

# Surfing on an Interactive Kiosk

**Leon Anavi**

Konsulko Group

leon.anavi@konsulko.com

leon@anavi.org

Yocto Project Summit 2021

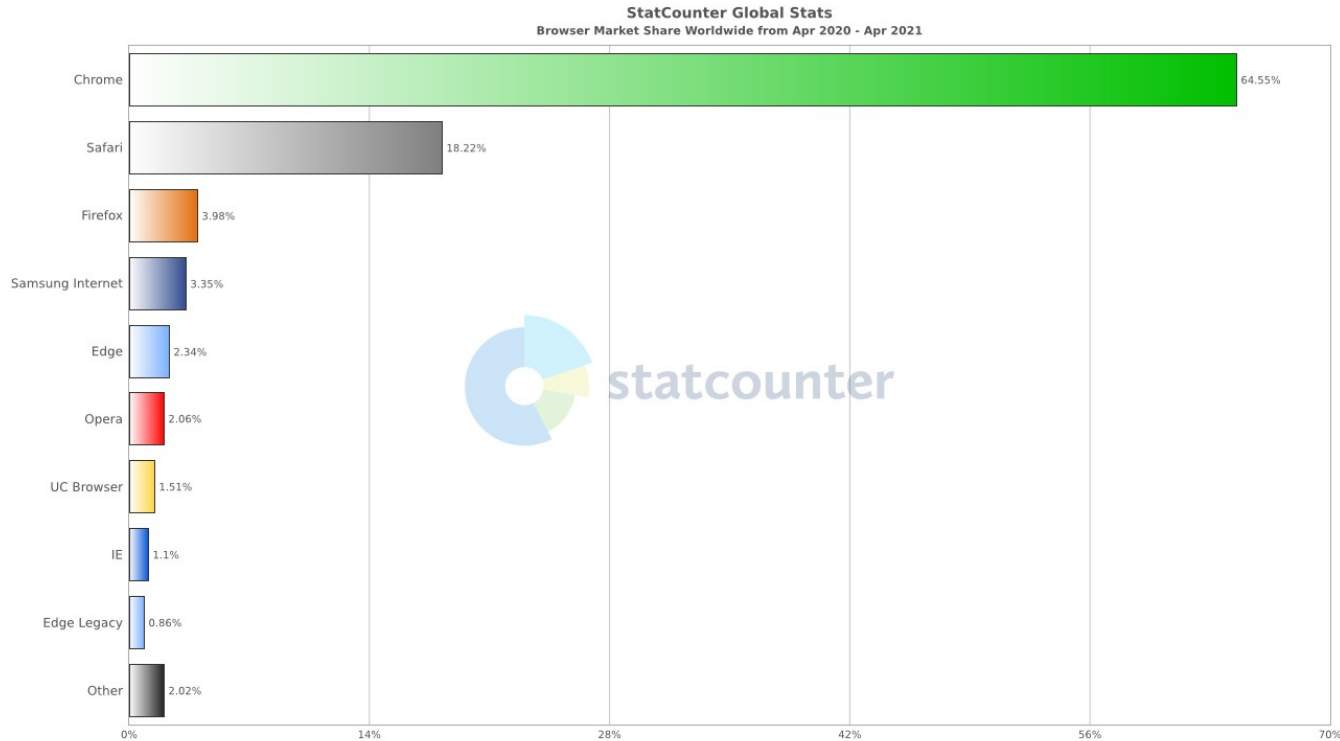
**Konsulko**  
Group

- 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



# 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 in meta-openembedded/meta-oe



## index : meta-openembedded

Collection of OpenEmbedded layers

[about](#) [summary](#) [refs](#) [log](#) [tree](#) **[commit](#)** [diff](#) [stats](#)

author Leon Anavi <leon.anavi@konsulko.com> 2019-11-17 21:03:17 +0200  
committer Khem Raj <raj.khem@gmail.com> 2019-11-17 21:02:14 -0800  
commit 053433f7957f0b050d2eedda2bee8f104de39a4c (patch)  
tree d8f68a6feb5f1333e527b90b717cb9fe95f0d27a  
parent b192e792cd0c72c19bf8f18217accf419d66b41e (diff)  
download meta-openembedded-053433f7957f0b050d2eedda2bee8f104de39a4c.tar.gz  
meta-openembedded-053433f7957f0b050d2eedda2bee8f104de39a4c.tar.bz2  
meta-openembedded-053433f7957f0b050d2eedda2bee8f104de39a4c.zip

