Musée Bolo
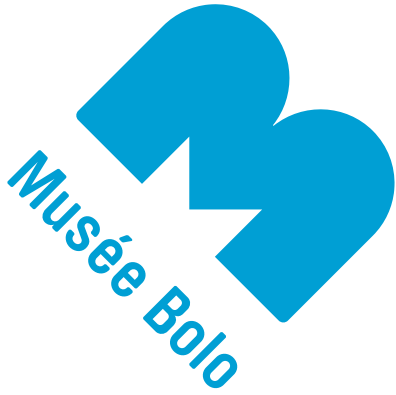
**Swiss Museum
of Computer Science,**
Digital Culture
and Video Games

RESTORATION
OF **CRAY**
SUPERCOMPUTERS

CRAY-1S
CRAY X-MP/48

WITHOUT DINOSAURS
THERE WOULD
BE NO BIRDS

Help us restore these
CRAY supercomputers

TAKE PART IN THIS BEAUTIFUL PROJECT

Musée Bolo is a private museum. It does not receive any financial support from the city of Lausanne or the canton. The museum owes its survival to a few generous donors and to the members, all volunteers, who take care of the collection, and who find funding through events and exhibitions.

To make this beautiful project a reality, we need funding. By contributing to the restoration and conservation of these CRAY supercomputers, you will be helping the museum to showcase these rare pieces and their history.

Through your participation in this project, you will be showing that this digital heritage has its place in the cultural heritage of Switzerland. It means teaching visitors that, inside their their cells phones, there are also stories to tell: stories of research, science, mathematics and above all people... brilliant inventors.

We have more and more requests for guided tours for school classes from all over French-speaking Switzerland and beyond. It is essential that children understand and learn about the history of computing, which is almost absent from school textbooks. Computers and digital technology are all around us. There is no escaping them. Some objects or ways of doing things: smartphones, desktop computers, online shopping, etc. are so much a part of our daily lives that we sometimes tend to forget their importance and their history.

The addition of these CRAY supercomputers to our exhibition is a real plus. These pieces are very important to us. They are incredible machines, because of their history, their size and their unique design.

YOUR HELP IS PRECIOUS

Sponsors who wish to take part in this adventure will gain special visibility at Musée Bolo (6,000 visits per year, excluding students). They will have their name or logo printed on a thank-you plaque that will be displayed near the CRAYs. (From CHF 3'000.- of donation).

Donations are tax deductible.

Would you like to know a little more before you make up your mind? Please come and visit Musée Bolo's reserve and have a chat with us about your interest in making a donation or sponsoring us.

Scan this QR-CODE

Bank details
Fondation Mémoires Informatiques – 1038 Bercher
IBAN: CH4009000000172991457
BIC: POFICHBEXXX
Mention: CRAY

MUSÉE BOLO

Musée Bolo, the Swiss museum of computer science, digital culture and video games, is a private museum that displays a small part of its collection on the EPFL campus.

The Musée Bolo collection is one of the most important in Europe. The main reserve of 800 m² is located next to the Lausanne train station and houses 97% of the collection. It contains more than 15,000 books and magazines, 8,000 software programs, 5,000 computers and game consoles.

The constant evolution of computing requires us to revisit its history

Every year, Musée Bolo participates in cultural events and projects to showcase the objects in the collection. For example, our temporary exhibit showcases the everyday technology of people with disabilities. In 2021, we conducted logic workshops for children with a passion for digital technology as part of the «Games» exhibition for the National Museum at the Château de Prangins.

This year, Musée Bolo has animated the Municipal Libraries of Geneva around the event PopChrono - Gaming back in time. We will also be present to animate the 36th International Championship of Mathematical and Logical Games and the Night of the Museums.

20 YEARS ALREADY!

This year, Musée Bolo celebrates its 20th anniversary. On June 19, 2002, the EPFL made an area available to the museum to exhibit part of its collection.

The museum's collections are enriched by donations from individuals or companies who entrust us with their pieces, some of which are unique. Each month, we receive between 4 and 6 propositions of donation.

