



Apple



Jaguar Software

System Software Needs
(A Laundry List)

Draft - March 29, 1990

Changes:

J Nichols - 28 March I added some detail to the communications component area.
 Probable sources for the components (where identified) are listed in italics.

J Nichols - 29 March update LocalTalk stack area

A Kossow - 29 March Little puddles everywhere. Reformatted in Garamond

R. Williams - 2 April Misc changes and additions.

E. Neumann - 4 April Filled in section on animation.

Necessary Software Components

- **User Applications**
 - Where does our 'Look and Feel' Come From?
- **Applications Programming Environments**
 - C++
 - C or Pascal-ish Languages
 - Dynamic (SmallTalk/Lisp)
 - Hacked Assembly (DSP stuff?)
- **Development Tools**
 - MPW Cross-Development
 - Native (Son of HOOPS?)
 - Debugger(s)
 - Kernel Level
 - Applications Level
 - Remote
 - System Profiling Tools
 - Intra-applications Development Tools (RPC/net tools)

Necessary System Software Components

Fundamental System Primitives (the stuff that execution environments are built upon)

- Targeted to entire *Jaguar* hardware product line
- Scalable to ~4 CPUs
- Realtime Support
 - Deadline Scheduling (?)
 - Backoff / Degradation
- MultiTasking, fast context switch
- Lightweight Tasking
- Semaphores
- Virtual Memory
 - Protection
 - Lock code or data in real memory
 - Memory Mapped Files
- IPC
 - Fast
 - Network Transparent (not necessary at lowest level)
- Mac Environment Support
 - 24-bit Address Space
 - Fast Access to A-line Traps
 - Fast Privileged Instruction Emulation
 - Son of the Blue Adapter
- **OS Runtime**
 - Shared Libraries
 - Run-time format
 - Memory Manager
 - Code Manager
 - Kernel load format
 - Math library

Basic data structures library
Sort utilities

• **Basic I/O Mechanisms**

- Common Messaging Interfaces (assuming we use msgs for I/O..)
- Async I/O
- Prioritized hard disk I/O (2 levels sufficient)

• **Floppy Disk Driver**

- Write support for new formats
- Should be able to read 800K and up

• **SCSI Driver**

- Scanner, MO, DAT, High Speed SCSI, Disc Arrays

• **Video Stream Driver (aka Wilson Driver)**

- Real Time Constraints of HW

• **Keyboard /Mouse Driver**

- ADB (?)
- ChefCat

• **BLT Manager**

- Moral Equivalent of Slot Mgr for config/primary init/drivers
- Communications BLT Devices (IEEE488?)
- Mass Storage BLT Devices

• **Hot Removal/Insertion**

• **Boot Manager**

- Takes Machine from Powerup to OS Kernel
 - Power on self test
 - Stage 1 Boot from EEPROM
 - Boot Preferences
 - Stage 2 Boot from OS Storage Device
- Handles Low Power Mode Transitions

• **Communications**

• **Ethernet Driver**

- EtherTalk
- twisted-pair Ethernet (10BaseT) driver (*N&C-John Galt*)
- promiscuous mode for network monitors
- packet cloner or pass-through mechanism for netSpy/stats

• **AppleTalk Stack**

- At least need up to PAP (to work w/ Laserwriter). (*"portable LocalTalk" "C" stack is under development in Neiss-land, contact Allan Oppenheimer*)
- LocalTalk LAP protocol as WANKEL task.

• **TCP/IP stack**

- *BSD public domain "C" sources/N&C (Jim Mathis)*

• **Serial drivers**

- equivalent functionality ported to XJS/WANKEL.

• **ISDN Driver**

- ISDN call management stack (*N&C-Teleos*)
- Communications Toolbox ISDN connection tool
- Is there any useful stuff from ATG CommTech?

