

COMPSCI 7096B - Software Engineering Group Project

Milestone 4 - Group 1

Mon Aug 18, 2008

Ticket 186 - Daemon Remove Feature

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Introduction

The Earth daemon operates by monitoring the size and file constituency of selected directories. This functionality requires the daemon to be able to add and remove monitored directories on-the-fly. The daemon can add directories to be monitored but the feature to remove or cease monitoring directories had yet to be implemented. The only way to remove directories was to access and directly manipulate the backend database.

Task Description

Ticket 186 proposes the actual implementation of the remove directory feature and the relevant provisions already exists in the Earth daemon code. In fact, the daemon script recognises the remove option as a valid command but simply indicated that the feature is not functional. This existing deficiency provides the basis for investigating how this feature can be effectively integrated into the existing codebase.

Implementation

To help ensure that the implementation of the remove feature is consistent with the original vision of the Earth project developers, the investigative tasks focussed initially on identifying the existing implementation of the add feature.

First, the following modifications were made to the Earth daemon code:

```
script/earthd

... .. @@ -217,7 +217,9 @@ class Earthd
217 217     response = talk_to_server("add #{ARGV[1]}")
218 218     puts response unless response == "OK"
219 219     when "remove"
220 220     - $stderr.puts "Remove action is currently not implemented."
220 220     + # $stderr.puts "Remove action is currently not implemented."
221 221     + response = talk_to_server("remove #{ARGV[1]}")
222 222     + puts response unless response == "OK"
221 223     when "clear"
222 224         if not daemon_running?
223 225             init_rails
... .. @@ -353,6 +355,21 @@ class Earthd
353 355         end
354 356     end
355 357
358 358 + def daemon_remove_directory(path)
359 359 +     logger.debug("received request to remove directory '#{path}')"
360 360 +     if not @booted
361 361 +         "Refusing to remove directory '#{path}': daemon hasn't booted up yet"
362 362 +     else
363 363 +         if Earth::Server::this_server.directories.exists?(:path => path)
364 364 +             dir_id = Earth::Server::this_server.directories.find(:first, :conditions => [ "path = ?", path]).id
365 365 +             Earth::Server::this_server.directories.destroy(dir_id)
366 366 +             return "OK"
367 367 +         else
368 368 +             return "Cannot remove directory '#{path}': path not found."
369 369 +         end
370 370 +     end
371 371 + end
372 372 +
356 373 def handle_client_connection(socket)
357 374     begin
358 375         message = socket.recv(1024)
... .. @@ -361,6 +378,8 @@ class Earthd
361 378     response = daemon_status()
362 379     elsif /add\s.*/ =~ message
363 380         response = daemon_add_directory(File.expand_path(message[3..-1].strip))
381 381 +     elsif /remove\s.*/ =~ message
382 382 +         response = daemon_remove_directory(File.expand_path(message[6..-1].strip))
364 383     else
365 384         response = "Cannot parse message #{message}"
366 385     end
```

Figure 1: Daemon code modification.

Note: The added code snippets are highlighted green while the removed code snippets are highlighted red.

Further modifications were then made to the code to ensure that the given path name is a valid directory as shown below.

```
script/earthd
...  ... @@ -359,14 +359,20 @@ class Earthd
359 359     logger.debug("received request to remove directory '#{path}'")
360 360     if not @booted
361 361         "Refusing to remove directory '#{path}': daemon hasn't booted up yet"
362 362     +   elsif not File.exists? path
363 363     +   "Refusing to remove directory '#{path}': does not exist"
364 364     +   elsif not File.directory? path
365 365     +   "Refusing to remove directory '#{path}': not a directory"
366 366     +   elsif not File.readable? path
367 367     +   "Refusing to remove directory '#{path}': not readable"
368 368     else
369 369         if Earth::Server::this_server.directories.exists?(path => path)
370 370         dir_id = Earth::Server::this_server.directories.find(:first, :conditions => [ "path = ?", path]).id
371 371         Earth::Server::this_server.directories.destroy(dir_id)
372 372     -   return "OK"
373 373     else
374 374         return "Cannot remove directory '#{path}': path not found."
375 375     +   "OK"
376 376     end
377 377 end
378 378
```

Figure 2: Validating directory path.

