

# Memorandum

DATE: July 20, 1994  
TO: Wilson, Roxanne, Steve, John McG, Terye, Dan,  
Bob G, ~~JH~~, PAC - Chase Last  
FROM: Angela Hey  
RE: Verity Due Diligence Consulting

Angela  
Well done  
might not be but to  
NTK (need to know!)  
HLS

Attached is an extremely sensitive report on Verity financing from Trident Capital. On July 19th I attended the Trident general partners' meeting, led by Don Dixon General Partner. The report includes a Gartner piece on Fulcrum. The meeting was very lively with many questions to myself and a consultant from Sybase who undertook technical due diligence. Verity is raising \$3M and the financing is oversubscribed by the original investors - they are now up to Series G of financing. Verity, formed in 1988, is in the full-text database market and has recently hired Philippe Courtot as CEO. Philippe sold cc:Mail for \$65M to Lotus from having \$1200 in the bank and 20 employees when he joined.

PS - Thanks to Judy for putting the report cover on INPUT stationery!

Peter

1994

CS LP 1



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CSLP1



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<https://archive.org/details/verityduediligen01unse>

# Custom Consulting



# Verity, Inc.

HIGHLY SENSITIVE

Do NOT USE FOR  
RESEARCH  
Apedc





# What are the Key Issues for Verity?

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## VERITY:OVERVIEW

- **Technology - will Verity be successful in the transition to client server**
- **Market - are customers increasing the use of full text retrieval and will full text retrieval be highly valued**
- **Management - will the team be able to execute; do we have confidence in Courtot**
- **Deal Structure - can we get an attractive valuation**



# What is Verity's Business?

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## VERITY:OVERVIEW

- full text search and retrieval software
- Customers use the tools develop applications for individuals, workgroups, departments, and enterprises to filter, search, retrieve, analyze, and navigate information sources
- Customers use the tools today for
  - litigation support
  - customer support
  - market intelligence
  - library
- Customers have historically been large corporations and gov't agencies (CIA, White House)
- Growth of electronic information sources have created opportunities from individual desktops to enterprise-wide systems



# Why is Verity Attractive to Trident?

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## VERITY:OVERVIEW

- IRR OF >40% (2 yr exit) based on the current public market value of a competitor that Verity appears more attractive than today
- Very positive major trends
  - shift to client/server (where Verity is focusing)
  - growth in the volume of information and need to intelligently access the information
- Consistent with Trident's strategy and builds our marketing "story"
- Provides a window into information providers that need these tools
- Prior positive experiences with the CEO



# What is Verity's History?

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## VERITY:OVERVIEW

- **Founded in 1988**
- **Developed custom mainframe systems**
- **Grew to approx. \$20M in revenue in 1993; Never profitable**
- **Consulting services masked product problems, but provided hope of exit for investors**
- **Agreed to be acquired by Frame Technology @ \$50M valuation, but deal fell through due to Frame stock price drop**
- **CEO replaced by Board in August 1993**
- **Major turnaround achieved over last 12 months**





# What is the Current Status of Verity?

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## VERITY:OVERVIEW

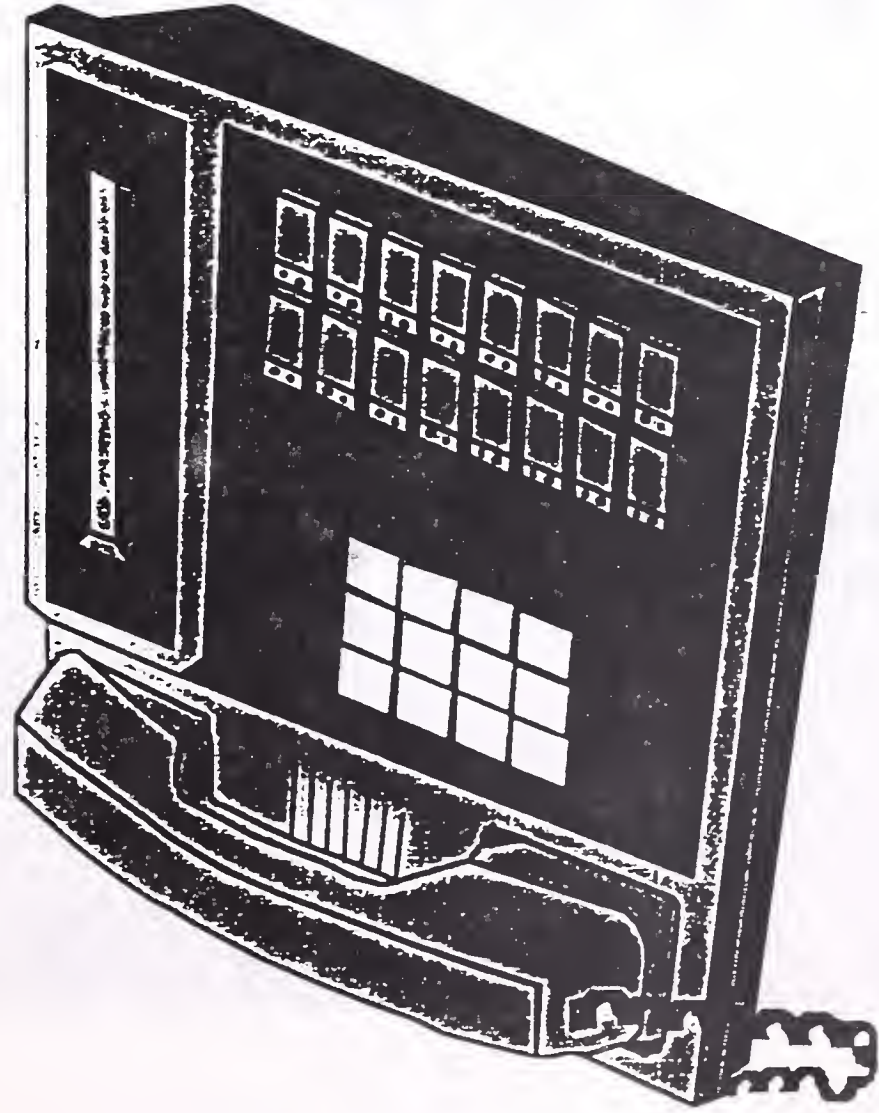
- Significant change enacted by Phillippe Courtot since taking over in 8/93
  - complete turnover in US sales force
  - significant reduction in operating expenses(Headcount changed from 155 to 125, 60% of which are new)
  - increase in R&D expenditures
- Product transition underway to client/server architecture
  - platform independent (OS, database, or info vendor)
  - scalable technology for individual, workgroup, departmental, and enterprise systems
- installed base of 650 corporations and government agencies worldwide
- 128 employees



# TOPIC at Work\*: Telecommunications

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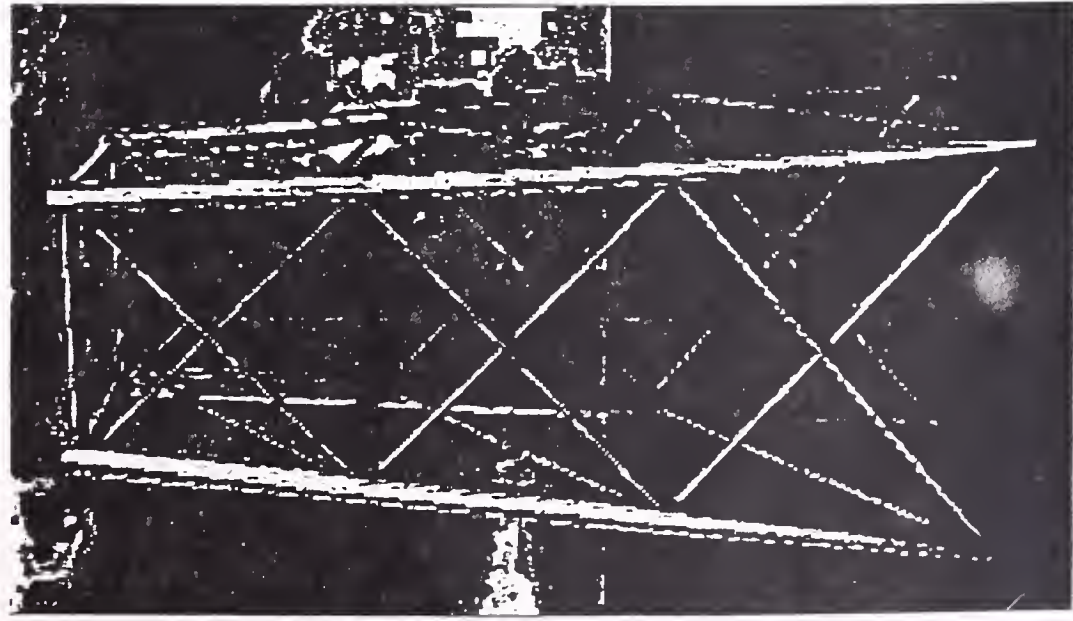
- GTE
- AT&T
- Pacific Bell
- British Telecom
- MCI
- PacTel
- Bellcore
- Intelsat



# TOPIC at Work\*: Petrochemicals

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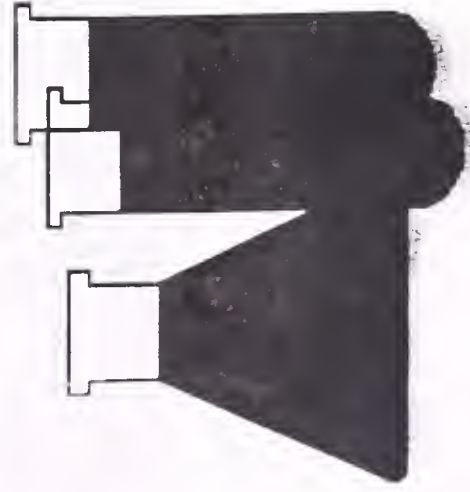


- British Petroleum
- Texaco
- Mobil
- Exxon International
- Phillips Petroleum
- Atlantic Research
- ICG
- Ontario Energy



## TOPIC at Work\*:

# Commercial Pharmaceuticals & Medical

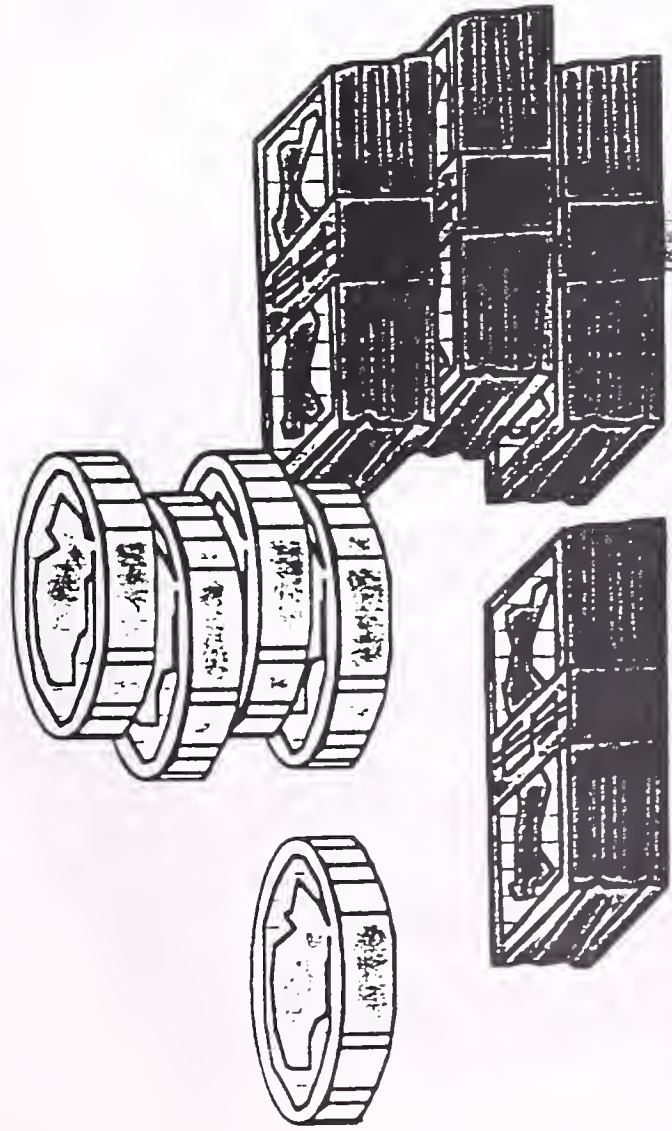


- Chiron Corporation
- Childrens' Hospital
- Colgate Palmolive
- Janssen (Johnson PRI)
- Pfizer
- Proctor & Gamble
- Syntex/Syva
- Warner Lambert
- Yamanouchi (Japan, UK, NYC)





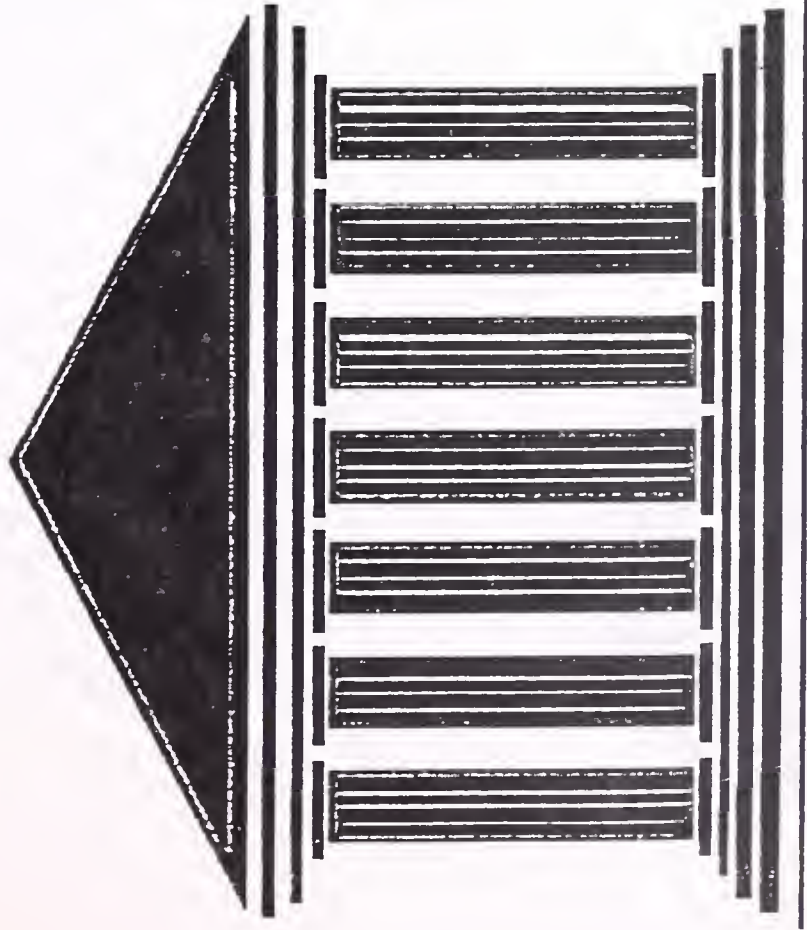
# TOPIC at Work\*: Financial Services



- Aetna Life Insurance
- Bank of America
- Chase Manhattan Bank
- Bankers Trust
- J.P. Morgan
- Chemical Bank
- Liberty Mutual
- Federal Bank of Boston
- Phibro Energy



# TOPIC at Work\*: Litigation Support

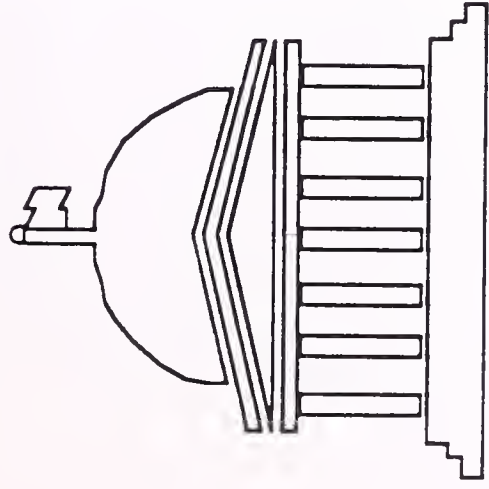


- Department of Justice (Canada)
- Bennett Jones
- Carroll, Burdick, McDonough
- Cravath, Swaine & Moore
- Davis, Polk, Wardwell
- FNV Bondsbestuur
- Labor Canada
- Russell McVeagh
- Sutherland, Asbill & Brennan



## TOPIC at Work\*:

# Government Intelligence & Message Handling



- AMHS (AF/ESD, Army/WIS, Navy/NOSC)
- Air Force Intelligence Agency
- Defense Intelligence Agency
- Marine Intelligence Center
- National Security Agency
- Strategic Air Command
- National Security Council
- Royal Canadian Mounted Police
- Northern Ireland Police
- Australian Diplomatic Corps. Network



# TOPIC in D.O.E.

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- EG&G INEL
  - Advanced Test Reactor Documentation
  - Technology Information System
  - Solvent Substitution System
  - Library
  
- Los Alamos
  - Library
  - MSDS
  - DOE orders
  - Policies & Procedures
  
- Hanford
  - All site regulations
  
- LLNL
  - Library
  - Automated Message Handling
  
- Sandia
  - Arms Control Treaties
  
- Argonne
  - Classified









# Why Does Verity Want Trident to Invest?

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## VERITY:OVERVIEW

- Paydown existing \$800K bank debt
- Increase R&D (world-wide-web server and Watcher development accelerated)
- Working capital cushion
- Trident focus on information company customer base
- Don Dixon as board member to assist in the liquidity process



# Why did Verity struggle prior to Courtot?

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## VERITY:OVERVIEW

- **Market for full text retrieval is only now broadening beyond specialized applications**
- **Mainframe orientation limited the market**
- **Development was not focused on creating products - consulting used to solve customer needs**
- **Frame merger possibility sidetracked company**



# What are the terms of the investment?

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## VERITY:OVERVIEW

- \$3M financing
- \$1.5M from existing investors; \$1.0-1.5M from Trident (all existing investors want to over invest their pro rata share)
- Series G Preferred
  - senior liquidation preference
  - participating preferred
  - \$0.85/share + 100% common warrant coverage @23¢
- existing shareholders waive anti-dilution protection
- 38.0M shares outstanding after new money and warrants (excludes 1.6M shares exercisable at \$200M company value)
- Post-Money valuation range of \$16.2 - \$20.5M
  - \$16.2M @  $(\$0.85 \div 2)$  (recognizes the de minimis cost to exercise warrants
  - \$20.5M @  $(\$.85 + .23) \div 2$

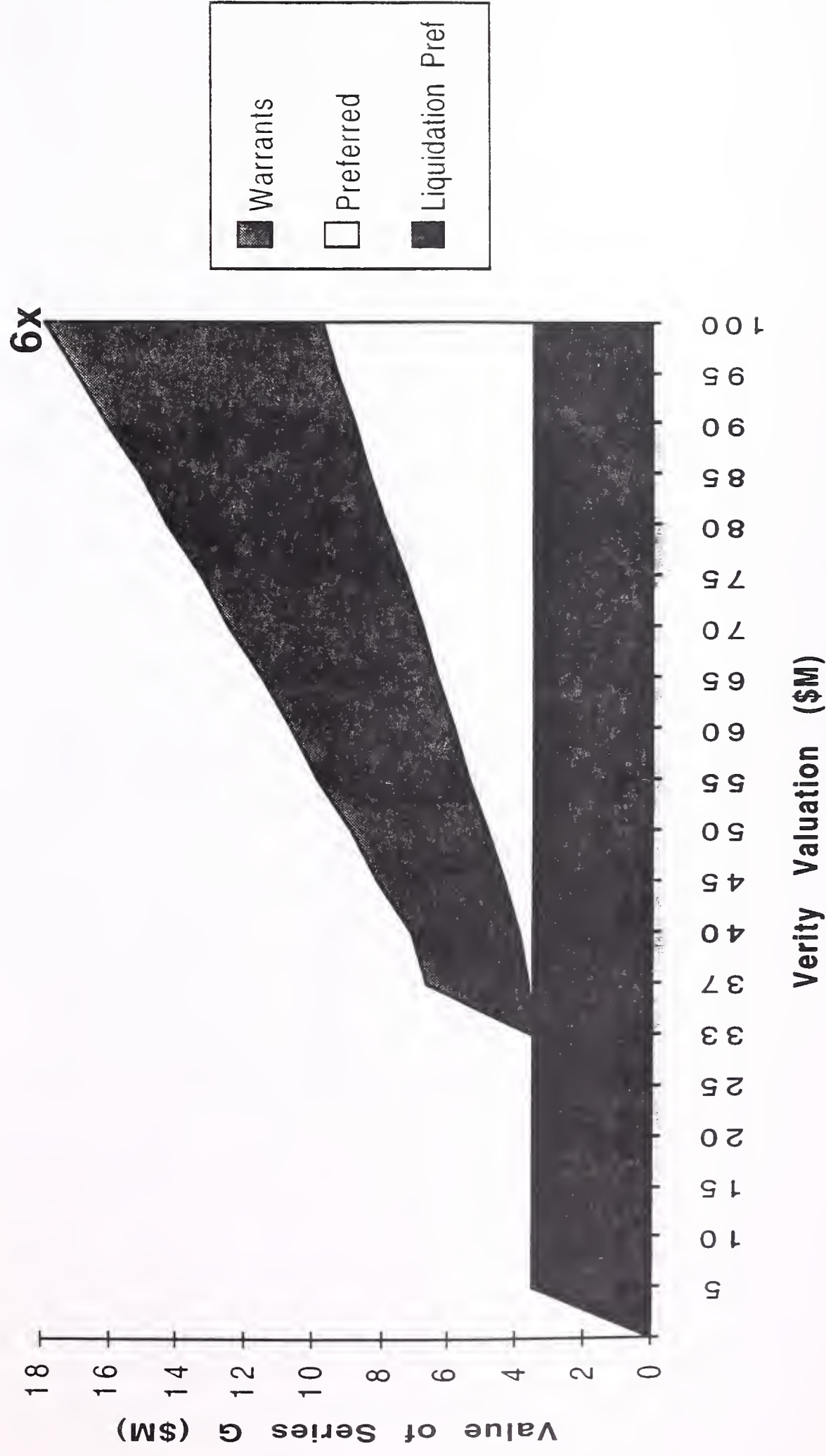




# What are the potential returns?

## VERITY:OVERVIEW

Potential Return on \$3M Investment in Verity







THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

# Why is Full Text Retrieval an Opportunity?

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## VERITY:OVERVIEW

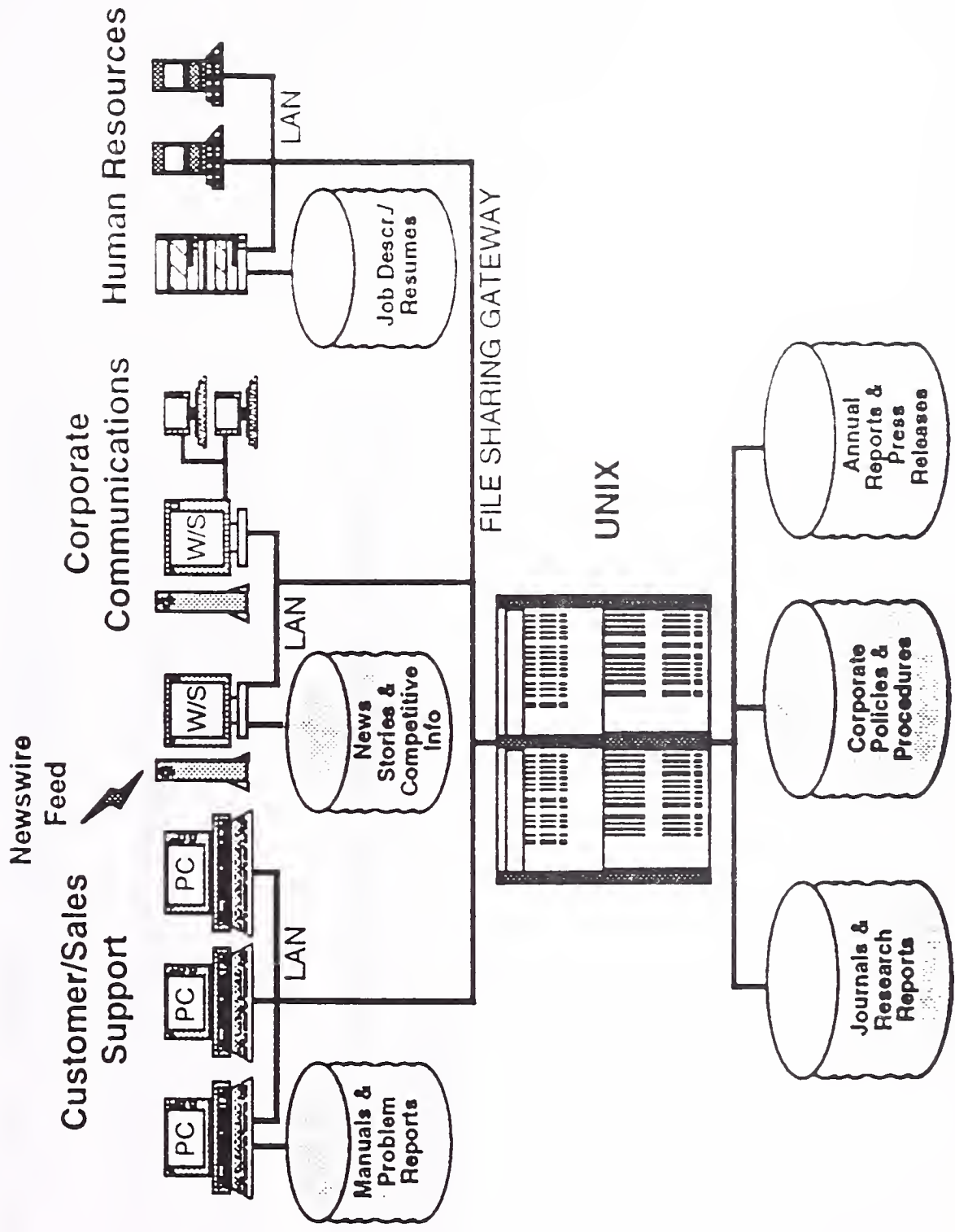
- 90% of existing corporate data is unstructured (in documents, not databases)
- Much of this data is now in electronic form
  - Word processors, scanned documents CDROM, DBMS text blobs
- As the world becomes more networked we get proliferation of electronic information
  - e-mail, on-line, real-time feeds, internet
- Retrieving information is currently platform, application and/or source dependent
- Its getting harder and harder, yet more and more important, to find useful information in this sea of data



# TOPIC Enterprise-Wide at HP

"We see TOPIC as a strategic tool for building corporate knowledgebases that allow users to share in the intelligence of the organization."

Willem Roelandts  
VP & General Manager,  
Networked Systems Group,  
Hewlett-Packard Company







# What Do Full-Text Retrieval Customers Want Today?

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## VERITY:OVERVIEW

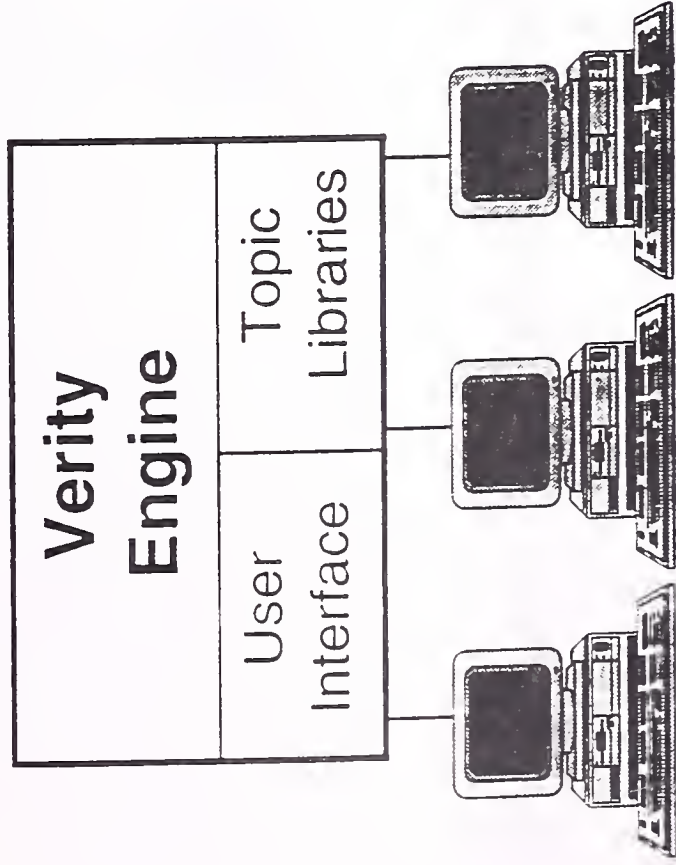
- Find me the information I need regardless of where it is
- Notify me when the information I need has arrived
- to be able to deploy these capabilities throughout the organization
  - across all platforms (computer, OS, application)
  - across all data formats



