SUSE

05 DECEMBER 2022

QE: First results from testsuite profiling

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A testsuite that can take its time

Lengthy runtimes

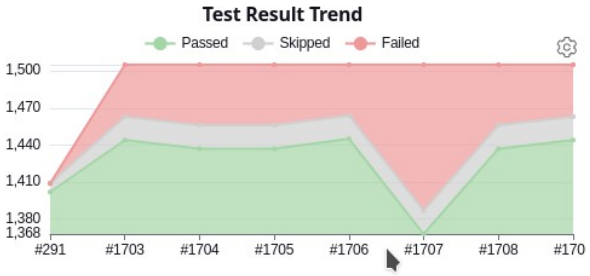
It can take more than 10 hours to run a full testsuite checking, which provides a very slow feedback on recent changes.

Some cards oriented towards optimising this runtime are already work in progress.

Profiling the testsuite can provide some insight as to where those efforts could be focused on in order to optimise this running time.

This is a first overview of what this profiling work provided.

Repo with raw data and graphs: https://github.com/elariekerboull/testsuiteProfiling



Stage View

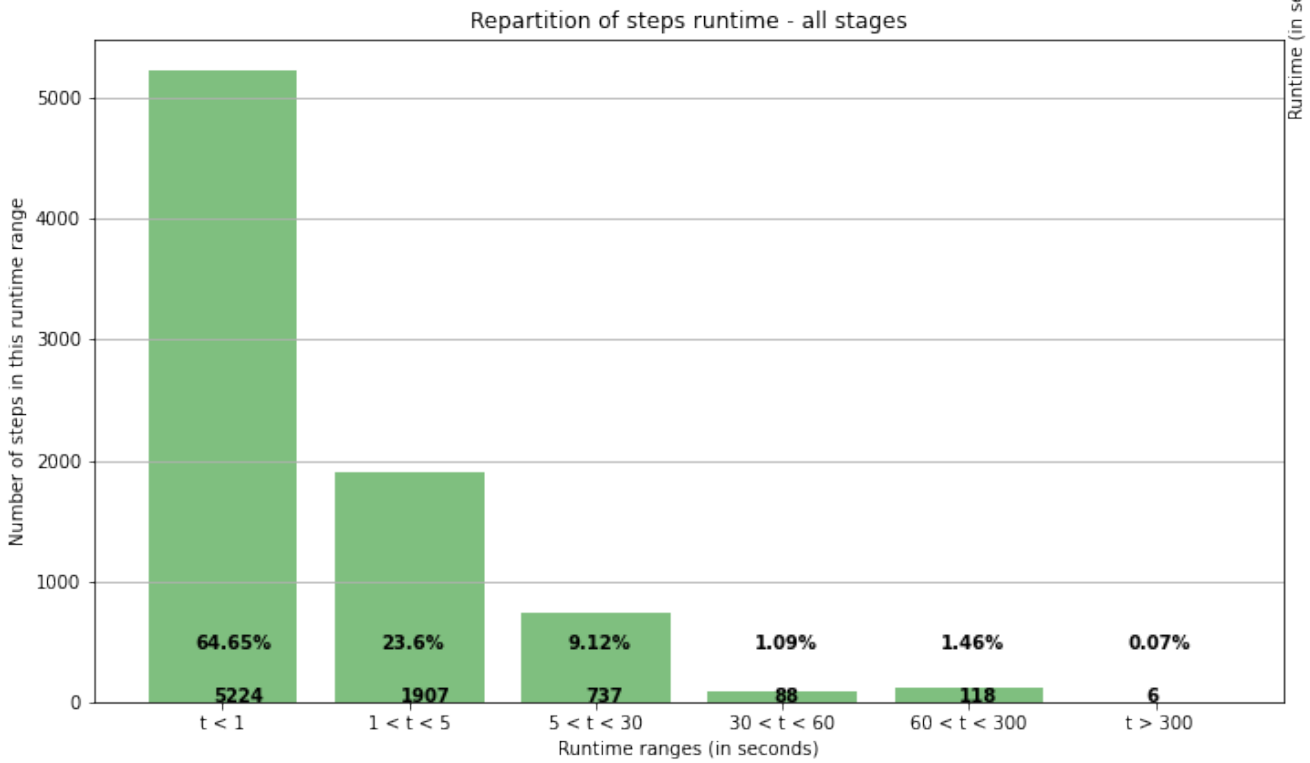
	Checkout pipeline	Clone terracumber, susemanager-ci and sumaform	Deploy	Product changes	Sanity Check	Core - Setup	Core - Initialize clients	Secondary features	Save TF state	Get results
Average stage times:	3s	35s	32min 53s	4s	56s	1h 23min	29min 9s	9h 4min	6s	12min 21s
#1710 Dec 01 04:11 No Changes	2s	19s	32min 36s	4s	58s	1h 21min	29min 15s	8h 47min failed	5s	12min 59s
#1709 Nov 30 16:19 2 commits	3s	1min 3s	32min 59s	4s	56s	1h 30min	29min 34s	9h 3min failed	5s	12min 12s
#1708 Nov 30 04:41 No Changes	2s	18s	32min 35s	4s	57s	1h 21min	29min 12s	9h 0min failed	15s	12min 25s
#1707										

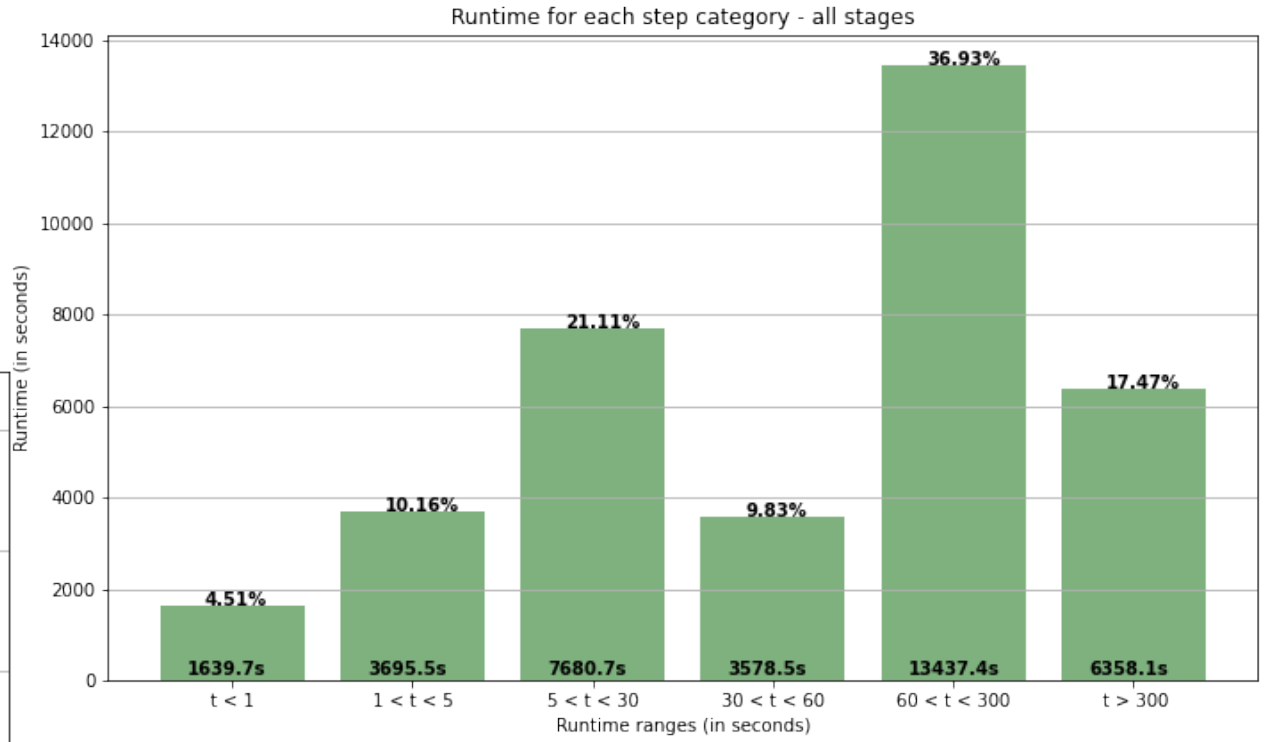
Profiling using cucumber

Running features using “cucumber --format usage” provides an overview of the time taken by each step of the feature under the following format: (cleaned version)

