BOEING

Desktop Integration Roadmap

- Objective
  - Complete presentation which outlines Client Server desktop integration strategy for 1999
  - Support common desktop synergy program/TBS
    - presumes a refresh rate of 100-0-0
    - enterprise-wide standards
- Audience
  - J. Palmer to give to P. Condit in July
  - Common desktop synergy team
  - CNO/Leadership Team
  - Standards Boards
  - Ourselves
- Deliverable
  - Presentation, recommendation, backup material

PENGAD-Bayonne, N. J.
GOVERNMENT EXHIBIT 636

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000348

BOEING®

Shared Services Group of Puget Sound
Computing and Network Operations
Technical Services

Desktop Integration Roadmap

Prepared by:
- Client/Server
  - PC Hardware Technologies
  - PC Interconnect Technologies
  - Workstation Software
  - Standard Software Service
  - Exchange Messaging Infrastructure

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000349

BOEING

Desktop Integration Roadmap - Core Team Members

PC Hardware Technologies
- Larry Franks
- Kent Greene
- Greg Hyde
- Herb Bendt

Workstation Software
- Kathy Crowell
- Joel Ware
- Lenore Baken
- Shirley Hinshaw
- Scott Vesey

PC Interconnect Technologies
- Tim King
- Bob Cerelli

Standard Software Service
- Dino Martinelli
- Jeff Greenough

Exchange Messaging Infrastructure
- Gail Meredith
- Rhonda Hoffman

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000350

BOEING

Desktop Integration Roadmap - Agenda

- Objective
- Roadmap and Issues
  - Hardware
  - Operating System
  - Software
  - Standard Software Service
- Conclusions and Recommendations

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000351

BOEING

Desktop Integration Roadmap - Objectives

- Recommend Integrated Desktop and Laptop Platforms
  - Tactical: what is available on 1/1/1999
  - Strategic: optimal Technology Alignment - available 06/1999
- Provide users with an integrated 18-month lookahead of
  - Desktop components
  - Desktop major technology transitions
  - Coexistence and leverage opportunities
- Offer information sharing that helps
  - Awareness of gaining technology
  - Support infrastructure planning
  - Facilitate migration planning
- Excludes issues related to
  - Cost for enterprise licenses
  - Deployment issues and resources
  - Business case data

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000352

BOEING

Desktop Integration Roadmap - Notebook Configuration as of 6/98

Processor	233 MHz Pentium
RAM	64 MB
Hard Drive	3.2 GB
CD-ROM	Multi-use bay (floppy/CD-ROM)
Screen	13.3 inch
Video RAM	2 MB
Network	10/100 Adapter and modem
Weight	6.0 lbs.
Ports	USB, serial, parallel, video, mouse
Sound	16 bit and headphones
Add ons	Port replicator, ext. monitor (17"), keyboard and mouse

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TRC 000353

BOEING

Desktop Integration Roadmap - Tactical (1/99) Notebook Configuration

Processor	300 MHz Pentium II
RAM	96 MB
Hard Drive	5.x GB
CD-ROM	Multi-use bay (floppy/CD-ROM)
Screen	13.3 inch
Video RAM	2 MB
Network	10/100 Adapter and modem
Weight	6.0/ <lbs.
Ports	USB, serial, parallel, video, mouse
Sound	16 bit and headphones
Add ons	Port replicator, ext. monitor (17"), keyboard and mouse

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TRC 000354

BOEING

Desktop Integration Roadmap - Strategic (6/99) Notebook Configuration

Processor	333 MHz Pentium II
RAM	128 MB
Hard Drive	7.x GB
CD-ROM	Multi-use bay (floppy/CD-ROM)
Screen	13.3 inch
Video RAM	4 MB with AGP 1 Graphics
Network	Adapter and modem
Weight	6.0/ <lbs.
Add ons	Port replicator, ext. monitor (17"), keyboard and mouse

US/States v. Microsoft
HIGHLY CONFIDENTIAL

BOEING

Desktop Integration Roadmap
Tactical/Strategic Laptop Issue

- Individual hardware component specifications are subject to industry and vendor driven change.
- Laptop port replicator design may change with each new product release causing incompatibilities with older laptops.
- Acceleration of industry/vendor technology (processor, O/S,& Apps., etc.) that may require hardware upgrades prior to the end of the designated life cycle (3-year?).
- Cost of adding additional memory to base configurations compared to future labor and memory upgrade costs to support total life cycle.
- Life cycle compatibility with remote administration capabilities such as Zero Administration Windows, Wake-up on LAN, PC 98/99 specification, software updates, etc., to reduce touch labor and administration costs.

