
Optimizing Your Analytics Life Cycle with SAS & Teradata

Rick Lower

Agenda

- The Analytic Life Cycle
- Common Problems
- SAS & Teradata solutions

Analytical Life Cycle



Analytical Life Cycle

Stage 2

- combining data from numerous sources
- handling inconsistent or non-standardized data
- cleaning dirty data
- integrating data that was manually entered
- dealing with semi-structured and structured data

Stage 1

- what the data looks like
- what variables are in the data set
- whether there are any missing observations
- how are the data related
- what are some of the data patterns



Stage 3

- customer retention
- customer attrition/churn
- marketing response
- consumer loyalty and offers
- fraud detection
- credit scoring
- risk management

Stage 4

- the probability of responding to a particular promotional offer
- the risk of an applicant defaulting on a loan
- the propensity to pay off a debt
- the likelihood a customer leave/churn
- the probability to buy a product

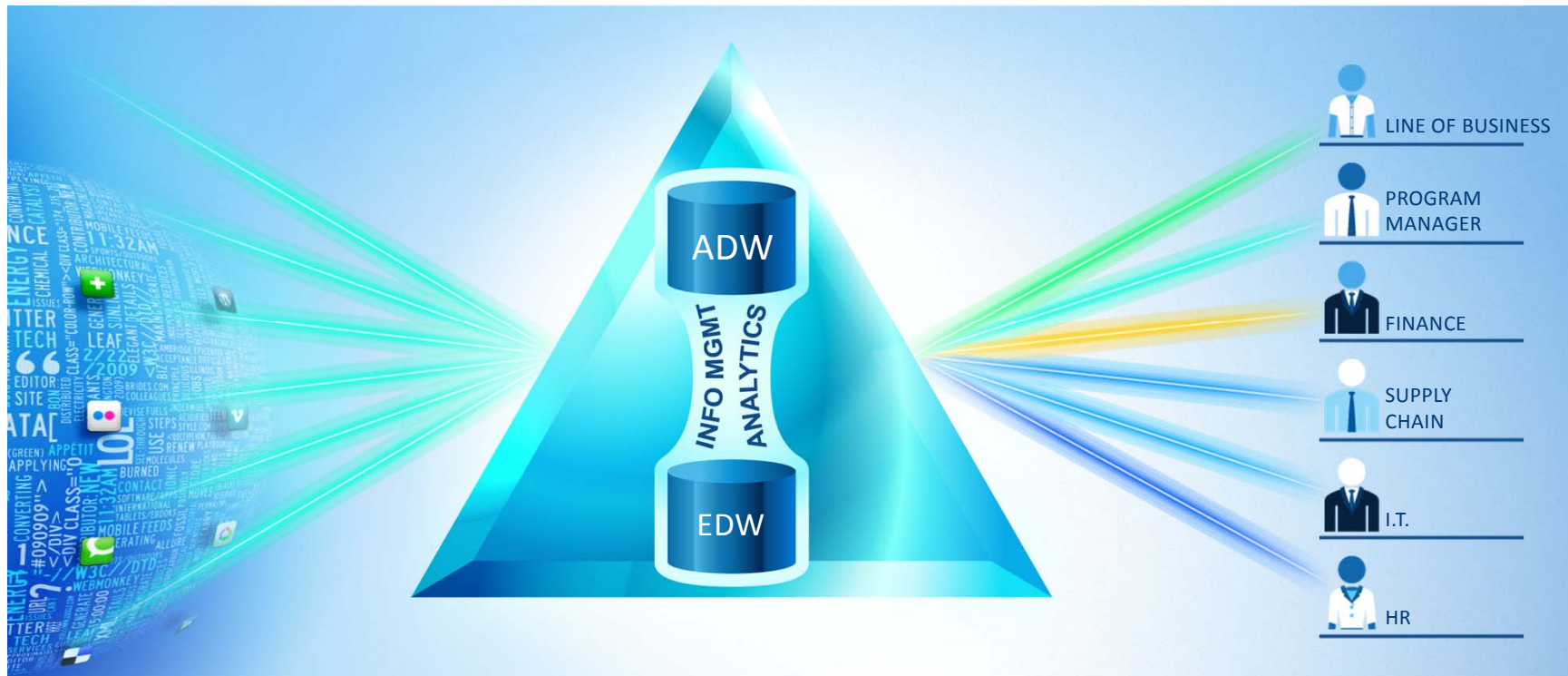
Common Problems

Typical Customer Challenges

- “ My analytical process runs too slowly* ”
- “ We spend too much time moving data around between systems ”
- “ I want to make more/better use of my EDW/data platform”
- “ It takes forever to extract and score the data”
- “ There is too much data for us to analyse ”
- “ We can’t buy new hardware”
- “The quality of our analytical models is lower because we sample – I worry we are missing valuable segments”

