Subject: Re: [PATCH 1/1, v7] cgroup/freezer: add per freezer duty ratio control
Posted by Matt Helsley on Mon, 14 Feb 2011 23:09:33 GMT
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On Mon, Feb 14, 2011 at 11:41:42AM -0800, jacob pan wrote:
> On Sat, 12 Feb 2011 15:29:07 -0800
> Matt Helsley <matthltc@us.ibm.com> wrote:
>
> > On Fri, Feb 11, 2011 at 11:10:44AM -0800,
> > jacob.jun.pan@linux.intel.com wrote:
> > > From: Jacob Pan <jacob.jun.pan@linux.intel.com>

<snip>

> > > cgroup. +To make the tasks frozen at 90% of the time every 5
> > > seconds, do: +
> > > +[root@localhost]# echo 90 > freezer.duty_ratio_pct
> > > +[root@localhost]# echo 5000 > freezer.period_ms
> > > +
> > > +After that, the application in this freezer cgroup will only be
> > > +allowed to run at the following pattern.
> > > +   __   __   __
> > > + | |<-- 90% frozen -->| | | |
> > > +____| |__________________| |______________| |_____
> > > +
> > > + |<---- 5 seconds ---->|
> >
> > So most of the time I've been reviewing this I managed to invert it!
> > I imagined "duty" meant the tasks were "on duty" ie runnable ie
> > thawed. But according this this documentation it's the opposite...
> >
> My logic is that since this is a freezer, so positive logic should be
> frozen instead of thaw.

Yup, I figured as much. That's the reason I didn't ask you to swap the
meaning of the ratio values.

> > I've reviewed my review and now my comments are consistent with the
> > above. :) However it makes me wonder if there are better names which
> > would avoid this confusion.
> >
> How about frozen_time_pct?

Much better! nit: I don't know if _pct is obvious to everyone but it only
takes 4 more characters to make it so..

> > > diff --git a/kernel/cgroup_freezer.c b/kernel/cgroup_freezer.c

<snip>

> > > +static void freezer_work_fn(struct work_struct *work)
> > > +{
> > > + struct freezer *freezer;
> > > + unsigned long delay_jiffies = 0;
> > > + enum freezer_state goal_state;
> > > +
> >
> > Looking better. There are alot of field accesses here which can race
> > with writes to the cgroup's duty ratio and period files. They should
> > be protected. Perhaps we can reuse the freezer spin lock. That also
> > has the benefit that we can eliminate the toggle.freeze_thaw bit I
> > think:
> >
> I did think about the race, it does exist. but in practice. My thought
> was that since freezer_change_state() holds the spin_lock of the
> freezer, the race with writes to params are harmless, it just means the
> new period or ratio will take effect in the next period.

I considered this but didn't like the idea of relying on it. More below.

> In terms of using freezer spin lock to eliminate toggle flag, I am not
> sure if i know how to do that. Are you suggesting based on whether the
> spin lock is taken or not, we can decide the toggle? but the freeze
> spin lock is used by other functions as well not just the delay work
> here. I guess I have missed something.

I was thinking that with the lock held you can check the state variable
and just do the "opposite" of what it indicates:

 state TODO
 FROZEN THAWED
 FREEZING THAWED
 THAWED FROZEN

Then you don't need the separate bit to indicate which state it should
try to change to next.

> > > +
> > > + freezer = container_of(work, struct freezer,
> > > freezer_work.work);
> > > + /* toggle between THAWED and FROZEN state.
> > > + * thaw if freezer->toggle.freeze_thaw = 0; freeze
> > > otherwise
> > > + * skip the first round if already in the target states.
> > > + */
> >

