CHAPTER 1

Executive Summary

Health Objects

Health Objects is a software company concentrating on the needs of the health care market. Health Objects builds a series of small applications that meet niche needs for primary health care providers. These small applications fit into an overall information architecture of the electronic patient chart. This architecture includes database storage, communication interchanges, application program interfaces, and agent cooperation. As the application suites expand, more of the overall architecture materializes until a consistent enterprise model is present. A health care provider can then monitor the care process to improve quality and reduce costs.

Product Description

Each application is built with a tool-based architecture optimizing interoperability. A tool-based architecture builds an underlying engine or tool. This tool is built without content. The content is then provided as a separate loadable item. There may be many contents. The tool plus the content represents a useful application to the user. There is a minimum number of tools necessary to support the patient chart. These tools will then be used to build many useful applications such as the patient chart and quality of care reporting system.

Each tool is built to maximize interoperability. A health care institute does not have to replace already existing applications, but merely needs to integrate and interface to a new Health Objects application. This integration may be partial or total and most of the integration work may be accomplished with minimal effects on existing applications. The interoperability tool makes this possible.

Health care, more then any other enterprise, is a distributed, loosely-coupled, multi-person group activity. A physician starts the process with a set of orders and plans. These are carried out by many individuals, in many different disciplines, in many different departments, throughout the health care institute. The results are accumulated in the patient chart, which is then evaluated by the physician and the cycle continues. An agent architecture mimics this enterprise model. Agents perform specialized tasks driven by a common goal in an interoperable fashion communicating the results to the electronic patient chart. This architecture allows for elaboration tolerance, the ability to adapt and support rapid changes.

Business Strategy Overview

The current information systems environment at health care institutes is well populated with many applications. These applications are generally not well integrated. Some of the applications have been developed by internal organizations. Many applications consist of proprietary interfaces built by competing vendors. This environment has led to micro worlds of computer applications centered around departments, leading to a very long purchase decision cycle time of 18 to 24 months.

In additional to this confusion, President Clinton is proposing sweeping changes to health care. These external changes come on top of the field of health care that has seen sweeping changes just due to technological growth of clinical procedures.

Health Object's plan is to use a tool-based architecture to build a series of small applications where the tool and the tool's content are separated. Each application fits into a consistent overall architecture of the legal patient chart. By building small applications, we hope to bypass the long decision process and capitalize on its fragmentation. Having each application separated from the content, will allow the application to adapt to the dynamically changing health care environment.

Once a health care institute has several of the applications installed, it will be a small step to accept the patient chart.

Marketing and Sales Plans

Health Objects will be generating a series of small applications with separate content. These applications could be used independently or in a cooperative fashion. Some of these applications could be purchased by groups of health care workers. The initial sales plan is to sell directly to small primary health care provider groups associated with a much larger health care organization like a PPO. These small target groups, such as private primary care physician group practices, have similar needs but with much less application demand. Health Objects plans on selling the application, the contents, and the updates to the contents, to these smaller groups. At the same time, Health Objects will be marketing to the larger health care institutes for the larger sale of the patient chart application suite. A complete, but simple, version of the patient chart will be available in about one year for small health care groups, and a more mature patient chart capable of supporting larger institutions will be available in two years.

Operations Plan

Start the company with key, well-experienced employees. Double the size of the company every year, both in employee count and revenues. Raise $4 million in a split first round financing. The first round financing is split between the first two years: $1.5 million in year one followed by $2.5 million in year two. The first round is followed by $8 million in second round financing in the third year. At the end of six years the company will be $72 million in annual sales with a staff of 720 full time employees augmented with a large consulting staff of physicians.

At the end of six years, Health Objects will go public.

Management and Key Personnel

The founder of the company is Ron Burback. There are an additional ten key initial employees with an average experience of over 20 years each. The board will be well seasoned with health care and business experience.

Financial Statements and Projections

Health Objects will be a $72 million a year company in six years with 720 employees.

Proposed Financing

The seed funding for Health Objects came from the private savings of the founder. Health Objects is looking for a split first round funding of $4 million. This is enough funding for two years of the company. This funding will carry the company well past the first revenue shipment of several of the small applications. In the third year, an addition $8 million of funding is required. This funding level plus profits will position the company in three more years to the delivery of several of the major application suites including a fully-functional, near-paperless, patient chart.