* scoring / analysis / data quality / data transformation

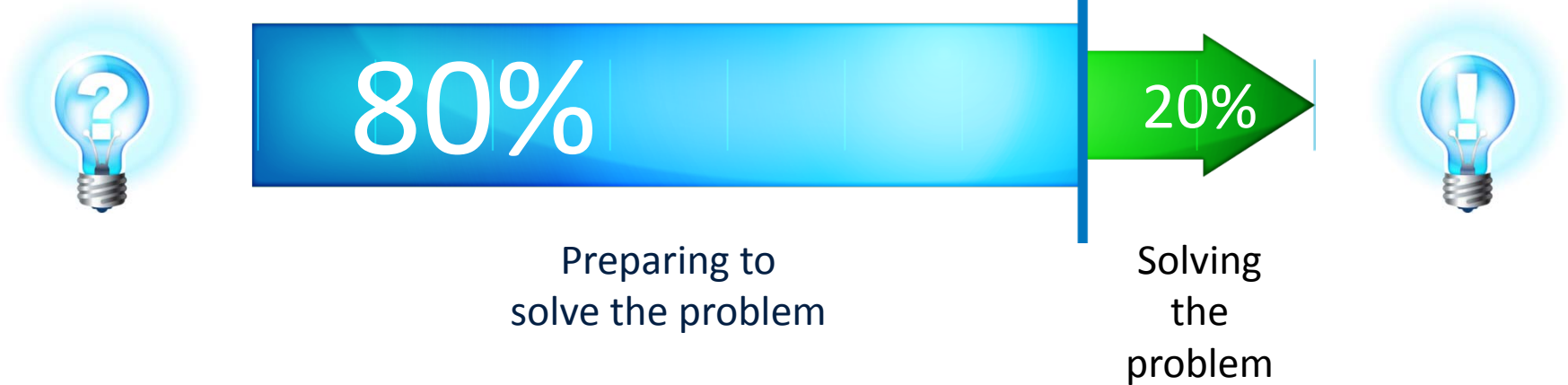
The Analytic Data Warehouse



Data Management: The crux of the issue facing your analysts

BUSINESS
PROBLEM

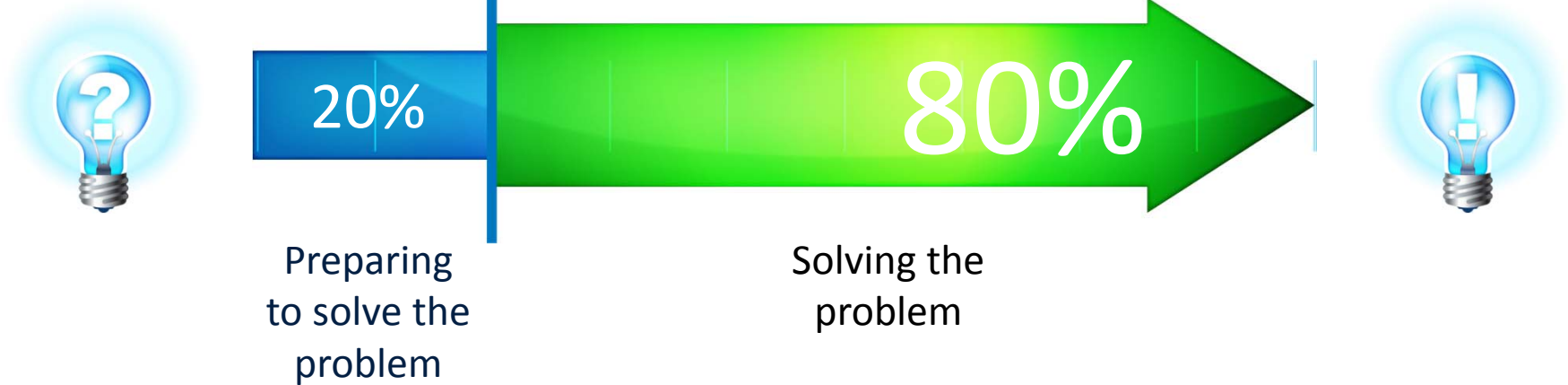
BUSINESS
DECISION



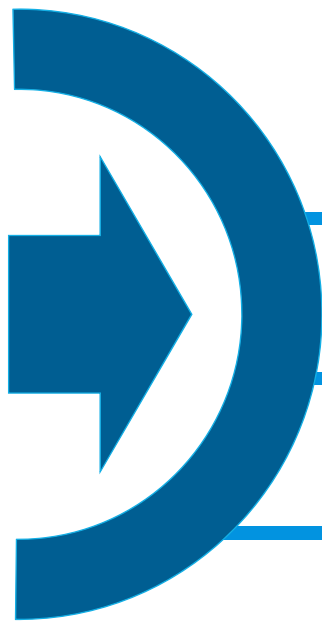
Data Management: SAS & Teradata working to change the Equation

BUSINESS
PROBLEM

BUSINESS
DECISION



Barriers to the Adoption of Analytics



Scarcity of analytical skills

The need to grow analytical talent from within

Tools that aren't right for the job

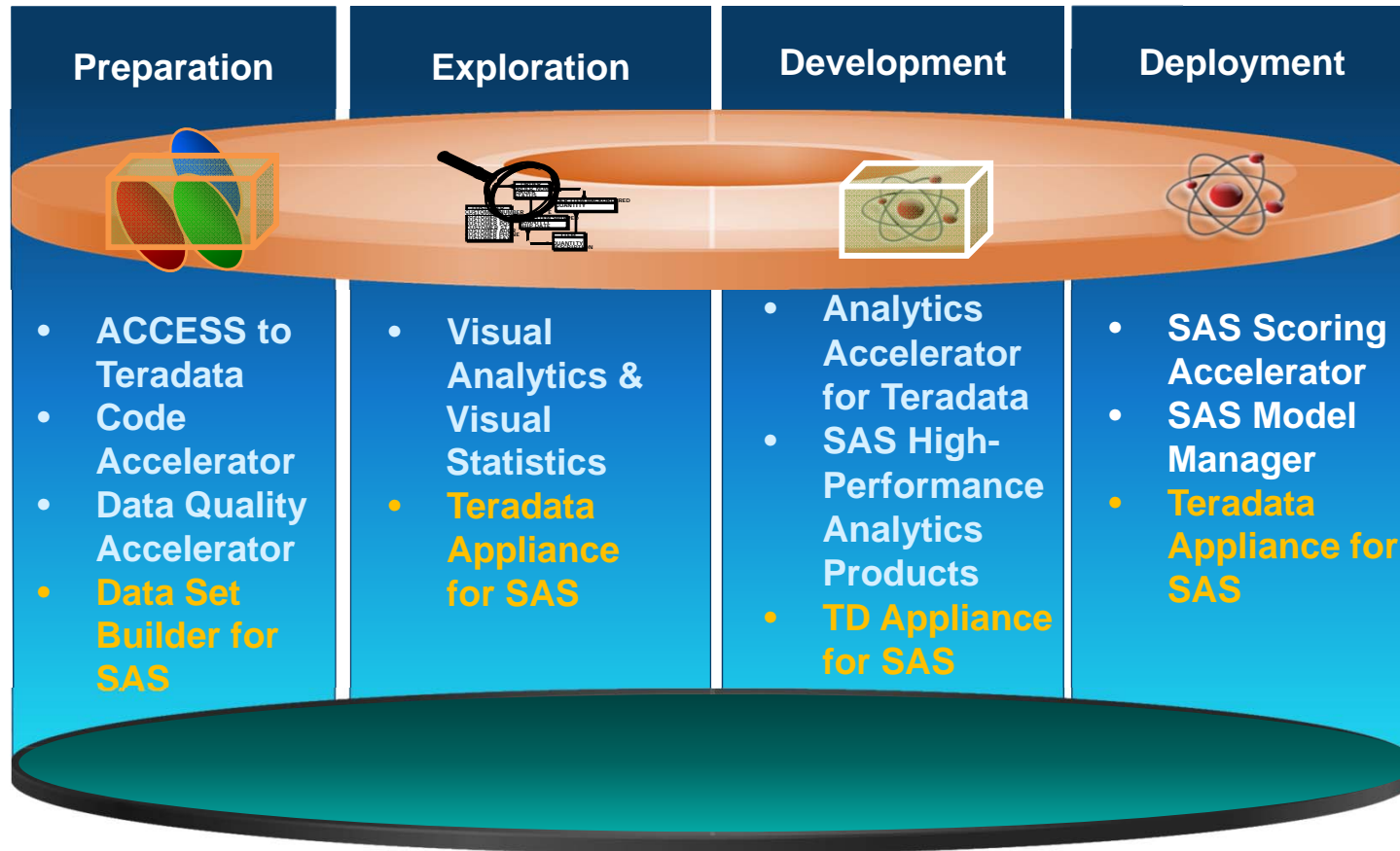
Learning curve to create, share and collaborate

