Experian Credit Attributes

Development principles and methodology

Premier Attributes℠ and Trended 3D™ are the credit industry's most advanced and comprehensive set of credit attributes, created to enable organizations to make more strategic, consistent and data-driven decisions across the Customer Life Cycle.

Introduction

Using the latest data sources available, our attributes summarize consumer credit data at the most granular level possible, providing the enhanced data elements needed for a wide variety of modeling and analytic opportunities.

Premier Attributes and Trended 3D enable lenders to advance consumer credit decisioning to achieve growth, reduce risk and improve retention. When used in model development, our attributes can provide significant performance lift over other credit attributes. These attributes are also effective in segmentation, as an overlay to scores and in policy rule definition.

The advantage of using Premier Attributes and Trended 3D attributes is that they provide clients with an ongoing managed set of base attributes so they don't have to invest the significant resources needed to develop, manage and update the attributes themselves.

Our attributes are not static products. To keep pace with market changes and regulatory updates, new attributes are developed as additional data elements become available. Raw data elements and existing attributes are monitored and managed following rigorous, comprehensive attribute governance protocols to ensure the continued integrity of attributes.

There are currently more than 4,500 attributes available, including a "core" subset of widely used attributes, as well as additional subsets across various industries. This document details the methodologies and development guidelines used to create and manage our attribute sets.

Management principles and approach

Our credit data experts spent nearly three years developing the first generation of Premier Attributes and nearly 10 years on our trended attributes. Our vision for the attributes was to create the most comprehensive set of credit attributes to satisfy the needs of the marketplace and address various regulatory concerns. Therefore, the attributes needed to be:

- Highly accurate
- Suitable for use across the Customer Life Cycle:
  - Prospecting
  - Originations
  - Account management
  - Fraud
  - Collections and recovery
- Suitable for use in credit decisioning and model development
- Available and consistent across multiple platforms
- Supportive and adaptable to ever-evolving regulatory considerations
- Thoroughly documented and monitored

Leveraging our decades of credit data expertise, extensive modeling experience and sound best practices, we've succeeded in developing the industry's most advanced credit attributes available in the marketplace today.

Infrastructure

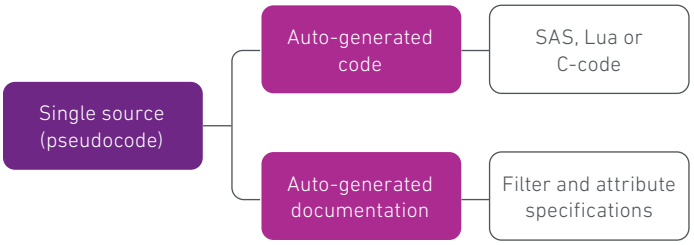
We created the infrastructure necessary to support and accommodate this vision for a robust attribute development and management process. This infrastructure was designed to be scalable, to support continuous development of new attributes and to facilitate speed to market so that clients could take advantage of new data elements and meet regulatory requirements or recommendations as soon as possible. The infrastructure includes creating standard naming conventions, developing an automated process for creation of pseudocode and crafting sophisticated mapping from source documents to our naming conventions.

Naming conventions and standards

We use meaningful and consistent filter and attribute naming conventions. Each attribute has a complete and accurate description of the attribute behavior, including a consistent attribute numbering schema across industries. We thoroughly document all general conventions, such as truncating versus rounding or starting with zero versus one when counting number of months.

Pseudocode process

At the core of this infrastructure is the single-source pseudocode process. Our proprietary and patent-pending process greatly improves coding accuracy and ensures synchronized specifications and code. The Premier Attributes code is automatically translated into multiple coding languages, allowing analysts to spend less time coding and more time doing in-depth analysis and auditing. By removing the manual coding process, errors are reduced, recoding is minimized and deployment timelines in various systems are greatly improved. This is critical to maintaining and updating attributes efficiently, when needed.



Developed for the end user
We believe that the same people who build and use analytical models should also be the developers of attributes, as they are the closest to the data and have a vested interest in creating and using an accurate and comprehensive set of attributes from which to work. Our attribute developers are statisticians, analysts and modelers who work directly with clients on audits, research and development. Therefore, they understand how attributes are best incorporated in various models and in other uses.

Regulatory and compliance considerations
We're constantly reviewing new regulations and regulatory recommendations in order to develop new attributes that help address regulatory concerns. For example, in recent releases we've developed attributes that specifically exclude medical collections, focus on unsecured personal loans and can identify consumers in accommodation.

Additionally, to ensure compliance, a single set of codes is used to align both offline and online bureau data to ensure consistency for back-end and front-end decisioning.