> > spin_lock(&freezer->lock);
> >
> > > + if ((freezer->toggle.freeze_thaw && freezer->state ==
> > > CGROUP_FROZEN) ||
> > > + (!freezer->toggle.freeze_thaw &&
> > > +   freezer->state == CGROUP_THAWED)) {
> > > + delay_jiffies = 0;
> >
> > This looks wrong. We should never schedule freezer work delayed by 0
> > jiffies -- even if the delayed work API allows it. With 0-length
> > delays I'd worry that we could peg the CPU in an obscure infinite
> > loop.
> >
> > I think you can safely eliminate this block and the "exit_toggle"
> > label.
> >
> Good point. My initial thought was that since the period for targeted
> usage is quite long, e.g. 30 sec., we want to start the duty ratio
> right away. But that shouldn't matter since we already schedule work
> based on the new ratio/period.
> > > + goto exit_toggle;
> > > + } else if (freezer->toggle.freeze_thaw) {
> >
> > if (freezer->state == CGROUP_THAWED) {
> >
> > > + goal_state = CGROUP_FROZEN;
> > > + delay_jiffies =
> > > msecs_to_jiffies(freezer->duty.ratio *
> > > +
> > > freezer->duty.period_pct_ms);
> > > + } else {
> > > + goal_state = CGROUP_THAWED;
> > > + delay_jiffies = msecs_to_jiffies((100 -
> > > freezer->duty.ratio) *
> > > +
> > > freezer->duty.period_pct_ms);
> > > + }
> > > + freezer_change_state(freezer->css.cgroup, goal_state);
> >
> > __freezer_change_state(freezer->css.cgroup, goal_state);
> > spin_unlock(&freezer->lock);
> >
> > (where the __freezer_change_state() function expects to already have
> > the freezer lock -- you can make that your first patch and this your
> > second)
> >
> > But you ought to double check the lock ordering, may-sleep, and
> > whether the _irq variants are correct.

> >
> I agree with the change to deal with race but again, I don't see the
> harm of the race other than delaying one period. If the user has to
> change period and duty ratio separately, there will always be a window
> of unwanted params unless user disable it first.

But those windows could be pretty large if you delay it that long and
that could be confusing. With the lock will it be delayed?

> Can you please explain the problem might be caused by the race.
> > > +
> > > +exit_toggle:
> > > + schedule_delayed_work(&freezer->freezer_work,
> > > delay_jiffies);
> > > + freezer->toggle.freeze_thaw ^= 1;
> >
> > This looks wrong. It looks like there could be a race between the next
> > scheduled work and the toggling of the freeze_thaw value. This race
> > would cause the cgroup to miss one or more duty cycles. You'd have
> > to re-order these two lines and probably need an smp barrier of one
> > sort or another between them.
> >
> I will fix that. good point.
>
>
> > Of course if you use locking and eliminate the toggle.freeze_thaw
> > field as I've suggested then you can ignore this.
> >
> same as before, not sure how to reuse the freezer spin lock for this.
> can you please explain.

Well you just need to acquire the spin lock when you enter the timer
function, calculate delay_jiffies and goal state without the need for
the freeze_thaw field, then drop the lock.

At that point you can initiate the state change and then do the
schedule_delayed_work().

<snip>

> > > @@ -360,7 +435,18 @@ static int freezer_write(struct cgroup *cgroup,
> > > goal_state = CGROUP_FROZEN;
> > > else
> > > return -EINVAL;
> > > -
> > > + /* we should stop duty ratio toggling if user wants to
> > > + * force change to a valid state.
> > > + */

> > > + freezer = cgroup_freezer(cgroup);
> > > + if (freezer->duty.period_pct_ms && freezer->duty.ratio <
> > > 100) {
> >
> > If duty.ratio is 100 then the delayed work should be cancelled too.
> > In fact it doesn't matter what the duty.ratio or period_pct_ms are --
> > writes to this file should always disable the duty cycle. Thus
> > you can omit the above if () and do this:
> >
> > > + if (freezer->toggle.enabled)
> >
> agreed, i will fix it.
> > {
> >
> > > +
> > > cancel_delayed_work_sync(&freezer->freezer_work);
> > > + freezer->duty.ratio = 0;
> >
> > Actually, shouldn't this be 0 if the cgroup is going to be thawed and
> > 100 if it's going to be frozen?
> >
> I am using 0 as an invalid value when toggle is not enabled. perhaps i
> should introduce -1 such that when user override occurs we just do
> freezer->toggle.enabled = 0;
> freezer->duty.ratio = -1;
> freezer->duty.period_pct_ms = -1;
> then we can allow and or 100% where both will turn off toggle as well.

