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If You Build it Well, They Will Come! Responding to a Growing Analytics Program with SAS® Viya®

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ABSTRACT

The objective of this breakout session shows strategies, tips, and lessons learned while implementing SAS® Viya® for use in a Business Analytics curriculum. The University of Arkansas Walton College of Business, located in Fayetteville, Arkansas, is accredited by the Association to Advance Collegiate Schools of Business (AACSB). SAS has been instrumental in helping to design our business analytics programs and has recognized the value of our program by presenting to graduate and undergraduate students an endorsed certificate upon completion. The initial portion of this session outlines the journey to our first iteration of SAS Viya on a single-node server running all our licensed SAS Viya components. The subsequent portion of this session discusses the growth in the analytics program, which created the need for a far more versatile solution. Details include the process of deploying a six-node distributed SAS Viya solution, including planning, documentation, unforeseen issues and how they were overcome, and other steps that have led to confidence by faculty in teaching SAS Viya as well as a solid learning experience for students.

INTRODUCTION

The Sam M. Walton College of Business at the University of Arkansas has established itself as a leader in business analytics programs. This recognition is evidenced by its collaboration with the Association to Advance Collegiate Schools and Business (AACSB) and the ISYS Departments Enterprise Systems group that provides data and platforms to faculty and students worldwide. This paper will outline the steps that were made by the team in the Walton College to bring about their business analytics program and show how SAS has been and continues to be an integral part of the success of this program.

ABOUT THE SAM M. WALTON COLLEGE OF BUSINESS

The Sam M. Walton College of Business at the University of Arkansas was founded in 1926 **and has grown not only to become the state's most prestigious business school, but also nationally competitive with respect to both research and curriculum. Its mission is to** advance and disseminate business knowledge using a diverse, inclusive, and global perspective and to encourage innovation in our primary strategic endeavors: Retail, Data Analytics, and Entrepreneurship This commitment to innovation, particularly in data analytics, has provided and continues to provide the leadership support necessary to advance our analytics programs throughout the college. The Department of Information Systems in the Walton College of Business is a leader in the teaching and research of business analytics, enterprise resource planning, enterprise systems, and most recently blockchain. Students who take information systems courses are not only exposed to the very latest computer technology and authentic business data but are also trained and equipped to solve business problems, create new business opportunities, and operate businesses more efficiently using these technologies and data. Enterprise Systems at the Walton College is an initiative started out of the Department of Information Systems to

support education and research efforts at the University of Arkansas and around the world. Combining world-class technology, authentic data from industrial partners, and well-crafted use case tutorials, the Enterprise Systems team supports an end-to-end analytics curriculum solution for faculty and students. In addition, recent textbooks in business and accounting analytics, as well as open online courses in analytics and big data have featured the use of our systems and the data in their coursework.

SAS VIYA: OUR JOURNEY

2018: DIPPING OUR TOE INTO THE WATERS OF SAS VIYA

In 2012, as a response to both the increased demand by local industries for persons skilled in data management, data analysis, and data modeling as well as the importance of data analytics placed by leadership in the College, the Department of Information Systems introduced the graduate Business Analytics Certificate program. This program focused on providing students with a foundation in managing and using data, the application of decision-making with respect to data, and the exploration of data using various data mining techniques. Courses which were part of the Business Analytics Certificate program also played an important role in both the Master of Information Systems and Professional Master of Information Systems program. Consequently, our SAS platform grew to meet the needs of our students. As the graduate certificate program became more popular through 2013 and into 2014, and a new 3-semester business analytics minor was introduced at the undergraduate level in 2015, not only was the need to deliver and enhance an already solid technology foundation becoming more important, but also the need to support a larger number of students across the College and the need to provide a superior user experience for users of this technology. To meet these needs, the College enhanced the existing SAS 9.4 three-tier platform (SAS Compute, SAS Metadata, SAS Mid-Tier) by providing more technical resources to support the increased growth in our analytic programs, and deployed SAS Visual Analytics and SAS Visual Statistics to complement the existing SAS 9.4 platform. **Following the successful "SAS Day" workshop event in the Walton College in May of 2017,** we engaged with SAS to discuss the possibility of deploying SAS Viya, the latest analytics technology platform from SAS. **In addition to providing our students with the "latest and greatest" from SAS, we believed that SAS Viya was a superior solution to help meet many of our objectives within our increasingly popular analytics programs.** Such objectives include:

- An easy to access analytics platform that could be accessed anywhere or on any device
- An analytics platform that provided the benefit of in-memory data access and computing like SAS Visual Analytics (SAS LASR)
- An analytics platform that provided tools for data preparation, data analysis and predictive modeling, and interactive reports consumable by multiple endpoints including mobile devices
- An analytics platform that integrated with open-source languages like Python and R
- An analytics platform that was scalable to meet the needs of existing and future analytics programs within and perhaps outside of the Walton College.

