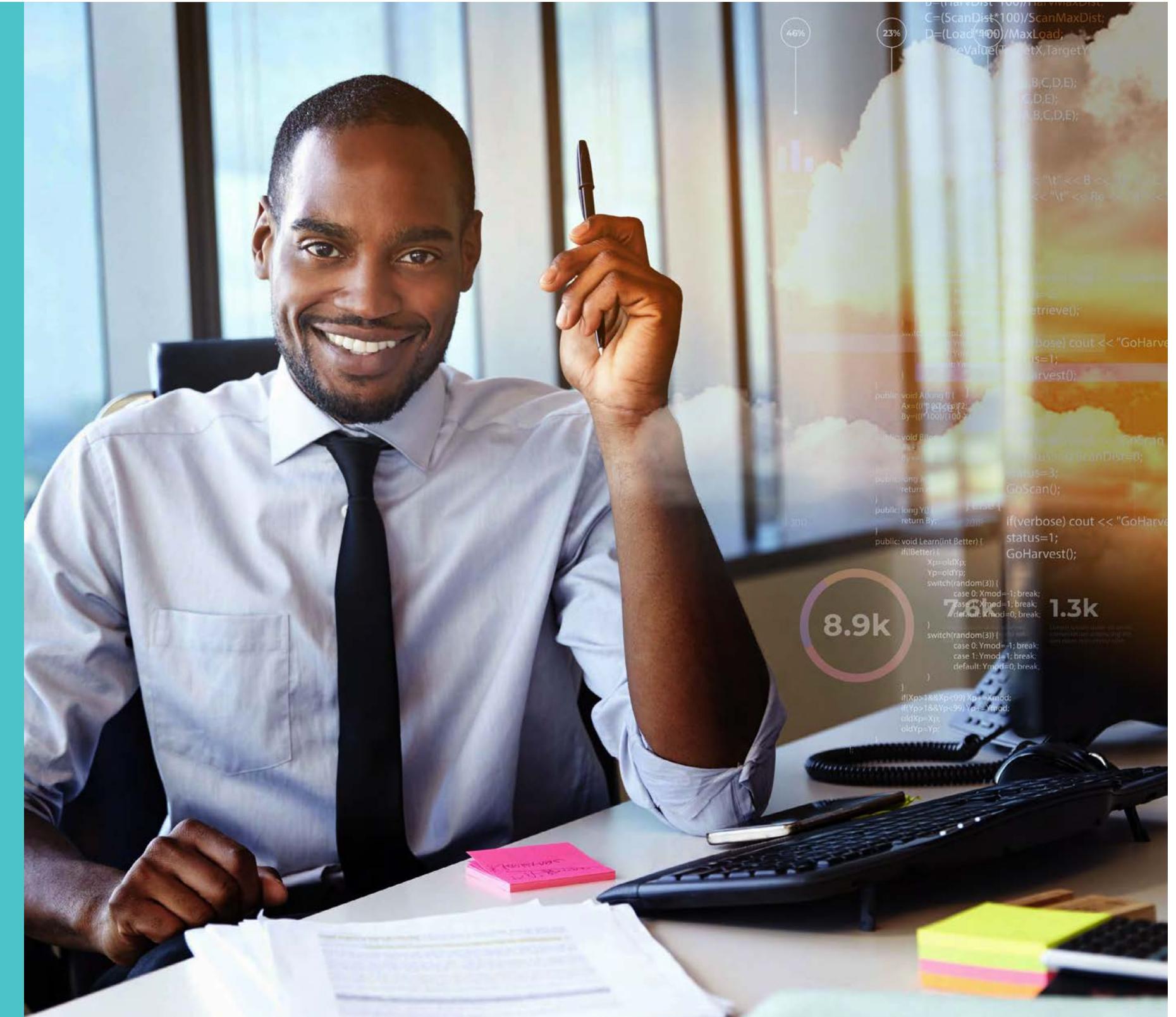




REIMAGINE ANALYTICS

IN THE CLOUD WITH SAS®
AND MICROSOFT® AZURE®

EASILY MIGRATE AND RUN ANALYTIC WORKLOADS
IN THE CLOUD TO MEET BUSINESS GOALS FASTER
AND DRIVE INNOVATION COST-EFFICIENTLY.





