



ElasTest

Testing in the Large



Funded by the
European Union

Life-cycle is too short not to use ElasTest

Antonia Bertolino, ISTI-CNR, Pisa, Italy

Francisco Gortázar, URJC, Madrid, Spain

Italian Software Testing Forum 2018

<https://elastest.io>

ElasTest project



ElasTest is a project funded by the European Commission

ElasTest: an elastic platform for testing complex distributed large software systems

Duration: From 2017-01-01 to 2019-12-31

Total cost: EUR 5 031 187,50

EU contribution: EUR 4 270 187

Coordinated in: Spain

Topic(s): ICT-10-2016 - Software Technologies

Call for proposal: H2020-ICT-2016-1



ElasTest consortium



Universidad
Rey Juan Carlos

Coordinator



Fraunhofer FOKUS (FRAUNHOFER)



Technische Universität Berlin (TUB)



Consiglio Nazionale delle Ricerche (CNR)



IMDEA Software Institute (IMDEA)



ATOS Spain (ATOS)

Zürcher Hochschule
für Angewandte Wissenschaften



Zürcher Hochschule für Angewandte
Wissenschaften (ZHAW)



Naevatec (NAEVAITEC)



IBM Ireland (IBM)



Relational (REL)

Cost of testing: 26% of total IT cost

Estimation for 2020: 32% of total IT cost

Capgemini World Quality Report 2017/2018

Testing large complex distributed applications

is hard

is time consuming

lacks / too many tools

End to end tests...

require some *infrastructure*

End to end tests...

require a lot of *effort*

End to end tests...

running under **real-world**
conditions is **hard** to achieve

End to end tests...

lack tools for
troubleshooting failures

Elastest focuses on end-to-end testing providing

infrastructure

services

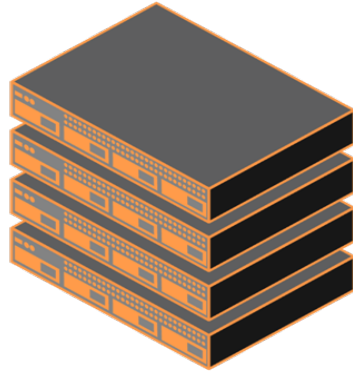
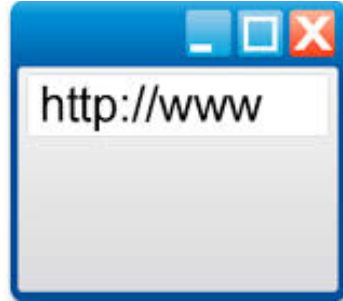
emulation of real-world conditions

troubleshooting tools

communication among team members

<https://elastest.io>

How can I use ElasTest?



Servers



Laptop

What about my tests?



Information you said?

- Projects
- TJob Execs
- Test Engines
- Test Support Services
- Log Analyzer

Chart configuration



Test Logs

```
[INFO] Downloading: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-components/18/maven-shared-components-18.pom
[INFO] Downloaded: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-components/18/maven-shared-components-18.pom (4.9 kB at 176 kB/s)
[INFO] Downloading: https://repo.maven.apache.org/maven2/com/google/code/findbugs/jsr305/2.0.1/jsr305-2.0.1.pom
[INFO] Downloaded: https://repo.maven.apache.org/maven2/com/google/code/findbugs/jsr305/2.0.1/jsr305-2.0.1.pom (965 B at 25 kB/s)
[INFO] Downloading: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-incremental/1.1/maven-shared-incremental-1.1.pom
[INFO] Downloaded: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-incremental/1.1/maven-shared-incremental-1.1.pom (4.7 kB at 139 kB/s)
[INFO] Downloading: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-components/19/maven-shared-components-19.pom
[INFO] Downloaded: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-components/19/maven-shared-components-19.pom (6.4 kB at 289 kB/s)
[INFO] Downloading: https://repo.maven.apache.org/maven2/org/apache/maven/maven-plugin-api/2.2.1/maven-plugin-api-2.2.1.pom
[INFO] Downloaded: https://repo.maven.apache.org/maven2/org/apache/maven/maven-plugin-api/2.2.1/maven-plugin-api-2.2.1.pom (1.5 kB at 43 kB/s)
```

