

## Systems Three Year Plan - April'94

### Agenda:

- ◆ Competitive Environments
- ◆ Key Factors
- ◆ Release Overview & Issues
- ◆ Focus Topics:
  - > Kernels & device drivers
  - > Graphics & Multimedia
  - > Networking
  - > Digital Office

## Competitive Environment

### OS/2:

- ◆ Market status:
  - > Selling substantial copies, but as a "form of Windows"
  - > ISV momentum is confined to Lotus and few others
  - > Some LA commitment esp. in Europe
- ◆ Plans:
  - > "Summer CY'94": OS/2 Lite (4MB), OS/2 SMP
  - > "Late CY'94": First beta of OS/2 for PPC (aka Workplace OS)
- ◆ Action Needed:
  - \* > ship high quality Chicago - remove need for "better Windows"
  - > Block OS/2 on Server & RISC with NT
  - > get Win32 ISV momentum (move on from Win16 base)

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## Competitive Environment

### Netware:

◆ **Market Status:** dominant network

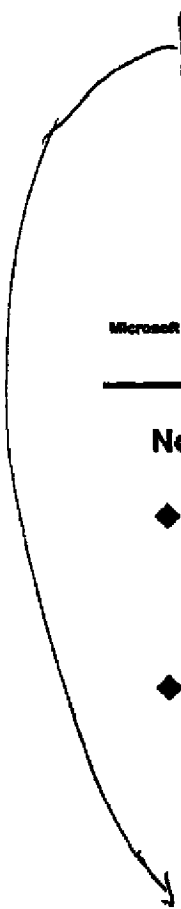
◆ **Plans:**

- > own corporate name space via NW4.0
- > turn Netware into better application server via:
  - ◆ cluster technology (95/98)
  - ◆ Mach kernel?
- > own client side API's via Appware

*now 32-bit GUI?*

◆ **Key Actions needed:**

- > Complete Netware interoperability is a requirement given their installed base and momentum
- > Need user visible & desirable client-side function to differentiate our server based offerings
  - ◆ Means again that we need storage unification and OFS
- > Need to be ahead of Novell in exploiting new communications options



## Competitive Environment

### Notes: Competing in the workgroup arena vs Notes (& WP Office)

◆ **Notes Plans:**

- > Make Notes the "OS & Shell"
- > AT&T "public Notes" deal
- > Notes version 4.0 due H1'CY95, use of OLE2
- > Improved versions of cc:Mail, integration of cc:Mail & Notes

◆ **Action needed:**

- > EMS V1.0 will give us good upgrade for MS Mail 4.0 customers and installed base comparable to "Notes" (given widespread upgrading)
- > unification of local and server file, document, object storage, & improved customization tools to go beyond Notes
- > OFS and VB5-based CDE are needed for this

*Windows on the server should be easy to leverage.*

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## Competitive Environment

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### Apple:

- ◆ Continued success in K-12, "creative" markets, and Japan

- ◆ Plans:

|  |                      |   |
|--|----------------------|---|
| System 7 (PPC: 7.12)                       | 680x0, PPC now       | Quickdraw, TrueType, QuickTime 1.6, Printing, Multiple Displays |
| System 7.5 (Mozart)                        | 680x0, PPC Mid '94   | Quickdraw GX, QuickTime 2.0                                     |
| System 8 (Copland)                         | 680x0, PPC Early '95 | (native PPC file systems, nets)                                 |
| System 8 (Gerstwin)                        | 680x0, PPC H1 '95    | 3-D modeling, Open Doc 2.0 (multithreading, new kernel)         |
| System 10 (KN) PPC<br>source: PC Week 3/28 | H2'95                | speech recognition, voice synthesis                             |

- ◆ Action needed:

- \* > **Ship Chicago**
- > Need improved Postscript & color matching in NT too
- \* > **Improve Multimedia support**
- > Improve NLS support, and time-to-market in Japan.

## Competitive Environment

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### UNIX

- > acceptance as application server, downsizing platform

- > Action needed:

- ◆ Improve scalability - ship great Daytona
- ◆ Do Cluster support

- ◆ Middleware - DSOM/OpenDoc:

- > being pushed hard as superior way to write cross-platform & client/server apps

- > Action needed:

- ◆ Need VB4 (OLE controls) & VB5 (Object customization)
- ◆ offer enough x-platform support to prevent key ISV defection
- ◆ offer distributed OLE support

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## Key Factor

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### ◆ Systems & Office synergy:

- Desirable to align systems releases with Office schedule on yearly basis:
  - ◆ Systems releases in early Q1
  - ◆ Apps release in late Q1
- Need to have a common "user model" for Shell, PIM, Apps:
  - ◆ allow for synergy
  - ◆ allow for rational decisions on how to package function
- Base function needs to be in volume platform for Office'96 to depend on it.

## Key Factor

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### ◆ The PC (Windows) as both:

- a platform for business automation
- a consumer information appliance

### ◆ Cairo investments move us toward better platform for business automation:

- distributed operation, common OLE tools and customization paradigms for apps and shell, rich store, etc.

### ◆ Need to ensure that also make investments for consumer information platform, e.g.:

- Better multimedia and games support
- Information Highway connectivity (Internet, MOS, cable networks)
- More Plug n'Play & HW platform leadership (never off, etc).
- Does work in Social interface (Utopia/Consumer) mean an alternate User Model & interface?

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## Key factor

### ◆ Greater efficiency & common code:

- > share more code internally to systems
- > reduce complexity for ISVs and Device Driver writers
- > clearer ownership of technology area's & fewer groups where possible - to make for less frustration and more efficiency

## Key Factor

### ◆ Programming model evolution:

- > Need an evolutionary Movement from Windows API's and Message Model to COM/OLE model for API's and Events.

