

CONFIDENTIAL

200503

Novell (DSG)	
European Development Centre	Tel. 44 (0) 488 681444
Chesham Park,	Fax. 44 (0) 488 682123
Hungerford, Berkshire	BBB. 44 (0) 488 684754
RG17 0EY	

NOVELL.
Desktop Systems Group

Panther Product Development Plan

Version 0.70

(1st July 1992)

Distribution List

**European
Development
Centre**

Steve Tucker
Andy Wightman
Chris Lusby-
Taylor
Joe Wein
Ian Jack

Glenn Stephens
Richard Deane
Ian Turnbull
Malcolm Roberts

John Bromhead
John Linney
John Constart

REL. DEVPLAN.DOC

80559731

EXHIBIT
7021

Plaintiff's Exhibit
5489
Comes V. Microsoft

MS-CCP-MDL 5010777

MS-CCPMDL 000005010777

Table of Contents

Overview	1
Document History	1
Design Goals	2
Target Environment	2
Compatibility	2
Run Time Size	3
Performance	3
Product Generation and Translation	3
Remable	4
Usability	4
Kernel, Command.com & Device Drivers	5
Ibmcds Com	5
Ibmcds Com	5
Config Sys	6
Device Drivers	6
Command.com	7
Installation & Configuration	9
MemoryMax	11
EMM386 EXE	11
HIMEM SYS	14
EMM386 SYS	14
MemoryMAX Optimizer	15
MEM	15
286 and 386 Protected Mode Device Drivers and TSRs	16
Utilities	17
Constant Full Screen User Interface	17
Existing Utilities	17
FDISK	17
EDITOR	17
Restore	17
Script	17
DiskOPT	18
New Utilities	18
DOSKEY	18
DEBUG	18
Graphical User interface	19
DOS 5.x considerations	19
OS/2 considerations	19
Functionality and Design	20
Functionality enhancements	20
Cosmetic enhancements	21
Other new features, not mentioned in the PRD are	21
Security	23
Enhanced secure partition security	24
User based security	24
Comms and floppy device security	25
MULTI-TASKING & Task Switching	27
MultiMAX	27
Task manager interface	29
TaskMAX	30
Portable System Issues	31

Novell (DStz) Company Confidential

RD559732

MS-CCP-MDL 5010778

MS-CCPMDL 000005010778

PCMCIA and JEIDA Cards	31
BatteryMAX	31
RS232/Parallel Port Network	31
Auto Resume Mode	31
Third Party Components	32
MultiSoft's SuperPCKwik Cache	32
AddStor's SuperStor	33
SSTOR.DRV SYS	33
SSTOR.EXE	33
Super Compress Function	34
Miscellaneous	35
CD ROM Driver (ORCD.EX)	35
IBM Compatibility Issues	36
Hardware Compatibility	36
Software Compatibility	36
IBM PC DOS 3.0 Compatibility	36
Network Issues	38
Network Management Agents	38
Remote Console Control	38
Multi-MAX Remote Program Load	38
NLS Overview	39
Single Byte Language Drivers	40
Keyboard	40
DISPLAY SYS & PRINTER SYS	41
Code Pages	41
Double Byte Language Drivers	42
Documentation Overview	43
Retail Documentation	44
Support Documentation	45
Online Documentation (DOSBook)	46
DOSBook Support Tools	46
Test/Validation	47
Test Plans	47
Hardware Compatibility	47
Application Compatibility	47
Performance Benchmarks	47
Internal QA	47
External Certification	47
Alpha & Beta Programs	47
Key & Sites	48
Development Environment	49
Source Code Control System	49
Development Tools	49
Disaster Recovery	49
Deliverables	50
Retail Product	50
OEM/SDK	51
OEM Book	51
Software Transition Kit	51
Key Development Mile Stones	52
Future Developments	53
PC DOS 3.0 Compatible Kernel	53
MemoryMAX	53
Misc	53

RD559733

CONFIDENTIAL

200508

Utilities	53
ViewMAX	54
Security.....	54
MultiTasker	55
SuperStor	56
Redirector Framework Interface	56
Virus Scanner	55
NetWare Support	53
Glossary/Definition of Terms	57
Reference Documents	58

Novell (DSG) Company Confidential

88559734

MS-CCP-MDL 5010780

MS-CCPMDL 000005010780

CONFIDENTIAL

200509

OVERVIEW

Document History

Throughout this document paragraphs that have been changed since the previous version of this document are marked in the left hand margin with a "Change Bar". This paragraph is always marked with a change bar as an example.

Version	Date	Comments
0.20	20 Jan 92	First public draft to Development Managers
0.30	7 Feb 92	First Public Draft
0.40	25 Feb 92	Reviewed by Business Unit VP and Marketing Director
0.50	9 Mar 92	Engineering Management Review
0.60	30 Apr 92	
0.70	1 Jul 92	

Novell (DSG) Company Confidential

88559735

MS-CCP-MDL 5010781

MS-CCPMDL 000005010781

200510

CONFIDENTIAL**DESIGN GOALS**

Design decisions for elements of the Panther product will be made based on the following prioritized design goals. For the purposes of this document the Operating System kernel is regarded as the

Basic Input/Output System (IBMBIO.COM)
 Basic Disk Operating System (IBMDOS.COM)
 Command Interpreter (COMMAND.COM)

Target Environment

Although the majority of features in the existing DR DOS product and those envisaged for Panther are processor independent a larger proportion than ever are targeted at the 386 processor. The base hardware requirements for Panther are:-

- 386sx/px or 486 Processor
- 2Mb Ram
- 60Mb Hard Disk
- Graphics Display Adapter (Hercules, EGA or VGA)

Compatibility**MS DOS**

Compatibility with MS DOS 3.31 as shipped by Compaq is the primary goal of this development. All external kernel data structures and code interfaces will be compatible with MS DOS 3.31. This means that functional improvements may be restricted in order to retain compatibility.

3rd Party Memory Managers

Except for specific named exceptions all components of Panther will be fully functional while running under third party memory managers (e.g. Qualitas 386MAX and Quarterdeck's QEMM). This allows users to achieve maximum free memory on systems where other drivers perform better than MemoryMAX.

Networks

Panther will support and be tested with the DOS 3.31 compatible versions of the following networks.

- 3COM 3-Open Lan Manager 1.1
- 3COM 3-Share 1.61 (as example MS-NET)
- Artisoft's LanTastic 4.0
- Banyan Vines 5.0
- IBM PC LAN 1.34
- IBM Lan Server
- Microsoft Lan Manager v2.1
- Novell NetWare 2.xx & 3.xx
- Novell NetWare Lite
- Sun Microsystems's PC/NFS 3.5

CD-ROM

Both ISO9660 and High Sierra format CD-ROM's will be supported by Panther either using the Microsoft's MSCDEX or Novell's DRCDROM extensions.

Novell (DSG) Company Confidential

80559736

Design Goals

MS-CCP-MDL 5010782

MS-CCPMDL 000005010782

CONFIDENTIAL

200511

Microsoft Windows

All versions of Microsoft Windows 3.x will be supported in all operating modes except when the Panther Multi Tasker is active (See MULTI-TASKING & Task Switching on page 25)

OS/2

Conflicts between Panther's use of data structures and OS/2 will be minimized. The user will be warned of instances where conflict can not be avoided and these functions can optionally be disabled

Run Time Size

The run time size of the operating system has a fundamental effect on the compatibility of the system. Many of today's major applications are extremely sensitive to the available TPA (Transient Program Area) especially when network software is loaded. Our goal is to increase the memory available to applications over that provided by PC DOS 5.0 or DR DOS 6.0 on all processor types.

Performance

The goal for the Panther development is to achieve better performance than a similarly configured copy of PC DOS 5.0 but in no case be more than 10% worse. Other commercially available utilities and drivers will be used to add functionality to the basic PC DOS operating system as required

Obviously benchmarks will highlight differences in architecture (BOBO/Small Model), algorithms, functionality and coding between the two products. These differences will not be allowed to significantly degrade the performance of Panther as compared to PC DOS as measured by the following industry standard benchmarks.

PC LABS Benchmarks
 BYTE Benchmarks
 PC Tech Journal Benchmarks
 Contest
 PC Magazine
 QuarterDeck's Manifest

The following areas of the product are of most interest -

File System (with and without a cache)
 Character Screen I/O (with and without a 386 Memory Manager)
 EMM386 SYS memory and exception handling
 Cache Performance

Product Generation and Translation

The base product will be enabled for translation into either 8 or 16 bit languages without modification to the generic portion of any component. All utilities can be compiled for Dual Language operation except where explicitly excluded in the NLS Overview section on page 37.

With this release of DR DOS it is our intention that an OEM or translator only requires Borlands C++ 2.0 in addition to the tools supplied by Digital Research in order to complete any translation.

Novell (DSG) Company Confidential

RD559737

MS-CCP-MDL 5010783

MS-CCPMDL 000005010783

Design Goals

2005 L2

CONFIDENTIAL

Remable

The DR DOS BIOS and BDOS will both execute from ROM or Write Protected RAM

Usability

The Usability of the *Panther* product will be enhanced by moving all Full Screen utilities to the standard introduced in DR DOS 5.0 with UNDELETE and DOSBOOK. Improvements to this interface will be made based on the results of an independent usability review.

Novell (DSO) Company Confidential

80559738

MS-CCP-MDL 5010784

MS-CCPMDL 000005010784

CONFIDENTIAL

200513

KERNEL, COMMAND.COM & DEVICE DRIVERS

ibmdos.Com

The compatibility of the existing DOS 331 compatible kernel will be further enhanced by supporting and using key internal structures rather than emulating them. These are -

Physical Drive Structure	The Physical Drive Structure will contain all the information required to access a physical drive. Thus allowing Block Device TSRs to add a PDS and run on Panther. Modifications to PDS fields will be honoured by the OS.
Logical Drive Structure	The fully ASCII path will be maintained in the Logical Drive Structure improving compatibility with various Networks
DOS Handle Structure	The DOS handle structures will contain all the information required to access files. Therefore no hidden DR DOS structures are used to maintain the DOS Handle structure and applications can extend the Handle Table as in DOS

ibmbio.Com

Key additions to the BIOS:-

- Removable hard disk support
- Support for >1024 cylinder hard disks
- Media sensing functions
- Generic screen size ioctl. functions

DISK Support

The standard BIOS has always supported multiple hard disk drives when the ROMBIOS reports that more than 2 drives are present via the INT13 interface. However very few systems support this extension and further investigations are under way to determine other techniques of reliably detecting multiple drive systems.

