



Introducing...



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```
static void sync_icache_030(addr_t address,size_t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movec %%cacr,%0"::"r"(cacr));cacr|=0x00000004;/**/do{asm
volatile("movec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n":"r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
volatile("nop");}static void set_pgdir(void*rt)
{long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola
tile("pmove (%0),%%srp\npmove (%0),%
%crp\n":"a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={m68k_translation_map_getpgdir,m68k_vm_translation_map_init_ma
```



Plan

- What are: a NAS, an appliance and FreeNAS ?
- Features
- Inside FreeNAS
- Example: Encrypted Software RAID 5
- History and Awards

```
static void sync_icache_030(addr_t address,size_t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
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%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n"::"r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
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tile("pmove (%0),%srp\npmove (%0),%
%crp\n"::"a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={ m68k_translation_map_getpgdir_m68k_vm_translation_map_init_ma
```




What is FreeNAS ?

1) Embedded OS specialized in NAS:

- Based on the m0n0wall “framework”
- Upgraded to latest FreeBSD stable with the m0n0wall firewall features replaced by NAS features

2) An exercise for discovering FreeBSD, PHP and OSS managment too :-)

```
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len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movc %%cacr,%0":"=r"(cacr));cacr|=0x00000004;/**/do{asm
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%1,%%cacr\naddq.l #4,%0\nmovc %0,%%caar\nmovc %1,%%cacr\n":"=r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
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%crp\n":"=a"((uint64*)&entry));}struct m68k_vm_ons m68030_vm_ons={ m68k_translation_map_getpgdir m68k_vm_translation_map_init ma
```




Features

- Hardware: all supported by FreeBSD
- Minimum: 256Mb RAM and 128Mb flash
- FreeBSD GEOM: RAID, JBOD, Encryption (using cryptographic hardware if available) and ZFS
- Filesystem: UFS, but you can use ext2/3, ntfs or even FAT for data migration
- Integration: LDAP and AD

- Monitoring: SNMP, email report, UPS

```
static void sync_icache_030(addr_t address, int l, off_t off, char *p, uint32_t cacr, off_t off, int) address&(CACHELINE-1);
len+=off; l=off; asm("nop"); asm("nop"); asm("nop"); asm("nop"); asm("nop"); asm("nop"); asm("nop"); asm("nop"); asm("nop"); asm("nop");
volatile("movc %0,%%caar\nmovc %0,%%cacr\naddq.l #4,%0\nmovc %0,%%caar\nmovc %1,%%cacr\naddq.l #4,%0\nmovc %0,%%caar\nmovc
%1,%%cacr\naddq.l #4,%0\nmovc %0,%%caar\nmovc %1,%%cacr\n::"r"(p),"r"(cacr)); p+= CACHELINE;} while((l-=CACHELINE)>0); asm
volatile("nop");}static void set_pgdir(void*rt)
{long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola
tile("pmove (%0),%srp\npmove (%0),%
%crp\n::"a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={ m68k_translation_map_getpgdir m68k_vm_translation_map_init ma
```



Features

- Services:
 - CIFS, NFS, AFP
 - FTP, TFTP, SCP
 - RSYNC, Unison
 - UpnP
 - I-SCSI target
- User Requested Services:
 - Bittorrent client

– Webserver

– Itunes/DAAP

```
static void sync_icache_..._t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address;asm volatile("nop");asm volatile("movec %%cacr,%0":"=r"(cacr:);cacr|=0x00000004;/**/do{asm
volatile("movec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n":"=r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
volatile("nop");}static void ..._t len){long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola
tile("pmove (%0),%%srp\npmove (%0),%
%crp\n":"=a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={ m68k_translation_map_getpgdir m68k_vm_translation_map_init ma
```



Inside FreeNAS

- Light FreeBSD system (about 80MB)
 - Only useful binary and libs are kept
 - Add softwares: samba, ntfs-3g, lighttpd, etc...
- All configuration parameters stored in a XML file
- All rc scripts re-wrote:
 - They re-generate the config files from the xml file

