Collaborative tools at Tech-X

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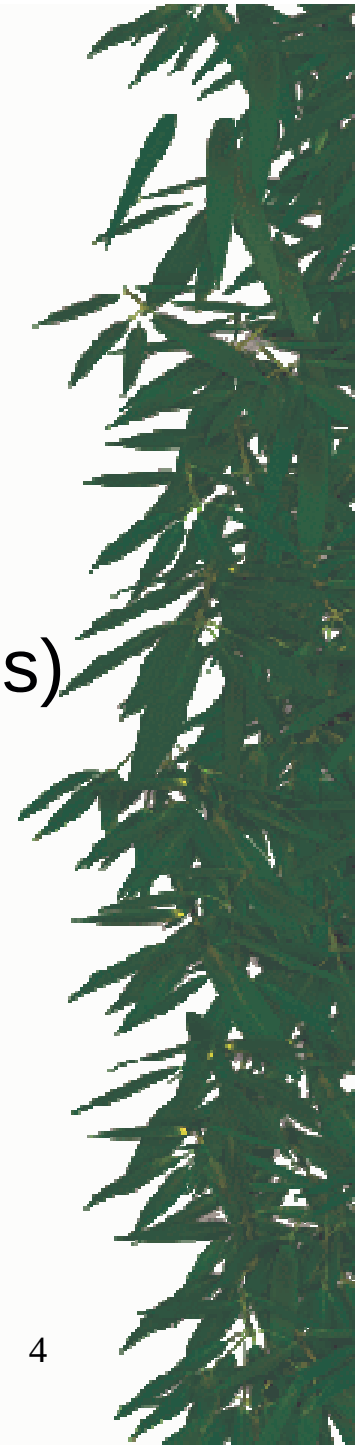
Overview

- Tech-X: who are we?
- CORBA
- CoDeveloper (application sharing, code development, secure, collaborative visualization tool)
- Elvis (virtual information space for search and browsing of documents and virtual meetings)
- DEMO
- New ideas

Tech-X Corporation
LightSite
Our newest educational project funded by the US Dept. of Education
Object Oriented Numerics
Optimize your application with this flexible and extensible C++ library
Applications and System Development
Unix and Windows, single processor to client-server

We are good at (like to do...)

- OOP (C++, Java, Python)
  - C++ nonlinear optimization libraries
  - C++ accelerator modeling code (MAPA)
  - 3D C++ plasma and accelerator modeling (OOPIC and VORPAL)
- Distributed computing (CORBA, RMI, Grids)
  - National Transport Collaboration
  - CORBA bridges (IDL CORBA bridge)
  - Grid portal for HEP (JAS with Grids)
  - Fusion Data Grids



Client Server Systems are ubiquitous in distributed computing

- Client asks server to do something, server does the job and returns results to the client
- Even in Grid settings each communication is a client-server transaction
- Thick clients, thin servers

Middleware connects clients and servers

- CORBA (Common Object Request Broker)
- Grids
- Web Services (MS .net, IBM Dynamic Business, Sun One)
- Grids Services (OGSA, Open Grid Services Architecture: meta Web Services)

CORBA is tested by industry

- Hidden low level communication details
- Open specification process (OMG)
- Object oriented: flexible and easy to maintain. CORBA is an object bus.
- Language transparent (bindings for C++, Java, Python…)
- Location/platform transparent
- Services (trader, naming etc)
- Secure (IIOP over SSL) + PI for authorization