### 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	<div style="width: 41px; height: 10px; background-color: green;"></div>
-rw-r--r--	meta-oe/recipes-graphics/surf/surf_2.0.bb	25	<div style="width: 25px; height: 10px; background-color: green;"></div>

2 files changed, 66 insertions, 0 deletions



## index : meta-openembedded

Collection of OpenEmbedded layers

[about](#) [summary](#) [refs](#) [log](#) [tree](#) **[commit](#)** [diff](#) [stats](#)

author Leon Anavi <leon.anavi@konsulko.com> 2021-05-18 18:17:22 +0300  
committer Khem Raj <raj.khem@gmail.com> 2021-05-19 09:17:49 -0700  
commit 34277b5ac92f246aaa8c04ff772ce11005e53345 (patch)  
tree d0433f2ce493e93f82e0e52e8add81a442a50850  
parent 417a344477180929a6e2ee8950451ad4cc4df69e (diff)  
download meta-openembedded-master.tar.gz  
meta-openembedded-master.tar.bz2  
meta-openembedded-master.zip

surf: Upgrade 2.0 -> 2.1 HEAD master



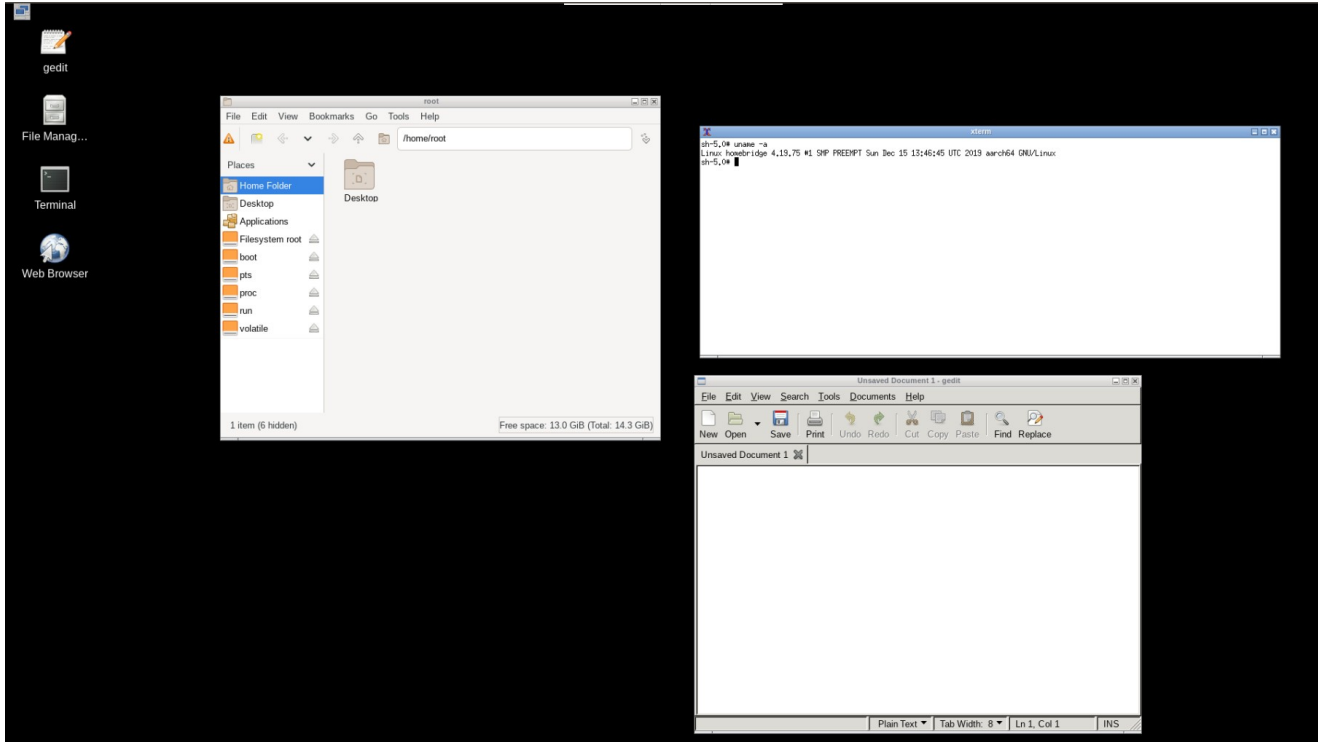
## Requirements:

- 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



- 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

- 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 \  
    nano \  
    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:

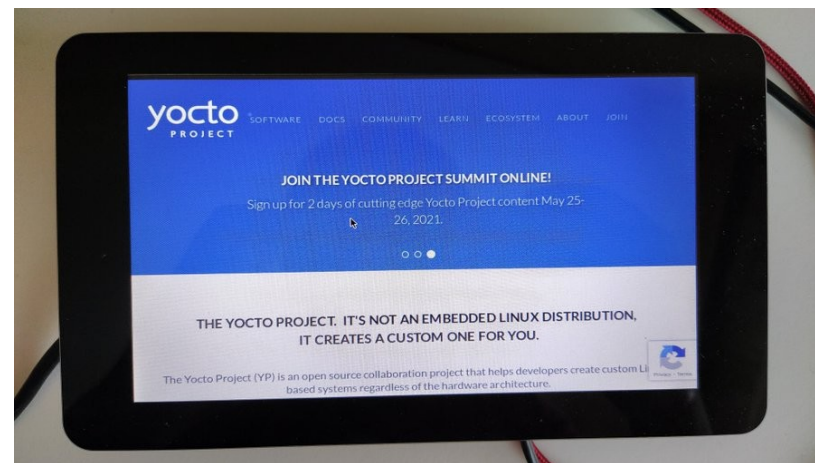
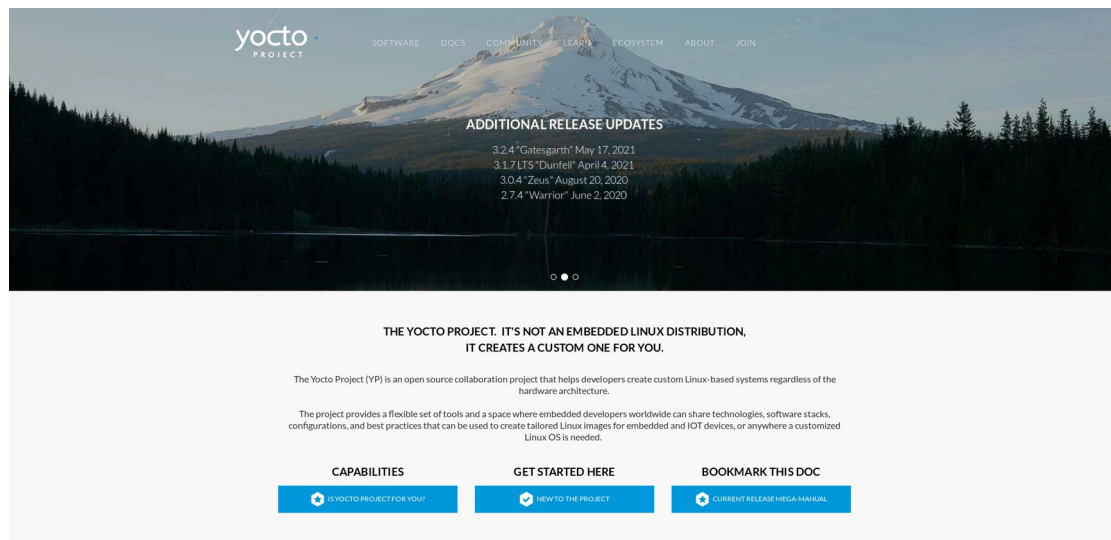
```
DISTRO_FEATURES_append = " systemd"  
VIRTUAL-RUNTIME_init_manager = "systemd"  
DISTRO_FEATURES_BACKFILL_CONSIDERED = "sysvinit"  
VIRTUAL-RUNTIME_initscripts = ""
```

- Build the image:

```
bitbake core-image-kiosk
```



# Showcase



## EXPERIENCED? GET THE CODE

2021.04.19  
**YP Core - Hardnott 3.3**

UPCOMING RELEASE DEVELOPMENT  
**View Nightly Build Progress**

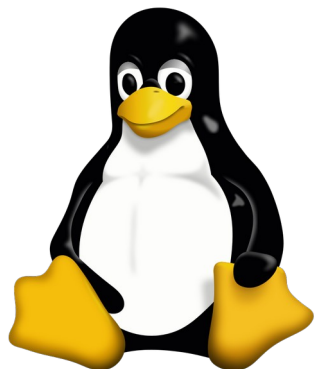
SOFTWARE ENGINEER STAFF  
Anavi Networks  
**VIEW ALL WORK**



# Conclusions

- The 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://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/>
- <https://www.yoctoproject.org/docs/current/mega-manual/mega-manual.html>
- [https://archive.fosdem.org/2020/schedule/event/ema\\_homebridge\\_with\\_yocto/](https://archive.fosdem.org/2020/schedule/event/ema_homebridge_with_yocto/)