

CECL/IFRS9 RFP



[CUSTOMER]



February 27, 2019

[CUSTOMER] CECL/IFRS9 RFP

Submitted by:

XXX

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February 27, 2019

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Dear xxx,

Thank you for the opportunity to present [CUSTOMER] INA Holdings with the enclosed Current Expected Credit Loss (CECL) and IFRS 9 proposal. Our submission highlights the depth and breadth of SAS solutions and expertise, as well as, our partnership with subject matter experts. We believe the tight relationship between a global accounting firm (policies) and a global solution provider (software) delivers to [CUSTOMER] the best of both worlds. It will play a key role in helping [CUSTOMER] to meet multiple accounting standards with a sustainable infrastructure with reasonable financial budgets.

In our fourth decade of service to the financial services community, SAS has the specific technology and experience for CECL and IFRS 9. Understanding the complexity of these regulations, ***SAS has joined with the global accounting firm of KPMG LLP US to provide [CUSTOMER] with the accounting and subject matter expertise*** that will deliver an efficient, effective CECL and IFRS 9 compliance program.

SAS formed a Risk Research and Quantitative Solutions (RQS) division several years ago to enhance our focus on complex customer issues, such as stress testing, regulatory compliance, and capital management. SAS has doubled its investment in R&D for financial risk management solutions and hired numerous industry experts to assume leadership roles in RQS supporting ***over 1,400 organizations worldwide using SAS risk solutions.***

From Chartis Research in their latest: FinTech Quadrant™ 2018:

“In particular, SAS’ experience in deploying IFRS 9 solutions prepared it well to deliver a strong CECL solution, as reflected in the company’s scoring on both the completeness of offering and market potential axes. The handling and classification of financial instruments in SAS’ CECL solution was especially notable. It offers the capacity for Q factor trend analysis, back-testing and assessment, as well as workflow for adjustments allocation. The solution’s expected credit loss modeling is another point of note, building on SAS’ depth of experience in analytics. In addition, its lifetime loss estimation capability provides a full model risk management framework. ***SAS’ delivery platform makes integration of the CECL solution easier via its modular implementation,*** allowing the required software to be delivered rapidly on top of SAS’ underlying technical foundation.”

This proposal includes the total cost for software, installation, configuration and implementation of [CUSTOMER]’s CECL and IFRS 9 program. **For delivery, we are proposing a SAS-hosted environment.**

We look forward to scheduling some time with you to present our solution, answer any question and to move forward with a full deployment. If you have any questions, please feel free to reach out to me directly.

Kind regards,

xxxx

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Executive Summary

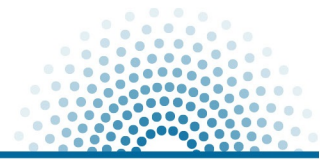
ASU 2016-13, Measurement of Credit Losses on Financial Instruments, and IFRS9, Financial Instrument, marks a significant change adding modeling complexity to credit impairment accounting by requiring the immediate recognition of estimated credit losses expected to occur over the remaining life of many financial assets. The significance of the accounting change cannot be overstated as it will require new workflows, analytics and reporting impacting current systems, processes and internal controls.

Unlike the spreadsheet approaches many financial institutions rely on today, SAS Expected Credit Loss (ECL) provides a single centralized environment to coordinate workflows, manage large data and model inventories, quickly create and execute complex models, apply the accounting rules, and prepare drill-down reports and ledgers for regulatory and financial reporting purposes.

The SAS Expected Credit Loss (ECL) solution is a well-controlled, high-performance platform to execute complex models and generate results in a substantially reduced timeframe - often in minutes rather than days or weeks. More importantly, the platform provides capabilities to orchestrate and govern the required data, workflow, analytics and reporting processes. This underlying platform is in production in over 120 customers in the financial services industry, across banking and insurance and continues to grow as the regulation deadlines approach.

The SAS ECL Solution is architected to work with regulatory content packages for IFRS 9, CECL, IFRS 17, Solvency II and the new FASB ASU 2018-12 guidelines – **LDTI** (Long Duration Contracts Targeted Improvements). This accelerates delivery and reduces the total cost of continual compliance with changes in the Accounting Standards. Such “White-Box” approach from SAS means the IFRS 9 & CECL content packages can integrate with existing [CUSTOMER] systems and that the whole process is governed, fully traceable and auditable.

The separation of platform and content creates an agile solution which can readily adapt to changes in interpretation, business needs and workflows, as well as provide an overall lower Total Cost of ownership by eliminating the need of insurance companies having to invest in separate individual point solutions. The SAS ECL solution is deployed in partnership with your Actuarial, IT and Finance departments and our implementation methodology encourages self-sufficiency from an early stage. The solution allows self-service business user interrogation of the calculation engine and development of reports.



SAS is a global leader in data management and analytics and has proven technology to meet any big data and modeling challenge. The SAS Solution combines this expertise with the accounting and subject matter expertise of KPMG LLP US delivering an end-to-end solution and deployment. Globally, [CUSTOMER] colleagues have been modeling using SAS software for over 12-years. This skillset and software footprint and can be leveraged for project delivery and on-going support.

In summary, the tight relationship between KPMG (accounting policies) and SAS (analytics software) delivers to [CUSTOMER] the best in subject matter expertise. This synergy and experience will play a key role in helping [CUSTOMER] to meet multiple accounting standards with a sustainable infrastructure and reasonable financial cost.

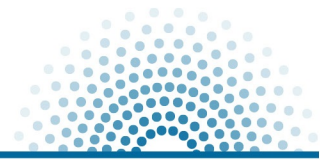
What are CECL and IFRS9 about?

In June 2016, FASB issued ASU 2016-13, “Financial Instruments – Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments.”, as known as CECL. It will change how credit losses are measured and recognized for securities and loans, aiming to improve financial reporting by requiring earlier recognition of credit losses on loans, held-to-maturity (HTM) securities and certain other financial assets. Specifically, held-to-maturities debt securities are subject to the CECL methodology described in ASC 326-20, which is also applicable to held-for-investment (HFI) loans, while available-for-sale debt securities are subject to a separate credit loss methodology described in ASC 326-30. Overall, Topic 326 replaces the current incurred loss impairment model that recognizes losses when a probable threshold is met with a requirement to recognize lifetime expected credit losses immediately when a financial asset is originated or purchased.

In parallel, IFRS 9 (2014) is the culmination of work done by the IASB to replace its standard on financial instruments, IAS 39 Financial Instruments: Recognition and Measurement. The most significant change is the addition of calculations for expected credit loss (ECL) for impairments, which represents an increased convergence of regulatory and accounting standards.

Given the nature of the forward-looking calculations needed for expected credit losses estimates, both CECL and IFRS9 introduces significant complexity to the reporting process of allowance and provision. In addition, it is expected that CECL and IFRS9 will have an impact on retained earnings and, by extension, capital ratios.

Also, for insurance companies, IASB issued IFRS17 and FASB issued LDTI, which will change how insurance liabilities are valued and profit is recognized, providing more transparent and consistent financial reporting across the insurance industry. Insurance will need to report more regularly (quarterly basis at a minimum), with more complexity at a more granular level, on how new insurance contracts are affecting their financial outlook and risk exposure. This will completely change how insurance providers manage their balance sheets, from static profit and loss approach to predictive forecasting in support of strategic planning.



Challenges

CECL is expected to require management to make new judgments and calculations when measuring expected credit losses. This likely requires changes in policies, processes and internal controls, as well as upgrades in IT systems to capture additional data to support the accounting and disclosure requirements. Similarly, explaining the impact of IFRS 9 on performance prior to the adoption of new measurement requirements for insurance liabilities likely to pose many challenges to insurers, as it will require enhanced capabilities to support the computation of IFRS 9 ECLs, the analysis of the ECL outputs and an auditable work environment. [CUSTOMER]'s current quarterly financial reporting processes on credit losses is rather manual under the incurred loss impairment model. CECL/IFRS 9 will magnify management's ongoing effort requiring definition and application of impairment triggers, expected credit loss modeling, estimating expected future cash flows and incremental financial reporting standards for loans and securities. Therefore, existing systems will likely not fully enable the relevant flexibility, agility and scalability needed to address CECL and IFRS 9 regulatory and accounting requirements.

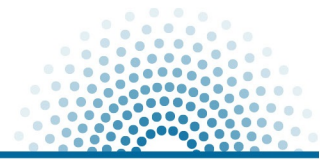
The Proposed Approach

The proposed solution provides an efficient, well-governed way to solve the CECL and IFRS 9 challenges. It consists of four main areas of functionalities, each working in concert to support the analytical and reporting process from end to end: from assuring input data quality; through the execution of credit risk models, stage allocations, scenarios and what-if analyses; to the production of appropriate management and disclosure reports. In addition, it provides robust and flexible reporting capabilities and a content package designed to meet CECL and IFRS 9 requirements. The content package includes data models, workflow frameworks and reporting, which accelerate and cut costs for the evolution of the insurer's CECL and IFRS 9 development process. Please refer to the [Solution Overview](#) in the next section, for details regarding the features of the software solution and functional highlights for [CUSTOMER]'s CECL and IFRS 9 requirements.

The solution presented herein to [CUSTOMER] is based on the SAS Expected Credit Loss (ECL), which was developed for helping financial institutions achieve compliance with the regulatory requirements for CECL and IFRS 9.

In addition, should [CUSTOMER] wish to use the solution for regulatory risks other than CECL and IFRS 9, SAS is offering the option to extend the usage of the ECL beyond the initial requirements. The solution could then be used for enterprise-wide stress testing purposes for example.

In conjunction with SAS ECL, SAS has developed and maintains complementary CECL and IFRS 9 content. Both CECL and IFRS 9 Content Packages include pre-defined content specifically designed to meet the CECL and IFRS 9 requirements which helps reduce implementation time and mitigate project risks. The content helps solve required regulatory analytical challenges through a robust, transparent and efficient platform.



Over the years, KPMG and SAS have developed a number of methodologies that integrate industry best practices and case studies to assist in the implementation of SAS initiatives. This disciplined approach ensures that we successfully deliver our projects and exceed our clients' expectations. We have built a strong reputation for our ability to deploy our leading-edge solutions in a way that allows [CUSTOMER] to achieve superior return on investment. Our commitment to customer service and value delivery is highly aligned with [CUSTOMER]'s expectations for quality. Our proposed implementation approach is customized to [CUSTOMER]'s specific reality and environment. It is Agile in nature and designed to deliver flexibility and results in a short period of time for an end-to-end CECL and IFRS 9 solution.

The proposed solution is designed to simplify set-up and deployment of complex modelling systems removing the need to re-code systems of models in another language. This will make the handover between modelers and IT more efficient and reduce the time to implementation, thereby shortening the overall project timeline.

Financial Aspects

SAS and KPMG have been working closely with [CUSTOMER] for many years and we welcome the opportunity to build on our longstanding relationship as your business advisor. We know that we are bringing the best price for value for the implementation of an CECL/IFRS 9 solution that will entirely meet [CUSTOMER]'s needs.

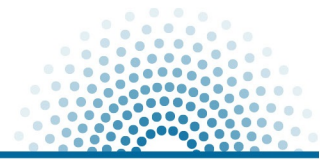
In recognition of our history and partnership, we are providing pricing incentives to ensure we offer competitive and lowered overall licensing costs and fees. In order to achieve this, SAS software has been discounted and KPMG's rates for implementation and delivery services are competitive. We are extremely confident that [CUSTOMER] will find our overall total cost of ownership and ongoing operational costs very favorable and competitive.

Our current proposition also leverages:

- ◆ [CUSTOMER] internal resources with deep knowledge on SAS technologies
- ◆ Current loss forecasting models developed/owned by [CUSTOMER] that will be compatible with the CECL/IFRS 9 solution
- ◆ Current SAS technology already in place at [CUSTOMER]
- ◆ An effective and proven approach to implementing an CECL/IFRS 9 solution at many other financial institutions that will make the process far more efficient for [CUSTOMER]
- ◆ An experienced SAS and KPMG team that understands the subtleties of CECL and IFRS 9 requirements as well as seasoned KPMG risk and accounting professionals

The SAS Difference

SAS provides an out of the box solution in support of both CECL and IFRS 9. It offers an end-to-end comprehensive and easy-to-customize approach to automate financial reporting processes to meet CECL and IFRS 9 standards, which allows [CUSTOMER] to implement a dedicated bridging platform between your existing credit losses capabilities, investment data system (PAM) and accounting system (PeopleSoft). This approach mitigates the project operational risk,

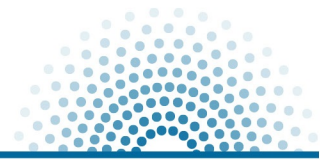


enabling [CUSTOMER] to comply with CECL and IFRS 9 standards in the most cost effective and sustainable manner.