CHAPTER 2

Product Description

Products

There are many small applications that are needed and used in the health care field. The collections of these applications form the bases of a highly distributed health care delivery system centered around the electronic patient chart. The patient chart is the heart of a clinical information system.

Architecture

Each application is built with a tool-based architecture optimizing interoperability. A tool-based architecture builds an underlying engine or tool. This tool is built without content. The content is then provided as a separate loadable item. There may be many contents. The tool plus the content represents a useful application to the user.

An example of a tool-based architecture with separable content is a carpenters tool box. You first buy the tool box without materials. You then buy separate materials that provide the content. There are many different kinds of materials. As you use the tools with different materials you build different buildings with different purposes.

You can profit on the sales of the tools, the materials, and the buildings. A few key tools are needed. Different materials lead to different buildings. Each building could have an individual role. The basic tool set is very stable and small in number. There is a vast number of different kinds of materials that change rapidly. A building may have many different purposes during its lifetime, leading to many renovations. A building is of little use unless it is connected to (interoperates with) the utility inter-structure.

Our tool-based architecture is similar, but done in software. You build a tool, and a content or module editor. The tools are designed to give base level features tailored for the health care application's needs. The content makes the tool usable by a health care worker.

A tool-based architecture allows for low entry cost into the market. It allows you to sell capabilities as additional features and it allows for a continuous revenue stream with version upgrade sales. Health care, more then any other market, is a moving target. The fundamental tools don't change very much but the content of the tools is very dynamic, changing from institute to institute, from provider to provider, and from month to month. Since health care is only semi-standard, the tool-based architecture allows for private customization of the content.

The tool-based architecture also allows for the long-term commitment of other institutes towards your product stream since they can license their content and make a profit. Every institution has a collection of standard operating procedures. This is what makes one institution perform better then another institution. An institution can author their procedures by providing content through one of the Health Object's tools. Health Objects could then act as a distributor of this content taking a percentage of the sales revenue. Imagine having for sale the standards of care of a large HMO in an electronic form complete with monitoring tools.

The tool engines are written in C++ and are user interface independent. The database engine is based on transaction processing. Current market-strong technologies will be the corner stone of the engineering development. At this time, this translates into windows NT, visual basic, relational databases Oracle or Sybase, TCP/IP, token ring, Transarc, NFS running on Unix servers, and 486 or pentium clones. Health Objects will error on the side of a given standard, even if the standard is non-optimal. This will allow the company to ride technology changes as they become viable alternatives.

There are hundreds of small applications that can be built for this market. By making the applications tool-based we can tailor them for user needs. By making the application interoperable, each application can use the features of the other applications. The major target application is the electronic patient chart.

Many of the applications already exists in the non-health care field. An example of such an application is the medical flow chart. This is, for all practical purposes, an account's spread sheet except flow chart uses medical terminology. The key here is to provide the medical terminology, the templates for the various medical flow sheets, and an interoperability interface to the rest of the systems.

High Level Architecture

The following diagram depicts the tools and their relationships.

Database

For the first suite of products a stand-alone PC server resident SQL compliant database is required. The intent is to purchase such a product off the shelf.