INTRODUCTION

Data analytics have driven better business since the dawn of trade. Fishermen knew which bodies of water yielded greater results, and at what time of day. Farmers compared harvests year over year to identify optimal crop rotations. And now, organizations in every industry collect information from their customers to deliver more sophisticated, targeted products and better experiences—all at a lower cost.

But only in this century have we unlocked the true power of data. Migrating analytics to the cloud can open the door for powerful capabilities like solving your most intractable problems, making the best decisions possible, and unearthing opportunities you would otherwise miss.

If you've been considering a migration to the cloud, you're probably looking to boost agility and scalability while reducing costs. With analytics running in the cloud, you can access large scale machine learning infrastructures, take advantage of more advanced hardware like GPUs, and spin unlimited containers up and down as needed. No wonder 75% percent of organizations surveyed by the International Institute for Analytics are either using or plan to use a public cloud by the end of 2020.¹

¹ Macdonald, David. Refactoring Analytics for the Cloud. International Institute for Analytics. April 2019.

SAS has long been ranked the #1 AI and Advanced Analytics software platform according to IDC, and is rapidly evolving its technology to work natively in any cloud environment.² By adopting a view of analytics over its entire lifecycle—from data to discovery to deployment—SAS helps pioneering organizations achieve transformative results. The key is to connect, prepare, cleanse, and govern your data, and develop and deploy models so that any employee can gain valuable insights. Integrating SAS Analytics natively on Microsoft Azure brings unparalleled security and flexibility to your fingertips, with greater visibility for managing compliance and the ability to store data in any of Azure's 60+ regions.

Not convinced by the transformative power of analytics in the cloud? Take a look at how one global bank empowered cross-functional leaders to achieve greater business results through SAS Viya optimized on Azure.

The story that follows is entirely fictional, but represents the very real challenges faced by customers, and the benefits SAS and Microsoft Azure can help them achieve.

² IDC, Worldwide Artificial Intelligence Software Platforms Market Shares 2018-June 2019, IDC#US45262419 and IDC, Worldwide Advanced and Predictive Analytics Software 2018 Share, July 2019, IDC#US45366918

REIMAGINE ANALYTICS

IDENTIFYING BOTTLENECKS

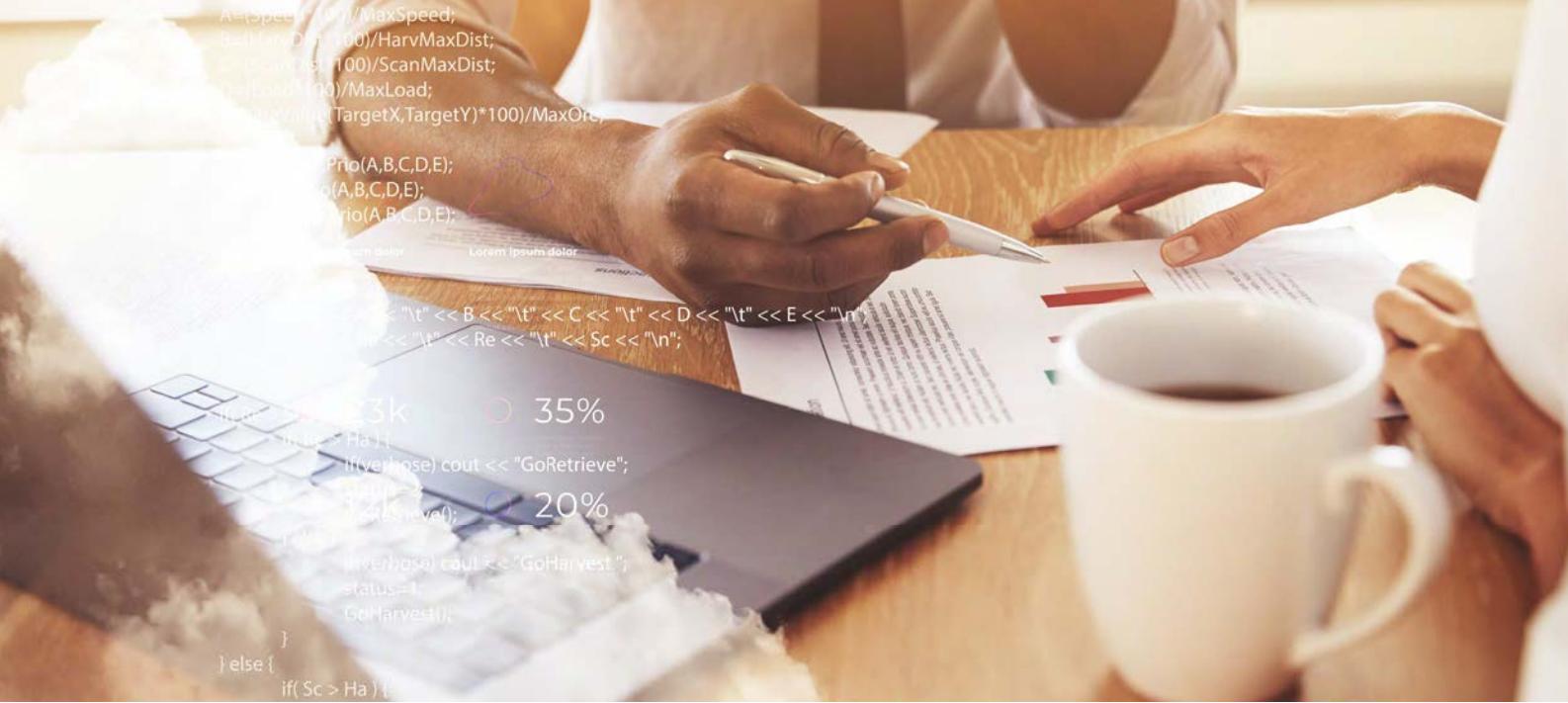
BROCK HAMPTON IS GETTING READY FOR HIS QUARTERLY CHECK-IN WITH COMPANY STAKEHOLDERS.



