Cooperative Application Development

N&C Worldwide Product Marketing

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Development Layers

Macintosh Operating System

Highly crafted environment that ties hardware software and networking together to provide the user with a great experience...

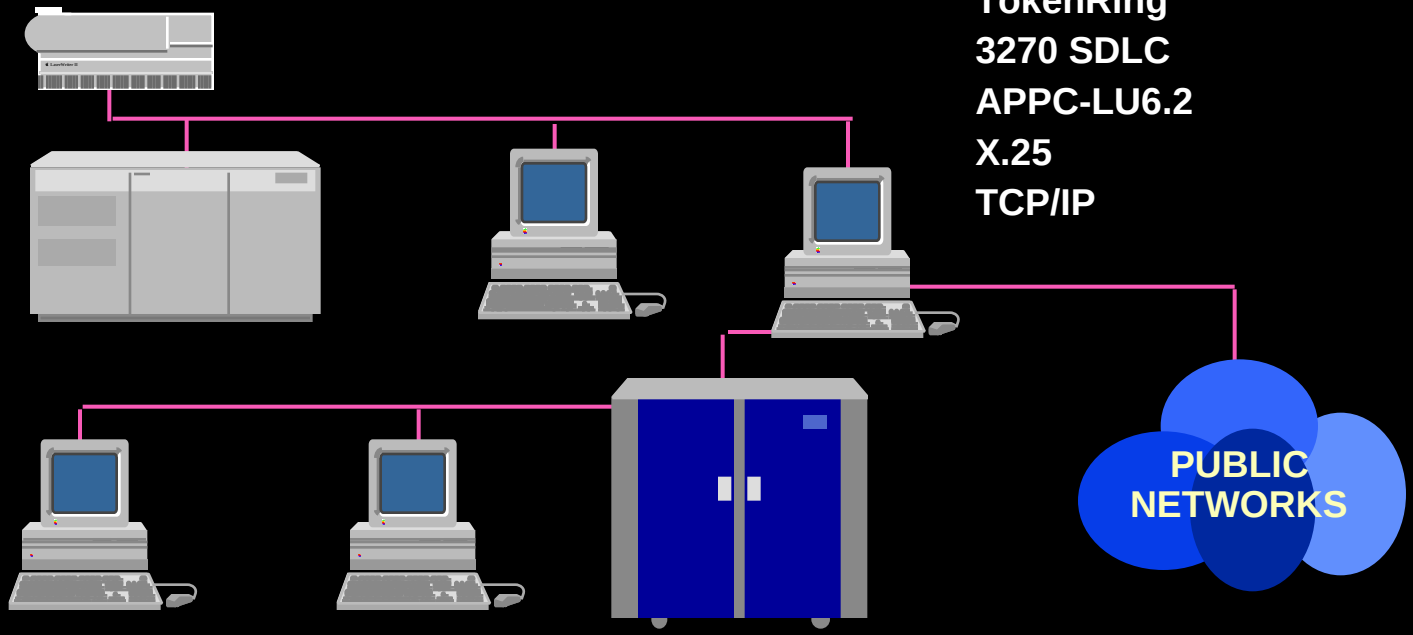
- Built-in Graphics
- Built-in Networking
- Use of Real World Metaphors
- Seemless integration of applications

User is at the Center
Not at the End

Communications

The Macintosh is the
best connected computer

AppleTalk
EtherNet
DecNet
TokenRing
3270 SDLC
APPC-LU6.2
X.25
TCP/IP



Desktop Tools

Macintosh has the most advanced and broadest desktop application development tools.

Programmer Tools

Macintosh Programmer's Workshop

Workgroup Tools

CommToolBox
AppleTalk

Object Oriented Tools

MacApp C++, O' Pascal
HyperCard
Common LISP

UNIX Tools

A/UX
X.Windows

Cooperative Application Tools

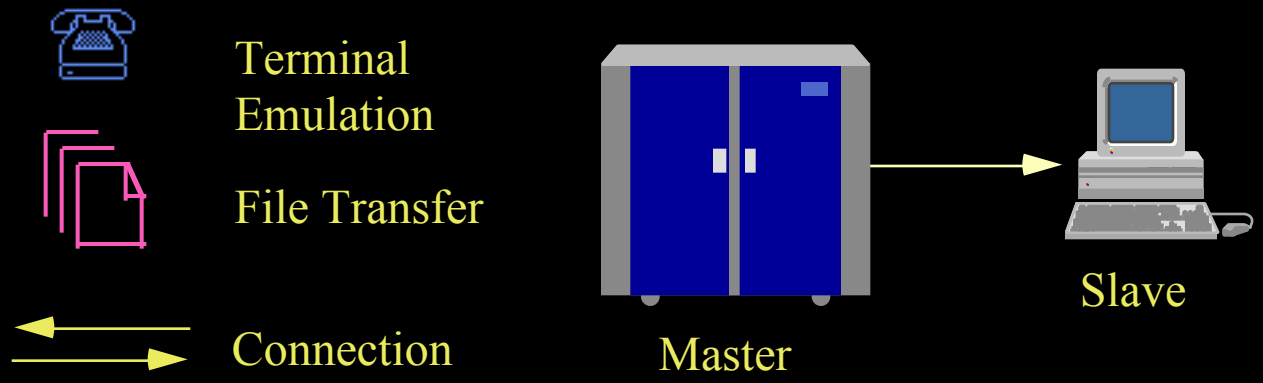
Cooperative Applications are programs that reach beyond the desktop. There are many types of cooperative applications.

