Optimizing MacOS X 10.3 for Realtime Performance

How To Make The BigBlackKitty Run

fALk Gaertner 2003

Inhalt

Pre-Introduction

Before anyone asks - no I will not change the font of the document. I choose it on purpose. Mainly because the below things are radical and also need careful attention. If I would have produced another helvetica love document you might miss some of the more important tiny bits and then you screw up your system. If you do not like the font and can totally not live with it then copy paste the text and choose whatever font you like. As for the license. Well I wanted to show some support for the whole free open software and documentation movement. So you show support by promoting it even in small pieces - I decided to do so. If you are one of the capitalistic citizens that always want to make profit and live in a cushioned world then this document is not for you as it inheres dangers to your safety and that of your property.

Introduction

The following abstrakt is in no way scientific. I am an artist rather then a computer technician, although over the years I have adopted Operating System Knowledge on various platforms and was exposed to Linux in its early days (a bit at least). With the advent of MacOSX the AppleCommunity was given a heavy Operating System that in the beginning lacked speed and understanding. Coming from the total control MacOS 9 world those who wanted a lightweight system where put in front of thousands of UNIX utilities and a command line to tune their system. No one had any experience what services were running or what extension would be needed. The top command gave us only a glimpse at the inner clockwork and what we were shown did send those of us with a need to run realtime based application a shudder down the spine. Thousands of little helpers did millions of little things and eat away the little processor cycle that we had in beginning with - with our underpowered Powerbooks.

I decided to take a deeper look and try to stop some of those things totally unnecessary to a live video performance in a tight and sweaty club without a network connection and only one app running. Its those pesky little core services that cause a full range of possible events ranging from a slight hickup(networktimeserver) to a total stop of the system for several seconds(mounting iDisk).

I thank Tim Pritlove from the ChaosComputerClub to give me a deeper understanding on what I am actually doing and give me warnings that I did not obey to ;)

Disclaimer

I urge every one who reads this to handle the information with care and add to missing points or correct those things that need correction. It is a work in progress and I take no guarantee for any loss of information, lost time or broken hardware (so I doubt that the things that I show will harm your hardware but I warned you).

I try to add detail to the things below to walk even the unexperienced through the process, but I guess you have to have at least a tiny little bit of knowledge inside the system to get this working.

My Test Configuration

I tested it only on one machine so far: a Titanium Powerbook 1Ghz (Model 3,5) with 1 gigabyte of ram a 60 gigabyte harddrive and an apple airport card. My VideoRealtimeApplication of choice is Vdmxx4.0 (http://www.vidvox.net) which at times eats the processor for lunch. If you are using other VJ applications I would like to hear from you if you can succesfully run those with the optimized system and if they enhance your realtime experience.

With the below optimization I have now a much more responsive system then before (freeing up to 20% of the processor with a good flow of information that gets not interrupted) and I guess with an earlier model powerbook this increase in speed will be even more dramatic.

This system has been running stable for the last 48 hours straight and so far I can not see any strange behaviour. Be warned so that I have deleted the cron jobs and if you are doing anything else then VJing on this minimal system your harddrive might become more unresponsive and your system might get bloated over time. Running just the videomix application should cause no problem however. Be aware that the resulting system is highly insecure when booted. If you want to make your computer a little more safe place you can add a Firmware password and boot out of the Minimal System after finishing your performance. I have a little more detail in appendix A on this.

The Dirt

Ok now for some preparations. As the system we are about to assemble is not really suitable for anything else then running this one special video mixing application and also lacks lots of administration functionality you will want to partition your harddrive into at least 2 different partitions. One for the normal internetsurfinggadgetfunlovingproducingart side in you (further called maxiOS) and the other for the realtime performance (further called miniOS). I personally have 3 partitions. One for the maxiOS one for miniOS and one for everything else - documents - 3rdparty applications - media files etc. My MaxiOS partition is 7 Gigabyte (I would recommend 10 Gigabyte for those who produce on the powerbook) and the miniOS partition is 4 Gigabyte(about optimal but if you are low on space you might get along with 2 Gigabyte or 3 Gigabyte). You can prepare your harddrive in DiskUtility found on the installer CD of panther (hold down the "C" key while booting and having the first panther install CD or DVD in your drive). Warning: make sure you have backed up all data! Repartitioning your harddrive will erase all data on the drive!

Now simply click on the harddrive go to the partition submenue and select 3 partitions and give them the amount of space you want them to have - for more information on how to do this please see the online help of diskutility.