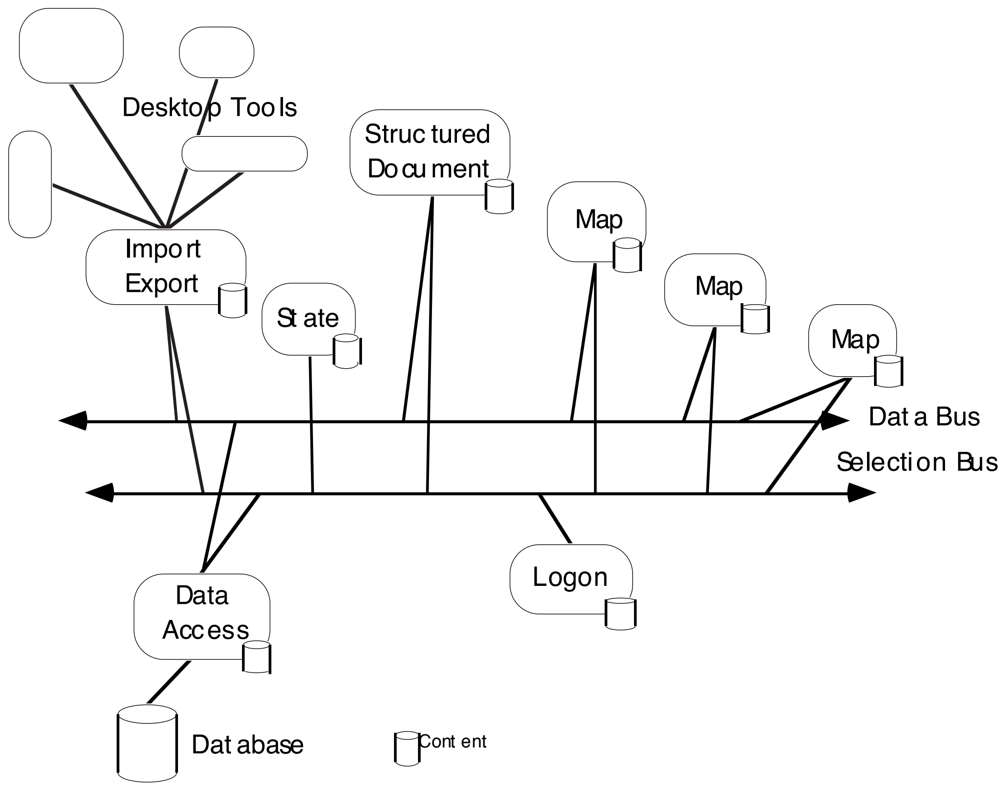
Data Selector and Data Busses

These are data pathways among the tools. The application protocols are private to Health Objects tools. The communication mechanisms can be Microsoft OLE (Object Linking and Embedding) in the first few releases, however the details of OLE are isolated from the tools by a set of portability classes. This allows the communication mechanisms to be more easily changed later if the platform should change or OLE found to be lacking in performance or capability.

The Selector Bus carries information among the map tools and allows them to launch other tools. The Data Bus carries the documents between the tools and the Data Access Service.

Map Tool

The Map Tool provides a query capability for documents. Map content describes a stamp of multiple fields which identifies the document for later retrieval. Content also defines the presentation mode and options for selections.



The map tool does two things:

- It provides the user interface and launching of the tools for viewing and editing of documents and
- it provides context when a document is entered into the system, and sets all the right stamps so that query is possible later.

Maps are defined in a tree to provide a sufficiently rich structure for retrieval of documents. Medical information is organized by patient, document type, care giver, protocol, etc. As a document is created, a set of maps have already been navigated to set the context of the document.

Query functions can occur along the paths in the tree to find documents by the same means that they are created, or new maps off the tree can be defined to allow queries across branches of the tree. Creating documents using maps off the tree will not lead to all the stamps being filled in properly for later retrieval. Such actions can either be allowed or disallowed depending on the system application requirements.

Import Export Tool

Unstructured documents are those produced by any existing desktop tool. These include: word processors, desktop publishing, graphics, charting, spreadsheets, data query tools, printing, fax, scanners, etc. The import/ export tool is given content which specifies the set of tools that are permitted to create documents for the repository.

Import/ export tool communicates with maps and data access for document storage and retrieval over the busses and uses OLE to communicate with desktop tools. Since OLE is a widespread standard, one would expect that all popular tools will provide the necessary OLE methods to allow import and export of documents with the import/ export tool.

Versions of the import/ export tool with special user interface front ends are easily possible where specialized functions such as printing, faxing and dictation / transcription are required. A generalized interface is adequate for access to the remaining unspecialized tools.

Structured Document Tool

The structured document tool can be thought of as a generalized forms manager interface to the Health Object tool suite. The structured document tool creates, edits and views structured documents. Each type of document is defined by an instance of content. In this sense the structured document tool is like a forms manager.

Structured document tool documents comprise:

- Fixed text
- Formatting information: font, styles, position, etc.

