# Wafe – An X Toolkit Based Frontend for Application Programs in Various Programming Languages

**Gustaf Neumann, Stefan Nusser**

*Wirtschaftsuniversität Wien*
*Abteilung für Wirtschaftsinformatik*

neumann@wu-wien.ac.at
nusser@wu-wien.ac.at

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# Overview

- Motivation
- What is Wafe?
- Design Principles of Wafe
- Wafe as a Scripting Language
- Wafe as a Frontend
- Separability of Application Program and Frontend
- Code and Documentation Generation
- Summary

# Motivation

- **Given:** Existing application programs in various programming languages without decent X Window bindings (Prolog, Fortran, Perl, SQL-Plus, ...)
- **Given:** X Window based environment (Workstations, PCs and Macs with X Server)
- **Wanted:** Decent user interface for developed Unix applications using accepted widget sets
- Is xterm the solution?
- Is reprogramming the application programs in C the solution (to access X Toolkit)?
- Is a modification to application language implementation the solution (to provide Xt bindings)?

# What is Wafe?

| | | |
|---|---|---|
| | *Wafe* = | |
| 1) | | *Tcl* + |
| 2) | | (*Intrinsics* + *Widgets* + |
| | | *Converters* + *Extensions*) + |
| 3) | | *Memory Management* + |
| 4) | | *Communication* |

1) Tool Command Language
(Ousterhout 1990)

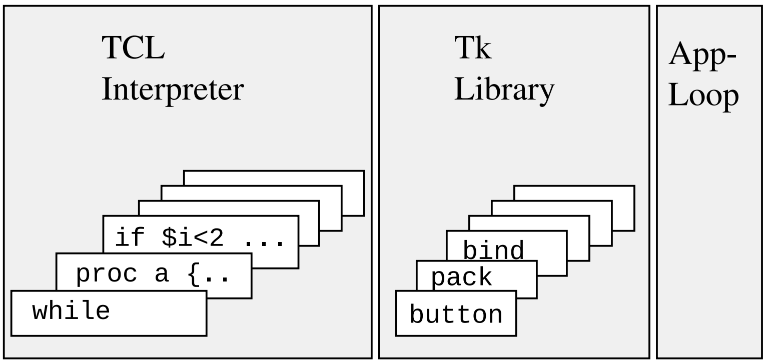
2) X Toolkit Intrinsics (Xt),
Athena widget set, OSF/Motif widget set,
XPM (Color Pixmaps), RDD (Drag & Drop
Library)