As CIO for the global bank, Bellwest Financial, Brock meets with select company leaders and front-line workers every few months to discover how he can improve their technology and business processes.

Last year, Brock's check-ins led to Bellwest migrating a number of workloads to Microsoft Azure. Having established a strong relationship with Microsoft, Brock trusted Azure to deliver on security, availability, and cost. The built-in security services have helped Bellwest identify threats in real-time and respond quickly. Plus, security management was unified across their environment. Azure also offered the scale needed to bring applications closer to users around the world, preserving data residency and offering comprehensive compliance and resiliency options. With availability in more than 60 regions and 140 countries worldwide, Azure supported Bellwest's global transformation initiatives. *We were able to reduce risk, lower complexity, and drive down CapEx costs by migrating critical workloads to Azure, Brock thought to himself. I wonder if there are more benefits we can gain from our cloud environment.*

This quarter's check-ins are particularly important, as Bellwest just released their revenue goals for the coming fiscal year. *To continue our growth, Brock thinks on his drive in to work, I've got to empower our workforce with the best technology. I just need to figure out where their bottlenecks are and how best to meet their needs.*



UNDERSTANDING CUSTOMERS

BROCK'S FIRST MEETING OF THE DAY WAS WITH MICHELLE, BELLWEST'S CHIEF MARKETING OFFICER.

"...it was great to meet you this weekend, too! I've got to hop off the phone, but please be sure to send me the results from that survey—I can't believe that nearly three fourths of the event attendees use more than five campaign management tools! Alright, bye now." Michelle hung up the phone just as Brock entered her office. "Hey Brock, you're right on time! I'm glad we scheduled for this morning because I just got back from an amazing marketing event and am full of ideas and inspiration."

"Good to hear, Michelle," responded Brock. "As you know, our new revenue goals are out and I want to be sure I'm supporting the marketing department with what you need to meet our objectives. So complain away!"

"Sure, Brock. You know I'm not a complainer, so I'll start with a positive. One thing I kept hearing at this event was the importance of democratizing data. Ever since we adopted a new CRM tool a year ago, my teams have found it easier to understand and gain insight from customer data. The artificial intelligence built into the platform helps us predict customers' journeys and identify significant experience drivers."

Brock cut in with a smile, "I'm waiting for the 'but.'"

"But," Michelle continued, "we want to enhance our customer journeys with personalized, timely and relevant communications across all our channels but we simply don't have the data to do that effectively. See, connecting a customer's digital activity with data from our CRM, call center and other systems is difficult. We spend too much time deduping and manually segmenting our lists which prevents us from reacting to significant customer moments as they happen. Greater access to more timely data, that's properly cleansed and connected, will help us build campaigns that are both contextually relevant to the customer and more effective for us."