The members of the association meet every week to inventory, digitize and archive the pieces of the collection. They also prepare the events in which the museum participates.

Our team is composed of engineers, electronics technicians, computer specialists, history students, curators/restorers...

All volunteers, for twenty years!

All of us share the same vision: to take care of the collection and prepare it to be exhibited one day, in the largest computer museum in Switzerland.

One of the first exhibitions of Musée Bolo at EPFL

Noémie Nydegger, volunteer curator/ restorer and technical expert

OUR PROJECT

During the next few weeks, the EPFL will make available to us a CRAY X-MP/48, used at CERN a few years ago, as well as a CRAY-1S, the first CRAY supercomputer in Switzerland, to place them at the heart of our exhibition. They will complement the CRAY-2 and the CRAY T3D in our collection.

Exhibited for many years in the corridors of the EPFL, the seats of these CRAYs have worn out with time. We would like to be able to restore these pieces and present them this fall for our 20th anniversary celebration.

These pieces have an important historical value in Switzerland and in the world. They are the ancestors of our microcomputers… Today, we all have a smartphone in our pocket that has a computing power equivalent or even superior to these machines. But what is the story behind this small screen, behind its memories and processors? What is the link between these two machines? What are the anecdotes linked to these objects? This is what Musée Bolo wants its visitors to discover.

Just exhibiting machines, without explaining their history, is meaningless. It must be accompanied by testimonies, interviews and some additional pieces of the collection.

Without dinosaurs there would be no birds

In parallel, we want to complement this restoration with a new temporary exhibition that highlights the history of CRAY supercomputers and its genius inventor, Seymour Cray.

CRAY X-MP/48 CERN/Geneva

A LITTLE HISTORY

On the EPFL campus is displayed a beautiful collection of super-powerful computers, designed between 1979 and 1993, and capable of performing the vector calculations required for the most complex scientific applications.

The CRAY-1S, an improved version of the CRAY-1, was installed in 1986. It is replaced in 1988, by the CRAY-2 which will be in function until the end of 1993. The machine worked for 43 000 hours. The main characteristics of the CRAY-2 are a primary processor, assisted by four secondary vector processors whose theoretical power is 1950 mega-FLOPS, and a RAM, colossal for the time, of 2 Gb. A CRAY X-MP/48 is also present, it is the first multiprocessor supercomputer used at CERN.
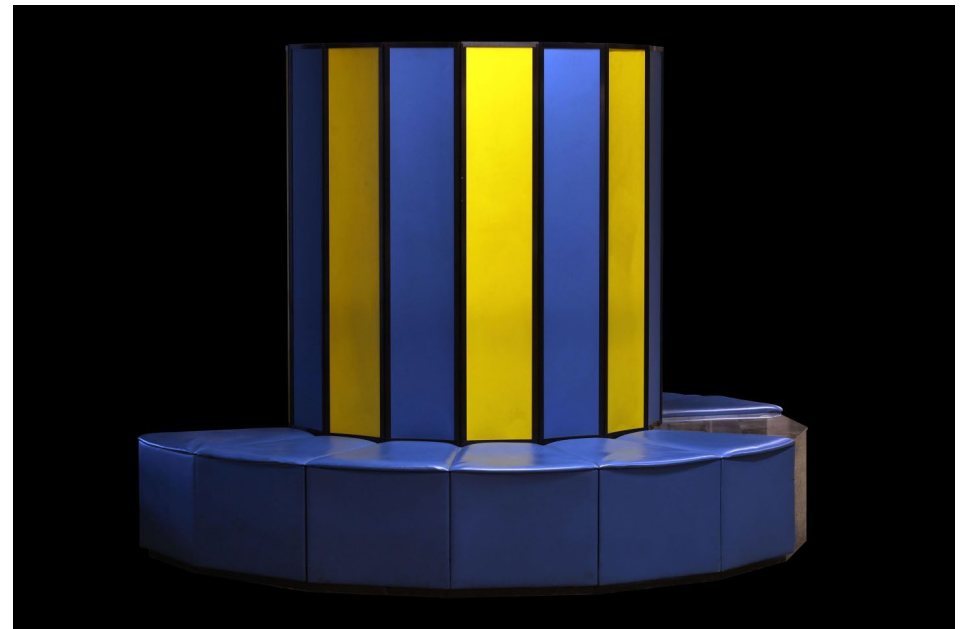
CRAY X-MP/48 CERN/Geneva (May 1988 - Computers and Control Rooms)