The technology backbone of the proposed solution is SAS Expected Credit Loss Solution (ECL), which supports CECL, IFRS 9, IFRS 17, Solvency II among other accounting and regulatory reporting requirements such as the recently published ASU 2018-12 guidelines (**LDTI**). This uniquely provides the benefit of leveraging the same cross-functional technology platform, throughout the organization to manage significant calculation and reporting on a multi-GAAP basis. SAS ECL solution ensures that data and processes are fully transparent and auditable at any step throughout the workflow. As part of the offering, SAS ECL also provides advanced Data Management to handle heterogeneous system landscapes and multi-system data sourcing.

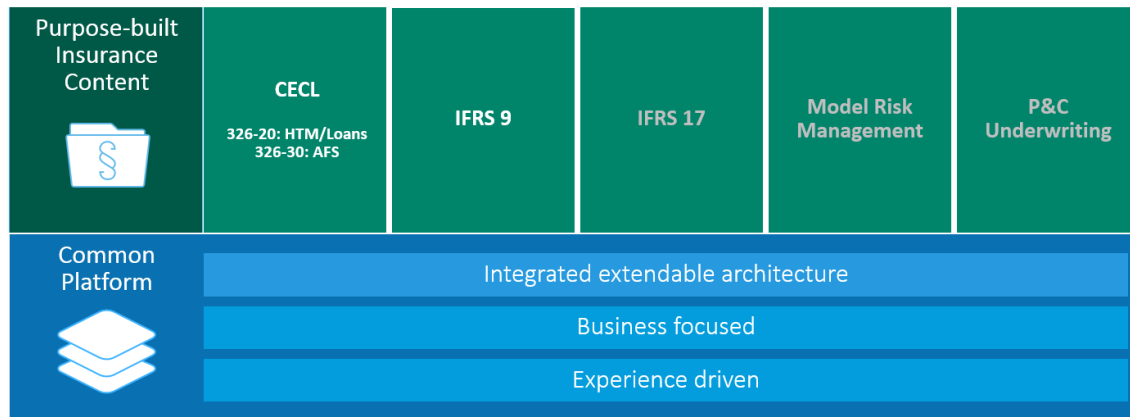
Although [CUSTOMER] manages CECL/IFRS 9 and IFRS 17 initiatives in separate workstreams, the potential to leverage the same technologies and underlying approaches provides [CUSTOMER] an opportunity for significant cost savings and a chance to form a consistent accounting and financial reporting framework, driving significant efficiencies in transition and business operations for both domestic and international accounting and reporting standards. Same platform can be leveraged as well to address the recently published FASB Accounting Standard ASU 2018-12 – **Targeted Improvements to the Accounting for Long-Duration Contracts (LDTI)**.

As these new standards transform financial reporting and compliance within the insurance industry, the costs of managing technology and resources, as well as implementation and on-going operations are expected to be significant. Business functions such as policy, process and control development and functional application, data sourcing and specification criteria, model and/or cash flow integration, change management, training and troubleshooting can be implemented and operated through streamlined workflows across the organization sharing knowledge and experience rather than repetitive and expensive independent implementation and operating programs. Moreover, we believe that a combination of the SAS end-to-end CECL/IFRS 9 solution, industry adoption of SAS technology in achieving CECL/IFRS 9 and IFRS 17/LDTI compliance, intimate knowledge of [CUSTOMER]'s IT architectural and data landscape, and KPMG's industry leading accounting expertise, along with proven implementation record at many industry peer institutions puts us in a unique position to successfully deliver the CECL/IFRS 9 solution for [CUSTOMER].



Solution Overview

The SAS CECL/IFRS9 solutions are part of SAS established Technical Risk Platform, also known as **SAS Expected Credit Loss (ECL)**.



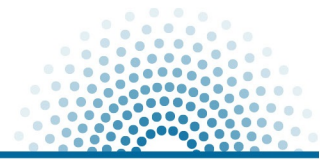
Technology Platform

The technical platform enables SAS customers to establish a central infrastructure that supports various business topics, while the business topics are provided as content packages from SAS which is regularly updated and extended. These content packages can be easily downloaded and applied on the Technical Platform. This approach enables SAS customers to keep up-to-date with the evolvement of various regulatory standards and to reduce project and maintenance efforts.

The SAS CECL and IFRS9 solutions and business content are a complimentary offering that protects SAS customers investment in their existing actuarial and financial tools, skills and processes.

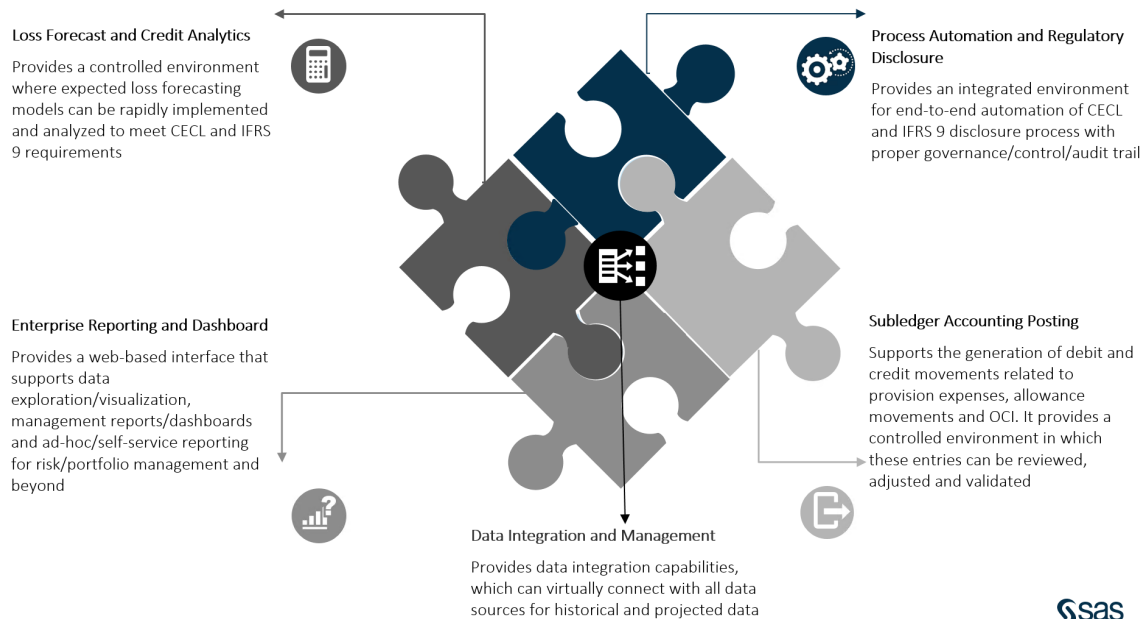
The technical platform itself, namely **SAS Expected Credit Loss (ECL)**, has a strong focus on general requirements for regulatory topics like Fast Close Automation, Auditability, etc. It provides an efficient, well-governed solution to the challenges introduced by CECL and IFRS 9, supporting the entire analytical and reporting process for expected credit loss calculation under CECL and IFRS 9:

- ◆ Assuring input data quality for control and audit
- ◆ Executing loss forecast models for expected credit loss estimation
- ◆ Performing scenarios and what-if analysis on loss forecasts for management judgements
- ◆ Automating securities filters for asset classification and incorporation of accounting policies around credit losses
- ◆ Producing appropriate management and disclosure reports for financial reporting
- ◆ Generating accounting entries using sub-ledger accounting posting module shared by CECL/IFRS9, IFRS 17/LDTI that is designed to address multi-basis and multi-currency



The solution provides five main areas of functionalities to achieve the specific business objectives listed above during CECL/IFRS 9 exercises:

- ◆ Loss forecasting and credit analytics
- ◆ Process automation and regulatory disclosures
- ◆ Enterprise reporting and dashboards
- ◆ Data integration and management
- ◆ Subledger accounting posting



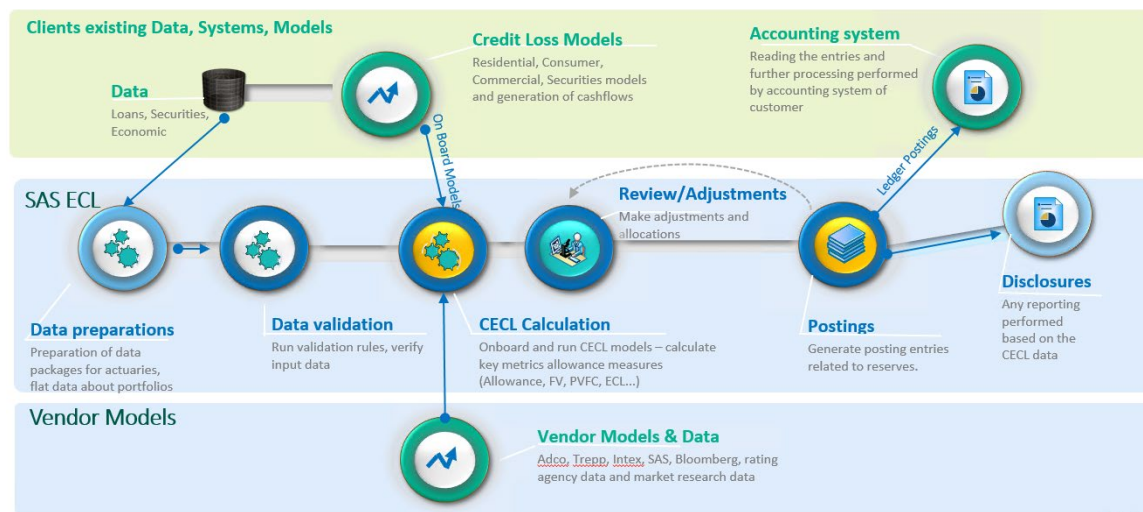
Main functionalities included in the SAS Expected Credit Loss solution

Business Content

Each business content is dedicated to a specific business topic. The business content includes pre-defined business workflows, a dedicated data-model, a calculation engine, posting rules for accounting and various pre-defined reports and analysis.

The CECL and IFRS 9 content packages are designed to meet CECL and IFRS 9 requirements. Both content packages include data models and filtering logic that are easily customizable, NPV cashflow logic for credit loss calculation, CECL and IFRS 9 workflows, management reporting and financial disclosures for credit losses for CECL and IFRS 9, which accelerate and cut costs for the evolution of the insurers' CECL/IFRS 9 development process.

From a workflow perspective, the SAS solution is building a bridge across IT, asset managers and accounting functions plus existing tools, supporting an agile cooperation between these different functions, which covers all relevant parts from data management, classification, model execution, reporting and posting.

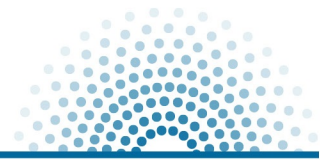


Key Differentiators

SAS will deliver a solution to help [CUSTOMER] meet the CECL and IFRS 9 standards using best-of-breed technology and business knowledge to ensure that all appropriate treatments are implemented in a timely fashion and backed by the right level of expertise from a risk, finance, accounting, and technology point of view.

Key differentiators of the SAS solution include, but are not limited to:

- ◆ Open, flexible, and fully customizable platform that can address multiple use cases, including CECL, IFRS9, IFRS 17, LDTI, stresstesting, capital planning, and BAU loss forecasting
- ◆ Reporting capabilities that are customizable and flexible to the needs of the various users (geo-map, waterfall, position level drilldown, dashboards, ad hoc queries, and analytics to analyze correlation/variance/loss trends)
- ◆ CFO attestation process
- ◆ Consolidation and integration of various forms of inputs from multiple data sources
- ◆ “What-if” scenario analysis to assess the impact of expected credit loss due to changing institution specific forecasts of economic and business conditions to the financial statements
- ◆ Workflow and data lineage for traceability and auditability for every aspect of the process to log all changes (who, when, impact)
- ◆ Calculation/storage of data, comparison capability between two or more periods of input/output data
- ◆ Collaboration of accounting and asset management teams on a common platform to quantify impacts of credit loss assumption changes on income statement and balance sheet

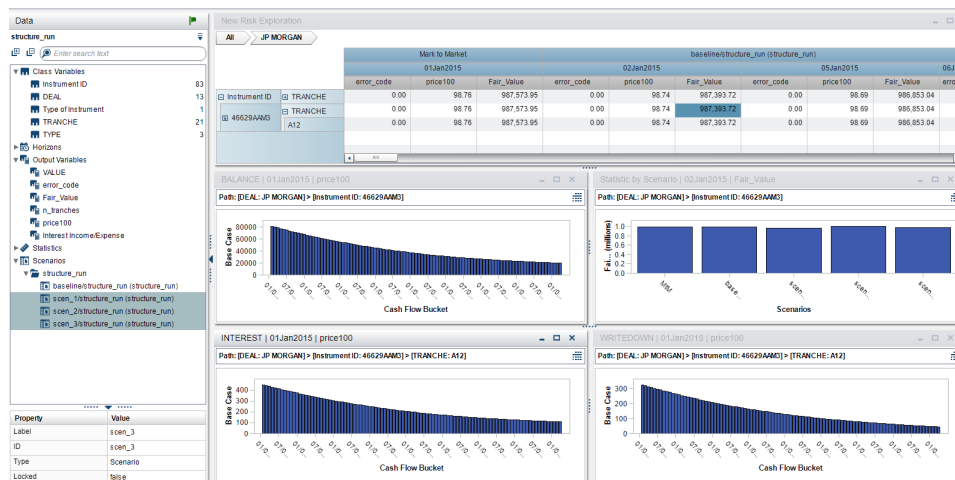


- ◆ Orchestration of multiple runs needed to compute the period-over-period roll forward ECL, including changes due to:
 - Macro-Economic Variables (MEV)
 - Models
 - Mean reversion
 - Supportable forecast period change

Key Functionality Descriptions

Loss Forecasting and Credit Analytics

The SAS Expected Credit Loss solution for CECL/IFRS9 provides a controlled environment where expected loss forecasting models can be rapidly implemented and analyzed to meet CECL/IFRS9 requirements.