### ◆ Need to ensure COM/OLE's success vs. DSOM/OpenDoc:

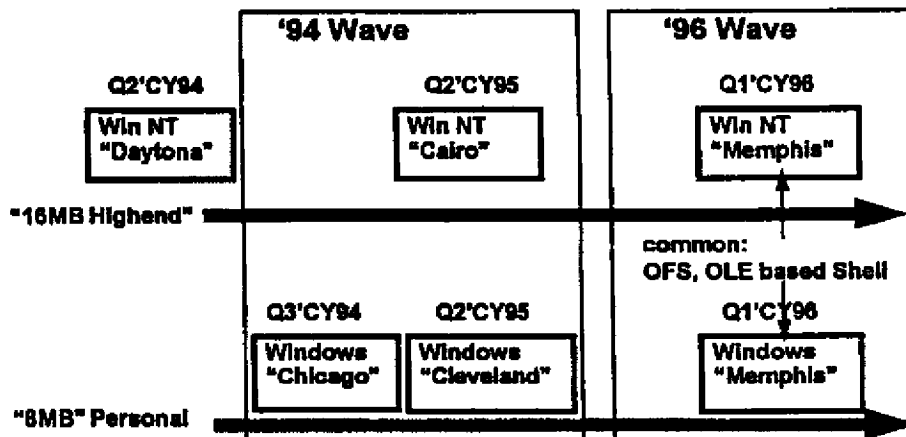
- > Need to ensure that COM/OLE succeeds as:
  - ◆ Comprehensive architecture (Comp Doc., Controls/Forms, Automation, DB, Shell, etc.) - support pervasively in our products
  - ◆ General means of writing client/server applications vs. DSOM:
    - ⇒ need distributed OLE
    - ⇒ tools
    - ⇒ need cross-platform support

*make it smaller*

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## Systems Release Summary - old

- as of Dec'93 presentation



### Issues with above:

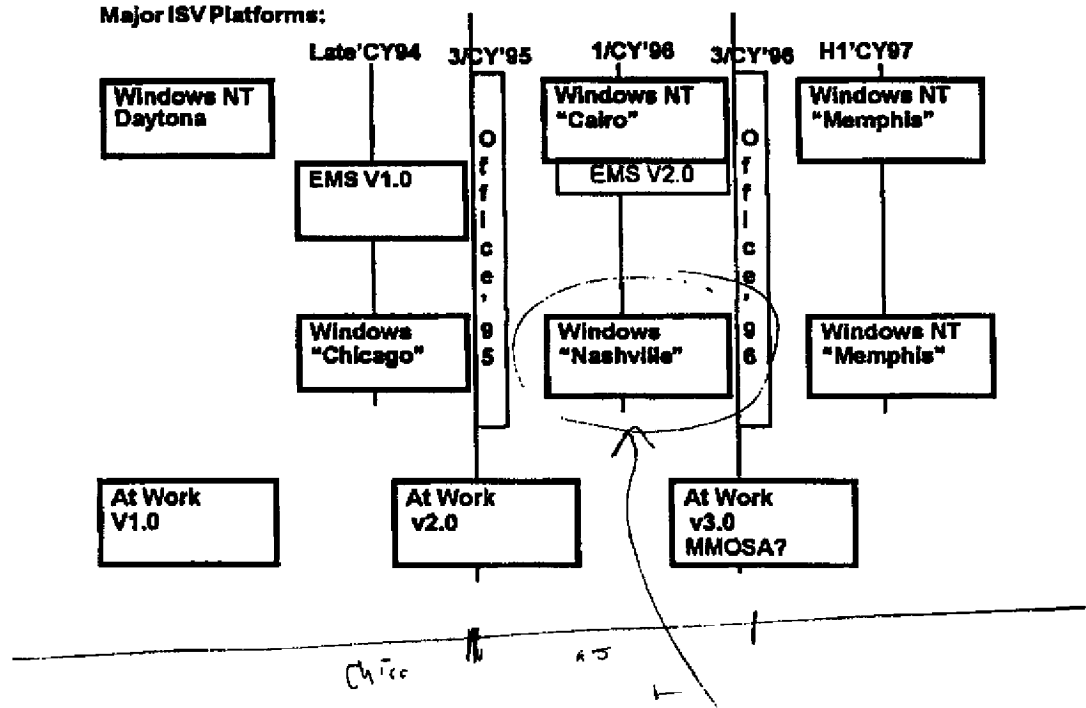
- ◆ **Ship dates moved:**
  - > Daytona from early Q2 to early Q3'CY94
  - > Chicago from Q3'CY94 to Q4'CY94
  - > cannot do two addtl releases of NT & Chicago before Q1'CY96
- ◆ **Re-evaluation of complexity needed to host OFS on Chicago**

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# Proposed Systems Release Summary

## Major ISV Platforms:



## Applications support

### ◆ Function for applications to exploit:

#### "CY'1995"

- > Win32
- > OLE2
- > Chicago UI
- > PnP
- > MAPI (PAB, LMS, EMS)
- > NT Admin Integration

#### "CY'1996"

- > OLE: Controls, Forms, DB, remote objects, etc.
- > OLE based, extensible Shell
- > Integrated Storage:
  - ⇒ Integrated object store (objects, files, documents, messages, etc.)
  - ⇒ Extensible
  - ⇒ Replicated
  - ⇒ Local & Remote

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## Post Daytona n/w enhcmnts. - "async. ship"

- ◆ Provide naming and service lookup for large Chicago networks (Service Lookup APIs)
- ◆ Netware compatible server (NWC Server)
  - > 2.x, 3.x
  - > Integration of accounts of "domains" of NW servers (Small World)
- ◆ Other candidates - see backup

## EMS 1.0

- ◆ Clients platforms
  - > Win16, Chicago Extensions, Win/NT, DOS
  - > Sch+ 2.0 for all Windows platforms
  - > Application Design Wizard for all Windows platforms
- ◆ Chicago deliverables:
  - > Capone
  - > MAPI 1.0
    - Local Message Store (LMS) with ODBC Interface
    - Personal Address Book (PAB) with ODBC Interface
    - SFS Provider set including remote via RNA
    - Internet Mail Provider set
  - > SMTP Provider
  - > WG Post Office with Win32 Admin

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## EMS 1.0

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- ◆ **EMS NT-hosted Server**
  - MTA
  - DSA with ODBC interface
  - DXA
  - MDB with ODBC interface
  - Goalline (support for MS Mail and Mac Mail)
  - Win/NT Admin
- ◆ **EMS Gateways:**
  - SMTP Gateway with MIME support
  - Profs Gateway with Schedule distribution
  - SNADS Gateway
- ◆ **Other:**
  - Sample Applications
  - Gateway Dev. Kit

