



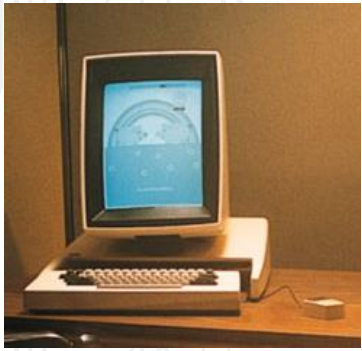
DIGITAL WORK ENVIRONMENTS

History and What's Next after
Siri and Cortana

A decorative graphic on the left side of the slide, consisting of a series of vertical and horizontal lines of varying lengths, some ending in small circles, resembling a circuit board or a stylized tree structure.

DIGITAL WORK ENVIRONMENTS **ORIGINS**

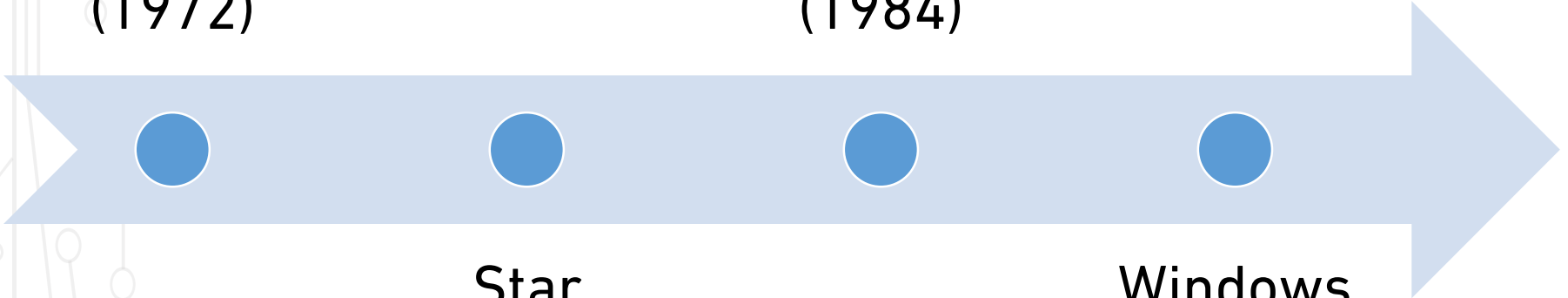




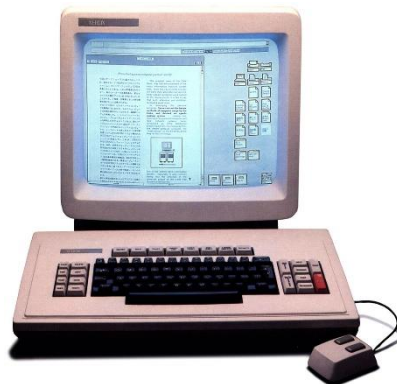
Alto
(1972)



Macintosh
(1984)



Star
(1981)



Windows
95 (1995)



DESK. METAPHOR MENTAL MODEL

- **Display documents** in overlapping windows
- **Access documents** in hierarchical file system
- **Folders = workspaces**

Simple, no-nonsense, coherent =
SUCCESS!

DESK. METAPHOR EVOLUTION

- 1972, 1991, 1995: Multitasking (Alto, Apple System 7, Windows 95) – work on several apps at once
- 1986: Multiple Desktops (Rooms) – task-related workspaces
- 1995: Taskbar (Windows 95) – switch between open windows
- 2004: Groups in Taskbar (GroupBar) – grouping tasks by apps
- 2004: Spotlight (Mac OS X) – integrated search across apps and files
- 2012: Integration of people, email, contacts, social networks into Shell (Windows 8)