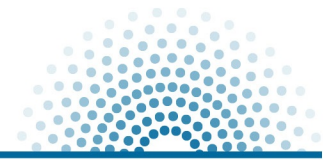


Screenshot of loss forecast and credit analytics

The solution minimizes the development and deployment effort for loss forecast models by providing out-of-the-box loss forecasting methodologies and cash flow logic designed to satisfy CECL/IFRS9 requirements, with flexible mapping between methodologies and loan types. Portfolio segmentations and economic scenarios can be very quickly created and tested through the user interface, to explore the impact on the expected credit loss forecast driven by hypothetical changes in the portfolio, macro-economic conditions, portfolio segmentation, models, or other user-defined changes.

Results can be efficiently visualized and drilled down in real time, enabling experts from credit, risk, and finance to work together to:

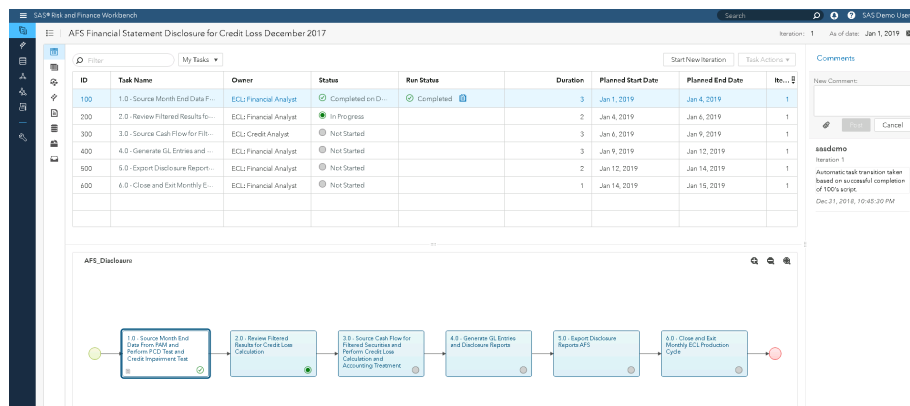
- ◆ Select the most suitable loss forecasting methodologies and risk segmentation/factors for each individual portfolio
- ◆ Produce expected loss forecast results that are both business sensible and statistically valid



Process Automation and Regulatory Disclosures

CECL/IFRS 9 requires financial institutions to have a more streamlined and well-orchestrated execution process. Due to the frequency of CECL/IFRS 9 execution and required level of auditability, having a repeatable process is imperative.

SAS Expected Credit Loss provides an integrated environment for end-to-end automation of the CECL/IFRS 9 disclosure process. The governance, controls, and audit features in the solution satisfy the highest level of regulatory and audit scrutiny. The solution integrates with third-party solutions within enterprises to provide a truly integrated experience.



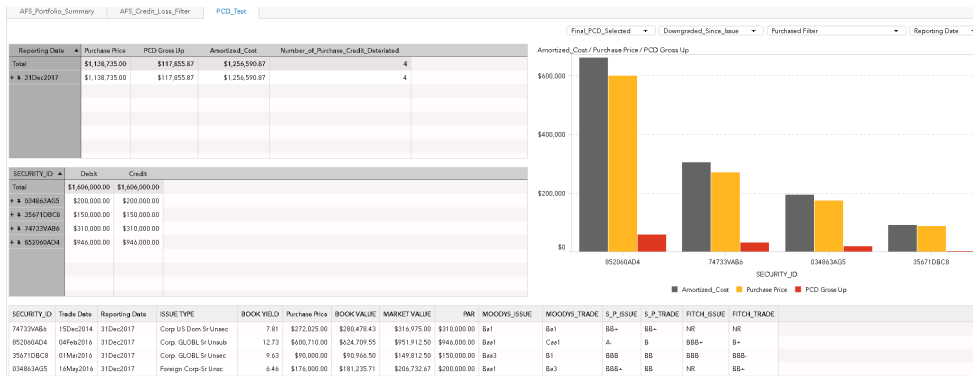
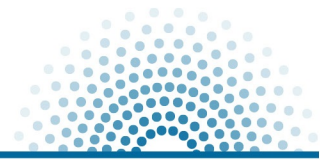
Screenshot of Workflow and Process Automation: This screenshot of process automation and regulatory disclosures represents the user interface for a typical CECL / IFRS 9 reporting cycle, including the tracking of all execution of models/analytics and manual adjustments such that audits always show which models/analytics were executed and what parameters were used for the production run of a specific reporting cycle.

The web-based environment enables financial institutions to orchestrate their entire CECL/IFRS 9 process, enabling different stakeholders to work in a well-coordinated and documented manner. The solution has the capability to integrate with any data source and to collect manual data and overrides with full auditability of data changes. Users can specify scenarios and execute the models (native to the solution or other external systems).

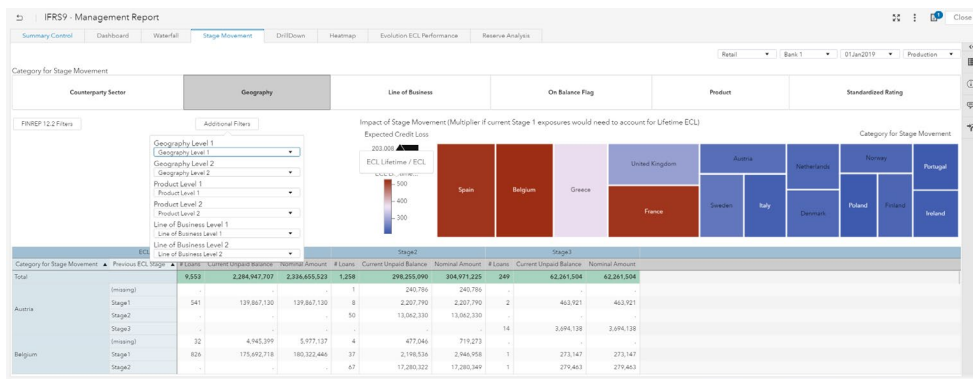
The solution aggregates the reserves in a customizable way to satisfy management, regulatory, and financial reporting while also tracking manual adjustments and overlays. The reporting capability within the solution produces regulatory, financial, and management reports to suit the needs of the organization.

Enterprise Reporting and Dashboard

The SAS Expected Credit Loss solution, along with the CECL content package and IFRS 9 content package, includes a full-fledged, web-based, self-service reporting platform with over 20 out-of-the-box CECL/IFRS 9 management dashboards and reports to provide portfolio trends and CECL/IFRS 9 calculations. It also provides data exploration and analytics capabilities (such as correlation, predictive analysis, and forecasting).



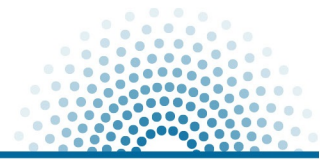
Screenshot of Management Reporting and Dashboards 1



Screenshot of Management Reporting and Dashboards 2

The following dashboards and disclosure and management reports are included:

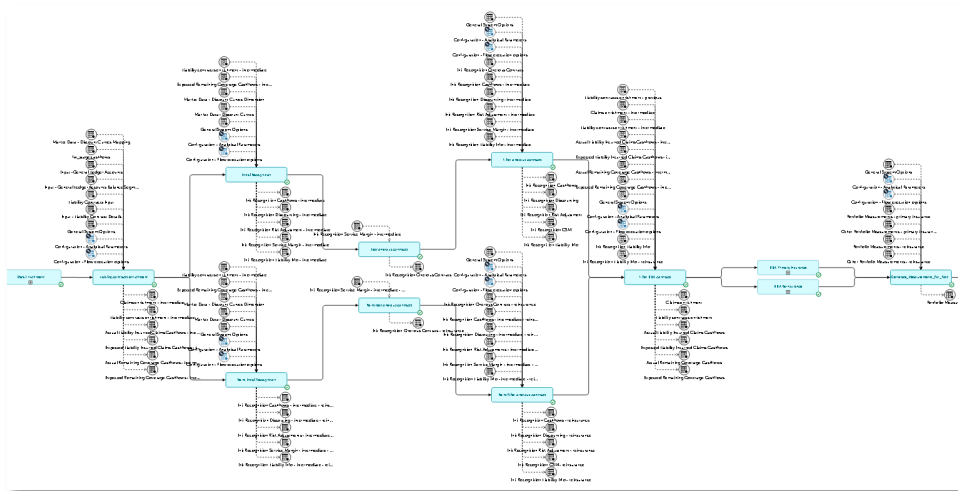
- ◆ Data Quality Reports per the BCBS239 principles (Accuracy, Integrity, Completeness)
- ◆ Input Portfolio Trend Analysis
- ◆ Summary Control
- ◆ Dashboard
- ◆ Attribution/Waterfall
- ◆ Stage Movement
- ◆ Provision Drill-down
- ◆ Heatmap
- ◆ Evolution ECL Performance
- ◆ Reserve Analysis
- ◆ Day 1 Accounting Treatment for PCD
- ◆ Accounting Entries
- ◆ Financial Statement Disclosures
- ◆ Accounting Treatment Scenarios
- ◆ ECL by product, geography, credit score, vintage



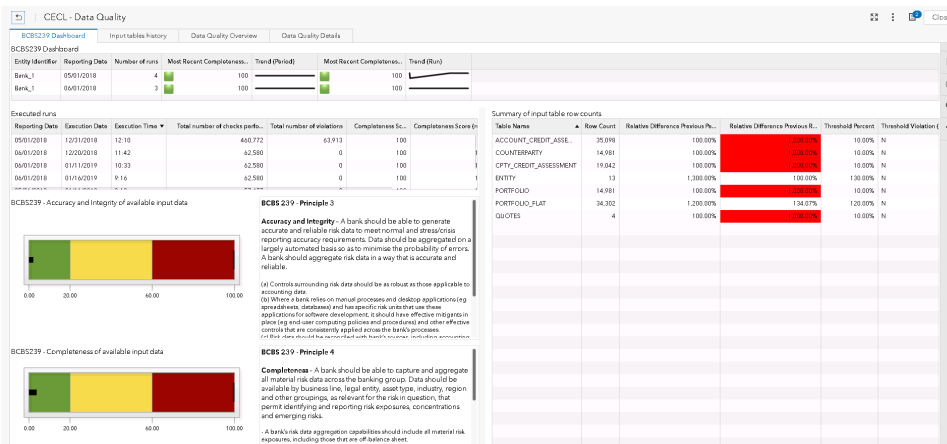
Data Management and Integration

The SAS Expected Credit Loss solution is built with capabilities to use either the solution data model or your own data model. The SAS solution for CECL/IFRS9 includes a data management solution with the required data integration capabilities, which can virtually connect with all data sources for historical and projected data. It provides the data lineage to track how data moves through the reserving process and undergoes different transformations. All this information is recorded for auditability and transparency.

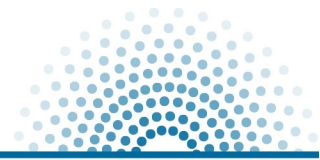
The solution automates and deploys business rules created and managed by business users. Furthermore, users can add advanced data management capabilities if required for data profiling, data quality, data cleansing, etc. to manage noisy, inconsistent, and incomplete data.



