
Subject: [RFC][PATCH 3/4] Pagecache and RSS accounting hooks
Posted by [Vaidyanathan Srinivas](#) on Wed, 20 Jun 2007 11:39:13 GMT
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Pagecache and RSS accounting Hooks

New calls have been added from swap_state.c and filemap.c to track pagecache and swapcache pages.

All existing RSS hooks have been generalised for pagecache accounting as well.

Most of these are function prototype changes.

Signed-off-by: Vaidyanathan Srinivasan <svaidy@linux.vnet.ibm.com>

fs/exec.c | 4 ++--
mm/filemap.c | 18 ++++++++
mm/memory.c | 18 ++++++-----
mm/migrate.c | 4 ++--
mm/rmap.c | 12 +++++-----
mm/swap_state.c | 16 ++++++++
mm/swapfile.c | 4 ++--
7 files changed, 55 insertions(+), 21 deletions(-)

--- linux-2.6.22-rc2-mm1.orig/fs/exec.c
+++ linux-2.6.22-rc2-mm1/fs/exec.c
@@ -321,7 +321,7 @@ void install_arg_page(struct vm_area_str
if (unlikely(anon_vma_prepare(vma)))
goto out;

- if (container_rss_prepare(page, vma, &pcont))
+ if (container_page_prepare(page, vma->vm_mm, &pcont, PAGE_TYPE_RSS))
goto out;

flush_dcache_page(page);
@@ -343,7 +343,7 @@ void install_arg_page(struct vm_area_str
return;

out_release:
- container_rss_release(pcont);
+ container_page_release(pcont, PAGE_TYPE_RSS);
out:
__free_page(page);
force_sig(SIGKILL, current);
--- linux-2.6.22-rc2-mm1.orig/mm/filemap.c
+++ linux-2.6.22-rc2-mm1/mm/filemap.c
@@ -30,6 +30,7 @@

```

#include <linux/security.h>
#include <linux/syscalls.h>
#include <linux/cpuset.h>
+#include <linux/rss_container.h>
#include "filemap.h"
#include "internal.h"

@@ -117,6 +118,9 @@ void __remove_from_page_cache(struct pag
    struct address_space *mapping = page->mapping;

    radix_tree_delete(&mapping->page_tree, page->index);
+ /* Uncharge before the mapping is gone */
+ if (page_container(page))
+ container_page_del(page_container(page), PAGE_TYPE_PAGECACHE);
    page->mapping = NULL;
    mapping->nrpages--;
    __dec_zone_page_state(page, NR_FILE_PAGES);
@@ -440,6 +444,8 @@ int add_to_page_cache(struct page *page,
    pgoff_t offset, gfp_t gfp_mask)
{
    int error = radix_tree_preload(gfp_mask & ~__GFP_HIGHMEM);
+ struct page_container *pc;
+ struct mm_struct *mm;

    if (error == 0) {
        write_lock_irq(&mapping->tree_lock);
@@ -453,6 +459,18 @@ int add_to_page_cache(struct page *page,
        __inc_zone_page_state(page, NR_FILE_PAGES);
    }
    write_unlock_irq(&mapping->tree_lock);
+ /* Unlock before charge, because we may reclaim this inline */
+ if(!error) {
+     if (current->mm)
+         mm = current->mm;
+     else
+         mm = &init_mm;
+     if (!container_page_prepare(page, mm, &pc, PAGE_TYPE_PAGECACHE))
+         container_page_add(pc, PAGE_TYPE_PAGECACHE);
+     else
+         BUG();
+ }
+
    radix_tree_preload_end();
}
return error;
--- linux-2.6.22-rc2-mm1.orig/mm/memory.c
+++ linux-2.6.22-rc2-mm1/mm/memory.c
@@ -1755,7 +1755,7 @@ gotten:

```

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    cow_user_page(new_page, old_page, address, vma);
}

- if (container_rss_prepare(new_page, vma, &pcont))
+ if (container_page_prepare(new_page, vma->vm_mm, &pcont, PAGE_TYPE_RSS))
    goto oom;

