.

Table 1: Benefits of Sierra7 Approach

|  |  |
| --- | --- |
| **Win Themes** | **Key Benefits** |
| * **Non-invasive data capture**: Sierra7 approach leverages the built-in capabilities of VAEC, so that the VistA systems remain unaffected during traffic capture, minimizing disruption to ongoing medical operations. * **Advanced analytics for actionable insights**: By using sophisticated cloud-based analytics tools, Sierra7 will deliver precise and actionable insights that will lead to tangible improvements in clinical workflows and patient care. * **Repeatability and future readiness**: The development of a repeatable SOP allows VA to continue to benefit from this approach in future analyses, making it a sustainable solution. | * **Enhanced clinical care standards**: The insights derived from the traffic analysis will directly inform improvements in clinical practices, leading to better patient outcomes. * **Data-driven decision-making**: By basing recommendations on actual traffic data, VA can implement changes with confidence, knowing they are grounded in the realities of current clinical practices. * **Scalability and adaptability**: The repeatable process and SOP developed will allow VA to scale this analysis across other VistA systems or future projects, for long-term value and adaptability. |

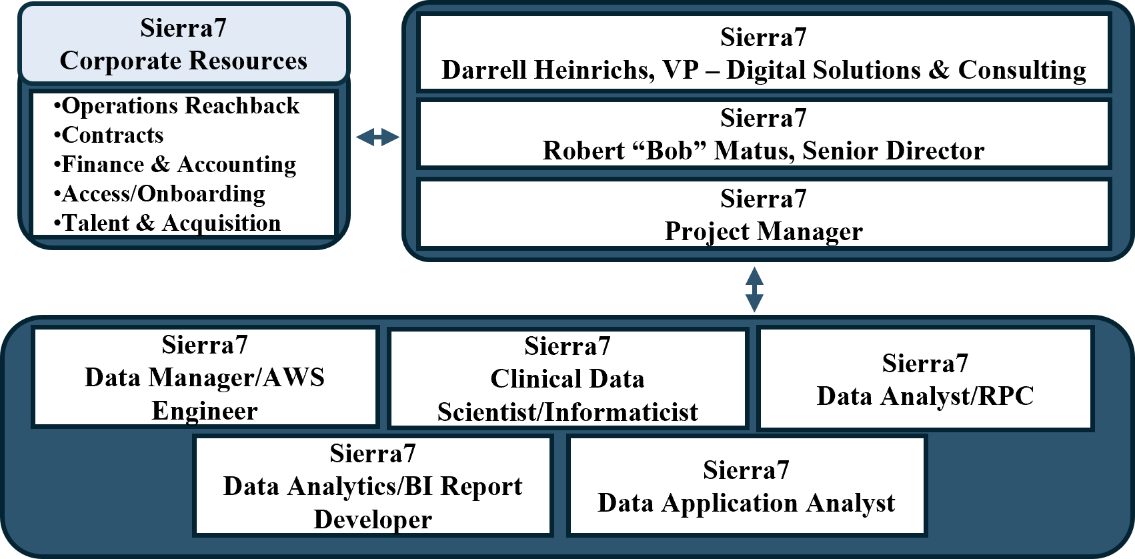
**Our People and Delivery Team:** This purpose-built, lean, and agile team is uniquely positioned to deliver each of the task areas for the VistA Application Analytics project with precision and efficiency. Comprising experts in project management, data science, AWS engineering, RPC analysis, and business intelligence, the team is designed to be both highly specialized and versatile, enabling each aspect of the project to be handled by individuals with the most relevant skills and experience. The agile team structure allows for rapid adaptation to evolving project needs to meet any challenges with swift and effective solutions. This configuration provides the efficient, optimized execution of tasks such as RPC traffic analysis, data integration, and cloud infrastructure management and align with the VA goals for improved patient care. By leveraging a blend of deep technical expertise and a flexible, results-driven approach, our team is best suited to deliver impactful outcomes that support the VistA Application Analytics project. **Table 2** details our team roles and responsibilities.

Table 2: Sierra7 Team Roles and Responsibilities

|  |  |
| --- | --- |
| **Role** | **Responsibilities** |
| Project Manager | The Project Manager is responsible for overseeing the entire execution of the project and to align project tasking with the VA strategic goals and objectives. This role requires close coordination with various teams and stakeholders to facilitate smooth communication and collaboration throughout the project lifecycle. The Project Manager manages timelines to meet deliverables submission dates on schedule while also tracking milestones and adjusting plans as needed. The Project Manager identifies, assessing, and mitigating risks to prevent any disruptions to project progress. This role is crucial in maintaining the overall health of the project, balancing scope, quality, and resources to meet the VA expectations. Ultimately, the Project Manager acts as the central point of contact, driving the project towards successful completion while keeping all parties informed and engaged. |
| Clinical Data Scientist/ Informaticist | The Clinical Data Scientist/Informaticist is a key player in the project, tasked with analyzing clinical data and VistA RPC (Remote Procedure Call) traffic to extract meaningful insights that can significantly enhance patient care. This role requires close collaboration with IT teams so that the integration of data aligns with clinical workflows to provide relevant and actionable information. By focusing on the analysis of VistA RPC traffic, the Clinical Data Scientist/Informaticist can identify patterns and trends that inform improvements in clinical decision-making and overall healthcare delivery. Their work supports data-driven strategies and provides that the technical aspects of data handling are optimized to support the VA patient care goals. This role is crucial in maintaining the integrity and accuracy of clinical data throughout the project, making sure that information used for analysis is secure, precise, and aligned with VA standards. Through their efforts, the Clinical Data Scientist/Informaticist so that the project contributes directly to the enhancement of patient outcomes within the VA system. |
| Data Analyst/RPC | The Data Analyst/RPC plays a critical role in capturing, monitoring, and analyzing RPC traffic data within the VistA system for optimal performance and security. This role involves meticulously tracking the flow of RPCs, identifying patterns and anomalies that could indicate potential issues within the system. By providing detailed insights into system performance, the Data Analyst/RPC helps to preemptively address any bottlenecks or inefficiencies that could impact the delivery of healthcare services. This role is key in identifying and mitigating potential security vulnerabilities to maintain robust and secure systems. Through their analysis, the Data Analyst/RPC contributes to the continuous improvement of system reliability and patient care. This position requires a strong understanding of both the technical aspects of RPC traffic and the broader implications for system operations and patient outcomes. |
| Data Analytics/BI Report Developer | The Data Analytics/BI Report Developer is responsible for developing comprehensive Business Intelligence (BI) reports and dashboards that transform complex data into clear, actionable insights. Utilizing a range of data analytics tools, this role involves analyzing large datasets to identify trends, patterns, and key performance indicators that support informed decision-making within the VA. The BI Report Developer reports and dashboards are not only visually engaging but also tailored to meet the specific needs of various stakeholders, providing them with the information necessary to enhance system performance and patient care. This role is crucial in bridging the gap between raw data and strategic action to produce relevant and accurate information accessible to reviewers. By creating user-friendly dashboards, the Data Analytics/BI Report Developer empowers VA teams to make timely, evidence-based decisions that align with organizational goals. |
| Data Manager/AWS Engineer | The Data Manager/AWS Engineer is integral to the management and optimization of data within the AWS environment, specifically within the VAEC. This role involves overseeing the storage, retrieval, and security of data. Information is both accessible and protected according to VA standards. In addition to data management, the Data Manager/AWS Engineer is responsible for implementing and maintaining the AWS infrastructure to support the project needs for scalability, security, and compliance. This position requires the ability to architect and design cloud infrastructure that is robust, secure, and compliant with relevant regulations and best practices. The Data Manager/AWS Engineer also plays a critical role in making the cloud solutions scalable, allowing them to grow and adapt as requirements evolve. By maintaining a focus on security and compliance, cloud-based solutions meet the stringent demands of data governance, thereby supporting the overall integrity and success of the project. |
| Data Application Analyst | The Data Application Analyst plays a crucial role in analyzing application data and workflows to for efficient and effective data processing within the systems. This role involves a deep dive into how data is managed and processed through various applications, identifying any bottlenecks or inefficiencies that could be optimized. By thoroughly understanding these workflows, the Data Application Analyst is able to pinpoint areas where improvements can be made, whether through optimization of current processes or through the integration of new tools and technologies. This role is essential for maintaining the smooth operation of data-driven systems for efficient, scalable alignment with business needs. The Data Application Analyst works closely with other teams to integrate these optimizations within existing systems. |

**Project Organization.** Our project organization, depicted in **Figure 1** below, provides a clear overview of the project's structure and key roles, outlining how the team is organized to deliver efficient and effective management. It illustrates the hierarchy and reporting relationships within the VistA Application Analytics project, highlighting the primary points of contact and their responsibilities. Sierra7’s defined project organizational structure identifies each project team member’s roles and responsibilities and facilitates streamlined communication and coordination across all levels to best deliver customer service.

Figure 1: VistA Application Analytics Project Organizational Structure



**Technical Stack and Architecture**. To effectively achieve the desired outcomes, the proposed tech stack will be assembled into a containerized solution using Docker and orchestrated via Amazon Elastic Kubernetes Service (EKS). This approach brings a solution that is modular, scalable, and easily deployable within its own VAEC instance, offering the flexibility to be turned on/off or deployed at will. At the core of our proposed architecture is the use of Splunk and leveraging its unique capabilities to scale and seamlessly integrate within the VAEC AWS architecture and native functions. This expanded stack provides a comprehensive set of TRM-approved tools to address the technical requirements laid out in the PWS. The following Integration and Capability components enable Sierra7 to build a VistA Application Analytics platform that is non-intrusive and portable across any VistA instance. **Table 3** illustrates our use of Splunk within the VAEC.

