Envisioning the Computer History Museum

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Executive Summary

Our vision: ***To explore the computing revolution and its impact on the human experience***

Our mission: ***To preserve and present for posterity the artifacts and stories of the information age***

The computer is an extraordinary invention that is changing society forever. The story of how this came to be needs to be preserved and communicated to people today and to future generations.

The goal of the Computer History Museum is to be the world's largest and most comprehensive history museum for the preservation, presentation and understanding of the artifacts, stories, and impact on society of the Information Age.

1. To be the **premier physical and virtual destination** for reliable information about the people and technology behind the development of computers, information technology and the computer industry worldwide.
2. To have the best and most accessible **collection** – consisting of artifacts, documents, media, oral histories, and stories about people and organizations -- for all aspects of computing including hardware, software, services, networking, the internet, graphics, human interfaces, and applications.
3. To have educational and engaging **exhibits and programs** that communicate and celebrate the details of this intellectual revolution. These include physical exhibits, cyber exhibits, lectures, celebratory events, restorations, collaborations, seminars, workshops, and publications in print and online.
4. To be a significant contributor to **computer history research**, whose aim is to understand, interpret and explain the development and impact of the computer and its applications on our civilization.

This is a long-term goal which will take decades to reach, but we are well on the way to success.

Our roots are in Boston, where *The Computer Museum* was founded in the late 1970s inside of Digital Equipment Corporation. It amassed a large collection of important historical artifacts and documents, and later became a public museum on "Museum Wharf" in Boston. It eventually expanded its mission and focused more on educating children about how computers work. In order to put renewed energy into the original history mission, the collection was moved to a subsidiary started in Silicon Valley in 1996. In 1999 the Boston museum was dissolved and ownership of the collection was transferred to the subsidiary, which had been incorporated independently as the non-profit *Computer History Museum*.

We are different from many other science centers and technology museums in three significant ways:

- Our focus is on computing and computers, not technology more broadly defined.
- Our approach is historical, and explains current developments and future possibilities in the light of past efforts.
- Although our physical location is in Silicon Valley, our scope is the history of computing anywhere in the world, and we serve as a resource for people worldwide.

The audience for the Museum's programs is broad, and is composed of different segments that take advantage of different aspects of the institution's programs and resources. There are many ways of segmenting the audience, but here are three characteristics that are particularly important to the Museum:

- Intensity of Interest: ***Enthusiastic interest*** by people who are in the computer industry or are avid hobbyists, vs. ***curious interest*** by people outside the industry who want to understand how computing fits into a larger historical context.
- Focus of Interest: ***Technical focus*** of people whose interest is in the hardware and software technology, vs. ***business focus*** of people who want to understand the computing industry, vs. ***impact focus*** of people who want to know how the computer has affected society, culture and politics.
- Motivation for involvement: ***Personal motivation*** of people who come to be educated or entertained, vs***. job-related*** motivation of people such as historians, researchers, journalists, attorneys and educators who come for professional help.

We will get a wide spectrum of visitors and users of our programs, from computer professionals to casual computer users, from local residents, to tourists and visitors, to visitors on the web. Some will be interested more in hardware, others in software or services or networking, others in business issues, others in applications, and others in the social impact of the computing revolution.

Unlike many science centers and newer museums, we do not expect the majority of our visitors to be school-age children. Because we are a technological history museum, our greatest appeal will be to adults and to students starting at the middle or high school level. Nonetheless, some younger children may be motivated and interested by involved parents, teachers or older siblings.

The long term financial plan for this institution does not depend on high on-site attendance. We have the capacity to accommodate over 500,000 visitors a year, but we can be successful with 50,000 per year. We expect many millions of visitors each year to the web-based online museum.

The physical home of the Computer History Museum consists of a 120,000 square foot modernistic building on seven landscaped acres with private parking for 400 vehicles in the heart of Silicon Valley, and a new 25,000 square foot high-bay warehouse 20 minutes away. The museum owns both sites and both buildings. Together they provide the space for:

- **Physical exhibits** that use selected objects from our collection to illustrate the history of computing. These exhibits are designed to be interesting and educational both to industry insiders and the curious public. They are rich with historical artifacts and include audiovisual and interactive components that tell the stories of the people who invented the future. The exhibits include:
    - A large "timeline" exhibit of computer history. This is the Museum's major exhibit to showcase the objects, headlines, and stories that summarize the history of computation from the ancient table abacus to the end of the 21st century.
    - Theme galleries that explore important areas in depth, such as software, data storage, networking/internet, human interface and processors/systems. Each may use a different mix of exhibit techniques appropriate to the expected audience.
    - Flexible exhibit galleries to accommodate changing or topical exhibits and traveling exhibits from other museums.
    - A minimally-interpreted "Visible Storage" area densely packed with hundreds of additional labeled objects selected from the warehoused collection.
- **Public events**, such as lectures, symposia and conferences, in the 400 seat multi-purpose auditorium and numerous meeting rooms.
- **Educational activities** in classrooms and meeting rooms.
- **Rental events** which expand our audience and provide additional revenue
- **Restoration workshops and display areas** for restoring, maintaining and exhibiting working historic computers

- **Warehouse and library** to house the "deep collection" that is not on display.
- **Networked servers** (local, remote, and distributed) which preserve multiple copies of the digital assets of the collection, including documents, photographs, video, software, simulations, and the collections catalogs.
- **The museum store** that makes available both serious and fun materials related to the history of computing.
- **Administrative offices** for staff and volunteers.

The cyber home of the Computer History Museum is our web presence, which includes several components:

- Web-based exhibits that tell an engaging and comprehensive history of computing. Exhibits on the web can be both broader and deeper than physical exhibits because there are no space constraints. In addition to curated, organized and interpreted displays, clickable icons provide direct access to related scanned archival material from the collection. Every physical exhibit will have an expanded analog in cyberspace, but some exhibits are entirely virtual and do not exist in physical space.
- Access to the collection through appropriate finding aids. The long-term goal is to make a substantial amount of the archival material (paper, photographs, videos, films, software, etc.) available digitally on the web, and to provide a catalog of our physical objects that includes images and links to the associated scanned documentation.
- Repositories for all the digital assets of the museum.
- Working areas and tools for museum special-interest groups that encourage collaboration, preservation, and emulation of historic computers and applications.
- Information about the Museum and its collections, programs, and organization for both physical and cyber visitors.

The programs and activities of the Computer History Museum include:

- Lectures and presentations open to the public, by pioneers and current practitioners, and available both live and on the web.
- Public tours of the physical exhibits, both docent-led and self-guided.
- Conferences, workshops, reunions, milestone celebrations, and symposia that collect and document aspects of computer history.
- Restorations and simulations to make the old computers and applications come alive.
- "Fellows of the Museum" awards that honor living pioneers at an annual gala.
- Fundraising events that are also entertaining and content-rich, such as the "Computer Bowl" and auctions.
- Videotaped oral histories recorded to capture the stories of pioneers and participants before they are lost.
- Publications of various kinds, including an in-house magazine ("CORE") and newsletter. Future publications could include monographs, original and reprinted books, and a general-distribution magazine.
- Historical research, both independently and jointly with universities or corporations. Contributions to scholarly journals, such as the IEEE Annals of the History of Computing.
- Development of educational materials on the history of computing for use in schools everywhere
- Workshops to teach about how computer technology has changed over the years.
- Collaborative activities with other organizations.
- Events sponsored by other organizations and individuals for which part of the building is rented.
- Products and events designed to extend the reach of the Museum worldwide, to educate a broad audience about the true history of the Information Age.

