

ADAPA

Product Data Sheet

Predictive analytics helps organizations unlock the value of their big data, making business insights more relevant, more accurate, more comprehensive and more nuanced. With these enhanced insights, organizations can make decisions and take actions faster and with far less risk, leading to greater positive business impact.

Businesses and other types of organizations can generate substantial value, in the form of:

- Accelerated time-to-market
- More precise targeting
- Real-time responsiveness
- Enhanced operational agility
- Competitive advantage
- Higher revenue growth rates
- Greater profitability

Yet one fundamental challenge can often erode much of the value that predictive analytics can deliver: inefficient model deployment.

The process of deploying a predictive model typically entails a series of highly manual interactions between the data science team and the organization's IT professionals. The data science team seeks to quickly operationalize their predictive model, so that business leaders and other decision makers can begin applying the resulting insights to driving tangible value. The IT team seeks to deploy the predictive model into the organization's operational IT environment, so that these same business leaders and other decision makers can consume predictive analytical outputs in a user-friendly business application. While this deployment process sounds simple, the reality is often far from ideal.

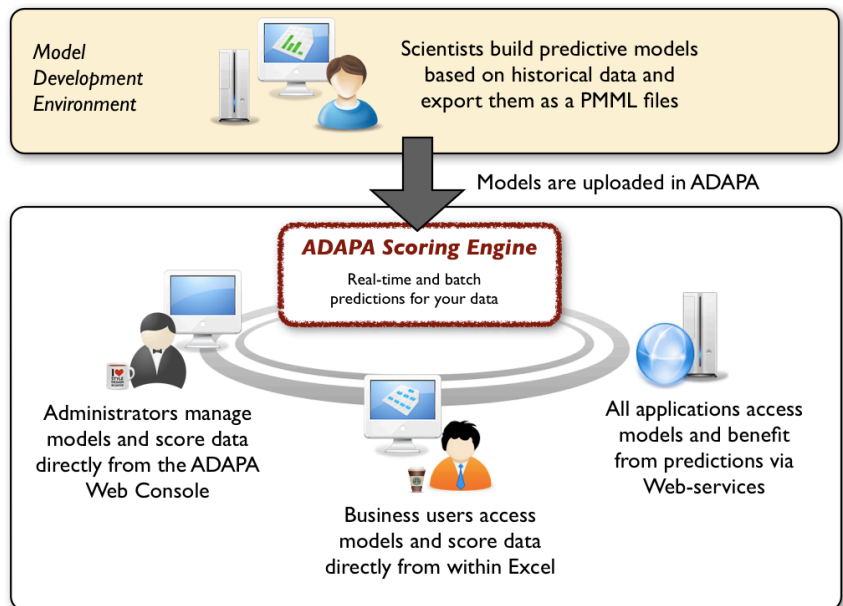
Extensive manual coding, cross-checking and fixing coding errors can turn predictive model deployment into a vicious rework cycle that can drag on for months. It is not uncommon for organizations to experience a 6-month or even 12-month deployment cycle for a single predictive model.

In today's environment of real-time data from multiple fixed and mobile platforms, spanning multiple data sources and geographies, a slow and inefficient deployment process for predictive models creates a severe competitive disadvantage. Organizations caught in this trap experience delays in developing critical insights, make less accurate decisions, miss key opportunities in the marketplace and ultimately destroy value.

Fortunately, there is a better way to deploy predictive models: Zementis ADAPA®.

ADAPA: Predictive Analytics at Scale

ADAPA (Adaptive Decision and Predictive Analytics) is an extremely fast, standards-based deployment platform and scoring engine for predictive analytics. It is built for data scientists who develop predictive models. It helps accelerate time-to-insight from predictive analytics for big data and creates a scalable capability for predictive analytics, while also reducing IT costs. By accelerating model deployment and reducing resource requirements, ADAPA allows data scientists to devote more time to data science.



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IT organizations devote less time and fewer resources to model deployment, leading to lower CapEx and Opex. Business analysts and leaders benefit from the increased speed, quality and consistency of their business decisions. Organizations can extend the use of predictive analytics internally, and accountability for business decisions increases. The result? Improved business agility across the entire organization.