Screenshot of sample data quality flows



Screenshot of sample data quality reports



Business Rules Management

The SAS Expected Credit Loss solution for CECL/IFRS9 also includes a web-based workspace for users to create and manage rules. For example, the rules may be used to:

- ◆ Determine loan classification/segmentation
- ◆ Implement data quality and transformation rules
- ◆ Prepare rules-based GL postings
- ◆ Automate manual processes

The screenshot displays the SAS Business Rules Manager interface. The top section shows a list of rules with columns for #, Run, Name, Version, Description, Date Modified, and Modified By. Below this, a detailed view of the 'FICO_Bands' rule logic is shown, including a table of conditions and actions.

#	Run	Name	Version	Description	Date Modified	Modified By
1	<input checked="" type="checkbox"/>	Loan_status	1.2	Create Loan status	Mar 17, 2016 03:09 PM	SAS Demo User
2	<input checked="" type="checkbox"/>	FICO_Bands	1.2	Create FICO bands	Mar 17, 2016 03:09 PM	SAS Demo User
3	<input checked="" type="checkbox"/>	Product_Type	1.2	CECL Product type both consumer an...	Mar 17, 2016 03:09 PM	SAS Demo User
4	<input checked="" type="checkbox"/>	CECL_Rating_Bands	1.2	Rating bands for retail and commerci...	Mar 17, 2016 03:09 PM	SAS Demo User
5	<input checked="" type="checkbox"/>	LTV_classification	1.2	LTV calculation	Mar 17, 2016 03:09 PM	SAS Demo User

#	Rule Name	Condition	Action
1	FICO<600	If (FICO < 600)	then CECL_FICO_Band = '1- <600'
2	FICO 600-700	If (FICO >= 600 and FICO < 700)	then CECL_FICO_Band = '2- 600-700'
3	FICO 700-800	If (FICO >= 700 and FICO < 800)	then CECL_FICO_Band = '3- 700-800'
4	FICO>800	If (FICO >= 800)	then CECL_FICO_Band = '4- 800+'
5	Substandard	If (Day_del_90 = 'Y')	then CECL_FICO_Band = '5- Substandard'

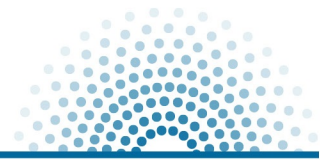
Screenshot of Business Rules Manager

As part of IFRS 9, business users typically need to apply specific rules at three key decision points:

- ◆ Asset classification rules and the SPPI test
 - FVOCI
 - Amortized cost
- ◆ Impairment stage classification
 - Stage 1 – based on current loan status
 - Stage 2 – based on changes from one period to another
 - Stage 3 – other scripted rules based on business user feedback
- ◆ GL posting
 - Rules facilitating the classification of each loan into buckets
 - Rules enabling creation of balances for posting to GL accounts
 - Balancing entry rules based on any balance adjustments on loans moving from one stage to another

The functionality is used to define bucketing (staging) rules via a web UI with audit on rule versions:

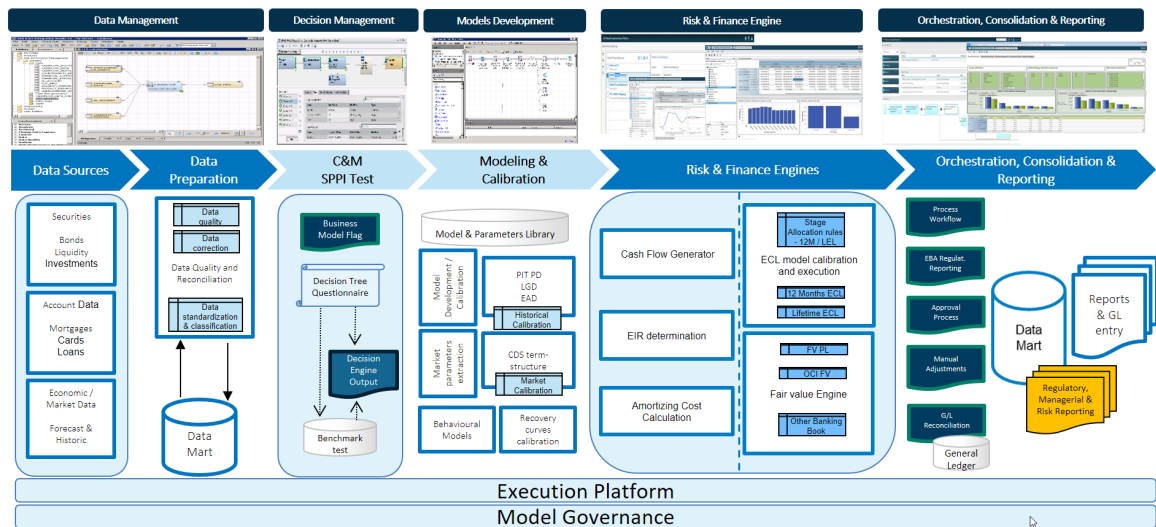
- ◆ Multiple rules can be defined in a rule set to run for final classification
- ◆ Rules can be easily promoted to production by the user



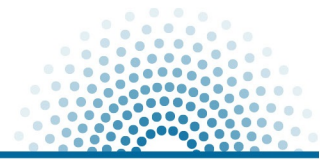
A graphical interface is provided for the inclusion of user defined criteria, available basic predefined criteria:

- ◆ Type of contract
- ◆ Impairment status of the counterparty
- ◆ Number of days and amount of past due
- ◆ Credit event to reflect recent risk conditions

Any free attributes of the counterparty or of the transaction.



Example Workflow for IFRS 9



Responses to RFP for CECL and IFRS9

1.1 Organization, Industry, and Market Information

1.1.1 Describe your business

Incorporated in 1976 and headquartered in Cary, NC, SAS is **the world's largest privately held software company** serving customers in 145 countries with about 14,000 employees around the globe operating from offices located in 60 countries.

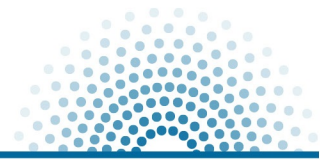
SAS (pronounced "sass") once stood for "statistical analysis system" and began at North Carolina State University as a project to analyze agricultural research. As demand for such software grew, SAS was founded to help all sorts of customers – from pharmaceutical companies and banks to academic and governmental entities.

As the market leader in providing a new generation of business analytics and business intelligence (BI) software and services, SAS enables our customers to create true enterprise intelligence. Our solutions are used at more than 83,000 sites – including 96 of the top 100 companies or their affiliates on the 2017 Fortune Global 500® list – to develop more profitable relationships with customers and suppliers; to enable better, more accurate, and informed decisions; and to drive organizations forward. SAS is the only vendor that completely integrates leading data management, analytics, and traditional BI applications to create usable intelligence from massive amounts of data.

Despite the fluctuating economic conditions over the years, **SAS has maintained profitable growth for each of the more than 42 years since the company was founded**. For 2018, SAS continued our unbroken track record of revenue growth and profitability with overall revenue of \$3.27 billion. SAS also reinvested about 25% of our revenues into research and development (R&D) – significantly higher than the average investment of large software companies – to improve existing technologies and support new development initiatives.

Please also refer to:

- ◆ **About SAS** | www.sas.com/about
- ◆ **History** | www.sas.com/about#history
- ◆ **Customers** | www.sas.com/success
- ◆ **Annual Report** | www.sas.com/annual-report
- ◆ **Quality** | www.sas.com/qualitypaper
- ◆ **Corporate Social Responsibility** | www.sas.com/csr
- ◆ **Security Assurance** | www.sas.com/security-assurance



1.1.2 Tell us about your organization's experience in the area described

More than 90% of the top 100 global banks use SAS. Many customers rely on SAS to enable their compliance with regulatory requirements. SAS Global Government Affairs, SAS Corporate Legal Staff, and Senior Management in Consumer Risk & Fraud Solutions monitor regulatory affairs on a constant basis. If a change in regulation dictates a new technology process, SAS acts to fulfill the requirement.

SAS Expected Credit Loss has been designed to provide a controlled and transparent environment for CECL estimation. It provides a full audit trail of the process and supports full replicability of results. Models and calculation flows are fully transparent, and numbers can be easily aggregated and disaggregated for analysis. Summary reports are automatically generated to support review, audit and disclosure tasks.

More than 95 customers around the world use SAS Expected Credit Loss to address CECL and IFRS 9 requirements. Our customers' results generated by using the SAS solution have been audited by major accounting firms.

1.1.3 Please provide your financials for the past 3 years

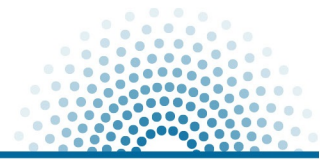
SAS' financial independence enables us to focus on delivering world-class solutions with a long-term view of success as partners with our customers. In 2018, SAS continued our history of being privately held and debt free, while growing total revenue to \$3.27 billion, a 0.8% increase over 2017.

We remain confident in our prospects for the future. SAS continues to grow in both market presence and revenue.

As a privately held corporation, financial statements are not made public, which includes percentage of revenue by product. Dr. Jim Goodnight, one of the company's founders and CEO, owns or controls, directly or indirectly, a majority of the shares of SAS. Our financial statements are audited in accordance with auditing standards generally accepted in the United States.

For further information, our D&B Number is 04-004-6724. Please also refer to:

- ◆ SAS Annual Report | www.sas.com/annual-report
- ◆ Company Information | www.sas.com/en_us/company-information.html
- ◆ Corporate Social Responsibility | www.sas.com/csr



Total Worldwide Revenue (US\$ | past five years):

- ◆ 2018 | \$3.27 billion
- ◆ 2017 | \$3.24 billion
- ◆ 2016 | \$3.2 billion
- ◆ 2015 | \$3.16 billion
- ◆ 2014 | \$3.09 billion

1.2 Functional Requirements

1.2.1 Asset classes supported

Please provide details on the asset classes you support:

a. AFS and HTM assets

- i. Loans*
- ii. Securities*

b. HFI securities

All sub bullets under this requirement are supported.

High Level Summary of Feature/Functionality of the Solution Supporting This Requirement:

For CECL, the solution provides classification/separation of workstreams for the following asset classes:

Securities:

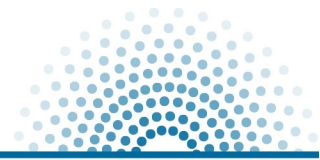
- ◆ Available for sale (AFS)
- ◆ Held to maturity (HTM)

Loans:

- ◆ Held for investment (HFI)

Both Held for investment (HFI) loan and Held to maturity (HTM) debt securities are measured at amortized cost basis and are within the scope of the current expected credit loss (CECL) model described in ASC 326-20. ASC 326 provides a different impairment model, described in ASC 326-30, that is a modified version of the other-than-temporary impairment (OTTI) model prescribed by prior GAAP. The recognition and measurement of impairment will differ between the CECL model and the AFS debt security impairment model.

For IFRS 9, the solution provides an additional SPPI test prior to separation of credit loss including fair value through other comprehensive income (FVOCI) vs amortized cost. Both requires ECL estimates under IFRS 9 standards, where fair value through OCI needs mark to market in addition.



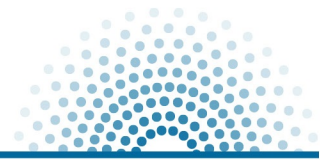
The solution provides the following components through content to address accounting treatments and disclosure requirements for each asset class:

- ◆ Workflow: key milestones for each reporting period, providing automated audit trail and control points through preparation of financial statements, disclosures, and accounting entries during each reporting cycle.
- ◆ Data Model for Securities
 - Position Data Model for Credit Loss Accounting Treatment
 - Cash flow Data Model for Credit Loss Calculation
- ◆ Securities Filter Logic: filter criteria to streamline asset classification, ensuring only in-scope positions go through calculation
 - SPPI Test
 - PCD identification criteria
 - Zero expected credit losses criteria
 - AFS securities filters
 - Impaired (fair value < amortized cost)
 - Intends to sell the security or if it is more likely than not that the bank will be required to sell the security before the fair value increases to at least the amortized cost basis
 - Decline in fair value has resulted from a credit loss
- ◆ Accounting Treatments:
 - Basic credit loss calculation methodologies
 - Calculation logic for allowance and related measures needed for disclosures
 - Movement logic for allowance roll forward
 - Aggregation logic for Disclosures
 - Bifurcation logic for accounting entries
- ◆ Management Reports
 - Input
 - Data exception
 - Data quality
 - Position credit risk profiling
 - Output
 - Scenarios
 - Waterfall
 - Disclosures
 - Accounting entries

1.2.2 Loss forecasting

a. What approaches do you support?