```
static void sync_icache_030(addr_t address,size_t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movec %%cacr,%0"::"r"(cacr));cacr|=0x00000004;/**/do{asm
volatile("movec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n"::"r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
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tile("pmove (%0),%%srp\npmove (%0),%
%crp\n"::"a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={ m68k_translation_map_getpgdir m68k_vm_translation_map_init ma
```




Inside FreeNAS

- System partition:
 - zipped kernel
 - zipped root filesystem (in one file)
 - config file
- Start-up sequence:
 - 1) Unzip the kernel in RAM
 - 2) Unzip the root filesystem in RAM
 - 3) Start rc scripts

```
static void sync_icache_030(addr_t address,size_t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movec %%cacr,%0"::"r"(cacr));cacr|=0x00000004;/**/do{asm
volatile("movec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n":"r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
volatile("nop");}static void set_pgdir(void*rt)
{long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola
tile("pmove (%0),%%srp\npmove (%0),%
%crp\n":"a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={m68k_translation_map,get_pgdir,m68k_vm_translation_map,init_ma
```



Inside FreeNAS

- RC scripts:
 - Search XML config file (scan all media)
 - Generate services config file
- Where are the FreeNAS files:
 - /etc/rc* : Customized startup scripts
 - /etc/rc.d/ : Customized services scripts
 - /etc/inc : Global PHP functions
 - /usr/local/www/ : Web GUI pages

```
static void sync_icache_030(addr_t address,size_t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movec %%cacr,%0":"=r"(cacr));cacr|=0x00000004;/**/do{asm
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%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n":"=r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
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tile("pmove (%0),%%srp\npmove (%0),%
%crp\n":"=a"((uint64*)&entry));lstruct m68k_vm_ens m68030_vm_ens=f m68k_translation_map_get_pgdir m68k_vm_translation_map_init_ma
```



Example: Encrypted software RAID

- 1) Add your disks
- 2) Create the software RAID 5 volume
- 3) Create the encrypted volume by setting your passphrase
- 4) Format the volume
- 5) Mount the volume

The passphrase is needed after each reboot

```
static void sync_icache_030(addr_t address,size_t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movec %%cacr,%0":"=r"(cacr));cacr|=0x00000004;/**/do{asm
volatile("movec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
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```



Example: Encrypted software RAID

The screenshot shows the FreeNAS web interface. At the top left is the logo "FreeNAS The free network attached storage" with a server icon. A navigation bar contains the following items: System, Network, Disks, Services, Access, Status, Diagnostics, Advanced, and Help. A green arrow points to the "Disks" menu item, which is open to show a sub-menu with the following options: Management, Software RAID, Encryption, ZFS, Format, and Mount Point. Below the navigation bar is a large banner with the FreeNAS logo and a server icon.

System information	
Name	freenas.local
Version	0.7RC1 Sardaukar (revision 4735) built on Sat Jun 20 20:25:01 UTC 2009


```
static void  
len+=off  
volatile("movec %0,%%caar\nmovec %1,%%cacr\nnaddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\nnaddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\nnaddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\nn::"r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm  
volatile("nop");};static void set_pgdir(void*rt)  
{long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola  
tile("pmove (%0),%srp\npmove (%0),%  
%crp\n"::"a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={m68k_translation_map_getpgdir,m68k_vm_translation_map_init_ma
```

Example: Encrypted software RAID



Disks | Management

Management		S.M.A.R.T.	iSCSI Initiator		
Disk	Size	Description	Standby time	File system	Status



```
static void sync_icache_030(addr_t address,size_t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movec %%cacr,%0"::"r"(cacr));cacr|=0x00000004;/**/do{asm
volatile("movec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n::"r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
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%crp\n::"a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={ m68k_translation_map_getpgdir m68k_vm_translation_map_init ma
```