- Dashboard
- Projects
- Web Browsers
- Log Analyzer

```

E2E : checking system message ( Student Imprudent has disconnected ) for Teacher
2018-04-04 13:29:54.074 INFO --- [ main] c.f.backend.e2e.FullTeachingTest
E2E : Logging out Teacher
2018-04-04 13:29:55.696 INFO --- [ main] c.f.backend.e2e.FullTeachingTest
E2E : Logging out successful for Teacher
2018-04-04 13:30:14.615 INFO --- [ main] c.f.backend.e2e.FullTeachingTest
E2E : ##### Finish test: oneToOneChatInSessionChrome
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 75.899 se
c - in com.fullteaching.backend.e2e.FullTeachingTestE2EChat
Results :
Tests run: 3, Failures: 0, Errors: 0, Skipped: 0
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] -----
[INFO] -----
[INFO] Total time: 04:56 min
[INFO] Finished at: 2018-04-04T13:30:14Z
[INFO] Final Memory: 53M/417M
[INFO] -----

```

```

2018-04-04 13:29:37.134 INFO 142 --- [nio-5000-exec-4] c.f.b.session.Vide
oSessionController : User 'Student Imprudent' removed
2018-04-04 13:29:37.976 INFO 142 --- [nio-5000-exec-8] c.f.backend.cours
e.CourseController : CRUD operation: Getting one course
2018-04-04 13:29:39.166 INFO 142 --- [nio-5000-exec-2] c.f.backend.securi
ty.LoginController : Logging out...
2018-04-04 13:29:39.166 INFO 142 --- [nio-5000-exec-2] c.f.backend.securi
ty.LoginController : Logged out user student1@gmail.com
2018-04-04 13:29:54.298 INFO 142 --- [nio-5000-exec-5] c.f.b.session.Vide
oSessionController : Removing user 'Teacher Cheater' from videosession
'{"lessonId":2}'
2018-04-04 13:29:54.299 INFO 142 --- [nio-5000-exec-5] c.f.b.session.Vide
oSessionController : User 'Teacher Cheater' removed
2018-04-04 13:29:54.299 INFO 142 --- [nio-5000-exec-5] c.f.b.session.Vide
oSessionController : Last user removed from session. Session '{"lessonI
d":2}' empty and removed
2018-04-04 13:29:54.356 INFO 142 --- [nio-5000-exec-9] c.f.backend.cours
e.CourseController : CRUD operation: Getting one course
2018-04-04 13:29:55.598 INFO 142 --- [nio-5000-exec-1] c.f.backend.securi
ty.LoginController : Logging out...
2018-04-04 13:29:55.598 INFO 142 --- [nio-5000-exec-1] c.f.backend.securi
ty.LoginController : Logged out user teacher@gmail.com

```

Sut_full_teaching_mysql Logs



```

PAGE_LRU'
2018-04-04T13:30:25.779730Z 0 [Note] Shutting down plugin 'INNODB_BUFFER_
PAGE'
2018-04-04T13:30:25.779734Z 0 [Note] Shutting down plugin 'INNODB_CMP_PER
_INDEX_RESET'
2018-04-04T13:30:25.779738Z 0 [Note] Shutting down plugin 'INNODB_CMP_PER
_INDEX'
2018-04-04T13:30:25.779742Z 0 [Note] Shutting down plugin 'INNODB_CMPMEM_
RESET'
2018-04-04T13:30:25.779746Z 0 [Note] Shutting down plugin 'INNODB_CMPMEM'
2018-04-04T13:30:25.779770Z 0 [Note] Shutting down plugin 'InnoDB'
2018-04-04T13:30:25.779824Z 0 [Note] InnoDB: FTS optimize thread exiting.
2018-04-04T13:30:25.779969Z 0 [Note] InnoDB: Starting shutdown...
2018-04-04T13:30:25.880232Z 0 [Note] InnoDB: Dumping buffer pool(s) to /v
ar/lib/mysql/ib_buffer_pool
2018-04-04T13:30:25.880531Z 0 [Note] InnoDB: Buffer pool(s) dump complete
d at 180404 13:30:25