Table 3: Splunk Integration within the VAEC

| **Component** | **Integration and Capability Overview** |
| --- | --- |
| AWS Integration | Splunk integrates seamlessly with AWS. It can be deployed directly on AWS through AWS Marketplace, and it has pre-built integrations with various AWS services, including Amazon S3, CloudWatch, and CloudTrail. For this project, Splunk can be used to ingest, monitor, and analyze the VistA traffic logs stored in VAEC, providing an additional layer of real-time data analysis and visualization. Using the AWS Data Analytics Services the solution supports processing and analyzing large volumes of captured traffic data. |
| Data Ingestion | Splunk can efficiently ingest data from various sources, including the RPC traffic logs captured within VAEC. It supports a wide range of data formats and can parse structured and unstructured data, making it an ideal tool for analyzing the diverse types of information being captured from VistA systems. |
| Python Integration | Splunk works well with Python, especially for more advanced data processing and automation tasks. Splunk REST API can be accessed using Python scripts, allowing custom data queries, report generation, and even integration into the broader data analysis pipeline already planned. Leveraging Python for custom data parsing, analysis/automation reporting. |
| GitHub Integration | While GitHub is typically used for version control of code and documentation, Splunk can integrate with GitHub for automated processes, such as pushing results or configurations from Splunk searches into GitHub repositories. This will support storing analysis reports or configurations used in traffic analysis. |
| AWS Glue | AWS Glue is a fully managed ETL (Extract, Transform, Load) service that makes it easy to prepare and load data for analytics. It can be used to transform and catalog the VistA traffic data before analysis and integrates seamlessly with other AWS services like Amazon S3, Amazon Athena, and Amazon Redshift, and can work well alongside Splunk for data preparation tasks. |
| Amazon Athena | Athena is an interactive query service that allows you to analyze data in Amazon S3 using standard SQL. It can be used to run complex queries on the captured VistA traffic data, providing quick insights without needing to set up complex databases. Athena integrates directly with AWS Glue and S3, making it a natural extension for querying the VistA data stored in S3. |
| Amazon Redshift | Amazon Redshift is a fully managed data warehouse that can scale to process large amounts of data quickly. It can be used for deeper data analysis and to store large volumes of processed traffic data. Integrates with AWS Glue, Athena, and other AWS analytics services, as well as third-party tools like Splunk, providing a robust platform for handling large datasets. |
| Apache Kafka | Kafka is a distributed streaming platform that can be used for building real-time data pipelines. In this project, Kafka will be employed to stream VistA traffic data in real-time to analytics tools like Splunk. We will use the managed Kafka service that integrates with other AWS services feeding data directly into Splunk or an AWS Redshift cluster for real-time analytics. |

**Advanced RPC Logging and Visualization:** To enhance the capabilities of our solution and deliver unparalleled insights, we have integrated RPC log visualization capabilities with Splunk within our overall tech stack. This combination brings an additional layer of intelligence and robustness to RPC logging and visualization, making it a key differentiator in our approach. Using log data, we will enhance the capabilities of our solution and deliver unparalleled insights, by integrating visualization-based layer within our overall tech stack. This combination brings an additional layer of intelligence and robustness to RPC logging through visualization, making it a key differentiator in our approach. RPC traffic is not only captured accurately but also visualized with a level of depth unmatched by conventional methods by utilizing a comprehensive visualization and behavioral analysis capabilities. This enables us to ingest RPC logs and other system behaviors, providing real-time insights into the relationships between various components and the flow of RPCs. This integration with Splunk capabilities of powerful data processing and monitoring tools allows us to detect anomalies, identify irregularities, and assess potential security threats with greater precision. In addition to visualization, we will create a digital twin of the VAEC environment within a test setting. This capability is instrumental in simulating changes and understanding their impact. Such simulations are particularly beneficial when preparing for tasks like Client Use Improvement Reports (PWS 5.2.4) and the Optional Period analyses (PWS 5.3.1 and 5.3.2), enabling us to refine our approach and deliver highly effective results. Our tech stack sets our proposal apart by offering a unique blend of visualization, advanced analytics, and real-time situational awareness. This forward-thinking approach underscores our commitment to providing a comprehensive solution with the highest levels of security, performance, and reliability for VistA systems.

**Table 4** describes the integration of Core Tools and how they support the architecture. We will use AWS CodePipeline as a fully managed continuous delivery service that automates release pipelines for application and infrastructure updates. We will integrate with the VA Enterprise GitHub for version control and AWS services for deployment for seamless updates and rollbacks if needed. This CI/CD pipeline supports the containerization of the analytics applications (e.g., Python scripts, Splunk forwarders) and provides portability that can be scaled easily across different environments.

Table 4: Integration of Core Tools and Architecture Support

| **Core Tools** | **Overview** |
| --- | --- |
| **Data Management and Analytics** -  **AWS Glue**:AWS Glue will handle the ETL processes, transforming raw traffic data into a structured format suitable for analysis. This data will be cataloged and stored in Amazon S3, ready for querying.  **Amazon Athena**: Athena will be used to run SQL queries directly on the data stored in S3, allowing for quick insights without the need for complex database setups.  **Amazon Redshift**:For more intensive data analysis, Redshift will serve as the data warehouse, storing large volumes of processed traffic data that can be queried and analyzed further. | **Efficient Data Transformation and Preparation**:AWS Glue automates the ETL (Extract, Transform, Load) process, simplifying the conversion of raw VistA traffic data into a structured format ready for analysis. This automation reduces the manual effort required for data preparation, resulting in data that is consistently formatted, accurate, and readily available for further processing and analysis.  **Quick and Cost-Effective Querying**:Amazon Athena allows for running SQL queries directly on the structured data stored in Amazon S3 without the need for setting up or managing complex databases. This serverless querying capability provides quick insights and is cost-effective, as you only pay for the queries you run, which optimizes resource use and reduces operational overhead.  **Seamless Integration and Scalability**:AWS Glue and Amazon Athena integrate smoothly with other AWS services, such as S3 and Redshift, creating a cohesive data pipeline that easily scales with project demands. As the volume of VistA traffic data grows, this integrated approach maintains the efficiency and responsiveness of data management and analytics processes, adapting to the evolving needs.  **High Performance for Complex Queries**: Amazon Redshift is optimized for handling complex, large-scale queries across massive datasets. It uses columnar storage and advanced compression techniques, which significantly speeds up query performance. This capability is crucial for intensive data analysis tasks, enabling VA to quickly process and analyze large volumes of VistA traffic data, leading to more informed and timely decision-making.  **Advanced Analytics and Data Integration**: Redshift supports integration with a wide range of data analytics tools, including machine learning models and business intelligence platforms like AWS QuickSight. This allows the project to not only perform deep historical analysis but also to apply predictive analytics, uncovering trends and patterns that can drive continuous improvement in clinical workflows and healthcare delivery within the VA system. |
| **Real-Time Data Streaming**: Apache Kafka (AWS Managed Streaming for Kafka): Kafka will enable real-time data streaming from the VistA systems to Splunk, useful for monitoring live clinical workflows. | **Immediate Data Availability**: Kafka enables real-time streaming of data from VistA systems to Splunk making data available for analysis as soon as it is generated. This immediacy is critical for monitoring live clinical workflows, allowing VA to respond swiftly to any issues.  **High Throughput and Scalability**: Kafka is designed to handle high volumes of data with low latency, making it ideal for managing the continuous flow of traffic logs from multiple VistA systems. Its distributed architecture allows the system to scale horizontally, accommodating increased data loads without sacrificing performance as the system grows/scales.  **Fault Tolerance and Reliability**: Kafka is a robust architecture that upholds data integrity and reliability, even in the event of system failures. With built-in replication and fault tolerance, it guarantees that no data is lost during transmission, maintaining a consistent and reliable streaming process—essential for continuous and accurate monitoring of clinical workflows.  **Stream Processing Capabilities**: Kafka stream processing features allow for the real-time processing and filtering of data before it reaches Splunk. This capability enables the system to handle only the most relevant data, reducing the load on downstream systems. |
| **Automation and Infrastructure Management -**  **Terraform**: Terraform will automate the provisioning of AWS resources for a consistent and reliable deployment process. This will be complemented by AWS CloudFormation for managing the cloud infrastructure.  **AWS CloudTrail**: CloudTrail will audit and track all user activities and API interactions within the VAEC, enhancing security and compliance. | **Consistent and Reliable Infrastructure Deployment**: Terraform automates the provisioning and management of AWS resources to deploy infrastructure consistently across different environments. This automation reduces the risk of human error, enhances reliability, and speeds up the deployment process, the project quickly scales/adapts to changing requirements.  **Enhanced Security and Compliance Monitoring**: AWS CloudTrail offers comprehensive logging and auditing of user activities and API interactions within the VAEC environment. This visibility into every action taken allows the project to adhere to strict security and compliance standards, which is particularly important for managing sensitive healthcare data within VA.  **Scalability and Flexibility**: Terraform infrastructure as code (IaC) approach allows for easy scaling and modification of the infrastructure as the project evolves. It enables rapid adjustments to the environment without manual reconfiguration. Infrastructure can quickly respond to new demands or changes in the project scope. This flexibility is crucial for maintaining the efficiency and effectiveness of the project as it grows.  **Terraform**:Infrastructure as Code (IaC) tool will be used to build, change, and version infrastructure. |
| **Containerization and Orchestration**:Docker and Kubernetes (Amazon EKS): The entire solution will be containerized using Docker, making each component portable and easily manageable. Kubernetes, via Amazon EKS, will orchestrate these containers so that the solution is scalable and can handle varying workloads. This setup allows the solution to be turned on/off as needed, deployed across different VAEC instances, and scaled according to demand. | **Portability and Consistency:** Containerizing the solution using Docker allows each component to run consistently across different environments, whether on a developer machine or in the VAEC. This portability eliminates compatibility issues, simplifying deployment and management across multiple VAEC instances without concerns about environment-specific configurations.  **Scalability and Flexibility**: Kubernetes, managed through Amazon EKS, provides powerful orchestration capabilities that allow the solution to scale automatically based on workload demands. This capability enables the system to efficiently handle varying traffic loads, from routine operations to peak periods, without manual intervention. The flexibility to scale up or down as needed optimizes resource usage and maintains performance.  **Ease of Deployment and Management**: The combination of Docker and Kubernetes allows the entire solution to be deployed, updated, and managed with minimal effort. The ability to turn the solution on or off, or redeploy it across different VAEC instances as required, provides significant operational flexibility. This setup supports continuous integration and delivery practices, enabling rapid iterations and updates while maintaining system stability and reliability. |
| **Data Flow and Processing Automation**:Apache NiFi will automate the movement and transformation of data between different systems, streamlining the data flow process. Data from VAEC will be efficiently routed to Splunk, AWS Glue, and other tools in the stack. Streamlined data flows facilitate real-time analysis and reporting, enabling faster decision-making. | **Streamlined and Efficient Data Movement**: Apache NiFi automates the entire process of moving and transforming data between different systems within the tech stack. This automation safeguards that data is efficiently routed from VAEC to Splunk, AWS Glue, and other tools without manual intervention, reducing the risk of errors and delays.  **Flexible and Scalable Data Integration**: Apache NiFi flexible architecture allows integration with a wide variety of data sources and destinations, simplifying the connection of different components within the tech stack. Its scalability allows NiFi to handle increased data volumes without compromising performance. This flexibility and scalability are crucial for maintaining smooth data operations as the project evolves and expands. |
| * + **BI and Reporting**: AWS QuickSight will complement Splunk visualization capabilities, offering executive-level dashboards and reports that provide high-level insights into the analysis.   **Confluence or Microsoft SharePoint**: These tools will be used for documenting processes, SOPs, and sharing information across the team. They will serve as the central repository for all project documentation. | **Comprehensive and Actionable Insights**: AWS QuickSight enhances the project reporting capabilities by providing executive-level dashboards and visualizations that complement Splunk real-time analytics. These high-level insights are tailored for decision-makers, enabling them to quickly understand complex data patterns and trends, make informed decisions, and align strategies with project objectives.  **Centralized Knowledge Management and Collaboration**: Confluence or Microsoft SharePoint serves as a centralized hub for project documentation, including processes, SOPs, and collaborative content. This central repository provides team members and stakeholders with access to the latest information, fostering better communication, alignment, and collaboration across the project. This consistency is key to maintaining project integrity focus on established goals.  **Enhanced Collaboration and Accountability**:Confluence or Microsoft SharePoint provides features like real-time document editing, version control, and task management. These tools enable effective collaboration, track progress on deliverables, and maintain accountability across the project for organized and successful execution. |
| **Security and Credential Management**: AWS Secrets Manager: Secrets Manager securely manages credentials and API keys required by different services within the AWS environment protecting sensitive information | **Enhanced Security and Compliance**: AWS Secrets Manager make certain that sensitive credentials and API keys are securely stored and managed, reducing the risk of unauthorized access. By automating the rotation and management of secrets, it helps maintain compliance with security policies and best practices, protecting critical information throughout the project.  **Simplified Secret Management**: Automates the process of managing and rotating credentials, reducing the administrative burden on the team. This simplifies security operations, secrets are always up to date, minimizing the potential for security vulnerabilities. |
| **Deployment and Operation**: The containerized solution, orchestrated via Kubernetes, will reside in its own VAEC instance. This design allows for On-Demand Deployment. The solution can be deployed at will, enabling rapid scaling or shutdown as project demands fluctuate.  **Flexibility and Modularity**: With minimal disruption, Components can be updated or replaced independently.   * **Enhanced Security**: Isolating the solution within its own VAEC instance provides an additional layer of security to manage sensitive data within a controlled environment. This comprehensive, containerized approach meets the technical and operational requirements are met for the project, providing VA with a robust, scalable, and secure solution. | **On-Demand Deployment and Scalability**: The containerized solution, managed via Kubernetes, allows for rapid deployment and scaling based on project needs. This flexibility allows for efficient use of resources, with the ability to quickly scale up during peak demand or scale down when not required, optimizing cost and performance.  **Flexibility and Modularity**: The modular design of the containerized solution allows individual components to be updated or replaced independently with minimal disruption to the overall system. This approach supports continuous improvement and adaptation to meet evolving project requirements.  **Enhanced Security**: By isolating the solution within its own VAEC instance, the project benefits from an additional layer of security. This controlled environment provides for securely managing sensitive data, reducing the risk of unauthorized access or data breaches.  **Robust and Resilient Architecture**: The comprehensive containerized approach provides a robust and resilient solution that meets both technical and operational requirements. This architecture provides for high availability and reliability, critical for maintaining consistent performance and meeting stringent VA standards.  **Integrated Scalable Architecture**: The use of Kubernetes within the VAEC enables seamless integration of various components, allowing them to work together efficiently while maintaining the ability to scale as needed. This integrated architecture supports the dynamic demands of the project for processing growing data volume and maintaining system performance and stability.  **Streamlined Deployment and Operation:** Facilitates streamlined deployment processes, allowing for rapid provisioning, testing, and deployment within the VAEC environment. This operational efficiency reduces downtime and accelerates the implementation of updates or new features. |