# Verity Listening To It's Customers

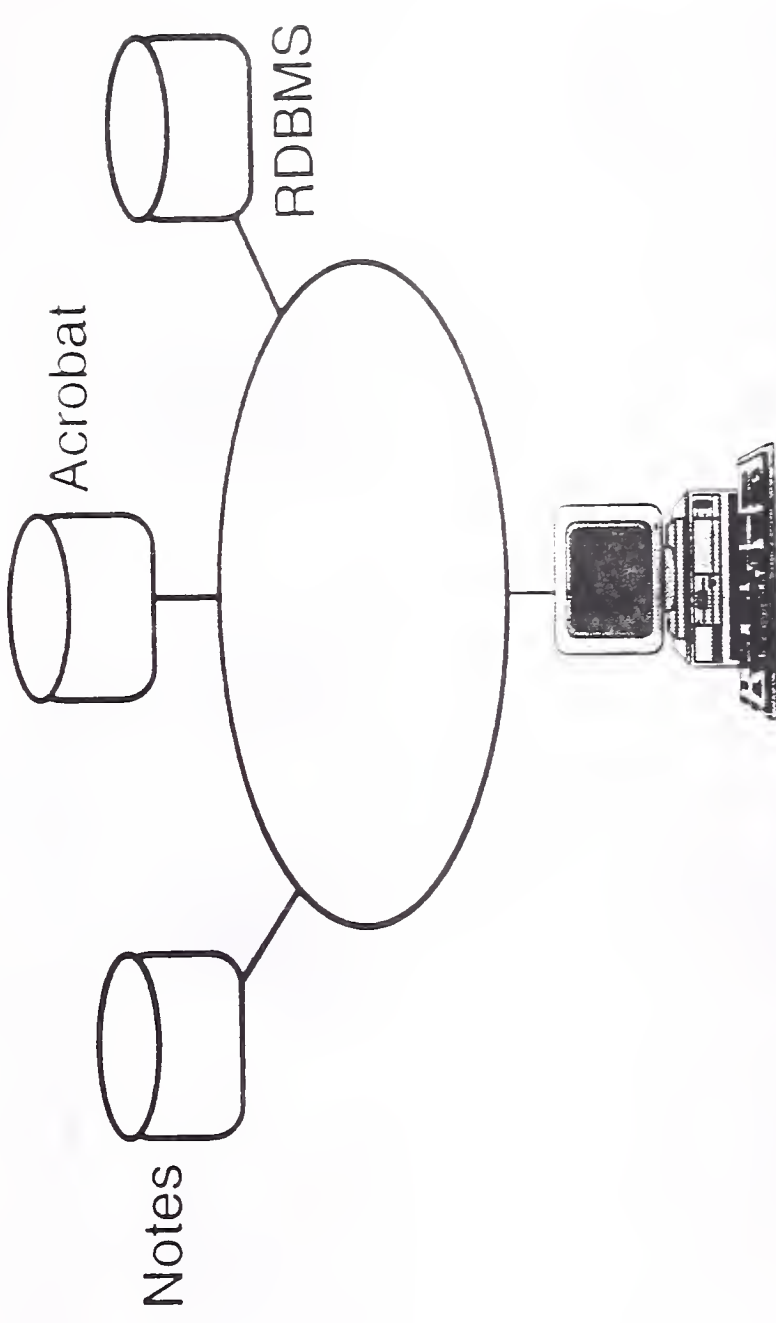
## Paradigm Shift

Bring me the documents



We will retrieve them for you

Find me the information I need wherever the information lives

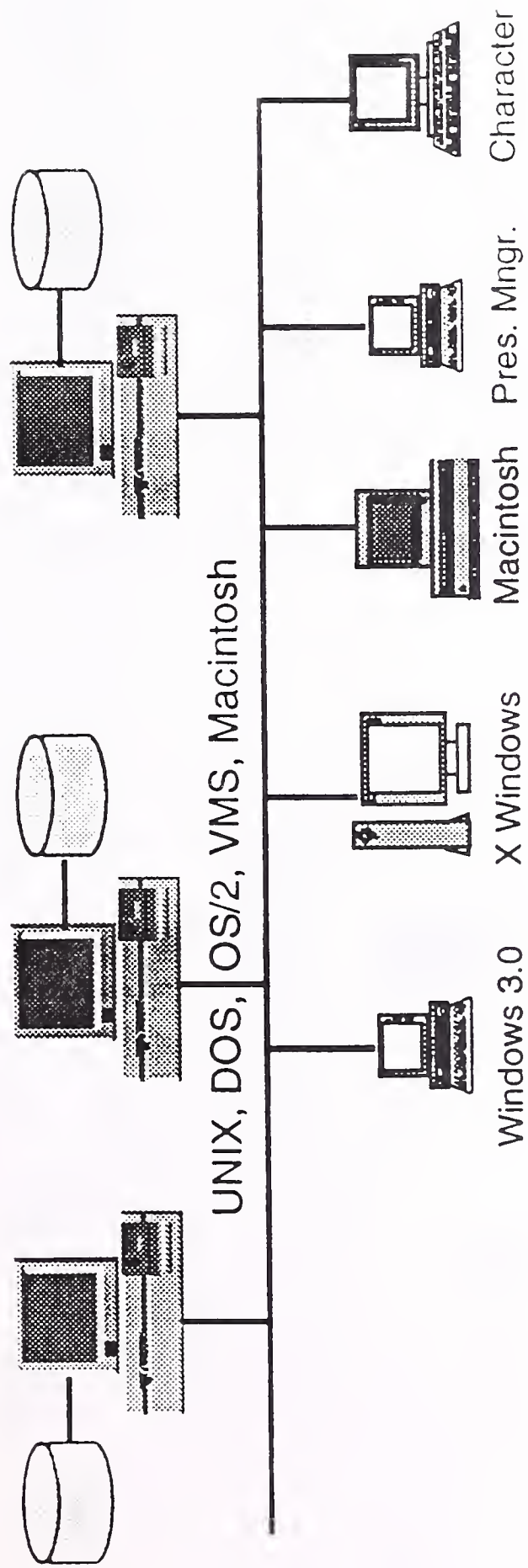


and notify me when the information I need has arrived

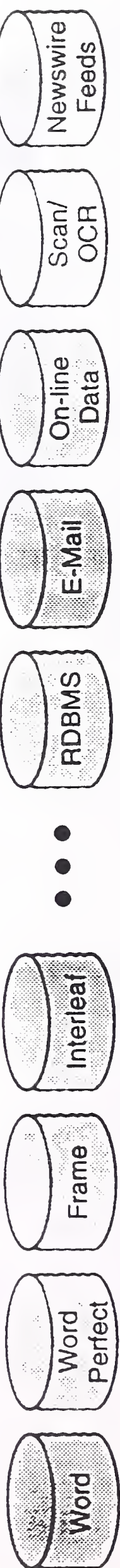


# System Architecture: Fingertip Access to ALL Relevant Information

## ■ Across Platforms



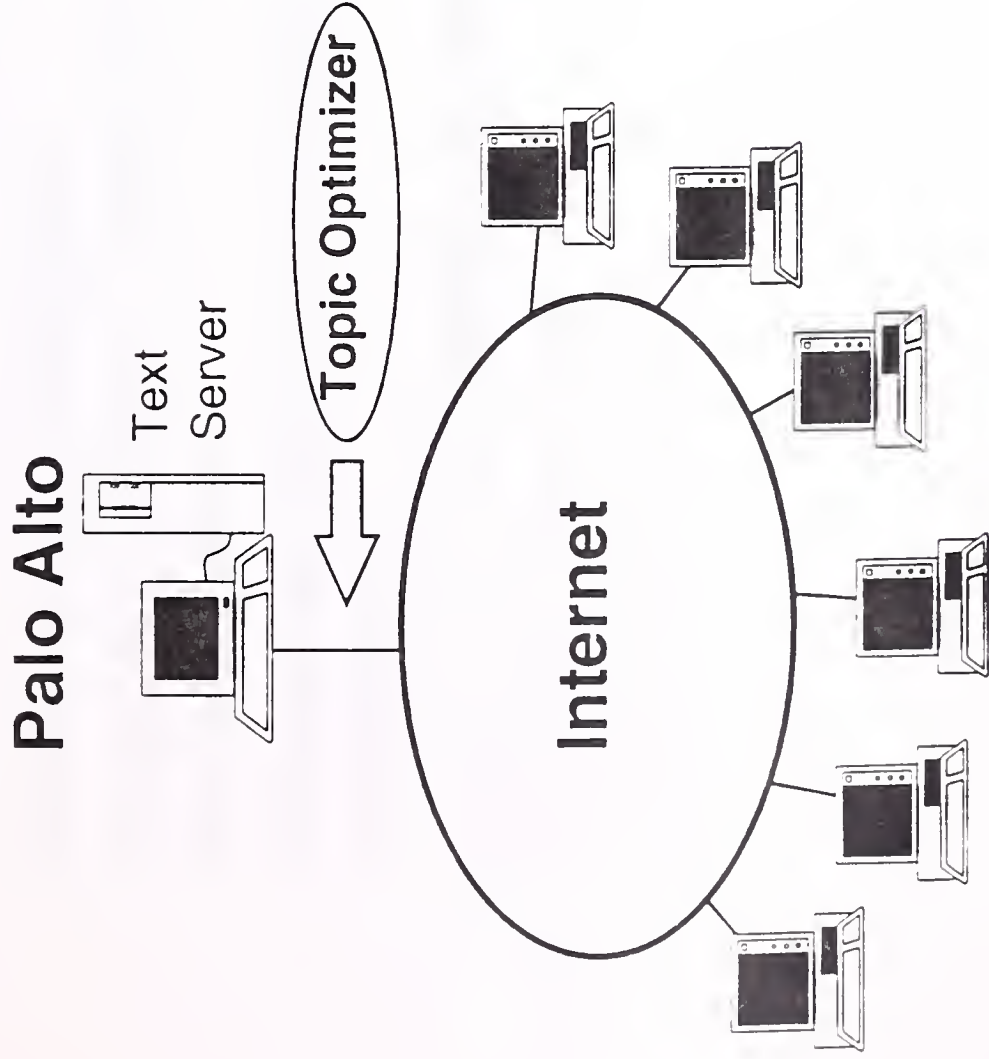
## ■ Across Native Formats





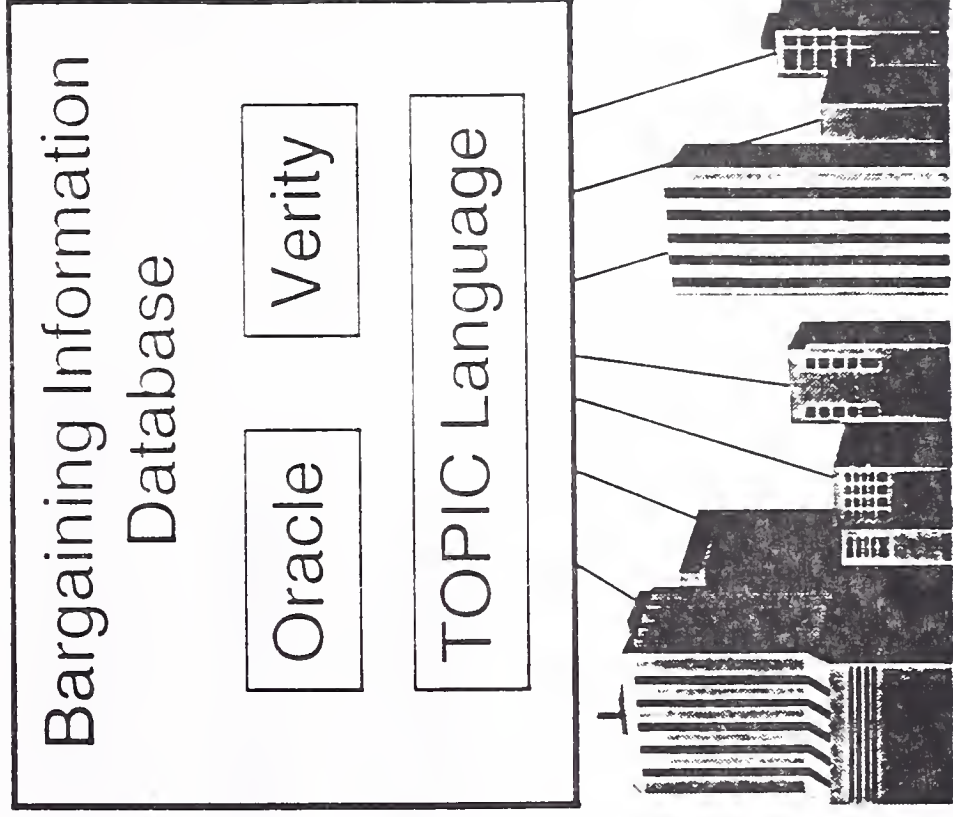
# Verity Listening To It's Customers (continued)

## Users Want Deployability Now



2700 Engineers Worldwide

Hewlett-Packard



50 Large Canadian Companies

Labour Department of Canada





# **How do these wants translate in to products?**

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## **VERITY:OVERVIEW**

- **powerful user interfaces**
- **scalable modules - ability to scale from a single PC to an enterprise**
- **APIs(application programming interfaces) for easy integration**
- **ease of set up, implementation and maintenance**
- **accurate searching**
- **reliable performance**



# What are the current Market Conditions?

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## VERITY:OVERVIEW

- \$200-300M annually ( estimated by Gartner Group)
- Growing at 30%/year - consistent with the rest of the client/server market
- lots of companies/very fragmented - competitors run the gamut from IBM to academic software to PC shareware
- Many different approaches to search and retrieval
- No company with total solution



# What is Verity's Product History?

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## VERITY:OVERVIEW

- **High Quality of Search Results**
- **Handle Large Volume of Data**
- **Real-Time and Retrospective Products**
- **Very sophisticated customers**
- **Sold first to the gov't and then Fortune 500**

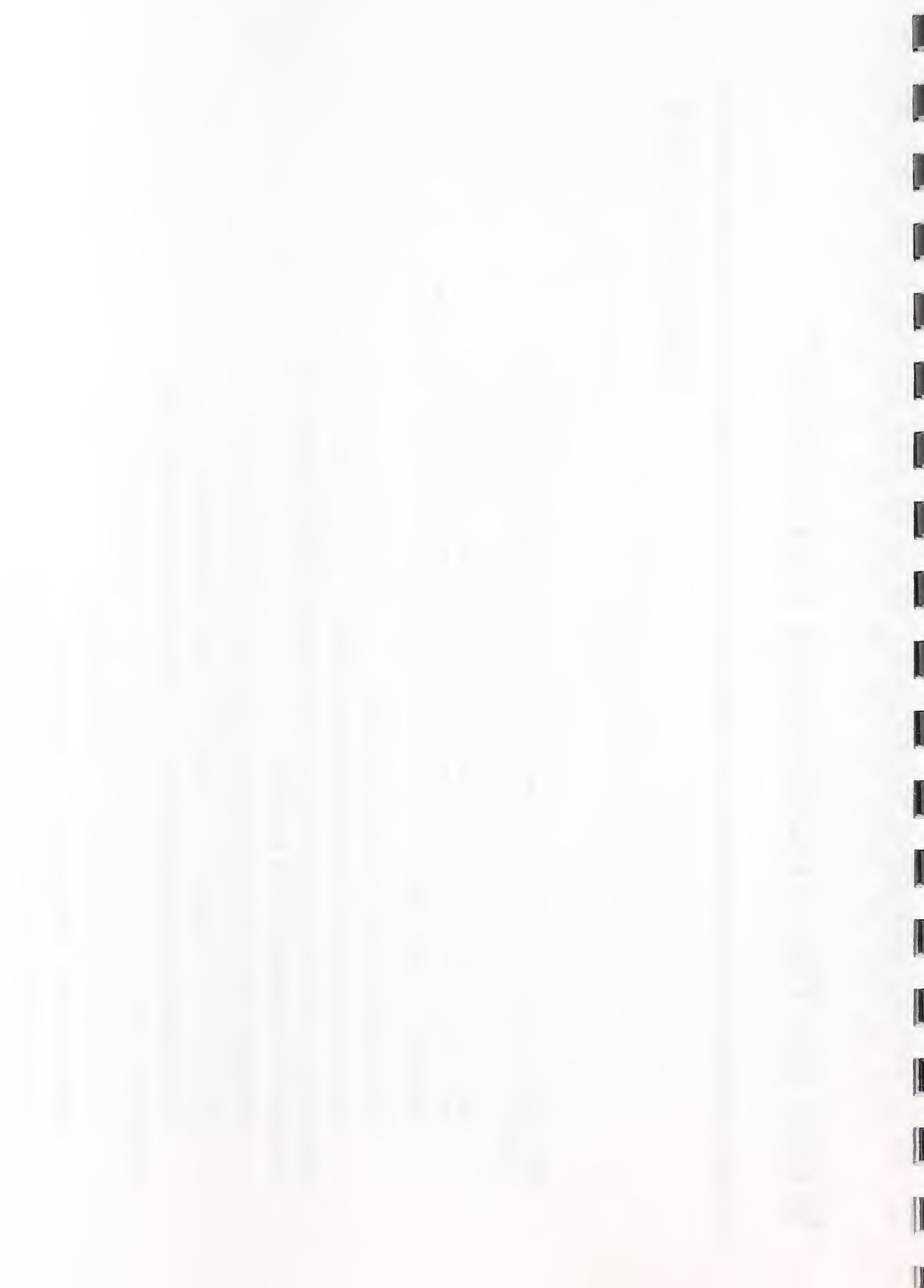


# What are the Technology Dynamics?

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## VERITY:OVERVIEW

- The advent of open software architectures makes the ability to run on all platforms, using all operating systems, and all networks a requirement
  - operating systems have evolved significantly in the last few years (Microsoft's OLE and Apple's OpenDoc), making it much easier to provide software components)
  - to succeed you need to be everywhere
  - you must conform to the emerging standards
- Proliferation of desktop computing has made the opportunity larger and changed the requirements to succeed
  - Desktops make the presentation issues much more important
  - More and more users are connected to more data sources
  - Faster servers appear regularly making the data more accessible
- Focus on the less sophisticated customer is now a requirement
  - Ease of use is necessary condition for success
  - Mass markets, higher volume, lower prices
  - Computer works harder so user doesn't have to





# **What is Verity's New Product/Marketing Strategy?**

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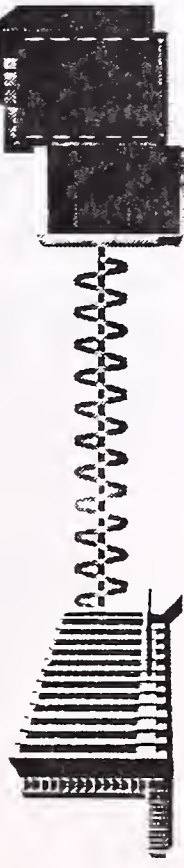
## **VERITY:OVERVIEW**

- Follow the E-mail analogy
- Populate the world with the engine
  - Horizontally (OEMs, Notes, Acrobat, PC-DOCS...)
  - Vertically ( VARs, Resume Tracking, Litigation Support, Help Desk)
- Deliver TOPIC software agents and tie everything together
- Have agents and TOPIC language operating on ALL sources of data



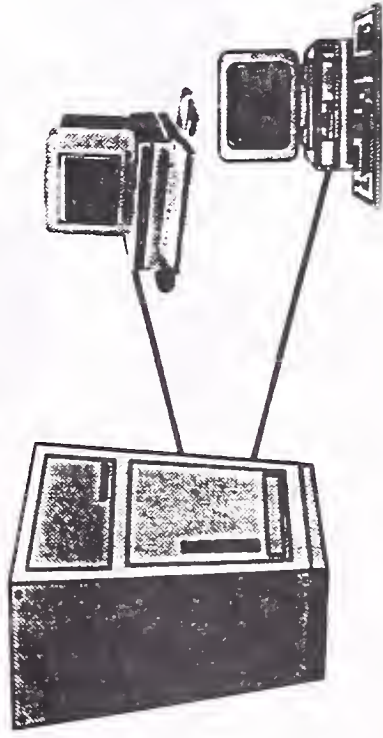
# The E-Mail Analogy

Outside

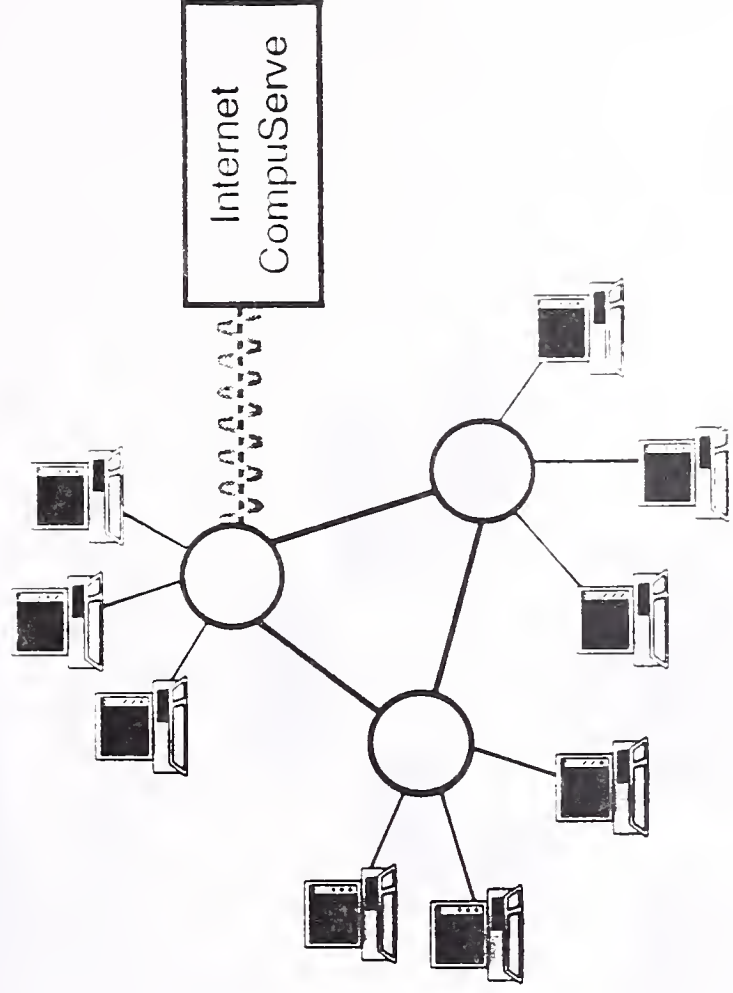


External mail services

Inside



Mainframe-based E-mail



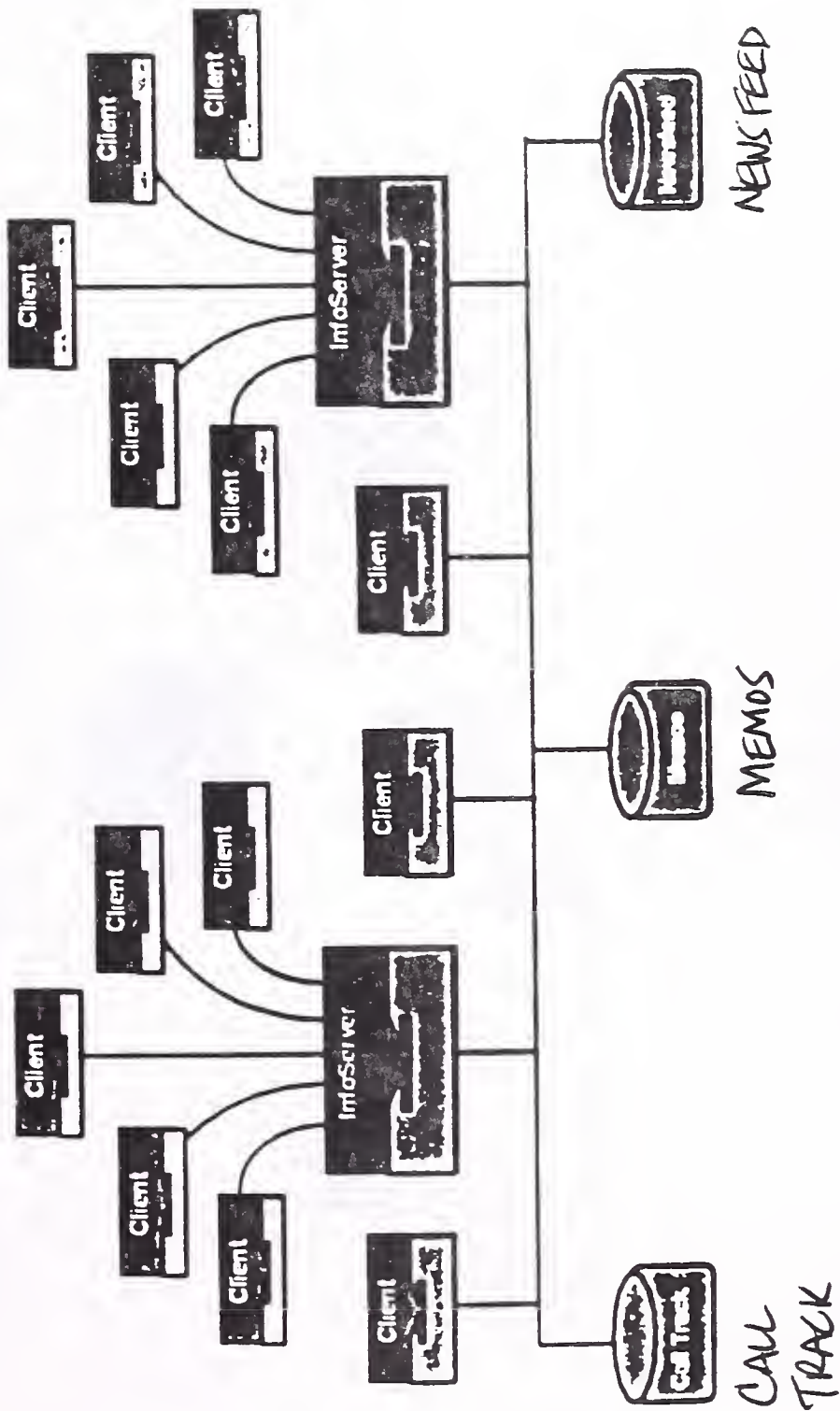
LAN-based E-mail

1980's: For the Few

1990's: For the Many

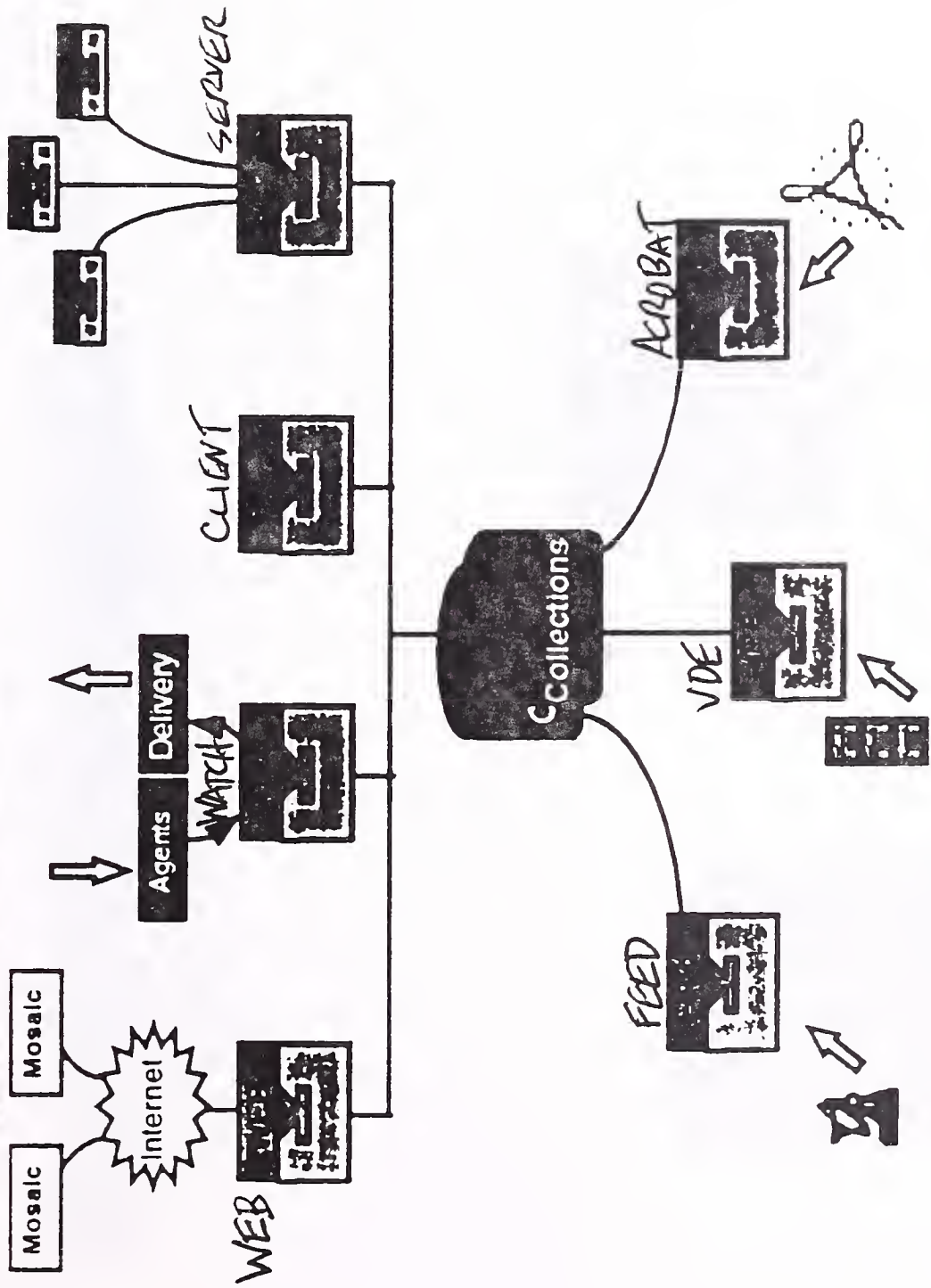


# InfoServer™ Configuration



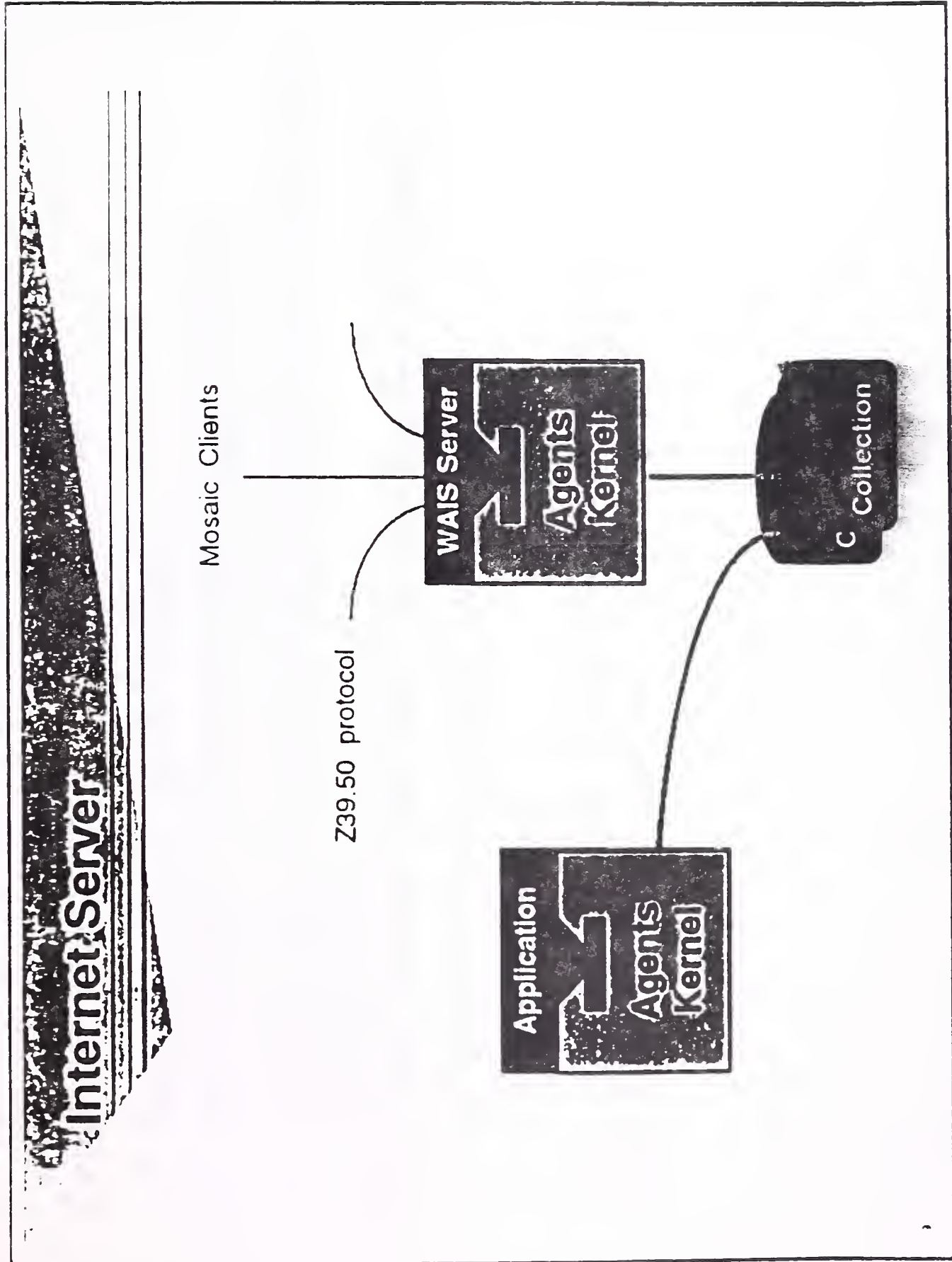


# Enterprise Architecture











# What is Verity's Product Strategy

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## VERITY:OVERVIEW

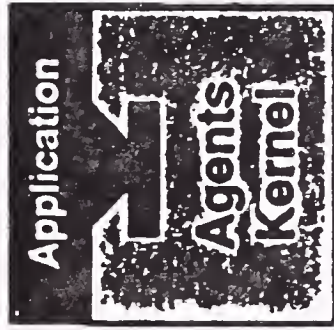
- **Embeddable Engine (VDK)**
  - **Basic and Advanced modes**
  - **Ensure that it will work with all applications**
  - **Leave hooks for companion products so Verity can sell add-ons**
- **Client and Servers for the end user market (Picasso)**
  - **Retrieval intensive applications**
  - **Enterprise search**
- **Filtering and Routing Tools for real time data (Watcher and Analyst)**



# Embedded Servers

Lotus Notes Clients

Notes protocol and networking





# What are some examples of the use of Verity's engine?

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## VERITY:OVERVIEW

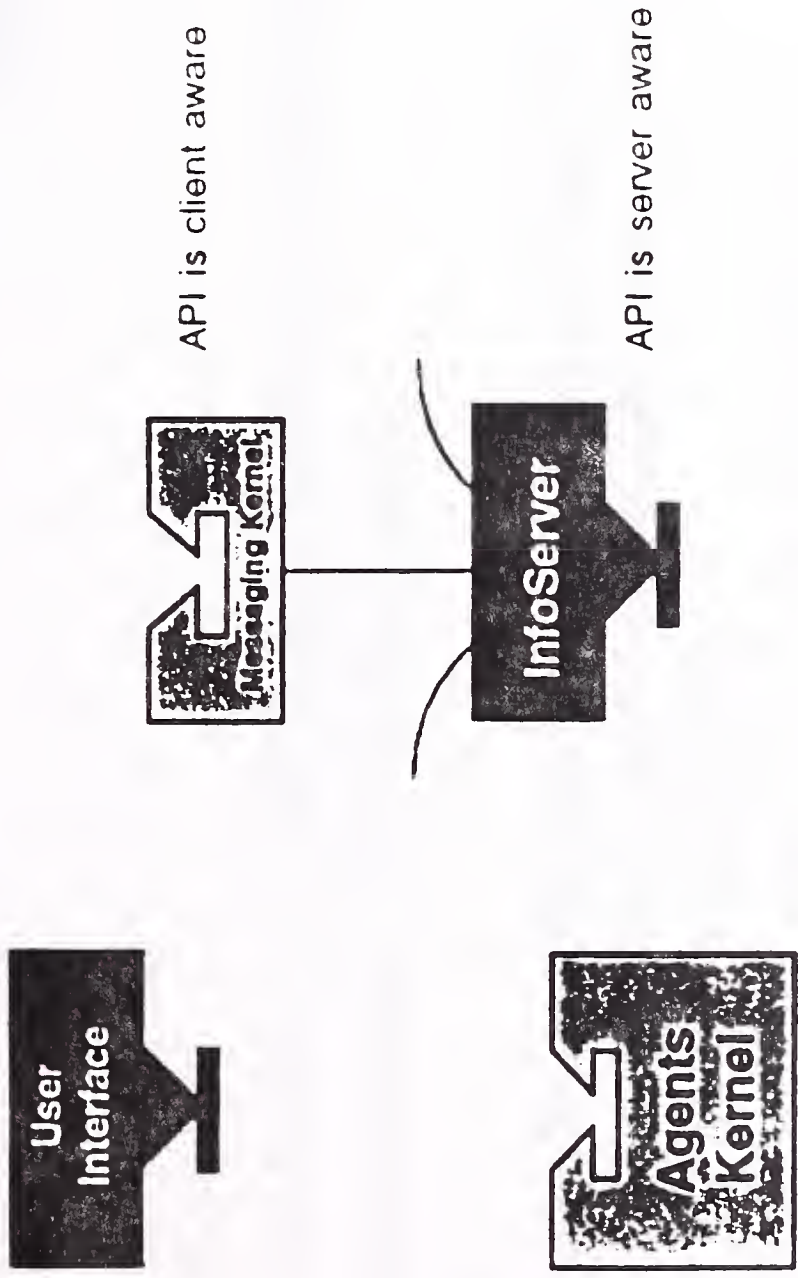
- Lotus Notes
  - Simple search for all Notes Users
  - Add-on to enable more powerful search tools
  - Access to external data
- Hewlett-Packard
  - Deploy several custom internal applications
- Document Management Companies (Documentum)
  - Embed with advanced search as differentiator
- San Jose Mercury News
  - Use engine for profiling and filtering news data