3) Dynamic creation and modification of widget
trees

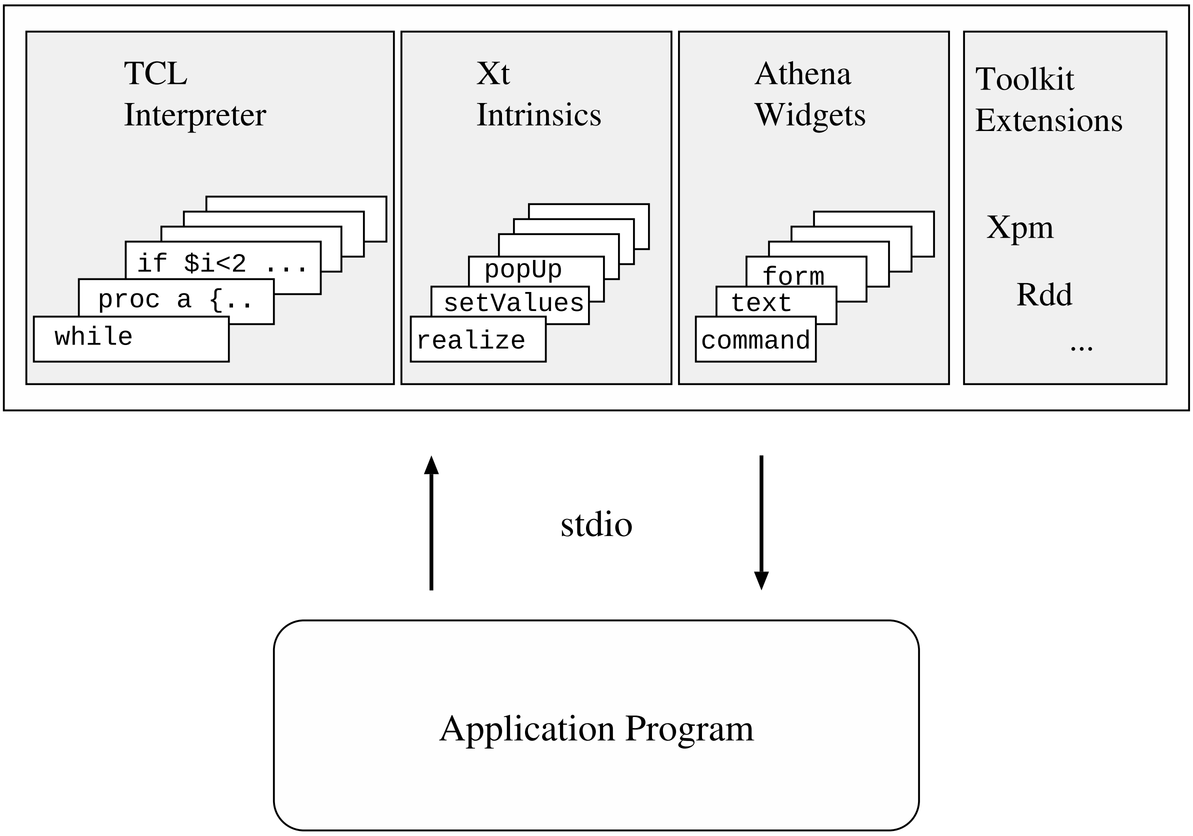
4) For Wafe's frontend mode

# Wafe and Tk

Tk Toolkit (Ousterhout 91)




Wafe



# Design Principles of Wafe

- Three Modes of Operation:
  - Interactive mode (shell)
  - File Mode (scripts)
  - Frontend Mode (2 processes)

- Following Xt Programming Philosophy

- Hiding Xt internals

- Standardize widget creation commands

- Providing rich set of converters

- Procedural behaviour triggered by callbacks and actions

# Tiny Wafe Scripts

- Athena widget set:

```
command hello topLevel \
        callback "echo Hello World"
realize
```

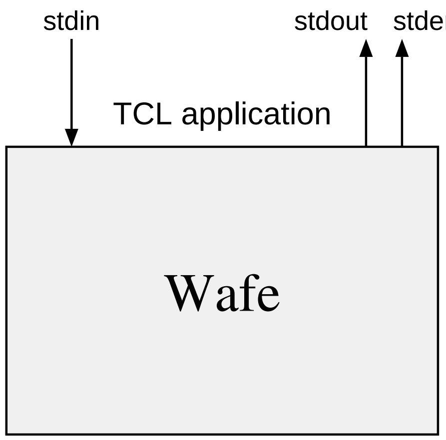
- OSF/Motif widget set:

```
mRowColumn form topLevel \
           background pink

    mPushButton Otto form \
           background firebrick \
           activateCallback "echo i am %w"

    mPushButton Quit form \
           background red \
           labelString "Press here to Quit" \
           activateCallback quit

realize
```

