

Nantes 2009 :
Rendez-vous Libres!



10^{es} Rencontres Mondiales du Logiciel Libre



How students can contribute to free software



OpenOffice.org success story

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Centrale Nantes: key figures

- Member of the Group of Ecoles Centrales
- Combines three activities:
 - Education – 1350 students
 - Graduate general engineering program (3 years, highly-selective admission procedure)
 - Other specialized master program including two Erasmus Mundus Master programs
 - Research: 4 laboratories

– Industrial Studies

```
static void sync_cache_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; volatile("movec %%cacr, %0": "r"(cacr)); cacr|=0x00000004; /**/ do {asm volatile("movec %0, %%caar\nmovec %%caar\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_t) &entry=DFL_PAGEENT_VAL; entry.type=DT_ROOT; entry.addr=TA_TO_PREA(((addr_t) rt)); asm volatile("pmove (%0), %%srp\npmove (%0), %0\n": "r"(((uint64_t) &entry) &entry);}
```



Why free software in education?

Free software is not only a technical alternative to proprietary solutions, it promotes values such that:

Freedom

Cooperation

Security

Durability

```
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("mvec %0, %1": "r"(cacr)); cacr|=0x00000004; /**/ do{ asm volatile("mvec %0, %1, %2, %3": "r"(cacr), "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_t*)&entry=DFL_PAGEENT_VAL; entry.type=DT_ROOT; entry.addr=TA_TO_PEA(((addr_t) rt)); asm volatile("pmove (%0), %1": "r"(entry.addr), "r"(rt));}
```



Centrale Nantes and free software

- Research development:
 - OrbisGIS: <http://tinyurl.com/orbisgis>
 - Roméo: <http://romeo.rts-software.org>
 - Trampoline: <http://trampoline.rts-software.org/>
- Educational use:
 - Linux : <https://pedagogie.ec-nantes.fr/spip/>
 - OpenOffice.org

– **Firefox, Gimp,**

```
static void sync_cache_1(int l, off; char*p; ui nt 32 eacr; off=( unsigned i nt) address& CACHELINE-1);
len+=off;l=len;p=( char*) address+off; volatile(" nmovec %%eacr,%0":="r"( eacr)); eacr|=0x00000004;/**/ do{ asm
volatile(" nmovec %0,%%caar\nmovec %1,%%eacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%eacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec
%1,%%eacr\naddq.l #4,%0\nmovec %0,%%caar\nmovec %1,%%eacr\n":="r"( p),"r"( eacr)); p+= CACHELINE;} while((l-=CACHELINE)>0); asm
volatile("nop");}static void set_pgdir(void*rt)
{long_page_directory_entry entry;*( ui nt64*)&entry=DFL_PAGEENT_VAL;entry.type=DT_ROOT;entry.addr=TA_TO_PREA((( addr_t) rt)); asm vola
tile("pmove (%0),%srp\npmove (%0),%
%\n"%"%"(( i nt64*)&entry));}
```

Centrale Nantes, free software and Tablet PC



- Recipient of the HP Technology for Teaching Grant 2008
 - 21 Tablet PCs
 - Innovative projects about education and tactile technologies
- A students' project to evaluate the usability of Tablet PC features under Linux... that led to OpenOffice.org

```
static void sync_icache_030(addr_t address, size_t len) { int i, off; char* p; uint32_t eacr; off=(unsigned int) address & CACHELINE-1;
len+=off; i=len; p=(char*) address-off; asm volatile("nop"); asm volatile("movcc %0,%1": "=r"(eacr)); eacr|=0x00000004; /* */ do{ asm
volatile("movcc %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,%999,0); while((1-CACHELINE)>0); asm
volatile("nop"); } static void set_pgdir(void*rt)
{ long_page_directory_entry entry; *(uint64*)&entry=DFL_PAGEENT_VAL; entry.type=DI_ROOT; entry.addr=TA_TO_PREA(((addr_t)rt)); asm vola
tile("pmove (%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,%999,0); } 
```




The Role of the « Incubators » projects is to ...