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TRC 000356

BOEING

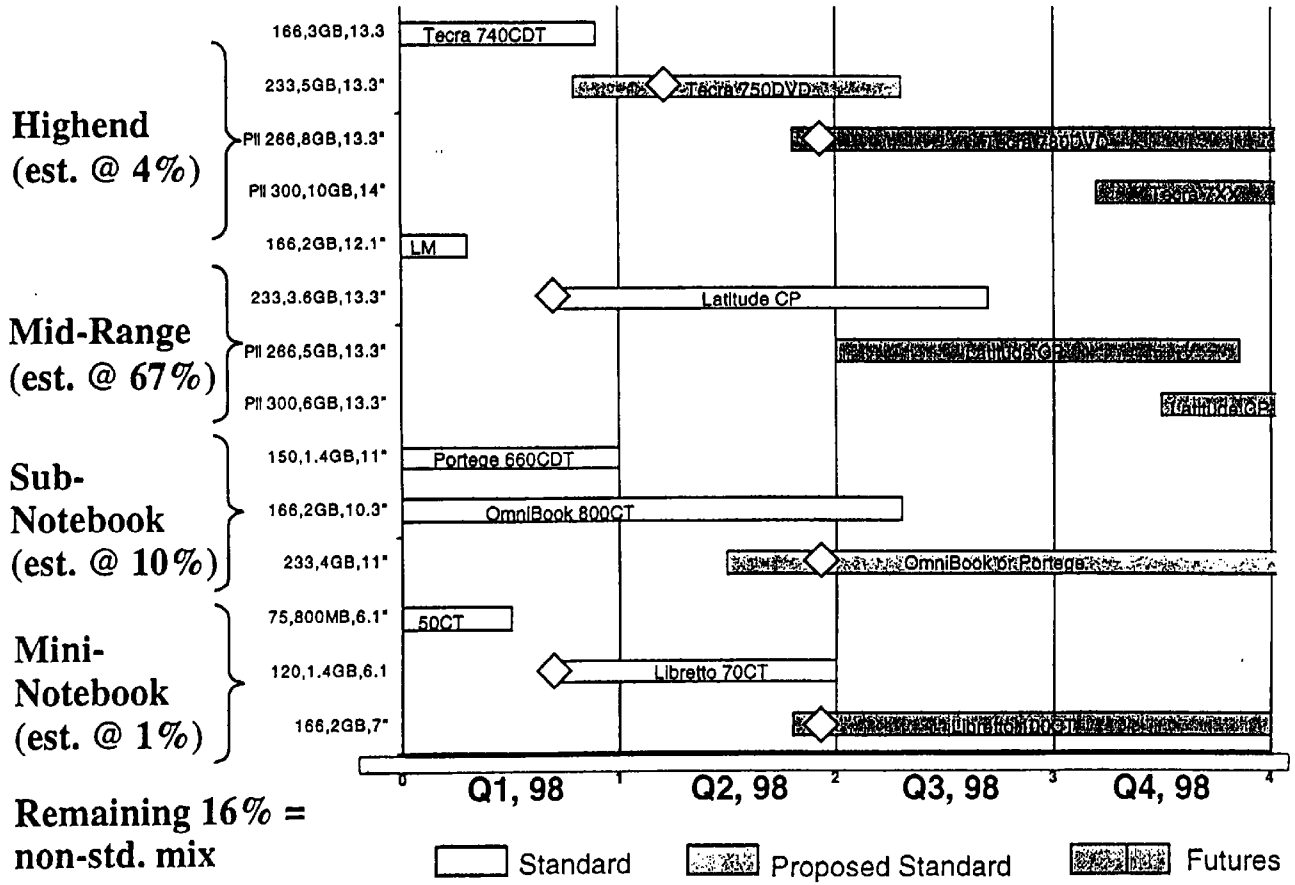
Desktop Integration Roadmap
Tactical/Strategic Laptop Issues - *continued*

- Software overhead requirements for the "outyears" are undefined.
- Customer acceptance of configurations as robust/stable over the lifecycle.
- Emerging customer requirements (hardware upgrade?).
- Suitability with long term computing architecture (infrastructure) plan.