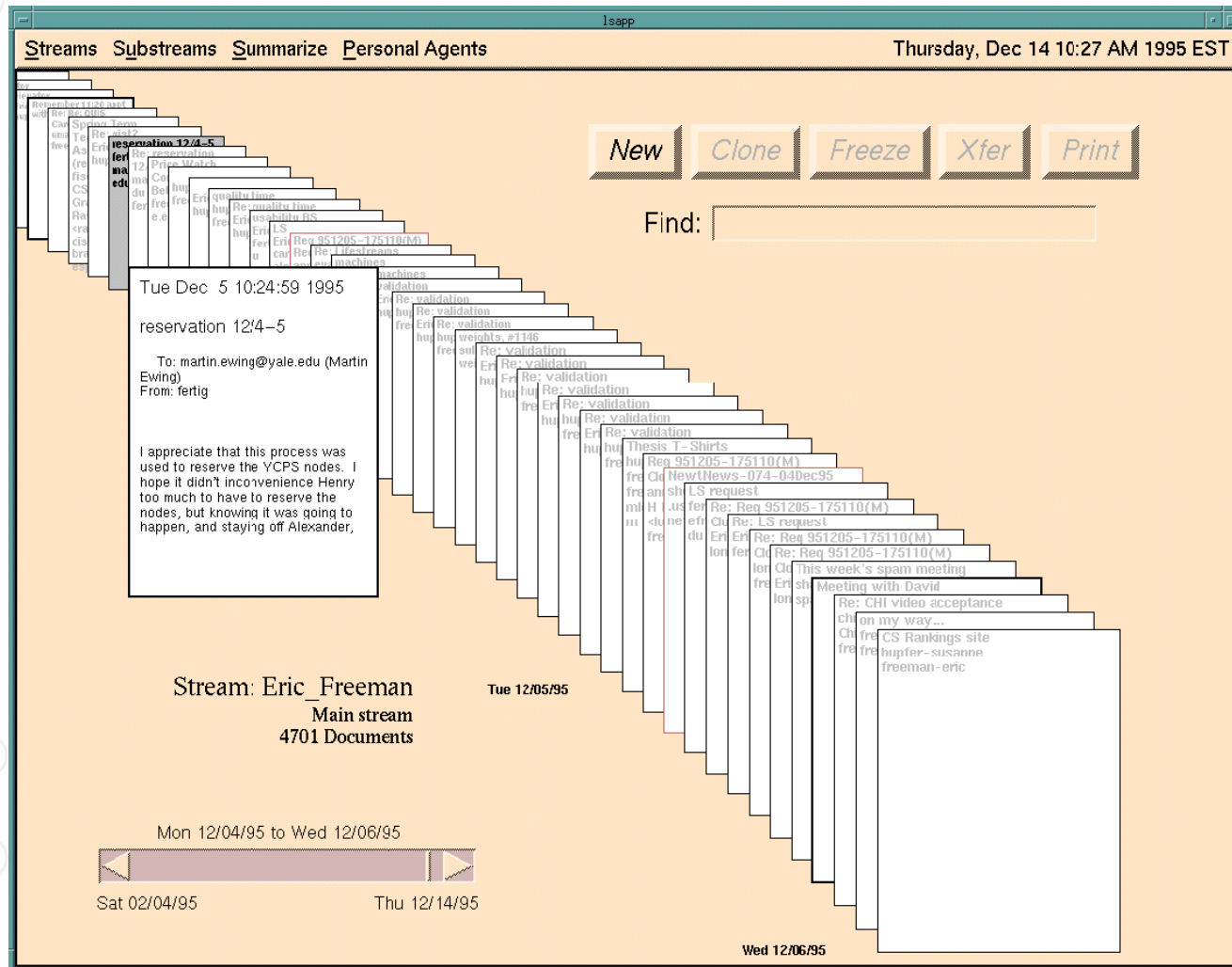
PROBLEMS

- In desk. Metaphor, both Access (file system) and Display (seeing contents) is done on the same small screen → switching
- Apps introduce own virtual hierarchies (e.g., email) → not files
- Browsers give access to public/private networks (web) → not files
- Hierarchical info organization is hard to support over time, doesn't preserve links