The participants in making the Computer History Museum a success include:

- The professional staff, currently at 37 and expected to grow to 50-60 when the full exhibit and program plan (but not research plan) is implemented.
- The Board of Trustees, currently at 28 and permitted to grow to 35.
- The Board of Advisors, who provide special expertise and assistance to the trustees and staff.
- The hundreds of volunteers who greatly magnify the abilities of the institution. Our volunteers are the tour guides, the restoration teams, an extension of the collections and exhibits staff, the event guides, and much more.
- The audience, as described above, which benefits from our collection and our programs

The fundraising plan for the Museum consists of two parts:

- The capital/endowment campaign to raise $100M-$120M, half of which is being used to pay for the building, the land and the exhibits, and half of which is invested as a board-designated quasi-endowment to generate operating funds. As of May 2007 we have commitments for $73.3M of the $100M, and have collected about $61M.
- The annual campaign to provide additional operating funds. Our fiscal year 2006 budget was balanced with about $4M in expenses and income. The operating expense of the running museum after the exhibits are built (but without the research program) is expected to be in the neighborhood of $7.2M, of which about 40% will be provided by the endowment income, 35% will be fundraised, and 25% will be earned income.

The bottom line:

As the only large-scale collecting museum in the world dedicated exclusively to the preservation and presentation of the history of computers, the Computer History Museum is unique. We are creating an important international institution, as well as a cultural destination for the Bay Area.

Join us!

Envisioning the Computer History Museum

Envisioning the Computer History Museum

Introduction

This document describes the strategy and plans of the Computer History Museum. It is, as it has been since the first version in 1995, a work that evolves as the Museum progresses.

This is a limited-distribution "white paper" not intended for publication or public use. Its primary purpose is to serve as a vehicle for discussion by the participants in building the museum. But there are paragraphs, phrases, words and ideas here that can be used to prepare other more public materials.

This document begins with broad general goals and becomes more specific. It focuses primarily on the endgame – what we are trying to become – and it does not discuss the timing or the phases necessary to get there.

The Vision of the Museum

To explore the computing revolution and its impact on the human experience

This motivates our existence. The "computing revolution" includes all aspects of information technology, not just the computer as a device. It is broadly synonymous with the Information Revolution. The "impact" includes both the technical achievement as a component of civilization's intellectual development, and the effect of this invention on the world at large. The "human experience" includes the effect on society as a whole as well as the stories – the aspirations, successes and failures -- of the pioneers who have created this revolution.

The Mission of the Museum

To preserve and present for posterity the artifacts and stories of the information age

"To preserve" motivates our collection: saving the artifacts (hardware, software, paper, images, stories and bits) for future use.

"To present" motivates our programs: understanding, displaying, communicating and interpreting the history encapsulated in the artifacts.

The Rationale

Historians mark the important technological eras as the Stone Age, the Bronze Age, the Iron Age, and the Industrial Age. We are at the dawn of the Information Age.

The engines of the 19th century industrial revolution were amplifiers for our physical bodies. The computers of the 20th century information revolution are amplifiers for our minds. They are changing the way we work, live, play, and think about ourselves. The computer ranks with the wheel and the printing press as one of the key inventions of civilization benefiting ourselves and future generations. The story of its invention and development needs to be preserved and told.

For ten thousand years of recorded history there were no computers. We are privileged to be living through the brief transitional period of change: from now on, and forever more, computers will be an intimate and inseparable part of our life and work.

Viewed from 1000 years from now, the 50 years that elapsed from the invention of the computer to its ubiquitous use will seem like a point in time. We owe it to ourselves as participants today, and to future generations as our beneficiaries, to document and explain how the Information Revolution came to be.

Time is of the essence because many of the people and artifacts representing this important history are disappearing.

The appeal is broad because computing has touched almost everyone.

History not preserved is history lost forever.

About "History" and why it matters

Computing has become embedded in our culture, and its history is an important component of the history of our civilization. That is reason enough to preserve it. But we do it also to:

- understand the technological present and help predict the future
- avoid yesterday's mistakes
- honor the inventors and their contribution to our lives
- inspire and teach the next generation who will continue the progression

We rejoice that history is continually being made. We proactively preserve the present as we watch it become tomorrow's history.

The Goals

What we are

The major strategic goals for the Computer History Museum are….

- Positioning: To be the world's largest history museum whose focus is the preservation and presentation of artifacts and stories of the Information Age. To be the premier international physical and virtual destination for reliable information about the development of computers and the computer industry worldwide, enabling people and companies everywhere to learn the history and to profit from past successes and failures.
- To have the three legs which represent the fundamental strengths of a comprehensive history museum:
    - Preservation: To have the best and most accessible collection of artifacts, documents, media, and stories for all aspects of computing, including hardware, software, networking, the internet and the web, graphics, human interfaces, applications, and business history.
    - Education: To communicate the facts, the effects, and the wonder of this intellectual revolution to multiple audiences. To study, understand, and explain the development of computing technology, the applications of computers, and the impact on society. To celebrate the accomplishments, make heroes of the revolutionaries, and to help inspire the next generation of heroes.
    - Research: To be a significant participant in the academic community of institutions and historians who focus on the Information Revolution
- Longevity: To create a permanent, financially stable institution.

Derivative goals of the Museum that are implied by the above include…

- To provide entertaining and educational physical exhibits and programs to Silicon Valley residents and visitors.
- To provide entertaining and educational cyber exhibits and programs on the web to visitors worldwide.

- To educate interested students of any age about the history of the computer and its applications.
- To inspire young minds with the stories of the people and inventions that created the Information Age.
- To provide physical and cyber access to the deep collection.
- To be a participant in the academic and historical effort to analyze, understand, and explain the computer as a technological and cultural phenomenon.
- To become a peer of quality professionally-run collecting museums worldwide, and to be accredited by the American Association of Museums.
- To be a center of community for people interested in the history of computing.
- To serve as a resource and a gathering place for other organizations interested in preserving aspects of the history of computing.
- To be a contributor to the intellectual and cultural life in the Bay Area.

Overview of the Institution

The three main components of the Computer History Museum are:

- Preservation: We believe we have, even now, the world's best collection of artifacts in all forms (hardware, software, media of all kinds, digital objects, and paper) relating to the development of the computer. We actively develop the collection and provide appropriate public access physically and in cyberspace.
- Education: We promote the understanding of the history of computers with a variety of programs, including physical exhibits, cyber exhibits, lectures, celebratory events, publications, restorations, and collaborations. We develop educational material and activities for use by ourselves and others.
- Research: We wish to contribute to the field of computer history as an academic discipline by research, seminars, workshops, and publications.

These will be described in more detail later.

How We Compare

We are, surprisingly, unique in the world. We share some attributes with -- but are fundamentally different from -- science centers, other collecting museums that treat computers, and other computer history museums.

Compared to Science Centers

Science and technology centers often include some coverage of computers. The Tech Museum of Innovation in San Jose and the Exploratorium in San Francisco are excellent examples. We differ from them in the following ways:

1. Scope: They broadly cover many areas of science and technology including biology, physics, and medicine. We focus only on computing and information technology.
2. Historical approach: They present current technology with limited or no reference to how it was developed. We are a history museum and emphasize the historical development from the origin to the present.
3. Collection: They do not generally have collections of artifacts and archival material other than what is in their exhibits. Preservation of history is not their mission. Our large collection is the key to our preservation mission. The part of our collection on display is only the tip of the iceberg.
4. Audience: The majority of their visitors are grade school and middle school students who come for the hands-on exhibits. Our audience is primarily adults and students at the high school level and above.

5. Uniqueness: Every large city has (or should have!) a science center to augment the technology education provided by the local schools. We are a unique resource in the world. There is no other large-scale collecting and research museum dedicated entirely to the history of computers.

Compared to Other Collecting Museums

We are a collecting museum that uses its collection for exhibits, education and research. Many other collecting museums do the same, but none has the computer as its single focus. Because of that focus, our collection and our programs can be both more comprehensive and deeper.