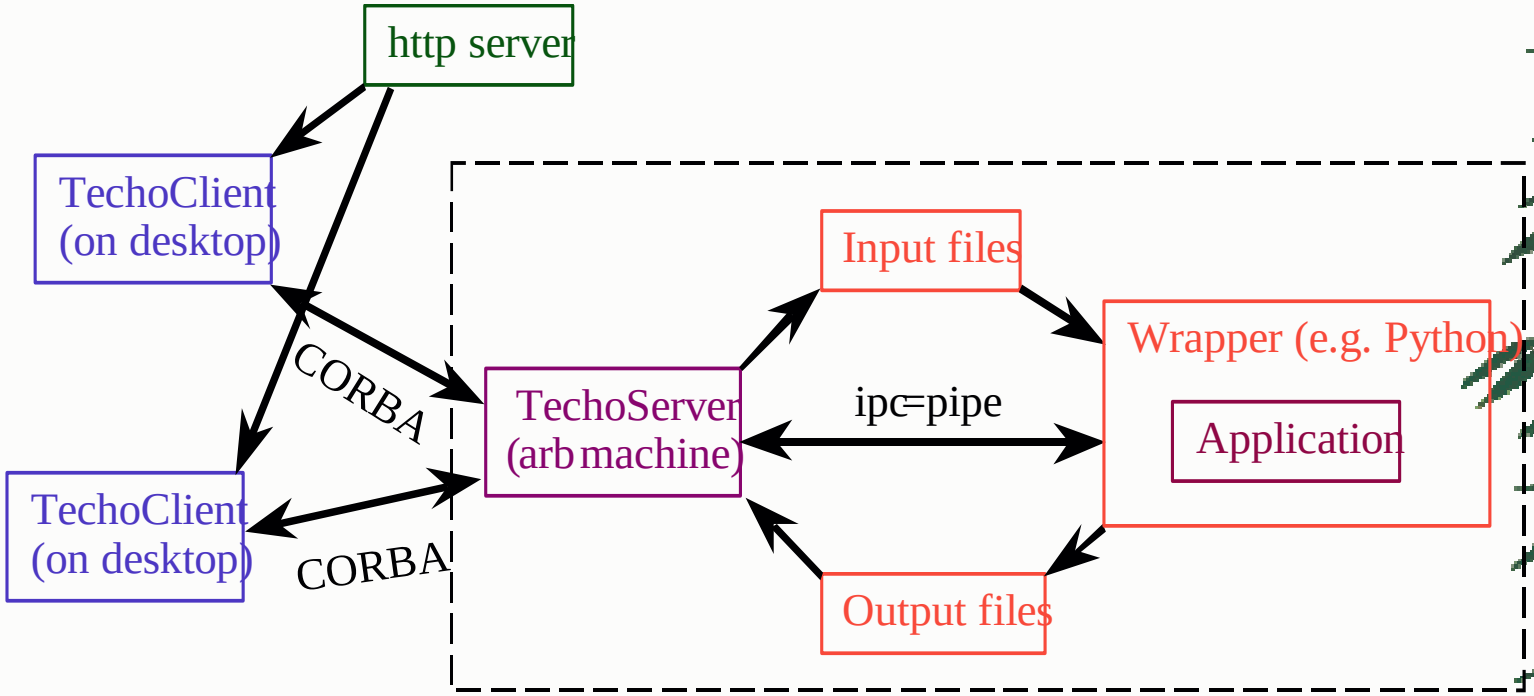
CORBA is about API

- Start with client-server interaction and design IDL interfaces
- Run IDL compiler: stubs (client side proxies) and skeletons (for server side implementation
- Write implementation: Voila!
- Or, start with implementation, abstract IDL interface and obtain unlimited clients!