Once you have your drive set up you install your normal system with all the function you would like to have it include on your maxiOS partition. Once this is done and you are fully focused again return to this manual :)

Installing OSX Minimum

Now again boot from your Panther cd/dvd as described above, this time select the miniOS partition as installation drive. Now in the next step of the installation click on option on the lower left side of the installer-window.

In the corresponding menue uncheck everything except:

❆ Core System (this is greyed out)
❆ BSD Sublayer (the second in the list)

The installation should take no more then 15 minutes.

Set up as usual in the Setup Assistent making only one user (you can quit the registration part of the setup assistent with apple+q as you probably already have registered with apple it then lets you skip this step). Do not setup any internet or networking or AppleID.

Now I know you are tempted to install this übercool system heat monitor or the such but install nothing else as much as you like small gadgets => if you are not 100% sure that you need it for your performance do not install! Small things hit your HD from time to time or Ram or Cpu and then they start to battle out resources with your VJ app causing slight hikups. Perhaps if you need anything installed (mididrivers or the such) => now is the time. I have not tested installers on this system but there is a certainty that the apple standard installer will fail once you have completed all the steps below.

Pathway To Root

Next step is to get access to all your files and all drives and remove some of them. You need root access for this. If you have a root user already forget about the next step. If you have never heard of something called root then be warned. Root is the god of your mac. Root has more priviliges then anything else even your normal administrator account that you are so proud of. Root is chi. Root can do harm to your system it can infinitly break it leaving you with only the option to reinstall when you freak something up (like throwing away your system folder while it runs). Anyway enough warning you oughta love Mr. Root after a while.

Boot back into your maxiOS (SystemPreferences/StartupDisk). Once there and logged in go to your Applications/Utilities folder and open the application called NetInfo Manager. Go to the top screen menuebar and under Security select "Enable Root User". If this is not there and only a "Disable Root User" option is available then you have your root user already set up. The NetInfo Manager now asked you to specify a secure password (make it the most secure passwort you can think off, someone guessing this passwort gains control over your complete system including any and all files!). Now close NetInfo Manager... You have successfully enabled the god of Unix -> ROOT. Now log out and in the loginwindow click on the "Others" button if you have enabled user list - otherwise you are already in the name/passwort entry field. Now as name type "root" and as password the password you have just given root. it then should take you to a completely virgin desktop. Congratulations you are now the true master of you system.

Removing StartupItems

First you want to use the go-to folder function of the finder. Either by going into the menue Go -> Go to Folder or by hitting apple+shift+g.

Please make sure that you are always removing stuff from your miniOSpartition and not from your currently running maxiOS partition. You find the folder by typing/copying the following into the go-to sheet that folds out (apple+shift+g):

/Volumes/miniOSpartition/System/Library/StartupItems

where the miniOSpartitionname is the exact name that you have given the partition where the optimized OS resides on. This is important. When you accidently remove stuff from your running system things may not function as normal.

This is a trip into StartupItems. Basically what you have in this folder are scripts that call other scripts or start processes or have information in them on what processes needed to be run at the time the script is accessed. Most of the stuff in here is related to networking like the bulky NetworkFileSystem (NFS) that you can happily live without. Basically you want to remove all of the folders content except the ones below. If you remove even one of those your system will not boot. By removing I mean moving them out of the current location to a save folder somewhere on your harddrive. I have made a system extension off folder in on my document partition for the unused stuff to go into. If you throw them to trash and later decide that you want to have a little bit more functions in your system there will be no way of return. Move is the name of the game that you wanna play with this step and all below.

Here is a list of the things that you can "safely" remove out of your StartupItemsFolder:

- Accounting
- AMD
- Apache
- AppleShare
- AuthServer
- BIND
- ConfigServer
- CrashReporter
- Cron
- DirectoryServices
- IPServices
- LDAP
- mDNSResponder
- NetInfo
- NetworkExtensions
- NetworkTime
- NFS
- NIS
- Portmap
- Postfix
- Printing Services
- RemoteDesktopAgent
- SNMP
- SystemLog

Below are the subfolders that absolutely **must stay** in StartupItems-Folder, removing them will cause your system to not complete the booting process as the scripts depend on each other to complete the boot process and Login2Window will wait until those processes have been started:

- AppServices
- CoreGraphics
- Disks
- KernelEventAgent
- LoginWindow
- SecurityServer
- SystemTuning

Removing CoreSystem Components

This one I did on my behalf despite long warning from the knowledgeable side. It will certainly make your computer more unsecure (but since we will completely disable network access this should be of not to much concern). Please put them in a different folder then the Startup Items so that you know what goes where later if you decide to put some stuff back in. The items on the list below need to be removed:

Go to (apple+shift+g)
/Volumes/miniOSpartition/System/Library/CoreServices

I try to comment on what the services do in case you need some specific functionality that you want not to be removed.

