

# Case-Based Reasoning and Call Centers

Bill Cheetham

“Applying Case-Based Reasoning” by Ian Watson chapters 5 - 8

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- 1 Introduction to Help Desks
- 1 Broderbund and Compaq
- 1 GE Appliances “Save the Call”
- 1 GE Appliances eMail Handling
- 1 Customer Service Issues

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## Introduction to Help Desks

- 1 What is a customer service help desk?
  - Companies provide telephone support for their products through 1-800 numbers
  - this is a multi-million dollar industry
    - 1 Compaq
    - 1 Broderbund
    - 1 GE Appliances

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## Help Desk Challenges

- 1 Growing complexity of products
- 1 Extended warranties
- 1 Corporate Image depends on service
- 1 Limited supply of qualified people
- 1 Training is expensive
- 1 Low pay / high turnover (80% per year)
- 1 Training when new products released

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## Help Desk Challenges

- 1 Consistency among call takers
- 1 Warranties for other manufacturers
- 1 Need to store new problems so the correct solution can be determined
- 1 Need to retain problems so they can be fixed in the next release
- 1 Fair treatment for all callers

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## Help Desk Solution

- 1 Old help desks
  - work from paper manuals
  - need to find proper manual / section
- 1 New help desks
  - CBR tools
  - type question and perform keyword search
  - search uses model #, service info, ...
  - automated without call taker (Internet)
  - eMail Questions

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## General Help Desk

- 1 Expand to any getting ANY information
  - question answering system
  - collaborative search
  - knowledge management tool
  - decision making tool



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## Compaq SMART System

- 1 The problem
  - Compaq manufactures personal computers, laptops, servers
  - In early 1990's had group of support engineers for dealers
  - In March 1991 they opened a customer call center
  - Customer service aim was “elate every customer by being accessible, responsive, enthusiastic, courteous, helpful, and caring.”
  - Received thousands of calls daily
  - Increased staff by 100%, but that was not enough

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## Compaq SMART System

- 1 The new process - CBR system (Inference Corp.)
  - The call taker collects basic information (name, address, ...)
  - Asks for a brief description which is typed in
  - SMART uses the description to provide an initial search
  - The call taker is presented with the best matching cases and questions to distinguish between them.
  - As each question is answered a new search is performed
  - Once a sufficient level of certainty is reached, the call taker will relay the solution.
  - If no solution was found the call was transferred to a more experienced call taker with a log of all the answered questions.

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## Compaq SMART System

### 1 Learning

- problems that were transferred by SMART
- solved by more experienced call taker
- call taker updates the case-base
- 1st level call takers can use the new case

### 1 Impact

- non-transferred solutions from 50% to 87%
- engineers moved to other work

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## Broderbund

### 1 The problem

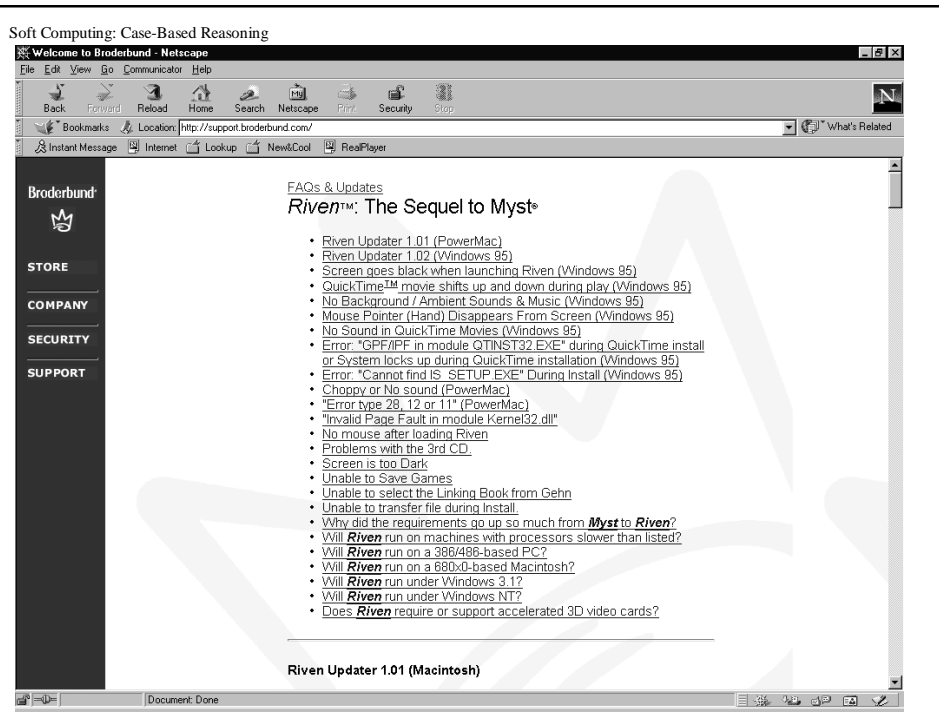
- Broderbund creates computer games and educational software
- Their customer service answered questions about their software, hardware, operating systems, drivers, ...
- Call takers were experienced technologists, not trained as service representatives. “They were surly, short-tempered, and occasionally insulting to the customers”
- Releasing, MYST, for Christmas 1995
- Expected large number of technical support calls
- 1-800 call is expensive