- Experiment
- Validate a new need
- Innovate and make the OpenOffice.org Project progress

```
static void sync_icache_030(addr_t address, size_t len) {int l, off; char* p; uint32_eacr; off=(unsigned int) address& CACHELINE-1);
len+=off; l=len; p=(char*) address-off; asm volatile("nop"); asm volatile("mvec %0, %0": "r"(eacr)); eacr|=0x00000004; /**/ do{ asm
volatile("mvec %0, %%caar\mmvec %1, %%caar\naddq.l #4, %0\mmvec %0, %%caar\mmvec %1, %%caar\naddq.l #4, %0\mmvec %0, %%caar\mmvec
%1, %%caar\naddq.l #4, %0\mmvec %0, %%caar\mmvec %1, %%caar\n": "r"(p), "r"(eacr)); 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), %
% \\";"}"
```



The goals of the OpenOffice.org Education Project ?

This is a **young project**,
Belonging to OpenOffice.org
with the main goal to
create a bridge
between **Educational World**
and **OpenOffice.org**

```
static void sync_icache_030(addr_t address, size_t len) {int i, off; char *p; uint32_t eacr; off=(unsigned int) address& CACHELINE-1; len+=off; i=len; p=(char*) address-off; asm volatile("nop"); asm volatile("mvec %0, %1": "r"(eacr)); eacr|=0x00000004; /**/ do { asm volatile("mvec %0, %1, %2, %3, %4, %5, %6, %7": "r"(p), "r"(eacr)); p+= CACHELINE; } while((i-=CACHELINE)>0); asm volatile("nop"); } static void set_pgdir(void *rt) {long_page_directory_entry entry; *(uint64_t *)&entry=DFL_PAGEENT_VAL; entry.type=DT_ROOT; entry.addr=TA_TO_PREA(((addr_t)rt)); asm volatile("pmove (%0), %1, %2, %3, %4, %5, %6, %7": "r"(rt), "r"(entry.type), "r"(entry.addr), "r"(entry.type), "r"(entry.addr), "r"(entry.type), "r"(entry.addr)); }
```



' Who ' is the Education Project ?

Approximatively 100 members,
Students, developers (mostly)
From all countries
All participate to OpenOffice.org

static
len+=
asm
volatile(__asm__ __volatile__("movl %%eax, %%eax\n\t" : : : "cc=cc"); while((1 - 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 volatile("pmove (%0), %%srp\n\t", %



The 3 main objectives of Education Project :

- Create a network of teachers using OpenOffice.org
- Provide a space for exchanging pedagogical contents, under free file formats
- Teach, provide young (core-)developers to write code for OpenOffice.org

```
static void sync_icache_030(addr_t address, size_t len) {int i, off; char*p; uint32_eacr; off=( unsigned int) address& CACHELINE-1);
len+=off; i=len; p=( char*) address-off; asm volatile("nop"); asm volatile("mvec %%eacr, %0": "=r"(eacr)); eacr|=0x00000004; /* */ do { asm
volatile("mvec %0, %%caar\nmvec %1, %%eacr\naddq. l #4, %0\nmvec %0, %%caar\nmvec %1, %%eacr\naddq. l #4, %0\nmvec %0, %%caar\nmvec
%1, %%eacr\naddq. l #4, %0\nmvec %0, %%caar\nmvec %1, %%eacr\n": "=r"(p), "=r"(eacr)); p+= CACHELINE; } while((1-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 vol a
tile("pmove (%0), %%srp\npmove (%0), %
% \ " " " (( i: 64*) &entry) )
691 6920 6930 6940 6950 6960 6970 6980 6990 7000
```



3rd Objective : provide new developers

Idea :

Associate : theory (the teachers)

The know how (professional developers)

The actors (students, profs, and so on)

Mentors (OpenOffice.org Project developers)

The needs (features for OpenOffice.org)