- Field definitions: name, class, size, formatting, permitted values, constraints, etc.
- Access and creation permissions based on user type and other logon context information.
- A widget based form for editing the content, initially created with Visual Basic.

The structured document tool has the following properties:

- All documents ever created by the structured document tool can be displayed with any future version of the structured document tool.
- Documents can be created by the structured document tool if content is available for that document type.
- New versions of documents can be created by simply creating a new content type. Version or revision control is not necessary. Old document styles can be retried by removing their content. New documents of those types can be created, but any old documents can be created.
- Whether documents can be created or only viewed and whether widget [Visual Basic] or document view is available is determined by content which references names set by the logon context tool.

State Tool

The state tool provides the means to control the state of documents and to a limited extent the flow of documents through the system. For example, if a document requires co-signature, then the state tool content defines the state of the document based on fields in one or more identification stamps.

The state tool content declares the state table transitions that are permissible and presents the simple dialogs that allow users to satisfy the transitions. The logon tool in a sense is a sub-class of a state tool in that a user logging on is a state transition.

Note that the state tool implements a passive workflow model rather than an active one. This means that users must query the system, by opening map tools, to discover what work needs to be done. Active consequences such as sending mail, routing to specific users, or performing other actions are implemented by Agent tools and workflow which are follow-on tools in the Health Objects tool suite.

Logon Tool

The logon tool establishes the user of the desktop and therefore the other Health Object tools. PC clients typically do not have security procedures, but this is extremely important in health care and especially important for patient medical records. Health Object systems establishes its own security policy.

A primary activity of the logon tool is to control the signing dialog for a new document. Any security related information required is stored in the database so that no shared file system is required.

Tools communicate with the logon tool before permitting any function. This allows the user context and rights to be established. Content for tools contains lists of rights identifiers [potentially] for each field and document type to allow the field or document type to be viewed or edited or its state changed in certain ways. This design amounts to an access control list design for security which is totally open ended and allows a wide range of security policies to be established for the resulting system.

Another type of information created by the logon tool is various logs of activity by users on the system for auditing and other purposes. These logs are stored in the database and can be signed by the tool to verify their authenticity should that be required.

The advantages of early customers include real experience with distribution and markets in possibly more controlled settings. A large inpatient or outpatient clinical setting is akin to a large factory with up time and throughput goals and requirements. These requirements lead, in large part, to the long lead time sales cycles expected in this portion of the health care market. However, if health care sites and applications can be found which are less like a factory and more like a cottage industry, then one can expect higher volumes and shorter sales cycles. Small group medical practices come immediately to mind as a cottage industry setting of health care. However, one finds considerable medical content is still required at the group practice level. Among the content is:

- Notes of several kinds - medical history, physical exam, in-office procedures, etc.
- Orders, prescription drug documentation, lab tests, etc.
- Results from lab tests.

- Admit, discharge and transfer (ADT) operations for new and returning patients, scheduling appointments and transferring to inpatient or specialized outpatient settings.

Rather simple document indexing tools are available in the market place today to index and retrieve documents as files. Interfacing such a document retrieval tool to Health Objects provides an added capability of context-based retrieval across the legal database.

Patient Chart

The patient chart is the center of the information flow of a health care institute. The patient chart is a legal stack of papers. Each page may contain many pieces of data. The data types in an electronic patient chart are:

1. unstructured text, templates
2. structured text, forms
3. numerical data, objects
4. enumerated data, list
5. scanned documents, faxes
6. dictation
7. plans
8. photographs
9. x-ray images
10. sounds
11. graphics
12. video
13. three dimensional images

Some of the data is manipulated by applications and the results are stored back into the patient chart.

1. trend plots: Takes numerical data and generates graphics
2. flow sheets: Takes numerical data and generates graphics
3. transcription: Takes dictation and generates un-structured text

4. OCR: takes scanned images and generates un-structured text
5. calculations: take numerical and enumerated data into numerical data. Examples are indices, acuity, units, and age.

There is an organization superimposed on these data elements.

