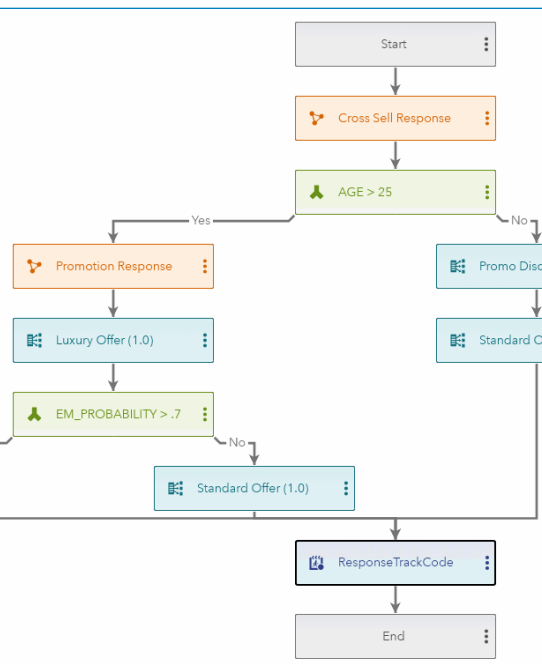# SAS® Intelligent Decisioning

Comprehensive decisioning framework combined with industry-leading analytics to streamline the automation of enterprise decisions

What does SAS® Intelligent Decisioning do?

SAS Intelligent Decisioning combines business rules management, decision processing, real-time event detection, decision governance and powerful SAS advanced analytics to automate and manage decisions across the enterprise. It supports customer-facing activities such as personalized marketing and next-best action, plus decisions affecting customers, including credit services and fraud prevention.

Why is SAS® Intelligent Decisioning important?

By managing, analyzing and operationalizing high volumes of data to automate thousands of daily decisions and applying sophisticated analytics to real-time customer interactions, SAS Intelligent Decisioning makes decisions smarter and organizations more efficient. Events can trigger actions, customer behavior can drive real-time communications, and risks can be mitigated. Version control, testing and traceability of analytically driven operational decisions is ensured by the common decision authoring and deployment environment.

For whom is SAS® Intelligent Decisioning designed?

The solution is designed for the business analysts and IT personnel who put analytical decision models into production, as well as the business executives who are responsible for enterprise decisions.

The day-to-day operations for most organizations can range from simple repeatable decisions that affect single business units to complex cross-functional, high-impact decisions that involve multiple participants. What's the optimal price point? When is a discount too excessive – and unprofitable? Which prospective customers qualify for targeted offers? When will changes in credit or collections parameters adversely affect the company, as well as the customer? Which offer is the most relevant to customers given their current situation?

SAS Intelligent Decisioning automates analytics-based decision making so organizations can function more efficiently while improving interactions with customers, suppliers, partners and employees. Likewise, organizations that are highly regulated – such as financial services, health care and insurance – can more easily achieve compliance as a result of documented, traceable decisions.

Key Benefits

- **Reduce risk and improve outcomes by automating operational decisions.** Based on operational data and informed by accurate models, business leaders and technical personnel can jointly implement the right decisions with sophisticated business rules, predictive analytics and the power of machine learning.

- **Capitalize on customer and operational needs – with the right action, at the right time, to the right channel.** Customer communications and actions are optimized through detailed segmentation and determination of offer eligibility and prioritization. Insights derived from behavior analysis and advanced data modeling form the basis for effective, targeted and personalized customer decisions.

- **Streamline business rule management.** Increase the speed of your business rule development and testing (including

dynamic term management). Cross-functional decisions are enhanced through a common and consistent method for accessing and managing information, selecting analytical models and defining the business rules that create the context for production use.

- **Manage high-volume customer interactions and other enterprise decisions effectively and consistently.** The microservice architecture supports high-volume, 24/7 businesses so you can make the best decisions, consistently and within a governed environment – regardless of transaction volume or the complexity of data attributes.

