Tcl / Tk as a Basis for Groupware

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Overview

About Groupware

Personalizable Groupware

GroupKit

Tcl and Tk for Groupware

GroupKit in Tcl

Future Directions

Group Object Model

Overlays

Cross Platform

What is Groupware?

Technology *supporting groups* of people working together

- Computer Supported Cooperative Work (CSCW)

Variety of systems

- electronic mail, Usenet News
- shared whiteboards, drawing programs, text editors
- desktop conferencing, media spaces
- Same Time / Different Time and Same Place / Different Place

What is collaboration?

- Why do we think computers can help us with it?
- Computer Science, Sociology, Anthropology, Psychology, Management…

Technology isn't hard — people are hard!

Personalizable Groupware

People are different — groups infinitely more so

Entire group must accept groupware for success

- Good interfaces
- Match users' ever-changing needs — within and between groups

Personalizable groupware…

- … allows *different groups* to use same system in different ways
- … allows *members of same group* to use same system differently

Examples

- Floor control
- Joining a groupware session

Open Protocols

GroupKit — A Groupware Toolkit

Building groupware is a pain

- Technical obstacles
- Human factors difficulties
- Important to build quickly for evaluation

GroupKit

- Requirements are "programmer-centered" and "human-centered"
- Implementation in C++ and InterViews

Communications Infrastructure

Overlays

Open Protocols

Groupware and Tcl / Tk

Easy to build new interfaces quickly

Quick evaluation, customization by "resilient end users"

Easy to prototype new "gidgets"

Flexible event bindings

Canvas widget

Tcl Commands are Communications Protocol

No encoding, message dispatching

Separate interface from application

Put new "views" on underlying "model"

Tie together via light-weight callbacks and tracing

GroupKit Revisited

Most of system redone in Tcl and Tk using Tcl-Dp

brainstorming / voting tools

shared whiteboard, structured graphics / hypertext editors

a variety of session management interfaces

Nicer than InterViews version

2000 lines of code vs. 20000

much simpler to create simple applications

modularity is a problem

overlay support missing

Group Object Model

Need to handle shared group objects

- Lines, rectangles, etc. in a shared drawing program
- Nodes in a hypertext system

Handle primitive behaviors at the toolkit level

- Concurrency control (fine-grained), e.g. locking
- Distributing changes to all instances of objects

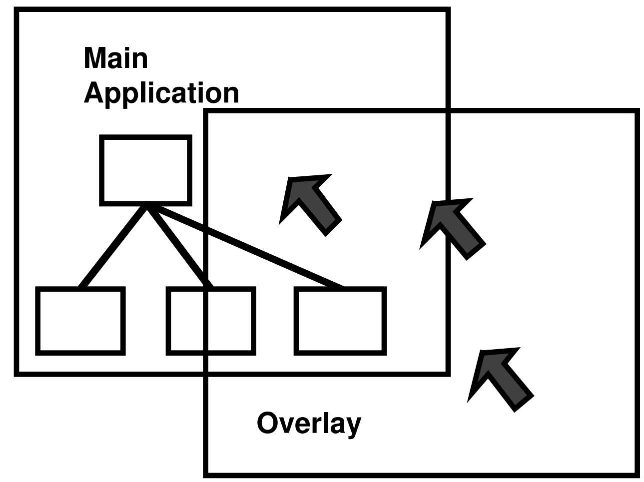
Tcl-DP distributed objects provide a good start

- Extend to work at “semantic level”
- Experiment with different concurrency models

Overlay Support

Overlays support generic actions over work surfaces

- Act as transparent windows
- e.g. gesturing and annotation
- Should be easy to add to *any* application

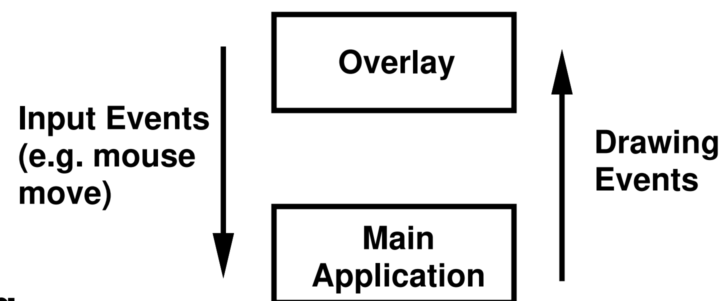


Drawing from application to overlay

- Should be doable with minor changes to canvas

Input from overlay to application

- Can hack with generic event handlers
- Raises issues of composition
- Dependent on changes to Tk event handling



Cross Platform Issues

Cross-platform important for groupware

- group members often on hetereogeneous systems
- field testing easier on Macs or PCs

Ideal solution is port Tk to Mac / Windows

- lots of X concepts embedded in Tk
- want native look and feel on other platforms

Practical solution is to keep lower levels the same

Tcl + Sockets	Application Data Structures (C + Tcl)	Wrapper for App Model (Tcl)	Wrapper for Interface (Tcl)	Platform specific interface: - Tk - MacApp - Windows SDK

Summary

Groupware difficult to construct

- Need good prototyping tools
- Need personalizable groupware systems

Tcl / Tk implementation of our groupware toolkit

Obstacles in Tcl/Tk for groupware

- Need high-level distributed object support
- Lack of fully transparent windows for overlays
- Event handling for overlays can only be hacked currently
- Cross platform development is not supported