US/States v. Microsoft
HIGHLY CONFIDENTIAL

BOEING

Desktop Integration Roadmap - 1998 Notebook Roadmap - Heritage Boeing only



Remaining 16% = non-std. mix

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000358

BOEING

Desktop Integration Roadmap - Desktop Configuration - as of 6/98

Processor	350 MHz Pentium II
RAM	96 MB
Hard Drive	4.3 GB
CD-ROM	Industry Standard
Video RAM	4 MB
Network	10/100
Headset	Yes
Keyboard	Standard
Mouse	PS-2
Sound	16-bit Sound
Monitor	17" (if required)

US/States v. Microsoft
HIGHLY CONFIDENTIAL

BOEING

Desktop Integration Roadmap - Tactical (1/99) Desktop Configuration

Processor	450 MHz Pentium II
RAM	96 MB
Hard Drive	6.4 GB
CD-ROM	Industry Standard
Video RAM	8 MB
Network	10/100
Headset	Yes
Keyboard	Standard
Mouse	PS-2
Sound	16-bit Sound
Monitor	17" (as required)

US/States v. Microsoft
HIGHLY CONFIDENTIAL

BOEING

Desktop Integration Roadmap - Strategic (6/99) Desktop Configuration

Processor	500 + MHz Pentium II
RAM	128 + MB
Hard Drive	8.6 + GB
CD-ROM	Industry Standard
Video RAM	16 + MB
Network	10/100
Headset	Yes
Keyboard	Standard
Mouse	PS-2
Sound	16-bit Sound
Monitor	17" (as required)

US/States v. Microsoft
HIGHLY CONFIDENTIAL

BOEING

Desktop Integration Roadmap
Tactical/Strategic Desktop Issues

- Individual hardware component specifications are subject to industry and vendor driven change.
- Acceleration of industry/vendor technology (processor, O/S,& Apps., etc.) that may require hardware upgrades prior to the end of the designated life cycle (3-year?).
- Cost of adding additional memory to base configurations compared to future labor and memory upgrade costs to support total life cycle.
- Life cycle compatibility with remote administration capabilities such as Zero Administration Windows, Wake-up on LAN, PC 98/99 specification, software updates, etc., to reduce touch labor and administration costs.
- If Tactical/Strategic configurations modified for Engineering use, could be overkill for 90% target population.

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000362

BOEING

Desktop Integration Roadmap
Tactical/Strategic Desktop Issues - *continued*

- Software overhead requirements for the "out years" are undefined.
- Customer acceptance of configurations as robust/stable over the lifecycle.
- Emerging customer requirements (hardware upgrade?).
- Suitability with long term computing architecture (infrastructure) plan.

