

Oracle Data Mining for Real-time Analytics

NYOUG

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Agenda

- Introduction to Data Mining
- What is Real-time Analytics?
- Overview of Oracle Data Mining (ODM)
- Real-time Analytical Applications
- ODM demo

About me...

- Principal Analytical Consultant, Business Intelligence and Warehousing group at Oracle
- Oracle Certified Professional, DBA track, since 1998 – Oracle database version 7.3 onwards
- Worked in industry domain like Finance industry, Telecomm, Healthcare, Crime Detection project etc.
- Speaker in Oracle Open world (2003), IOUG/Collaborate (2005-06), NYOUG (June), IEEE conferences etc on Data Mining

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O V E R V I E W

Data Mining

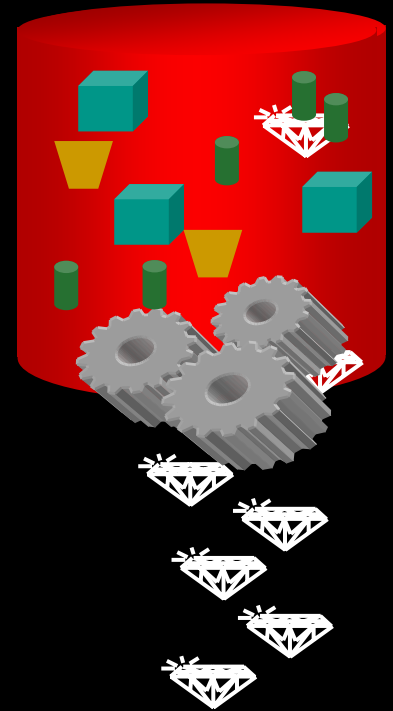
What is Data Mining?

Simply stated Data Mining refers to extracting or “mining” knowledge from large amount of data. The term is actually a misnomer, data mining should be more appropriately named “knowledge mining from the data”. Thus such a misnomer that carries both “data” and “mining” became popular choice. The larger meaning encapsulates a variety of techniques and methodologies that among other things include ‘cluster analysis’, ‘classification’, ‘association rules’: pattern recognition in the data.

- J. Han and M. Kamber

In other words...

- Process of sifting through massive amounts of data to find *hidden* patterns and discover *new* insights
- Data Mining can provide valuable results:
 - Identify factors more associated with a target attribute (*Attribute Importance*)
 - Predict individual behavior (*Classification*)
 - Find profiles of targeted people or items (*Decision Trees*)
 - Segment a population (*Clustering*)
 - Determine important relationships with the population (*Associations*)
 - Find fraud or rare “events” (*Anomaly Detection*)



The Amazon Example (Association Rules)

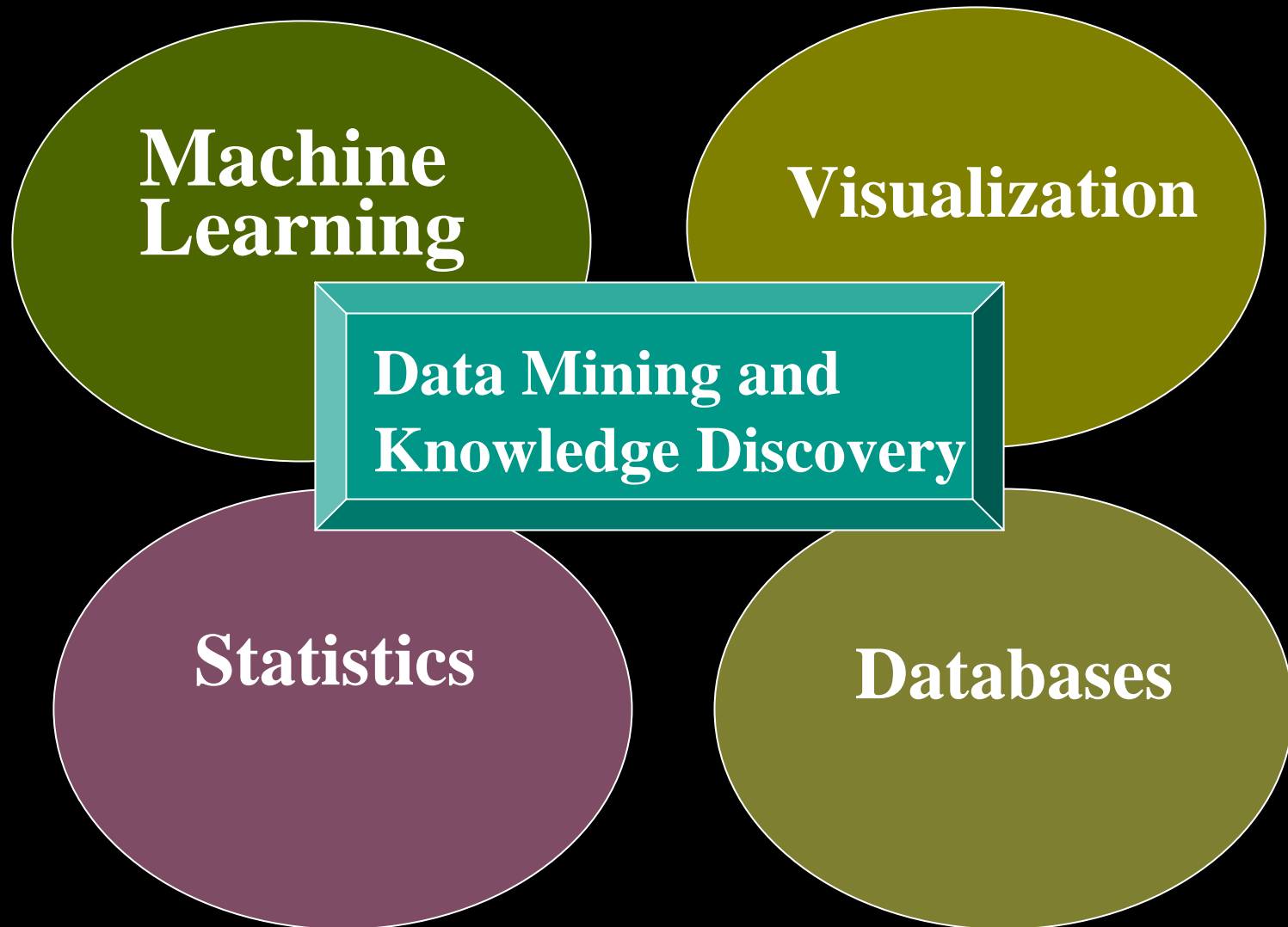
The screenshot shows the Amazon.com Shopping Cart page in Microsoft Internet Explorer. The address bar displays the URL: http://www.amazon.com/gp/cart/view.html/ref=rsl_mainw_zeroE/102-0283260-1240955. The page features a section titled "Your Recent History" with a link to "Learn more". Below this, there are four columns of information:

- Recently Viewed Products:** A book titled "Introduction to Data Mining, (First Edition) by Pang-Ning Tan".
- Recently Viewed Categories:** A link to "Amazon.com".
- Recent Searches:** A link to "data mining".
- Customers who bought items in your Recent History also bought:** Two books are displayed: "Data Mining by Ian H. Witten" and "Data Mining by Jiawei Han".

Red arrows originate from a common point at the bottom center of the page and point to the book "Introduction to Data Mining" in the "Recently Viewed Products" column, and the two books in the "Customers who bought items in your Recent History also bought:" column. This illustrates the association rules derived from the data.

At the bottom left, there is a link: [View & edit Your Browsing History](#).

Related Fields



Statistics, Machine Learning and Data Mining

- Statistics:
 - more theory-based
 - more focused on testing hypotheses
- Machine learning
 - more heuristic
 - focused on improving performance of a learning agent
 - also looks at real-time learning and robotics – areas not part of data mining
- Data Mining and Knowledge Discovery
 - integrates theory and heuristics
 - focus on the entire process of knowledge discovery, including data cleaning, learning, and integration and visualization of results
- Distinctions are fuzzy

Business Intelligence

Query

and Reporting

OLAP

Data Mining

Extraction of
detailed and
roll up data

“Information”

**How is the
interest rate
changing in last
2 years?**

Summaries,
trends and
forecasts

“Analysis”

**What is the
average home
price** of the
condos, by
region, by year
of construction?

Knowledge discovery
of hidden patterns

“Insights & Prediction”

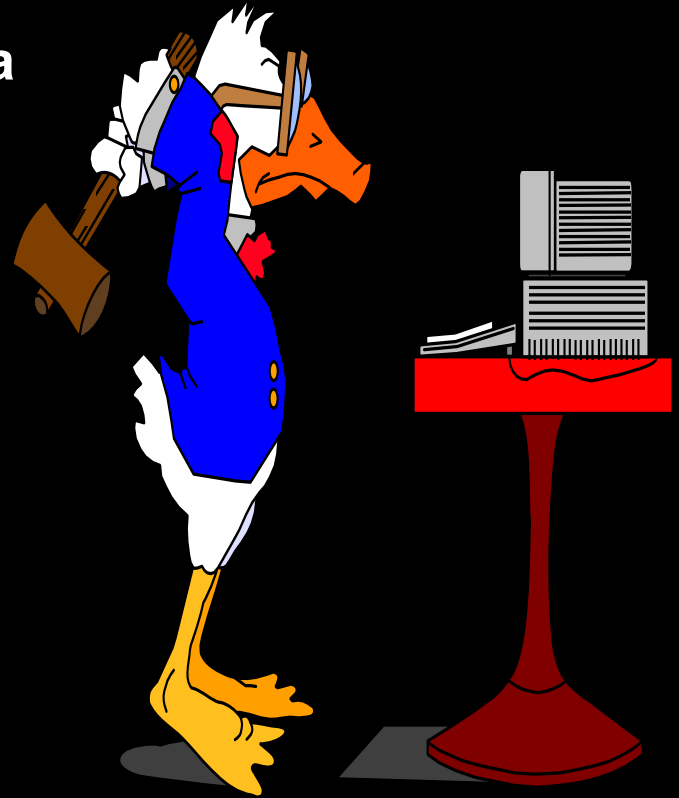
Who will re-
consolidate loans in
the next 6 months and
why?

Results of Data Mining Include:

- Forecasting what may happen in the future
- Classifying people or things into groups by recognizing patterns
- Clustering people or things into groups based on their attributes
- Associating what events are likely to occur together
- Sequencing what events are likely to lead to later events

Data mining is not

- Brute-force crunching of bulk data
- “Blind” application of algorithms
- Going to find relationships where none exist
- Presenting data in different ways
- A database intensive task
- A difficult to understand technology requiring an advanced degree in computer science



Data Mining Is



- A hot buzzword for a class of techniques that find patterns in data
- A user-centric, interactive process which leverages analysis technologies and computing power
- A group of techniques that find relationships that have not previously been discovered
- A relatively easy task that requires knowledge of the business problem/subject matter expertise

Other Industry Examples

Financial Services

- Combat attrition (churn)
- Fraud detection
- Loan default
- Identify selling opportunities

Database Marketing

- Buy product x
- More targeted & successful campaigns
- Identify cross-sell & up-sell opportunities

Telecommunications

- Identify customers likely to leave
- Target highest lifetime value customers
- Identify cross-sell opportunities

Insurance, Government

- Flag accounting anomalies (Sarbanes-Oxley)
- Reduce cost of investigating suspicious activity or false claims

Retail

- Loyalty programs
- Cross-sell
- Market-basket analysis
- Fraud detection

Life Sciences

- Find factors associated with healthy or unhealthy patients
- Discover gene and protein targets
- Identify leads for new drugs

What is Real-time Analytics?

- Real-time analytics is the use of, or the capacity to use, all available enterprise data and resources when they are needed. It consists of dynamic analysis, drawing inferences and reporting, based on data entered into a system up to the actual time of use.
- Real-time analytics is also known as real-time data analytics, real-time data integration, and real-time **business intelligence**.

Examples of Real Time Analytics

- Real-time analytics can be used in CRM (customer relations management) analytics, which includes all programming that analyzes data about an enterprise's customers and presents it so that better and quicker business decisions can be made.
- Another application is in scientific analysis such as the tracking of a hurricane's path, intensity, and wind field, with the intent of predicting these parameters hours or days in advance.

Data Mining Techniques(10g,10gR2)

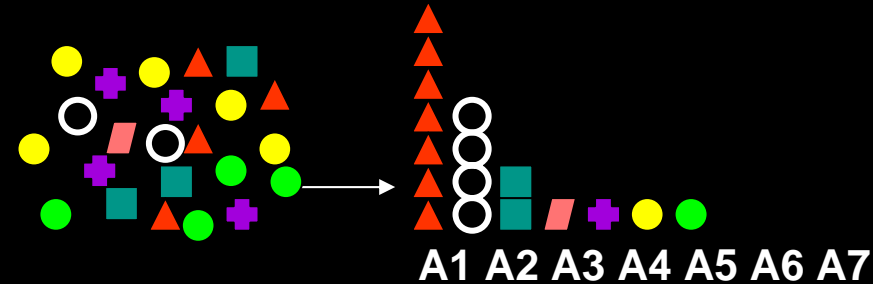
- Unsupervised (clustering)
 - K-means
 - O-Cluster
 - Non-Negative Matrix Factorization
 - Anomaly Detection
 - Hierarchical
 - Self Organizing maps
 - Expectation Maximization
 - Many More (pca,mds)
- Supervised (classification and prediction)
 - Adaptive Bayes Network (ABN)
 - Naïve Bayes
 - Support Vector Machine
 - Decision Trees
 - K – Nearest Neighbor
 - Neural Networks
 - Linear Discrimination (PL/SQL code generator)

Oracle Data Mining

Algorithms & Example Applications

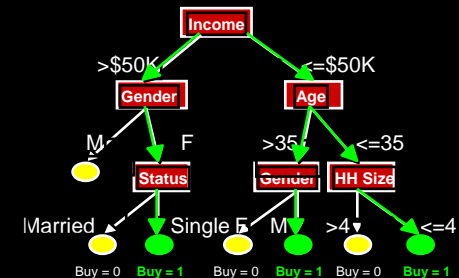
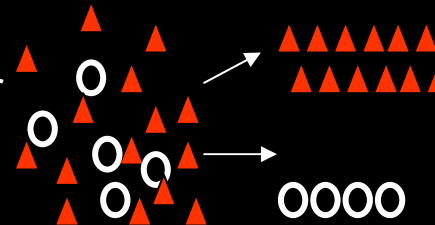
Attribute Importance

- Identify most influential attributes for a target attribute
 - Factors associated with high costs, responding to an offer, etc.