Examples of excellent museums with important historical collections that include some coverage of computers are the Science Museum in London, the Deutsches Museum in Munich, and the Smithsonian Institution in Washington D.C. These magnificently comprehensive museums are limited in the attention they can give to information technology because it represents a small part of their scope. The Smithsonian's only exhibit on the Information Age, at the National Museum of American History, was closed in 2006. We believe that our current collection and our planned exhibits in the history of computers are significantly larger than any other collecting museum.

The Charles Babbage Institute, http://www.cbi.umn.edu/, is an important archive located at the University of Minnesota. Their collection contains corporate records, manuscripts, personal papers, oral history interviews, trade publications, periodicals, obsolete manuals, product literature, photographs, films, videos, and books that have become historically significant in the subject area. They do not collect computers and other physical artifacts, or software, and do not create exhibits.

Compared to Other Computer History Museums

There are a few other museums that focus, as we do, on the history of computers. The two most significant public museums, both of which suffer from a disadvantageous location, are:

- Heinz Nixdorf Museums-Forum in Paderborn Germany, http://www.hnf.de/. This is the largest computer history exhibit currently on display in the world, with 2000 objects displayed in 65,000 square feet. They have a moderate backroom collection in addition to what is exhibited. Like The Computer Museum in Boston did, they seem to be struggling with the pressure to become a computer-oriented science center whose primary audience is schoolchildren.
- American Computer Museum in Bozeman MT, http://www.compustory.com/. Founded and run by George Keremedjiev and his wife and located in a suburban shopping center, they have 1000 artifacts displayed in 6000 square feet.

Most of the other computer museums are small individually-run efforts, although sometimes within the context of larger institutions. Access is often by appointment. They come and go. Some that exist or have existed are:

- University of Virginia Computer Museum in Charlottesville VA, located in the hallways of the Department of Computer Science, created by Professor Gabriel Robins. http://www.cs.virginia.edu/brochure/museum.html.
- American University Computer History Museum in Washington DC, located in two rooms with four large display cases, created by Dr. Tim Bergin. http://www.computinghistorymuseum.org/
- The San Diego Computer Museum in San Diego CA, created by David Weil. http://www.computer-museum.org/. Originally part of Claremont College, then part of Coleman College, it is now closed and the collection has been gifted to San Diego State University Library.
- Digibarn Computer Museum in Boulder Creek, CA, created by Bruce Damer and his wife in a converted barn in the Santa Cruz mountains. It is a hands-on, "more whimsical" [their characterization] collection that can be visited by appointment. http://www.digibarn.com/.
- Australian Computer Museum in Homebush NSW Australia, run by Max Burnet and David Hawley, http://www.acms.org.au/. As of June 2003 they have lost their exhibit facility and have artifacts in a warehouse that may be visited by appointment.

There are three kinds of related efforts whose long-term survival is also often at risk:

- Private collections for which there are no public exhibits or programs. Many such collections cover a subset of the field, like personal computers starting in the 1980's, or game computers. Some do have older objects, and a few of these collections have remarkable artifacts. Few of the collectors have made a provision for the ultimate disposition of their artifacts.
- Corporate collections documenting the history of a single company. A few companies in our industry, such as IBM and HP, do a good job of preserving their history. Most do not. Corporate collections often become at risk because of financial difficulty, management change, or company acquisition.
- Virtual museums of computers that do not have physical collections or programs other than their web presence. Many have excellent source materials in digital form, and some include good interpretative exhibits or guides. They are typically run by an individual. Many exist for a while and then disappear.

The Collection: What we have

"The only error we can make is failing to collect important artifacts and people's stories that may disappear."
-- Gordon Bell, June 2003

The collection of the Computer History Museum is a repository of primary source materials for current and future generations of historians.

- We collect physical artifacts, software, photographs, books, documents, marketing materials, videos, films, ephemera (T-shirts, coffee mugs, buttons, etc.), and stories in various forms. We wish to have the best and most comprehensive such collection in the world. See Appendix 1, "Summary of Collections Policy", for details of the subject areas and object types in the collection.
- We provide responsible acquisition, curation, cataloging, warehousing, and preservation. We must implement a level of physical care, organization, and database accuracy corresponding to best museum practices, to the extent permitted by our resources.
- We strive to provide the maximum possible access to our collection through appropriate finding aids, subject to resource constraints. The long-term goal is to make a substantial amount of the archival material (paper, photographs, videos, films, software, etc.) available digitally on the web, and to provide a catalog of our physical objects that includes images and links to the associated scanned documentation.
- Our view of history within our field is broad, and our collection supports that by
  - preserving the intellectual content of computers and not just the evocative iron and bits. The details of architecture, design, engineering, manufacturing, application, business operation, and impact are all important records of the achievement
  - preserving the history of the people, the companies, and the institutions involved
  - preserving the history of marketing, sales, acceptance, use, and application of computers
- We strive for completeness of the collection in all the areas of major focus, which includes:
  - hardware (computer systems, processors, memory, storage, peripherals, networking, game devices, graphics, and user interfaces)
  - software (applications, languages, operating systems, applications, and services)
  - systems, whether general-purpose, application-specific, or embedded.
  - the internet and the world wide web
- We balance collecting for intellectual content with collecting for exhibition. We recognize that an evocative physical exhibit aids in future collecting ("I have the manual for that!"), promotes a sense of awe in accomplishment ("Did it really do that?"), and inspires action ("I could do that!"). But we also

recognize that artifacts we will never exhibit may be needed by researchers, or by other museums, or by future historians to answer questions we cannot anticipate today.

- We emphasize the collection of items that are not being kept by other institutions, such as unpublished and "near print" documents.
- We do proactive targeted acquisitions to fill gaps in our collection.
- We do targeted interviews to collect stories for the collection. We put priority on the aging pioneers and those whose stories have not yet been recorded.
- We preserve the subset of the web relating to the history of computers. The many well-researched web sites dedicated to particular computers, operating systems, applications, languages, companies and services that are developed and maintained by individuals are fragile and will disappear unless preserved. We cooperate with the authors to take, catalog, and index periodic snapshots of important web-based material relevant to computing history.
- We collaborate with other collecting institutions to make sure that everything important to the historical record is saved, by us or by others. We stand ready to rescue important collections that are in danger.
- We provide artifacts, images and documents to other responsible organizations, so that the world benefits first-hand from our collection.
- We provide physical access to part of the collection to the general public through exhibits and warehouse tours. We provide physical access to the entire collection to responsible researchers.
- We aggressively strive to convert the collection into bits available to the public on the web as a CyberArchive. The highest priority is to convert deteriorating magnetic media (data tapes and videos) into a more durable form. The second highest priority is to provide broad searchable access to the entire collection to anyone anywhere.

Programs and Research: What we do

The Museum uses its collection and expertise in computer history to create a variety of programs and activities that appeal to different audiences. They can be categorized as:

- Exhibits
- Lectures and Events
- Special Programs and Activities
- Historical research

Each of these is described in more detail below.

Exhibits

The exhibits we produce are intended to educate, inspire, and entertainingly engage visitors to our facility or to our website. They are all historical in nature and artifact-rich. They are designed to appeal simultaneously to the computer-knowledgeable insiders and to the intellectually curious who have only a user-level familiarity with computers.

The exhibitions showcase the technology, its applications, its impact, and the people responsible for it. The exhibitions are rich in the stories behind the objects, and use archival film and video, photographs, documentation and ephemera to bring back the feel of historical eras. The target audience begins with older teenagers and adults, although interested younger children can also have a satisfying experience. Simplified text and graphics provide the big picture quickly. Information at the "Scientific American" level is available to those who wish to read, listen or watch it.