Cooperative Application Tools

- Distributed User Interface
- Front-Ending
- Distributed Data Access
- Distributed Processing

Terminal Emulation

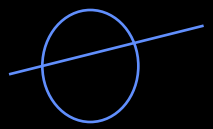
This is still the most popular aspect of integrating Macintosh into host based systems but least powerful.



Apple's new CommToolbox Managers provide terminal emulation, file transfer, and connection services at the operating system for all Macintosh applications.

X.Windows

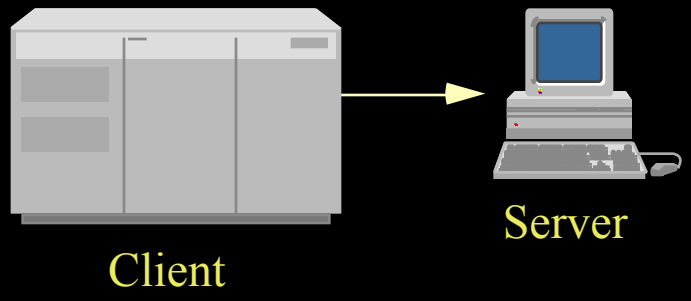
X.Windows is a set of low level drawing primitives that allow host programs to provide a distributed user interface.



low level graphics

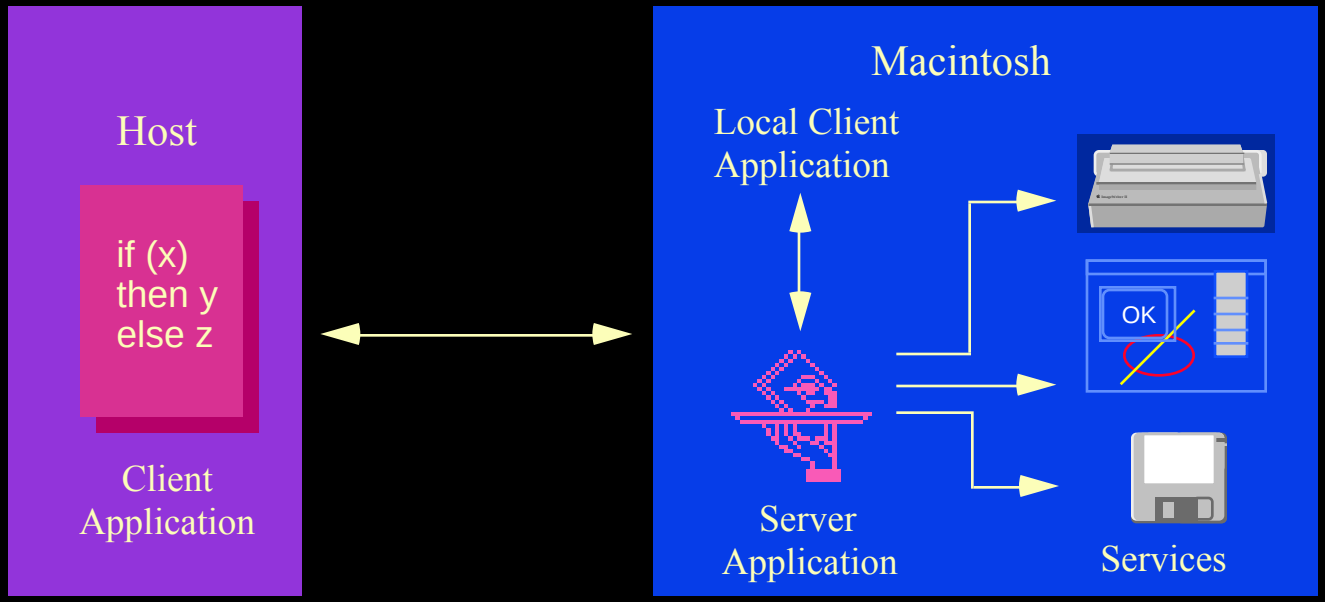
No printing or filing features

High Speed Network



Even though X.windows is a client server architecture, the reality is a master-slave relationship with the host and host programmer having to do most of the work.

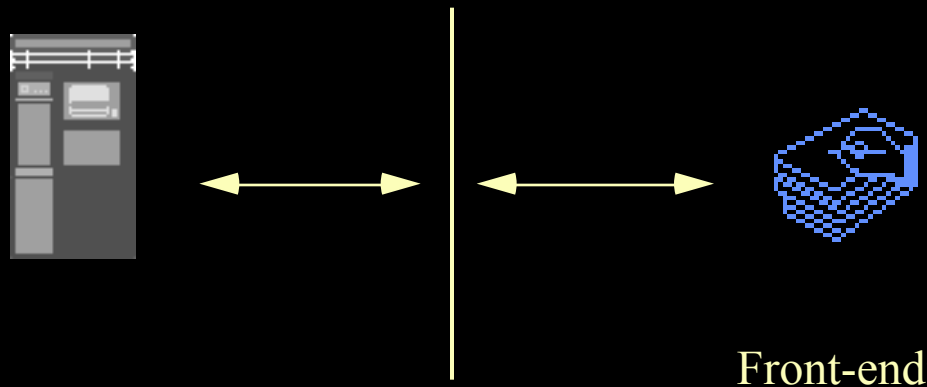
MacWorkStation



MacWorkStation represents a very high level client-server model, allowing remote or local applications to request and receive user interface, printing and filing services through a simple but powerful protocol. Desktop resources are optimized to offload host processing and to work over any speed network.