CLIENT SERVER

# InfoServer™ - Components





# **What are some examples of the use of Verity's client/server product?**

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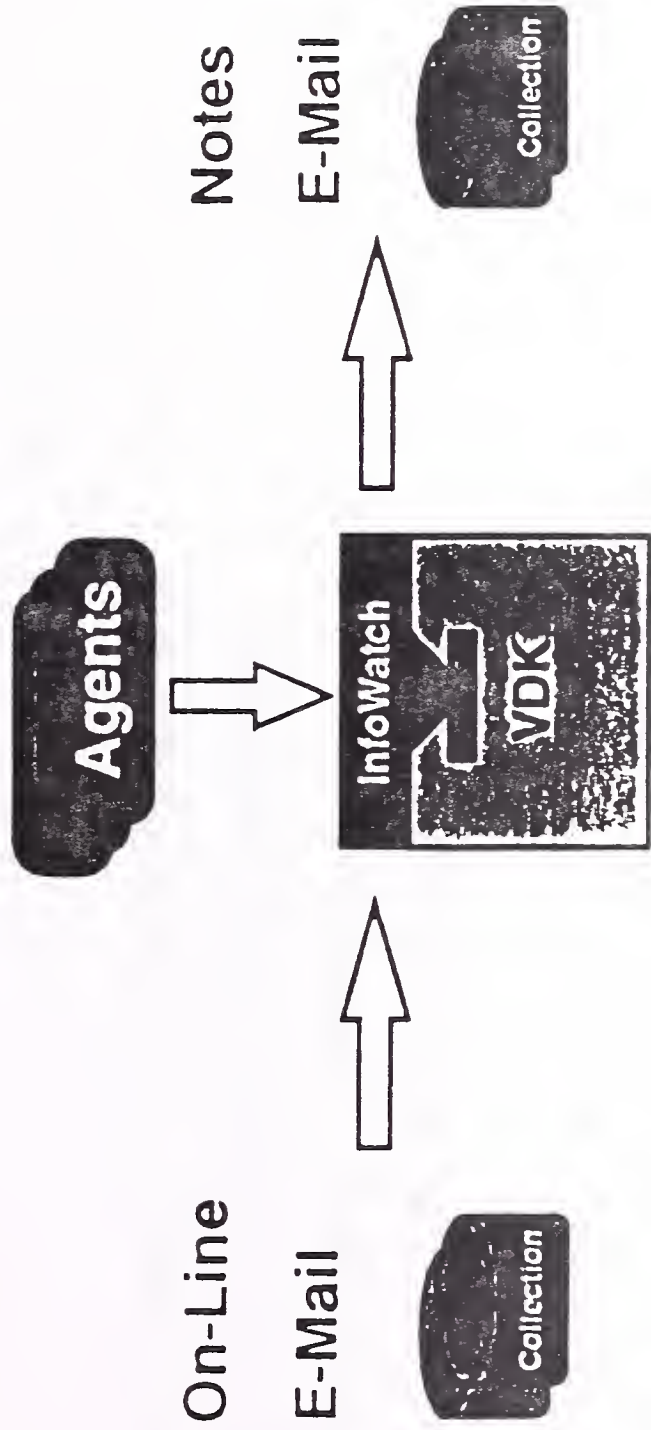
## **VERITY:OVERVIEW**

- Hewlett-Packard
  - On-line library for field consultants over Internet
  - Implemented by HP on V3 engine
- US Govt
  - A World-Wide-Web server providing access to anyone using the Mosaic client software (a widely used shareware program)
- NY Financial House (Moody's, Salomon Bros.)
  - Enterprise access to Notes, Acrobat, Real time news and archive documentation





- 'Smart Valve' for Data Source
- Disseminate Desired Information





# **What is the development strategy to transition from current products to client/server?**

**VERITY:OVERVIEW**

- **Repackage the core technology**
- **Migrate installed applications**
- **Build Agent applications**
- **Incorporate new technology**





# Repackage the Core Technology

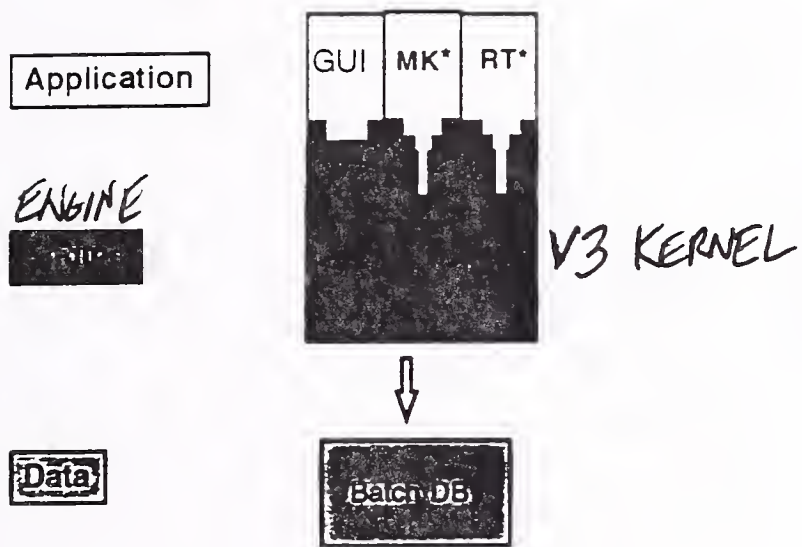
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## VERITY:OVERVIEW

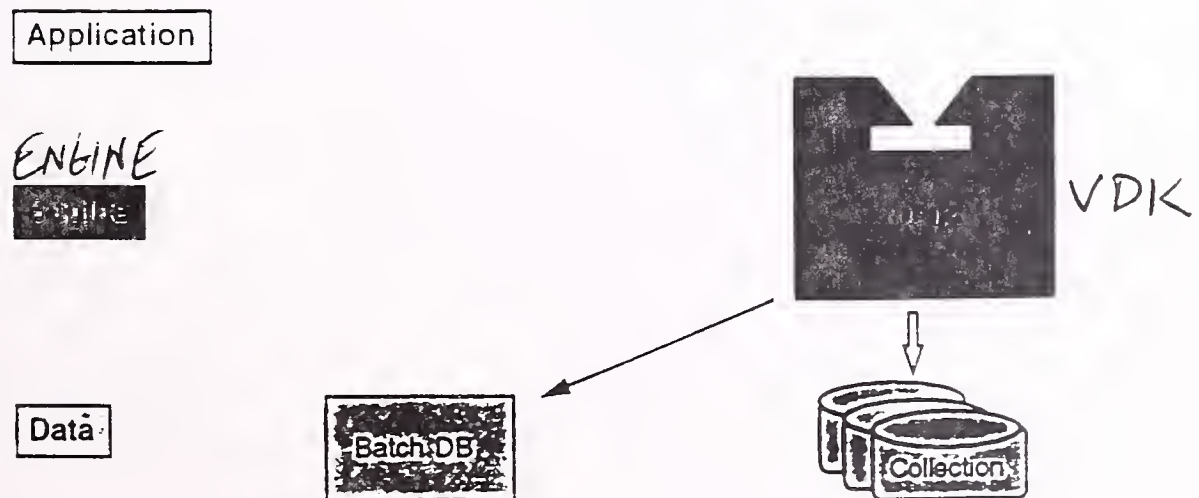
- **Separate Back-End and Front-End**
- **Package Technology into Developers Kit**
- **Re-engineer Data Management=Collections**
  - **Minimal administration**
  - **Tightly integrated real-time and retrospective**
  - **Gateways to documents and formats**
- **Scalable Architecture**
  - **Desktop to Enterprise**
  - **Local and Served**



# Code Map - Version 3

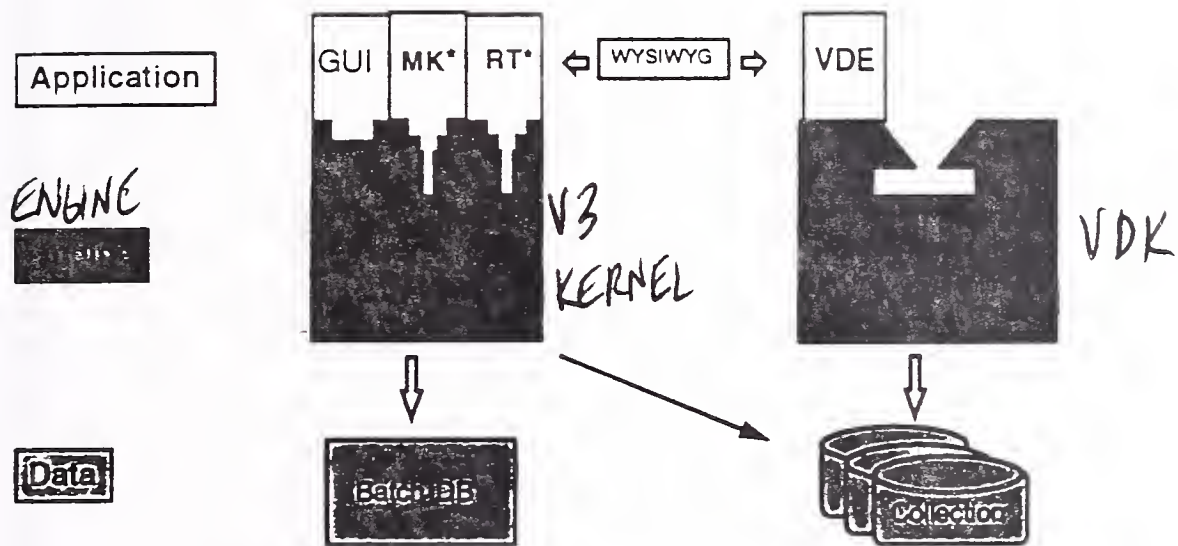


# Code map - VDK 1.0.3

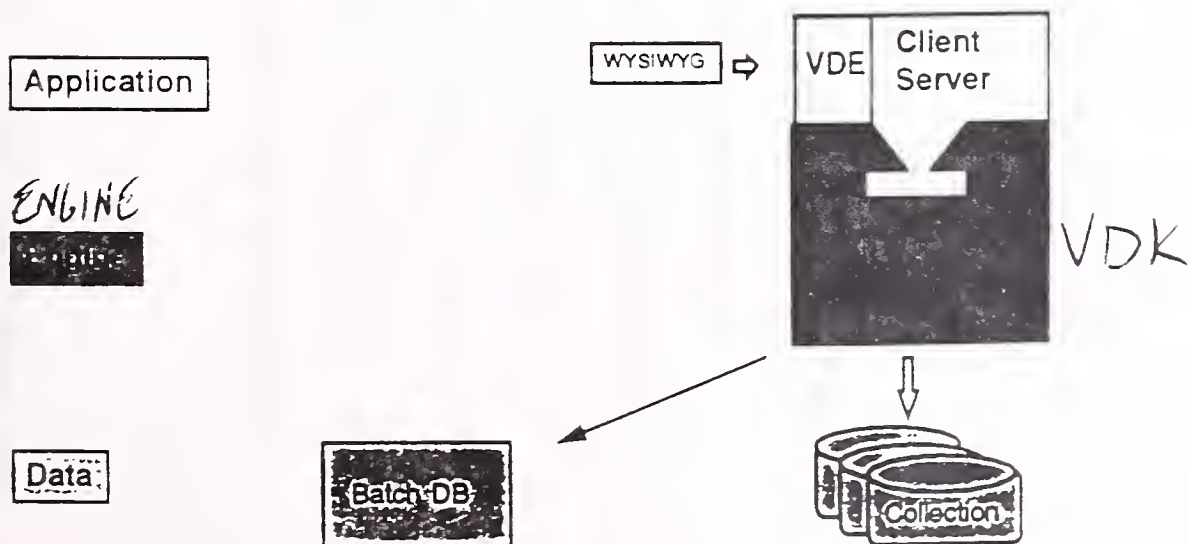




# Code map - Version 4



# Code Map - Picasso





# Migrate Installed Applications

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## VERITY:OVERVIEW

- Listen to Feedback
  - Database administration tools
  - WYSIWYG document viewing
  - Character UI
- Compatibility Between Releases
  - Topics, Documents, Indexes
- Upgrade OEM/VARs to New Engine
  - Adobe, Lotus, HP, etc.
- Technology Partnerships
  - Mastersoft, TMS





# Build TOPIC Agent Applications

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## VERITY:OVERVIEW

- TOPIC Agent Client/Server
  - TOPIC Server over LAN and WAN
  - New user interface metaphor
  - Compatible with emerging standards
- Watcher
  - Packaged real-time profiling
  - Smart valve on flow of data
  - San Jose Mercury News = premier application (filtering classified ads based on customer profile)
- Agents in Notes
  - Tightly integrated in Notes environment



# Incorporate New Technology

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## VERITY:OVERVIEW

- Smarter Software Agents
  - Enhanced language understanding (natural language)
  - Personalize through feedback
  - Integrate with new scripting languages
- Performance
  - CD-ROM, parallel server
- Structured Generalized Markup Language (SGML) for Structured Documents
- Tighter database systems (Oracle, Sybase, etc.) and application integration
- Analyst Agents



# What are the Products?

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## VERITY:OVERVIEW

- **TOPIC V3/V4**
- **VDK (Verity Developers Kit)**
- **Picasso**
- **Notes Add-On**
- **World-Wide-Web**
- **Watch**



# What is the status of development?

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## VERITY:OVERVIEW

- TOPIC v3.1.5
  - shipped 2/4/94
- TOPIC v4.0
  - beta 5/27/94
  - scheduled ship 8/12/94
- VDK
  - shipped 1.0.0 3/28/94
  - shipped 1.0.3 7/11/94
  - scheduled ship of 1.1 10/31/94
- Picasso
  - alpha 8/19/94
  - beta 10/17/94
  - scheduled ship 1/31/95





# Status of Development (Continued)

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## VERITY:OVERVIEW

- TOPICs in Notes
  - Windows Notes clients only
  - Feature complete 7/29/94
  - Code freeze 8/29/94
  - scheduled ship 9/25/94
- World-Wide-Web
  - alpha complete
  - limited resources to productize
- Watcher
  - toolkit for consultants to handle newspaper profiling
  - limited resources to expand beyond initial target



# What is VDK?

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## VERITY:OVERVIEW

- **information kernel (core search and retrieval code)**
- **C-callable application programming interface (API)**
- **administration utilities**
- **Sample applications**
- **What's in the API?**
  - **~10 functional suites (session, collection, search,...)**
  - **~50 entry points**
- **Platforms**
  - **Windows, Mac, SunOS, HPUX**
  - **v1.0.3 adds Windows NT, Solaris, AIX**

these are the  
procedures and  
hooks that make it  
easy for  
developers to add  
to their  
application



# Description of Picasso

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VERITY:OVERVIEW

MORE TO COME



AGENT LIST WINDOW







# QUERY ASSIST WINDOW

The screenshot shows a window titled "Query Assists" with a search bar containing "crime". Below the search bar, there are three sections: "Browse in Topics", "CRIME", and "Expansion".

**Find in List:** crime

**Browse in Topics:**

- COMP-CRIME-INDICATORS
- COMP-CRIME-PHRASE
- COMPUTER-COMPANIES
- COMPUTER-CRIME
- COMPUTER-PRODUCTS
- CORPORATE-RAIDERS

**CRIME**

- DEC
- DEC-COMPANY-NAMES
- DEC-MISC
- DEC-PEOPLE
- DEC-PRODUCTS
- DESTRUCTION

**Expansion**

- ▷ <topic> COMP-CRIME-INDICATORS
- ▷ <topic> COMP-CRIME-PHRASE
- ▷ <topic> COMPUTER-CRIME
- ▷ <topic> CRIME
- ▷ <topic> REPORTED-CRIMES
- ▷ <thesaurus> CRIME
  - <meaning> CRIME
  - <meaning> crime
  - <meaning> crime
- ▷ <thesaurus> CRIME



SPECIFIC AGENT

# Crime

Collections Query Results

## Info Sources

- I:\dbs\dowdb1
- I:\dbs\dowdb2
- I:\dbs\dowdb3
- I:\dbs\dowdb4

## Query View: Simple

And Or Not And/Or Near

crime

## Results

Retrieved 9 of 1000 : 100%

RANK	Score	Region	Product	Headline	Docs
1	0.89	Canada; North Ame	PR News Wire	STATEMENT FRC	
2	0.73	North America; Per	DJNS Broad Tape	Head of Tax Firm I	Fin.
3	0.63	Oregon	PR News Wire	OKI Semiconducto	Ser
4	0.60		Dow Jones Intl. Ne	Swiss Reject Loos	
5	0.60	District of Columbia	PR News Wire	AH&MA Offers infc	Loc

## Document Viewer



# **What have learned about customer views of TOPIC?**

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## **VERITY:OVERVIEW**

- **Topics (concept retrieval) are very powerful**
  - **single query can find all answers whereas boolean searches may need multiple shots**
  - **once developed a TOPIC is very accurate**
  - **provides relevance ranking which helps immediately identify correct document**
  - **can be used to categorize data as it is received**
- **is much better at adapting to a variety of domains**
  - **TOPICs can be developed on anything - other approaches such rely on a thesarus which must contain the relevant text in order to find something**
  - **can be written to bridge languages**
- **requires an expert and some effort to build TOPICs**
  - **Verity is addressing this issue by building TOPIC libraries to sell**



# What are TOPIC Libraries?

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## VERITY:OVERVIEW

- pre-defined sets of Topics
- serve as models for customers to build additional Topics
- building blocks for customers to use





# **What is the implementation plan for TOPIC Libraries?**

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## **VERITY:OVERVIEW**

- Staffed by teams of Topic builders
- "Topic Lead" will establish info sources, vocabularies, and models within specific industry area
  - Look for existing or "near" Topics and supervise teams
- Teams will consist of students of library science or other professional researchers with subject expertise
- Work with on-line data providers to define Topics that can categorize data as it is received



# **What is the status of the TOPIC Library project?**

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## **VERITY:OVERVIEW**

- **3 Topic leads identified, 2 already trained and moving forward with the creation of Topics - 3rd being trained this month**
- **First area will be business and financial topics as these span many vertical markets**
- **More generic Topics being created in:**
  - **legal definitions**
  - **geographical topics**
  - **chemicals (for environment health and safety)**
- **Discussions underway with Reuters to start pilot project using Topics as categorization tools - hopefully 8/1/94**
- **First release to Topic library scheduled to coincide with the release of the client server product - 11/94**



**Topic Subjects**  
(Just the Beginning)

<b>Business and Finance</b>	Planned release 11/94 Version 1 Quarterly updates thereafter
<ul style="list-style-type: none"> <li>Business development opportunities</li> <li>Commentary on financial developments</li> <li>Company profiles</li> <li>Economic developments</li> <li>Entrepreneurial success stories</li> <li>Foreign exchange</li> <li>Major executive profiles and changes</li> <li>Mergers, acquisitions, divestitures</li> <li>Money markets</li> <li>Rumors</li> <li>Taxes</li> <li>Ticker news</li> </ul>	
<b>Geographical Topics</b>	Planned release 11/94 - Version 1 Quarterly updates thereafter
<ul style="list-style-type: none"> <li>Continents, nations, countries, regions, states, counties, cities</li> </ul>	
<b>Customer Support Automation</b>	Currently being defined for release in January 1995
<b>Litigation Support Automation</b>	Currently being defined for release in March 1995
<b>Government and Politics</b>	Unscheduled
<ul style="list-style-type: none"> <li>Congress and Senate</li> <li>IRS</li> <li>Judicial decisions (Supreme Court)</li> <li>Labor news</li> <li>Legislation</li> <li>Lobbying activities</li> <li>Political developments</li> <li>Regulatory news (state and federal)</li> </ul>	
<b>Consumer News</b>	Unscheduled
<ul style="list-style-type: none"> <li>Advertising and marketing to consumers</li> <li>Consumer demographics and psychographics</li> <li>Leisure</li> <li>Product announcements and product safety</li> <li>Public opinion</li> </ul>	
<b>Industry Developments (by industry)</b>	Unscheduled
<ul style="list-style-type: none"> <li>Market segments and market share</li> <li>Product announcements</li> <li>Research and development</li> <li>Technology issues</li> </ul>	



# What is the competitive environment?

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## VERITY:OVERVIEW

- lots of full text retrieval software available, ranging from shareware for single PC users to massive custom systems based on parallel processing
- Verity can not compete at all levels, and is now focused on client/server solutions for the enterprise
- Verity's software is scalable so it can be used by small groups, but Verity is not a good solution for casual PC users who only need simple file searching
- At the high end, some competition from database companies
  - Oracle's SQL\*TextRetrieval server has not been successful
  - Oracle's recent Context announcement shows renewed interest, however Context is aimed at analyzing streams of data rather than search and retrieval
  - RDBMS companies are limited by inherent limitations of relational database structure for handling text





# Who are the major competitors?

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## VERITY:OVERVIEW

- Fulcrum
- Excalibur
- PLS
- Conquest
- OpenText
- IDI
- Dataware/BRS
- FolioViews (for on-line providers)
- WAIS (for Internet searching)



# What is Verity's view of the competition?

---

## VERITY:OVERVIEW

- OEM
- Fulcrum
- VARs
- Fulcrum
- Corporate MIS/End User
- Excalibur- West and South
- Opentext - East Coast
- PLS - East Coast
- Conquest - East Coast
- IDI - Midwest



# Comparison of Verity and Fulcrum by Input

## VERITY:OVERVIEW

Exhibit 2

Fulcrum vs. Verity

Feature	Verity	Fulcrum
Accuracy of query processing	High quality using TOPICS. The current setting up of TOPICS is also a disadvantage as it takes time to set up the topics. However Verity is working on automating the creation of topics and on supplying standard topics.	Uses many methods including matching to a sample document, statistical relevance ranking. Does not work as accurately as Verity. It may be better at retrieving documents associated with phrases rather than individual words than Verity.
Quality of APIs	At both Lotus and Adobe Verity beat Fulcrum because it had better APIs for developers.	
SQL support		A key focus that makes the product useful to those familiar with SQL databases.
Multi-threaded engine	Yes	
SGML Support		Acquired 34% in Exoterica an SGML company
Size of client software libraries for MS windows (DLLs)	100 to 200K using VDK	1MB



# Comments about other competitors

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## VERITY:OVERVIEW

- **Excalibur**
  - integrates its software well with scanning and OCR solutions - competes where scanning paper files and converting to text is important
- **PLS**
  - Licensed to Apple for AppleSearch
  - Good API, UI, SGML support
  - documents and indices are not compressed, scalability is questionable





<b>Competitive Matrix - Full Text Retrieval Systems</b>									
Feature	Verity	BRS Software Products - BRS/Search	ConQuest	Excilbur Technologies EFS (electronic retrieval), XRS (libraries), IRS & IRL (text recognition)	Fulcrum Technologies IBM - Book-Manager	Oracle - ConText	Personal Library Software (PLS) - Callable Personal Librarian (C code), Windows Personal Librarian	Subsld of Mead Data Central - Folio Corporation Folio Views	Subsld of OCLC - Information Dlmenglons Inc. (IDI) - BASIS
Phone		703-442-3870	410-290-7150	619-625-7900	613-238-1761	415-506-7000	301-990-1155	800-543-6548	800-DATA-MGT
Fax		703-442-3870	410-290-7155	619-625-7901	613-238-7895	415-506-7200	301-963-9736	801-344-3790	614-761-7290
Location	Mountain View, CA	McLean, VA	Columbia, MD	San Diego, CA	Ottawa, Canada	Cary, NC	Rockville, MD	Provo, Utah	Dublin, OH
Positioning	Aiming to be scalable.	Legacy vendor - originally ran on IBM mainframes, Fast search.	Search technology for UNIX and PC users.	Focuses on data capture and complete solution for entering data into a full-text retrieval system. Also emphasizes technology.	Strong in the UNIX tools market.	For major document databases and structured databases.	OEM supplier of C tools for building full-text search systems Advanced algorithms.	PC solution - for publishing databases and for mixed PC networks.	Corporate solution - from indexing to retrieval with networking and data management.
Technology	TOPIC ranking, based on relationships between search terms.	Boolean, proximity.	Semantic Net - has 250,000 concepts and 3M links between concepts, Natural Language	Boolean, user-defined synonyms. Adaptive pattern recognition. Relevanccce ranking.	Ranking, boolean and others.	Analyzes linguistic knowledge of dictionary words.	Relevance ranking, generates related concepts, natural language querying.	Boolean, phrase, proximity, synonyms via thesaurus	Boolean, proximity, sounds similar - aging technology
Customer Types	OEM and end-users	Major corporations.	OEM, System Integrators	Major corporations, system Integrators	Computer manufacturers, system Integrators, CD-ROM publishers, end-users.	Oracle users, Fortune 1000, Oracle system Integrators and developers.	CD-ROM publishers, enterprise users, online services	Database and Information publishers, major corporations wishing to downsize.	System Integrators, end-users



Feature	Verity	BRS Software Products - BRS/Search	Excalibur Technologies EFS (electronic retrieval), XRS (libraries), IRS & IRL (text recognition)	Eulerium Technologies	IBM - Book-Manager	Oracle - ConText	Personal Library Software (PLS) - Callable Personal Librarian (C code), Windows Personal Librarian	Subsid of Mead Data Central - Folio Corporation	Subsid of OCLC - Information Dimensions Inc. (IDI) - BASIS
Key Platforms	UNIX, Windows, Mac	Mainframes, UNIX, PCs - very wide range of platforms.	UNIX, VAX VMS, PCs, NeXT, Macintosh	UNIX, DOS, Windows, OS/2, Macs, CD-ROM	IBM - AIX/6000, OS/2, DOS, MVS/TSO, VM/CMS	Sun and other UNIX first, then others.	CD-ROMs, UNIX, Windows, VAX - VMS, Sun, Mac, Other UNIX	PCs - Windows, Mac, DOS	IBM mainframes, DEC VAX, CDC, HP, Sun, Bull, Unisys, MIPS RISC OS, Siemens SGML, CALS, JCALS (military docs), DDIF (DEC), 30+word processing interchange formats
Key File Types	Verity converts word processing, ASCII files into their format.	EBCDIC, ASCII plus conversion tools to convert these and other WP files into their format.	Multimedia, ASCII, SGML, Word processor files.	Word processing docs, ASCII, SQL and ODBC databases, SGML	Word Processing, ASCII, BookMaster, SGML, DCF GML	Corporate databases, other data not yet specified.	Legal, newspapers, corporate marketing, technical documentation, FDA filings, libraries, utility regulations, government, online information systems	Word, WordPerfect, Folio, ASCII, LEXIS/NEXIS databases.	Document imaging, libraries, pharmaceuticals FDA filings,
Key Applications Targeted (either directly or through resellers)	Legal, Govt. Intelligence, Health & Safety	Mainframe corporate text data.	Document Imaging.	Legal.	Electronic books, technical docs	Online information services, document routing and retrieval, mail profiling, document indexing for corporate systems.	Insurance - Workers Comp, Automobile Company policies. CD-ROM and database publishing.		



<p><b>Feature</b></p>	<p>Verity</p>	<p>BRS Software Products - BRS/Search</p>	<p>ConQuest</p>	<p><b>Excalibur Technologies</b> EFS (electronic retrieval), XRS (libraries), IRS &amp; IRL (text recognition)</p>	<p><b>Fulcrum Technologies</b></p>	<p>IBM - Book-Manager</p>	<p>Oracle - ConText</p>	<p>Personal Library Software (PLS) - Callable Personal Librarian (C code), Windows Personal Librarian</p>	<p>Subsidiary of Mead Data Central - Folio Corporation Folio Views</p>	<p>Subsidiary of QCLC - Information Dimensions Inc. (IDI) - BASIS</p>
<p><b>Price</b></p>				<p>\$12K for single-user UNIX, 10-users \$51K, 20-users \$81K</p>			<p>\$7500 - \$100K per server, \$75-\$300 per workstation.</p>	<p>Windows - \$995 per user</p>		
<p><b>Key Selling Points</b></p>				<p>Client/server. Provides complete imaging and OCR system. Integrates with groupware and workflow tools.</p>	<p>Open systems, SQL query (like databases)</p>	<p>Cut printing costs, reduce paper handling, keep information up to date</p>	<p>From Oracle, large systems, client/server, C programs, APIs, accurate search. Fast.</p>	<p>Development tools and powerful Windows solution.</p>		<p>Interface to databases via Uniface, toolkits for Hypercard and Visual Basic.</p>



Feature	Verity	BRS Software Products - BRS/Search	ConQuest	Excalibur Technologies EFS (electronic retrieval), XRS (libraries), IRS & TRL (text recognition)	Eulerum Technologies	IBM - Book-Manager	Oracle - ConText	Personal Library Software (PLS) - Callable Personal Librarian (C code), Windows Personal Librarian	Subald of Mead Data Central - Follo Corporation Follo Views	Subald of OCLC - Information Dimensions Inc. (IDI) - BASIS
Leading Customers	..							Apple (AppleSearch), Grolier, Electronic Publishing, Wave Systems, Financial Times (CD-ROM), Congressional Quarterly (online), Marathon Oil, US		Upjohn (FDA Info), US Arms Control Agency, Scottish Nuclear, Aerospace, 3M, Over 50% of Fortune 500.
Maturity of Company	..	Initial funding from Alr Force, Blueridge Technologies (image scanning), Motorola (to be used in an online information service)		Ford Motor, Rocky Mountain Arsenal, Solar Turbines, NASA, OSHA, law firms, Ultramar (refinery), Infotec (system integrator for fingerprint recognition software), ISSC (system integrator)	Sun (SunService division), Cognos, Florida Power, National Semiconductor, Banca DI Roma, AT&T, Bell Atlantic, Cray Research, Dun & Bradstreet Software, ESRA, HP, Microsoft, Siemens-Nixdorf	ISSC-Oxford University Press, Recording For The Blind, IHS, ISO, New Science, SRA Technology Training, IBM, SMS (Shared Medical Systems), Systems Center (IBM data center info), Boole & Babbage, Texaco, US West	University Microfilms (PhD theses)	Agricultural Network, European customers - ICL, Bull, KPMG, France Telecom, International Atomic Energy Agency	Aetna (mainframe data moved to CD-ROMs on networked PCs), Union Carbide (Federal Register - for regulations)	Marketing agreements with FileNet, Vull, DEC, HP, ICL, Siemens, Uniface, SXerox, Sun, Unlsys, LaserData, IBM, CDC





<p><b>Feature</b></p> <p>Verity</p>	<p>BRS Software Products - BRS/Search</p>	<p>ConQuest</p>	<p>Exallbur Technologies EFS (electronic retrieval), XRS (libraries), IRS &amp; IRL (text recognition)</p>	<p>Eulerium Technologies</p>	<p>Oracle - ConText</p>	<p>Personal Library Software (PLS) - Callable Personal Librarian (C code), Windows Personal Librarian</p>	<p>Subold of Mead Data Central - Folio Corporation Folio Views</p>	<p>Subold of OCLC - Information Dimensions Inc. (IDI) - BASIS</p>
<p><b>Advantages</b></p> <p>Good reputation. Accurate searching.</p>	<p>Installed base</p>	<p>40 patents, does not have to build TOPIC-like associations between words.</p>	<p>Emphasizes not just text-retrieval but pattern-recognition, OCR and multimedia support. Automatic analysis of text and patterns. Focused on document management.</p>	<p>Established in the UNIX market. Good tools.</p>	<p>Sold by Oracle, will have database interfaces. E-mail interfaces likely.</p>	<p>Good for Windows PC platforms - a likely player on NT. Good libraries for OEMs.</p>	<p>Focused on document retrieval, rather than data capture. Suitable for publishing</p>	<p>2200 locations, 10000 applications installed. Well-respected because they cover more than just retrieval - very experienced in indexing. Global support.</p>
<p><b>Disadvantages</b></p> <p>Takes effort to build an index. Team needs rebuilding, needs to deliver on time.</p>	<p>Legacy company - not well-funded, struggling.</p>	<p>Start-up</p>	<p>May not understand channel management well - focusing more on systems than mass distribution. Less emphasis on text-retrieval, more on imaging.</p>	<p>Less user presence - now trying to move into this market. May be hard and expensive if they do not understand channels.</p>	<p>Oracle has other products to sell - may be hard to focus sales force. May lack office automation requirements</p>	<p>Does not work as well as Verity.</p>	<p>PC product - but as PCs grow can run across multiple PCs. Not as robust as a UNIX server solution.</p>	<p>Mature technology - aging, expensive.</p>



# **What have we concluded about the technology?**

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## **VERITY:OVERVIEW**

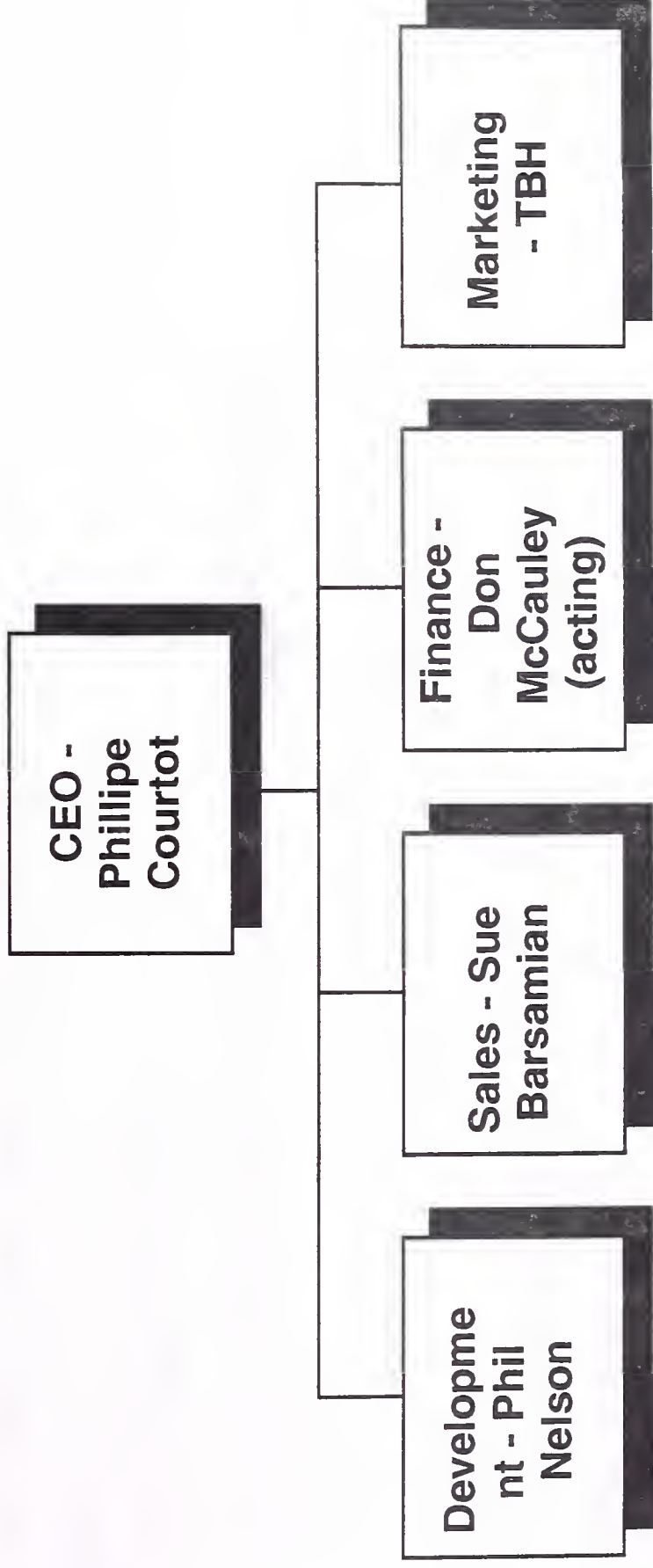
- **There are many competing search technologies (algorithms) which distinguish themselves based on the circumstances**
- **More important than search algorithms are
  - **ease of integration for developers**
  - **ability to incorporate future advances in search algorithms**
  - **ease of use for end user****
- **Over time the "quality" of search will become more and more important - this is Verity's strong suit today**



# Who is the Management Team?

---

## VERITY:OVERVIEW





# **What are the backgrounds and issues with the management team?**

## **VERITY:OVERVIEW**

- Courtot
- Ex-cc:mail CEO - sold to Lotus
- Worked with Don in the past
- Is Phillippe on top of the situation?
- Nelson
- Founder of Verity
- Highly respected by the team, customers and industry
- Very young - first time as a VP - will he succeed?
- Barsamian
- 6 years with Verity (3 in London establishing European ops)
- Became VP-Sales for North American in Dec '93
- 5 years at Sytek (Hughes LAN Systems) - Mgr of European ops
- BSEE - Kansas State
- Will the Company be able to attract marketing VP?