The SAS solution includes a component of software called Model Implementation Platform that allows [CUSTOMER] to embed and integrate external loss models. While SAS does not provide out-of-the box/pre-calibrated credit models, the solution has capability to execute PD models, Rating Transitions Matrices internally given model specification, as well as to integrate



with third-party APIs such as Intex and Bloomberg. Such configurations and model importation are typically performed as part of the implementation services of the solution. Alternatively, the SAS ECL solution can directly consume undiscounted cashflows for AFS securities and/or loss forecasting results for different scenarios.

For loans, SAS can also provide a connectivity module that generates cash flows for credit loss forecasting (that will be used to calculate expected credit losses for the remaining life of the instrument).

b. Do you provide out of the box models? If so please list by asset class?

No; however, the solution has the capabilities to integrate with external models if desired.

c. Do you provide additional models which are not included? if so please list

Yes. SAS Mortgage Models: Fixed 30 – Monte Carlo. It is a loan-level state transition model for conforming fixed-rate mortgage loans.

d. Do your CECL models have applicability for Stress testing and Capital planning?

The SAS ECL solution is designed to enable customers to perform Stress Testing and Capital Planning once the external credit models are imported/integrated into the solution.

e. Do you integrate with third party models support (SAS, Excel, Others)?

- i. Can you call the models via an API?*
 - ii. Can you load model output into your system?*
 - iii. Can you extract model output from your system?*
-

All sub bullets under this requirement are supported

f. For more complex cashflow based approaches:

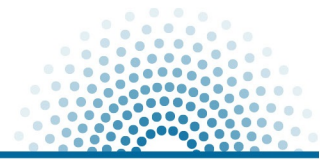
- i. Does your system generate cashflows? If so what are the assets classes supported*
-

The SAS ECL solution relies on undiscounted cashflows provided by external sources.

Alternatively, the solution has ability to generate cashflows, however, it requires implementation services to import customer provided models or to integrate with third party applications such as Intex.

-
- ii. Can it take cashflows as inputs?*
-

Yes



iii. Describe your NPV cashflow model/comparisons

The solution automates the NPV cashflow calculation as part of the credit loss allowance process after undiscounted cash flows are provided to the solution. Note, undiscounted cash flows will be required for AFS securities that trips the entity's credit filters pre-programed into the solution, and for all HTM securities, if DCF election is made by the entity. If DCF is not chosen for HTM, [CUSTOMER] will need to provide the credit allowance amount by security to the SAS solution for reporting and disclosure purposes. The solution takes undiscounted cashflows of each security as an input, then sources effective yield and reporting date of corresponding security from position data to perform proper discounting to produce an NPV result of the cashflow.

iv. How do you segregate OCI from the allowance portion for AFS securities?

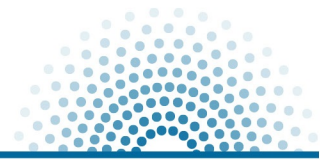
Upon determining the NPV for each security, the solution automates accounting bifurcation for calculating the credit loss allowance and amount calculated for OCI for AFS securities. As result of the calculation, the solution produces credit loss allowance and OCI estimates for all securities for accounting entries and disclosures.

High Level Summary of Feature/Functionality of the Solution Supporting This Requirement:

The web-based solution provides customization functionality incorporating an entity's policy guidelines for automating the determination for which securities are required for further credit allowance calculations, discounting 3rd party provided undiscounted cashflows, and comprehensive accounting treatments that properly segregate the credit allowance and OCI portion for AFS securities. The solution also provides a connectivity module that allows implementation of client specific credit loss models. This module is used by financial institutions to produce the reasonable and supportable forecasts for HFI and HTM assets.

The SAS ECL platform enables the performance of these key processes for CECL/IFRS9 by dynamically extracting from client data sources and third-party sources, such as those providing vendor models or cashflows. The SAS ECL platform provides a data preparation and validation layer, model execution and cashflow attribution services, and resulting analytics, postings, and disclosures for all asset classes mentioned in section 1.2.1.

SAS will import cashflows generated by external cashflow tools already in use by the client. However, for HTM assets and loans, SAS can also provide a module that generates cashflows for credit loss forecasting (that will be used to calculate expected credit losses for the remaining life of the instrument).



1.2.3 Analysis

a. Ad hoc and what if analysis

-
- i. Can a user choose an adhoc analysis to replace the production run if required?*
-

Yes

-
- ii. How easy is it for a user to create new analysis and to configure?*
-

The reporting engine provides out of box iteration capabilities to allow user to create new analysis and track changes. The solution in addition provides ad-hoc reporting interface to facilitate easy to customize analysis from segment level to loan level.

-
- iii. Can you run pro forma analysis?*
-

Yes.

b. Attribution – Roll Forward ECL

-
- i. Is attribution out of the box?*
 - ii. Do you have FASB required attribution and additional granular levels of attribution available?*
 - iii. Can you drill down to loan level within the attribution?*
-

All sub bullets under this requirement are supported

c. Sensitivity Analysis

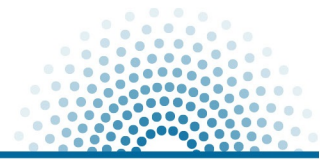
-
- i. Can you run sensitivity analysis directly in the system?*
 - ii. Can the system allow for test dummy portfolios?*
-

All sub bullets under this requirement are supported

d. Drill down capabilities

-
- i. Are you able to drill to loan level details?*
 - ii. Cashflow level details (if CF analysis is used)?*
-

All sub bullets under this requirement are supported



High Level Summary of Feature/Functionality of the Solution Supporting This Requirement:

The solution provides many capabilities to facilitate ad hoc and what-if analysis. This includes but not limited to AFS filter decision analysis, scenario analysis, sensitivity analysis, attribution analysis and cashflow analysis. These capabilities are developed on top of SAS high performance technology, along with the out of box instrument level logic and instrument level data model, all scenario analysis, sensitivity analysis, attribution analysis and cashflow analysis could be drilled down to instrument level. More specifically, features and functionality included in the platform are:

Well-governed process orchestration workflow

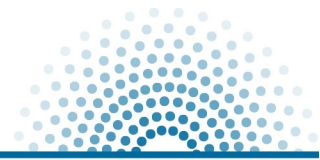
- ◆ Orchestrated IFRS9/CECL and stress testing process at the enterprise level with status and timelines
- ◆ Transparent control, management and testing
- ◆ Identify bottlenecks and streamline processes
- ◆ Comprehensive audit trails are provided, including who, when, what and why
- ◆ Complete record of data lineage

Controlled model execution library

- ◆ A single model execution library, including metadata
- ◆ The centralized library can include open source and SAS models
- ◆ Qualitative estimates, including version control and change management
- ◆ Interactive what-if scenarios:
 - Manage scenario library from a web-based interface
 - Import scenarios provided by regulators
 - Compare scenarios side by side
 - Enhance and edit scenarios
- ◆ Visualize fully documented model execution results with overlays
- ◆ Forecasting from line of business to enterprise level

Flexible risk and finance aggregation:

- ◆ Define legal entity structure and hierarchies
- ◆ Mapping between risk, finance and regulatory hierarchies
- ◆ Capital assessments and risk-weighted assets
- ◆ What-if analysis with review and challenge processes
- ◆ Management overlays with audit and governance
- ◆ Integration with existing ALM, aggregation and reporting systems



Regulatory reporting and analytics:

- ◆ Scalable regulatory reporting engine
- ◆ Stress testing regulatory packages
- ◆ Ability to slice and dice historical and forecasted data
- ◆ Management dashboard, including analytical reports
- ◆ Ability to document regulatory reporting processes, including Microsoft Office integration

1.2.4 Data

a. Scenario data

i. Does your system include scenario data?

No

ii. What is the frequency of updates?

N.A.

iii. Can user based scenarios be loaded?

Yes, for loans and HTM securities (non-DCF approach), no for AFS securities.

b. Data model

i. Does the system provide a data model?

ii. Is it fully documented?

iii. Do you provide subject area specific information?

1. Specific instrument details?

2. Specific model requirements?

iv. Can it be customized easily?

v. Do you provide data templates?

All sub bullets under this requirement are supported

c. Data load

i. Can the user input data directly through the interface?

ii. Can automated data load be configured?

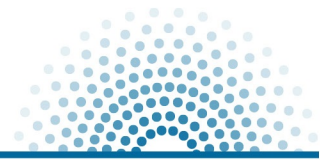
iii. Can data be imported or exported via CSV files?

All sub bullets under this requirement are supported

d. GL Reconciliation

i. Do you facilitate GL or sub-system reconciliations?

All sub bullets under this requirement are supported



High Level Summary of Feature/Functionality of the Solution Supporting This Requirement:

SAS have predefined CECL/IFRS9 data models that can be flexibly customized if needed. The predefined data model includes the following areas:

1. Landing area

Configuration tables – contain parameters that influence analytical and reporting logic, parameters used by investment data system and credit loss models (for cashflow generation) may be kept here as well; definition of dictionaries (lines of business, configuration of data used from previous reporting period, reporting templates).

Mapping tables – translate input code values to relevant identifiers and labels used within the solution (calculation methods, countries, foreign exchange rates types, chart of accounts).

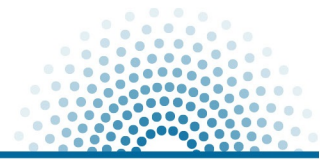
Fact tables – keep all fact data required for CECL/IFRS9 specific calculations: details about loans/debt securities, interest curves, exchange rates, actual cashflows, expected cashflows; there are also tables for storing the actual organizational structure and actual chart of accounts (may be different for different entities).

2. Results data area

Measurement tables – placeholder for results of calculations from each reporting period; they are needed as input for calculations for Existing Business in the next reporting periods; by default, data is stored on the same level of detail as calculations were performed.

Posting tables - postings generated by the solution (based on rules, manually adjusted by users, reconciled), with their status and codes. By default, the level of details is the one used in the posting rules.

In addition, the proposed solution includes comprehensive data integration capabilities and business rule management capabilities. They are designed to address all data process management requirements specified by [CUSTOMER] for CECL/IFRS9.



The solution:

- ◆ Uses the portfolio cube to store all instrument (loan or debt securities) level information needed for cash flow generation and credit loss calculations
- ◆ Includes business rule management capabilities for creating, storing and publishing data quality rules (including flagging exceptions), scorecard mapping rules, risk bucketing rules, along with thresholds used in these rules
- ◆ Provides data integration tools for integrating and processing all data, information and logic produced by different modules in the solution

The solution provides a UI access to create regulatory templates and worksheet hierarchies to automate the regulatory reporting processes, guaranteeing total consistency with the GL postings and avoiding further needs for manual intervention and reconciliation.

1.2.5 Accounting / Audit

a. Controls

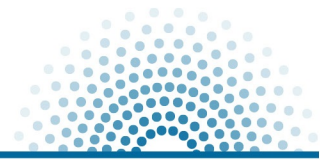
i. Please describe control framework

The solution also provides proper governance and control in all the modules. All user actions are secured through proper versioning and controls.

- ◆ The production version of the model in the calculation module is fully locked down with automatic versioning of all sub-components and could only be modified as a different version.
- ◆ Data process and model execution, including data quality checks and risk bucket allocation, could be automated and locked down in the orchestration module for production execution once it is developed and fully tested for version control.

ii. Do you provide a SSAE 16 Report? If so, what level?

SAS has a current SOC-2 report related to controls of our hosted solutions infrastructure located in Cary, NC. Additionally, with CECL reporting becoming effective January 1, 2020 for US institutions, SAS is investigating the audit process required to provide a SOC-1 attestation report for our software solutions used in financial reporting by our customers. We expect to complete this SOC-1 as of September 30, 2019 and will make the report available upon request after its completion.



b. Audit trails

i. Describe the system audit trail capability:

1. Data level
 2. Report
 3. Analysis
 4. Configuration
 5. Models
-

The solution allows for coordination and orchestration of the entire CECL/IFRS 9 and management review process from a single interface, improving auditability, transparency and repeatability. It streamlines orchestration of CECL/IFRS 9 process for executing and consolidating results across categories:

- ◆ Provides a workflow around execution for assigning tasks to different users, tracking delivery dates, results review, challenge and sign-off.
- ◆ All actions in the entire CECL/IFRS 9 workflow are recorded including the automated numbers, the overrides, who has done what and why, and any comments and supporting documentation added.
- ◆ All changes and comments entered into the results review panel are automatically recorded and can be viewed in a history log through UI and is available for export to a distributable format.

c. Audit period end analysis report

i. Does the system generate an audit report for the production run?

Yes

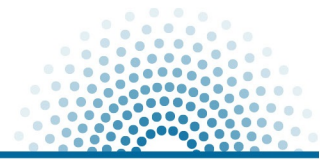
d. Period Close

i. How does your system facilitate period close?