❰ ARD Agent
Apple Remote Desktop Agent for controling your computer from an remote location. Since Networking does not work we can safely remove this.

❰ Bluetoothlauncher
❰ BluetoothUIServer
Services for your Bluetooth device. I do not even have a bluetooth option for the powerbook so this is also not needed

❰ CrashSubmitter
This service tracks bugs when a program crashes. It also polls the system from time to time. I figure you could live without this function

☾ Kerberos

Kerberos is a network authentication protocol. It is designed to provide strong authentication for client/server applications by using secret-key cryptography. A free implementation of this protocol is available from the Massachusetts Institute of Technology.

☾ MenuExtras

This folder contains the little gadget that I call menulingse that appear on the upper right corner of your screen and display such importing things as time airport connectivity and battery. Me beeing radical and all have decided to pull out the whole folder but you can remove some stuff individually or leave the whole folder in its place and instead go and disable the menulingse in the corresponding system preference. There should be no difference between the two methods.

☾ MirrorAgent

This one is huge and I had it happen during a performance. I was very happy that I found this service and send it to hell. It is basically the Manager for your iDisk that we all have and regulary use during performance -not. clicking on it accidently causes the finder to hang for a couple of minute and consume tons amount of cpu time by trying to connect to the network.

☾ Network Setup Assistent

Ok I decided to kill all network services so who cares about the setup assistent.

☾ OBEXAgent

Object Exchange Protocall for wireless(only?) services. IrDA during performance anyone?

❦ SetupAssistent

Need to setup something that you need help with? Then this tutorial is not for you anyway :)

❦ webdavfs.bundle

WebDAV stands for "Web-based Distributed Authoring and Versioning". It is a set of extensions to the HTTP protocol which allows users to collaboratively edit and manage files on remote web servers.

Just In Case - Hostconfig

The hostconfig file is a text file that tells the system at startup what kind of services to launch. Even after removing all of the above I still had CUPS (Common Unix Printing System, open source software for running your unsupported printers on OSX) running. As this also provides html services all the time I figured time to kill that as well. You open the hostconfig file in TextEdit (in your applications folder). Again be sure that you edit only the hostcinfig file of your miniOS.

Go to:

/Volumes/miniOSpartition/etc/

find the file named hostconfig (the one without the tilde on the end!) then drag drop this file onto TextEdit.

the hostconfig file looks something like this:

```
##
# /etc/hostconfig
##
# This file is maintained by the system control panels
##
# Network configuration
 HOSTNAME=-AUTOMATIC-
 ROUTER=-AUTOMATIC-
# Services
 AFPSERVER=-YES-
 AUTHSERVER=-NO-
 AUTOMOUNT=-YES-
 CUPS=-YES-
 IPFORWARDING=-NO-
 IPV6=-YES-
 MAILSERVER=-AUTOMATIC-
 NETINFOSERVER=-AUTOMATIC-
 NFSLOCKS=-AUTOMATIC-
 NISDOMAIN=-NO-
 RPCSERVER=-AUTOMATIC-
 TIMESYNC=-YES-
 QTSSERVER=-NO-
 WEBSERVER=-YES-
 SMBSERVER=-NO-
 DNSSERVER=-NO-
 COREDUMPS=-NO-
 VPNSERVER=-NO-
 ARDAGENT=-YES-
```

please change every -YES- or -AUTOMATIC- to a -NO-
save the file (apple+s)

The Hard Part Ends

Ok that was the hard part....
Now go and see if the system still boots. Change System Preferences StartupDisk to your miniOS and hit restart.

<center>:) or :(</center>

if :) then continue onto the last parts below.

if :(then bad luck. either you have deleted something important or your hardware is so much different that it needs something that got removed. Force Reboot (on powerbook press apple+control+power on desktop system press and hold powerbutton until the computer turns off) hold down the ALT key while rebooting. Teh firmware should present you with a choice of Operating System you can boot from. Choose your maxiOS and press enter. You then log in as root as described above.