# Appendices

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## VERITY:OVERVIEW

- **Term Sheet**
- **Market Comparables**
- **Research report on Fulcrum**
- **Eric Kiebler Report**
- **Angela Hey Report**
- **Courtot Report on Q1 Sales Outlook**







MEMORANDUM OF TERMS  
FOR PRIVATE PLACEMENT OF  
SERIES G PREFERRED STOCK OF  
VERITY, INC.

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This memorandum summarizes the principal terms of the Series G Preferred Stock venture capital financing of Verity, Inc.

**Offering Terms**

Issuer:	Verity, Inc., a California corporation (the "Company").	
Securities to be Issued:	3,529,412 shares of Series G Preferred Stock and 3,529,412 Common Stock Warrants.	
Aggregate Proceeds:	\$3,000,000.	
Price:	\$0.85 per share for Preferred and \$0.23 exercise price for Common.	
Expected Closing Date:	August 12, 1994	
Investors:	Trident Capital	\$1,500,000
	Existing Verity investors and employees	<u>1,500,000</u>
		\$3,000,000

**Terms of Preferred Stock**

Dividends: Annual 9% per share dividend on the Preferred Stock (or, if greater, an amount equal to that paid on any other outstanding shares of the Company), payable when and if declared by Board; dividends are not cumulative. For any other dividends or distributions, Preferred Stock participates with Common Stock on an as-converted basis.



Liquidation Preference:

First pay the sum of (i) \$0.85, (ii) declared but unpaid dividends, and (iii) an amount equal to \$0.085 times the number of years (rounded to the nearest 1/12) which have transpired between the Closing Date and the Liquidation Event on each share of Series G Preferred Stock (the "Series G Preference Amount"). Next pay the holders of the Series A, B, C, D, E and F Preferred according to the existing articles of incorporation. Thereafter, the Series G Preferred Stock and Common share on an as-converted basis (i.e., "Participating Preferred").

A merger, reorganization or other transaction in which control of the Company is transferred will be treated as if a liquidation.

Redemption:

Mandatory redemption after four years, payable in eight equal quarterly installments at the Series G Preference Amount, upon request of 2/3 of the outstanding Series G Preferred Stock.

Conversion:

Automatically converts into Common Stock upon consummation of underwritten public offering with a price per share of at least \$2.715 and aggregate proceeds in excess of \$7,500,000.

(7)

Antidilution Adjustments:

Conversion ratio adjusted on narrow weighted average basis in the event of a dilutive issuance. "Dilutive issuance" shall not include up to 1,995,292 shares of Common Stock reserved for future issuance to employees. Proportional adjustments for stock splits and stock dividends.

• Common Stock  
Warrants  
- Leasing

Voting Rights:

Votes on an as-converted basis, but also has class vote as provided by law and on (i) the creation of any senior or pari passu security, (ii) payment of dividends on Common Stock, (iii) repurchase of Common Stock except





upon termination of employment, (iv) any transaction in which control of the Company is transferred, (v) an increase in the number of authorized shares of Preferred Stock, and (vi) any adverse change to the rights, preferences and privileges of the Preferred Stock.

### **Terms of Common Stock Warrants**

Exercise Price: \$0.23 per share. Holder has the alternative to exercise on a "net" basis.

Antidilution Adjustments: Exercise Price to maintain the same ratio to Series G Preferred Stock Conversion Price as \$0.23 is to \$0.85. Number of warrants to change upon change in exercise price such that total exercise amount for Series G Common Stock Warrants totals \$811,764.76.

Term: Seven years with no provision for early termination.

### **Terms of Preferred Stock and Common Stock Warrant Purchase Agreement**

Representations and Warranties: Standard representations and warranties by the Company.

Assignment of Inventions and Confidentiality Agreement: Key employees and consultants shall have entered into the Company's standard form inventions and proprietary information agreement.

Expenses: Wilson, Sonsini, Goodrich & Rosati to serve as counsel to the Investors. The Company shall pay reasonable fees (not to exceed \$20,000) and expenses of this single Investors' counsel. All Investors will use this counsel.



Registration Rights:

(a) Beginning earlier of three years from the closing, or three months after initial registration, two demand registrations upon initiation by holders of at least a majority of outstanding Preferred Stock for aggregate proceeds in excess of \$5,000,000. Expenses paid by Company.

(b) Unlimited piggyback registration rights subject to pro rata cutback at the underwriter's discretion. Full cutback allowed upon IPO; 30% minimum inclusion for the former Series G Preferred Stockholders in IPO or Secondary Offering. Expenses paid by Company.

(c) Unlimited S-3 Registrations of at least \$500,000 each upon initiation by holders of 20% of the Preferred. Expenses paid by Company.

Registration rights terminate five years after initial public offering.

No future registration rights may be granted without consent of a majority of Investors unless subordinate to Investors' rights.

Market Standoff:

180 day lockup period after date of final prospectus; provided, that all shareholders, warrant holders and optionees have entered into similar agreements.

Right of First Refusal:

The Investors shall have a pro rata right, based on each Investor's percentage of this financing, to participate in subsequent equity financings of the Company (subject to customary exclusions). Right terminates on and is not applicable to IPO.

Financial Information:

The Investors shall receive standard information rights including audited



financial reports, quarterly unaudited financial reports, monthly unaudited financial reports, and annual budget and business plan, as well as standard inspection rights. Rights terminate upon IPO.

Board of Directors:

Board shall consist of 9 members. Board shall include Trident Capital as the representative of the Series G investors.

[5]

Voting Agreement:

The Company, the Investors and the shareholders of the Company shall enter into a voting agreement to effect the agreed-upon Board composition.

### **Post-Closing Capitalization**

Series G Preferred Stock outstanding:	3,529,412 shares
Series F Preferred Stock outstanding:	1,063,830 shares
Series E Preferred Stock outstanding:	606,061 shares
Series D Preferred Stock outstanding:	2,400,000 shares
Series C Preferred Stock outstanding:	6,891,163 shares
Series B Preferred Stock outstanding:	4,444,444 shares
Series A Preferred Stock outstanding:	2,957,000 shares
Series G Common Warrants outstanding:	3,529,412 shares
Common Stock outstanding:	3,596,921 shares
Options and Warrants to Purchase Common Stock outstanding:	8,565,697 shares
Common Stock Options Reserved for Employees:	<u>1,995,292</u> shares
Total:	39,579,232 shares



## Other Matters

Common Stock Vesting:

[To be supplied by Company].

Restrictions on all Common Stock Transfers:

(a) No transfers allowed prior to vesting.

(b) Company right of first refusal on vested shares until initial public offering.

(c) Investors have right to participate share-for-share in transfers by major shareholders prior to initial public offering.

(d) No transfers or sales permitted during lock-up period of up to 180 days required by underwriters in connection with stock offerings by the Company.

Employee Agreement:

Philippe Courtot shall have entered into an Employment and Stock Option Agreement mutually satisfactory to Trident Capital and the Verity Board of Directors.

Closing Conditions:

Closing subject to the following conditions:

a. Negotiation of definitive legal documents and completion of legal and financial due diligence by Investors.

b. Execution of indemnification agreement for all officers and directors. Company to purchase D&O insurance, if available for reasonable cost, within one year of closing.

c. Amendment of existing Series A, B, C, D, E and F rights and preferences with regard to [Liquidation Preference], [Conversion], [Adjustments to Conversion Rate], [Voting rights], [Redemption], and [Protection Provisions].

Voting









## Verity Comps

	Symbol	FY End	Price 7/13	Shares Out. (mm)	Market Value (mm)	Price/Book	P/E	FY 1993 EPS	EPS Trailing 12	EST. EPS FY 1994	FY 1994E P/E	Revenues 1993 (mm)	Price/ Revenues
Adobe Systems	ADBE	November	31.38	45.17	1,417.21	4.56	25.93	1.22	1.21	1.41	22.25	313.50	4.52
Excallbur Technology	EXCA	January	6.75	9.13	61.63	3.80	Neg	-0.91	-0.83	n/a	n/a	10.70	5.76
Frame Technology	FRAM	December	9.25	13.73	127.00	2.22	Neg	-2.53	-2.14	0.45	20.56	56.10	2.26
Fulcrum Technology	FULCF	December	11.50	6.62	76.13	3.20	54.76	0.19	0.21	n/a	n/a	24.44	3.11
Lotus Development	LOTS	December	40.50	44.93	1,819.67	4.59	28.93	1.24	1.40	2.14	18.93	961.20	1.85
Microsoft	MSFT	June	49.50	572.00	28,314.00	9.36	28.70	1.57	1.73	1.92	25.78	3,753.00	7.54
Aldus Corp	ALDC	December	26.50	13.48	357.22	2.53	32.32	0.70	0.82	1.24	21.37	206.80	1.73
InfoSoft International	INSO	December	22.25	5.78	128.61	8.50	45.41	0.48	0.49	0.78	28.53	13.76	9.35
Comshare	CSRE	June	11.50	5.35	61.53	2.35	26.14	-0.33	0.44	0.56	20.54	105.20	0.58
Powersoft	PWRS	December	58.25	9.53	555.12	11.04	71.04	0.71	0.82	1.16	50.22	51.00	10.88
Sybase	SYBS	December	48.50	47.78	2,317.33	12.16	50.79	0.86	0.96	1.28	37.89	426.70	5.43
Parplace Systems	PARQ	March	16.38	7.05	115.44		54.58		0.30				
					<u>Averages</u>		5.85						4.82







# PACIFIC GROWTH EQUITIES

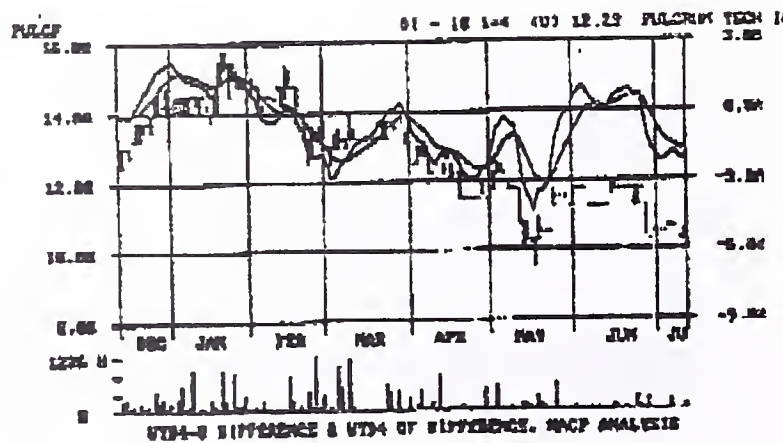
353 Sacramento Street, 16th Floor, San Francisco, CA 94111

Ben Huston  
(415) 274-6857

July 13, 1994

## Fulcrum Technologies Inc. (FULCF: OTC)

Price (\$US)	\$10.25
Price Range (\$US)	\$10.00-14.50
Weighted Average Shares (Millions) (1)	7.1
10-Day Average Daily Volume (000)	5
Market Capitalization (US\$ Millions)	\$73



Year	Revenue (2) (\$ Millions)	Operating Margin	US\$		
			EPS (2)	Equity EPS (3)	P/E Ratio (3)
12/93A	\$ 17.6	10.6%	\$ 0.17	\$ 0.12	NM
12/94E	\$ 26.9	18.7%	\$ 0.51	\$ 0.38	33.8
12/95E	\$ 36.0	20.7%	\$ 0.72	\$ 0.52	24.0

Year	Quarterly Earnings			
	Q1	Q2	Q3	Q4
12/93A	\$(0.06)	\$(0.06)	\$ 0.07	\$ 0.19
12/94E	\$ 0.04A	\$ 0.04	\$ 0.13	\$ 0.30

(1) Does not include dilutive effect from employee stock options. (2) All revenue and EPS figures, except "US\$ Equivalent EPS", are stated in Canadian dollars (C\$).  
(3) Calculated at 1.0 US\$ = 0.72 C\$.

### Research Update

- We continue to believe Fulcrum is uniquely positioned as a "pure-play" on the rapidly emerging text retrieval applications development business for client/server environments. Fulcrum delivers the requirements demanded by today's applications developers, including:

o Popular Applications Development Environments:

Fulcrum offers of its SearchTools Software Development Kits (SDKs) for Visual Basic, Visual C++, C++, C, and a soon-to-be-released version for the popular PowerBuilder Enterprise Series (Fulcrum "SearchBuilder"). SearchBuilder is set to ship later this summer (September).

o Tools that are Fast, Powerful and Easy to Use:

SearchTools is viewed by most developers as the fastest and the most scalable text retrieval solution on the market today. Competing text retrieval vendors (including Oracle, PLS, Conquest, and Verity) are marketing vastly more expensive and complicated APIs requiring significantly more software development time and resources. From the end-users' perspective, Fulcrum's "Intuitive Searching" feature (versus traditional single word and Boolean searches) permits rapid searching of databases for documents that are similar in content or meaning to the current document or phrase(s) being used as a "search term".

o Adherence to Industry Standards:

SearchTools is based on the widely accepted and well-understood query language, SQL. Fulcrum also promotes and supports SGML for structured documents. In addition, the recently introduced SearchTools Version 2.0 (began shipping in mid-June) supports Microsoft's ODBC for integration of text

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retrieval functionality and structured relational database (including SyBase and Oracle) applications. ODBC allows "power end-users" (who use standard desktop applications such as Microsoft Office, Lotus SmartSuite) and applications developers (who use Visual Basic, 4GLs such as PowerBuilder) to access Fulcrum SearchServer as an ODBC data source.

o Internet Support: Many companies are turning to the Internet as a way of communicating with and learning more about their customers. In addition, these same organizations have expressed a strong interest in making their textual information available on the Internet. Fulcrum is working with wide-area network publishing and Internet leader WAIS Inc. to offer a "server-only" version of SearchServer to its large base of resellers and Fortune 1000 customers.

### Recent Significant Events

- Lower SDK Pricing Encourages Adoption Fulcrum released SearchTools Version 2.0 as scheduled on June 15th. Fulcrum has dramatically reduced SDK pricing for SearchTools in order to induce developers to give it a try with very little risk. The average Ful/Text SDK sells for \$50K. SearchTools 1.2 SDK pricing was \$7,500. Fulcrum now offers SearchTools 2.0 SDKs for \$995. Moreover, Fulcrum has bundled its tools, run-time licenses, training and 90 days of support, called "Fast-Start Bundles" to encourage small scale deployment. 10-, 25- and 50-user Fast-Start Bundles sell for \$9,999, \$19,999 and \$39,999. These changes significantly reduce sales leadtime and seed the market with SearchTools. PowerSoft had a major hit last fall with the PowerBuilder 3.0 after it unbundled its tools and dramatically lowered their prices. By comparison, PowerBuilder Desktop (\$695, for Xbase applications development), PowerMaker (\$349, "power-user" forms, reportwriters) and PowerMaker (\$199, an end-user database query tool) all sell for under \$1000. PowerBuilder Enterprise (RDBMS applications development) sells for \$3,395.
- SearchBuilder to Ship Soon PowerBuilder has emerged as a very popular visual 4GL tool of choice today among developers for building high-performance data access applications for client/server environments. Fulcrum SearchBuilder should do well among developers seeking to rapidly deploy powerful text-retrieval applications.
- Quarter Ended June 30 The company should comfortably beat our Q294 revenue and EPS estimates of \$5.2M and \$0.04 per share. Moreover, the outlook for the remainder of this year and 1995 is very strong. We are likely to raise our FY95 estimates following the June quarter release. Fulcrum reports financial results on August 2.
- Significant New Customer Announcements We expect Fulcrum to announce major new SearchTools customers and strategic deals for domestic and international markets in the coming few weeks.

### Investment Outlook

We continue to strongly recommend purchase of shares in Fulcrum Technologies. The company has comfortably exceeded our revenue and earnings estimates for the past 2 quarters. Fulcrum trades at the low end of a \$10-16 trading range since its IPO last November. Despite the recent market correction, particularly for technology issues, investors continue to value high-growth client/server software stocks at 25-30X calendar 1995 earnings estimates, a class of stocks in which Fulcrum clearly belongs.

	----- P/E -----	
Stock	C94	C95
PWRS	44X	32X
PARQ	36X	25X
ATSW	52X	29X
SYBS	35X	26X
<b>FULCF</b>	<b>30X</b>	<b>19X</b>

Fulcrum trades at a discount to this group, even on our conservative financial estimates through calendar 1995. As positive developments and earnings surprises unfold during the next few months, we expect Fulcrum shares will rise. Our target price for the stock is \$18-20 per share.



Today's Date: 01-May-84  
Last Revision: 22-Feb-84

Fulcrum Technologies, Inc.  
Financial Results & Model  
(\$ 000) FYE 12/31

	FY91	FY92	Q1A Mar-93	Q2A Jun-93	Q3A Sep-93	Q4A Dec-93	FY93	Q1A Mar-94	Q2E Jun-94	Q3E Sep-94	Q4E Dec-94	FY94	FY95
<b>Statement of Income</b>													
License Fees	\$6,324	\$10,422	\$1,057	\$2,937	\$3,915	\$6,571	\$15,080	\$3,503	\$4,200	\$5,500	\$8,700	\$21,903	\$29,000
Services	\$932	\$737	\$555	\$487	\$802	\$676	\$2,500	\$975	\$1,004	\$1,206	\$1,757	\$1,941	\$7,000
Total Revenue	\$7,256	\$11,159	\$2,212	\$3,404	\$4,717	\$7,247	\$17,580	\$4,478	\$5,204	\$6,706	\$10,457	\$20,804	\$36,000
% ch Y-T-Y	141.8%	53.7%	100.5%	93.3%	110.7%	19.8%	57.8%	105.2%	52.9%	42.1%	44.3%	53.0%	33.0%
Cost of Revenue:													
License Fees	\$127	\$418	\$246	\$444	\$385	\$351	\$1,411	\$323	\$525	\$650	\$860	\$2,348	\$2,800
Services	\$316	\$846	\$310	\$711	\$429	\$485	\$1,915	\$430	\$470	\$603	\$879	\$2,371	\$9,850
Total Cost of Revenue	\$443	\$1,264	\$556	\$1,155	\$784	\$836	\$3,326	\$753	\$995	\$1,253	\$1,739	\$4,719	\$12,650
Gross Profit	\$6,813	\$9,895	\$1,656	\$2,244	\$3,932	\$6,431	\$14,254	\$3,755	\$4,209	\$5,453	\$8,718	\$16,085	\$23,350
Gross Margin	93.9%	88.7%	74.8%	65.9%	83.2%	88.7%	81.1%	83.8%	80.9%	81.3%	83.5%	77.3%	64.8%
Costs and Expenses													
Sales & Marketing	\$4,098	\$6,472	\$1,377	\$1,976	\$2,084	\$3,726	\$9,163	\$2,516	\$2,500	\$2,700	\$3,800	\$13,519	\$14,500
R & D	\$721	\$873	\$80	\$60	\$379	\$440	\$648	\$333	\$700	\$800	\$1,000	\$2,033	\$4,000
General & Administrative	\$1,511	\$2,069	\$550	\$459	\$873	\$802	\$2,704	\$689	\$675	\$700	\$760	\$2,794	\$3,100
Total Operating Expenses	\$6,330	\$9,414	\$1,987	\$2,495	\$3,336	\$4,777	\$12,515	\$3,538	\$3,875	\$4,200	\$5,560	\$17,047	\$21,600
Operating Income	\$580	\$1,421	(\$331)	(\$251)	\$787	\$1,654	\$1,739	\$277	\$334	\$1,253	\$3,178	\$5,032	\$11,750
Other Inc/(Exp), Net	(\$259)	(\$141)	(\$75)	(\$139)	(\$249)	(\$245)	(\$707)	(\$104)	(\$150)	(\$175)	(\$175)	(\$104)	(\$100)
Pre-tax Income	\$321	\$280	(\$406)	(\$390)	\$544	\$1,409	\$1,032	(\$281)	(\$184)	\$1,078	\$2,003	\$3,928	\$11,650
Income Tax (Expense)	\$52	(\$229)	(\$122)	(\$117)	(\$193)	(\$338)	(\$392)	(\$114)	(\$168)	(\$500)	(\$1,174)	(\$1,957)	(\$2,800)
Tax Rate	16.2%	(21.8%)	(30.0%)	(30.0%)	35.6%	24.0%	25.2%	29.9%	35.0%	35.0%	36.0%	31.7%	24.0%
Net Income	\$119	\$509	(\$528)	(\$507)	\$351	\$1,071	\$640	(\$395)	(\$315)	\$578	\$829	\$1,971	\$8,850
Earnings per Share	\$0.09	\$0.42	(\$0.41)	(\$0.40)	\$0.27	\$0.81	\$0.51	(\$0.31)	(\$0.25)	\$0.43	\$0.63	\$1.51	\$0.71
Avg Common Shares Out (000)	1,392	1,212	1,287	1,267	1,287	1,316	1,257	1,287	1,267	1,300	1,300	1,300	1,250

	FY91	FY92	Q1A Mar-93	Q2A Jun-93	Q3A Sep-93	Q4A Dec-93	FY93	Q1A Mar-94	Q2E Jun-94	Q3E Sep-94	Q4E Dec-94	FY94	FY95
<b>US GAAP (\$C)</b>													
Income from Operations	\$480	\$20	(\$338)	(\$259)	\$681	\$2,084	\$2,068	\$309	\$0.04	\$0.13	\$0.30	\$0.51	\$0.73
Net Income (Loss)	\$159	(\$350)	(\$291)	(\$281)	\$145	\$1,501	\$1,074	(\$288)	(\$0.04)	\$0.04	\$0.30	\$0.51	\$0.73
Net Income (Loss) per Share	\$0.11	(\$0.29)	(\$0.23)	(\$0.22)	\$0.11	\$1.14	\$0.85	(\$0.22)	(\$0.03)	\$0.03	\$0.23	\$0.39	\$0.58

[1] Results are reflected for the nine month period ended December 31, 1990.

	FY91	FY92	Q1A Mar-93	Q2A Jun-93	Q3A Sep-93	Q4A Dec-93	FY93	Q1A Mar-94	Q2E Jun-94	Q3E Sep-94	Q4E Dec-94	FY94	FY95
<b>Operating Statistics</b>													
Cost of License Fees	2.0%	4.0%	14.8%	15.3%	9.3%	5.3%	9.1%	9.1%	12.5%	11.8%	9.8%	10.7%	10.0%
Cost of Services	33.9%	15.7%	55.8%	162.2%	53.5%	68.8%	43.1%	43.1%	45.8%	50.0%	60.0%	48.0%	55.0%
Total Cost of Sales	6.1%	17.4%	26.1%	34.1%	16.8%	11.3%	16.4%	16.4%	18.1%	18.7%	16.5%	17.5%	18.0%
Gross Margin	93.9%	88.7%	74.8%	65.9%	83.2%	88.7%	83.8%	83.8%	80.9%	81.3%	83.5%	82.8%	81.0%
Sales & Marketing	56.6%	58.0%	62.3%	58.0%	44.2%	51.4%	55.4%	55.4%	48.0%	40.3%	36.3%	42.8%	40.3%
R & D	9.8%	7.8%	2.7%	1.8%	8.0%	6.2%	7.3%	7.3%	13.5%	11.9%	9.8%	10.5%	11.7%
General & Administrative	20.8%	18.5%	24.9%	13.5%	14.3%	8.3%	14.7%	14.7%	13.0%	10.4%	7.2%	10.4%	8.2%
Total Operating Expenses	87.3%	84.3%	89.8%	73.3%	66.5%	65.9%	77.5%	77.5%	74.5%	62.6%	53.1%	63.7%	60.4%
Operating Income	6.0%	4.3%	(15.0%)	(7.4%)	10.7%	22.8%	6.1%	6.1%	8.4%	18.7%	30.4%	18.7%	20.7%
Pre-tax Income	1.2%	3.0%	(18.4%)	(11.5%)	11.5%	19.4%	8.4%	8.4%	9.3%	21.3%	22.1%	21.0%	27.9%
Net Income	1.0%	1.0%	(12.8%)	(8.0%)	7.4%	14.8%	5.9%	5.9%	8.0%	13.8%	20.8%	13.7%	14.9%







# A Technical Evaluation of Verity Inc.

Prepared for Trident Capital, Inc.

June 3, 1994





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## **Abstract**

An overview of text processing is presented, followed by a discussion of the the industry in terms of major application categories, followed by a discussion of Verity's position in the industry and conclusions.

---

### **Introduction**

Text processing systems represent a growing market. This document provides some background on text processing, identifies some of the criteria by which they may be judged, and contrasts the features and capabilities of several systems with those of the product Topic from Verity.

### **What is Text Processing**

Typical databases are either hierarchical or relational databases of "records", or highly structured, usually tabular data. Recent advances in publishing and authoring technologies have created an explosion of information, most of it in machine readable format. Most of this information is in the form of documents which organize information in a very different fashion than traditional database systems. The term "unstructured data" has often been applied to databases where the items of interest are documents rather than rows or columns in a table. A such, the term is something of a misnomer, but draws a necessary distinction between Textual Information Retrieval Systems (TIRS) and the more traditional relational, hierarchical, and network database systems (TDBMS.) The importance of the representation of structure in text will be discussed throughout this discourse.

Text processing comprises several activities, the most important for the purposes of this research being the following: Capture, Storage, Searching, Presentation, and Applications. Different programs and products address these areas with varying degrees of enthusiasm,



but almost all packages must address the issues of storage and searching, and as such these topics demand the greatest attention.

## **Data Capture**

Capture refers to the processes of making a body of information available to a TIRS. A body of text which has been made machine-readable is generally referred to as a corpus (plural corpora). The ready availability of desktop publishing has spawned millions of documents rendered as corpora. Yet, the vast majority of textual records are still available today only as ink on paper, often stored without indices. Technologies such as Optical Character Recognition attempt to automate the conversion from ink on paper to bytes, although the accuracy of conversion often requires human assistance to achieve high quality conversion.

As a result, much of the attention of the authoring world is focused on producing documents which do not require conversion from an image to text. Few if any commercial newspapers use anything but computers for typesetting. Computer networks accept and propagate hundreds to thousands of megabytes of articles, mail, software, and news postings every day. Interestingly, however, competitive pressures have until very recently created a large number of document formats, word processing applications, and information viewers which range from occasionally interoperable to completely incompatible. Current standards work such as the Unicode standard (for uniformly encoding the character sets of the worlds languages), Adobe Acrobat (providing a common document presentation format), and SGML (standardizing formatting, structure, and annotation) are attempts to consolidate the often gratuitous differences between competing commercial formats while providing room for product differentiation.

The challenge for data capture systems is to provide the search engine with relevant information which fits within the bounds of the capabilities of the storage mechanisms available.

## **Storage**

Document storage has traditionally been achieved with file systems. Every popular computer operating system offers at least one file storage system, often multiple systems concurrently, for storing and



organizing things we call files. Some operating systems make assumptions about the structure of the contents of files. VMS, for instance, offers files which can contain records similar to those in traditional database systems (RMS files), as well as files whose contents are completely opaque. The important point here is that the operating systems has knowledge of the structure. The Unix operating system takes the opposite approach, and treats all files as a sequence of bytes. It is up to programs which use the files to understand their structure. This approach leads to greater generality, often at the cost of more code or limitations on performance optimizations.

With respect to TIRS's, the important fact is the association between a sequence of bytes and a program of function which can interpret those bytes. Programs which attempt to locate keywords on a hard disk and then find the files which contain those keywords must either understand all possible file formats, or else have access to another program or function which does. As an example, consider a search of a disk for the word DOG on a disk. It is quite possible that the sequence of characters D•O•G might be in an ASCII file on pet maintenance. It might also just happen to be the binary representation of a machine language operation in the code portion of a DOS .EXE file. It is necessary to indicate the context of a search to avoid addressing storage where the context is inappropriate.

The notion of context is central to all text processing, and consumes much of the energy devoted to the discipline. A TIRS must be flexible enough to permit corpora from many different software packages, encoding formats, operating system file and directory structures to be referenced and manipulated. Commercial software applications are just today transitioning from monolithic, file-based cooperation schemes to active, message-based cooperation, such as OLE 2.0, DDE, AppleEvents, CORBA, and DCE. Applications in the future will comprise a bundle of software components, individually replaceable and upgradeable at the point of use. At this time, the storage and access of documents with respect to TIRS will become a commodity.

The result of a query into a text database produces a set of references to corpora which may have many different structures; one reference might be to a paragraph in a book, another to a page in a magazine, another to a row in a relation database, and so on. For any search engine, the precision of the indexing is determined by the





precision of reference provided by the referent storage systems. This precision is often at the level of a file, or may be as detailed as a file name and a byte offset into the file. In other cases, such as a relational database, a database name and query may be required, or even the database name, a table name, and a primary key. Whatever the access scheme, the operational characteristics of the referent systems must be accommodated, or else the integrity of the referent systems can be violated.

An example is document security. Most file systems provide file-level security, permitting access to files based upon rules, file ownerships and permissions. A TIRS referencing the files in such a system should take into account the access rights of the user making a query, and exclude files from the result list which are not accessible by that user. Unfortunately, most systems do not accommodate such security rules. Even more difficult is the case where multiple types of referents are maintained, such as files, relational databases, and network feeds, as each may have their own protection mechanisms which are completely unrelated.

Issues regarding the proper security models, determining the right referencing models, and managing indexes can be reduced to two concepts: structure and policy models. Structure models detail the organizational structures which a storage system can accommodate, and policy models describe the choices to be selected from among the possible options of a structure model. Efforts such as SGML and Acrobat are attempts to create structure models and provide well defined policy choices. By covering the capabilities of the structure and policy models, application developers can develop systems which accommodate a variety of storage models without redundant coding. In an ideal world, the storage system becomes a simple API issue, with the complexity of managing structure and policy models in the search component.

## **Searching**

Searching represents the primary task of text processing, and over time, will represent the primary product differentiation between text processing products. Searching involves three fundamental tasks: query expression processing, query optimization, and referent retrieval.



Query expression evaluation involves the conversion of the request for a search into a search plan. The techniques used to specify a query range from pure point-and-click interfaces to extended SQL language syntax. The important measure of query expression is fidelity to the interface and the intended purpose; most interactive Windows users would prefer the point-and-click interface, while database coders would appreciate extensions to SQL. At their very essence, however, is an mathematical algebra which represents the fundamental capabilities of the search engine. Generally, the more powerful the mathematical capabilities, the better the search engine. In practice, however, it is better to make sure that there is a good fit between the sophistication of the query expression and the sophistication of the one posing the query. This is not to say that the same mathematical basis shouldn't apply to both simple and sophisticated queries, but rather that the expression of the queries should meet the expectations of the intended user.

For instance, desktop file indexing programs can probably perform quite well with a simple boolean operator and keyword model: find ("fred" OR "barney") AND ("Wilma" or "Betty"). On-line information services may need a sophisticated natural language interface to reach the immense audience such systems have without requiring extensive training on how to compose a query. In both cases, however, the results of translating the queries result in a search plan which could be fed to the same engine.

Searching large amounts of data efficiently requires spending time to analyze the query to see if opportunities for optimization exist. Running a brute force query over a few megabytes may only take a couple seconds, and as such, may not warrant a complex optimization pass. On the other hand, searching a few terabytes of data certainly cries out for the very best optimization attempts. The types of optimizations which can be performed depends entirely upon the nature of the indexing technique, and accurate cost estimates of the expected performance of the storage system. Accurate estimates may be difficult to make in a highly abstracted storage system where details of document placement and searchability may be unavailable or impossible to compute. The storage systems must be capable of providing structure models and policy models from which access cost information can be accurately determined, else query optimization will be shoddy at best, especially compared to RDBMS systems.



An added complication for query processing is the determination of context. A search for a word in the title of a document may be orders of magnitude faster than a search for the same word in the body of the document because the structure imposed by the notion of title constrains the amount of text to be searched. Another kind of context is represented by constraining a search by the usage of a word, differentiating the meanings of a word such as "bear." Bear can mean an animal, the state of having no fur, the state of having no covering, the act of sustaining a force, etc. The responsibility for understanding the meaning of a word in context is split between query processing and data capture. A very good natural language system (NLS) can determine such usage in a majority of cases, but may fail in critical areas. The only way to be 100% assured of the correct meaning is to encode the meaning along with the text, a process called tagging. Tagging can be thought of as a structuring convention, as such tags might be embedded in the text as in SGML, or can be stored as separate annotations in a coordinated document. To properly interpret the context, the query engine must understand the encoding format.

Several techniques have emerged as standard techniques for improving search performance:

Stop lists	Remove low-relevance words like "the", "an"
Spelling Variations	Understand that "color" == "colour"
Stemming	Index the base of words, removing endings which indicate part of speech, like -ive, -ly, and so on.

Another technique, called faceting, attempts to structure queries based on semantic information. A typical faceted system provides several core words, such as "action", "object", "subject", and "location", and all documents are indexed based on a key comprising the concatenation of core words in the document which match the keywords. For instance, a typical query of "who shot Roger Rabbit?" would be encoded as:

action:	"killed" or "shot"
object:	"Roger Rabbit"
subject:	*
location:	*

The results of such queries are typically much better than systems employing simple word searches, and usually better than boolean



operator systems. The cost of encoding is very high, however, as the automation of the indexing requires both very sophisticated NLS as well as substantial human intervention.