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000363

BOEING

Desktop Integration Roadmap - Future High-End PC Price/ Performance

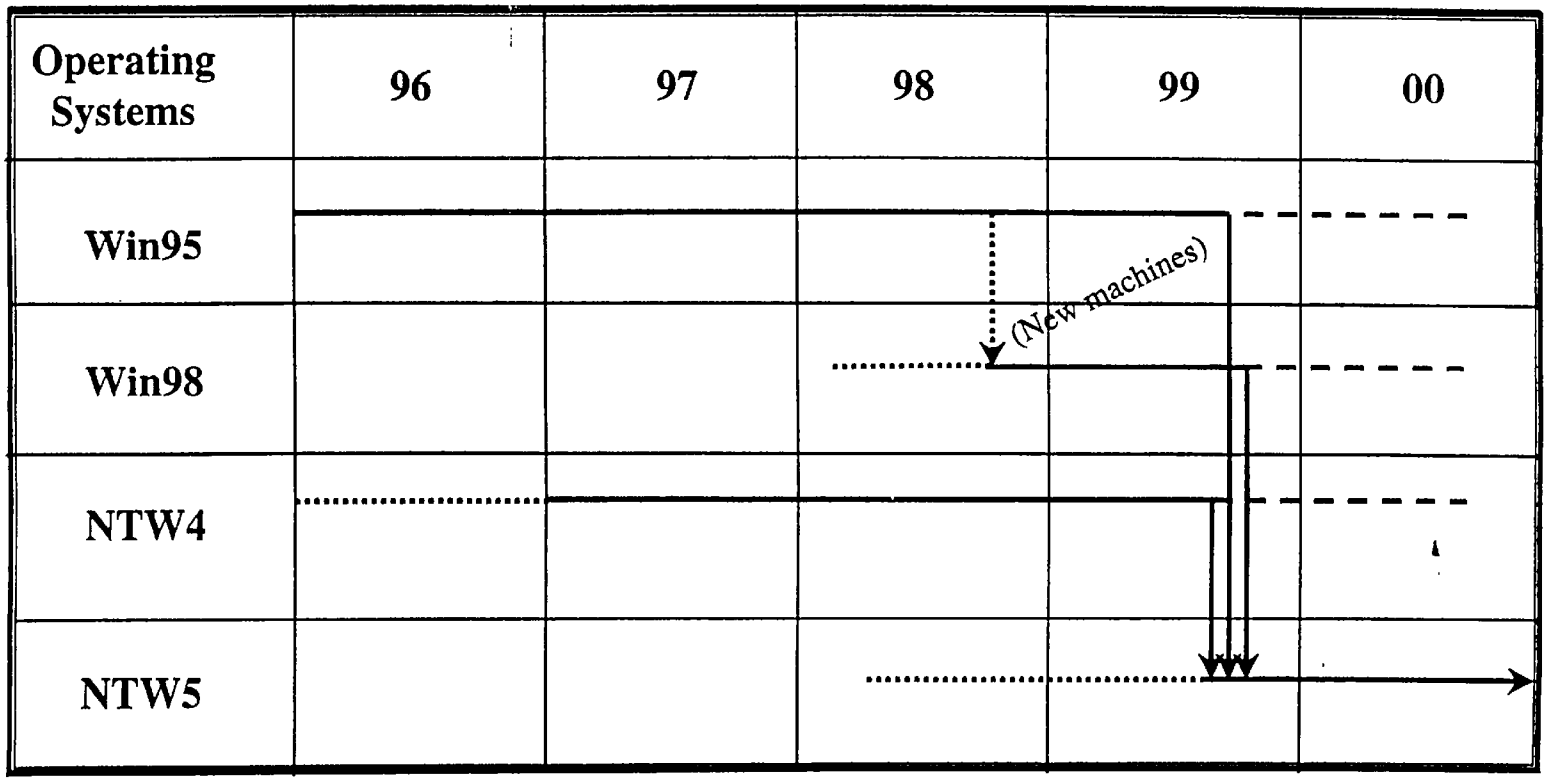
Function	OS App's Mail Web DCAC	Win95 NTW 4.0 Office Pro 95 Exchange Netscape eXceed	Win 98 Office Pro 97 Exchange/ Outlook Netscape eXceed	NTW 5.x Office Pro 9 Outlook 9 IE eXceed
Configuration	CPU Memory Video HD Monitor L2 Cache CD ROM/DVD Warranty	PII/300/333 96 MB 8 MB video AGP2 4 GB HD 17" monitor 512Kb 14/32X CD ROM 3 year	PII/400/450 96/128 MB 8 MB video AGP2 6/8 GB HD 17" monitor 512 Kb Std. CD ROM 3 year	PII/550 128 + MB 8/16 MB video AGP4 8 + GB HD 17/19" monitor .512/1 Gb CD ROM/DVD 3 year
Price	$4000 $3000 $2000	Anticipated cost trend guesstimate		

6/98 1/99 6/99

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000364

BOEING

Desktop Integration Roadmap - Operating Systems



..... ramp up (beta vendor release, CNO test and certification
——— available in production in Boeing
------ sunset

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TRC 000365

BOEING

Desktop Integration Roadmap - Operating System Issues

- Windows95
  - Increasingly difficult to configure new drivers
  - Will not support newer hardware
    - USB requirement
    - 32-bit Card Bus - Network adapters
    - UDMA hard drive controllers
    - DVD
  - Difficult to find all the bug fixes
  - Could be five years old before converted to NT 5.0

US/States v. Microsoft
HIGHLY CONFIDENTIAL

BOEING

Desktop Integration Roadmap - Operating System Issues

- Windows98
  - Released June, 1998
  - Not a new Operating System
    - Update to Windows95
    - Minimal support and training impact
    - Requires S^3 and other testing
    - Supports all current hardware
    - Best transition platform to NTW 5.0
  - Recommended for new machines until NTW 5.0 in production

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000367

BOEING

Desktop Integration Roadmap - Operating System Issues

- NTW 4.0
  - Laptop Support: No power management; no docking/undocking; older laptops will not run NTW 4.0; no plug and play; limited hardware profiles; no automated install process for the laptops
  - Support for latest desktops: have video problems with Dell GXAs; newer drivers are difficult to incorporate into the base OS
  - Operations support structure for NTW 4.0 is lacking
  - There is no clear advantage to moving to NTW 4.0