## Post EMS 1.0 - "async. ship":

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- ◆ **EMS 1.0 fixes**
- ◆ **SFS 4.0 (degree of BBS support is TBD)**
- ◆ **Macintosh Client including Sch+ 2.0**
- ◆ **Unix Client**
- ◆ **FAX Gateway**
- ◆ **Further Internet Services:**
  - Client: Gopher and WEB MAPI Providers
  - Server: Full Internet Host based on NT and EMS
- ◆ **"Commercial" or "OEM" EMS:**
  - OEM deals with ATT, MCI, CompuServe, etc
    - ◆ Will require some levels of customizations based on specific usage models

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## Cairo Key Function:

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- ◆ **"Chicago" function on NT**
  - > Plug and Play
  - > Mobile Support
  - > Improved Multimedia
  - > Common driver support with Chicago/Nashville (see below)
- ◆ **Distributed Systems Support**
  - > Distributed File System
  - > Directory
  - > Distributed Security (Kerberos)

*shell?  
APIs?*

## Cairo Key Function:

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- ◆ **Object File System**
  - > common storage for documents, files, messages, etc.
  - > content indexing
- ◆ **OLE based User Interface:**
  - > Upward compatible with Chicago:
    - ◆ Superset of Chicago look/feel
    - ◆ Support for Chicago shell extensions
  - > OLE programming interfaces, automation
  - > "Workgroup" features:
    - ◆ Component Form as document type ("InfoDoc")
    - ◆ Labels (customization of objects)
    - ◆ Customizable views/folders
    - ◆ VB as customization/authoring tool
  - > Support for OFS based queries

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## Cairo Key Function:

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- ◆ "EMS 2.0"
  - > EMS server using OFS as store and directory
  - > Workgroup features built into Cairo UI environment

## Nashville New Function Candidates

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- ◆ Work not contained in Chicago
  - > Unicode *why?*
  - > Full Win32 GDI apps
  - > More mobile support
- ◆ Cairo DFS & DS Client function
- ◆ Improved Multimedia support
- ◆ Common driver support with NT (see below)
- ◆ Issues:
  - > OFS
  - > Common UI code base with Cairo

## Key Issue

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### ◆ OFS on Nashville:

- > Original proposal was to provide an NT-style IFS on Chicago, and the port NT's OFS code - yielding common OFS code. Issues:
  - ◆ original estimate (last September) of 23 man-weeks now thought much too low (darrylh, markz, thomasf, ralphi)
  - ◆ would require significant modifications to Chicago kernel - would Chicago skilled resource now to make late CY'95 date, hard to overlap development
  - ◆ may not be 8MB solution
- > No OFS on Nashville means that:
  - ◆ Office'96 can't depend on it
  - ◆ we have period of year when NT volume will still be ramping - and we are less competitive vs Notes, Netware
- > Investigation needed:
  - ◆ what is value of remote access only to OFS
  - ◆ scope effort move OFS to Chicago's native IFS
  - ◆ how to enhance/layer access to LMS & FAT in Chicago to allow common operations across them & OFS?

## Key Issue

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### ◆ What is UI & User model & code base for CY'96 releases?

- > Ideal would be to have:
  - ◆ one user model to drive UI constructs in Shell, PIM, "Mail Client", Office Apps (underway between Cairo & Office teams)
  - ◆ one code base to yield: Shell and Shell Extensions (PIM/Mail client)
  - ◆ common extensibility model (components/forms/views) supported by Shell, PIM/Mail Client, Office Apps, VB5 authoring tools - to compete vs Notes.
- > Issues:
  - ◆ what will memory cost of Cairo/REN'96 code base be? Will it fit in 8MB?
  - ◆ what will cost/benefit to a "non-workgroup" user be?
- > Action Needed:
  - ◆ get data on working set of Cairo shell code base *how? it's not done yet.*
  - ◆ think through what apps would do if Nashville does not have OFS

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## Key Issue

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### ◆ The "NT" gap

- > In above proposal, there is a one year gap when NT has different UI, API than Chicago
  - perception problem
  - some apps won't run (e.g., MOS, Access Navigator)
- > Actions needed:
  - Determine issues with running Office'95 to run on NT
    - ◊ preliminary thinking is the Office'95 will run, some issues (e.g., Help files)

## Key Issue

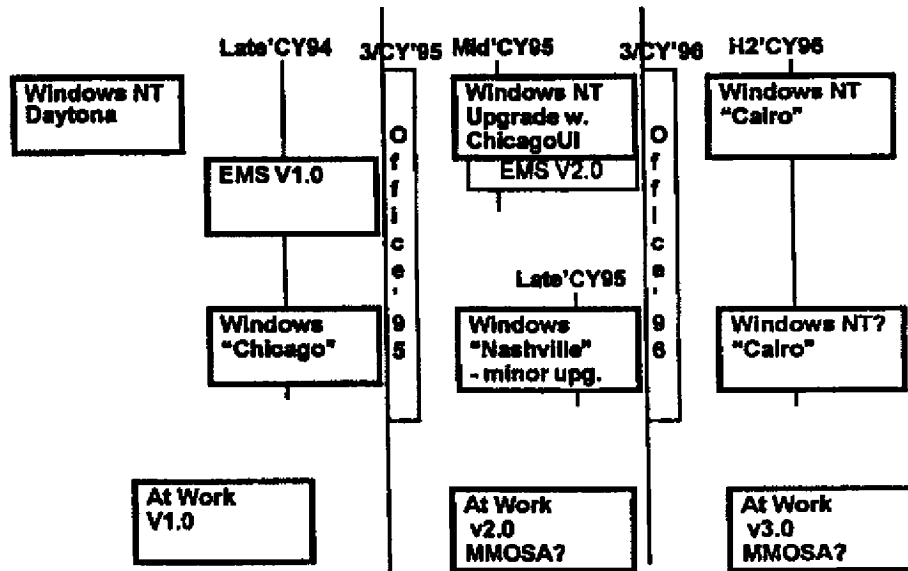
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### ◆ Synchronizing systems & apps schedules introduces risk:

- > Need to be hard-core about schedules for Nashville/Calro if Office'98 is dependent on them:
- > Actions needed:
  - need overlapped work if Nashville is to be more than basic ".1" release
  - set hard PDK, Beta dates for both systems - stick to them

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## An Alternate Systems Release Summary



## Decision considerations:

- ◆ **How important is to get NT client to high volume in CY'95?**
  - > we can sustain client OS market share with Chicago
  - > lower NT volumes mean less incentive for device driver writers to support NT, delays day when we can move general desktop to NT
- ◆ **How essential is it to have "Cairo" services (DFS, OFS, Shell/CDE) on a high volume client to compete with Notes/Netware:**
  - > Important - means that we have either to put services on Chicago or push NT to high volume sooner.