The Topic system from Verity employs conceptual search, where a concept is manifested as a topic. A topic represents a statement about the relevance of a search word to a set of other search words or topics. The relevance is represented as a rational number between 0 and 1 inclusive. Operators can be applied between relationships in a topic to add further relevance. Such operators include the traditional AND and OR, but also operators such as NEAR, ACCRUE, SOUNDEX (sounds-like), and case sensitivity. The combination of queries is represented by the composition of the topics, and optimizations can be performed on the result based on rearranging the relationships of the resulting topic graphs.

Another interesting approach is represented by Excalibur. Excalibur treats a document as a sequence of numeric bytes representing a signature much as might be returned as a sonar echo from a submarine or the stream of digital data from a compact disk audio recording. The query engine uses signal analysis techniques to identify relevant referents. This approach permits references to any kind of document, but at the same time cannot take advantage of the contextual constraints provided by understanding the higher level structure of textual documents.

Regardless of which techniques are used, finding the right set of documents rests upon finding the right query, which is a process of trial and error based. Even if a query is perfectly expressed, a perusal of the documents retrieved may cause a change in the information being sought, sometimes by helping to identify further constraints, but often by redirecting the search to different areas of interest. In order to expedite the perusal process, documents must be easily viewed, which is represented by the term presentation.

## **Presentation**

Different documents require different programs to display them. Once, a long time ago, almost all computerized text was either EBCDIC or ASCII encoded characters with common or similar carriage control characters embedded. Indexing such text was straightforward, and





almost all terminals were capable of displaying the text in a way which was meaningful, albeit not necessarily pretty.

The advent of windowing systems based on GUI changed this landscape drastically, as competing word-processing, spreadsheet, and drawing packages conceived hundreds of different file formats for their respective products. The ability to afford a human operator a simple, effective, graphic interface for such programs almost always came at the expense of making interactions with other programs difficult or impossible, except through exchanging files. As such, most cooperative work between programs was based on writing and reading compatible file formats.

As such, building a TIRS is complicated by orchestrating the various viewers in such a way that their use is meaningful in the framework of successively refining a search. Building such a framework has proved to be difficult, as the many releases of DDE, OLE, AppleEvents, etc. have shown. Once built, however, viewers can be identified as software components in the framework and invoked when needed in a straightforward manner. As cooperative frameworks become more powerful and prevalent, the problems associated with presentation will diminish.

Another approach to solving the presentation problem is to create a single document presentation standard, and then embed the viewing software in the application. Adobe's Acrobat is just such a standard. Such an approach is attractive as it permits text processing vendors to focus on text processing as opposed to maintaining code for integrating foreign viewers. The success of such an approach probably rests upon the ability of Adobe to upgrade and improve Acrobat features and presentation quality to match that of the products from independent viewer developers.

## **Applications**

Incorporating text processing functionality into applications depends heavily of the application architecture as well as the text processing product chosen. Some generalizations can be made, however.

First, the presentation fidelity will generally determine a great deal about the application architecture. If high-quality presentation is



required, then high-quality viewers must be invoked, and such viewers are typically not embeddable into arbitrary application programs. MS-Word, for instance, is not embeddable. However, it is messageable, which dictates the use of DDE or OLE. Applications using such standards must have certain architectural features, such as having an event loop, responding to certain messages and being able to accept callbacks. Should low-quality presentation be sufficient, then referent text rendered in ASCII could be returned as the result of a text query, and displayed using simple ASCII controls, placed in a file, etc. The requirements of such systems are vastly simplified over high-fidelity presentation systems. So the rule is: Increasing presentation fidelity is increasingly expensive.

Second, most applications are either text centric or text enhanced. Text centric applications are written around the text search API, and tend to focus on whatever programming metaphor the selected text engine employs. Other items, such as RDBMS access, are secondary considerations. Text enhanced applications are usually legacy applications, or else applications where the text processing functionality clearly represents a minority of the problem. Help-desk applications represent a text-enhanced application, as the application can clearly be authored without using a text engine, although the quality of the application increases dramatically when good text processing capabilities are available.

To accommodate this difference, various text processing vendors have differentiated their products to address the divergent requirements of each approach. Systems such as Fulcrum attempt to make text processing look like an extension of RDBMS programming, hoping to permit client/server applications to readily include their API while disturbing program structure as little as possible. Other systems, such as Excalibur, use a completely separate API and a substantially different metaphor, and as such, address different markets. Thus, the appeal of these different approaches varies as the flexibility of the application architecture and the demand for presentation fidelity.

Third, adding text search to an application brings with it concepts and features which must be administered and maintained. Adding a text engine which features document security controlling user access may mean that the application itself must be upgraded to understand user groups, capabilities, etc. The full extent of such changes are rarely properly implemented until several revisions of the



application have occurred. As such, adding text processing capabilities may complicate an application as much as adding a graphic user interface might, not based on structure, but based on features.

Given these generalizations, one can reach the conclusion that the bulk of application upgrades will introduce minimum text processing functionality in their first release, to avoid the complexities associated with higher-fidelity features. As understanding increases, applications will evolve to present greater fidelity text processing. New applications will be written to the same standards and constraints as they were before, with the added complexities of text processing rolled in as well. Blanket statements about the suitability of a particular engine for all applications seem, based on these generalizations, to lack substance.

### **Major Application Categories**

From a technology standpoint, the market is divided into three main areas: desktop file combing, workgroup and departmental text processing, and on-line information services.

#### **Desktop Text**

Desktop file combers attempt to help users locate files on hard disk based on the file name yet independent of the directory structure, or by searching the content of the files for words or phrases. Typically, they perform searches on whatever the current popular size hard drive might be, and are tailored with limited search engines, and occasionally don't even use indices. Examples include those listed below:

Alki Software Alki Seek 2.1  
Claris Retrieve It 1.0  
Microlytics Gofer 2.0  
On Technology On Location 2.0

They are distinguished by the fact that they assume that the data is local, so that concurrency control (usually implemented with file locking) is unnecessary, that the cost for accessing the hard disk data is negligible, and that the search is probably the most important



thing happening on the machine at the time, and so can consume as much CPU as needed.

Another important facet of desktop text is CD-ROM search. Such search is not fundamentally different than searching a hard drive, except that the access times of CD-ROM tend to be much larger than those of hard drives, often slowing the search process. Careful access scheduling can mitigate much of the performance disadvantage, but the best advantage is obtained by indexing.

## **Workgroup and Departmental Text Search**

Workgroup text search is characterized by two separate technologies: shared file systems and client/server operation.

Shared file system text search is essentially the same as desktop search, except that the text base is no longer local, but rather is accessed via shared file system. With this sharing brings the requirements for adhering to file system and resource security models, potential concurrency bottlenecks, and interrupted data access. Bringing the entire text base across a network connection is infeasible, so all workgroup systems must be indexed in some fashion.

Client server operation mitigates many of these problems by performing the search close to the data, and moving only the minimum required data from server to client to satisfy a query. The penalty for client/server operation is the added complexity of installation and administration compared to simple shared file access. Examples of shared file systems text search systems include:

- Virginia Systems Software Sonar Professional 8.4
- Mainstay MarcoPolo 2.0
- Knowledgeset GraphicsKRS 1.0
- Personal Librarian 1.06

## **Enterprise and Federated On-Line Information Services**





On-line Information Retrieval Services (OLIRS) are either client/server or mainframe style applications. Such services typically must provide for many different resource usage measurements to facilitate chargeback accounting. Examples include connect time, difficulty of search, breadth of document search, number of words or pages actually transferred, etc. Such services also support hundreds or thousands of concurrent users searching gigantic text bases. Many of the documents referenced from a large text base may be stored in systems which are currently unavailable for access -- essentially off-line. In addition, different text services may share indices to data, but not the corpus itself. Systems which share text indices in such a manner are considered federated. As such, flexibility in the search engines, both architectural and operational, is necessary to implement successful large-scale on-line systems.

Large text bases also lead difficulties with indexing. On-line customers expect low latency between the arrival of information to the text base and the integration of the information into the index. As such, on-line indexing is very important for such systems. For very large text bases, the incoming data rate may be so large that off-line indexing is simply impossible. The tradeoffs to accommodate large text bases are different than those for small text bases, just as database techniques for very large database systems are quite different than those of DBASE-II. The integrity of the index becomes paramount as well, as the loss of an index puts a halt to all searches.

Some example of engines suitable for OLIRS are:

- Apple AppleSearch
- Blueridge Technology Optix Network NLS 4.0
- Excalibur Technologies PixTex/EFS 3.03
- Fulcrum Technologies SearchTools 1.2
- MicroDynamics MARS 3.0
- Verity Topic 3.1.4

### **Overview Summary**

This section has attempted to provide background and discussion concerning the technology and operational frameworks associated with text processing. In the following section, we briefly examine



the technology of Verity, and how it fits into the operational frameworks outlined above.

### **Success Criteria**

To understand Verity's position in the text processing market, it is necessary to make some generalizations concerning that market. Several of these have been made in previous sections, but are reiterated here and specifically applied to Verity.

First, most desktop text systems will become commodity items, in the same manner that spell checking programs are commodity items. These low-end packages employ algorithms which are simple enough to duplicate and place in every application rather than create a separate application which provides a single service. It is possible that text search will become a combination of operating system and associated bundled application software in the future, as Microsoft has indicated an intent to pursue such an approach in Cairo. Indeed, the UNIX operating system traditionally shipped with a comprehensive dictionary, thesaurus, spell checker, and text formatting tools as part of the standard distribution, with later additions including a reading level evaluation and diction tool. In general, however, the function of spell checking become an OEM problem, or else was implemented in a quick and dirty fashion, forcing many of the spelling checkers off the market.

Creeping featurism in operating systems, application frameworks such as OLE, and technology consortiums such as Shamrock, OpenDoc, and DCE will eventually provide most of the tools which are necessary for building efficient text search engines well integrated with the underlying technology. The quality and fidelity of these systems, however, will be suspect, as there must be some commercially viable, reputable, and persistent organization providing support and upgrades for anyone to seriously consider relying upon such technology. A good example is the GNU projects C compiler. By most accounts, it represents a high-quality, very flexible and reliable compiler, for much of its life providing functionality and performance exceeding that of many hardware and compiler companies' releases.

Most organizations, especially large ones, refuse to invest in unsupported software. To answer that need, companies such as



Cygnus were created which provide contract support for the free software released by the GNU project. While acceptance improved, it never reached the level of usage for commercial projects that hardware vendor and compiler companies reached with their products.

To be successful then, a text search engine company must establish strong OEM ties with both OS and application vendors, and maintain those ties by continually upgrading their product. Their pricing must be cheap enough, and their products of sufficient quality and performance, to keep OEM partners from switching to other suppliers or inventing their own solution.

To be successful then, a text processing company will need to exploit a single facet, or at most two facets, of the spectrum of text processing. The two most likely candidates are data capture and search. Storage is not viable because companies such as Microsoft and its competitors need to add storage support features to their operating systems to show continuous product improvement. This is not to say that a Microsoft solution is the only one. Rather, the market for storage improvement will be vastly diminished by the ready availability, and most of the improvement in the storage performance and features lies in improving the index methods in any event, which lies in the realm of data capture and search. Presentation is a lost cause, as all the application frameworks are attempting to solve this problem, and the influential partnerships have already been created. There is opportunity in application development, but such applications will be mostly end-user application development, such as Fortune 1000 in-house application development, add-ins to application development systems such as PowerBuilder, and simple front-ends for client-server systems.

A real threat exists, however, in the few large companies which control the application infrastructure of the Fortune 1000, such as Oracle and Microsoft. By treating text processing as another facet of client/server database computing, the highly attractive proposition that text search can be added with a minimum of retraining and application rearchitecture is presented. For many applications, such an approach is in fact feasible, although as the application grows in size and fidelity, more and more difficulties will arise.

During customer interviews, one report noted that a company which had been using one engine was probably going to convert to another.



This decision was based on the fact that the text engine company had decided to use Microsoft's ODBC database interface for its text processing interface. While the text engine vendor saw this as a great savings in code and maintenance costs, and a step towards standards compliance, the customer saw it as a rather gratuitous change which caused application rearchitecture and induced a performance penalty. The lesson here is that the API's and application architectures supported at first release are very difficult to substantially alter at a later date.

Finally, some companies will fail because they try to do it all, and don't do each section well. The advance of Adobe Acrobat makes significant investments in presentation components unwise. Companies such as Oracle will attempt to fit each facet of text processing into their currently existing products, innovate where there are holes, and generally provide a level of fidelity suitable for corporate applications. In addition, they are no doubt investigating coupling their text engine with their video server technology to provide TIRS interfaces over video networks. Combating such infrastructure giants is certain doom.

The areas where smaller players can capitalize and succeed are search and capture. The investment in search algorithms, accommodating references to the myriad file formats and the emerging Acrobat documents, relational database access and referencing, and security models for text processing are all areas which need be authored only once and are substantial investments for companies focused on providing a larger added value. Products which can fit into the various application frameworks will succeed whereas standalone systems will fail.

### **Strengths and Challenges for Verity**

Verity's strengths lie mostly in their new architecture and their focus on query processing, which promotes longevity based on the ideas presented above. While their "topic" technology is sure to be supplanted with superior technology in several years, they are in a good position to capture a reasonable portion of the OEM market, based upon their alliances with Adobe and HP. A closer relationship with Microsoft would not hurt, but is not necessary for success. Verity has remained focused on search and capture, and has a superior architecture for OEM embedding than their competitors, due





to their early adoption of a multithreaded, reentrant program. The size of their engine is also attractive for OEMS (~600KB), and will not necessarily require client server operation, permitting a single computer to be used as well as addressing multiprocessors (through process-per-processor client server.)

In addition, Verity has made the corporate transition from a \$30K product to a \$1K product, and can by careful planning and partnering accommodate even lower price points.

There are many challenges as well, however. Search technologies such as LSI (Latent Semantic Indexing) and similar techniques will provide considerable competition. In a market where missing even one relevant document might mean success or failure, sensitivities to query precision and algorithms will continue to increase. Verity must make sure that their API's and kernel architecture can survive the addition of or conversion to a very different search model. Companies such as Excalibur are probably better positioned to take advantage of LSI and its successors than Verity at this time.

In terms of addressing the existing client/server market, the two companies to beat are Fulcrum and then Oracle. Fulcrum has placed its bet on marketing text processing as a database problem, and have provided enhanced versions of SQL to accommodate text. Oracle has done the same thing, but will integrate the extensions across its product line. Fulcrum has approached most RDBMS vendors to provide similar enhancements using its dialect or variants suitable for the RDBMS vendor. In any event, Fulcrum has the lead in market share and has created the perception that text is a server problem. Verity must find a way to either fit or change the perception.

Finally, overall performance will be a key differentiator. Benchmarking text retrieval systems is difficult as the criteria for success depend heavily on the application. Clearly, however, the best performance increases will come from improving the search algorithms, then by tuning the search engine to best utilize the storage engine (such as aligning text on double-word boundaries, etc.)

## **Conclusions**



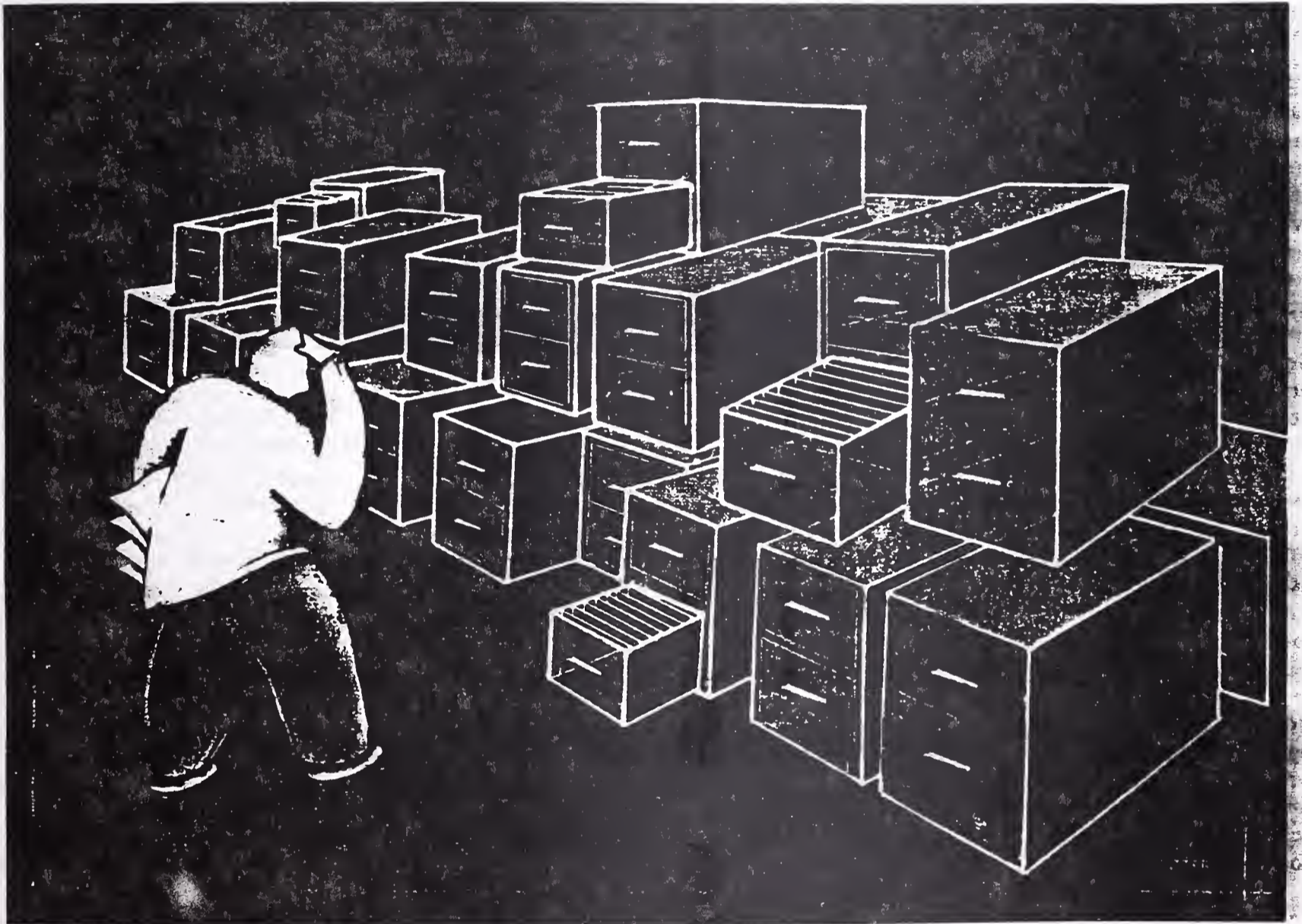
The entire text processing industry will sustain a massive shakeout once established players start offering their solutions. Verity must maintain partnerships to ride the shakeout. Their partners will succeed based on Verity's ability to improve their search technology without revolution. Partnerships with presentation companies are crucial for success. Verity must establish some defense against server-centric assaults from Oracle and Fulcrum, else they risk being disregarded by the RDBMS community. The underlying technology of "topics" provides as good a model as most for constraining searches, and does not represent a major advantage or disadvantage at this time. Continued development of query processing and optimization techniques is vital. To address on-line information services, partnerships with natural language understanding systems will need to be established within 12-18 months (and are currently being investigated.)



## APPENDIX A



# Advances in Text



JOHN RITTER

**N**ot long ago, finding documents with information you needed meant looking through bankers boxes full of musty file folders, leafing through the *Reader's Guide to Periodical Literature*, or making yourself queasy skimming rolls of microfiche just to find two paragraphs relevant to your search.

Fortunately, recapturing the past is easier these days, thanks to special software for archiving and retrieving text. The primary function of text-archiving-and-retrieval software is to store text on your computer and to find it for you later. The most basic text-retrieval packages, such as

Claris's Retrieve It, Alki Seek, Microlytics' Gofer, and On Technology's On Location, respond to your typing in a word or several words—*jazz* and *Charlie Parker*, for example—by listing all files on the volume you're searching that contain those words. These packages are well suited for individuals who must often dredge up half-remembered facts or deeply nested files.

But many retrieval packages go far beyond simply finding a few words. The high-end packages, as well as On Location, preindex text or store it in an archive—a text database—to speed up the search. Many, including Blueridge Technology's Optix Network NLS (Natural

BY KRISTI COALE

# Retrieval

Locate any information, anytime, anywhere

Language System), Apple's AppleSearch, and Mainstay's MarcoPolo, are designed for network access to an organization's data; in fact, some products, such as Verity's Topic and Excalibur Technologies' PixTex/EFS (Pictures and Text/Electronic Filing System), even let Mac clients access data stored on a non-Mac server. And others, including Knowledgeset's GraphicKRS (Knowledge Retrieval System) and Fulcrum Technologies' SearchTools, actually include programming tools for designing a custom interface, which is especially useful for distributing your organization's archives—or even selling information—on CD-ROM.

## Advanced Search Features

A simple word search can return a list of documents so long you'll wish you were back at the microfiche reader. Boolean operators—AND, OR, and NOT—and proximity operators are useful for zeroing in on the text. For instance, a search for *Jazz AND Monk WITHIN 10 New York* yields documents containing both *Jazz* and *Monk*, but only if these two words are within ten words of *New York*.

Wild-card searching and fuzzy searching, which looks for approximate spellings, come in handy when you don't know the exact spelling of a word, or if you're looking for related words. For instance, *Bio\** (the asterisk is a common wild-card symbol) might find *Biology*, *Biochemistry*, and *Biotechnology*.

Some high-end packages, such as AppleSearch, Personal Library, software's Personal Librarian, and Optix Network NLS, provide a natural-language search engine, so you can type what you want to find in plain English. If you look for the phrase "articles about modern music," the program might return files with information about the Spin Doctors, jazz, and Branford Marsalis. Natural-language searching understands relationships between words, either by looking them up in a built-in dictionary and thesaurus, or by analyzing the

contents of documents and finding words that frequently occur together.

Even with all these search tools, you can wind up with a lengthy list of retrieved files. If you didn't create the files yourself, you have no way of knowing which make only passing reference to the search term and which are useful. Fortunately, some natural-language systems figure this out for you and rank the files according to their relevance.

## Finding Your Search Tool

Searching for a text-retrieval package can be about as complicated as searching for documents, so decide what you want to accomplish before you choose a package.

For instance, if you have an 80MB hard disk and your filing system is totally disorganized, a basic retrieval package can help you find lost files more easily. Alki Seek, Retrieve It, Gofer, and On Location are geared for this. All four packages provide the basic Boolean operators, but beyond that there's a big gap in offerings.

Retrieve It has the most basic set of search tools: Booleans and proximity searching. However, it does provide a smorgasbord of proximity searches, letting you look for words before or after other words, for example. It can pause a search in progress or search in the background.

Gofer is slightly better, letting you search for up to eight words separated by the Boolean and proximity operators and adding wild-card searches. You can search in the background with Gofer and search for near spellings. However, since Gofer doesn't run on the 68040 processor and Microlytics has no plans to update the program, avoid Gofer if you own or plan to buy a newer Mac.

Gofer and Retrieve It are outdone by Alki Seek. Seek offers more text-search criteria than you ever thought possible. Its well-designed query window won't overwhelm you, and its Banter Box describes in plain English what you're searching for. You can save and reuse your search

criteria, and Seek also lets you open up a document and view it in its original format—Seek supports XTND as well as formats of major programs like Word and PageMaker. (Retrieve It and Gofer can show the text of found documents without formatting.) However, Seek can't search in the background, and it doesn't have relevance ranking.

These three packages are painfully slow for large amounts of text because they have to read through the actual files. In an informal test on a PowerBook 140 I searched for *Macintosh AND Centris* in roughly 377MB of text from back issues of *MacWorld*. Seek took about 23 minutes, Gofer took nearly 30 minutes—and Retrieve It had the sense to quit after 20 minutes and chastise me for my search criteria.

Programs that index all the text and then search the index instead of the original documents are much faster. On Location performed the same informal test in 5½ minutes. Indexing saves searching time, but it costs hard disk space: some programs' indexes are about 1 percent of the size of the data you're indexing, but others can be 100 percent.

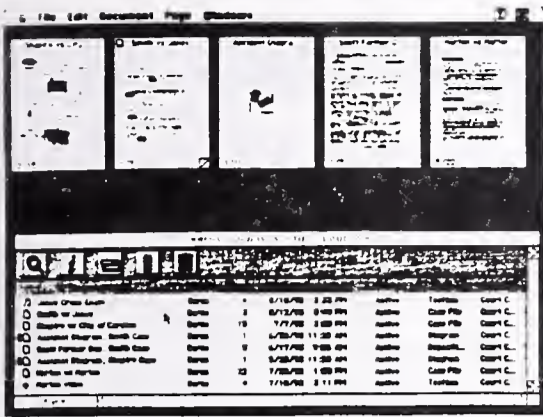
On Location has a nice feature—it can index in the background and update the index automatically when you modify your files. On Location's indexing outweighs the sparse set of search criteria and lack of relevance ranking and makes On Location the best basic package, though Alki Seek should be upgraded with indexing and background searching by the time you read this (see "Fast Find").

## Sharing Your Knowledge Base

Text-archiving-and-retrieval tools really come into their own when your workgroup or company can share information on a Mac network. Virginia Systems Software's Sonar and Sonar Professional, MarcoPolo, GraphicKRS, and Personal Librarian make it easy to do this.

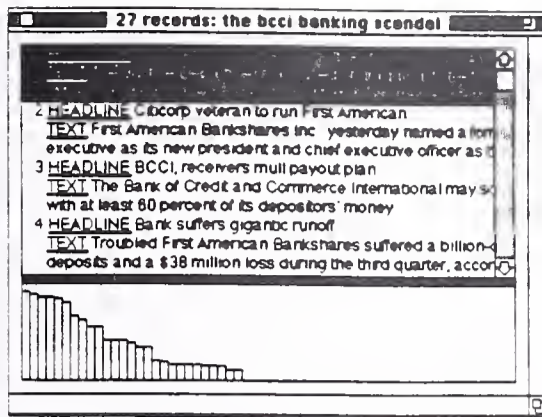
Both Sonars have the standard Boolean search operators, fuzzy and proximi-





**MarcoPolo's Picture File** MarcoPolo's special pntt driver archives an image of your Mac-generated files along with the text they contain, so you can see thumbnails of retrieved files while you read them.

PICT image of documents in the database as it archives them, and it can do subqueries—that is, query the list of files found by a previous search. But MarcoPolo lacks natural-language searching and



**Relevant Details** Personal Librarian has ranked this group of 27 files by their relevance to the BCCI banking scandal, and the histogram-like display below shows how relevant each file is.

relevance ranking, and is not programmable (see "MarcoPolo's Picture File").

MarcoPolo has a nice feel and is very easy to set up, thanks to straightforward manuals. Still, the nod for these packages

goes to Personal Librarian, because of its natural-language querying and relevance ranking (see "Relevant Details"). Second place goes to Sonar Professional, despite confusing manuals that make setting up the program difficult, because Sonar Pro has some great extras, such as sticky notes that you can add to documents and that become part of the index for searching as well. In my informal speed test, Sonar took a bit under three minutes, and MarcoPolo took just under four.

### Serving Up Information

For very demanding situations, you need to look at client-server systems. There are three client-server systems that can be all-Mac—Optix, MARS (Microdynamics Archiving and Retrieval System), and AppleSearch. In several others the Mac's role is only as a client on a VMS, Unix, OS/2, or mainframe server.

## CLIENT/SERVER SYSTEMS

Personal Librarian 1.06	AppleSearch	Optix Network NLS 4.0	PixTex/EFS 3.03	SearchTools 1.2	MARS 3.0	Topic 3.1.4
Personal Library Software	Apple Computer	Blueridge Technology	Excalibur Technologies	Fulcrum Technologies	Micro Dynamics	Verity
301/990-1155	408/996-1010	703/675-3015	619/625-7900	613/238-1761	301/589-6300	415/960-7600
○	800/635-9550	○	800/788-7758	800/385-2786	○	○
\$995	starts at \$1799	\$75,000 <sup>a</sup>	starts at \$12,000 <sup>a</sup>	starts at \$1000 per user <sup>a</sup>	starts at \$70,000 <sup>a</sup>	starts at \$30,000 <sup>a</sup>
●	●	●	●	●	●	●
●	○	●	●	●	●	●
●	●	●	●	●	●	●
○	○	●	●	○	○	●
●	●	●	○	●	●	●
○	○	●	●	○	○	●
●	●	●	○	○	○	○
○	○	●	●	●	●	●
○	○	●	●	●	○	●
○	●	○	●	○	●	●
○	●	●	●	●	●	○
60% of original data	100% of original data	2K per page	1/3 of original data	85% of original data	100% of original data	65%-70% of original data
●	●	●	○	●	●	●
●	●	●	●	●	○	●
System 7 file sharing, Unix, VMS servers	Mac OS, A/UX servers	Unix server	Unix, VMS servers	internal, Unix, OS/2 servers	Mac OS server	DOS, Unix, VMS, OS/2 servers
○	○	●	●	●	●	●

<sup>a</sup> Doesn't create index or archive.

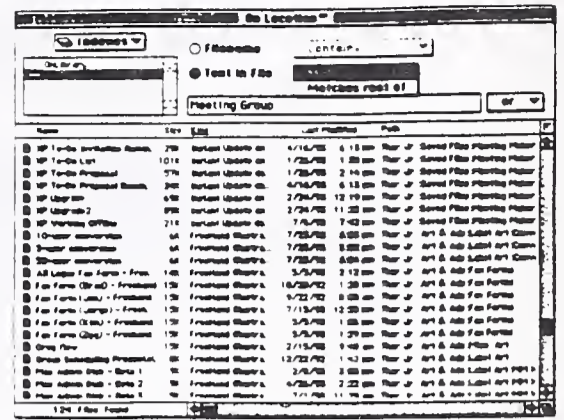
ty searching, wild-card searching, and relevance ranking. Sonar Pro can also search phonetically—by finding words that sound like the search terms—and lets you pause in the middle of a query, conduct another search, and then resume the previous search. GraphicKRS also has this branching search capability.

GraphicKRS moves the text to be searched into a separate archive. Tools for programmers let you build a complete application around this archive—for example, you can build an interface and set up hypertext links between parts of documents. GraphicKRS also imports graphics embedded in documents into the archive. Sonar Pro has a hypertext feature but isn't programmable. Both packages record the current session's search path, so you can easily retrace your steps.

GraphicKRS has wild-card and Boolean searching, but Sonar Pro adds

concept searching—a technique that is similar to natural-language searching but requires the user to define the relationships between words. Concept searching makes Sonar Pro a better retrieval tool than GraphicKRS, but Sonar Pro is outdone by Personal Librarian's natural-language query capability. Personal Librarian looks for statistical relationships between words in the documents it retrieves. For example, if you tell it to look for *baseball*, it will notice that many of those documents contain the word *umpire* and may start to turn up documents containing the word *umpire* that don't mention baseball. Personal Librarian also has fuzzy and wild-card searches, and ranks the files it finds for you.

MarcoPolo stands out from this group for several reasons. The Sonars, GraphicKRS, and Personal Librarian use System 7 file sharing to run on a network,



**Fast Find** On Location's limited search criteria make it hard to filter out files that are marginally relevant to your query, but its index does make retrieval very rapid.

and they don't track who owns documents. MarcoPolo has its own networking scheme with built-in access management and document tracking. Through a special print driver, MarcoPolo includes a

## Text-Archiving Systems at a Glance

### SMALL SYSTEMS

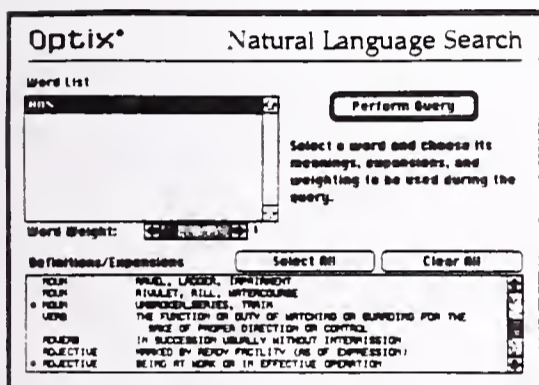
### MULTIUSER SYSTEMS

	Alki Seek 2.1	Retrieve It 1.0	Gofer 2.0	On Location 2.0.1	Sonar Professional 8.4	MarcoPolo 2.0	GraphicKRS 1.0
<b>General</b>							
Company	Alki Software	Claris	Microlytics	On Technology	Virginia Systems Software	Mainstay	Knowledgeset
Phone	206/286-2600	408/727-8227	716/248-9150	617/374-1400	804/739-3200	805/484-9400	408/738-3400
Toll-free phone	800/669-9673	800/325-2747	○	800/548-8871	○	○	800/456-0469
List price	\$39.95	\$69	\$39.95	\$129	\$795 <sup>A</sup>	\$395	\$15,000 <sup>B</sup>
<b>Query Methods</b>							
Boolean	●	●	●	●	●	●	●
Fuzzy	○	○	●	●	●	●	○
Proximity	○	●	●	○	●	○	●
Phonetic	○	○	○	○	●	○	○
Wild card	●	○	●	●	●	●	●
Pattern	●	○	○	○	○	○	○
Keyword	●	●	●	●	●	●	●
Root search	○	○	○	○	●	○	○
Natural language	○	○	○	○	○	○	○
Concept	○	○	○	○	●	●	○
Subquery	○	○	○	○	○	○	●
Save query	●	○	●	○	●	●	●
Autoquery	●	○	○	○	○	●	○
<b>Other Features</b>							
Automatic index and/or archive update	NA <sup>C</sup>	NA <sup>C</sup>	NA <sup>C</sup>	●	○	●	○
Space requirements for index/archive	NA <sup>C</sup>	NA <sup>C</sup>	NA <sup>C</sup>	2%–4% of original data	60%–100% of original data	1% of original data	400% of original text
Background searching	○	●	●	●	○	●	○
Relevance ranking	○	○	●	○	●	○	●
Multuser support	System 7 file sharing	System 7 file sharing	System 7 file sharing	System 7 file sharing	System 7 file sharing	internal	System 7 file sharing, internal, Unix server
Imaging capability available	○	○	○	○	Sonar Image (separate product)	●	○

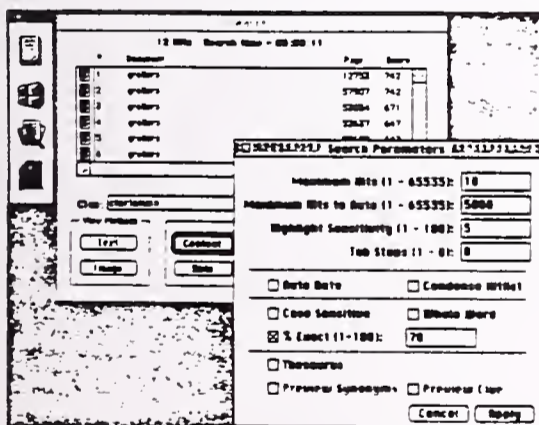
● = yes; ○ = no; NA = not applicable. <sup>A</sup> A \$295 version. Sonar 8.4, lacks phonetic and root-search queries, and it cannot save queries. <sup>B</sup> Price varies with configuration and license.