Front-Ending

Hiding the existing user interface with another user interface can be done sometimes quickly and without changing the host program.



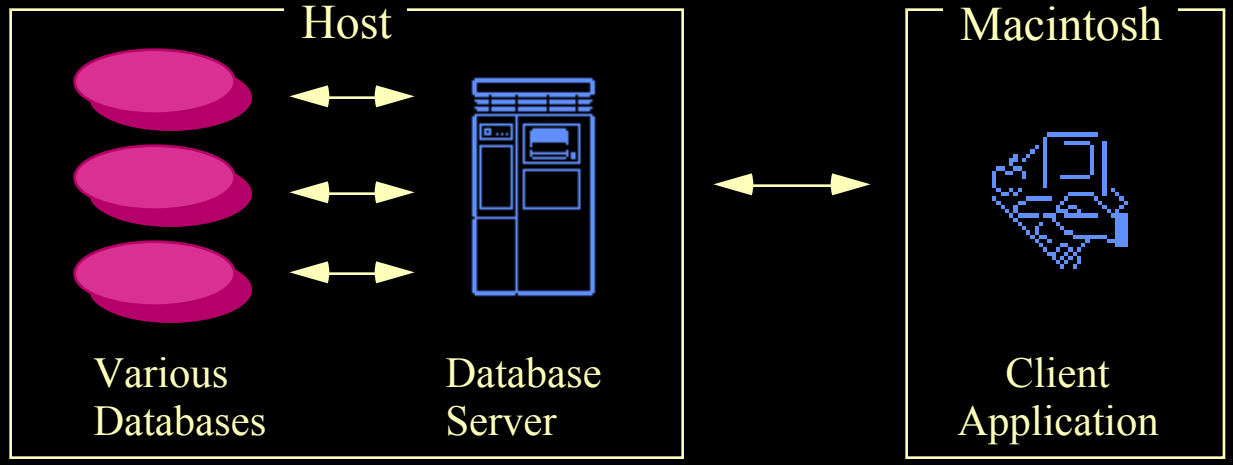
Host Application

Front-ending Application

HyperCard is an excellent Apple product for “front-ending” an existing host application.

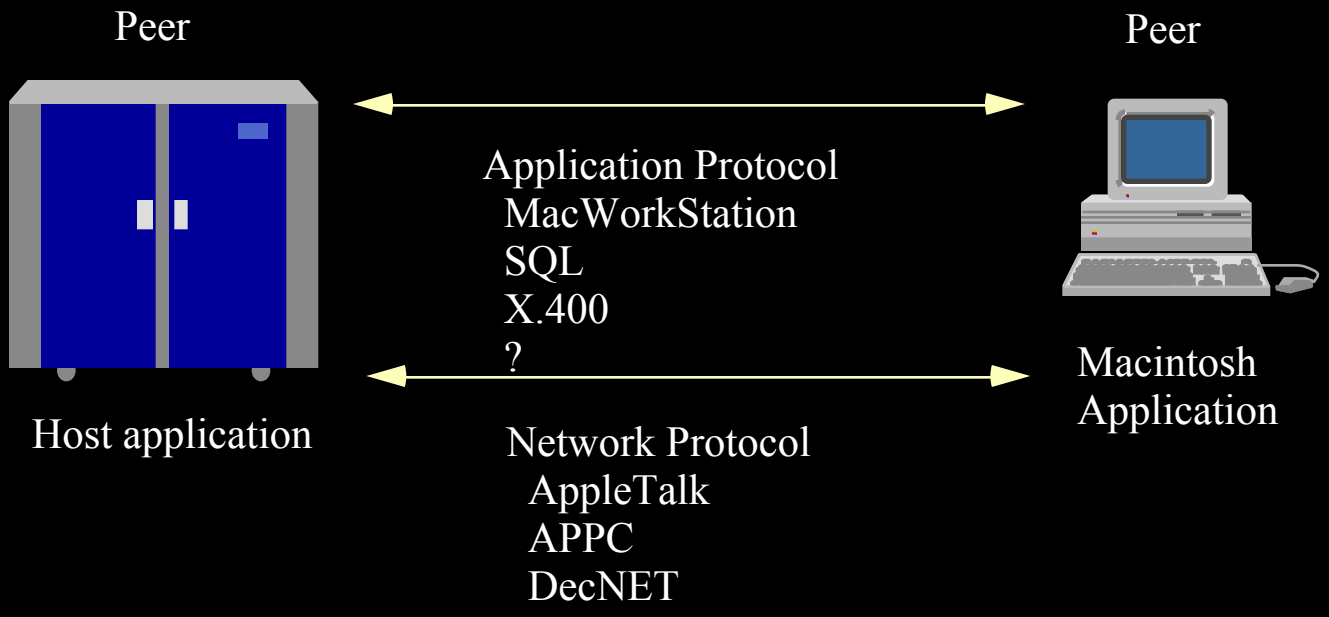
Data Access

Data Access technology provide a methanism for an application to request data from a database server program running on another computer.