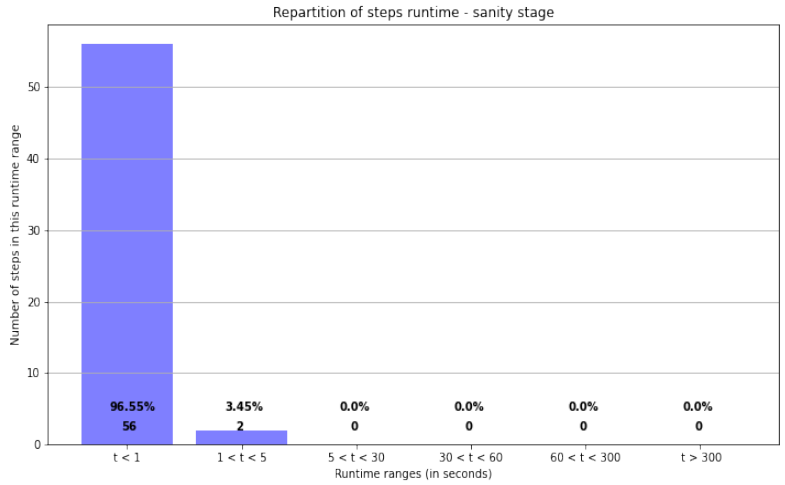
```
# Step definition and average runtime for this step
11.2087984 /^I have a property "([^"]*)" with value "([^"]*)" on "([^"]*)"$/                  # features/step_definitions/navigation_steps.rb:1041
  # Run time for this specific occurrence of the step
  11.2500642 Given I have a property "City" with value "Little Whinging" on "sle_minion"       # features/secondary/srv_advanced_search.feature:23
  11.1675326 Given I have a property "State/Province" with value "Surrey" on "sle_minion"      # features/secondary/srv_advanced_search.feature:32
10.4589200 /^I should see a "([^"]*)" text$/                                                   # features/step_definitions/navigation_steps.rb:571
  10.4589200 Then I should see a "No results found." text                                      # features/secondary/srv_advanced_search.feature:20
5.7859206 /^I am authorized for the "([^"]*)" section$/                                        # features/step_definitions/navigation_steps.rb:396
  5.7859206 Given I am authorized for the "Admin" section                                      # features/secondary/srv_advanced_search.feature:12
1.3651015 /^I click on the search button$/                                                     # features/step_definitions/navigation_steps.rb:1075
  2.5521624 And I click on the search button                                                   # features/secondary/srv_advanced_search.feature:19
  0.0000000 And I click on the search button                                                   # features/secondary/srv_advanced_search.feature:28
  0.0000000 And I click on the search button                                                   # features/secondary/srv_advanced_search.feature:37
  0.0000000 And I click on the search button                                                   # features/secondary/srv_advanced_search.feature:46
  3.5617212 And I click on the search button                                                   # features/secondary/srv_advanced_search.feature:54
  2.0767256 And I click on the search button                                                   # features/secondary/srv_advanced_search.feature:61
...
```

