

THE BEST TESTING TOOLS WE'VE EVER HAD

An introduction to

OPENQA FOR GNOME

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MY STORY

- GNOME (2003-)
- Codethink (2011-)
- Desktop search (Tracker) (2011-)

In 2011, GNOME had no automated testing *at all*

DREAMS OF END TO END TESTING

- **GUADEC 2012** in A Coruña:
 - GNOME Continuous; "Testable" initiative
- **GNOME OS** project:
 - BuildStream, Freedesktop SDK
- openQA at **SUSE**: since 2009
 - Now used by Fedora, Debian, ~~Endless~~ and more
- **Codethink**: openQA testing in automotive

Open this URL in your laptop:

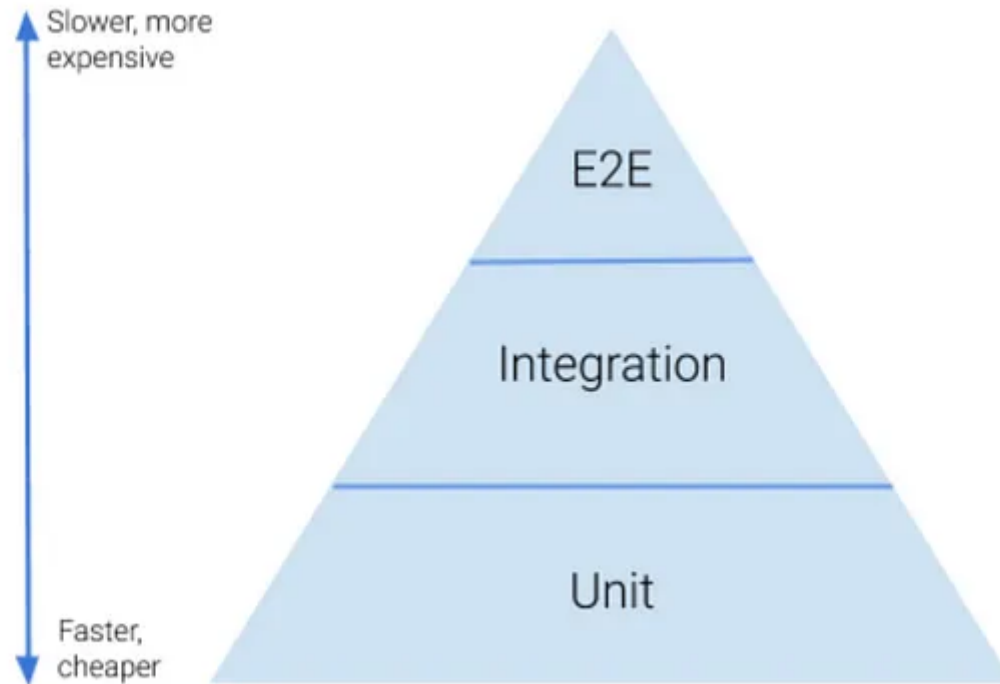
<https://openqa.gnome.org/>





END TO END TESTING FOR GNOME

- Each testsuite runs in a new virtual machine
- Tests run against [GNOME OS](#):
 - Latest commit of every GNOME module
 - [Freedesktop SDK](#) base OS
- Working since Sept. 2022, in "open beta" status

TYPES OF TESTING



USE CASES

1. See "latest GNOME" 
2. Update needles 
3. Diagnose & report regressions 
4. Develop new tests: 

HOW TO: SEE "LATEST GNOME"







Documentation: [Checking test results](#)

COMPONENTS OF GNOME OPENQA TESTING

1. **openQA**: optional web frontend (openqa.gnome.org)
2. **isotovideo**: openQA test runner (you can run this on your laptop!)
3. **gnome-build-meta**: integration repo
 - project CI builds GNOME OS and runs openQA tests
4. **openqa-tests**: tests repo
 - Defines test suites (using Perl + [openQA test API](#))
5. **openqa-needles**: screenshots repo