Disjointed, inefficient workflow

How can you fail fast & learn to refine quickly

SAS & Teradata Solutions

Analytical Life Cycle

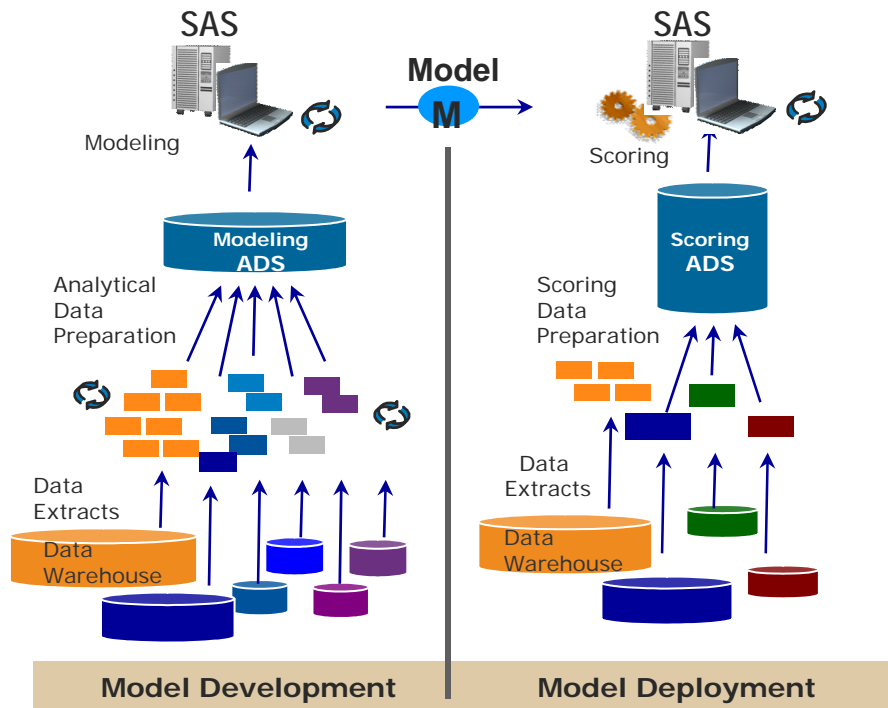


SAS Analytics in Teradata

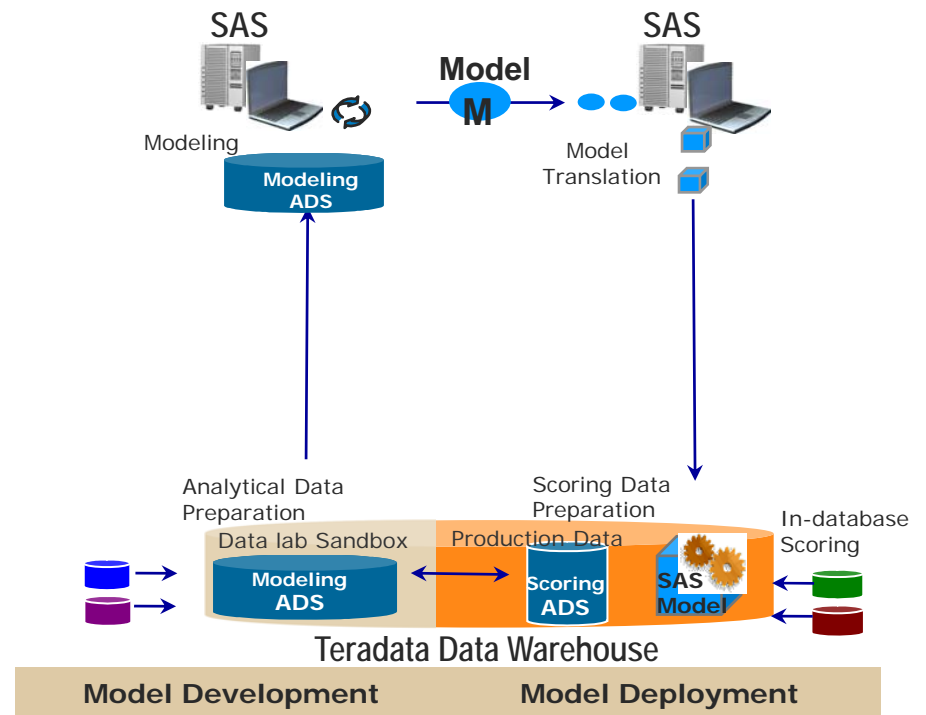


Modeling Architecture

Traditional Architecture

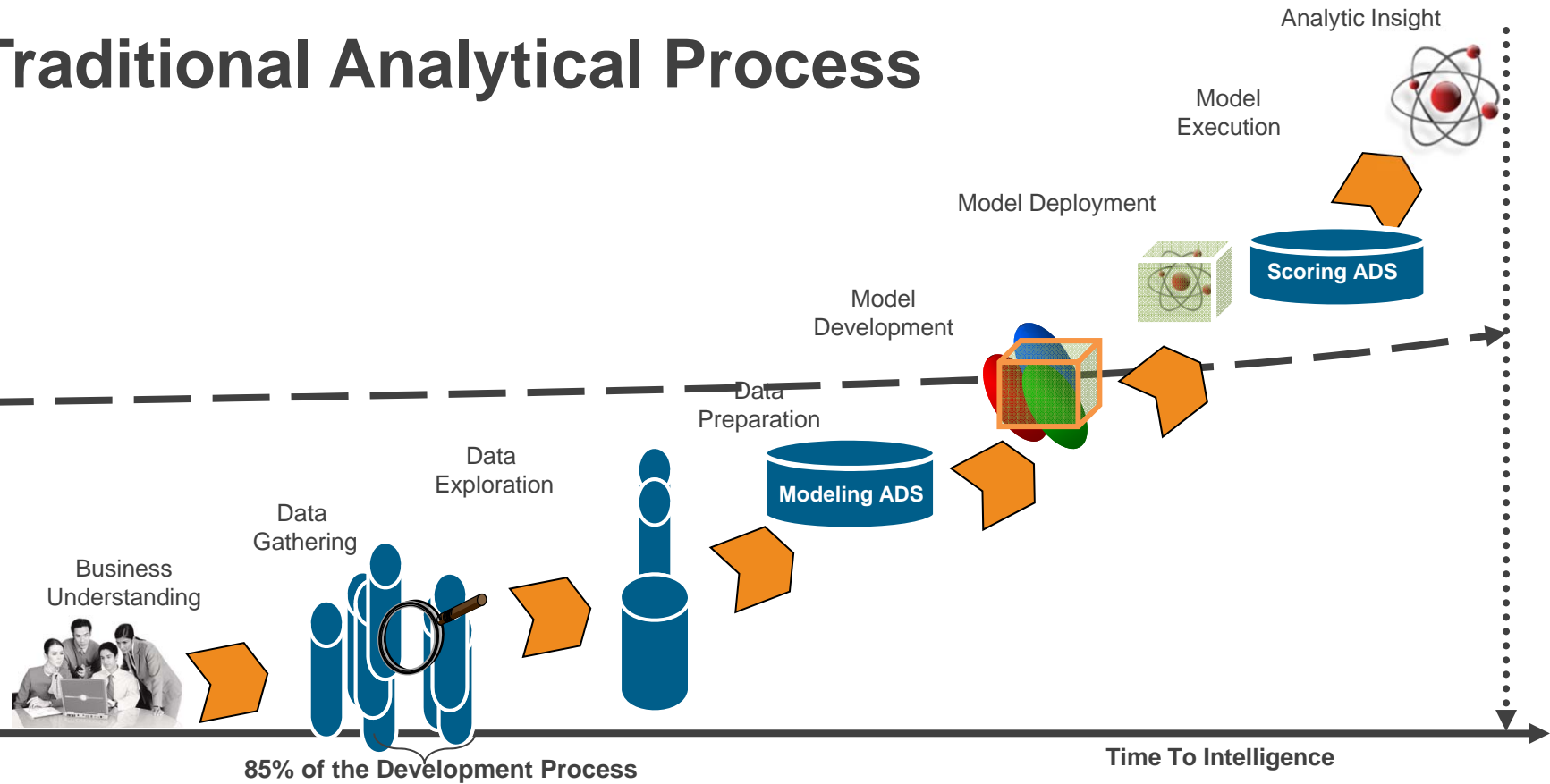


In-Database Architecture



Competitive Advantage

Traditional Analytical Process



Competitive Advantage

In-Teradata Analytical Process

SAS STAT
SAS Analytics Accelerator

SAS Enterprise Miner

Model 720 - "Companion"

Analytic Insight

Model Execution

Model Deployment

Model Development

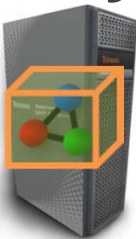
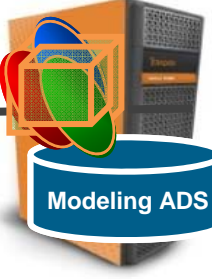
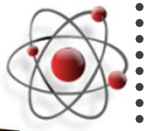
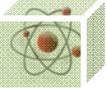
Data Preparation