# Using Wafe for Scripts and as Frontend

## *File Mode*

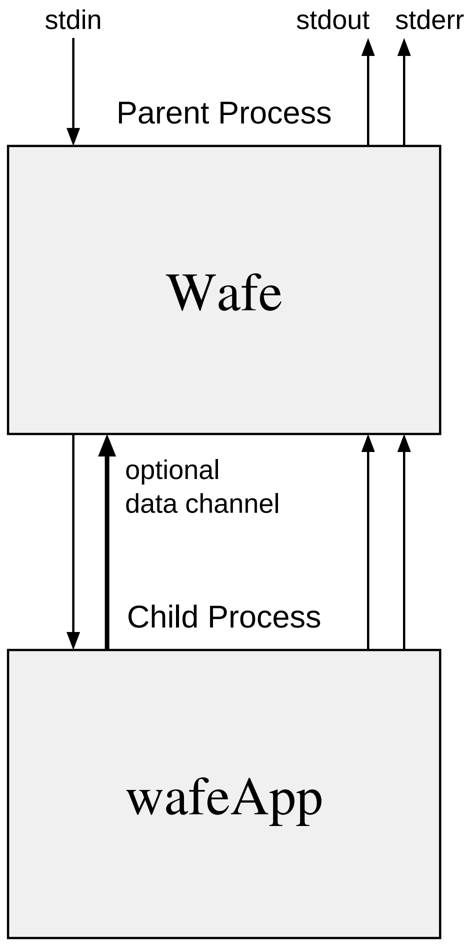
`#!/usr/bin/X11/wafe --f`



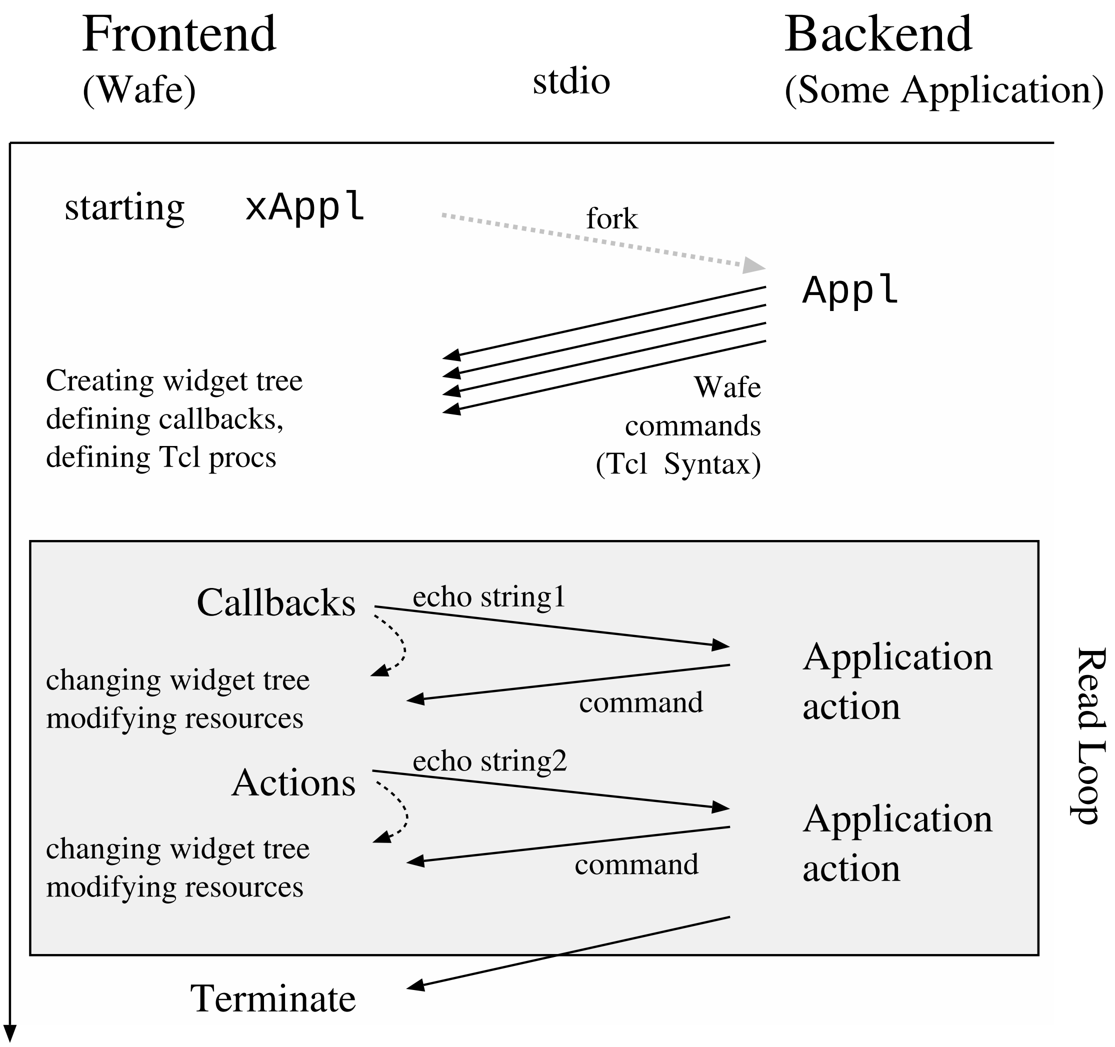

```
#!/usr/bin/X11/wafe --f
command hello topLevel \
   label "Wafe new World" \
   callback "echo Goodbye; quit"
realize
```

