
Subject: [PATCH 23/33] memory controller containers setup v7

Posted by [Paul Menage](#) on Mon, 17 Sep 2007 21:03:30 GMT

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(container->cgroup renaming by Paul Menage <menage@google.com>)

Setup the memory cgroup and add basic hooks and controls to integrate
and work with the cgroup.

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```
include/linux/cgroup_subsys.h |  6 +
include/linux/memcontrol.h   | 21 +++++
init/Kconfig                |  7 +
mm/Makefile                 |  1
mm/memcontrol.c             | 127 ++++++++++++++++++++++++++++++
5 files changed, 162 insertions(+)
```

```
diff -puN include/linux/cgroup_subsys.h~memory-controller-cgroups-setup-v7
include/linux/cgroup_subsys.h
--- a/include/linux/cgroup_subsys.h~memory-controller-cgroups-setup-v7
+++ a/include/linux/cgroup_subsys.h
@@ -30,3 +30,9 @@ SUBSYS(ns)
#endif
```

```
/*
+
+ifdef CONFIG_CGROUP_MEM_CONT
+SUBSYS(mem_cgroup)
#endif
+
```

```
/*
diff -puN /dev/null include/linux/memcontrol.h
--- /dev/null
+++ a/include/linux/memcontrol.h
@@ -0,0 +1,21 @@
/* memcontrol.h - Memory Controller
```

```
+ *
+ * Copyright IBM Corporation, 2007
+ * Author Balbir Singh <balbir@linux.vnet.ibm.com>
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```

```

+ * (at your option) any later version.
+
+ * This program is distributed in the hope that it will be useful,
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+ * GNU General Public License for more details.
+ */
+
+ifndef _LINUX_MEMCONTROL_H
#define _LINUX_MEMCONTROL_H
+
#endif /* _LINUX_MEMCONTROL_H */
+
diff -puN init/Kconfig~memory-controller-cgroups-setup-v7 init/Kconfig
--- a/init/Kconfig~memory-controller-cgroups-setup-v7
+++ a/init/Kconfig
@@ -346,6 +346,13 @@ config SYSFS_DEPRECATED
    If you are using a distro that was released in 2006 or later,
    it should be safe to say N here.

+config CGROUP_MEM_CONT
+ bool "Memory controller for cgroups"
+ depends on CGROUPS && RESOURCE_COUNTERS
+ help
+   Provides a memory controller that manages both page cache and
+   RSS memory.
+
config PROC_PID_CPUSET
    bool "Include legacy /proc/<pid>/cpuset file"
    depends on CPUSETS
diff -puN mm/Makefile~memory-controller-cgroups-setup-v7 mm/Makefile
--- a/mm/Makefile~memory-controller-cgroups-setup-v7
+++ a/mm/Makefile
@@ -30,4 +30,5 @@ obj-$(CONFIG_FS_XIP) += filemap_xip.o
obj-$(CONFIG_MIGRATION) += migrate.o
obj-$(CONFIG_SMP) += allocpercpu.o
obj-$(CONFIG_QUICKLIST) += quicklist.o
+obj-$(CONFIG_CGROUP_MEM_CONT) += memcontrol.o

diff -puN /dev/null mm/memcontrol.c
--- /dev/null
+++ a/mm/memcontrol.c
@@ -0,0 +1,127 @@
+/* memcontrol.c - Memory Controller
+ *
+ * Copyright IBM Corporation, 2007
+ * Author Balbir Singh <balbir@linux.vnet.ibm.com>
+ *

```

```

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+ * GNU General Public License for more details.
+ */
+
+#
+#include <linux/res_counter.h>
+#include <linux/memcontrol.h>
+#include <linux/cgroup.h>
+
+struct cgroup_subsys mem_cgroup_subsys;
+
+/*
+ * The memory controller data structure. The memory controller controls both
+ * page cache and RSS per cgroup. We would eventually like to provide
+ * statistics based on the statistics developed by Rik Van Riel for clock-pro,
+ * to help the administrator determine what knobs to tune.
+ *
+ * TODO: Add a water mark for the memory controller. Reclaim will begin when
+ * we hit the water mark.
+ */
+
+struct mem_cgroup {
+ struct cgroup_subsys_state css;
+ /*
+ * the counter to account for memory usage
+ */
+ struct res_counter res;
+};
+
+/*
+ * A page_cgroup page is associated with every page descriptor. The
+ * page_cgroup helps us identify information about the cgroup
+ */
+
+struct page_cgroup {
+ struct list_head lru; /* per cgroup LRU list */
+ struct page *page;
+ struct mem_cgroup *mem_cgroup;
+};
+
+
+static inline
+struct mem_cgroup *mem_cgroup_from_cont(struct cgroup *cont)
+{

```

```

+ return container_of(cgroup_subsys_state(cont,
+   mem_cgroup_subsys_id), struct mem_cgroup,
+   css);
+}
+
+static ssize_t mem_cgroup_read(struct cgroup *cont, struct cftype *cft,
+  struct file *file, char __user *userbuf, size_t nbytes,
+  loff_t *ppos)
+{
+ return res_counter_read(&mem_cgroup_from_cont(cont)->res,
+   cft->private, userbuf, nbytes, ppos);
+}
+
+static ssize_t mem_cgroup_write(struct cgroup *cont, struct cftype *cft,
+  struct file *file, const char __user *userbuf,
+  size_t nbytes, loff_t *ppos)
+{
+ return res_counter_write(&mem_cgroup_from_cont(cont)->res,
+   cft->private, userbuf, nbytes, ppos);
+}
+
+static struct cftype mem_cgroup_files[] = {
+ {
+ .name = "usage",
+ .private = RES_USAGE,
+ .read = mem_cgroup_read,
+ },
+ {
+ .name = "limit",
+ .private = RES_LIMIT,
+ .write = mem_cgroup_write,
+ .read = mem_cgroup_read,
+ },
+ {
+ .name = "failcnt",
+ .private = RES_FAILCNT,
+ .read = mem_cgroup_read,
+ },
+ };
+
+static struct cgroup_subsys_state *
+mem_cgroup_create(struct cgroup_subsys *ss, struct cgroup *cont)
+{
+ struct mem_cgroup *mem;
+
+ mem = kzalloc(sizeof(struct mem_cgroup), GFP_KERNEL);
+ if (!mem)
+  return -ENOMEM;

```

```
+  
+ res_counter_init(&mem->res);  
+ return &mem->css;  
+}  
+  
+static void mem_cgroup_destroy(struct cgroup_subsys *ss,  
+    struct cgroup *cont)  
+{  
+    kfree(mem_cgroup_from_cont(cont));  
+}  
+  
+static int mem_cgroup_populate(struct cgroup_subsys *ss,  
+    struct cgroup *cont)  
+{  
+    return cgroup_add_files(cont, ss, mem_cgroup_files,  
+        ARRAY_SIZE(mem_cgroup_files));  
+}  
+  
+struct cgroup_subsys mem_cgroup_subsys = {  
+    .name = "memory",  
+    .subsys_id = mem_cgroup_subsys_id,  
+    .create = mem_cgroup_create,  
+    .destroy = mem_cgroup_destroy,  
+    .populate = mem_cgroup_populate,  
+    .early_init = 0,  
+};
```

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Containers mailing list
Containers@lists.linux-foundation.org
<https://lists.linux-foundation.org/mailman/listinfo/containers>
