DEPARTMENT OF MEDICAL ASSISTANCE SERVICES

2017 NASCIO Award Submission

STATE OF VIRGINIA

Title: SMARTDATA PROGRAM (Enterprise SAS Implementation for Advanced Data Analytics)

SAS Enterprise Miner Server 14.1, Platform Suite for SAS 9,
SAS Grid Manager 9.41, SAS Office Analytics 7.2,
SAS Visual Analytics 7.3, Distributed Environment Deployment [Linux]

Category: Improving State Operations

Contact: Department of Medical Assistance Services

Mukundan Srinivasan

CIO, Office of Information Management

Mukundan.Srinivasan@dmas.virginia.gov

(804) 371-6369

Initiation: March 2nd, 2015

Completion: January 31st, 2017

Executive Summary

In 2014, Office of Information Management and Office of Data Analytics developed a Strategic plan to take DMAS to the next level in Data Analytics. In alignment with MITA requirements, and in an effort to enhance process transparency, automation, and consistency, DMAS evaluated its existing SAS/analytics infrastructure and found improvement opportunities in the following dimensions:

- Data Sharing Architecture and Security

- Fast Response and efficiency

- Audit and Version Control

- Automation of Manual Processes

- Provide accurate Data Analysis and better decision making

Based on the evaluation, DMAS has decided to upgrade the legacy PC based SAS to an Enterprise analytics environment. DMAS awarded the contract to SAS via VA state contract and partnered with Virginia Information Technology Agency (VITA) and its Infrastructure partner Northrop Grumman to accomplish this goal.

This was the first of its kind and the largest implementation for DMAS (second only to CMS in the East Coast). This was also the first multiyear, multivendor project at the agency and a top priority for agency director Cindi Jones and the Secretary of Health and Human Services.

Business Problem

DMAS faced challenges in the following areas in the legacy PC based environment and wanted to embrace the advantages of the SAS analytics environment to improve their Operations.

1. **Protecting Sensitive Information: HIPAA requirements**

   DMAS wanted to protect their sensitive data and comply with HIPAA security regulations and CMS national standards and also ensure to log, backup and regulate their SAS processes and save potential risks to the organization.

2. **Data and process integrity**
   DMAS wanted to create standard controls over the accessibility and storage of data and also create standardized version control for data analysts to store and share data and processes systematically to avoid redundancy and integrity issues of data manipulation.

3. **Process repeatability and knowledge management**
   Data (information) and processes (business rules) are valuable assets of DMAS. It was crucial to ensure that appropriate data protection, archiving and recovery management measures are taken to protect this asset. DMAS wanted to embrace a controlled change management on server to take advantage of – backup and recovery in scenarios where undocumented and partially documented processes might be inaccessible.

4. **Processing Time/ Performance**
   A multiuser scenario cannot be executed on the desktop system. Moreover, complex processes take longer time. In addition, the limited processing power also limits the type of analysis that can be performed. DMAS wanted to take advantage of the processing power of the analytical system to process complex jobs that can now be executed in minutes versus few hours.

5. **Reusability of reports**
   DMAS wanted to track all repositories of reports and avoid duplication in the organization. Moving to SAS analytics environment can help DMAS efficiently coordinate across organization and help business users remove the dependency on analysts for the reports.

Solution – SAS Analytics Environment & Benefits

1. **Security and Authentication:**

   The SAS analytics server provides one stop shop to store and share sensitive data across the organization. The secured environment and user authentication functionality provides DMAS capabilities to adhere to HIPPA security standards for safeguarding PHI data. Enterprise security policy can be implemented and frequently audited through a server. A change in policy also can be consistently applied across the organization easily, mitigating compliance risk.

2. **Data Integrity: Centralized repository for all data and programs**

   Maintaining and assuring the accuracy and consistency of data is a critical aspect to the design, implementation and usage of any system which stores, processes, or retrieves data. The SAS analytics server solves for the most important requirement for data configuration, which is to "collect once; and use many times". Data integrity can be administered and version controls can be applied to a central repository. Audit of data and programs can be made possible and redundant data sets can potentially be eliminated. Documentation of metadata and data dictionary is possible, which will ultimately help with consistency and standardization.

3. **Data Management: Transparent, Structured and Automation**

   Central repository enables transparency across the organization and enforces structured approach for data management. Programming standards can be incorporated through standard policies. Job scheduling capabilities offered by SAS can be utilized to streamline ongoing maintenance tasks, data back-up & recovery. With SAS Analytics server it is possible to create stored procedures and utilize the output of one program as an input to the other. Identifying and tracking dependencies will help in streamlining processes and eliminate potential human error. Most important, complex repetitive reports such as CMS reports can be automated and generated with significantly less time.

4. **Scalability: preparing for the future**

   DMAS extracts and disseminates over billion records a year. The number of records to be analyzed in the future will increase significantly as DMAS transitions to more managed care. This creates a huge need for an analytical platform capable to scale to meet the growing needs of extreme volumes of data. The processing time for performing complex analysis with huge datasets can be significantly reduced with SAS server. Not having a SAS server for handling large volumes of data could expose DMAS to performance constraints that can possibly hinder business processes. Also, this environment will complement the data warehouse that DMAS intends to create as part of its data standardization and integration effort (MITA 3.0 Information Architecture), and these tools will create a comprehensive data management platform.

5. Dashboards / Reporting / Visualization

Majority of the reports generated today are exchanged through emails, which severely limits the accessibility of such reports by other authorized individual who may be ignorant of its existence. A centralized processing system capable of interfacing with document sharing system (such as SharePoint) can increase accessibility significantly. The SAS server also can access multiple disparate data sources (Oracle, Cognos) simultaneously to generate reports. This benefit enhances data usage and its consistency. A server's ability to interact in real-time with web portals, mobile devices, document management systems, and PC based interfaces makes it much easier to securely and quickly disseminate information.