DESKTOP METAPHOR ALTERNATIVES

Time stream - Lifestreams, 1994



RDF desktop - Haystack, 1999

The screenshot displays the Haystack application window, which is designed for managing RDF collections. The interface is divided into several panes:

- Top Bar:** Includes navigation buttons like 'Back', 'Go to', and 'Search for', along with 'Starting Points' and 'Information Sources' dropdown menus.
- Left Pane:** Contains a 'Collection (20 items)' section with a 'Similar Items' button. Below this, there are sections for 'Body Content' (Groups (2), Thanks (2), ...), 'Body Creator' (Karger (2)), 'Body RDF Type' (HTTP Content (2), Note (2)), 'Date' (Est (2), Nov (2)), and 'Sent' (Est (2), Nov (2)). An 'E-mail' section at the bottom lists actions like 'Compose Talk Announcement', 'Compose e-mail message', and 'Existing Messaging and news connections'.
- Center Pane:** Titled 'Inbox', it shows a list of messages with columns for 'From', 'Title', 'Date', and 'Recommended categories'. The messages listed are from Hari Balakrishnan, Jaime Teevan, Karun Bakshi, and Robert Krauthgamer. A context menu is open over the Robert Krauthgamer entry, showing options like 'Add to Address Book', 'Annotate', 'Apply tools to', 'Browse to', 'Chat', 'Compose e-mail message', 'Copy URI', 'Locate additional information', 'Recommend', 'Remind me to contact this party', 'Remind me to prepare for this', 'Remind me to read this', 'Rename', 'Send this item to someone', 'Use in pending tasks...', and 'Show summary...'. The 'Person: Robert Krauthgamer' section is also visible, showing details like 'Mail Endpoint Specification' and 'List'.
- Right Pane:** Contains two sections: 'Hari Balakrishnan' and 'Google Scholars'. The 'Hari Balakrishnan' section shows 'Messages to this person' and 'Messages from this person'. The 'Google Scholars' section shows a 'Body' with a blurb about a search result and 'Attachments'.

The bottom of the window features a 'Create a project workspace' button and a 'See preview' button.

Role Mgmt. for students, 2004

School Role - Calendar

File Edit View Options Roles Help

General School Work New Role...

Frequent functions for school calendar: Schedule, Find, More

Semester overview (current subrole's events highlighted): FALL 2002

Selected week overview: Starting November 3, 2002

Day events detailed view: Wednesday, November 6

Selected day's reminders:

- ANTH 240 annotated biblio due today
- ENEE 435 paper number 6 due today
- ENEE 490 homework 5 due tomorrow
- ENEE 408E project due 11/13
- ENEE 435 exam 11/20

Time Event

Time	Event
11:00 am	
12:00 pm	
1:00 pm	ANTH 240 - Section 0001 Location: PL3114E
2:00 pm	ENEE 408E - Section 0001 Location: ENG0102
3:00 pm	
4:00 pm	ENEE 435 - Section 0001 Location: ENG0100
5:00 pm	Gemstone - Section 0001 Location: A07W425