Nope. Then you will have "negative" sleeps in the timer function which
just begs for misinterpretation. For example, look at msleep -- it takes an
unsigned int. This coupled with the race is a recipe for an unintended
long sleeps.

We don't need special values here -- just the enabled flag. When
enabled you can report the ratio from the ratio field. When not enabled
you can report the ratio by looking at the freezer state (might
want to do an update_if_frozen() first). Or you could just have writes
to the freezer.state always update the ratio. You don't need to vary
period_pct_ms at all when enabling/disabling the duty ratio.

That way at all times the values reported to userspace are consistent,
there are no "special" values, and writes to either file trigger the
correct changes between enabled/disabled and freezer state. For example
you might do:

$ echo 0 > freezer.frozen_time_pct
$ cat freezer.state
THAWED

$ cat freezer.frozen_time_pct
0
$ echo 100 > freezer.frozen_time_pct
$ cat freezer.state
FREEZING
$ cat freezer.state
FROZEN
$ cat freezer.frozen_time_pct
100
$ echo THAWED > freezer.state
$ cat freezer.frozen_time_pct
0

>
> > > + freezer->duty.period_pct_ms = 0;
> >
> > I think this should always be a non-zero value -- even when duty
> > cycling is disabled. Perhaps:
> >
> >   freezer->duty.period_pct_ms = 1000/100;
> >
> > So it's clear the default period is 1000ms and one percent of it is
> > 10ms.
> >
> > (NOTE: To make it always non-zero you also need to add one line to the
> > cgroup initialization code in freezer_create()).
> how about -1 as suggested above.
>
> >
> > > + freezer->toggle.enabled = 0;
> > > + pr_info("freezer state changed by user, stop duty
> > > ratio\n");
> >
> > nit: I don't think this pr_info() is terribly useful.
> >
> I will make it pr_debug instead.

Hmm, OK I suppose.

<snip>

> > > +
> > > + switch (cft->private) {
> > > + case FREEZER_DUTY_RATIO:
> > > + if (val >= 100) {
> >
> > ratio == 100 ought to be allowed too.
> Ok, 100% frozen would be equivalent to echo FROZEN > freezer.state. I

> will document these corner cases. I think as long as these behaviors

Actually the tricky part to document has nothing to do with the
value of frozen_time_pct being 0 or 100. It has everything to do with
which write happened "last".

For all freezer.state values the value that should be read from
freezer.frozen_time_pct depends on whether it's due to a write to
freezer.frozen_time_pct or freezer.state. Writes directly to
freezer.frozen_time_pct should show what was written (if it's in 0-100
inclusive). Writes to freezer.state should appear to modify
freezer.frozen_time_pct to be consistent.

That's easily managed within the respective write functions.
Alternately, the read function for freezer.frozen_time_pct could check
the enabled bit and use that to switch which method it uses to
"read" the value.

Note how the period has nothing to do with any of this. It's just
a timescale factor which ensures there's a maximum frequency at which
we can change between FROZEN and THAWED (soon to be 1HZ).

> are documented well so that user can get the anticipated results, the
> interface does matter that much.
>
> >
> > > +   ret = -EINVAL;
> > > +   goto exit;
> > > + }
> >
> > Add:
> >
> >   spin_lock_irq(&freezer->lock);
> >
> > > + freezer->duty.ratio = val;
> >
> > Because this can race with the delayed work.
> >
> > > + break;
> > > + case FREEZER_PERIOD:
> > > + do_div(val, 100);
> > > + freezer->duty.period_pct_ms = val;
> >
> > This can race with the delayed work. Also I think that a 0ms
> > period_pct_ms should be disallowed. Otherwise all the work delays go
> > to zero and we'll probably peg the CPU so that it's just spinning the
> > freezer state between FROZEN and THAWED and doing nothing else.
> >

> 0 or low number of period is dangerous for reason as you mentioned,
> I think I should move back to one second resolution. Especially, we are
> using common workqueue now.

Sounds good.