**Solution Testing and Simulation.** It is crucial that the approach is fully functional, secure, and non-disruptive before implementing the solution to capture RPC logs from the production VistAs. We will use a VA-provided VistA test environment to establish a controlled setting to rigorously test the solution. This approach mitigates risks, improves accuracy, and provides confidence that the traffic logging mechanisms will perform as intended when applied to production systems. When the VistA test environment is made available by VA, Sierra7 will coordinate with VAEC maintainers and VistA managers to set up the environment to mirror the configurations and traffic patterns expected in the production VistAs. The technical stack detailed in our proposal, including Splunk, AWS Glue, Amazon Athena, Docker, Kubernetes (Amazon EKS), and Apache Kafka, will be deployed within the VistA test environment. This deployment will follow the same procedures as intended for the production environments for consistency and reliability in results. The RPC traffic capture mechanisms will be configured in the VistA test environment using the same setup that will be used in production. This includes the setup of non-invasive logging procedures without modifications to the VistA system or its client interfaces.

Sierra7 will work with VA stakeholders to generate simulated RPC traffic that reflects typical clinical workflows and data exchanges in the production VistAs. This simulated traffic will help to assess the ability of the solution to accurately capture and log the relevant RPC data. During the testing phase, the captured RPC traffic will be monitored in real-time using Splunk and AWS data analytics tools. This monitoring will allow us to verify that the traffic is being captured accurately, without any loss of data or impact on system performance. The captured data will undergo rigorous validation to verify that it accurately represents the simulated traffic, including checks for data completeness, integrity, and the correct categorization of user activities and RPC calls. The solution will be subjected to performance testing to determine the upper threshold to handle the expected volume of traffic without causing latency or other performance issues. The solution will be tested for compliance with VA security and privacy standards, particularly regarding the handling of Personally Identifiable Information (PII) and Protected Health Information (PHI). Data utilized will be sanitized and protected in accordance with HIPAA and VA policies.

Sierra7 will document the results of the testing phase, including any findings, issues encountered, and corrective actions taken. This documentation will be included in a Test Environment Traffic Logging Report, which will be shared with VA stakeholders for review and approval. Based on feedback from VA stakeholders and any lessons learned during the testing phase, Sierra7 will refine the traffic capture and analysis processes to optimize the solution for deployment in production environments. Once the solution has been successfully validated in the VistA test environment, Sierra7 will prepare for the transition to the production VistAs. This preparation will include a final review of the configuration, testing of deployment procedures, and a readiness assessment of the implementation. The validated solution will then be deployed to the identified production VistAs, where it will begin capturing RPC traffic as originally planned. Sierra7 will continue to monitor the solution closely during the initial production. Any potential issues are identified and resolved by testing the solution in a controlled environment before impacting the production systems. The use of a VistA test environment validates that the traffic logging mechanisms function as intended, capturing accurate and complete data without disrupting ongoing medical operations. This approach provides VA stakeholders with confidence in the solution performance and reliability, paving the way for a successful production implementation.

#### 2.1 Project Management (PWS 5.1)

Team Sierra7 proactively manages quality assurance and quality control activities to drive high-quality performance in our project management delivery. This is accomplished using our defined processes based on industry best practices such as CMMI, ISO, ITIL, and PMBoK, and uses an internal governance that monitors and supports overall project health and quality delivery. This approach has been successfully implemented on more than 50 VA projects and is fully compatible with VA DevSecOps, PLM, U.S. Digital Services Playbook (DSP), and SAFe for efficient program execution and delivery. **Table 5** describes our support for the required project management activities and deliverables.

Table 5: Project Management and Deliverables

| **PWS Section** | **Approach** |
| --- | --- |
| **Contractor Project Management Plan (CPMP) (PWS 5.1.1)** | Our PM plans, organizes, and assigns resources; aligns status and progress; records and reports ongoing progress; oversees quality assurance; administers and documents change control; manages risk; and monitors task performance and project milestones/timelines aligned to the established scope, schedule, and baselines. In partnership with VA, our PM facilitates transparent communication across the contract using four key elements: Planning, Communications, Risk and Quality Management, and Resource Management. The **Contractor Staff Roster** is delivered to the VA COR within three business days after award. For planning, our team develops and manages the **CPMP** (***PWS 5.1.1 A***) and its integrated schedule of the team progress, with consistent monitoring of deliverables, milestones, risks, and resources, with delivery within 30 calendar days after award and monthly thereafter. Using collaborative tools such as SharePoint, MS Teams, and Outlook, we communicate clear reporting touch points (daily, weekly, and monthly), depending on priority level, and liaise with stakeholders on processes and progress. As part of the CPMP, we work with VA stakeholders to identify risks and mitigate them before they become an issue. Our team resource management, documented in the CPMP, involves long-term planning and oversight of resource and budget planning using performance indicators, such as achieved SLA requirements and lean management techniques, and conducting customer feedback meetings. The initial baseline CPMP is concurred upon and updated in accordance with Section B of the contract. Sierra7 updates and maintains the VA PM approved CPMP throughout the Period of Performance. |
| **Reporting Requirements (PWS 5.1.2)** | We provide the COR a Monthly Progress Report (MPR) on the first day of each month, in MS Word format, reflecting data captured for the previous month. The **MPR** (***PWS 5.1.2 A***) includes all information required by **PWS 5.1.2**, including but not limited to updates on all project milestones and their anticipated completion dates, invoicing data, an assessment of current month and future month activities, and a discussion of any issues related to contract performance or administration. Our report proactively identifies problems and offers remediation approaches to resolve them, including an overall plan and timeline for closing out the issue. Our PM maintains open and transparent communications with VA to address any issues encountered rapidly and keep the need for issue escalation to a minimum. |
| **Technical Kickoff Meeting (PWS 5.1.3)** | We will meet the requirements described in **PWS Section 5.1.3** when the Technical Kickoff Meeting is held within 10 days of TO award. Our team lead will provide an agenda at least five (5) calendar days prior to the meeting; once approved, we will distribute to the appropriate audience. The Agenda will highlight that during the meeting, Sierra7 will present, for review and approval by VA, our approach, work plan, and project schedule for each effort in a Microsoft PowerPoint format. Once the meeting concludes, we will provide a ‘Summary Report’ slide in the Technical Kickoff Meeting Presentation that has captured any major issues, agreements, or disagreements discussed during the kickoff meeting and the following statement “As the Post-Award Conference Chairperson, I have reviewed the entirety of this presentation and assert that it is an accurate representation and summary of the discussions held during the Technical Kickoff Meeting for the VistA Application Analytics effort.” We will convert the PowerPoint deck into a Microsoft Word document and provide this to the CO for review and signature within three (3) calendar days after the meeting. |

#### 2.2 VistA Client Traffic Capture and Analysis (Base Period) (PWS 5.2)

##### 2.2.1 Capture of VistA Client Traffic (PWS 5.2.1)

**Understanding**:Sierra7 will coordinate the non-invasive logging of RPC traffic for three VAEC-hosted VistA systems without changes or modifications to the VistA systems themselves or their client interfaces. This includes identifying three specific VistAs in collaboration with the Government, obtaining necessary permissions from VistA managers, and configuring the logging of all RPC traffic. At least one of the selected VistAs must support a large integrated medical facility. Sierra7 will monitor the logging process at least a one-month period, securely capturing and storing it within VAEC. We develop a Standard Operating Procedure (SOP) documenting the processes and permissions required for traffic logging for repeatability and compliance in future endeavors.