Work with third party ROMBIOS manufacturers to standardise the extensions to the INT13 interface required to support >1024 cylinders and removable hard disk drives. This ROMBIOS extension would then be supported by *ibmbio.com* as well as *ibmdos.com*.

Use the media sensing functions defined by IBM which detect the current media type (i.e. 720Kb or 1.44Mb) and prevent the wrong formats being applied to these disks. *FORMAT* command to be updated with appropriate error messages etc.

Console Support

Support the ioctl. extensions to the console device driver which return the current screen width and length. This will allow all of the Panther utilities to determine the console size generically for paging scrolling data etc.

Novell (DSO) Company Confidential

R0559739

Kernel, Command.com & Device Drivers

MS-CCP-MDL 5010785

MS-CCPMDL 000005010785

2005 L4

CONFIDENTIAL

Config.Sys

The config processing code is currently optional when the file `swsio.com` is being generated. For greater flexibility in the embedded systems market this code will also be generated as a separate loadable module which can be added to the boot media if required

New Commands

- STACKS n,m** Implement the STACKS command which allocates n stack buffers of m bytes. These stack buffers are used when a hardware interrupt occurs for stack switching. This is required for PC DOS and application compatibility.
- DEVICEHIGH** PC DOS compatible DEVICEHIGH statement
- IF** IF statement to test environment variables, system information (processor type ?)
- TIMEOUT n[,c][,s]** The timeout command will be enhanced to support a default character. Currently if the TIMEOUT value n seconds expires the prompt [?["..."]] and gosub commands will take their default actions of N and T correspondingly. The new C option allows the user to define the default query and the S option the default switch

Device Drivers

- DRIVER.SYS**
DRIVER.SYS will be upgraded to support 2.88Mb drives with media detection etc

Kernel, Command.com & Device Drivers

Novell (DSG) Company Confidential

80559740

MS-CCP-MDL 5010786

MS-CCPMDL 000005010786

CONFIDENTIAL

200515

Command.com

New features for COMMAND.COM -

- Optional command execution using the ? optional command
- Improved conditional support (IF Command)
- Character and string input.
- New system information statements

4DOS and WHAT are also being evaluated for the command extensions which have been provided by these third party utilities.

IF Command

The IF command will also be extended to support the following logical tests by finding a new method of supporting these commands external to the command processor :-

= or ==	is equal to
!=	is not
<>	Not equal to
>	is greater
>=	is greater than or equal to
<	is less than
<=	is less than or equal to
OR	Logical OR
AND	Logical AND
Begin & Endblock	Group Commands

Character & String Input

Derive from DR MDOS and/or extend

System Information Statements

Support will be provided for the following System information statements which can be included in batch files to display extra information to the user or modify its execution. For Example -

```

ECHO "Hello %Full_Name% (%Login_Name%)"
IF NOT "%Login_Name%" == "JDCE" goto normal
ECHO "Checking Mail"
...
normal

```

will always display the users Full Name and Login Name but only check mail for JDCE. These statements are compatible with those used by Novell NetWare login scripts

AM PM	Day	Day of Week	Hour
NDAY-of Week	Hour24	Minutes	Second
Greeting Time	Month	Month Name	Year
Short Year	Full Name	Login Name	SpoolLevel
Station	P Station	OS	OS Version
Machine	S Machine		

Novell (DSG) Company Confidential

R8559741

Kernel, Command.com & Device Drivers

MS-CCP-MDL 5010787

MS-CCPMDL 00005010787

200516

CONFIDENTIAL**INSTALLATION & CONFIGURATION**

The current DR DOS 6.0 install program was primarily designed to install and configure DR DOS on a previously unused machine. Thus when used to upgrade existing systems the current environment is not maintained. The main features of the Panther version of install are:

- Prepare, Install and Configure DR DOS on a new/unused machine.
- Upgrade an existing DOS (DR DOS, MS DOS or OEM specific) maintaining the existing configuration, device drivers, memory managers, TSRs etc. Standard DOS utilities which have extended functionality will be detected if possible and preserved. OS/2 users will be warned if the installation process will overwrite OS/2 system.
- Support installation from Network Server
- Partial installations will be supported which will only copy the required files from the installation disk. The SETUP program will allow the user to selectively add and delete these optional components.
- Install program will be extensible to support the installation of system extensions supplied by third parties. The current configuration state will be available to third party installation programs via a .ini file.
- Install will work under any 3.x DOS operating system or greater. Therefore removing the need to boot Panther to install the system and allowing the operating system to be installed from any drive.
- INSTALL will generate and optionally use a configuration file which allows standard installations to be created for the corporate environment. Both the target hardware environment and user responses can be specified.
- The INSTALL program will always default to provide the Maximum application memory for the current hardware.
- The INSTALL program will use the same full screen user interface as other Panther utilities. Any Microsoft compatible mouse driver will be used if loaded during the installation process.

The installation process is greatly simplified from the users perspective from DR DOS 6.0. After the welcome screen a short list of the most basic options will be presented to the user.

Installation & Configuration

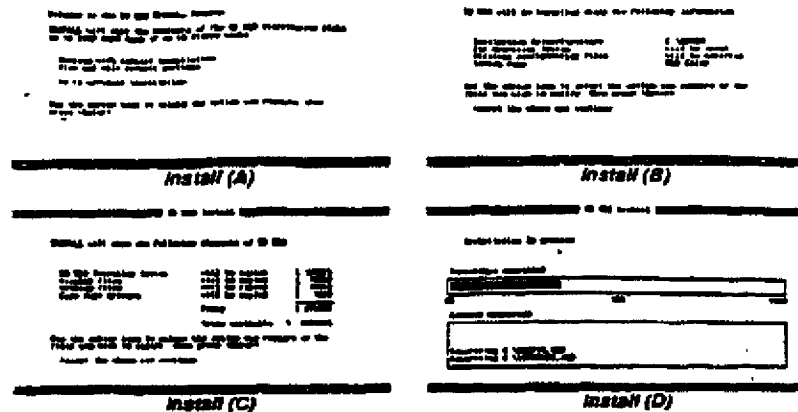
Novell (DBD) Company Confidential

R0559742

MS-CCP-MDL 5010788

MS-CCPMDL 000005010788

CONFIDENTIAL 200517



Install (A) - Panther Install Welcome screen
 The user has three exit routes from this screen the first, and default, is to accept all of the default options. These could have been determined automatically or been set by the system supervisor in the configuration file. Second the user can modify these default options before installing the operating system (See Install (B) and Install (C)) Finally the user can choose the Advanced Options and change the defaults used for any option available to him from the setup program

Install (B) - First Default Options Screen
 The first options screen allows the user to override the default location for the operating system and what is preserved from the previous operating system.

Install (C) - Second Default Options Screen
 The second options screen allows the user to select the components of the operating system to be installed.

Install (D) - Installation In progress
 As the installation process proceeds the user will be able to review any README files supplied. The user will also get visual feedback about the state of the installation process from the Completion Gauge.

- Other issues**
1. Driver and Utility versions will be checked and only earlier versions overwritten.
 2. Update DOS files on all partitions
 3. Scan for installed applications

Novell (DSG) Company Confidential

A0559743

MS-CCP-MDL 5010789

MS-CCPMDL 000005010789

200518

CONFIDENTIAL**MEMORYMAX**

MemoryMAX is the term used to describe all of the components supplied with Panther to manage the users RAM. The major drivers have been separated into the following sections:

EMM386.EXE

Supported Interfaces	DR DOS 5.0	DR DOS 6.0	Panther
LIM 4.0	*	*	*
XMS (High & Extended)	*	*	*
XMS (Upper)		*	*
VCP1	*	*	*
VDS		*	*
DPMI (v1.0)			*
Wetek Support			*

Additional Features

- Minimal Upper memory use
- Wetek Maths Coprocessor Support
- Support for EMM386 ON & OFF commands
- >16Mb RAM Supported on ISA, EISA or MCA architecture machines
- Version 1.0 DPMI Support
- Windows Standard mode support with minimal reduction in functionality (Windows 3.0 and 3.1)
- Support Laptop and Notebook Auto Resume modes.
- ROM releasing
- Enhanced A20 support.
- Use existing XMS memory manager's hardware support
- 80386 processor support (fast virtual interrupts)
- XMS v3.0
- EMM386.SYS will be renamed EMM386.EXE.

Minimal Upper Use

The DR DOS 6.0 EMM386.sys currently uses approximately 250K of Upper memory because large portions run in virtual 80386 mode. The Panther driver will be substantially rewritten to use protected mode code which means that minimal upper memory is required by the driver.

Wetek Maths Coprocessor Support

Wetek support requires ensuring the HMA remains free if the maths coprocessor is detected and maybe required. The HMA memory mapping must also be changed when the Wetek coprocessor is enabled and disabled.

Novell (DSG) Company Confidential

R8559744

MemoryMax

MS-CCP-MDL 5010790

MS-CCPMDL 000005010790

200519

CONFIDENTIAL**Support for EMM386 ON & OFF commands**

EMM386 is already capable of turning ON and OFF as required by Windows 3.x. For Panther this functionality will be available to the user from the command line. However, some parts of the driver cannot operate or must be loaded into conventional memory if this function is enabled. The XMS interface and upper memory support are examples of this.

Supporting >16Mb RAM

Up to 64Mb of memory will be supported by emm386.exe on either EISA, ISA or MCA architecture machines. Unfortunately no standard has been defined in the ROMBIOS interface to return the presence of more than 16Mb of RAM. Therefore several OEM and architecture specific detection routines will be supported by the driver in addition to a command line override.

DPMI Support

The 1.0 DPMI protected mode application interface will be supported in addition to VCPI.

Further investigation is also being undertaken into the extensions to DPMI implemented by MicroSoft Windows and how extensively these are used by DOS extenders: e.g. Rational Systems, PharLap, Borland and MicroSoft.

Windows Standard mode support

Currently the functionality of emm386.sys is substantially reduced in order to run Windows 3.0x in standard mode. In fact all use of upper memory apart from the LIM page frame and emm386 code must be disabled by using the WINSTD switch.

For Panther the Windows 3.0x load image will be dynamically modified to switch between protected and virtual 8086 mode instead of real mode. This allows Windows to run in standard mode without using the /WINSTD option. Windows 3.1, already runs in standard mode without reducing the functionality of third party memory managers.