University News

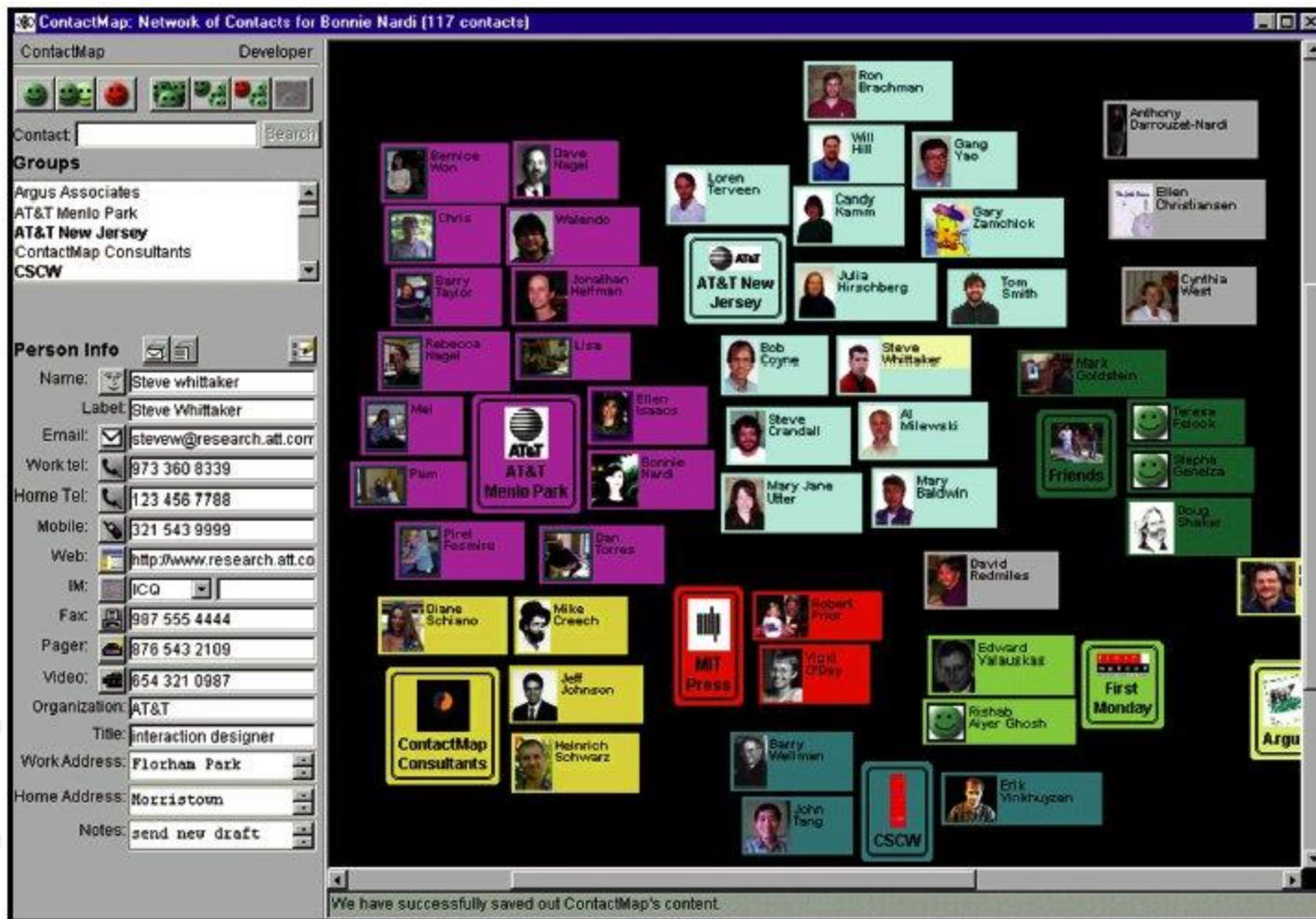
- Delayed vs. Deliberate
- Student leader meets with president