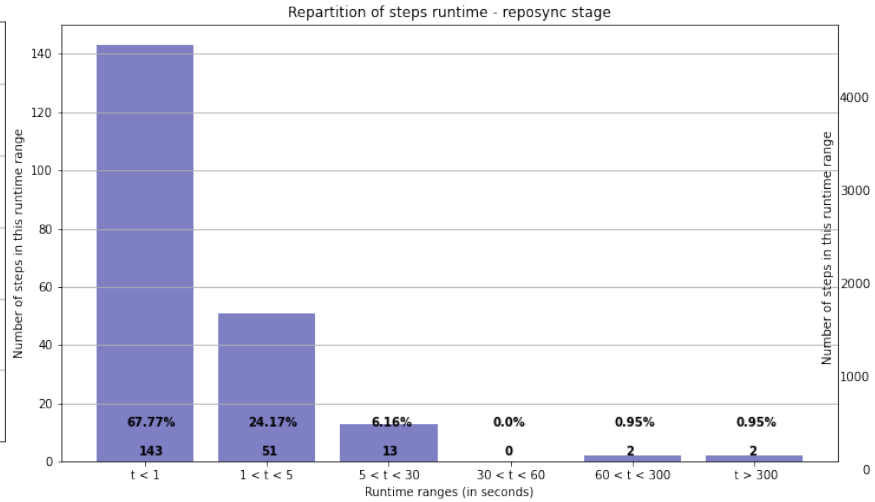
All stages

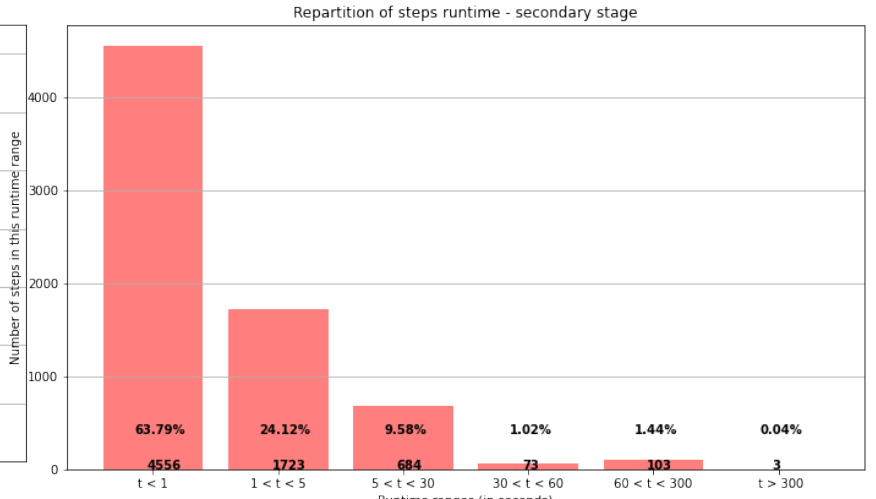


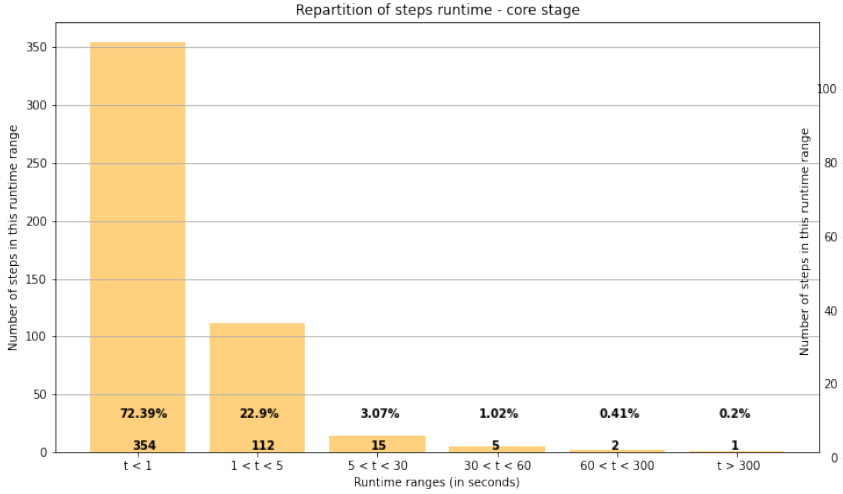


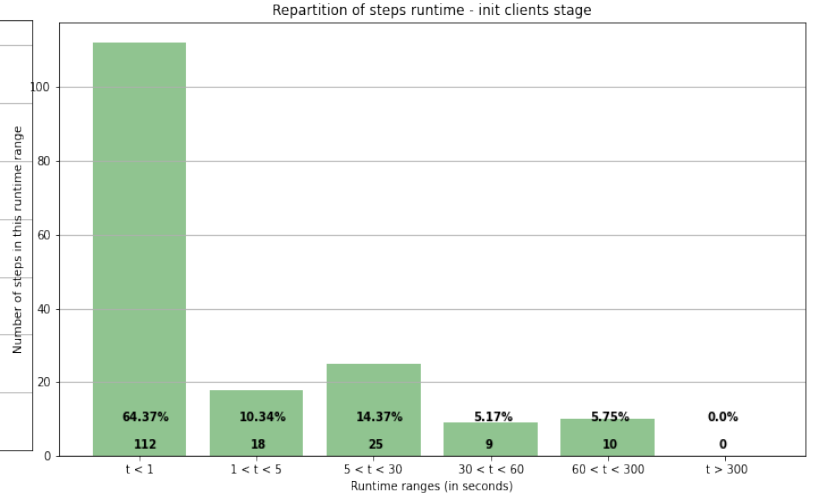
6 distinct stages

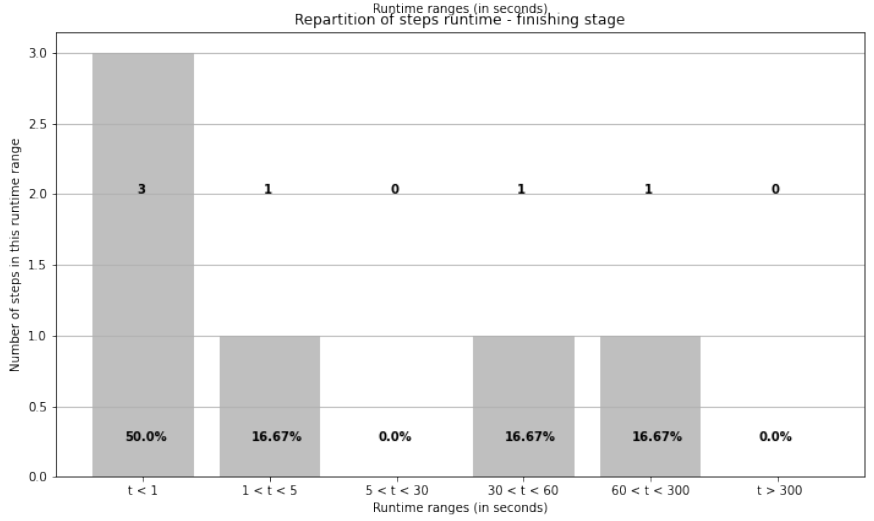




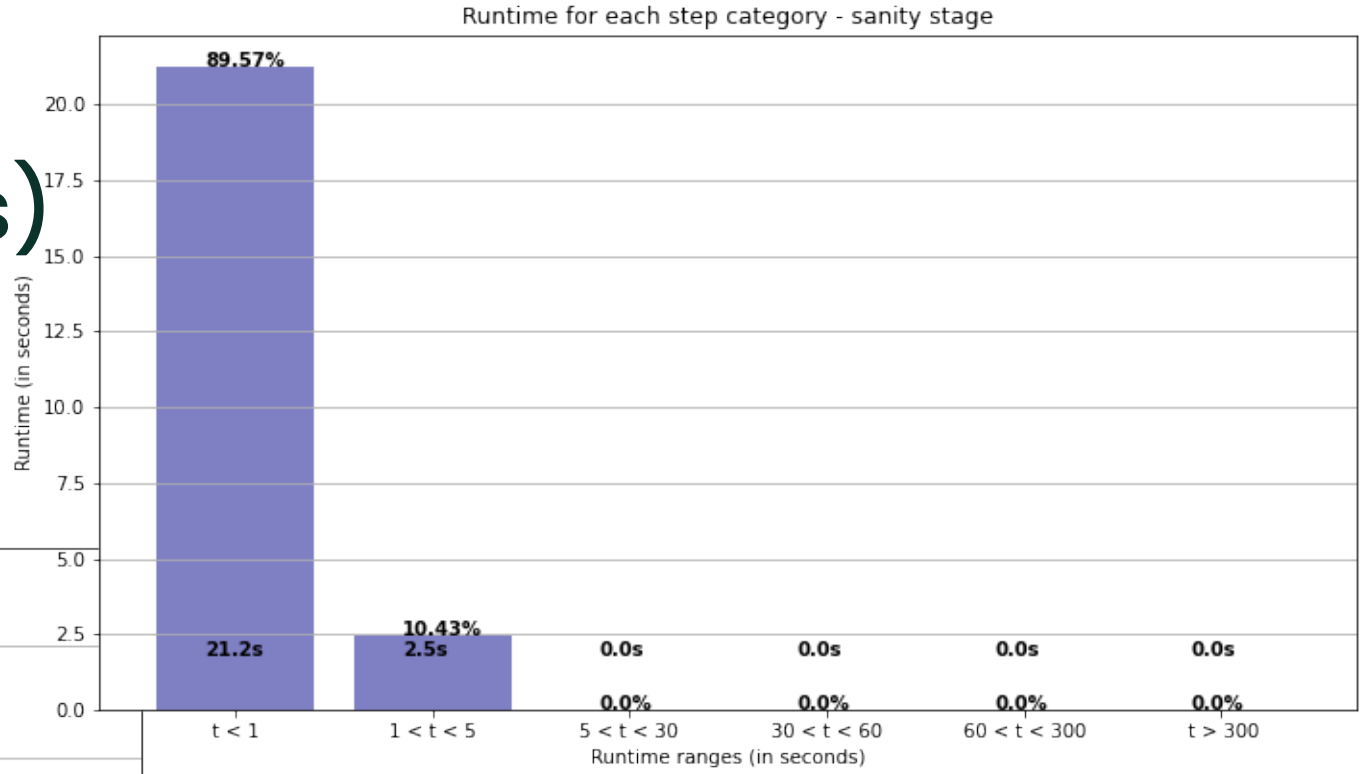