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# Broderbund

- 1 New process (1997) - CBR system
  - Internet based customer support
  - 3,000 cases went live Christmas day
  - Customers performed searches and answered questions
  - The same case-base is used when customers call the 1-800 number
- 1 Benefits
  - In 1997 implemented for all products
  - 24 hour support
  - Web site handles work of 7 call takers
- 1 Replaced by simple FAQ in 1999

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## GE Appliance

- 1 The problem
  - GE Appliances sells all major household appliances
  - Their customer service answers more than 3,000,000 calls per year and has over 300 full/part time call takers.
  - There is 70% turnover per year
  - Training is difficult
  - Unnecessary service calls are expensive
    - 1 each call costs about \$75
    - 1 15% of service calls are unnecessary
  - People would rather get the answer over the phone than wait at home

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## GE Appliances

- 1 New process - CBR system (eGain)
  - Internal call takers use CBR
  - Internet based customer support
  - Mail out parts with instructions
  - Customers can schedule their own service calls on-line
- 1 Future
  - Graphics, animations, and video available
  - Internet chat / Internet phone with call taker
  - Push the appropriate web site
  - CBR for remote diagnostics

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## eGain k-Commerce

- 1 Case-Based Reasoning with Question Answering and Rule-Based System
- 1 k-Commerce is the market leader for customer support applications
  - Authoring environment (CBR Express),
  - Search engine (CasePoint),
    - 1 DLL, and API
    - 1 WWW facility,

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## k-Commerce - Case data

- 1 LOG: 7/29/96 14:19:15 - Lower cassette tray is installed improperly. The printer didn't print, and couldn't print a self test. On inspection the display message was: "14 Lower Tray" and the optional Lower Cassette tray was installed incorrectly. The action taken was to reinstall the lower Cassette tray.

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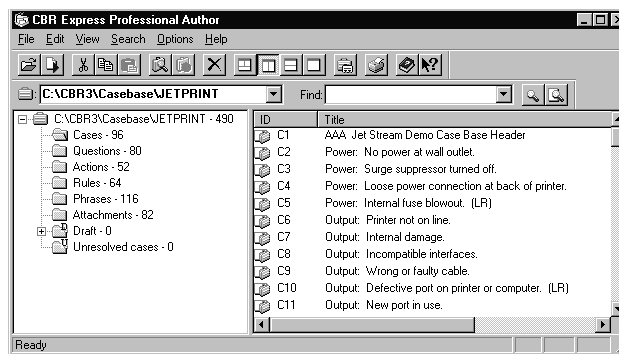
## K-Commerce - Case Format

1 Case Title	Lower cassette tray installed improperly
1 Case Description	Printer doesn't print, and will not print self test
1 Questions Can you print a self test? What is the display message? Is optional Lower Cassette tray installed correctly?	NO 14 Lower Tray NO
1 Action	Reinstall the Lower Cassette tray

