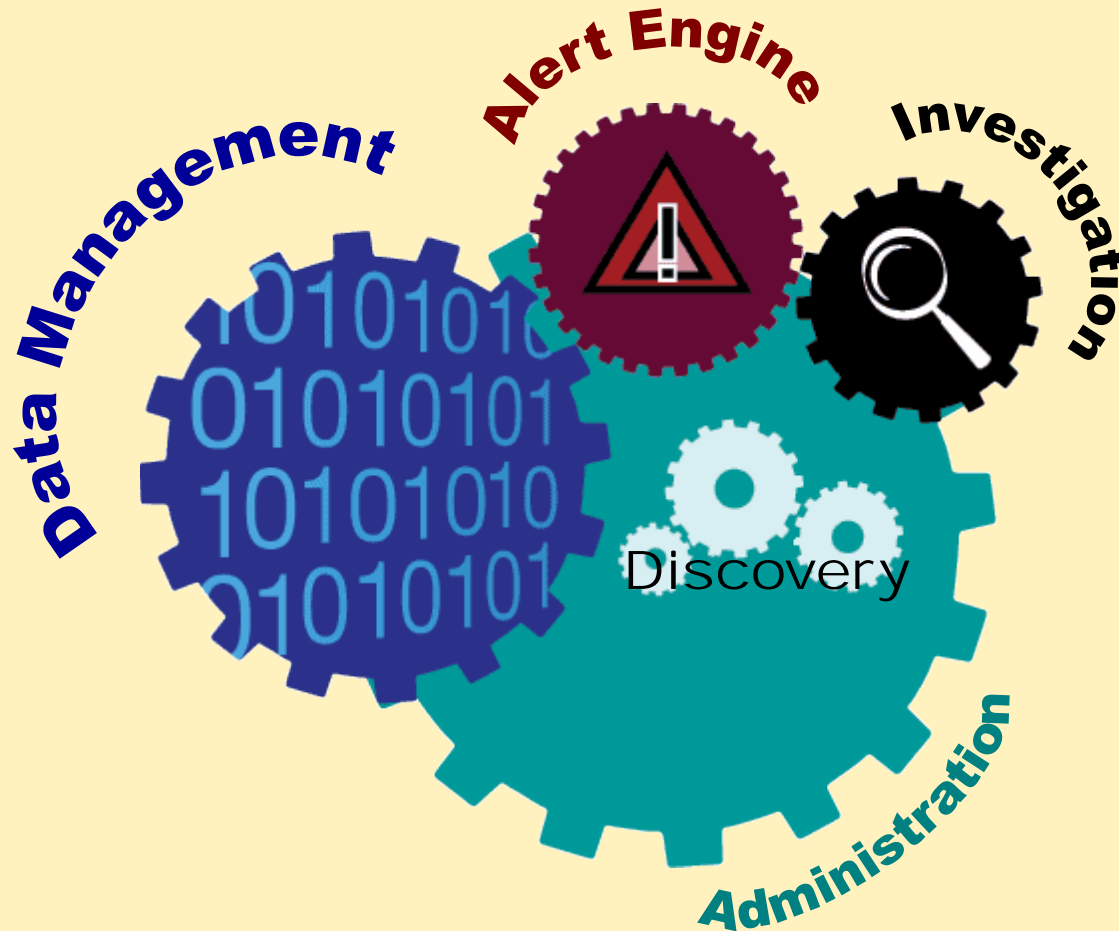




Anti-Money Laundering Solution

Dr. Viterbo H. Berberena González
Data Mining Solutions Director

Functional Solution Overview

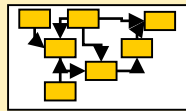


Data Management

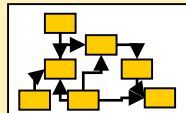
- Open Metadata-Driven Architecture
- Robust Data Access Engines
- Comprehensive Transformation and Load Suite
- Physical Data Model



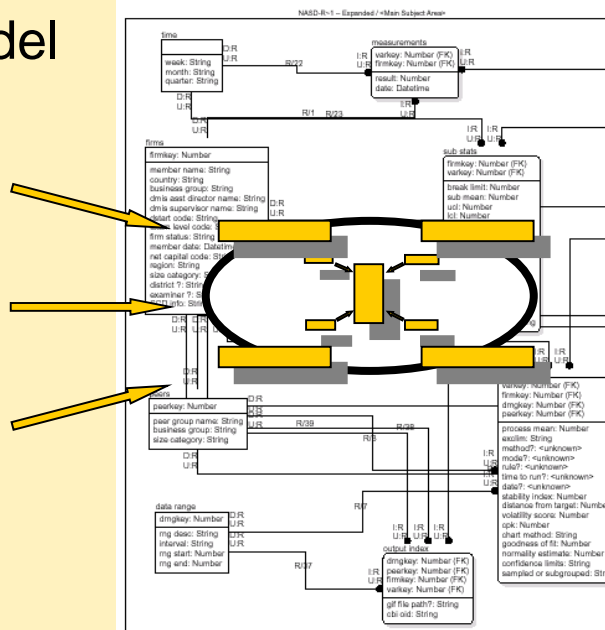
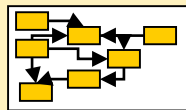
Customer & Account



Transactions



Product



ETL Process

The screenshot displays the SAS Data Warehouse Environment interface. On the left, a tree view shows the structure of the 'SAS Anti-Money Laundering Soln v1.0' data repository. The tree includes a 'BIS Data Repository' folder containing 'AML Data Schema' (with sub-items: Dimension Tables, Fact Tables, Views (Used by Rules)), 'Knowledge Center Configuration' (with sub-items: CATEGORIES, PARMS, RULE DEFINITION), 'Knowledge Center Schema' (with sub-items: ALERT TRANSACTION DETAIL, ALERTS, DAILY, MONTHLY, RULE SUPPRESION), and a 'Temporary Data Group'. Below these are 'Customer Source Data' (with sub-items: cust1, cust2) and 'OFAC Data'.

The right pane shows the 'General' properties for the selected 'SAS Anti-Money Laundering Soln v1.0' environment:

- DESCRIPTION: [Empty text box]
- TYPE: Warehouse Environment
- METADATA CREATED: 02DEC2002:15:36:20
- METADATA MODIFIED: 02DEC2002:15:36:37
- METADATA ID: A0000001

The taskbar at the bottom shows several open windows: 'Output - (Untitled)', 'Log - (Untitled)', 'Program Editor - (Untitl...', 'SAS/Warehouse Admin...', 'Editor - Untitled1', and 'Data Warehouse En...'. The system tray shows the path 'c:\my demos\aml'.