- **Standardize analytical model use and deployment in one governed environment.** A common decision authoring and deployment environment dramatically reduces time spent by IT validating and deploying analytical models. Shared, flexible processing control logic lets analysts select data and models from a common model repository. Decision

logic is defined once and can be deployed many times for batch or real-time decisions, all from a single deployment interface.

- **Control operational decisions and policy compliance.** Managed, automated decisions defined for operational activities deliver analytically sound, consistent actions across the organization. A fully integrated application on a single framework means users' activities are fully traceable and open to detailed investigation, helping ensure governance and policy compliance.

Overview

Responding to dynamic environments and changing business requirements, SAS Intelligent Decisioning consolidates and streamlines the deployment of analytical models, automating repeated operational decisions and making them both data-driven and analytically sound. This ensures rapid deployment and consistent decisions in dependent applications and by front-line workers or other systems.

The decision builder interface helps you assemble models and rules.

Easily evaluate test results with decision path tracking.

Streamlined analytical model deployment

Business and technical users face the daunting task of using different tools to access and manage information, select analytical models, and define the business rules that create context. SAS Intelligent Decisioning provides a common and consistent method for each of these tasks so you can put analytical models into production quickly for batch and real-time processing without manual recoding for each execution target.

This alleviates duplicate effort across departments and provides clear, centralized instruction for how analytical models are defined and how they're meant to be used. From a single interface, analytical models and business rules are natively integrated, managed and published, with identical logic for both batch and real-time web service execution. The result is faster deployment and model integrity within analytically driven operational decisions.

Real-time analytics

Real-time analytics provides immediate insights and recommended best actions exactly when they're needed. For example, in the case of a customer marketing offer, analytics provides insight into a customer's behavior, while decision logic addresses immediate marketing considerations: eligibility rules, contact policy, etc. This combination of historical data with real-time analytics ensures that a wide array of factors – including customer lifetime value, propensity, attrition, etc. – are infused into the decision process to provide personalized and relevant customer interactions in real time. Comprehensive impact analysis for the entire operational decision flow includes models, rules and data – making it easier to assess the relationships and dependencies associated with changing elements, data or conditions.

Rapid decision process creation and management

Business users can create decision workflows using an interactive, visual environment – no tedious coding required.
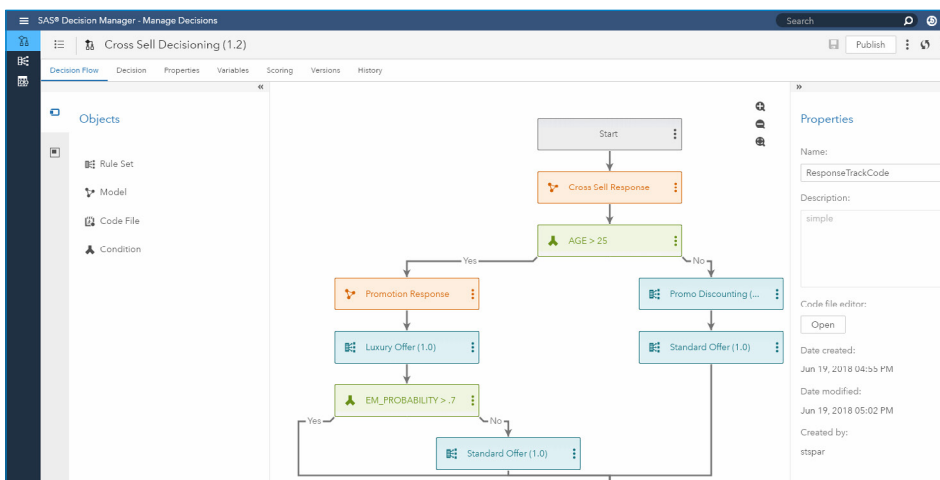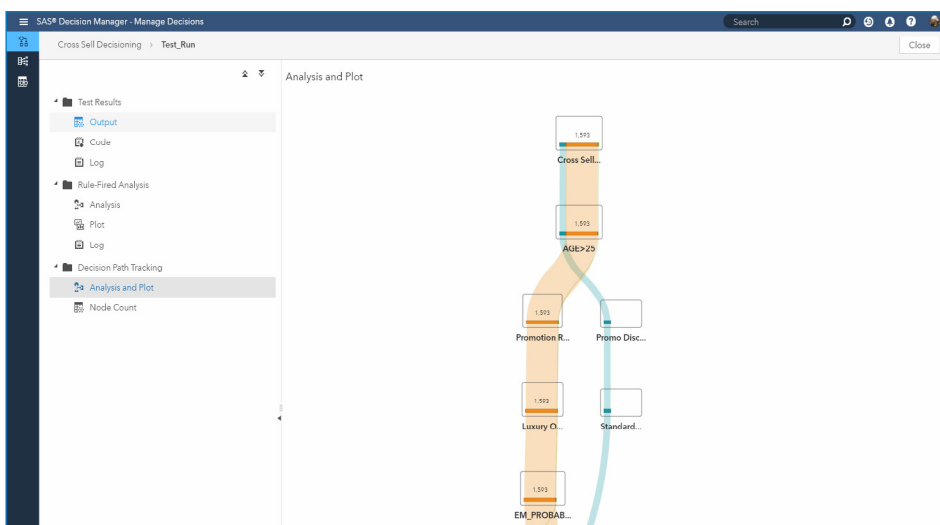
A management console allows you to quickly develop decision paths, from design to test to production. The interactive interface includes drag-and-drop nodes that can be reused, making decision rule building and deployment quick and collaborative.