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**Actions needed to decide - summary:**

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- ◆ **Bottoms Up Cairo Schedule:**
  - > what can be delivered by Q4'CY95
  - > need complete asap after Daytona
- ◆ **OFS on Nashville:**
  - > need serious (re-)assessment, assign resource to do it now
- ◆ **Common Shell Code base for Nashville/Cairo:**
  - > need working set assessment, including 100% upwards compatibility with Chicago extensions
  - > need preliminary Shell-98, PIM/Mail client-96, Office-96 plan
- ◆ **NT Gap:**
  - > Cairo schedule
  - > Assessment of how Office'95 will run on Daytona

**Complete work and decide by Daytona ship + 30 days  
(July 31)**

**MS-DOS**

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- ◆ **We plan no new releases of MS-DOS after MS-DOS 6.22 (FCS May 31, 1994) !!**

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## **Support for business processes:**

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- ◆ **Cairo will provide many functions needed by VAR, corporate developer, power user:**
  - OLE based, extensible UI environment for workgroup support
  - Integrated, extensible, replicated store
  - VB & OLE controls/forms
- ◆ **Further action needed:**
  - ensure appropriate support for Office'96 (dialogue started)
  - need generalized event model/service (LAN/WAN-wide)
  - integration of Systems and DDT storage strategies
  - workflow/workgroup toolkits (who should do - DDT?)

## **Systems Management**

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- ◆ **Need to continue focus on "central administration of geographically distributed networks":**
  - OS support: allow remote administration of all OS settings (NT & Chicago)
  - Provide "WOSA" interfaces for common systems management functions (directory access, etc.)
  - Ship SMS (Hermes) - see backup slides 80-82 for plan
  - Continue to integrate with network management providers

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## Information Highway/Consumer PC

- ◆ **PC as "Information Highway Terminal":**
  - Voice, Data, Video conferencing (see MM & Digital Office section)
  - Internet (see backup slides 98-98)
  - MOS
  - Electronic Commerce (see issue in Digital Office section)
  - ACT Broadband infrastructure (PSG will work with ACT)
  - Additional WAN & Wireless support (see networking below)
- ◆ **PC as consumer platform:**
  - Chicago: Plug n'Play, novice UI modes *utopia*
  - Continue active role in extending PnP & helping set hardware standards
  - Improved Multimedia
  - Consumer Shell, Application Environment? *F?*
    - will watch reaction to Utopia
  - *publishing; paper, electronic, etc*

## Kernels, Subsystems, and Device Drivers

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## Issues:

- 
- ◆ Long term goal is to:
    - > reduce number of kernels, subsystem, drivers we & 3rd parties have to support
    - > get as much commonality across OS base that has to scale from:
      - ◆ 1MB ROM, 1MB RAM (low end of At Work)
      - ◆ to robust, secure, high performance servers

## Leverage NT

- 
- ◆ Leverage NT long-term across notebook, desktop, server - assume 486+/16MB class machine from CY'97.
  - ◆ Issues gating this will be:
    - > device coverage
    - > full superset of Chicago function (PnP, mobile, etc.)

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## At Work

### ◆ Need:

- > large degree of scalability: 1MB/1MB for bare-bones system
- > need compatibility with GDI/USER
- > need to leverage as many subsystems (redir, xports, etc.) from Windows/Chicago as possible
- > need portable system

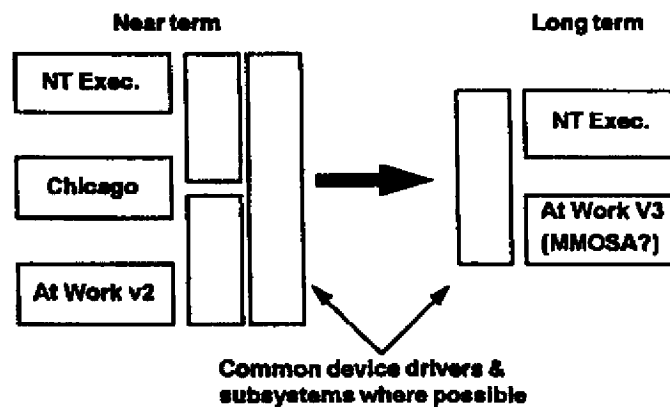
### ◆ Investigating:

- > MMOSA - would need to add above compatibility
- > Chicago kernel - would need to re-write x86 dependant pieces, synergy with ACT?
- > stripped down NT - still too big

## Framework:

### ◆ Initial thinking by:

- > Havens, Lips, Fite & others
- > Abrash, Weise & others
- > Thompson, Ludwig & others