<snip>

> > > + /* only use delayed work when valid params are given. */
> > > + if (freezer->duty.ratio && freezer->duty.period_pct_ms &&
> > > + !freezer->toggle.enabled) {
> > > + pr_debug("starting duty ratio mode\n");
> > > + INIT_DELAYED_WORK(&freezer->freezer_work,
> > > freezer_work_fn);
> > > + freezer->toggle.enabled = 1;
> > > + schedule_delayed_work(&freezer->freezer_work, 0);
> > > + } else if ((!freezer->duty.ratio
> > > || !freezer->duty.period_pct_ms) &&
> > > + freezer->toggle.enabled) {
> > > + pr_debug("invalid param, stop duty ratio mode
> > > %p\n",
> > > +   freezer->freezer_work.work.func);
> > > + cancel_delayed_work_sync(&freezer->freezer_work);
> > > + freezer->toggle.enabled = 0;
> > > + /* thaw the cgroup if we are not toggling */
> > > + freezer_change_state(freezer->css.cgroup,
> > > CGROUP_THAWED); +
> > > + }
> >
> > I don't think this is as readable as (assuming the change above to
> > disallow setting period_pct_ms to 0):
> >
> > if (freezer->duty.ratio == 100) {
> >   freezer_disable_duty_cycling(freezer); /* see helper
> > below */ __freezer_change_state(freezer->css.cgroup, CGROUP_FROZEN);
> > } else if (freezer->duty.ratio == 0) {
> >   freezer_disable_duty_cycling(freezer);
> >   __freezer_change_state(freezer->css.cgroup,
> > CGROUP_THAWED); } else {
> >   if (freezer->toggle.enabled)
> >   goto exit; /* Already enabled */
> >   INIT_DELAYED_WORK(&freezer->freezer_work,
> > freezer_work_fn); freezer->toggle.enabled = 1;
> >   schedule_delayed_work(&freezer->freezer_work, 0);
> > }
> > spin_unlock_irq(&freezer->lock);

Something to look into: you might even be able to factor this chunk to

share it between both cgroup file write functions.

Cheers,
-Matt Helsley

_____
Containers mailing list
Containers@lists.linux-foundation.org
https://lists.linux-foundation.org/mailman/listinfo/containe rs

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Subject: Re: [PATCH 1/1, v7] cgroup/freezer: add per freezer duty ratio control
Posted by jacob.jun.pan on Tue, 15 Feb 2011 22:18:46 GMT
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> > <snip>
> >
> > > > cgroup. +To make the tasks frozen at 90% of the time every 5
> > > > seconds, do: +
> > > > +[root@localhost]# echo 90 > freezer.duty_ratio_pct
> > > > +[root@localhost]# echo 5000 > freezer.period_ms
> > > > +
> > > > +After that, the application in this freezer cgroup will only be
> > > > +allowed to run at the following pattern.
> > > > +   __   __   __
> > > > + | |<-- 90% frozen -->| | | |
> > > > +___| |__________________| |______________| |_____
> > > > +
> > > > + |<---- 5 seconds ---->|
> > >
> > > So most of the time I've been reviewing this I managed to invert
> > > it! I imagined "duty" meant the tasks were "on duty" ie runnable
> > > ie thawed. But according this this documentation it's the
> > > opposite...
> > >
> > My logic is that since this is a freezer, so positive logic should
> > be frozen instead of thaw.
> >

> Yup, I figured as much. That's the reason I didn't ask you to swap the
> meaning of the ratio values.
>
> > > I've reviewed my review and now my comments are consistent with
> > > the above. :) However it makes me wonder if there are better
> > > names which would avoid this confusion.
> > >
> > How about frozen_time_pct?
>
using frozen_time_percentage in v9