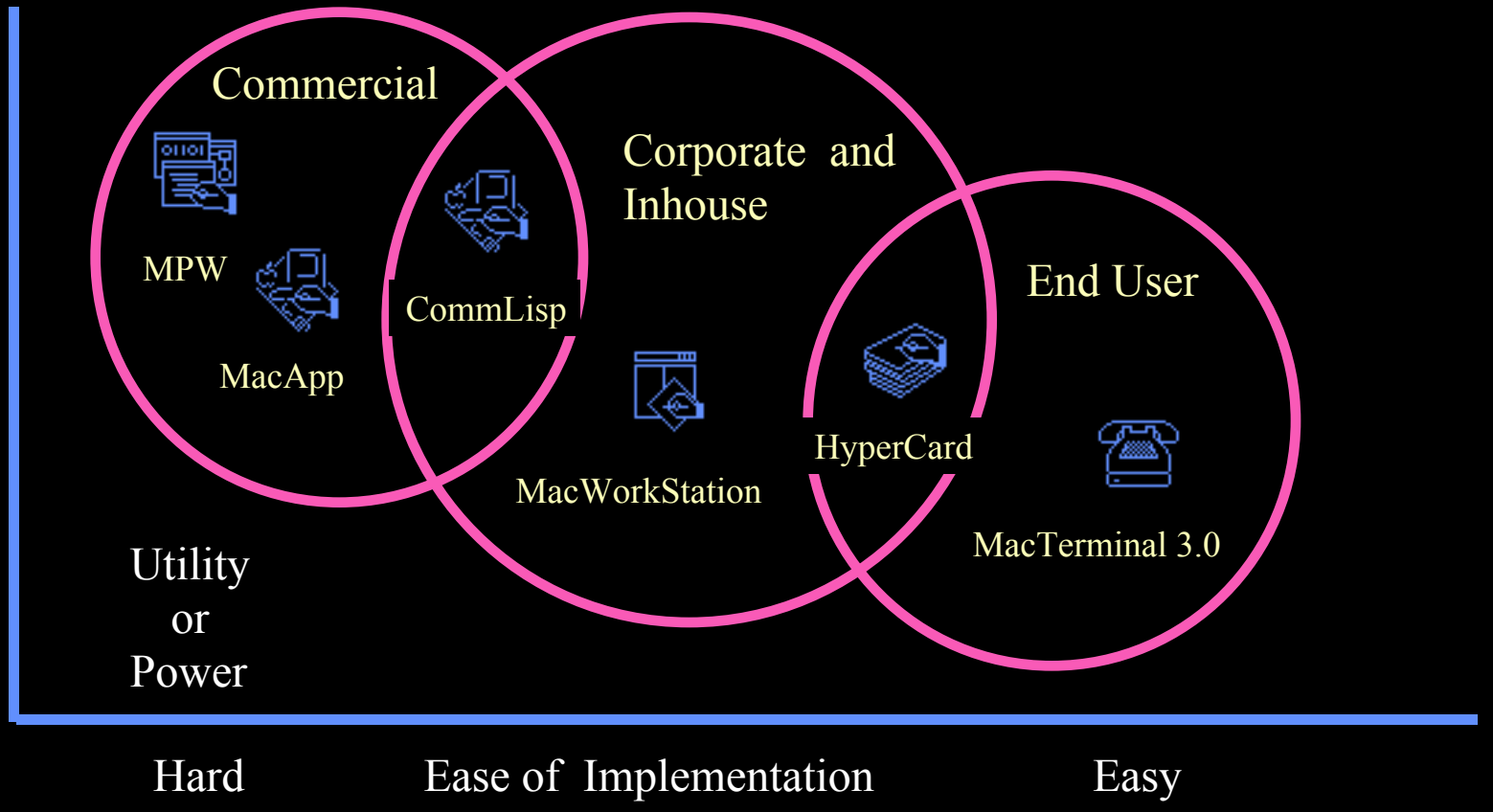
Apple’s CL/1 technology provides excellent data access and data entry services for any Macintosh application.

Peer to Peer



Peer to peer application development is very powerful but is also very expensive and takes a complete rewrite of the host application and then the development of desktop applications.

Product Line



MacWorkStation

About MacWorkStation

MacWorkStation is a distributed user interface technology designed to leverage desktop resources for transaction processing applications.

