Surfing on an Interactive Kiosk

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Konsulko Group

- Services company specializing in Embedded Linux and Open Source Software
- Hardware/software build, design, development, and training services
- Based in San Jose, CA with an engineering presence worldwide
- http://konsulko.com/
Agenda

- Using web browsers for an interactive kiosk
- Openbox and Surf
- Building an image
- Conclusions
- Q&A
Web Browser Market Share

StatCounter Global Stats
Browser Market Share Worldwide from Apr 2020 - Apr 2021

- Chrome: 44.12%
- Safari: 18.22%
- Firefox: 5.98%
- Samsung Internet: 3.75%
- Edge: 2.84%
- Opera: 1.46%
- UC Browser: 1.53%
- IE: 1.13%
- Edge Legacy: 0.86%
- Other: 2.62%
Yocto/OE Layer for Mainstream Web Browsers

- meta-browser
  https://github.com/OSSystems/meta-browser
- Available in GitHub under MIT license
- Sub-layer with recipes for Chromium
- Sub-layer with recipes for Firefox
Surf Web Browser

- Minimalist web browser
- No graphical control elements
- Controlled via keyboard shortcuts or external tools
- Based on WebKit2/GTK+
- Developed by suckless.org
- Initial release in 2009
- Available under MIT License
**surf**: Add a simple web browser

Add a recipe for surf, a simple web browser based on WebKit2/GTK+.

Signed-off-by: Leon Anavi <leon.anavi@konsulko.com>
Signed-off-by: Khem Raj <raj.khem@gmail.com>

**Diffstat**

- `+rw-r--r-- meta-oe/recipes-graphics/surf/surf/0001-config.mk-Fix-compiler-and-linker.patch 41 +---------`
- `-rw-r--r-- meta-oe/recipes-graphics/surf/surf_2.0.bb 25 ----------`

2 files changed, 66 insertions, 0 deletions
Surf Web Browser

Requirements:

- Requires X11 and OpenGL
- Depends on WebKitGTK, GTK+ 3, glib-2.0 and gcr
- WebKitGTK is a full-featured port of the WebKit2 rendering engine
Openbox

- Highly configurable stacking window manager for X11
- Written in C and XML for configurations, licensed under GPLv2
- `rc.xml` - main configuration file of the overall session
- `menu.xml` - configuration file for the desktop menu, accessible by right-clicking the background
- `autostart` - automatically starts applications
- Recipe in `meta-oe`
- http://openbox.org/
Openbox Screenshot

- Openbox
- xterm
- pcmanfm
- gedit
- surf
- stalonetray
Layers

- Poky
- meta-raspberrypi
- meta-openembedded/meta-oe
- meta-openembedded/meta-python
- meta-openembedded/meta-networking
Create a New Layer

- Set up build environment:
  
  ```
  source oe-init-build-env
  ```

- Create a new layer:
  
  ```
  bitbake-layers create-layer ../meta-my-kiosk
  ```

- Add the new layer:
  
  ```
  bitbake-layers add-layer ../meta-my-kiosk
  ```

- Add other required layers
Systemd Service for Surf

- surf.service:

  [Unit]
  Description=Surf
  After=display-manager.service

  [Service]
  Type=simple
  EnvironmentFile=/etc/default/xserver-nodm
  ExecStart=/usr/bin/surf https://www.yoctoproject.org/
  TimeoutStartSec=120
  Restart=on-failure
  RestartSec=3

  [Install]
  WantedBy=graphical.target
Systemd Service for Surf

- surf_%_bbappend in meta-my-kiosk:

  FILESEXTRAPATHS_prepend := "${THISDIR}/files:"
  SRC_URI += "file://surf.service"

  inherit systemd

  do_install_append() {
    if ${@bb.utils.contains('DISTRO_FEATURES', 'systemd', 'true', 'false', d)}; then
      install -d ${D}${systemd_unitdir}/system
      install -m 644 ${WORKDIR}/surf.service ${D}${systemd_unitdir}/system
    fi
  }

  FILES_${PN} += "${systemd_unitdir}/scripts/"
  SYSTEMD_SERVICE_${PN} = "surf.service"
core-image-kiosk

SUMMARY = "Interactive kiosk with X11, openbox and surf"
IMAGE_FEATURES += "splash package-management x11-base"
LICENSE = "MIT"
inherit core-image features_check
REQUIRED_DISTRO_FEATURES = "x11"
QB_MEM = '${@bb.utils.contains("DISTRO_FEATURES", "opengl", "-m 512", "-m 256", d)}'
IMAGE_INSTALL_append = " \
    kernel-modules \n    nano \n    openbox pcmanfm xterm surf xwd \
"
Building an Image

- Set machine and enable UART at local.conf:

  MACHINE = "raspberrypi4"
  ENABLE_UART="1"

- Switch to systemd at local.conf:

  DISTRO_FEATURES_append = " systemd"
  VIRTUAL-RUNTIME_init_manager = "systemd"
  DISTRO_FEATURES_BACKFILL_CONSIDERED = "sysvinit"
  VIRTUAL-RUNTIME_initscripts = ""

- Build the image:

  bitbake core-image-kiosk
Showcase

Yocto Project Summit 2021, Leon Anavi, Surfing on an Interactive Kiosk
Conclusions

- Yocto Project and OpenEmbedded provide a lot of different options for creating interactive kiosk images
- Surf web browser is an alternative of the mainstream web browsers for some very specific use cases
- Minimalist configuration with X11, Openbox and surf web browser is good and easy option for implementing an interactive HTML5 kiosk on constrained embedded Linux devices
- TODO: software over the air updates, continuous integration, setup tool (google repo/kas/git submodules/etc), templates for local.conf and bblayers, create distro configuration...
Thank You!

Useful links

- https://surf.suckless.org/
- http://openbox.org/wiki/Main_Page
- http://git.openembedded.org/meta-openembedded
- http://git.yoctoproject.org/cgit/cgit.cgi/meta-raspberrypi
- http://git.yoctoproject.org/cgit/cgit.cgi/poky/