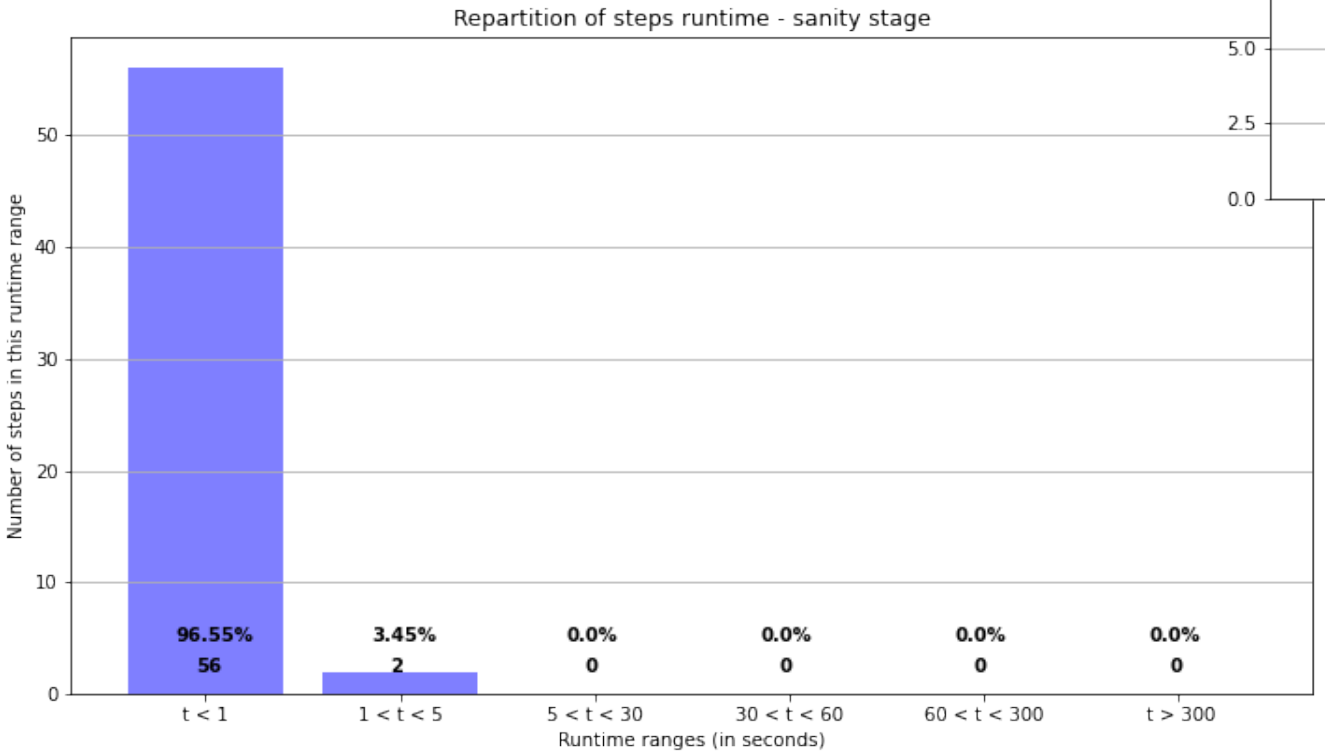




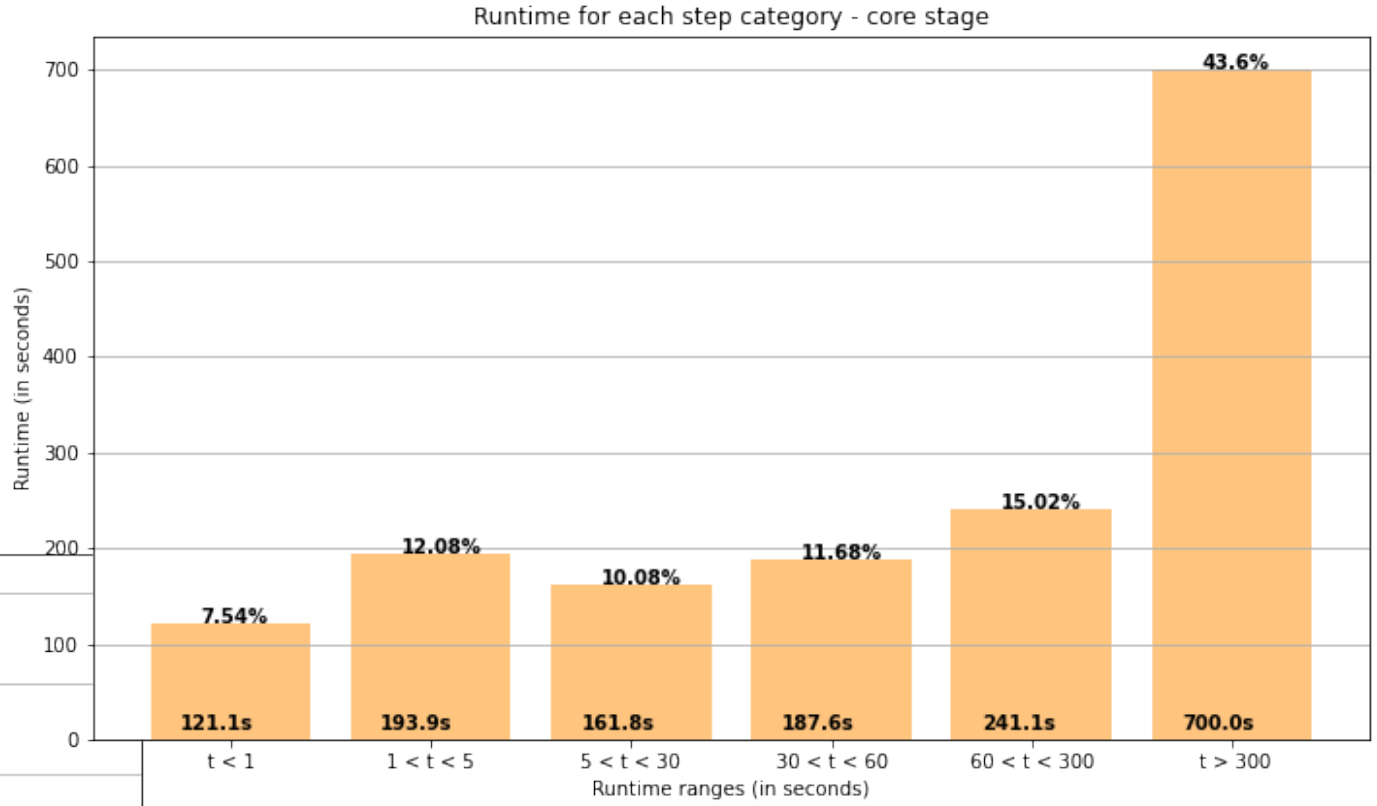


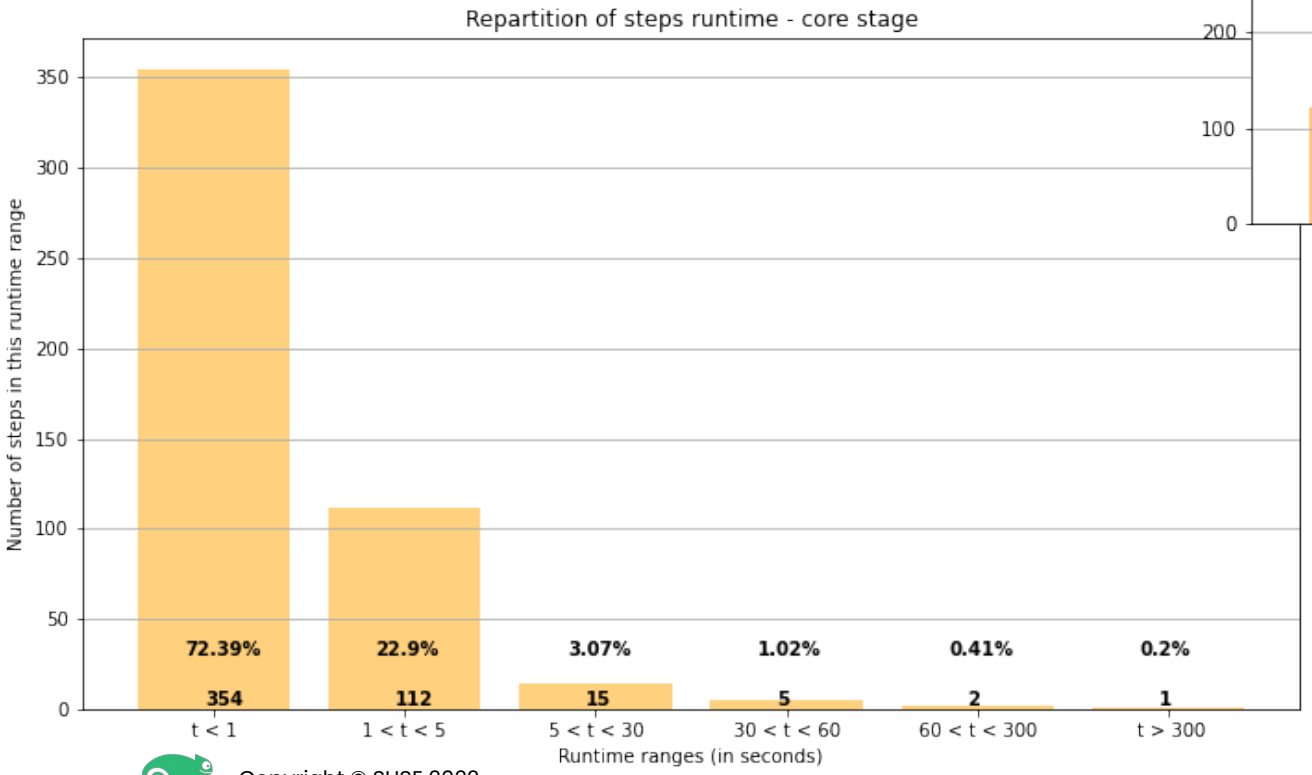
Sanity stage (~23 seconds)



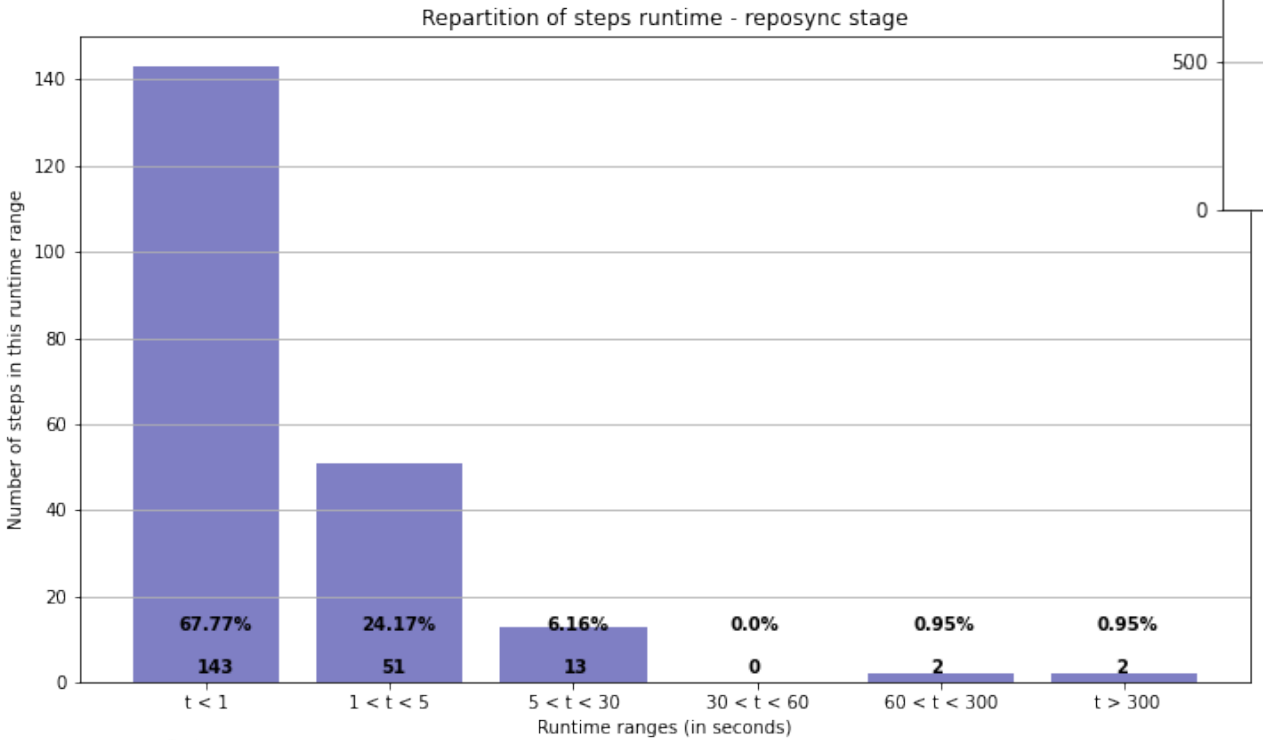


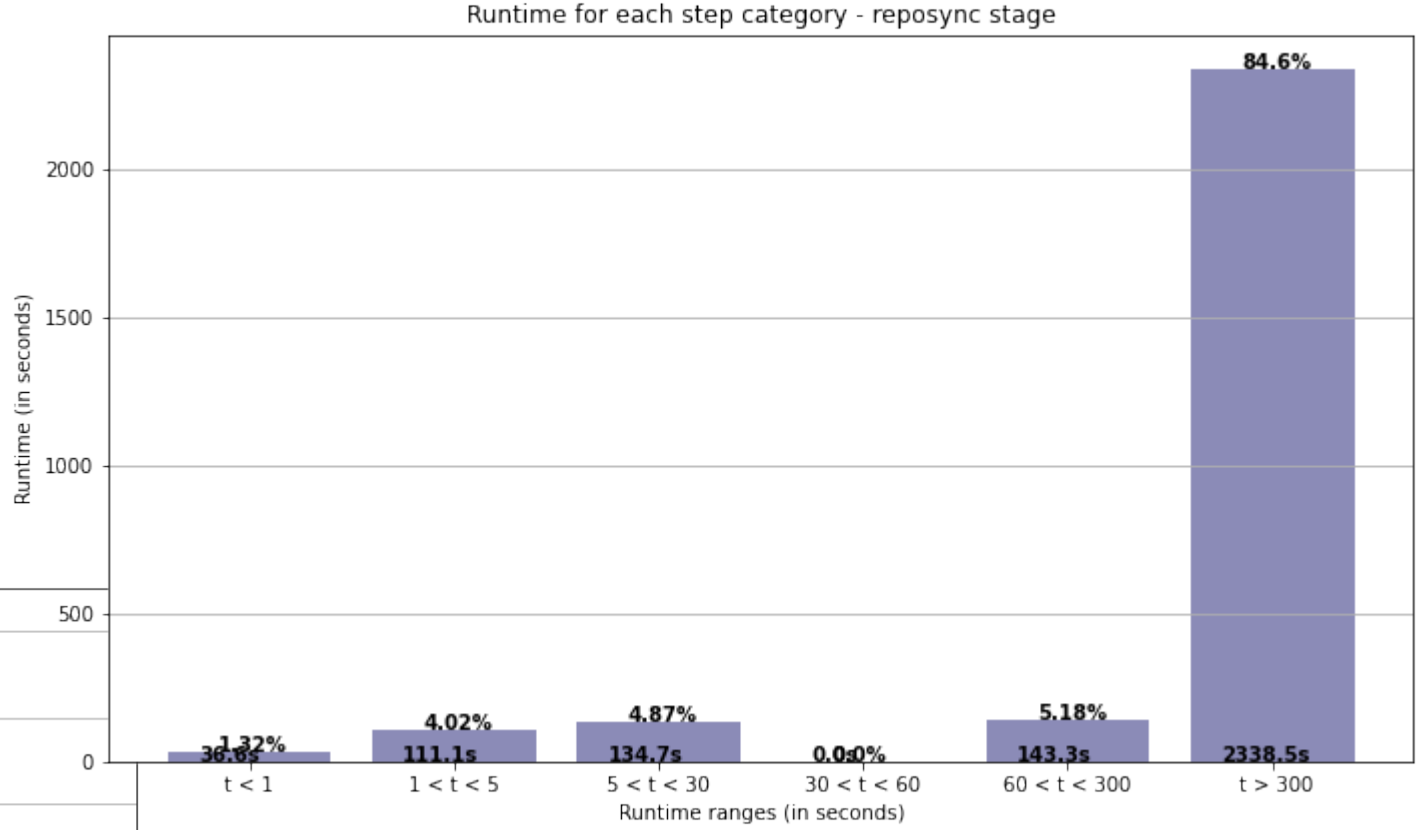
Core stage (~1605s or 26m45s)