Every physical exhibit also exists in cyberspace on the web.

Special attributes of physical exhibits

A physical exhibit provides information, as a book might, but it also provides an experience. It is a way to commune with authentic objects to establish a connection with the past, and an opportunity to compare your reactions to that of others. We go to see the original Declaration of Independence not because it contains words we wish to read, but because it is a visceral link to historical people and events.

Touring a physical exhibit is often a social and intergenerational activity. It creates an environment in which friends and family can learn collaboratively, and discover things about each other as well as the exhibit's subject matter.

Our exhibits will be layered, and can be experienced at several levels of depth. A variety of exhibit techniques are used to accommodate different learning styles, including recreated historical environments, hands-on interactives, demonstrations of restored computers/applications, etc.

For those who wish to use it, audio-visual tours using players or networked digital receivers are available. The tour can be customized to the visitor's interest and experience. For those who wish a live human guide, docent tours are regularly given by volunteers.

For planning purposes we are targeting only 50,000 to 100,000 visitors per year, although if our exhibits are popular we could enjoy considerable upside. Our capacity is in excess of 500,000 per year based on the standard museum design rule of 20 visitors per square foot of exhibit space per year, and we would like to serve as many visitors as will benefit from our exhibits and programs. But the financial model does not require high attendance rates for the stability of the institution.

Special attributes of cyber exhibits

Unlike the physical exhibits, the cyber exhibits are not space-limited and can be both broader and deeper. For those who want more information, the exhibit provides access to related scanned archival material from the collection. Cyber exhibits can also be customized by interest or experience.

The CyberMuseum expands the geographic reach of the Museum to the entire world, and increases the potential visitor audience by several orders of magnitude. It is one component of our overall web presence and should be a satisfying self-contained experience which is independent of the physical museum.

The exhibit plan (cyber and physical)

The current exhibit plan, which is subject to review and modification, includes the following key exhibit areas:

- Computer History "Timeline" exhibit

  This overview of computer history is the icon exhibit of the Museum. It will focus on headlines and most significant milestones, beginning with pre-computing, gaining depth with the dawn of electronic computing during World War II, and ending at the turn of the 21st century. It has something to offer all our audience segments, and is the recommended first exhibit experience.

- Theme areas

  Theme galleries explore the important aspects of computing systems in greater detail by focusing on a specific aspect. The explanations here may be more technical and more comprehensive. Examples of possible theme galleries include:

  - Software: operating systems, applications, languages, graphics, games, networking, services, etc.
  - Storage: main memory, secondary memory (tapes, disks), archival storage, etc.
  - Networking: local area networks, wide area networks, the internet, telecommunications, the web, etc.

  - Input/Output, or communicating with humans: displays, graphics, sound, user interface, human-computer interaction, keyboards, printers, etc.
  - Processors: architecture and components of computing elements and systems.
  - Semiconductors: transistors, integrated circuits, semiconductor memory, microprocessors, etc.

- Topical Exhibits

  These are limited-duration exhibits which are expected to change every few years to keep the Museum fresh and appealing for repeat visitors. See Appendix 2 for some of the many possible themes for flexible exhibits. Some will appeal to specialists and others will appeal to a more general audience. The physical exhibit spaces can also be used to host exhibits on loan from other museums. Some of the flexible or temporary exhibits will exist only on the web and there will not be a corresponding physical exhibit.

- Visible Storage

  In the style of our original first-phase exhibit, Visible Storage is a dense assemblage of artifacts with minimal interpretation. It is halfway between a museum exhibit and a warehouse. Like most collecting museums, the interpreted exhibits can display only a small fraction of the whole collection; Visible Storage makes a larger part of it accessible to the interested visitor. The existence of Visible Storage in any particular museum phase will depend on available physical space.

- Traveling exhibits

  We will create small physical exhibits that can be moved for use at other museums, at trade shows, at schools, and at sponsor companies.

- Access to the deep collection

  By special arrangement visitors may access the physical collection artifacts and archived documents that are not on exhibit. This will be increasingly unnecessary as the deep collection becomes available in cyberspace.

The CyberMuseum

The Museum's overall cyberpresence at www.computerhistory.org consists of several sections:

- The Museum's administrative website: information about mission, objectives, events, programs, calendar, newsletter, supporters, contacts, and current special projects such as computer restorations and symposia.
- The CyberMuseum: The interpreted exhibits, as described above, which provide authoritative information on the history of computing. In addition to exhibits that are analogs of physical exhibits, there are web-only exhibits on other topics.
- The CyberCollection: A cataloged and searchable representation of as much of the physical collection as possible in the form of 2- and 3-D images, video and sound. Documents are available as images of the original and are searchable as text. It may also contain cyber versions of artifacts which are not in our physical collection. Finding aids assist in navigating through the many gigabytes of data.

  The long-term goal is to make a substantial amount of the archival material (paper, photographs, videos, films, etc.) available digitally on the web, and to provide a catalog of our physical objects that includes images and links to the associated scanned documentation. It is an ambitious project that will take many years. We will determine priorities based on the size and benefit to the expected audience for access to that material. We will investigate innovative procedures like "scan on demand".

  The cybercollection also contains many objects which were "born digital" and did not exist first (or perhaps ever) as a physical object. Much software, many documents, and some images fall into this category.

Software within the cybercollection is housed in a "software repository", whose goal is to permanently archive many thousands of important programs and applications. The software may be represented in several forms (source code, object code, memory images ready to execute) and may be accompanied by a rich set of other related objects in the collection including manuals, design documents, marketing materials, photographs, videos, oral interviews of creators and users, business histories, etc.

- Copies of cyber resources on the history of computers created by others, including websites for particular computers, software, companies, services and applications. There are many well-researched and valuable sites which disappear from the web when the author loses interest or dies. We will select appropriate sites to preserve, but will not editorialize or vouch for their accuracy.

Lectures and Events

- Speaker series: We hold a regularly-scheduled series of lectures and panel discussions open to the public. Presenters are both pioneers and current practitioners. The lectures entertain and inform, and also contribute to the historical record because every event is recorded for the archive. The events should be available in realtime on the web as well as for viewing later. The audience profile and attendance level for lectures varies depending on the content.
- Conferences, workshops, and symposia: We organize and participate in events that collect and interpret the history of the computer. Many, like DECworld in 2002 and AppleLore in 2003, can be a vehicle for collecting stories and artifacts centered on a particular company, individual, technology, computer, or application.
- Fellows: We honor living pioneers by inducting them as Fellows of the Computer History Museum. The annual Fellow Award Banquet event is a celebration of their contributions as well as a marketing event for the Museum.
- Fundraisers: We hold other events, like the Computer Bowl, which are entertaining but content-rich fundraising opportunities with a computer history theme.
- Other creative events: For example, we might hold a regular "Friday Evening at the Movies" featuring some of the films in our collection.
- Rental events: To the extent we can -- limited by resources, space availability, tax considerations, and legal constraints -- we rent parts of the facility to other organizations and individuals for private events. Most such events include access to exhibits. These events are generally consistent with our mission, they expand our audience, and they make money for the Museum.

Special Programs and Activities

- Restorations

  We use some of the study items in the collection actively, not just as venerated historical objects on the shelf. We can do this for hardware, software, and applications. These efforts are almost always driven by volunteers who provide incredible passion, knowledge, hard work, and infectious enthusiasm.