CORBA systems allow for multiple “clients” to

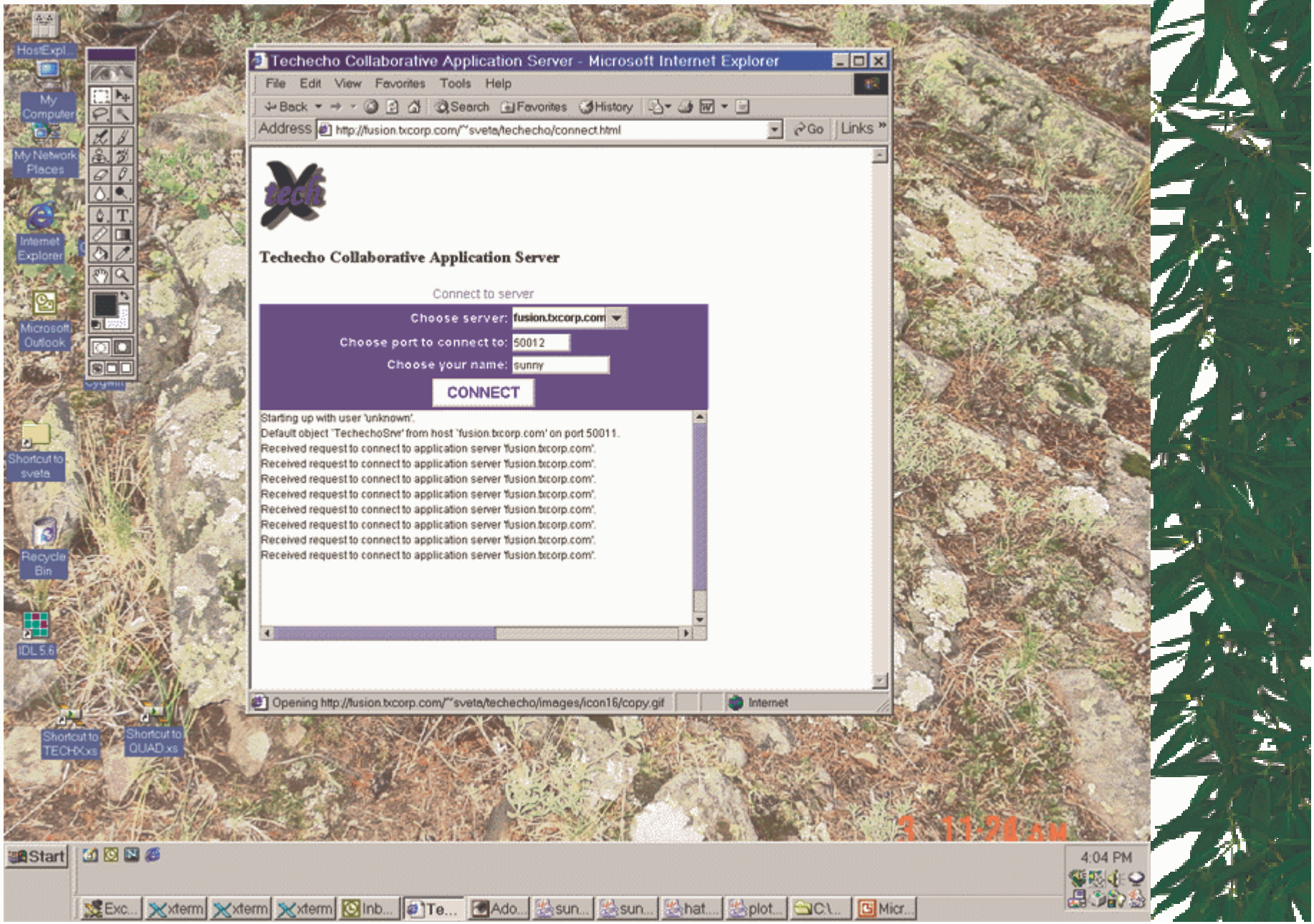
- be in one Web accessible “session”: be aware of each other presence and actions
- communicate with each other (private and public channels) and exchange information artifacts (texts, images and markups)
- run server applications and share results
- edit server code collaboratively
- have persistent repository for these artifacts, log-books, tracked changes to them
- have authentication and fine-grain authorization