"Thanks Michelle, I'll circle back around after my week of check-ins," Brock said. It seems we may need broader improvements to our data strategy to get the most out of our analytics tools, he thought to himself as he walked to his next meeting,

REIMAGINE ANALYTICS

FALSE POSITIVES

THE HEAD OF FRAUD WAS HEADS DOWN IN A PARTICULARLY DENSE REPORT WHEN BROCK POPPED INTO HIS OFFICE.

"Catching up on War and Peace?" Brock asked as he took a seat across from Bellwest's Head of Fraud.

"Way more fun," Jamaal joked back. "These are the latest updates to the ICO guidance around data protection regulation. Keeping our compliance with the EU is one job that never ends."

"That's why I'm here. If it won't end, maybe I can make that job a little easier. While not directly related to our bottom line, I know that keeping Bellwest protected from fraudsters and regulators alike is essential for our continued revenue growth. Hopefully our recent move to Azure has helped you govern

our compliance more effectively. I remember in my research that they had more compliance offerings than any other cloud. Is there anything else I can do for you?"

"Nothing that I haven't been asking about for ages. I could put together the most advanced fraud strategy the world has ever seen, but we simply don't have the technology to support advanced fraud prevention initiatives. And often, it costs us more to investigate instances of fraud than what's directly lost to fraud itself."

"Well what kind of technology would you need in a perfect world?" asked Brock.

"Advanced analytics and machine learning would help us exponentially improve our fraud detection," answered Jamaal. "We still rely on traditional tools to identify risks, which results in false positives and inefficient case management. The benefits of more innovative analytics tools would span the entire fraud lifecycle, from identifying instances faster and more accurately to freeing up investigators so they work only on the most critical and costly cases."

"Advanced analytics, you say," Brock noted, sensing a theme developing. "I'll see what I can do. Until then, keep up the summer reading."

FIGHTING FRAUD: A NEVER-ENDING BATTLE PWC'S GLOBAL ECONOMIC CRIME AND FRAUD SURVEY 2020³

47% OF COMPANIES

experienced a fraud incident in the past 24 months

6 IS THE AVERAGE

number of frauds reported per company

\$42B IS THE TOTAL

fraud losses reported by respondents

ONLY 56% OF RESPONDENTS

conducted an investigation into their worst fraud incident

³ Global Economic Crime and Fraud Survey, PwC, 2020.

THE FRONT LINE

NEXT, BROCK HOPPED ON A MICROSOFT TEAMS CALL WITH A COMMERCIAL LOAN SVP BASED IN TORONTO.



"Hey Christina, I think your mic is muted," Brock mentioned as they started their call.

"Wow, you're so right—that happens every time," she responded. "So how can I help my favorite CIO?"

"The real question is how can I help you. I spend so much time in HQ that it's easy to forget how our technology impacts those on the front line. I've been chatting with some of the leadership about how we might improve our analytics capabilities, but I wanted to get your perspective before landing on any solution."

"Well, you called at a perfect time, albeit a frustrating one. We actually just lost a customer at our

branch because we couldn't get them approved for a loan on their timeline. To be honest, I'm used to working at smaller banks, where we had strong personal connections with all of our clients. Since I began at Bellwest, it's been overwhelming trying to work through the same manual processes with a much larger (and more demanding) account base. In the past, my time to decision on transactions like inventory purchases and property acquisitions could be as little as a few days. Now it takes three to five weeks, with time to cash collection approaching three months for an average client. It's a struggle to provide the level of service our customers expect without the tools to make decisions more quickly."

"Wow, that does seem like a long time," responded Brock. "It sounds like you'd be best served if we automated some of the decision-making processes around commercial loans."

"Careful," Christina replied, "don't get my hopes up! Automation would give me so much more time to work on building stronger client relationships, my favorite part of the job."

"Well hang in there, Christina. I have a feeling some great changes are on the way."

REIMAGINE ANALYTICS

THE 16TH FLOOR

BROCK GEARED UP FOR HIS MOST IMPORTANT MEETING YET—WITH THE HEAD OF DATA AND ANALYTICS.