/*
@@ -1791,7 +1791,7 @@ gotten:
    new_page = old_page;
    ret |= VM_FAULT_WRITE;
} else
- container_rss_release(pcont);
+ container_page_release(pcont, PAGE_TYPE_RSS);

if (new_page)
    page_cache_release(new_page);
@@ -2217,7 +2217,7 @@ static int do_swap_page(struct mm_struct
    count_vm_event(PGMAJFAULT);
}

- if (container_rss_prepare(page, vma, &pcont)) {
+ if (container_page_prepare(page, vma->vm_mm, &pcont, PAGE_TYPE_RSS)) {
    ret = VM_FAULT_OOM;
    goto out;
}
@@ -2235,7 +2235,7 @@ static int do_swap_page(struct mm_struct

if (unlikely(!PageUptodate(page))) {
    ret = VM_FAULT_SIGBUS;
- container_rss_release(pcont);
+ container_page_release(pcont, PAGE_TYPE_RSS);
    goto out_nomap;
}

@@ -2271,7 +2271,7 @@ unlock:
out:
    return ret;
out_nomap:
- container_rss_release(pcont);
+ container_page_release(pcont, PAGE_TYPE_RSS);
    pte_unmap_unlock(page_table, ptl);
    unlock_page(page);
    page_cache_release(page);
@@ -2302,7 +2302,7 @@ static int do_anonymous_page(struct mm_s
    if (!page)
        goto oom;

```

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- if (container_rss_prepare(page, vma, &pcont))
+ if (container_page_prepare(page, vma->vm_mm, &pcont, PAGE_TYPE_RSS))
    goto oom_release;

    entry = mk_pte(page, vma->vm_page_prot);
@@ -2338,7 +2338,7 @@ unlock:
    pte_unmap_unlock(page_table, ptl);
    return VM_FAULT_MINOR;
release_container:
- container_rss_release(pcont);
+ container_page_release(pcont, PAGE_TYPE_RSS);
release:
    page_cache_release(page);
    goto unlock;
@@ -2442,7 +2442,7 @@ static int __do_fault(struct mm_struct *

}

- if (container_rss_prepare(page, vma, &pcont)) {
+ if (container_page_prepare(page, vma->vm_mm, &pcont, PAGE_TYPE_RSS)) {
    fdata.type = VM_FAULT_OOM;
    goto out;
}
@@ -2483,7 +2483,7 @@ static int __do_fault(struct mm_struct *
    update_mmu_cache(vma, address, entry);
    lazy_mmu_prot_update(entry);
} else {
- container_rss_release(pcont);
+ container_page_release(pcont, PAGE_TYPE_RSS);
    if (anon)
        page_cache_release(page);
    else
--- linux-2.6.22-rc2-mm1.orig/mm/migrate.c
+++ linux-2.6.22-rc2-mm1/mm/migrate.c
@@ -159,7 +159,7 @@ static void remove_migration_pte(struct
    return;
}

- if (container_rss_prepare(new, vma, &pcont)) {
+ if (container_page_prepare(new, vma->vm_mm, &pcont, PAGE_TYPE_RSS)) {
    pte_unmap(ptep);
    return;
}
@@ -194,7 +194,7 @@ static void remove_migration_pte(struct

out:
    pte_unmap_unlock(ptep, ptl);
- container_rss_release(pcont);

```

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+ container_page_release(pcont, PAGE_TYPE_RSS);
}

/*
--- linux-2.6.22-rc2-mm1.orig/mm/rmap.c
+++ linux-2.6.22-rc2-mm1/mm/rmap.c
@@ -578,14 +578,14 @@ void page_add_anon_rmap(struct page *pag
    if (atomic_inc_and_test(&page->_mapcount)) {
        __page_set_anon_rmap(page, vma, address);
        /* 0 -> 1 state change */
- container_rss_add(pcont);
+ container_page_add(pcont, PAGE_TYPE_RSS|PAGE_SUBTYPE_ANON);
    } else {
        __page_check_anon_rmap(page, vma, address);
        /*
         * we raced with another touch or just mapped the page
         * for the N-th time
         */
- container_rss_release(pcont);
+ container_page_release(pcont, PAGE_TYPE_RSS|PAGE_SUBTYPE_ANON);
    }
}