Predictive Analytics Using Open Standards

ADAPA uses the Predictive Model Markup Language (PMML) standard to import and deploy predictive models. PMML was created by the Data Mining Group, an independent vendor-led consortium created to develop data mining standards that are applicable across all industries. By providing a uniform standard to represent such models, PMML allows for the exchange of predictive models and solutions between different applications and vendors. All leading commercial and open-source data mining tools (including IBM SPSS, SAS, KNIME, R) support PMML. In this way, a model built in any of these tools can be automatically exported as a PMML file. ADAPA removes the complexity of translating and operationalizing models.



ADAPA supports a wide range of predictive modeling techniques, including:

- Association Rules
- Decision Trees for classification and regression
- Neural Network Models: Back-Propagation, Radial-Basis Function, and Neural-Gas
- Support Vector Machines for regression, binary and multi-class classification
- Linear and Logistic Regression (binary and multinomial)
- Naïve Bayes Classifiers
- General and Generalized Linear Models
- Cox Regression Models
- Rule Set Models (flat decision trees)
- Restricted Boltzmann Machines
- Clustering Models: Distribution-Based, Center-Based, and 2-Step Clustering

- Scorecards (including support for reason codes and point allocation for categorical, continuous and complex attributes)
- Multiple Models: Model Composition, Segmentation, Chaining, Cascade and Ensemble, including Random Forest Models and Boosted Trees.

ADAPA also implements the definition of a data dictionary, missing, outlier and invalid values handling, and myriad other functions for implementing data pre- and post-processing functions, including:

- Value Mapping
- Discretization
- Normalization
- Scaling
- Logical and Arithmetic Operators
- Conditional Logic (IF-THEN-ELSE)
- Built-in Functions
- Lookup Tables
- Business Decisions and Thresholds
- JSON
- Customs Functions (user-defined)

ADAPA consumes model files that conform to PMML, versions 2.0 through 4.2. If a model development environment exports an older version of PMML, ADAPA will automatically convert the file into a 4.2-compliant format.

The use of open standards permits the quick and easy adoption of ADAPA as the deployment vehicle for predictive models developed solely by your analytics team, or in collaboration with the experienced Zementis team of data scientists.

Model Management in ADAPA

With ADAPA, models are managed through an intuitive, Web-based console that serves as a central repository for executing predictive models and solutions. To use ADAPA, simply upload a PMML file representing a predictive model, and then score data against the model in batch-mode or in real-time through one of three convenient options: the Web console, Microsoft Excel or via Web-service calls.

The Web-services API enables users to score data one record at a time, which allows real-time scoring, or

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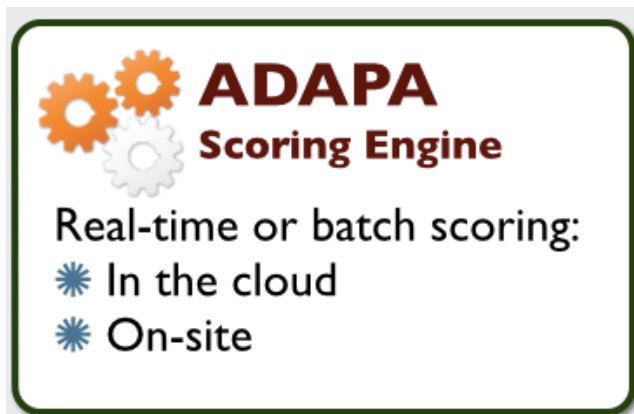
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multiple records at a time, which allows scoring in batch-mode or on-demand. The API also permits data to be scored against one or several models and for models to be managed programmatically.

The ADAPA Web Console includes the following key functions:

- **Model Validation Test:** Allows the user to verify that the model has been deployed correctly; by executing a test file containing input data and expected results for a model, the engine reports deviations from expected results, greatly enhancing traceability of errors and debugging of model deployment issues.
- **Model Verification PMML Element:** Provides functionality similar to that of the Model Validation Test, fully embedded in the model file.,
- **Compressed File Upload Capability:** Allows a user to upload a compressed CSV data file and batch-score it against any of the deployed models; results are returned in the same format and may be downloaded for further processing and visualization.