CRAY-1S

CRAY X-MP/48

1. CRAY-1S

The CRAY-1, invented by Seymour Cray, was launched in 1976. It is a supercomputer with a vector architecture, considered to be the fastest computer in the world. It is built around a 64-bit processor running at 80 MHz, with 8 MB of RAM and cooled with freon.

It reached a computing power of 160 MFLOPS (or mega-FLOPS), the average power of a desktop computer twenty years later. One of the innovations of this machine is its arc shape, which reduces the length of the various wires. This supercomputer weighed nearly 5 tons and cost nearly $9 million at the time. The first CRAY-1 was delivered to Los Alamos National Laboratory and a total of 16 machines were produced.

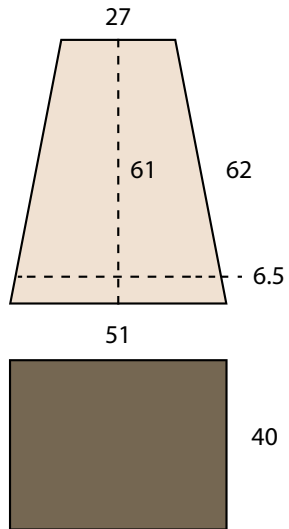Currently, a copy of the CRAY-1 is on display at the Science Museum in London.

This piece will be exhibited at Musée Bolo.

CRAY-1S

27

61   62

6.5

51

40

4 placets

Restoration work

Ordered the original fabric in the United States from the company Naugahyde

Replacement of the foam and leatherette for the 4 placets

Cleaning of the plexiglas

Cleaning of the leatherette of the upper stucture (outside/inside)

Cleaning of the metal structure

2. CRAY X-MP/48

The CRAY X-MP, mainly invented by Steve Chen, was launched in 1982.

This supercomputer is almost identical to the CRAY-1 in terms of external appearance, especially in its horseshoe shape, but it is equipped with two processors clocked at 105 MHz, each capable of reaching 200 MFLOPS. This model will be improved later to give birth in 1984 to the quadriprocessor CRAY X-MP/48, each CPU being clocked at 117 MHz, for a theoretical unit power of 230 MFLOPS.

This piece will be exhibited at Musée Bolo.

CRAY XMP-48

27.5

63.5   61

- 6.5
- 3.5

51

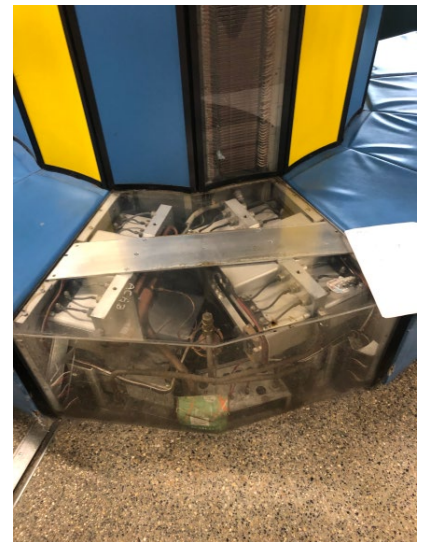40
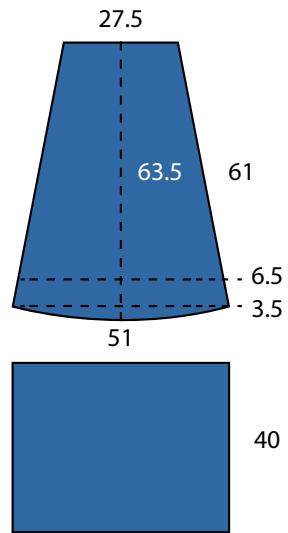
10 placets