**Approach**:Sierra7 anticipates that from setting up and configuring of the VistA Traffic Logging analytics platform to the delivery of the **VistA Traffic Logging Standard Operating Procedure** (***PWS 5.2.1 A***) will be completed within 4 to 5 months of contract award. We have included in our schedule estimation the time to tune and calibrate the platform for efficiency and refine the processes to curate the RPC data that is collected. We place safeguards to scan for any personally identifiable information (PII) or Protected Health Information (PHI) contained in the data and all Privacy and HIPPA safeguards are in place. Our approach for each project task to be performed in five phases is outlined in **Table 6**.

Table 6: Timeline and Task Approach

| **Phase/Duration** | **Task** | **Approach** |
| --- | --- | --- |
| **Phase 1 (Weeks 1-4)**  **4 weeks** | Planning and Initial Coordination | * Identify VistAs and Obtain Permission. * Set up the VistA Traffic Logging analytics platform. * Collaborate with the Government to identify the three VAEC-based VistAs to be analyzed. * Obtain necessary permissions from the VistA managers and stakeholders. * Set up communication channels with VistA managers, VAEC maintainers, and other stakeholders. |
| **Phase 2 (Weeks 5-6)**  **2 weeks** | Configuration / Preparation of RPC Traffic Capture | * Coordinate with VAEC maintainers to set up and configure the non-invasive RPC traffic capture for the three identified VistAs. * Perform initial tests verifying the logging configuration without impacting the VistA systems. |
| **Phase 3 (Weeks 7-14)**  **8 weeks** | Traffic Logging and Monitoring | * Start the RPC traffic logging for three VistAs. * Monitor the logging process for consistent and complete data capture. * Store captured data securely within VAEC. * Conduct regular status checks and address any issues that arise during the logging period. |
| **Phase 4 (Week 15)**  **1 week** | Data Review and Initial Analysis | * Review the captured data for completeness and accuracy. * Prepare initial findings and reports for the Government, highlighting any immediate concerns or insights. |
| **Phase 5 (Weeks 16-17)**  **2 weeks** | Develop SOP Documentation | * Develop VistA Traffic Logging SOP * Document the entire process, including steps taken, configurations used, permissions required, and lessons learned. * Review the SOP with relevant stakeholders, including VAEC maintainers and VistA managers. * Finalize the SOP and deliver it to the Government. |

Sierra7 brings a comprehensive approach to identifying VistAs for obtaining permission, configuring, monitoring, and finalizing Non-Invasive RPC Traffic Logging includes seven major steps and associated tasks spanning across the five phases described above in **Table 6** above.

**Step 1: Identification of Target VistAs**. In this step, we identify and begin collaborating and engaging with key stakeholders that include VA Enterprise Cloud (VAEC) representatives and VA Office of Information and Technology (OIT), briefing them on project scope and Sierra7 approach. Any concerns or adjustments to the approach are documented. Upon agreement with COR, we proceed to identify potential VistA systems hosted on VAEC to be added to a candidate list, with a focus on those critical to healthcare delivery, particularly those supporting large integrated medical facilities.

**Step 2: Developing the Criteria for Selection**. We establish selection criteria based on factors such as facility size, RPC traffic volume, operational complexity, and stability. At least one of the selected VistAs supports a large, integrated medical facility for a representative sample of traffic. To develop a comprehensive list of criteria, we engage project stakeholders and the COR to validate that the anticipated sample sizes are adequate for the anticipated reporting period and reporting attribute types needed.

**Step 3: Review and Finalize Selection**.We review the analysis of potential candidates with VA and finalize the selection of the three VistA systems.

**Step 4: Developing and Approving a Memorandum of Understanding (MOU)**. After selecting the VAEC VistA systems that are in scope for the RPC logging/data capture, we will draft the appropriate MOUs with the VistAs outlining the scope, roles, responsibilities, data security, privacy considerations, and timelines. Each MOU will emphasize the non-invasive nature of the logging. The MOU is then circulated to relevant stakeholders, including VistA managers, VAEC maintainers, and the VA Privacy Office. Then we will address any concerns that may be raised related to data privacy, system integrity, and operational impact. Once concerns are addressed, we initiate the approval process by facilitating meetings with stakeholders to discuss and finalize the MOU and obtain formal sign-off, securing a commitment to the project. With an approved MOU, we begin the process of obtaining permissions and begin configuring the Non-Invasive RPC Traffic Capture. Following MOU approval, engage with VistA managers to discuss project objectives and secure buy-in. As needed, we provide detailed information on the logging process, including system integrity and data privacy protections. We then coordinate with the VAEC to set up and configure non-invasive RPC traffic capture for the identified VistAs while using configurations that align with VAEC policies and technical standards. To verify performance, we conduct initial tests to verify that the logging configuration functions without impacting VistA systems' performance or stability; monitor closely during testing to detect and resolve potential issues. To alleviate potential securing access concerns, we will comply with VA security standards and request access permissions from VistA managers and VAEC maintainers. Permissions requested pertain only to obtaining RPC traffic data logs. Permissions and configurations are documented in the MOU.

**Step 5: Starting RPC Traffic Logging and Monitoring**. We begin initiating with RPC Traffic Logging. Once the configuration is confirmed stable, we begin RPC traffic logging for all three VistAs. Through continuous monitoring, we verify that the process is non-intrusive and operates without impacting VistA systems. Our team performs continuous monitoring and data capture activities and provides daily reports. Our monitoring promotes consistent and complete data capture and identification of anomalies, initiates resolutions, or undertakes preventive action to safeguard the non-intrusive log-capturing activities and the performance of the VistA instance. We conduct regular status checks to identify and address any issues that arise during the logging period. Our process emphasizes a ‘Do No Harm’ philosophy and can be isolated from the VistA instance to only capture RPC traffic data. RPC traffic data is captured securely within VAEC, adhering to VA data security protocols. We conduct scans and implement safeguards to protect Personally Identifiable Information (PII) and Protected Health Information (PHI) in compliance with HIPAA and VA policies. Using Regular Expression (Regex) Scanning techniques, we will implement a lightweight and efficient method to identify patterns of PII/PHI data line SSN, addresses, names, etc. Once identifies we will sanitize the data through data masking rendering it unusable for unauthorized purposes while maintaining its usability for VistA Application Analytics RPC analysis. We will sanitize the data of PII, PHI, and HIPAA-protected data only showing volume, client type, connection volumes, frequency, and duration, types of user authentication/security and relative use, RPC usage frequency and execution times, RPC groupings – representing transactions, and RPCs specific to a VistA from cross-VistA RPCs. The log files may contain other attributes that are not considered sensitive data that will be kept for ad-hoc reporting purposes. A detailed Data Dictionary will be created allowing stakeholders to determine if additional reporting views are wanted. Based on feedback from monitoring, we will make any necessary adjustments to the logging setup to optimize performance and accuracy. These adjustments are documented and communicated any to relevant stakeholders.

**Step 6: Data Review and Initial Analysis**. After the logging period, we conduct a thorough review of the captured data to verify its completeness and accuracy. We analyze the data to identify any trends, anomalies, or issues that may require immediate attention and then begin the preparation of findings and reports. The initial findings are prepared, and reports are developed for the Government, summarizing the key insights, potential concerns, and any recommendations for further action. If there are immediate concerns or insights that could impact ongoing or future operations, we flag them for appropriate action.

**Step 7: Develop and Finalize the VistA Traffic Logging Standard Operating Procedure (SOP)**.Lastly, we document the entire process, including steps taken, configurations used, permissions required, and lessons learned throughout the project. Included in the documentation are detailed technical descriptions of the logging setup and any challenges encountered. Once the initial draft is completed, we review and solicit feedback from stakeholders. The draft SOP is shared with relevant stakeholders, including the VAEC, VistA managers, and the VA Privacy Office, for review, and the feedback received is then incorporated with necessary revisions into the SOP so that it is comprehensive and applicable for future use. The finalized and approved SOP is delivered and placed in the VA Enterprise GitHub for version control.

The Sierra7 process of identifying VistAs, obtaining permissions, configuring, monitoring, analyzing data, and developing the SOP is customer-focused and fully compliant with VA policies and privacy standards. Our approach provides a roadmap to successful project completion and establishes a robust framework for future traffic logging endeavors.

##### 2.2.2 Analysis of VistA Client Traffic (PWS 5.2.2)

**Understanding**:The VAEC serves as a critical platform for hosting VistA, a core system used by VA to manage Veterans' health records and related healthcare information. Given the complexity and the high volume of transactions processed through VistA, analyzing client traffic is crucial for determining optimal performance, security, and interoperability of VistA instances. The deliverable of Traffic Analysis Reports for each VistA is intended to provide a comprehensive understanding of user interaction, system usage patterns, and the flow of Remote Procedure Calls (RPCs) within and across VistA instances. The insights derived from these reports will support VA in optimizing system performance, enhancing security measures, and improving the overall user experience for VA staff and Veterans.

**Approach**: To meet the requirements for delivering **Traffic Analysis Reports** **for the three production VistAs** (***PWS 5.2.2 A***) and a **Cross VistA Traffic Analysis Report** (***PWS 5.2.2 B***), the approach in **Table 7** will be implemented.