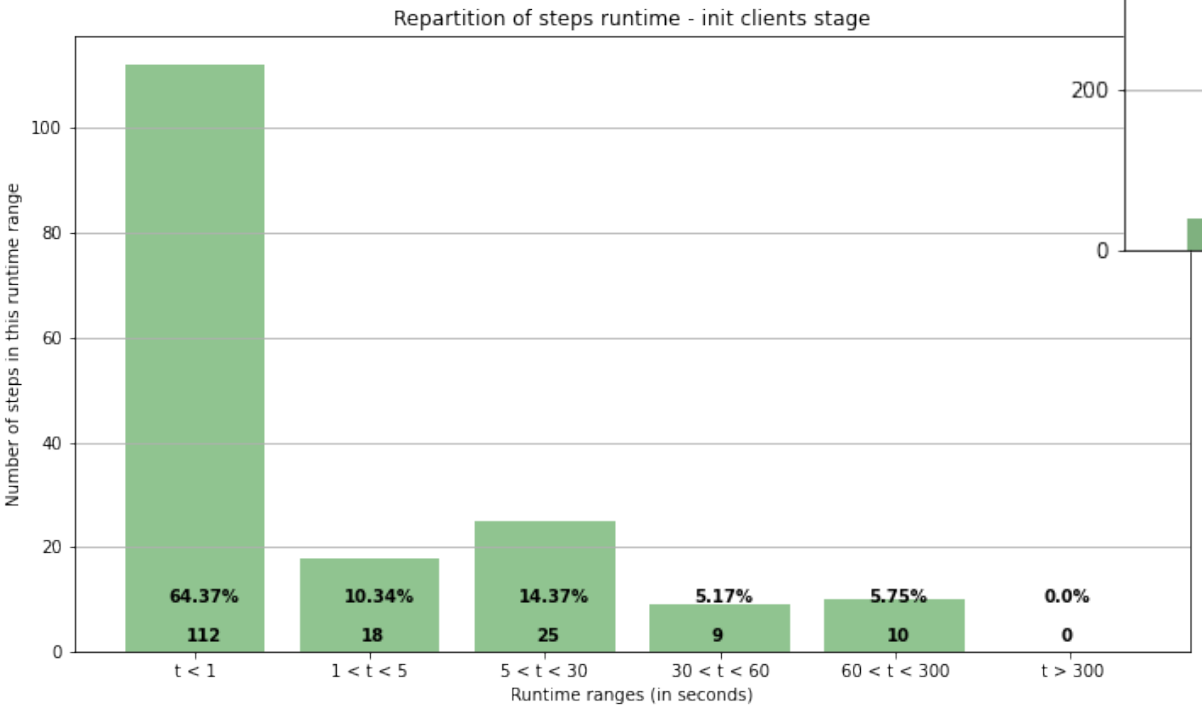


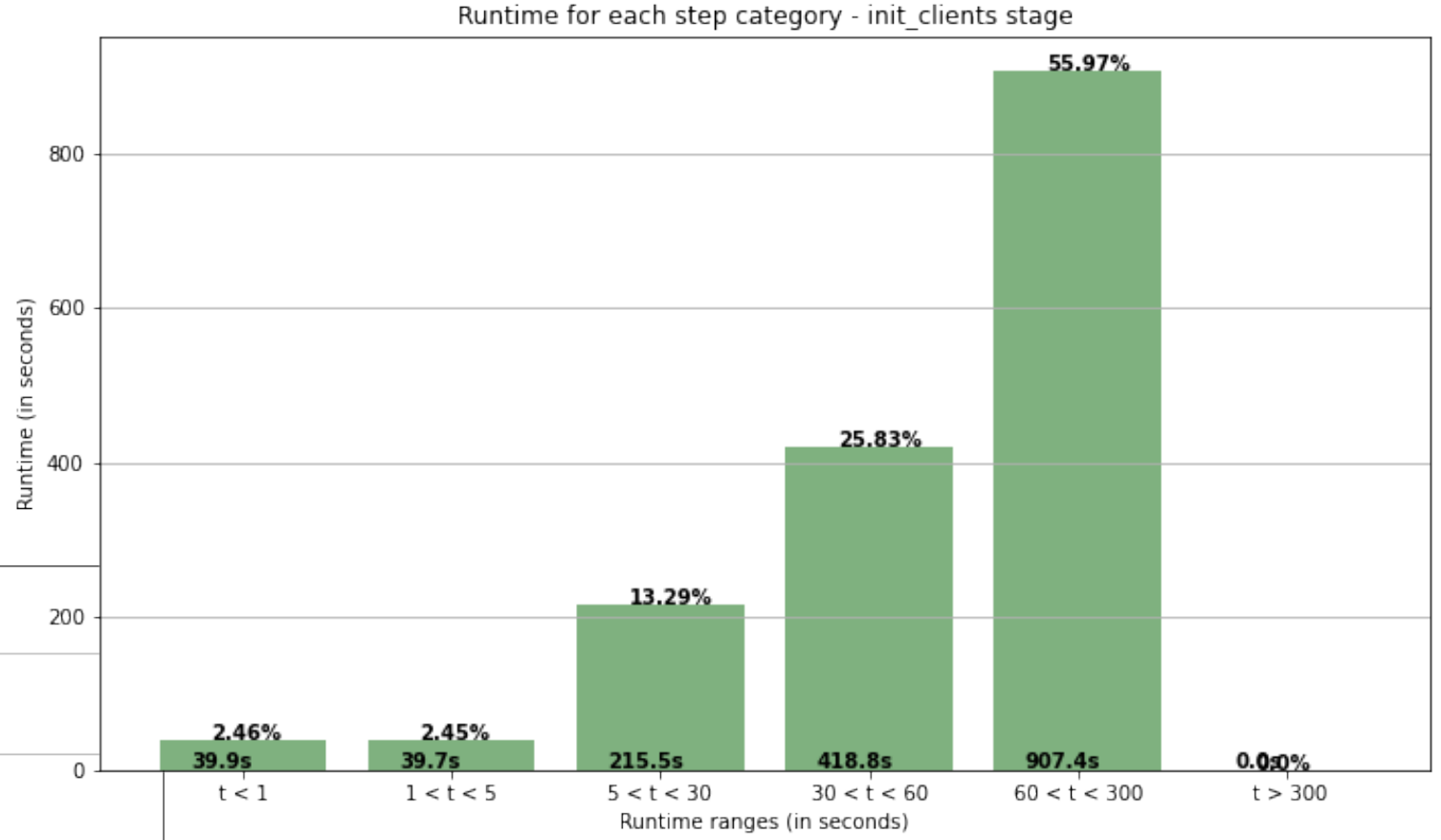
Reposync stage (2764s or 46m4s)