In Feb 2018, we deployed our first iteration of SAS Viya, a single-machine full deployment like the example shown in Figure 1.

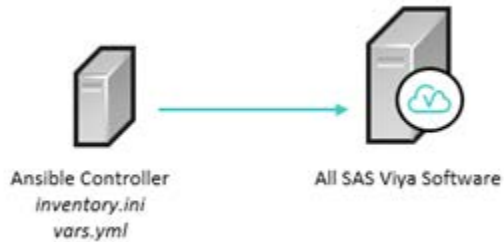


Figure 1 SAS® Viya® on One Machine Using Ansible

(SAS Institute Inc., 2020)

Our first technical deployment proved to be quite successful, and this was due to several reasons:

- The collaboration between the technical team at SAS and us prior to this deployment, **which included “POC deployments” that provided us the necessary information and direction** resulting in the necessary confidence to self-deploy SAS Viya for productive use by our faculty and students.
- The overall simplicity of a single-machine deployment (compared to a multi-machine deployment) provided a much easier path to completion. This included having our ansible controller on the same machine as where the software was deployed.
- The decision to virtualize this deployment of SAS Viya, which gave us the flexibility to add compute, memory, and storage resources as needed with little difficulty or disruption. This first deployment consisted of a virtual server.
- Access to University-managed resources that gave us the ability to integrate SAS Viya into our existing College Active Directory and our overall University domain.
- Consistent communication and collaboration with our analytics faculty giving them ample opportunity and time to test, provide feedback to the technical team, and develop labs and exercises around SAS Viya.

As a result of the successful deployment, we piloted the use of SAS Viya in the classroom in Spring 2018, and SAS Viya was in full classroom use by Fall 2018. Many of our faculty and students spoke positively of SAS Viya in its ease of use and overall performance.

2019: GROWTH BEGETS MORE GROWTH

By the Summer of 2019, we had successfully integrated SAS Viya into our graduate analytic courses and two of our three undergraduate courses. Most notably was our capstone course, Seminar in Applied Business Analytics (ISYS 4393), in which student teams were tasked with solving a business problem using actual company data and various analytics tools like SAS Viya. While our initial single-machine deployment of SAS Viya could handle the load being placed on it, it was clear by the end of the Spring 2019 that further resources would be necessary to keep up with the increased demand by our students. Our second semester analytics course, Business Intelligence (ISYS 4293) was adding a third section and the datasets for our ISYS 4393 capstone course were getting larger, including a newly acquired dataset from a retail company that was being updated weekly. To meet this demand, we purchased additional hardware resources and upgraded our SAS Viya 3.3 from a single-machine deployment (SMP) to a newly deployed, six-machine deployment of SAS Viya 3.4 (MPP) like the example shown in Figure 2.

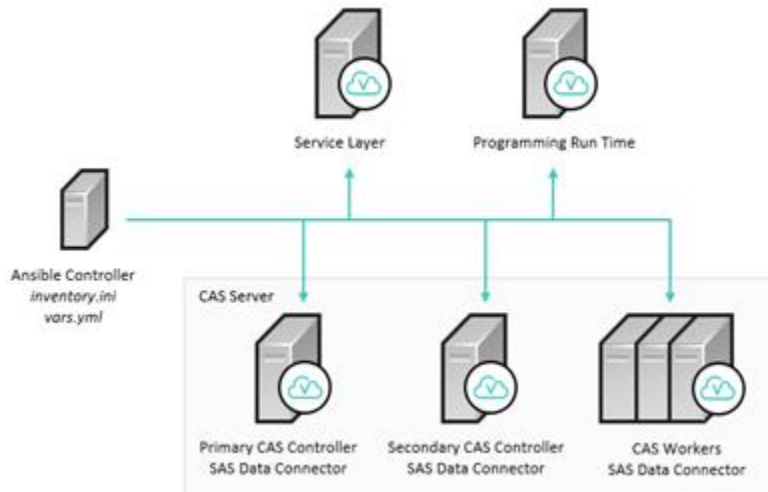


Figure 2 - Full Deployment of SAS® Viya® with a Distributed CAS Server

(SAS Institute Inc., 2020)