@@ -606,7 +606,7 @@ void page_add_new_anon_rmap(struct page
{
    BUG_ON(address < vma->vm_start || address >= vma->vm_end);
    atomic_set(&page->_mapcount, 0); /* elevate count by 1 (starts at -1) */
- container_rss_add(pcont);
+ container_page_add(pcont, PAGE_TYPE_RSS|PAGE_SUBTYPE_ANON);
    __page_set_anon_rmap(page, vma, address);
}

@@ -628,10 +628,10 @@ void page_add_file_rmap(struct page *pag
    * are not added to the container as they do not imply
    * RSS consumption --xemul
    */
- container_rss_add(pcont);
+ container_page_add(pcont, PAGE_TYPE_RSS|PAGE_SUBTYPE_FILE);
    __inc_zone_page_state(page, NR_FILE_MAPPED);
} else if (pcont)
- container_rss_release(pcont);
+ container_page_release(pcont, PAGE_TYPE_RSS|PAGE_SUBTYPE_FILE);
}

#ifdef CONFIG_DEBUG_VM
@@ -689,7 +689,7 @@ void page_remove_rmap(struct page *page,
}

```

```

    if (pcont)
-   container_rss_del(pcont);
+   container_page_del(pcont, PAGE_TYPE_RSS);
/*
 * It would be tidy to reset the PageAnon mapping here,
 * but that might overwrite a racing page_add_anon_rmap
--- linux-2.6.22-rc2-mm1.orig/mm/swap_state.c
+++ linux-2.6.22-rc2-mm1/mm/swap_state.c
@@ -17,6 +17,7 @@
#include <linux/backing-dev.h>
#include <linux/pagevec.h>
#include <linux/migrate.h>
+#include <linux/rss_container.h>

#include <asm/pgtable.h>

@@ -74,6 +75,8 @@ static int __add_to_swap_cache(struct pa
    gfp_t gfp_mask)
{
    int error;
+   struct page_container *pc;
+   struct mm_struct *mm;

    BUG_ON(PageSwapCache(page));
    BUG_ON(PagePrivate(page));
@@ -92,6 +95,17 @@ static int __add_to_swap_cache(struct pa
}
write_unlock_irq(&swapper_space.tree_lock);
radix_tree_preload_end();
+   /* Unlock before charge, because we may reclaim this inline */
+   if(!error) {
+       if (current->mm)
+           mm = current->mm;
+       else
+           mm = &init_mm;
+       if (!container_page_prepare(page, mm, &pc, PAGE_TYPE_PAGECACHE))
+           container_page_add(pc, PAGE_TYPE_PAGECACHE);
+       else
+           BUG();
+   }
    return error;
}

@@ -130,6 +144,8 @@ void __delete_from_swap_cache(struct pag
    BUG_ON(PagePrivate(page));

    radix_tree_delete(&swapper_space.page_tree, page_private(page));
+   if (page_container(page))

```

```

+ container_page_del(page_container(page), PAGE_TYPE_PAGECACHE);
  set_page_private(page, 0);
  ClearPageSwapCache(page);
  total_swapcache_pages--;
--- linux-2.6.22-rc2-mm1.orig/mm/swapfile.c
+++ linux-2.6.22-rc2-mm1/mm/swapfile.c
@@ -535,7 +535,7 @@ static int unuse_pte_range(struct vm_area
  int found = 0;
  struct page_container *pcont;

- if (container_rss_prepare(page, vma, &pcont))
+ if (container_page_prepare(page, vma->vm_mm, &pcont, PAGE_TYPE_RSS))
  return 0;

  pte = pte_offset_map_lock(vma->vm_mm, pmd, addr, &ptl);
@@ -552,7 +552,7 @@ static int unuse_pte_range(struct vm_area
  } while (pte++, addr += PAGE_SIZE, addr != end);
  pte_unmap_unlock(pte - 1, ptl);
  if (!found)
- container_rss_release(pcont);
+ container_page_release(pcont, PAGE_TYPE_RSS);
  return found;
}

```