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000368

BOEING

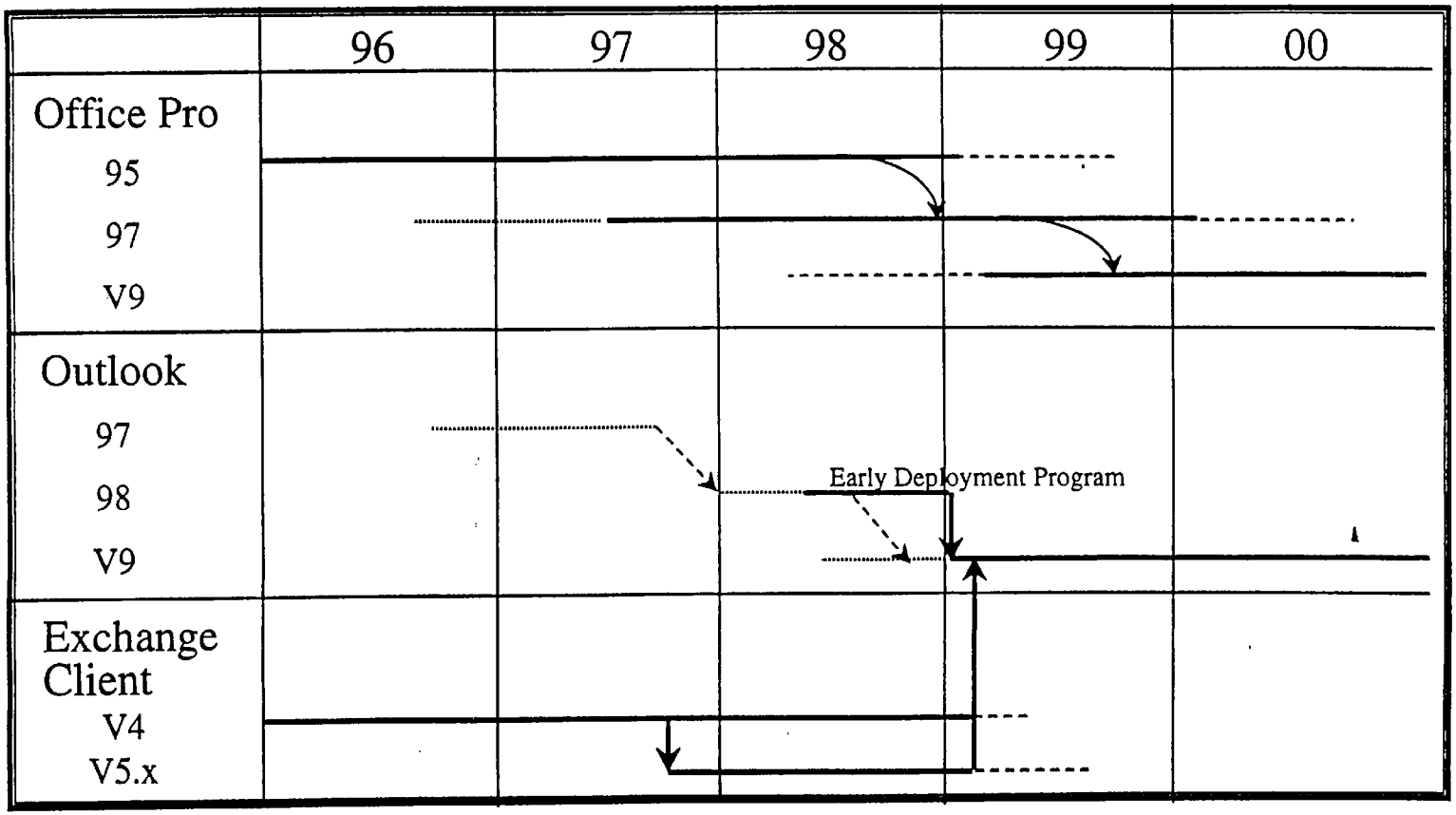
Desktop Integration Roadmap - Operating System Issues

- NTW 5.0
  - Required for bulk of desktop TCO savings
  - Projected release date is 1Q99
  - Test and certification processes under way
  - Supportability issues
    - new Company-wide end user support processes needed
  - Tied to server synergy activities