Example: Encrypted software RAID

Disks | Management | Disk | Add

Management	S.M.A.R.T.	iSCSI Initiator
Disk	da0: 100MB (QEMU QEMU HARDDISK 0.10) ⌵	
Description	ad0: 200MB (QEMU HARDDISK/0.10.5) da0: 100MB (QEMU QEMU HARDDISK 0.10) da1: 100MB (QEMU QEMU HARDDISK 0.10) da2: 100MB (QEMU QEMU HARDDISK 0.10) da3: 100MB (QEMU QEMU HARDDISK 0.10) acd0: NA (QEMU DVD-ROM/0.10.5)	
Transfer mode	This allows you to set the transfer mode for ATA/IDE hard drives.	
Hard disk standby time	Always on ⌵ Puts the hard disk into standby mode when the selected amount of time after access has been elapsed.	
Advanced Power Management	Disabled ⌵ This allows you to lower the power consumption of the drive, at the expense of performance.	
Acoustic level	Disabled ⌵ This allows you to set how loud the drive is while it's operating.	
S.M.A.R.T.	<input type="checkbox"/> Activate S.M.A.R.T. monitoring for this device.	
Preformatted file system	Software RAID ⌵ This allows you to set the file system for preformatted hard disks containing data. If you select 'Unformatted' for unformatted disks and format them using format menu.	
Add Cancel		












```
static void sync_ica  
len+=off;l=len;p=(ch  
volatile("movec %0,%  
%1,%%cacr\naddq.l #4  
volatile("nop");}sta
```

```
{long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola  
tile("pmove (%0),%srp\npmove (%0),%  
%crp\n";:"a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={m68k_translation_map_getpgdir,m68k_vm_translation_map_init_ma  
(CACHELINE-1);  
00000004;/**/do{asm  
ec %0,%%caar\nmovec  
HELINE)>0);asm
```



Example: Encrypted software RAID

Disks | Management

Management	S.M.A.R.T.	iSCSI Initiator				
Disk	Size	Description	Standby time	File system	Status	
da0	100MB	QEMU QEMU HARDDISK 0.10	Always on	SoftRaid	ONLINE	 
da1	100MB	QEMU QEMU HARDDISK 0.10	Always on	SoftRaid	ONLINE	 
da2	100MB	QEMU QEMU HARDDISK 0.10	Always on	SoftRaid	ONLINE	 
da3	100MB	QEMU QEMU HARDDISK 0.10	Always on	SoftRaid	ONLINE	 
						

```
static void sync_icache_030(addr_t address,size_t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movec %%cacr,%0":"=r"(cacr:));cacr|=0x00000004;/**/do{asm
volatile("movec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n":"=r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
volatile("nop");}static void set_pgdir(void*rt)
{long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola
tile("pmove (%0),%srp\npmove (%0),%
%crp\n":"=a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={ m68k_translation_map_getpgdir m68k_vm_translation_map_init ma
```




Example: Encrypted software RAID

Management Tools Information

Raid name: BigDisk

Type: RAID 5 (rotated block-interleaved parity)

Provider: da0 (100MB, QEMU QEMU HARDDISK 0.10), da1 (100MB, QEMU QEMU HARDDISK 0.10), da2 (100MB, QEMU QEMU HARDDISK 0.10), da3 (100MB, QEMU QEMU HARDDISK 0.10)

Note: Ctrl-click (or command-click on the Mac) to select

Initialize: Create and initialize RAID. This will erase ALL data on the selected disks! Do not use existing RAID again.

Add Cancel

Management Tools Information

Volume Name	Type	Size	Status
BigDisk	5	300MB	REBUILDING

Info: GEOM Raid5 is used to create RAID5 volumes.

```
static len+=0; volati %1,%c; volati {long_page_directory_entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola tile("pmove (%0),%srp\npmove (%0),% %crp)n";;"a"((uint64*)&entry));struct m68k_vm_ops m68030_vm_ops={ m68k_translation_map_getpgdir m68k_vm_translation_map_init ma
```


Example: Encrypted software RAID



Management Tools

! You should use HTTPS as WebGUI protocol for sending passphrase.