USE CASES

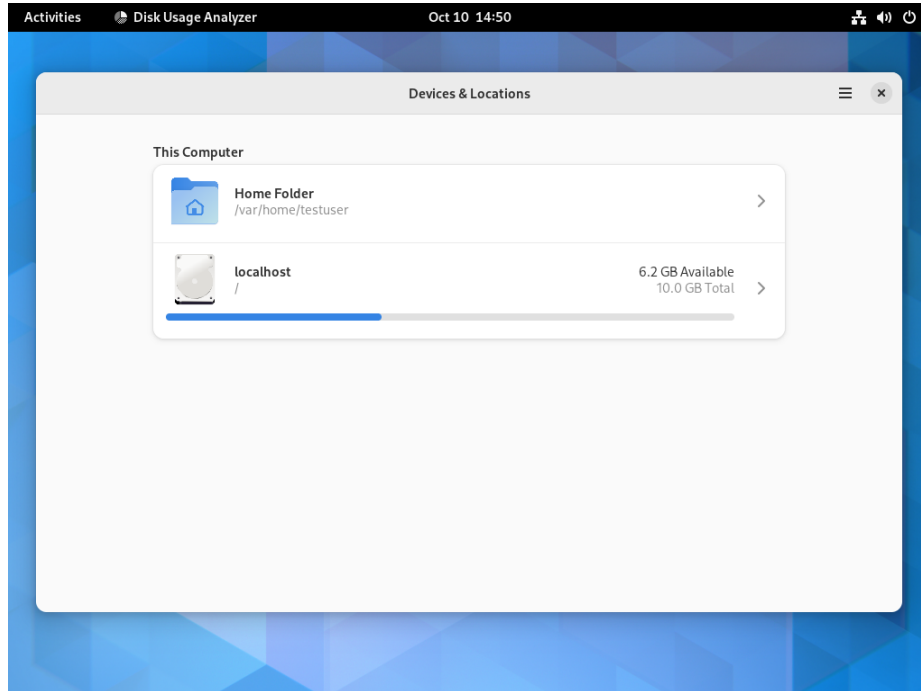
1. See "latest GNOME" 
2. **Update needles** 
3. Diagnose & report regressions 
4. Develop new tests: 

HOW TO: UPDATE A NEEDLE



Documentation: [How to update a needle](#)

AN EXAMPLE NEEDLE



```
{
  "area": [
    {
      "xpos": 31,
      "ypos": 78,
      "width": 959,
      "height": 599,
      "type": "match",
      "match": 96,
    }
  ],
  "properties": [],
  "tags": [
    "app_baobab_home"
  ]
}
```

See this needle in action [here](#).

See also: [openQA starter guide - Basic Concepts](#).

Screenshot tests will always have false positives.

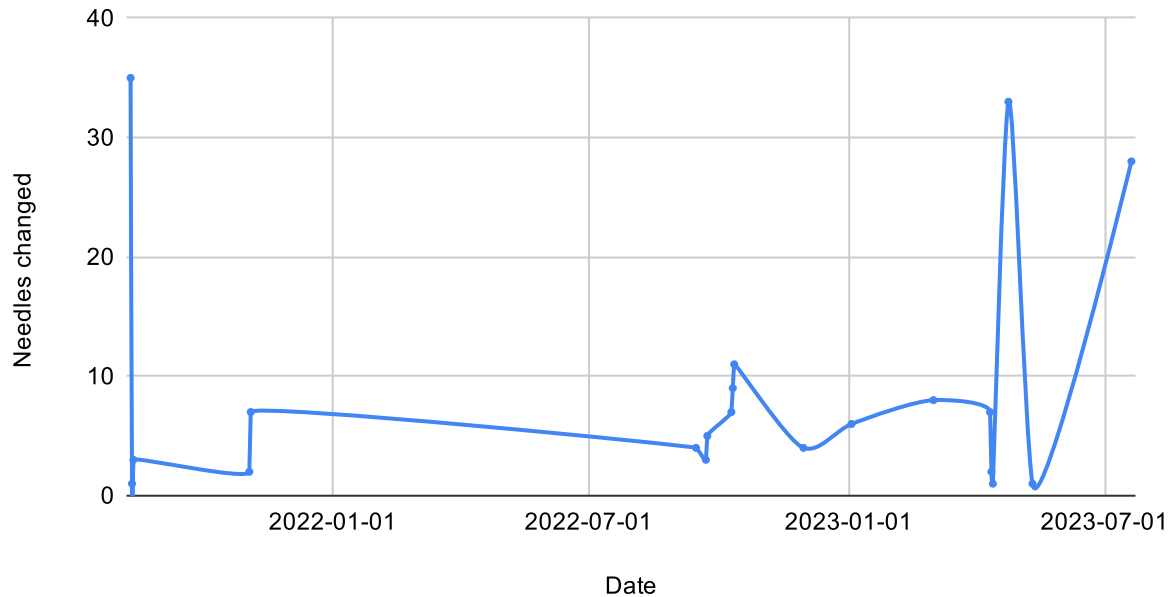
openQA deals with this in 4 ways:

1. Search within the screen
2. Similarity threshold (90-100%)
3. Exclude zones
4. Web UI for needle updates.

Question: *"How many false positives do you get?"*

Look at how often the needles are updated...

Needles changed vs Date





USE CASES

1. See "latest GNOME" 
2. Update needles 
3. **Diagnose & report regressions** 
4. Develop new tests: 

HOW TO: DIAGNOSE & REPORT REGRESSIONS

Documentation: [When tests fail](#)

GNOME openQA pipeline-report.py utility




https://www.youtube.com/watch?v=nLk_govDdxA

Question: *"how many real bugs has openQA caught?"*

Let's see Gitlab label: 9. End-to-end test failure

USE CASES

1. See "latest GNOME" 
2. Update needles 
3. Diagnose & report regressions 
4. **Develop new tests:** 

HOW TO: DEVELOP NEW TESTS



Documentation: [Adding more tests](#)

HOW YOUR TEST CONTROLS THE VM

1) Trigger an action:

- Type on keyboard - `send_key`, `type_string`
- Click with mouse - `mouse_set`, `assert_and_click`
- Run command on serial console - `assert_script_run`
- Other stuff: `power`, `switch_network`, ...