Enhanced Predictions with Multiple Models

With ADAPA, a data scientist can implement a model segmentation approach to predictive analytics, executing multiple models in PMML format based on different input conditions. This approach allows a predictive solution to be tailored to different customers or device types.

With several models working in tandem, ADAPA can generate an overall score that reflects the richer

predictive capabilities that multiple coordinated models can offer. Model ensembles such as Random Forest Models and Boosted Trees are two well-known examples of this approach. By supporting multiple models, ADAPA can consume and score myriad model combinations that can significantly enhance the accuracy of predictive analytics.

Within ADAPA, multiple external PMML files can be combined into a single predictive solution. In such a scenario, different PMML files come together to implement the decision strategy most suitable for the task at hand. For example, different files can be used to implement different pieces of the predictive puzzle, in which tasks such as pre-processing + model + post-processing are represented by their own PMML files. External files lead to easier testing and validation of models.

Predictive Analytics at the Speed of Business

With its PMML post-processing capabilities, ADAPA instantly transforms your scores into business decisions. PMML-based rules allow the data scientist to pair different score ranges with specific business decisions. In this way, numbers and predictions can lead to more consistent and accurate actions.

In most situations, the value of automated decisions is measured not only by their accuracy but also by the speed at which they are delivered. ADAPA is designed to scale with business needs and enable instant decisions. Although execution speeds depend on model type and complexity, ADAPA can scale to easily score thousands of data records per second. This speed and scalability supports use cases in the most rigorous business environments, ranging from multi-platform marketing campaign management to high frequency trading of financial assets.

A highly capable scoring engine must not only be fast and enterprise-grade, it must also be accountable. ADAPA users can configure it to log data and decisions, which can then support forensic tracing and reporting. ADAPA also logs information about missing or invalid data elements submitted to the engine during model execution. This information allows users to assess data quality and measure its potential impact on deployed models.

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Data Scoring in Excel

Zementis has developed a simple and convenient add-in tool for Microsoft Excel users, allowing them to score their data directly within Excel. Once the ADAPA Add-in for Excel is installed, one only needs to select "Data" from the standard Excel menu and connect to ADAPA in order to begin scoring data. With the ADAPA Add-in for Excel®, anyone can access the power of predictive analytics directly from their desktop. Scoring has never been easier.

Cloud and On-site Deployment

ADAPA - Cloud Computing Options

ADAPA is available in several leading cloud computing environments, as a fully hosted Software-as-a-Service (SaaS) solution. The subscriber only pays for the service and the capacity that is needed, eliminating costs associated with software licenses, ongoing IT support and on-premises hardware resources.

As the business grows, ADAPA provides a cost-effective expansion path in your cloud computing environment of choice. Users can simply add additional ADAPA instances (virtual servers running a pre-installed version of ADAPA) for scalability or failover. The SaaS model removes the burden for the business to manage a scalable, on-demand computing infrastructure.

ADAPA is available as a service through Amazon Web Services [in the AWS Marketplace](#), through the [Microsoft Azure Marketplace](#) and in the [FICO Analytic Cloud](#). Each of these cloud infrastructure options offers utility computing with virtually unlimited scalability. In addition, each provides compute regions and data centers throughout the world so that local capacity can be brought online wherever it is needed.

Whichever cloud you choose for your big data analytics needs, Zementis' partnerships with these leading cloud services providers allows data scientists to extract superior value and insight from their predictive models and data immediately and efficiently with high availability, high scalability and optimized business value.

Private ADAPA Instance

This service is implemented as a private, dedicated instance of ADAPA, and provides a single-tenant

architecture. Only the owner/subscriber has access to the ADAPA engine instance(s) via HTTPS. Predictive models and data never share the same ADAPA engine with other clients.