> Much better! nit: I don't know if _pct is obvious to everyone but it
> only takes 4 more characters to make it so..
>
> > > > diff --git a/kernel/cgroup_freezer.c b/kernel/cgroup_freezer.c
>
> <snip>
>
> > > > +static void freezer_work_fn(struct work_struct *work)
> > > > +{
> > > > + struct freezer *freezer;
> > > > + unsigned long delay_jiffies = 0;
> > > > + enum freezer_state goal_state;
> > > > +
> > >
> > > Looking better. There are alot of field accesses here which can
> > > race with writes to the cgroup's duty ratio and period files.
> > > They should be protected. Perhaps we can reuse the freezer spin
> > > lock. That also has the benefit that we can eliminate the
> > > toggle.freeze_thaw bit I think:
> > >
> > I did think about the race, it does exist. but in practice. My
> > thought was that since freezer_change_state() holds the spin_lock
> > of the freezer, the race with writes to params are harmless, it
> > just means the new period or ratio will take effect in the next
> > period.
>
> I considered this but didn't like the idea of relying on it. More
> below.
>
fair enough, I added spin lock in v9
> > In terms of using freezer spin lock to eliminate toggle flag, I am
> > not sure if i know how to do that. Are you suggesting based on
> > whether the spin lock is taken or not, we can decide the toggle?
> > but the freeze spin lock is used by other functions as well not
> > just the delay work here. I guess I have missed something.
>
> I was thinking that with the lock held you can check the state

> variable and just do the "opposite" of what it indicates:
>
> state TODO
> FROZEN THAWED
> FREEZING THAWED
> THAWED FROZEN
>
> Then you don't need the separate bit to indicate which state it should
> try to change to next.
>]
good idea, using it in v9
> > > > +
> > > > + freezer = container_of(work, struct freezer,
> > > > freezer_work.work);
> > > > + /* toggle between THAWED and FROZEN state.
> > > > + * thaw if freezer->toggle.freeze_thaw = 0; freeze
> > > > otherwise
> > > > + * skip the first round if already in the target
> > > > states.
> > > > + */
> > >
> > > spin_lock(&freezer->lock);
> > >
> > > + if ((freezer->toggle.freeze_thaw && freezer->state ==
> > > CGROUP_FROZEN) ||
> > > + (!freezer->toggle.freeze_thaw &&
> > > +   freezer->state == CGROUP_THAWED)) {
> > > + delay_jiffies = 0;
> > >
> > > This looks wrong. We should never schedule freezer work delayed
> > > by 0 jiffies -- even if the delayed work API allows it. With
> > > 0-length delays I'd worry that we could peg the CPU in an obscure
> > > infinite loop.
> > >
> > > I think you can safely eliminate this block and the "exit_toggle"
> > > label.
> > >
> > Good point. My initial thought was that since the period for
> > targeted usage is quite long, e.g. 30 sec., we want to start the
> > duty ratio right away. But that shouldn't matter since we already
> > schedule work based on the new ratio/period.
> > > > > + goto exit_toggle;
> > > > > + } else if (freezer->toggle.freeze_thaw) {
> > >
> > > if (freezer->state == CGROUP_THAWED) {
> > >
> > > > > + goal_state = CGROUP_FROZEN;
> > > > > + delay_jiffies =

> > > > msecs_to_jiffies(freezer->duty.ratio *
> > > > +
> > > > freezer->duty.period_pct_ms);
> > > > + } else {
> > > > + goal_state = CGROUP_THAWED;
> > > > + delay_jiffies = msecs_to_jiffies((100 -
> > > > freezer->duty.ratio) *
> > > > +
> > > > freezer->duty.period_pct_ms);
> > > > + }
> > > > + freezer_change_state(freezer->css.cgroup, goal_state);
> > > >
> > > __freezer_change_state(freezer->css.cgroup, goal_state);
> > > spin_unlock(&freezer->lock);
> > >
> > > (where the __freezer_change_state() function expects to already
> > > have the freezer lock -- you can make that your first patch and
> > > this your second)
> > >
> > > But you ought to double check the lock ordering, may-sleep, and
> > > whether the _irq variants are correct.
> > >
> > I agree with the change to deal with race but again, I don't see the
> > harm of the race other than delaying one period. If the user has to
> > change period and duty ratio separately, there will always be a
> > window of unwanted params unless user disable it first.
>
> But those windows could be pretty large if you delay it that long and
> that could be confusing. With the lock will it be delayed?
>
There is no way to prevent such window. e.g. if user wants to change
from 50% of 3 second period to 90% of 2 second period, it will get a
mismatch for one period. lock does not help here. Users just have to
disable the toggling mode if they want to prevent that.