1. temporal - organized by time
2. legal - organized by incarnation and signatures
3. hierarchy - organized by parent-child relationships
4. list - organized by sequence order
5. set - organized by uniqueness
6. maps - may be 1 to 1, 1 to many, many to 1, or many to many. Example of such maps are the patient, department, problem, encounter, episode, and problem.

The chart has many surveillance agents.

1. observer - this element observes another element. When one changes the observers are notified. An observer is free to take the necessary actions including doing nothing.
2. guardian - acts like an observer but can veto the changes.
3. security.

The patient chart has many physical location organizations.

1. distributed by patient, health care provider, physical location, or department.
2. replicated data
3. archival data
4. partitioned data

The patient chart has to interface to the sources of information.

1. medical equipment - MIB (Medical Information Bus)
2. printing
3. standard interface protocols like HL7
4. electronic mail
5. general import and export of clinical information

The chart has many indexes for fast retrieval and for query processing.

1. text-index system.
2. clinical encoding with indexing system

Now that we have all that data, we need to process the data into information by generating reports.

1. Total Quality Management TQM
2. Continuous Quality Improvement CQI
3. Quality Assurance QA

Base Level Tools

Ten tools are needed to build a core patient chart. The next table lists these tools.

TABLE 1. Tools, Technology, and Applications

Tool	Technology	Applications
unstructured text	word processor templates spell checker medical dictionary medical thesaurus	To produce any piece of paper that is currently used in the health care institute
structured numerical enumerated	data dictionary interpreted language	medical calculator laboratory results
list manager	relational database	formulary list of procedures, CPT4 list of diseases, ICD9 any medical list

TABLE 1. Tools, Technology, and Applications

Tool	Technology	Applications
structured text	visual basic database forms content sensitive editor	Any piece of paper that is currently produced at the health care institute that lends itself to a well structured definition. Results and orders are example applications.
relationship tool maps 1-1, 1-many	relational databases data rings	Master Patient Index Rosters Census Locator
index and query tool	text indexing tools text query language report writer	Total Quality Management Continuous Quality Improvements Quality Assurance systems
time	simple algorithms state transition tables	calendar clock reminders
persistent storage	transaction processing RCS	legal patient chart
interface tool	content free grammars lex and yacc state transition tools	HL7 MIB LAB
work flow	persistent queues state transition graphs data flow programming	orders care plans protocols

Unstructured Text Tool

This will be used for unstructured text entry. Template of typical letters will be authored including letter head. Significant standard paragraphs may exist along with typical documents. This tool will be based on a word processor, such as Frame, with a medical dictionary, spell checker, and thesaurus. Typical applications include:

1. Physician notes
2. Nursing notes
3. Radiology notes
4. Pathology notes
5. Referrals
6. Patient account form letters

Numerical Tool

This is a simple calculator where the base level functions are as expected. This calculator also supports array operations with a basic-like programming language. The health care extension is to create and manage an unlimited named storage space of clinical findings. The tool has a database storage space for the content programs, a database storage space for the term definitions, an information interchange allowing for the information to come from many sources or to send the information to other applications, and a global mapped memory allowing for many applications to see the result simultaneously. This tool would be used to define the fundamental numerical objects in the patient chart and is based mainly around clinical laboratory results. Some of the laboratory results are only semi-numerical in nature. An example of this is color. This is also defined by this tool and represents an enumerated list.

The contents may include:

1. a physician calculator used to calculate medical indices and unit conversions
2. a nurses calculator for i/o operations, drip rate, solution, and dosage
3. a pharmacy calculator used for dosage, frequency, and route calculations
4. an accounting clerk calculating bills
5. an quality assurance clerk calculating mortality rates
6. nutritionist based calculations

List Manager

The list manager is a tool to build and maintain lists. There are many lists in a health care institute. Some of the lists are standardized. Many are not. The lists are placed inside a relational database. Some lists may include:

1. Formulary, the list of all medications
2. CPT4, the list of all procedures
3. ICD9, the list of diseases
4. phone numbers
5. physicians
6. health care workers
7. employees
8. inventories