Architecture of the tool

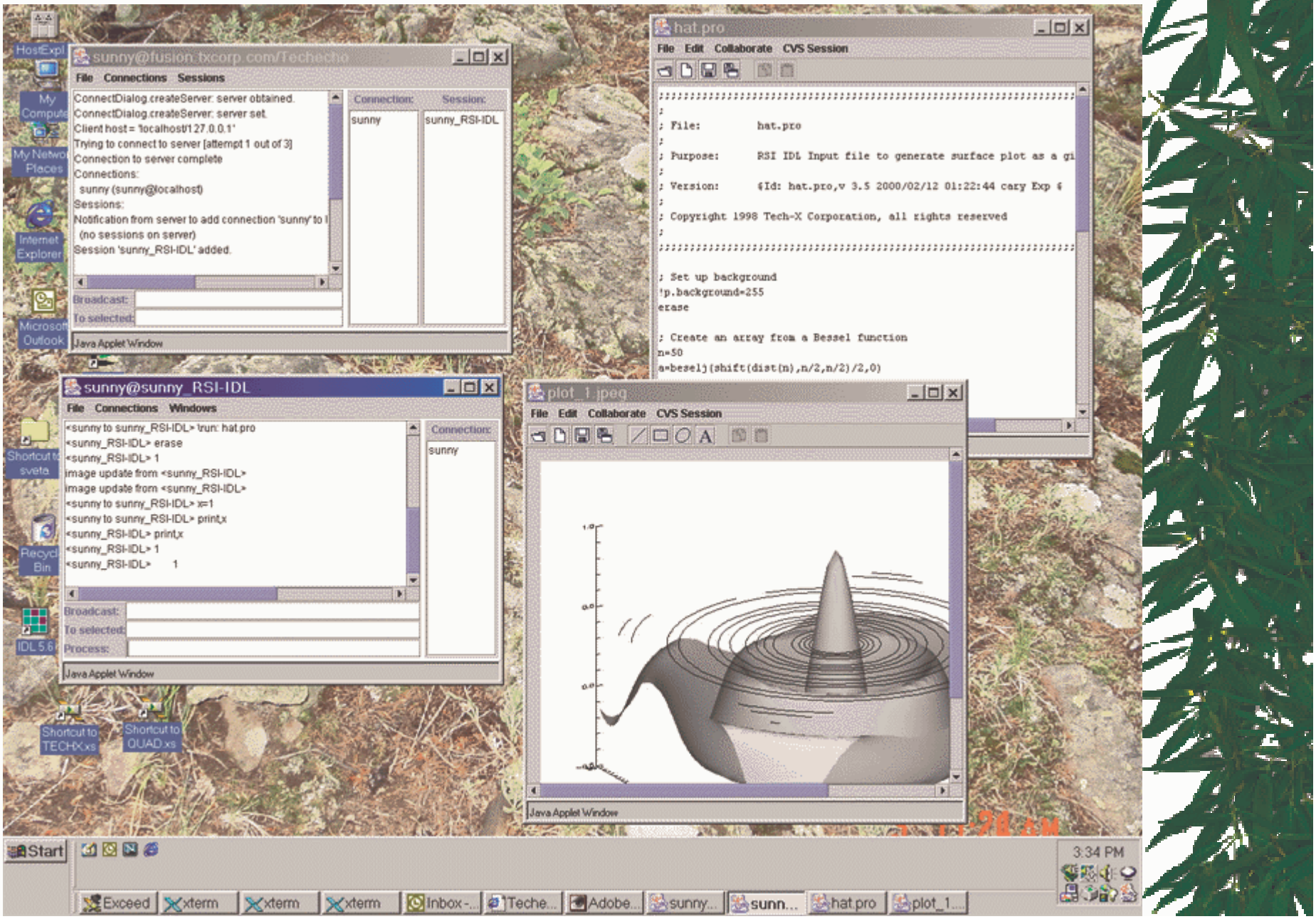


Show my demo (keep all fingers crossed!)