  We can…

  - …restore computers to original operating condition. (Example: the IBM 1620 restoration in 2000-2001, the PDP-1 restoration in 2004-2005, and the IBM 1401 restoration in 2004-200x.)
  - …run them for demonstration, research, legal evidence, and fun. (Examples: the Xerox "last running Alto" celebration; the TI "first 8-bit microprocessor" board demonstration.)
  - …rebuild systems that were lost or are rare. (Examples: the Colossus and Manchester Baby projects in England, the Apple I "new production" run)
  - …build important systems that were designed but never built. (Example: The Babbage Difference Engine)
  - …simulate older systems using newer technology. (Example: The 1620 peripheral simulator)

- Simulations

  We actively participate in the efforts to emulate old computers, in particular as a way to make the preservation of software and graphical interfaces meaningful (Example: Bob Supnik's general emulator framework, and the IBM 1620 simulator). Simulations have the potential of operationally surviving forever, unlike physical restorations. These, too, are primarily developed and maintained by volunteers.

- Oral Histories

  Collecting the stories from the people who created this revolution is a critical component of the Museum's program. We actively solicit and create videotaped interviews of pioneers and important participants. We place special priority on older individuals whose stories have not already been recorded. The material collected includes personal background and activities as well as research, product and corporate history. Creating the oral histories is also an opportunity to get important donations of artifacts and papers into the collection. We will investigate opportunistic, real-time, and web-based methods to capture additional personal stories.

- Educational outreach

  We extract that part of the history of computing that is appropriate for the general student. We provide support to teachers at all levels who are attempting to teach that history at the middle school level and above. We work with educational experts to infuse the teaching of technology with an appreciation of the people, companies and systems (hardware and software) that were the milestones in this historical development.

  Some of the activities are local to our facility, but many are of benefit to an external audience. Specific materials and activities that we collaboratively develop might include:

  - A portable curriculum for teaching computer history at the high school and university level.
  - A collection of duplicable material useful in teaching computer history: films, photos, PowerPoint presentations, etc.
  - Collateral educational materials: posters, timelines, models, simulations, etc.
  - Contests to promote awareness of computing history.
  - Guest lectures by our staff and volunteers at local schools and organizations.
  - A book about computer history targeted at high school students. They know who invented the telephone, the airplane, and the light bulb. Shouldn't they also know who invented the computer?
  - Tours of our cyber and physical exhibits that are specifically targeted to students at different levels.

- Student projects and classes

  We find ways to engage interested students in activities involving historic computers, such as a weekend "learn to program and operate a mainframe/minicomputer" workshop. Students can also participate in restoration projects under the direction of more experienced restoration volunteers.

- Non-specialist publications.

  We publish our own magazine ("CORE") and newsletter. Future publications could include original and reprinted books, and a general-distribution magazine. We contribute to other general-distribution magazines, like "Invention & Technology".

- Community resource

  We are a resource and supporting umbrella institution for private collectors and volunteer clubs and organizations devoted to computer history. Where appropriate we provide space for meetings, conferences, activities, and modest specialized collections.

- Collaborative activities

We work collaboratively with other institutions with an interest in the history of computers. This includes:

- Universities such as Stanford, UC Berkeley and CMU that have a focus on computing and the history of technology. We host students, do joint research, and partner for workshops and other events.
- Other computer history organizations: The Babbage Institute, Heinz Nixdorf Museum, the London Science Museum, the Internet Archive, etc.
- Professional and trade organizations: the IEEE History Center, the ACM, SEMI (Semiconductor Equipment and Materials International), etc.
- Volunteer organizations: Vintage Computer Fair (VCF), Digibarn, etc.

Historical Research

We participate academically and professionally in the subset of the history of technology related to computer and the information age.

- We support and do research in the historiography of computing.
- We host visiting scholars requiring access to artifacts for research. We provide an interesting and attractive environment where scholars of all levels visit and interact, and develop their own perspectives on history.
- We aid in creating communities of interest around subtopics: companies, product areas, applications, languages and other technical topics.
- The software problem: We study the problems of preserving the intellectual content of the history of computers in addition to the physical devices, and in particular we try to understand how best to preserve software. Based on that understanding we preserve source code and keep it running on real or simulated hardware. We collect design documents and programming environments and document how techniques have evolved. We study the companies and individuals in the software business. Our definition of software is inclusive: programming languages, operating systems, algorithms, artificial intelligence, graphics, databases, networking and internet protocols and systems, end-user applications, embedded applications, etc.
- We publish in the appropriate academic journals, such as the IEEE's "Annals of the History of Computing", and the Society for the History of Technology's "Technology and Culture".

Who Does the Work

There are various groups of participants who contribute to building and running this institution:

- The professional staff, currently at 37 and expected to grow to 50-60 as the full exhibit and program plan (but not yet the research activity) is implemented. Departmental functions include: Finance, Administration, Operations, Development, Public Programs, Education, Marketing, Collections and Exhibits, and Information Systems.
- The volunteer Board of Trustees, currently at 28 and permitted to grow to 35. The primary role of the board is to provide strategic direction and oversight. Trustees provide expertise in a wide variety of technical, legal, marketing and strategic areas. They have fiduciary responsibility for the organization, and are not compensated for their work. Many are current or former computing industry and academic leaders. All have a vested interest in the preservation of computing history. All are also, within their means, generous financial contributors to the Museum.

  The full board meets quarterly, and the seven-member Executive Committee of the board meets monthly. There are several other formal subcommittees of the board (Finance, Audit, Legal, Investment, and Nominating), some of which are assisted by advisory committees of non-trustees.

  There are various other informal committees whose members include staff, trustees, and other volunteers. Examples include the Development Committee, Marketing Committee, Acquisitions Committee, Restorations Committee, Exhibits Committee, and Oral History Committee.
- The Board of Advisors, which consists of individuals with particular talents, experience, or notoriety who help us in targeted areas.
- The Special Interest Groups which focus on particular domains. They help us understand what the significant events are and identify the important people, products, and companies. They facilitate the collection of artifacts of all kinds, stories, and funding. The participate in the design of programs and

exhibits for their area. SIGs members are variously staff, trustees, and other volunteers who are industry veterans and experts. Existing and planned SIGs include:

  - Storage SIG (disk and tape)
  - Semiconductor SIG (ICs including microprocessors)
  - Software Preservation Group (software technical history)
  - Software Industry SIG (software business history; was the Software History Center)
  - Web and networking SIG (planned)

- The hundreds of volunteers. They are a critical component of the museum. Our volunteers are the tour guides, the restoration teams, an extension of the collections and exhibits staff, the event guides, and much more. Many of the volunteers are themselves important contributors to the development and use of computers. The community spirit and dedication of our volunteer pool is awe-inspiring, and we could not exist without them. The *Volunteer Steering Committee* organizes and plans volunteer activities with the assistance of staff.

The audience

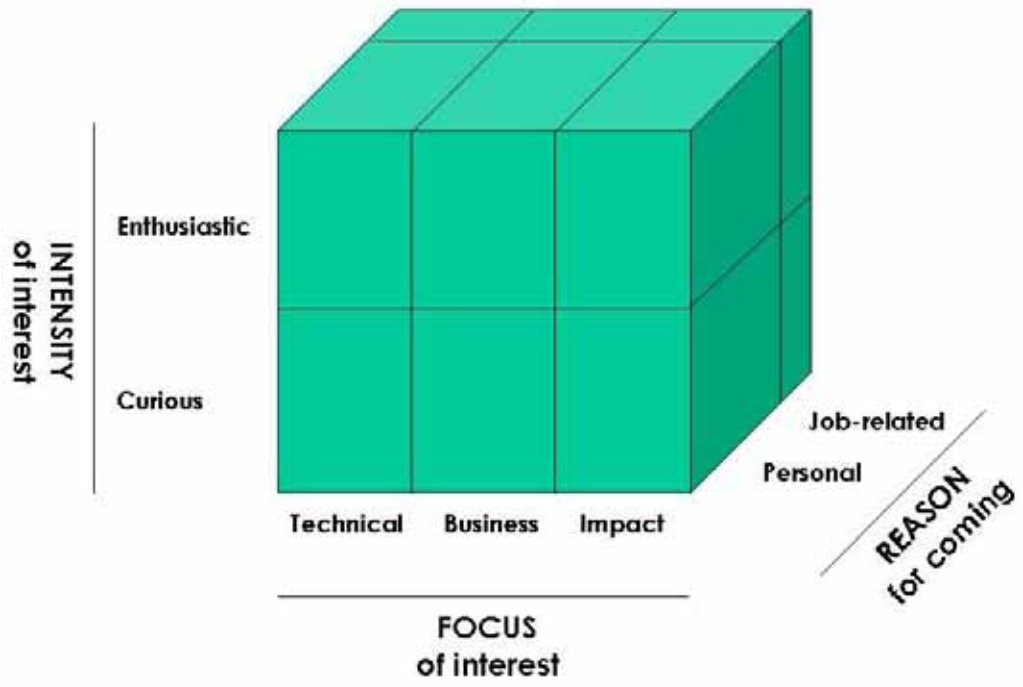
In addition to the long-term benefit to posterity, this institution is for the benefit of today's audience. It is important to have a clear understanding of who that audience is, so that exhibits, programs and marketing materials can be targeted to them.