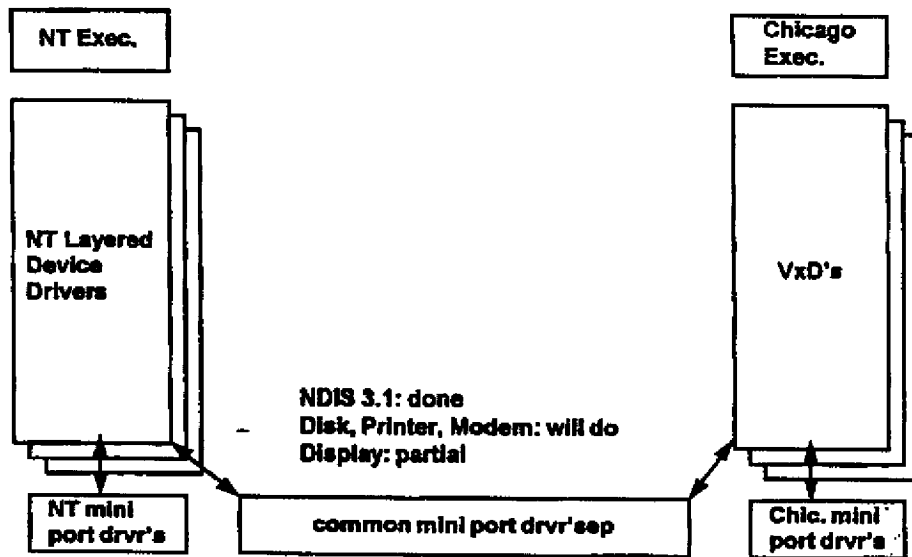
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# Recommendations

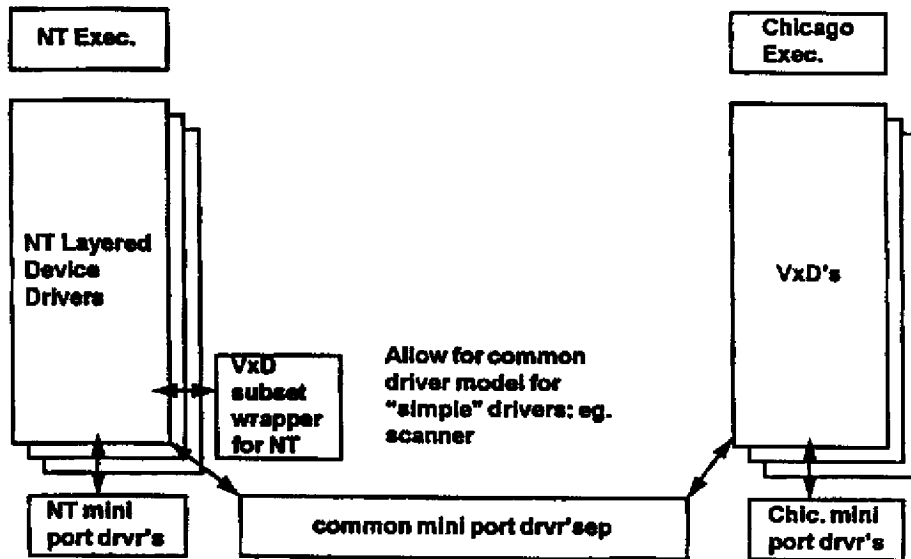
- ◆ Eliminate driver model & development differences:
  - > PE vs LE (add PE loader to Chicago for VxD's)
  - > Common driver to driver communication means
  - > Resource assignment (NT to follow PnP model)
  - > Installation, Initialization, Configuration

## NT & Chicago driver commonality - step 1

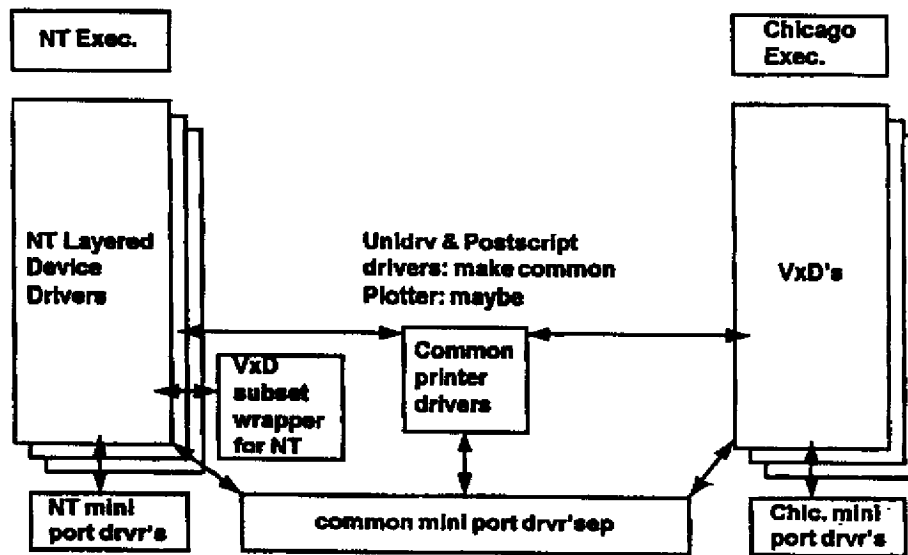


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### NT & Chicago driver commonality - step 2