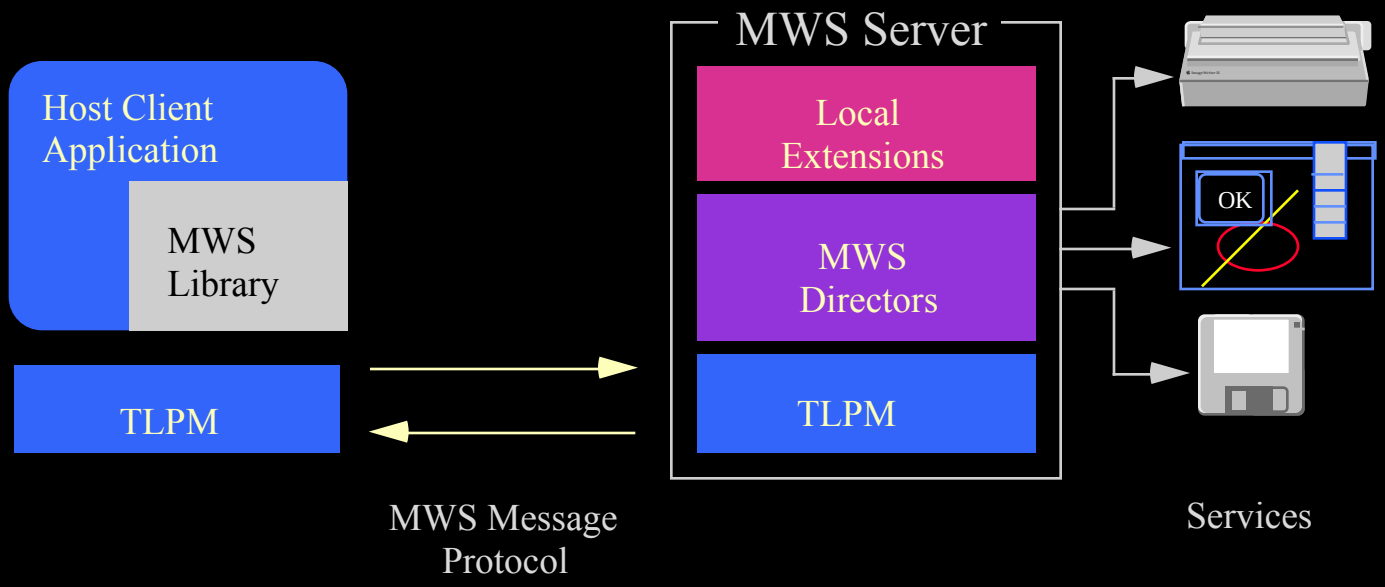
MWS Benefits

- Allows any host application to look and feel like a normal desktop application. Provides complete transparency between local and remote applications.
- Reduces development time
- Reduces host cpu loads
- Reduces network traffic

MWS Features

- Uses a very high level message protocol which is easy to use and easy to learn by traditional host programmers
- Can be used by any programming language on any host across virtually any network
- Full desktop user interface, printing and filing services are supported
- All local objects are maintained by local processing, including complete integration with desktop and other applications

Programming Model

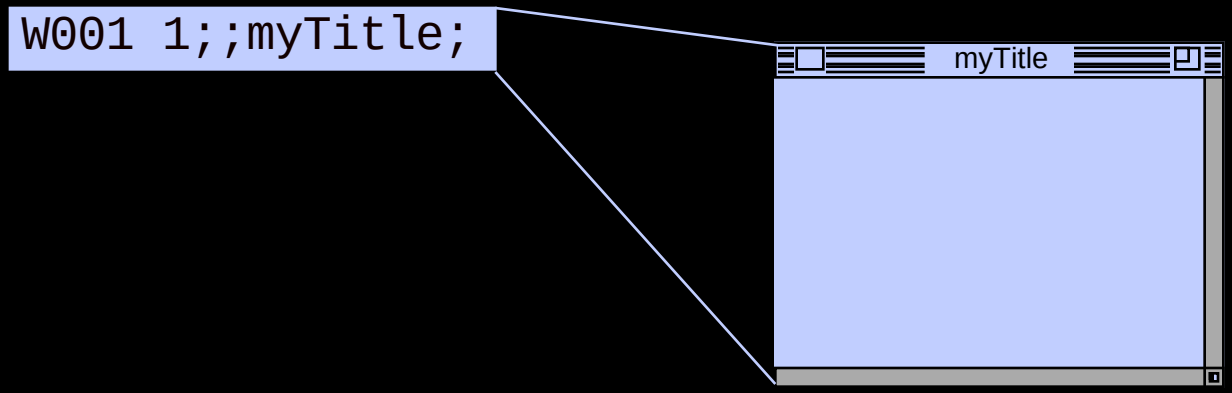


The MWS Message Protocol reduces the complexity of graphical user interface programming to the level of normal terminal screen programming but keeps the benefits distributed processing.