Segmenting the audience

We do not have a single audience; we have multiple audiences. There are many different stakeholders in the Museum interested in different combinations of its programs and resources.

Some are visitors to the building, and some are not. Some are in the computer industry, and some are not. Some are knowledgeable about computing, and some are not.

There are several ways of segmenting the audience. One scheme is to divide the space into the following three orthogonal directions:



- The "INTENSITY of Interest" axis defines how much someone is interested in computing:
  - Enthusiastic means very interested, typically because of participation in the computer industry or from being an enthusiastic hobbyist.
  - Curious means somewhat interested, typically in understanding how computing influences the larger historical context.
- The "FOCUS of Interest" axis defines the topics of interest:
  - Technical means interest in the hardware or software technology
  - Business means interest in the companies: history, structure, finances, activities, employees, culture, etc.
  - Impact means to what extent and how the computing industry has affected society, culture and politics.
- The REASON for coming defines why someone is interacting with CHM:
  - Personal means they want to for their own reasons (education, entertainment, socialization, etc.), and not because they need to for their work. Most of the audience falls in this category.
  - Job-related means they are interacting with CHM in the performance of their job. They may be historians, researchers, journalists, attorneys, educations, event planners, etc.

Typical audience profiles

We can examine some typical audience profiles, and then look at where they fit in the segments above, and what their specific interests in what we provide might be.

- Computer industry professionals: The designers, engineers, marketers, business people, executives, and academics in the computer industry are our largest and most involved audience. They are the most knowledgeable about the technology and the business. The history we preserve is partly their history. Some are honored by having their own contributions to the revolution recognized. Many are contributors to the collection and the fundraising campaigns. People with this profile often are extraordinarily enthusiastic, have a deep technical focus, and come for personal rather than job-related reasons.

"Professionals" includes professionals-in-training. Computer science and engineering curricula now contain little history, but many of the students are interested in what happened before. They enjoy the contrast between the 10^7 transistors they put on a chip and the postcard-sized logic modules that held two AND gates, and are amused by the quaintness of 32 by 32 core memory arrays. They are prepared to accept Eckert and Cray as engineering heroes of our age alongside Watt and Edison of a century earlier.

- Serious computer users: Serious users have first-hand familiarity with the technology and the history starting from when they got involved. They respond with enthusiasm to having memories of their first computers refreshed; a familiar old machine provokes a stream of reminiscences. They are receptive to learning about what came before. Their technical and business understanding is generally not as high as the professionals.
- Curious casual users: Almost everyone now is a computer user, and almost everyone started by using a computer which is now obsolete and in the Museum's collection. Many who are only casual users will be interested in learning in a minimally-technical way about how they developed. As personal computers become ubiquitous among the general population, old computers are becoming an object of more broadly-based interest in the same way that old cars and planes are.
- General students and teachers: Students from middle school age and up have a variable interest in history and technology, but those who are interested in either, and their teachers, can benefit from programs at the Museum.
- Public media: The progress of computer technology is now a mass-audience tabloid story, and we can help the media tell it. Film, television, web and print journalists need a source for historical photographs, films, and sound clips, as well as a place (or service) to do historical fact-checking and do live interviews.
- Researchers
  - History researchers: The displayed and stored collection, especially the archival technical and business documentation, is a valuable resource for studying the evolution of computers and its effect on society. At a more global level, the development of the computer industry is a rich example of accelerated scientific development and the social and economic factors that made it happen. Current and future historians need primary source documents to understand these times, and we provide them. The users are historians, sociologists, business school academics, and others.
  - Technology researchers: Techniques used in the past can be reused, or can instruct about past failures. If we know the past, we get to choose whether to repeat it.
  - Legal researchers: Lawyers and corporate research staff doing prior-art investigations of intellectual property for patent and trademark work need the material in our archives.

In addition to this categorization by level of involvement in computers, we can also categorize our audience by geography:

- Bay Area residents: We expect most of the visitors to the physical museum to be from the local area. They will be from all of categories above.
- Visitors to the area with a technology interest or curiosity: This facility will become a regular attraction for visitors who come to Silicon Valley for computer-related business, including conventions.
- Tourists: Whether we target them or not, the general museum-going public will come. Some will enjoy the experience, and some will find it "too narrow and too technical".
- Visiting scholars: A few visitors, particularly researchers, will come to the area specifically to use the resources of the Museum or collaborate with our staff and volunteers.
- CyberVisitors: Many more people will visit our CyberMuseum and CyberArchive than will come to the physical museum.

Matching audience profiles to segments

The audience profiles above provide hints, but not guarantees, about which segment someone with that profile might fall into. The following table shows where a typical person with that profile might fit; there will always be variations.

	Intensity		**Focus**			**Reason**	
	Enthusiastic	**Curious**	**Technical**	**Business**	**Impact**	**Personal**	**Job-related**
Computer Professionals	√		√	√		√	
Serious computer users	√		√	√		√	
Curious casual users		√			√	√	
Students		√			√	√	
Media		√		√			√
Researchers		√	√	√			√
Tourists		√			√	√	

Matching audience profiles to programs

There are multiple profiles for members of our audience, and each of our facilities, exhibits, programs and events appeals to a different subset of attendees, users, and financial supporters. We are a multi-faceted institution, and very few people are equally attracted to everything we do.

The following matrix attempts to categorize the match between typical audience profiles and museum programs. The symbols represent low (L), medium (M) and high (H) affinity. A blank indicates limited or no appeal.

	Computer Professionals	Serious Computer Users	Curious casual users	General Students	Media	Researchers	Tourists
Timeline Exhibit	H	H	H	M	L	M	M
Theme Exhibits	H	M	M	L	L	M	L
Flexible Exhibits	M	H	H	L	M	L	M
Visible Storage	H	M	M	L		M	
Collection Access	M	L		L		H	
Cyber Museum	M	M		H	M	L	
Cyber Archive	M	L		L	H	H	
Lectures	H	M	L	L	M	M	
Conferences	M	L			L	H	
Fellows	H	L			M	L	
Computer Bowl	H	M			M		
Restorations	M	M	L		L	M	
History curricula				H	M		

The Physical Museum

Headquarters: 120,000 square feet, 7.5 acres, at 1401 N. Shoreline Blvd, Mountain View CA

Warehouse: 25,000 square feet at 756 Yosemite Way, Milpitas CA

The Museum owns a striking modernistic 120,000 square foot two-story building on 7½ acres in Mountain View at the center of Silicon Valley, and a 25,000 square foot high-bay warehouse 20 minutes away in Milpitas.