Table 7: Approach to Deliver of Traffic Analysis Reports

|  |  |  |
| --- | --- | --- |
| **Phase/Duration** | **Task** | **Approach** |
| **Phase 1 (Weeks 18-19)**  **2 Weeks** | Data Validation | * Monitor/Review of the data capture process for completeness and accuracy. * Perform data validation to confirm that a relevant client traffic is being captured effectively. |
| **Phase 3 (Weeks 20 -25)**  **6 Weeks** | Data Analysis and Report Development | * Analyze the collected data for each VistA instance, focusing on the specified criteria such as user volume, RPC usage, connection patterns, and cross-VistA interactions. * Draft the Traffic Analysis Reports for each VistA, incorporating insights/embedded graphics. * Conduct a cross-VistA traffic analysis to develop the Cross VistA Analysis Report, highlighting inter-instance communication and related patterns. |
| **Phase 4 (Weeks 26-29)**  **4 Weeks** | Review, Refinement, and Finalization | * Conduct an internal review four reports to evaluate accuracy, clarity, and compliance with VA standards. * Refine the reports based on feedback from the internal review. * Convert reports into GitHub-compatible markdown format and embed necessary graphics. |
| **Phase 5 (Week 30)**  **1 Week** | Submission and Documentation | * Upload finalized reports to the VA Enterprise GitHub repository. * Documentation, supporting files or data are properly stored and accessible. * Provide a briefing or presentation to VA stakeholders, if required, to explain the findings and implications of the reports. |

**Data Collection and Logging**. The first phase involves capturing client traffic data as outlined in PWS 5.2.1, Deliverable A. This will include the logging of relevant client interactions with the VistA systems, for data capture that is both comprehensive and non-invasive. The logging process will be carefully configured to avoid any disruptions to the VistA systems and capture necessary data traffic data, including user volumes, client types, connection details, user authentication methods, and RPC usage.

**Traffic Analysis for Individual VistAs**. Once the data is collected, the analysis will begin with a detailed examination of the traffic for each VistA instance. The Traffic Analysis Report will provide insights into the following key areas:

* **User Volume**: The report quantifies the number of unique users interacting with each VistA, including peak usage times.
* **Client Types and Volume of Use**: Different types of clients (e.g., desktop applications, mobile devices) will be categorized and their respective usage volumes analyzed.
* **Connection Volumes, Frequency, and Duration**: This will include an analysis of the number of connections, how frequently they occur, and the average duration of each session.
* **Types of User Authentication/Security**: An analysis of the various authentication methods used by clients, along with their relative usage frequency.
* **Machine from End Users**: Identification and categorization of the machines from which end-users connect to VistA.
* **RPC Usage Frequency and Execution Times**: Detailed statistics on the frequency of RPC usage and the average execution times for these calls.
* **RPC Groupings**: RPC groupings that represent specific transactions or workflows within the VistA environment.
* **VistA-Specific vs. Cross-VistA RPCs**: Analysis to distinguish between RPCs that are specific to the VistA instance and those that interact across multiple VistA instances.

Each Traffic Analysis Report will be composed using GitHub-compatible markdown format, with appropriate graphics embedded to visually illustrate key findings.

**Cross VistA Traffic Analysis**. The Cross VistA Analysis Report will focus on traffic patterns that span multiple VistA instances. This analysis will distinguish between cross-VistA RPCs and those specific to individual VistAs, offering insights into how different VistA instances interact with one another. The report will highlight any potential bottlenecks, inefficiencies, or security concerns associated with cross-VistA communications. This report will also be written in GitHub-compatible markdown with embedded graphics, providing a clear and visually engaging presentation of the findings.

**Report Storage and Accessibility**. Upon completion, the four reports (three Traffic Analysis Reports and the Cross VistA Analysis Report) will be stored in the VA Enterprise GitHub repository. The reports will be easily accessible to authorized VA personnel and can be version-controlled, tracked, and updated as necessary.

**Benefits to VA**. The detailed Traffic Analysis Reports will provide VA with critical insights into the performance and security of VistA systems. By understanding user behaviors, connection patterns, and RPC usage, VA can optimize system configurations, enhance security protocols, and improve the user experience. The Cross VistA Analysis Report will help VA identify and address any challenges in interoperability between VistA instances, ultimately supporting more seamless and efficient operations across the VA enterprise. Storing the reports in GitHub provides configuration management control, making them accessible and maintainable with the ability to track changes and update content as VistA environments evolve. This approach aligns with VA configuration management practices and documentation.

Our approach to complete the Analysis of VistA Client Traffic will occur over a 12-week period, starting on week 18 of the Base Year PoP, immediately after the delivery and approval of the VistAs Traffic Logging SOP.

##### 2.2.3 Analysis of Use of Key VistA Clients (PWS 5.2.3)

**Understanding**:The VistA point-of-care applications, or "Clients," are critical components within the VistA. These clients are used extensively by VA staff to deliver clinical care, access patient records, and perform a variety of healthcare-related tasks. Given their importance, understanding how these clients are used, their performance characteristics, and their impact on clinical workflows is essential for optimizing VistA overall effectiveness for high-quality Veteran care. The Client Traffic Analysis builds upon the initial VistA traffic analysis by focusing specifically on the operation of three of the most frequently used VistA clients, with the Computerized Patient Record System (CPRS) being one of them. This analysis will provide detailed insights into how these clients are used across VA, including user behavior, client performance, and the specific tasks supported by these applications. Sierra7 will verify and validate the analysis providing confidence that the findings are accurate, reliable, and directly relevant to clinical care delivery.

**Approach**: To achieve the objectives of the Client Traffic Analysis, the approach in **Table 8** will be implemented along the proposed timeline.

Table 8: Timeline of Client Traffic Analysis

| **Phase/Duration** | **Task** | **Approach** |
| --- | --- | --- |
| **Phase 1 (Weeks 31-32)**  **2 Weeks** | Validate RPC Data Capture | * Categorize data collected from the 3-VistAs. |
| **Phase 3 (Weeks 33-34)**  **2 Weeks** | Preliminary Analysis | * Relevant data, including user volumes, connection details, RPC usage, and client-specific interactions, is captured accurately. * Conduct a preliminary analysis of the collected data to validate its completeness and relevance. * Identify any additional data needs or adjustments required for a thorough analysis. |
| **Phase 4 (Weeks 35-37)**  **3 Weeks** | Detailed Client Traffic Analysis | * Perform a detailed analysis of user volumes, user types, and connection patterns for each client. * Categorize users by clinical specialties and roles and analyze how different user groups interact with each client. * Analyze RPC usage for each client, including distinguishing between clinical and non-clinical RPCs, read vs. write operations, and identifying any slow-running or high-overhead RPCs. * Begin mapping clinical care task sets to specific client screens and workflows. * Complete the mapping of RPC flows to client screens and typical tasks. * Isolate and document any performance issues, especially those that may impact clinical care. * Start drafting the **VistA Client Use Analysis Reports (*PWS 5.2.3 A*)** with embedded graphics. |
| **Phase 5 (Week 38-39)**  **2 Week** | Verification, Validation, and Report Finalization | * Conduct verification and validation activities to assess the accuracy of the analysis. * Match RPC flows to specific client screens and validate the clinical task sets against real-world workflows. * Document the verification and validation process. * Finalize the **VistA Client Use Analysis Reports** for three clients. * Finalize the **Client Traffic Analysis Validation and Verification Report (*PWS 5.2.3 B*)**. * Prepare reports in GitHub-compatible markdown format |
| **Phase 5 (Week 40)**  **1 Week** | Report Submission and Documentation | * Upload all finalized reports (three **VistA Client Use Analysis Reports** and the **Client Traffic Analysis Validation and Verification Report**) to the VA Enterprise GitHub repository. * Documentation is complete, accessible, and version controlled. * Conduct a briefing or presentation to VA stakeholders, if required, to explain the findings and implications of the analysis. |

**Selection of Clients for Analysis**. The first step involves selecting the two additional VistA clients for analysis, alongside CPRS. The selection will be based on client usage data derived from the initial VistA traffic analysis. The chosen clients will be those with the highest volume of use and significance to clinical workflows. This selection process will be completed shortly after the project kickoff.

**Data Collection and Analysis**. Building on the data collected during the initial VistA traffic analysis, the Sierra7 will focus specifically on traffic associated with the three selected clients. The analysis will cover the following aspects:

* **User Volumes and Types**: The analysis will categorize users by volume and type, including their clinical care specialties and roles. This will help identify how different user groups interact with the clients.
* **Connection Volume and Duration**: The frequency and duration of connections will be analyzed, with a focus on correlating these metrics with specific user types and tasks performed.
* **User Authentication/Security**: The types of user authentication and security measures used by the clients will be examined, along with their relative usage frequency.
* **Patient Volumes**: The analysis will quantify the volume of patients accessed through each client, providing insights into how client usage impacts patient care.
* **Enumeration of RPCs**: RPCs used by each client will be enumerated, and their relative use will be analyzed. This will include a distinction between clinical and non-clinical RPCs, as well as between RPCs that read versus those that write to the clinical record.
* **Task Sets and Client Screens**: Clinical care task sets, represented as groups of RPCs, will be identified and mapped to specific client screens. This mapping will be crucial for understanding how clients are used in real-world clinical settings.
* **Performance Issues**: The analysis will isolate any performance issues, particularly those associated with patterns of use that may slow down clinical care. This includes identifying slow-running or high-overhead RPCs and understanding their impact on user experience.

**Verification and Validation**. Sierra7 will undertake a rigorous verification and validation process This will involve:

* Matching RPC Flows to Client Screens: The RPC flows identified in the analysis will be matched to specific client screens and tasks for analysis on how clients are used in practice.
* Validation of Clinical Tasks: The clinical care task sets identified will be validated against real-world clinical workflows and capture the care provision process.

**Documentation of Verification and Validation**. The entire verification and validation process will be documented in the **Client Traffic Analysis Validation and Verification Report** (***PWS 5.2.3 B***), detailing demonstrable and verifiable findings.

**Report Composition and Storage**. Upon completing the analysis, we will produce three detailed **VistA Client Use Analysis Reports** (***PWS 5.2.3 A***), one for each selected client. These reports will be composed in GitHub-compatible markdown format, with embedded graphics to illustrate key findings. The reports will be stored in the VA Enterprise GitHub repository. The Client Traffic Analysis Validation and Verification Report will also be composed in markdown format and stored alongside the client analysis reports, providing a comprehensive and validated view of client usage.

**Benefits to VA**. The detailed Client Traffic Analysis will provide VA with critical insights into how key VistA clients are used in real-world clinical settings. By understanding user behavior, task performance, and client-specific performance issues, VA can optimize these applications to better support clinical workflows, reduce delays in care delivery, and enhance the overall user experience for VA staff. The validation and verification process provides VA with accurate, actionable analysis for improving patient care. Storing the reports in GitHub makes them accessible, version-controlled, and easy to update, aligning with VA configuration management practices.

