WHY IS IT IMPORTANT?

- Business Interest
- Data Growth
- Technology

RUN, GROW AND DIFFERENTIATE

SAS PREDICTIVE ANALYTICS
MOVING FROM REAR VIEW TO FORWARD THINKING

Monitor & Detect

Higher Decision Impact

Predict & Act
A KEY FACTOR IN DECISION MAKING

- Better decision-making: 49%
- Better enablement of strategic initiatives: 16%
- Better relationships with customers: 10%
- Detect risks and ability to react to changes: 9%
- Better financial performance: 9%
- Respond to new buying trends: 5%
- New revenue streams: 1%
SHOW ME THE MONEY

- Credit Risk
- Fraud
- Time Series Data Mining
- Predictive Asset Maintenance
- Social Networks
CUSTOMER ANALYTICS

SHOW ME THE MONEY

Customer Segmentation

Targeted Marketing / Customer Acquisition

Market Basket Analysis

Cross-sell/Up-sell

Retention / Attrition

Customer Lifetime Value
THE ANALYTICS LIFECYCLE

APPLYING ANALYTICS IN AN ITERATIVE FASHION

IDENTIFY / FORMULATE PROBLEM

DATA PREPARATION

DATA EXPLORATION

TRANSFORM & SELECT

BUILD MODEL

VALIDATE MODEL

DEPLOY MODEL

EVALUATE / MONITOR RESULTS

Domain Expert
Makes Decisions
Evaluates Processes and ROI

BUSINESS MANAGER

Data Exploration
Data Visualization
Report Creation

BUSINESS ANALYST

Exploratory Analysis
Descriptive Analytics
Predictive Modeling

DATA SCIENTIST / MODELER

Model Validation
Model Deployment
Data Preparation

IT SYSTEMS / MANAGEMENT

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EVALUATION CRITERIA FOR PREDICTIVE ANALYTICS HUB

COMPETITIVE ADVANTAGE

- Types of users
- Production scoring
- Modern techniques
- Interoperability
- Analytical data preparation
- Scale to your needs
- Interactive data exploration
- Model lifecycle management
SAS® PREDICTIVE ANALYTICS KEY FUNCTIONAL AREAS

- Intuitive Role-based Interface
- Analytical Data Preparation
- Descriptive and Predictive Algorithms
- Create and Transform Variables
- Batch or Real-time Scoring
- Data Exploration and Data Discovery
- Model Validation and Assessment

Create and Transform Variables

Model Validation and Assessment

Batch or Real-time Scoring

Intuitive Role-based Interface

Analytical Data Preparation

Descriptive and Predictive Algorithms

Create and Transform Variables

Batch or Real-time Scoring

Data Exploration and Data Discovery

Model Validation and Assessment
INTEGRATE DATA

- Access structured and unstructured* data
- Data sampling and partitioning
- Data filtering, including outliers
- Time series data preparation and analysis
- Create ad hoc data-driven rules and policies

*Requires SAS Text Miner Add-on License
EXPLORE DATA

- Easy-to-use Graphics Explore wizard and node
- Interactively linked plots, charts and tables
- Descriptive Analytics
  - Associations, Market Baskets, Clustering
- Variable distribution and summary statistics
- Univariate and Bivariate statistics and plots
- Segment profile and interactive plots
- Web path for sequence analysis
MODIFY DATA AND VARIABLE SELECTION

- Remove variables
- Replace missing values
- Interactive binning of input variables
- Reassign and consolidate levels of input variables
- Transform variables to create new ones
- User defined rules to define values for outcome variables and paths to outcomes
MODERN SET OF MODELING TECHNIQUES

- Supervised Techniques
  - Regression
  - Gradient Boosting
  - Decision Trees
  - Neural Networks
  - Bayesian Networks, Support Vector Machines, etc.

- Unsupervised Techniques
  - Clustering, Dimension reduction
  - Associations, Principal Components, etc.