But if you need more complex capabilities, you can build sophisticated decision diagrams and link the processes with various data sources, advanced analytic techniques and business logic.

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Common decision authoring and deployment environment

Many organizations don't have standardized or efficient processes to apply advanced analytical processes in their businesses. Often, IT staffers must recode models for deployment – and seldom do they have the business context, analytical rationale or even shared terminology at their disposal. As a result, the relevance of the models deteriorates due to delays associated with these manual tasks, and the operational controls necessary to trace full lineage, authorized approvals and more are lost – or require tedious, additional work.

SAS Intelligent Decisioning provides a common decision authoring and deployment environment for both IT and business users that preserves documentation, testing traceability and continuity in a shared environment. One environment used by different specialists to orchestrate decision flows simplifies validation of the entire decision – and provides complete version control.

User-friendly interface

A user-friendly interface lets you design decision processes intuitively rather than through cryptic programming and rules. For example, you can construct processes

Key Features

Enterprise data throughput
- Ability to deliver more than 5,000 real-time transactions per second.
- Ability to achieve response times of 10 milliseconds per transaction.
- Simple integration with a variety of third-party applications at the data level.

Decision flow builder
- A centralized, graphical drag-and-drop interface lets you assemble business rules, custom code and models into complete decision flows, minimizing the need to write deployment code that joins these pieces together.
- To define decisions, you can browse existing repositories of data, models and business rules and select from existing assets.
- Create custom code within a decision flow to integrate with business application REST APIs, databases, web service calls and open source Python.
- To control decision orchestration, add condition logic (i.e., IF-THEN-ELSE) and use outputs from any preceding rule or model.
- From a decision flow, you can easily navigate to the business rule editor to simplify editing and rule-logic updates using deep linking.
- Ability to drill through from decision flow to model repository simplifies model selection and model inspection.
- The enhanced rule list view provides compressed, easy-to-read rules for readily identifiable logic definitions.
- Version control for entire decision flow simplifies testing and validation.

Business rules management
- An integrated business rule management platform enables fast rule construction, testing, governance and integration within decision flows.
- Manage rule versions for improved tracking and governance during deployment, including deep linking to business rules from decision flows.
- Quickly create complex business logic within decision flows, including on-the-fly term development.
- Provides freeform rule-logic creation with full access to sophisticated functions.
- Lookup table integration to execute lookup for rule-logic checks and rule actions.
- Lookup table management for table import and updates gives you the ability to create lookups from SAS Visual Analytics tables.
- Lookup tables can be activated and locked at user discretion to support proper usage of most current lookup tables within business rules.