## *Frontend Mode*

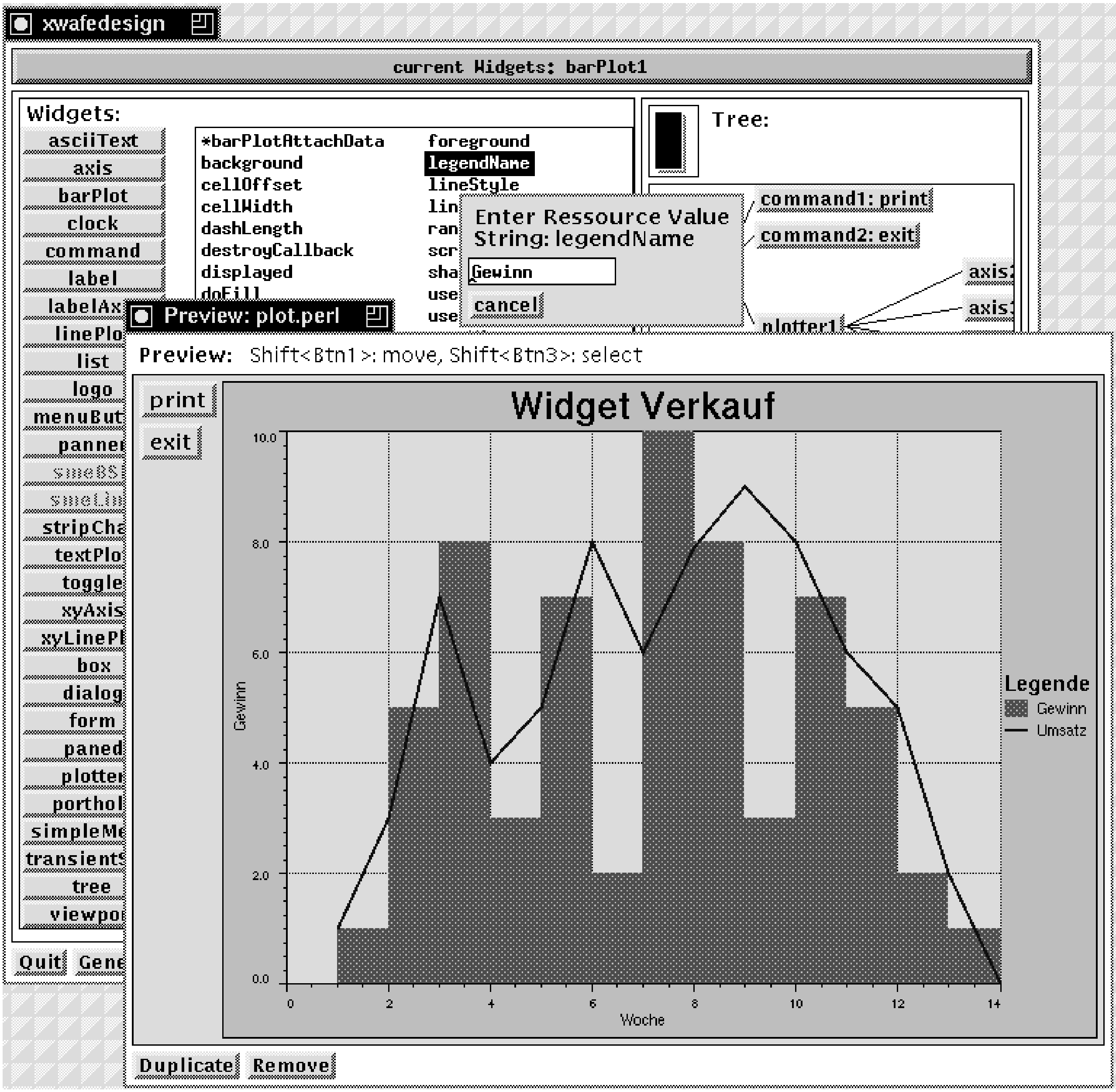
`xwafeApp -display ...`



# Communication between Wafe and an Application Program



# xwafedesign: A Wafe Application to Generate Wafe Applications in Tcl or Perl



# Generating Wafe's C code

- High level Description:

```
~widgetClass
viewport
   include <X11/Xaw/Viewport.h>

void
XawViewportSetCoordinates
   in: Widget             # viewport Widget
   in: Position           # x position
   in: Position           # y position
```