Support Laptop and Notebook Auto Resume modes.

emm386.exe will support and be tested with the following Laptop and Notebook machines which support an Auto Resume mode:-

- Toshiba 3100xx
- IBM PS/2 Model 40
- AST Premium Exec
- DELL 320N

Enhanced A20 support.

In addition to extending the list of supported gateA20 techniques a command line option will be added to emm386.exe and rombios.sys so that the user can override the drivers automatic detection routines.

Existing XMS memory managers

emm386.exe can be loaded after another XMS memory manager. Under these circumstances emm386.exe will use the hardware control routines from the original driver but the other XMS routines will be completely replaced. This allows an OEM with non standard GateA20 hardware to use the full functionality of the Panther memory manager.

Novell (DSG) Company Confidential

R8559745

MemoryMax

MS-CCP-MDL 5010791

MS-CCPMDL 000005010791

CONFIDENTIAL

200320

XMS 3.0 Support

Windows 3.1 supports this enhanced XMS version. Currently no details of the changes to the specification are available. One obvious restriction that applies to the current version is that only 16Mb of memory can be allocated via XMS 2.x.

MemoryMax

Novell (DSO) Company Confidential

88559746

MS-CCP-MDL 5010792

MS-CCPMDL 000005010792

200521

CONFIDENTIAL

HMEMSYS

Manufacturer	Chip Set	DR DOS 5.0	DR DOS 6.0	Parther
Chips & Technology	Nest, Leap, Leaptx, Nesttx	*	*	*
	SCAT		*	*
	PCChip			*
ALL	LIM memory managers		*	*
Hedaka ChipSet				*
AMD	286x, 286dx		*	*

Additional Features

- Enhanced A20 support. (See mem386.txt)
- Loading parts of HMEM SYS above 1Mbyte
- hmem.sys will be renamed hmem386.sys.

Loading parts of HMEMSYS above 1Mbyte

The conventional memory foot print of hmem386.sys will be reduced by about 4Kb. This is achieved by relocating the majority of the device driver code and data to the upper portion of high memory. This feature can be disabled by a command line option so that the full high memory region can be used by third parties.

MEM

MEM will use a full screen interface, compatible with the other Parther utilities, providing functionality similar to QuarterDeck's Manifest product

Additional Features

- Online context sensitive help
- Allocated memory display sorted by owner or location.
- Allocated LIM Handles displayed by name

MemoryMax

Novell (DSG) Company Confidential

00559747

MS-CCP-MDL 5010793

MS-CCPMDL 000005010793

CONFIDENTIAL

200522

286 and 386 Protected Mode Device Drivers and TSRs

Panther will include a device driver, `DPMS.SYS`, which will provide the Protected Mode Services required by device drivers and TSRs to run in extended memory. These services will allow both 16 and 32 bit protected mode code to execute under DOS, the Panther Multi-tasker and all Windows operating modes.

Major Features

- Supports Intel 286, 386, 486 and compatible processors
- INT15, XMS, VCM and DPMI interfaces supported
- Third party memory managers supported.
- Approximately 1Kb conventional and upper memory DPMI driver footprint.
- Compatible with Windows 3.x Standard and Enhanced mode
- Compatible with existing Extended DOS applications.
- 32 bit code and data support on Intel 386, 486 and compatible processors

`DPMS.SYS` will include a Microsoft Windows VxD driver which will provide the services while Windows is operating in enhanced mode. The protected mode services will isolate the clients from the changing operating environment.

Creating this environment allows third parties to extend the functionality of device drivers, redirectors etc. without impacting the conventional and upper memory available to DOS applications. The following Panther drivers and utilities will be modified to use `DPMS.SYS` -

- SuperStar (`STARDRV.SYS`)
- SuperPCWin (`SUPERPCW.EXE`)

The following system extensions are also obvious candidates to use the protected mode services to reduce their conventional memory footprint

- Network redirector and drivers (i.e. NetWare NETX & IPX)
- Network Management Agents
- Peer-to-Peer Network Server code (i.e. NetWare Lsa, Lantastic)

MemoryMax

Novell (DSG) Company Confidential

R8559748

MS-CCP-MDL 5010794

MS-CCPMDL 000005010794

200523

CONFIDENTIAL**UTILITIES****Consistent Full Screen User Interface**

Install	Setup	Editor
Undelete	DiskOPT	FileLink
		DOSBook

The Panther utilities in the table above will all have a consistent full screen interface with the following features:

- Online context sensitive help
- User selectable Colour Sets
- Keyboard or Mouse driven
- Drop down menus
- Keyboard Accelerators
- Windows' style alerts

Panther will extend the existing DR DOS 6.0 house style based on external usability testing. The INSTALL & SETUP programs will vary from the interface style defined by DRDOPT etc. because of the serial nature of the interface.

Existing UTILITIES**EDITOR**

In addition to adopting the Panther full screen interface the functionality of the editor will be enhanced to match the PC DOS 5.0 EDIT program. This includes:-

- Search and Replace
- Display Line Numbers
- Keystroke compatibility with EDIT

Restore

The standard command line RESTORE command will be updated to support restoration of corrupted backup disks. The user will be warned which files cannot be restored and prompted if the partial file should be deleted. Missing or corrupted disks will also be skipped.

Script

The Script command will be enhanced to detect the format of data being printed and automatically convert HP LaserJet and Line printer output to PostScript. Thus a PostScript printer can be installed on LPT1 and the Script command SCRIPT LPT1 LPT1 [/options] will add Print Screen and HP LaserJet support to this device.

DiskOPT

DiskOPT will be modified so that it can be run entirely from a batch file. This will include the addition of command line parameters to specify the target drive, a Fragmentation Factor above which DiskOPT will optimise the disk. DiskOPT also makes extra checks during the optimization process in order to directories in which the data is static (i.e. executable or Read Only files) to the of the disk. This will improve incremental De-Fragmentation because quantities of the disk should already be in the optimal location.

Novell (DSG) Company Confidential

R0559749

Utilities

MS-CCP-MDL 5010795

MS-CCPMDL 000005010795

200524

Performance problems will also be investigated. If these are related to the extra work involved in optimising SuperStor drives the user will be warned that compressed drive optimisation is taking place which takes longer than on a standard drive.

Full De fragmentation of SuperStor drives will also be added to DiskOPT so that in addition to making the free space contiguous all files will be physically contiguous.

New Utilities

DOSKEY

PC DOS 5.0 compatible keyboard macros. Compatibility with the existing DR DOS 6.0 keyboard history will be maintained either via a compatibility mode or by supplying a superset of functionality.

DEBUG

A PC DOS 5.0 compatible debugger will added to the Panther product.

Utilities

Novell (D&I) Company Confidential

R0559750

MS-CCP-MDL 5010796

MS-CCPMDL 000005010796

200525

CONFIDENTIAL**GRAPHICAL USER INTERFACE**

Panther will include a graphical shell based on ViewMAX.

Significant new features include:-

- multiple overlapping, resizable windows
- program items in groups
- drag and drop execution
- screen saver with keyboard lock option
- improved tree display
- full colour icons
- improved 3-D appearance
- proportional fonts
- fully supports 16-bit character sets
- selectable background image
- file attributes display/change
- overlaid code to reduce memory requirements
- uses EMS if available

To clarify, the following features have been proposed but rejected:

- | | |
|---------------------------|---------------------------------------|
| Select Across Directories | - more confusing than useful |
| Move file | - too many error conditions possible |
| Select All | - not necessary if a mouse is present |
| File browser | - too much work to implement |

Two features of previous versions will be abandoned. These are:

- the ability to run on a dual-floppy disk machine
- the ability to run GEM applications directly

DOS 5.x considerations

The shell will include similar functionality to DOS 5.x's shell. This includes:

- program items in groups
- directory tree display
- associate data files with applications
- copy, rename, delete files
- view file contents
- change Read Only file attribute

Features of the PC DOS 5 shell which will not be included are:

- Select Across Directories. This is felt to be contrary to the spirit of WYSIWYG and, in practice, is confusing.
- Move Files. PC DOS Shell uses Ctrl-drag to copy a file, drag to move it (i.e. copy and delete the original). ViewMAX will use drag to copy files. Ctrl-drag will not be used.

OS/2 considerations

The 3-D features will be redesigned to look similar to those of OS/2 2.0.

Functionality and Design**Functionality enhancements**

In addition to existing ViewMAX functionality, the shell will offer:

Novell (DSG) Company Confidential

R0559751

Graphical User Interface

MS-CCP-MDL 5010797

MS-CCPMDL 000005010797

CONFIDENTIAL

200526

Windows.

Windows will be movable, sizeable, overlapping windows à la GEM Desktop 1.x. Although the current configuration of two half-screen windows may be retained as the default, further windows can be opened on demand, up to some limit (perhaps eight). The Copy command becomes ambiguous with more than two windows, so will be disabled. When a program item is copied to a different program group under Windows a list box is displayed with the Group Titles. This is very effective and should be used for copy.

Window sizing will be effected by dragging a sizer icon in the lower right corner of the window, as with GEM. The tree display part of directory windows, when enabled, will have its own sizer icon so that its width can be set.

GEM is now unusual in treating a mouse click on an untopped window as merely a request to top the window. The shell will work like Windows and GEM Desktop and not require a second click to select an object in an untopped window.

Program Items

As a short-cut the user will be able to create, modify and use program items. For convenience these may be organized into program groups, as in DOS Shell or Windows.

Program items will display as an icon of the user's choice and a name which need not correspond to a filename. The icon will appear inside the window of the item's program group, or on the desktop for top-level items.

Each program item will have an associated command which will be executed when a disk, folder or document icon is dragged and dropped onto the item's own icon, or when the user double clicks on the icon. Users without a mouse will be able to select a program item by tabbing until its icon appears selected.

In order to offer an upgrade path for customers who have used the program group and item features of MS/PC DOS 5 Shell, we may convert their .INI files to the equivalent program group(s), though not all functionality could be implemented.

Drag and Drop

The drag-and-drop metaphor will be extended. Dropping a file or other icon on a program icon will invoke the program with the dropped item in its command tail. This will be used as a general mechanism for deleting, printing, etc.

TaskMAX integration

As in ViewMAX 2, the user may ask that ViewMAX control TaskMAX. The implications of this on a multitasking kernel still need to be examined.