AML Alert Engine

Monitoring Approaches

RULES

Set up rules to filter suspicious transactions

Examples:

Amount > \$20,000
AND
country in hotlist

=

Suitable for **KNOWN** patterns

PROFILING & PEER GROUPING

Build statistical profiles of behavior

Examples:

Mean, standard, deviation, quartiles, distributions

=

Suitable for **UNKNOWN** patterns

ADVANCED ANALYTICS

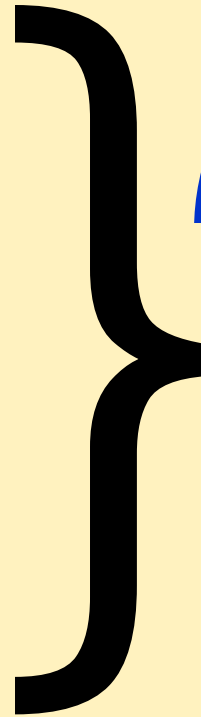
Knowledge discovery in databases, decision trees and machine learning

Examples:

Neural networks
Fuzzy logic
Link analysis

=

Suitable for **COMPLEX** patterns

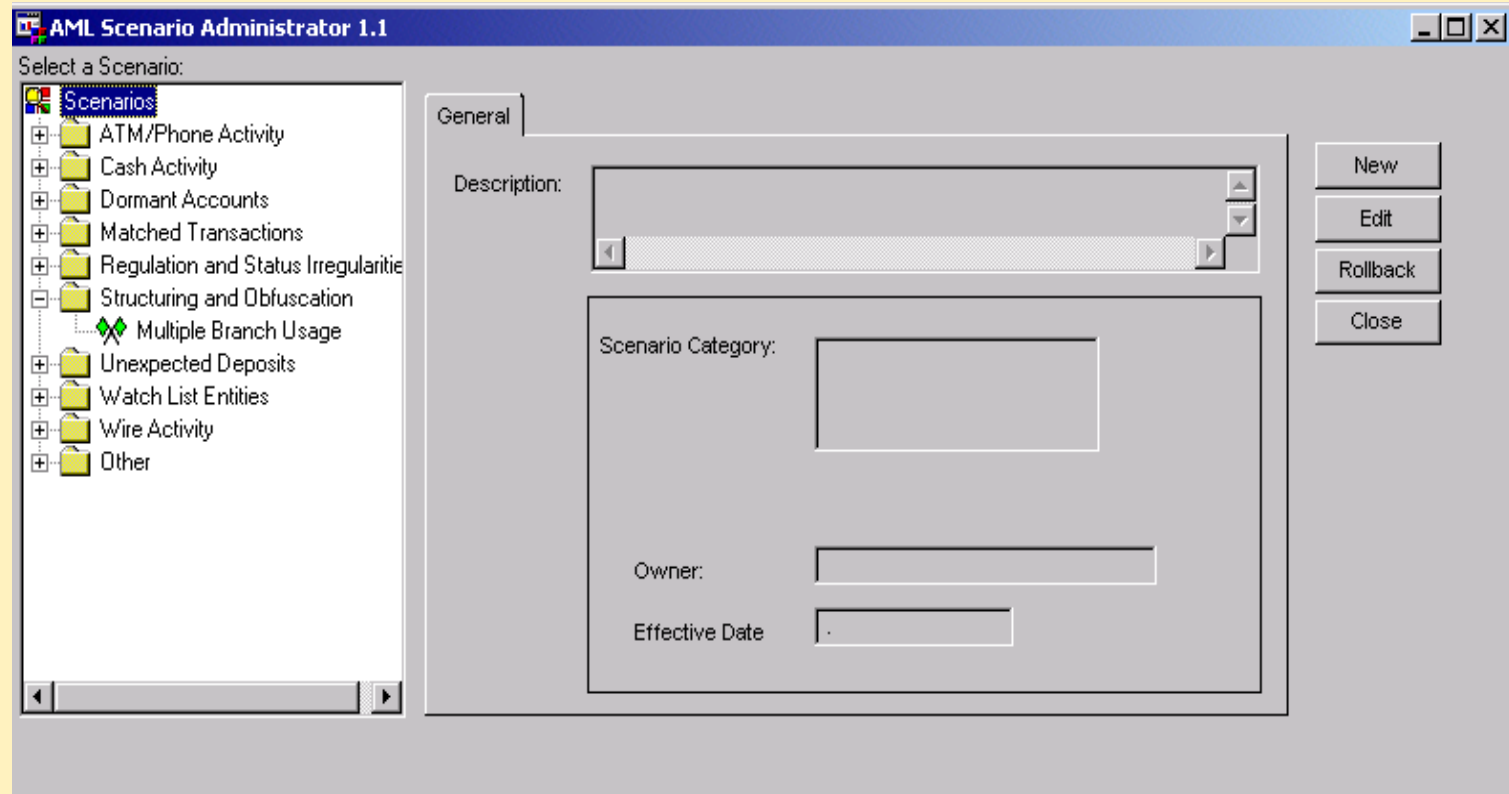