It's clear that our next big project will be around analytics, thought Brock in the elevator to the 16th floor. It's come up in my discussions around marketing, fraud prevention, and even our front line. I'm hoping Rahul can help me nail down some specifics around how to meet these challenges and goals.

"I hope you don't mind I invited Cassidy to join us," Rahul said as he greeted Brock at the elevator. "She's one of our brightest data scientists, and I thought she'd be able to provide some added, 'on-the-ground' insight."

"Lovely," Brock said, "I wouldn't have it any other way. Nice to meet you Cassidy. I know we scheduled this as a regular check-in, but I've actually got some exciting ideas that I'd love your input on. From all my meetings this week, it's become clear that Bellwest could stand to improve our data analytics platform. Now, you've been evangelizing about this for some time..."

"...right you are!" interrupted Rahul. "My job is to embed data and analytics into our corporate culture, but it's difficult to do that when our systems are limiting even our best data scientists. For instance, all of our different business units are using different systems and coding languages. That not only makes it harder to attract top talent, but it prevents us from innovating the way we should."

"So what would you be looking for in a new analytics solution?" asked Brock.

"We need something that orchestrates and scales analytics without limiting choice for my analysts," Rahul offered.

"We're also struggling to deploy analytical models in production," added Cassidy. "Only about 60% of our models ever make it to production.⁴ To drive decisioning at scale, our analytics life cycle needs to become more operational in nature, so that we can continuously develop and deploy models."



⁴ The new analytics ecosystem: Transform, evolve and operationalize, SAS, 2019.



"MICHELLE MENTIONED THAT SHE DOESN'T ALWAYS TRUST THE DATA HER MARKETING TEAMS ARE WORKING FROM. HOW CAN WE CONNECT ALL OF OUR BUSINESS SILOES SO THAT EVERY DEPARTMENT AND LOCATION IS WORKING FROM THE SAME INFORMATION?" ASKED BROCK.

"We call that a 'single source of truth,' and it's not just about bridging siloes," replied Rahul. "An ideal solution would cleanse, dedupe, and connect our data while aligning it to privacy and security standards."

"On top of that, we need more elastic computing resource to help manage costs better. Traditionally, we've built out our infrastructure to accommodate huge analytic workloads that run infrequently. This contributes to the slow deployment of models, makes it harder to scale, and raises our infrastructure costs."

"This is some great insight. I suppose my last question would be, what is the most important action we could take to modernize our analytics?"

Rahul and Cassidy looked at each other for a second and turned back to Brock, then, in unison, said, "move our analytics to the cloud."

⁵ IDC's Advanced and Predictive Analytics survey and interviews, 2017-2019.

⁶ Our Top Data and Analytics Predictions for 2019 Through 2022, Gartner, 2019.

REIMAGINE ANALYTICS

THE BOTTOM LINE

BEFORE DIVING INTO RESEARCH TO FIND BELLWEST'S DREAM ANALYTICS SOLUTION, BROCK KNEW HE HAD TO TALK TO THE CFO.

"Thanks for making time for me on a Friday afternoon, Priyanka," Brock said to Bellwest's Chief Financial Officer.

"Of course!" responded Priyanka. "So how are your quarterly check-ins going? I've heard rumblings that you're promising some great new analytics solution."

"No promises from me, but it does seem like employees from every part of the company could benefit from a modernized analytics platform. From what I'm finding, a new solution could help us meet, or even exceed, our new revenue goals."

"Well, if you're looking for a new analytics platform, you'll need to prove the ROI first. But even I have to admit that we're behind the curve in this area. I barely have time to research what our competitors are doing in this area, though I know Artificial Intelligence and Machine Learning are becoming more than buzzwords. Plus, I've been searching for a more effective way to tie profits back to some of the technology investments we're making."

"I think I may have your answer," Brock said. "Rahul got me thinking about our presence on Azure. We've already migrated a lot of our workloads to the cloud, but we're still experiencing trouble with our on-prem environment. Scaling our workloads up and down is costing us more money than it would in the cloud."

"What I'm searching for is an analytics solution in the cloud that connects, cleanses, and prepares data across business siloes, automates model development and deployment steps, enables stronger decisioning by integrating analytics into front-end systems or operational applications, and frees up time to innovate."

"You've got me nervous thinking about another migration," Priyanka responded. "Still, if you find something that does all of those things and can actually boost our revenue—I'm all ears."