Structured Text

The structured text tool is an application that builds simple user interfaces complete with database storage and interoperability interface. Think of this tool as a high tech form letter. The skeleton of the form letter is authored. The fields of the form letter are defined by the previous tools. This tool is based on the technology of a content sensitive and grammar sensitive editor. An existing industry standard form package and a screen building tool, like visual basic, with its C++ interface, will be used and cloned into the medical market place. This tool generates the paper work associated with the major systems of ADT, results, orders, and notes, but should not be confused as a completely functional system. Many support activities are still missing at this stage. The addition of the workflow tool and the patient chart storage will then materialize a complete application. Some contents may include:

1. order forms
2. results forms
3. physician notes forms
4. admission, discharge, transfer forms

Maps

The next major tool helps to build maps. Maps are prevalent throughout a health care institute. This is not a physical map of the building, but this tool captures the relationship that objects have to one another. A map could be 1-to-1 or 1-to-many. Applications that could be built from the map program are:

1. SNOMED - mapping of medical terms to international codes
2. Master patient index
3. patient rosters, patient to physician, physician to patient, patient to ward
4. locators - patient to physical location.
5. census - list of active patients
6. bed control

Index and Query Tool

The next tool is a text indexing tool. The patient chart is a collection of pages of text. As has been shown, the text can come from many sources, but it is still text. All text is indexed using an industry standard indexing technique of word count and proximity measurements.

In addition, structured text can be indexed with a more powerful technique such as balanced trees.

Associated with the index is a text query language which can then be used to generate reports. There are three main questions that can be addressed at this time.

1. How many Xs are there?
2. What is the cost of each X?
3. What is the re-work rate for each X?

X could be a procedure, a test, a disease, a diagnosis, a prescription, or any other piece of information that is in the patient chart.

Sample reports are:

1. total quality management, TQM
2. continuous quality improvement, CQI

3. quality assurance, QA

The Time Tool

We need to build a time tool. This tool handles all the necessary temporal relations such as current time, incremental time, frequency, durations, repeat counts, time zones, and age calculations. When an order is given in a hospital, it may contain a temporal field such as “every four hours”. This does not really mean “every four hours” but a complex calculation based on work load, staffing, patient availability, and rounds scheduling that leads to “approximately every four hours”. Such applications could be:

1. calendar
2. clock
3. reminders

The Legal Chart

The patient chart is a collection of pages that are managed as a legal document. All pages are signed. Some pages may require co-signatures. Once a page is entered into the chart, it can never be removed. It can be marked as an error, or as obsolete, or out dated, or an addendum can be added. This tool is based on transaction processing tools as provided by Transarc. This is the main repository. The tool is used to build repositories for all the different data types previously stated.

Interface Tool

The interface tool builds interfaces from our application to other applications or visa versa. It is based on a context free grammar supported by Lex and Yacc. Some standard interfaces are:

1. HL7
2. MIB - Medical Interface Bus
3. Printer

4. Email

Work Flow

This tool builds and maintains work flow for the health care institute. It is based on persistent queues provided by Transarc. As an item is created, such as an order, it must be processed by many health care workers, laboratories, and departments. The procedures and protocols of a health care institute form a complex enterprise model that is captured by this tool. This is one of the major tools. Each institution has a large collection of established procedures to accomplish tasks. These tasks may be clinical in nature or administrative. Example tasks are called protocols, care plans, and standards of care. The tool contains a medical process programming language that can generate hierarchical work flows and recursive work flows with work flow merging and subsumption.

In addition, this tool may include a monitor. This module takes work flows and evaluates them and keeps track of the progress made towards an outcome. If the standard protocol goes astray an alert is issued. Capabilities include:

1. work flow monitor
2. work flow creation
3. work flow repair
4. work flow integrator

Second Level Tools

There are many more tools necessary to round out the patient chart. We have a usable chart now but these tools would enhance the chart. Some of these tools would be built in the second round.

1. **Assistance tool**: Many activities in the health care environment are triggered by abnormal values. These may be temporal alerts, numbered guardians, cobal pictures, or regular expression. This tool could include expert system monitors based on rules. This tool builds a guardian suite to monitor results.
2. **Scheduler:** Many facilities, personnel, and patients have to be scheduled. This tool engine builds a generic scheduler. By changing the content the application suites are built.

