

Microsoft API Strategy

September 19

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Plaintiff's Exhibit

7449

Comes v. Microsoft

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Situation

□ Windows application development is the standard for ISV. S/P and corporate IS are

Key Win32 APIs are wrapped by VBRUN, MFC, Delphi, ...

- New, non-MS platform is emerging
 - Driven by Internet distribution
 - Java based
 - Cross-platform
 - Network centric
 - Windows agnostic

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Manipulation

- Compilers are more successfully powered for Java middleware to succeed for Java and content-centric applications
 - Driven by Internet distribution
- MS has lost significant control over innovation for the new Internet platform
 - Sun's Java. * classes are well established

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Microsoft Goals

□ Provide complete, high quality, low cost, for Windows development

□ Establish leadership in the new Internet platform, distributed computing environment and programming model

– Match the competition with Java and cross-platform (OS) support

– Support rapid, maintainable development of distributed applications

■ language neutral, seamless in Java

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Microsoft Goals

- Re-establish the foundation for innovation
- Regain control of the platform definition and innovation
- End the least common denominator phenomenon
- Leverage our distributed services, interoperate with others
- Win by: Creating a compelling developer message
 - HTML leadership
 - Being the best offering on Windows; making Windows the best for the Internet
 - Support for all mainstream languages (not just Java)
 - Great Microsoft tools, great support from systems for Microsoft Tools

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Objectives

① Developer adoption of Windows-specific interfaces

– Optimize for Windows

② Developer adoption of MS-specific cross-platform libraries

– Stick with Microsoft, stay in the program

③ Developer adoption of our tools and frameworks

– Allows us to steer the community on the best path

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Application from C-Info Systems

Information should remain risk

- **Client/Server forms apps**
 - Corporate, vertical
 - Moving to Web-based technology "Weblications"
- **Web-based content apps, multimedia**
 - CD-ROM today, "Webication" tomorrow
 - Encarta, Amazon.com
- **Collaborative apps**
 - Realtime: Netmeeting, chat
 - Workflow: Notes, Exchange
 - Moving to Web-based technology over next 2 years
- **Games**
 - Quake, Monster Truck Madness
 - Serious ones not at risk right now

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Category Messengers

Client/Server forms apps

Transition simple apps to Web technology

More complex apps will require better tools

Based on: Trident, Denali/Viper, High level language frameworks

■ Web-based content apps, multimedia

– Leverage HTML features of Trident

– Leverage Windows-specific class libraries based on COM Windows, including Trident

– For Cross-platform support, use our tools and class libraries subset

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Supporting Client/Component & Client/Server Developers

Microsoft Server
Microsoft Client
Leverage IE share to focus
on MS extended HTML

Client development
Netcape ONE, Java, & only
MS Class libraries

Why?

- Great support for IE on Win32
 - Great services, tools, size, speed
 - Great server support

- Reasonable cross-platform support

- IE, Mac, Unix

- Reasonable Navigator support

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Where we are today

COMS has taken the lead in HTML

New Navigator 4 object model extensions indicate their HTML support is ahead-only

Trident can incorporate Netscape extensions, go beyond

■ Java environment deeply entrenched

- Sun's Java.* classes, bytecodes well established
- Netscape ONE could fragment the market

■ Windows API inaccessible from Java

- MS has extended Java in IE 3 with COM, AWT extensions, DirectX, but we need to do more

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Where we are today

- ActiveX controls are platform and browser dependent

ActiveX controls on Windows are tied to User

- All controls call Win32 APIs

Support in Navigator is weak

Today's Mac and Windows embedding/control interfaces are not compatible

New ActiveX controls for Mac use Mac-specific interfaces

Implications:

- Cross-platform ActiveX Control support requires a higher-level abstraction and new code
- Support in Navigator for ActiveX controls must be fixed

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Approach

■ Tools drive business developer adoption

■ Compelling tools drive adoption of MS strategy

■ Microsoft determine the libraries, frameworks used in solutions

■ Tools are the hook to developer information programs

■ Define services which are compelling to developers and are only available on Microsoft licensed platforms

- "Your competitors will take advantage of this stuff..."