## HOW TO MANAGE PAPER DOCUMENTS

Searching text files is fine when your data is on the computer, but chances are you have a mountain of papers stored away too. If your organization needs to convert paper files to searchable computer format, you might consider a document-imaging system. A document-imaging system scans paper files and lets you add keywords to the scans to facilitate retrieving the documents later; when you conduct a search the system displays the image of the original document. Most document-imaging packages use OCR software to convert scanned documents into searchable text (see "OCR: The Recognition You Deserve," *Macworld*, November 1993). Optix Network NLS and MARS, among other products in this article, are geared toward document-imaging, but the topic requires an article to itself, so look for more coverage in an upcoming issue of *Macworld*.



**Searching in English** Optix's Natural Language Search lets you fine-tune how it interprets your query terms. In this example, Optix provides a list (under Definitions/Expansions) of nuances associated with the search term *RUN*.



**Matching Patterns** PixTex/EFS looks for strings of letters instead of entire words, so it can find *Charlemagne* even though the search term is misspelled as *charlamain*.

These systems are for large organizations with many users who need simultaneous access. For instance, a company might have a help desk that receives calls about its products and needs to track problems and make the solutions accessible to its technicians. As records of calls build up, a wealth of information accumulates in the retrieval system so that a technician can type in a description of a problem and get references to previous solutions.

AppleSearch is based on Personal Librarian's search engine, so it incorporates natural-language searching. Like

Personal Librarian, AppleSearch saves queries, but it goes a step further: you can set an AppleSearch query (called a Reporter) to run automatically on a schedule—for example, to search information downloaded from the wire services once a day. Results are ranked by relevance.

Optix Network NLS can run as a single-user system but is designed for Macintosh clients on a Unix server. Optix's natural-language engine is a little different from AppleSearch's or Personal Librarian's—it uses a dictionary and a thesaurus to analyze the words in a query and draw relationships between them. You can control how sensitive Optix is to finding these relationships (see "Searching in English").

Verity's Topic, with a Mac client that can access servers on several platforms, is for people who have a good idea what they are looking for and how to ask for it. Topic uses concept searching, so you (or an expert in the subject you are investigating) must define the queries, or topics, by setting up hierarchical relationships between search words and weighting each part of the query. As you add new subjects and words to a query you can change the relationships to reflect any new emphasis you might want to underscore. Topic ranks finds in order of importance. Verity also sells a module, called Topic Real-Time, that searches real-time data feeds such as news wires.

Excalibur's PixTex/EFS runs as a Mac client on Unix and VMS servers. PixTex specializes in pattern recognition, searching at a fine resolution that ignores words and looks for letters—it compares every sequence of characters in your query against every sequence of characters in the documents. This makes phonetic and fuzzy searching unnecessary. You can even type in approximate spellings of words, and the program finds anything having similar sequences of characters and ranks them by relevance (see "Matching Patterns").

Micro Dynamics' MARS is a document imaging system with a text-search module, FreeForm, that would be impressive as a stand-alone program but is not sold separately. Micro Dynamics started out selling turnkey systems, complete with a server, storage, and Macs with preinstalled software, though the company now sells the software without hardware. MARS's FreeForm offers up to eight levels of nested search terms and can perform automatic searches that are similar to those of AppleSearch's Reporters.

Fulcrum's SearchTools is a programmable system, like GraphicKRS, that is really designed for developing in-house text-retrieval systems and searchable CD-ROMs. SearchTools adds a new wrinkle: it incorporates a version of SQL, the universal database query language, that has been extended with commands specific to text-retrieval operations. SearchTools runs as a Macintosh client on Unix or OS/2 servers (a Windows NT server is also in development).

With such a wide variety of search tools available, there is certain to be one that can help you find all the information you need. Now if someone would just hurry up and convert all those reams of microfiche into digital text. ■

KRISTI COALE, based in Redwood City, California, wishes text-retrieval technology had been available sooner to save her from years of microfiche sickness.

## TEXT-RETRIEVAL SOFTWARE



The client server tools are too complex for us to make a call, but among products geared for the casual user and for workgroups, two products stand out.

**Small System**

**On Location** On Location is very fast and barely requires maintenance, because once you create an index it updates automatically every time you modify or create documents. **Company:** On Technology. **List price:** \$129.

**Multiuser System**

**Personal Librarian** Personal Librarian's statistics-based natural-language querying helps you find not only what you know to search for, but also related topics. **Company:** Personal Library Software. **List price:** \$995.



## APPENDIX B





**GartnerGroup**  
Continuous Services

Office Information  
Systems

**OIS**

Products, P-FUL-1114  
J. Popkin

**Research Note**  
March 22, 1993

REPRINT

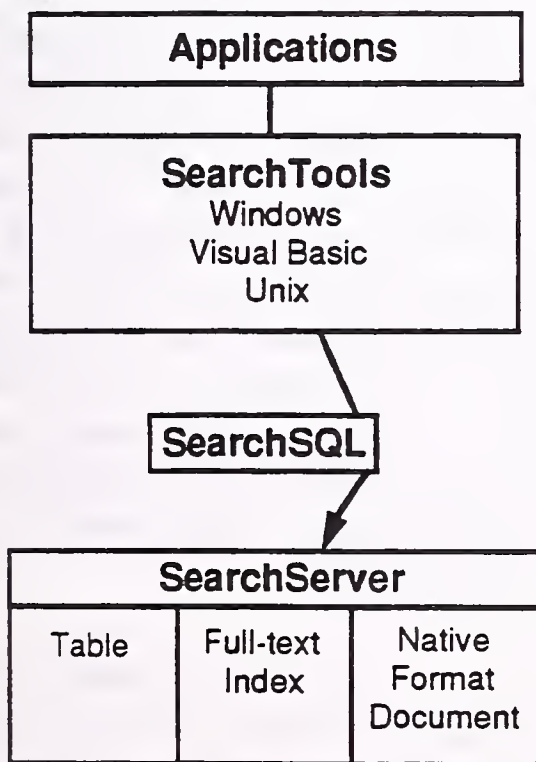
**Fulcrum's SearchTools: A New Era in Text Retrieval**

The era of stodgy text-retrieval applications is over. Fulcrum's SearchTools will bring text retrieval to the wide world of SQL application developers. SearchTools are easy to use and priced for wide distribution.

SearchTools  
Fulcrum Technologies Inc.  
Ottawa, Ontario  
(613) 238-1761

Fulcrum Technologies Inc.'s March 22, 1993, announcements not only introduce a new product, but also mark a fundamental change in Fulcrum's marketing and distribution strategy. SearchTools, a family of SQL-based text-retrieval application development tools, will catapult Fulcrum's Ful/Text technology into the mainstream of corporate application development. The long-term benefit to developers and users is obvious: the rapid development of powerful and inexpensive text-retrieval applications (see Figure 1). For Fulcrum, this is like supply-side economics: lower the price, and high-volume sales will increase total revenue. We believe it will be successful — and therein lies a risk. Fulcrum has traditionally marketed the Ful/Text technology solely through OEMs, and thus had a high degree of control over the quality of the applications its technology supported. With this new, direct sale to corporate developers, the quality of end-user applications will become variable and will no longer be under Fulcrum's direct control.

Figure 1  
SearchTools Architecture



Source: Fulcrum, Gartner Group

The SearchTools product family delivers a platform for the development of client/server text-retrieval applications, e.g., on-line access to emergency-response procedures and technical documentation. The SearchTools family includes: SearchTools, a SQL-based developer's toolkit; SearchServer, a run-time indexing and retrieval engine; and SearchSQL, a query language based on an evolving standard — Structured Full Query Language (SFQL) — for extending SQL to text retrieval.

SearchTools are based on a familiar relational database management system (RDMS) paradigm and allow developers to access unstructured text data with the same access method — ISO/ANSI Structured Query Language (SQL) — used for structured data. The difference is that while the text data is organized into table-like structures for indexing, documents are also stored in their native, revisable format (see Figure 1). This

**GartnerGroup**

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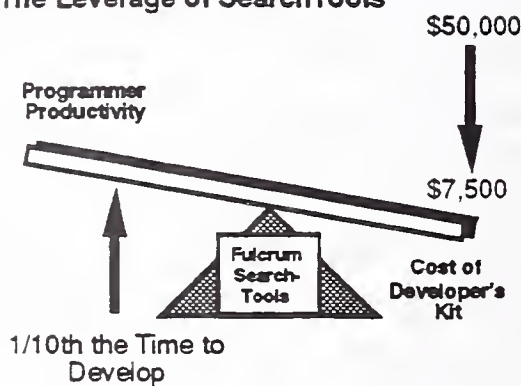
is unlike the approaches taken by other text-retrieval vendors, which often either store text BLOBs in RDBMS databases without SQL access, or store ASCII text in proprietary search and retrieval engines. Fulcrum's approach has two key strengths: 1) users can build more sophisticated searches with the SQL access method than with Boolean operators; 2) revisable-document retrieval is faster, because the SearchServer stores the documents in their native format.

Developers familiar with Fulcrum's earlier SDK will remember both the flexibility and complexity of the 250 API calls available for application development. SearchTools will leverage those developers with a dazzling breakthrough of price and productivity: The SearchServer API has been reduced by an order of magnitude to 25 "C" language routines for calling text-indexing and search services, thereby reducing development time; and the cost of the SearchTools SDK is now one-tenth its former price (see Figure 2). An additional attraction of the SearchServer API is that it is compliant with the SQL Access Group's Call-Level Interface (CLI) standard for connectivity, data retrieval and error processing.

In a significant expansion of its distribution channels, Fulcrum is building a direct-sales force for marketing directly into corporate IS departments. Fulcrum has traditionally marketed its products indirectly through OEM and VAR channels. This strategy presumes two distinct streams of consumer demand for text search-and-retrieval technology: 1) text search-and-retrieval services *within* a line-of-business application (OEMs/VARs); and 2) text search-and-retrieval *as* a line-of-business application (direct sales). Fulcrum's shift away from its long-time strategy comes at an interesting time, as most text-retrieval vendors are scrambling to emulate Fulcrum's historical strategy through mergers and partnerships. The primary risk to Fulcrum's reputation is the quality of end-user applications developed without the quality control and support typically extended to OEM and VAR applications. Fulcrum will be challenged to support a greatly expanded base of applications.

Fulcrum believes that there is a stand-alone market for mission-critical, text-retrieval applications, based on the 80 percent of corporate data that exists in unstructured, text form. Gartner Group is skeptical of the size of that market. We believe SearchTools is a technology magnet that will attract other DM middleware services for mixed-object-type applications 1Q94 (0.7 probability) (see *Research Note SPA-MAG-1106, 3/8/93*). Developers will be drawn to the low price, highly functional APIs and familiar SQL paradigm.

Figure 2  
The Leverage of SearchTools



Source: Gartner Group

Glossary

- API Application programming interface
- BLOB Binary large object
- DM Document management
- OEM Original equipment manufacturer
- SDK Software developer's kit
- VAR Value-added reseller





## APPENDIX C



## First Looks

### Software

# Windows Personal Librarian Turns Data into Information

BY JAMES KARNEY

How do you find the information you need efficiently when the data you have access to on hard disks and networks climbs up into the gigabyte range? Windows Personal Librarian (WPL) is like having a trained research librarian on call to manage the task. This \$995 Windows-based program from Personal Library Software can give you capabilities normally found on dedicated full-text image retrieval systems, without programming or file conversions.

WPL's search engine was originally designed for large-scale and CD-ROM information management applications. The database can include text, graphics, hypertext, and linked sound and animation. It can be small, with a few word processing files, or huge—up to 4GB with 16 million records. Multiple databases can be searched at the same time, which makes the size of your storage system the limiting factor.

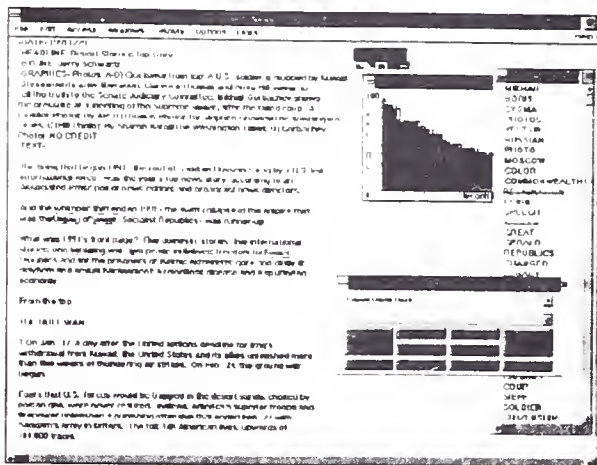
The real power of this program lies in its sophisticated searches. You enter a query using words or complete sentences like "Look up the files on the Iran-Iraq War." You can also use phrases, logical operators, and wildcards in your query. If you are unsure of spelling, the Fuzzy option will look for similar words.

We queried with the string "Iran-Iraq War" on a 3MB database containing 1,045 articles from newspapers of the late

1980s. The WPL main window displayed the document that the program considered the most important out of the 135 located. Scrolling through the rest of the selections was just a matter of using the plus and minus keys.

#### AUTOMATIC WORD LISTS

The Expand and Concept options automatically generate lists of words for further investigation. The list we got for the Iran-Iraq query included North, Poindexter, Contra, and Sandinista, as well as Saddam, the names of Iranian leaders, and the reporters who wrote the articles. Any of these could be added to the query by clicking on them with the mouse. Other available windows list all matching files, show a bar chart indicating how focused the query is,



**FAST SEARCHES:** *Windows Personal Librarian has powerful full-text database features and sophisticated searches.*

and display a dictionary containing all the words in the database (except stop words like an, and, the, and so forth).

The search engine uses a number of statistical models to locate relevant information. The recovery quality gets better as the amount of data being examined increases. Instead of just placing files in the list as they are found, WPL ranks the documents with the most interesting ones first. The quality of these recovery techniques is excellent.

The time it takes to complete a search depends on the total size of your files. We used the archives of London's *The Independent* (which are already indexed for Personal Librarian on a CD-ROM containing 455MB of data) during informal testing on a 33-MHz 486 system with Microsoft Word for Windows running at the same time. Complex six- and seven-word Boolean queries took 4 to 6 seconds. With a 2MB database containing

links located on a hard disk, the same type of query took less than 2 seconds. Simple three- and four-word search strings executed in 3 seconds and less than 1 second, respectively, for the two databases.

#### SETTING UP TO SEARCH

There are two levels of sophistication when setting up WPL. The basic level lets novice users set up and query databases using the program's defaults. Advanced features require more work, but using them is less complicated than designing spreadsheets.

Creating a new database is handled via the PL-Admin utility. Just select any combination of ASCII, Microsoft Word, or WordPerfect files you want to include. The files require no special modification and can reside on any storage device available to your computer, either locally or on a network.

Once the files are selected, an index file is automatically generated, which can take a while if you have a lot of files. Indexing can run in the background, and the final file will be 50 to 60 percent of the size of the source files. More files can be added to the database without building a new index.

Personal Library software is also available in DOS, Macintosh, Unix, and VMS versions. All can use shared databases. There is also an OCR Connection utility sold separately that can automatically add documents scanned using Calera or Kurzweil optical recognition software to a target database.

Windows Personal Librarian lets you find and organize information you may not have realized you needed to see when you asked your question. Its ease of use and powerful search features justify its relatively high price tag. □

#### FACT FILE

### Windows Personal Librarian, Version 3.0

Personal Library Software, 2400 Research Blvd., #350, Rockville, MD 20850; 301-990-1155

**List Price:** \$995.  
**Requires:** 2MB RAM (4MB recommended), 4MB hard disk space, Microsoft Windows 3.0 or later.  
**In Short:** A very powerful retrieval tool that turns large amounts of electronic data into easily searched information. Its easy-to-use interface lets you perform sophisticated searches immediately.

422 ON READER SERVICE CARD



## APPENDIX D



# □ ONLINE DATABASES □

BY CAROL TENOPIR

## The New Generation of Online Search Software

MOST OF TODAY'S database searchers spend a lot of time learning the commands of a variety of systems, how to formulate queries, and the correct use of Boolean operators. Even with end user systems—whether online, CD-ROM, or locally loaded databases—reference librarians report an increased need for bibliographic instruction. Why is something that makes research so much faster so complicated?

Part of the problem is that most of today's online systems and many CD-ROM systems operate with essentially the same software developed for the first online systems 20 years ago. Although improved and sometimes rewritten in more modern programming languages, the major systems still reflect first-generation search techniques. They rely on exact match Boolean logic, structured commands or menu choices, and convoluted input syntax, features that may be advantageous to experienced searchers, allowing them to control the search process, but unsatisfactory for end user systems.

### Software improvements

"Innovations in Text Retrieval Software" (*Online Databases*, *LJ*, June 1, 1992, p. 94, 96) discussed the many improvements in text retrieval software that evolved from the information retrieval research laboratories into the software market for end users. More innovative search techniques such as natural-language input, relevance or word frequency ranking, and automatic thesaurus features are appearing in commercial products. A little more than a year ago, most innovations in retrieval software were available only for in-house databases—in

software packages such as Topic, Personal Librarian, and ZyINDEX.

The new generation now has spread to the commercial online and CD-ROM environment. Thus far, the Personal Librarian (PL) software and Westlaw Is Natural (WIN) are two of the most successful representatives of the online second generation.

PL is still available as a stand-alone program, but it is now used as the search software for many CD-ROM products and as a search engine for several online hosts. WIN provides an alternative method for searching Westlaw's many online legal databases. This month, I will profile Personal Librarian; next month I will focus on WIN.

### Personal Librarian

PL, known originally as SIRE, was developed over a decade ago by Matthew Koll and his colleagues at Syracuse University as an experimental retrieval system. It was first offered in 1983 as a commercial software product for creation of microcomputer-based in-house databases. (Personal Library Software, Inc., 2400 Research Blvd., Rockville, MD 20850; 301-990-1155)

PL was the first commercial application to offer a number of search features. Natural-language input is perhaps the most obvious to users. Instead of entering a search statement in the correct and stilted Boolean operator form as with other systems, users can input any sentence that describes their information need.

Thus the statement "I need information about the effect of last year's hurricanes in Florida and Hawaii on tourism" will work as an input string. PL does not use any artificial intelligence or other techniques for interpreting the meaning of the statement, nor does it match words to a thesaurus. Instead it just eliminates stop words from the string, then ORs together all the remaining words. A concise statement loaded with meaningful words will thus work best.

At first glance, a Boolean OR between every word may seem like sure

disaster in full-text databases. It will retrieve many documents, but it works because the PL software uses relevance ranking. Retrieved documents are ranked in order of likely relevance; users can browse through documents until the relevance diminishes or their information need is met.

PL's relevance ranking works by a complex formula that takes into account how many of the words occur in each document, how many times each word occurs, each document's length, and how often each term occurs in the entire database compared with how many times it occurs in each document. Tests show that although the formula is not perfect, it does predict likely relevance much of the time.

Another notable search feature is the ability to use a relevant document as a query. When a "good" one is found, users can request similar documents. PL examines word occurrence in the relevant document to search for documents with similar word frequencies.

Although PL has no standard thesaurus features, it will locate words that occur frequently with another word. A user can expand any search term to locate related terms in the database and then search the additional terms automatically.

PL is still known as a package for creating in-house databases, with DOS, Windows, Mac, UNIX, and VMS versions. Stand-alone and networked versions make it popular with both small companies and large corporations, including Apple Computers and Unisys. In the last year or two, the larger information industry has taken note of its strengths as well.

### CD-ROM products

You may not even realize you are using PL when you purchase a CD-ROM product from the U.S. Government Printing Office or from a company such as Grolier. That's because it has been adapted as the search engine by a variety of CD-ROM developers, many of whom put their own interface



Carol Tenopir is Associate Professor at the School of Library and Information Studies, University of Hawaii at Manoa, Honolulu

## ONLINE DATABASES

onto the powerful PL search engine. According to Richard Black, VP of Business Development at Personal Library Software, "several CD-ROM developers use our search engine buried deep in the bowels of their products with their own custom interfaces." The licensing agreement, however, does require a copyright statement on the disc and on the packaging.

PL is now the search engine for several popular CD-ROM products. Among the notable titles are the U.S. Code from the U.S. House of Representatives, the Guinness Multimedia Disc of Records from Grolier, the American Memory Project from the Library of Congress, the Laws of Washington and Oregon from CD-Law, a series of British newspapers from the Financial Times (including the *Economist*, the *Financial Times*, the *Daily Telegraph*, the *Independent*, and others), and McCarthy's compilation of full-text business articles from European business newspapers and magazines. Both text-only and multimedia CDs use PL.

### Online expansion

PL has expanded into the online arena as well. One of the first online services to use PL as its search engine is Washington Alert, the online system from Congressional Quarterly. Washington Alert developed its own search interface to work with the PL search engine.

Washington Alert debuted with the PL search engine almost five years ago. The service includes approximately 20 databases that together provide comprehensive coverage of Congress and Congressional actions. Notable databases include the full text of the *Congressional Quarterly Weekly Report* and other newsletters; full texts of all bills and all committee reports; bill-tracking; and information about roll call floor votes, members of Congress, committee actions, and schedules.

America Online, the popular end user online service, announced in May 1993 that PL would be used as the search engine for an improved version of its online system. Again, America Online uses its own interface, but the search powers that make retrieval work are now from PL.

America Online is phasing in PL on its system, database by database. The first database searchable with PL is America Online's member directo-

ry. This database gets more use than you may expect, since sending and receiving messages is America Online's most popular service. America Online will continue to phase in the conversion of its full-text databases. It now offers news, sports, weather, stock market, and software databases, in addition to its popular E-mail and conferencing functions.

America Online also serves as a gateway to many databases on other online systems in addition to being a resident host. The gateway databases will continue to use the search engines of the systems that house them, but with the America Online interface. This may be confusing to users, since the connections are made transparently.

DataTimes announced in June 1993 that PL would replace BASIS as its newspaper archives software for minicomputer systems. (It did not announce it will be using PL for its commercial online system.) DataTimes has two businesses—as a vendor of the online system and as a provider of internal library systems to newspapers. DataTimes had been selling micro versions of PL for Macintosh and Windows for its newspaper library systems clients. Starting in June, it will also offer the minicomputer version of PL to replace BASIS.

Dow Jones News/Retrieval (DJNR) may be the best-known online system to convert to PL. This past spring, rumors began to surface that DJNR would switch from IBM equipment to DEC computers and from IBM STAIRS to PL. Although the "official" announcement was delayed, PLS and Dow Jones have not denied the rumors.

Informed sources say PL has been selected as DJNR's next generation search engine, with an interface to be developed by Dow Jones. Conversion has not yet begun, but expect something in 1994.

### DIALOG buys into PLS

DIALOG Information Services, Inc. is involved with Personal Library Software in a slightly different vein. DIALOG announced in July a significant minority investment in Personal Library Software. It does not plan to replace the DIALOG software with the PLS system, but DIALOG will be represented on the PLS Board of Directors and the two will jointly develop new products.

One of the first applications areas is likely to be with DIALOG's CD-

ROM products. PLS has been successful with multimedia CD-ROMs, an area in which DIALOG has done little to date. We can expect some multimedia and image/document management systems from DIALOG with Personal Library Software.

DIALOG and PLS is a marriage of market presence with forward-looking technical expertise. According to Patrick Tierney, president and CEO of DIALOG, "PLS has excellent technology, strong performance, and knows where the information business is heading. Together, our companies will develop synergistic products that will integrate text and image-based information from internal and external databases and deliver mission-critical data directly to users' desktops."

DIALOG denies plans to abandon its current CD-ROM search software, a program that has gotten consistently positive reviews. How the current system and PL will interact and whether they will be used for separate databases or different types of applications is still unclear. Perhaps more than anything, this announcement shows that Personal Librarian has arrived as a search engine and company to be taken seriously in the larger information industry marketplace.

### Why now?

Why is PLS attracting so much attention in the information industry now after a decade of existence? PLS VP Black speculates that "things are changing very quickly in the entire information industry. Information vending and information retrieval are moving out of the hands of professional searchers and into the public domain. That's the impetus." The time is finally right for innovations that make software easier to use and go beyond the techniques we've been using since the early days.

### Online/CD-ROM '93

I will moderate a session at the Online/CD-ROM '93 meeting in Washington, D.C., November 1, that will debate the relative effectiveness of "old-fashioned" command-based Boolean logic systems with natural-language and relevance ranking systems. Speakers will represent both sides of the issue.

Next Month: More on the new generation of online systems with a look at Westlaw Is Natural (WIN).



# Gentlemen, Start Your Engines! Online Deals Brace for Tomorrow's Information Technology

by Mick O'Leary

Throughout the online information age, leading companies have worked with proud independence, relying upon themselves for technological innovation. And why should they look elsewhere? Didn't the DIALOGs and Meads and Dow Jones News/Retrievals and OCLCs virtually invent commercial online information retrieval?

But the age of isolationism is over. Within a few months we have seen a flurry of partnerships, acquisitions, and deals among these one-time Lone Rangers. DIALOG and Sun, Mead and Folio, DIALOG and Personal Library Software, Dow Jones News/Retrieval and Personal Library Software, DIALOG and Advanced Research Technology and Telebase, OCLC and Information Dimensions: the long-time online industry isolationist status quo is gone.

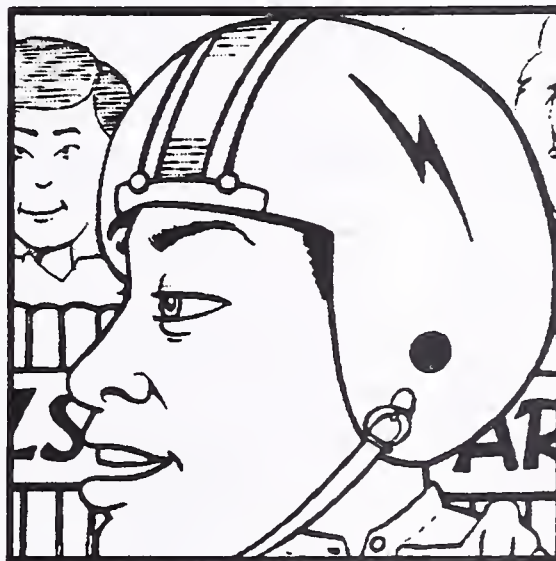
Are these deals signs of weakness—admissions that the online leaders just can't cut it alone any more? Actually, it's the other way around. The deals demonstrate foresight and an ability to prepare for the online environment of the future, where no one knows it all and the smart players are the firms that make the shrewdest alliances.

## "This Isn't Kansas, Anymore..."

The online technology that most of us have known for as long as twenty years is gone . . . or to put it more charitably, is giving way to a new, more complex, and more powerful paradigm. The comfortable old model has several basic technical principles: mainframe computers linked to terminals or microcomputers; ASCII data format; Boolean searching; and character-based interfaces. The new paradigm will have open system architecture with distributed computing; formats that allow graphic transmission and connectivity between host and di-

verse local environments; relevance search engines; and graphical interfaces.

This is not just technobabble. The new paradigm will offer faster, more powerful retrieval of richer data by searchers and end users alike, along with simpler, organization-wide connectivity. It will provide the growing legions of end users with genuine search power and allow searchers to step into more managerial and consultative roles. Putting all of these elements together, however, is far beyond the expertise of any single company. Hence the deals.



## DIALOG Does Deals

No one has made more big deals lately than DIALOG. Perhaps the biggest is a long-term alliance with Sun Microsystems Computer Corporation, to transfer DIALOG's mainframe operations to Sun's client/server, open system architecture. This will provide several internal advantages, including faster, cheaper operation and easier upgrades. Searchers, according to DIALOG Vice-President for Systems Development Gordon Schick, will benefit mainly through connectivity and graphics. The new systems will permit compatibility with local environments and distribution of varied data formats.

Schick explains that the DIALOG/

Sun collaboration will unfold over several years, but that DIALOG users will see two substantial benefits as early as the end of this year. One will be delivery of search results by fax, including page graphics. The second is compatibility with many electronic mail systems through an X.400 gateway. Such e-mail connectivity will allow downloaded information to be seamlessly distributed throughout a consumer organization's local environment.

DIALOG has been active in reforming its search technology as well. Alliances with Advanced Research Technologies (ART) and Telebase authorize these gateway services to devise specialized interfaces for individual clients. DIALOG of course has a series of end-user interfaces, including the Connections and DIALOG Menus, but these still aren't enough. ART President Dan Meyer explains that many clients require a much higher degree of customization, which puts every aspect of the search process under automatic or menu-driven control.

ART is only two years old, but its interface-developing roots are deep. Meyer and several other ART principals were part of the original Telebase team that created EasyNet. The firm has done front-ends for GE Information Services, GENie, the Bell Atlantic IntelliGate Business Service, and many private clients. ART's interfaces, Meyer explains, customize database selection, specific search query formulation, and output. ART will even devise a "pricing" interface, which will translate conventional DIALOG pricing into subscription or pay-per-search for the client.

## Beyond Boolean

This summer DIALOG also purchased a minority share in Personal Li-

(continued on page 28)

(continued from page 26)

brary Software (PLS), whose flagship product is Personal Librarian (PL), its relevance search engine. PLS has been all over the online news lately. Besides the DIALOG deal, PLS is supplying its software to Dow Jones News/Retrieval, DataTimes, and America Online. This sudden fame, and the accompanying fuss over relevance searching, amuses PLS president and founder Matt Koll:

"A lot of what we do is not new. In 1983 we were shipping a retrieval system with natural language queries, relevance ranking, automatic word associations, concept searching, and search by example. That's based on stuff that was in the literature for 20 years at that point."

However, the time has arrived for PLS and relevance engines. Boolean retrieval may have reached the end of its life cycle, having been refined by DIALOG and others to the last degree. Today's end users, Koll explains, will prefer relevance to Boolean searching:

"As we start getting into a broader audience, most of the casual users do not want to learn Boolean operations. Natural language, relevance feedback searching will be a lot more attractive to them. In many ways it's more effective. There are lots of circumstances where just being able to throw a few words and then interact, is the most powerful and efficient way to find what you want."

PLS' first commercial online application was with Congressional Quarterly's Washington Alert Service, back in 1990.

DIALOG's ownership share in PLS has been estimated at ten to twenty percent. Nevertheless, DIALOG's Gordon Schick emphasizes that DIALOG does not yet have an implementation plan for PL and may even use other relevance engines as well. DIALOG is also evaluating the WIN search engine developed by Westlaw, its alliance partner.

Regardless of what DIALOG does with PL, relevance searching is coming to DIALOG, as Marketing Manager Libby Trudell acknowledges: "Non-Boolean search engines are going to have to be available. We definitely see that in our future."

The proven PLS engine could very well become the system of choice throughout DIALOG. Although this search technology has been associated with full-text databases, Koll explains that it works well with abstract and directory files as well:

"The algorithms work well with large size entries and with small to medium records, as long as there is a little bit of information to give the relevance ranking something to work with."

### Dow Jones News/Retrieval and DataTimes Kick Tires

PLS will have a lot to work with in the big full-text databases on Dow Jones News/Retrieval and DataTimes. News about the Dow Jones News/Retrieval and DataTimes deal with PLS slipped out before either company could make a formal announcement, catching both off-guard. Neither Matt Koll nor Dow Jones officials have commented upon the outcome, yet it is interesting to speculate upon Dow Jones News/Retrieval's intentions, especially in view of its history in relevance searching.

In 1990 Dow Jones announced DOW-QUEST, making it and CQ's Washington Alert Service the first commercial online services to offer natural language/relevance searching. DOW-QUEST, a very complex and expensive development project, uses an engine developed by Thinking Machines. Although there are many conceptual and technical differences between the Thinking Machine and PLS engines, to the casual searcher they are similar.

The PLS deal raises intriguing questions. Is PL a replacement for an unsatisfactory Thinking Machines engine? What is the implementation plan for Personal Librarian software? How will it be integrated with Dow Jones News/Retrieval's present interface?

DataTimes will undoubtedly share any Dow Jones News/Retrieval-PLS implementation plan. The two services have a common technical platform, and DataTimes itself has already had considerable experience with PLS. It employs Personal Librarian as the search engine

for PC DataTimes, which is used by its smaller newspaper clients for internal text retrieval.

DataTimes recently announced that Personal Librarian would be used for a larger, client/server version that would support newspapers of all sizes. According to Marketing Manager Ed Roach, this product will not be available to DataTimes' online service clients, but he emphasizes that DataTimes is very interested in the broader application of the PLS engine.

The prominence of PLS in the plans of so many major online services has quickly made the small firm an online industry heavyweight. When asked if deals with competitors aren't conflicts of interest, PLS' Matt Koll replies:

"We think that all of the people we are working with will remain happy that we have the integrity to do what is in the interest of our partner."

Serving two—or more—masters is of course common in the online world; database producers have been doing it since the beginning. PLS' wide acceptance also raises the question of whether it is emerging as a de facto standard for natural language/relevance retrieval. PLS could be on its way to being the Microsoft of online searching.







Verity

Business Plan Analysis

6/9/94

Prepared for Trident Capital

by

Angela Hey, Client/Server Program Manager,

INPUT, 1881 Landings Drive, Mountain View, CA, 94043.