> > Can you please explain the problem might be caused by the race.
> > > > > +
> > > > > +exit_toggle:
> > > > > + schedule_delayed_work(&freezer->freezer_work,
> > > > > delay_jiffies);
> > > > > + freezer->toggle.freeze_thaw ^= 1;
> > > >
> > > > This looks wrong. It looks like there could be a race between the
> > > > next scheduled work and the toggling of the freeze_thaw value.
> > > > This race would cause the cgroup to miss one or more duty cycles.
> > > > You'd have to re-order these two lines and probably need an smp
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> > I will fix that. good point.
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> > > Of course if you use locking and eliminate the toggle.freeze_thaw
> > > field as I've suggested then you can ignore this.
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> > same as before, not sure how to reuse the freezer spin lock for
> > this. can you please explain.
>
> Well you just need to acquire the spin lock when you enter the timer
> function, calculate delay_jiffies and goal state without the need for
> the freeze_thaw field, then drop the lock.
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> At that point you can initiate the state change and then do the
> schedule_delayed_work().
>
> <snip>

done in v9.
>
> > > > @@ -360,7 +435,18 @@ static int freezer_write(struct cgroup
> > > > *cgroup, goal_state = CGROUP_FROZEN;
> > > > else
> > > > return -EINVAL;
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> > > > + /* we should stop duty ratio toggling if user wants to
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> > > > + freezer = cgroup_freezer(cgroup);
> > > > + if (freezer->duty.period_pct_ms && freezer->duty.ratio
> > > > < 100) {
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> > > If duty.ratio is 100 then the delayed work should be cancelled
> > > too. In fact it doesn't matter what the duty.ratio or
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> > >
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> > > Actually, shouldn't this be 0 if the cgroup is going to be thawed
> > > and 100 if it's going to be frozen?

> > >
> > I am using 0 as an invalid value when toggle is not enabled.
> > perhaps i should introduce -1 such that when user override occurs
> > we just do freezer->toggle.enabled = 0;
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> enabled you can report the ratio from the ratio field. When not
> enabled you can report the ratio by looking at the freezer state
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> have writes to the freezer.state always update the ratio. You don't
> need to vary period_pct_ms at all when enabling/disabling the duty
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> example you might do:
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> THAWED
> $ cat freezer.frozen_time_pct
> 0
> $ echo 100 > freezer.frozen_time_pct
> $ cat freezer.state
> FREEZING
> $ cat freezer.state
> FROZEN
> $ cat freezer.frozen_time_pct
> 100
> $ echo THAWED > freezer.state
> $ cat freezer.frozen_time_pct
> 0
>
fixed in v9
> >
> > > > + freezer->duty.period_pct_ms = 0;
> > >
> > > I think this should always be a non-zero value -- even when duty

> > > cycling is disabled. Perhaps:
> > >
> > > freezer->duty.period_pct_ms = 1000/100;
> > >
> > > So it's clear the default period is 1000ms and one percent of it
> > > is 10ms.
> > >
> > > (NOTE: To make it always non-zero you also need to add one line
> > > to the cgroup initialization code in freezer_create()).
> > how about -1 as suggested above.
> >
> > >
> > > > + freezer->toggle.enabled = 0;
> > > > + pr_info("freezer state changed by user, stop
> > > > duty ratio\n");
> > >
> > > nit: I don't think this pr_info() is terribly useful.
> > >
> > I will make it pr_debug instead.
>
> Hmm, OK I suppose.
>
> <snip>
>
> > > > +
> > > > + switch (cft->private) {
> > > > + case FREEZER_DUTY_RATIO:
> > > > + if (val >= 100) {
> > >
> > > ratio == 100 ought to be allowed too.
> > Ok, 100% frozen would be equivalent to echo FROZEN > freezer.state.
> > I will document these corner cases. I think as long as these
> > behaviors
>
> Actually the tricky part to document has nothing to do with the
> value of frozen_time_pct being 0 or 100. It has everything to do with
> which write happened "last".
>
> For all freezer.state values the value that should be read from
> freezer.frozen_time_pct depends on whether it's due to a write to
> freezer.frozen_time_pct or freezer.state. Writes directly to
> freezer.frozen_time_pct should show what was written (if it's in 0-100
> inclusive). Writes to freezer.state should appear to modify
> freezer.frozen_time_pct to be consistent.
>
> That's easily managed within the respective write functions.
> Alternately, the read function for freezer.frozen_time_pct could check
> the enabled bit and use that to switch which method it uses to

> "read" the value.
>
> Note how the period has nothing to do with any of this. It's just
> a timescale factor which ensures there's a maximum frequency at which
> we can change between FROZEN and THAWED (soon to be 1HZ).
>
little confused, there is no need to "appear to modify" things. I just
made freezer.state write in sync with ratio value.