6. Empower Users

Today, there are around 50 SAS analysts across the organization who can write complex code to extract and analyze data. The implementation of SAS Analytics server provides a golden opportunity to make data accessible to over 200 users and facilitate them to analyze and perform simple queries independently. The business users who are not savvy programmers can conveniently use excel, word and other MS products to refresh and infer data by utilizing the SAS MS add-in functionality, without having to actually get into the SAS environment. This will also help free up some time of SAS SMEs and will capacitate them to focus on performing complex research and statistical analysis, which is almost unattainable today due to limited resource availability.

How SAS is helping DMAS analyze Population Health

- **Network Adequacy**: Understand how provider coverage across the state for ASAM levels 2-4
- **Site of Service:** Understand how much care is being provided for a population at a specific site – hospital inpatient, doctor's office, emergency room, etc., – and provides meaningful comparisons between these sites on key clinical, cost and utilization metrics. This allows decision-makers to align the care being provided with the most appropriate, lowest-cost setting.
- **Prescription Drug:** Understand pharmacy spending trends and provides a tool to assist in identifying problematic prescription patterns and get in front of new utilization trends.
- **Super-utilizers:** Identify the top 1%, 2-5%, 6-10% of utilizers and determine what percentage of the total costs they make up. By detecting demographic, geographic, clinical composition, and service utilization patterns within this group, decision-makers can identify populations in need of attention.
- **Member Analysis:** Clearly see and easily understand cost and utilization patterns of members in a particular program and/or benefit package.
- **Opioid treatment**

In November, the State Health Commissioner declared opioid addiction a Virginia public health emergency. Opioid-related deaths in the commonwealth were up nearly 80 percent in 2016 compared to five years ago. Virginia's Medicaid Addiction and Recovery Treatment Services (ARTS), which facilitates Medicaid reimbursements for a host of addiction services, has become a bulwark in the battle. DMAS, which administers Virginia's Medicaid program and oversees ARTS benefits, faces daunting challenges. According to the U.S. Centers for Medicare and Medicaid Services, "Medicaid beneficiaries are prescribed painkillers at twice the rate of non-Medicaid patients and are at three-to-six times the risk of prescription painkillers overdose." But with data flooding in from across the commonwealth, including emergency department, opioid and heroin abuse data, it is difficult to match patients with the best provider and services. This is particularly burdensome in rural counties, where providers are fewer and scattered.

Using SAS Visual Analytics, DMAS can review fresh provider network data each day and view on a heat map any gaps in coverage. Today, DMAS can instantly see which services are available. This will help get addiction recovery assistance to the people who need it more quickly. The screenshot below depicts provider availability by geographic location.

After ARTS Medicaid Provider Network Adequacy
Opioid Treatment Program
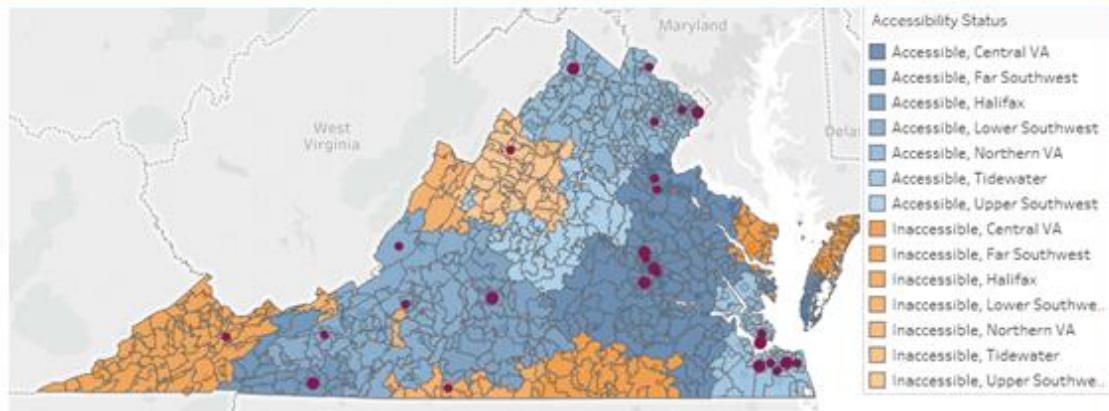
Source: Department of Medical Assistance Services - Provider Network data (March 20, 2017).
Circles # of Medicaid providers included in network adequacy access calculation.
Accessible is considered to be at least two providers within 60 miles of driving distance.
Driving distance is calculated by Google services based on the centroid of each zip code.

Virginia Medicaid recently began covering more community-based addiction recovery services, including medication-assisted opioid treatment and inpatient detoxification, which experts believe is more effective than outpatient or community detox. With help from analytics, DMAS is shepherding more people wrestling with opioid and heroin addiction into those programs and increase positive patient outcomes.

Conclusion - CIO comments

I strongly believe in "Business drives technology and data driven decision" concept. Virginia Medicaid has a blue print for a comprehensive technology refresh to assist the business users in helping our program beneficiaries. As part of the Medicaid Enterprise System initiative, SmartData SAS platform is the first one to be implemented. This solution is now used by over 50 power users in the agency to analyze the data and present the findings quickly to business users. Also, we have rolled out Microsoft Office SAS plugins for business users and stakeholders empowering them to get their information directly. DMAS is also planning to share the analytical algorithms developed by us with other state Medicaid programs for their use via the CMS Zone portal.

The architecture is scalable for other Virginia state agencies. We already have a handful of business use cases implemented in the first few months of rollout and I am confident that we can assist other agencies, states and partners as we integrate more data sources in to this platform.