```

Sut_full_teaching_openvidu_server_kms Logs



```

2018-04-04 13:30:26,184 DEBG 'kms' stdout output:
0:06:40.690791463 [334m 9[00m 0xdb8cc0 [36mINFO [00m [00m KurentoMed
iaSet MediaSet.cpp:110:deleteMediaSet:[00m Destroying mediaSet
0:06:40.690811771 [334m 9[00m 0xdb8cc0 [37mDEBUG [00m [00m KurentoMe
diaSet MediaSet.cpp:169:~MediaSet:[00m Still 1 object/s alive
2018-04-04 13:30:26,184 DEBG 'kms' stdout output:
0:06:40.690854941 [334m 9[00m 0xf94900 [37mDEBUG [00m [00m KurentoWo
rkerPool WorkerPool.cpp:49:workerThreadLoop:[00m Working thread finished
0:06:40.690864205 [334m 9[00m 0xf7f03340018a0 [37mDEBUG [00m [00m Kure
ntoWorkerPool WorkerPool.cpp:49:workerThreadLoop:[00m Working thread fi
nished
2018-04-04 13:30:26,184 DEBG 'kms' stdout output:
0:06:40.691085812 [334m 9[00m 0xdb8cc0 [37mDEBUG [00m [00m KurentoMe
diaSet MediaSet.cpp:469:async_delete:[00m Destroying ServerManager -> ma
nager_ServerManager
2018-04-04 13:30:26,184 DEBG 'kms' stdout output:

```

- Dashboard
- Projects
- Web Browsers
- Log Analyzer

TJob "GOLD" : Execution 46 ✓

Result	Start Date	End Date	Sut Execution	Log Index	View in Log Analyzer	Monitoring Config	Delete Execution
SUCCESS	Wed Apr 04 2018 15:23:12 GMT+0200 (CEST)	Wed Apr 04 2018 15:30:15 GMT+0200 (CEST)	92	46			

Test Results

Test Suite	N° Test	Errors	Failures	Skipped	Flakes	Time Elapsed
✓ E2E tests for FullTeaching 1 chat		0	0	0	0	75.88999938964844
✓ E2E tests for FullTeaching 1 REST CRUD operations		0	0	0	0	37.81800079345703
✓ E2E tests for FullTeaching 1 video session		0	0	0	0	142.5229949951172