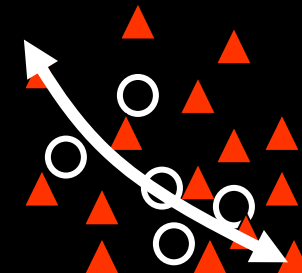
Classification and Prediction

- Predict customers most likely to:
 - Respond to a campaign or offer
 - Incur the highest costs
- Target your best customers
- Develop customer profiles



Regression

- Predict a numeric value
 - Predict a purchase amount or cost
 - Predict the value of a home

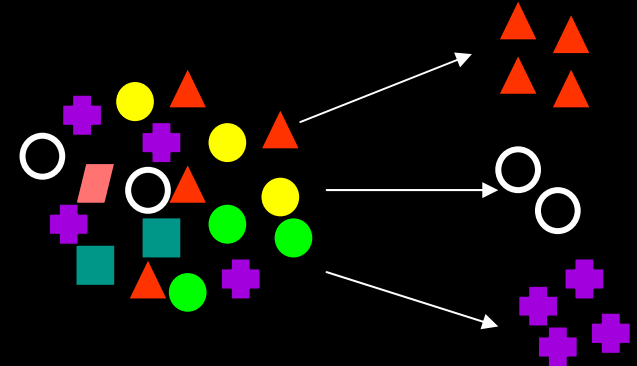


Oracle Data Mining

Algorithms & Example Applications

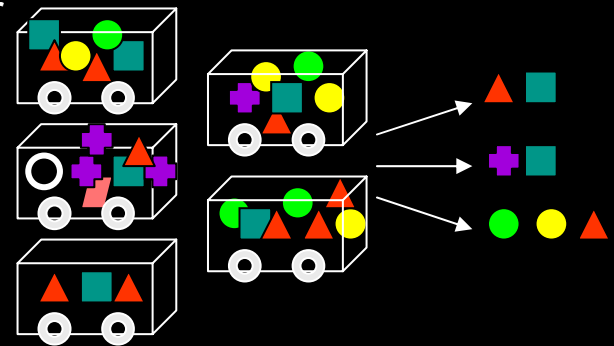
Clustering

- Find naturally occurring groups
 - Market segmentation
 - Find disease subgroups
 - Distinguish normal from non-normal behavior



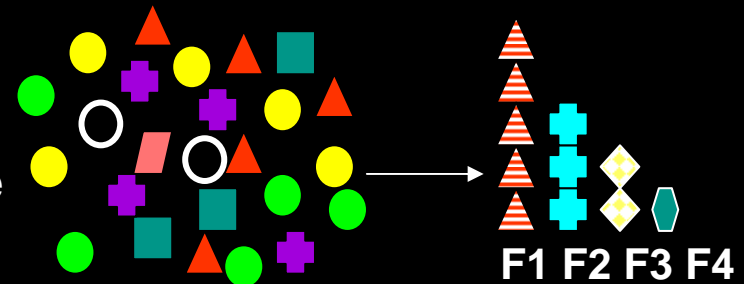
Association Rules

- Find co-occurring items in a market basket
 - Suggest product combinations
 - Design better item placement on shelves



Feature Extraction

- Reduce a large dataset into representative new attributes
 - Useful for clustering and text mining

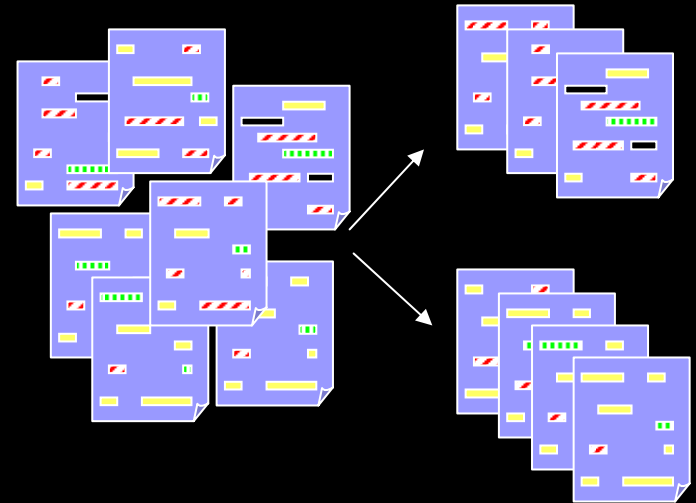


Oracle Data Mining

Algorithms & Example Applications

Text Mining

- Combine data and text for better models
 - Add unstructured text e.g. physician's notes to structured data e.g. age, weight, height, etc., to predict outcomes
- Classify and cluster documents
 - Combined with Oracle Text to develop advanced text mining applications e.g. Medline



BLAST

- Sequence matching and alignment
 - Find genes and proteins that are “similar”

ATGCAATGCCAGGATTCCA

CTGCAAGGCCAGGAAGTTCCA

ATGCGTTGCCAC...ATTCCA

GGC..TGCAATGCCAGGATGACCA

ATGCAATGTTAGGACCTCCA



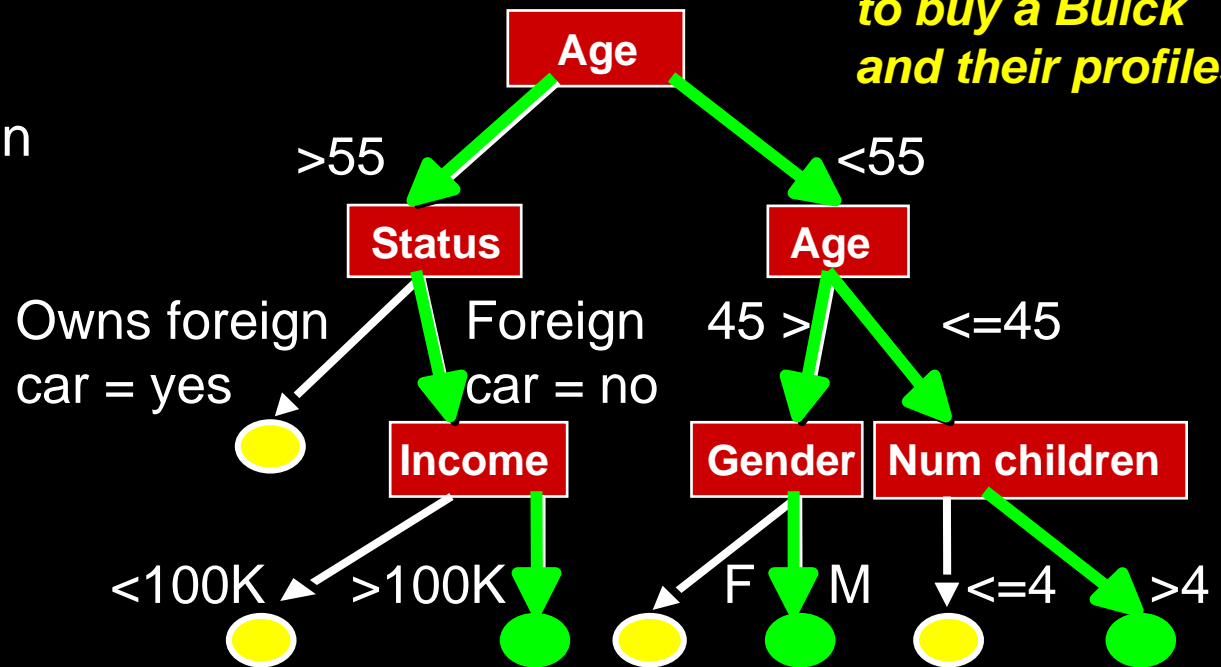
Oracle Data Mining 10g R2

Decision Trees

- Decision Trees

- Classification
- Prediction
- Customer "profiling"

Problem: Find customers likely to buy a Buick and their profiles



Buick = 0 **Buick = 1** Buick = 0 **Buick = 1** Buick = 0 **Buick = 1**

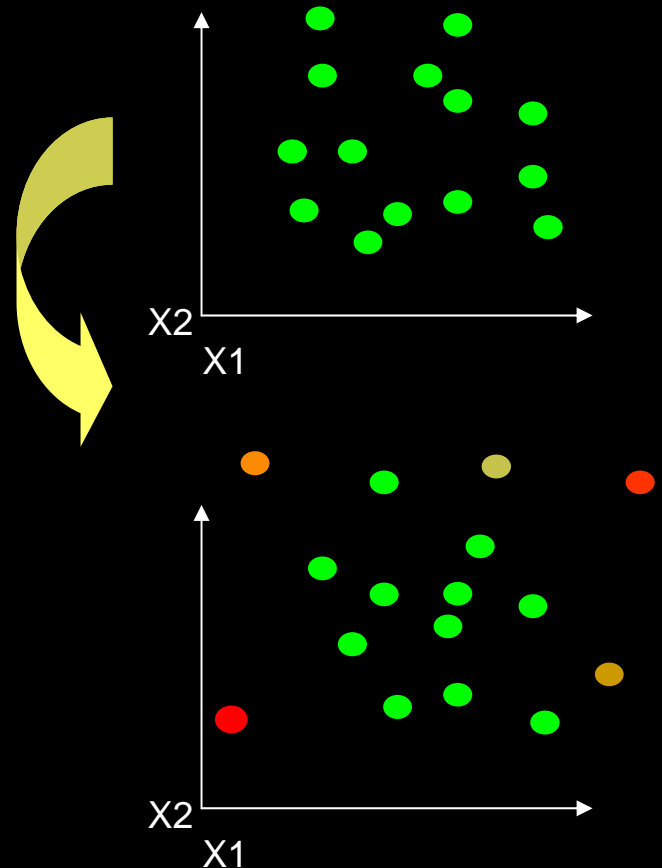
*IF (Age >55 AND Owns foreign car=no AND Income >100K...)
THEN P(Buy Buick=1) = .77 Support = 250*

Oracle Data Mining 10g R2

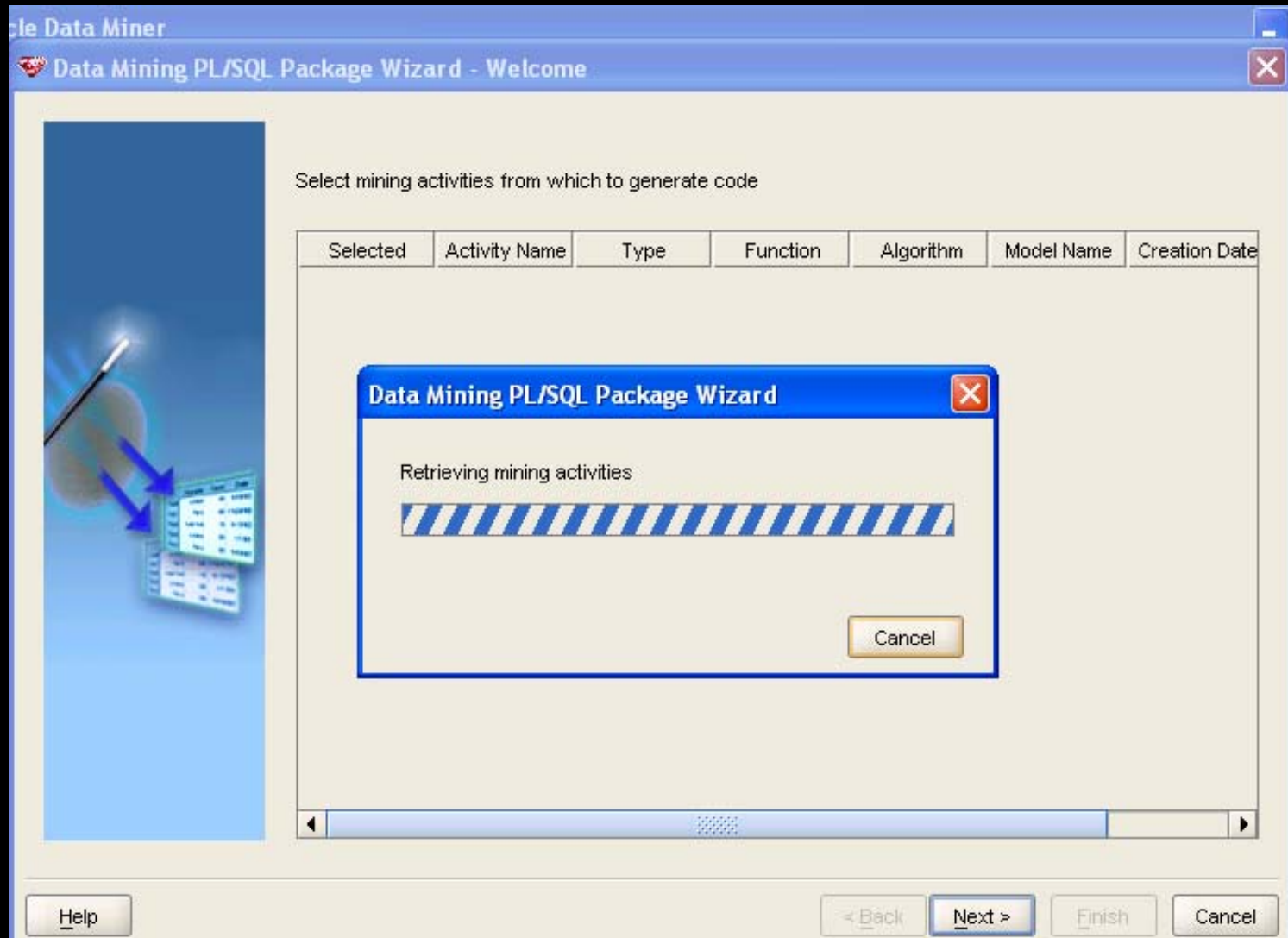
Anomaly Detection

- “One-Class” SVM Models
 - Fraud, noncompliance
 - Outlier detection
 - Network intrusion detection
 - Disease outbreaks
 - Rare events, true novelty

Problem: Detect rare cases



PL/SQL Code Generator



PL/SQL code sample

```
/* pl/sql code gen1 */
```

```
CREATE PACKAGE "DATAMININGACTIVITY1" AUTHID DEFINER AS  
  PROCEDURE "MINING_BUILD_TEST"(case_table IN VARCHAR2  
    DEFAULT "DMUSER1"."MINING_BUILD_TEXT",  
    additional_table_1 IN VARCHAR2 DEFAULT NULL,  
    model_name IN VARCHAR2 DEFAULT 'MINING_BUILD_75202_DT',  
    test_metric_name IN VARCHAR2 DEFAULT "DM4J$MINING_TEST",  
  END;  
/
```

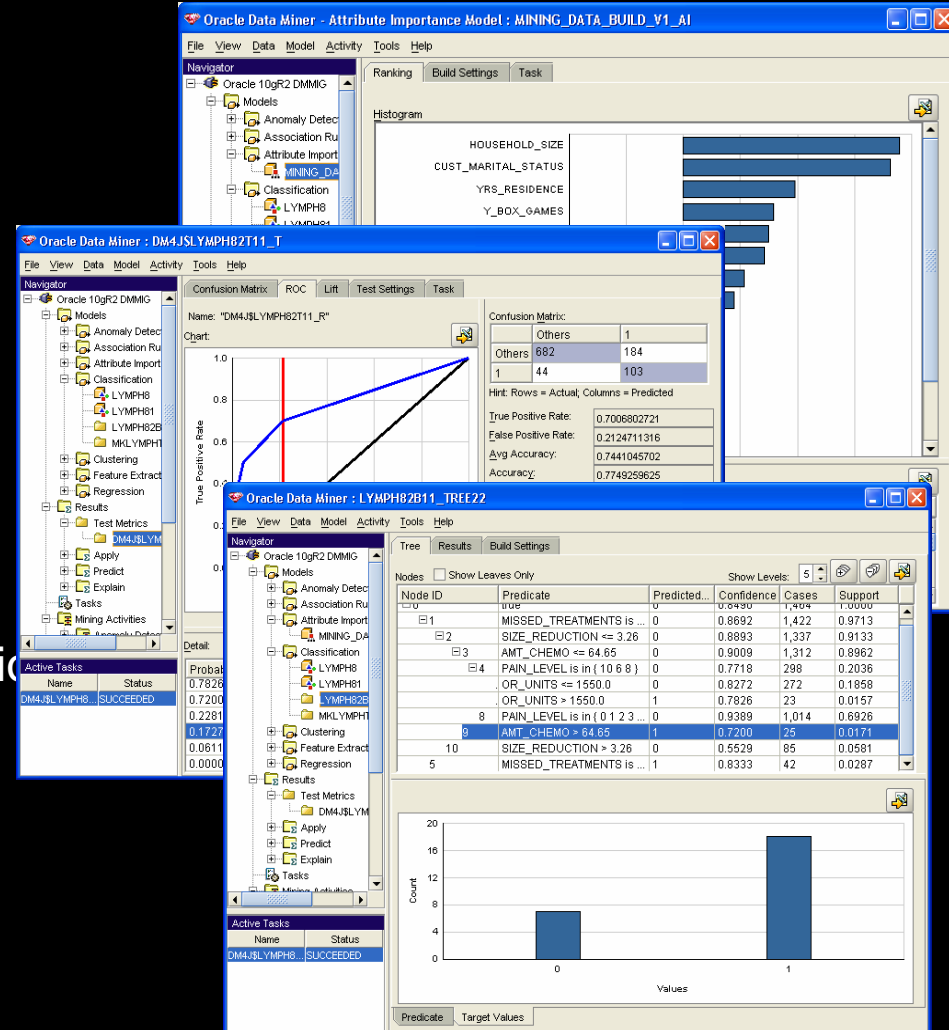
```
/* pl/sql code gen1 */
```

```
CREATE PACKAGE BODY "DATAMININGACTIVITY1" AS  
  c_long_sql_statement_length CONSTANT INTEGER := 32767;
```