HYBRID

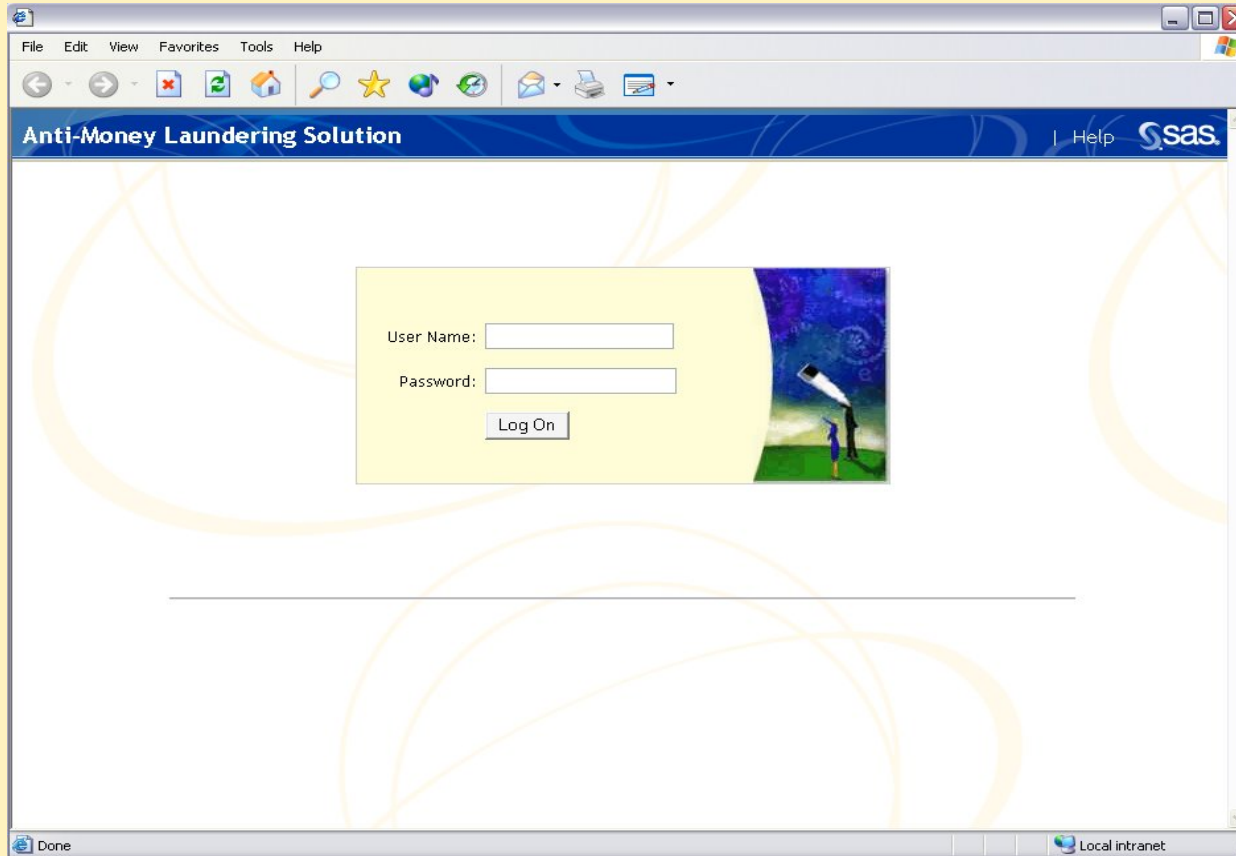
Combination of All existing approaches



Alert Engine



Investigation System



Regulatory Reporting

SAS Anti-Money Laundering - SAR Section 1 of 5 - Reporting Financial Institution Information - Microsoft Internet Explorer prov

File Edit View Favorites Tools Help

Address Outlook\MyF5\AML\AMLPrototype\20030210\AMLPrototype\sarsection1.html Go

SAS Anti-Money Laundering Help sas

Summary Alerts Query Reports **SAR Filing**

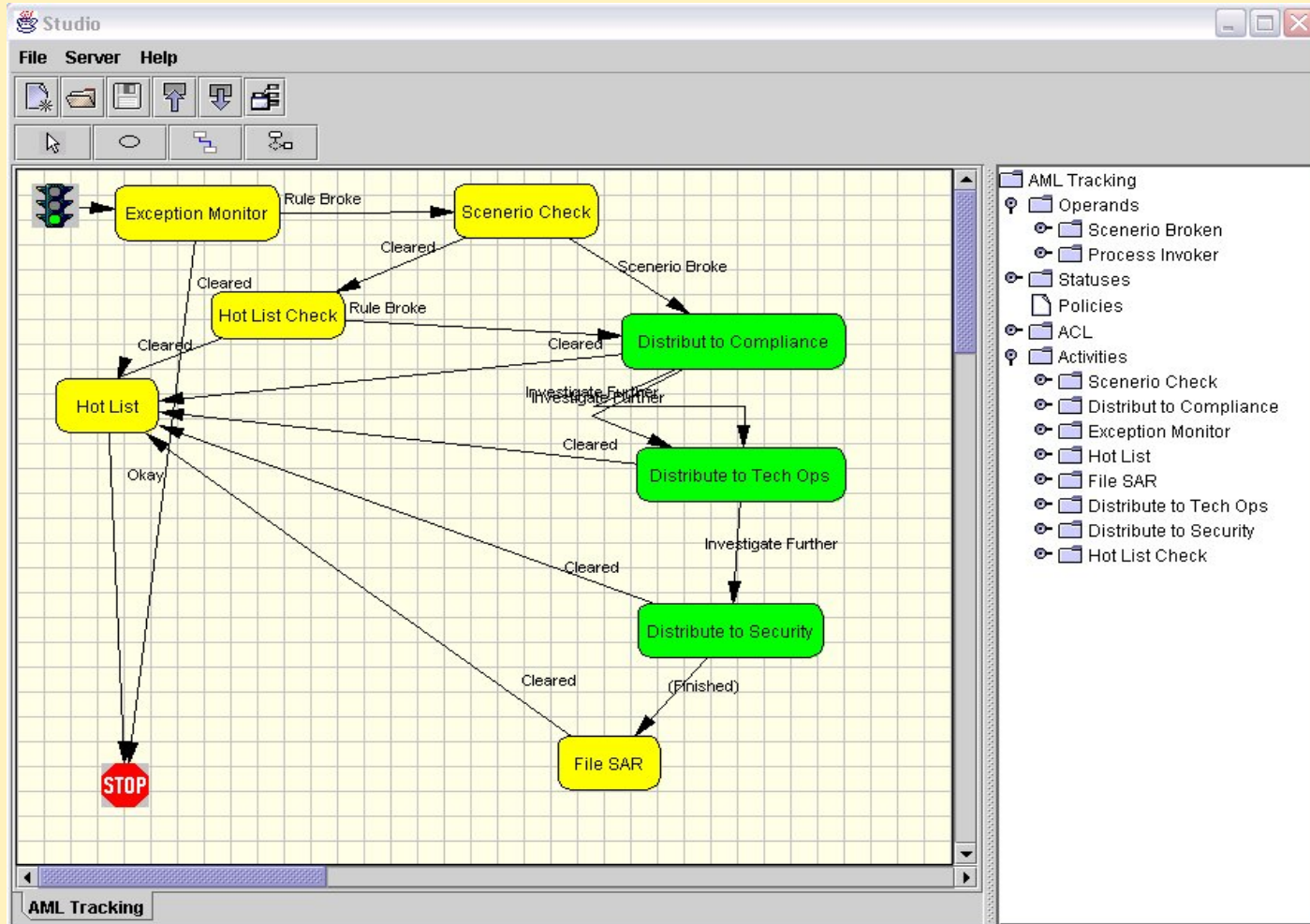
1 **Institution** 2 Suspect 3 Suspicious Activity 4 Contact 5 Explanation File SAR