■ Where developers demand cross-platform capabilities, supply a superior solution so that they are using Microsoft interfaces and tools

- Above all, keep them in the program, keep them using our tools

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Competition: Netscape ONE

HTML

JavaScript

Plug-ins

Java Applets

Live Connect

Internet Foundation Classes (IFC)

Java Runtime Environment

Browser protocols: (HTTP, LDAP, IIOP, SMTP, ...)

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Comprehension - Netscape (NIE)

Full browser with its object model

Netscape equivalent to JavaBeans

Supports IIOP for distributed computing

■ Internet Foundation Classes

- UI (Basic controls, multifont text, windowing animation, drag/drop, single threaded concurrency, object persistence, localization)
- Messaging: SMTP, POP3, IMAP, NNTP
- Security: SSL, X.509v3 certs, signatures, extensibility
- Distributed Services: IIOP exposure

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Competition - JavaSoft

□ Java 2 vs. Java's "standard" classes libs from the 1990s

AWT, Net, Lang, IO, JDBC

AWT

■ Simple windows, frames, widgets

■ Simple events

■ Layouts

- Net - classes for networking

- TCP/IP sockets, URLs (http, ftp, gopher, wais, ...)

- IO - file i/o

■ sequential and random access

■ Borland's *Latte* and *Symmantec's Café* are high quality RAD tools targeted at Java.*

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Competition - JavaSoft New Classes

Java Beans Embedding Component support

Hot Beans (AWT)

Clipboard, Keyboard accelerators,

Drag/drop, Uniform Data Transfer

■ Media Framework

– 2D: (Adobe), 3D: (Intel, SGI)

– Animation, Audio, Collaboration, Video, Telephony

■ Security - Authentication, code signing, encryption

■ Commerce (Wallet)

■ Network Management: (SunSoft)

■ Late: Q2 '97?

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Competition - Java Beans

□ Component model based Java Platform

Higher level than Java classes

Integrates Java and VM facilities (likely to be folded back into Java)

- major overlap with OLE (interop "for free")
- Additional tool-centric features

■ Endorsed by system and tool vendors - Borland, IBM, Netscape, Sun

- Sun designed infrastructure (serialization, etc.)
- Component features designed and engineered by Borland

■ Current plans are dependent on AWT

- Implication: Container and all services must be AWT based

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Java Beans Frameworks

Interface publication and discovery: Reflection

Event handling

Persistence

RAD infrastructure: Inspectors and editors

Layout: Embedding

Distributed location and activation: RMI and

Corba

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Comprehensive Comparison

Category	ActiveX/Com	JavaBeans	Netscape One
Interface publishing/discovery	typelibs, QueryInterface	reflection/introspection APIs	Java Registration Interface (JRI)
Events/inter-component communication	ActiveX Events model	Beans events model	LiveConnect
Persistence	IPersist	Beans serialization specification	Persistable
Deployment	ActiveX Control/ActiveObject/ActiveObjects	Beans (AWT/Abstract) embedded JAVAIL spec	Manifest/ManifestEntry
Architecture	ActiveX Control/ActiveObject/ActiveObjects	UI/Java	ManifestEntry
Architecture	ActiveX Control/ActiveObject/ActiveObjects	UI/Java	ManifestEntry

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Competitive Summary

Microsoft's core classes have developer mindshare

Will be significantly reinforced in V2

- Netscape's Internet Foundation Classes will be driven/limited by future success of Navigator
 - Cross-browser claim yet to be tested
 - Primarily consumer-driven, not likely to have major impact in corporations
- MS ability to lead Java developers is largely driven/limited by IE share

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Recommended Actions

- Follow similar strategy to Browser, Enable and Extend particularly with Java and Java.
- Make integration between Java and ActiveX as seamless as possible
- Adopt JavaBeans as Java language integration for OLE/COM

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Recommendations (continued)

Bundled with existing language-specific frameworks (VBRUN, MFC, Java, ...)