While the second deployment of SAS Viya was successful and is what we're currently utilizing in the classroom today, the deployment process was certainly not without its challenges. In addition to the increased complexity of installing components of SAS Viya throughout six machines instead of one, there were other challenges as well:

- Configuring storage, compute, and RAM resources properly throughout the SAS Viya landscape
- How to best configure application user (cas and sas) communication between the Cloud Analytic Server (CAS) controller and its worker nodes.
- How to allow users from multiple Active Directory Organizational Units (OU) to login and use SAS Viya
- How to successfully deploy and connect SAS Viya to our data warehouse platforms like Teradata and SAP HANA

With an ambitious deadline for deploying SAS Viya by Aug 1, 2019, we knew that how we responded to these and other challenges would determine if we would be able to meet that deadline. Fortunately, our persistence, along with help of SAS support, helped us to successfully work through these challenges and meet the deadline for using our distributed SAS Viya platform during the Fall 2019 and subsequent Spring 2020 semester.

DEPLOYING SAS VIYA: WHAT WE LEARNED, AND WHERE WE GO FROM HERE

With two successful deployments of SAS Viya finished, there are several takeaways that we learned in the process. While not exhaustive, these tips, helpful hints, and lessons learned will undoubtedly help prepare, deploy, and manage any subsequent deployments of SAS Viya in the Walton College:

- As you plan, take stock of your tools: This is not only about knowing what technical resources you have, such as Microsoft Active Directory(AD) or VMware, but also knowing about the human resources you will need to ask for assistance with any of these tools. For example, while we had the access we needed to configure and manage our virtual servers on VMware, we needed to work with central IT to have the servers initially deployed and configured with respect to compute and storage resources.

Knowing the tools you have, the tools you still need, and the technical persons you will need involved prior to deployment is paramount for success.

- Know your audience and deliver for them: **User experience and answering the “why”** questions is critical to any technology we deploy in the Walton College, be it SAS Viya, Microsoft SQL Server, or VMware VDI. While issues like security and maintenance times are also important, making decisions prior to, during, and after deployment should be done with the utmost attention to the users of the technology. Minimizing barriers to using this technology was a primary reason our deployment of SAS Viya was and continues to be successful.
- Know when to make the call: **My manager has a saying that “when you are working on a technical problem, you have to know when to call time of death”.** Persistence is crucial, but best if coupled with humility and timeliness. One challenge we had with our second SAS Viya deployment was the challenge of deploying two worker nodes to our CAS controller. After a lot of time reading SAS community blogs, redeploying SAS Viya multiple times, and multiple virtual server restorations, we finally called SAS Support who worked with us to resolve the issue.
- Keep your stakeholders involved and welcome constructive feedback: Our first deployment of SAS Viya carried with it a certain level of excitement and proud accomplishment by the **technical team**. At one **“show-me” meeting with faculty**, however, there were many questions, some general unease about learning something new, and comparisons to existing tools used in the classroom that were deemed **“superior” to Viya**. **Learning to listen, accept, process, and respond to valid concerns** by users is important to overall success.
- Document well, and then document more: **It’s probably safe to suggest that any technical project has not been hindered by “too much” documentation.** Keeping notes of the issues we experienced with our first iteration of deploying SAS Viya and modifying and adding to that documentation for our most recent SAS Viya deployment has prepared us well for future deployments.

CONCLUSION

Our faculty and students continue to use all that SAS Viya has to offer, and we do not see this slowing down any time soon. Future updates to our environment, including more worker nodes, increased usability between SAS Viya and open-source tools like Python and R, and more connectivity between SAS Viya and data management platforms like SAP HANA and Microsoft SQL Server are just a few of the plans for improving our SAS Viya platform, ultimately making our students the winners.

REFERENCES

SAS Institute Inc. (2020, February 19). *Deployment Examples and Guidance*. Retrieved from SAS® Viya® 3.4 for Linux Deployment Guide:
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