Analytic Data Labs Infrastructure

Data Gathering

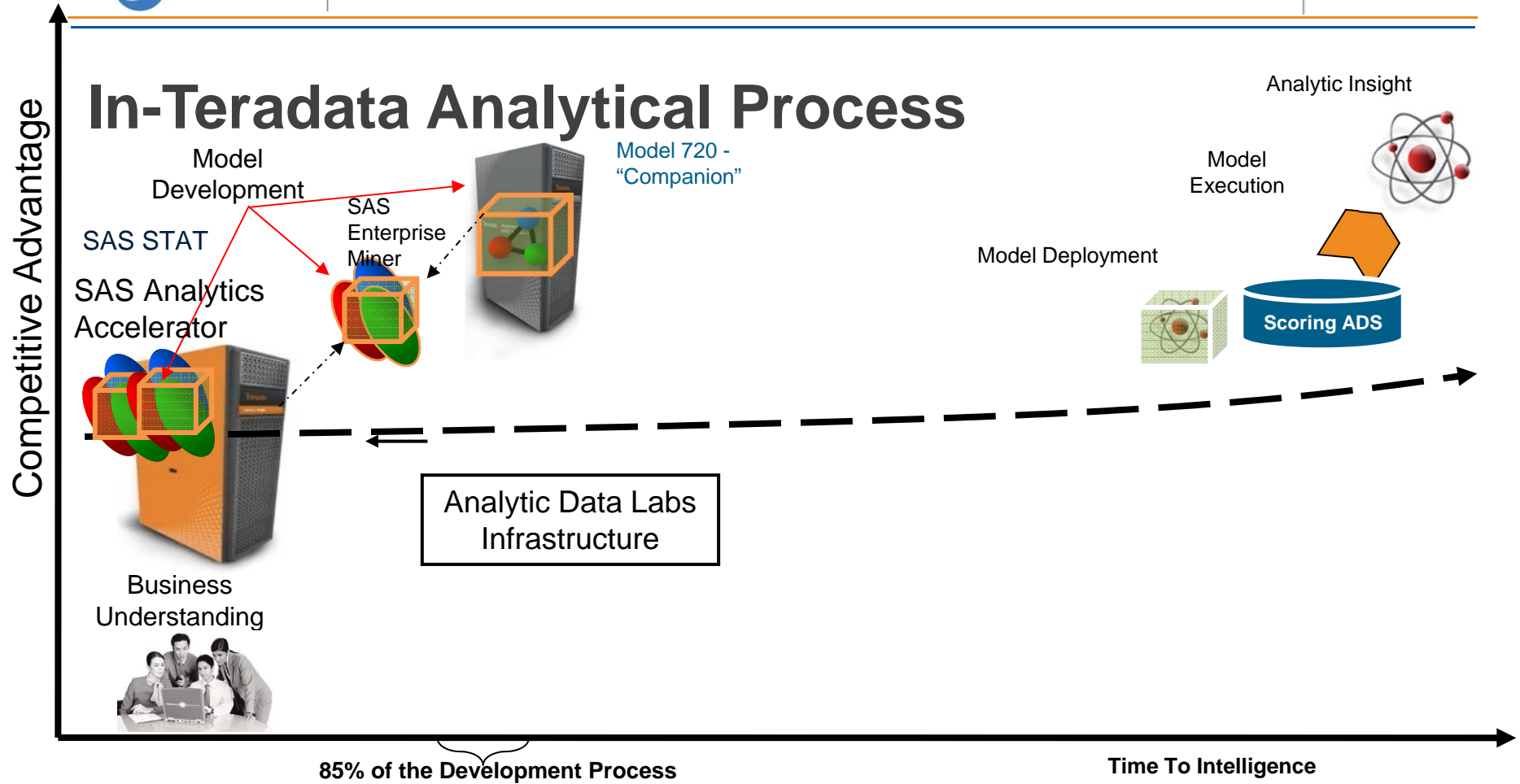
Data Exploration

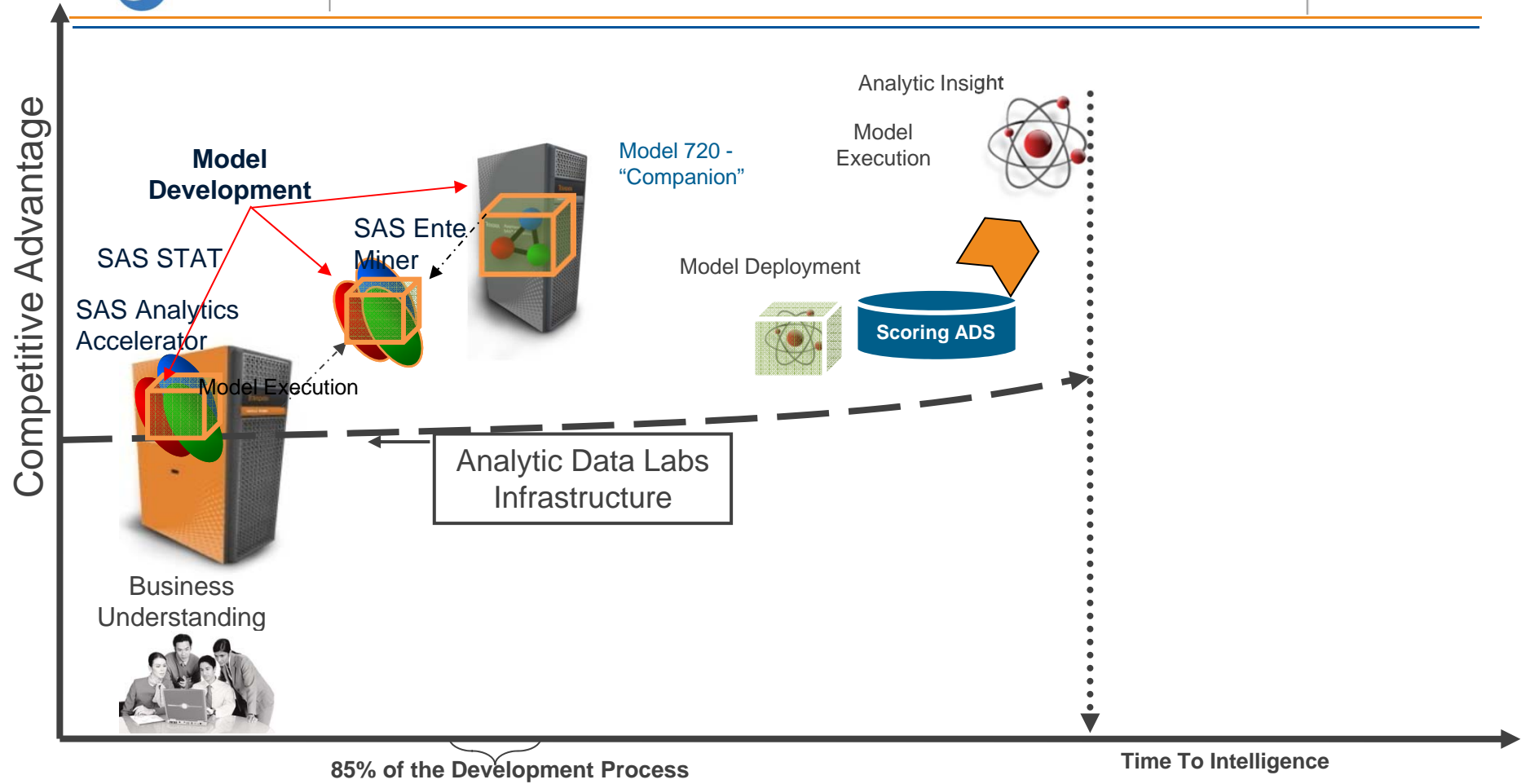
Business Understanding

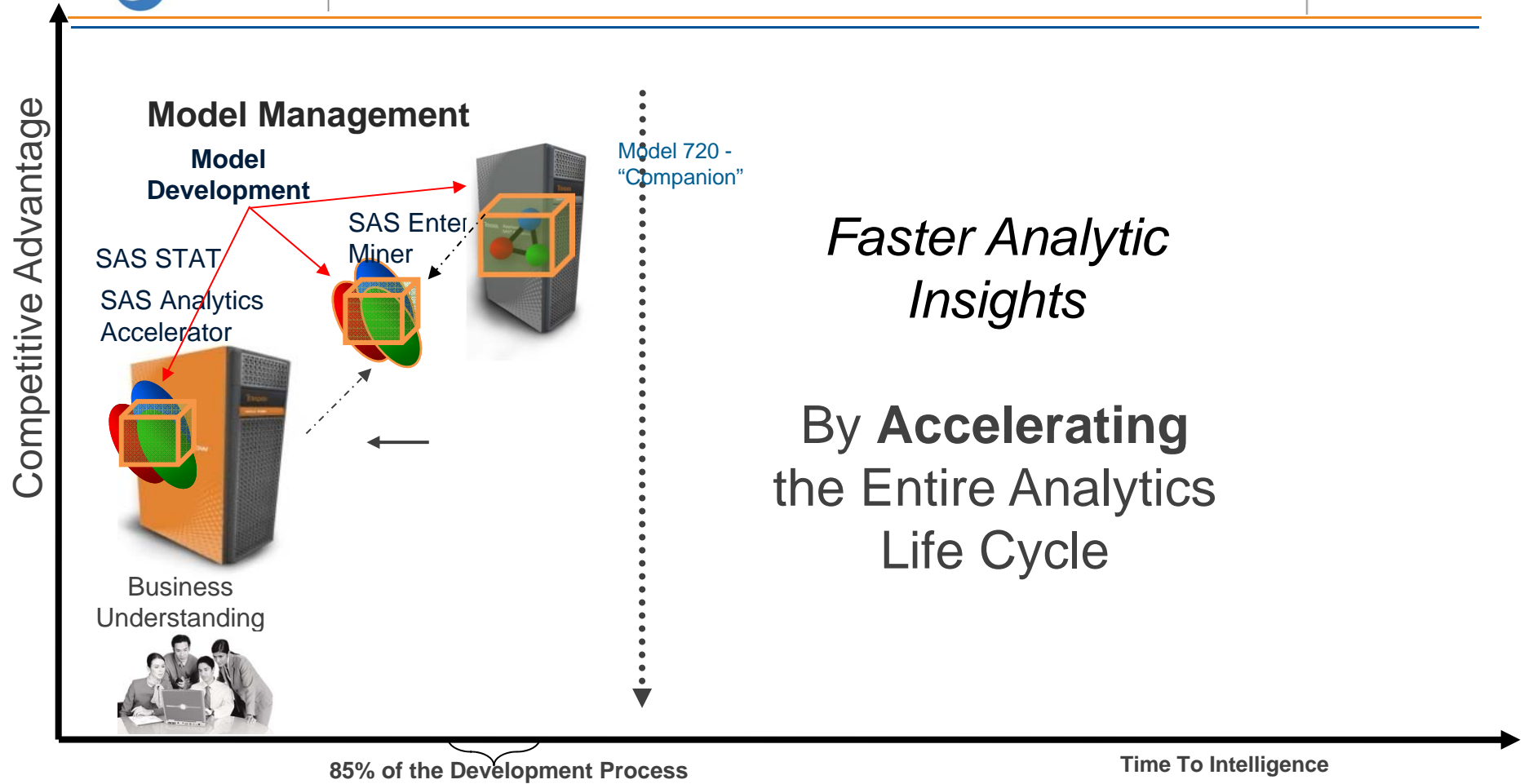


85% of the Development Process

Time To Intelligence

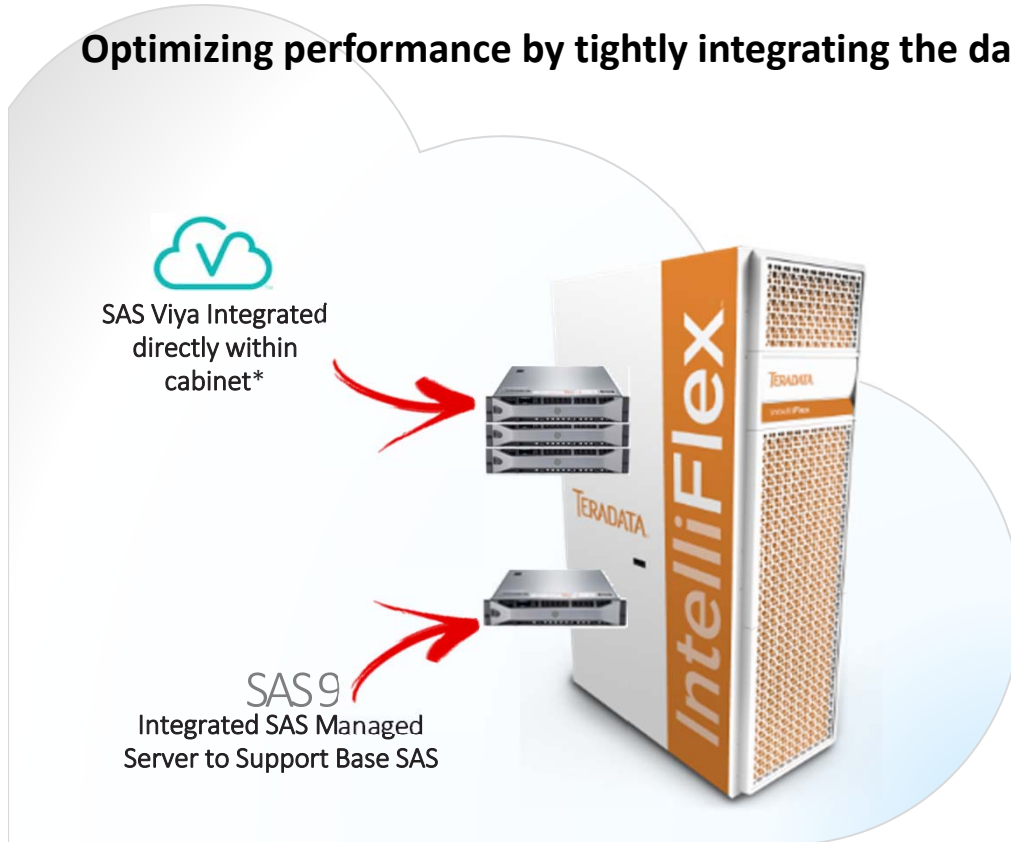






The Teradata Environment is SAS Enabled

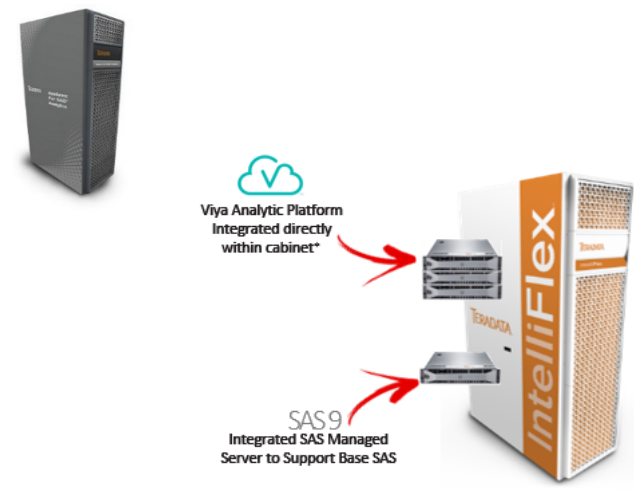
Optimizing performance by tightly integrating the data and the analytics



- SAS Viya and SAS 9 can be installed directly within the Teradata Environment
- Provides high-speed connectivity between SAS and the data
- SAS in-Database tools further improve data access and performance
- Available as Cloud, On-Premise and Hybrid Architectures
- Supports a single version of data for all analytics across SAS 9 and SAS Viya
- Fully scalable to grow with the customers needs

Achieving Business Lead Outcomes with SAS