– **RAID depends on language/framework integration**

– **Make language-specific part as small as possible**

■ **Make most services language independent**

– **Fix existing problems: Versioning, typelibs, ...**

– **Create system COM interfaces that are optimized for support of frameworks**

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Recommended platforms (COMI'd)

- Windows as language independent COMI

All new system services as language independent, well-structured COMI objects and interfaces

Restructure the most leveraged Windows services as well-structured COMI objects

- Focus is on simplifying the Weblication developers job on Windows
 - Platforms and tools work together on this - must be great for language framework integration
 - Make a subset of these services available cross-platform
- “Mechanically” think Windows APIs to COMI to allow Java programmers access to Windows APIs

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Alternatives & Scenarios

- Alternative Strategy: Build MS Java classes for compute with Java

Java has momentum we'll never catch up

Java is the "studio" of Java, we'll look like we don't get it

■ Best Case Scenario: Fragmented Class definitions

- Netscape/Sun fragment Java Classes, object model
- Even a fragmented Java will be successful, but will target Sun-defined least common denominator initially
- Leaves MS time, opportunity to build Windows-based momentum around our definitions, tools

■ Worst Case Scenario: Sun/Netscape/Borland team up on Java classes and Java tools

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Top Priorities for COM Windows

□ Our work is making Networked Windows
Web browsers easy

Java.net only defines URL, Sockets interfaces

— We can (must) take leadership on advanced services
— Sunsoft is focused on "wrapping" existing definitions

■ All work must be tuned for language integration,
especially Java

■ Build in our fundamental distribution technologies
— Load balancing, name transparency (DCOM vs. RMI)
— Transactions

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Top Priorities for COM Windows

■ Manage Directory

– `FolderView`, `Namespace`, `IBFS`

– Directory services, `FileShare`, `FileAccess` – `OLE DB`

– Property access

■ Database query and access (vs. `JDBC`)

– `ADO`, `OLE DB`

■ Security (vs. `JECF`)

– Authentication, Authorization, Wallet, Encryption, Signing, Safety

■ Simple Messaging

Cross-platform Support

Create

(Create a safe Active Control binary which can run
in Win32, Mac, Unix)

- Design infrastructure for cross-platform Java and VB
- Once design complete, decide whether it is worth supporting cross-platform VB or just using Java
- Focus C++ products on high-performance Windows development

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Cross-platform Support

Requirements

(Component platform: Internet Explorer, Navigator)

- Middleware API: Java 2 + X-Platform: COM Subset

- Trident subset (No Ditect(X))
- Drawing: controls
- Database subset (No local storage)
- Optionally Safe: Signature tells IE to sandbox control

- VM

■ Single Microsoft VM

- Extend Windows Java VM to support VB
- Use Collusa technology to support C++, SQL, ...

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Single Windows Model

We must have a single *IP* address story for *Internet* and *server* compatibility/extensions

- Current market situation mandates Netscape support

- Apache should be guided to use our model on NT
- More than APIs, it's also the complete model and environment

■ Requires:

- Plug-in for Navigator to run MS HTML and COM services - utilizes DCOM
- Denali and Viper extensions work under NT Netscape Server (NSAPI), NT Apache server - utilizes DCOM
- Common controls as Java classes for cross-browser/platform
- Strategy for making UNIX Apache, Netscape migration easy

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Windows Advantages

- **Single platform of choice for client and server implementation (and their migration)**
 - Performance will be best on windows
 - New things appear on windows first
 - Multimedia/graphics is best on Windows
 - Great DirectX
 - Fastest, best support of new devices
- **Client market share**
 - ISVs need to, will optimize for Windows
 - New things appear on windows first
- **Windows has the complete version of...**
 - Full IE
 - Full Trident
 - Full set of Windows Interfaces (available to Java)
 - Full set of client-side database APIs
- **Focus of Distributed services innovation on both client and server**
 - Active Server platform
 - by far the coolest server programming environment

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Windows 3.11/3.11x

It's the past, represented as a group of new APPLS that's continuing.

It's becoming a liability, too much complexity.

■ Focus **MUST** be on simplicity as we move to COM Interfaces

- Easy to figure out

- Easy to access new services

- Easy to exploit the network from Windows

- Language / Framework integration

■ Security blanket

- We're here for the long run

- We protect your investments

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Language Framework Integration

- It manages already provided programming model
- Tool presents a user model for the developer
- Approach needs to be tool centric
 - Tools provide direction to developer - this needs to be consistent with our systems strategy
- Developers want straightforward access to system services
- By providing quality system services which meet developer needs, the language specific framework can be made thinner