2 Name of Financial Institution <input type="text"/>		3 EIN <input type="text"/>	
4 Address of Financial Institution <input type="text"/>		5 Primary Federal Regulator a <input type="checkbox"/> Federal Reserve d <input type="checkbox"/> OCC b <input type="checkbox"/> FDIC e <input type="checkbox"/> OTS c <input type="checkbox"/> NCUA	
6 City <input type="text"/>	7 State <input type="text"/>	8 Zip Code <input type="text"/>	9 Address of Branch Office(s) where activity occurred <input type="text"/> <input type="checkbox"/> Multiple Branches (include information in narrative, Part V)
10 City <input type="text"/>	11 State <input type="text"/>	12 Zip Code <input type="text"/>	13 If institution closed, date closed <input type="text"/>
14 Account number(s) affected, if any a <input type="text"/> <input type="radio"/> Yes <input type="radio"/> No		14 Account number(s) affected, if any c <input type="text"/> <input type="radio"/> Yes <input type="radio"/> No	
b <input type="text"/> <input type="radio"/> Yes <input type="radio"/> No		d <input type="text"/> <input type="radio"/> Yes <input type="radio"/> No	

Done My Computer



Workflow Definition



User Administration

SAS AML - Alert Summary - Microsoft Internet Explorer provided by SAS

File Edit View Favorites Tools Help

Address <http://4008:7001/sasaml/do/UserAdmin> Go Links

SAS Anti-Money Laundering Log off | Help

Alerts Query Reports **Administration**

User/Group Rules

User Definition

Add User Modify User Delete User

Name:

Group Membership:

Route Options:

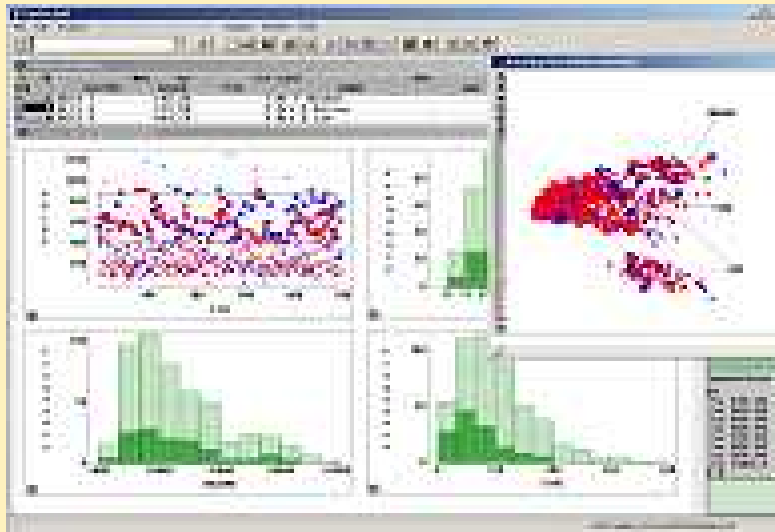
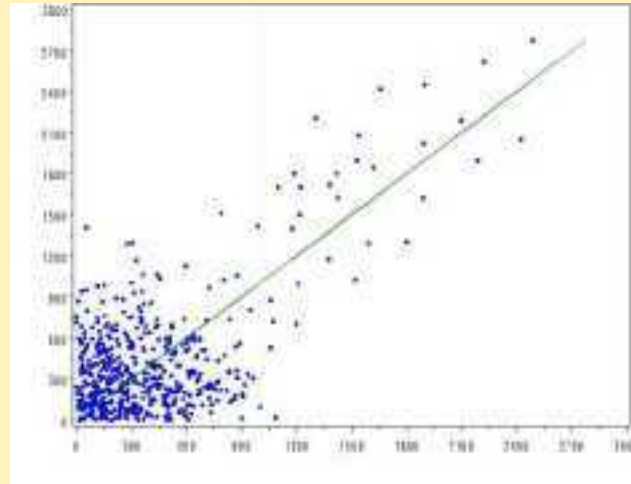
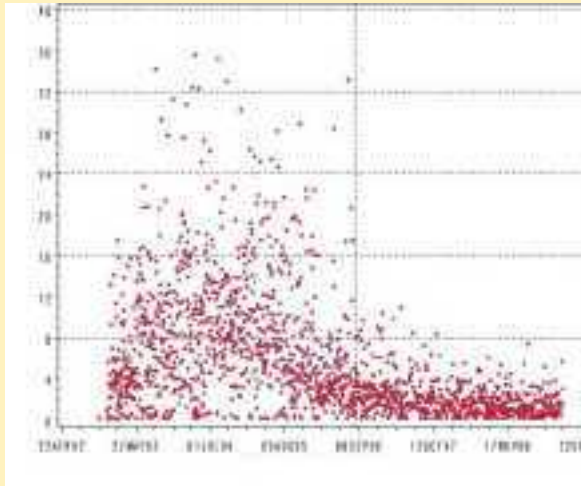
Permissions: Close Alert
 Route Alert
 File SAR