The solution offers a Subledger Accounting Module (SLAM) that supports the generation of debit and credit movements related to provision expenses, allowance movements and write-offs. The SLAM takes the accounting events produced by the "the ECL process flows" and converts those to debit and credit entries in a SL Journal. It provides a controlled environment in which these entries can be reviewed, adjusted and validated. To support this review drill down dimensions can be set up. These drill-down dimensions also help to increase the understanding of the amounts posted to the General Ledger and more granular postings enriched with these domain specific dimensions will stay available for future reference in the Subledger Reportmart.

ii. How do you ensure nothing can be altered after close?

Each reporting period is managed through the concept of a project, which provides the workflow that orchestrate all the activities, data flow, calculation, reporting to serve the financial reporting process for that period. Once all tasks within the project are completed, the solution provides an out of box functionality to lock-down the project to ensure nothing can be altered after close.



e. Treatments

i. Please describe all accounting treatments supported:

1. PCD
 2. Securities (AFS and HTM)
 3. IFRS 9
 4. Other
 5. Multi-Basis
 6. Multi-Currency
-

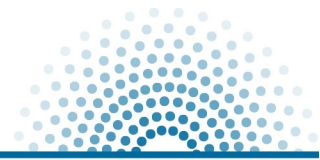
Purchased credit deteriorated CECL gross up and amortized cost basis on discounted or non-discounted approach is supported on acquired AFS and HTM debt securities. Moreover, the gross up is calculated by adding the CECL amount to the purchase amount to arrive at the amortized cost basis. The amortized cost basis is deducted from par value to derive at the cost basis adjustment. All acquired PCD assets must be designated via flag when first onboard (e.g., initially recognized by the entity, or purchase period). AFS credit loss, fair value floor and bifurcation to P&L and OCI on tax effected basis is supported. Specifically, AFS securities credit losses are limited to the extent the fair value is below amortized cost. If there is any additional fair value impairment, that amount is recorded as other comprehensive income before applying the effective tax rate. The credit loss amount of the fair value impairment is recorded as provision for credit loss expense and allowance for credit loss on the balance sheet. IFRS 9 ECL calculation and corresponding stage assignment is supported (see [Business Rules Management](#) section for details). The system computes US GAAP credit loss given the HTM or AFS debt security amortized cost basis and the discounted expected cash flows. Under the IFRS 9 module, the cash flow shortfalls are discounted. Otherwise, multi-basis is not supported (e.g., cash basis versus accrual basis of accounting).

1.2.6 Reporting

a. Detail reporting capabilities to support financial statement disclosure reporting.

The solution provides a platform to integrate risk and finance reporting:

- ◆ Standard reports can be customized and run directly from the user interface by the users.
- ◆ Regulatory templates can be populated automatically based on the data produced in the solution, guaranteeing total consistency with the GL postings and avoiding further needs for manual intervention and reconciliation
- ◆ Includes pre-defined content specifically made to respond to the CECL/IFRS 9 requirements, which covers most of the reporting and accounting requirements specified by [CUSTOMER]
- ◆ Interactive graphical data representation with lots of on-the-fly filters and distribution categories



b. Detail reporting capabilities to support allowance committee/board report generation. Specifically what are the narrative generation, table, and charting capabilities?

Currently, SAS RFW / ECL generates required ASC 326-30 disclosure tables including allowance for credit loss roll forward, fair value impaired securities and purchased credit deteriorated information. In addition, SAS reports all of the applicable ASC 326-20 financial information including vintage, allowance for credit loss, and purchased credit deteriorated information. SAS can generate additional tables such as non—accrual and past due information that may be applicable to HTM debt securities at adoption.

Finally, SAS calculates and stores the credit loss at the CUSIP level, which enables “bottoms up” credit loss reporting capability. We have found executive management information can be specific to client preferences and vary accordingly. Our bottom’s up capability aligns with management information needs such as company specific aggregations, attribution, trend analysis, coverage ratio, and portfolio or product concentration levels.

c. Provide a list of reports available

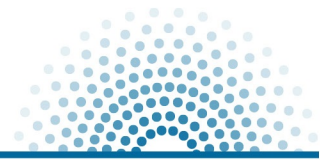
CECL/IFRS9:

Input Reports

- ◆ Portfolio Summary
- ◆ Portfolio Details
- ◆ Credit Quality Trend

Data Quality Reports

- ◆ BCBS239 Dashboard
- ◆ Input Tables History
- ◆ Data quality Overview
- ◆ Data quality Details



Management Reports

- ◆ Summary Control
- ◆ Dashboard
- ◆ Attribution/Waterfall
- ◆ Stage Movement
- ◆ Drill-down
- ◆ Heatmap
- ◆ Evolution ECL Performance
- ◆ Reserve Analysis
- ◆ Day 1 Accounting Treatment for PCD
- ◆ Accounting Entries
- ◆ Financial Statement Disclosures
- ◆ Accounting Treatment Scenarios

d. How easily customizable are the reports?

The system is designed to provide users easy access to customize reports through UI.

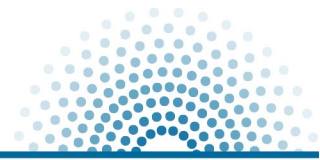
e. Can report generation be automated?

Yes

High Level Summary of Feature/Functionality of the Solution Supporting This Requirement:

The SAS ECL solution provides a dynamic workflow engine for the execution, review, tracking, and adjustment of ECL results in a controlled environment, allowing all stakeholders to complete their processes in a coordinated and documented manner. By executing within this controlled structure, SAS ECL provides a reporting interface within which all results can be presented and reported on in a contextual manner that ties back to original asset data while supporting management's reporting requirements and external reporting guidelines (in terms of format, book hierarchy, column outputs, etc.). The SAS ECL solution also provides a method to capture and document management overlays and an ad-hoc reporting interface to produce reports in the exact templates desired by the client or its regulators (e.g., via a MS Office add-in to an Excel template). More importantly, as the orchestration module for the entire ECL lifecycle, SAS ECL provides the production environment, which tracks all execution of models such that audit always knows which models were executed and what the parameters at execution were for the production run of the CECL/IFRS9 results.

These results can be reviewed at any level of aggregation, and down to the loan level and across all calculation scenarios. Comments and adjustments can be made at any level of the reporting hierarchy. All such adjustments are



documented within the application, to support any subsequent reporting requirements or audit activities.:

After adjustments and approval, GL posts are generated according to the Client's chart of accounts. Management reports can be customized and run directly from the user interface to suit the needs of all reporting stakeholders. Finally, regulatory templates can be populated automatically based on the results produced in the platform, guaranteeing total consistency with the GL postings and avoiding further needs for manual intervention and reconciliation.

1.2.7 Disclosures

a. Provide listing of out of the box disclosures

CECL:

AFS (Subtopic 326-30)

- ◆ CECL_AFS_Allowance_RollForward
- ◆ CECL_AFS_PCD_Reconciliation
- ◆ CECL_AFS_Unrealized_Loss_Analysis
- ◆ CECL_AFS_Balance

HTM (Subtopic 326-20)

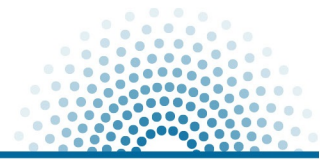
- ◆ CECL_HTM_Credit_Quality_Information
- ◆ CECL_HTM_Allowance_RollForward
- ◆ CECL_HTM_Nonaccrual_Analysis
- ◆ CECL_HTM_PastDue_Analysis
- ◆ CECL_HTM_PCD_Reconciliation
- ◆ CECL_HTM_Collateral_Analysis
- ◆ CECL_HTM_Balance

HFI (Subtopic 326-20)

- ◆ CECL_Credit_Quality_Information
- ◆ CECL_Allowance_RollForward
- ◆ CECL_Nonaccrual_Analysis
- ◆ CECL_PastDue_Analysis
- ◆ CECL_PCD_Reconciliation
- ◆ CECL_Collateral_Analysis
- ◆ CECL_C.1.a_ECLScenarioAttribution_Report

IFRS 9:

- ◆ Table 4.1 Financial assets held for trading.
- ◆ Table 4.2.1 Non-trading financial assets mandatorily at fair value through profit or loss
- ◆ Table 4.2.2 Financial assets designated at fair value through profit or loss

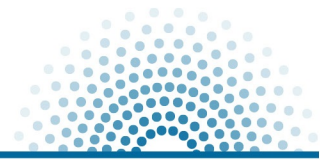


- ◆ Table 8.1 Breakdown of financial liabilities by product and by counterparty sector
- ◆ Table 8.2 Subordinated financial liabilities
- ◆ Table 9.1.1 Off-balance sheet exposures: Loan commitments, financial guarantees and other commitments given
- ◆ Table 14. Fair value hierarchy: financial instruments at fair value
- ◆ Table 18. Information on performing and non-performing exposures
- ◆ Table 19. Information forborne exposures
- ◆ Credit Concentrations by Product
- ◆ Credit Concentrations by Asset Type
- ◆ Credit Concentrations by Region
- ◆ Loan to Value Analysis
- ◆ Vintage Analysis
- ◆ Credit Quality Analysis
- ◆ Collateral Held
- ◆ ECL Movements
- ◆ ECL Movements by counterparty type – Retail/Bank/Corporate/Government/Other
- ◆ ECL Scenario Attribution

High Level Summary of Feature/Functionality of the Solution Supporting This Requirement:

The solution provides worksheets to aggregate and merge ECL calculations with other financial data across entities for reporting and accounting, offering a governed, controlled, transparent and automated way to generate information that comply with CECL/IFRS9 related disclosures. The CECL content package and IFRS 9 content package provides out of box disclosure templates to comply with CECL/IFRS9 related disclosures that are customizable and flexible, and extractable in various format.

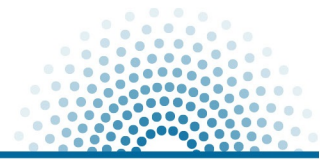
In addition, the solution includes a web-based interface that provides data exploration capabilities. In addition to its analytics capabilities, it provides an information delivery capability for self-service reporting. While out-of-box CECL/IFRS9 management dashboard are provided to report on portfolio trend and Allowance calculation results using the capability, the capabilities can be used to supplement the analytical/reporting requirements that [CUSTOMER] outlines in terms of analyzing data controls, cashflows and credit losses, as well as pre-view/validate accounting entries and disclosures from segment level to loan level.



1.2.8 Product Roadmap

a. Please provide a product roadmap for your system?

Recent releases	Q3 2018	Q4 2018	Q1 2019	Q2 2019
SAS Regulatory Content for CECL				
SAS Regulatory Content for CECL v06.2018 <ul style="list-style-type: none"> • Support for RFW 3.1 • Expanded Data Quality checks • Roll-Rate Loss Model • Support for MIP 2.4 new features • parameter matrices • computed methods • output variables selection • batched queries 	N/A	SAS Regulatory Content for CECL v10.2018 <ul style="list-style-type: none"> • Support for RFW3.2 • Performance improvements • Memory optimization (MIP instances) • Enhancements on Accounting posting (SLAM) • Updates on ASC 326-20-50 Disclosure Reports (for Financial Receivables and Securities) 	SAS Regulatory Content for CECL v03.2018 <ul style="list-style-type: none"> • Add support for Output Mean Reversion • Reduce the size of certain LASR Tables (CASHFLOW_Detail and MGMT_Movements /_Detail) • Move the join of Individual Assessment (ECL adjustments should not apply to IA exposures) • Separate out Waterfall and Finance Roll Forward • Add a new role - ECL Approver 	SAS Regulatory Content for CECL v06.2019 <ul style="list-style-type: none"> • Add more flexibility for ECL Qualitative Adjustments (at lower grain and allow numeric and Percentage QA) • Remove Standardized Process Flow, retain only Simplified Flow • Add support for ECL treatment for AFS Securities and Purchased Credit Deteriorated (PCD) Loans/Securities
SAS Regulatory Content for IFRS 9				
<ul style="list-style-type: none"> • SAS Regulatory Content for IFRS9 – v12.2018 • Support for RFW 3.2 • Performance improvements • Leverage IRM parallel execution • Weighting and stage allocation in MIP • Enhancements on accounting postings 	N/A	SAS Regulatory Content for IFRS 9 v12.2018 <ul style="list-style-type: none"> • Support for RFW 3.2 • Performance improvements • Leverage IRM parallel execution • Weighting and stage allocation in MIP • Enhancements on accounting postings 	N/A	SAS Regulatory Content for CECL v06.2019 <ul style="list-style-type: none"> • Accounting interface (SLAM) • Performance improvements • Leverage HP Risk Schema • Hotfix & improvements • Reconciliation • Revise disclosures according to regulators and market feed-back • Include Credit Assessment Management Module • Improve asset classification coverage • Include “Asset in Default” classification • Include better coverage Fair Value evaluation