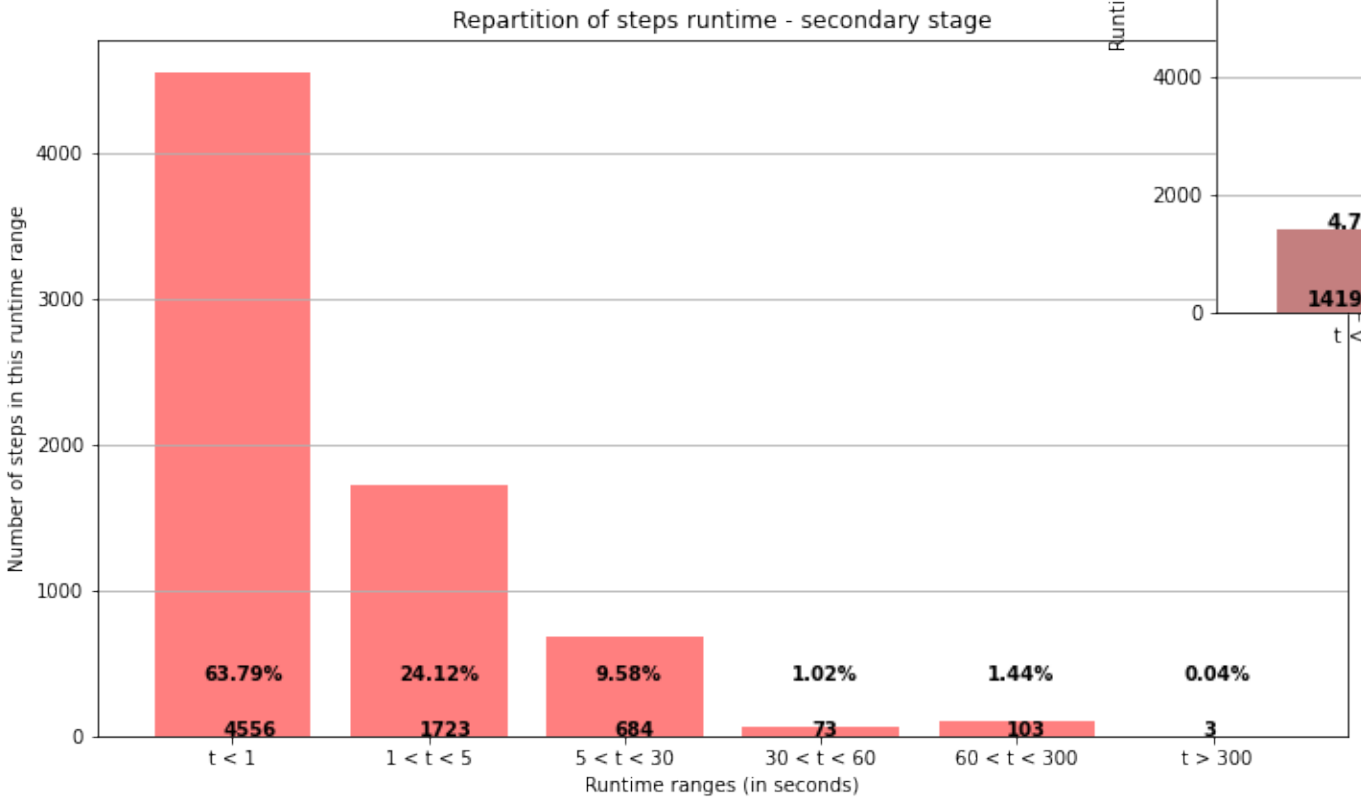


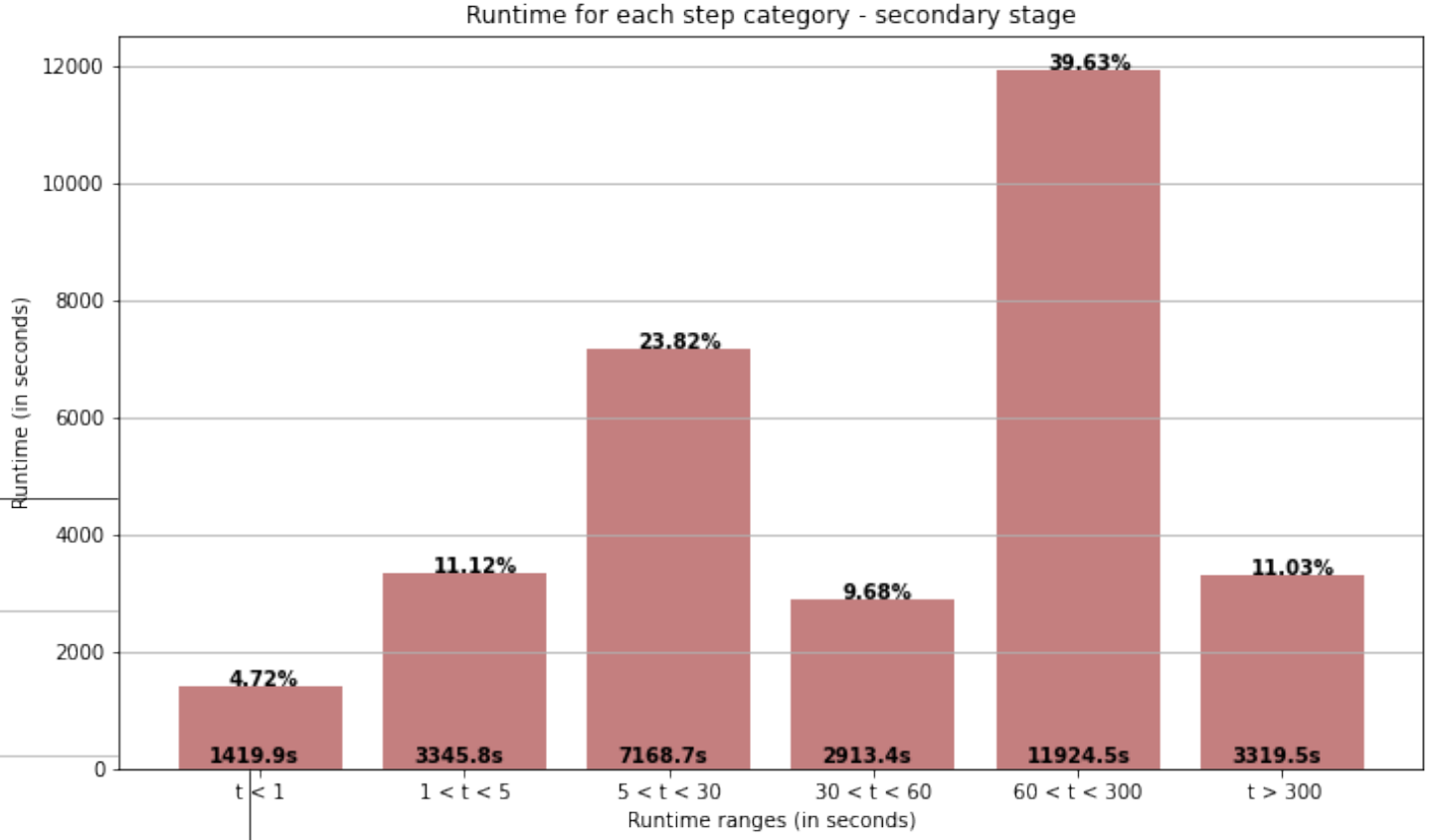
Init clients stage (1620s or 27m)