Networks integration

No integration with Networks is currently planned. As with ViewMAX 2.0, all mapped drives will appear as icons alongside those of local disks. However, they will use a new icon that represents them as network drives.

With a sufficient extension of the development cycle, we feel there are many possibilities for enhancing ViewMAX to work better with Networks, including the functions of NWTOOLS such as making attachments, drive mappings and printer queue mappings.

FileLink.

Similarly, no graphical front end for FileLink can be committed, but we note that FileLink is to become easier to use as more will be supported.

Novell (DSG) Company Confidential

RD559752

Graphical User Interface

MS-CCP-MDL 5010798

MS-CCPMDL 000005010798

200527

CONFIDENTIAL**Screen saver**

A screen saver will be incorporated. A minimal screen saver has already been implemented, and 'fun' savers may also be included. The screen saver will incorporate a keyboard lock on secure systems.

Cosmetic enhancements**Background image.**

As per Windows 3.x, the user will be able to select from a library of background images with which the screen will be painted. Images will be in Windows Paint format so that users can (potentially) create their own.

Coloured icons.

Icons will have multiple planes so that they appear in polychrome on colour screens, but correctly on monochrome screens. More icons will be offered for different drive types, applications and utilities. The Windows icon file format will be used.

It may prove possible to display icons in .EXE files in Windows.

Proportional fonts.

It is generally agreed that proportional fonts are much more attractive. We will replace the large and small system fonts by proportional ones in *some* screen drivers.

3-D effects.

ViewMAX 2.0 introduced some 3-D effects, but they do not look the same as PM or Motif. Generally, PM uses single-pixel width highlights and shadows whereas Motif uses two-pixels. We will adopt one or the other (to be decided). Note that these schemes do allow coloured button-tops, unlike Windows.

File Browser / Viewer

The shell will incorporate the same file finder and viewers as in ViewMAX 2.0.

Other new features, not mentioned in the PRD are:**Security**

User-based security, similar to that in DR Multi-user DOS, will be supported on secure systems. This includes the ability to display and set the owner's, group's and world's access rights to files.

As with certain DR Multi-user DOS utilities, file display and manipulation operations may be qualified by the name of the owner of the file, rather as wildcards can be used as a selection filter.

Improved Tree Display

The display of directory trees will be improved by using a colourful folder icon to replace the existing [+], [-] and [].

Memory Usage

EMS will be used, if present, to overcome existing limitations in displaying directory trees and contents.

Overlaid code will reduce the amount of TPA required in all systems.

16-bit character sets

All code will be fully supportive of 16-bit character sets such as kanji.

Novell (DSG) Company Confidential

80559753

Graphical User Interface

MS-CCP-MDL 5010799

MS-CCPMDL 000005010799

CONFIDENTIAL

200528

New Screen Drivers
Drivers will be included for XGA and, possibly, other newer screen standards (to be defined).

Graphical User Interface

Novell (D&G) Company Confidential

80559754

MS-CCP-MDL 5010800

MS-CCPMDL 000005010800

Security

Panther will incorporate several new security features that may be selected independent of one another to offer levels of security to suit the environment

These will include:

- Enhanced secure partition security
- User based security to allow more than one user to share a single PC
- Comms and floppy device security

The following utilities and drivers will provide this functionality:-

SECURITY.EXE	This utility configures and displays each users rights. Changes can only be made by the Supervisor.
LOGIN.EXE	This utility validates the supplied user name and password against the system database and if successful gives the user access.
LOGOUT.EXE	Logs the current user out of the system
LOCK.EXE	This mixed DOS and Windows utility allows the user to lock the keyboard which can only be unlocked with a password. Optionally under Windows the keyboard will automatically be locked after n minutes of inactivity

The security utility used to create each account will allow the Supervisor to apply any or all of the following restrictions to any user:-

- Access to removable media
- Access to specified logical drives
- Running VCP1 applications which can break hardware security
- Time & Date modification functions
- Access to the system outside specified hours
- Password minimum length and expiration time
- Force TRUE delete disabling DELWATCH

(The following may only be supported through additional hardware driver)

- Direct disk access.
- Standard Communications ports (COM1 through COM4)
- Parallel Ports
- CMOS RAM

Novell (DSG) Company Confidential

00559755

Security

MS-CCP-MDL 5010801

MS-CCPMDL 000005010801

200530 CONFIDENTIAL

Enhanced secure partition security

Panther will provide new mechanism for storing and retrieving the MasterKey password to be more compatible with other Fixed disk security mechanisms and to be more resistant to hackers and Viruses. The mechanism to set and test the MasterKey password will still function on systems that use the old mechanism.

A new partition will be created in an unused part of the disk which will contain the MasterKey password. An entry will be added to the Partition table which will describe the location of the partition in the normal way. However the Partition type will be C0h.

If there is no free space on the disk or if there is not a spare entry in the partition table then the Panther security system cannot be used.

A thorough investigation will be required before and during the development cycle to ensure that Panther secure partitions do not conflict with PS/2 security.

User based security

Panther will offer User based security that will allow predetermined users to login into the system via the LOGIN command and will offer automatic file security. In a single user configuration the user will only be prompted for his password.

Each user on the system must be a member of a group. By grouping users together in this manner it is possible to restrict access to files based on whether the person accessing the file is in the category of owner of the file, a member of the owners group or any other user. For each of the three categories it is possible to restrict access to reading, writing or deletion of the file.

Attributes can also be assigned to sub directories so that it is possible to restrict access to a group of files just by placing them in a particular directory.

Each user is assigned an optional password which, if required, will be prompted for at the LOGIN screen. A special user called Superuser is created at install time and uses the MasterKey password to LOGIN. The Superuser has special file privileges which effectively mean that the Superuser can do anything to a file that the Owner of the file can do. In addition the Superuser is the only user authorized to create and edit User accounts and can change any users password. As holder of the MasterKey password the Superuser can also enable or disable system security.

The SECURITY, XATTRIB and PASSWORD utilities from DR Multi-user DOS shall be used to create and edit user accounts, edit extended file security attributes and change user passwords respectively. The DR DOS 6.0 LOGIN and LOCK commands already support Multiple user based security if the LOGIN.TXT file includes the <USER> prompt, and will therefore only require the version check code to be changed.

When a User account is created it is possible to specify a Home directory for each user. If a home directory is specified, COMMAND.COM will search in that location for an AUTOEXEC.BAT to execute in preference to the root directory. This facility allows several users to share a common machine but still have the ability to customize their environment to suit their particular requirements. DR DOS 6.0 COMMAND.COM already supports this functionality and will require no code changes.

 Novell (DRD) Company Confidential

R8559756

Security

MS-CCP-MDL 5010802

MS-CCPMDL 000005010802

CONFIDENTIAL

200531

A LOGOUT command will be required that will return the system to the state it was at prior to the user logging in. The possibility of providing the following functionality will be investigated - The ability to remove TSRs loaded by the last user, deleting any environment variables the user created, canceling any device redirection or drive substitution and severing any network connections the last user had made. This would enable several users to share the same machine without having to reboot the system after each user has completed their work session.

In addition Panther will offer the ability for the Supervisor to bar a user from the system at specified times by defining a list of valid and invalid login times for each user or group.

Auditing features

Panther will offer an auditing facility that will provide a log of users activity to a file that can be inspected to provide a documented history of system activity. This facility can enable the Superuser to trace breaches of Security and would enable users to be charged for use of the system. Key system events such as power on, login, logout, system locked, system unlocked and system rebooted are logged to the file.

In addition it will be possible to select advanced auditing that would further restrict access to specified files. This will be provided by an optional system watch facility whereby the Operating Systems Kernel will call out to a Syswatch agent before accessing a file or device. The Syswatch agent will be responsible for checking whether the file is allowed to run. It will also be possible to allow a predetermined number of copies of a given program to be run simultaneously. This would prevent program licences from being exceeded.

To operate in a Network wide environment the Syswatch agent would report program execution and termination to a Network Server process that would receive information from the clients and allow or disallow the program to be executed.

All Auditing and Network Management functions must be maintainable and support changing by multiple members i.e. Network manager and Auditing TSR.

Comma and floppy device security

Panther will offer the ability to restrict access to the Floppy, and communications devices based on their User login account. The Supervisor can assign Read, Write, and Delete privilege to specified devices. The Syswatch agent described above will be responsible for determining whether access is to be allowed to the device and will return a value to the Kernel which will determine whether access is to be allowed.

This would enable the Supervisor to restrict access to certain printers, Modems and other devices to those authorized to use the facilities.

It may only be possible to provide this level of functionality through a generic driver interface to a hardware security device or through a VxD driver for Windows so that access to communications devices can be controlled.

Problem areas - BackUp programs like FastBack which access the hardware directly. If serial devices are disabled how are serial mice to be supported.

Novell (DSG) Company Confidential

R0559757

Security

MS-CCP-MDL 5010803

MS-CCPMDL 000005010803

200532

CONFIDENTIAL

Other Issues

Security should support *Multi Use* PC's as used in Schools and Colleges

Partition, Directory and File security should provide recovery tools so that end user's can-disable these features in order to get to their data.

File Passwords to be supported for backwards compatibility

Integrate with IBM PS/2 security features

Forced system lock after a variable period of inactivity This can easily be implemented under windows using the existing LOCK program. But for DOS utilizes a keyboard lock as envisaged for *Sturton* is required.

All TXT files to be included in executables Customisation if any available via .INI files

Store the user's Network User name, Full name and encrypted password These can then be accessed from network login utilities

Security

Novell (DSO) Company Confidential

88559758

MS-CCP-MDL 5010804

MS-CCPMDL 000005010804

CONFIDENTIAL

200533

MULTI-TASKING & TASK SWITCHING**MultIMAX**

Panther will extend TaskMAX to automatically create a multi-tasking environment when loaded on a 386sx or above with at least 2Mb of RAM. Each DOS task will require approximately 640k of memory. The Operating system itself should require no more than half a megabyte of system memory. The Panther multitasker will run on either DR DOS 3.x or 5.x based kernel.

Panther multitasking will be a fully pre-emptive priority driven system based on the proven technology of the DR Multi-user DOS Real Time Monitor. The multitasker will run at a dispatch rate of 18.2 ticks per second. The user will have the option through the task manager interface to mark a task as 'suspend in background'.

The Multitasker will be designed to be modular such that the user can choose whether to load it or not. Once loaded the system will appear as a standard single tasking DR DOS with EMM386 loaded, with an identical level of compatibility. Only once the Task manager has been invoked by the user to start another task will the multitasking commence.