3. **Kardex:** This is an accepted nursing metaphor built on top of the work flow engine. Contains a list of actions that a nurse needs to accomplish in a given time given the current list of patients under the nurse's care.
4. **Flow sheet:** Medical spread sheet with graphics used for input of data and display of information. Upgraded temporal component with numerical calculations and medical terminology. A large collection of standard formats exists such as vital signs and IO.
5. **Graphics engine:** Generates trend plots.
6. **Reference material:** MEDLINE, on-line PDR
7. **Image system:** This would be an example of a PACS.
8. **Scanned document storage system**
9. **Transcription - dictation**
10. **System monitor:** Monitor and control the total computer distributed network application.
11. **Archives system**
12. **Accounting system**
13. **Photo shop**
14. **Paint and draw program**
15. **Distributed application manager**
16. **Decision process application**
17. **OCR System**
18. **Video system**
19. **Training system**
20. **Phone system:** Pager system, auto call, phone integration, phone book
21. **Security system**
22. **Diagnosis system**
23. **Drug monitoring**
24. **Billing**
25. **Utilization review**
26. **Remote access, modem control**
27. **Point of care system**
28. **Nursing care plans**
29. **Nursing intervention**
30. **Bar code system**

31. **Label printers**
32. **Magnetic card readers and writers**
33. **Pattern recognition systems and feature extractors**

CHAPTER 3

Marketing and Sales Plans

The health care market represents about 14.5% of the GNP, or about $800 billion. Handling of information represents about 26% of that cost [Friedman and Martin, 1987]. Unfortunately, even though this is an information intensive market, the capital investments have lagged behind the needs. A typical health care institute invests 7% annually on information related technologies. Thus the current clinical informational market is about $56 billion with strong market pressures to increase to $125 billion annually. This pressure is generated by decades of under-capitalization of the information intra-structure in the health care field. Regardless of which health care reform proposal is accepted, a greater need will be present for better clinical information.

This market is hampered by long decision cycles. Ranges of the decision cycles are from 18 to 24 months in duration.

The current market place is flooded with out-of-date products based on proprietary architectures. No one vendor has major market share. In addition, many health care institutes have computer services shops that have grown internal applications over the last 30 years. The current surge in computer science technology and the exiting of IBM from the health care software market, has left the health care informational services in the dust. On top of this, is a presidential administration demanding health care reform. This reform will push for higher quality of care at a lower price thus emphasizing the need for better clinical information.

The repository of all clinical information is the patient chart. Centered around the information in the patient chart are a vast number of processes and applications. The goal of Health Objects is to build an electronic patient chart materialized over many small applications each of which could stand alone. These applications are architected for maximum content flexibility and interoperability.

The long-term goal of Health Objects is direct sales of the patient chart to health care institutes but we want to avoid the 18-24 month decision cycles. This will be accomplished by direct sales to small group primary-care practices associated with a health care institute. The decision cycle, and the demand on the tools, is significantly reduced. The tools and applications are still correctly focused. A small discipline group or department within a health care institute is also a good candidate. Once several of these small groups purchase the product, then an institute-wide decision becomes much, much easier.

Each application is sold without content. Content is a separately purchased module. There are many contents for each application. Each application has an authoring system. This system may be licensed and authored content may be distributed by Health Objects.

Once a critical number of small applications are available then application suites could be sold primarily to institutions. The small applications allow for quick penetration of the market place followed by major commitments for one or several of the application suites institute-wide. By having flexible content we can change with the market.

The application tool suite would be sold for around $10,000 per seat. Each content around the price of $1,000 per seat. It is estimated that several contents would be necessary to make a usable tool. In addition, many health care institutes would want all tools to have the same capability regardless of the seat location and thus would want full content coverage at each seat. There could be as many as a dozen possible contents for every tool. Every content has an annual renewal license fee of $250 per seat.

The patient chart would be sold by a calculation based on:

1. number of total patients
2. number of active patients
3. size of each patient chart

This calculation would equate to around $5 million dollars for a hospital the size of Stanford. There is an annual license fee for the system at $1.25 million.

An institute can license the authoring tools. The cost of the authoring tools are about the same as the patient chart. Health Object would then distribute the content for that institute. Royalties would then be paid back to the institute.