All Metrics ✕

Chart configuration ▼

Legend

- Dashboard
- Projects
- Web Browsers
- Log Analyzer

@timestamp	component	message
2018-04-04T13:24:48.22...	sut_full_teaching	\ \ _)) ()))))
2018-04-04T13:24:48.22...	sut_full_teaching	' _ _ \ _ , / / / / /
2018-04-04T13:24:48.22...	sut_full_teaching	===== _ ===== _ =/ / _ / _ /
2018-04-04T13:24:48.23...	sut_full_teaching	:: Spring Boot :: (v1.4.1.RELEASE)
2018-04-04T13:24:48.23...	sut_full_teaching	
2018-04-04T13:24:48.41...	sut_full_teaching	2018-04-04 13:24:48.404 INFO 142 --- [main] com.fullteaching.backe
2018-04-04T13:24:48.41...	sut_full_teaching	2018-04-04 13:24:48.412 INFO 142 --- [main] com.fullteaching.backe
2018-04-04T13:24:48.50...	sut_full_teaching	2018-04-04 13:24:48.506 INFO 142 --- [main] ationConfigEmbeddedWel
2018-04-04T13:24:50.72...	sut_full_teaching	2018-04-04 13:24:50.723 INFO 142 --- [main] trationDelegate\$BeanPr
2018-04-04T13:24:51.42...	sut_full_teaching	2018-04-04 13:24:51.424 INFO 142 --- [main] s.b.c.e.t.TomcatEmbedc
2018-04-04T13:24:51.44...	sut_full_teaching	2018-04-04 13:24:51.442 INFO 142 --- [main] o.apache.catalina.core
2018-04-04T13:24:51.44...	sut_full_teaching	2018-04-04 13:24:51.443 INFO 142 --- [main] org.apache.catalina.cc
2018-04-04T13:24:51.53...	sut_full_teaching	2018-04-04 13:24:51.530 INFO 142 --- [ost-startStop-1] o.a.c.c.C.[
2018-04-04T13:24:51.53...	sut_full_teaching	2018-04-04 13:24:51.530 INFO 142 --- [ost-startStop-1] o.s.web.con
2018-04-04T13:24:51.77...	sut_full_teaching	2018-04-04 13:24:51.773 INFO 142 --- [ost-startStop-1] o.s.b.w.serv
2018-04-04T13:24:51.77...	sut_full_teaching	2018-04-04 13:24:51.772 INFO 142 --- [ost-startStop-1] o.s.b.w.serv
2018-04-04T13:24:51.77...	sut_full_teaching	2018-04-04 13:24:51.773 INFO 142 --- [ost-startStop-1] o.s.b.w.serv
2018-04-04T13:24:51.77...	sut_full_teaching	2018-04-04 13:24:51.773 INFO 142 --- [ost-startStop-1] o.s.b.w.serv
2018-04-04T13:24:51.77...	sut_full_teaching	2018-04-04 13:24:51.775 INFO 142 --- [ost-startStop-1] .s.Delegatir
2018-04-04T13:24:51.77...	sut_full_teaching	2018-04-04 13:24:51.775 INFO 142 --- [ost-startStop-1] o.s.b.w.serv
2018-04-04T13:24:52.09...	sut_full_teaching	2018-04-04 13:24:52.096 INFO 142 --- [main] j.LocalContainerEntity
2018-04-04T13:24:52.12...	sut_full_teaching	2018-04-04 13:24:52.119 INFO 142 --- [main] o.hibernate.jpa.interr
2018-04-04T13:24:52.12...	sut_full_teaching	name: default
2018-04-04T13:24:52.12...	sut_full_teaching	...]
2018-04-04T13:24:52.28...	sut_full_teaching	2018-04-04 13:24:52.281 INFO 142 --- [main] org.hibernate.Version
2018-04-04T13:24:52.28...	sut_full_teaching	2018-04-04 13:24:52.283 INFO 142 --- [main] org.hibernate.cfg.Env
2018-04-04T13:24:52.28...	sut_full_teaching	2018-04-04 13:24:52.285 INFO 142 --- [main] org.hibernate.cfg.Env
2018-04-04T13:24:52.37...	sut_full_teaching	2018-04-04 13:24:52.376 INFO 142 --- [main] o.hibernate.annotation
2018-04-04T13:24:53.05...	sut_full_teaching	Wed Apr 04 13:24:53 UTC 2018 WARN: Establishing SSL connection with
2018-04-04T13:24:53.37...	sut_full_teaching	Wed Apr 04 13:24:53 UTC 2018 WARN: Establishing SSL connection with
2018-04-04T13:24:53.42...	sut_full_teaching	Wed Apr 04 13:24:53 UTC 2018 WARN: Establishing SSL connection with
2018-04-04T13:24:53.46...	sut_full_teaching	Wed Apr 04 13:24:53 UTC 2018 WARN: Establishing SSL connection with

Filter Mark

Search on message 179

backend

Search on message 66

hibernate

Search on message

- Projects
- TJob Execs
- Test Engines
- Test Support Services
- Log Analyzer

Test Log
[INFO] ...
e/maven/s...
r (68 kB)

T E S T S
Running ...
2017-11-2...
stE2ESlee...
envidu-te...
Nov 20, 2...
ake creat...
INFO: Det...
2017-11-2...
stE2ESlee...
Nov 20, 2...
ake creat...
INFO: Det...

Logs

```
ats  
39", "userName": "Teacher Cheat  
39", "userName": "Teacher Cheat  
[10-5000-exec-10] c.f.backen  
logged  
[10-5000-exec-10] c.f.backen  
logged
```

Chrome 61 - automated test

Connected (unencrypted) to 79cbf9db9cba:99.0

Not secure | https://172.18.0.16:5000

Chrome is being controlled by automated test software.

FullTeaching SIGN UP LOG IN

Welcome to FullTeaching!

Email
student1@gmail.com

Password

LOG IN CLOSE

Not registered yet? SIGN UP

Do not limit yourself
Whenever you want. Whenever you are
Learning should have no limits

Workspace 1 | 20 Nov, Mon 16:01:12 | FullTeaching - Google Chrome

Close

Actions

View

Do not disturb



ElastiTest

```
node{
  elastest(tss: ['EUS']) {
    stage("Preparation") {
      git "https://github.com/elastest/full-teaching-experiment.git"
    }
    stage("Start SUT") {
      sh "cd docker-compose/full-teaching-env; docker-compose up -d"
      sh "sleep 20"
    }
    stage("Test") {
      def sutIp = containerIp("fullteachingenv_full-teaching_1")
      try {
        sh "mvn -Dapp.url=https://" + sutIp + ":5001/ test"
      } finally {
        sh "cd docker-compose/full-teaching-env; docker-compose down"
      }
    }
  }
}
```