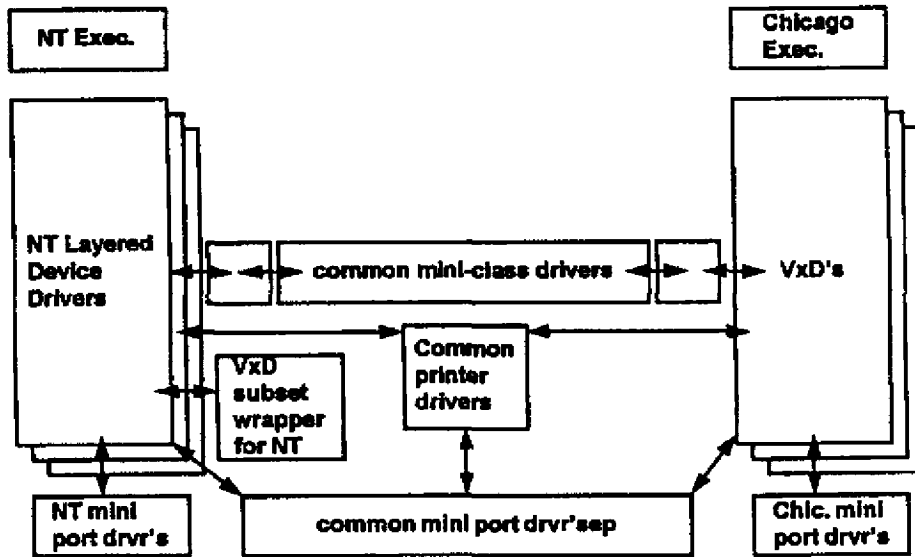


### NT & Chicago driver commonality - step 3

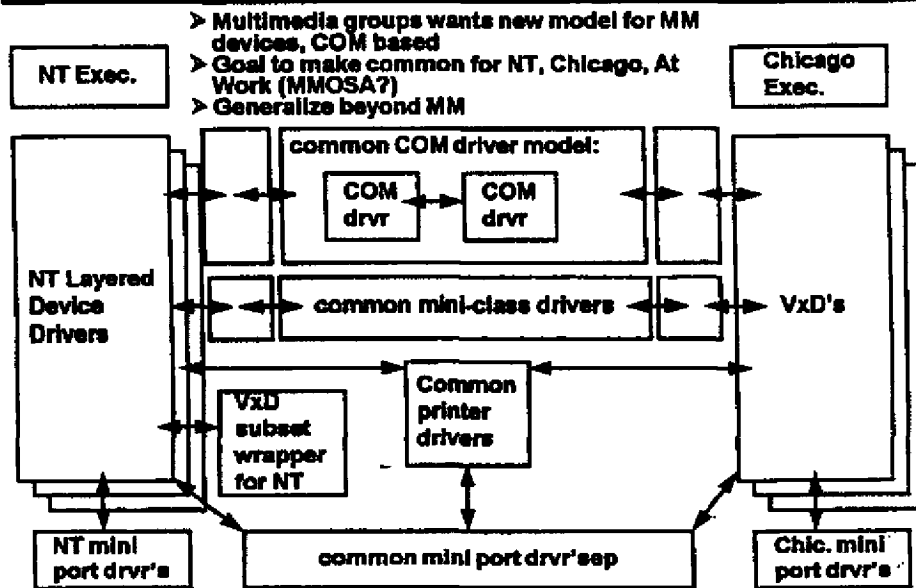


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### NT & Chicago driver commonality - step 4



### NT & Chicago driver commonality - step 5



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## **Recommendation:**

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◆ **Do try to achieve binary compatibility for:**

- **Common VxD subset for non-MS defined classes**
- **Multi-class devices**
- **SCSI & Hard Disk**
- **SCSI Class drivers**
- **NDIS (done for NDIS 3.0 on NT, Chicago)**
- **Modems**
- **Printers**
- **Multimedia (sound, MIDI, Video capture, Codecs)**
- **Selected parts of display drivers**

## **Recommendation**

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◆ **Do not try to achieve binary compatibility between NT & Chicago on:**

- **File Systems**
- **Network Stacks**
- **PnP Bus drivers**
- **ASPI, PCMCIA Card Services**
- **File System Locks, Direct IO services**
- **Undelete trackers, Anti-virus, Compression drivers, etc.**
- **Floppy, kbd, mouse**

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## Further Actions:

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- ◆ Design, schedule device compatibility work as part of Nashville/Cairo
- ◆ Investigate how to transition At Work base to MMOSA kernel technology
  - > Win API compatibility
  - > common subsystem, device driver support with Chicago & NT

## Other Kernel Technology Investments

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- ◆ Cluster Technology:
  - > frequently requested, needed to compete vs. UNIX & Netware
  - > both scalability & redundancy support
  - > need to start design now
- ◆ Other investments we will not make in this three year plan:
  - > 64bit address space support
  - > massively parallel systems
  - > workstation farms
  - > "Bx" (x >=1) security

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## RISC Architecture Support

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### ◆ Current support in NT:

- > MS does x86, Alpha, MIPS - all held in master source tree
- > Post-Daytona will merge into master tree:
  - PowerPC (done by IBM)
  - HP PA (done by HP)
- > Will supply all five binaries on CD
- > Need to evaluate continued support for MIPS, investigate having MIPS/SGI, NEC do work?

## International Version Support

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### ◆ Moving to long term model whereby:

- > US teams do English, German, Japanese ("US" & NEC), Arabic
  - Same schedule
  - Same code base (no "if-defs", "no compile")
- > Other languages done by remote sites and/or outside vendors

### ◆ Status:

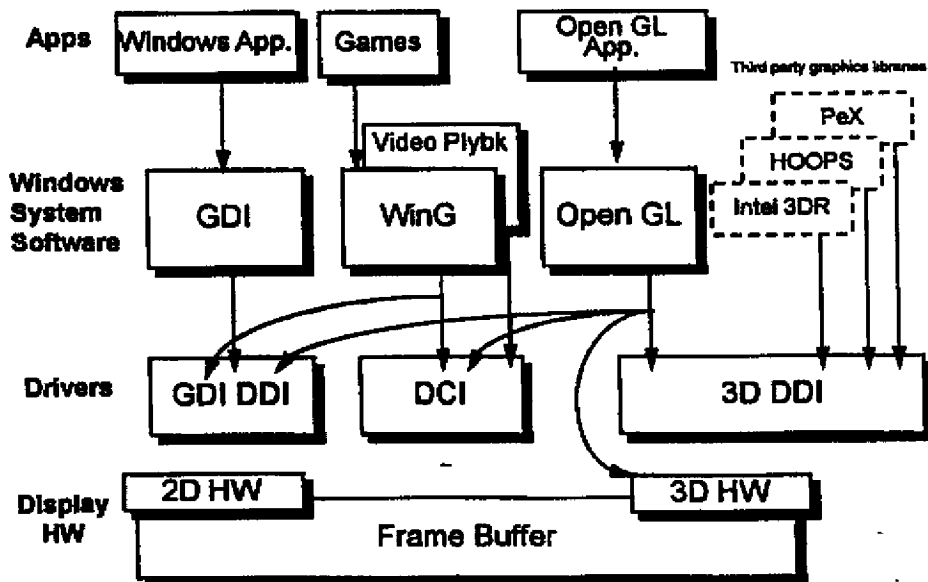
- > NT:
  - very close to "no compile" for Western Languages
  - Japanese with "if-def's", Daytona done by separate team in MSKK
  - Cairo will be done by "new" model
- > Chicago:
  - approximating new model
    - one team, one site for English, German, Japanese, Arabic
    - Japanese = US + 90 days, Arabic = US + 190 days

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## Graphics & Multimedia Technology

For graphics/MM content of  
Daytona/Chicago/Cairo/Nashville - see backup  
slides 105-108

## Windows Graphics Device Driver Ext.



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## Games

### ◆ Issues

- > Need performance analogous to DOS
  - ◆ Ability to manage off-screen bitmaps from an application
  - ◆ Animation without raster tearing or shearing (Bit during v-refresh)
- > 3-D hardware acceleration.
- > Integration of Multimedia framework for games: 3-D, sounds, etc.