Current view selection (some are role-specific): Post Mail, Class Website

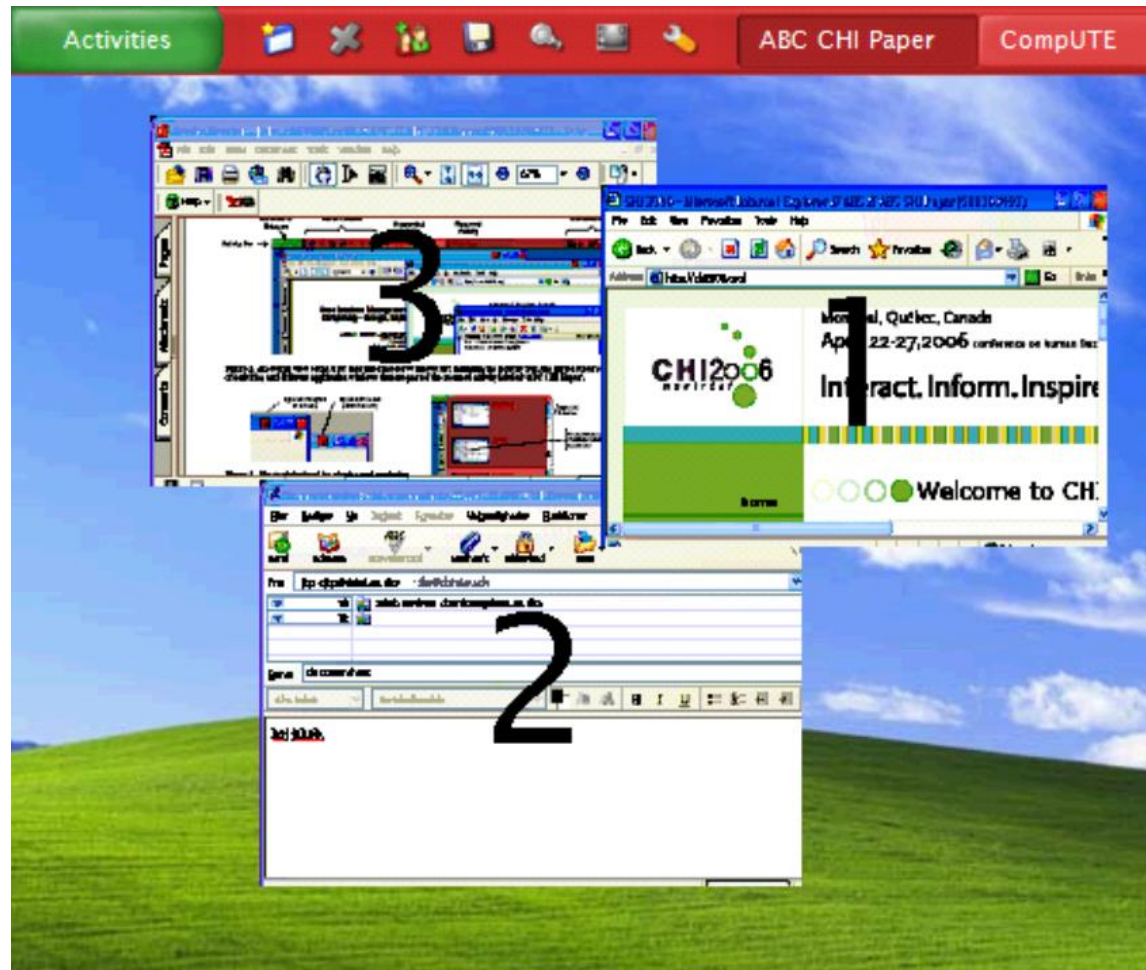
Current subrole can be selected here: ENEE 435, ENEE 408E, ENEE 490, Gemstone