# Summary and Conclusions

Verity has a high-end information retrieval product that is positioned in a highly fragmented market. The growth of online services and electronic messaging offers new opportunities for vendors of this type of software. Verity needs to capitalize on its good technical reputation, continue packaging the software into modules and market aggressively to attract high quality distribution partners. This is a risky investment that requires world class marketing to make it succeed.

1. The company has many challenges to overcome, both technical and marketing. To succeed the company will have to continue to re-engineer its products and have world class marketing. The re-engineering is going well.
2. Philippe Courtot has generally been well-received by key accounts. They mentioned that he had made Verity more customer focused. For example he ran a successful user conference - the only negative comments being concerns about the company's ability to deliver modular software.
3. Major factors that Philippe is trying to rectify include: finding a VP of Marketing, and getting code development on schedule. Philip Nelson, a founder and VP Engineering, has already demonstrated ability to get projects on track. Adobe also mentioned that they were pleased with the release they received in March on schedule to within a week.
4. For the company to succeed will require major alliances with developers. Adobe and Lotus are two of Verity's partners. Key to Verity's success will be the ability to penetrate the value-added reseller (VAR) market.
5. Both large and small system integrators need to be given the tools required to support their teams of programmers. This includes software modules for connecting to other systems and training materials for both sales and engineering staffs.
6. To succeed the company will need a scalable product line - from the desktop to the enterprise. This may require the acquisition of smaller companies over time.





# Introduction

This report reviews the market opportunities for Verity, a full-text retrieval software vendor. It indicates steps that Verity needs to take to become a successful company. It also provides both customer and personal references.

## Market Analysis

### Historical Positioning

When large full text retrieval systems were first launched on mainframe computers their main function was to **find** documents, with a simple **sort by** date or search field. Verity's TOPIC adds another dimension. It **ranks** documents based on search relevance.

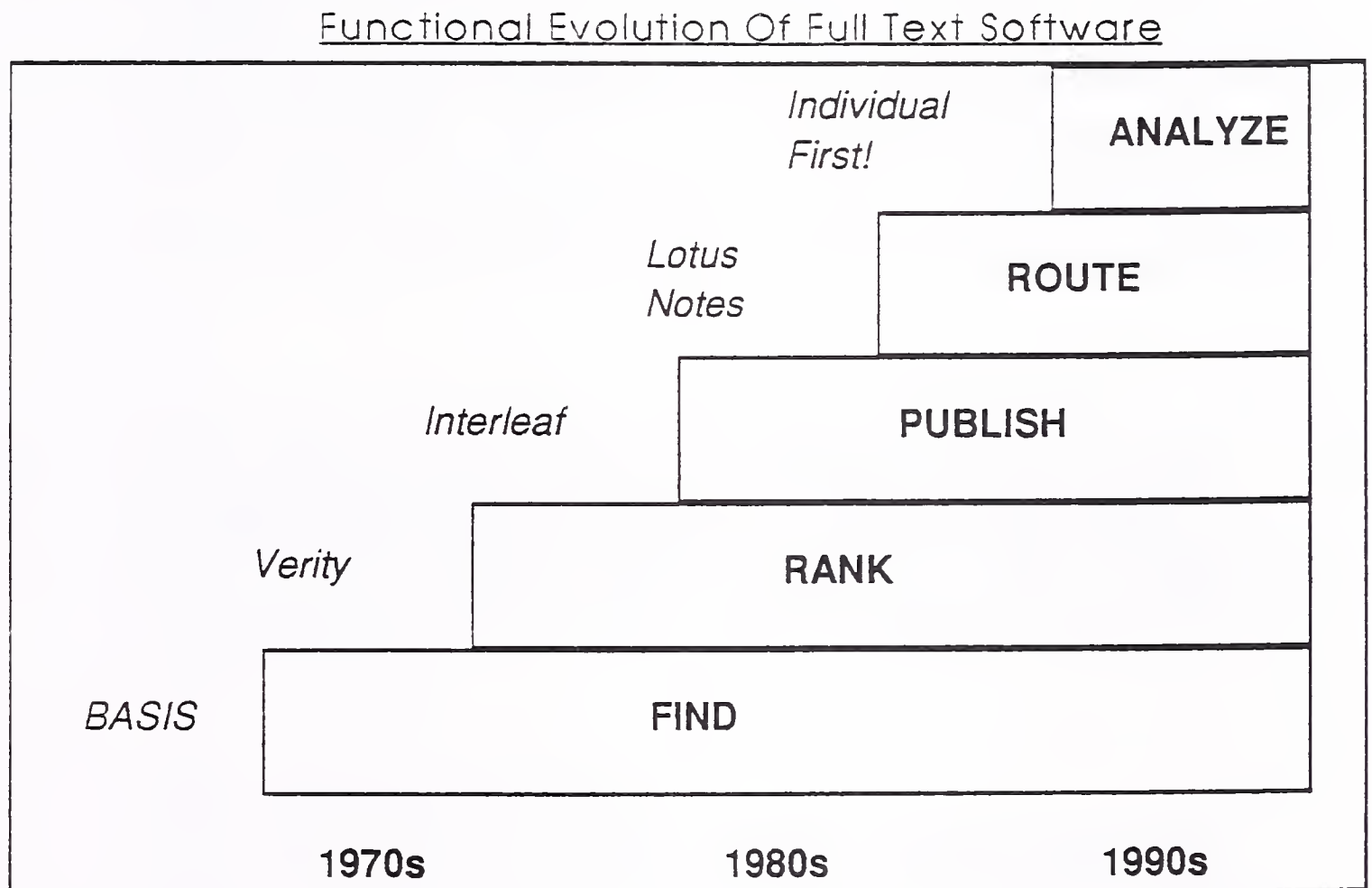
In addition, search technology has been applied to publishing systems for two reasons. First document publishers need to be able to find text already stored on a system to add to their publications. Secondly, information searchers need to **publish** and present document search results professionally. Frame has integrated Verity's TOPIC as a search engine for its FrameMaker software. Interleaf is another publishing software company that has chosen to market full-text retrieval software, WorldView, as part of its product line. WorldView provides full-text retrieval, based on Fulcrum's Ful/Text, for electronic document distribution. A key development in the integration of publishing and retrieval systems has been the SGML language. This language enables the structure of a document to be represented across different computers, enabling it to be retrieved and published on both screens and printers. For example, Silicon Graphics uses software from Passage Systems to display its online technical documentation and electronic books.

Lotus Notes is a client/server database that can **route** documents from one desk to another. Combining a search engine with Lotus Notes enables documents to be found. Once documents are found they can be merged, processed and analyzed. Verity has also released a Worldwide Web (WWW) server for the internet that companies can use to post information on public data networks. Some companies are starting to compose personal newspapers electronically from full-text searches, an example being Individual, a provider of headline news services to corporations and individual subscribers. Individual's software, SMART, **analyzes** the documents using retrieval rules, with human intervention as needed to modify the search. Exhibit 1 shows the evolution of functionality



found in systems that use full text retrieval. With its partners Frame and Lotus, Verity's TOPIC is a player in all areas.

Exhibit 1



### Market Conditions

Verity sees a fragmented market with vendors ranging from established hardware manufacturers like IBM, through academic software to PC shareware. Verity needs to take a market leadership role as the number of full text search vendors clearly proves that there is a market. Customers want:

- powerful user interfaces
- scalable modules - ability to scale from a single PC to an enterprise
- APIs (application programming interfaces) for easy integration
- ease of set up, implementation and maintenance
- accurate searching
- reliable performance



- rapid retrieval speed

The issue is whether Verity can outmarket its competitors. **Verity has competed to date on speed, performance and searching.** Verity **also competes on the overall quality of its software integration** environment and APIs. **User interfaces, modularity and ease of system maintenance have not been key strengths.** Instead Verity relies on either embedding its software in other applications, such as Lotus Notes, to improve the user interface or relying on the skills of a professional information scientist. To succeed it has to leverage its strengths through partners that can compensate for its weaknesses.

**Verity will grow by focusing on** emerging markets, for which it can provide a modular solution, such as **enterprise electronic document retrieval, consumer online services and electronic messaging applications.** As it gains presence in these high growth areas it can then displace competitors in more established areas like document imaging, legal and corporate online information services.

### Competitive Positioning

There are hundreds of full text search software packages, ranging from shareware for single PC users to massive custom systems based on parallel processing systems. Verity cannot take this entire market with its current product line, even though this may be desirable long term. Verity is focusing on client/server solutions for the enterprise. The software is scalable so that it can be used for small groups, but Verity will not be a good solution for casual PC users who can get solutions for simple file searching from companies like On Technologies with On Location.

At the high-end, database companies can compete to some extent with Verity. Oracle's SQL\*TextRetrieval server has not been a success, fundamentally because the architecture required to retrieve full text documents is not the same as that required for data fields and binary files. Oracle's recent announcement of ConText suggests that Oracle is moving further into the text retrieval market. ConText focuses on analyzing streams of data, rather than on managing the storage of full text documents. ConText combined with an Oracle database may compete with Verity in applications like reading newsfeeds because it will be able to select items of interest from a news collection. However, the underlying storage provided by Oracle will not be tailored for full text searching in the way that Verity's database is optimized. A further indication that database



companies are really not in the same business as Verity is that Sybase is working with Verity for full text technology.

Verity's biggest competitor in the UNIX market is Ottawa-based Fulcrum. Fulcrum has established itself as the leading supplier of enabling technology for full text retrieval in the UNIX environment. It is now moving more towards an end-user model. Fulcrum claims to have over 100 development partners, several thousand installations and over 250,000 CD-ROMs using its software. Exhibit 2 below compares Fulcrum vs. Verity.

Exhibit 2

Fulcrum vs. Verity

Feature	Verity	Fulcrum
Accuracy of query processing	High quality using TOPICs. The current setting up of TOPICs is also a disadvantage as it takes time to set up the topics. However Verity is working on automating the creation of topics and on supplying standard topics.	Uses many methods including matching to a sample document, statistical relevance ranking. Does not work as accurately as Verity. It may be better at retrieving documents associated with phrases rather than individual words than Verity.
Quality of APIs	At both Lotus and Adobe Verity beat Fulcrum because it had better APIs for developers.	
SQL support		A key focus that makes the product useful to those familiar with SQL databases.
Multi-threaded engine	Yes	
SGML Support		Acquired 34% in Exoterica an SGML company
Size of client software libraries for MS windows (DLLs)	100 to 200K using VDK	1MB





**BASIS** from Information Dimensions has the installed base in many corporations. Information Dimensions provides more user consulting and support than either Verity or Fulcrum. Its system is aging and Verity has seen less competition from BASIS in the last few years than in the late 80s when it started. **Excalibur** is also a competitor. Excalibur integrates its software well with scanning and OCR solutions and is more likely to win in situations where scanning paper files and converting them to text is important. In its last quarter ending April 1994 its quarterly revenues were down to \$2.1M compared with \$2.4M from a year before. Excalibur is much less likely to align itself with OEMs and VARs to the extent that Fulcrum has or that Verity plans to do. For the internet, WAIS is a public domain package that is being commercialized. It uses the Z3950 protocol for retrieving data which is somewhat limited. Verity has produced a Worldwide Web server for the internet which will provide better searching functionality than WAIS.

ConQuest (410-290-7150, Columbia MD) is an emerging competitor. ConQuest is working with Motorola for an online information service. FolioViews is also a competitor at the low-end although it is more suitable for applications that involve publishing a database, rather than for workgroup applications.

### Market Size

The market size is estimated to be about \$200 to \$300M for full text retrieval software. It is growing at about 30% according to industry estimates. This growth rate is in line with INPUT's estimates for the US client/server software market. The full text retrieval market is considerably smaller than the database market.

Verity will be constrained by sales. Each sales person can probably sell on average \$1M to \$2M per year, depending on distribution channel. Hence 50 sales people could sell \$50M to \$100M giving a 25-30% market share. This in addition would require another 50 support people, for technical support, field sales support and administration. In addition, the budget for marketing, promotion and advertising required to support and justify such an effort would be about \$15M per year. With an average sales person costing \$180K a year including travel and expenses and administrative staff costing \$130K, the total sales and marketing budget required to achieve such penetration would be close to \$30M. This is out of the question for a start-up so the market must be more narrowly defined. The market can be segmented by:

- operating system platform - Verity is targeting UNIX and NT servers



- database platform - Verity is working with Sybase and potentially could work with all the database companies
- enabling software - Verity is working with Lotus Notes and Adobe Acrobat
- customer size - typically Verity has worked with large customers and is moving to work with smaller companies through distributors
- software architecture - Verity is targeting client/server architectures with UNIX servers

By focusing on the lucrative enterprise client-server market and selling through indirect channels Verity can accumulate the capital needed to move into other segments. Another key success factor will be for Verity to ensure that third parties can provide the complete solution for various applications and industries, including TOPIC files.

### Market Trends

- **Usage-based pricing.** Several software companies are considering usage based pricing. For example, Cincom has a pricing scheme where users pay depending on how much they use a database. It is still unclear whether software companies will be compensated for usage, or whether it will only apply to content companies that supply the information stored in databases. In the enterprise this is not likely to affect Verity for several years, but in public networks it could affect Verity's business model.
- **Explosion in public and private messaging.** Major corporations have used electronic mail for years. As small businesses, non-profits and individuals discover the technology there will be more electronic documents. Using Verity for specific applications like classifieds at the San Jose Mercury News is an example of a public online service.
- **Full text software built into the operating system.** On the one hand companies like IBM are moving to microkernels and multiple operating systems. On the other hand companies like Microsoft are integrating more tools into their Windows family of operating systems, including full text. This offers an opportunity for Verity to supply other operating system vendors, namely the UNIX hardware manufacturers with embedded full text technology. Verity's modular approach gives it the opportunity to supply tools that work around other commodity full text engines.



- **Automated customer service and trouble reporting.** These are also document intensive applications that are based on electronic messaging. Customer service frequently requires fast response and accurate answers.

## Verity's Strategy

To be successful Verity can take either a vertically integrated full solution approach or a horizontal approach. The vertically integrated approach requires Verity to acquire or partner with the vendors of software that can provide a customer with a full solution. This was the approach taken by Verity initially in the government market and with a few corporate accounts. However it proved costly to support.

The alternative approach is to rely on third parties for distribution, software additions and support. This is the course chosen by Verity. It should leverage Verity's strengths as a technology supplier and accelerate market penetration.

A key element of Verity's strategy is modularity. Modules are required for:

- Casual user clients
- Expert user clients
- Searching ported to various servers
- CD-ROM authors
- Third party software developers - like Lotus
- TOPICs - customized by application and market
- Administration
- Agents, routing and directories

Verity has made the architectural switch to client/server modules and the key will be to interconnect them efficiently and seamlessly. Another key challenge is pricing. The agent developers' kit at \$2950 is acceptable for now, but it needs to get to no more than \$300 to be attractive to the mass market.



## Operational Priorities

- **Improve customer relations.** Philippe Courtot has set Verity on a clear mission, to improve customer relations and build modular products. In interviewing customers they all commented on how well they had been treated compared with their prior experience.
- **Improve employee teamwork and morale.** Prior to Philippe's arrival Verity appears to have had strife between engineering and sales, with detrimental results. Philippe has addressed the problem with a new sales force, however he still has to staff engineering fully and marketing lacks leadership. It is hard for a Silicon Valley company to attract engineers after the initial wave of start-up energy has died down. It will be one of the hardest jobs of Philippe and his team to energize the organization, however a promising start has been made in this direction.
- **Package the software in modules.** As software prices decline, operating systems include full text search engines and information services move to transaction-based pricing
- **Ship on time.** Philip Nelson, recently appointed VP Technology, reported that Verity had reset its schedules for Version 4.0 and shipped according to the revised schedules. Another ship date of March 28th had been met within a week. Philip said that he had tried to set realistic schedules and that working closely with HP, Lotus and Adobe had helped keep the schedules under control.
- **Improve user interface.** Philip reported that they were working hard on this and that many aspects of the user interface, especially in the area of administration, had already been improved. Verity sees this as a key priority.
- **Attract high quality engineers.** In the past few weeks 5 engineers have been hired and Philip is confident that they can rebuild a high calibre organization. He emphasized that engineers were mainly friends of other engineers so that they were confident that they could work together.
- **Attract the right VARs and consultants.** Philippe mentioned that this was key to their success. Once they have marketing team in place they can be expected to attract the appropriate partners.

## Partnering Opportunities

To ramp its business Verity is looking to indirect distribution channels and also OEM relationships. To be an OEM supplier Verity has to maintain a





technological lead. The company has to focus on distribution channels in an orderly fashion as follows:

#### Corporate users

- corporate users - attract for good references, keep current sites
- refocus on systems integration groups when ready

#### OEMs

- hardware manufacturers like HP - compete for platform now especially with UNIX vendors such as Silicon Graphics, Sequent, Unisys, IBM, Sun
- database vendors - compete for platform now especially Sybase, also try Informix who once acquired a full text company
- document software vendors - publishers like Frame and Adobe, workflow vendors like Notes, display software like No Hands
- networking vendors like Novell
- copier companies - Xerox, Kodak and Japanese vendors
- when established increase presence with overseas OEMs

#### VARs

- continue to build vertical market presence through VARs in particular try VARs that cannot afford to maintain their home grown text retrieval code for applications such as document management, imaging, legal, publishing

#### System Integrators

- when the code is well-documented, modular, stable and supported by VARs then attract in-house system integrators in major corporations, system integrators like SHL Systemhouse, Andersen, getting widespread deployment.
- attract federal contractors to bid with Verity once the product is rolling with the commercial integrators



## Partners That May Acquire Verity

**Adobe** - needs more than PostScript and Acrobat - yet another tool for their bag

**AT&T** - for online information services (Easylink division) or Global Information Systems division - something for them to integrate.

**Computer Associates** - to go with their numerous databases - they acquire many older software companies that need a direct sales force.

**DEBIS** - Daimler-Benz Information Systems - owns AEG - world's largest postal sorting OCR technology supplier - may want to expand document management systems integration business in Europe.

**Informix** - once acquired a full-text company in the mid-80s - what happened?

**Kodak** - realize George Fisher's vision of an electronic world. Fulcrum is a key Kodak supplier for the Optistar writeable CD system for data centers.

**Lotus** - once acquired BlueFish for text-retrieval for CD-ROM publishing in mid-80s - what happened?

**Novell** - unlikely - but if Verity integrated well with AppWare and NetWare (as well as Word Perfect) may make sense for the larger enterprise

**Sybase** - unlikely as they have many choices

**Wang** - still a \$900M company interested in documents

**Xerox** - even though they have XSoft - they can acquire competing technologies - there are so many divisions - sell it in El Segundo or Rochester to someone who does not like XSoft.

## References

### Verity Employees

Both Philippe Courtot (President), Phil Nelson (VP Engineering) and Sue Barsamian (NA sales) are highly enthusiastic and energetic regarding the new direction of the company. Philippe clearly articulated his plans, Phil explained how he had motivated engineering to get projects on schedule and Sue explained how she sold against the competition.



## End-user Customers

### **Bernard Morere - 216-271-8929 BP**

Used internally for hazardous waste and health and safety documents for about 6 years. Also uses with AUTOCAD and Verity Image Viewer for engineering. Help desk is another application. Spread to European offices. May use at other sites internally. Very satisfied.

Alternatives considered were BASIS, Digital's Book Reader and Videotext and Fulcrum. Used an RFP to map capabilities with requirements. Still believes that Verity is top of the line and would choose it again. Finds Philippe Courtot very easy to deal with - good rapport. Like's new company philosophy and wonders how pricing will affect the ability to deploy on a wider basis and how shrink-wrapped products will turn out.

New applications will be for reading news wires for trading desks **monitoring** crude oil futures and related news. Weaknesses seem to be a gap between demos and what is actually shipping. In particular Verity is tackling installation and maintenance a key area of interest. Hopes that he does not have to spend hours of consulting time as in the past to get the platform stable. Hopes that Verity can deliver on what it promised at its user conference.

### **Dave Sharp - Legal Dept. - 713-374-2744' Compaq**

Uses Verity's TOPIC to anticipate lawsuits - does the work of 2600 filing clerks going through over 1.5M documents in 8 minutes. They can OCR 40,000 pages a day. Has licensed technology to other customers. Very satisfied. Has shown to over 45 other companies. Noticed big improvement in customer relations when Philippe was hired. Philippe went out of his way to help Compaq - much appreciated this help.

## OEM Customers

### **Greg Holmgren - 408-922-2797**

### **Frame Technologies**

Evaluated many alternatives to Verity. Said prior to failed merger with Frame that engineers at Verity hated sales. May or may not continue with Verity - not entirely convinced it is the best technical solution - Claritech from Carnegie-Mellon is technically about the same. Claritech is not as mature a company as



**Darell Long 415-390-8200**

**Global Village**

Had really enjoyed working for Philippe Courtot at cc:Mail. Philippe has a strong personality, lots of charisma and works best with forceful people that can measure up to him. Has heard people refer to Philippe as a marketing genius. Feels that he is heading in the right direction at Verity.

Darell joined Verity, primarily to work for Philippe, but only stayed there 8 weeks. Verity was a very sick company when Philippe took over with a vicious political environment. It could not be fixed without some drama. Customer expectations had been set too high too early. Darell felt that it was too hard to succeed there personally when he went in given the political struggles and the masses of work that needed to be done to fix things.

### Other References

**David Stamm - 408-428-2010**

**President, Clarify**

Clarify uses Fulcrum not Verity yet. They may support both, just as they support Oracle and Sybase for help desk applications. He claims a typical revenue breakdown is \$800 to \$1000 per user (using concurrent floating license model) for full text search module in a help desk system. Of this the OEM gets about 15%, leaving a company like Verity with \$120 to \$150 per seat. He claims this is sustainable for the next few years. (*I question whether software prices will stay as high - what if Verity can only get \$15 - \$30 per seat which is more likely over the next few years.*) Has hired a few people from Verity's consulting group - excellent people - as Verity moves to a more indirect sales model. Decided to go with Fulcrum because at the time Verity could not deliver in time and he needed to meet a schedule and Verity was in disarray. Now Verity seems to be improving so may reconsider, however Fulcrum will not be displaced. The reason they would support more than one full text package is to meet customer compatibility requirements - for example Cisco already has documents in Verity format and if Clarify cannot support them they could lose a sale to Cisco.

## List Of Potential Competitors

### **Personal Library Software**

Richard Black, ext 241  
rmb2@pls.com  
2400 Research Blvd., Suite 350  
Rockville, Maryland 20850  
301.990.1155  
301.963.9738 Fax

*This has been licensed by Apple as AppleSearch. Also has Callable Personal Librarian C tools with a search engine - potentially*





*dangerous competitor in the C development community and OEM channels. Relevance ranking using post-boolean and natural language techniques. Generally not as accurate as TOPIC.*

**Fulcrum Technology, SearchTools**

275 Shoreline Drive, Suite 510

Redwood City, CA 94065

415.802.7050

7060 Fax

John Carr, Director US West & Central

Charles Neumeier, Sales Manager

7054

chuckn@fultech.com

Miles Kehoe 7052

**SERIOUS COMPETITOR.**

*This is a very well-respected OEM vendor, moving into the end-user market. Strong in the UNIX server market.*

**OpenText**

Lee Levin, VP Western Region

5101 136th Street S.W.

Edmonds, WA 98026

206.742.5951

6077 Fax

*University of Waterloo alumni, Canada. Started by doing Oxford English dictionary on CD-ROM. Customers include Canadian Pharmaceutical Assn., Union Bank of Switzerland, Mutual Life of Canada, NSA, Grolier Publishing, Peugeot, Caterpillar. Expected 1993 revenues of \$2M to \$3M. Research software.*

**Jouve**

Mark Biskeborn, President

800.835.6883

203.488.6625

203.481.1133 Fax

500 East Main St., Suite 328

Branford, CT 06405-2911

*Not a serious competitor.*

**ConQuest Software**

Bob Kaminski

bob\_kaminski@cq.com

9705 Patuxent Woods Drive

Columbia, Maryland 21046

410.290.6290

6292 Fax



800.787.1715  
Paul Nelson, VP Dev.  
Mr. Addison, Pres ?  
MaryBeth, Addison's assistant  
*Could be serious competitor. Emerging company working with  
Motorola.*

**WAIS, Inc.**

John Duhring  
415.617.0449  
duhring@wais.com

Nathaniel Lee  
415.617.0444  
info@wais.com

1040 Noel Drive  
Menlo Park, CA 94025  
415.327.WAIS (9247)  
415.327.6513 Fax  
frontdesk@wais.com

*Will be for Internet searching - don't forget WAIS is free public  
domain software for searching Internet files.*

**INQUIRY - UMass**

Bruce Croft  
croft%perth@cs.umass.edu  
413.545.0463  
413.545.1249  
Email Postscript  
Paul McOwen  
2475

**Northern Telecom, Helmsman**

Tom Van Atta  
TN  
615.734.4405  
615.734.5189

**InteleQ, IQ/Texttract**

Penny Fulton  
Bill Moss, Principle  
Mathew McAndrew, VP Sales & Marketing  
768 Walker Road, Suite 227  
Great Falls, Virginia 22066  
703.757.7592  
703.757.7593 Fax

**Information Access Systems, ITMS**

303.442.6224



4530 Fax  
Earlene Busch  
Russ Holsclaw  
3085 Bluff St.  
Boulder, CO 80301

**Thunderstone, Metamorph**

11115 Edgewater Drive  
Cleveland, OH 44102  
216.631.8544  
281-0828 Fax  
Bart Richards  
epi@thunderstone.com

**Alliance Technologies, TextMachine**

Mike O'Grey, Technical something manager  
TX  
512.794.9856  
512.794.0199 Fax  
Server Unix only

**HNC, Inc.**

5501 Oberlin Drive  
San Diego, CA 92121-1718  
619.546.8877  
452.6524 Fax  
Todd Gutschow, VP Application Development

**Claritech**

Suite 200A, 319 S. Craig St.  
Pittsburgh, PA 15213  
Elise Yoder  
eyoder@clarit.com  
412.621.0570  
412.621.0569 Fax  
David Evans, CTO  
Eric Brown, eeb

**Tech International**

12701 Fair Lakes Circle, Suite 870  
FairFax, Virginia 22033  
703.631.6895  
703.631.6734 Fax  
Edward G. Newman, Executive VP  
Carol Kovan

**InfoSoft, Houghton-Mifflin spin-off**  
Intelliscope



Kam Pinkerton  
Senior Account Manager  
22525 S.E. 64th Place  
Suite 210  
Issaquah, WA 98027  
206.557.3644  
206.557.3645 Fax  
Kirby Mansfield

**Noblenet, RPC tools**

Virginia Systems, Midlothian, VA 804-739-3200 **Sonar Professional** (\$795), Sonar Text Retrieval (\$295) - retrieves text from Mac files.

**Microdynamics MARS** - for Apple Macintosh imaging systems, now a subsidiary of another company. Silver Spring, MD (301-589-6300) (\$70K+ per system). Provides complete systems for imaging, OCR, scanning and retrieval.

**Empirical Research Systems** - Tacoma, WA - 206-627-8511, Fax: 206-627-5934

**MINDS** - Hypertext Retrieval System - asks a question of the user and finds information. Used for tech support, legal, government, technical documentation.

**Skytronics Software** - Nottingham, UK 011-44-602-864350, Fax: 011-44-602-861717. Found-It! Text Retrieval -for word processing files.

**Knowledge Set** - Mountain View, CA - CD-ROM publishing, first product was in 1985 timeframe - Grolier Encyclopaedia, one of the first CD-ROMs for PCs. Acts as a service for major publishers to put information on CD-ROMs.

**Academic software from Cornell University** is believed to be the foundation for Individual, Inc.'s SMART software for Heads Up! and First! daily electronic news services.

**XSoft** - Xerox Document Management Systems subsidiary. 415-424-0111, fax: 415-813-7181, info@xsoft.xerox.com. Visual Recall - based on Xerox PARC technology.

There are numerous small PC-based desktop systems from **Alki** (206-286-2600) (\$39.95), **Claris** (408-727-8227) (\$69), **Microlytics** (716-248-9150) (\$40), **On Technology** (617-374-1400) (\$129). Also word processing vendors incorporate full-text search into their products for word processing files.

NeXTStep from **NeXT** has full-text search built into the operating system.











# VERITY

1550 Plymouth Street  
Mountain View, CA 94043  
(415) 960-7600  
FAX (415) 960-7598

## FAX TRANSMITTAL SHEET

DATE: \_\_\_\_\_

TO: STEVE HALL

COMPANY: TRIDENT CAPITAL

FAX#: (415) 399 4375

FROM: Philippe COURTOI

AT: (415) 960- \_\_\_\_\_

# OF PAGES, INCLUDING COVER SHEET: 22

**MESSAGE:**

FY 95 Q1 OUTLOOK

& MIX ANALYSIS

Regards

~~Philippe~~



Printed By: Philippe Courtot

7/7/94 6:24

Page: 1

From: Philippe Courtot (7/7/94)

To: Steve Hall

CC: Sue Barsamian, Philippe Courtot, Stephany Derry, Laurent Le Foll, John Lehman, don mccauley, Hugo Sluimer

REGARDING Q1 OUTLOOK and Business Mix Analysis

Q1 OUTLOOK

=====

199321

As of last Monday the Outlook for Q1 is as follows :

↓ NEurope	<sup>6/12</sup> 532	615K	risk	HM Customs	\$ 65k
↑ CEurope	143	195K			
↑ SEurope	45	50K			
Total		860K			
↑ USComm	730	830K	upside WRQ 25K, CISCO 15K	( HP WWW in Outlook at \$100K)	
↓ USFeder	378	275K	upside McDonaldDouglass \$ 100K, AF Pentagon \$ 35K		
↓ ROW	275	260K			
OEM's		45K			

Total 2,270K versus a FCST of \$ 2.4M and a PLAN of \$ 2.6M

Maint	935K
ConsEU	185K
ConsUS	205K
ConsFed	75K
ConsROW	65K
TrainingUS	170K
TrainingEU	50K

Total 1,685K versus a PLAN and a FCST of \$ 1.6M

Gran Total 3,955K versus a PLAN of \$ 4.2M and a FCST of \$ 4.0M

Q2 is shapping up very well and generally speaking the activity is picking up in both commercial and federal US and OEM's.

We signed last week with NO HANDS, should sign this week with SARROS.

Mix Anlysis ( Q1 Outlook )

=====

	Revenues	Number of accounts	Number of VAR's	Number of A/O	Average transactions
Europe	860K	34	4	5	30K
ROW	260K	15	4	1	18K
USCom	830K	41	10	8	25K
USFed	275K	9	-	2	39K
OEM's	45K	1	1	-	50K
Total	2,270K	100	19	16	25K*

<sup>1 1/2</sup> (user)

\$2 / user

Analys

\* Without A/O which are typically less than \$ 5K per transactions.



Printed By: Philippe Courtot

7/7/94 6:24

Page: 2

The average transaction dollar amount will increase during the course of the year and this because :

- VAR's will start generating business ( they are currentlty dropping the average down because of the low initial API investment they make (Typically \$ 5K to \$ 7K and we are not asking any royalty prepayment )
- Many customers are waiting our client server product to deploy the application in a big way.
- Some Notes agents transactions will be very big, like minimum 1,000 users at \$ 100 per seat. > \$200,000

The FY 95 PLAN reflects this trend via increase in sales productivity .

By FY year end we should every sales person generating at least \$ 200K in revenues per Quarter with an average transaction in the \$ 50K range.

FY96 should see another significant productivity gain due to transactions getting bigger, the transaction cycle getting shorter and of having the channel at full production.

we saw at cc:Mail the same phenomema whereby we started with an average of \$ 15K per transactions and three years later where at more than \$ 100K per transactions with some beeing multi million dollar range.

Please let me know if you need more info.

Thanks Philippe

Note for the recipients who do not know Steve . He is one of the partners at Trident Capital ( a potential investor in the new and last round of financing ) doing the due diligence on Verity.

=====





UK		5 Jul 94		New Orders											
Forecast/Company	Application	JUN	JULY	AUG	Save	Trng	Mnt	Status	Next Steps or Obstacles						
Radio Communications Agency	Manuals	MA	1				0	Closed							
MoD	News	SC	3		3		1	Closed							
Services - and Office	Services	MA			12		0	Closed							
Proctor & Gambro	Consulting	PE	15		2		0	Closed							
Courtauld's	Library	PE			15		3	PC received - Closed Order Due Min View This Week							
Miles33	VAR - Publishing	PE		(7)			1	Order to end-user - VDK A.P.I							
PTCDAFI	VAR - Imaging Systems	PE		(7)			1	PC Confirmation - VDK A.P.I							
London Stock Exchange	Real Time Feeds	PE	W/O	10	22	3	2	Final Meetings							
BEC-CDIT	SA - Policies	PE	A/O	11	12	3	2	Policies and procedures Budget Approved							
Xerox	South Africa Distributor	SC			88		16	New Systems							
Sheffle University	CD ROM Harlib Papers Project	SC			6		1	Agreement for Pricing Model							
ODA	System Expansion	SC	A/O		10		2	Additional Licence Procurement							
Watsons	SA - Acturis reports db	PE			25	3	5	Order In Process							
Dorwent	Peterie Database	PE			33		6	Conclude Trials and Present to Board							
GCHC	Intelligence/Library/Expansion	SC			66		12	FC in Process - 2 Orders combining							
	Total Forecast		16	35	220	71	51	Forecast = 262							
* Opportunities															
Coscate	News Industry Systems Hisc	PB		6			1	References taken							
IDS	Swedish Distributor	SC		55			10	Sweden Police							
MS EDT	Norway Distributor	SC		60			11	Upgrades to Existing Installation							
Miles33	VAR - Publishing	PB		(5)			1	Demo to customer							
Spikes Covel	Information Provider - CD ROM	PB		12			2	Meeting with MD							
Reed Business Publications	SA Journals Archive	PB		15	12	6	3	Order in Process - Expected							
Janes	VDK	PB		(5)			1	Current Trial							
Piedlar	Mirror Group	PB		8			1	Present to end-user							
Piedlar	Police Systems	PB		37			7	Call off order							
HM Customs and Excise	SA Exclis Systems	SC		65	11	8	2	Add on to COVAT							
ARIC	Intelligence	SC		66	15	9	2	Procurement Process Started							
Tetra Pak	Library Systems	SC			18	5	0	Trials System for European Agreement							
	Total * Opps		C	120	213	56	60	* Opps = 339							
Opportunities															
Boots Pharm pilot	Pharmaceuticals	PB		5	5	2	1	Mezian and Sol Solutions - Present to Team							
Center File - Nat West Bank	VDK - Dso Management	PB		22		3	4	Confirmation of VDK							
ANT (BASF)	Procedures Manual	PB			10		2	User Demo							
Audi. Commission	Add On Licences	SC			15	5	3	Subject to Roll Out							
Mers Group - Info Services Internal	Enterprise Network System	PB			35	22	6	Trials first then roll out - NOTES Addon required							
BBC-World Service	SA Archive System	PB			40	20	7	Archive of BBC World Service							
Fisons	Additional Server	PB			18		3	FO Confirmation							
	Total Opps		C	27	118	62	20	Opps = 145							
		JUN	JULY	AUG	Save	Trng	Mnt								
		100	150	110	120	230	100								





# VERITY

5 Surbiton Hill Road  
Surbiton, Surrey  
KT6 4TW

TEL: 081 - 390 - 3330 FAX: 081 - 390 - 3334

To: Philippe Courtot  
Organisation: Verity  
Fax Number: Mtn View  
From: Stephen Cole  
Date: Tuesday, July 5, 1994  
Subject: UK Outlook  
No of Pages: 3 inc front sheet

We are looking at \$615K for Q1. Risk is one \* opportunity - HM Customs and Excise. This may slip to Sept. if the project boards are missed. The rest is solid. We have other opportunities if this slips.