##### 2.2.4 VistA Client Use Improvement Report (PWS 5.2.4)

**Understanding**:The VistA Client Use Improvement Report is the culmination of the detailed analysis conducted in the previous phases, specifically the VistA Client Traffic Analysis and the Analysis of Use of Key VistA Clients. This report focuses on providing actionable recommendations to enhance the functionality and effectiveness of the three most heavily utilized Point-of-Care VistA Clients, identified based on RPC usage. The primary objective is to optimize these clients to better support clinical workflows, improve patient care, and enhance the overall user experience for VA healthcare providers. By leveraging insights from the Client Use Analysis Reports, the recommendations will be tailored to address specific performance issues, inefficiencies, and user experience challenges observed during the analysis. The end goal is to provide VA with clear, practical guidance on how to upgrade these critical applications to better meet the needs of their users and improve the quality of care provided to Veterans.

**Approach**: Sierra7 timeline to develop and deliver the **Client Use Improvement Reports** (***PWS 5.2.4 A***) is approximately 9 weeks. **Table 9** details the tasks and their phases, and the approach for each task.

Table 9: Timeline for Delivery of Client Use Improvement Reports

| **Phase/Duration** | **Task** | **Approach** |
| --- | --- | --- |
| **Phase 1 (Week 41)**  **1 Week** | Initial Planning and Review | * Review the Client Traffic Analysis and Client Use Analysis Reports. * Identify key focus areas for the improvement recommendations. * Finalize the approach for synthesizing the findings and developing recommendations. * Align the format and structure of the reports and the presentation. |
| **Phase 2 (Weeks 42-43)**  **2 Weeks** | Synthesis of Client Use Analysis | * Conduct a detailed review and synthesis of the Client Use Analysis Reports. * Identify trends, challenges, and areas for improvement. * Begin drafting preliminary recommendations based on the synthesized analysis. * Complete the synthesis and refine initial recommendations. * Validate preliminary recommendations with subject matter experts. |
| **Phase 3 (Weeks 44-45)**  **2 Weeks** | Development of Improvement Recommendations | * Develop detailed improvement strategies for each VistA Client, focusing on optimizing RPC usage, enhancing user interfaces, and streamlining workflows. * Begin drafting the Client Use Improvement Reports. * Complete the drafting of the Client Use Improvement Reports. * Conduct an internal review and make necessary revisions. |
| **Phase 4 (Week 46-47)**  **2 Weeks** | Development of Supporting PowerPoint Presentation | * Develop the PowerPoint presentation summarizing the key findings and recommendations. * Create a visually engaging and concise presentation. * Finalize the PowerPoint presentation. * Prepare for presenting the recommendations to VA leadership, if required. |
| **Phase 5 (Weeks 48-49)**  **2 Weeks** | Finalization and Submission | * Finalize an accurate and clear Client Use Improvement Reports. * Conduct a final quality check of the reports and the presentation. * Submit the Client Use Improvement Reports and the supporting PowerPoint presentation to VA. * Upload the final reports to the VA Enterprise GitHub and designated SharePoint site. |

**Synthesis of Client Use Analysis Reports**. The first step involves synthesizing the findings from the Client Use Analysis Reports for the three selected VistA Clients. This synthesis will focus on identifying key trends, challenges, and areas of improvement across the following dimensions:

* **RPC Usage**: Examining the most frequently used RPCs, particularly those that are critical to clinical care, and identifying any performance bottlenecks or inefficiencies.
* **User Interaction Patterns**: Understanding how different user types (e.g., clinicians, nurses, administrative staff) interact with the clients and identifying any patterns that may hinder efficiency or effectiveness.
* **Task Performance**: Analyzing the completion of clinical tasks using the clients, focusing on task sets and their associated RPCs, and identifying opportunities for streamlining workflows.
* **Performance Issues**: Highlighting any identified performance issues, such as slow-running or high-overhead RPCs, and their impact on clinical care delivery.

**Development of Improvement Recommendations**. Based on the synthesis of the analysis, we will develop a set of recommendations aimed at improving the use of each of the three VistA Clients. These recommendations will be focused on the following areas:

* **Optimizing RPC Usage**: Recommending changes to the way RPCs are utilized within the clients, such as streamlining or reconfiguring RPC calls to reduce latency and improve response times, especially for those critical to clinical workflows.
* **Enhancing User Interfaces**: Suggesting enhancements to the user interfaces of the clients to make them more intuitive, reduce the cognitive load on users, and align better with clinical workflows.
* **Streamlining Workflows**: Identifying opportunities to simplify and streamline common clinical task sets within the clients for efficient and faster performance.
* **Improving Performance and Reliability**: Recommending technical improvements to address any performance issues identified, such as optimizing server configurations, adjusting client settings, or upgrading hardware where necessary.

**Documentation of Recommendations**. Recommendations will be documented in detailed Client Use Improvement Reports for each of the three VistA Clients. Each report will be structured to provide a clear and concise overview of the issues identified, the rationale behind each recommendation, and the expected benefits of implementing these changes. The reports will be formatted in Microsoft Word for easy access and editable by VA stakeholders.

**Development of Supporting PowerPoint Presentation**.To facilitate communication and discussion of the recommendations, we will develop a supporting PowerPoint presentation. This presentation will summarize the key findings and recommendations from the Client Use Improvement Reports, providing a visual and easy-to-understand overview for VA leadership and other stakeholders. The presentation will highlight the most critical improvements, the expected impact on clinical care, and any necessary next steps for implementation.

**Benefits to VA**.The Client Use Improvement Reports will provide VA with targeted, actionable recommendations to enhance the functionality and performance of the most critical VistA Clients. By implementing these recommendations, VA can expect to see:

* **Improved Clinical Efficiency**: Streamlining RPC usage and optimizing client interfaces will help healthcare providers complete tasks more quickly and with fewer errors, leading to more efficient clinical operations.
* **Enhanced User Experience**: By addressing user interface and performance issues, the recommendations will make the VistA Clients more user-friendly and reliable, reducing frustration and improving satisfaction among VA staff.
* **Better Patient Care**: Ultimately, the improvements to VistA Clients will enable VA healthcare providers to deliver better, more timely care to Veterans, improving overall patient outcomes.
* **Strategic Alignment**: the technology supports the mission of providing high-quality care to Veterans with recommendations that align the VistA Clients more closely with broader strategic goals for healthcare delivery

|  |
| --- |
| ***Conclusion of Base Year Tasks***.In the final weeks of the base year (Weeks 50-52), the project will focus on comprehensive wrap-up activities to support a smooth transition and preparation for potential future work. This period will include debriefing sessions with VA stakeholders to review the project outcomes, gather feedback, and discuss any challenges encountered. Sierra7 will document these discussions in a "Lessons Learned" report, highlighting key insights and recommendations for future improvements in VistA Client traffic analysis and optimization efforts. The wrap-up phase includes preparation for the Optional Period tasking under Section 5.3, "VistA Client Traffic Capture and Analysis." The planning activities will cover preparations for analyzing Migrated VistA traffic post-Cerner migration and capturing traffic related to VistA Community Care clients. This includes setting up methodologies for identifying the subset of RPCs still in use within Migrated VistA systems, analyzing the traffic from VistA Community Care, and developing strategies for better integrating external data with VA internal systems. We will collaborate, develop, and outline a detailed approach and timeline for these tasks, should the option period be exercised, for a seamless transition into the next phase of work. |

#### 2.3 VistA Client Traffic Capture and Analysis (Option Period 1) (PWS 5.3)

**Transition into the Optional Period**. The transition into the Optional Period will be a seamless continuation of the efforts and methodologies established during the base period. Building upon the non-invasive traffic analysis approach successfully implemented for the three VistA Clients, we will extend the current approach to new and specialized types of VistA traffic and scenarios, for consistency and leveraging insights gained from the initial phase of the project.

**Continuity and Expansion of Methodologies**.The non-invasive traffic analysis framework developed during the base period will serve as the foundation for the Optional Period tasks. This framework, which includes the mechanisms for capturing, monitoring, and analyzing VistA traffic without disrupting system operations, will be adapted and refined to address the specific needs of the following two scenarios:

1. **Migrated VistA Client Traffic Analysis**:
   * Sierra7 will apply the established traffic capture techniques to a “Migrated VistA” system, which, post-Cerner migration, continues to run a subset of its original functionality. The focus will be on identifying which clients and RPCs remain in use, assessing the volume and type of users still interacting with the system, and comparing this with the broader VistA environment analyzed during the base period. This will provide critical insights into the ongoing relevance and operational requirements of Migrated VistAs.
2. **VistA Community Care Client Traffic Analysis**:
   * With the increasing role of Community Care in Veteran services, our team will isolate and analyze traffic related to this external care provision. The analysis will focus on understanding how parseable text, images, and other information from Community Care are integrated into VistA clients, identifying opportunities to enhance this integration for better clinical decision-making and care coordination. The same non-invasive methods from the base period will be adapted to capture this specific traffic without affecting broader VistA operations.

**Preparatory Activities**. Prior to the commencement of the Optional Period, the Sierra7 will undertake several preparatory activities during the wrap-up period, including stakeholder engagement with VistA managers, VAEC maintainers, and others to discuss the transition and confirm the objectives and expectations for the Optional Period. We will be conducting an assessment of the current VistA environments that will be analyzed during the Optional Period so existing traffic capture setup is fully compatible with the new scenarios. A comprehensive analysis of the relevant data points through a traffic analysis methodology is conducted to address the unique characteristics of Migrated VistAs and Community Care traffic.

**Execution of Optional Period Tasks**. Once the Optional Period begins, Sierra7 will immediately initiate the traffic capture and analysis activities as outlined in the planning phase. The process will include:

* Data Capture: Initiating the non-invasive capture of client traffic from both Migrated VistAs and VistA Community Care scenarios, using the established methodologies from the base period.
* Data Analysis: Conducting detailed analysis of the captured data, focusing on identifying active clients, RPC usage, and the integration of external data with VA internal systems.
* Report Development: Producing comprehensive analysis reports for both Migrated VistAs and VistA Community Care, with actionable recommendations for enhancing system performance and data integration.

**Benefits to VA**. By extending the non-invasive traffic analysis approach to new VistA scenarios, VA will gain valuable insights into the ongoing utility of legacy VistA systems post-Cerner migration and the integration of external Community Care data. This will enable VA to continue to meet the evolving needs of both Veterans and healthcare provider by optimizing these systems for better clinical care. The continuity of the approach provides consistent, reliable, and directly comparable analysis to the work completed during the base period, for a comprehensive view of VistA traffic across a range of scenarios.