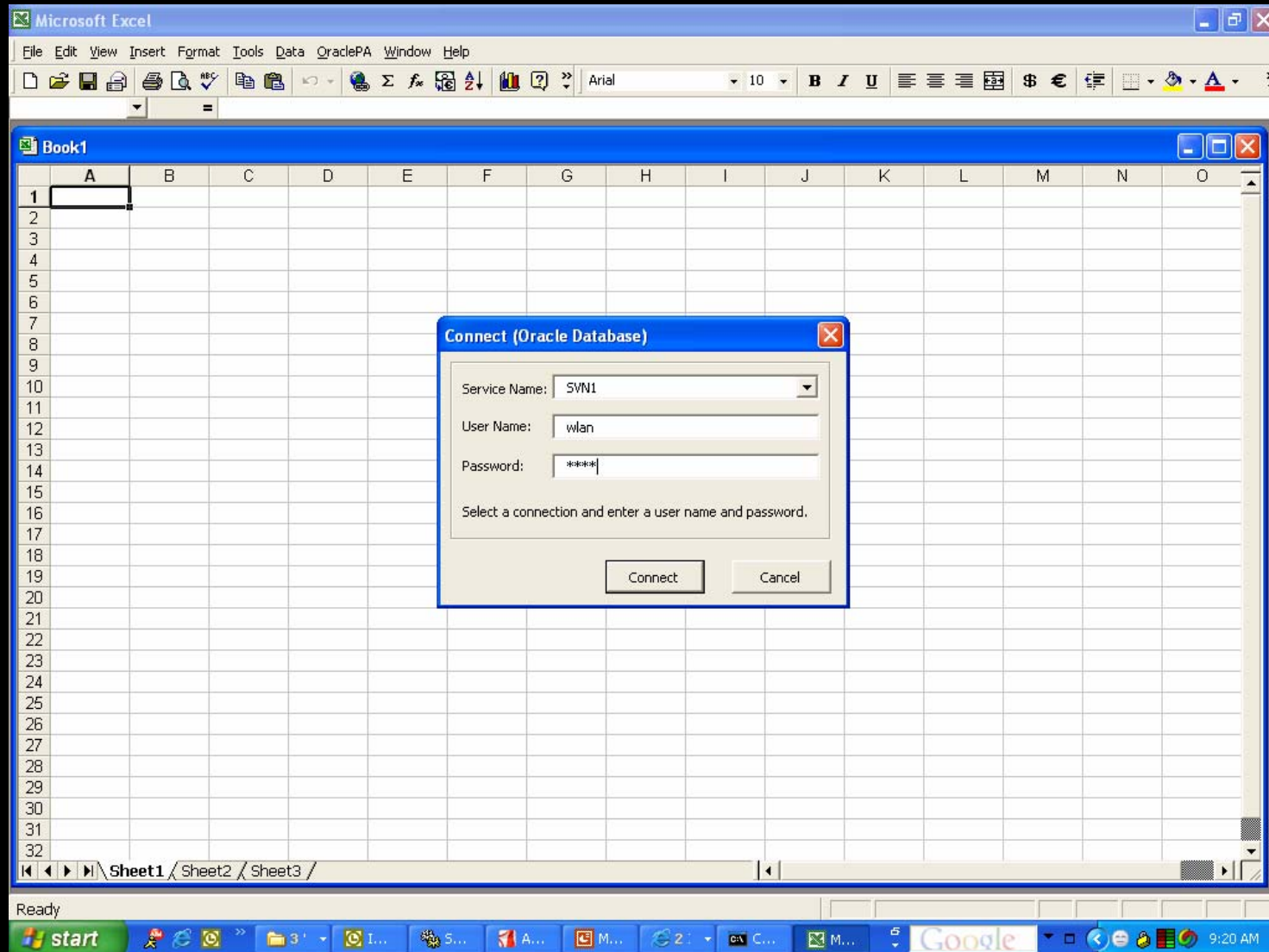
```
.....
```


Oracle Data Mining

- Oracle mining platform
 - PL/SQL API
 - Java API (JSR-73)
 - Oracle Data Miner (gui)
 - Spreadsheet Add-In
- Range of algorithms
 - Structured & unstructured data
 - Attribute importance
 - Classification, regression & prediction
 - Anomaly detection
 - Association rules
 - Clustering
 - Nonnegative matrix factorization
 - BLAST



Oracle Spreadsheet Add-In for Predictive Analytics



Oracle Data Miner Support for Text

- ODMr allows one column of the input table for a mining activity to be a text column. You can mine tables with two or more text columns using the ODM programmatic interfaces. If you have text columns only, you can use ODM or Oracle Text.
- Data Preparation for Text Columns - Any text columns must be properly prepared:
 - For the Oracle Data Mining programmatic interfaces, text columns must be converted to nested columns.
 - For an Oracle Data Miner Activity, the text column must be indexed. Oracle Data Miner automatically creates the index during the mining activity.
- Data | Transform | Text lets you prepare a text column for use with the Oracle Data Mining PL/SQL interface. The same transform allows you to do directly the processing done internally by the mining activity.

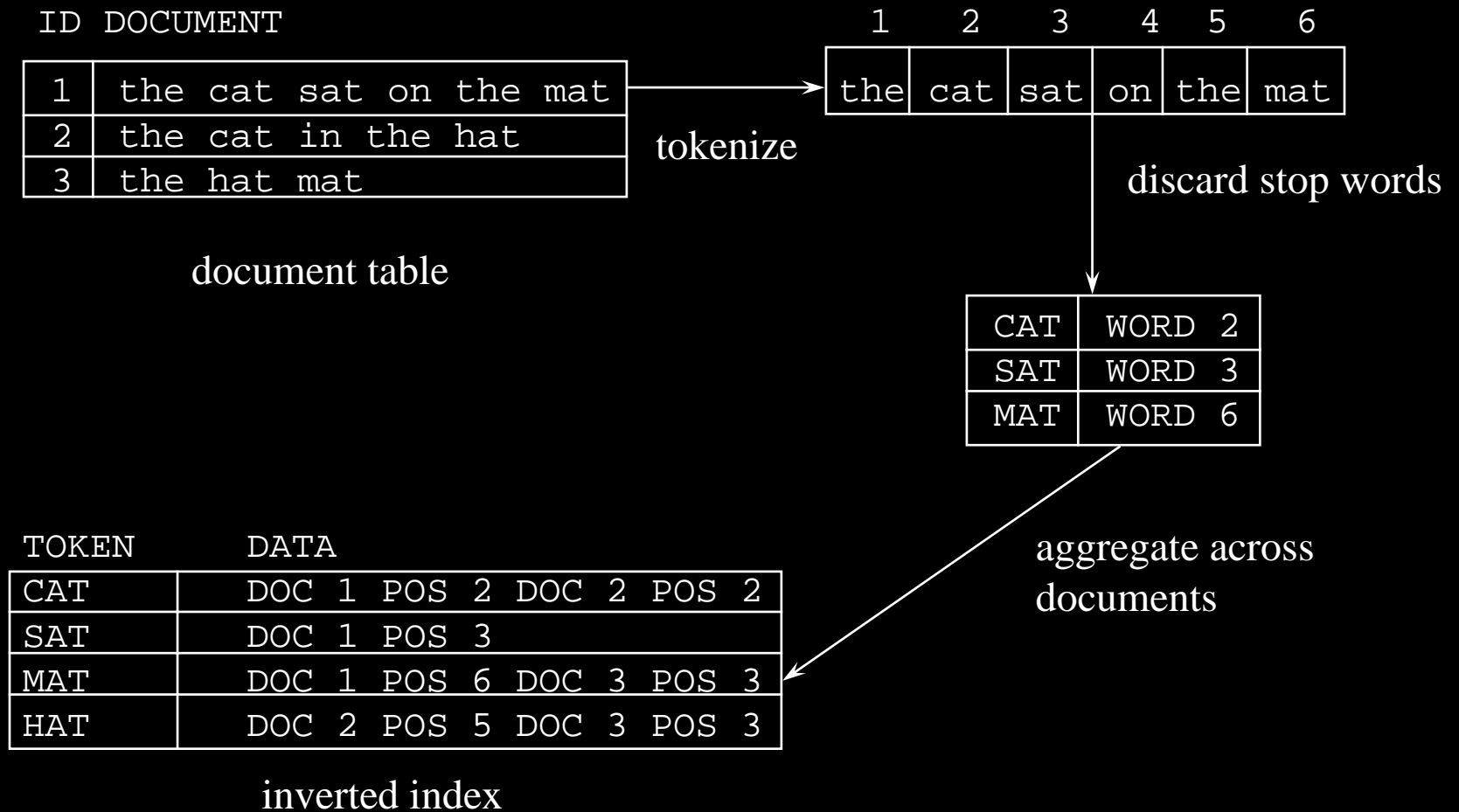
ODMr Restrictions on Text Mining

- ODMr does not support all of text mining functionality provided by Oracle Data Mining. The following restrictions apply to text mining using ODMr:
- You can include zero or one text columns in a mining operation. If you need to build a model with two or more text columns, you must use one of the ODM programmatic interfaces.
- The mining type of the text column must be text; if the data type of the column is VARCHAR2 or CHAR, you will have to change the mining type from categorical to text.
- The case ID column must be numerical.
- You must have Oracle Text installed with appropriate permissions

Indexing & PL/SQL (Oracle Text)

- Three index types
 - `context` for traditional information retrieval
 - `ctxcat` for catalogs
 - `ctxrule` for classification and/or routing
- Extensions to SQL
 - `select ... from ... where contains ...`
 - `select ... from ... where catsearch ...`
 - `select ... from ... where matches ...`
- Large set of PL/SQL packages

The Inverted Index



Text Retrieval

```
create table foo (text varchar2(80));  
insert into foo values ('the cat sat  
on the mat');
```

```
create index foox on foo(text)  
inctype is ctxsys.context;
```

```
select * from foo where  
contains(text, 'cat')>0;
```

```
TEXT
```

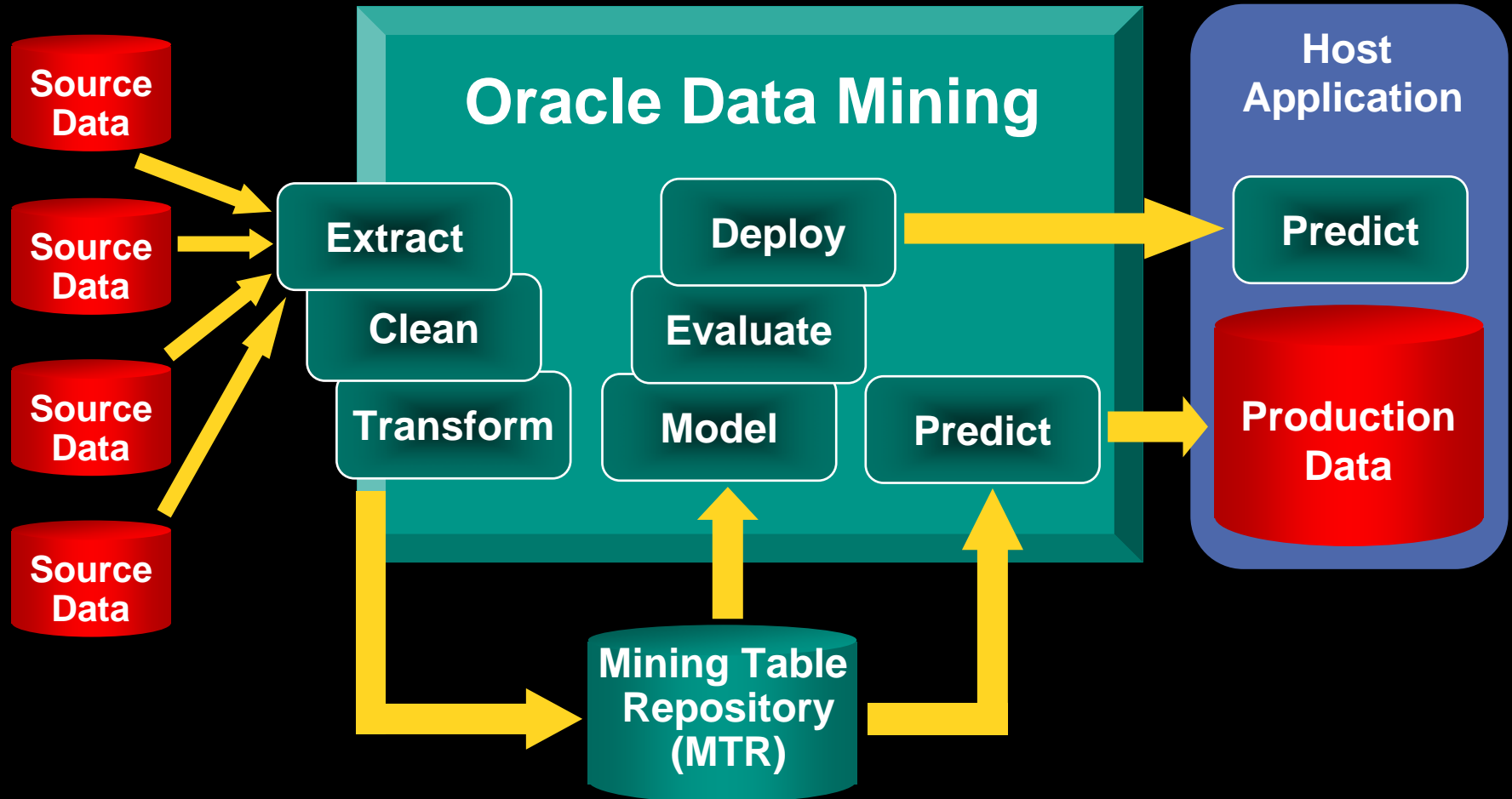
```
-----
```

```
the cat sat on the mat
```

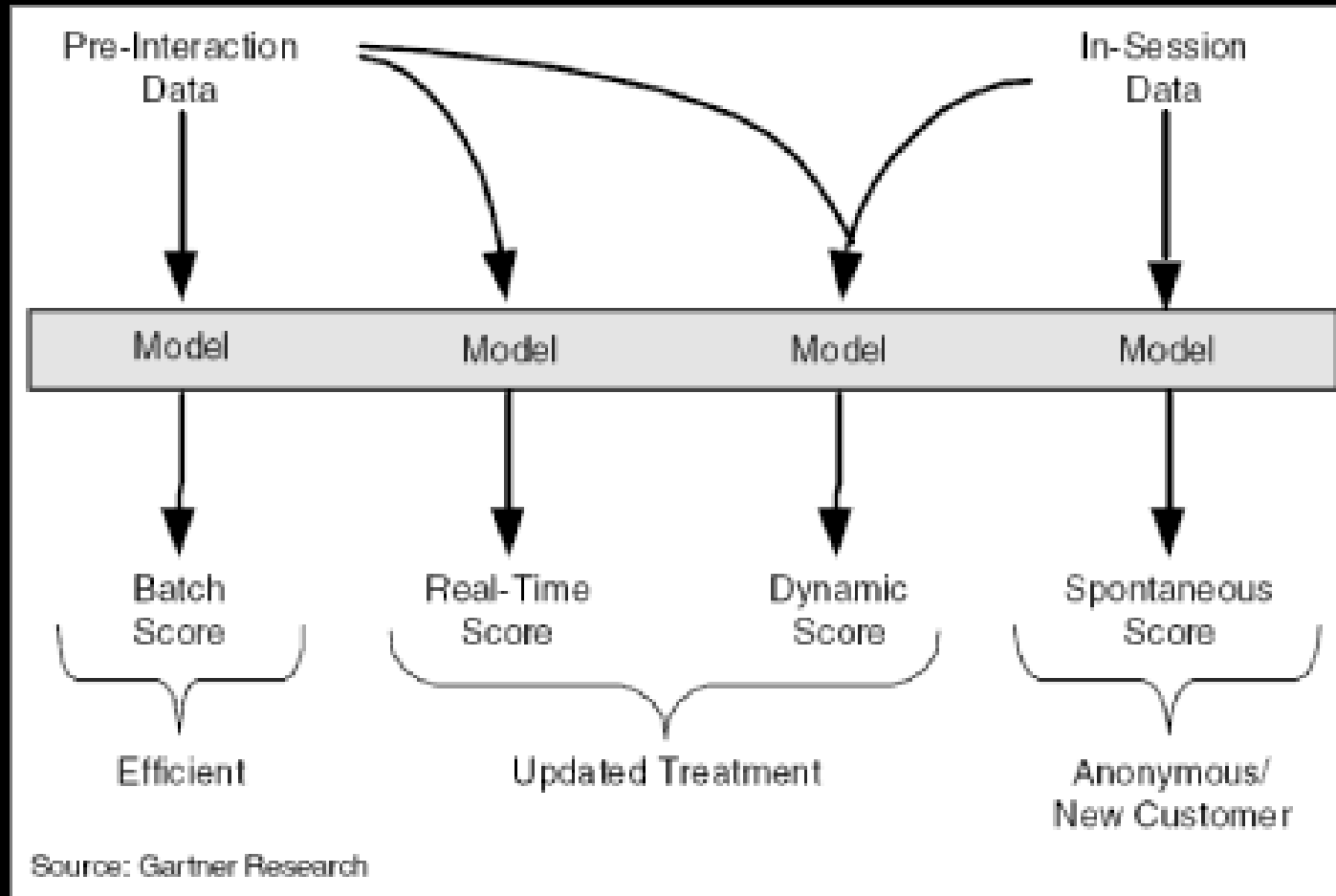
Real-Time Applications based on Data Mining

- Why do we need Real time decisions?
- Recent industry changes like “DO NOT CALL LIST”, TIVO, spam blockers, aversion to junk post mail etc
- Importance of “In-Bound Opportunity”
- Finance-banking industry example

Data Mining Flow



Model Scoring Approach



Gartner's Scoring Approach Classification

Continuum of Scoring Options

Matching the
approach to
Business
requirement

Scoring Approach	Description
Batch	Most common approach. Can be scheduled, and the results can be shared among different applications. Disadvantages can be incorrect scores due to time lags, amount of time and storage needed to score numerous models with many predictors. In addition, the number of cases affects scoring.
Real Time	Scoring allows for updates on recently collected data. Especially useful when little new data is collected.
Dynamic	Scoring allows data to be integrated from current interaction. Useful if there is a significant amount of missing information that is important for the model.
Spontaneous	Used to gain insight into a new or anonymous customer for whom a previous history or profile is unavailable.