Q2 is looking very promising. \$722K with good opportunities.

Peter Bolton is shaping up very well - he has closed his first orders. I am replacing Marc Adams in the next two weeks - Marc did not perform. The delinquent accounts list is unacceptable and Eric and I are working on it - I expect to see improvement by the end of July.

The South Africans are very positive after Chris de Wet attended DASH - they have substantial opportunities - the results will show in Q2.

Steve







FRANCE	04-Jul-94											Status, Next Steps or Obstacles
Forecast/Company	Application	JUNE	JULY	AUG	STVC	Trng	Mnt					
MOOSUEZ		20									2	Order received. On the way to US
GEOLINK	EDV Integrator A/O		4									RT on 210 ead
<b>Total Forecast</b>		20.0	4.0	0.0	0.0	0.0	2.0					<b>Forecast = 24</b>
<b>Opportunities</b>												
MATRA MARCONI	Deployment		26									In procurement
<b>Total * Opps</b>		0.0	26.0	0.0	0.0	0.0	0.0					<b>* Opps = 26</b>
<b>Opportunities</b>												
EDF	Prototype											
MATRA TRANSFORT	Prototype		10									Technical aprova OK
TELESYSTEMES	Integrator		7									
DRM	Run Time			5								Defense project
<b>Total Opps</b>		0.0	25.0	5.0	0.0	0.0	0.0					<b>Opps = 30</b>
<b>Total Outlook</b>		MAR	APR	MAY	STVC	Trng	Mnt					
	Plan	20.0	30.0	0.0	0.0	0.0	2.0					50.0
	GAP	-20.0	0.0	-10.0								80.0
												-30.0





**V E R I T Y****VERITY FRANCE**  
6, BOULEVARD DE LA LIBERATION  
IMMEUBLE PERINORD  
93 284 SAINT DENIS CEDEX

Tél : (33) 1 49 33 73 00

Fax : (33) 1 48 09 10 00

Date: 5 Juillet 1994

Nombre de pages: 2

**FROM:** LAURENT LE FOLL. VERITY FRANCE**TO:** PHILIPPE  
CARY VERITY INC  
19 1 415 960 7698**COPY:****SUBJECT:**

Please find enclosed my updated Outlook report for Q1.

Last week was a good week in France.

We had our first order in the banking market with a major reference, INDOSUEZ, and also our first installation of TOPIC on top of LOTUS Notes for a global of 22 KS.

This contact was taken at the Sybase forum on June the 8th, we invited the prospect to the seminar we organized with TELESYSTEMES on June the 21st announcing our collaboration and showing Notes Add on's. We also had already confirmed a meeting with them on June 27th and finally got their order on June the 30th and the according paperwork early July.

The conclusion of this deal : how to sell in one visit with the help of partners. This by the way also confirms the interest within Notes major accounts for additional retrieval functionalities.

Good reception.

Laurent



REST -OF-WORLD TERRITORY  
Q1 FY95 REVENUE SUMMARY  
JULY 4, 1994

LICENSE	
FORECAST	200
PLAN	300
OUTLOOK	258
AUSTRALIA	92
OTHER	166
NEW MAINTENANCE	26
CONSULTING/TRAINING	64 -
TOTAL	348
Upside	75k (BHP Newcastle, BHP Project M, HongKong Patents, Unisys)
-----	
*Re-activated RTA	21k, recognizable maint., invoiced
*DIO	19k recognizable maint., received check



**Q1 FY95**

**AUSTRALIA**

Kent	4-Jul-94	JUN	JUL	AUG	Srvc	Trng	Mnt	Status, Next Steps or Obstacles
Forecast/Company	Application							
Compucal	amhs system integrator			(7.0)				agreement to terms by 7/29
AIPC	office auto. add-on		(7.0)					agreement to terms by 7/29
Computechics	"objective" oem lic.		(7.0)				1.0	commitment to return signed agreement by 7/15
RTA	inf clearinghouse			20.0			21.0	Bug in v4 beta, 7k rec'd 6/20, hold for v4
HP	customer support		7.5					via corporate agreement
	<b>Total Forecast</b>	0.0	21.5	27.0	0.0	0.0	22.0	<b>Forecast = 48.5</b>
<b>* Opportunities</b>								
federal police dept	law enforcement			10.0				BIS active opportunity
AWA defence Industries	intelligence			14.0			1.0	remainder of ADFDIS order
BHP-Steel Wollongong	doc mgmt			16.0			3.0	30 day eval began 29 June
approved	news watcher for ap						1.5	1st priority is submit all gen prop by 7/1
health	medical research			4.0				pilot, needs wysiwyg with highlights
	<b>Total * Opps</b>	0.0	0.0	44.0	0.0	0.0	5.5	<b>* Opps = 44</b>
<b>Opportunities</b>								
Law Society	pilot, research		3.2					awaiting budget total of site=42k
BHP	project "M"			75.0			10.0	mult site, based on eval ends 1 aug
BHP-melbourne	newsfeed		25.0				4.0	rel 4 client plus vdk-mac
BHP-newcastle	doc mgmt "objective"			25.0				Computechics awaiting notice of award
NSW Judicial Commission	litigation support		25.0					quoted 6/8, computechics may take 60 users
Office Express	profile notes-grapevine			10.0			1.7	2nd meeting 7/5
Defense via Unisys	intel		47.4					quote 6/15, decision 7/1
Malisons, via wang, micros/	litigation doc-mgmt			10.0				1300 seat law firm, microsoft has VDK 6/21
	<b>Total Opps</b>	0.0	100.8	120.0	0.0	0.0	15.7	<b>Opps = 220.6</b>
<b>Total Outlook</b>								
	Plan	60.0	60.0	60.0				180.0
	GAP	-60.0	-38.5	11.0				-87.5









Region	License	Consulting
East	39	9
Northeast	94.8	101
Canada	16.1	0
Southeast	97.3	62
Midwest	121	22
Southcentral	235.7	21
West	161	10.5
Microtrac	65 (estimated - will be distributed by P.O.S)	225.5

HP www@ ldx  
 2

330

332

(2019-2020)

191

102

100

1202

31

151

33

313

25

191

0

878

101

38

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200000

200000





FAX to SUE BARSAKIAN

Page 1 of 1

B. Rockwood	1-Jul-94	Jun	Jul	Aug	Srvc	Trng	Min	Status	Next Steps or Obstacles
Forecast/Company	Application								
Vision Data A/O	newspaper billing/circuit.	1.0			2.0	1.4	1.4	1.4	order in, 1 person trained, Depassey meeting in Aug at my request
Lockheed Sanders					12.0				order in, Jose working week of 7-4
General Datacomm	image management		23.3						have signed order, waiting for P.O. per GDC request
Raytheon	message protobing		0.5		30.0				order getting last signatures, start work in July
Mine Corp #3018 A/O									1.5 more clients to come
	<b>TOTAL FORECAST</b>	1.0	23.8		64.0	1.4	5.9		Forecast = 24.3
<b>* Opportunities</b>									
ITT Hartford -- 30 day	Remedy help desk		20.0		5.0	3.0	4.0		they're checking Irene's virus clause--last hurdle I THINK
Raytheon	realtime feed				12.0				Mainstream to E-Mail prototype
Groundwater/ DEC	proposals/engr/g/acc.		45.0		15.0	3.0	8.0		mg on 7/11 to decide, new DEC met -- SLOW
XVVISION	publishing		50.0		5.0	2.0	1.0		VDK, SGMH. issue, may not sell consulting
Actna	medical utilization						5.0		290 new referrals clients
	<b>TOTAL *Opps</b>		25.0	45.0	37.0	8.0	18.0		*Opps = 70.0
<b>Opportunities</b>									
Logica - Ameritech	multimedia surfing			20.0	5.0		4.0		are not returning calls.
Children's Hospital	billing			12.0		2.0	2.0		have old license -- price sensitive
Xerox Corporation *****	Document Management			20.0	5.0	3.0	4.0		Excaltair compete, decision by end of July.
Waters Corp. *****	tech support			20.0	10.0	3.0	4.0		august is 50/50 chance, 80% chance overall
Xerox Corporation	help desk								RFP in August--we are front runner--Inference is competitive
Salomon Brothers *****	various			20.0	5.0	2.0	4.0		handed over to Scott Taylor On 6/30/94
HP Chelmsford	Remedy helpdesk								Sep-Oct startup 30 users
Flexcon									Fall - Winter opportunity
Thomson Financial Svcs	on-line provider								CA mtg in late July / early August
Bausch & Lomb	tech support			10.0	5.0		2.0		may need 2nd server, real-time
General Datacomm									world wide opportunity
Compuvision	customer support			46.0	18.0	9.0	8.0		customer wants September new prog mgr
Cabot Corporation	Lotus Notes to TOPIC			20.0	10.0	2.0	4.0		has large Notes base want access to current RND TOPIC at
	<b>Total Opps</b>			168.0	58.0	21.0	32.3		Opps = 168.0
	<b>Total Outlook</b>	1.0	48.8	45.0	101.0	9.4	23.9		94.8
	Plan	30.0	50.0	70.0	50.0	12.0	27.0		150.0
	OPA	-29.0	-1.2	-25.0	51.0	-2.6	-3.1		-55.2

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Darlene G. Hines Forecast/Company		30-Jun-94 Application		Commercial			Southeast			Q1FY95 Next Steps or Obstacles	
Philip Morris	Consulting	JUN	JUL	AUG	Svc	Trng	Mnt	Status	Jose working		
Philip Morris (M/D)	New Licenses	A/O	22.9		26.4		2.0	CLOSED!!	Shipped on 6/24/94		
<b>TOTAL FORECAST</b>											
		0.0	22.9	0.0	26.4	0.0	2.0	Forecast =	22.9		
<b>Opportunities</b>											
INTELSAT	Consulting				12.5				May be August	Requesting additional consulting	
MRJ	Information Searching			30.4	3.6			4.6	In Pilot	Meeting w/Stephanie postponed. Need to reschedule.	
C3/Telos	Corp Info Service	A/O	9.3		7.5	0.0		1.7	Proceeding	Demo Scheduled for 7/11 at the latest. Proto to start there after	
GTE Spacenet	VDK			34.5	12.0	0.0		3.5	New Final Quotation Numbers	Decision by 7/1/94	
							0.0				
							0.0				
							0.0				
	<b>TOTAL *Opps</b>	0.0	9.3	64.9	35.6	0.0	9.8	*Opps =	74.4		
<b>Opportunities</b>											
Baker & Hofstetter	Litigation Support			15.0				2.3	Dependent	Cleveland developing application for distribution which will cause action in Washington	
C3/Telos	Corp. Information Syst			10.4	6.0			1.9	Aug/Sept	Dependent on Pilot/Prototype	
Ciba-Geigy	Expanded Licenses			15.0	7.5			2.3	Dependent on DMS selected by Ciba		
Digital Ink	VDK?							0.0	Preparing Custom Demo - Tentative week of 6/20		
GTE Spacenet	VDK			36.2	15.0	3.0		11.3	6/17 - Meeting with Andy Leak		
IBOX	Real Time Add On		4.9		12.5	0.8		0.7	Submitting	Potential Lotus Notes site - major additional opportunities dependent on NOTFS add on	
IIFSI	CIS/Client Lic. Conversion			4.7				0.7	Beta 4.0 Site	Must have V4.0 with Frame and W6.0 filters that work!!!	
KUMG	Resume/Proposal		10.9		7.5			2.3	May be going with Res Tract!!		
Lanier Worldwide	P-VAR - Imaging/DMS								June/July next meeting		
Lockheed	VDK								On Hold til discussion with Stephanie		
Newbridge Networks	Help Desk/Corporate IS.			58.5	15.0	2.0		10.5	Q) Opp	Coordinating with Boston/Canada.	
Washington Post Newspaper	Archives								Schedule on-site soon	Prototyping P.L.S now	
CDI - First Union	Help Desk/Customer Supp.			30.0	15.0	2.0		4.5	Eval	Meet in Charlotte with First Union on 6/28/94	
Intelnet	Additional Licenses			68.2				12.3	Proof of Capabilities	must happen first.	
<b>Total Opps</b>											
		0.0	15.8	238.0	78.5	7.8		48.9	Opps =	273.8	
<b>Total Outlook</b>											
		0.0	32.4	64.9	62.0	0.0		11.7		97.3	
	Plan	70.8	70.8	70.8	42.5			31.9		212.4	
	OPA	-70.8	-38.4	-5.9	19.5	0.0		-20.2		-115.1	





TOTAL P.02

13 - June - Kasarian

MIDWEST REGION									
Stegelo	July 1, 1994	JUNE	JULY	AUG	Svc	Tmg	Mnt	Status, Next Steps or Obstacles	
Forecast/Company	Application								
B&McKenzie/chg	internal trng/w/ifenel			32.0	6.0	4.0		3.2.4 should work interim. still need 3	
Reuters	help desk				6.0	4.0		decision makers on vaca til 7/25	
ComRep	VAR)			(5.0)				chicago & detroit var with call tracking	
Emerald Intelligence	VAR			(5.0)				small company.	
Howard Pubs	vdk	(6.0)						order received	
Baker & Hostetter	internal docs			25.0		2.0		working on getting approval	
Mead Data Central	vdk		(5.0)			7.0		decision made, in procurement	
Ameritech	consulting				5.0				
Fermi	on-line, vdk		43.0		5.0		8.0	decision made, in procurement	
<b>Total Forecast</b>		6.0	48.0	67.0	22.0	17.0	8.0	<b>Forecast =</b>	<b>121</b>
<b>* Opportunities</b>									
CompuServe	on-line, vdk			6.0	6.0	2.0		need to complete consulting quote	
RR Denrelley	VAR		(5.0)					Legal var	
Odesia	vdk							oem, evaluating vdk	
<b>Total * Opps</b>		0.0	0.0	0.0	0.0	0.0	0.0	<b>* Opps =</b>	<b>0</b>
<b>Opportunities</b>									
ComRep/Kelly	call tracking							lost to Answer	
Gordon Foods/grnd rap	Customer Suppt							project cancelled-left w/5k budget-90	
ComRep/Ell Lilly	help desk			20.0				wants to add rig sched 5/17 - oct. 55k	
Teitech	on-line			5.0				in process resending rfi.	
Ameritech/Hoffman	sales/support org							crag helping w/rti	
Ameritech/Chg	IS Doc Mgt prod Standrdz							Still in process of eval. standardization	
NCR/AT&T/Woolworth/Nile								Still no word, rep not returning my call	
Rynolds & Rynolds/Dayton	Customer Suppt			60.0				regained position, proj. elongated, Jar	
Motorola/Schaumburg	Real Time			50.0				50 user add-on opport. 1 YL	
Southwestern Bell/StLouis	Enterprise deal			125.0				want to inst. 4.0 & c/s. need hp c/s re	
Interactive/NCR/Dayton	Customer Suppt							early stages of product review	
CompuServe	On-line			100.0				preparing consulting and pricing quote	
NCS Assessments	Customer Support							still reviewing products. decision in se	
Andersen	notes, api, help desk			100.0				hard to gain momentum w/out product	
Baker & Hostetter	internal docs			25.0				to make decision by aug. 5 sites	

1521 11-11-1994 10:00 AM







**Southcentral Region Q1 FY95**

Knapp	1-Jul-94	Jun	Jul	Aug	Svc	Trng	Mnt	Status, Next Steps or Obstacles
<b>Forecast/Company</b>	<b>Application</b>							
Citigo	Filenet Integration V/M		8.3				3	We have T&C changes from Citigo in house & have b
Motorola Paging	Help Desk		20		7.5	2.2	3.6	Victor Kamchee will be back in office on July 1. He w
EDS Corp. Mktg.	Competitive analysis		32.8			2.2	3.2	New person now involved in project, Cindy Greenberg.
Amex	Customer support A/C	4.7					0.7	P.O. is in Mkt. View.

<b>Total Forecast</b>		4.7	61.1	0.0	7.5	4.4	41.1	<b>Forecast = 65.80</b>
<b>* Opportunities</b>								
AT&T NSAC	Cust Supp			30				5 Decision is made for Topic - waiting funding - Bill Bro
Novadyne Computer	Help Desk		20		6	2	3	Follow-up on demo at Xerox was positive. Is attempti
Melaware	VDK Integration VANL			10		2	2.0	Will be integrating with Document Management System. H
Amex	Corporate License		54.4				30.6	Trying to finalize CLA based on negotiated maintenance at
Colorado Memory Syst.	Help Desk	N/D	7				1	More clients for new group to be added to Sean Seal
AMOCO Chemical	Procedure Man/OCR		48.5		7.5	12	8.7	Committee has selected Verity. We will know configu
<b>Total * Opps</b>		0.0	129.9	40.0	13.5	16.0	50.3	<b>* Opps = 169.9</b>

Opportunities	SW Reuse Lib	47	0.5	2	7.5	Gave Larabee contact at EDS as reference with similar at		
Loral Defense	Electronic dist., Help Desk	30				VDK is in house at Compaq. we will do demo for help		
*Compaq	Procedure Man.		20			Custom demo being done by Kevin		
Southwestern Bell S.A.	Help Desk		20			Kevin did demo on 6/2. Went well - will set up addi		
*CSI	Eng. Manuals			30		Information now being gathered to make decision. Ni		
Lockheed	Cust. Support		17.5			Will F/U in June		
DEC Colo. Sprgs.	Saber/STIN					Committee considering a site license. Potential for 2		
American Airlines	Doc. Mgmt./Acrobal Int					Acrobal beta site. Potential for 8000 users over limi		
Hughes Missiles	Cust Supp.		20			Dan Rowald has transferred to new group and a new		
Abbotl Diag.	Multi Media Project		20			Meeting at Min. View with Director & Mgr. to confir		
*MCI	Litigation Supp		5			Waiting for case to get set for hearing		
Looney/Cooper	SA-20 concu		45	6	2	5.0	3	Topic selected by committee. Project on hold till Jan cue ic
*Blue Cross AZ	Filenet Integration		20	40	3	3	3	We are continuing to address remaining questions on
*Stirling Chemical	Doc. Mgmt. Integration			20	2	3	3	We are the spec. retrieval prod. by all 3 finalists
*Honeywell								
<b>* Accls. focused on to move up</b>								
<b>Total Opps</b>		0.0	67.5	160.0	46.0	7.0	11.0	<b>Opps = 217.5</b>
<b>Total Outlook</b>		5	191	40	30	24	71	235.7
Plan		63.3	63.3	63.3				250.0
GAP		-70	108	-43				-14



Q1 FY95

Company

5-Jul-94

Judy A. Calloun

Forecast/Company	Application	June	July	Aug	Sevc	Trng	Mnt	NXQ	Status	Next Steps or Obstacles
Services					7.5				Jul 11-14	
Cisco	Mosaic	15.0					2.7		Discussing Site License after July 4th	
	<b>TOTAL FORECAST</b>	<b>15</b>			<b>7.5</b>		<b>2.7</b>		<b>Forecast = 22.5</b>	
<b>* Opportunities</b>										
Kennedy	Help Desk OEM			8.0					New Contract. To be presented wk of 6-27	
AT&T	VDK		5.0							
Starbase	OEM		25.0				CL		Need to move to...	
Answer	Help Desk OEM			8.0						
	<b>TOTAL *Opps</b>	<b>5</b>	<b>30.0</b>	<b>16.0</b>					<b>*Opps = 7.1</b>	
<b>Opportunities</b>										
Hughes	VPA - Corp Standard								Live Test Demo 3rd Week in July. Several new groups	
Packard Bell	VPA - Corp Standard								Volume Pricing c	46.0
AT&T	VPA - Corp Standard								Need Dayton Conf	
Datavac	VDK								Collin Dove Chairman	
Siri Sci	Builder			45.0				27.0	Q2 Op. Just Deploying Vanire	
Pac Bell				25.0					Visit July 13	
WRQ	Cost Support			15.0					Looking at Demo. Visit July 12	
Chenier/ The Gate	Mosaic								Commence Mig. 2nd week of July	
AMID									Need On-Site Seminar. Associated with Well Gutsdorf	
Telesch				20.0					July Calloun - June 24 Update	
Northrop	VPA - Corp Standard			5.0					Deciding on Standard for North Group	
Carroll Hardic	Legal								Adding New User	
Cisco	Mosaic		85.0						Looking at multiple Mosaic servers	
HP	Mosaic		25.0						Quoting first week in July	
Avery Dominion									Still impressed with Fuzzy Logic Verilog	
Douglas Aircraft	Sales Support Desk			70.0					Brand New Opportunity	
	<b>Total Opps</b>		<b>110.0</b>	<b>230.0</b>				<b>27.0</b>	<b>Opps =</b>	
	Total Outlook	June	July	Aug	Sevc	Trng	Mnt			
	Plan		30.0	16.0	7.5		2.7			43.5
	GPA		30.0	16.0	7.5		2.7			140.0

43.5  
 -50 HP  
 -25 WREQ  
 -15 Cisco A/O  
 133.5

100K HP WWW

See - Adding Boy A. Concord as new opportunity Sept prototype









Q1 FY95

Federal - Paul Schur

Forecast/Company	01-Jul-94	JUN	JUL	AUG	Srvc	Trmg	Mnt	Status, Next Steps or Obstacles
U.S. Gov./SRA	Search into Legacy System	0.0	0.0	0.0	0.0	0.0	0.0	went with CIA site ilc.
	<b>Total Forecast</b>	0.0	0.0	0.0	0.0	0.0	0.0	<b>Forecast 0</b>
<b>* Opportunities</b>								
McDonnell Douglas	amhs		50.0				7.5	Pricing Submitted, get response, \$7
	<b>Total * Opps</b>	0.0	50.0	0.0	0.0	0.0	7.5	<b>* Opps = 57.5</b>
<b>Opportunities</b>								
U.S. Forscom/Booz Allen	c2amhs						26.0	Must go through NRCC contracting, black hole, unknown
FAA/DISA	profiling/OA			34.8	20.0		6.2	contracting 6/24, Sole Source? CBD? GSA?, revise pricing
JNIDS/DELFIN	retrospective single user			12.8			1.5	Customer wants, just needs to "do it", look at discount??
McDonnell Douglas	amhs			200.0			30.0	Add. 10% disc., replace 50K *opp, SD to give revised pricing
	<b>Total Opps</b>	0.0	0.0	247.6	20.0	0.0	63.7	<b>Opps = 247.6</b>
	<b>Total Outlook</b>	0.0	50.0	0.0	0.0	0.0	7.5	<b>50.0</b>
	Plan	83.3	83.3	83.3				<b>250.0</b>
	GAP	-83.3	-33.3	-83.3				<b>-200.0</b>



Q1	July 1, 1994	June	July	Aug	Srvc	Trng	Mnt	Status, Next Steps or Obstacles
Forecast	Application							
DOD J2	Intel DB	40.0						Closed - No maint till fiscal 95'
Hughes Aircraft	Executive branch client for SOCOM J2	N/A					4.0	Closed - Full maintenance for pilot license
ITV		1.0						Closed - Add-on to existing installation
DOD R51	Library App	26.0					4.0	Close early July
	Revenue	67.0	0.0	0.0	0.0	0.0	8.0	Total Lic = 67
<b>Opportunities</b>								
DOD A7/K	DG Project			35.0				
DOD J2	AMHS		26.0	45.0			6.0	Add-on using SUNPIC IDIQ contract
US SOCOM/SUN	Add-on to ODM app	N/A	5.0					Add-on to system, will build TOPICs only
USAF WP	intel DB/PRC is integrator			20.0			3.0	small part of larger order, contact checking status
LA AFB	Multi DB access project				101.0			Other part of Q4 services contract, 118K in other SW
DOD - Open Road	AMHS			25.0				
Harris/Socom	Total ^ Opps	0.0	31.0	125.0	101.0	0.0	9.8	^ Opps = 156
<b>Opportunities</b>								
Accurate Information Sys	AF Pentagon IS		35.0					Eval installed, Fulcrum-Snoobur-competition- problems w/integration
HY	for SOCOM J2		10.0					Add-on to existing installation - Move to Q2
UNISYS	Gov't client, Dial-in app			65.0			9.0	Early in process, we are preferred technology
DOD J2	for AFTAC/Patrick AFB			45.0				DOD buying for AFTAC - Money not transferred yet - move to *app
CACI/Justice Dept.	VAR integration		10.0				2.0	negotiating agreement - TECHNICAL PROBLEMS to fix
ITG/Executive Branch	AMHS		33.0				7.5	Proposal under consideration by executive agency client
Harris/SOCOM	AMHS		25.0					Harris meeting with client to determine needs - contact Harris decision maker
LMI	NASA labs DB		50.0				7.5	Building custom database for demo
DOE/Ontario	DOE PINS program		10.0					Restarting the procurement cycle
DOD A7/K	DG Project		35.0				5.0	Going into procurement cycle - move to *app
Aegis/DOD	Real-Time/Retrospective			12.0			31.6	Comp. exhibit of PRA imaging system/oracle engine
<b>Total Opps</b>								
		0.0	45.0	298.0	0.0	0.0	51.6	Opps = 336
<b>Total Outlook</b>								
	Plan	83.3	76.9	419	101.0	0.0	67.4	225
		83.3	83.3	83.3				250.0

223





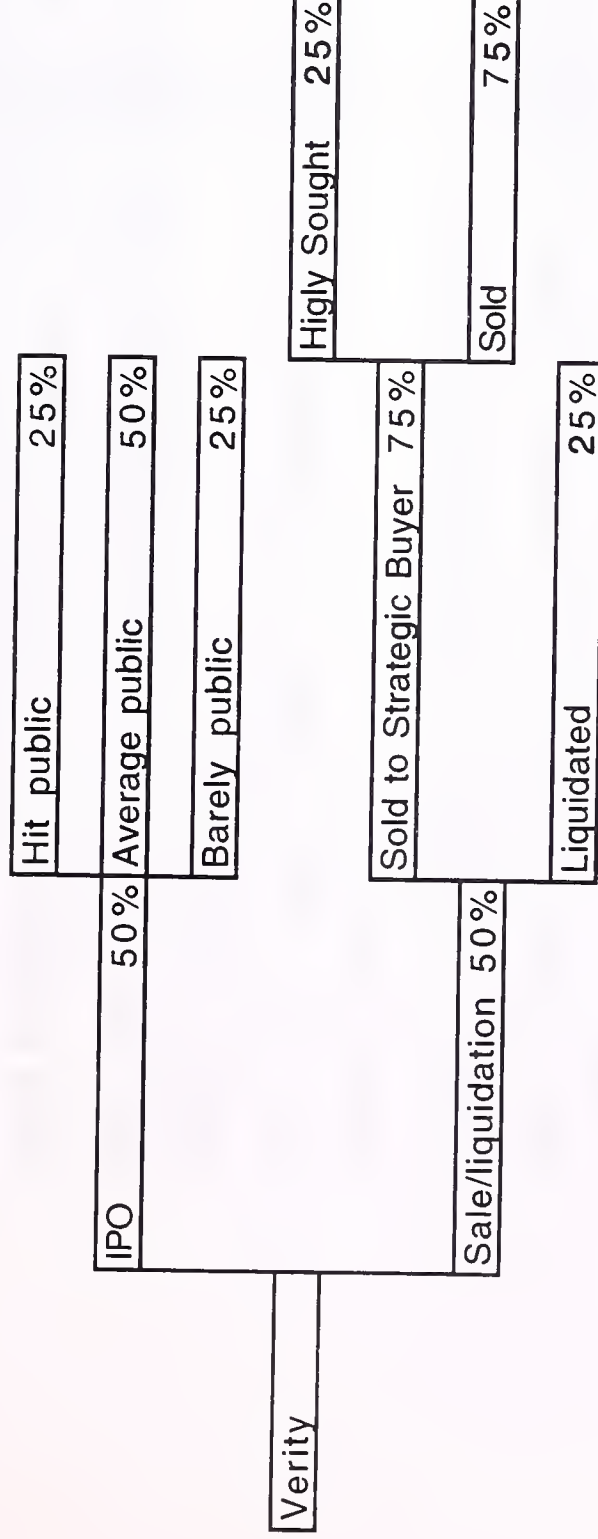




# What are the potential returns (continued)?

## VERITY:OVERVIEW

Assumes a \$3M investment and exit in 2 years



Company Value	Series G Value	Probability	Expected Value	IRR
\$100	\$17.0	12.5%	\$2.13	138%
\$70	\$11.7	25.0%	\$2.92	97%
\$30	\$4.5	12.5%	\$0.57	23%
\$50	\$8.1	9.4%	\$0.76	64%
\$20	\$3.6	28.1%	\$1.00	9%
\$10	\$3.6	12.5%	\$0.45	9%
			<u>\$7.82</u>	
			2.6x	
			61%	



# What are the features of the Picasso Client?

---

VERITY:TECHNOLOGY

- Runs on Windows, Macintosh (PowerMac native code) and X-Motif for SunOS, Solaris, HPUX, AIX
- Has an intuitive user interface with full power of TOPIC queries
- Has the capability to create Agents that remember your queries
- Uses WYSIWYG document viewers
- Very small footprint on the client computer <400k bytes



# **What are the feature of the Picasso Server?**

---

## **VERITY:TECHNOLOGY**

- **First release runs on SunOS, Solaris, HPUX, AIX
  - **within 90 days of first release Windows/NT and OS-2****
- **Is a load balancing, multi-threaded server**
- **Has the capability to organize data by logical layout**
- **Has the capability to search up to 256 collections simultaneously**
- **Allows new documents to be inserted in a collection in real time while searching**
- **First release network protocols are TCP/IP and Windows Sockets
  - **Netware to follow****



# **What is the development schedule for Picasso?**

---

**VERITY:TECHNOLOGY**

- **Alpha version to HP on 8/19/94**
- **Beta version to ship 10/15/94**
- **First customer ship on 1/30/95**
- **On schedule for internal 0.1 milestone on 7/22/94**
- **Internal 0.0 milestone (functional prototype) delivered on schedule 7/1/94**





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Executive Overview .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete report .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part of report (_____ %) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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- |                       |                          |                          |                          |                          |                          |
|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Data presented .....  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Analyses .....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Recommendations ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. How useful was the report in these areas:

- |   |                          |                          |                          |                          |                          |
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| Confirming existing ideas .....                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Meeting expectations .....                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
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| Confirming existing ideas.....                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
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- |                       |                          |                          |                          |                          |                          |
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- |   |                          |                          |                          |                          |                          |
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7. In what ways could the report have been improved? \_\_\_\_\_  
 \_\_\_\_\_

8. Other comments or suggestions: \_\_\_\_\_  
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| <input type="checkbox"/> Required reading         | <input type="checkbox"/> New product development  | <input type="checkbox"/> Future purchase decision |
| <input type="checkbox"/> Area of high interest    | <input type="checkbox"/> Business/market planning | <input type="checkbox"/> Systems planning         |
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	Extent		Usefulness (1=Low, 5=High)				
	Read	Skimmed	1	2	3	4	5
Executive Overview .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete report .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part of report (_____ %) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. How useful were:

- |                      |                          |                          |                          |                          |                          |
|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Data presented ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Analyses.....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Recommendations..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. How useful was the report in these areas:

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|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Alerting you to new opportunities or approaches ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Covering new areas not covered elsewhere .....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Confirming existing ideas.....                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Meeting expectations .....                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ .....                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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<input type="checkbox"/> Area of general interest	<input type="checkbox"/> Product planning	<input type="checkbox"/> Other _____
3. Please indicate extent to which report has been used and overall usefulness:
 

	Extent		Usefulness (1=Low, 5=High)				
	Read	Skimmed	1	2	3	4	5
Executive Overview .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete report .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part of report (_____ %) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. How useful were:
 

Data presented .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Analyses .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recommendations .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. How useful was the report in these areas:
 

Alerting you to new opportunities or approaches .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Covering new areas not covered elsewhere .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confirming existing ideas .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meeting expectations .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____ .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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| <input type="checkbox"/> Required reading         | <input type="checkbox"/> New product development  | <input type="checkbox"/> Future purchase decision |
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Executive Overview .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete report .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part of report ( _____ %) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. How useful were:

- |                       |                          |                          |                          |                          |                          |
|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Data presented .....  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Analyses .....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Recommendations ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. How useful was the report in these areas:

- |   |                          |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Alerting you to new opportunities or approaches ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Covering new areas not covered elsewhere .....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Confirming existing ideas .....                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Meeting expectations .....                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ .....                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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Complete report .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Data presented .....  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Analyses .....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Recommendations ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Alerting you to new opportunities or approaches ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Covering new areas not covered elsewhere .....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
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|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Data presented .....  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Analyses .....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Recommendations ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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- |   |                          |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
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| Covering new areas not covered elsewhere .....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Confirming existing ideas .....                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Meeting expectations .....                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
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- |                       |                          |                          |                          |                          |                          |
|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Data presented .....  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Analyses .....        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Recommendations ..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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