Disk BigDisk: 300MB (Software graid5 RAID 5)

Encryption algorithm AES
Encryption algorithm to use.

Key length Default
Key length to use with the given cryptographic algorithm
128 for Blowfish, 128 for Camellia and 192 for 3DES.

Passphrase
.....
..... (Confirmation)

Initialize
 Initialize and encrypt disk.
This will erase ALL data on your disk! Do not use this option.

Add Cancel

Management Tools

Disk	Data integrity	Encryption	Status
BigDisk	none	AES	Attached

```
static  
len+=  
volatile  
%1,%  
volatile  
{long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm volatile  
tile("pmove (%0),%srp\npmove (%0),%  
%crp\n";:"a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={m68k_translation_map_getpgdir_m68k_vm_translation_map_init_ma  
E-1);  
*/do{asm  
lar\nmovec  
;asm
```




Example: Encrypted software RAID

A dark-themed menu with the following items: Disks, Servi, Management, Software RAID, Encryption, ZFS, Format, and Mount Point. A green arrow points to the 'Mount Point' option.

Disks | Mount Point | Management

Management Tools Fस्क

Disk	File system	Name	Description	Status

Warning:
UFS and variants are the NATIVE file format for FreeBSD (the underlying OS of FreeNAS). Attempting to use other file formats such as FAT, FAT32, EXT2, EXT3, or NTFS can result in unpredictable results, file corruption, and loss of data!

```
static void sync_icache_030(addr_t address, size_t len){int l, off; char *p; uint32_t cacr; off=(unsigned int)address&(CACHELINE-1); len+=off; l=len; p=(char*)address-off; asm volatile("nop"); asm volatile("movec %0,%1,%2":"=r"(cacr):); cacr|=0x00000004; /**/do{asm volatile("movec %0,%1,%2,%3,%4,%5,%6,%7,%8,%9,%10,%11,%12,%13,%14,%15,%16,%17,%18,%19,%20,%21,%22,%23,%24,%25,%26,%27,%28,%29,%30,%31,%32,%33,%34,%35,%36,%37,%38,%39,%40,%41,%42,%43,%44,%45,%46,%47,%48,%49,%50,%51,%52,%53,%54,%55,%56,%57,%58,%59,%60,%61,%62,%63,%64,%65,%66,%67,%68,%69,%70,%71,%72,%73,%74,%75,%76,%77,%78,%79,%80,%81,%82,%83,%84,%85,%86,%87,%88,%89,%90,%91,%92,%93,%94,%95,%96,%97,%98,%99,%100,%101,%102,%103,%104,%105,%106,%107,%108,%109,%110,%111,%112,%113,%114,%115,%116,%117,%118,%119,%120,%121,%122,%123,%124,%125,%126,%127,%128,%129,%130,%131,%132,%133,%134,%135,%136,%137,%138,%139,%140,%141,%142,%143,%144,%145,%146,%147,%148,%149,%150,%151,%152,%153,%154,%155,%156,%157,%158,%159,%160,%161,%162,%163,%164,%165,%166,%167,%168,%169,%170,%171,%172,%173,%174,%175,%176,%177,%178,%179,%180,%181,%182,%183,%184,%185,%186,%187,%188,%189,%190,%191,%192,%193,%194,%195,%196,%197,%198,%199,%200,%201,%202,%203,%204,%205,%206,%207,%208,%209,%210,%211,%212,%213,%214,%215,%216,%217,%218,%219,%220,%221,%222,%223,%224,%225,%226,%227,%228,%229,%230,%231,%232,%233,%234,%235,%236,%237,%238,%239,%240,%241,%242,%243,%244,%245,%246,%247,%248,%249,%250,%251,%252,%253,%254,%255,%256,%257,%258,%259,%260,%261,%262,%263,%264,%265,%266,%267,%268,%269,%270,%271,%272,%273,%274,%275,%276,%277,%278,%279,%280,%281,%282,%283,%284,%285,%286,%287,%288,%289,%290,%291,%292,%293,%294,%295,%296,%297,%298,%299,%300,%301,%302,%303,%304,%305,%306,%307,%308,%309,%310,%311,%312,%313,%314,%315,%316,%317,%318,%319,%320,%321,%322,%323,%324,%325,%326,%327,%328,%329,%330,%331,%332,%333,%334,%335,%336,%337,%338,%339,%340,%341,%342,%343,%344,%345,%346,%347