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Industry Specific Cases/Applications of Data Mining

The “in-bound” window of opportunity

- In-bound calls present a great opportunity for up-sell and cross sell
- Data mining scoring for recommendations in Real time can provide CSR's with most likely loan product to offer
- Such an application was built using Oracle Data Mining for finance industry

Intelligent Offer Generation and Retention Management Application

The screenshot displays two overlapping windows from a software application. The background window, titled "Retention Action", features a "Menu" dropdown, three buttons ("Yes! Tell Me More", "No. Thank You", "Show Details"), a "Churn Indicator" showing 20% with a red progress bar, a "Treatment" field set to "Free Checking", and an "Information" field with the text: "As a valued customer of 8 years, we would like to offer you free checking fees effective immediately." The foreground window, titled "Intelligent Offers", also has a "Menu" dropdown and buttons for "Begin Script", "Interested", and "Not Interested". It contains a table with three columns: "Offer", "Score", and "Description".

Offer	Score	Description
> Overdraft Protection	★★★★★	Offer Overdraft Protection for checking accounts
Auto Insurance	★★★★☆	We can meet or beat any auto insurance rate
Auto Refinancing	★★★★☆	Looking for a better rate on your auto financing

- Integrated User Interface for real time analytical application based on data mining (from Finance Industry)

Demo Scenario: Business Challenges

About National Bank

- Fictional financial services provider
- Customer base: 5 million
- Assets: \$69 billion
- Revenue: \$4.6 billion
- Large volume Siebel Call Center

Business Challenges

- High customer turnover rate of 14% per year
- Associated replacement cost in millions per year
- Average cost of new customer acquisition: \$250
- Currently 2 products per customer, goal of achieving 4 per customer

Demo Scenario: Call Center Solution

- Predict in **real-time** customers **propensity to attrite** and to respond to various retention treatments
- Offer **relevant and timely retention offers** such as free online bill payment only to customers most likely to leave
- Predict in **real-time** customers **propensity to respond** to various cross- & up sell offers
- Target customers with **relevant and timely cross sell offers** at the time of call

instead of

Running **costly, less relevant and less timely** outbound retention and cross- & up-sell campaigns

Call Scenario A: Intelligent Cross-Sell

Profile of caller (Linda Johnson):

- Female, 28 years old, single
- Holds checking and savings account at National Bank
- Medium-value customer
- Calls to change address (due to new job after grad school)

Objectives of National Bank:

- Expand customer relationship through real-time intelligent cross- and up-sell offers

Call Scenario A: Upon caller identification,

...

The screenshot displays the Siebel CRM interface for a contact named Linda Johnson. A yellow speech bubble highlights the text: "... Linda Johnson is recognized as a student holding two accounts with National." The interface includes a top navigation bar with menus like File, Edit, View, Navigate, Query, Tools, and Help. Below this, there's a contact summary section with fields for Last Name, First Name, Middle, Mr/Ms, Suffix, Id, Job Title, Email, Address, City, State, Country, Zip Code, Work #, Home #, and Privacy settings. The contact is identified as a student living at 1114 Blossom Street, Suite 102, Redwood City, CA 94062. To the right, a Command Center section allows for account management. Below the contact details, there are sections for Retention Action, Activities, Intelligent Offers, and Financial Accounts. The Activities section shows a list of recent calls, including inbound calls for money transfer, late payment, and balance checks. The Financial Accounts section lists two accounts: a Standard Checking account and a Standard Savings account, both with open statuses.

... Linda Johnson is recognized as a student holding two accounts with National.

Contact: Linda Johnson

Menu | New | Delete | Query

*Last Name: Johnson Id: 4-5657-4646 Address: 1114 Blossom Street, Suite 102
*First Name: Linda Job Title: Student City: Redwood City State: CA
Middle: H Email: enid@aol.com Zip Code: 94062 Country: USA
Mr/Ms: Ms. *Privacy: Opt-Out: All Part Work #: (510) 456-2134 Don't Call: ☐
Suffix: Household: Ahl - Redwood C Home #: (650) 456-6578 Don't Mail: ☒

More Info | Account Affiliations | Account Affiliations | Accounts | Activities | Activity Plans | Addresses | Affiliations | Agreements | Alerts | Applications | Summary (RTD)

Retention Action 1 of 1+

Menu | Yes! Tell Me More | No. Thank You | Show Details

Offline Churn: 20% Churn Indicator: 15%
Treatment: No Action Required
Information:

Activities 1 - 4

New	Type	Call Reason	Description	End
>	Call - Inbound		Inbound call	8/26/2005 12:50:1
	Call - Inbound	Transfer Money		8/22/2005 18:43:1
	Collect Payment		Late payment	8/22/2005 13:24:3
	Call - Inbound	Check Balance		8/22/2005 13:24:0

Intelligent Offers 1 - 1 of 1

Name	Score	Information	Offer Code	Of
> Auto Insurance	☆☆☆☆☆	Affordable car insurance fro	130258-3791914	

Financial Accounts 1 - 2

Account #	Product	Current Balance	Status
> 4992-3550-2051-0012	Standard Checking	\$736.23	Open
5376-6372-7373-00	Standard Savings	\$3,181.00	Open

Open enrollment for all company benefits begins next m 1 of 1
Local intranet

In addition, upon caller identification, ...

The screenshot displays the Siebel CRM interface. At the top, a navigation bar includes 'File', 'Edit', 'View', 'Navigate', 'Query', 'Tools', and 'Help'. Below this is a toolbar with various icons. The main content area is divided into several sections:

- Contact Information:** A form for Linda Johnson with fields for Last Name, First Name, Middle, Mr/Ms, Suffix, Id, Job Title, Email, Home Address, City, Zip Code, Work #, Home #, Privacy, and Household.
- Retention Action:** A section with a 'Menu' dropdown and buttons for 'Yes! Tell Me More', 'No. Thank You', and 'Show Details'. It displays 'Offline Churn: 20%' and 'Churn Indicator: 15%' with progress bars. The 'Treatment' is 'No Action Required'.
- Intelligent Offers:** A table showing offers for Linda Johnson, including 'Auto Insurance' with a score of 5 stars and a description 'Affordable car insurance from 130258-3791914'.
- Account Information:** A table showing account details, including '4992-3550-2051-0012' (Standard Checking) and '5376-6372-7373-00' (Standard Savings).

Two callout boxes provide additional context:

- Callout 1:** "... based on Linda's customer profile, the Decision Server predicts that Linda currently has no significant risk of churning, and therefore no retention treatment is warranted, and ..."
- Callout 2:** "... that 'Auto Insurance' is the marketing offer that is most likely to be accepted by Linda."

The bottom of the screen shows a status bar with the text 'Open enrollment for all company benefits begins next month' and a 'Local intranet' link.

Upon noting Linda's call reason, change of address, ...

... this new in-context information is communicated to the Decision Server in real-time.

The screenshot displays the Siebel CRM interface for contact Linda Johnson. The interface includes a menu bar, a toolbar, and several data sections. A yellow callout bubble points to the 'Change of Address' call reason in the 'Activities' table.

Contact: Linda Johnson

Menu | New | Delete | Query

*Last Name: Johnson Id: 4-5657-4646 Home Address: 1114 Blossom Street, Suite 102
*First Name: Linda Job Title: Student City: Redwood City State: CA
Middle: H Email: enid@aol.com Zip Code: 94062 Country: USA
Mr/Ms: Ms. *Privacy: Opt-Out: All Part Work #: (510) 456-2134
Suffix: Household: Ahl - Redwood C Home #: (650) 456-6578

More Info | Account Affiliations | Account Affiliations | Accounts | Activities | Activity Plans | Addresses | Agreements | Alerts | Applications | Summary (RTD)

Retention Action 1 of 1+

Menu | Yes! Tell Me More | No. Thank You | Show Details

Offline Churn: 20% Churn Indicator: 15%
Treatment: No Action Required
Information:

Activities Menu | New | Delete | Query 1 - 4

New	Type	Call Reason	Description	End
>	Call - Inbound	Change of Address	Inbound call	8/26/2005 12:50:00
	Call - Inbound	Transfer Money		8/22/2005 18:43:00
	Collect Payment		Late payment	8/22/2005 13:24:00
	Call - Inbound	Check Balance		8/22/2005 13:24:00

Intelligent Offers Menu | Yes! Tell Me More | No. Thank You 1 - 1 of 1

Name	Score	Information	Offer Code	Of
> Auto Insurance	☆☆☆☆☆	Affordable car insurance fro	130258-3791914	

Financial Accounts Menu | Query 1 - 2

Account #	Product	Current Balance	Status
> 4992-3550-2051-0012	Standard Checking	\$736.23	Open
5376-6372-7373-00	Standard Savings	\$3,181.00	Open

Local intranet

Based on the new in-context information, ...

The screenshot displays a Siebel CRM interface. At the top, a navigation bar includes 'File', 'Edit', 'View', 'Navigate', 'Query', 'Tools', and 'Help'. Below this is a toolbar with various icons. The main content area is divided into several sections:

- Contact Information:** A form for Linda Johnson with fields for Last Name, First Name, Middle, Mr/Ms, Suffix, Id, Job Title, Email, Home Address, City, Zip Code, Work #, Home #, Privacy, and Household.
- Retention Action:** A section with a 'Churn Indicator' of 15% and a 'Treatment' of 'No Action Required'.
- Intelligent Offers:** A table showing offers for Linda Johnson, including 'Overdraft Protection' and 'Standard Checking'.

Two callout boxes provide context:

- Callout 1:** "... the Decision Server predicts in real-time that Linda's churn risk has not increased ..."
- Callout 2:** "... but that the most appropriate offer now is 'Overdraft Protection', addressing Linda's likely increased financial needs."

The interface also includes a 'Command Center' on the right and a status bar at the bottom with the text 'Open enrollment for all company benefits begins next month'.

Linda's response to the extended offer ...

The screenshot displays the Siebel CRM interface for a contact named Linda Johnson. The interface includes a top menu bar with options like File, Edit, View, Navigate, Query, Tools, and Help. Below this is a toolbar with various icons. The main content area shows the contact's details, including Last Name (Johnson), First Name (Linda), Middle (H), Job Title (Student), Email (enid@aol.com), and Home Address (1114 Blossom Street, Suite 102). A call log table is visible, showing two entries: 'Call - Inbound' with 'Change of Address' and 'Inbound call' on 8/26/2005, and 'Call - Inbound' with 'Transfer Money' on 8/22/2005. A 'Retention Action' section shows 'Offline Churn' at 20% and 'Churn Indicator' at 15%. A 'Siebel' dialog box is open, displaying a yellow warning icon and the message: 'Customer response is successfully recorded. (SBL-EXL-00151)'. The dialog has an 'OK' button. The bottom of the screen shows a status bar with the text 'Open enrollment for all company benefits begins next month' and a taskbar with various icons.

... is noted by the agent using the offer response buttons. The response information is communicated to the Decision Server in real-time for self-learning.

Siebel

Customer response is successfully recorded. (SBL-EXL-00151)

OK

Name	Score	Information	Offer Code	Account #	Product	Current Balance	Status
Overdraft Protection	☆☆☆☆☆	Credit to write checks for mo	130258-3791901	4992-3550-2051-0012	Standard Checking	\$736.23	Open
				5376-6372-7373-00	Standard Savings	\$3,181.00	Open

Linda's response to the extended offer ...

The screenshot displays the Siebel CRM interface with a focus on the 'Retention Action' and 'Intelligent Offers' sections. A yellow callout bubble points to the 'Responses' table, highlighting a response to the 'Overdraft Protection' offer.

Retention Action

Offline Churn: 20% Churn Indicator: 15%

Treatment: No Action Required

Information:

Intelligent Offers

Name	Score	Information
Overdraft Protection	★★★★☆	Credit to write checks for mo 130230-3731301

Responses

Created	Campaign	Source Code	Offer
8/26/2005 13:12:22	Campaign FB		Overdraft Protection

... is also recorded in the database, enabling offer response tracking and cross channel Marketing Analytics reporting.

Marketing users can analyze offer response behavior ...

The screenshot displays the Siebel CRM interface for the 'Overdraft Protection' offer. The interface includes a top menu bar with options like File, Edit, View, Navigate, Query, Tools, and Help. Below this is a toolbar with various icons. The main content area shows the offer details, including the offer name, code, channel, and activation date. A speech bubble points to the 'Offer Name' field, containing text about analyzing customer response behavior. Below the offer details, there is a table showing the 'Overdraft Protection Correlation' with attributes and values.

... by viewing the "ideal" profile of customers that are most likely to accept an offer. The ideal profile is useful for evaluating whether an offer appeals to the intended target audience or not, and serves as intelligence for driving outbound marketing activities.

Attribute	Value
Contextual Call Interaction Call Reasons	Change of Address
Customer Investment Profile	Check Writer
Customer Age	27 to 29
Customer Credit Score	421 to 440
Customer Annual Income	5000

More in-depth reporting on key drivers

Siebel FINS (Development)

- Strategic Objectives
- Performance Goals
- Decisions
- Decision Process
 - Rules Library
 - Churn Indicator Result
 - Marketing Messages
 - Intelligent Offers
 - Purpose
 - Acquisition
 - Awareness
 - Cross-Sell
 - Auto Insurance
 - Gold VISA card
 - Home Equity
 - Life Insurance
 - Overdraft Protection**
 - Loyalty
 - Referral
 - Up-Sell
 - When
 - Retention Actions
 - Integration Points
 - Informants
 - Advisors
 - Entity Catalog
 - Session

Decision Center:

Home Opportunities Contacts Accounts Activities Service Households Offers Administration - Marketing

System Tasks Servers Marketing Server Admin Analytics Data Load Response Types Source Code Formats List Formats Vendors Sites Decision Center

Open Perspective

Queries: * All Offers

00:49:04

-> Call from 5104562134

Overdraft Protection

Definition Performance Analysis

Best-fit Drivers Trends

Report Settings

Time Window: Since Aug 22, 2005 Minimum Predictiveness: 5

Choice Outcome: Interested Maximum Number of Rows: 10

channel: All

Count: 1993 Model Quality: 72

Go

Most Important Customer Investment Profile Values for Overdraft Protection

Customer Investment Profile Value	Importance Score (Approximate)	Importance Type
Check Writer	65	Positive Importance
Frequents ATM	35	Positive Importance
Big Spender	15	Positive Importance
Fees Accruer	-10	Negative Importance
Frequent Trader	-50	Negative Importance
Cautious Saver	-75	Negative Importance

Legend: Positive Importance (Green), Negative Importance (Red)

Open enrollment for all company benefits begins

1 of 1

Local intranet

Trends in customer response behavior

The screenshot displays the Siebel CRM interface, specifically the 'Overdraft Protection' analysis section. The left sidebar shows a tree view of the 'Decision Center' with 'Overdraft Protection' selected. The main window has tabs for 'Definition', 'Performance', and 'Analysis', with 'Analysis' currently active. Below the tabs, there are 'Report Settings' and two data tables.