... and finally provide developers



Already started actions

- Online Courses « ClassRooms »
- Projects with engineers schools students, and shools contributions

```
static void sync_icache_030(addr_t address, size_t len) {int l, off; char*p; uint32_eacr; off=(unsigned int) address& CACHELINE-1; len+=off; l=len; p=(char*) address-off; asm volatile("nop"); asm volatile("movcc %0,%1": "r"(eacr)); eacr|=0x00000004; /*/ do{ asm volatile("movcc %0,%1,%2,%3,%4,%5,%6,%7": "r"(p), "r"(eacr)); 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_PEA(((addr_t)rt)); asm volatile("pmove (%0),%1,%2,%3,%4,%5,%6,%7": "r"(rt), "r"(entry.type), "r"(entry.addr), "r"(entry.type), "r"(entry.addr), "r"(entry.type), "r"(entry.addr));
```



Education Project Effort

- Mentored projects with active participation of the schools

http://wiki.services.openoffice.org/wiki/Education_Project/Effc

```
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movc %cacr,%0":="r"(cacr));cacr|=0x00000004;/**/do{asm volatile("movc %0,%cacr\nmovc %1,%cacr\naddq.l #4,%0\nmovc %0,%cacr\nmovc %1,%cacr\naddq.l #4,%0\nmovc %0,%cacr\nmovc %1,%cacr\naddq.l #4,%0\nmovc %0,%cacr\nmovc %1,%cacr\nn":="r"(p),"r"(cacr));p+=CACHELINE;}while((1-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 volatile("pmove (%0),%srp\npmove (%0),%0\n":="r"(entry),"r"(rt));}
```




Schools who joined the project

Epitech/Epita (Paris, France)

École Centrale Nantes (Nantes, France)

UTBM (Sévenans, France)

Seneca College (Toronto Canada)

...

```
static void sync_icache_030(addr_t address, size_t len) {int i, off; char*p; uint32_eacr; off=(unsigned int) address& CACHELINE-1; len+=off; i=len; p=(char*) address-off; asm volatile("nop"); asm volatile("mvec %%eacr, %0": "r"(eacr)); eacr|=0x00000004; /**/ do{ asm volatile("mvec %0, %%caar\nmvec %1, %%eacr\naddq.l #4, %0\nmvec %0, %%caar\nmvec %1, %%eacr\naddq.l #4, %0\nmvec %0, %%caar\nmvec %1, %%eacr\naddq.l #4, %0\nmvec %0, %%caar\nmvec %1, %%eacr\n": "r"(p), "r"(eacr)); p+= CACHELINE; } while((i-=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 volatile("pmove (%0), %%srp\npmove (%0), %%srp\n": "r"(entry.addr), "r"(entry.type), "r"(entry.addr): "r"(entry.addr), "r"(entry.type), "r"(entry.addr));}
```



Examples

Mozilla 1.7.5 → Seamonkey 1.1.14 migration
(Pierre Pasteau / Epitech Paris) QA in progress, will be integrated

Developers who contributed : Frank Schönheit (Sun Microsystems), Eric Bachard (unaffiliated)

```
len+=off; l=len; p=(char*) address-off; asm volatile("nop"); asm volatile("movcc %%eax, %0": "r"(eax)); eax|=0x00000004; /**/ do{ asm volatile("movcc %0, %%eax\nmovcc %1, %%eax\naddq.l #4, %0\nmovcc %0, %%eax\nmovcc %1, %%eax\naddq.l #4, %0\nmovcc %0, %%eax\nmovcc %1, %%eax\naddq.l #4, %0\nmovcc %0, %%eax\nmovcc %1, %%eax\nn": "r"(p), "r"(eax)); p+= CACHELINE; } while((1-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 volatile("pmove (%0), %%srp\npmove (%0), %0\n": "r"(entry.addr), "r"(entry.type));}
```



Examples

Aude Quintana, Olivier Girardot (École Centrale Nantes): implementation of the eraser features, with Tablet PC and Impress. Code review in progress.