Save Cancel

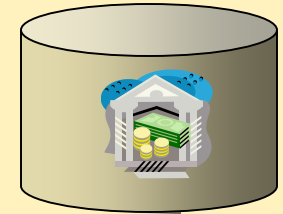
Local intranet



Discovery - Visualization



Data Repository



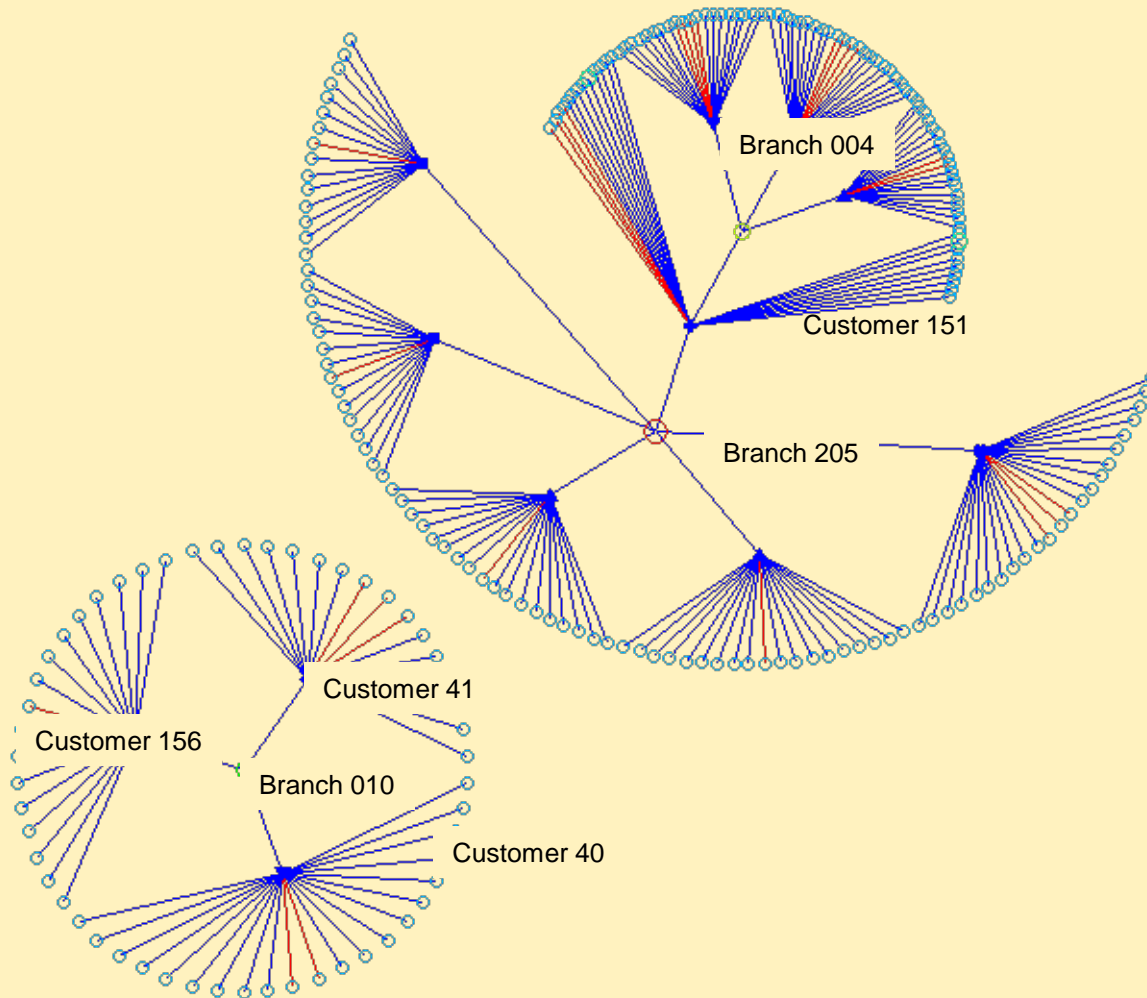
Data



Analysis



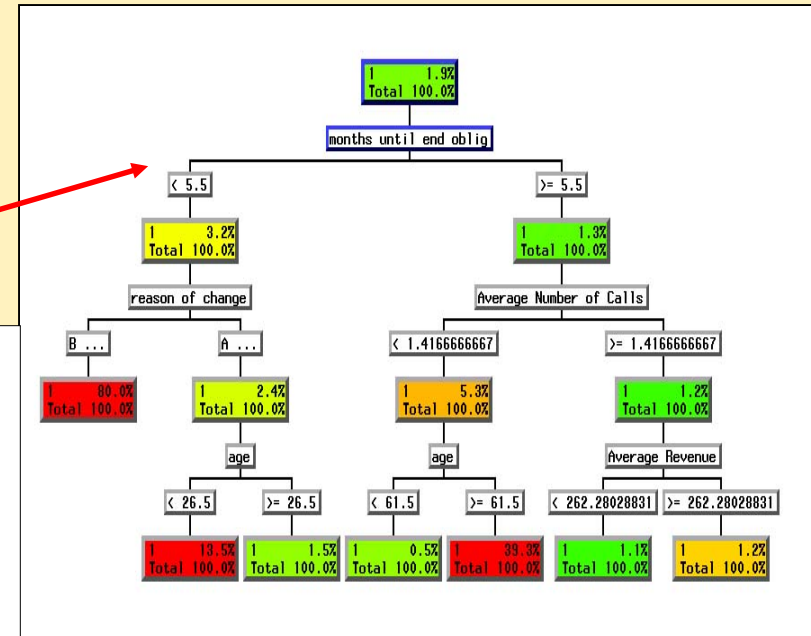
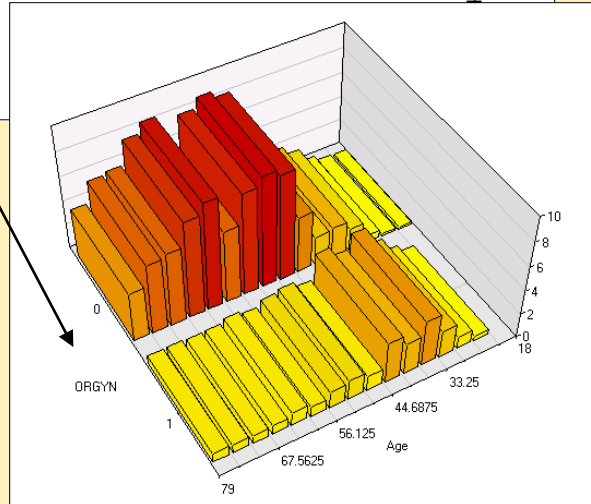
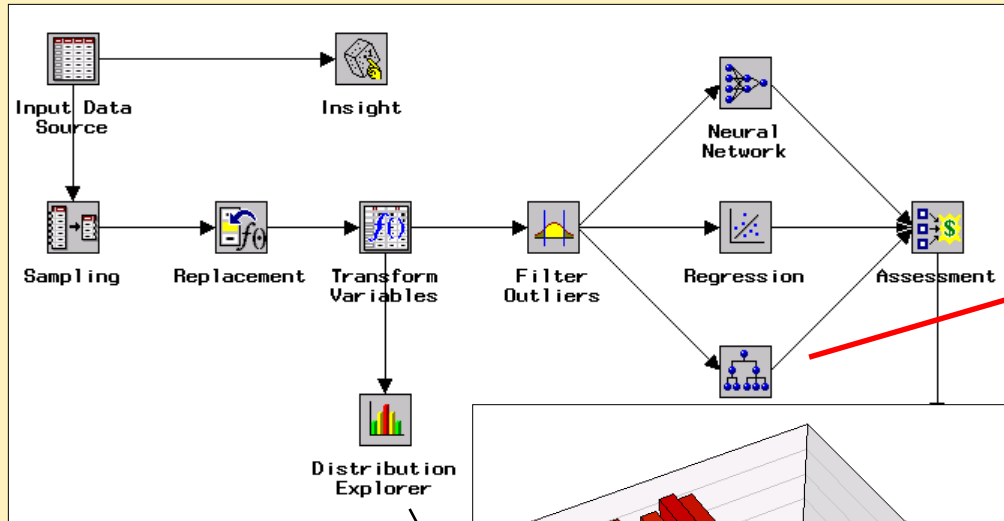
Discovery – Link Analysis



