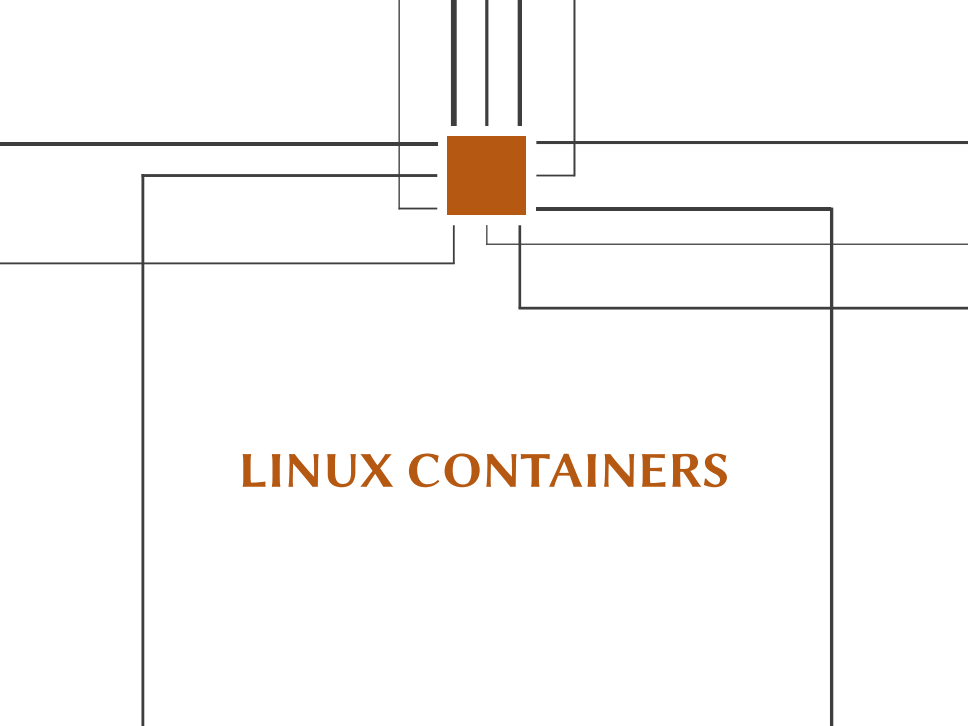


An abstract graphic consisting of a central brown square. From this square, several black lines extend outwards. Three lines go upwards, two go to the left, and two go to the right. From the left-side lines, one goes further left and another goes down. From the right-side lines, one goes further right and another goes down. These lines then connect to form a large, irregular rectangular frame that encloses the text below. The overall style is minimalist and technical.

# OpenWrt & Linux Containers

by Luka Perkov

- ▶ OpenWrt developer
- ▶ Sartura
- ▶ FOSS, ISP, remote management SW



# LINUX CONTAINERS

LXC is a userspace interface for the Linux kernel containment features. Through a powerful API and simple tools, it lets Linux users easily create and manage system or application containers.

LXC containers are often considered as something in the middle between a chroot and a full fledged virtual machine. The goal of LXC is to create an environment as close as possible to a standard Linux installation but without the need for a separate kernel.

[linuxcontainers.org](http://linuxcontainers.org)



# OPENWRT INTEGRATION

- OpenWrt feeds
- ubus
- rpcd & rpcd-mod-lxc
- Linux kernel & BusyBox configuration
- LuCI

# OpenWrt feeds

- collection of build recipes
- packages, routing, telephony, luci, management
- available on GitHub, contribution via pull requests
- lxc, rpcd-mod-lxc, luci-app-lxc

[github.com/openwrt/packages](https://github.com/openwrt/packages)