CHAPTER 4

Business Strategy Overview

Staffing Plan

TABLE 2. Total number of Employees

Year	Employees
1	22.5
2	45
3	90
4	180
5	360
6	720

Revenue Plan

TABLE 3. Revenue in million dollars

Year	Revenue in million dollars
1	0
2	2.0
3	5.5
4	13.5
5	36
6	72

Total Man Year Estimates

TABLE 4.

Tool	Engineering	Content
unstructured text	.5	1.5
list	.5	1.5
time	.5	1.5
numerical	2	6
structured text	2	6
maps	2	6
interface	2	2
chart storage	2	2
index and query	4	12
work flow	4	12

Product Delivery Schedule

TABLE 5. Product Delivery

Period (first 8 quarters)	**Major goal**	**Tool**
Q1		unstructured text
Q2		structured numerical
Q3		list manager
Q4	internal prototype	time chart storage interface
Q5	beta test	structured text
Q6	first revenue ship to small practice groups	relationship tool
Q7		index and query tool
Q8	first revenue ship to larger health care institutes	work flow

CHAPTER 5

Management and Key Personnel

The founder of the company is Ron Burback. Ron Burback is a first generation American having come from Russian and German immigrant farm workers. His parents were farm laborers in the beet fields of Colorado. Ron has pulled himself out of poverty by succeeding in education, business, and family.

Ron Burback has 20 years of experience and has delivered many products. He has started two successful companies. As founder and president of Peak Technologies He built 286 clones. As co-founder and CEO of Tableau Deductive Systems he built a Macintosh based theorem prover. Other software products include three in the health care market, the ELAN version of RDB (Relational Database) for Digital, text database system, object database system, military command control system, image processing system for business forms, distributed transaction processing system in the health insurance market, and artificial intelligence systems. Ron is known for his craftsmanship, having products in the field for many years with few reported errors from the customer base.

Ron Burback has a BA in Math and Physics from the University of Colorado graduating summa cum laude. He is a member of Phi Betta Kappa and former president of the Physics Student Society. His MS is in engineering from Stanford University with emphasis on mechanical engineering, electrical engineering, and computer science. Ron Burback is in Ph.D. candidacy status at Stanford in the computer science department. Having entered TGR status, he will graduate soon. Ron has published many papers and a book and is known for his teaching and research abilities. Ron has been involved in several patents. He is trained in Medical Informatics.

The second person to join the company is Darrell Duffy. Darrell Duffy has 20 years of experience with Digital and holds patents in network technology. He is an expert at modern software design and implementation and has built many distributed applications.

The third person to join the company is Mary Miller. Mary is a recent MBA specializing in health care. Her BA is in nutrition. She has worked in the health care environment for many years, has run her own company, and has a decade of experience in building health care applications.

Joel is a 20 years experienced engineer from Digital with expertise in graphical user interfaces.

Sandy Burback will be the office manager. Sandy has a business degree and worked in accounting. She is currently in charge of payroll for a large international construction company.

There are many other people who are considering joining the company but have not yet committed.

4. An engineer, 10 years of experience in building applications. Dave
5. An engineer, 15 years of experience in building applications. Brent
6. A nurse, 25 years of experience. Joyce
7. Marketing, Product development. 30 years of experience in health care. Joe
8. MBA from Stanford in health care. Carol
9. Physician resident, medical informatics, from Stanford. Cecil

We will be using numerous medical consultants for the content of the applications

In addition to the employees the board will be comprised of:

1. VC funding representative. Open.

2. 45 years experience in healthcare, retired. Open
3. Health care market expert from the Stanford business school. Carol
4. Medical informatics expert from Stanford.
5. ex CEO from large computer company. Open

CHAPTER 6 *Proposed Financing*

This is a six year program to build a medical information system centered around the electronic patient chart.

Health Objects is looking for $4 million dollars of round one financing. These funds will be spent over the next two years. This will be followed by round two financing of $8 million dollars for years three and four.

TABLE 6. Funding in Million Dollars

Year	Investors
1	$1.5
2	$2.5
3	$3.5
4	$4.5
5	0
totals	$12