Development approach
Premier Attributes was created using a systematic approach to support appropriate attribute development. From discovery to ongoing maintenance, this approach ensures each step is structured and well-documented.

Attribute development

The attribute development process includes discovery, exploratory data analysis, filter and attribute development.

Discovery
In order to facilitate improvements to the attribute creation process, we begin by reviewing the existing processes and all relevant source documentation. We consider feedback collected from clients and internal users regarding new concepts or enhancements. We also take into consideration any regulatory updates or recommendations.

Raw credit data comes directly from the data contributors in a uniform Metro 2® format, but each bureau "equalizes" raw data by doing a number of black-box transformations on this format. These transformations are intended to add value, differentiate each bureau and comply with regulatory standards.

Exploratory data analysis
The goal of exploratory data analysis (EDA) is to understand the differences between the data structure, formats and platforms across the various Experian® data platforms. This includes the frequencies of all relevant data fields, reconciling data elements to Experian's technical manual and identifying the differences between technical documents and samples, specifically inconsistencies that may be irreconcilable. This process familiarizes our developers with the nuances across the various data platforms.

Understanding all differences between formats and platforms across the various bureau data sources is critical. We begin with an extensive review of all data elements and values from the offline versions.

To understand how to create online formats, we use Experian's technical manuals as the main guide. Additionally, we pull approximately 50,000 online test cases from Experian.

It's important to note that while 50,000 test cases are statistically significant, these aren't live consumer reports. We don't have permissible purpose to validate unrestricted. During the initial deployment and audit of our attributes, we work with clients and use their live test cases to ensure the nuances residing in each client's production system are accounted for.

Filter development
Filtering is the pre-attribute development process that groups like tradelines in preparation for creating an attribute. Filter development begins with the mapping of raw fields from the credit report. We start by understanding how Experian transforms the Metro 2 data to its displayable formats, including derived or assigned data elements. Next, tradeoffs are identified to accommodate the different business practices across the data.

We then run frequency reports on the raw trade fields, evaluating the raw data distributions, and then develop the basic filters. This allows us to define, for example, a "retail" trade, a "student loan" or a "no preset spending limit" trade.

We use our own policies and compliance guidelines to determine how to define an attribute and ensure the attribute definition remains aligned with the Experian credit report display rules. For example, suppressing delinquent/derogatory authorized user accounts or removing medical collection trades under $50.

Attribute development
When we create the attributes, we:

- Analyze the available data elements and how they are populated (the frequencies of fields).
- Determine a "sensible" definition of the attribute.
- Evaluate attribute frequencies across the bureau.
- Review consumer credit reports, where possible.
- Refine the definition and assess more frequencies and examples.

Auditing and implementation

Once the development of the filter and attribute logic is complete, and prior to implementation on either internal or external (client) platforms, we conduct an audit on the attributes themselves. After attributes are deployed across various mediums, a second audit is conducted to ensure the attributes that clients receive in production are the same as what was developed internally.

Auditing the attributes and filters

Before implementation into the various Experian platforms, we conduct an internal audit of filters and attributes. The primary objective of this auditing process is to ensure both programming and logical accuracy. We perform both electronic and manual auditing. For the electronic audit, we identify available data. In the manual audit, we print and review consumer credit reports and their corresponding attribute values, focusing on the logic validity.

The auditing process begins with a review of all data elements used in the attribute development. We run raw data distributions and compare all elements in the distributions with the technical manual specifications. We identify new elements or a change within an existing data element and determine how to treat that change. Next, we identify obsolete codes and determine if they need to be removed, making allowances for archive files. Finally, we ensure all data elements of interest have been accounted for.

Once the filters have been defined and coded, they're audited. Defining, coding and auditing filters is 80 percent of the attribute development process. We validate that the filter values are being calculated correctly by generating the input bureau data values and evaluating if the filter values are generated as expected. When possible, "trade to trade" cross tabulations are created to check for equal treatment of equal values. If they're not equal, we investigate to account for the differences. We then run distributions for filters, and any significant differences are researched.

After the initial audit, we make any necessary adjustments to the filter definitions, validating with printed online test cases where possible. After any changes are made, we repeat the process as many times as required.

Once the filter audit is complete, an audit of the attributes begins. First, we create distributions of attributes to compare distributions with older versions and determine if changes are as expected. Next, we evaluate attribute distributions on the same consumer set, where possible.

When attribute values are different, we select test cases to review the cause of the difference, and we repeat the process as necessary. We also print consumer credit reports from both online (test cases) and offline (real and test cases) for each format supported to validate the logic manually and determine if the attribute values generated are reasonable given the data on the consumer report.