- The lobby of the main building is the grand welcoming space. It is visitor-friendly and indicative of the mission and purpose of the History Center. Selected artifacts and graphic materials are used to attract and inform the visitor of what to expect inside. During non-public hours this space is used for receptions, which can overflow into adjacent spaces and exhibit halls. The lobby contains the reception desk and ticket cashier, if we use one. The gift shop is off the lobby.
- The exhibit halls are the heart of the public museum. There are several big spaces with high ceilings that are appropriate for many kinds of use. All exhibits will be infused with history. The organization of exhibits may be chronological or thematic.
- Visible Storage is a minimally interpreted display halfway between a museum exhibit and a storage warehouse. This provides public access to many more objects for those interested in things not in the exhibits. Visible Storage may not exist in all phases of the museum's growth.

- The warehouses are the storage for objects not on public display. There is limited warehouse space within the main building; most of the objects not on display are in the Milpitas warehouse.
- The auditorium on the second floor is used for holding lectures, symposia and other public activities for up to 450 people. It is a multi-purpose area with a flat floor, a raised stage, built-in screen, and sound system.
- The library is a quiet study area for visiting scholars, members, and staff. It holds the video, film, photograph, book, and documentation collection. Appropriate tools are available for accessing and reviewing materials in the different format. Access is provided to the web via a high-bandwidth connection.
- The restoration labs provide the space for volunteers to actively repair and restore old computers and peripherals.
- The restoration display rooms provide exhibit space for demonstrating operating restored computers.
- The offices provide space for staff, volunteers, and visiting researchers.
- The multipurpose rooms provide space for general unspecified activities such as meetings. conferences, and rental events.
- Classrooms, for a variety of educational activities.
- The outdoor terraces are comfortable spaces for events, relaxation, and social mingling.

The Finances

This plan is based on the successful completion of a $100-120M capital/endowment campaign. Half of that, $50-60M, is used for purchasing the buildings and land, and for developing the physical and cyber exhibits. The other half, $50-60M, is not to be spent, and is invested as a board-designed quasi-endowment to generate operating funds.

The income from the endowment, even when complete, will not provide sufficient funding to operate all the programs. As for almost all non-profits, significant annual campaign fundraising is still required. Our fiscal year 2006 budget was balanced with about $4M in expenses and income. The Museum has been in the black every year since independent operation in 1996, and strives aggressively to continue to do so.

At the point when the exhibits described here have been built and the (first) capital campaign is completed, but the research activities have not yet been developed, we will be a fully-operational public museum. At that point the operating expense of the running museum is expected to be in the neighborhood of $7-8M, of which about 40% will be provided by the endowment income, 35% will be fundraised from public and private sources, and the balance will be earned income from venue rental, admission fees, the store, and program revenue.

Contributors to the capital/endowment campaign have primarily been individuals involved in the computer industry who believe that it is important to preserve this history. Corporate support tends to go to the annual campaign or to be in-kind donations of equipment, although there have been notable exceptions. There are opportunities for foundation support of both campaigns which we are starting to pursue. There is a multi-level recognition program that provides for naming opportunities that are unrelated to restrictions on the contributed funds. See the "Naming Opportunities" document for more details.

Most of the capital/endowment campaign contributions have been unrestricted. When we do get restricted contributions, such as to the endowment, we allocate other unrestricted donations to the other purpose so we maintain the 50% endowment balance.

In a worst-case scenario, the endowment income would be sufficient to operate the Museum with reduced staffing at a breakeven level. This ensures that the institution can survive difficult times should fundraising become impossible for a while and contraction become necessary until an economic recovery. The major assets of the Museum – the collection and the buildings – would not be in danger.

The schedule for complete development of the museum depends on the timing for the completion of the $100M-$120M capital campaign. The endpoint could be as early as 2009, is more likely to be 2012, but could be beyond that.

As trustee Dave House points out, the horizontal axis of our plan is measured in dollars, not years. It will take as long as it takes. It depends on the economy, and it depends on our execution, but most of all it depends on the enthusiastic support of people who believe that what we are doing is important.

Our own history

[The first few paragraphs are adapted from Gwen Bell's Director's Letter in the first *Digital Computer Museum Report*, January 1982]

The Museum's birth and parentage were responses to different needs that sprang from several sources. When Ken Olsen and Bob Everett saved Whirlwind from the scrap heap in 1973 and arranged to exhibit it at the Smithsonian, they envisioned a place where all the treasures related to the evolution of computing could be preserved. Ken then bought the TX-0, the first full-scale transistorized computer, when it came up for auction. Word went around that he was maintaining a warehouse for old computers, and the collection grew.

At the same time, Gordon Bell was also thinking about a computer museum, an idea that emerged while writing *Computer Structures* with Allen Newell between 1967 and 1970. Soon his office and home were filled with artifacts.

Those efforts merged with the opening on September 23, 1979, of the Digital Computer Museum inside the Marlboro Massachusetts "tower building" owned by Digital Equipment Corporation. Gwen Bell became the director and began its transformation into a professionally-run museum. Many important artifacts were saved, and many important pioneers – may of whom are now gone -- were recorded on videotape for posterity.

In the Spring in 1984 the Museum moved to downtown Boston, sharing a building on the Wharf with the Children's Museum. It was renamed "The Computer Museum" and became an independent non-profit corporation. The collection continued to expand over the next ten years, and major historical exhibits were mounted. The lecture series and the morning "breakfast seminars" were popular.

By 1990 a second mission – to educate children about computers -- had been added to that of preserving and presenting history. The Museum created a "walk-through" giant computer model, a "Tools and Toys" exhibit about modern PCs, and a computer-generated Virtual Fishtank. The collecting activity, history-based exhibits and lecture series gradually became lower priorities and were not getting much funding or attention.

In 1995, Len Shustek, who had been planning to create a new computer history museum in Silicon Valley, instead joined the board of TCM to start a west-coast branch that would focus again on the original mission of preserving and presenting computer history. In 1996 most of the backroom artifact collection was moved to NASA warehouses at Moffett Field in Mountain View CA. The lecture series was restarted, and "Visible Storage" tours were given of parts of the warehoused collection. Fundraising was done independently, with fees paid to the Boston corporation for "oversight".

The Computer Museum could not sustain both missions. In 1999 it was dissolved, and a new non-profit corporation originally called The Computer Museum History Center (now the Computer History Museum) was formed out of the California project. The assets of the original museum were split: about 20%, including ownership of the artifact collection, was transferred to the new California corporation, and the rest was transferred to the Museum of Science in Boston.

The Computer History Museum gradually expanded its presence on Moffett Field, and held a competition to select the architectural and exhibit design firms to plan for a new building to be constructed as part of the proposed NASA Ames Research Park. When global economics caused that park to be postponed, the Museum took advantage of the real estate climate to purchase its current home on Shoreline Boulevard in Mountain View in 2002. It purchased the warehouse in Milpitas at the beginning of 2007.

We have mounted several exhibits since starting the on the west coast. Visible Storage began at Moffett Field in 1997, without labels. "Innovation 101", created as a physical exhibit jointly with Intel in 2001 for their Science and Engineering Fair in the San Jose Convention Center, was initially installed at Moffett Field and then moved to the Shoreline building. A new Visible Storage opened in 2003 as both a physical and web-based exhibit. The topical exhibit "Mastering the Game: A History of Computer Chess" opened in both modes as well, in 2005.

We are still a startup, but one with a 30-year history. We are a unique historical and cultural institution. Help make us great!

Appendix 1: Summary of Collections Policy (r6.0, May 2003)

The Computer History Museum maintains the world's largest collections of artifacts and documents related to the history of computers. The Museum's mission is to preserve and present for posterity the artifacts and stories of the information age. Our goal is to become the best physical and virtual destination for those interested in the history of computing.