- Ensembles
  - Integration with R Software
  - High-Performance Analytics Nodes/Procedures
APPLICATION SPECIFIC MODELING TECHNIQUES

- Incremental Response (or Net Lift) Modeling
- Time Series Data Mining
- Survival Analysis
- Rate Making in Insurance
- Credit Scoring*

\[ F(x) = \frac{\beta}{(\frac{N50}{x})^a + 1} \]

*Requires Credit Scoring for SAS Enterprise Miner Add-on License
MODEL ASSESSMENT

- Ensure Generalization
  - Prevent over fitting
- Champion / Challenger
  - Training and monitoring
- Profiler to compare and contrast competing models using Statistical and ROI metrics.
- Group processing for multiple targets and segments.
- Estimate deployment performance
  - Acquire target measures
OPERATIONALIZE MODELS

- Optimized score code and data transformations for real-time or batch scoring:
  - SAS, C, Java or PMML for deployment into applications
  - In-database functions (Teradata, DB2, Oracle, Netezza, Aster Data, Pivotal, SAP HANA, and Hadoop)*
  - Scoring task in a SAS Data Management job flow
  - Scoring task in SAS Enterprise Guide

*Requires separate license of SAS Scoring Accelerator.
SELF-SERVICE PREDICTIVE ANALYTICS

- Easy-to-use, 3 clicks, automated approach.
- Models In Minutes or Hours, Not Weeks.
- Entire data mining process is generated behind-the-scenes.
- Not a black box! Models can be modified in SAS Enterprise Miner.
### COMPLETE LIST OF SAS® ENTERPRISE MINER™ NODES

**SAMPLE**
- Append
- Data Partition
- File Import
- Filter
- Merge
- Sample
- Input Data

**MODEL**
- Tree
- Regression
- Neural Networks
- Squares
- Regression
- Ensemble
- Induction
- Boosting
- MBR
- Model Import
- **T-S** Data Prep
- **T-S** Dimension Reduction
- **T-S** Decomp.
- **T-S** Similarity
- **T-S** Exponential Smoothing
- Incremental Response
- Survival Analysis
- Credit Scoring**
- TS Correlation
- HP Explore
- HP Impute
- HP Regression
- HP Transform
- HP Variable Selection
- HP Neural Networks
- HP Forest
- HP Decision Tree
- HP Data Partition
- HP GLM
- HP Cluster
- HP Principal Components

**ASSESS**
- Cutoff
- Decisions
- Model Comparison
- Score
- Segment Profile

**UTILITY**
- Control Point
- End Groups
- Start Groups
- Open Source Integration
- Reporter
- Score Code Export
- Metadata
- SAS Code Ext Demo
- Save Data
- Register Metadata

- All of these “HP*” nodes are automatically multithreaded, spreading processing across the cores on your machines.
- All of these procedures are documented for use outside of the SAS Enterprise Miner interface.

*HP = high-performance. **Requires Credit Scoring for SAS Enterprise Miner Add-on License.
SAS Enterprise Miner

- DESKTOP or SINGLE SERVER (Traditional)
- SAS GRID MANAGER (On-premise Grid)
- SAS HIGH-PERFORMANCE DATA MINING (In-memory)

SAS Model Manager

SAS Scoring Accelerator (In-database)
Gartner defines advanced analytics as, "the analysis of all kinds of data using sophisticated quantitative methods (for example, statistics, descriptive and predictive data mining, simulation and optimization) to produce insights that traditional approaches to business intelligence (BI) — such as query and reporting — are unlikely to discover."
ONEBEACON

BUSINESS GOALS

- Price insurance to improve bottom line
- Choose policies to underwrite
- Select claims for investigation vs. fast resolution

SOLUTION

- SAS® Enterprise Miner

RESULTS

- Loss ratio up by 2 to 4 points
- Operational projects see 10 times ROI
- Successful move into hard-to-price specialty lines

“The models that we use all built with SAS give us a competitive advantage.”

Read the full story
BUSINESS ISSUES

- Long wait time for predictive modeling jobs because of capacity constraints and inefficient use of computing resources.
- Ineffective allocation of server capacity – some underutilized, others not used enough; lack of flexibility in reassigning resources when needed; and unnecessary transfer of data from different locations.