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# k-Commerce- CBR Express

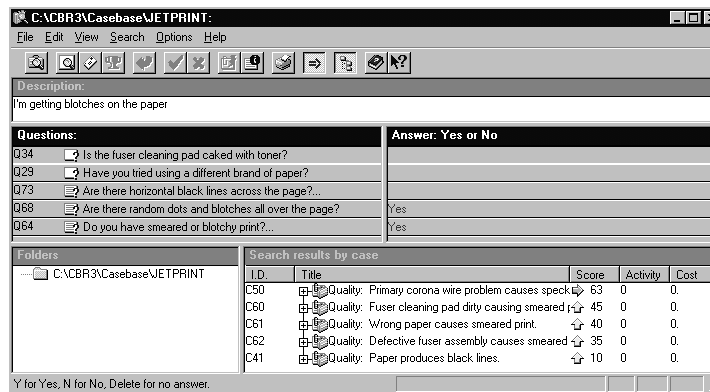
- 1 Windows based case authoring tool



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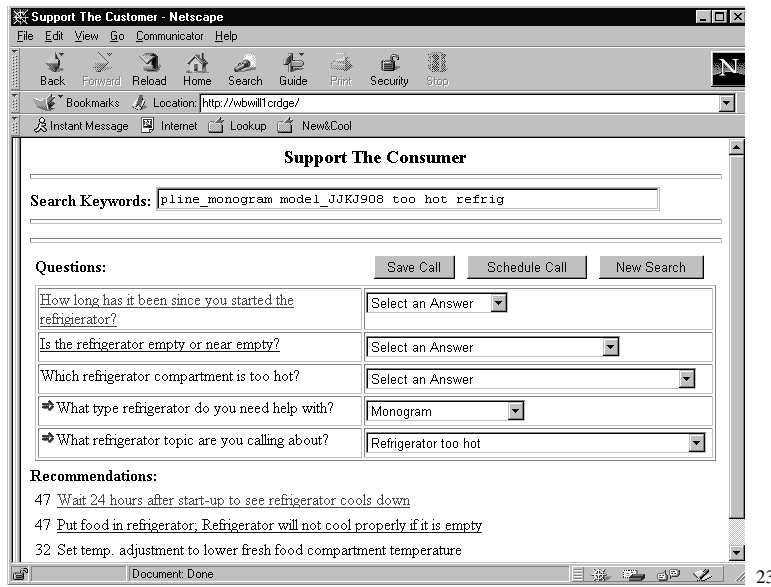
# k-Commerce - CasePoint