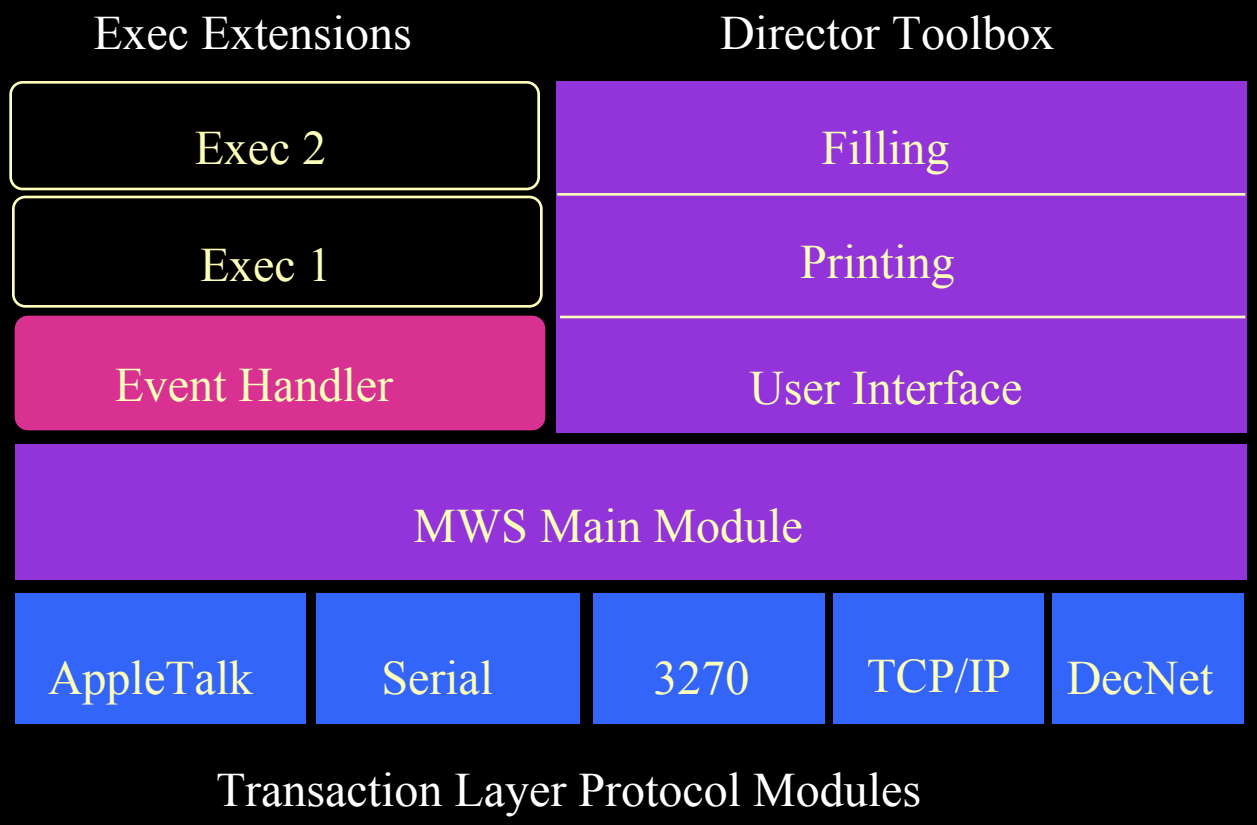
MWS Message Protocol

The MWS Message Protocol is the heart of MacWorkStation. It provides for an elegant method for controlling local desktop objects.

The Following Sample Creates a “live” text Window

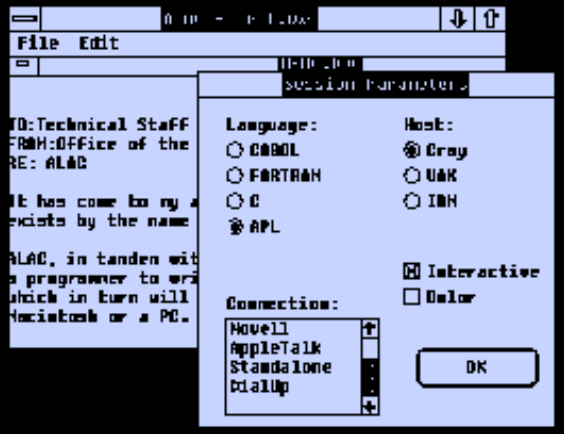


MWS Server

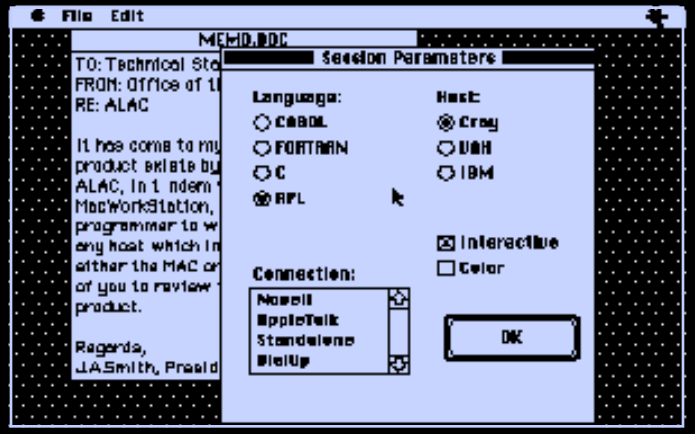

Exec Extensions
Director Toolbox
Exec 2
Exec 1
Event Handler
Filling
Printing
User Interface
MWS Main Module
AppleTalk
Serial
3270
TCP/IP
DecNet
Transaction Layer Protocol Modules

ALAC

ALAC (Any Language, Any Computer) is the first MWS compliant non-Macintosh server on the market. It provides Windows users with access to host applications using the MacWorkStation protocol.