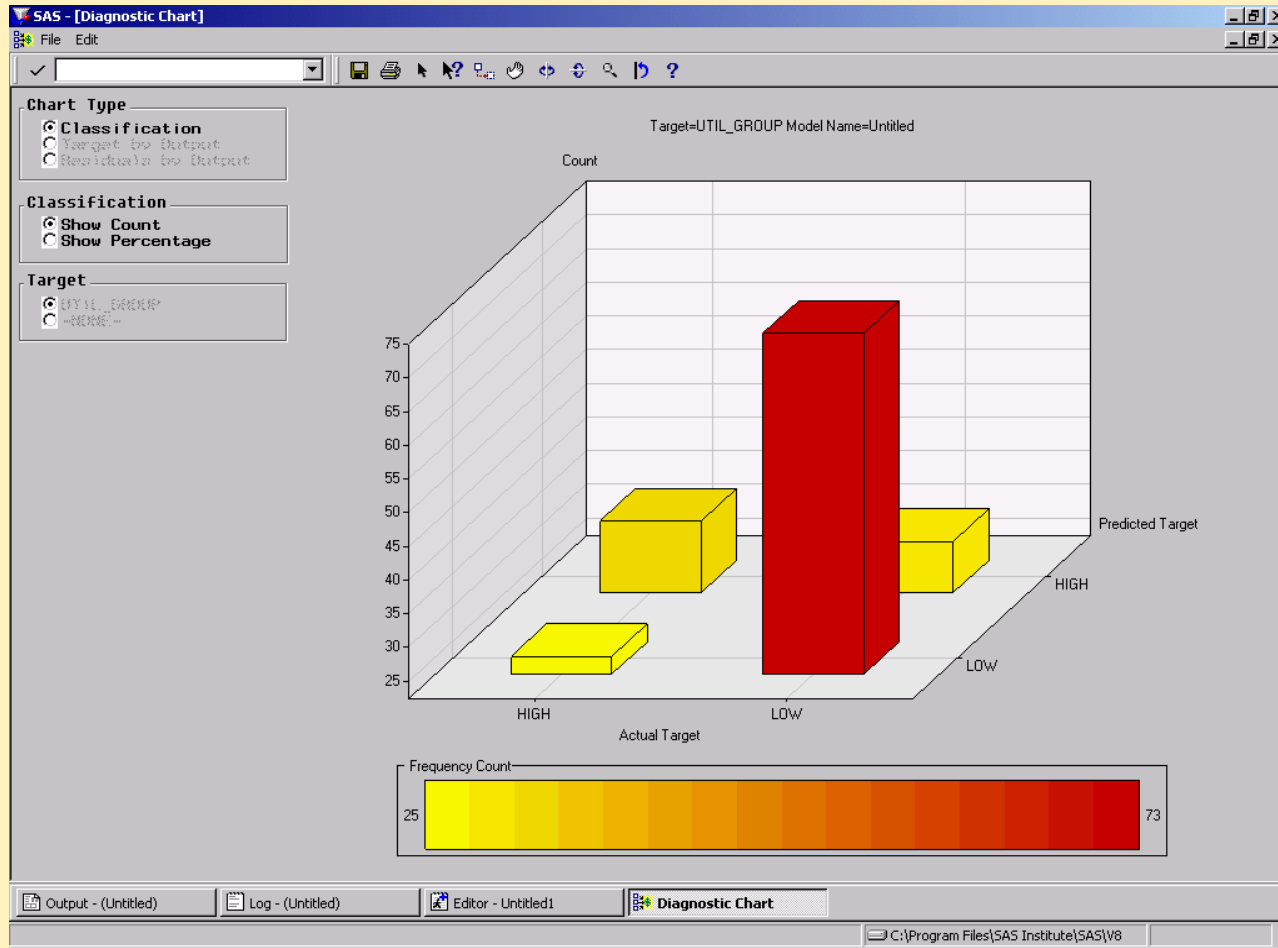
Discovery – Clustering and Profiling

The screenshot displays the SAS Clustering software interface. The main window is titled "Results - Clustering" and contains several tabs: Partition, Variables, Distances, Profiles, Statistics, CCC Plot, Code, Log, Output, and Notes. The "Partition" tab is active, showing a pie chart titled "Clusters for Transformed Train" with four segments labeled 1, 2, 3, and 4. A legend below the pie chart shows a color gradient from yellow to red, labeled "Maximum Distance from Cluster Seed". To the right of the pie chart is a dot plot titled "Input" showing the distribution of four variables: "No of transactions per day", "Monthly balance", "Time between transaction", and "Value of transaction per day". The x-axis is labeled "Normalized Mean" and ranges from 0.2 to 1.0. The legend for the dot plot shows two categories: "_ALL" (blue) and "1" (red).

Discovery – Predictive Analysis



Discovery – Predictive Analysis



The Confidence Challenge

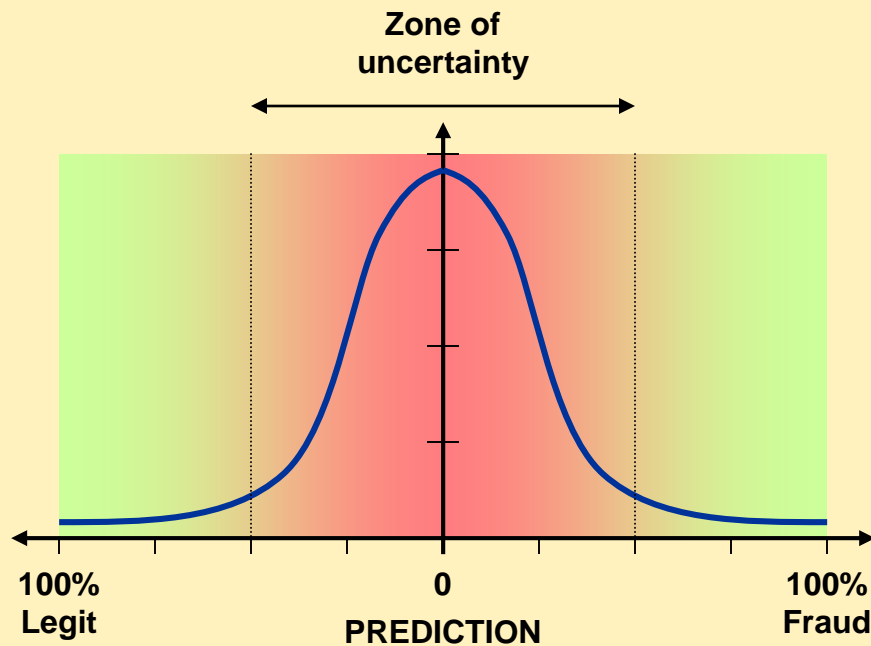
		Prediction	
		Non-Crime	Crime
Actual	Non-Crime	Correct Dismissal 	False Detection
	Crime	False Dismissal 	Correct Detection