- 1 Windows based case retrieval tool

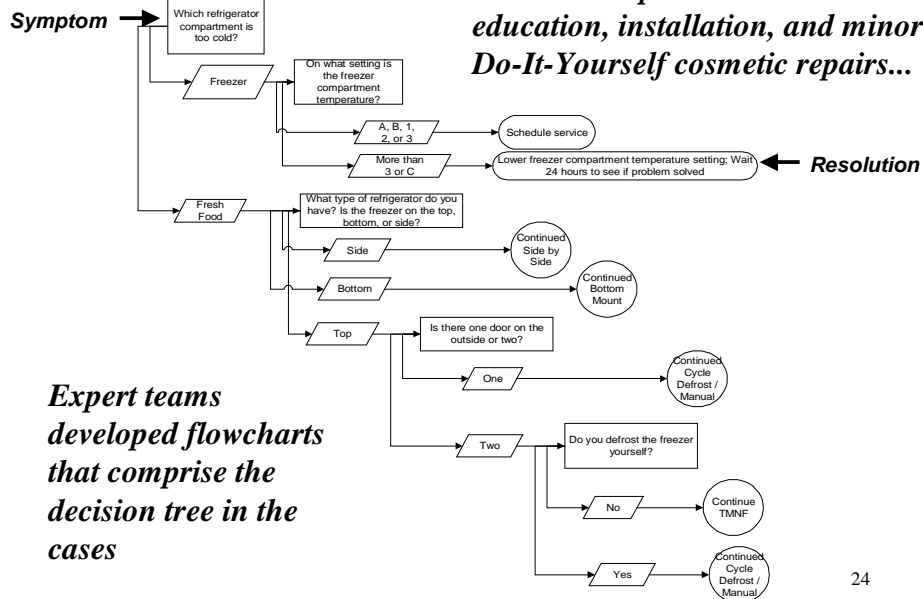


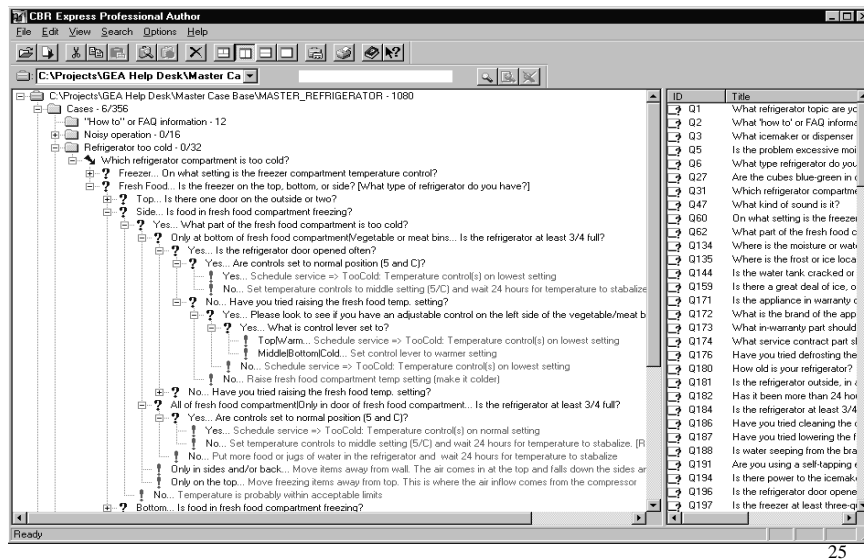
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# k-Commerce - Webserver



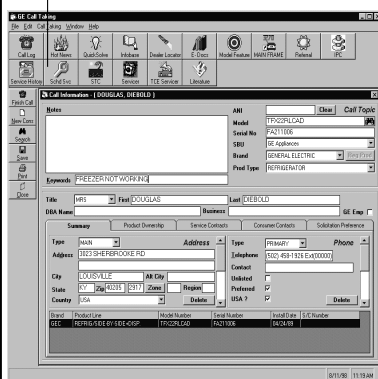
*Cases developed to solve customer education, installation, and minor Do-It-Yourself cosmetic repairs...*



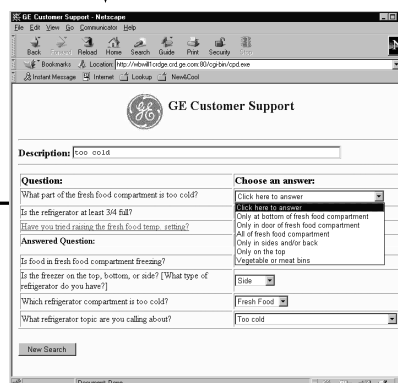


Desktop launches CBR and sends Brand, Product Line, Warranty Type, Model Number and Problem statement to CBR.

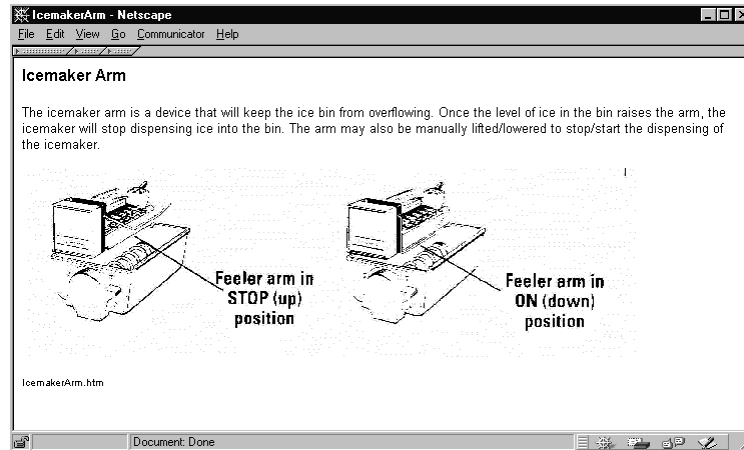
- Unlimited number of cases
- Only relevant cases displayed
- Attachments / Graphics



Calltaker collects Consumer Information and Product Information on call using Calltaking 32



Calltaker attempts to save the call using CBR



*Text attachments and graphics provide resolutions to Consumer Problems*

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## GEA "Save the Call" - Benefits

Fully deployed for all product lines on June 1999

This effort saves \$2.5 MM / year (3.9 % to 12.3%)