The following changes were then made to the model, controller and view codes respectively to enable the execution of the directory removal feature from the web-based user interface.

```

app/models/earth/server.rb
...
@@ -144,6 +144,13 @@ module Earth
144 144     exec("#{@daemon} add #{directory_name}")
145 145     end
146 146     end
147 147
148 148     - end
149 149     + def remove_directory(directory_path)
150 150     +     initialize_daemon
151 151     +     fork do
152 152     +         puts "Removing monitored directory"
153 153     +         exec("#{@daemon} remove #{directory_path}")
154 154     +     end
155 155     + end
156 156 end

```

Figure 3: Modified model code.

```

app/controllers/servers_controller.rb
...
@@ -163,14 +163,36 @@ class ServersController < ApplicationController
163 163     render :update do |page|
164 164     # update the status
165 165     if @added
166 166     -     page.replace_html 'adding_directory_message', "<font color=blue>[ Adding '#{@val}' directory. (~ls) ]</font>"
167 167     +     page.replace_html 'updated_directory_message', "<font color=blue>[ Adding '#{@val}' directory. (~ls) ]</font>"
168 168     else
169 169     -     page.replace_html 'adding_directory_message', "<font color=blue>[ Please specify directory name. ]</font>"
170 170     +     page.replace_html 'updated_directory_message', "<font color=blue>[ Please specify directory name. ]</font>"
171 171     end
172 172     # highlight the updated div - so client notices
173 173     - page.visual_effect :highlight, 'adding_directory_message'
174 174     + page.visual_effect :highlight, 'updated_directory_message'
175 175     end
176 176     end
177 177
178 178     + # PUT /servers/1
179 179     + # PUT /servers/1.xml
180 180     + def removedir
181 181     +     @server = Earth::Server.find(params[:id])
182 182     +     @removed = false
183 183     +     @value = params[:dir_path]
184 184     +     if @value != ''
185 185     +         @server.remove_directory(@value)
186 186     +         @removed = true
187 187     +     end
188 188     +     render :update do |page|
189 189     +         # update the status
190 190     +         if @removed
191 191     +             page.replace_html 'updated_directory_message', "<font color=blue>[ Removing '#{@value}' directory"
192 192     +             page.replace_html 'updated_directory_message', "<font color=blue>[ Please verify directory name."
193 193     +         end
194 194     +         # highlighted the updated div - so client notices
195 195     +         page.visual_effect :highlight, 'updated_directory_message'
196 196     +     end
197 197     + end
198 198 end

```

Figure 4: Modified controller code.

```

app/views/servers/show.html
...
58 @@ -58,6 +58,7 @@
59     %th.directory-count Total Directories
60     %th.file-count Total Files
61     %th.indexed Indexed
62 +   %th.remove Remove
63 -   for root in Earth::Directory::roots_for_server(@server)
64     %tr
65       %td.icon.directory
66     @@ -66,6 +67,10 @@
67       %td.directory-count= number_with_delimiter(root.recursive_directory_count)
68       %td.file-count= number_with_delimiter(root.size.count)
69       %td.indexed= root.cache_complete? ? "Yes" : "Pending"
70 +   %td.remove
71 +   - remote_form_for(:server, :url => url_for(:action => :removedir, :params => {:id => @server.id}), :html => {:n
72 +   %input{:type => "hidden", :id => "remove_dir_path", :name => "dir_path", :value => root.path}
73 +   = submit_tag "Delete", :id => "remove_dir_button", :onclick => "refreshNow()"
69 74
70 75
71 76 - remote_form_for(:server, :url => url_for(:action => :add_dir, :params => {:id => @server.id}), :html => { :multipart
...
79 @@ -79,7 +84,7 @@
80     %font{:color => "red", :size => "3"}Attention: Directory can only be added if daemon is running.
81 86
82 -.%p{:id => 'adding_directory_message'}
87 +.%p{:id => 'updated_directory_message'}
83 88
84 89 %h2= "Users space usages on " + @server.name
85 90 %table#server-space_usage

```

Figure 5: Modified view code.