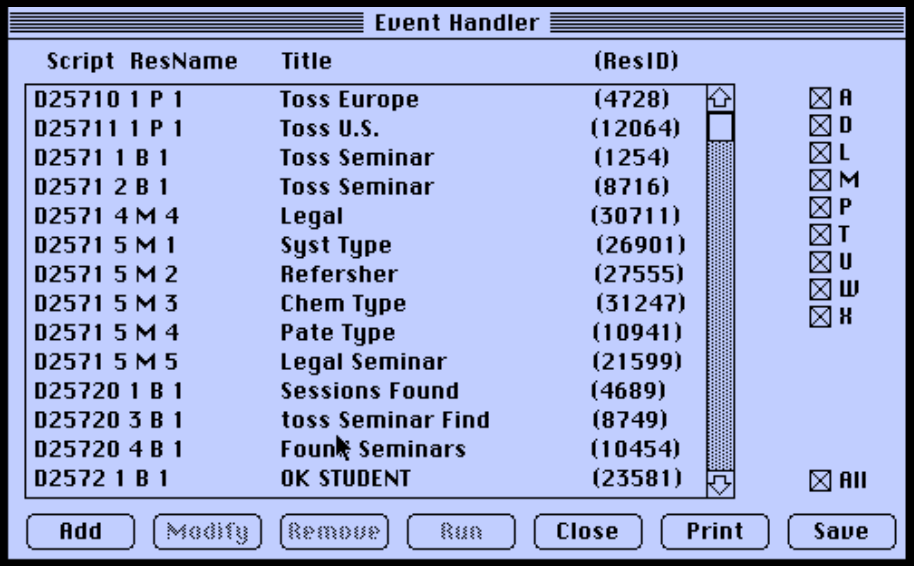


Windows



Macintosh

Event Handler



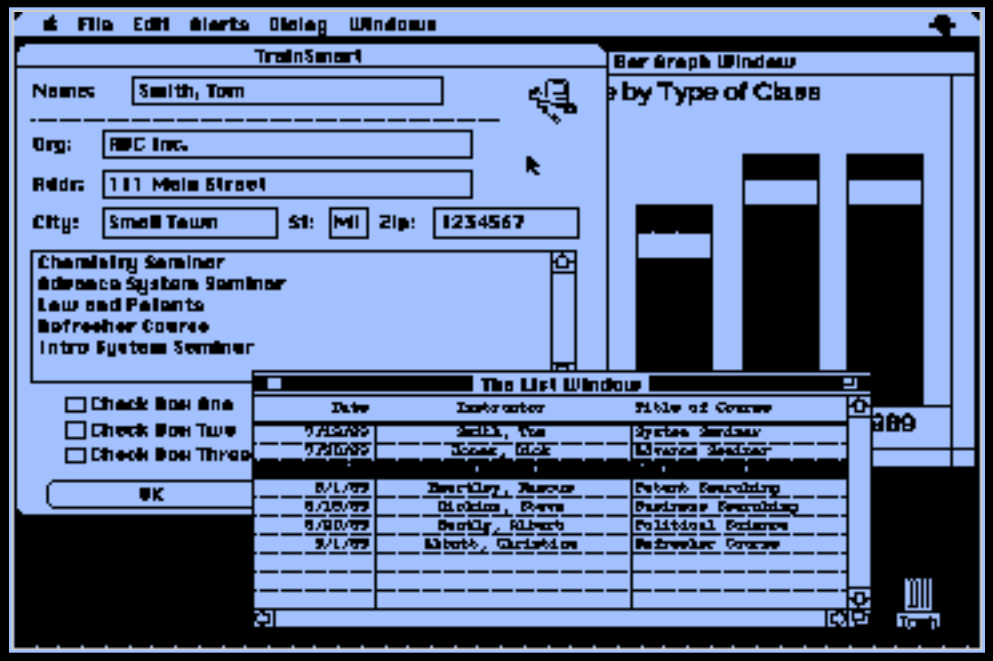
Quickly design and Prototype 100% of the user interface.

The prototype IS the base for the application.

Dialog Builder

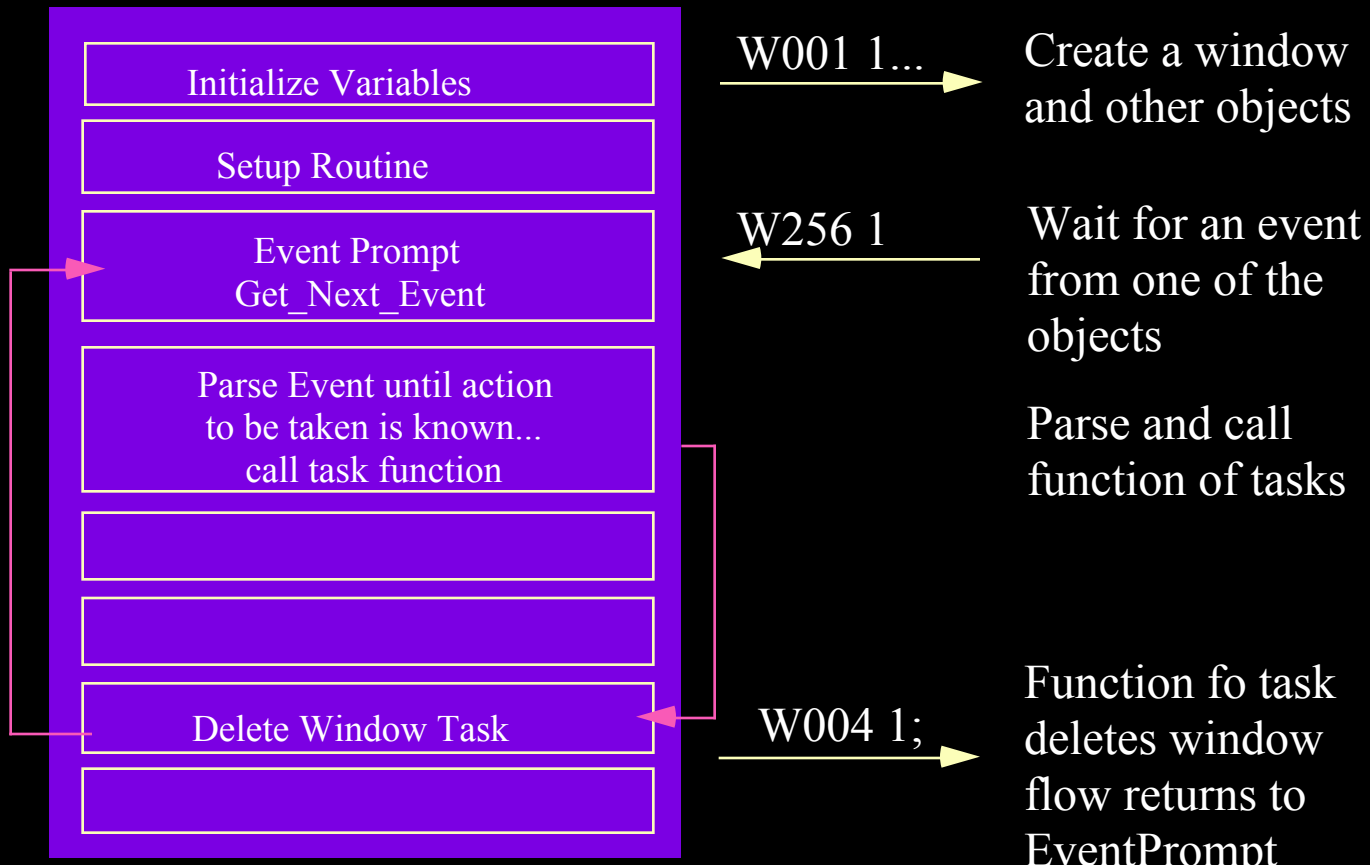
MWS Dialog Builder allows the “painting” of dialog boxes which can then be used by the client or by Event Handler