⇒ Source for generation of Wafe's C code to implement commands

```
viewport v topLevel
viewportSetCoordinates v 30 30
```

⇒ Source for the generation of the short reference guide:

*w* **viewport** .................................... *viewport*

*f* **viewportSetCoordinates** *XawViewportSetCoordinates*

Arguments: viewport Widget, x position, y position
Return value: void

# Wafe Distribution

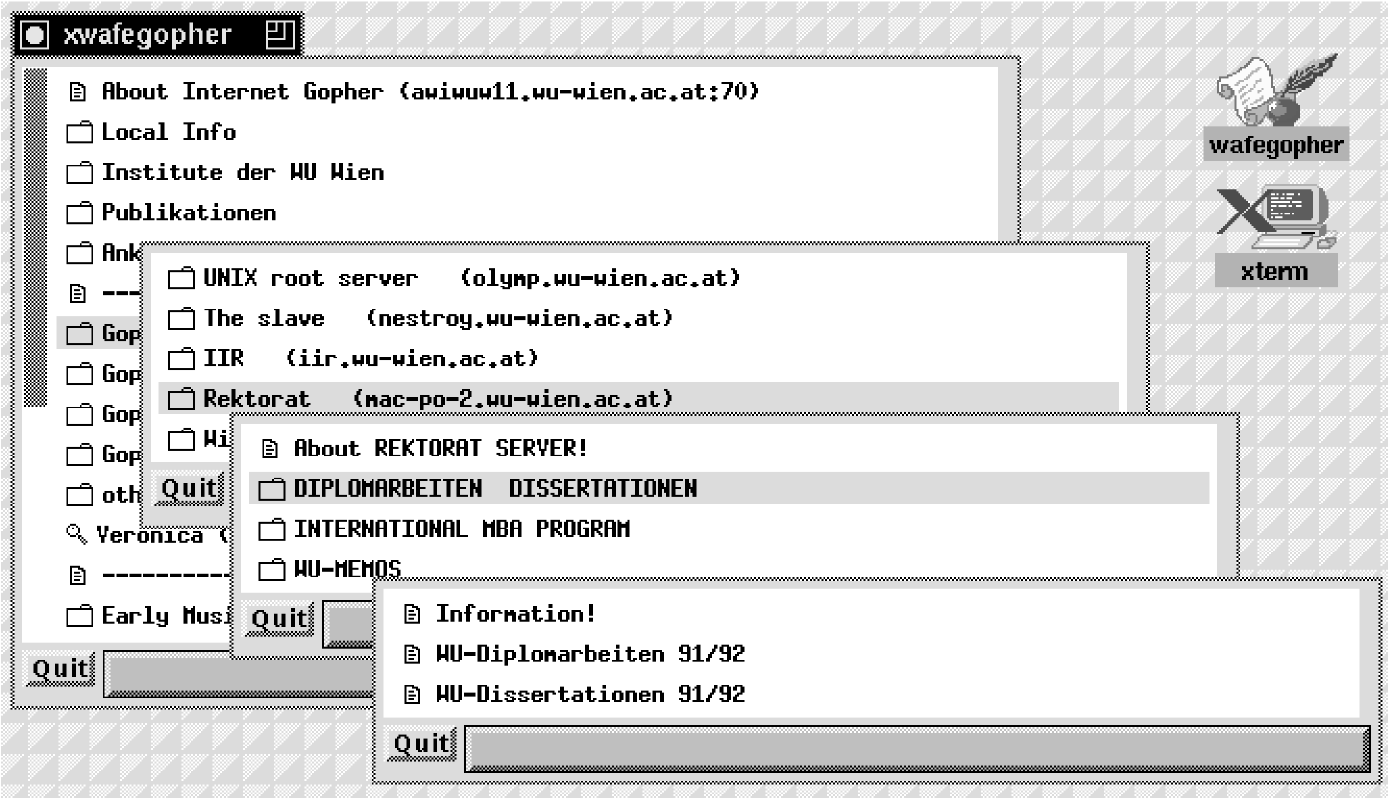
- Wafe + set of sample Applications

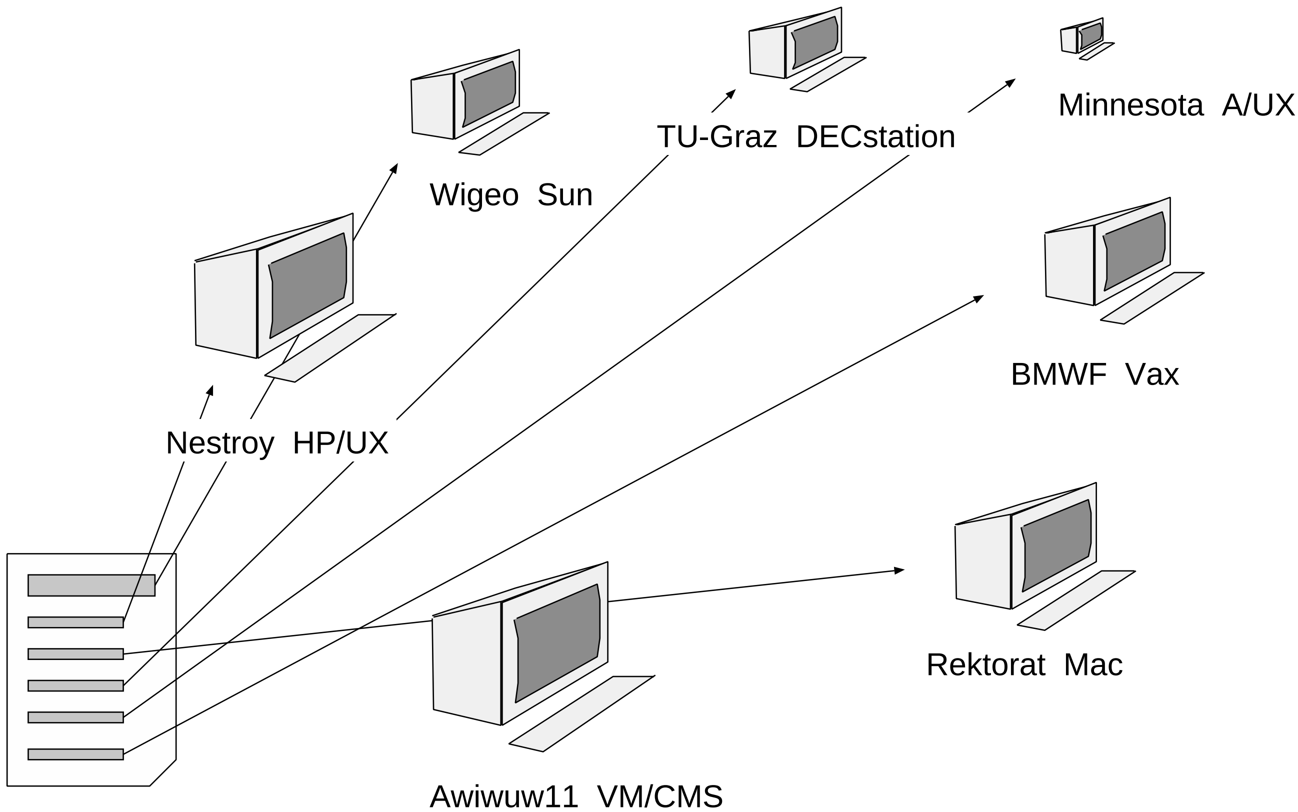
- Mail client, news client, gopher client, ftp client, multiple choice program, sample Oracle application, monitoring programs (frontends for vmstat, netstat, iostat, ping), etc.