Self-Service Scoring Engine

For ADAPA in a cloud computing environment, at any given time, the subscriber may launch one or more instances using the cloud provider's intuitive management console. The respective payment service for the cloud provider handles billing and subscription management. Each subscriber can be confident that payment information remains secure and confidential while enjoying the convenience of using an existing cloud computing account.

ADAPA on-Site

By choosing an ADAPA on-Site license, Zementis customers have access to all the great features ADAPA offers, along with the added confidence of managing their data within their own physical environment. ADAPA becomes an essential piece of the IT infrastructure.

Enterprise-wide integration of ADAPA requires only minimal effort. This was by design. One of Zementis' prime considerations in developing ADAPA was ensuring ease of deployment for seamless integration with existing software and processes.

ADAPA is a Java application easily deployed in most commercial or open source application servers. Once deployed, ADAPA allows users to manage predictive models through its intuitive Web console. In addition, the scoring capabilities built into ADAPA are automatically available as Web-services. This means that deployment of an advanced analytics solution takes minutes, not weeks. ADAPA-based solutions are the natural way to enhance your IT infrastructure with automated decision capabilities while at the same time lowering Total Cost of Ownership (TCO).

Why ADAPA?

ADAPA accelerates time-to-insight for predictive analytics on big data. With ADAPA, data scientists retain full flexibility to develop predictive models in whichever commercial or open-source data mining tools they choose (such as IBM SPSS, KNIME, Python, R and SAS). It enables data scientists to deploy their predictive models

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in minutes instead of months. This flexibility and accelerated deployment cycle time get predictive analytics into the hands of business decision makers quickly and enable scalable predictive capabilities, doing so at a fraction of the cost and resources typically required.

ADAPA benefits data-driven organizations operating in the most challenging operating environments, across multiple industries and use cases.

Select industry examples include:

Banking and Financial Services	<ul style="list-style-type: none"> • Multi-channel fraud detection • Credit risk management • Asset and liability management
Health Care and Life Sciences	<ul style="list-style-type: none"> • Insurance fraud detection and mitigation • Provider cost optimization • Biotech and pharmaceutical R&D
Security Solutions	<ul style="list-style-type: none"> • Anomaly detection • Pattern recognition • Post-event forensics

Select use case examples include:

Customer Analytics	<ul style="list-style-type: none"> • Smart credit scoring • Churn avoidance • Multi-channel marketing campaign enablement
Operations Analytics	<ul style="list-style-type: none"> • Quality control for critical infrastructure • Advanced product development • Enhancing reliability and uptime for Internet-of-things (IoT) components
Fraud & Risk Analytics	<ul style="list-style-type: none"> • Multi-channel fraud detection • Risk-based product pricing • Risk-based capital management

About Zementis

Zementis, Inc. provides software solutions for predictive analytics. The company was founded on the principle that data science teams and IT departments can collaborate seamlessly and efficiently, allowing predictive models to rapidly move from development to deployment, so that businesses and other data-centric organizations can easily incorporate predictive analytics into their routine operations. Agile deployment of predictive solutions is the cornerstone of the Zementis philosophy.

CIO Review recognized Zementis as one of the "Top 20 most promising Big Data companies in 2013", and Gartner named Zementis a "Cool Vendor in Data Science" in 2014. Its ADAPA® and Universal PMML Plug-in (UPPI) scoring engines are designed from the ground up to benefit from open standards and to significantly shorten the time-to-market for predictive analytics in any industry. Customers such as Bosch, FICO, Equifax and Western Union have used Zementis solutions successfully to enhance their predictive analytics capacity and capabilities.

Zementis partners with leading analytics and data warehouse solution providers to enrich and extend customer capabilities. Supported partner solutions and platforms include: Amazon Web Services, Apache Software Foundation (Hadoop, Hive, Spark, Storm, Tomcat), Cloudera, Datameer, FICO, Hortonworks, IBM (BigInsights, PureData / Netezza, WebSphere), MapR, Microsoft Azure, Oracle WebLogic, Pivotal Greenplum, RedHat JBoss, SAP (HANA, Sybase IQ), Teradata and Teradata Aster.

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