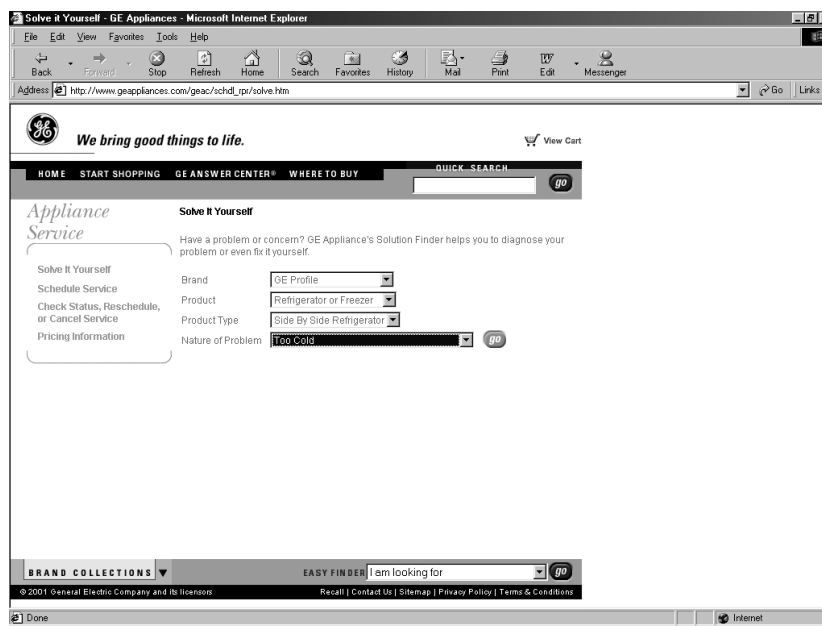
- reduce Service Call Rate (SCR) and spending on Customer Education & Installation (CEI) calls. CEI calls were 15% of all calls (1,400,000 per year)
- each service call avoided saves \$50
- increase consumer satisfaction (solve issues in one call),
- feedback issues to design teams
- we can enforce policies "Always ask question X if callers issue is Y"

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## Additional Uses of CBR

- 1 Web Based Save the Call for Internet Service Application
  - Meets the Consumer expectation for total online service
  - Increases the Brand commitment for GE consumers
- 1 Consumer Relations - controls concessions, reduces escalations, provides consistency
  - Resolves consumer complaints faster and to the consumers satisfaction more consistently than without CBR

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[http://www.geappliances.com/geac/schdl\\_rpr/solve.htm](http://www.geappliances.com/geac/schdl_rpr/solve.htm) <sup>30</sup> demo

## Updated Overall Results

**Interview with Appliances General Manager 5-8-03**

**“This is the most wonderful thing to ever happen at Appliance”**

**Saving 17% of all calls.**

**Over the last 4 years this has saved \$61 Million**

**Surveys show customer satisfaction is up**

**Better at answering questions of potential customers (sales up)**

**Web version being updated (purchased new version from eGain)**

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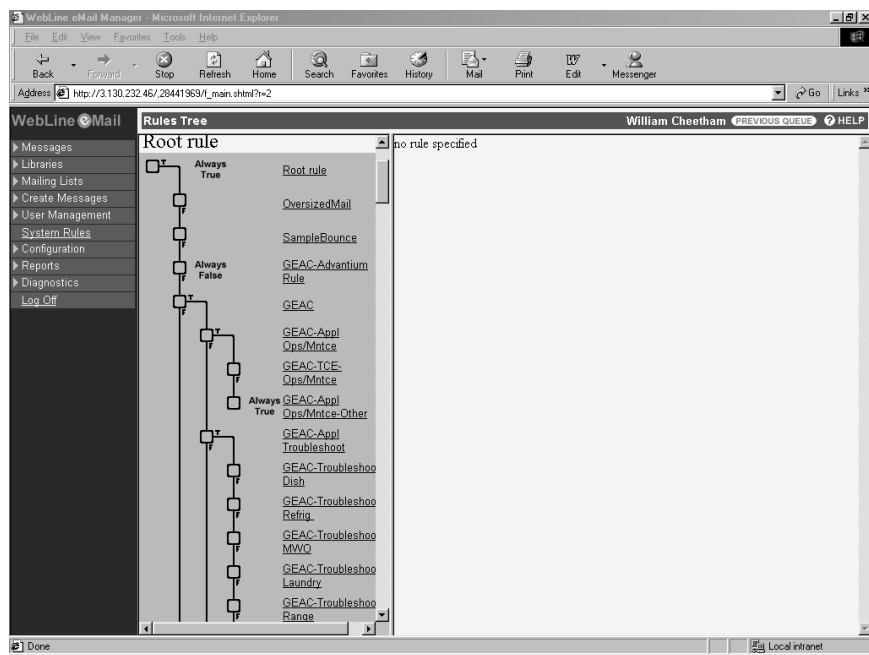
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## GEA eMail - Problem