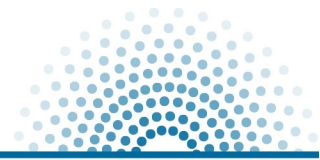
1.2.9 Customer Service

a. Please describe your customer service models post implementation

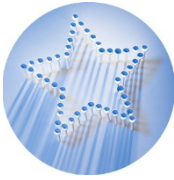
Ongoing Support

Once the timeline for adoption is met, SAS will provide continuous, complimentary, and ongoing support for the duration of the license terms in the following forms:

- ◆ SAS offers free **how-to tutorials** for many SAS software products as well as general analytics topics of interest. [CUSTOMER] can access these tutorials on our website: <https://video.sas.com/detail/videos/how-to-tutorials>.
- ◆ For questions about using SAS software, the [SAS Education](#) division has a Customer Service team dedicated to answering customer's specific questions on how to use SAS software.
- ◆ Once the initial project has achieved success, SAS offers **ongoing support** for [CUSTOMER]'s executives, business analysts, users, and system admins in many complimentary ways through the SAS Customer Success team (described below).
- ◆ The [SAS Support Communities](#) (described below) is a community site for peer-to-peer collaboration among SAS practitioners. It also serves as a valuable direct line of communication between SAS end users and SAS staff who create and support our software. Our community has well over 150,000 registered members, including thousands of SAS employees.
- ◆ Through our global resources, we provide **24/7 technical support** at no additional fee. Users with questions and problems relating to SAS software during business hours can contact technical support by phone. During non-business hours, users may access the [SAS Customer Support](#) website or [email](#) Technical Support 24 hours a day, 7 days a week to report a problem. In addition, we provide customers with an array of resources that they may use to solve problems without having to contact Technical Support (described on page 26).



Customer Success Team



The SAS Customer Success team is responsible for a proactive and consistent engagement process that makes the most of every customer touch point. Their goal is to build strong and long-lasting relationships with SAS customers.

The Customer Success team is your liaison to other support service teams at SAS. To help with ongoing support, the Customer Success team can help customers with platform and technology software.

- ◆ Facilitate successful closure of technical support tracks
- ◆ Bring together groups at SAS to address customer concerns
- ◆ Perform assessments to determine SAS usage, including recommendations for getting the most value from their software
- ◆ Serve as customer's advocate to address problems and foster customer loyalty and satisfaction

The Customer Success team can help customers adopt and migrate to new software releases and keep them informed about new features and options. The team can also assist with account-specific organizational events, either on-site or virtual. Following are some examples that the team sponsors:

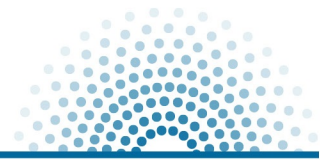
- ◆ **SAS® Days** – Half- or full-day events to teach ways to optimize SAS usage, discover new capabilities and technology, showcase new products, share feedback, and network
- ◆ **Lunch-and-Learn Sessions** – One-hour presentations that showcase an area of technology specific to your organization's needs
- ◆ **Webinars/Cafes** – Regularly scheduled WebEx sessions for more exposure to SAS software
- ◆ **In-House Users Groups** – An opportunity to connect with your entire organization at one location (or multiple locations) to share confidential topics and use actual data in discussions to foster an environment of growth, development, and education
- ◆ **Other Events** – Global, regional, and local users groups

Explore the wide variety of support and service resources available to SAS customers on our website: www.sas.com/sas_cares.

SAS Support Communities



The SAS Support Communities (communities.sas.com) is a branded community site for peer-to-peer collaboration among SAS practitioners. It also serves as a valuable direct line of communication between SAS end users and SAS staff who create and support our software. Our community has well over 150,000 registered members, including thousands of SAS employees! Established over a decade ago, SAS-hosted communities continue to grow in usefulness and relevance among our customer base. Users ask questions (thousands of new



topics per month) and find solutions quickly when they visit the communities. Technical questions and answers rank highly in internet searches, and nearly 90% of site traffic is driven by search engines. Over half of the site page views are of solved topics.

In an ongoing “impact survey,” almost three out of four community visitors report they found the information they needed. Of those, 20 percent say they would have called SAS Technical Support as a next step. SAS communities allow customers to get immediate guidance on their challenges of the day, while helping to free up support resources for higher-level engagement.

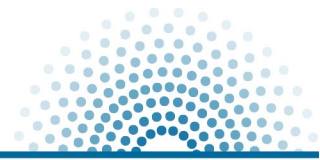
User-generated content drives the SAS Support Communities experience. SAS Communities members share code examples, data, and projects in many ways, including:

- ◆ Attaching files
- ◆ Inserting screenshots or other images
- ◆ Embedding video
- ◆ Embedding SAS code through a custom widget in the text editor that maintains SAS language-specific highlighting and coloring
- ◆ Linking out to external repositories like GitHub

Members contribute to the SAS Communities Library, a collection of knowledgebase articles with usage tips, tricks, and best practices. Some enthusiastic users will author a series of articles, such as Free Data Friday (about analyzing open data with SAS). Users also contribute to a growing collection of SAS Tips — quick hits to make SAS customers more productive.

The SASware Ballot, also hosted on SAS Support Communities, is a decades-old tradition for SAS users to submit new software feature/ideas and vote on those ideas. SAS staff can provide feedback and status updates as the ideas are considered and – in many cases – eventually implemented.

While many of the SAS Communities are technology and product-centered, we also host regional online communities that align with live and virtual user group events. Sample groups include the Administration and Deployment/SAS Users Group for Administrators, SAS Community Nordic, and a community that connects attendees before, during, and after SAS Global Forum.



Users Groups and Conferences



SAS users groups are volunteer organizations run by SAS users with support from SAS. While there are different types of groups, ranging from “in-house” to international groups, all share the same purpose: to support and foster an environment of growth, development, and education among SAS users.

[SAS Global Forum](#) is the world’s largest gathering of SAS software users. This annual event is planned and sponsored by the SAS Global Users Group, a non-profit organization that is open to all SAS software users throughout the world. There is no membership fee. SAS Global Users Group is governed by an Executive Board.

Since 1975, SAS Global Forum has served as the premier event for SAS professionals worldwide, offering unequalled educational and networking opportunities.

The most recent SAS Global Forum was held in April 2018 at Colorado Convention Center in Denver, CO. More than 5,800 SAS users and executives (and thousands more online) from all over the world met to see the *latest and greatest* in SAS technology.

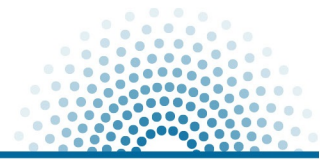
The 43rd annual SAS Global Forum will be held April 28 to May 1, 2019 at Kay Bailey Hutchison Convention Center in Dallas, TX. For more information, please visit sasglobalforum.com.

[Analytics Experience](#) is SAS’ annual fall conference (September 17-19, 2018 in San Diego, CA) designed for executive business leaders, analytics professionals, and students. It offers a mix of thought leadership, analytic innovation, learning, and connecting with fellow problem-solvers. Information on SAS Analytics Experience, including last year’s content, can be found on our website: www.sas.com/analyticsx.

In addition to international users groups such as SAS Global Forum, there are hundreds of other SAS users groups that meet frequently:

- ◆ In-house users groups meet within a single company
- ◆ Local users groups typically consist of users from a particular city or geographic area, and they are composed of SAS users from multiple companies
- ◆ Special-interest users groups are those that share a common focus such as finance, pharmaceuticals, insurance, or retail. They are also composed of SAS users from multiple companies

Please visit www.sas.com/en_us/connect/user-groups.html or email ugsupport@sas.com for more information on SAS users groups.



Thousands of SAS practitioners participate in users group activities. User groups provide a variety of learning opportunities, including presentations, hands-on workshops and access to SAS experts. In user groups, participants can:

- ◆ Learn about the latest technology and new SAS products and services
- ◆ Exchange ideas and network with your peers
- ◆ Enhance your skills and boost your knowledge for professional development

For more information on SAS users groups, please refer to the following online video: www.youtube.com/watch?v=F0lf_4KuZjc. Also, you can visit www.sas.com/en_us/connect/user-groups.html or email ugsupport@sas.com for more information.

Finally, many SAS best practices and educational videos can be accessed on the SAS YouTube channel which can be found online: www.youtube.com/channel/UCtOiaxdcY_6RsRUpBg_2LoQ.

Technical Support



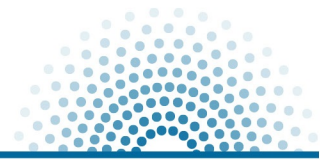
For complete current information regarding SAS Technical Support services and policies, please refer to:

- ◆ Technical Support Policies | www.sas.com/support/techsup/support.html

SAS makes it easy for our customers to obtain help by including telephone, email, chat, and online support as part of the annual licensing fee. Customers are encouraged to access Technical Support via the channel of their choice to ensure that their requests are dealt with efficiently and effectively.

Through our global resources, **we provide 24/7/365 technical support.** Customers with questions and problems relating to SAS software during business hours may contact us as follows:

- ◆ Phone (9:00 am to 8:00 pm US Eastern time)
 - 1-800-727-0025 (US and Canada)
 - +1-919-677-8008 (International Calls to US Headquarters)
- ◆ Chat (9:00 am to 6:00 pm US Eastern time)
 - *Chat With SAS Technical Support* | www.sas.com/support/en/technical-support/contact-sas/chat-technical-support.html
- ◆ Customer Support site (available 24/7/365)
 - Support | www.sas.com/support
- ◆ Email (available 24/7/365)
 - *Email SAS Technical Support* | www.sas.com/support/en/technical-support/contact-sas/email-sas-technical-support.html
 - Email | support@sas.com



Customers who have critical problems should contact Technical Support by phone. For critical problems that occur outside of the business hours that are listed above, customers are directed to one of our worldwide support centers in North America, Europe, or Asia/Pacific. Using this strategy, we provide SAS customers with 24-hour, follow-the-sun support.

SAS Technical Support offers toll-free, *real-time*, telephone support. The average hold time for customers who call us is less than 30 seconds, and approximately 60 percent of questions that come in are resolved within 24 hours.

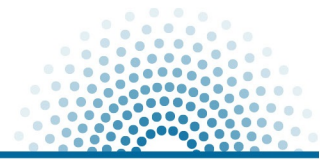
We route problems that cannot be immediately resolved to subject-matter experts, who prioritize those problems based on the severity of the problem. For example, we strive to call back within a two-hour period for severe problems and up to a maximum of 24 hours for less severe problems.

We pride ourselves on fast and accurate responses to questions and problems that are reported by our customers. A key goal of Technical Support, however, is to empower customers with the tools that they need to find answers and resolve problems on their own. We do this by including a variety of self-help resources as part of our licensing agreements and by providing a full range of electronic support services on the SAS Customer Support website:

- ◆ Customer Support site | www.sas.com/support

From the website, customers may:

- ◆ Contact SAS Technical Support for help | www.sas.com/support/en/technical-support/contact-sas.html
- ◆ Search our Knowledge Base | www.sas.com/support/en/knowledge-base.html
 - SAS Notes
 - Sample Programs
 - User Documentation
- ◆ View SAS administrator resources | www.sas.com/support/en/sas-administrators.html
 - Downloads
 - Hot Fixes
 - Maintenance Updates
 - Security Bulletins
 - System Requirements
- ◆ Suggest ideas for software enhancements | https://communities.sas.com/t5/SASware-Ballot-Ideas/idb-p/sas_ideas



- ◆ Obtain documentation about our technical-support services | www.sas.com/support/en/technical-support.html
 - Standard Support
 - Premium Support
 - Elite Support
 - Support Services and Policies
- ◆ Interact with other SAS customers through our SAS Support Communities | www.sas.com/communities
- ◆ Find information about SAS Training | www.sas.com/training
 - Classroom Training (on-site, web, and mentor training)
 - Free Tutorials
 - Certification Program
 - E-learning
 - The SAS Learning Subscription

1.2.10 Implementation timeline

a. Please provide a description of the on-boarding process for implementation

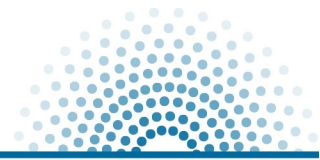
We understand the importance of an implementation approach to meet the timeline for CECL/IFRS readiness. Therefore, SAS developed a hybrid agile methodology for implementing the SAS CECL and IFRS solution. This methodology accelerates the implementation of the foundational solution and provides a flexible approach to tailor expansion and ongoing support to best align with customer requirements.