> > are documented well so that user can get the anticipated results,
> > the interface does matter that much.
> >
> > >
> > > > +   ret = -EINVAL;
> > > > +   goto exit;
> > > > + }
> > >
> > > Add:
> > >
> > >   spin_lock_irq(&freezer->lock);
> > >
> > > > + freezer->duty.ratio = val;
> > >
> > > Because this can race with the delayed work.
> > >
> > > > + break;
> > > > + case FREEZER_PERIOD:
> > > > + do_div(val, 100);
> > > > + freezer->duty.period_pct_ms = val;
> > >
> > > This can race with the delayed work. Also I think that a 0ms
> > > period_pct_ms should be disallowed. Otherwise all the work delays
> > > go to zero and we'll probably peg the CPU so that it's just
> > > spinning the freezer state between FROZEN and THAWED and doing
> > > nothing else.
> > >
> > 0 or low number of period is dangerous for reason as you mentioned,
> > I think I should move back to one second resolution. Especially, we
> > are using common workqueue now.
>
> Sounds good.
>
> <snip>
>
> > > > + /* only use delayed work when valid params are given.
> > > > */
> > > > + if (freezer->duty.ratio && freezer->duty.period_pct_ms
> > > > &&

> > > > + !freezer->toggle.enabled) {
> > > > + pr_debug("starting duty ratio mode\n");
> > > > + INIT_DELAYED_WORK(&freezer->freezer_work,
> > > > freezer_work_fn);
> > > > + freezer->toggle.enabled = 1;
> > > > + schedule_delayed_work(&freezer->freezer_work,
> > > > 0);
> > > > + } else if ((!freezer->duty.ratio
> > > > || !freezer->duty.period_pct_ms) &&
> > > > + freezer->toggle.enabled) {
> > > > + pr_debug("invalid param, stop duty ratio mode
> > > > %p\n",
> > > > +   freezer->freezer_work.work.func);
> > > > +
> > > > cancel_delayed_work_sync(&freezer->freezer_work);
> > > > + freezer->toggle.enabled = 0;
> > > > + /* thaw the cgroup if we are not toggling */
> > > > + freezer_change_state(freezer->css.cgroup,
> > > > CGROUP_THAWED); +
> > > > + }
> > >
> > > I don't think this is as readable as (assuming the change above to
> > > disallow setting period_pct_ms to 0):
> > >
> > > if (freezer->duty.ratio == 100) {
> > >   freezer_disable_duty_cycling(freezer); /* see
> > > helper below */ __freezer_change_state(freezer->css.cgroup,
> > > CGROUP_FROZEN); } else if (freezer->duty.ratio == 0) {
> > >   freezer_disable_duty_cycling(freezer);
> > >   __freezer_change_state(freezer->css.cgroup,
> > > CGROUP_THAWED); } else {
> > >   if (freezer->toggle.enabled)
> > >   goto exit; /* Already enabled */
> > >   INIT_DELAYED_WORK(&freezer->freezer_work,
> > > freezer_work_fn); freezer->toggle.enabled = 1;
> > >   schedule_delayed_work(&freezer->freezer_work, 0);
> > > }
> > > spin_unlock_irq(&freezer->lock);
> >
> > Something to look into: you might even be able to factor this chunk to
> > share it between both cgroup file write functions.
> >
> I did some consolidation in v9, the checks for cancellation are all
> merged in one function now.
> I did not introduce __freezer_change_state() but rather just use the
> internal freeze and unfreeze function w/o lock (when caller already has
> the lock).

Thanks,

Jacob

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