If the user shuts down all running tasks the system will return to its power up state, single tasking DR DOS with EMM386.

The multitasker modules when loaded will run in protected mode. Giving a 0Kb conventional memory footprint and approximately 4Kb Upper memory footprint.

Multiple Graphics

Panther multitasking will include support for running multiple graphics applications simultaneously. Support will be included for all graphics modes on Hercules, VGA, EGA and CGA systems, and EGA 43 line and VGA 50 line text modes. Support for other Super VGA or XGA modes will also be investigated.

Note: The Virtual machine manager will have a modular design such that support for other graphics standards can be added at a later stage e.g. Genius monitor support.

Graphics modes will require up to a 256k byte save area when switched to background, while 43/50 line modes will require a 16k byte save area. The user will be able to choose whether the graphics save area should be spooled to disk or saved in RAM while in background. All graphics applications will continue to run while in background, unless save buffer has been spooled to disk where the application will be suspended upon first access to video memory.

DOS Extenders

The DPMT server interface supplied with Panther will also allow multiple DPMI client applications to co-exist in a multitasking environment. The DPMI driver will not necessarily be loaded when the Panther multitasker is enabled depending on its final size. VCP1 applications will not be supported when running Multimax.

Shared Devices

The Multitasker will automatically arbitrate on the allocation of shared resources including:

- Intel Maths coprocessor

Novell (DSQ) Company Confidential

#0559759

MULTI-TASKING & Task Switching

MS-CCP-MDL 5010805

MS-CCPMDL 000005010805

200534

CONFIDENTIAL

- Keyboard
- Comms devices
- Parallel Ports
- mice.

The Keyboard and mouse will be attached to the task running in the foreground session. While the maths coprocessor will be shared by multiple tasks simultaneously, with its state being saved between each of the tasks.

Comms devices will be attached to the first task to access the device. Each device will have a time-out assigned to the device. If the device is not accessed for the duration of a time-out period then the device will be freed for other tasks.

Networking

The Multitasker will extend the network management and auditing functions to provide information about each task.

Multiple Novell NetWare sessions will be supported via the VIPX interface created for Windows. This interface is supported by the current IPX and the ODI and ODINSUP level drivers. Other vendors will be encouraged to support this interface. The program `tlm2` must be loaded to support NetWare aware applications which make asynchronous IPX calls.

The Panther multitasker will also support applications making asynchronous calls to the NetWare interface.

Pre loaded Applications.

The user can configure a number of DOS applications to load automatically under Panther multitasker.

Extended API

The standard DOS APIs will be extended when the Panther multitasker is loaded to provide the following extra functionality :-

Inter Process Communication

PIPES	These would be named pipes similar to the queue functionality found in OS/2 and Multi-user DOS Queues.
QUEUES	Random access queues similar to OS/2 functionality.
SEMAPHORES	Same as File functions used in Multi-user DOS.
SHARED MEMORY	The API will support mapping of memory pages between applications.

Process Control

THREADS	The ability to create process threads will be provided through the API.
PRIORITY	Processes will be able to change their priorities or that of other processes.
ABORT	Processes will be able to abort other processes.

Novell (DSG) Company Confidential

80559760

MULTI-TASKING & Task Switching

MS-CCP-MDL 5010806

MS-CCPMDL 000005010806

200535

SUSPEND	Processes will be able to suspend other processes.
DELAY	Processes will have the ability to delay for defined time.
SWITCH	Ability to force a process to be switched to foreground.

The DOS task switcher and DR DOS 5.0 TaskMAX APIs will both be supported under the multitasker.

Panther and Windows 3.x support:

It is our goal for Windows 3.x to run in Standard mode under the multitasker. However, it requires further investigation before we can be sure that this is possible.

Task manager interface

The User will easily be able to create tasks or switch between tasks by one of three methods :-

1. Immediate switch from one task to another via dedicated Hot keys e.g. CTRL + numpad. Hot keys to be user definable.
2. Via a pop up menu e.g. CTRL+ESC will present the user with a pop up menu of currently active tasks. The task will be selected by use of arrow keys or via mouse.
3. Through ViewMAX shell. ViewMAX will be able to switch from one task to another through the currently defined TaskMAX API.

The goal is to have a consistent look and feel between TaskMAX and the multitasker task manager. Both interfaces will support the use of a mouse.

The cut and paste facilities offered in TaskMAX will also be supported through the task manager (text based only).

An "enhanced" option will be added to the task manager interface for user definable functions such as Suspend in background, or the ability to change the amount of CPU time to be allocated to foreground and background tasks. It will not be possible to change the allocation between individual background tasks.

Install/Setup options

Install will detect the presence of a 386 processor and enable the option for the user to select to install the multitasker module. Other installation options will appear as for taskmax.

Virtual Memory Support

Currently not planned for this release.

Profile TOP 100 Applications (?)

PIF files and Editor

.PIF files allow MultiMAX (and TaskMAX) to configure the environment before an application is loaded. The following information is stored:-

Novell (D&G) Company Confidential

09559761

MULTI-TASKING & Task Switching

MS-CCP-MDL 5010807

MS-CCPMDL 000005010807

200536

CONFIDENTIAL

- Maximum Expanded Memory
- Maximum Expanded Memory
- Suspend in Background
- Graphics to Memory/Disk
- Other

TaskMAX

The TaskMAX user interface will be enhanced to match changes made to the Multitasker (task manager) user interface

MULTI-TASKING & Task Switching

Novell (DSG) Company Confidential

R0559762

MS-CCP-MDL 5010808

MS-CCPMDL 000005010808

CONFIDENTIAL

200537

PORTABLE SYSTEM ISSUES

PCMCIA and JEIDA Cards

PCMCIA and JEIDA cards will be supported in the PalmDOS product. These drivers etc. will be incorporated into the Panther OEM kits

BatteryMAX

Enhance the BatteryMAX drivers to support the MicroSoft/Intel Advanced Power Management (APM) specification.

RS232/Parallel Port Network

NetWare Lite Serial port drivers are available and this could be offered as an alternative to Microsoft's NetWare product? Disk and memory size, parallel port driver issues to be investigated

Auto Resume Mode

Mac386 sys will support the Auto Resume mode of named notebooks. See MemoryMAX

Portable System Issues

Novell (DSG) Company Confidential

80559763

MS-CCP-MDL 5010809

MS-CCPMDL 000005010809

200538

CONFIDENTIAL**THIRD PARTY COMPONENTS****MultiSoft's SuperPCKwik Cache****Cross Memory Lending**

One of the major restrictions with the existing product is support for lending. Currently SuperPCKwik will only monitor the interface through which cache memory had been allocated. i.e. An XMS cache would only lend memory to applications asking for memory using XMS calls. This means that the user must statically decide how much memory could be required by applications using other standard interfaces to `mem000.sys` i.e. VGPI or EMS.

Cross Memory Lending is now supported in 8 versions of the latest SuperPCK and will be incorporated into the Panther product

Windows Utilities

SuperPCK includes a Windows based Cache monitor which could be included in Panther to form, with the Lock program, a DQS Tools Program Group inside Windows.

Protected Mode Device Driver (See MemoryMAX)

A SuperPCK overlay will be generated which will operate in Protected Mode using the services provided by `pmv.sys`. The protected mode version will have minimal conventional and upper memory usage. Additional performance benefits cannot be estimated until a 8 version of the driver is available

Lend Cache Memory dynamically to other system extensions

SuperPCK supports a private interface for the short term loan of memory to other MultiSoft components. This interface will be available for other system components in Panther

Third Party Components

Novell (DSO) Company Confidential

R0559764

MS-CCP-MDL 5010810

MS-CCPMDL 000005010810

CONFIDENTIAL

200539

AddStor's SuperStorSSTORDRV.SYS**Protected Mode Device Driver**

sstordev.sys will be converted to a protected mode device driver capable of running in both real and 286 protected mode (See 286 and 386 Protected Mode Device Drivers and TSRs on page 14). Thus on 286 and above systems with extended memory the majority of the device driver's 40Kb of code and data can be relocated to extended memory.

Windows 3.x Permanent Swap file support

The Windows 3.x Permanent swap file is accessed directly using INT13 calls which means that it cannot normally be stored on a SuperStor partition. The SSTOR utility will be enhanced to provide the ability to create a Permanent swap file on the SuperStor partition while it is being created. A Windows utility will also be provided which will allow a Permanent swapfile to be created on a SuperStor partition from within the Windows environment.

Documented API and Structure for Third Party Utility Vendors

The SuperStor device driver API and structures will be documented for third party disk utility vendors.

Compressed Floppy disk support

A planned enhancement to the retail SuperStor product is support for compressed floppy disks. These must be formatted then prepared by the sstor utility however after this the disks are used in exactly the same way as a normal floppy disk.

Panther will further hide the difference between compressed and standard floppy disks by updating the FORMAT, DISKCOPY, DISKCOMP etc utilities to fully support both media.

SSTOR.EXE

The SuperStor conversion program will be enhanced in the following ways:-

- Drive Shrink and Expand functions.
- Decompress function
- Restartable Conversion routine
- Conversion Preview function
- Consistent User interface with other Panther Utilities

Drive Shrink and Expand functions

The user will be given the ability to shrink and expand the SuperStor host file thus allowing the user to fine tune the amount of free space on the host drive for use by Windows etc. The user will not be able to expand the host file significantly from its original size.

Decompress function

A Decompress function will be added to sstor.exe which allows the users to return to a normal FAT based disk structure without going through the BACKUP, FORMAT, RESTORE cycle. The user will be forced to delete sufficient data from the compressed drive so that the decompress function can complete.

Novell (DSG) Company Confidential

20559765

Third Party Components

MS-CCP-MDL 5010811

MS-CCPMDL 000005010811

200540

CONFIDENTIAL**Restartable Conversion routine**

The conversion process will be modified to be fully restartable in case a power failure occurs during the conversion process. Thus if the power fails and the conversion is stop the user only needs to reboot and restart again. Currently if the conversion process fails the user must delete the partially converted files and host file, restore from a backup and restart the conversion process.

Conversion Preview function

Will execute a full scan of the selected disk to estimate compression factor and total disk space requirements without converting the drive. This preview option will be substantially faster than the conversion process because it just requires each data cluster to be read, compressed and the total compression factor calculated.

Super Compress Function

Enhanced compression code, compatible with existing decompress code, will be incorporated into DiskOPT to further reduce the disc space used by read-only files. Typically a extra 10% to 15% gain is achieved on a compressed drive.