		Prediction	
		Non-Crime	Crime
Actual	Non-Crime	Correct Dismissal 	False Detection
	Crime	False Dismissal 	Correct Detection

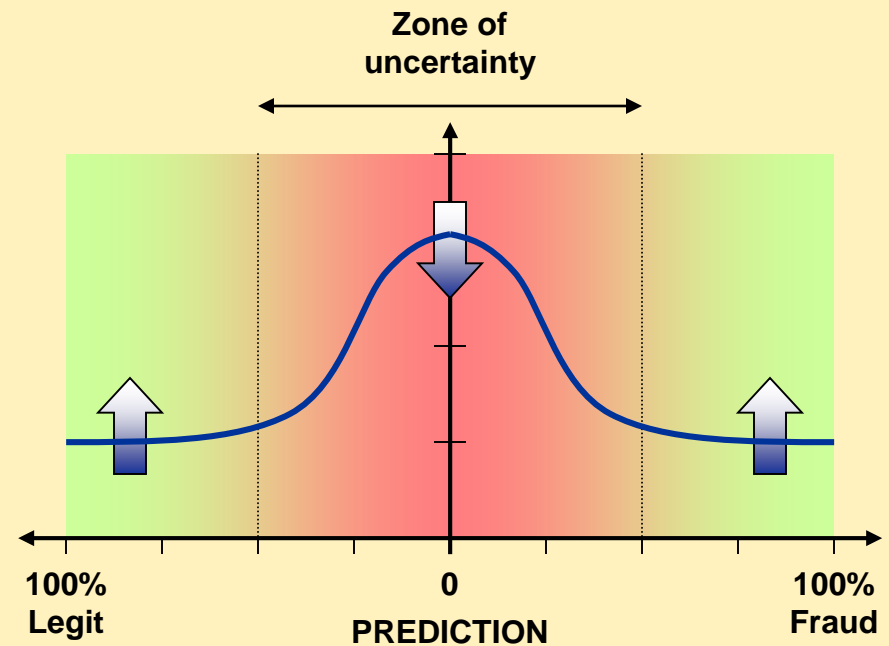
		Prediction	
		Non-Crime	Crime
Actual	Non-Crime	Correct Dismissal 	False Detection
	Crime	False Dismissal 	Correct Detection

The Effect of Increasing Prediction Accuracy

- Standard model – most predictions are ‘uncertain’



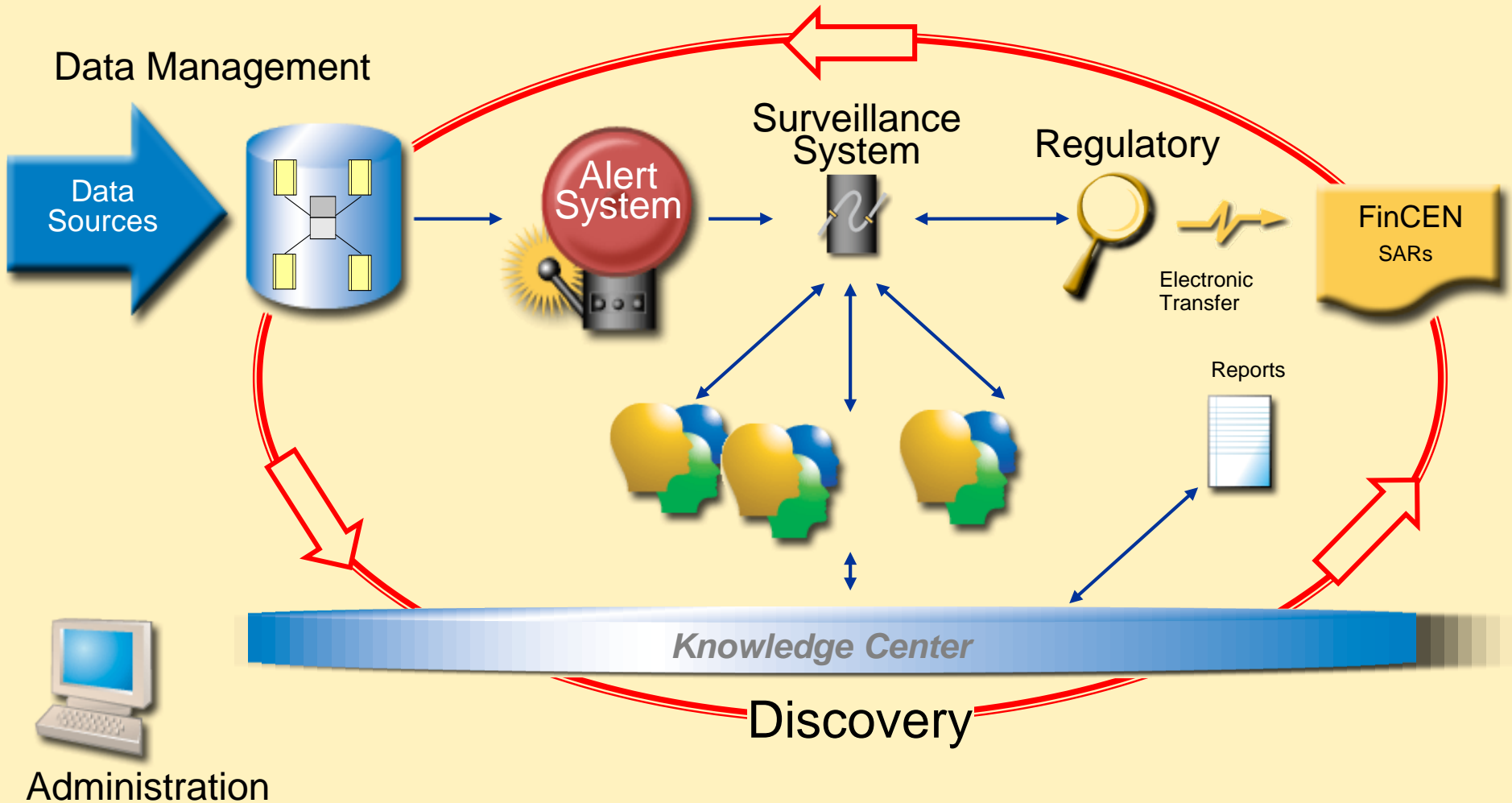
- Enhanced model – more predictions are at extremes of probability curve



Implementation Plan

ID	Task Name	Duration week:	Month 1				Month 2				Month 3				Month 4				Month 5				Month 6			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Kickoff	2d	★	▲																						
2	Solution Review	4w	★	▲	▲	▲																				
3	Requirements & Gap Analysis	2w			★	▲																				
4	Design & Implement	12w					★	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲						
5	Test	2w																	★	▲						
6	Migrate to Production	2w																		★	▲					
7	Train	2w																			★	▲				
8	Close-Out	1w																					★	▲		
9	Total Duration	24w	★	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	

AML Process



Why SAS AML?