- Application programs of distribution written in: Perl, Prolog, Ada, Gawk, Tcl

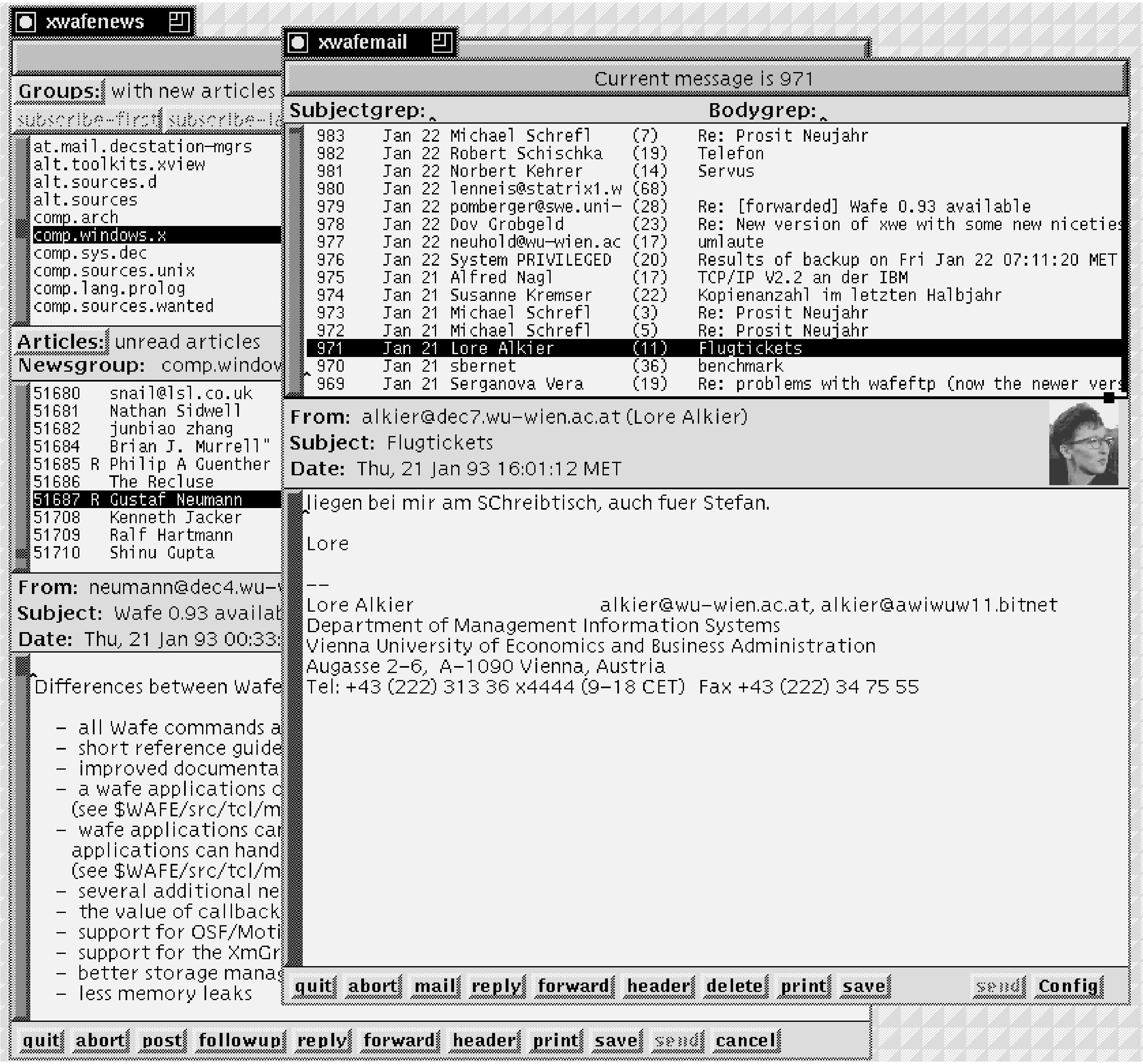
- ftp.wu-wien.ac.at:
  pub/src/X11/wafe/wafe-0.93.tar.Z

- Since May 92: more than 2700 ftp requests for Wafe on ftp.wu-wien.ac.at


xwafegopher
About Internet Gopher (awiwuw11.wu-wien.ac.at:70)
Local Info
Institute der WU Wien
Publikationen
UNIX root server (olymp.wu-wien.ac.at)
The slave (nestroy.wu-wien.ac.at)
IIR (iir.wu-wien.ac.at)
Rektorat (mac-po-2.wu-wien.ac.at)
About REKTORAT SERVER!
DIPLOMARBEITEN DISSERTATIONEN
INTERNATIONAL MBA PROGRAM
WU-MEMOS
Information!
WU-Diplomarbeiten 91/92
WU-Dissertationen 91/92
Quit
wafegopher
xterm


Wigeo Sun
TU-Graz DECstation
Minnesota A/UX
Nestroy HP/UX
BMWF Vax
Rektorat Mac
Awiwuw11 VM/CMS

# xwafemail and xwafenews



# Summary

Wafe can be used ...

- ...as a frontend for application programs written in various programming languages
- ...as a shell for X Toolkit scripts
- ...as a prototyping environment for X Toolkit applications