All documentation is stored in a central repository, including definitions, explanations and final audit reports. The developers then sign off on the audit and prepare for internal and user acceptance. We document and explain any differences, as all differences at the end of an audit must be considered acceptable and explainable.

Deployment audits
Deployment to internal and external platforms involves distributing specifications and/or code to the various platform development teams. Once the code has been implemented, a deployment audit is conducted.

Experian has multiple versions of delivery formats (for both offline and online). Premier Attributes is coded for the most widely used formats.

The primary objective of the deployment audit is to ensure both the programming and logical accuracy of the output is executing correctly on the various platforms.

In a deployment audit, we assist clients in reviewing live data samples, distributions and reports. We also check credit report formats and the display of attribute values, focusing on the logical validity of output between what the client's platform is calculating and what Experian would calculate independently.

We provide any documentation that explains differences, as all differences at the end of the audit must be explainable by Experian and accepted by the client. Any specification changes that arise from the audit findings are logged in a change log. The client signs off and conducts its own user acceptance.

External audits with IP license holders
For a physical audit, the client provides test case examples for validation and explanation. We run distributions for attributes, and where the client sees significant differences, we conduct research to reconcile those differences. We also run the code on live test cases that a client can provide, run its own distributions, do comparisons and reconcile any notable differences. We audit across the different deployment platforms a client may use, using any one of the supported bureau formats.

Attribute governance

Ongoing monitoring and reporting
Premier Attributes and Trended 3D aren't static products. Existing attributes are updated and new attributes are added based on new learnings as well as both industry and regulatory changes. A robust attribute governance process was put in place to ensure that our attributes stay relevant, up to date and continue to provide clients with what they need to pass internal and external compliance and/or regulatory audits. We expand and add new attributes over time based on three types of external changes:

Economic changes
- **Environmental impact —** sensitivity of data attributes to changing economic conditions

Bureau changes
- Newly introduced bureau data elements and values
- Credit reporting changes in business practices driven by regulatory initiatives

Reporting changes
- Subscriber data changes
- Subscriber data changes driven by regulatory initiatives

Additionally, we maintain a separate government affairs team that monitors legislative changes and works with our legal and compliance teams on policy changes.

As part of our commitment to ongoing monitoring and reporting, we conduct a quarterly validation of Premier Attributes on Experian data. These validations generate attribute distribution reports and Kolmogorov–Smirnov (KS) variance reports. Any variations that exceed the predetermined KS threshold will be identified, quantified and explained.

Additionally, we monitor Experian's technical documentation for format and/or data changes. We review the documents to understand the nature and timeliness of the change and determine if it impacts our attributes. When a new field or data value within an existing field is announced, the impact is assessed to determine if it's significant or critical to the underlying filters/attributes, both in terms of accuracy or use under regulatory scrutiny. If the change is considered significant and relevant, it may trigger a revision of the attribute specification. To limit the amount of updates, thereby reducing a client's effort to reaudit and deploy, Experian only creates or modifies an attribute based on the impact and importance, not on volume. Major product releases have occurred, on average, every three years.

Version management
New version releases are necessary due to various reasons, such as credit bureau data updates, new attributes in response to market needs, compliance requirements, corrections in logic where errors were identified or improvements to logic, e.g., better classification of default logic (additional default values to improve identification of false-zero conditions).

With each new version, we conduct an analysis comparing the previous and current set of attributes. We measure the differences between them and determine the percentage of consumers impacted.

Documentation

Conventions and standards are established in attribute documentation for ease of adoption as well as regulatory support.

Logic and attribute naming conventions
Meaningful logic and attribute naming conventions are applied, along with complete and accurate descriptions of the attribute behavior captured in the attribute description. The naming convention achieves consistency across industries so that any attribute with the same series number captures the behavior across different industries.

Version management
We document the changes between versions in our technical version management guide to enable clients to assess the impact against previous versions and to help facilitate adoption of the new version. The technical version management guide includes what's new, what's changed, the rationale for changes and the impact of changes on existing attributes.

Comprehensive documentation
We provide users of Premier Attributes and Trended 3D with comprehensive documentation, including:

- Attribute list
- Data dictionary
- Core and industry subsets
- User guide
- Glossary of terms
- Version management technical guide
- Attribute series list
- Collections grid

Premier Attributes and Trended 3D intellectual property license holders also receive:

- Detailed attribute and filter definitions and specifications
- Quarterly and annual attribute governance report package, including KS report, technical bureau manual report and frequency distributions report for Experian data

Experian
475 Anton Blvd.
Costa Mesa, CA 92626
T: 1 888 414 1120
www.experian.com

05/21 • 2000/1236 • 1022-DA