Testing and model governance
- Business rules:
  - Rule versions can be locked down or augmented.
  - Explicit and detailed rule-fire analysis can be used for testing, refinement and rule auditing documentation prior to operational deployment.
  - Rule tests, test suites and log details can be saved for documentation and reuse.
- Deployment:
  - Disciplined testing, change management, auditing and validation are available from a common environment.
  - Complete decision flows can be created from within the interface for both batch and real-time environments, simplifying IT integration and acceptance testing, as well as operational deployment.
  - Simplified IT testing for applications that call operational analytics as web services includes reporting and user logs for audit history.
  - Multiple input tables can be registered for use within SAS Intelligent Decisioning, including testing, publish target validation and simulation.

by dragging and dropping a set of reusable, out-of-the-box tasks. Shared, flexible processing control logic lets analysts select data and models from existing repositories. And defining business rules in context ensures continuity and shared terminology across business functions.

Integrated with SAS® Machine Learning capabilities

Prior to deploying an analytical model, it's important to define the logical elements of a decision and how the elements combine (rigorously tested) business scenarios. These activities are time-intensive, so much so that analytical models often become obsolete before they're put into production. Bringing science to the art of operational decisions, SAS Intelligent Decisioning helps expedite this process. It integrates with the model studio interface in SAS Visual Data Mining and Machine Learning for faster model development. Common tasks, like defining business rules and deployment, take much less time. A common model repository provides a centralized model governance and monitoring capability.

Custom processes and integration

Business rules and analytical models can be integrated with custom code to deliver customer-specific decision logic that goes beyond analytical models and rules. Custom code provides the ability to integrate your business applications in an open computing environment using REST APIs, Python and other integration options.

TO LEARN MORE »

To learn more about SAS Intelligent Decisioning, download white papers and see other related material, please visit sas.com/intelligent-decisioning.

Key Features (continued)

- Embed:
  - Publish the model to production.
  - Minimize data movement by executing in the data store or stream.
  - Reuse portable score code.
- Monitor:
  - Provide performance reports and notifications.
  - Automatically retrain when model decays.
  - Swap champion with challenger based on thresholds.
- Automate:
  - Automate the complete end-to-end model management process.
  - Provide workflows and rules that govern model execution.
- Marketing specific:
  - Champion/challenger model comparisons.
  - Decision analysis capabilities, including simulation options.
  - Track and view lineage of campaign components to conduct impact analysis of changes.
- Detailed contact and response history, which translates to more information about your customers.

Enhanced term management

- Automated rule-to-term mapping includes type and domains from existing data dictionaries and tables.
- You can rename terms and choose what to include/exclude from the input and output the definition of a decision flow.
- Dynamically add new terms as needed to simplify term definition, data type, input/output designation and lengths.

Simplified deployment

- Real-time deployment (via web services):
  - Micro analytic web service (MAS) provides fast, scalable web service deployment.
  - Easily move complete decision flows into IT web service testing environments and production deployment.
  - Supporting analytical scoring as a service, MAS execution operates in a self-contained and portable standalone architecture (with a minimal footprint). In-memory threaded kernel processing for simplified integration with transactional systems, as well as IoT edge or in-stream computing used.
- SAS Environment Manager plug-in provides simplified execution target definition and management for CAS, MAS, in-database and Hadoop targets.
- In-database batch deployment:
  - Execute business rules and analytical model scoring without moving the data.
  - Deployment of business rules, decisions and related analytical models in Hadoop distributions is supported (SAS/ACCESS® Interface to Hadoop), which transforms data lakes into functional IT testing and implementation environments.[1]
  - Extended support is included for the following Hadoop environments: Cloudera, Hortonworks, MapR, Pivotal and BigInsights.
  - In-database rule execution for models, rules and decisions is supported for Hadoop, Teradata and CAS.

[1] SAS/ACCESS Interface to Hadoop is required, which includes the SAS Scoring Accelerator needed to support Hadoop distributions. This is an add-on for in-database execution of analytical models only.