SOLUTIONS

- SAS® Grid Computing
- SAS® Enterprise Guide®
- SAS® Enterprise Miner™

RESULTS

- Deliver better service levels where SAS applications are guaranteed to be available, resources are provisioned based on business needs, and jobs are prioritized based on user needs and policies/rules.
- Improved access to data and faster processing spares time to do more in-depth analytics, find new opportunities and become more productive.
- IT gained flexibility to manage different analytic workloads and expand capacity without disruption.

“SAS® Grid Manager increases our analytic processing power by allowing us to put all our resources in a grid environment and better manage the different work cycles.”

Sterling Green
Vice President
Business Intelligence, Delivery Services, Enterprise Data and Integration

Read the full story
ScottishPower

BUSINESS GOALS
• Manage financial risk of customer defaulting on electric or gas account by improving credit risk scores.
• Integrate more data from third parties to enhance scoring model.
• Make process more efficient and cost-effective by prioritizing accounts for specialized treatment.

SOLUTION
• SAS® Analytics

RESULTS
• Provided robust and timely credit risk scores for 5.3 million electric and gas customers, updated weekly
• Embedded risk score within sales and marketing systems
• Reduced “reminder” mailings by 43 percent.
• Increased ability to protect the business from customer debt

"It only takes about 20 minutes to run risk scores across our entire domestic base, which we simply couldn't do before."

Duncan Bain
Risk Analytics Manager
ScottishPower

Read the full story
Justifying marketing campaign costs is easier now that the company can accurately track data on prior campaign costs and profits. Results from SAS make decisions rational and rational decisions make money.”

Arti Ots
Chief Marketing Automation

BUSINESS ISSUE

• Increased competitive pressures due to higher churn rates following market deregulation

SOLUTION

• SAS® Marketing Automation
• SAS® Digital Marketing
• SAS® Enterprise Miner™

RESULTS/BENEFITS

• A 2-1 ratio of return on its campaign investments
• Increased its ARPU by 9%
• Cut churn by 10%
• Reduced marketing budget by 30%-40%
• Achieved twice the result of previous marketing efforts
KEY BENEFITS

- Modern workbench to solve variety of problems
- Gain accurate insights with confidence for different types of users
- Quickly and intuitively derive Insights and improve outcomes
- Ease model deployment and scoring process

SAS® ENTERPRISE MINER™
• SAS Enterprise Miner Product Web Page
• SAS Enterprise Miner Technical Documentation
• SAS Enterprise Miner Online Community (Please Join!)
Online. Everyday.

“I always learn something new when I post in this forum. Just what I needed…”

SAS Data Mining Community
SAS WORK PLACEMENT PROGRAM
Who is SAS?  
Industries, Customers  
What does SAS actually do & what’s possible?  
The Challenges  
What is analytical talent?  
SAS Work Placement Program
THE SAS CORPORATE OBJECTIVE IS TO BE

"the first company people call when they need to solve complex business problems"

Dr. Jim Goodnight – CEO, SAS Inc.
WHERE HAS SAS COME FROM?

Pronounced “sass”

It once stood for “statistical analysis systems”

SAS in the USA was ranked no.1 in 2011 out of 100 best places to work and has been in the top 10 ever since!

Founded in 1976 out of NC State

Originally designed to analyse agricultural data

Now has 75,000+ customers worldwide across a variety of different industries

Surpassed 3 Billion $ in 2013

SAS ranks in top 10 of Fortune’s 100 Best Workplaces for Millennials

Renowned workplace culture lands SAS at No. 9

Cary, NC (Jan 23, 2015)

SAS named among 2015 Best Places to Work for Recent Grads

Workplace culture and training opportunities reward and motivate young professionals

Cary, NC (May 04, 2015)
Why choose a career in analytics?

3 MILLION BIG DATA JOBS
... will need to be filled in the US by 2018.

THE SKILLS GAP
40% projected growth in global data generated each year.