The following additional modification was then made to the view code to sort the list of monitored folder in ascending alphabetical order.

```

app/views/servers/show.html
...
59 @@ -59,7 +59,9 @@
60     %th.file-count Total Files
61     %th.indexed Indexed
62     %th.remove Remove
63 -   for root in Earth::Directory::roots_for_server(@server)
64 +   - @directories = Earth::Directory::roots_for_server(@server)
65 +   + @directories.sort!{|a,b| a.name <=> b.name}
66 +   for root in @directories
67     %tr
68       %td.icon.directory
69       %td.path= root.name

```

Figure 6: Modified view code to sort directory listing.

Unfortunately, these changes would cause the unexpected termination of the daemon whenever the remove method is invoked. Apparently, the removal action introduced some inconsistencies between the cached data and the directories array which would trap the daemon on subsequent updates. The following modification was then made to the file monitor plugin to resolve this data consistency issue.

```

lib/earth_plugins/file_monitor.rb

120 121
121 122   def directory_saved(node)
...  ...   @@ -243,6 +244,13 @@ private
243 244   def run(directories, force_update_time=nil)
244 245     # At the beginning of every update get the server information in case it changes on the database
245 246     server = Earth::Server.this_server
247
248   +   # FL - Checks consistency of directories array to prevent daemon
249   +   #   dying when removing a directory.
250   +   if not directories.length == Earth::Directory.roots_for_server(server).length
251   +     directories = Earth::Directory.roots_for_server(server)
252   +   end
253   +
246 254   update_time = force_update_time || server.update_interval
247 255   # Hmm.. children_count doesn't include itself in the count
248 256   directory_count = directories.map{|d| d.children_count + 1}.sum

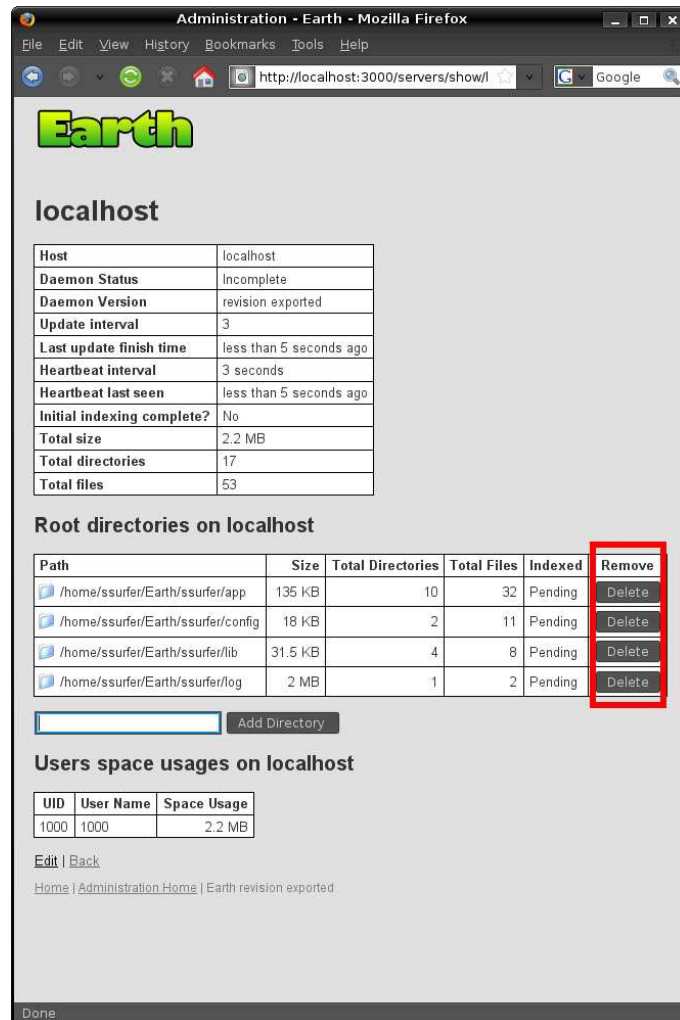
```

Figure 7: Modified file monitor code to resolve data inconsistency.