We will begin with an assessment and planning phase where business requirements are mapped to configure the SAS solution. In parallel, SAS will enable access to the solution by beginning the installation of the core platform.

Our implementation approach is based upon a close partnership with our customer team with customer enablement driven by continuous knowledge transfer from the SAS consulting team. This approach is flexible based upon our customer team's skillset and bandwidth. SAS Consulting will typically lead the foundational implementation and then collaborate to define a plan for ongoing support as needed.

Core Platform Setup

- ◆ Technical Architecture
 - Hardware Provisioning
 - Pre-installation Readiness
 - Installation and Configuration
 - Documentation and Knowledge Transfer



Implementation Phases

- ◆ Phase 1 – Assessment and Planning
- ◆ Phase 2 – Foundation Creation
- ◆ Phase 3 – Foundation Expansion
- ◆ Phase 4 – Finalization and Rollout

Phase 1 – Assessment and Planning

SAS partners with [CUSTOMER] to prepare for the implementation. Common tasks include:

- ◆ Review Accounting Policies
 - Methodology Review
 - Governance and Controls
 - Data Acquisition

Phase 2 – Foundation Creation

The second phase creates an initial end-to-end configuration, based on a carefully selected set of representative portfolios. This entails creation of elements such as:

- ◆ Data Flow
 - Rules Definition
 - Role Definition
 - Generation of Key Reports

Phase 3 – Foundation Expansion

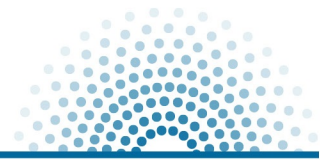
With the foundation in place, the next phase will incorporate all the remaining configuration tasks into the SAS CECL solution:

- ◆ Refinement of Rules
- ◆ Additional Reporting
 - Workflow and Governance
 - SIT and UAT

Phase 4 – Finalization and Rollout

The project closes with final training and documentation, and support for go-live transition:

- ◆ Close Configuration
 - Training and Documentation
 - Parallel Run
- ◆ Transition to Production
- ◆ Ongoing Support



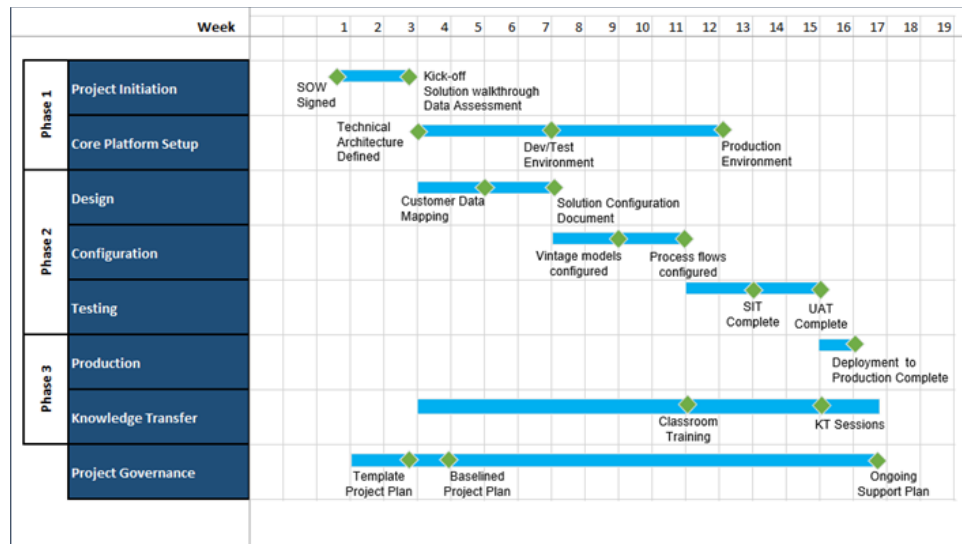
Project Governance and Leadership

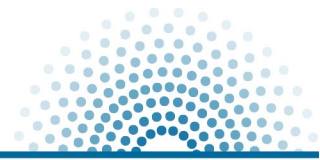
The SAS Project Management Methodology provides the basis on which all SAS projects are executed. A SAS Consulting Project Leader will be responsible for the following for the duration of the engagement:

- ◆ Support the delivery of the project within the agreed time frame, budget, and required features (project scope)
- ◆ Help set and maintain the right expectations with all project stakeholders
- ◆ Provide the necessary techniques and tools to monitor/ and control the project and project risks

Timeline:

SAS has developed the following high-level timeline. The resources and efforts are estimated based on our standard implementation approach. The timeline will be finalized as part of the Project Initiation.





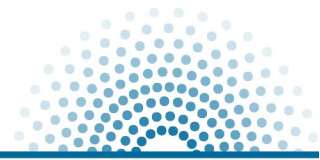
Phase	Activities	Deliverables	CECL Est. Hrs.	IFRS 9 Est. Hrs.
Kick-off & Requirements Workshop	<ul style="list-style-type: none"> Assess, draft, review and confirm business requirements Document solution configuration Design and document technical Architecture 	<ul style="list-style-type: none"> Business Requirements Document Solution Configuration Document Software Installation requirements Architecture Document 	289	104
Installation, Design and Configuration	<ul style="list-style-type: none"> Software installation & set up Data Augmentation Set up Solution based on client business requirements and configuration document 	<ul style="list-style-type: none"> Preinstallation readiness document Data mapping Software Installation Post Installation Documentation Source Data Connections 	1209	377
Testing Phase	<ul style="list-style-type: none"> Perform system integration testing Perform user acceptance testing 	<ul style="list-style-type: none"> SIT Results / Resolved Defects UAT Results / Resolved Defects 	404	304
Pre-Production	<ul style="list-style-type: none"> Conduct production roll-out 	<ul style="list-style-type: none"> User process flows Education & Training 	73	23
Total SAS/KPMG Estimated Services Hours			1,975	808

Scope & Assumptions:

- Configure RFW portfolio with HFI loans, HTM debt securities and AFS debt securities
- Effort is to configure the SAS ECL standard out-of-the-box (OOTB) content package
 - Configure standard SAS ECL tables (portfolio and related data, hierarchy data, EIR or CIR, microeconomic data, and etc.), and standard OOTB DQ rules (generally up to 50 rules)
 - Configure one OOTB process flow for both of the two portfolios
 - Configure OOTB allocation and overlay methods
 - Configure OOTB (non-customized) reports
- All input data will be provided by Client in the format SAS ECL consumes, in a location as requested by SAS. No ETL effort is needed to bring data into the SAS ECL data format."
- Client provides all cash flows or loss rate inputs required
- Client provides all data/information needed on a timely manner
- Client resolves issues on a timely manner
- Resources gain accesses to all information/ systems on a timely manner
- KPMG resources have client computers and can work remotely majority of the time
- Accounting decisions are made before system implementation

Additional Services on Time and Material Basis:

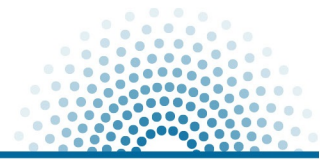
- Gathering and configuring additional DQ rules
- Development and validation of ETL to extract data from client source system and translate to the SAS input data files format
- Additional disclosure reports, or modification to the standard disclosure reports
- Additional data files/ tables due to customization for the client
- Additional accounting sub-ledger functionality development & configuration
- Re-configuration caused by client decision change or other reasons (e.g. update of models, or switching to new models after a portfolio has been configured)"



7. Hours incurred above the projected hours in the LOE due to reasons outside of KPMG resources' control
8. Model review, assessment, and recommendation
9. Model development

Notes:

1. Project management activities mainly include status tracking & reporting, communication and coordination with client and/ or other SAS resources on the project for meetings, discussions, and hand-offs
2. KPMG internal leadership status reporting, discussions, and issue resolution, in order to ensure project success
3. Advisor plays CECL / IFRS 9 Solution Lead role, responsible for the activities assigned to CECL-SL, as well as mentoring KPMG resources assigned tasks on a daily basis



1.3 Training

1.3.1 Please provide a training overview once implementation is completed

1. SAS® Expected Credit Loss: Solution Overview for CECL

- ◆ 1.5 days - \$7,275 plus travel (covers up to 15 students)

2. SAS® Expected Credit Loss: Workshop

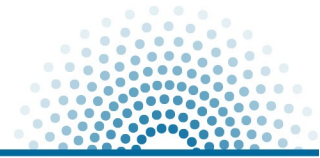
- ◆ 3.5 days - \$16,975 plus travel (covers up to 15 students)

3. SAS® Expected Credit Loss: Solution Overview for IFRS9

- ◆ 1.5 days - \$7,275 plus travel (covers up to 15 students)

4. SAS® Platform Administration: Fast Track

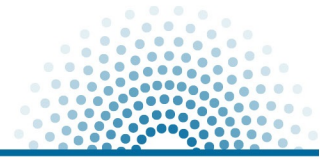
- ◆ 4.0 days - \$6,400 (SAS Classroom Facility)



1.4 Pricing Information

1.4.1 Describe your pricing for the types of modeling solutions and consulting services.

REDACTED





February 27, 2019

XXX

Dear XXX:

This proposal responds to your request entitled, OTTI / CECL and IFRS9 RFP dated January 29, 2019. The response describes how SAS can provide [CUSTOMER] INA Holdings ([CUSTOMER]) with a comprehensive, integrated quality solution for the specific requirements set forth in the request and subsequent discussions.

Terms and Conditions

This proposal represents a good faith invitation to negotiate based on our current knowledge of your requirements. It is valid for installation of SAS software only in the United States upon the hardware configuration indicated in the response.

The terms and conditions for the license of the SAS software products and the purchase of any related services described in the response shall be governed by SAS' standard license and services agreements. Sample copies of these documents will be provided to you upon request. As you currently have a Master License Agreement in place with SAS, that agreement plus an applicable SAS Software Supplement will continue to govern the license of any new SAS software. That agreement plus an applicable SAS Services Supplement will govern any professional services performed by SAS. In the event that SAS provides an enterprise hosting solution for you, SAS' Master Hosting Agreement and an Order Form will govern. No other terms and conditions, unless mutually agreed upon, shall apply to any resultant contracts for software and services. Neither the RFP, the response, nor this letter shall be deemed to constitute an agreement between SAS and [CUSTOMER]; nor shall those documents be incorporated as a whole or in part into any contract between the parties.

Title to all SAS software and any work product produced and delivered as a result of the performance of any services shall remain with SAS and its licensors.

Fees

All fees set forth in the response are based on 2019 U.S. license fees and service rates. The fees do not include applicable taxes. Please note that unless specifically stated otherwise in the attached response, all fees for services are quoted on a time-and-materials basis. SAS' time and any computer code and related documentation resulting therefrom are the only service deliverables. All fees for software are exclusive of fees that may be assessed for third-party access to SAS software in a services environment such as facilities management, outsourcing, time-sharing, or service bureau, or for the right to process third-party data using SAS software.

SAS Contacts

For questions concerning this submission, scheduling demonstrations of the solution, or making arrangements for reference calls, please contact your Account Executive or Sales Manager. For questions regarding negotiations, software license agreements, and legal matters, please contact the SAS Legal Counsel assigned to you.

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Proposal Validity, Confidentiality, and Ownership

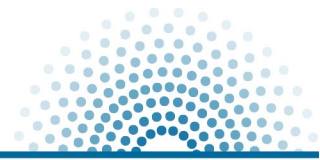
The response, including all fees set forth therein, shall be valid until May 31, 2019. The response is based on SAS' current understanding of your requirements as set forth in the RFP and subsequent discussions. As such, it is subject to change based on changes in hardware configuration and additional or different information regarding your requirements and infrastructure.

The response and all materials attached hereto remain the confidential proprietary property of SAS Institute Inc. and shall be provided only to [CUSTOMER]'s personnel with a need to know in connection with your evaluation of SAS as a potential vendor. All copies provided and any duplicates shall be returned to SAS or destroyed upon request. Such information shall not be disclosed outside the [CUSTOMER] organization without the express written consent of SAS.

As SAS learns more about the details of this project, it may be appropriate to consider the participation of SAS partners. We would, however, approach any such participation only with your full knowledge and consent.

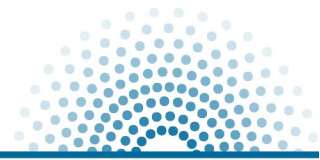
SAS appreciates the opportunity to provide you with information concerning your software licensing and services needs. We look forward to continuing discussions regarding this project.

Sincerely,

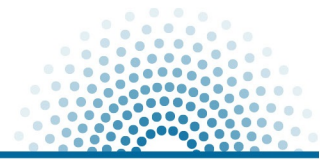


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