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000369

BOEING

Desktop Integration Roadmap - Front-Office Apps

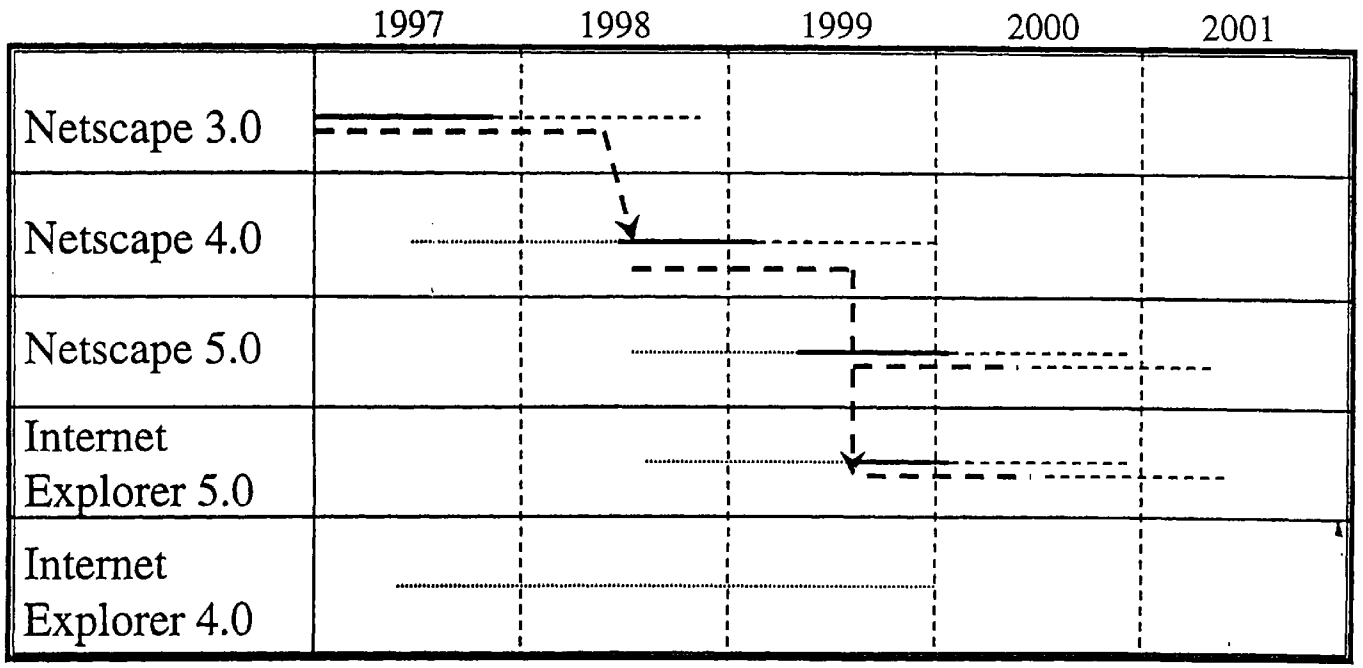


..... ramp up (beta vendor release, CNO test and certification
——— available in production in Boeing
------ Sunset

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000370

BOEING

Desktop Integration Roadmap - Browsers



Footnotes:

1) UNIX platforms are expected to continue using the Netscape browser.
   Current versions of Internet Explorer for UNIX do not meet functional and reliability requirements.
2) Internet Explorer 5.0 will be bundled with Windows NT 5.0, Office 9, and Outlook 9.

..... ramp up (beta vendor release, CNO test and certification
——— available in production in Boeing
------ Sunset

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 00037

BOEING

Desktop Integration Roadmap - Microsoft Outlook

- Outlook98 is baseline for Early Deployment Program
- Outlook9 in beta - RTM 4Q 1998
- Customer decision for deployment may be based on version availability of Outlook9 (decision point 10/98)
- New machines do not have Exchange or Outlook client loaded
- Exchange or Outlook is not part of S^3 suite

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000372

BOEING

Desktop Integration Roadmap - Microsoft Outlook Issues

- Outlook version for deployment
- Duration period for migration
- Existing clients must be upgraded to Outlook98 or newer prior to migration of Exchange directory to NT server 5.0

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000373

BOEING

Desktop Integration Roadmap - Microsoft Office Issues

- Office V9 has significant synergy with NTW 5.0 and Internet Explorer 5.0
  - Office does not require NTW 5.0
  - Internet Explorer is installed as a component of Office9 but not required as a browser
- Historically, Microsoft Office deployment in Boeing lags the Microsoft release by 12-18 months (or more)
  - Why: Installed-base, large-company standards and deployment processes
  - Customers want us to close this gap by 6-12 months
- Interoperability with customers / suppliers - receiving Office 97 content
  - A single Office version mitigates impact
- Planned V9 RDP in 1998 partnership will help close technology gap
- Web application migration issues from Netscape to Internet Explorer for applications coded to browser-specific specifications (e.g. document object model, browser specific HTML)