These changes effectively enabled the resulting implementation of the daemon remove feature. Further, these code modifications were pushed onto the remote github repository (ssurfer/earth.git) before it would be further propagated onto the Group 1 repository (sepg2sg1/earth.git).

Results

Apart from the code snippets presented in the previous section, the only other visual outcome of this task were the delete buttons column on the monitored directories listing as shown in the following screenshot.



The screenshot shows the Earth Administration interface in a Mozilla Firefox browser window. The address bar displays `http://localhost:3000/servers/show/`. The page title is "Administration - Earth - Mozilla Firefox". The interface includes a menu bar (File, Edit, View, History, Bookmarks, Tools, Help) and a search bar (Google). The main content area is titled "localhost" and features a table with system information, a table of root directories, and a table of user space usages.

localhost

Host	localhost
Daemon Status	Incomplete
Daemon Version	revision exported
Update interval	3
Last update finish time	less than 5 seconds ago
Heartbeat interval	3 seconds
Heartbeat last seen	less than 5 seconds ago
Initial indexing complete?	No
Total size	2.2 MB
Total directories	17
Total files	53

Root directories on localhost

Path	Size	Total Directories	Total Files	Indexed	Remove
/home/ssurfer/Earth/ssurfer/app	135 KB	10	32	Pending	Delete
/home/ssurfer/Earth/ssurfer/config	18 KB	2	11	Pending	Delete
/home/ssurfer/Earth/ssurfer/lib	31.5 KB	4	8	Pending	Delete
/home/ssurfer/Earth/ssurfer/log	2 MB	1	2	Pending	Delete

Add Directory

Users space usages on localhost

UID	User Name	Space Usage
1000	1000	2.2 MB

[Edit](#) | [Back](#)

[Home](#) | [Administration Home](#) | Earth revision exported

Done

Figure 8: Directory listing with delete column.

Discussion

For this task, the allocated time of 81 hours was adopted based on the feedback from Milestone 3 wherein a preliminary study was conducted. This time was subdivided into the following subtasks in the Milestone 4 Plan document:

1. Investigate the existing add feature of the daemon. (8hrs)
2. Identify the relevant components of the remove feature. (16hrs)
3. Design and code an effective implementation of the remove feature. (40hrs)
4. Test and integrate solution to the Subgroup 1 codebase. (16hrs)
5. Update the Earth Trac system. (1hr)

The actual recorded work took 87 hours (log included as Appendix) which in hindsight, appeared to have been over budgeted for a relatively minor and isolated task. However, the task assumed an intermediate level of Ruby On Rails understanding and in-depth knowledge of the earth application. This particular skillset was limited at the commencement of this current milestone and a significant amount of resources (time) had to be expanded in order to complete the planned task. Nevertheless, a significant understanding of the earth application was attained as a result which would certainly be valuable for proceeding with the more challenging tasks of later milestones.

Conclusion

The daemon remove feature was implemented with appropriate modifications in relevant files on the Earth project codebase. Further, a simple adaptation of the remove feature on the web user interface was included for completeness.

Acknowledgement

The code snippets included in this document were extracted using the source view feature of the github repositories where the project codebase is controlled and distributed.

Appendix - Development Log

Note Figures rounded to nearest hour in some cases and every effort made to keep this log as accurate and informative as possible.

Semester 2 Week 1

Monday Jul 28, 2008

1300 - 1500 hrs

Attended main group meeting and discussed planned tasks for Milestone 4.