CoDeveloper is Web invocable



CoDeveloper runs remote applications collaboratively



CoDeveloper allows for asynchronous collaboration

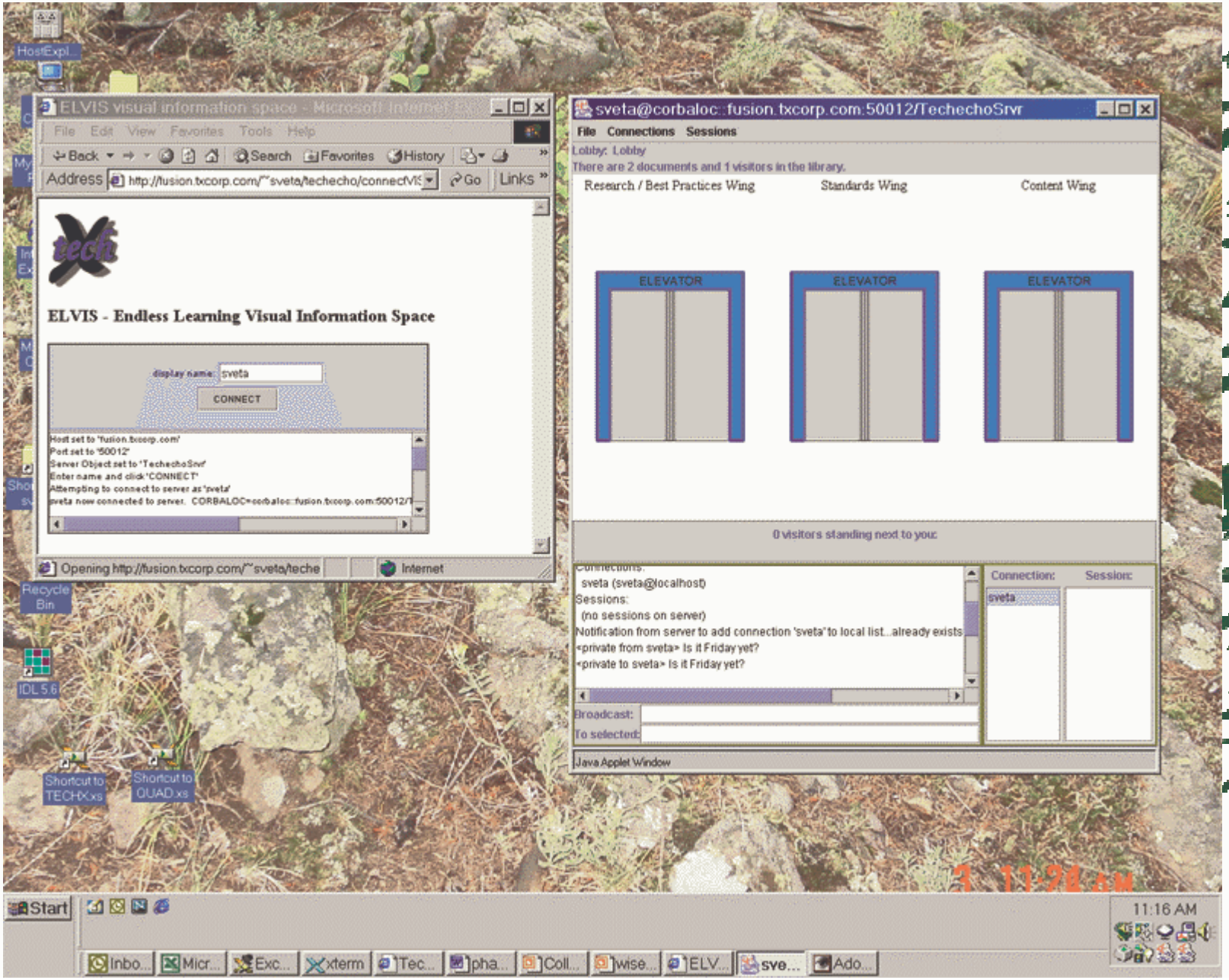
- CVS repository on the server: files can be retrieved and edited again
- Log files for each session
- Needs persistent sessions, arbitration and distributed fine grain security (Akenti, BNL or CAS, Argonne)