According to IDC, only 35% of organizations indicate that analytical models are fully deployed in production⁵



According to Gartner: Our Top Data and Analytics Predictions for 2019: Through 2022, only 20% of analytic insights will deliver business outcomes⁶



According to Gartner, by 2020,
DATA PREPARATION WILL BE USED IN MORE THAN 50% OF NEW DATA INTEGRATION EFFORTS FOR ANALYTICS,⁷

and organizations that offer users access to a curated catalog of internal and external data will realize twice the business value from analytics investments than those that do not.

⁷ Top Data Preparation Tools and Techniques for Analytics & Data Science Success webinar, Gartner.

THE SAS SOLUTION

WITH HIS ORGANIZATIONAL GOALS DEFINED, BROCK SET OFF TO FIND A PARTNER WHO COULD HELP MIGRATE BELLWEST FINANCIAL'S ANALYTICS WORKLOADS TO AZURE.



"I'm glad you reached out, Brock," said Rebecca, a SAS Senior Account Executive. "SAS offers a host of robust analytics solutions for enterprises just like Bellwest. From what you've told me about your key objectives—reducing capital expenditures in your on-prem environment, deploying models faster, working from a single source of truth, and enabling more automated decisioning—I think you're correct in wanting to migrate your analytic workloads to the cloud."

"In fact, SAS recently released our latest version of Viya, optimized on Microsoft Azure. This cloud-native platform offers the perfect balance of choice and control: we can deploy SAS software on Bellwest's own Azure tenant, or manage it through our Hosted

Managed Service offering. We provide SAS software deployed on our SAS Cloud tenant on Azure tuned specifically for the solution, with dedicated service and support. This tailored solution helps customers like you by leaving the technical environment administration and management to us, reducing the burden on their IT departments. Our hosted offering also gives developers the ability to customize Bellwest's analytics to meet your unique needs and requirements.

"In either case, Viya helps you get the most out of your Azure investment by integrating with popular features like Azure Kubernetes Service (AKS), Azure Synapse, and even Microsoft Power BI for visualizations. Your data scientists will love working

with their favorite open-source languages, and Azure Synapse will consolidate, cleanse, and update all of your data in real time, helping to bring your different departments all on the same page. Plus, our custom deployment patterns for SAS workloads help you stand up your Azure instance quickly, optimize performance, and save on infrastructure costs."

"Thanks, Rebecca," Brock responded. "You've given me a lot to think about. This sounds like the perfect fit for our needs. And since our IT is already at capacity working on mission-critical innovations, the Hosted Managed Service offering sounds especially attractive."

"That's great to hear," said Rebecca. "Let's stay in touch as you make your decision."

REIMAGINE ANALYTICS

THE REPORT

BROCK DECIDES TO EVOLVE BELLWEST'S ANALYTICS IN THE CLOUD BY DEPLOYING SAS VIYA ON AN AZURE ENVIRONMENT. ONCE THE FIRST SET OF RESULTS OF THE NEW ANALYTICS PLATFORM COMES IN, BROCK SITS DOWN TO WRITE A REPORT FOR THE CEO.

Marketing and Sales

Microsoft and SAS are working hand in hand to make our marketing campaigns and sales engagements more profitable than ever. With Azure Synapse, the high-value data we collect gets cleansed and prepped so that everyone is working from the same information. From there, SAS helps Michelle's teams gain insight from that data to make better and faster decisions.

Here's what she had to say: "I feel like you've taken off a blindfold I didn't know I was wearing! The data we use to build campaign targeting lists has been deduped and integrated with more types of sales data—bringing in information from different sources to give us a more comprehensive view of customers. Now we can augment our decisions according to data about past engagements with Bellwest and propensity to purchase additional financial products. Plus, the ease of access to insights helps us build our personalized lists in hours versus days. With greater access to more accurate and complete data, I'll be able to justify our marketing budget and improve return on investment."

Sales are up by 20% because we can identify more relevant cross-sell and upsell opportunities, while traffic to our website has increased two-fold due to more personalized marketing campaigns.

Fraud and Compliance

We've strengthened our fraud prevention strategy and investigations through advanced technologies like Artificial Intelligence and Machine Learning. SAS Viya has helped us quickly build AI/ML models and operationalize them to pursue more innovative fraud strategies. That, in turn, has led to fewer false-positives, allowing Jamaal to distribute resources more effectively.