The compressed data generated by the Super Compress algorithm can be decompressed by the existing driver. It is not normally used because it is slower than the current compression code. Once a drive has been Super compressed only clusters that are subsequently modified are then rewritten by the normal compression code.

Third Party Components

Novell (DSG) Company Confidential

00559766

MS-CCP-MDL 5010812

MS-CCPMDL 000005010812

CONFIDENTIAL

200541

MISCELLANEOUS

CD ROM Driver (DRCDEX)

DRCDEX will be functionally equivalent to Microsoft's MSCDEX version 2.2 allowing DR DOS to read ISO9660 and High Sierra compatible CDROMs. Interfacing to the operating system using the INT2F redirector interface and with the hardware specific device driver via an extended character device driver.

DRCDEX will be shipped to OEM's with a sample device driver for the CD drive. Both data and audio control functions will be supported.

Write Once

No support for Write Once CDROMs will be included in Panther, however the developments in this (e.g. Frankfurt Proposal) will be monitored.

Miscellaneous

Novell (DSG) Company Confidential

R0559767

MS-CCP-MDL 5010813

MS-CCPMDL 000005010813

200542

CONFIDENTIAL

IBM COMPATIBILITY ISSUES

Hardware Compatibility

Support all IBM Printers

PS/2 Compatible Mouse driver

Software Compatibility

LAN, Comms and AVC 7

IBM PC DOS 5.0 Compatibility

Config Processing:

BUFFERS	Add support for Secondary Cache Buffers - supports = N,M. Load buffers into HIMEM automatically
DEVICEHIGH	Alias for HIDEVICE command (Supported in DR DOS 6.0)
DOS	DOS-HIGH or LOW and UMB and NOUMB
DRIVPARM	Add support for /I on DRIVPARM to indicate disk is J14

IBM Compatibility issues

Novell (DPO) Company Confidential

R0559768

MS-CCP-MDL 5010814

MS-CCPMDL 000005010814

CONFIDENTIAL: AL20054?

Command Processing:

ASSIGN	Add /STATUS switch*
BACKUP	Allow setting of return error codes
COMMAND	Add /MSG messages in memory
COMP	Add /D mismatches in decimal Add /L display line numbers in offset Add /N number comparing first number of lines Add /C non case sensitive operation
COPY	Add /V verify
DELETE	Add /P switch
DIR	Add /A attributes switch Add /O sort order switch Add /S sub directory switch Add /B bare list switch Add /L lowercase switch
DISKCOMP	Allow setting of return error codes
DISKCOPY	Add /V verify
DOSKEY	Add macro name support Add /REINSTALL Add /BUPSTZ Add /Macros Add /History Add /Insert
EMM386	Add separate EMM386 to run from command line to give ON OFF AUTO support and WEITEK coprocessor ON and OFF support
FASTOPEN	Add command line support and /X
FC	Add /mn number of matching lines to resync Add /Lln internal buffer Add /N display line no in ASCII Add /T do not expand tabs to space
FIND	Add /l case sensitive search
FORMAT	Allow setting of return error codes
KEYB	Add /D-yyy Add /E long 101/102 key support
LOADHIGH	Alias for HL/DAD
MEM	Add /CLASSIFY Add /DEBUG Add /PROGRAM
SYS	Add support for second drive*
TIME	Add AM and PM formats for setting
TREE	Add /A to show graphics chars as 1 and
UNDELETE	Add alias /A for /ALL Add alias /L for /LIST Add alias /D for /R Add /DOS Add /DT alias for /R
UNFORMAT	Add /J, /L, /A, /Test, /P, /PARTN

IBM Compatibility issues

Novell (DSG) Company Confidential

R8559769

MS-CCP-MDL 5010815

MS-CCPMDL 000005010815

200544 **CONFIDENTIAL****NETWORK ISSUES****Network Management Agents**

Panther will implement call out functions which can be intercepted by Network Management Agents or Security Agents. These will provide information about and control over the local environment which cannot be obtained in any other way. Examples are:

- Program Load and Terminate Functions
- File Open/Create Functions
- Device Driver Critical Errors
- Configuration Information
- Task creation (TaskMAX/Multitasker)

Note: Further items may be added to this list after discussions with the NetWare Network Management.

For instance NMA's could monitor the Program Load Function and fail the function if the maximum number of copies of the application are already in use on the network.

Remote Console Control

Remote console control programs like Central Point's console and PCAnywere will be fully supported in single tasking and multitasking environments.

Multitasker Remote Program Load

Multitasker will define an interface which allows the Network Manager to execute a program remotely with or without capturing the screen/keyboard I/O.

Network Issues

Novell (DSG) Company Confidential

R0559770

MS-CCP-MDL 5010816

MS-CCPMDL 000005010816

CONFIDENTIAL

200540

NLS OVERVIEW

The following table shows the language versions available for PC DOS 5.0, those already translated for previous versions of DRDOS and those which are planned for translation as part of the Panther project.

	Language	Group	Current Version	Estimate FCS Date
1.	English (US & UK)	A	6.0	See Below
2.	French	A	6.0	English FCS
3.	German	A	6.0	English FCS
4.	Italian	B	6.0	English FCS + 7 Months
5.	Spanish	B	6.0	English FCS + 7 Months
6.	Japanese (KANJI)	B	6.0	English FCS + 2 Months
7.	Korean (Hangeul)	B	6.0	English FCS + 2 Months
8.	Portuguese	C	5.0	Not Planned
9.	Arabic	C	None	Not Planned
10.	Brazilian Portuguese	C	None	Not Planned
11.	Canadian French	C	None	Not Planned
12.	Chinese (Simplified) *	C	6.0*	Not Planned
13.	Chinese (Traditional)	C	None	Not Planned
14.	Dutch	C	6.0	Not Planned
15.	Finnish	C	None	Not Planned
16.	Hebrew (partial)	C	3.41	Not Planned
17.	Hungarian	C	3.42	Not Planned
18.	Norwegian	C	None	Not Planned
19.	Russian	C	3.41	Not Planned
20.	Swedish	C	None	Not Planned
21.	Thai	C	6.0*	Not Planned
22.	Turkish	C	3.41	Not Planned

The table above is sorted by Language Group (A, B, and C) and then alphabetically by country. Versions marked by * are currently being translated and have NOT been released.

Language Groups

- A Group A languages are always translated for simultaneous release.
- B Group B languages are translated for release during the 3 months following the Group A languages.
- C Group C languages will ONLY be translated after Business Cases have been completed.

Novell (DSG) Company Confidential

88559771

NLS Overview

MS-CCP-MDL 5010817

MS-CCPMDL 000005010817

200546

CONFIDENTIAL

Single Byte Language Drivers

Keys

- KEYS.COM enhancements include:
 - Character Compose Key
 - DOS compatible error code
 - Keyboard ID command line switch (/ID=)

Supported Countries

Belgium	Canada (French)	Denmark	Finland	France
Germany	Hungary	Italy	Latin America	Netherlands
Norway	Portugal	Russia	Spain	Sweden
Norvis (French)	Swiss (German)	Turkey (FGGIO)	Turkey (QWERTY)	United Kingdom
United States				

Character Compose Key

The CTRL-ALT-F3 key sequence will be treated as a Compose Character command so that the next two key sequences will compose any character in the current codepage in addition to those supported by the current keyboard selection. Therefore the sequence CTRL-ALT-F3 S S will generate the S character for any country if S is included in the current codepage.

NLS Overview

Novell (DSG) Company Confidential

80559772

MS-CCP-MDL 5010818

MS-CCPMDL 000005010818

CONFIDENTIAL

200547

DISPLAY.SYS & PRINTER.SYS

These drivers will be updated to use XMS extended memory functions to store font information. This will increase the available conventional memory in countries which require code page drivers to be loaded.

Code Pages

The following table outlines the code pages that are supported for displays and printers by DR DOS 6.0 and will be included in Panther -

Code Page	6.0	Countries
437	✓	English (US/UK), France, Germany, Italy, Spain, Holland, Sweden, Finland
850	✓	International Code Page
852	✓	Latin II (Hungary)
857	✓	Turkey
860	✓	Portugal, Brazil (?)
863	✓	French Canada
865	✓	Denmark, Norway
868	✓	Russia (Cyrillic)

EGA.CPI Font File

The DR DOS EGA.CPI contains the following fonts sizes in a compressed format for all of the supported code pages listed above -

Font Size	6.0	Comments
8*8	✓	Used by ViewMAX for ICON string
8*8	✓	43 and 50 line screen modes
8*14	✓	Standard EGA 25 line display mode
8*16	✓	Standard VGA 25 line display mode
8*18	✗	Not currently supported by EGA.CPI but widely used by notebook LCD displays

ISO compliant fonts will not be supported as no hardware currently exists which supports the required cell size 8*16 or refresh rate

Novell (DSG) Company Confidential

R0559773

NLS Overview

MS-CCP-MDL 5010819

MS-CCPMDL 000005010819

200548

CONFIDENTIAL**Printer CPI files**

The DR DOS printer CPI files contain the following printer fonts for all of the code pages listed above -

CPI File	6.0	Printer
4201	✓	IBM 4201 Proprietary and IBM 4202 Proprietary XL
4208	✓	IBM 4207 Proprietary XL24 & IBM 4208 Proprietary XL24
5202	✓	IBM Queuecenter II
1050	✓	Epson FX850 & FX1050 and compatible printers

Double Byte Language Drivers**DOS/V Device Drivers**

Promote the DOS/V driver technology as the generic solution for 16bit language support. The interface may require modification to meet existing driver standards (i.e. Hangul Driver interface) but the core of the drivers will not require modification.