Developers who contributed : Thorsten Behrens (Novell)

Managed by Morgan Magnin, for Ecole Centrale Nantes

```
len+=off;l=len;p=(char*)address-off;asm volatile("nop");asm volatile("movcc %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);
```




Other example :

Seneca College, Toronto

Professor : Fardad Soleimanloo

(4 projects started, expected for Summer 09)

All other proposed subjects :

http://wiki.services.openoffice.org/wiki/Education_Project/Effc

```
static void sync_icache_030(addr_t address, size_t len) {int i, off; char* p; uint32_t eacr; off=(unsigned int) address& CACHELINE-1;
len+=off; i=len; p=(char*) address-off; asm volatile("nop"); asm volatile("mvec %0, %1": "r"(eacr)); eacr|=0x00000004; /**/ do{ asm
volatile("mvec %0, %1, %2, %3, %4, %5, %6, %7": "r"(p), "r"(eacr)); p+= CACHELINE; } while((i-=CACHELINE)>0); asm
volatile("nop");} static void set_pgdir(void*rt)
{long_page_directory_entry entry; *(uint64_t*)&entry=DFL_PAGEENT_VAL; entry.type=DT_ROOT; entry.addr=TA_TO_PEA(((addr_t)rt)); asm vola
tile("pmove (%0), %1, %2, %3, %4, %5, %6, %7": "r"(p), "r"(eacr)); p+= CACHELINE; } while((i-=CACHELINE)>0); asm
volatile("nop");}
```




•••

```
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("mvec %%cacr, %0": "r"(cacr)); cacr|=0x00000004; /**/ do{ asm volatile("mvec %0, %%caar\nmvec %l, %%cacr\naddq.l #4, %0\nmvec %0, %%caar\nmvec %l, %%cacr\naddq.l #4, %0\nmvec %0, %%caar\nmvec %l, %%cacr\naddq.l #4, %0\nmvec %0, %%caar\nmvec %l, %%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 volatile("pmove (%0), %%srp\npmove (%0), %0\n": "r"(entry.addr), "r"(entry.type), "r"(entry.addr): "r"(entry.type));}
```



Guidelines for further projects: benefits of communication

- All documentation must be in english
- Frequent communication
 - Inside the education community
 - Inside the free software community

- Use a maximum of media:
 - News on official websites
 - Blog, Twitter, ...



– Video



Guidelines for further projects

- Development team opened to students' contribution
- Supervising teacher to guarantee the project respects the educational expectations
- Team of students from 2 to... ?

```
static void sync_icache_030(addr_t address, size_t len) {int i, off; char *p; uint32_t eacr; off=(unsigned int) address& CACHELINE-1; len+=off; i=len; p=(char*) address-off; asm volatile("nop"); asm volatile("movec %%eacr, %0" : "=r"(eacr)); eacr|=0x00000004; /**/ do { asm volatile("movec %0, %%caar\nmovec %1, %%eacr\naddq.l #4, %0\nmovec %0, %%caar\nmovec %1, %%eacr\naddq.l #4, %0\nmovec %0, %%caar\nmovec %1, %%eacr\naddq.l #4, %0\nmovec %0, %%caar\nmovec %1, %%eacr\nn" : "=r"(p), "=r"(eacr)); p+= CACHELINE; } while((i-=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_PEA(((addr_t) rt)); asm volatile("pmove (%0), %%srp\npmove (%0), %
```



Guidelines for further projects

- Find students
 - Interested in a first professional development experience
 - Having a good knowledge in technical matters
 - Potentially willing to contribute beyond the given project

```

static void sync_icache_030(addr_t address, size_t len) {int l, off; char*p; uint32_eacr; off=(unsigned int) address& CACHELINE-1);
len+=off; l=len; p=(char*) address-off; asm volatile("nop"); asm volatile("movcc %0, %1:="r"(eacr)); eacr|=0x00000004; /**/ do{ asm
volatile("movcc %0, %%caar\mmovec %1, %%caar\maddq.l #4, %0\mmovec %0, %%caar\mmovec %1, %%caar\maddq.l #4, %0\mmovec %0, %%caar\mmovec
%1, %%caar\maddq.l #4, %0\mmovec %0, %%caar\mmovec %1, %%caar\n":="r"(p), "r"(eacr)); p+= CACHELINE; } while((1-=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_PEA(((addr_t)rt)); asm vol a
tile("pmove (%0), %%srp\mpmove (%0), %
%
```



Timeline

- Detailed specifications according to the software standards
 - Features
 - Test cases
- Learn the basics about the implementation
 - IRC courses
 - Documentation
- Implementation on a Child WorkSpace w.r.t. software development rules