Report Settings:

- Between: Since Aug 22, 2005
- And: Since Aug 22, 2005
- Choice Outcome: Interested
- channel: All
- Minimum Predictiveness: 5
- Minimum Absolute Percent Change: 0
- Model Quality Since Aug 22, 2005: 72

Changes in Predictiveness of Entity Attributes for Overdraft Protection

Attribute	Predictiveness Since Aug 22, 2005	Predictiveness Since Aug 22, 2005	% Change
Contextual Call Interaction Call Reasons	58	58	0%
Customer Investment Profile	36	36	0%
Customer Age	23	23	0%

Customer Age values Since Aug 22, 2005

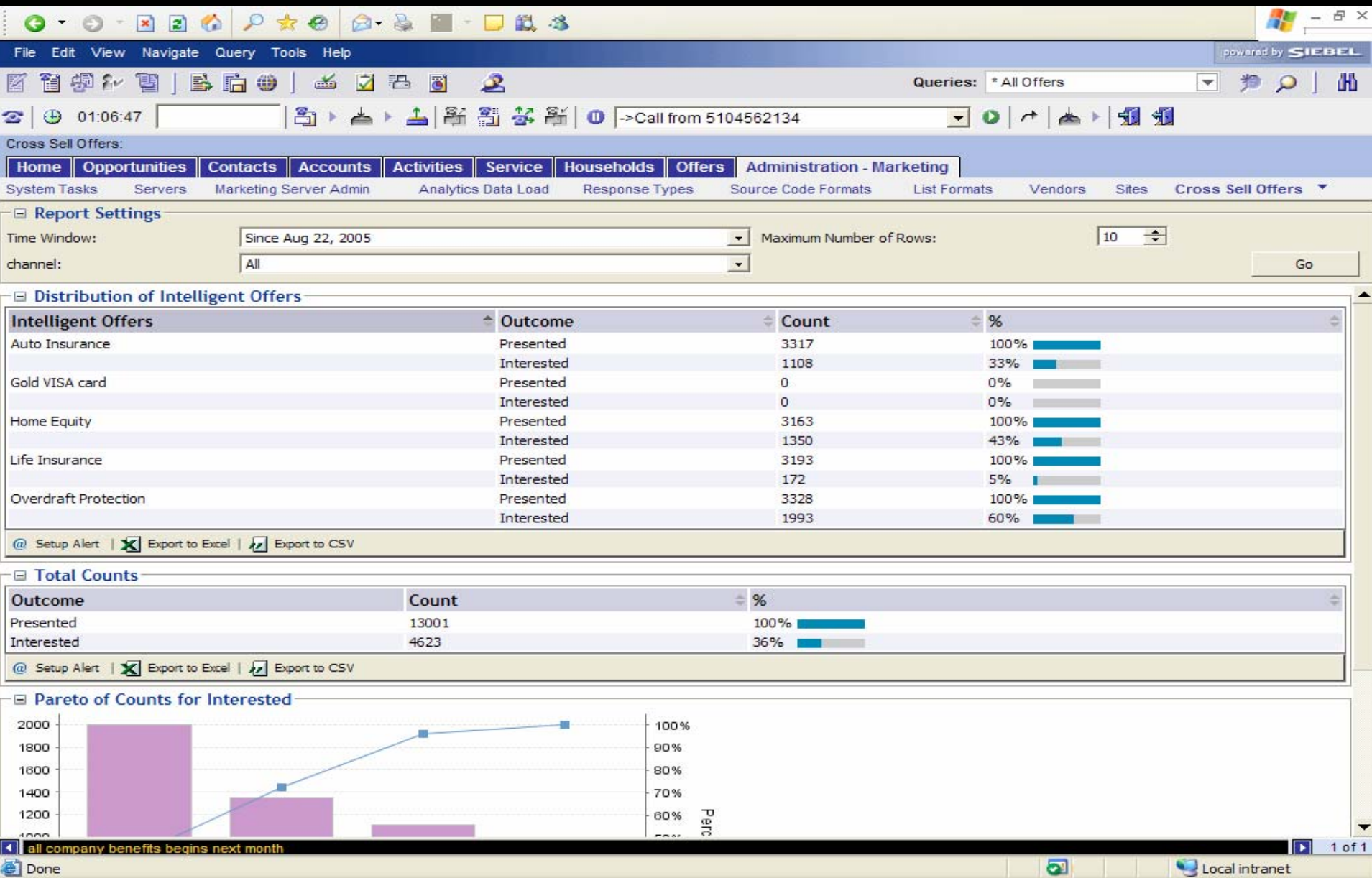
Customer Age	Importance	Count
18 to 28	High	385
29 to 40	High	398
41 to 51	High	378
52 to 63	Medium	337
76 to 87	Low	254
64 to 75	Low	241

Customer Age values Since Aug 22, 2005

Customer Age	Importance	Count
18 to 28	High	385
29 to 40	High	398
41 to 51	High	378
52 to 63	Medium	337
76 to 87	Low	254
64 to 75	Low	241

Open enrollment for all company | 1 of 1

Overall offer response statistics



Call Scenario B: Real-time Retention

Profile of Caller (Robert Knowles):

- Male, 38 years old, married, homeowner
- Holds several accounts at National Bank
- High-value customer
- Considers closing all accounts (unknown to National Bank)
- Calls to inquire about checking account fees

Objectives of National Bank:

- Retain customer relationship through real-time retention treatment

Call Scenario B: Upon caller identification, ...

The screenshot displays the Siebel CRM interface for a customer named Robert Knowles. The interface includes a top navigation bar with tabs for Home, Opportunities, Contacts, Accounts, Activities, Service, Households, Offers, and Administration - Marketing. Below this, there are sub-tabs for Contacts Home, Contacts List, Consumers List, Personal Contacts List, Charts, Manager's Explorer, My Team's Universe By Specialty, and Contact Administration. The main content area shows the contact details for Robert Knowles, including his last name, first name, middle name, job title, home address, and email. A large yellow callout box highlights the text: "Robert Knowles is recognized as a high-value customer holding several accounts at National." Below the contact details, there are sections for Retention Action, Intelligent Offers, and Financial Accounts. The Financial Accounts section shows a list of accounts, including Gold Checking, Millennium Investment Account, and Whole Life Insurance.

Robert Knowles is recognized as a high-value customer holding several accounts at National.

Name	Score	Information	Offer Code	Of
Home Equity	★★★★☆	Home Equity Lines of Credit (130258-3791927		

Account #	Product	Current Balance	Status
6373-7383-2051-00	Gold Checking	\$9,536.45	Open
9383-6373-8122-00	Millennium Investment Account	\$147,838.00	Open
7383-3383-9393-00	Whole Life Insurance		Open

In addition, upon caller identification, ...

The screenshot displays the Siebel CRM interface. At the top, a menu bar includes File, Edit, View, Navigate, Query, Tools, and Help. Below the menu, a toolbar contains various icons for navigation and actions. The main content area is divided into several sections:

- Contact Information:** Displays details for Robert Knowles, including Last Name, First Name, Middle, Mr/Ms, Suffix, Id, Job Title, Home Address, City, Zip Code, Email, Privacy, Work #, and Home #.
- Retention Action:** Shows a bar chart for Offline Churn (20%) and a Churn Indicator (25%). The Treatment is set to "No Action Required".
- Intelligent Offers:** Lists offers for Robert Knowles, including "Home Equity" with a score of 5 stars.
- Activities:** Displays a list of activities, including "Call - Inbound" on 8/26/2005.
- Account Information:** Shows account details for Robert Knowles, including Account #, Product, Current Balance, and Status.

Two callout boxes provide additional context:

- Callout 1:** "... based on Robert's customer profile, the Decision Server predicts that Robert currently has a low risk of churning, and therefore no retention treatment is warranted ..."
- Callout 2:** "... and that 'Home Equity' is the offer most likely to be accepted by Robert and ..."

The bottom of the screen shows a status bar with the text "Open enrollment for all company benefits begins next month" and a "Local intranet" link.

Upon noting Robert's call reason, fees inquiry, ...

... this new in-context information is communicated to the Decision Server in real-time.

The screenshot displays the Siebel CRM interface for a contact named Robert Knowles. The interface includes a top navigation bar with menus like Home, Opportunities, Contacts, and Accounts. The main content area shows the contact's details, including name, job title, email, and phone numbers. A yellow callout bubble highlights the 'Call Reason' field in the 'Activities' table, which contains the text 'Fees Inquiry'. The 'Activities' table also shows other activities like 'Inbound call', 'Email - Inbound', 'Check Balance', 'Birthday Call', and 'Call - Outbound'. The bottom of the screen shows 'Intelligent Offers' and 'Financial Accounts' sections.

Contact: Robert Knowles

Menu | New | Delete | Query

*Last Name: Knowles
*First Name: Robert
Middle: M
Mr/Ms: Mr.
Suffix:
Job Title: Ops Manager
Email: knowles@yahoo.co
Zip Code: 94404
Work #: (415) 595-2770
Home #: (415) 786-2838
Household:
City: San Mateo
State: CA
Country: USA

More Info | Account Affiliations | Account Affiliations | Accounts | Activities | Activity Plans | Addresses | Affiliations | Alerts | Applications | Summary (RTD)

Retention Action | 1 of 1+

Menu | Yes! Tell Me More | No. Thank You | Show Details

Offline Churn: 20%
Churn Indicator: 25%
Treatment: No Action Required
Information:

Activities | Menu | New | Delete | Query

New	Type	Call Reason	Description	End
>	Call - Inbound	Fees Inquiry	Inbound call	8/26/2005 14:00:00
	Email - Inbound		Request for new token b	8/22/2005 17:46:00
	Call - Inbound	Check Balance		8/22/2005 17:45:00
	Birthday Call		40th Birthday	8/22/2005 17:44:00
	Call - Outbound		Set up appointment for fir	8/22/2005 17:44:00

Intelligent Offers | Menu | Yes! Tell Me More | No. Thank You | 1 - 1 of 1

Name	Score	Information	Offer Code	Of
> Home Equity	★★★★☆	Home Equity Lines of Credit (130258-3791927	

Financial Accounts | Menu | Query

Account #	Product	Current Balance	Status
> 6373-7383-2051-00	Gold Checking	\$9,536.45	Open
9383-6373-8122-00	Millennium Investment Account	\$147,838.00	Open
7383-3383-9393-00	Whole Life Insurance		Open

Open enrollment for all company benefits begins next month

Local intranet

Based on the new in-context information, ...

The screenshot displays the Siebel CRM interface for a customer named Robert Knowles. The interface includes a top navigation bar with menus like File, Edit, View, Navigate, Query, Tools, and Help. Below this, there's a search bar and a status bar showing the time as 00:05:43 and a call log entry for 4155952770.

The main section shows the contact details for Robert Knowles, including his last name, first name, middle name, job title (Ops Manager), email (knowles@yahoo.co), and phone numbers. A callout box with a yellow border and a black background contains the following text:

... the Decision Server predicts in real-time that Robert's attrition risk is at a critical level, and that the most appropriate retention treatment is an offer for an one-time fee waiver.

Below the contact details, there's a section for Retention Action. It shows a churn indicator of 50% (represented by a red bar) and a treatment of One Time Fee Waiver. The information provided is: "As a valued customer we would like to waive your most recent banking fees".

At the bottom, there are two tables. The first table, titled "Intelligent Offers", shows a list of offers with columns for Name, Score, Information, and Offer Code. The second table, titled "Financial Accounts", shows a list of accounts with columns for Account #, Product, Current Balance, and Status.

Name	Score	Information	Offer Code
Home Equity	★★★★☆	Home Equity Lines of Credit (130258-3791927

Account #	Product	Current Balance	Status
6373-7383-2051-00	Gold Checking	\$9,536.45	Open
9383-6373-8122-00	Millennium Investment Account	\$147,838.00	Open
7383-3383-9393-00	Whole Life Insurance		Open

At the bottom right, there's a status bar with the text "Open enrollment for all company ber" and "Local intranet".

Robert's response to the extended offer ...

The screenshot displays the Siebel CRM interface. A customer record for Robert Knowles is visible, including fields for Last Name, First Name, Middle, Mr/Ms, Suffix, Job Title, Email, Zip Code, City, State, Country, and Privacy. A yellow callout bubble points to the 'Yes! Tell Me More' button in the 'Retention Action' section, with the text: "... is noted by the agent using the offer response buttons. The response information is communicated to the Decision Server in real-time for self-learning."

A confirmation dialog box titled "Siebel" is displayed, stating: "Customer response is successfully recorded. (SBL-EXL-00151)". The dialog has an "OK" button.

The interface also shows a "Retention Action" section with a "Yes! Tell Me More" button, a "Churn Indicator" (50%), and a "Treatment" (One Time Fee Waiver). Below this, there is a table of "Intelligent Offers" and a table of "Financial Accounts".

Name	Score	Information	Offer Code	Of
Home Equity	★★★★☆	Home Equity Lines of Credit	130258-3791927	1

Account #	Product	Current Balance	Status
6373-7383-2051-00	Gold Checking	\$9,536.45	Open
9383-6373-8122-00	Millennium Investment Account	\$147,838.00	Open
7383-3383-9393-00	Whole Life Insurance		Open

At the bottom of the screen, there is a status bar with the text: "Open enrollment for all company benefits begins next month".

FileEditViewNavigateQueryToolsHelp

Queries:

00:02:10

->Call from 5104562134

HomeOpportunitiesContactsAccountsActivitiesServiceAdministration - ApplicationAdministration - Business ProcessAdministration - Communications

Contacts HomeContacts ListConsumers ListPersonal Contacts ListChartsManager's ExplorerMy Team's Universe By SpecialtyContact Administration

Contact:

Linda Johnson

1 of 1+

MenuNewDeleteQuery

*Last Name:Johnson

*First Name:Linda

Middle:H

Mr/Ms:Mrs.

Suffix:

Account:

Job Title:Pediatrician

Email:ljohnson@comcast.

*Privacy:Opt-Out: All Part

Household:Ahl - Redwood C

Home Address:1114 Blossom Street, Suite 102

City:Redwood City

State:CA

Country:USA

Don't Call:

Don't Mail:

Command Center

1 of 1+

MenuCommand LineGo

Policy Number:

Area:

Type:

Action:

More InfoAccount AffiliationsAccount AffiliationsAc

sesAffiliationsAgreementsAlertsApplicationsSummary (RTD)

Retention Action

MenuYes! Tell Me MoreNo. Thank YouDetails

Offline Churn:20%

Churn Indicator:5%

Treatment:No Action Required

Information:

Intelligent Offers

MenuYes! Tell Me MoreNo. Thank You1 - 1 of 1

Name	Score	Information	Offer Code
> Visa Signature	☆☆☆☆☆	Earn great dividends on all purchases	130258-3121952

Initial offer recommendation after identifying Linda's call as a service-to-sales opportunity

Financial Accounts

MenuQuery1 - 1

Account #	Product	Current Balance	Status
> 4992-3550-2051-0012	Cash Management Account	\$975,000.00	

for all company benefits begins next month

1 of 1

Linda Johnson

1 of 1+

Menu New Delete Query

*Last Name: Johnson

Account:

Home Address: 1114 Blossom Street, Suite 102

*First Name: Linda

Job Title: Pediatrician

City: Redwood City

State: CA

Middle: H

Email: ljohnson@comcast

Country: USA

Mr/Ms: Mrs.

*Privacy: Opt-Out: All Part

Don't Call: ☐

Suffix:

Household: Ahl - Redwood C

Don't Mail: ☒

**Revised offer
recommendation
in account of call
reason (Order
Checks)**

Command Center 1 of 1+

Menu Command Line Go

Policy Number:

Area:

Type:

Action:

More Info Account Affiliations Account Affiliations Account Affiliations

[ses](#)
[Affiliations](#)
[Agreements](#)
[Alerts](#)
[Applications](#)
[Summary \(RTD\)](#)

Retention Action

Menu Yes! Tell Me More No, Thank You Details

1-5

Offline Churn: 20%

Churn Indicator: 0%

Treatment: No Action Required

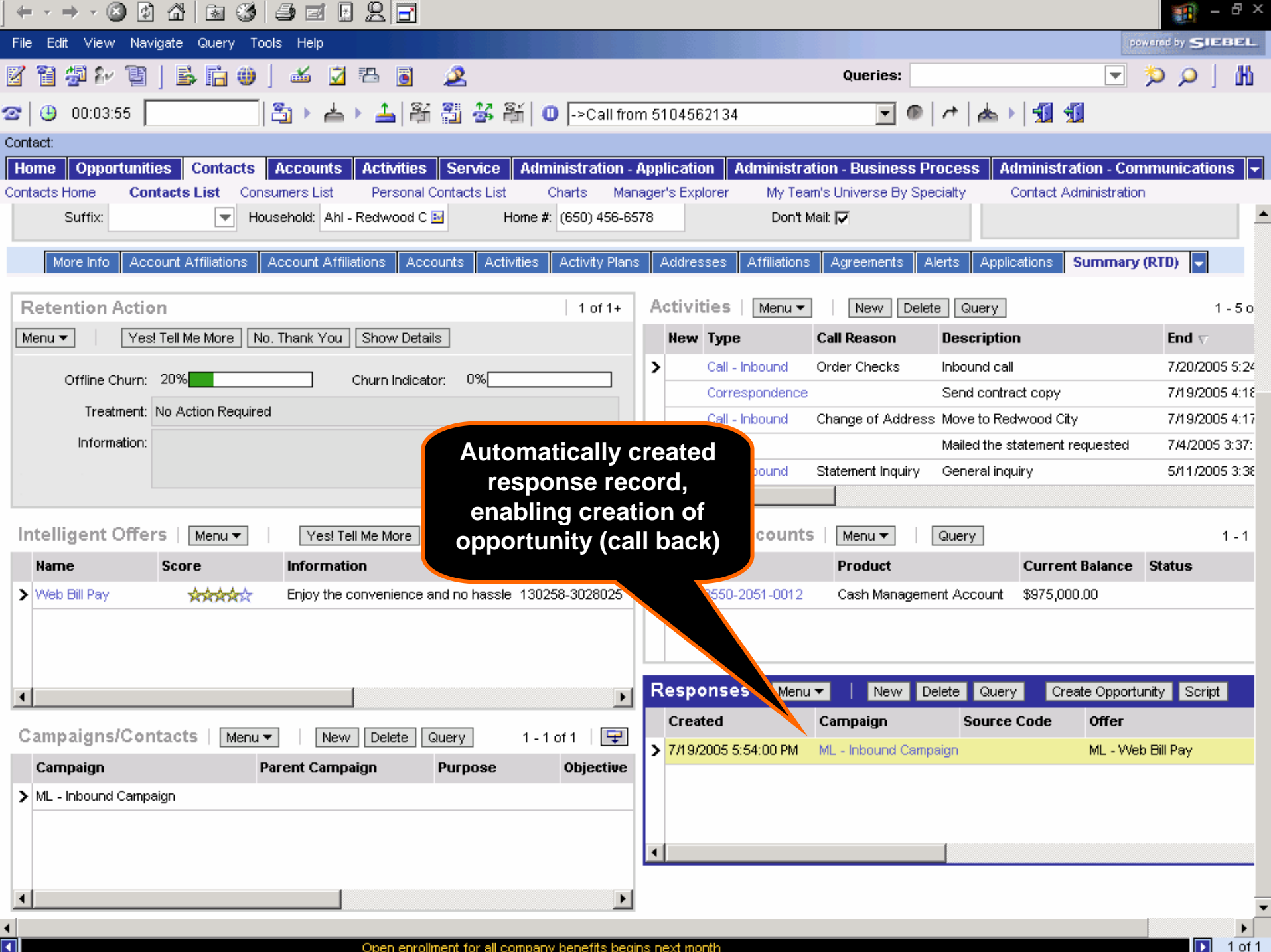
Information:

Intelligent Offers | Menu ▾ | Yes! Tell Me More | No, Thank You | 1 - 1 of 1

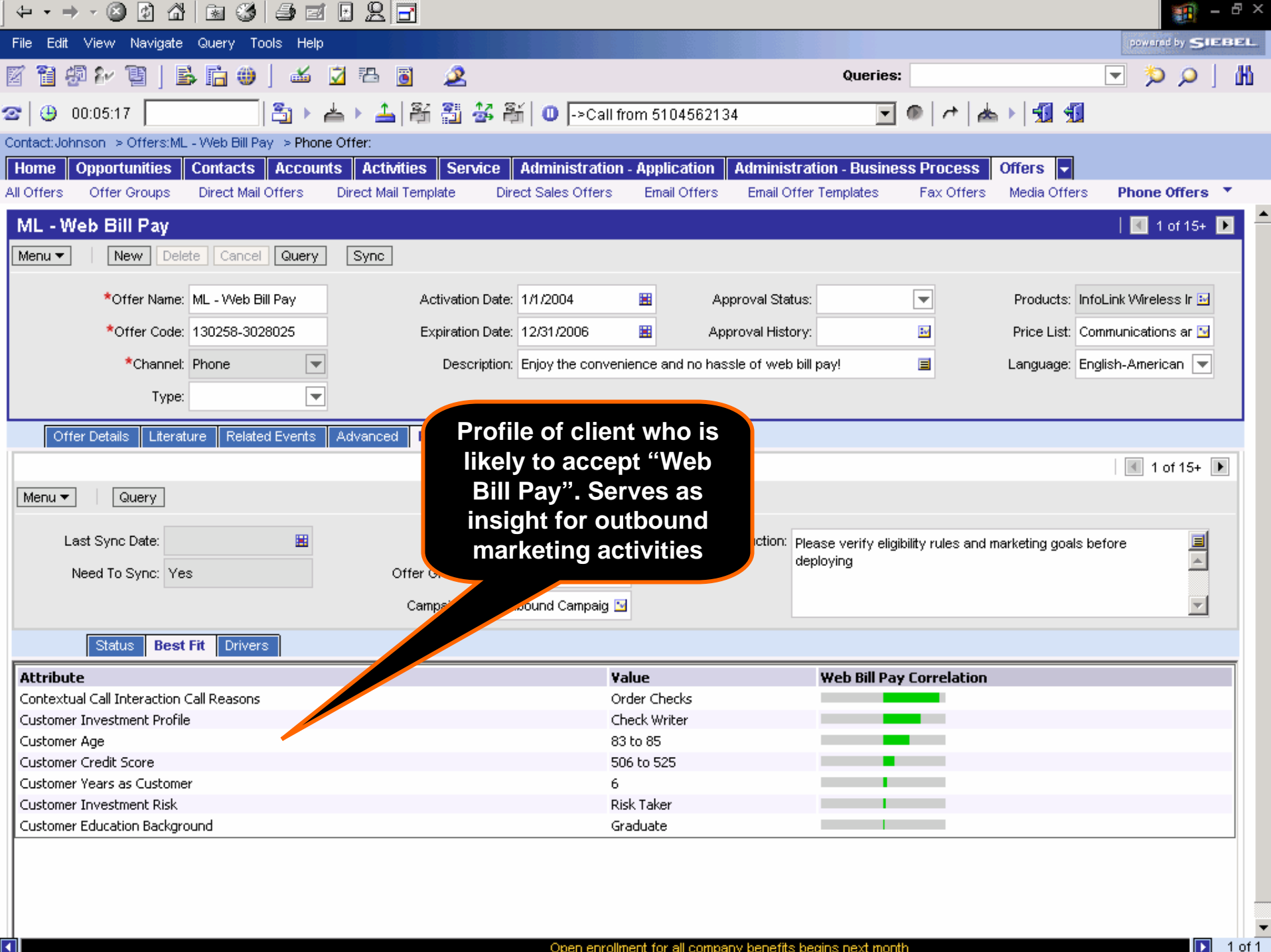
Name	Score	Information	Offer Code
Web Bill Pay	★★★★☆	Enjoy the convenience and no hassle	130258-3028025

Financial Accounts | Menu | Query | 1 - 1

Account #	Product	Current Balance	Status
> 4992-3550-2051-0012	Cash Management Account	\$975,000.00	



Automatically created
response record,
enabling creation of
opportunity (call back)



Performance report
across all offers

Cross Sell Offers:

Report Settings

Time Window: Since Jul 19, 2005 Maximum Number of Rows: 10
channel: All

Distribution of Intelligent Offers

Intelligent Offers	Outcome	Count	%
Beyond Banking	Presented	2476	100%
	Interested	1036	42%
Merill+ Credit Card	Presented	2508	100%
	Interested	770	31%
Visa Signature	Presented	2510	100%
	Interested	785	31%
Web Bill Pay	Presented	2506	100%
	Interested	1507	60%

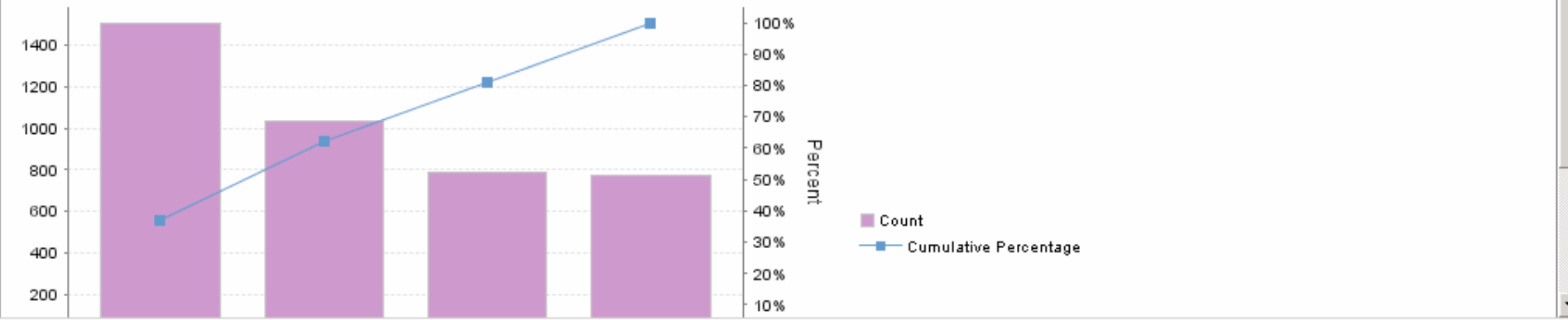
Setup Alert Export to Excel Export to CSV

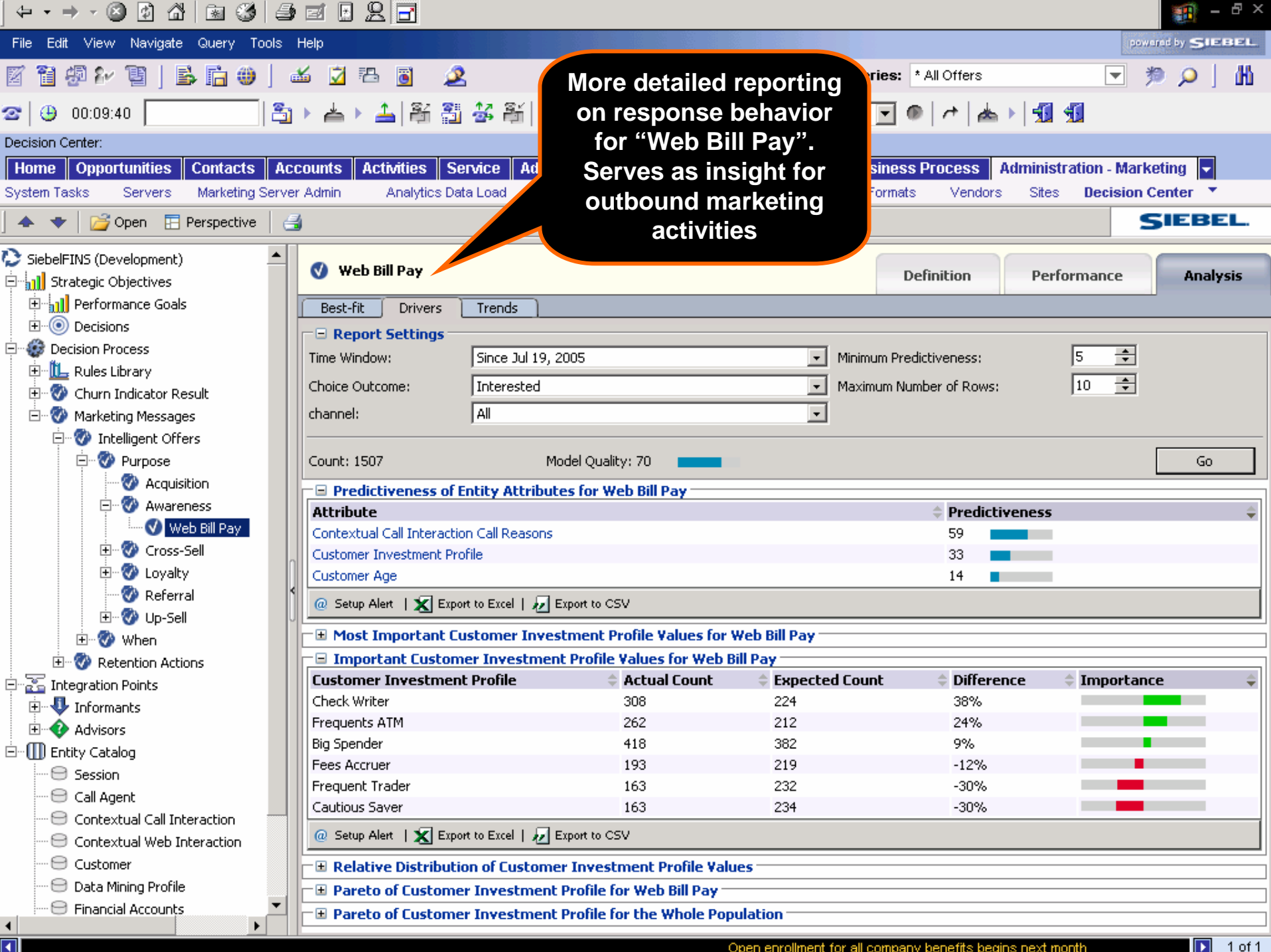
Total Counts

Outcome	Count	%
Presented	10000	100%
Interested	4098	41%

Setup Alert Export to Excel Export to CSV

Pareto of Counts for Interested





More detailed reporting
on response behavior
for "Web Bill Pay".
Serves as insight for
outbound marketing
activities

Web Bill Pay

Report Settings

Time Window: Since Jul 19, 2005

Choice Outcome: Interested

channel: All

Minimum Predictiveness: 5

Maximum Number of Rows: 10

Count: 1507

Model Quality: 70

Go

Predictiveness of Entity Attributes for Web Bill Pay

Attribute	Predictiveness
Contextual Call Interaction Call Reasons	59
Customer Investment Profile	33
Customer Age	14

Setup Alert | Export to Excel | Export to CSV

Most Important Customer Investment Profile Values for Web Bill Pay

Important Customer Investment Profile Values for Web Bill Pay

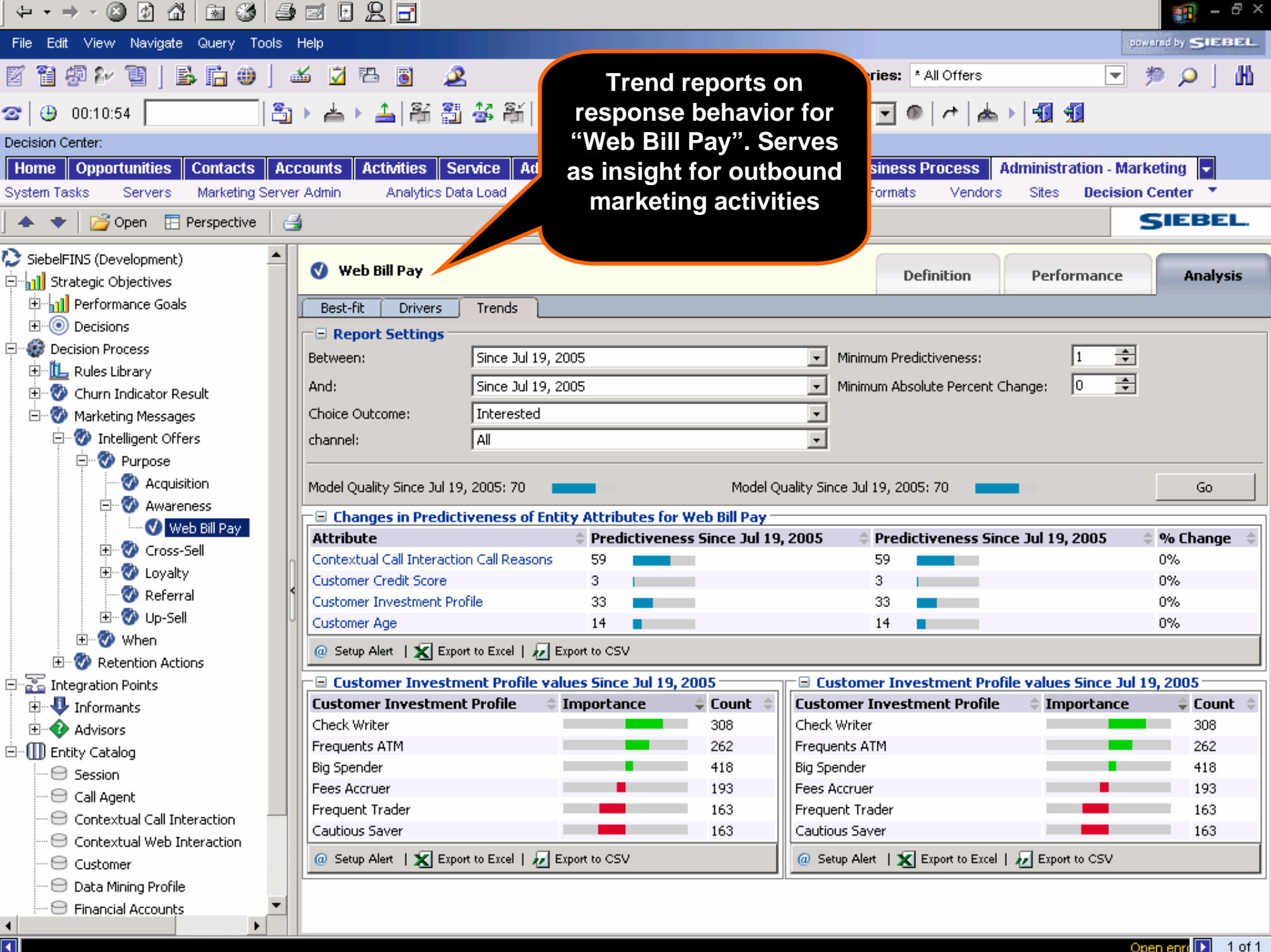
Customer Investment Profile	Actual Count	Expected Count	Difference	Importance
Check Writer	308	224	38%	
Frequents ATM	262	212	24%	
Big Spender	418	382	9%	
Fees Accruer	193	219	-12%	
Frequent Trader	163	232	-30%	
Cautious Saver	163	234	-30%	