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000374

BOEING

Desktop Integration Roadmap - S^3

S^3 Releases	96	97	98	99	00
R4 WfW Win95					
R5 WfW Win95					
R6 WfW Win95 Off97 Off 95					
R7 Win95, Win98, Off 97 XtoPC (NTW4.0)					
R8 Off9 XtoPC (NTW4.0) NTW 5.0					

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000375

BOEING

DRAFT

Desktop Integration Roadmap - S³

DRAFT

Proposed Content for S³ Release 7.0

S³ APPLICATIONS SUPPORTED

n (current) & n-1 (previous)

Desktop (Assumption: WfW is removed from S³)		
n	n-1	n-2 / other (to be removed)
Office 97 (SR-1/SR-2)		2.0
Access 97	7.0b	7.0, 4.0
Excel 97	7.0a	
PowerPoint 97	7.0b	2.0c
Word 97	7.0a	3.53
Canvas 5.0.3	5.0.2	5.0.1
eXceed 5.1.3		Freelance 2.1
		4.0
Milestones Etc. 5.0 (4/98 version)	5.0	2.02
Netscape Communicator 4.05	3.0	
Adobe Acrobat Reader 3.01	3.0	
(with Forms & Search Plug-ins)		4.0
Project 98 SR1	4.1b	2.03/2.02
Rumba Office 95/NT -5.2	2.10	4.0, 3.0
Visio 5.0	4.5	
WinZip 6.3	6.2	[1]**Downloadables:** BCSLIB 14; BUD 1 2.0; BUD 2 2.0; PkZip 2.04g; SQC 5.4

[1] Removal requires approval of S³ Customer Board.

Note: Bolded, blue fonted applications are new to S³

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000376

BOEING

DRAFT

Desktop Integration Roadmap - S^3

DRAFT

Proposed Content for S3 Release 7.0

S3 APPLICATIONS SUPPORTED

n (current) & n-1 (previous)

Laptop		
n	n-1	n-2 / other (removed, upgrade path provided)
Office 97 (SR-1/SR-2)	Office 95	
Access 97	7.0b	7.0
Excel 97	7.0a	
PowerPoint 97	7.0b	
Word 97	7.0a	
Canvas 5.0.3	5.0.2	3.53
eXceed 5.1.3		5.0.1
		Freelance 2.1
Milestones Etc. 5.0 (4/98 version)	5.0	4.0
Netscape Communicator 4.05	3.0	
Adobe Acrobat Reader 3.01 (with Forms & Search Plug-ins)	3.0	
Project 98 SR1	4.1b	
Rumba Office 95/NT -5.2	2.10	2.03
Visio 5.0	4.5	4.0
WinZip 6.3	6.2	

Note: Bolded, blue fonted applications are new to S^3

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000377

BOEING

DRAFT

Desktop Integration Roadmap - S³

DRAFT

Proposed Content for S³ Release 7.0

S³ APPLICATIONS SUPPORTED

n (current) & n-1 (previous)

Microsoft Windows Terminal Server [2] (X-to-PC)		
n	n-1	no longer available (offered outside of S³ prior Release 7.0)
Office 97 (SR-1/SR-2)	N/A (no upgrades for X-to-PC)	
Access 97		7.0b
Excel 97		7.0/7.0a
PowerPoint 97		7.0b
Word 97		7.0a
Canvas 5.0.3		5.0.2
		Freelance 2.1
Milestones Etc. 5.0 (4/98 version)		5.0
Netscape Communicator 4.05		3.0
Adobe Acrobat Reader 3.01 (with forms & Search Plug-ins)		
Project 98 SR1		4.1b
Rumba Office 95/NT -5.2		
Visio 5.0		4.5
WinZip 6.3		6.2

[2] This Microsoft Terminal Server client will follow the availability of S³ Release 7 for desktops and laptops

Note: **Bolded, blue fonted applications are new to S³**

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000378

BOEING

Desktop Integration Roadmap

- Baseline
  July 1998
  - Office 97, SR-1
  - Netscape 4.05
  - S^3 Release 6
    (Netscape 3.0)
- Tactical
  Jan 1999
  - Office 97, SR-2
  - Netscape 4.05
  - S^3 Release 7

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000379

BOEING

Desktop Integration Roadmap - S^3 Release Issues

- Adding Windows98 as an S^3 client would require S^3, WSTS, and all sites to maintain/support ten workstation configurations just for Windows95 and Windows98 combined
  - Mitigated by strategic proposal
- Adding Windows98 as an S^3 client may impact delivery schedules for other S^3 projects (e.g., Phase II of Laptop Offering, adding an X-to-PC client, S^3 Release 7.0, etc.)
- Alignment on a single operating system (NTW 5.0) will reduce complexities and have significant synergy relative to S^3