Use Elastest Plugin with Browsers

Start SUT

Get web container IP

Execute Tests

Teardown SUT

```
My_Pipeline_2 #20 Cons: x TJob Execution x
localhost:8095/jenkins/job/My_Pipeline_2/20/console
Jenkins > My_Pipeline_2 > #20
: Using URL https://localhost:5000/ to connect to openvidu-testapp
Starting ChromeDriver 2.33.506120 (e3e53437346286c0bc2d2dc9aa4915ba81d9023f) on port 5295
Only local connections are allowed.
nov 22, 2017 11:13:31 AM org.openqa.selenium.remote.ProtocolHandshake createSession
INFORMACION: Detected dialect: OSS
2017-11-22 11:13:33.383 INFO --- [
: Test video session
Tests run: 1, Failures: 0, Errors: 0, Skipped:
com.fullteaching.backend.e2e.FullTeachingTest

Results :

Tests run: 1, Failures: 0, Errors: 0, Skipped:

[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 01:13 min
[INFO] Finished at: 2017-11-22T11:13:58+01:00
[INFO] Final Memory: 21M/246M
[INFO] -----
[Pipeline] bat
[My_Pipeline_2] Running batch script

D:\git\elastest-jenkins\work\workspace\My_Pipel
Variable de entorno ET_EUS_API no definida
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] }
[Pipeline] // elastest
[Pipeline] End of Pipeline
ERROR: script returned exit code 1
```

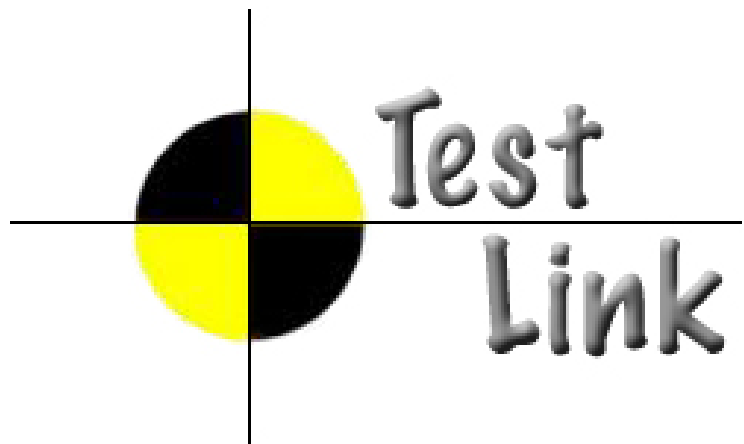
My_Pipeline_2 #20 Cons: x TJob Execution x
localhost:4200/#/projects/9/tjob/11/tjob-exec/223

ElasTest My_Pipeline_2 / My_Pipeline_2 / Execution 223

- Dashboard
- Projects
- Web Browsers
- Log Analyzer

Test Logs

```
elenium Driver
2017-11-22 11:13:27.572 INFO --- [ main] c.f.backend.e2e.FullTeachingTest : Using URL htt
ps://localhost:5000/ to connect to openvidu-testapp
Starting ChromeDriver 2.33.506120 (e3e53437346286c0bc2d2dc9aa4915ba81d9023f) on port 5295
Only local connections are allowed.
nov 22, 2017 11:13:31 AM org.openqa.selenium.remote.ProtocolHandshake createSession
INFORMACION: Detected dialect: OSS
2017-11-22 11:13:33.383 INFO --- [ main] c.f.backend.e2e.FullTeachingTest : Test video se
sion
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 36.212 sec - in com.fullt
eaching.backend.e2e.FullTeachingTest
Results :
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 01:13 min
[INFO] Finished at: 2017-11-22T11:13:58+01:00
[INFO] Final Memory: 21M/246M
[INFO] -----
[My_Pipeline_2] Running batch script
Variable de entorno ET_EUS_API no definida
```



+



- Dashboard
- Projects
- Test Engines
- Test Support Services
- Log Analyzer
- TestLink
- Data Manager (EDM)
- Monitoring Platform (EMP)