### ◆ Solutions

- > 2-D 32 bits
  - ◆ WinG 1.1 (bitmaps)
  - ◆ DCI Level 2 from drivers/hardware (tearing/shearing)
  - ◆ WinG version 2 to cover DCI Level 2 direct access, double/triple buffering, StretchBit, off screen bitmaps/buffer capabilities.
- > 3-D
  - ◆ OpenGL
  - ◆ 3-D DDI to support OpenGL and other graphics systems
  - ◆ Full OpenGL port for workstation class performance
  - ◆ Pickup applicable ACTGFX animation work. Provide as extensions to OpenGL API and 3-D DDI.
  - ◆ Investigate Multimedia framework integration for games, 3-D, sounds, etc.

## 3-D Graphics

### ◆ Issues

- > Lack 3-D hardware and software for Win32 platform.
- > Not yet full workstation or game level performance.
- > Needs to be fully integrated with Windows environment.
- > ACT and Systems using different 3-D code bases.

### ◆ Solutions

- > Staff a systems-wide (*company-wide?*) 3-D OpenGL graphics team.
- > Put OpenGL on Chicago. State public availability with time frame.
- > Evangelize OpenGL as Win32 3-D API.
- > Optimize software only OpenGL performance. Streamline paths to hardware.
- > Finish 3-D DDI . Extend it for full OpenGL functionality. Make it work for printers.
- > Develop workstation class direct hardware access solution for NT post-Daytona.
- > Windows integration work (Metafile, Printing, Clipboard, OLE, ICM, TrueType, Multimedia) for both platforms. Provide general purpose pixel format, overlay plane APIs for WinG, DCI and MM in Calro and Nashville.

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## Remote Printing

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### ◆ Issues

- Neither NT nor Chicago can spool a print job for rasterization on a remote print server.
- NT's fast return to app from printing uses journalling which requires large code and is Chicago incompatible.
- Spooled print jobs are often very large.

### ◆ Solutions

- Use of spooling wrappers (Viewfiles - see next slide) and enhanced metafiles for local and remote print spooling by both Cairo and Chicago 1.1.
- Apply compression and shared objects to metafile spooling.

## ViewFiles

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### ◆ Issues

- Lack of current Microsoft solution to exchanging read-only documents retaining high visual fidelity.
- How down-level support will be provided. How do ViewFiles work on WinPad?

### ◆ Solutions

- Enhanced metafiles in an RTF wrapper = ViewFiles.
- Systems develops graphics support. First delivery in Nashville, Cairo.
- Word team develops text/RTF support. *Need to coordinate.*
- Down-level support provided by emulation in ViewFile Viewer and Bit to screen or printer.

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## Common Code : Display Drivers

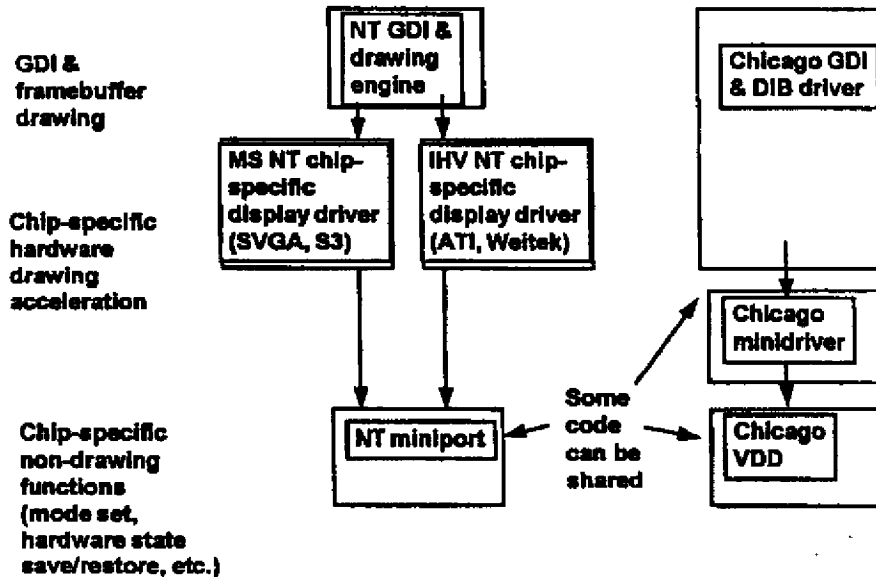
### ◆ Issues

- IHV resource/time/priority/bug problems with supporting two DDIs for display and printing.
- Less IHV focus on NT driver performance than on Chicago.

### ◆ Solutions

- Share portions of miniport and VDD/minidriver source/binaries (mode set code, hardware state save/restore, but not drawing code).
- Cross-platform single-binary solution for drawing code not possible for performance reasons.
- We've already done the work to make it easy to write drivers on both platforms:
  - ◆ The DIB driver/NT GDI engine provides all non-accelerated drawing functionality.
  - ◆ For drawing, IHVs only have to provide code to support their accelerated hardware, we do the rest - ie:
  - ◆ NT display drivers - Chicago minidrivers - IHV custom hardware acceleration.
- Provide a document in DDK describing how to share/port as much driver code as possible between Chicago and NT.

## Common Code : Display Drivers (cont.)



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## Common Code : Printer Drivers

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### ◆ Issues

- > DDIs are structured differently between Chicago and NT.
- > Windows provides poor Postscript Level2, EPS support compared to Macintosh.
- > Minidriver definition isn't extensible. Chicago UNIDRV has limited (8 color) color support. These caused HP to write full printer drivers for new models.
- > Chicago has Win 3.1 HP/GL driver. Daytona plotter solution does black and white, color with pens on sheet output.