Restoration work

Ordered the original fabric in the United States from the company Naugahyde

Replacement of the foam and leatherette for the 4 placets

Cleaning of the plexiglas

Cleaning of the leatherette of the upper stucture (outside/inside)

Cleaning of the metal structure

3. CRAY-2

The CRAY-2, invented by Seymour Cray and launched in 1985, was the second supercomputer to exceed GFLOPS after the Russian M-13.

Running under the Unix system, it is composed of 2 to 4 processors operating at 243 MHz and can address up to 4 GB of memory. Its power is estimated at 1.9 giga-FLOPS for the 4 processor configuration.

For this machine, the cooling had to be particularly studied. The solution adopted was to immerse the whole system in a heat-conducting and insulating liquid (a perfluorocarbon from Fluorinert).

An example of the CRAY-2 is exhibited in the permanent collection of the Musée des arts et métiers in Paris, France.

CRAY T3D   CRAY-2   Musée Bolo

When the CRAY-2 was moved into Musée Bolo exhibit, the Plexiglas fountain was unfortunately damaged.

Due to misuse prior to its arrival at the museum, the fountain has turned completely yellow. We will seek funding later for its restoration.

CRAY-2

Restoration work

Cleaning of imitation leather mainly

ADDITIONAL EQUIPMENT

Remote control posts

Protective posts essential for the CRAY-2, the CRAY X-MP/48 and the CRAY-1S.

- 25 meter semi-elastic rope spool (black) - LINE
  147 Euros / 25 meters

- Distancing post 45cm (black) - LINE MINI
  74 Euros / pièce (14x: X-MP/48, 1-S et CRAY 2)

Interactive kiosks

The purchase of 4 interactive kiosks is a bonus to this project.

2 kiosks will be needed for our temporary exhibitions.

We will integrate interviews, videos and archives that will allow us to tell the story of these CRAY supercomputers. 2 other kiosks will replace those that are outdated and worn, used in the museum for 10 years. They will allow us to provide our visitors with emulated retro games, interviews, videos and additional information to our permanent exhibition.

- 789.-/piece

- Custom-made boxes 1800.-/piece

- Interface realized under Linux by the volunteers of Musée Bolo

- Minix Neo J50C-4 Max computers 347.-/piece

ADDITIONAL EQUIPMENT

Communication around the project

- Communication around the project
- Visuals: technical sheets
- Multimedia content
- Invitation cards
- Thank you plaque

Fixed price: 2'000.-

All the graphic design is realized and offered by the vice-president,
professional graphic designer, of the association Les Amis du Musée Bolo.

BUDGET AND QUOTE

Description	Amount	Unit price	Total in CHF
Restoration (by a conservator)			
CRAY X-MP/48 (estimate on request)			2762.50
CRAY 1-S (estimate upon request)			1657.50
CRAY 2 (estimate upon request)			1062.50
Replacement of leatherette and foams			
CRAY X-MP/48 + CRAY 1-S (quote on request)			3700.00
Naugahyde fabric (supplier for CRAY)	Total tissue		440.00
Space Blue (14 yards = 12.8m) - Antelope (3 yards = 2.75m) - Neutral (3 yards = 2.75m)	Delivery		460.00
Small equipment			
Distancing post	14 x	Euros 74.-	1042.95
Semi-elastic rope spool (25 meters)	1 x	Euros 147.-	147.95
Communication			
Package		CHF 2000.-	2000.00
Interactive kiosks			
27 inch screens	4 x	CHF 789.-	3156.00
Custom made cases	4 x	CHF 1800.-	7200.00
Minix Neo J50C-4 Max computers	4 x	CHF 347.-	1388.00
TOTAL			**25017.40**

Musée Bolo

Musée Bolo
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