Executing External TJob "Sample plan 1" - Exec 3

Executing Build: Sample Build 1

TC Name: **Sample case 1**

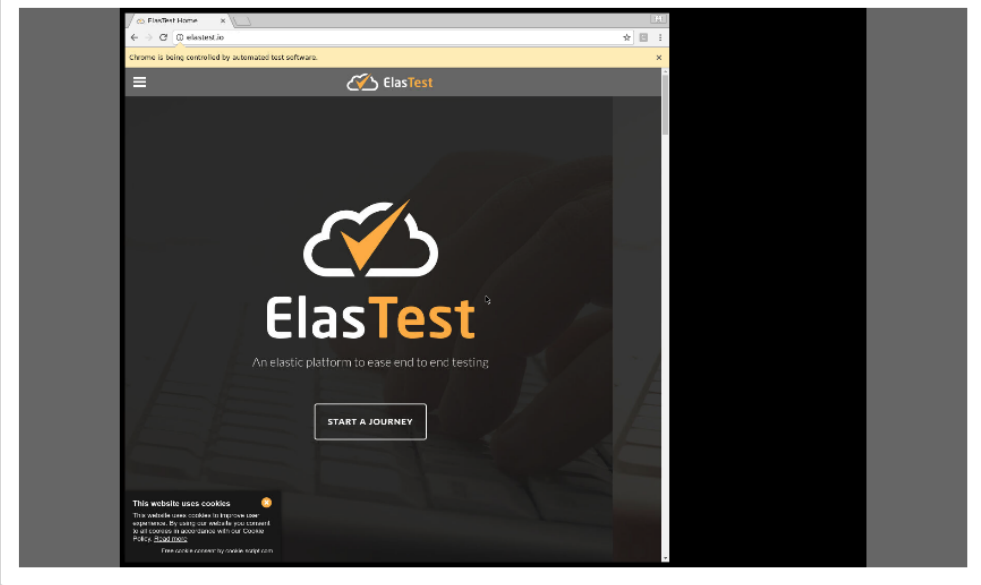
Test Case Version: 1 Last Execution: **NOT_RUN**

Summary	Preconditions
Sample case 1 Summary	Sample case 1 Preconditions

Test Case Steps			
Id	Actions	Expected Results	Exec Type
	<p>Step 1 actions</p>	<p>Step 1 results</p>	
5	<div id="selenium-highlight"> </div>	<div id="selenium-highlight"> </div>	MANUAL
	<p>Step 2 actions</p>	<p>Step 2 results</p>	
6	<div id="selenium-...>	<div id="selenium-...>	MANUAL

Save & Next

Browser



Tss_eus_browser_66be2484973d638bf3aea7254979a6a7 Console Logs

```
[INFO] http://elastest.io/js/core.min.js 15:479 "JQMIGRATE: Logging is active"
[WARNING] http://elastest.io/js/core.min.js 86 Registering mousewheel event as passive due to smoothscroll.js usage. The smoothscroll.js library is buggy, no longer necessary and degrades performance. See https://www.chromestatus.com/feature/5749447073988608
[WARNING] http://elastest.io/js/core.min.js:15:110 "JQMIGRATE: 'jQuery.mousewheel' event is deprecated, use 'jQuery.mousewheel' instead"
```

Test Project Sample Pj 1

Name	Sample Pj 1	Enable Automation	true
Prefix	SPJ1	Enable Inventory	false
Enable Requirements			
Enable Test Priority			

Test Suites

Id	Name
2	Sample suite 1

Test Plans

Id	Name
7	Sample plan 1

SuTs

Id	Name	Specification
4	Plan 1 associated Sut	172.18.0.2

TestLink 1.9.16 (Moka pot)

admin [admin]

SPJ1-

Test Project | SPJ1:Sample Pj 1

Navigator - Test Specification

Settings

Update tree after every operation

Filters

Test Case ID: SPJ1-
 Test Case Title:
 Test Suite: Select an Option
 Status: Select Some Options
 Importance: Select Some Options
 Execution type: [Any]

Apply | Reset Filters

Expand tree | Collapse tree

- Sample Pj 1 (2)
 - Sample suite 1 (2)
 - SPJ1-1:Sample case 1
 - SPJ1-2:Sample case 2

Test Case

SPJ1-1:Sample case 1

Version 1

Summary

Sample case 1 Summary

Preconditions

Sample case 1 Preconditions

#	Step actions	Expected Results	Execution
1	Step 1 actions	Step 1 results	Manual ✖ +
2	Step 2 actions	Step 2 results	Manual ✖ +