##### 2.3.1 Migrated VistA Client Traffic Analysis (PWS 5.3.1)

**Understanding**:The migration to the Cerner Electronic Health Record (EHR) system marks a significant transition for VA, yet many VistA systems remain operational to support specific functions at migrated sites. These “Migrated VistA” systems continue to run a subset of its previous functionality, serving a smaller, yet critical role within the VA healthcare infrastructure. Understanding how these legacy systems are still being used, particularly in terms of client traffic and RPC utilization is essential to continue to meet operational needs while aligning with the broader EHR transition. The objective of the Migrated VistA Client Traffic Analysis is to capture and analyze the client traffic within a Migrated VistA environment, post-Cerner migration. This analysis will provide insights into the specific clients and RPCs still in use, the volume and types of users interacting with the system, and how these factors compare to full VistA environments analyzed in the base period. The results will guide VA in optimizing the continued use of these legacy systems integrated into the new EHR landscape.

**Approach**:TheSierra7timeline for the completion of the Migrated VistA Traffic Analysis is approximately **19 weeks (approximately 5 months)** from the start of Optional Period 1 (Week 53) as described in the timeline in **Table 10**.

Table 10: Sierra7 Timeline for Completion of Migrated VistA Traffic Analysis

| **Phase/Duration** | **Task** | **Approach** |
| --- | --- | --- |
| **Phase 1 (Week 53)**  **1 Week** | Planning and Preparation | * Finalize the approach and schedule for the Migrated VistA traffic analysis. * Confirm the specific Migrated VistA site to be analyzed and obtain any necessary permissions from stakeholders. * Set up the environment and so that the traffic capture mechanisms used during the base period are ready for deployment. |
| **Phase 2 (Weeks 54-56) 3 Weeks** | Traffic Capture Setup and Initial Testing | * Deploy the non-invasive traffic capture setup on the identified Migrated VistA site. * Perform initial tests on the traffic capture system to determine it is functioning correctly and not impacting the VistA system operations. * Make any necessary adjustments based on test results to optimize data capture. |
| **Phase 3 (Weeks 57-62) 6 Weeks** | Traffic Data Capture | * Begin capturing client traffic from the Migrated VistA site. The capture period will now extend to six weeks to develop a more comprehensive dataset. * Continuously monitor the data capture process for consistency and accuracy. * Store the captured data securely within the VAEC environment. * Conduct regular status checks and address any issues that arise during the logging period. |
| **Phase 4 (Week 63-64) 2 Weeks** | Initial Data Review and Validation | * Review the captured traffic data for completeness and accuracy. * Perform data validation to confirm that relevant client traffic has been captured effectively. * Prepare preliminary findings based on the captured data to guide the detailed analysis phase. |
| **Phase 5 (Weeks 65-69) 5 Weeks** | Detailed Data Analysis and Report Development | * Analyze the captured data to identify which clients are still in use within the Migrated VistA and how they are being utilized. * Assess the type and volume of users operating within this VistA environment. * Identify the subset of RPCs still in use and compare these to the range of RPCs used in full VistA environments analyzed during the base period. * Draft the **Migrated VistA Traffic Analysis Report** (***PWS 5.3.1 A***), incorporating detailed insights, comparisons, and any embedded graphics. |
| **Phase 5 (Weeks 70-71) 2 Weeks** | Final Review, Refinement, and Submission | * Conduct an internal review of the Migrated VistA Traffic Analysis Report for accuracy, clarity, and compliance with VA standards. * Refine the report based on feedback from the internal review. * Finalize the report and prepare it for submission. * Submit the final Migrated VistA Traffic Analysis Report to VA and post in GitHub. |

**Planning and Coordination**.Our approach begins with a comprehensive planning phase, during which the specific Migrated VistA site will be identified in collaboration with VA stakeholders. This phase will involve securing the necessary permissions from VistA managers and other key stakeholders to deploy the non-invasive traffic capture mechanisms. Communication channels with relevant parties, including VAEC maintainers, will be established to collaborate and coordinate throughout the project.

**Traffic Capture Setup and Testing**.Building upon the successful methodologies developed during the base period, the non-invasive traffic capture system will be deployed within the Migrated VistA environment. Initial tests will be conducted on the system for correct functioning without impacting the performance or stability of the VistA system. Any necessary adjustments will be made to optimize data capture.

**Data Capture and Monitoring**.Once the traffic capture system is fully operational, client traffic will be logged for a period of one month. This extended capture period is designed to provide a comprehensive dataset that accurately reflects the usage patterns within the Migrated VistA. Throughout this period, the data capture process will be closely monitored. Regular status checks will be conducted and any issues that arise will be promptly addressed to maintain the quality of the data collected.

**Data Analysis**.After the data capture period, the collected traffic data will undergo a detailed analysis. This analysis will focus on three key areas:

* **Client Usage**: Identifying which VistA clients are still actively used in the Migrated VistA environment and understanding how these clients are being utilized. This will include an examination of the specific tasks performed using these clients and how they contribute to the remaining operational functions of the system.
* **User Types and Volume**: Assessing the type and volume of users still operating within the Migrated VistA system. This will provide insights into the user base composition, including clinical staff, administrative personnel, and other stakeholders who rely on the system.
* **RPC Utilization**: Analyzing the subset of RPCs still in use within the Migrated VistA, with a focus on comparing these RPCs to those used in full VistA environments analyzed in the base period. This comparison will highlight any significant changes in RPC usage patterns and identify RPCs that are critical to the ongoing functionality of the Migrated VistA.

**Report Development**. The findings from the analysis will be documented in the Migrated VistA Traffic Analysis Report. This report will provide a comprehensive overview of the current state of the Migrated VistA system, including detailed insights into client usage, user volumes, and RPC utilization. The report will also include comparisons with the full VistA environments analyzed previously, offering a clear picture of how the system has evolved post-migration. The report will be formatted to VA standards and stored in the VA Enterprise GitHub repository for easy access and version control.

**Benefits to VA**: The Migrated VistA Client Traffic Analysis will deliver several key benefits to VA:

* **Optimized Use of Legacy Systems**: By understanding which clients and RPCs are still in use within Migrated VistAs, VA can optimize these systems to better support the remaining operational functions. Legacy VistA systems will continue to provide value even as the broader EHR transition progresses.
* **Informed Decision-Making**: The analysis will provide VA stakeholders with detailed insights into how the Migrated VistAs are being used, enabling informed decisions about the future management, integration, or potential decommissioning of these systems.
* **Improved System Integration**: By comparing the RPCs used in Migrated VistAs with those in full VistAs, VA can identify areas where further integration or alignment with the Cerner system may be beneficial, supporting a smoother transition and better interoperability between the old and new systems.
* **Enhanced Data Management**: Critical information preserved and effectively utilized within the new EHR framework will help VA better manage the data within the Migrated VistA systems.

##### 2.3.2 VistA Community Care Client Traffic Analysis (PWS 5.3.2)

**Understanding**:As the VA increasingly relies on private sector healthcare providers to deliver services through the Community Care program, the integration and management of external healthcare data within VA systems, particularly VistA, has become more complex and critical. The data exchanged between private sector providers and VA systems includes a variety of information such as parseable text, images, and other clinical data that must be accurately captured, processed, and integrated into VistA for continuity of care for Veterans. The VistA Community Care Client Traffic Analysis aims to isolate and analyze the client traffic associated with Community Care within a production VistA environment. By understanding how this external data flows into and is utilized within VistA, the analysis will provide VA with insights into how effectively the current system handles this integration and where improvements can be made. This effort builds on the methodologies established during the base period VistA RPC traffic analysis, applying them to the unique challenges presented by Community Care data integration.

**Approach**:The timeline for the completion of the Migrated VistA Community Care Client Traffic Analysis is approximately 19 weeks (approximately 5 months) from the start of Optional Period 1 (Week 53) as described in the timeline in **Table 11**.

Table 11: Timeline for Migrated VistA Community Care Traffic Analysis Completion

| **Phase/Duration** | **Task** | **Steps** |
| --- | --- | --- |
| **Phase 1 (Weeks 72-73)**  **2 weeks** | Planning and Preparation | * Finalize the project plan and timeline for the VistA Community Care Client Traffic Analysis. * Identify the specific VistA production environment(s) where Community Care traffic will be captured. * Secure the necessary permissions and coordinate with stakeholders, including VistA managers and Community Care coordinators. |
| **Phase 2 (Weeks 74-76)**  **3 weeks** | Traffic Capture Setup and Initial Testing | * Deploy the non-invasive traffic capture mechanism within the identified VistA environment. * Conduct initial functional tests to the traffic capture system without impacting the VistA system performance. * Make any necessary adjustments based on test results to optimize. |
| **Phase 3 (Weeks 77-82)**  **6 weeks** | Community Care Traffic Data Capture | * Begin capturing client traffic specifically related to Community Care for a period of one month. * Monitor the data capture process closely for consistent, accurate and complete data collection. * Store captured data securely within the VAEC environment, providing accessibility for analysis. * Conduct regular status checks and address any issues that arise during the capture period. |
| **Phase 4 (Week 83-84)**  **2 weeks** | Initial Data Review and Validation | * Review the captured Community Care traffic data for completeness and accuracy. * Perform data validation to confirm that relevant traffic, including text, images, and references, has been effectively captured. * Prepare preliminary findings to guide the detailed analysis phase. |
| **Phase 5 (Weeks 85-90)**  **6 weeks** | Detailed Data Analysis | Analyze the captured traffic data, focusing on:   * Types, volumes, and sources of parseable text: Identify the types of text data transmitted during Community Care interactions and their sources. * Types, volumes, and sources of references to images/screenshots: Examine how images and screenshots are referenced and integrated within the VistA system. * Display of Information: Determine where and how this external information is displayed in pre-existing and specialized VistA clients. * Identify any gaps or inefficiencies in how Community Care data is currently managed and integrated into the VistA system. |
| **Phase 6 (Weeks 91-94)**  **4 weeks** | Development of Recommendations and Report Drafting | * Develop recommendations on how to better integrate Community Care data with clinical and other data within the VA system. * Draft the **VistA Community Care Traffic Analysis Report (*PWS 5.3.2 A*)**, detailing the findings from the data analysis and the proposed recommendations. * Reports include visual aids, such as graphs and tables, to effectively communicate the analysis results. |
| **Phase 7 (Weeks 95-97)**  **3 weeks** | Review, Refinement, and Finalization | * VistA Community Care Traffic Analysis Report is internally reviewed for accuracy, clarity, and alignment with VA standards. * Refine the report based on feedback from the review process. * Finalize the report and prepare it for submission. |
| **Phase 8 (Week 98)**  **1 week** | Submission and Documentation | * Submit the finalized VistA Community Care Traffic Analysis Report to VA. * Upload the report to the VA Enterprise GitHub and other required repositories. * Documentation is complete, accessible, and version controlled. * Provide a briefing or presentation to VA stakeholders to explain the findings and recommendations. |

Our approach is further illustrated below in more detail and executed in alignment of the Phases and steps in **Table 11** above.