Prototype Using EH Dialog Builder



After design and prototype, then start moving event handling to the client program

Host Program Structure



Benefits

- Leverages the strengths of the desktop computer while taking advantage of the current host environments
- Does not require the host programmer to become a full Macintosh Guru
- Integrates into existing complex systems environments easily without bucking existing MIS procedures

Benefits *(cont.)*

- Reduces development time, host cpu, and network traffic
- Provides transparency between local and remote applications and provides for a stable transition to peer to peer application development

Some Customers

Aetna Life & Casualty
Alamo Rent A Car
Apple, Computer, Inc.
Arco Alaska, Inc.
Arthur Anderson & Co.
Baylor University
Bendix
British Petroleum
CitiBank
Claris Corporation
Cornell University
Deft,Inc.
E.I. Dupont
Emory University
Env. Protect. Agency
GEIS
General Dynamics
GTE
House (U.S. Con)
Hughs Aircraft
Hydro Quebec

Some Customers *(cont.)*

Innovative Med. Software
INET, Co of America
Kal Kan Foods, Inc.
KMS Fusion, Inc.
Knowledge Based Tech.
Legislative Ass./Ont.
Liberty Mutual Ins. Co.
M.I.T.
Michigan Leg. Assembly
Mobil Oil
NASA
North Amer. Phillips
Northrop Corporation
Pacific Bell
Peat Marwick & Main
Princeton University
Relational Tech. Inc.
Relay Communications
Stanford University
Tandem Computers. Inc.
Time, Inc.

Some Customers *(cont.)*

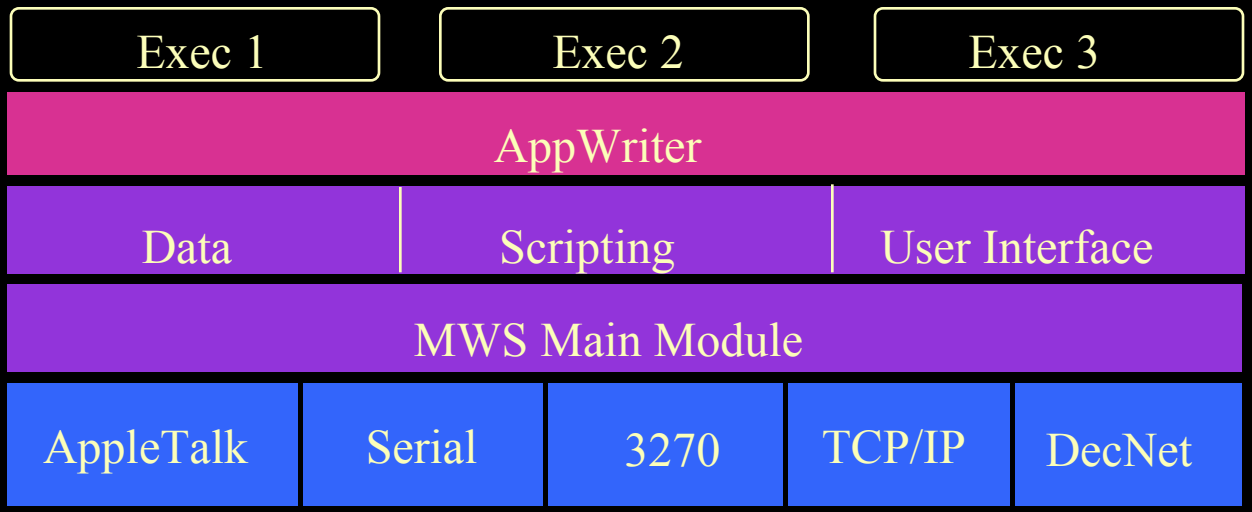
Union Carbide
University of Michigan
University of Ziekenhuizen
University of Ohio
University of Oslo
University of Pittsburgh
University of Wollongong
Western Mich. U.
Wise Man Ltd.

Future Directions

- Additional Third Party Libraries
- Additional Third party Servers
  - X.Windows
  - VT100
- Scripting in EventHandler for easy local processing
- Automatic program compiling of EventHandler prototypes and applications

AppWriter

AppWriter will provide an application development environment for building cooperative or standalone applications



Transaction Layer Protocol Modules

Demonstration Time