AMD Geode LX as i686 CPU howto and benchmark

The geode is a i586 CPU (family 5) but it has almost everything that a i686 CPU (family 6) has. The only CPU instruction that is missing is the NOPL or NOP Long (means no operation).
Now there is a patch available that simulate the missing instruction in the kernel so that the user space don't know that the instruction is missing. The program can use the instruction as if there is nothing missing instead of crashing.
The advantage is, the programs that are compiled for i686 can run on the Geode CPU with this modified Kernel. In Debian there is also a special optimized C Lib version for i686 CPU's (with uses cmov instructions). This optimized version of the library works with the modified Kernel too.
For more info's go to http://notes.osuv.de/doku.php?id=geode.
I's quite a funny idea but the real question for me is:
What is the performance increase of running Geode LX CPU as a i686 CPU.

I applied the patch to the actual Kernel 2.6.36.2 and compared the performance to a geode optimized 2.6.36.2 and 2.6.26 Kernel (old Debian Lenny Kernel) and the default Debian Squeeze Kernel 2.6.32 with i486 optimization.

Make kernel with patch in Debian Squeeze:

```
apt-get install kernel-package libncurses5-dev build-essential zlib1g-de
cd /usr/src
wget http://www.kernel.org/pub/linux/kernel/v2.6/linux-2.6.36.2.tar.bz2
tar xjvf linux-2.6.36.2.tar.bz2
ln -s linux-2.6.36.2 linux
mkdir patch
wget http://notes.osuv.de/lib/exe/fetch.php?media=geode_i686.patch -O
patch/geode_i686.patch
wget http://notes.osuv.de/lib/exe/fetch.php?media=geode_nopl.patch -O
patch/geode_nopl.patch
sed -i 's/linux-2.6.36/linux/g' patch/geode_i686.patch
sed -i 's/linux-2.6.36/linux/g' patch/geode_nopl.patch
patch -p0 < patch/geode_i686.patch
patch -p0 < patch/geode_nopl.patch
cd linux
cp /boot/config-2.6.32-5-686 .config
make menuconfig
         Processor type and features --->
            Processor family (Geode GX/LX)  --->
         [*] Geode NOPL emulation
time make-kpkg --initrd --revision=1 --append-to-version=.geode686 kernel_image
kernel_headers
```

Result:

Geode LX 800 (500 MHz)

Kernel		**2.6.26.8**	**2.6.32**	**2.6.36.2**	**2.6.36.2**
CPU Optimization		**geode**	**486**	**geode**	**686**
mpg123	s	3,49	3,53	3,51	3,51
nbench MEM		1,915	1,914	1,918	1,917
nbench INT		1,873	1,885	1,889	1,891
nbench FLOAT		1,593	1,592	1,595	1,594
rar comp.	s	132,88	133,62	132,89	132,99
rar decomp.	s	14,03	14,16	14,02	14,01
7z MIPS comp.		205	205	206	205
7z MIPS decomp.		195	195	195	195

Conclusion:
As you can see in the table there is no performance increase by operating the AMD Geode LX CPU as i686 CPU. The optimized C Lib has no effect on the performance.
All in all I stick to the standard Debian Squeeze Kernel for i486 witch is supported by Debian.

Kernel Performance bench:
http://www.phoronix.com/scan.php?page=article&item=linux_2612_2637&num=1

Evil 19.12.2010