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Tools Evolution

- Finish VS releases
- Target IE 5 (or 6) as application development
- Focus on combining Internet Studio, Java, VB into RAD Internet development environment
 - Trident forms
 - Make IE the IDE
 - Client-side Active controls, server-side Denali, Viper objects
 - Written in Java and VB
 - Active scripting on Client and Server
 - Javascript and VB Script
- Enhance VC++ for current customers

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Java Approach

- Use our Windows VM to own Java.* and Beans
- Build on Java.* Beans as the Java framework

Extend these to run best on Windows

- Expose Win32 functionality in Java.* /Beans
 - Provide MS APIs where possible
 - Change Java.* /Beans to support MS objectives - ActiveX
 - Use Sun's approach where necessary

- Provide MS alternatives for other Sun services
 - Net, RMI, Media, commerce, security

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MFC Evolution

Minimal evolution of MFC 4.2

New system features as standard libraries

New common controls: Date-time picker, Colorbar

Future MFC

- Implement new functionality as COM classes

■ Address Versioning

- Investigate restructuring of MFC to reduce fragility

■ Stay compatible with MFC 4.2

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ATL

Make ATL work very well in the MFC environment

Common marketing message

ATL 2.0 for hard-core ActiveX controls creation

- Keep ATL small and fast
- Remain focused on components, not apps

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VB RUNTIME Evolution

Strip out Ruby

Package as standalone Active Designer that we deprecate over time

Strip out EX Code engine

VB should target the Windows VM

Move some VB objects into a core system runtime where they can also be shared by other tools.

E.g., Printer, Clipboard, Screen

We have already done this for Font and Picture

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Type Libraries

□ We intend to invest in a new component description infrastructure

- Type libs are an obstacle today

- They will be a crippling limitation of our system in the near future

- We do not believe the current solution can be grown to meet our future requirements

■ This mechanism needs to be an integral part of COM, not the *wart-on-the-side-for-VB* that it is today

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Typelib Requirements

- It is currently completed great performance
- Suitable for all core languages

Type support for VB, Java, Visual Basic Script, SQL and C++ including debugging

■ Enable multiple providers

- Dynamic creation
- Language independent interfaces

■ Easily queryable and updatable

- Object description database
- Generic operators for data manipulation

■ Extensible

■ Typelibs currently achieve none of these!

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Typelib Recommendation

Build a new core type system

- Leverage many concepts from Java Class File

- Support Typelib requirements

■ Provide "Beans" view for Java

- Concepts could be leveraged for other languages

■ Provide "Typelib" view for downlevel OLE

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Trident Forms

HTML Active Documents

VB/Java (code attached to the Trident object model)

HTML Active Controls

Form becomes a control-runtime

HTML Active Dialogs

Forms used as dialog manager

Trident and AWT objects are independent

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Drawing Approach

□ Build language-independent COM interfaces to GDI

and DirectX

Thin layer on top of GDI

— Make subset cross-platform

— Focus on ISV requirements

— Fit these into AWT framework

■ Why will ISVs use this?

- Brings richer GDI/DirectX specifics to Java
- Provides these services to other VB, C++,...

■ We've already extended "Graphics" in AWT with "GraphicsX COM interfaces"

- Beziers, font extensions, Intl., etc.

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Database

- ADO is language independent API
- Small OLE DB wrapping under development
- Client side support to ODBC and OLE DB data
- 3 Tier through Active Data
- JDBC
 - Widely adopted, equivalent to RDO 1
 - Forward-only cursor, no bookmarks, no batch update, no snapshot semantics, no local indexing
 - Extend JDBC with ADO semantics

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Developer Message

Use C++ for performance dependent, high performance components

■ Use Java or VB for RAD development

■ Target Language-dependent frameworks plus MS COM Windows Classes to take full advantage of Windows

– Cross-platform ISVs target subset

– MS will make your components work under Netscape client and server; Apache NT Server

■ Use VIPER/DCOM for distributed apps under the Active Server environment

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How does Microsoft Win?

- Inadequate, extended, herxol
- Requires leadership in browser marketshare
 - Developers target MS API extensions
 - Focus on Windows
- Developers use our tools
 - Approach, mindshare

Summary of Necessary MIS Actions

Product Roadmap for the "Web Applications" development using Java/JSP

- Focus future IE on "Web Applications"
- Extend Java * classes with MS features, Services
- Expose Windows to Java programmers
- Focus DBSD API efforts on language-independent COM objects
 - Top priority is distributed services

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