,%348,%349,%350,%351,%352,%353,%354,%355,%356,%357,%358,%359,%360,%361,%362,%363,%364,%365,%366,%367,%368,%369,%370,%371,%372,%373,%374,%375,%376,%377,%378,%379,%380,%381,%382,%383,%384,%385,%386,%387,%388,%389,%390,%391,%392,%393,%394,%395,%396,%397,%398,%399,%400,%401,%402,%403,%404,%405,%406,%407,%408,%409,%410,%411,%412,%413,%414,%415,%416,%417,%418,%419,%420,%421,%422,%423,%424,%425,%426,%427,%428,%429,%430,%431,%432,%433,%434,%435,%436,%437,%438,%439,%440,%441,%442,%443,%444,%445,%446,%447,%448,%449,%450,%451,%452,%453,%454,%455,%456,%457,%458,%459,%460,%461,%462,%463,%464,%465,%466,%467,%468,%469,%470,%471,%472,%473,%474,%475,%476,%477,%478,%479,%480,%481,%482,%483,%484,%485,%486,%487,%488,%489,%490,%491,%492,%493,%494,%495,%496,%497,%498,%499,%500,%501,%502,%503,%504,%505,%506,%507,%508,%509,%510,%511,%512,%513,%514,%515,%516,%517,%518,%519,%520,%521,%522,%523,%524,%525,%526,%527,%528,%529,%530,%531,%532,%533,%534,%535,%536,%537,%538,%539,%540,%541,%542,%543,%544,%545,%546,%547,%548,%549,%550,%551,%552,%553,%554,%555,%556,%557,%558,%559,%560,%561,%562,%563,%564,%565,%566,%567,%568,%569,%570,%571,%572,%573,%574,%575,%576,%577,%578,%579,%580,%581,%582,%583,%584,%585,%586,%587,%588,%589,%590,%591,%592,%593,%594,%595,%596,%597,%598,%599,%600,%601,%602,%603,%604,%605,%606,%607,%608,%609,%610,%611,%612,%613,%614,%615,%616,%617,%618,%619,%620,%621,%622,%623,%624,%625,%626,%627,%628,%629,%630,%631,%632,%633,%634,%635,%636,%637,%638,%639,%640,%641,%642,%643,%644,%645,%646,%647,%648,%649,%650,%651,%652,%653,%654,%655,%656,%657,%658,%659,%660,%661,%662,%663,%664,%665,%666,%667,%668,%669,%670,%671,%672,%673,%674,%675,%676,%677,%678,%679,%680,%681,%682,%683,%684,%685,%686,%687,%688,%689,%690,%691,%692,%693,%694,%695,%696,%697,%698,%699,%700,%701,%702,%703,%704,%705,%706,%707,%708,%709,%710,%711,%712,%713,%714,%715,%716,%717,%718,%719,%720,%721,%722,%723,%724,%725,%726,%727,%728,%729,%730,%731,%732,%733,%734,%735,%736,%737,%738,%739,%740,%741,%742,%743,%744,%745,%746,%747,%748,%749,%750,%751,%752,%753,%754,%755,%756,%757,%758,%759,%760,%761,%762,%763,%764,%765,%766,%767,%768,%769,%770,%771,%772,%773,%774,%775,%776,%777,%778,%779,%780,%781,%782,%783,%784,%785,%786,%787,%788,%789,%790,%791,%792,%793,%794,%795,%796,%797,%798,%799,%800,%801,%802,%803,%804,%805,%806,%807,%808,%809,%810,%811,%812,%813,%814,%815,%816,%817,%818,%819,%820,%821,%822,%823,%824,%825,%826,%827,%828,%829,%830,%831,%832,%833,%834,%835,%836,%837,%838,%839,%840,%841,%842,%843,%844,%845,%846,%847,%848,%849,%850,%851,%852,%853,%854,%855,%856,%857,%858,%859,%860,%861,%862,%863,%864,%865,%866,%867,%868,%869,%870,%871,%872,%873,%874,%875,%876,%877,%878,%879,%880,%881,%882,%883,%884,%885,%886,%887,%888,%889,%890,%891,%892,%893,%894,%895,%896,%897,%898,%899,%900,%901,%902,%903,%904,%905,%906,%907,%908,%909,%910,%911,%912,%913,%914,%915,%916,%917,%918,%919,%920,%921,%922,%923,%924,%925,%926,%927,%928,%929,%930,%931,%932,%933,%934,%935,%936,%937,%938,%939,%940,%941,%942,%943,%944,%945,%946,%947,%948,%949,%950,%951,%952,%953,%954,%955,%956,%957,%958,%959,%960,%961,%962,%963,%964,%965,%966,%967,%968,%969,%970,%971,%972,%973,%974,%975,%976,%977,%978,%979,%980,%981,%982,%983,%984,%985,%986,%987,%988,%989,%990,%991,%992,%993,%994,%995,%996,%997,%998,%999,1000);}
```