Japanese Issues

The Kany FEP (Front End Processor) and display software will not be developed by Novell but sourced externally

Korean Issues

The Hangul FEP (Front End Processor) and display software will not be developed by Novell but sourced externally

NLS Overview

Novell (DSG) Company Confidential

R0559774

MS-CCP-MDL 5010820

MS-CCPMDL 000005010820

CONFIDENTIAL

200549

DOCUMENTATION OVERVIEW

The following table gives the current page counts for the existing documentation and estimates for Panther

	DR DOS 5.0	DR DOS 6.0	Panther Est.
DR DOS User Guide	500	700	700
ViewMAX User Guide	90	105	120
DR DOS Quick Reference Card	12	14	16
DR DOS Release Notes	-	14	16
DR DOS Quick Start Guide	-	50	50
DR DOS System and Programmers Guide	290	295	325
Implementing BatteryMAX in DR DOS	20	20	20
Implementing DR DOS in ROM with a ROMDISK	34	34	34
Optimization and Configuration Guide	-	50	60

The following titles will be produced for Panther -

Retail Documentation

- DOS User Guide
- ViewMAX User Guide
- DOS Quick Reference Card
- DOS Release Notes
- DOS Optimization and Configuration Guide
- DOS Quick Start Guide

OEM Documentation

- DOS System and Programmers Guide
- Implementing BatteryMAX in DOS
- Implementing DOS in ROM with a ROMDISK

Support Documentation

- DOSLock Writers Guide
- Translation Guide

Novell (DBG) Company Confidential

#0559775

Documentation Overview

MS-CCP-MDL 5010821

MS-CCPMDL 000005010821

200550

CONFIDENTIAL**Retail Documentation**

The layout of the manuals will be the same as for DR DOS 6.0. They will be printed on 9"x7" pages, and we will use Ventura 3.0 for the DTP. The second colour will be a 50% black tint. In Panther the product will be referred to generically as DOS and not as DR DOS.

User Guide

The proposed new functionality will require major additions and changes to the DR DOS 6.0 User Guide. We will retain the current structure and layout of the manual, but we aim to add a significant number of illustrations. These will add value to the manual and help differentiate it from DOSBook. The bulk of the Error Messages included in Appendix A will be removed from the manual and included in DOSBOOK.

ViewMAX Guide

The proposed ViewMAX enhancements are likely to require extensive additions and changes to the ViewMAX Guide, although we will probably retain the general structure of the manual. Page count is likely to increase from 106 pages to around 125 pages.

Quick Start Guide

The Panther Quick Start Guide will be based on the Quick Start Guide that UK Tpubs are producing for DR DOS 6.0. It will be about 50 pages. Given the basic nature of the information in this manual, it is unlikely that there will be extensive changes for Panther.

Quick Reference Card

The Panther Quick Reference Card will look the same as the DR DOS 5.0 and 6.0 Reference Cards. The English 6.0 card has 14 sides, and there is some free space, but we will probably need two more sides to accommodate all the proposed additional commands. The expansion that occurs in translation will certainly cause most translated cards to expand to 18 sides.

System and Programmer's Guide

The multitasking API will be fully documented in the System and Programmer's Guide. We will also add details of certain structures and functions that are documented in other DOS 5.0 programmer reference guides. The DPMS specification will also be incorporated into this guide. Page count will probably increase from 285 pages to around 375 pages.

Release Notes

As in previous releases, we will use Release Notes to document late changes/additions to the product. The layout will be as before, with 100% black text on 9"x7" pages.

Documentation Overview

Novell (D&D) Company Confidential

R0559776

MS-CCP-MDL 5010822

MS-CCPMDL 000005010822

CONFIDENTIAL

200551

Optimisation and Configuration Guide

The Panther Optimisation and Configuration Guide will follow the same approach as the 6.0 Guide, although content is likely to change substantially. The new software will probably remove some potential problems, but at the same time new problem areas will arise. The Guide will advise on how to optimise memory usage. It will also identify problems that may occur when the user is running particular utilities, and will suggest how to resolve these problems. There will be significant overlap with the User Guide, and it will therefore help if writing of the Optimisation and Configuration Guide is linked closely with the writing of the User Guide.

We propose that the Optimisation and Configuration Guide be issued as an online document, and not as a printed manual. It would be separate from DOSBook, but would use the same display mechanism. The Optimisation and Configuration Guide is likely to need regular updates after the Panther release, and a small online document would allow us to issue updates regularly and rapidly via the Business Update Service. An online document has a further advantage in that it avoids the lead time associated with printed manuals. An effective Optimisation and Configuration Guide is dependent on detailed feedback about the product, particularly from DR Technical Support and customers, and this in turn is dependent on these people having the maximum opportunity to exercise the product before we finalise the Guide. Our experience with DR DOS 5.0 and 6.0 suggests that a printed manual would have to be frozen long before all functionality had been tested and problems + solutions identified.

Support Documentation**DOSBook Writers Guide and Translation Guide**

We will update these guides as appropriate, for example if there are changes to the way in which DOSBook is created.

Documentation Overview

Novell (DSG) Company Confidential

R0559777

MS-CCP-MDL 5010823

MS-CCPMDL 000005010823

200552

CONFIDENTIALOnline Documentation (DOSBook)

DOSBook will include all the DOS User Guide except for illustrations. The current TPUbs draft of DOSBook includes most of the 6.0 User Guide, and the source text is approximately 1.2Mb up from 512Kb in the shipping product. This is likely to grow to around 1.6Mb for Panther. The DOSBook compiler compresses the raw data to half its original size in the executable image. The appearance of DOSBook depends on what improvements are developed by engineering, but it is likely to look very similar to the DR DOS 6.0 version.

DOSBook Display Engine

The following extensions will be made to the existing DOSBook in order for the complete DR DOS User's Guide to be put Online. DOSBook was designed to conform to the broad outlines of the GUA specification. Therefore the product may differ from the official GUA specification but only where the usability of the product is enhanced.

- Enhanced table of contents display, including collapsing heading
- Fixed text (used to show computer output and shown in courier font in manual)
- Improve Headings and Table Titles
- Improved keyword search
- Improved print function
- User selectable colours.
- Make DOSBook work in 50 line mode
- Keep the section title at the top of the screen while scrolling through the document

DOSBook Support ToolsDOSBook Compiler

Currently the DOSBook compiler relies on close adherence to the Ventura file format but Tech Pubs and the translation agencies find it more convenient to edit the source files directly with EDITOR. Therefore the compiler will be more tolerant of slight variations from the Ventura standard in order to reduce the development cycle and enhance quality.

DOSBook Test Tools

Currently each DOSBook link and popup can only be tested by running the program. This is a very time consuming and tedious process which will be automated by the Test Tools.

DOSBook Automated Translation

Translation Tools will be generated which will automatically insert the link and popups into the raw translated DOSBook text. These tools rely on a paragraph for paragraph match between the English and translated text.

Documentation Overview

Novell (DSG) Company Confidential

R0559778

MS-CCP-MDL 5010824

MS-CCPMDL 000005010824

CONFIDENTIAL

200553

TEST/VALIDATION

Test Plans

Hardware Compatibility

Application Compatibility

Windows 3.x including FastDISK

Performance Benchmarks

To Be Completed

Internal QA

DSG European Development Centre

DSG Japan
Dual Language and OBCS testing

Novell Test Labs (Provo)

Novell Connectivity Business Unit

External Certification

Panther will be submitted to an independent external test facility for the following reasons:-

- Certification of the Panther release against the Top 100 applications
- Certification against a standard implementation of MS NET, either 3 Com or IBM PC LAN.
- Independent regression test
- Verification of full Windows 3.x Support.

Veritest & XCAL

Alpha & Beta Programs

Panther will have a 20 week Beta program with 3 Beta releases.

The ENGLISH version will be used throughout the development cycle and will be the only language variant used in the Panther Beta cycle.

Novell (DSG) Company Confidential

80559779

Test/Validation

MS-CCP-MDL 5010825

MS-CCPMDL 000005010825

200354

CONFIDENTIAL

	Length	Proposed Start Date	Key Features
Beta I	6 weeks	17th July '92	
Beta II	6 weeks	28th Aug '92	
Beta III	8 weeks	8th Oct '92	

Key & Sites

Certain key third parties will be targeted for early release of the Panther specification and software. In order to ensure that key software either takes advantage of new features or that requires extensive testing

System software extensions like -

- Network redirectors
- CDROM extensions
- Device drivers
- Task Switchers & Multi Taskers
- KANJI Front End Processors

Are typical examples of software which interacts at the lowest level with the OS and requires extensive and early testing

Key & Site	Type	Product/Focus of testing
Banyan Vines	Systems	Vines Network
Sun Microsystems	Systems	PC/NFS
WordPerfect Corp	Applic	WordPerfect & WordPerfect Office
Lotus	Applic	123 etc and CDROM testing by BlueFish development group
New York State Health	Corp.	Various applications and drivers
Argonaut	Systems	Lectronic
Quartermack	Systems	OEM/386 and DESQnew
Quintec	Systems	386/387

Test Validation

Navell (DSG) Company; Confidential

R0559780

MS-CCP-MDL 5010826

MS-CCPMDL 000005010826

CONFIDENTIAL

200555

DEVELOPMENT ENVIRONMENT**Source Code Control System**

A fully integrated Source Code Control System (SCCS) will be implemented for Panther. This will be used to archive sources, track source changes and status.

Development Tools

The primary development tools and libraries for the Panther project are -

- Borland C++ 2.0
- Borland Tasm (from C++ 2.00)
- Borland Make (from C++ 3.00)
- PKWare's PKLITE (EDBE file compression)
- CXL 5.52 (Full Screen interface routines)

Other tools will only be used in the following instances:-

- MultiSoft's SuperPCkwik - OPTASM
- AddStor's SuperStor - MicroSoft MASM 5.0 and C 5.0
- IBMDCS.COM - RASM86

All components without exception will be regenerated from source via a standard MAKEFILE.

Disaster Recovery

All project tools, documentation and sources will be archived on a central NetWare server which has a regular and complete backup. Off site copies of these tapes will guarantee that no more than one weeks work is lost.

Certbed off site tapes will be generated for each external 0 release.

Novell (DSG) Company Confidential

R0559781

Development Environment

MS-CCP-MDL 5010827

MS-CCPMDL 000005010827

200550

CONFIDENTIAL

DELIVERABLES

Retail Product

As with OR DOS 4.0 No copy protected version of Panther will be generated

Documentation (Full Documentation Option)

- DOS User Guide
- ViewMAX User Guide
- DOS Quick Reference Card
- DOS Release Notes
- DOS Optimisation and Configuration Guide

Documentation (Quick Start Documentation Option)

- DOS Quick Start Guide
- DOS Quick Reference Card
- DOS Release Notes

Disk Configurations

TBD

Note - These target configurations do not include any network supplements other than Novell NetWare IPX and, NETX.COM and support files.

All DBCS translations (Japanese, Chinese & Korean) will require more disks for fonts, front end processors etc. This will also apply to some single character translations which require extra support drivers (Arabic & Hebrew).

