Building a Web UI for the Fedora installer

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Reasons for a Web UI
Status Quo

About the Fedora installer.

- the Fedora installer is called Anaconda
  - a project with long history, going back to ~1999
- currently has a GTK3 GUI and a text based UI
- modular architecture
  - UI talks to a backend via DBus
- addon support
- capable of fully automated operation via kickstart
- used by Fedora & RHEL, CentOS and related distributions
Why Web UI?

Issues of the current GTK3 GUI.

- UX issues that accumulated over time
- GUI uses outdated technology in places
  - GTK 3
  - Hard dependency on X for keyboard switching
- Inefficient and insecure remote access (VNC)
- Co effective unit tests for the GUI
- Clear trend for system management tooling migrating to Web UI
  - System-config tools usually went from GTK mini-apps to becoming Cockpit plugins
Why Web UI?

A fresh start has many benefits.

- known UX issues can be addressed from the start
- easier to achieve consistency
- based on modern and widely used tools and libraries
  - much bigger developer/designer community when compared to native GUI toolkits
- secure and efficient remote access - with just a browser!
  - makes it possible to have headless installation images with full graphical (remote) UI
The tools and libraries
Under the hood

How does it actually work?

Python backend <-> DBus <-> Cockpit <-> React/PatternFly

- the installation is controlled via a DBus interface
  - same as with current GTK3 GUI, TUI or kickstart installation
- Cockpit tooling exposes the DBus interface & general OS access to the Web UI
- the Web UI is built from PatternFly components and powered by React.js
- Web UI runs locally in a Web view or remotely in a browser
Test tooling

Making sure it works.

- using the Cockpit test framework
- unit tests
  - interact with a running Web UI & simulate user interaction
  - written in Python, very similar to regular unit tests for Python code
- pixel tests
  - compare screen areas with reference images
  - powerful include/exclude support based on element id
  - indispensable for gating automated NPM dependency updates
Progress so far
Minimal installation workflow

Just the bits needed to install a working system.

- installation + system language selection
  - pre-selected by geolocation
- disk selection
  - with runtime additional disk detection
- review screen
  - provides overview of what has been selected
- progress screen
  - at a glance + detailed installation progress reporting
Language selection screen

Anaconda installer

Welcome to the Anaconda installer

Choose a language

Chosen language: English (United States)

The chosen language will be used for installation and in the installed software. To use a different language, find it in the language list.

Find a language

Common languages

- العربية (مصر)
- English (United States)
- English (United Kingdom)
- Français (France)

Next  Back  Quit
Disk selection screen

### Anaconda installer

#### Installation destination

Select the device(s) to install to. The installation requires 8.36 GB of available space. Storage will be automatically partitioned. Learn more about your storage options.

Local standard disks

<table>
<thead>
<tr>
<th>Name</th>
<th>ID</th>
<th>Total</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<td>vda</td>
<td>0x1af4</td>
<td>34.4 GB</td>
<td>1.05 MB</td>
</tr>
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</tr>
</tbody>
</table>

[Next] [Back] [Quit]
Review screen
Progress screen

Software installation: Storage configuration complete. The software is now being installed onto your device.
Anaconda Web UI preview

An unofficial image demonstrating the Web UI

- released after Fedora 37 finally went GA
- installs a minimal F37 system built from F37 content
- not an one-off release, the image will be updated with latest Web UI work in regular intervals
- main focus on the Web UI rather than installed system
- valuable source of feedback
- want to give it a try?

https://fedorapeople.org/groups/anaconda/webui_preview_image/
https://fedoramagazine.org/anaconda-web-ui-preview-image-now-public
Challenges and issues
Building a new installer UI

Is quite an undertaking.

- huge amount of functionality in the current GUI
  - important to see what is import and what is actually not being used
- avoid past UX issues
- keeping things consistent
- what to implement first?
- processing feedback
Running locally

Local Web UI display + minimal installation image.

- Web engines can bump image size and increase resource requirements
- tried GTK3 WebKit & Firefox so far
  - GTK3 WebKit is smaller and uses less RAM, worse performance with no acceleration
  - Firefox needs more space and more RAM, uniform performance
- headless image side-steps the issue
Running remotely

How to make remote connection easy & secure?

- what address should the user connect to?
  - address might be randomly assigned by DHCP
  - need to check the booted machine to define the address

- how to secure the remote connection?
  - regular SSL certificates can’t be used due to the dynamic address
  - self signed certificate triggers a scary warning in most browsers & user needs to compare certificate fingerprint to avoid MitM
Next steps
Storage configuration

The most complex part of any OS installer.

- at the moment we plan to work on two main workflows
  - guided partitioning
    - pre-configured storage configuration options
    - user picks one and is guided forward
  - custom partitioning
    - manual bottom-up assembly of the storage layout by the user
- combination of both
  - complete a guided path
  - edit the result via custom partitioning
More screens

Not just storage.

- date and time configuration
- user and root account creation
- error reporting
- installation source
- software selection
- addons
Storage feedback!

Back to storage. ;-) 

- we are trying to find out what storage options are important for users
- we put together a survey form
- [https://redhatdg.co1.qualtrics.com/jfe/form/SV_87bPLycfp1ueko6](https://redhatdg.co1.qualtrics.com/jfe/form/SV_87bPLycfp1ueko6)

- closing soon, hurry up! :-)
- thanks!
Questions ?
"Problems only use Anaconda."

An ancient Bugzilla wisdom