Daily Total: 2 hrs

Tuesday Jul 29, 2008

0800 - 1100 hrs

Drafted Milestone 4 plan for Group 1 and discussed resource planning with other group members.

1500 - 1700 hrs

Completed and submitted Milestone 4 plan for Group 1.

Daily Total: 5hrs

Wednesday Jul 30, 2008

0800 - 1100 hrs

Investigate implementation of add directory feature.

1300 - 1600 hrs

Revisit rails documentation on ActiveRecord::Base class. (Ref: The Rails Way)

1900 - 2100 hrs

Trace add directory implementation code through the application.

Daily Total: 8 hrs

Thursday Jul 31, 2008

0800 - 1100 hrs

Advanced Rails Tutorial (Ref: Wrox Beginning Rails).

1230 - 1530 hrs

Continued with Advanced Rails Tutorial (Ref: Wrox Beginning Rails).

Daily Total: 6 hrs

Friday Aug 1, 2008

0800 - 1100 hrs

Continued with Advanced Rails Tutorial (Ref: Wrox Beginning Rails).

1300 - 1600 hrs

Revisited earth code on add directory feature and identified remove feature components on MVC framework.

Daily Total: 6 hrs

Weekly Total: 27 hrs

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Semester 2 Week 2

Monday Aug 4, 2008

1300 - 1400 hrs

Attended main group meeting and discussed progress.

1600 - 1900 hrs

Continued with coding as planned design had to be revised.

Daily Total: 4 hrs

Tuesday Aug 5, 2008

1300 - 1600 hrs

Code and progressively test the remove feature implementation.

1800 - 2100 hrs

Continued with coding.

Daily Total: 6 hrs

Wednesday Aug 6, 2008

1400 - 1500 hrs

Attended Group 1 subgroup meeting with Dr. Li.

1800 - 2100 hrs

Continued with the coding. Delete method still doesn't work.

Daily Total: 4 hrs

Thursday Aug 7, 2008

0800 - 1100 hrs

Continued with coding. Monday Aug 3, 2008

1900 - 2200 hrs

Continued with coding.

Daily Total: 6 hrs

Friday Aug 8, 2008

1300 - 1600 hrs

Revisited base class to find out the SQL statement of the delete and delete_all method.

1800 - 2200 hrs

Still no luck with actual removal action.

Daily Total: 6 hrs

Weekly Total: 26 hrs

=====

Semester 2 Week 3

Sunday Aug 10, 2008

1000 - 1400 hrs

Tested various methods in ActiveRecord::Base class to identify most suitable removal method.

1600 - 1800 hrs

Identified the 'destroy' class method in ActiveRecord::Base as the best option to remove directory for the daemon.

Daily Total: 6 hrs

Monday Aug 11, 2008

1300 - 1400 hrs

Group Meeting at SE Meeting Room

2000 - 0000hrs

Investigated the termination of the daemon when removing a directory. Still not resolved.

Daily Total: 5 hrs

Tuesday Aug 12, 2008

1200 - 1530 hrs

Traced through daemon execution sequence to identify termination condition.

1700 - 2330 hrs

Continued with above unresolved task.

Daily Total: 10 hrs

Wednesday Aug 13, 2008

1000 - 1500 hrs

Devised test script to trap daemon execution sequence. Found 'culprit' code in file monitor plugin module (file_monitor.rb).

Daily Total: 5 hrs

Thursday Aug 14, 2008

2000 - 2300 hrs

Verified conformance of remove feature with existing unit tests.

Daily Total: 3 hrs

Friday Aug 15, 2008

0800 - 1000 hrs

Repeated unit and function tests. Updated remote group 1 repository (segrp2sg1/earth.git).

1130 - 1330 hrs

Tested repository code on uni machine and prepared for group presentation.

1400 - 1500 hrs

Attended milestone 4 presentation.

Daily Total: 5 hrs

Weekly Total: 34 hrs

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