85% + of Fortune 500 organizations will be unable to effectively exploit big data by 2015.
Demand for deep analytical talent in the U.S. could be 50% to 60% greater than it’s projected supply by 2018.

SOURCE: Supply and Demand of Deep Analytical Talent by 2018, Thousand People

2008 Employment: 150,000
Graduates with Deep Analytical Talent: 180,000
Others *: 30,000
2018 Supply: 300,000
Talent Gap: 140,000-190,000
2018 Projected Demand: 440,000-490,000

What is analytic talent?
WHAT DO ANALYTICS PROFESSIONALS DO?

Analytics Function % of Week (Mean)

- Broad range, cross-industry, size and circumstances
- Average, not specific!
- There is not a single “type” of analytics professional

Talent Analytics and International Institute for Analytics (2013) report of N=302 “deep-dive” analytics professionals.
THE CHALLENGE

JOB BOARDS

2,518 jobs matching your search criteria

Active filters: SAS, All Australia

631 jobs matching your search criteria

Active filters: SAS, All New Zealand
INDUSTRY  ANALYTICS HITS THE BOARDROOM

Job title – e.g., accountant, sales
Keywords or company name

Search Advice ▼ Enter keywords

Data Scientist: The Sexiest Job of the 21st Century
by Thomas H. Davenport and D.J. Patil

Job Skills That Lead to Bigger Paychecks
By Charyn Pfeuffer, PayScale.com

Skill No. 1: SAS
- What It Is: Pronounced "say," SAS is a software suite that can perform a variety of tasks, including business forecasting, project management and statistical analysis.
- How to Get It: Read books, review online forums or ask questions on SAS discussion forum.
- Job with Skill: Data analyst.

Related
Executive Summary
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WHAT ARE SAS & SAS CUSTOMERS LOOKING FOR??

Common areas of study:
- Comp Science, IT or Engineering
- Information Systems
- Statistics
- Operations Research
- Actuarial
- Applied Mathematics
- Business

Solid foundations in the below areas are desirable:
- Mathematics
- Statistics
- Computer Programming
- Soft Skills

MOTIVATION

ATTITUDE

INTERNSHIP / JOB OPPORTUNITY

APPLICATION
**WHAT IS INVOLVED?**

*SAS Work Placement Program* links students with SAS skills to SAS customers. Placement duration is between 6 and 12 weeks and *normally* takes place between November and February.

Unique opportunity to put your theoretical study into practice and get a foot in the door of the corporate world.

This experience enhances students professional development and future career opportunities, while also providing links to jobs upon completion.

We encourage host employers to offer payment or scholarships, however some opportunities may be unpaid.

“We’re committed to building the next generation of data-savvy professionals.... Anyone who wants a good-paying, recession-proof skill set should consider a career in analytics.” – Dr. Goodnight
All students wishing to participate in the SAS Work Placement Program must submit a detailed application to us by **30\textsuperscript{th} September**.

- Click on the below link & search for ‘Work Placement’ after **1\textsuperscript{st} August**  
  
  **APPLY HERE!**

- On the SAS job board include your **cover letter**, **CV** and **academic transcript**.

We will make every effort to find a suitable placement, however application does not guarantee a position.

We attempt to set up interviews and finalise details of placements prior to exams however sometimes this is not possible.
SAS AUSTRALIA & NEW ZEALAND

- SAS support site – http://support.sas.com
- Global Forum papers, discussion forums
- Usage notes, documentations, lots more
- www.sasCommunity.org
  - A collaborative online community for SAS® users worldwide.
- SAS Professionals www.sasprofessionals.net
- Social Network of SAS users
- Other social networks:
Free SAS® software. An interactive, online community. Superior training and documentation. And the analytical skills you need to secure your future.
For any queries or concerns regarding the Academic Program, please contact:

Academic Program Coordinator
Phone: +61 2 9428 0571
Email: academic@oz.sas.com
Website: http://www.sas.com/australia/academic
THANK YOU