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000380

BOEING

Desktop Integration Roadmap - Conclusions and Recommendations

- Tactical Target Platform: (ECD: 1/1/1999)
  - Hardware
    - Pentium PC with 64 MB+ memory
      - Desktop - Pentium II 450 MHz processor
      - Laptop - Pentium II 300 MHz processor
  - Operating System
    - Windows98 (new machines)
  - Software
    - Office97 SR 2
    - Netscape Navigator 4.x
    - Outlook98
    - S^3 Release 7

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000381

BOEING

Desktop Integration Roadmap - Conclusions and Recommendations, Continued

- Strategic Target: (ECD: June, 1999)
  - Hardware
    - Pentium PC with 128 MB+ memory
  - Operating System
    - NTW 5.0
  - Software
    - Office V9
    - Internet Explorer 5.0
    - Outlook V9
    - S^3 Release 8

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000382

BOEING

Desktop Integration Roadmap

- Opportunity
  - Optimal refresh opportunity is June 1999 --- NOT Jan 1999.
  - There is an alignment of key strategic desktop technologies available for a single blockpoint release
- Challenge
  - To support Year 2000 mitigation, customers may request a temporary freeze on desktop configuration during late 1999.
  - Boeing production readiness is dependent on the ability of
    - Vendor to deliver the products on time/in time and with quality
    - Infrastructure to be in place to support new technologies
    - Customer's willingness and ability to migrate
    - Microsoft history leads us to expect product delivery slides and lack of quality in first releases

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000383

BOEING

Desktop Integration Roadmap, Continued

- Mitigation
  - RDP involvement
    - NTW 5.0
    - Outlook
    - Office 9
- Next Steps
  - Need a direction decision by June 30, 1998 to be able to meet dates
    - planning
    - delivery designs
    - certification
    - integration tests
    - production support
    - vendor packaging plans
    - communication
    - customer migration readiness

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000384

BOEING

Desktop Integration Roadmap
Backup Materials

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000385

BOEING

Desktop Integration Roadmap - Tactical Product Availability Matrix

	Vendor	Certification	Ready
Outlook 98	March, 1998	May, 1998	January, 1999
Office97 SR-2	July, 1998	August, 1998	September, 1998
Windows98	June, 1998	August, 1998	September, 1998
Netscape 4.05	March, 1998	April, 1998	May, 1998
S^3 Release 7	N/A	October, 1998	January, 1999

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000386

BOEING

Desktop Integration Roadmap - Strategic Product Availability Matrix

	Vendor	Certification	Ready
Outlook 9	1Q99	1Q99	1Q99
Office9	1Q99	2Q99	June, 1999
NTW 5.0	1Q99	1Q99	June, 1999
Internet Explorer 5.0	1Q99	2Q99	June, 1999
S^3 Release 8 NTW 5.0 only	N/A	2Q99	June, 1999
Desktop	1Q99	1Q99	June, 1999
Laptop	1Q99	2Q99	June, 1999

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000387

BOEING

Desktop Integration Roadmap - Technical Review for Readiness

NTW 5.0

- Technical Readiness Review on October 1, 1998
  - Criteria
    - pieces Boeing requires are present
    - bug level is acceptable
    - approaching RC status
    - show stoppers resolved
    - confidence in 1Q99 delivery date
  - Go/no go - Thursday, October 1, 1998
  - Opportunity for mitigation October, 1-29, 1998. Time to address with vendors and abatements (workload, headcount, etc.)
  - Report to BDSB - October 30, 1998
  - Office same schedule as above
  - Outlook same schedule as above
  - Hardware
    - Laptop - assess readiness March, 1999
    - Desktop - assess readiness on TBD

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000388

BOEING

Desktop Integration Roadmap

NTW 5.0

- Does not need to be run against an NTS 5.0
  - will work
  - stable
  - but not full functionality, e.g. ZAW

	June 1999	Tentative 2nd Half 1999
Server:	NTS 4.0	NTS 5.0
Client	NTW 5.0	NTS 5.0

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000389

BOEING

Desktop Integration Roadmap
Readiness Issues

- Need defined commitment to ESD method (e.g. SMS) by October 1, 1998
- Need defined direction on January 1, 1999
  - Windows98 use
  - Inclusion in S^3 release
  - Availability of S^3 release 7.0 (Office97 SR-2, Project98, eliminate 16-bit, etc.)

US/States v. Microsoft
HIGHLY CONFIDENTIAL
TBC 000390