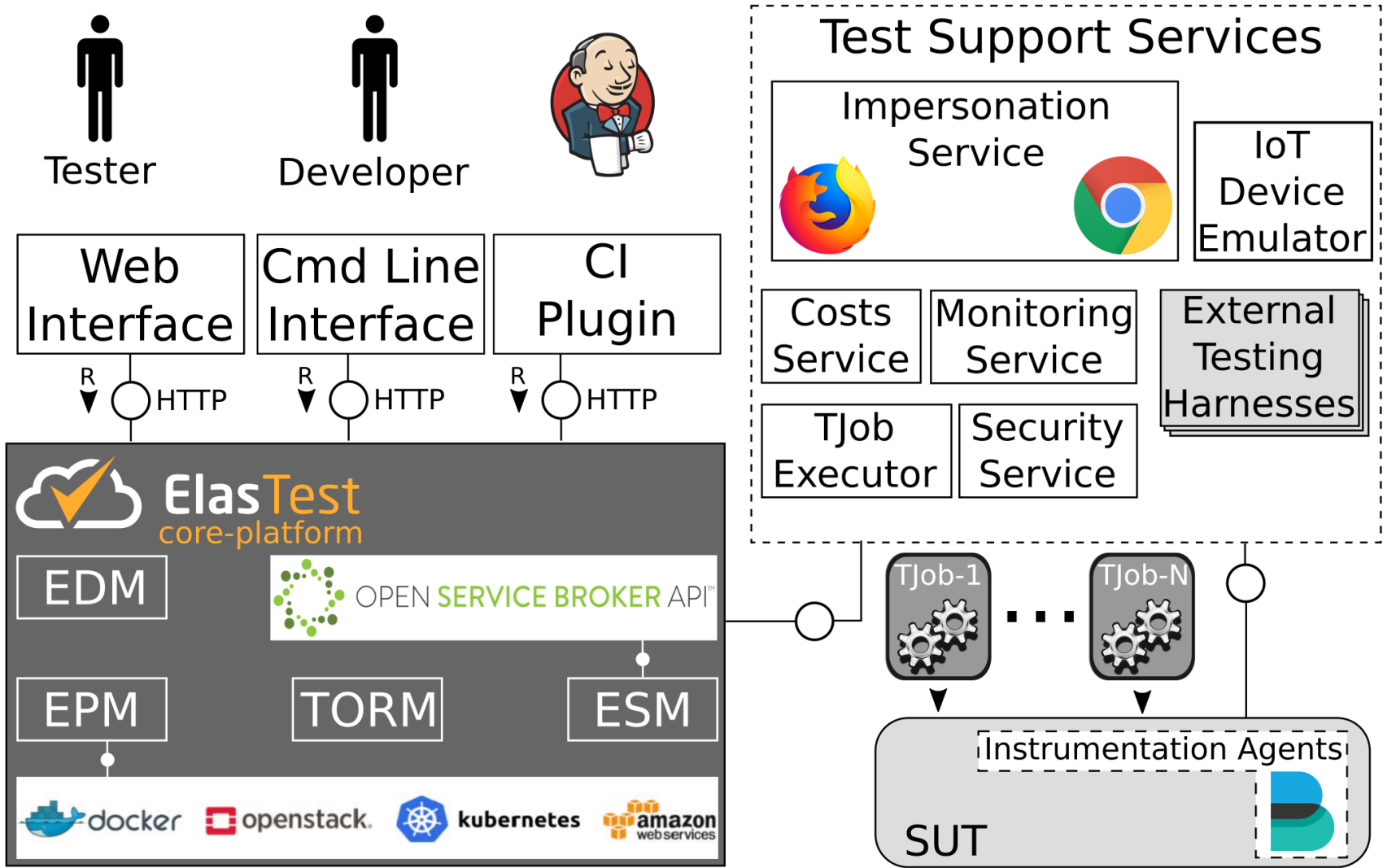
Create step | Resequence Steps

Status: Draft | Importance: Medium | Execution type: Manual | Estimated exec. (min): Save

Keywords: None

Relations

javascript:ET(3)