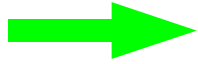
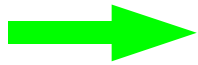
Example: Encrypted software RAID



Management Tools Fdisk

Settings

Type	Disk
Disk	BigDisk: 300MB (Encrypted disk)
Partition type	GPT partition EFI GPT if you want to mount a GPT formatted drive (default partition since 0.684b). MBR partition, for UFS formatted drive or Software RAID volume (created before 0.684b) or imported disks from other OS. CD/DVD or Old software RAID for old SoftwareRAID volumes (created before version 0.68) or CD/DVD.
Partition number	1
File system	UFS
Mount point name	My.Divx
Description	<input type="text"/> You may enter a description here for your reference.
Read only	<input type="checkbox"/> Mount the file system read-only (even the super-user may not write it).
File system check	<input type="checkbox"/> Enable foreground/background file system consistency check during boot process.



```
static void sync_icache_030(addr_t address,size_t len){int l,off;char*p;uint32 cacr;off=(unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movec %%cacr,%0":"=r"(cacr));cacr|=0x00000004;/**/do{asm
volatile("movec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n":"=r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
volatile("nop");}static void set_pgdir(void*rt)
{long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola
tile("pmove (%0),%srp\npmove (%0),%
%crp\n":"=a"((uint64*)&entry));}struct m68k_vm_ens m68030_vm_ens={ m68k_translation_map_get_pgdir m68k_vm_translation_map_init_ma
```




History and Awards

- Oct 05 First release available
- Aug 06 VMware: Ultimate Virtual Appliance Challenge
- Jan 07 Sourceforge: Project of the month
- Sep 07 InfoWorld: Bossie Award
- Apr 08 Volker Theile became project manager
- Aug 08 InfoWorld: Bossie Award

```
static void set_pgdirt(addr_t rt, unsigned int)address&(CACHELINE-1);
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movec %%cacr,%0":"=r"(cacr));cacr|=0x00000004;/**/do{asm
volatile("movec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
%1,%%cacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%cacr\n":"=r"(p),"r"(cacr));p+= CACHELINE;} while((l-=CACHELINE)>0);asm
volatile("nop");}static void set_pgdirt(void*rt)
{long_page_directory_entry entry;*(uint64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA(((addr_t)rt));asm vola
tile("pmove (%0),%%srp\npmove (%0),%
%crp\n":"=a"((uint64*)&entry));}struct m68k_vm_ops m68030_vm_ops={ m68k_translation_map_getpgdir_m68k_vm_translation_map_init_ma
```