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

- **GUADECE 2012** in A Coruña:
  - GNOME Continuous; "Testable" initiative
- **GNOME OS** project:
  - BuildStream, Freedesktop SDK
- **openQA at SUSE**: since 2009
  - Now used by Fedora, Debian, 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

- Unit
- Integration
- E2E

Slower, more expensive
Faster, cheaper
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](http://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

See this needle in action here.

See also: openQA starter guide - Basic Concepts.
Question: "How many false positives do you get?"

Look at how often the needles are updated...
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.
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
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
Question: How much effort is it to maintain?

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...

- Tests for core app features, Shell, locales, accessibility, search + content apps
- Pre-merge testing for gnome-build-meta
- Tests on real hardware and performance measurement
- Tests for specific GNOME releases
- Testing beyond gnome-build-meta (e.g. 3rd party apps)
- A culture of end-to-end testing and higher 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
- Forum: https://discourse.gnome.org/
- Email: sam@afuera.me.uk

Also: documentation, issue tracker

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