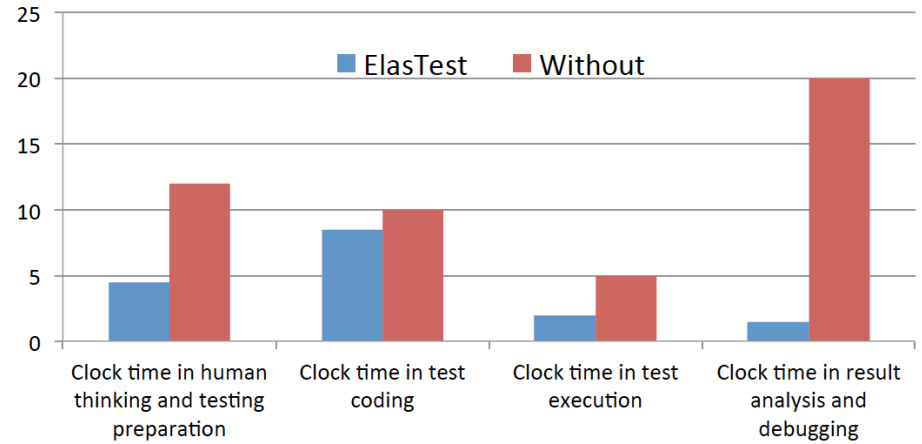


Four real world demonstrators:

- **Web** applications (ATOS)
- **WebRTC** - videoconferencing (NAEVATEC)
- **5G** - telecommunications (FRAUNHOFER)
- **IoT** - Industry 4.0 (TUB)

Reality check

- Extensive **experimentation** continuously ongoing on the four demonstrators
- All **data** will be made available from the project web site



Roadmap

September

- Laptop and cloud versions ready

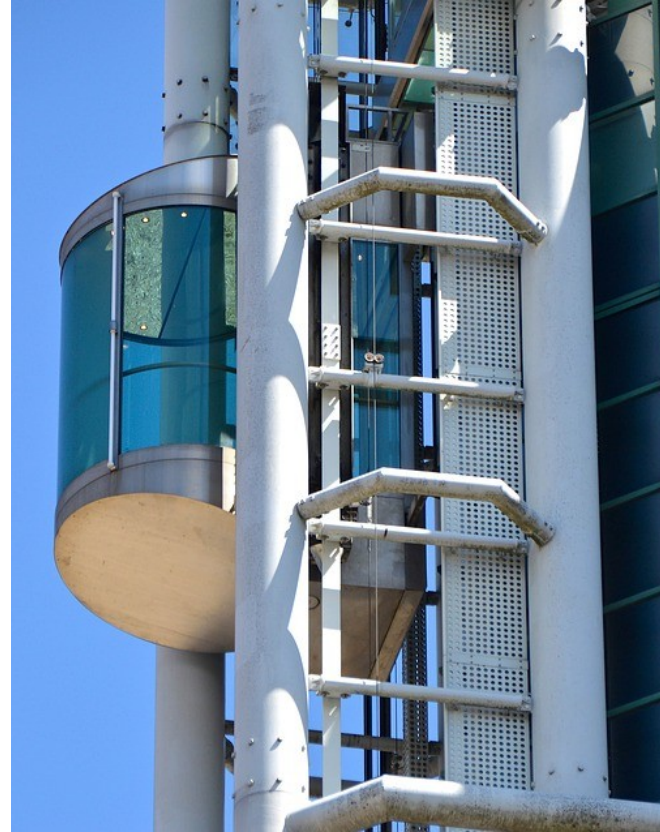
End 2018

- Version 1.0 (ready for production environments)

2019 and beyond...

- Stay tuned

ElasTest is a **game changer** that lets you run **complex tests** against modern applications, enabling **novel** ways of testing, collecting **information** at runtime, improving **communication** across teams, and providing a whole new set of **analysis** tools, and more importantly this can be done **effortlessly** and without disruption thanks to our Jenkins and TestLink integrations



Survey



We want to build the *better* possible platform for integration and system testing

Input from the *industry* is key for succeeding

You can help us help you by filling in this short survey: <https://elastest.io/survey/>



Follow us on Twitter: [@elastestio](https://twitter.com/elastestio)



Watch our videos at our [YouTube channel](#)



Subscribe to our user list at <https://elastest.io>



Star our repo <https://github.com/elastest/elastest>



Thank you!



ElasTest