Reminder from non-visible mail view: E-Mail, 6 New Messages

People Net - ContactMap, 2002



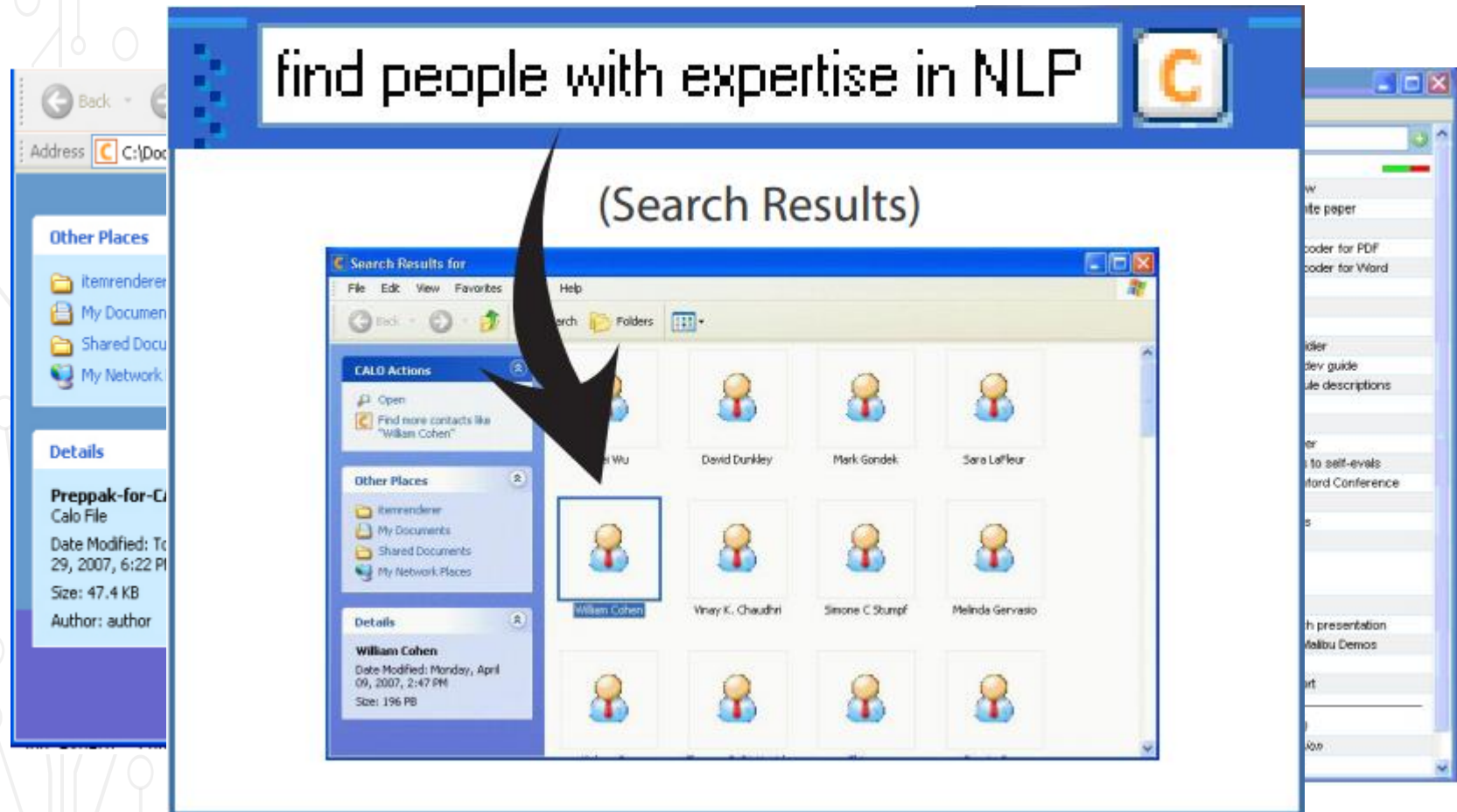
ABC/Activities - 2002



Activities Spaces - Kimura, 2002



ASSISTANT - DARPA PAL, 2000s

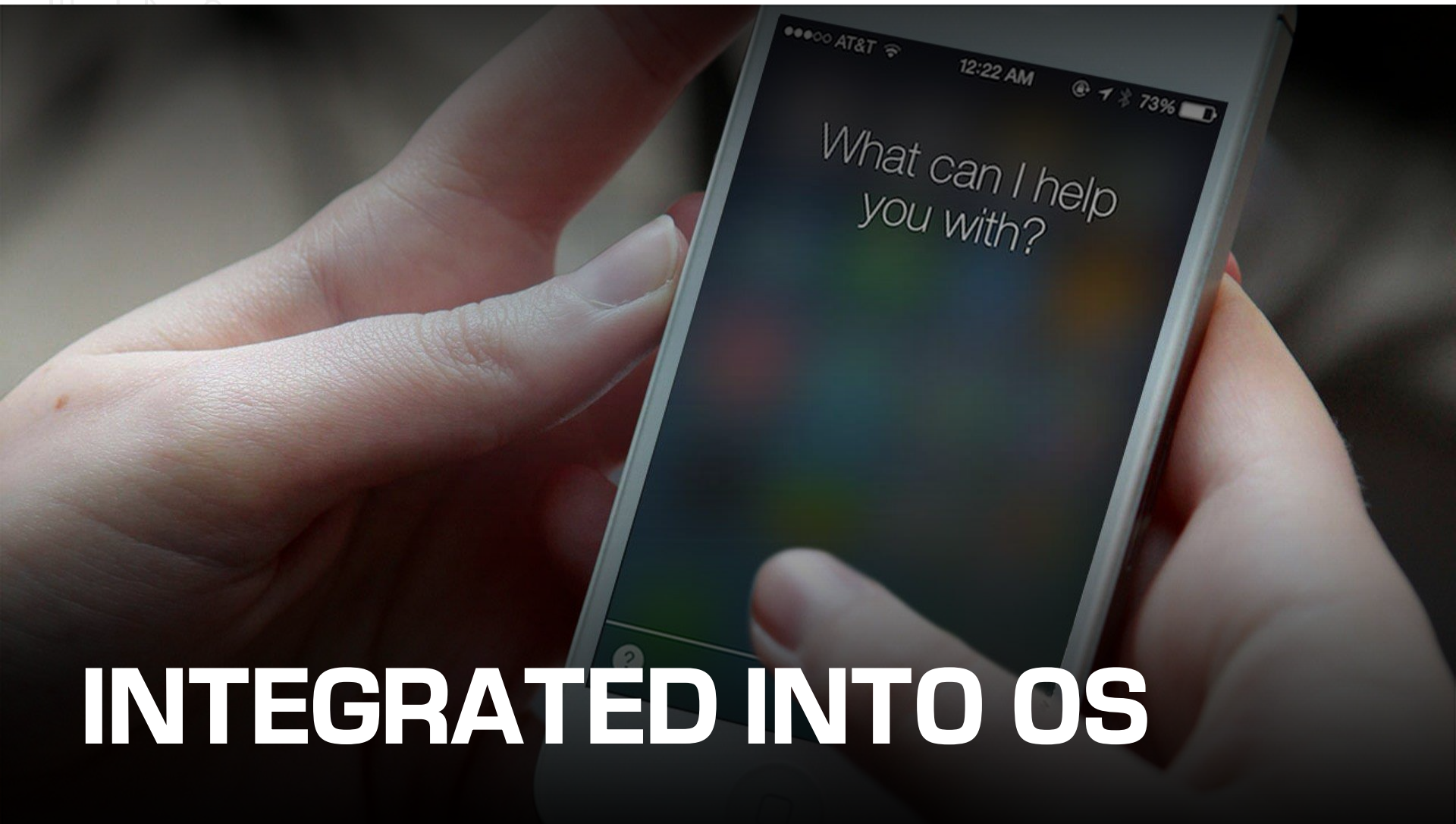




DIGITAL WORK ENVIRONMENTS

AI ASSISTANTS

VOICE ASSISTANT - SIRI, 2009



INTEGRATED INTO OS

AI ASSISTANT- CORTANA, 2012





DIGITAL WORK ENVIRONMENTS **WHAT'S NEXT?**

DIGITAL WORK ENVIRONMENT?

- Personal and Group-based AI Assistant
- Works everywhere, w. AR/VR as target
- Preserves knowledge in Visual Memory
- Knows user priorities & ontology
- Protects from interruptions

DIGITAL WORK ENVIRONMENTS WILL BE EMBEDDED INTO THE BRAIN

A futuristic scene with two men. On the left, a younger man in profile, looking towards the right. On the right, an older man with glasses, looking down. Between them are several floating, semi-transparent digital screens displaying various data, charts, and text. The background is dark and blurry, suggesting a high-tech environment.

CORTICAL MODEM ENABLES CYBER PROJECTIONS



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