• Tests

```
static void sys_cache030(addr_t address, size_t len) {int i, off; char*p; uint32_eacr; off=(unsigned int) address& CACHELINE-1); len+=off; len; i=address-off; asm volatile("nop"); asm volatile("movcc %%eacr, %0": "r"(eacr)); eacr|=0x00000004; /**/ do{ asm volatile("movcc %0, %%caar\nmovcc %1, %%eacr\naddq.l #4, %0\nmovcc %0, %%caar\nmovcc %1, %%eacr\naddq.l #4, %0\nmovcc %0, %%caar\nmovcc %1, %%eacr\naddq.l #4, %0\nmovcc %0, %%caar\nmovcc %1, %%eacr\nn": "r"(p), "r"(eacr)); p+= CACHELINE; } while((1-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_PEA(((addr_t)rt)); asm volatile("pmove (%0), %%srp\npmove (%0), %0\n": "r"(entry.addr), "r"(entry.type), "r"(entry.addr));}
```



Guidelines for further projects

- Be “transparent” yourself :
 - Do not lie about the difficulties!
 - Do not base your evaluation only on final results.
 - Take into account the methods and autonomy of students.
- Frequent (on-line or IRL) meetings between students and supervisors to keep up the motivation

```
static void sync_icache_030(addr_t address, size_t len) { int i, off; char*p; uint32 cacr; off=(unsigned int) address& CACHELINE-1;
len+=off; l=len; p=(char*) address-off; asm volatile("nop"); asm volatile("mvec %0": "r"(cacr)); cacr|=0x00000004; /*/ do{ asm
volatile("mvec %0,%0\%aar\nmvec %l,%0\%aacr\naddq.l #4,%0\nmvec %0,%0\%aar\nmvec %l,%0\%aacr\naddq.l #4,%0\nmvec %0,%0\%aar\nmvec
%l,%0\%aacr\naddq.l #4,%0\nmvec %0,%0\%aar\nmvec %l,%0\%aacr\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),%0\%srp\npmove (%0),%
%\n": "r"((uint64*)&entry), "r"((uint64*)&entry));
}
```




References

- EducOO : <http://www.educoo.org>
- Blog on the various projects involving Tablets PC at École Centrale de Nantes:
<https://pedagogie.ec-nantes.fr/tablet-pc/>
- “Effort page”: <http://tinyurl.com/effort-ooo-ecn>

```
static void sync_icache_030(addr_t address, size_t len) {int l, off; char*p; uint32_eacr; off=(unsigned int) address& CACHELINE-1; len+=off; l=len; p=(char*) address-off; asm volatile("nop"); asm volatile("mvec %%eacr, %0": "r"(eacr)); eacr|=0x00000004; /**/ do{ asm volatile("mvec %0, %%caar\nmvec %l, %%eacr\naddq.l #4, %0\nmvec %0, %%caar\nmvec %l, %%eacr\naddq.l #4, %0\nmvec %0, %%caar\nmvec %l, %%eacr\naddq.l #4, %0\nmvec %0, %%caar\nmvec %l, %%eacr\n": "r"(p), "r"(eacr)); 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 volatile("pmove (%0), %%srp\npmove (%0), %0\n": "r"("0x00000000"), "r"("0x00000000"));
```



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www.educoo.org 2009

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```
static void sync_icache_030(addr_t address, size_t len) {int l, off; char*p; uint32_eacr; off=(unsigned int) address& CACHELINE-1);
len+=off; l=len; p=(char*) address-off; asm volatile("nop"); asm volatile("movcc %%eacr,%0": "r"(eacr)); eacr|=0x00000004; /**/ do{ asm
volatile("movcc %0,%%caar\mmovec %l,%%eacr\naddq.l #4,%0\mmovec %0,%%caar\mmovec %l,%%eacr\naddq.l #4,%0\mmovec %0,%%caar\mmovec
%l,%%eacr\naddq.l #4,%0\mmovec %0,%%caar\mmovec %l,%%eacr\n": "r"(p), "r"(eacr)); 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),%
%\n":"%0"(%0));}
```