For things you can do to remove your problem:
Do not bother about the hostconfig file the computer runs 100% with all those services -NO-. The problem lies probably in a missing startup items. You only option is to put all the startupitems back into the original folder and throw out one at a time. The ones described in the section "Removing StartupItems" above are absolutely mandatory!

I hope that all went well throughout the process and that your computer did a hellish fast restart.

System Preferences Tweak

Well now some little easy obvious tweaks that need to get some mentioning:

Assuming your are logged into your booted miniOS go to your system preferences.
go into each preference panel of the list and check your settings:

☾ Apperance
Turn off Text smoothing for font sizes 12 and smaller

☾ Desktop and screen saver
desktop: change it to some solid color no pictures and turn OFF change pictures every XX minutes
ScreenSaver: ComputerName: StartScreenSaver never

☾ Dock
Minimize Using Scale Effect
Turn off animate opening application (sometimes I accidently click on a little program I have in the dock then I am frustrated enough with the loading process and do not want the dock to consume even more valuable processor times.)

☾ Energy Saver
Highest Performance for both poweradapter and battery (in case someone unplugs your cable while performing you want to make sure that your computer is not falling to a lower CPU speed (667 Mhz for the 1Ghz powerbook) until you find it out that your cable is unplugged)

Make sure that put harddrive to sleep when possible is turned off! Very important as sometimes when there is no disk access the harddrive falls to sleep and then at one point the OS might need something causing the HardDrive to spin up again and the whole system comes to a halt for up to two seconds.

Of course no FastUserSwitching

Be sure that everything is turned off in Sharing

Outro

Thats it. from this point on I leave you on your own. Please explore and share your knowledge by adding to this document or send me an email with your additional insightfull information. Valuable to the community would also be configuration data of your particular machine if it is not in the list for supported configuration yet. Again this is work in progress and messing with your system should not be taken lightly. If you have any thoughts to share - positive or negative please feel free to do so at:

mailto:falk@prototypen.com

Appendix A -
The Security Problem

When I booted into the miniOS the first time I noticed that some of the safeguards of OSX were gone. I could read files of users on the maxiOS side that should be locked off. I guess I removed something that checks the filepermissions inside the OS. Me being conspiracy theorist and a little paranoid did not like this aspect very much, but I guess its the price to pay. So my advice to the freaks out there who do not want a computer with the ability to boot into a completely insecure system right out the box. Install a firmware lock. This lets you specify a password for the firmware and lets no other user boot into a different operating system.

You can get the firmware password utility from apple here:

http://docs.info.apple.com/article.html?artnum=120095

Once you are done with your performance boot into your maxiOS immediately (through your system preference startup disk).

Appendix B -
Your Friend The RamDisk

In the old OS 9 days there was something called a Ram Disk that made everyone who had a slow lappy harddrive very happy. You could turn it on and copy you highspeed files onto it and then they where magically streaming from Ram at up to 100 times as fast. There was a little helper application that was called Rambanctious that made it possible to have more then one Ram Disk and that you could save your RamDisks with their content. For a long time there was no solution for us to make use of the Ram Disk under MacOSX and only very very late the Rambanctious application was ported - but it was extremly slow in making the Disk and allowed for only one RamDisk at a time. With the introduction of panther this app also ceased to work and has not been updated yet.

Well fear not for the brave I have a solution. Not very pretty but it works fast and reliable. This is a little bit for the advanced of you. You should be able to do all this when under the miniOS - it works over here.

Lets start by opening the TextEdit application. Make a new document and convert it to plain text (apple+shift+t). Then you decide how big your Ram Disk should be. I make an example with 512 Megabyte. You take that number and multiply it by 2048.

512 * 2048 = 1048576

You then write the exact text below but make the Numsector the number you calculated

```
#!/bin/sh

NUMSECTORS=1048576

. /etc/rc.common

ramdisk_device=`hdid -nomount ram://$NUMSECTORS`
newfs_hfs -v RAMDisk $ramdisk_device
hdiutil mount $ramdisk_device
```

save this text in a for you convinient place. Now open the Terminal Application and dragdrop the textfile you have just created onto the window. Then hit enter. If all went well you should have a fresh 512Mb ramdisk at your disposal.

If you have permission problems type:

```
sudo chmod 7777 /path/of/file/as/shown/when/dragdropped
```

you are then asked for your administrator password and after that the script should start with the above method.

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Version 1.2, November 2002

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