-- lxc..... LXC userspace tools

Configuration --->

- < > lxc-attach..... Utility lxc-attach from the LXC userspace tools (NEW)
- < > lxc-autostart..... Utility lxc-autostart from the LXC userspace tools (NEW)
- < > lxc-cgroup..... Utility lxc-cgroup from the LXC userspace tools (NEW)
- < > lxc-checkconfig.... Utility lxc-checkconfig from the LXC userspace tools (NEW)
- < > lxc-clone..... Utility lxc-clone from the LXC userspace tools (NEW)
- < > lxc-common..... LXC common files (NEW)
- < > lxc-config..... Utility lxc-config from the LXC userspace tools (NEW)
- < > lxc-configs..... LXC virtual machine common config files (NEW)
- < > lxc-console..... Utility lxc-console from the LXC userspace tools (NEW)
- < > lxc-create..... Utility lxc-create from the LXC userspace tools (NEW)
- < > lxc-destroy..... Utility lxc-destroy from the LXC userspace tools (NEW)
- < > lxc-execute..... Utility lxc-execute from the LXC userspace tools (NEW)
- < > lxc-freeze..... Utility lxc-freeze from the LXC userspace tools (NEW)
- < > lxc-hooks..... LXC virtual machine hooks (NEW)
- < > lxc-info..... Utility lxc-info from the LXC userspace tools (NEW)
- < > lxc-init..... LXC Lua bindings (NEW)
- < > lxc-ls..... Utility lxc-ls from the LXC userspace tools (NEW)
- < > lxc-lua..... LXC Lua bindings (NEW)
- < > lxc-monitor..... Utility lxc-monitor from the LXC userspace tools (NEW)
- < > lxc-monitord..... Utility lxc-monitord from the LXC userspace tools (NEW)
- < > lxc-snapshot..... Utility lxc-snapshot from the LXC userspace tools (NEW)
- < > lxc-start..... Utility lxc-start from the LXC userspace tools (NEW)
- < > lxc-stop..... Utility lxc-stop from the LXC userspace tools (NEW)
- < > lxc-templates..... LXC virtual machine templates (NEW)
- < > lxc-unfreeze..... Utility lxc-unfreeze from the LXC userspace tools (NEW)
- < > lxc-unshare..... Utility lxc-unshare from the LXC userspace tools (NEW)
- < > lxc-user-nic..... Utility lxc-user-nic from the LXC userspace tools (NEW)
- < > lxc-usernsexec..... Utility lxc-usernsexec from the LXC userspace tools (NEW)
- < > lxc-wait..... Utility lxc-wait from the LXC userspace tools (NEW)



# ubus

- OpenWrt micro bus architecture
- *ubusd* & command line utility *ubus*
- C & Lua API
- HTTP JSON-RPC 2.0 via *uhttpd-mod-ubus*

[wiki.openwrt.org/doc/techref/ubus](http://wiki.openwrt.org/doc/techref/ubus)

# rpcd & rpcd-mod-lxc

- OpenWrt ubus RPC backend server
- session, uci
- file, rpcsys, iwinfo
- shell scripts

*rpcd-mod-lxc* enables the exposure of liblxc internals via ubus.

[wiki.openwrt.org/doc/techref/rpcd](http://wiki.openwrt.org/doc/techref/rpcd)

RPCD & RPCD-MOD-LXC

```
[build@dev3 trunk]$ ubus -v list lxc
```

```
'lxc' @29728c7e
```

```
  "start":{"name":"String","config":"String"}
```

```
  "reboot":{"name":"String","config":"String"}
```

```
  "shutdown":{"name":"String","config":"String","timeout":"Integer"}
```

```
  "stop":{"name":"String","config":"String"}
```

```
  "freeze":{"name":"String","config":"String"}
```

```
  "unfreeze":{"name":"String","config":"String"}
```

```
  "rename":{"name":"String","config":"String","newname":"String"}
```

```
  "create":{"name":"String","config":"String","template":"String","flags":"Integer","args":
```

```
  "destroy":{"name":"String","config":"String"}
```

```
  "list":{}
```

```
[build@dev3 trunk]$ █
```

# Linux kernel & BusyBox

- KERNEL\_CGROUPS, KERNEL\_NAMESPACES, KERNEL\_LXC\_MISC
- *config/Config-kernel.in*
- various BusyBox options for *lxc-create* utility

[github.com/openwrt/packages](https://github.com/openwrt/packages)




# LuCI

- Web User Interface for OpenWrt
- luci-app-lxc

[github.com/openwrt/packages](https://github.com/openwrt/packages)

## LXC Containers

### Available Containers

Name	Status	Actions
acme		<span>Start</span> <span>Stop</span> <span>Delete</span> <span>more ▾</span>
ajax		<span>Start</span> <span>Stop</span> <span>Delete</span> <span>more ▾</span>
zen		<span>Start</span> <span>Stop</span> <span>Delete</span> <span>more ▾</span>

### Create New Container

Name	Template	Actions
<input type="text" value="Enter new name"/>	<span>OpenWrt ▾</span>	<span>Create</span>

### Options

Containers URL

Save & ApplySaveReset

# Contact

Luka Perkov  
Managing Director  
luka.perkov@sartura.hr

Sartura d.o.o.  
Kuniščak 28  
10000 Zagreb  
Croatia

www.sartura.hr  
info@sartura.hr