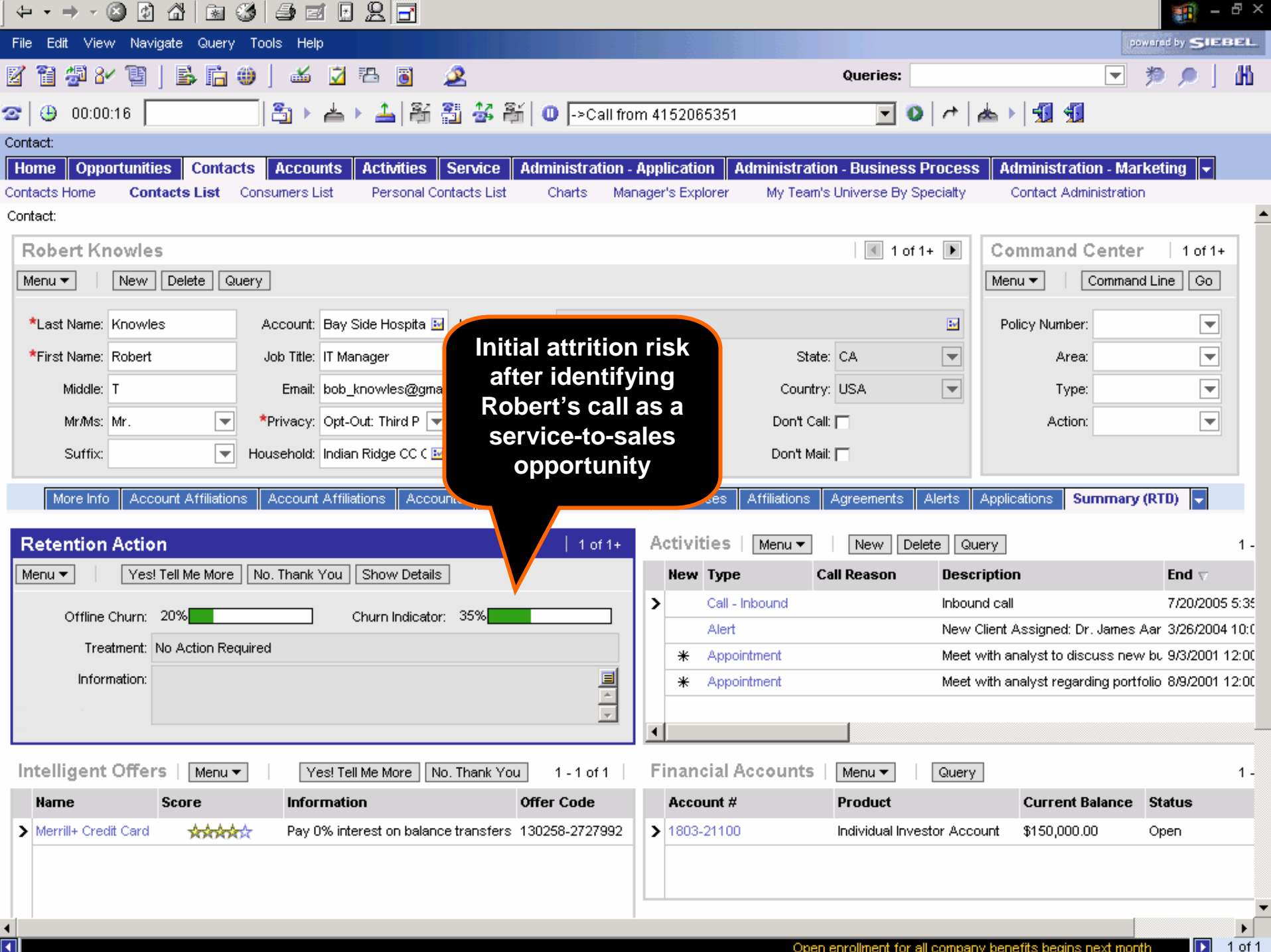
Setup Alert | Export to Excel | Export to CSV

Relative Distribution of Customer Investment Profile Values

Pareto of Customer Investment Profile for Web Bill Pay

Pareto of Customer Investment Profile for the Whole Population





Initial attrition risk
after identifying
Robert's call as a
service-to-sales
opportunity

Retention Action

1 of 1+

Menu Yes! Tell Me More No. Thank You Show Details

Offline Churn: 20%

Churn Indicator: 35%

Treatment: No Action Required

Information:

Intelligent Offers

Menu

Yes! Tell Me More

No. Thank You

1 - 1 of 1

Name	Score	Information	Offer Code
> Merrill+ Credit Card	★★★★☆	Pay 0% interest on balance transfers	130258-2727992

Activities

Menu

New

Delete

Query

1 -

New	Type	Call Reason	Description	End
>	Call - Inbound		Inbound call	7/20/2005 5:39
	Alert		New Client Assigned: Dr. James Aar	3/26/2004 10:00
*	Appointment		Meet with analyst to discuss new bu	9/3/2001 12:00
*	Appointment		Meet with analyst regarding portfolio	8/9/2001 12:00

Financial Accounts

Menu

Query

1 -

Account #	Product	Current Balance	Status
> 1803-21100	Individual Investor Account	\$150,000.00	Open

FileEditViewNavigateQueryToolsHelp

Queries:

00:00:41 ->Call from 4152065351

Contact:

HomeOpportunitiesContactsAccountsActivitiesServiceAdministration - ApplicationAdministration - Business ProcessAdministration - Marketing

Contacts HomeContacts ListConsumers ListPersonal Contacts ListChartsManager's ExplorerMy Team's Universe By SpecialtyContact Administration

Contact:

Robert Knowles1 of 1+

MenuNewDeleteQuery

*Last Name: Knowles

*First Name: Robert

Middle: T

Mr/Ms: Mr.

Suffix:

Account: Bay Side Hospita

Job Title: IT Manager

Email: bob_knowles@gma

*Privacy: Opt-Out: Third P

Household: Indian Ridge CC C

State: CA

Country: USA

Don't Call:

Don't Mail:

Command Center1 of 1+

MenuCommand LineGo

Policy Number:

Area:

Type:

Action:

More InfoAccount AffiliationsAccount AffiliationsAccountsAffiliationsAgreementsAlertsApplicationsSummary (RTD)

Retention Action1 of 1+

MenuYes! Tell Me MoreNo. Thank YouShow Details

Offline Churn: 20%

Churn Indicator: 65%

Treatment: One Time Fee Waiver

Information: As a valued customer, we would like to waive your most recent fees.

ActivitiesMenuNewDeleteQuery

New	Type	Call Reason	Description	End
>	Call - Inbound	Fees Inquiry	Inbound call	7/20/2005 5:39
	Alert		New Client Assigned: Dr. James Aar	3/26/2004 10:0
*	Appointment		Meet with analyst to discuss new bu	9/3/2001 12:00
*	Appointment		Meet with analyst regarding portfolio	8/9/2001 12:00

Intelligent OffersMenuYes! Tell Me MoreNo. Thank You1 - 1 of 1

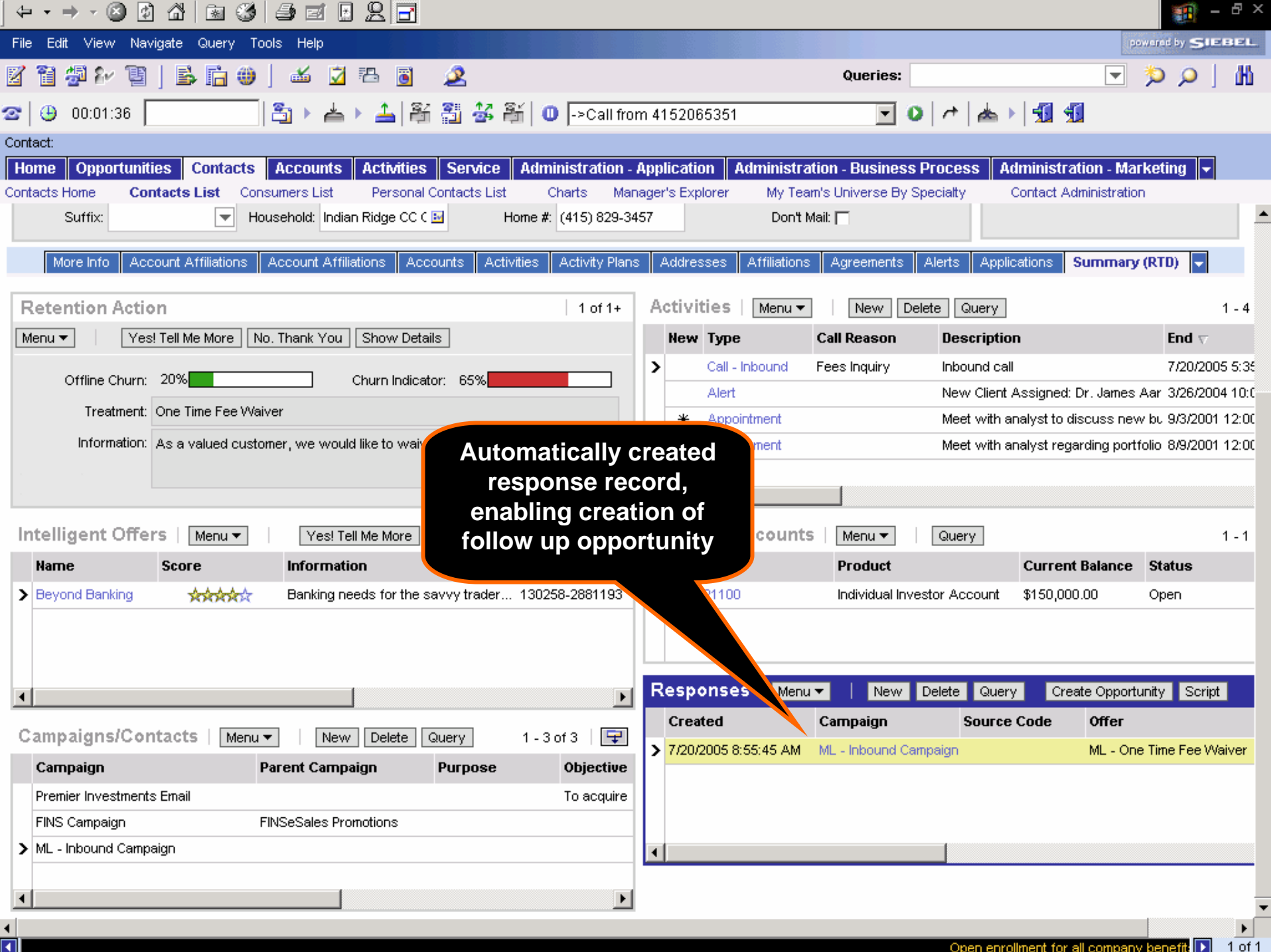
Name	Score	Information	Offer Code
> Beyond Banking	★★★★☆	Banking needs for the savvy trader...	130258-2881193

Financial AccountsMenuQuery

Account #	Product	Current Balance	Status
> 1803-21100	Individual Investor Account	\$150,000.00	Open

Revised attrition risk in account of call reason (Fees Inquiry)

Open enrollment for all company benefits begins ne1 of 1

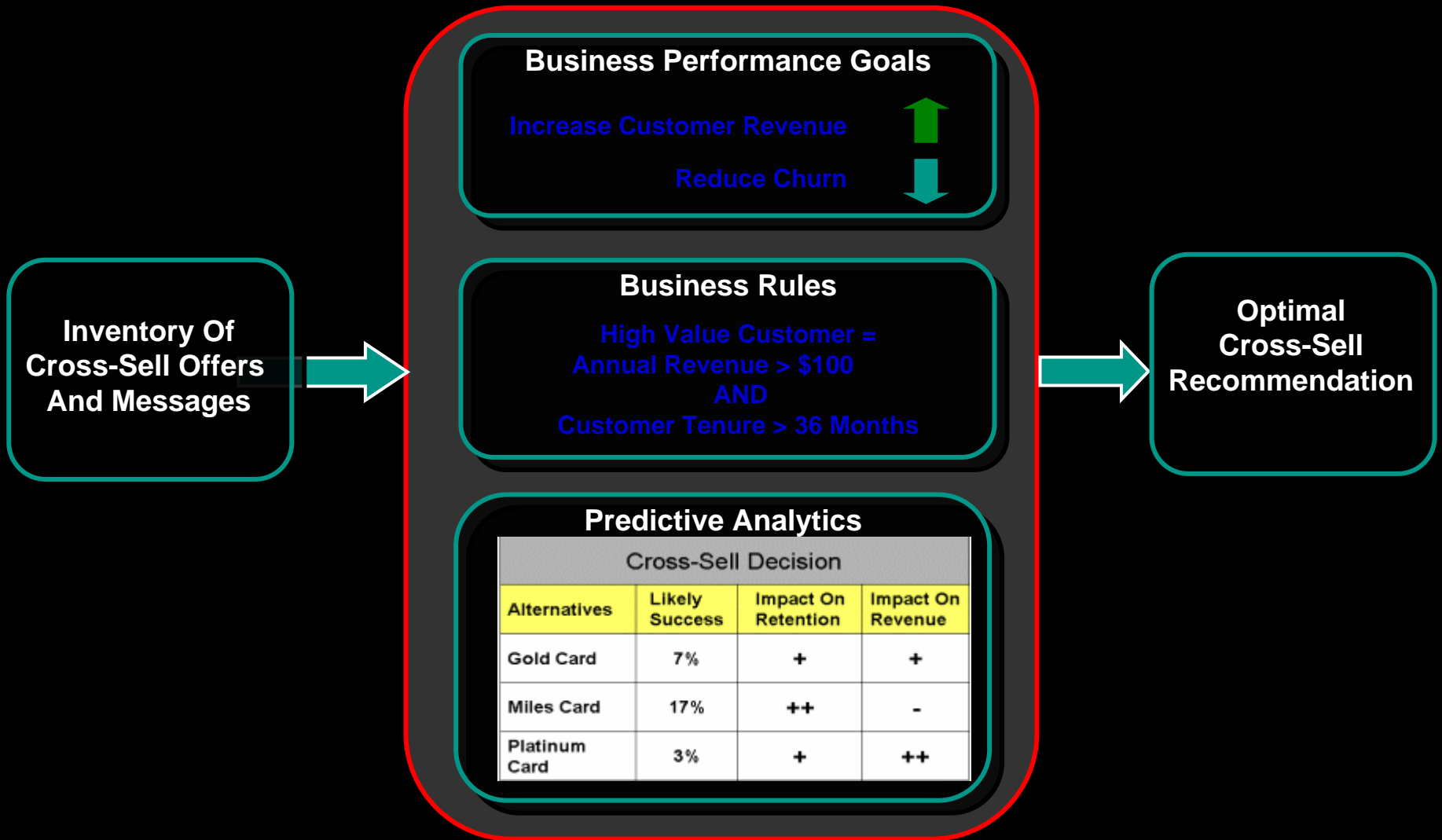


Automatically created
response record,
enabling creation of
follow up opportunity

Responses

Created	Campaign	Source Code	Offer
7/20/2005 8:55:45 AM	ML - Inbound Campaign	ML - One Time Fee Waiver	

Real-Time Decision Framework





Installing Oracle Data Mining

Architecture for Oracle Data Mining

- Installing Oracle Data Mining
- How to optimize the DB configuration?
- How to understand the schemas necessary to support Data Mining?