2) Assert that the correct thing happened

- Await needle (screenshot) match - `assert_screen`
- Other stuff - `upload_asset`, `assert_recorded_sound`, ...

Example: `app_nautilus.pm`

RUNNING TESTS LOCALLY

Documentation: [Running the test suite locally](#)

Helper tool: [ssam_openqa](#)

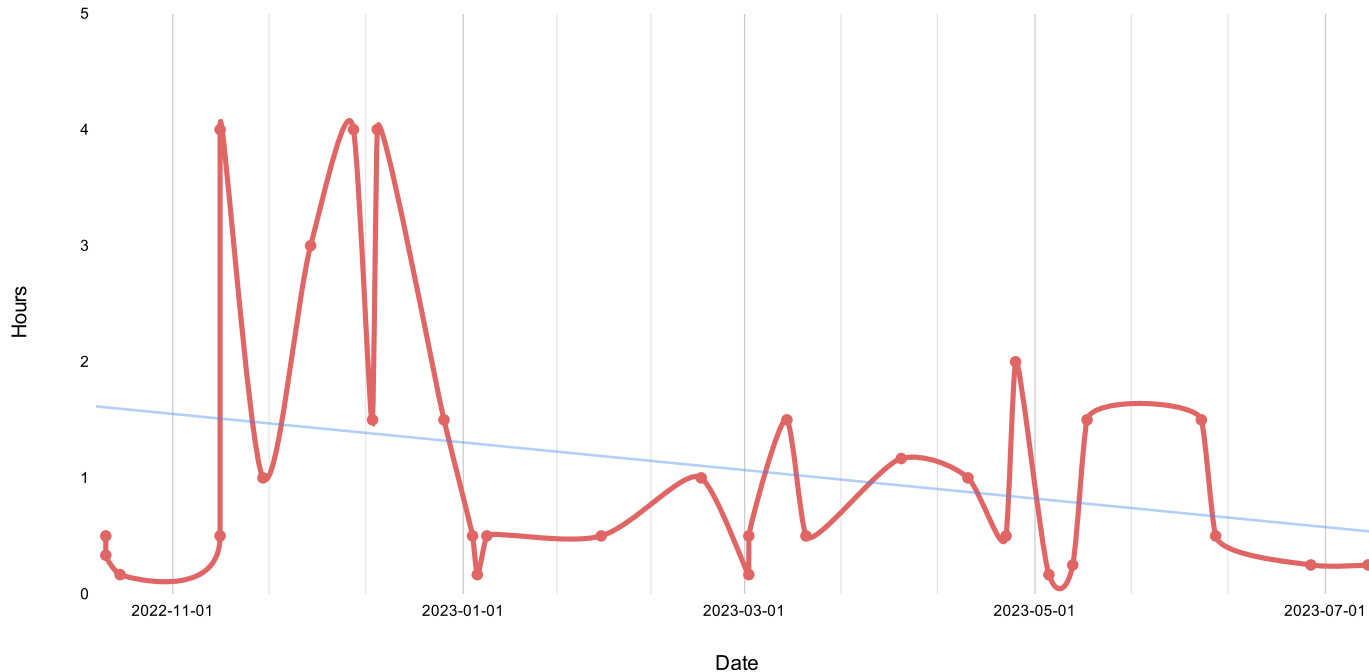
`ssam_openqa` demo



<https://www.youtube.com/watch?v=PyQ2v1iaCBk>

Question: *How much effort is it to maintain?*

Hours spent on openQA maintenance



Source: <https://gitlab.gnome.org/GNOME/openqa-tests/-/issues/9>

WHAT'S NEXT?

It's up to you! Any of these things may or may not happen...

- **More tests!** Core apps, [Shell](#), [locales](#), [accessibility](#), [search](#) + [content apps](#), [mobile UIs](#)
- [Pre-merge testing](#) for gnome-build-meta
- Tests on **real hardware** and performance measurement
- [openQA tests in your project repo](#)
- An easy way to **update all needles**.
- A culture of end-to-end testing and high quality releases.

HOW TO GET INVOLVED

Help welcome from GNOME maintainers and **everyone else!**

I will provide training on infra maintenance and writing tests - just ask.

- Chat: Matrix [#gnome-os:gnome.org](https://matrix.to/#/#gnome-os:gnome.org)
- Forum: <https://discourse.gnome.org/>
- Email: sam@afuera.me.uk

Also: [documentation](#), [issue tracker](#)

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