### ◆ Solutions

- > Investigate a modular driver solution consisting of an OS specific front-end and a common back end for printer devices. Investigate common print monitors.
- > Chicago has improved Postscript support to solve this. Incorporate this in Calro. Chicago Postscript driver is currently a form of front/backend.
- > Evolve minidriver definition to be extensible for new hardware functionality. Add color, plotter to definition. Put NT's color halftone code into common backend or Chicago GDI.
- > Move Daytona plotter code to Nashville using common back end model.

## Common Code : Multimedia Drivers

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### ◆ Need for new driver model:

- > Need additional features that today's drivers don't support like audio mixing from arbitrary inputs, MPEG playback cards.
- > Need synchronization capabilities in video conferencing, networked multimedia, interactive games and professional level video capture and midi.
- > Need to be able to directly connect devices in flexible way
- > Need an easier method than MCI for MS and OEM's to write drivers to control simple devices like VCR's, laser disks, tape decks, CD players, etc.
- > Need to access drivers across the network.
- > Need to have OEM's write a single driver for all MS MM platforms.

### ◆ Proposed new model:

- > COM interfaces
- > 32-bit layered, OS independent, stream oriented model.
- > Drivers are treated as connectable filters with common methods of making those connections between various classes data.
- > Take advantage of/complement MMOSA services when available.

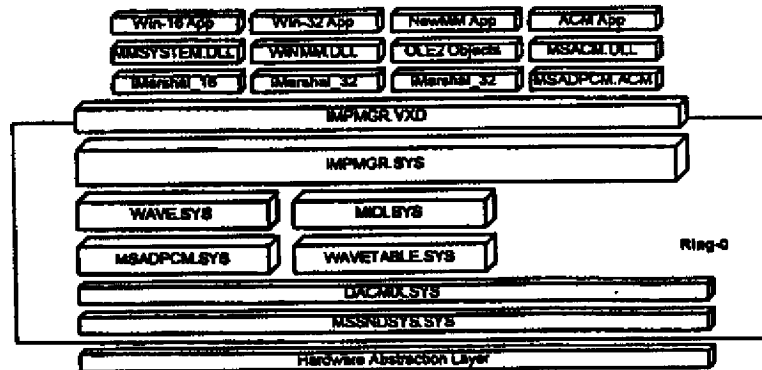
### ◆ Goal: same as

- > common NT & Chicago class driver model
- > MMOSA driver model

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## New Multimedia Driver Model

### ◆ Eg. Chicago incarnation:



## Video/Data conf.

### ◆ Issues

- > Third party ISV's and IHV's are in chaos about Media/Video conferencing on PC's.
- > Sockets, NDIS, VCOM need quality of service extensions.
- > Standards (H.320) exists for WAN, but not for LAN.
- > Proprietary solutions such as Intel are competing with H.320.
- > Integrate Video conferencing, MPEG and MM hardware.

### ◆ Solutions

- > Develop vendor independent, hardware independent API set.
  - Work with Intel so that they can use our APIs to implement Proshare.
- > Extend sockets, NDIS, and VCOM.
- > Support H.320, develop a Lan solution.
- > Driver model to support integration of Video conferencing and MPEG.

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## Multi-lingual / NLS issues

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### ◆ Issues

- > No locale issues, Chicago/Daytona have will have good support.
- > Do not have single worldwide code base to yield complete document/app portability (with installation of requisite fonts & input method).
- > Need a way to support Johab in Korea

### ◆ Steps needed:

- > Nashville: completely Unicode enable with a Unicode shell.
- > No language #ifdef's in Nashville/Cairo.
- > Abstract Text Layout from rest of GDI:
  - ◆ Do layout of text in an installable DLL, which then calls a SimpleTextOut(pText,pPlacement) that simply blasts characters to the device at the given positions.
  - ◆ Done for Chicago, need for Cairo.
- > Johab?

## Ease of Programming / OLE interfaces

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### ◆ Issues

- > Need to make it easier to program for Graphics, MM. Should evolve in backward compatible fashion.
- > Top OLE issue : clipping of objects w/ containers in non-rectangular regions.

### ◆ Solutions

- > Investigate COM, ACTGFX interfaces for graphics (IDib, ISprite).
- > Investigate SGI inventor for 3-D class library, OLE enable.
- > Cairo, Nashville support for clipping to solve OLE issue.

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## Apple Graphics - response

### ◆ Technology / responses:

- > Multiple Display, User configurable display, behavior. Displays windows spanning screens.
  - Limited support in Daytona, investigate for Nashville/Cairo
- > PS Printing: Better communication with printer for PS errors, font installs, gray scale/color calibration /manageability.
  - Need to investigate what is required to solve - (Nashville or Cairo?)
- > QuickDraw GX: Object oriented, new primitives, portable documents, new printing architecture(easy to write new drivers).
  - ViewFiles, MiniDrivers, OLE interfaces, investigate new primitives.
- > TrueType GX: Ligatures, Kerning, Line layout manager, styles, embedded bitmaps
  - TrueType Open, Chicago Multi-lingual support
- > ColorSync: Color matching from scanner to screen to printer
  - ICM
- > Escher : 3-D API available fall '94 for Mac, Windows
  - OpenGL, long term : ACTGFX
- > WorldScript: Multi-lingual support - including swapping input methods on same line
  - Chicago Multi-lingual support (can't switch input methods on same line)

*what's this mean*

## Apple MM - response

### Advantages of QT over Video for Windows:

VFW 1.1 addressed most of the advantages  
 QT has enhanced SMPTE history  
 we provide this post Chicago  
 QT has more precise capture control from VCR's  
 we are providing spring '94  
 QT has better still image API  
 we are providing in core work in Nashville  
 QT File format with volume control, Edit list and pointers used for editing systems  
 we are providing in Nashville  
 QT is supporting MIDI data in QT 2.0  
 vfw 1.1 does this but Chic. will have a MIDI stream handler to make it easier

### Advantages of Video for Windows over QT:

Audio compression with installable codecs  
 MPEG support under MCI. QT only demonstrates MPEG showing on a separate monitor  
 Ability to use data other than AVI files (AVIFILE), for example MPEG data and animation data  
 Taking advantage of hardware acceleration

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