Subject Focus Areas of the Collection

- Electronic computer systems, including
  - Processors (mainframes to PCs to handhelds)
  - Memory and storage for programs and data
  - Peripherals and I/O equipment
  - Networking, both local and wide-area
  - Game consoles
  - Underlying technology: transistors, semiconductors, mathematical/engineering theory (representative sample)
  - Graphics and graphical user interfaces
- Computer Software, including
  - Applications, including games
  - Languages
  - Operating Systems
  - The Internet, the World Wide Web, networking and telecommunications
- Precursor Systems, including
  - Punched card equipment
  - Non-computer mathematical instruments (representative samples)
  - Mechanical calculating machines (representative samples)
- Histories of individuals and businesses related to any of our focus areas

Object Types in the Collection

- Hardware Artifacts
- Documents: manuals, books, journals, magazines, brochures, individuals' papers, etc.
- Storage Media: tapes, punched cards, disks, CD-ROMS, listings, etc.
- Content: photographs, films, videos, posters, audio recordings, transcripts, etc.
- Design Documents and Data: software source code, schematics, blueprints, etc.
- Advertising and Promotional Materials: collateral, t-shirts, buttons, coffee mugs, etc.

Collection Access and Exhibitions

Permanent Collection (present and planned future exhibits): Dense Storage, Visible Storage, Computer History Timeline Exhibition, Theme Area Exhibitions (Storage, Software, Processors, Networking, Input/Output), Flexible and Topical Exhibitions
Study Collection: Hands-on exhibits, Research tools, Restoration projects
Cyber Museum: Cyber Collection (online access to the collection), Cyber Exhibits (online virtual exhibits)

Acquisition Criteria

The Collection's Department staff acquires new artifacts under the direction of the curators, based on guidelines developed by the Museum staff and approved by the Board of Trustees. Items are selected based on numerous criteria, including:

- Is it a "first" of a production series?
- Is it a "classic" or a "standard"?
- Is it a "representative sample"?
- Is it part of a "complete set"?
- Is it a "failure" with important lessons to be learned?

Collaboration with Other Museums

The Museum collaborates with national and international programs through the loan of artifacts and is actively working to make its document collection available online to other archives and individuals.

Collection Funding

The current collection is supported by the operating funds of the Computer History Museum and the occasional restricted donation for a specific artifact acquisition. Almost all of the artifacts currently in the collection were donated by their owners. We also have a special collections acquisition fund for objects that must be purchased.

Appendix 2: Topical Exhibit themes

Topical exhibits focus on a particular thematic area. Some exhibits may be "semi-permanent", with an expected lifetime of more than five years with updating. Other exhibits may be temporary and designed to be on display for only a year or two. Some exhibits will be designed to be transported elsewhere after initial display at the Museum. Some will be both physical and web-based, others will exist only on the web.

The themes for topical exhibits are endless. Here are a few of the many ideas:

- Memories: How do computers store information? The techniques for storing bits of information over the years. Both internal (RAM) and external (rotating) memories.
- Pioneers: The people who have made the important contributions.
- Programming: How have we told computers what to do over the years? Languages, interpreters, compilers
- What was it like to be a programmer? Reconstruct programmers' offices of the 50's, 60's, 70's, 80's, 90's, 00's.
- Supercomputing: The quest for the fastest computer.
- Miniaturization: How computer logic has shrunk; from relays to 30M transistor ICs.
- The heroes of the computer revolution.
- The mainframe era: reconstruct a computer big enough to walk through
- Computers and the military: SAGE, code-breaking, etc.
- The pursuit of the home computer: what was it expected to do, and how?
- Computers in the air: avionic and spacecraft uses over the years.
- Graphics: This history of non-numeric non-text computer output.
- Printing: How computers have made marks on paper (teletypes, golf balls, daisy wheels, laser printers, inkjet).
- Networks: Making computers talk to each other. From the IMP and the SRI van to the internet.
- Modems: the technology of computer communication, from modems to broadband to DSL.
- The progress towards ubiquitous computing: from 6 computers to "everything is a computer."
- User interfaces: making computers talk to people. Examples of great and terrible UIs through the years.
- Peripherals: how computers have been connected to the outside world.
- The evolution of personal computers: a crowd-pleaser, because everyone sees what they used.
- Special purpose computers: from the calculator to the kitchen computer.
- Hidden computers: the development of embedded computing ("computers in your car and coffeemaker").
- Robotics: making computers do physical work.
- The history of computers as used in music and art.
- The history of Computers and Medicine: MRI; cochlear implants. AI software for medical diagnosis. Software for mapping brain activity
- Failures: not everything works; the grand fiascoes, technologies and companies (bubble memories, AI, Trilogy, etc.).
- The evolving influence of computers on society.
- Artificial Intelligence: The quest to make really smart computers.
- The history of computerizing xxx, where xxx is almost anything: accounting, mechanical design, business practices, writing (word processors, etc.), reading (e-books, etc.), airline scheduling, etc.
- The History of the Future: past predictions of computer development and uses.
- Not all computers were digital: analog computing.
- The history of Computers and Telecommunication: The history of computerized telephone switching equipment. How computers are made to make calls. Managing cell phone calls for voice and data.
- The history of Computers used for voting. Computer based vote tallies. How computers are used to make voting predictions.

- The history of Computers as applied to genetics: How computers do sequencing. Information theory and genetics.
- Computers for fun: videogames and other recreations
- The World's Fastest: history of the supercomputer
- Selling computers: the history of computer advertising
- The theory behind it all: important formal results (Godel, Turing, NP-complete, etc.)
- Moore's Law: Where it came from, what it really is, how we're doing, and when it ends
- The history of archival storage of bits: from paper tape to terabit disks
- A milestone in mechanical automatic calculating: The Babbage Difference Engine (on loan from Nathan Mhyrvold)

Document change log

18 October 1995	v1	L. Shustek	Original white paper on creating a Silicon Valley computer museum.
29 November 1995	v2	L. Shustek	Assume we get the TCM collection. Add a section on "site, staff, and expenses".
11 March 1996	v3	L. Shustek	Assume we are a TCM subsidiary. Expand the building required to 60K sqft
1996-1998	v4	L. Shustek	Create various updates and derivative 1- 2- and 3-page vision statements.
21 January 1999	v5	L. Shustek	Rewrite and update as an outline of ideas.
20 November 1999	v6	L. Shustek	Assume we become independent of TCM. Add budget and building configuration from other notes. Use some earlier text from Gwen Bell about space descriptions.
2 December 1999	v7	L. Shustek	Update the audience descriptions after talking w/ Bernard Peuto.
17 July 2000	v8	L. Shustek	Updated and slightly expanded. New budget. Add ideas from Charlie Pfefferkorn's building document, and the Building Committee's report
16 August 2000	v9	L. Shustek	Assume we purchase Shoreline. Update the space allocation table.
19 June 2003	v10	L. Shustek	Major rework into "Envisioning CHM" after purchasing Shoreline. Deleted much of the building-specific material. Imported and adapted the attendance essay from the NASA research park submittal.
2 September 2003	v11	L. Shustek	Rework again for a broader audience. Add the executive summary. Remove financials. Remove the attendance essay and incorporate some of it into the body. Add more text about volunteers.
23 September 2003	v12	L. Shustek	Add our own history. Add comments from John Toole, esp. "Why History" section.
19 June 2004	V13	L. Shustek	Add new audience segmentation based on Tom Melcher's work. Add more descriptions of area focus. Various small changes throughout. Two-level table of contents.
24 Feb 2006	V14	M. Cantrell	Update to reflect FY06 numbers
1 June 2007	V15	L. Shustek	Increase cyber, web/internet, and business history visibility. Make research explicit as the third leg of the institution. Make clear what stage the financial projects apply to. Extensive general editing and cleanup.