**Planning and Coordination**.Our team will carefully plan and facilitate coordination activities with relevant VA stakeholders to identify the specific VistA production environment that will be analyzed. This will include collaborating with VistA managers and Community Care coordinators to align the data capture process with VA operational needs and complies with necessary regulations. The project team will isolate Community Care-related traffic, secure the required permissions and finalize the setup for non-invasive traffic capture.

**Traffic Capture Setup and Execution**.Building upon the non-invasive traffic analysis framework used in the base period, the project team will deploy the traffic capture system within the identified VistA environment. This setup will be configured to specifically target and capture client traffic that reflects Community Care interactions, including parseable text, references to images/screenshots, and other relevant data. The traffic capture process will be conducted over a one-month period to gather a comprehensive dataset that accurately represents the typical volume and types of data exchanged during Community Care operations.

**Data Review and Validation**.Following the data capture phase, the project team will conduct a thorough review and validation of the captured traffic for complete and accurate data capture. This step is crucial to confirm that relevant Community Care-related traffic has been captured, including any nuanced or atypical data types that might have been overlooked. The team will also validate that the data is appropriately categorized, making it ready for detailed analysis.

**Detailed Data Analysis**.The core of the project will involve a detailed analysis of the captured Community Care client traffic. This analysis will focus on several key areas:

* **Types, Volumes, and Sources of Parseable Text**: The project team will identify and categorize the different types of text data exchanged during Community Care interactions, determining their sources, and analyzing their volume. This will help to understand how textual data from private sector providers is integrated into VistA and its impact on clinical workflows.
* **Types, Volumes, and Sources of References to Images/Screenshots**: The analysis will also cover non-textual data, such as images and screenshots, to understand how visual information is transmitted, referenced, and utilized within VistA. This will provide insights into the adequacy of current systems for handling and displaying such data.
* **Display and Integration of Information**: The project team will map where and how the captured information (text, images, etc.) is displayed within both pre-existing and specialized VistA clients. This analysis will identify potential gaps or inefficiencies in how Community Care data is presented to VA healthcare providers, which could impact decision-making and patient care.

**Development of Recommendations**. Based on the findings from the detailed analysis, the project team will develop a set of actionable recommendations aimed at improving the integration and use of Community Care data within VistA. These recommendations may include technical enhancements, changes to data processing workflows, or updates to VistA client interfaces to better handle the unique challenges posed by Community Care data. The recommendations will be designed to enhance VA ability to effectively manage external healthcare data to be seamlessly integrated with internal clinical information to support comprehensive care for Veterans.

**Report Development and Submission**. We will involve compiling the findings and recommendations into the **VistA Community Care Traffic Analysis Report** (***PWS 5.3.2 A***). This report will be thoroughly reviewed to verifying that it meets VA standards for clarity, accuracy, and completeness. The report will include visual aids such as graphs and tables to help convey the analysis results effectively. Once finalized, the report will be submitted to VA stakeholders and stored in the VA Enterprise GitHub repository for easy access and version control.

**Benefits to VA**. The VistA Community Care Client Traffic Analysis will provide VA with critical insights into how Community Care data is currently managed within VistA and where improvements can be made. Key benefits include:

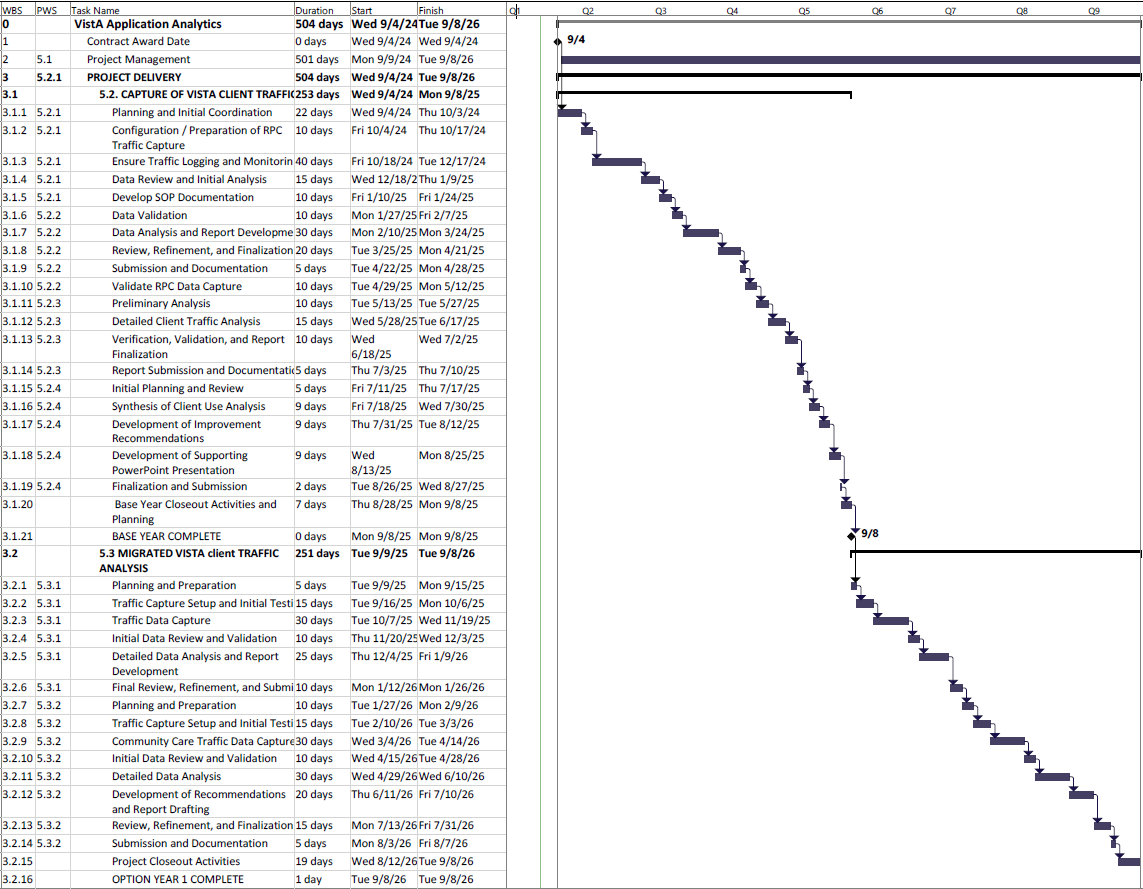
* Enhanced Data Integration: The analysis will identify areas where Community Care data can be more effectively integrated into VistA, so that VA healthcare providers have access to comprehensive, accurate, and timely information when making clinical decisions.
* Improved Clinical Workflows: By understanding how external data is used within VistA, VA can make informed changes to improve the efficiency and effectiveness of clinical workflows, ultimately leading to better patient care.
* Optimized System Performance: The recommendations will help optimize how VistA handles the influx of Community Care data, reducing potential bottlenecks and verifying that the system remains responsive and reliable.
* Strategic Alignment: The findings from this analysis will support broader VA goals of enhancing interoperability between VA systems and external healthcare providers, safeguarding that Veterans receive coordinated, high-quality care regardless of where they receive services.

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| ***Project Close Out and Next Steps***.Upon completing the tasks outlined in Option Period 1, including the Migrated VistA Client Traffic Analysis and the VistA Community Care Client Traffic Analysis, the project will transition into a formal close-out phase. During this period, the project team will finalize documentation so that the findings, reports, and recommendations are thoroughly reviewed, archived, and accessible within the VA Enterprise GitHub repository. A final debriefing will be conducted with VA stakeholders to discuss the outcomes of the analyses, highlight key insights, and address any remaining questions. The project team will also compile a "Lessons Learned" report to capture best practices and challenges encountered throughout the project, providing valuable guidance for future initiatives. As potential next steps, VA may consider extending the non-invasive traffic analysis to other VistA environments or exploring further enhancements to the integration of external data sources within the VA healthcare systems. These next steps would build on the successes of the current project, continuing to improve VA capabilities in managing and optimizing VistA traffic and data integration in a post-Cerner migration landscape. |

### 3.0 GANTT Chart for Base and Option Year (RTEP B.1.2)

**Figure 2** exhibits Sierra7’s GANTT Chart for base and option year tasks and includes all the required information per the Request for Task Execution Plan (RTEP) instructions.

Figure 2: Sierra7 GANTT Chart



### 4.0 Level Of Effort (LOE) (RTEP B.1.3)

The LOE of our approach for each task at the 5.X. level for the base, and all optional tasks are provided in **Tables 12 and 13**.

Table 12: Sierra7 LOE for the Base Period

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Base Period** | | **PoP** | **5.1.1** | **5.1.2** | **5.1.3** | **5.2.1** | **5.2.2** | **5.2.3** | **5.2.4** |
| Sierra7 | Project Manager |  | 80 | 20 | 10 | 20 | 20 | 10 | 15 |
| Sierra7 | Functional Area Expert II |  |  |  |  | 470 | 470 | 470 | 470 |
| Sierra7 | Functional Area Expert I |  |  |  |  | 360 | 20 | 20 | 0 |
| Sierra7 | Developer |  |  |  |  | 580 | 500 | 500 | 300 |
| Sierra7 | Data Manager |  |  |  |  | 580 | 500 | 500 | 300 |
| Sierra7 | Data Management Technician |  |  |  |  | 140 | 110 | 105 | 105 |

Table 13: Sierra7 LOE for Option Period 1

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Option Period 1** | | | | | | | | | | **5.3.1 (Optional Task 1)** | **5.3.2 (Optional Task 1)** |
| Sierra7 | Project Manager |  |  |  |  |  |  |  |  | 80 | 80 |
| Sierra7 | Functional Area Expert II |  |  |  |  |  |  |  |  | 940 | 940 |
| Sierra7 | Functional Area Expert I |  |  |  |  |  |  |  |  | 200 | 200 |
| Sierra7 | Developer |  |  |  |  |  |  |  |  | 940 | 940 |
| Sierra7 | Data Manager |  |  |  |  |  |  |  |  | 940 | 940 |
| Sierra7 | Data Management Technician |  |  |  |  |  |  |  |  | 150 | 150 |