Installation Test

```
C:\WINDOWS\system32\cmd.exe - sqlplus wlan/wlan

C:\Documents and Settings\shyam>sqlplus wlan/wlan

SQL*Plus: Release 10.2.0.1.0 - Production on Tue May 23 23:43:24 2006

Copyright (c) 1982, 2005, Oracle. All rights reserved.

Connected to:
Oracle Database 10g Enterprise Edition Release 10.2.0.1.0 - Production
With the Partitioning, Oracle Label Security, OLAP and Data Mining options

SQL>
```

- Check to see if the product exists

```
C:\WINDOWS\system32\cmd.exe - sqlplus wlan/wlan

SQL> select parameter, value from v$option where parameter like 'Data Mining%';

PARAMETER
-----
VALUE
-----
Data Mining
TRUE

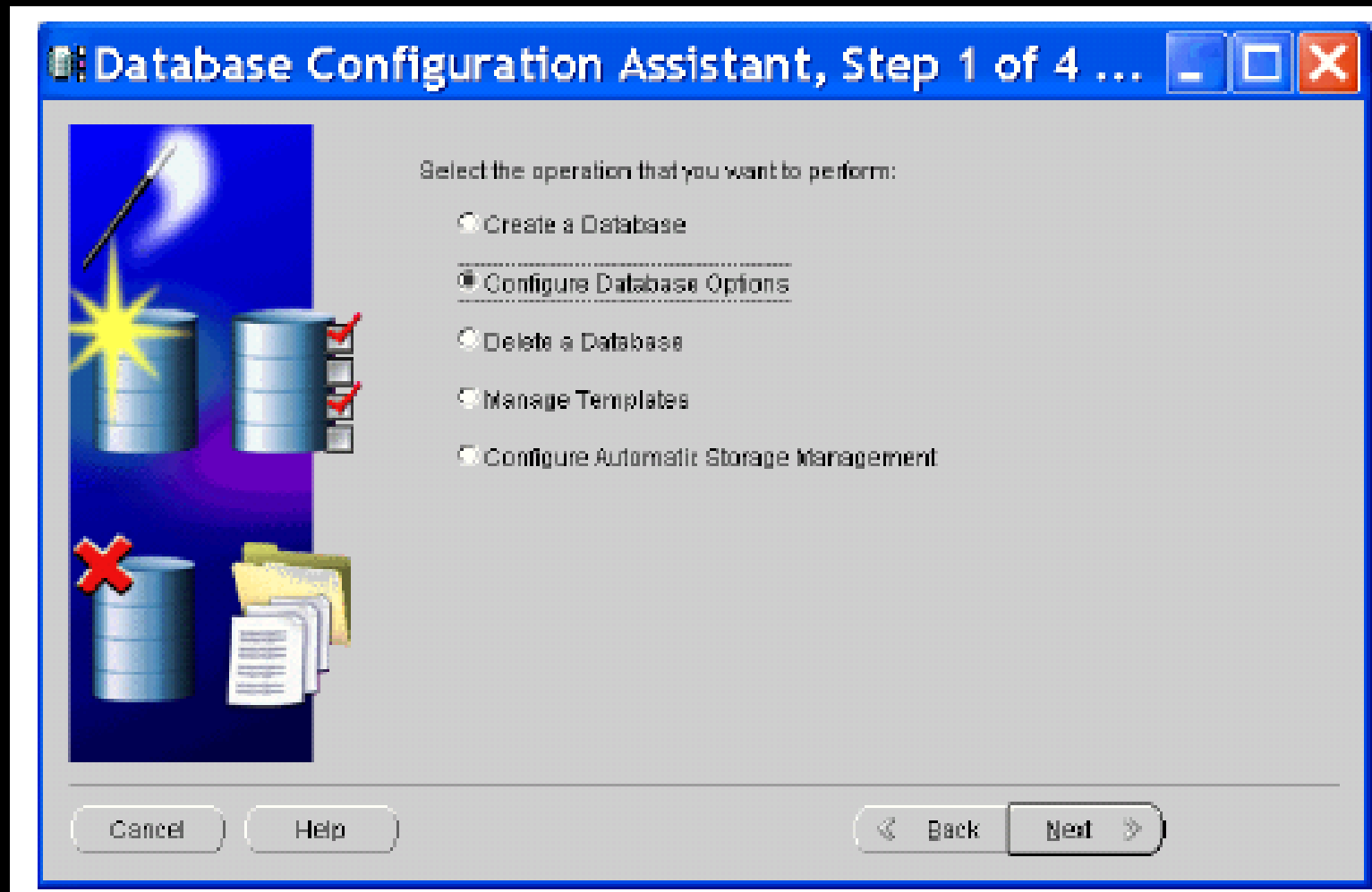
Data Mining Scoring Engine
FALSE

SQL> select parameter, value from v$option where parameter like 'Data Mining%';
```

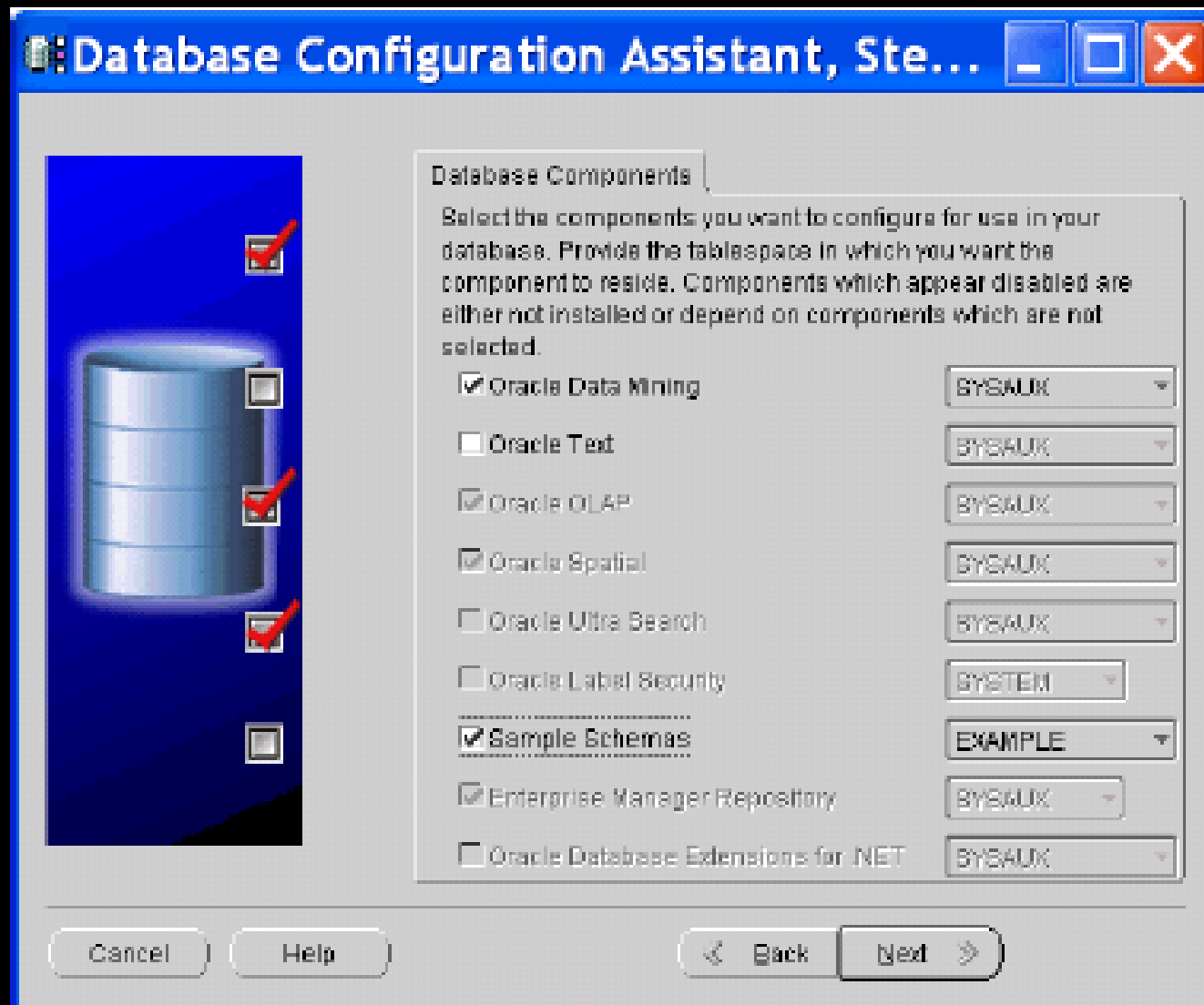
Install Option

- Default install list for Oracle 9i and 10g RDBMS include ODM
- It's a separate license, free for development, fee for production
- If ODM not installed, can be added by custom install using Oracle Universal Installer (OUI)
- Companion disk has samples programs for ODM
- ODMr the GUI
- ODM website

Add ODM



ODM...



Installing ODM GUI

- The GUI is called ODMr
- Uses JDBC connection to the database
- Can be used for most data mining tasks such as importing data from flat files, running models, scoring, visually viewing the results etc.



How to optimize the DB configuration

Sizing the DB

- Depends on use of Data warehouse or Data Mart as the ODM schema
- Size of the data to be used for mining
- Batch mode v/s real time response (analogy-optimize DB for total query run time v/s first response)

Config.ora Parameters

- If DB is used for other purposes, parallel DML can be disabled for the Data Mining sessions using the PL/SQL API's
 - `alter session disable parallel query;`
 - `alter session disable parallel dml;`
 - `alter session disable parallel ddl;`
- Some of the data mining sessions by-pass the underlying table's parallel settings
- Runs on RAC and Grid seamlessly



Schema for Data Mining

Creating mining users

- ```
CREATE TABLESPACE "ODMPERM" DATAFILE
'C:\ORACLE\PRODUCT\10.2.0\ORADATA\ORCL
\odm1.dbf' SIZE 20M REUSE AUTOEXTEND
ON NEXT 20M;
```
- The next SQL command creates a new temporary tablespace.

```
CREATE TEMPORARY TABLESPACE "ODMTEMP"
TEMPFILE
'C:\ORACLE\PRODUCT\10.2.0\ORADATA\ORCL
\odmtemp.tmp' SIZE 20M REUSE
AUTOEXTEND ON NEXT 20M;
```



# DB Privileges to the DM user

- **Access Rights:** Data mining users require several `CREATE` privileges. For text mining, users must also have access to the Oracle Text package `ctxsys.ctx_ddl`. The following privileges are required.
- `CREATE PROCEDURE`
- `CREATE SESSION`
- `CREATE TABLE`
- `CREATE SEQUENCE`
- `CREATE VIEW`
- `CREATE JOB`
- `CREATE TYPE`
- `CREATE SYNONYM`
- `EXECUTE ON ctxsys.ctx_ddl`

# SQL for Create user

- `CREATE USER dmuser1 IDENTIFIED BY change_now DEFAULT TABLESPACE odmperm TEMPORARY TABLESPACE odmtemp QUOTA UNLIMITED on odmperm;`
- SQL for Grants
  - `GRANT create procedure to DMUSER1;`
  - `GRANT create session to DMUSER1;`
  - `GRANT create table to DMUSER1;`
  - `GRANT create sequence to DMUSER1; ...`
- Export / import data mining models
  - `SQL> EXECUTE DBMS_DATA_MINING.EXPORT_MODEL('allmodels.dmp', 'DMTEST');`

Q&A

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DW & BI Special Interest Group

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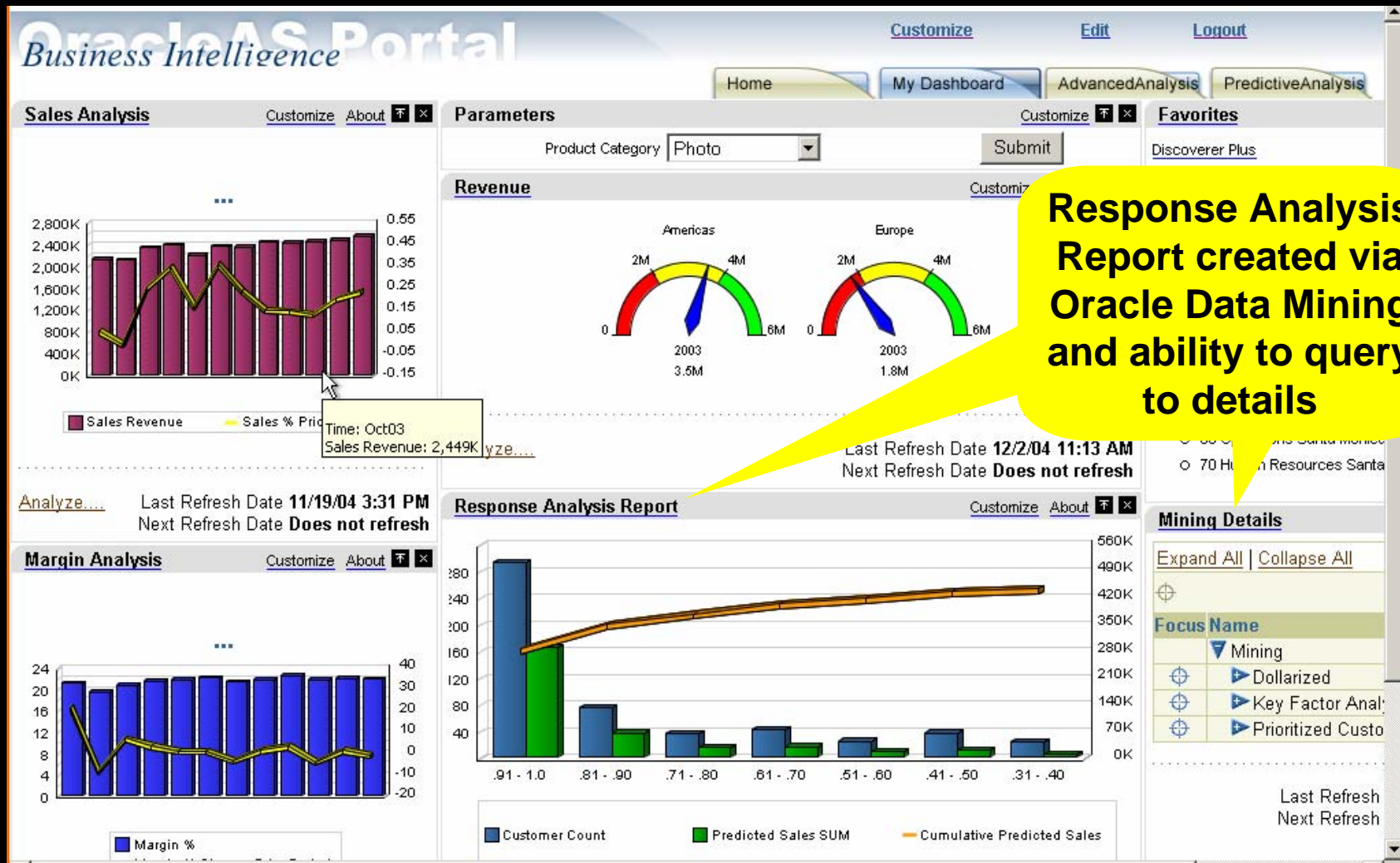


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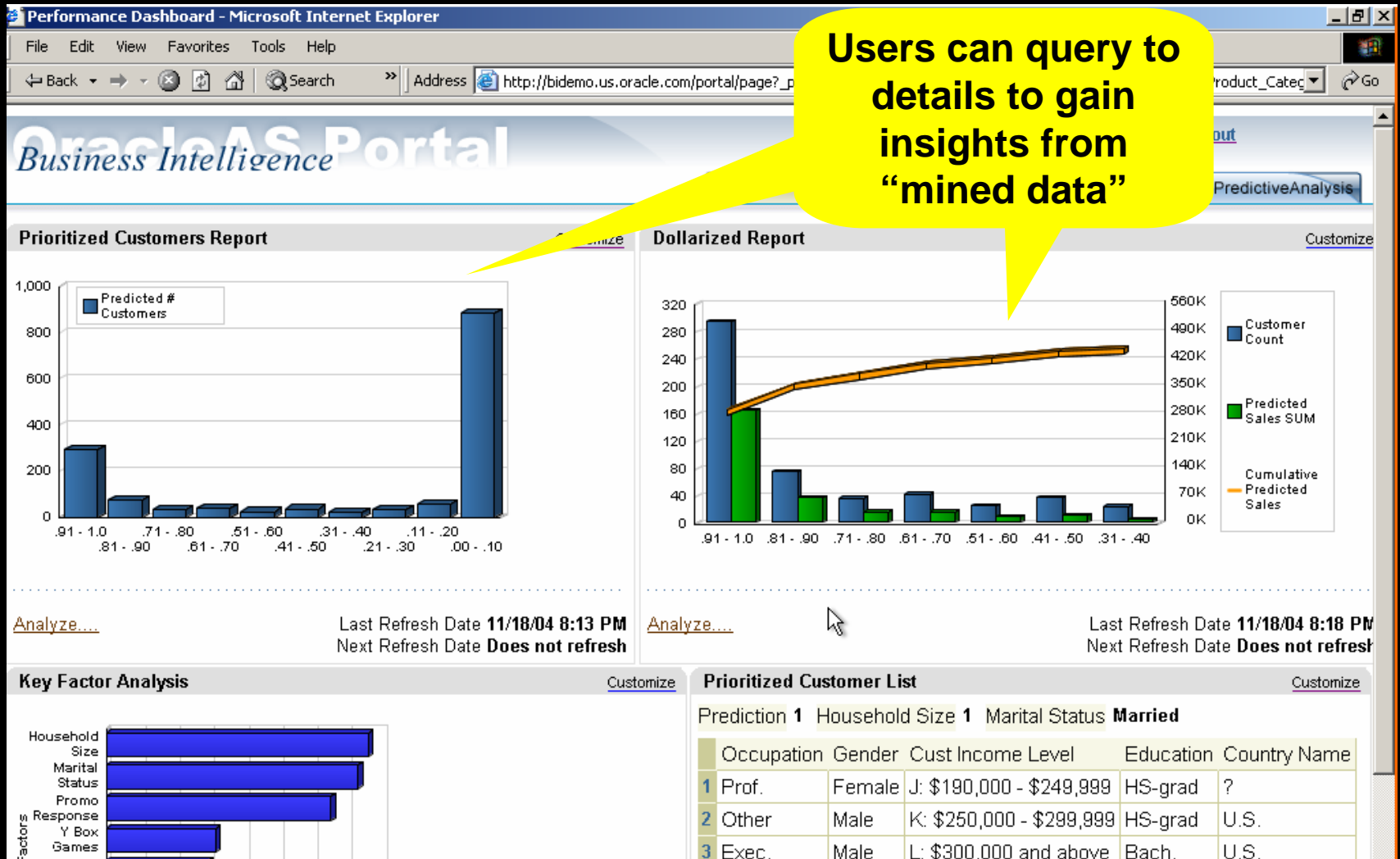
# Oracle Business Intelligence

## "Predictive Insights Reports"



# Oracle Business Intelligence

## "Predictive Insights Reports"



Users can query to details to gain insights from "mined data"