- 1 Managing Costs/Productivity
  - 10 min per email at 1.00 per minute
  - Increasing volume
  - Consistent miss on business commitment
  - Agent subjectivity
- 1 Content Consistency
  - Inconsistent answers among team members
  - Inconsistent answers among GEA teams (GEAC/ASI)
- 1 Reporting
  - Manual reporting (over/under 24 hours) lacking detail
  - No automated method to measure agent productivity or performance

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Soft Computing: Case-Based Reasoning

**EDIT RULE GEAC-Troubleshoot Refrig**

Rule Name: GEAC-Troubleshoot Refrig Test This Rule OK

Description: Troubleshooting tips for refrigerators  
Check/Set Mail processor status

Status:

Initialization Status: Form initialized Wait until form is initialized before using.

Auto Explanation: **GEAC-Troubleshoot Refrig**

**Troubleshooting tips for refrigerators**

- If Body text has any of the patterns: "refrigerator", "fridge", "icebox", "ice box", "refrig", "freezer", "sxs", "side-by-side", "side by side", "ice maker", "icemaker", "ice machine"
- If FALSE, return FALSE, else do this:
- Assign the mail to AnswerCenter
- Suggest templates with these keywords: GEAC-Icemaker,GEAC-Refrigerator
- Assign these Categories:GEAC-Problem-Solver\_DIY
- Return TRUE

Bypass this rule, returning FALSE or TRUE

Make this rule return FALSE even when executing actions

**Matching Tests**

Match Time:

Skip tests for Time and Date If the Time and Date are between

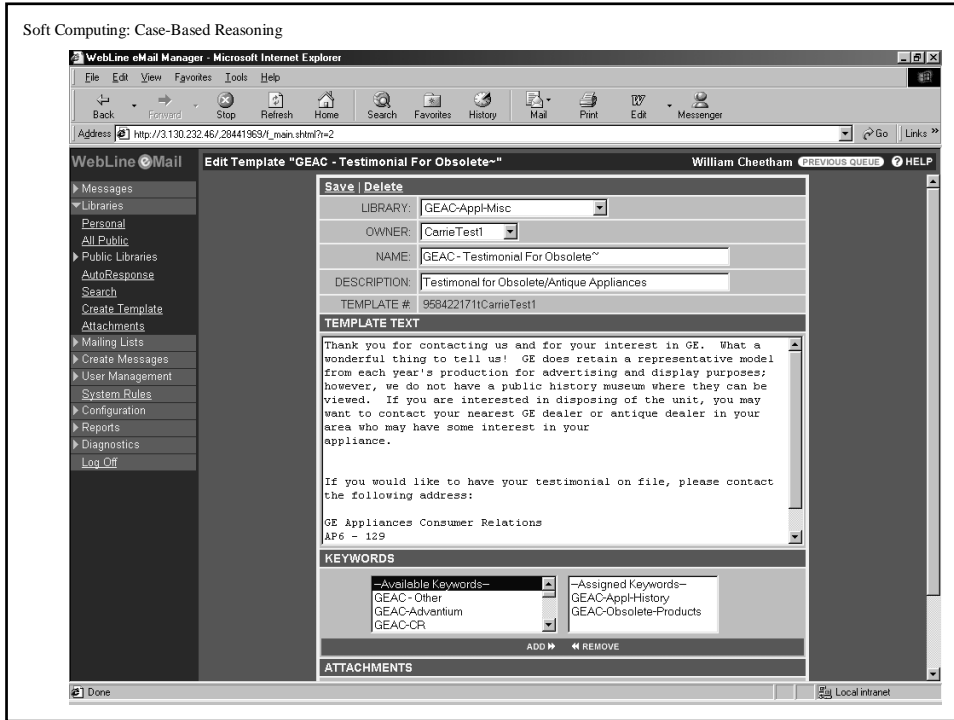
And

Match Text:

Soft Computing: Case-Based Reasoning

**All Public Templates**

TITLE	KEYWORDS	DESCRIPTION	LIBRARY	OWNER
GEAC - Inquiry for becoming em-	GEAC - Other	Inquiry for becoming employee with GE	GEAC_Parts-Non-Appl-Other	LD55630
GEAC - Rebates (Delays)	GEAC-Rebates	Rebate delay inquiries	GEAC-Appl-Misc	CarrieTest
GEAC - Stock	GEAC-Stock_Financial	GE Stock inquiries	GEAC_Parts-Non-Appl-Other	CarrieTest
GEAC - Canadian WTB Parts, S-	GEAC-Intl-Prepurchase	CAMCO WTB, Parts, Service, Operation	GEAC-International	CarrieTest1
GEAC - Connection Roast	GEAC-Ranges-Gas-Electric	Definition of Connection Roast	GEAC-Appl-Operate	CarrieTest1
GEAC - CR 800#	GEAC-CR, GEAC-CR-HQ	GE CR 800#	GEAC-Appl-Complain	CarrieTest
GEAC - CR Headquarters Address ~	GEAC-CR, GEAC-CR-HQ, GEAC-Respond-Complaints	Address for CR Headquarters	GEAC-Appl-Complain	CarrieTest1
GEAC - Dish P/S-Block Wash Arm	GEAC-Dishwasher	Blocked wash arm	GEAC-Appl-DIY_Solve	CarrieTest1
GEAC - Dish P/S-draining while ~	GEAC-Dishwasher	Dishwasher draining while filling	GEAC-Appl-DIY_Solve	CarrieTest1
GEAC - Dish P/S-Humming	GEAC-Dishwasher	Dishwasher Humming	GEAC-Appl-DIY_Solve	CarrieTest1
GEAC - Dish P/S-interior stain	GEAC-Dishwasher	How to remove interior staining in dishwashers	GEAC-Appl-DIY_Solve	CarrieTest1



## GEA eMail - Results

### 1 Hard Benefits

- 1 40% reduction in email handle time
  - \$4.00 cost out per email
  - \$600,000 gain in productivity for 2001
- 1 99.9% response within business commitment
- 1 Average span 5 hrs

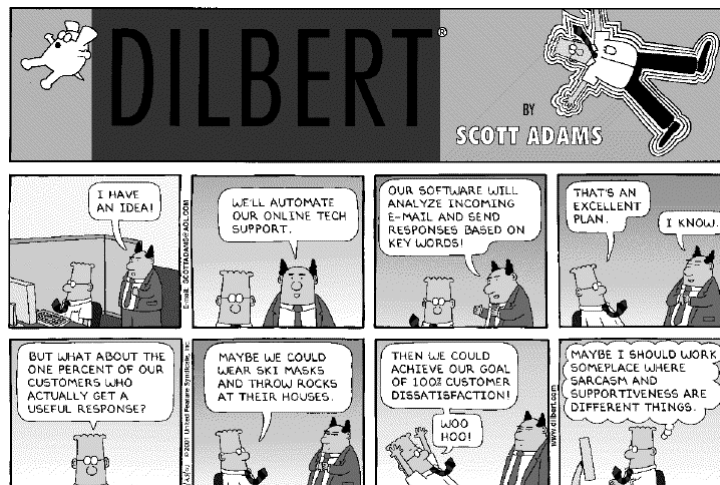
### 1 Soft Benefits

- 1 Improved Process and Content Control
  - Consistence Internal Response
  - Streamlined processes among email teams
  - Reduced Agent Subjectivity
- 1 Improved reporting
  - Ad Hoc
  - Individual Metrics
  - >Performance Appraisal

Increase Productivity and Responsiveness, Reduce Cost!!

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“80% of profits come from 20% of customers. The rest nag you”

But technology changed everything.

It has become much easier to track and measure individual transactions

People can now serve themselves on the Web at a negligible cost.

Companies are doing everything possible to push their customers--especially low-margin ones--toward self-service.

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'We're Sorry, All of Our Agents Are Busy with More Valuable Customers'

*Companies have become sophisticated about figuring out if you're worth pampering--or whether to just let the phone keep ringing. Here are some of their techniques:*

#### **CODING**

Some companies grade customers based on how profitable their business is. They give each account a code with instructions to service staff on how to handle each category.

#### **ROUTING**

Based on the customer's code, call centers route customers to different queues. Big spenders are whisked to high-level problem solvers. Others may never speak to a live person at all.

#### **TARGETING**

Choice customers have fees waived and get other hidden discounts based on the value of their business. Less valuable customers may never even know the promotions exist.

#### **SHARING**

Companies sell data about your transaction history to outsiders. You can be slotted before you even walk in the door, since your buying potential has already been measured.

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