• **BLT comm card environment**

- MCP card equivalent for BLT (*Rosco has an initial design*)
- A/ROSE system tool port
 - downloader
 - connection manager
- Livonia (serial) and Token Ring card ports to Jaguar

• **Analog Phone Driver**

- modem data pump modules
- DTMF generator and receiver software
- error correction protocols (MNP 5 and V.42bis)
- Communications Toolbox Modem tool interface
- Dialback (communications security)

• **Fax Driver**

- T4 image compression routines (*Paris/Apple FAX*)
- T30 handshake protocol machine (*Paris/Apple FAX*)

• **Communications Toolbox**

- for compatibility with third-party applications
- Connection Tools (HAS to support multiple sessions ie. NCSA Telnet)
- File Transfer Tools (Xmodem, FTP)
- Terminal Emulators

- **Distributed Systems Stuff**

- **Diskless Boot Protocols**

- AppleTalk version for Apple supplied servers
- Bootp version for TCP/IP Servers

- **Distributed Systems Strategy**

- How do multiple systems interact with each other on a LAN
- How do they interact with other resources on a LAN?

- **Remote Procedure Call Services (inter and intra machine)**

- Stub Compiler
- Port Mapper

- **System Checkpointing (Low-Power Mode)**
 - Warm Start / Soft Power Down

- **System Error Handling**
 - Deep Shit Handler
 - Error Logging
 - Crash Dumps

- **System Settings Management**
 - Manages Permanent Data Stored in EEPROM

- **EEPROM read record/write record**
 - Permanent Hardware Info
 - Boot Hints
 - Primary Init Hints

- **File System**
 - Manages Disk Bits
 - Indexes Files (for Content-based Retrieval)
 - Optimized to Handle Very Small Files
 - Optimized for Multimedia (data placement on disk)
 - Suitable for Large Secondary Storage
 - Support for Relational Queries
 - "Smart" Notification of Changes
 - Memory Mapped Files

• **Graphics Manager**

- Resolution Independent
- 3D Primitives
- 24-bit Color Capable (alpha blending?)
- Hardware Acceleration Capable
- Photorealistic (e.g. rendering primitives)
- Modeling and rendering separable
- Fast (to allow for animation at 30 frames/sec)
- Video Capable
- Fully utilizes Wilson

• **Time Manager**

- Definition of Time
- Definition of Sequencing
- Definition of Synchronization
- SMPTE
- Might be Part of Kernel

• **Animation Manager**

- Timing services (a "universal time ruler" & registers tasks)
- Storage of animation objects & related data
- compositing engine (to composite objects together)
- objects with state & behavior
- scripts for controlling/programming objects
- state-graphs & rules for controlling/programming objects
- clip animation data formats (for exchanging/copying)
- advanced animation object features (eg. hierarchy, communication between objects, constraints, collision detection, camera control, lighting control)
- toolboxes: (interpolation, metamorphosis, texture warping, visual effects like dissolves)
- ability to play a basic format (without creating application)
- the "standard file package of time" (quick way to sequence)
- play, stop, rewind type user functions
- support for alternate input devices (knobs, stylus)
- simple key frame animation editor (2.5D & 3D)
- simple animation object editors

• **Video Manager**

• **Sound Manager**

- Rate Conversion
- MIDI Drivers

• **Font Manager**

- Resolution Independent

• **Event Manager**

- Handles Many I/O Devices
- 3D Capable
- Gesture Capable(?)

- **Layer Manager**

- Manages Screen as a Resource
- Creation, Destruction, Ordering
- Groups Multiple Windows

- **Window Manager**

- Creation, Destruction, Drawing, Ordering

- **Control Manager**

- Scroll bars, buttons, etc.

- **Menu Manager**

- Form not Clear (Pull-down vs. Pop-up vs. Tearoff, etc.)
- Will Exist in Some Form

- **Text Manager**

- Text/Line Layout
- Style Management
- Presentation Management (e.g. rotation, scaling, etc.)
- International Issues

- **Notification Manager**

- Dialogs
- Audio
- Non-intrusive Visual

- **Data Manager**

- Structured Storage
- Data Type Management
- Support for Relational Queries
- Support for Semi-Structured Data
- Data Interchange
 - Memory, disk, or network
 - Definition of Basic Data Types

- **Print Manager**

- Integrated w/ Graphics Manager

MarketDroid Fodder

- **Government Sales**

- Procurement Requirements (UGH!)
- Security

- **Installation Strategy**

- System Upgrades