In an email he sent me last week, Jamaal said, "we've finally removed bottlenecks that have long persisted in our fraud strategy. By leveraging cloud computing, we can push out fraud detection models faster and with greater confidence that they will do their job. That means I spend less time mitigating issues and more time preparing for new threats or brushing up on regulatory updates."

False positives are down by 23%, which has led to a 47% reduction in investigative costs.



Customer Success

In addition to SAS Viya, we also leveraged automation tools to improve customer experiences. SAS integrated our models with enterprise decision management tools to create business-rule-based triggers that produce the best automated decisions. By adopting sophisticated machine learning algorithms, we can make decisions about credit worthiness faster and more accurately. This simultaneously reduces our risk profile by increasing our confidence in our credit assessments. SAS Viya has helped Christina, the Commercial Loan SVP I spoke with earlier in the year, meet the demands of a higher volume of customers.

Christina told me, "We have increased confidence in the data quality entering our decision process. SAS Viya has helped us process more customer requests, on tighter deadlines, than ever before. Now I can focus on building stronger relationships with clients and recommending other financial services, which has already positively impacted our profitability. Plus, we've improved our delivery of performance information that can be presented to executive management and regulators."

In our Toronto branch alone, Bellwest completed 17% more transactions per month since deploying Viya on our Azure environment.

Data and Analytics

It comes as no surprise that SAS Viya has empowered our analytics experts on the 16th floor to improve efficiencies and time to market. By bringing our analytics into the cloud, our data scientists enjoy greater agility and flexibility to build analytical assets how they want, in the language they choose. For Bellwest employees in the lower tiers of the analytic skills pyramid, SAS Viya has democratized our data analytics so that everyone can gain insight from our data.

Rahul had this to say: "Now that we are working with the most advanced analytics technology out there, I've found it easier to get other department heads on board with our data strategy. More employees see the value of data, because they can visualize it with powerful tools like Power BI. Our data scientists are using Azure's integration with Kubernetes to streamline the software development workflow so that we can speed up our Continuous Integration / Continuous Deployment process. They're also better equipped to support Bellwest by getting machine learning models into production faster. Basically, by accelerating our cloud environment with Viya, we can accomplish more tasks each day to meet business challenges and opportunities as they come up."

In the months since deployment of SAS Viya on Azure, Rahul has attracted 5 top tier data scientists from our competitors, bringing a greater diversity of experience and skill to our team.

Return on Investment

From an IT perspective, running SAS Viya on Azure has made us more innovative while reducing our infrastructure costs. We now have access to powerful graphics processing unit (GPU)-based compute resources for complex analytics, and SAS has helped us optimize costs in the cloud by leveraging best practices like Azure Reserved Instances. With SAS managing our cloud environment, my teams can focus on mission-critical tasks.