- **Comprehensiveness / Breadth**
 - Data Management
 - Alerts Engine
 - Investigation
- **Sophistication / Depth**
 - Variety of analytic techniques
- **Scalability**
- **Flexibility**
 - Open Rules Environment / Rules Consortium
- **Expertise**
 - Acquired data mining talent with vast experience
 - Domain expertise
- **Financially Strong Organization**

Why SAS: 26 Years Building Relationships with Customers

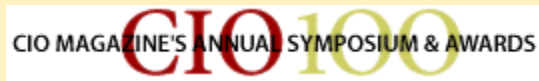


- Who?
 - 90% of Fortune 500
 - 97 of Forbes Super 100
- How many?
 - 39,500 customer sites
 - More than 3.5 million users
- Where?
 - 117 countries

Why SAS: Award-Winning Software and Services

Technology

Solutions



InformationWeek 500



ECOMWORLD



Network Computing COMPANIES TO WATCH

Why SAS Financial Services

- More than 25 years of experience in the financial services industry.
- We work with over 2,000 Financial Institutions worldwide, including 97 percent of FORTUNE Global 500 banks.
- Recognized as the provider of the most reliable and proven analytical expertise in the world.

What solutions we are working on

- Anti-Money Laundering
- Fraud/Risk (6σ control & detection)
- Credit Card Retention
- Churn Analysis
- Customer Attrition
- Credit Scoring
- Cash (ATM) Optimization

SAS AML Recognition

- Named in 'The Best Anti-Money-Laundering Technology' by Forbes.com
- Recognized as a "Vendor to Watch" by Celent Communications



[5/14/03: "Banks Taken To Cleaners In Terrorist Search" \(forbes.com\)](http://forbes.com)

[5/5/03: "COMPLIANCE: Age of Tech's Transparency" \(banktechnews.com\)](http://banktechnews.com)

[3/14/03: "Banks dig in...to stop money laundering" \(banktechnews.com\)](http://banktechnews.com)

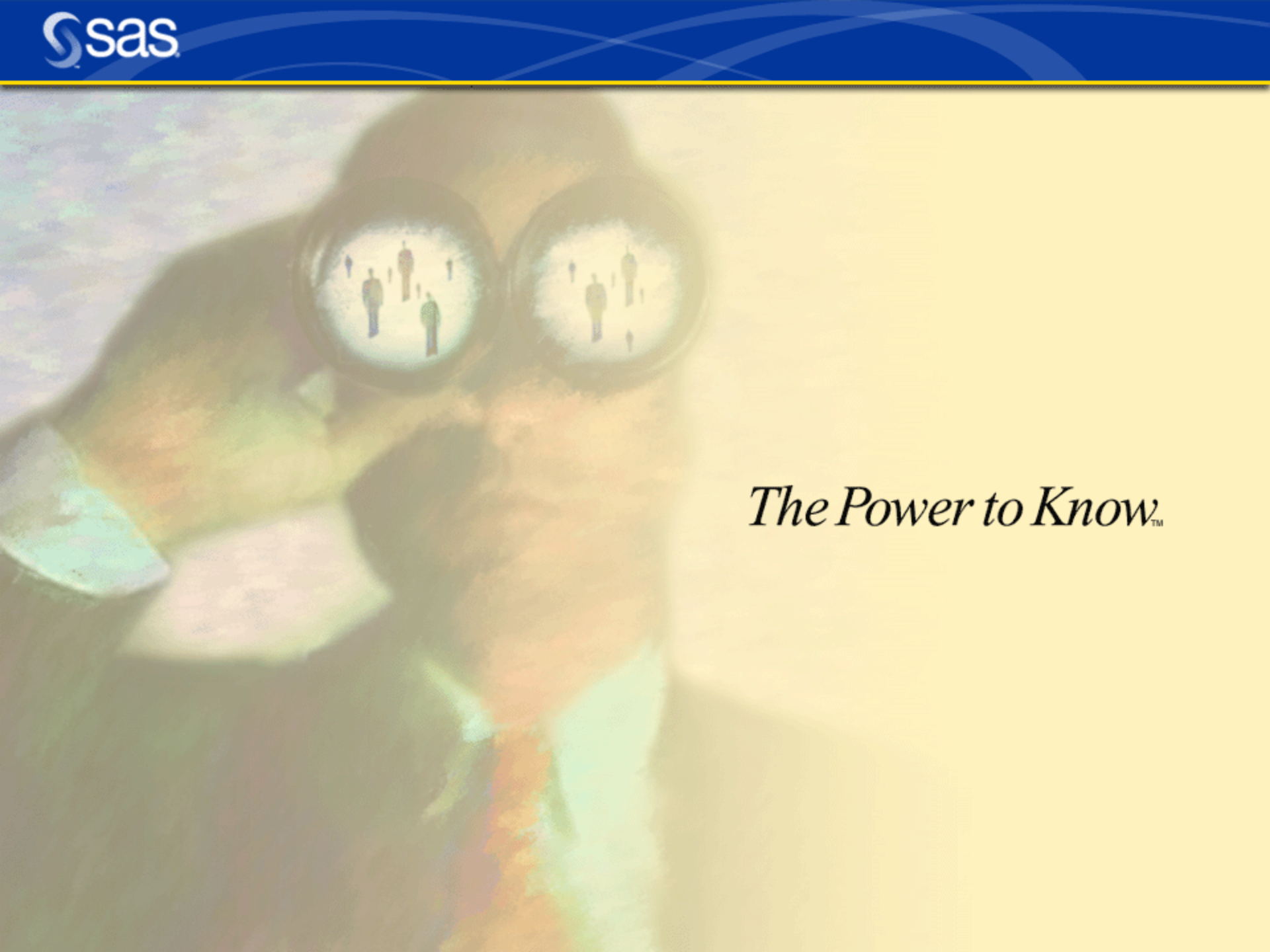
[2/24/03: "...Companies Want to Turn Regulatory Burden into..." \(informationweek.com\)](http://informationweek.com)

[2/14/03: "The USA PATRIOT Act: A Long-Term Financial Services Strategy " \(banktech.com\)](http://banktech.com)

[10/01/02: "SAS Ready to Target Money Launderers" \(newsobserver.com\)](http://newsobserver.com)

“I've been very impressed with what SAS has to offer. It's not just a point solution for anti-money laundering. The technical capabilities of SAS in terms of the warehousing of the information and the analysis tools make it a strategic solution.”

Alan Yong
Research Director,
Aberdeen Group



The Power to Know™