ELVIS: Eternal Learning Visual Information Space

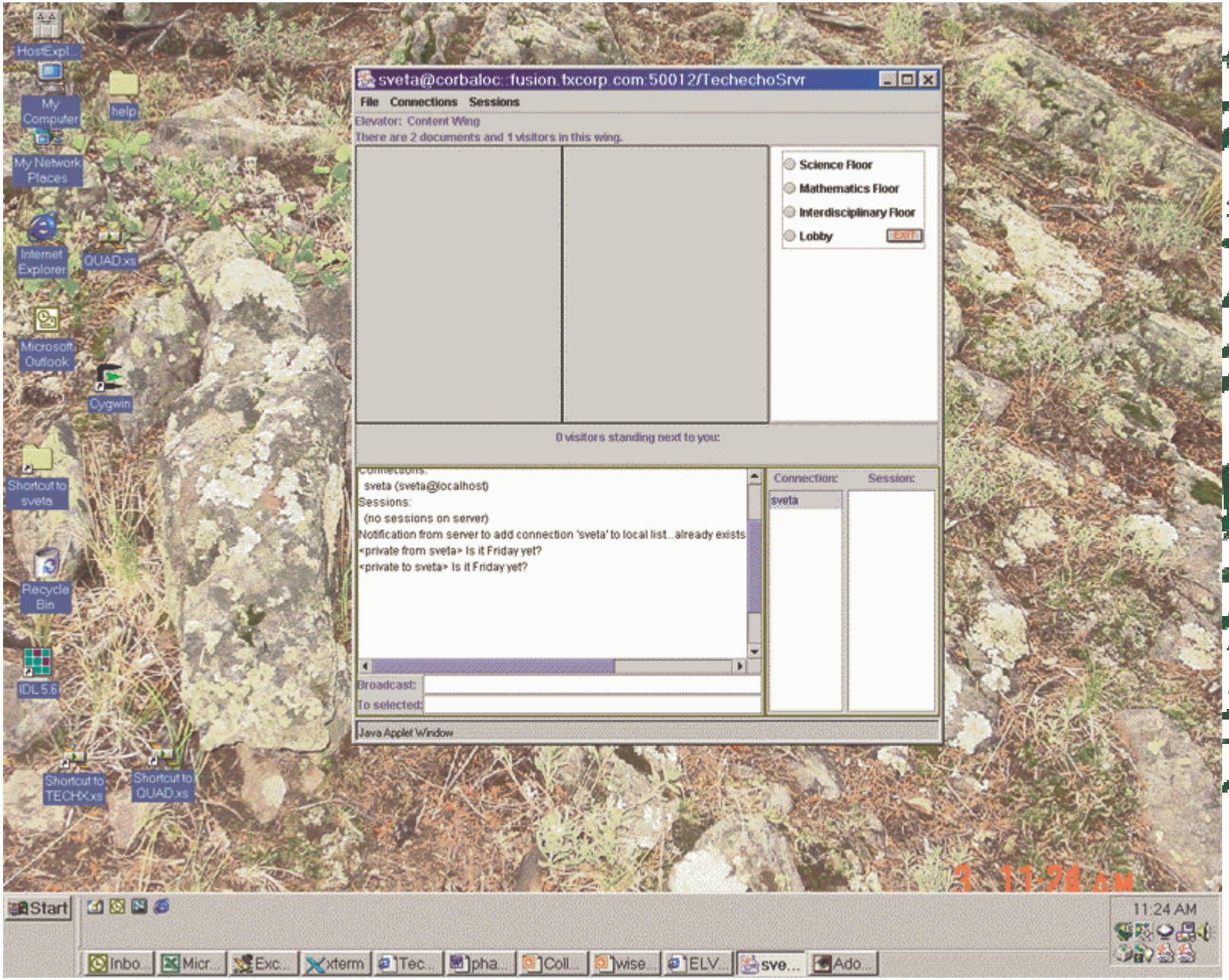
- VIS for teachers to browse documents about teaching standards, share success stories, add new documents (with XML tags)
- VIS is defined by an XML file
- ELVIS is searchable
- Virtual meetings (extended chat-room)