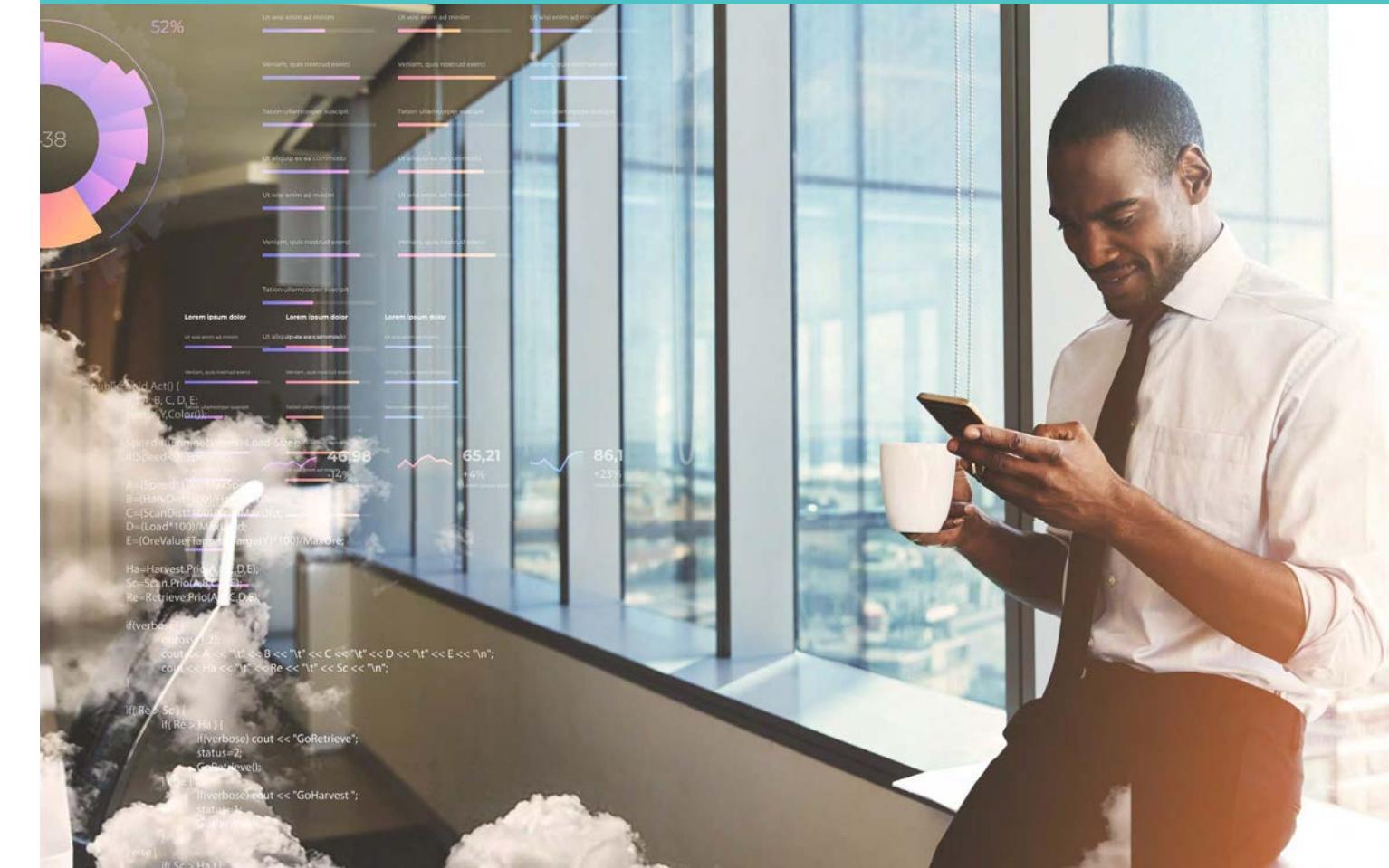
Priyanka agrees, "This was a necessary step to accelerate our Azure environment, thus getting more return on our investment in the cloud."

We're close to doubling our ROI on the analytics migration because we can access compute and storage power on demand while paying only for what we use.



WHAT JOURNEY WILL YOU TAKE?

Enterprises in every industry can gain the same performance improvements and cost-savings as Bellwest Financial.



Every business is different, and SAS is committed to finding the perfect solution to meet your organizational goals.

CHOOSE YOUR JOURNEY

HOW YOU CAN GET STARTED TODAY WITH SAS ON AZURE:

- **Managed Application Services:** Let SAS manage your production SAS environments on Microsoft Azure so you can focus on maximizing value. SAS offers both hosted and remote managed services on Microsoft Azure, enabling you to take advantage of cutting-edge SAS technology with maximum uptime and minimal administrative overhead.
- **SAS for Containers:** Begin your container journey. Take advantage of container deployments to migrate production SAS 9 and SAS workloads to Microsoft Azure. Empower your data science teams with a flexible and efficient way to execute SAS workloads using containers.
- **SAS Viya Quickstarts on Microsoft Azure:** Stand up your SAS instance on a Microsoft Azure validated environment in minutes to get insights quickly.

COMING SOON

- **The next release of SAS Viya on Microsoft Azure:** Quickly transform raw data into operational insights that support every kind of decision your organization makes. SAS Viya is being redesigned to run natively on Microsoft Azure, taking advantage of Azure Kubernetes Service (AKS), Azure Synapse and other Microsoft services so you get the most out of your cloud investments.

VISIT WWW.SAS.COM/MICROSOFT
TO LEARN MORE ABOUT THE SAS AND MICROSOFT STRATEGIC PARTNERSHIP.