Deliverables

Novell (DSG) Company Confidential

R0559782

MS-CCP-MDL 5010828

MS-CCPMDL 000005010828

CONFIDENTIAL

200557

OEM/SDK

Documentation

- Retail Kit Documentation (Full Doc Option)
- The DOS System and Programmers Guide
- Cut-down BIOS for embedded systems
- ROMming DOS
- Idle Detection Supplement

Software

- 1 * Retail Disk Set (Any Format)
- 1 * DOS PC BIOS Disk (5 1/4" 360Kb and 3 1/2" 720Kb)
- 1 * DOS Skeleton BIOS (5 1/4" 360Kb and 3 1/2" 720Kb)
- 1 * DOS BatteryMAX (5 1/4" 360Kb and 3 1/2" 720Kb)

OEM Book

Documentation

- Customising DOSBook

Software

- 2 * DOSBook Development Disk (5 1/4" 1.2Mb and 3 1/2" 1.44Mb)

Software Translation Kit

Documentation

- DOS Software Translation Guide

Software

- n * DOS Software Translation Kits (5 1/4" 1.2Mb and 3 1/2" 1.44Mb)

Novell (DSG) Company Confidential

80559703

Deliverables

MS-CCP-MDL 5010829

MS-CCPMDL 000005010829

000558

CONFIDENTIAL

KEY DEVELOPMENT MILE STONES

- Beta I Release
- Beta II Release
- Beta III Release
- Vertical Validation Begins
- Engineering Release (ER)

- 1st Draft User Guide
- 2nd Draft User Guide
- Documentation Release (DR)

- First Customer Ship (FCS)

Key Development Mile Stones

Novell (DSG) Company Confidential

00559704

MS-CCP-MDL 5010830

MS-CCPMDL 000005010830

CONFIDENTIAL

200559

FUTURE DEVELOPMENTS

The features discussed in this section are NOT included in the Panther product they have been included because they have been referenced in the Product Requirements Definition

PC DOS 5.0 Compatible Kernel

A kernel compatible with the PC-DOS 5.0 structures and API will not be included in this release of DR DOS.

MemoryMAX**EMM386 Stealth Support**

The STEALTH feature of EMM386 version 6 is complex and has significant compatibility problems which could be extremely difficult for the naive user to overcome. Therefore support for this feature will not be provided in Panther

EMM386 ROM relocating.

The new MAP command will allow users to move hardware adapters in upper memory to maximize the size of contiguous upper memory blocks. For instance MAP=C800-CBFF,C400 relocates a 180k adapter resident at segment C800 down to C400. This command is primarily intended for advanced users on ISA architecture machines when hardware adapters have more limited addressing options than the supporting drivers. On EISA and MCA machines the optimizer will recommend the hardware relocations that should be made.

EMMXMA.SYS

EMMXMA.SYS will be upgraded to support Upper Memory Blocks which can be allocated via the XMS interface. The LIM 4.0 driver will also be enhanced to include all of the bug fixes added to emu386.com.

MemoryMAX Optimizer

Time constraints prevent the development of this utility which would analyse the load and runtime size of all device drivers and TSR's and optimize their load location and order.

Also delayed is the definition of a structure that can be adopted by manufacturers which will mark reusable components of the ROMBIOS (e.g. initialization and Setup routines) which can be replaced by XMS Upper Memory blocks by emu386.sys or memos.sys. Before this system is adopted the information could be collected manually by the OEM or Novell DSG for the major machines or, preferably, generated automatically by the MemoryMAX Optimizer

Overlaid Device Drivers and TSRs

Some existing device drivers or TSRs may be overlaid in areas of upper memory, only being switched into context when an interrupt, or other event wakes them up.

This can easily be accomplished for programs which are modified slightly to be aware of this technique, but with a little additional effort, many standard programs may be loaded in this way.

Novell (DSG) Company Confidential

80559785

Future Developments

MS-CCP-MDL 5010831

MS-CCPMDL 000005010831

200360

CONFIDENTIALUtilities

The utilities supplied with Panther will NOT be modified to support full background operation in a multitasking environment. However ALL utilities which cannot guarantee error free operation in a multitasking environment will either warn the user of possible errors (CHKDSK) or fail to load (DIRCOPY or BACKUP)

Full Screen BACKUP

Instead of adding a full screen interface to BACKUP and RESTORE the existing utilities will be left unmodified and compatible with the standard DOS versions. A new BACKUP2 utility will include the following features-

- Data Compression
- Full Screen Interface with Mouse support
- Context sensitive help
- Tolerant of missing or corrupt disk on restoration
- Point and click file selection with user selectable sort order
- Include/Exclude Filesets
- Three Operational Modes Full, Incremental & Differential

Full Screen DISKMANT

Instead of adding a full screen interface to all of the disk related utilities a new DISKMANT utility will be generated allows the user to format, copy and sys disks from a menu driven utility with context sensitive online help etc.

FDISK

FDISK will be modified to use the Panther full screen interface, provide Quick Formatting and support for >1024 cylinders. Advanced users will also be given the option to modify the defaults of the new partitions. For example for a small partition used to store relatively large databases runtime performance will be improved by selecting the largest possible cluster size

SPOOLER**EDLIN**

The full screen editor, EDITOR, will be the only text editor provided in Panther

BASIC

No Basic compiler or interpreter will be provided with Panther

ViewMAX

If each Program Item is list in a User Menu then the keyboard User can access the command via Alt-UL for Lotus 123 for example. This also allows the keyboard user access to drag and drop.

DOSBook.

Within the current development there is insufficient time to put a graphical front end on DOSBook, but this is seen as a candidate for any spare time if other parts of Panther slip, or if the overall schedule change

Novell (DSG) Company Confidential

R0559786

Future Developments

 MS-CCP-MDL 5010832

MS-CCPMDL 000005010832

CONFIDENTIAL

200561

Security**Generic driver Interface**

Support for 3rd party Security Hardware will not be added in this release of the product however programming AP's etc will be designed with this enhancement in mind

MultiTasker**Virtual Memory**

The panther release will not include support for dynamic paging of applications to disk when all memory has been allocated.

Moveable Sizable Windows

Support for text applications in moveable, sizeable and overlapping windows will be provided through a transient process or through an extended version of the task manager. As this would not necessarily need to be an integral part of the multitasking system it could be developed at a later date and made available as a demonstration vehicle.

A later development would be to support windowing graphics applications through the ViewMAX interface.

SuperStor

No support for processing compressed data will be added to Panther i.e. data copy from a SuperStor drive will only be available in its compressed form. This isolates utilities from the different compression routines used and keeps the kernel interface simple and compatible for a facility which would provide marginal performance improvements for the xcopy and copy commands.

Replaceable Compression Code

SuperStor has been designed to use alternative compression routines however this feature will not be available with this release of DR DCG

Variable Drive Compression Ratio.

User's will not be able to change the compression ratio of a SuperStor Host file after creation. However the shrink, expand and Preview functions provided in Panther reduce the importance of this change.

Redirector Framework Interface

Panther will include a development kit which will isolate third party developers and OEM's from the complex NT2P redirector interface. The kit will contain the object files which transform the NT2P redirector functions into basic Open, Read, Write, Search functions.

These object files will allow third parties to develop replacement redirectors to a clean and standard interface i.e.:-

- Native File System redirectors for emulated RISC or UNIX environments
- CD ROM extension replacements
- Compress File Systems

Novell (DSG) Company Confidential

R0559787

Future Developments

MS-CCP-MDL 5010833

MS-CCPMDL 000005010833

2005L2

CONFIDENTIAL**Virus Scanner**

Investigate providing a third party virus scanning engine with *Panther* and free, or low cost, access to a frequently updated virus database.

NetWare Support

Implement a subset of NetWare 3.xx utilities

No NetWare utility subset or local naming conventions will be included in the *Panther* product because the utility names are highly version specific in both name and functionality. However specific DOS commands could be enhanced to advise the user to use NetWare commands when the DOS version would not preserve Extended Attributes and Name Space information.

Capture	ChkDir	ChVol	Colorpal
Endcap	Flag	FlagDir	Grant
LastDir	Login	Logout	Map
Menu	NDir	NPmt	NVer
PConsole	Setpass	Salvage	SList
Syscon	TList	VolInfo	WhoAmI

Adopt the NetWare "Look & Feel" where appropriate.

The current NetWare character based utilities are based on a *Pick List*. Where the list of available options is displayed to the user, the item of interest is selected and the ENTER key actions the item. This type of interface is not appropriate for many of the utilities included in *Panther* in particular the *colorpal*.

Extended Redirector Interface.

Currently no significant performance improvement is envisaged by extending the *nrzf* interface for network redirectors. However this will be constantly reviewed with the NetWare developers.

Misc.**Online Tutorial**

Has been omitted from the development plan because of the limited benefit to the user but primarily its size which would increase the number of disks required for *Panther*.

Multimedia and Pen Support

No specific enhancements or investigations are planned for the *Panther* product in these areas.

Future Developments

Novell (P&D) Company Confidential

R0559780

MS-CCP-MDL 5010834

MS-CCPMDL 000005010834

~~CONFIDENTIAL~~

20056J

GLOSSARY/DEFINITION OF TERMS

High Memory	The first 64kb of Extended Memory which begins a 1024kb and ends at 1088kb. This block of memory is can be addressed using segment 0xFFFF while a 286, 386 or 486 processor is still in real mode
Upper Memory	384kb of memory between 640kb and 1Mb Normally reserved for hardware extensions in an IBM PC compatible.
Extended Memory	All memory above 1Mb.
Expanded Memory	
LIM	
XMS	
VCPI	Virtual Control Program Interface
DPMI (0.9 & 1.0)	DOS Protected Mode Interface
VDS	Virtual DMA Services

Glossary Definition of Terms

Novell (DSG) Company Confidential

R0559789

MS-CCP-MDL 5010835

MS-CCPMDL 000005010835

200564

CONFIDENTIAL

REFERENCE DOCUMENTS

The following documents are referenced in the Panther Product Development Plan and contain detailed information about specific aspects of this development

External Documents

- XMS 2.0 Specification
- OPMI 0.9 Specification
- Preliminary OPMI 1.0 Specification
- Visual DMA Services Specification
- LIM 4 xx

DSG Marketing Documents

- Panther Product Requirement Document (Version 1.0b)

Reference Documents

Novell (DSG) Company Confidential

80559790

MS-CCP-MDL 5010836

MS-CCPMDL 000005010836