Show ELVIS demo

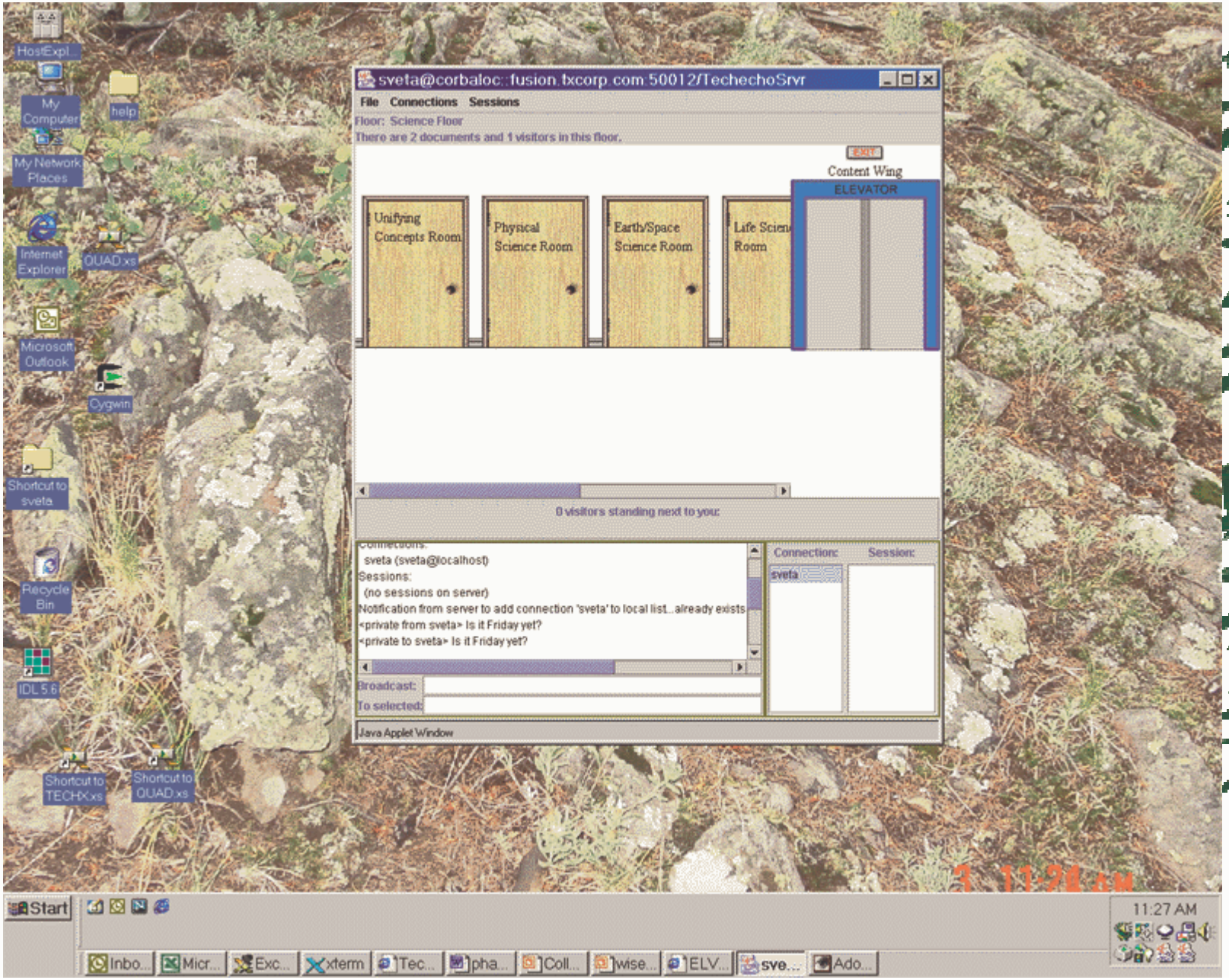
ELVIS has floors and rooms



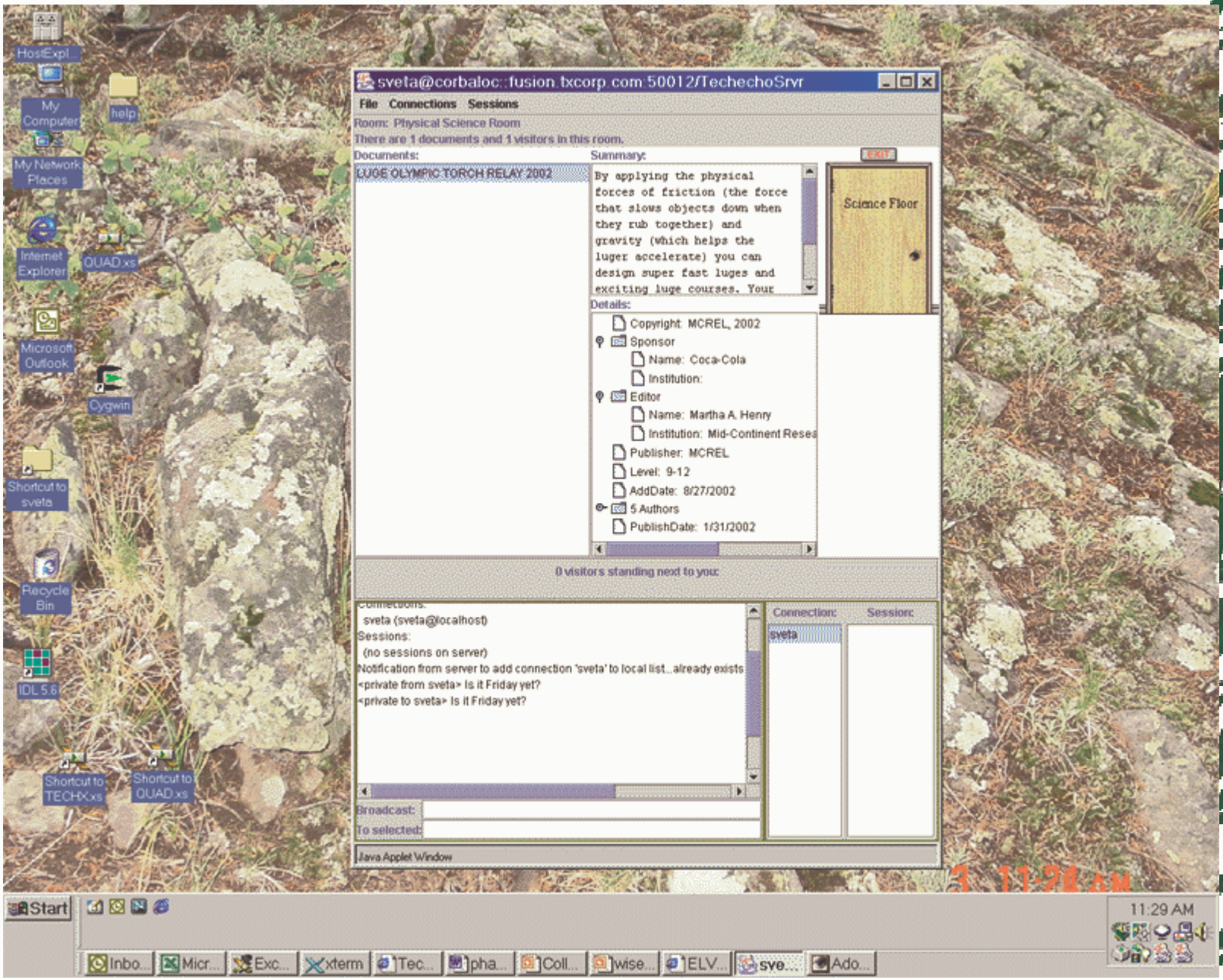
In the elevator of the contents wing:



Science Floor



Inside the room: see docs and chat



Summary of what we have

- Our tools allow clients to run and share remote applications, exchange texts, images and markups and talk in real time (synchronous collaboration)
- Visualize and navigate persistent information spaces (asynchronous collaboration). Log-files.
- We are working on making sessions persistent, adding collaborative visualization, and fine grain authorization tools (DOE: CoDeveloper and DOEd: ELVIS)

Grids

- A set of data and compute resources (VO) communicating through a protocol for distributed resource manipulation
- Globus is the most developed for Grids: information discovery, resource management, communication and security.
- Until now: set of protocols with no API

Web Services is the latest great thing

- SOAP (Simple Object Access Protocol) is light-weight protocol for XML exchange (not objects!). Can be carried out by HTTP, FTP and Java Messaging Service.
- WSDL (Web Service Description Language) specifies services as a set of endpoints operating on messages containing docs or RPC's. Also specifies the location and data-encoding format.
- There are various bindings for WSDL (Java and C++)

WS vs CORBA (1)

- Data model
  - WS is message oriented
  - CORBA is object oriented
- Client-Server coupling
  - WS: loose
  - CORBA: tight
- Location transparency
  - WS: URL
  - CORBA: Object reference
- Type safety
  - WS: runtime
  - CORBA: static and runtime

WS vs CORBA (2)

- Parameter passing
  - WS: by value
  - CORBA: by reference
- Transfer format
  - WS: unicode
  - CORBA: bytecode
- Data discovery and registry
  - WS: WSDL
  - CORBA: Interface Repository and Trader/Name services (White/Yellow pages)
- Transport
  - WS: TCP/IP and HTTP
  - CORBA: TCP/IP and IIOP
- Security and Firewalls
  - WS: SOAP over HTTP, Security?!!
  - CORBA: upcoming specs for firewall routing, Security Service

Grid Services (OGSA at Argonne) are very promising!

- Grid Service is a Web Service that provides a well-defined interface suitable for VO's
- Interfaces address discovery, dynamic service creation, lifetime management, notification…Conventions address names and upgradability

Summary

- Tech-X has extensive expertise in distributed computing, collaboration tools and accelerator physics
- We are funded by SBIR (and some direct funding) which can leverage GAN efforts
- We are open for ideas and collaboration!