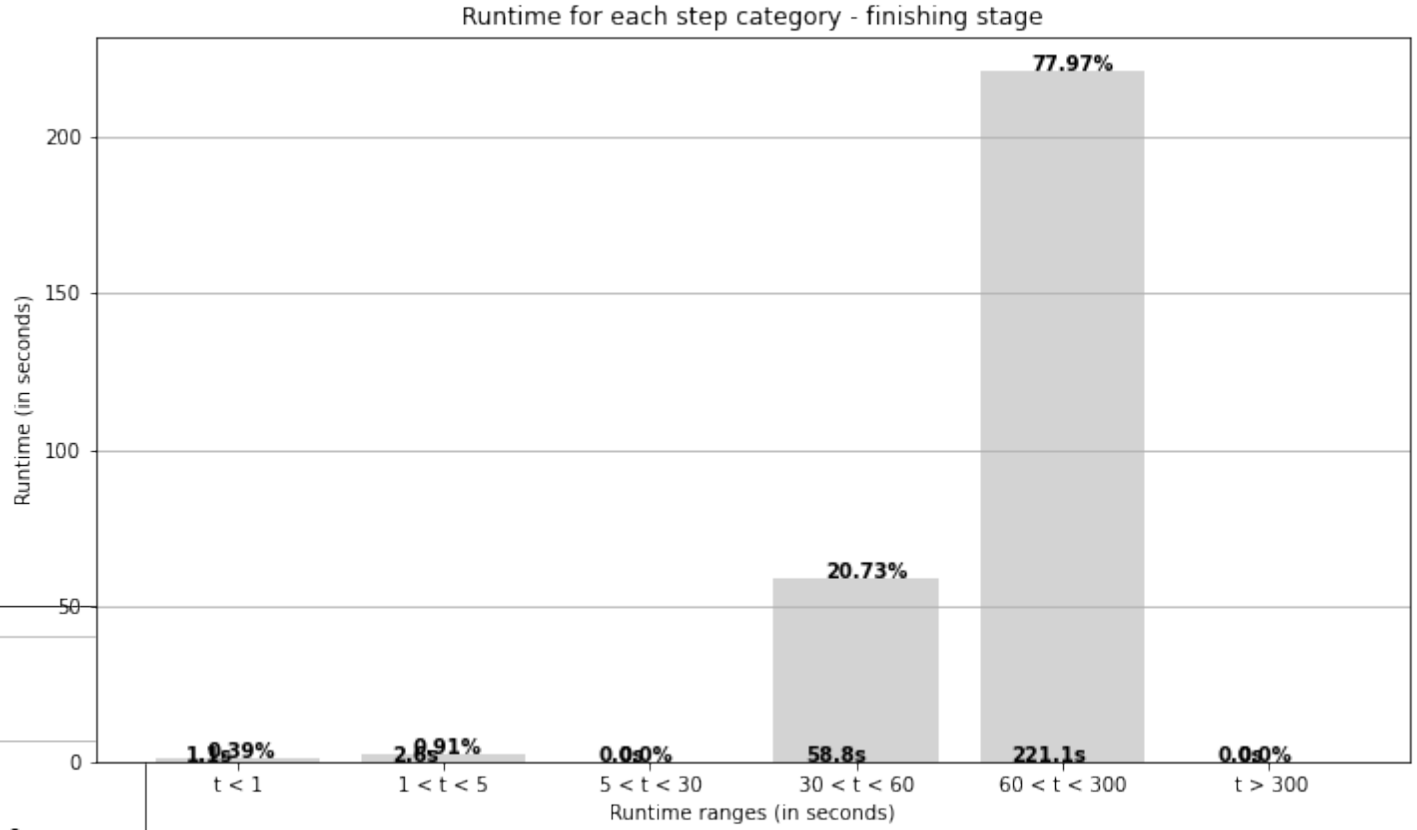


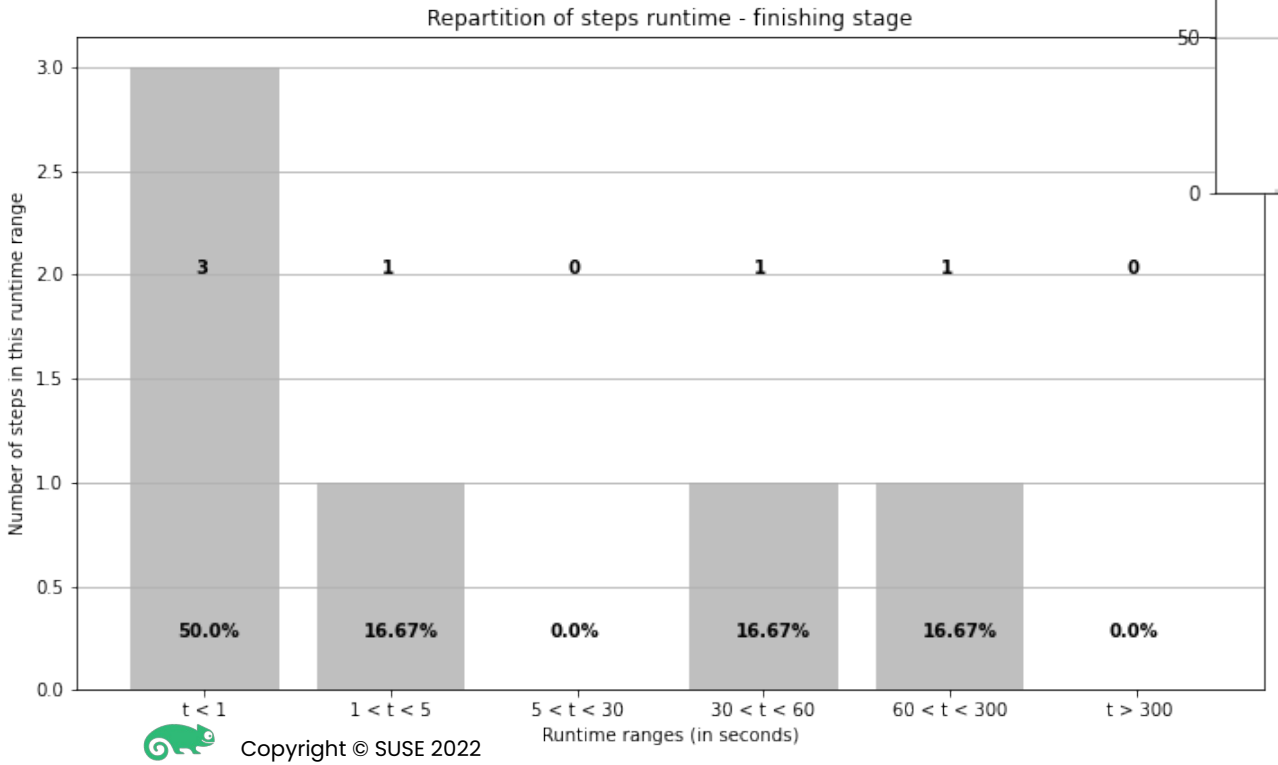
Secondary stage (~30000s or 8h20m)





Finishing stage (~280s or 4m40s)





Very lengthy steps

1005s And I wait until all spacewalk-repo-sync finished	# features/reposync/srv_add_rocky8_repositories.feature:55
1333s When I kill all running spacewalk-repo-sync, excepted the ones needed to bootstrap	# features/reposync/srv_wait_for_reposync.feature:17
1772s When I wait until the image build "suse_os_image" is completed	# features/secondary/buildhost_osimage_build_image.feature:50
700s And I wait for "700" seconds	# features/core/proxy_branch_network.feature:200
768s And I wait at most 1200 seconds until Salt master sees "pxeboot_minion" as "unaccepted"	# features/secondary/proxy_cobbler_pxeboot.feature:89
779s And I wait at most 1000 seconds until Salt master sees "test-vm2" as "unaccepted"	# features/secondary/minkvm_guests.feature:439

Two types of steps

Non-waiting steps (active)

Could potentially be optimised by adapting the step or through code optimisation

Waiting steps

We can only wait these steps out

Some steps could be run in parallel to those (WIP)

They could be resource dependent (slow processes)

Steps with runtime over one minute

Which represent ~37% of total runtime (~3h40m)

- 118 steps

- 88 of those are waiting steps
  - Average runtime of 114 seconds by step
  - They are represented by 14 unique step definitions

- 30 are active steps
  - Average runtime of 110 seconds by step
  - Represented by 16 unique step definitions
  - Most of them are called very few times (once or twice)
  - Optimisation would require work on each individual step

Steps with runtime over one minute

Active steps (~3300s or 55m)

Step definitions not involving waiting

(# of occurences) Runtime	Step	Source file
(1) 82.4830964	/^I refresh SCC$/	# features/step_definitions/command_steps.rb:295
(1) 60.7944658	/^I execute mgr\-sync refresh$/	# features/step_definitions/command_steps.rb:300
(1) 250.0649249	/^I apply highstate on "([^"]*)"$/	# features/step_definitions/command_steps.rb:229
(2) 251.5911643	/^the server starts mocking an IPMI host$/	# features/step_definitions/command_steps.rb:511
(2) 114.7700303	/^I apply state "([^"]*)" to "([^"]*)"$/	# features/step_definitions/salt_steps.rb:119
(2) 90.6102990	/^I reboot the server through SSH$/	# features/step_definitions/common_steps.rb:1392
(1) 67.1474187	/^I call system\.bootstrap\(\) on host "([^"]*)" and salt\-ssh "([^"]*)"$/	# features/step_definitions/api_common.rb:27
(2) 65.7805784	/^I run spacewalk-hostname-rename command on the server$/	# features/step_definitions/common_steps.rb:1422
(10) 64.7684465	/^I check for failed events on history event page$/	# features/step_definitions/common_steps.rb:1101
(1) 61.4129839	/^I synchronize the tftp configuration on the proxy with the server$/	# features/step_definitions/command_steps.rb:605
(1) 197.2032020	/^I trigger cobbler system record on the "([^"]*)"$/	# features/step_definitions/common_steps.rb:299
(1) 169.0685101	/^I create system "([^"]*)" for profile "([^"]*)" as user "([^"]*)" with password "([^"]*)"$/	# features/step_definitions/common_steps.rb:286
(1) 154.1943175	/^I create a system record$/	# features/step_definitions/api_common.rb:69
(1) 67.1907258	/^I delete all the imported terminals$/	# features/step_definitions/retail_steps.rb:340
(2) 61.4939052	/^I add the Cobbler parameter "([^"]*)" with value "([^"]*)" to item "(distro|profile|system)" with name "([^"]*)"$/	# features/step_definitions/common_steps.rb:1375
(1) 221.1050757	/^I extract the log files from all our active nodes$/	# features/step_definitions/command_steps.rb:473

Steps with runtime over one minute

Waiting steps (~10100s or 2h48m)

Step definitions involving waiting

```
(1)   64.9930312    /^I wait until event "([^"]*)" is completed$/                                                  # features/step_definitions/common_steps.rb:132
(1)   65.7727450    /^I wait until file "([^"]*)" exists on "([^"]*)"$/                                            # features/step_definitions/command_steps.rb:712
(2)   241.1510973   /^I wait at most (\d+) seconds until file "([^"]*)" exists on "([^"]*)"$/                       # features/step_definitions/command_steps.rb:716
(1)   210.2372435   /^I wait and check that "([^"]*)" has rebooted$/                                                # features/step_definitions/command_steps.rb:731

(23) 192.1859834    /^I wait at most (\d+) seconds until event "([^"]*)" is completed$/                            # features/step_definitions/common_steps.rb:151
(7)   145.9208646   /^I wait at most (\d+) seconds until image "([^"]*)" with version "([^"]*)" is built successfully via API$/
                                                                                                                   # features/step_definitions/docker_steps.rb:33
(10) 104.7155054    /^I wait at most (\d+) seconds until image "([^"]*)" with version "([^"]*)" is inspected successfully via API$/
                                                                                                                   # features/step_definitions/docker_steps.rb:54
(16) 82.2300005     /^I wait until onboarding is completed for "([^"]*)"$/                                         # features/step_definitions/common_steps.rb:856
(1)   73.9298250    /^I wait at most "([^"]*)" seconds until I do not see "([^"]*)" text$/                         # features/step_definitions/navigation_steps.rb:81
(1)   39.9683635    /^I wait at most (\d+) seconds until I see "([^"]*)" text in the environment "([^"]*)"$/ # features/step_definitions/common_steps.rb:1177
(7)   7.7104036     /^I wait until I see "([^"]*)" text$/                                                          # features/step_definitions/navigation_steps.rb:36
(10) 53.2050744     /^I wait until I see the name of "([^"]*)", refreshing the page$/                              # features/step_definitions/navigation_steps.rb:109
(1)   28.4937906    /^I wait (\d+) seconds until the event is picked up and (\d+) seconds until the event "([^"]*)" is completed$/
                                                                                                                   # features/step_definitions/common_steps.rb:136
(7)   55.1671249    /^I wait for "(\d+)" seconds?$/                                                                # features/step_definitions/common_steps.rb:13
```