Teradata continues to develop and support collaborative SAS & Teradata solutions

Horizontal Offers	Vertical Solutions	Dedicated Applications
<ul style="list-style-type: none"> • Advanced Analytics for Hadoop • Analytic Advantage (in-database analytics) • Data Quality Advantage • In-database Decision Management • Managed Server for SAS • SAS MA for Teradata • Teradata Appliance for SAS • SAS Event Stream Processing (ESP) and TD Listener • Accelerated Insights • Optimization Services 	<ul style="list-style-type: none"> • Credit Risk • Credit Scoring • AML (Anti-Money Laundering) • SAS Asset Performance Analytics • SAS Field Quality Analytics • SAS Production Quality Analytics 	<p>Teradata 750 Appliance for SAS</p>  <p>The diagram illustrates the integration of SAS solutions with Teradata hardware. On the left is the Teradata 750 Appliance for SAS. On the right is the Teradata IntelliFlex server cabinet. Two red arrows point from the IntelliFlex cabinet to the left, indicating integration. The top arrow points to a server rack labeled 'Viya Analytic Platform Integrated directly within cabinet*'. The bottom arrow points to a server rack labeled 'SAS 9 Integrated SAS Managed Server to Support Base SAS'.</p>

In-Database Functionality

SAS/Access to Teradata:

- PROC APPEND
- PROC CONTENTS
- PROC COPY
- PROC DATASETS
- PROC DELETE
- PROC FORMAT
- PROC FREQ
- PROC MEANS
- PROC PRINT
- PROC RANK
- PROC REPORT
- PROC SORT
- PROC SQL
- PROC SUMMARY
- PROC TABULATE

DQ Accelerator for Teradata

- Match code
- Parsing/Casing
- Gender/Pattern/Identification analysis
- Standardization

SAS Code Accelerator for Teradata

- PROC DS2

SAS Scoring Accelerator for Teradata

- EM/STAT* Models

SAS Analytics Accelerator for Teradata Statistical Analysis Procedures:

- PROC CANCORR
- PROC CORR
- PROC FACTOR
- PROC PRINCOMP
- PROC REG
- PROC SCORE
- PROC TIMESERIES
- PROC VARCLUS

SAS Enterprise Miner

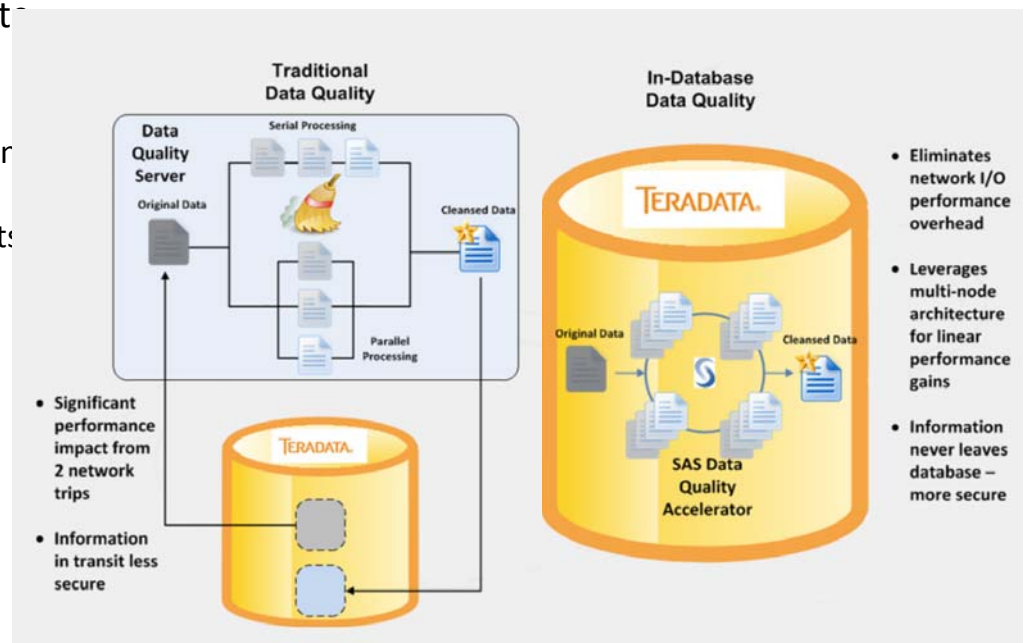
- PROC DMDB
- PROC DMINE
- PROC DMREG (Logistic Regression)
- Also nodes for Input, Sample, Partition, Filter, Merge, Expand

• PROC SCORE works with coefficients from:

- PROC ACECLUS
- PROC CALIS
- PROC CANDISC
- PROC DISCRIM
- PROC FACTOR
- PROC PRINCOMP
- PROC TCALIS
- PROC VARCLUS
- PROC ORTHOREG
- PROC QUANTREG
- PROC REG
- PROC ROBUSTREG

In-Database Example: Data Quality

- SAS Data Quality functions ported to operate *in-database*
 - Invoked as SQL Stored Procedures
 - Processing leverages parallelism of underlying RDBMS
 - Significant performance/throughput benefits
- Supported functions:
 - Matchcode generation
 - Parsing
 - Standardization
 - Casing
 - Pattern analysis
 - Identification analysis
 - Gender analysis

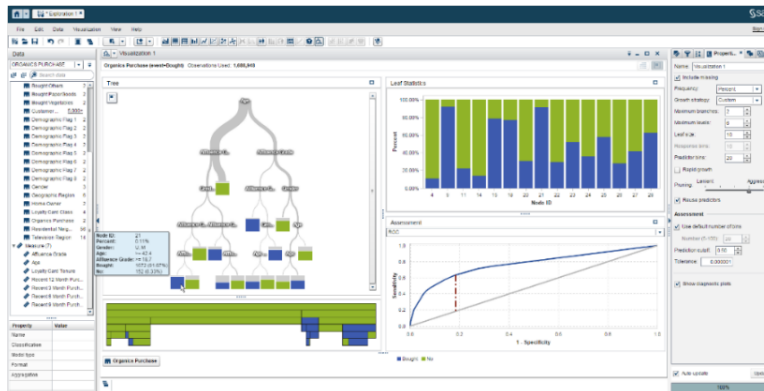


SAS Visual Analytics & Visual Statistics



SAS Visual Analytics

- Data exploration and discovery
- Distribution and summary statistics
- Post-model analysis and reporting



SAS Visual Statistics

- Build prediction and classification models
- Refine candidate models
- Compare models and generate score code

Teradata Everywhere Supports SAS Viya



SAS Viya is a cloud-enabled, in-memory analytics engine that delivers everything your customer needs for quick, accurate and consistent results. SAS Viya:

- Provides elastic, scalable and fault-tolerant processing
- Effortlessly scales to meet future needs
- Enables faster processing with in-Memory analytics
- A standardized code base that supports programming in SAS and other languages, like Python, R, Java and Lua
- Support for cloud, on-site or hybrid environments. It deploys seamlessly to any infrastructure or application ecosystem... including Teradata

SAS & Teradata Partner Success Stories



- Increased productivity of the analyst community
- Improved analytic processing times from 73x to 657x for different processes
- Enabled a self-service environment for provisioning and management of data
- Provided better business insights into internal and external data
- Maintained data governance



- Accelerate drug development with integrated data & analytics
- Enabled self- service analytics, data exploration & consumption
- Reduced the cost and time to bring treatments to patients
- Decreased analytic processes from days/hours to just minutes
- Integrated SAS Managed Server within a Teradata 2800 system
- SAS Data Integration, Enterprise Guide and Enterprise Miner



- Improved patient treatments to deliver better care paths
- Captured streaming device data
- Expanded DataLabs for market analysis and strategy
- Decreased operational cost
- Teradata Appliance for SAS (5 node), 2800 Appliance (16 node) and (2) Teradata Appliances for Hadoop
- Multiple SAS in-Database & in-Memory technologies



Customer Success Story

Large US Retailer

Leveraging SAS and Teradata for advanced analytics to analyze customer data and loyalty programs with in-database and in-memory technologies

Issues

- Projects involving high-end analytics were placing more and more demand on IT and Business Analytics teams
- Needed to streamline the analytics workflow
- Needed a solution that provided scalability and data consistency
- Process could not support additional analytics requests

Solutions

- Replaced desktop tools with SAS server based HPA tools such as Enterprise Miner, Scoring Accelerator, Model Manager, VA & Data Mining
- Added Teradata Appliance for SAS for production and development of data models
- Expanded EDW
- Added Data Labs Environment to streamline data modeling

Impact

- Improved the speed and performance of analytics
- Streamlined data preparation, evaluation and testing
- Added additional analytics capacity without requiring the addition of new headcount
- Freed up IT time used for data collection, loading and prep

- YouTube Videos

- Demonstrate the integration of SAS and Teradata
- From data preparation to data model scoring
- In-database and in-memory portfolio
- 8 videos [online](#)

Summary

- Minimize the need to move the data
- Faster modeling times (months/weeks to hours/minutes)
- Improve data quality, availability and consistency
- Work with entire data sets, including enabling an end-to-end view of data from across the enterprise
- Free up staff to focus more time on value-adding activities