Steps with runtime between 5 and 30 seconds

Represent ~21% of total runtime (~2h8m)

- 737 steps
- 192 of those are waiting steps
  - Average runtime of 15 seconds by step
  - They are represented by 21 unique step definitions
- 545 are active steps
  - Average runtime of 9 seconds by step
  - Represented by about 75 unique step definitions
  - Some are called numerous times
  - Optimising those steps could significantly decrease overall runtime

Steps with runtime between 5 and 30 seconds

- Too numerous to list
- Some highlights

1.2153065 /^I click on "([^"]*)"$/ # features/step_definitions/navigation_steps.rb:260
Present 50 times in this runtime-range (Called over 800 times globally)

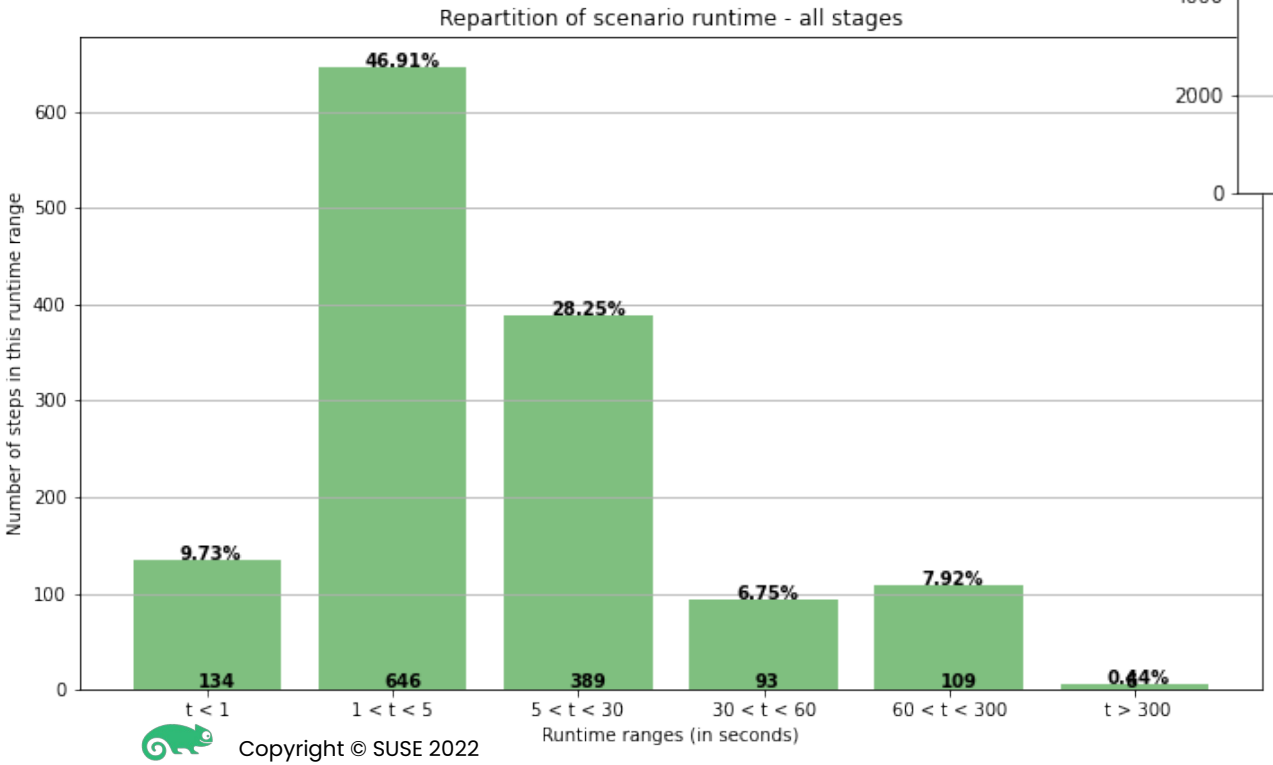
5.9464136 /^I am on the Systems overview page of this "([^"]*)"$/ # features/step_definitions/navigation_steps.rb:407
Present 250 times in this runtime-range (Called 253 times globally)
It is however composed of several steps which explains its runtime:

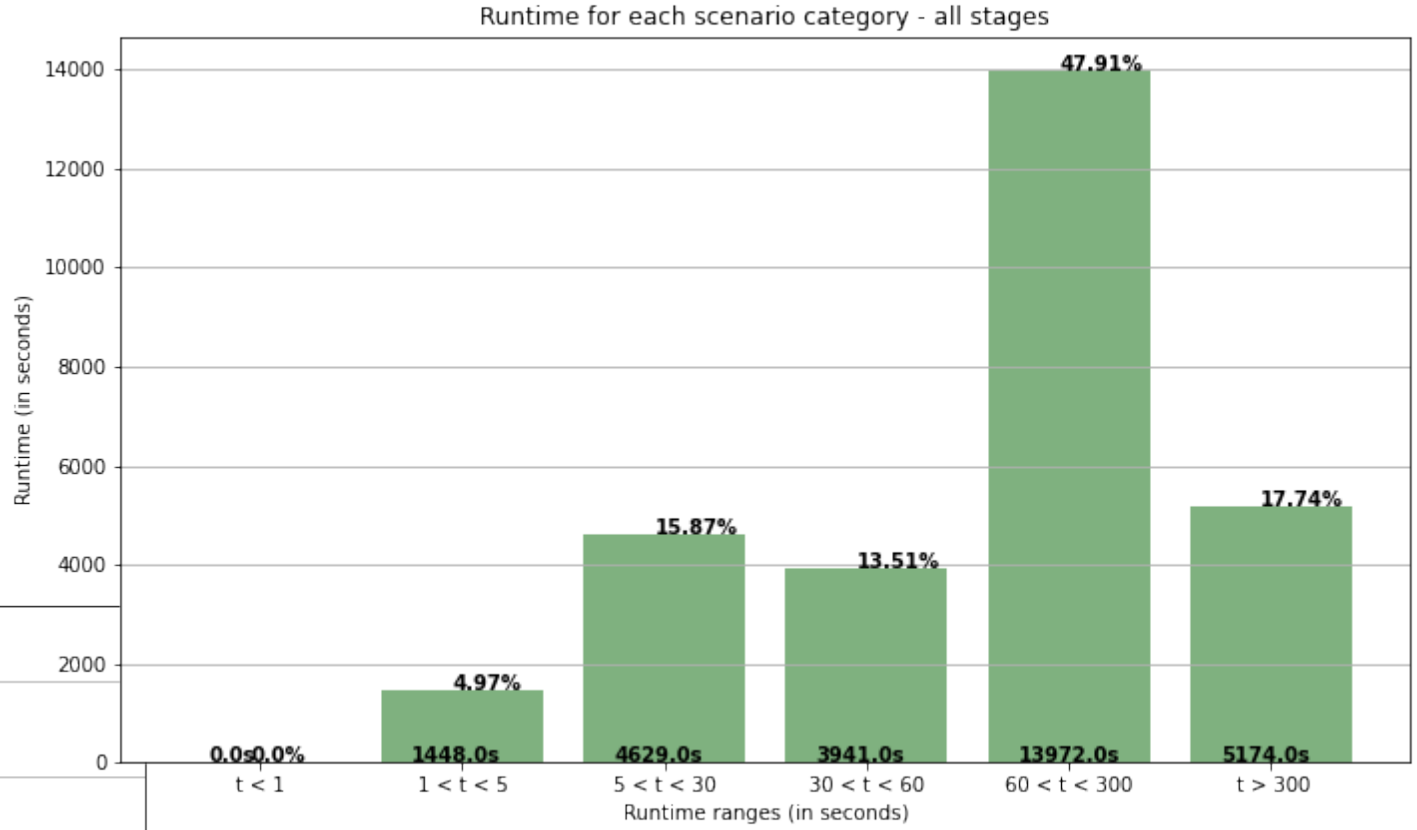
```
# access the clients
Given(/^I am on the Systems overview page of this "([^"]*)"$/) do |host|
  system_name = get_system_name(host)
  steps %(
    Given I am on the Systems page
    When I enter "#{system_name}" as "criteria"
    And I wait until I do not see "Loading..." text
    And I follow "#{system_name}"
    And I wait until I see "System Status" text
  )
end
```

Key takeaways

- Most time-consuming steps are either waiting steps or special cases
- Waiting steps could potentially be optimised with higher performances
- Steps called numerous times can be looked into to see if they can be enhanced (e.g. API calls instead of UI manipulation if possible)
- Running a ruby profiler (e.g. ruby-prof) on targeted steps could also provide more useful information
- Looking into what actually happens in some of the waiting processes -e.g. during the image building
- What else?

Scenario level





Scenario level

- Scenarios taking over 300 seconds:

```
Scenario: Disable repositories after installing branch services,700
Scenario: Kill running reposyncs or wait for them to finish,2095
Scenario: Synchronize the repositories in the custom channel for Rocky 8 DVD,514
Scenario: Check the built OS image,692
Scenario: PXE boot the PXE boot minion,631
Scenario: Create an auto installing KVM virtual machine,542
```

- 134 scenarios with a runtime of less than one second.
- Nearly half of scenarios taking between 1 and 5 minutes

Thank you

For more information, contact SUSE at:

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