OpenWRT build systém

Výroba balíčků pro router

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Cíle systému

- Tvorba základního image
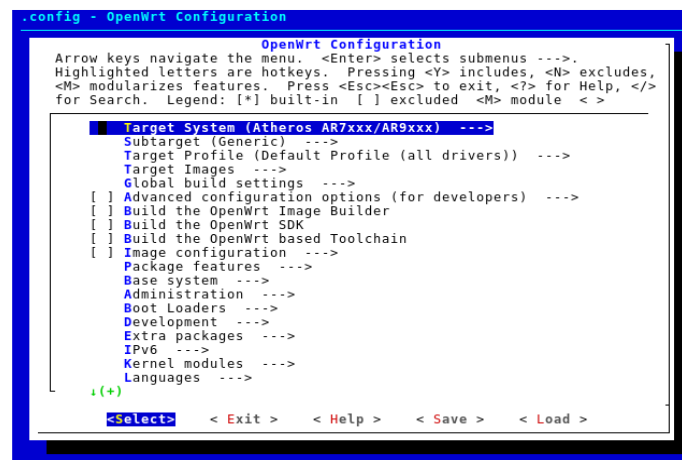
- Tvorba balíčků

- Konfigurace „na míru"

Výzvy

- Kompilace pro jinou architekturu

- Mnoho podporovaných architektur

- Překlad celého systému

- Velmi omezené zdroje systému

Spuštění

- Potřebuje:

  - Silný stroj

  - Základní nástroje (make, gcc, …)

- git clone URL
  https://gitlab.labs.nic.cz/turris/openwrt.git

- make menuconfig

- make -j<hodně>

```
.config - OpenWrt Configuration
                   OpenWrt Configuration
Arrow keys navigate the menu.  <Enter> selects submenus --->.
Highlighted letters are hotkeys.  Pressing <Y> includes, <N> excludes,
<M> modularizes features.  Press <Esc><Esc> to exit, <?> for Help, </>
for Search.  Legend: [*] built-in  [ ] excluded  <M> module  < >

    Target System (Atheros AR7xxx/AR9xxx)  --->
    Subtarget (Generic)  --->
    Target Profile (Default Profile (all drivers))  --->
    Target Images  --->
    Global build settings  --->
[ ] Advanced configuration options (for developers)  --->
[ ] Build the OpenWrt Image Builder
[ ] Build the OpenWrt SDK
[ ] Build the OpenWrt based Toolchain
[ ] Image configuration  --->
    Package features  --->
    Base system  --->
    Administration  --->
    Boot Loaders  --->
    Development  --->
    Extra packages  --->
    IPv6  --->
    Kernel modules  --->
    Languages  --->
↓(+)

    <Select>    < Exit >    < Help >    < Save >    < Load >
```
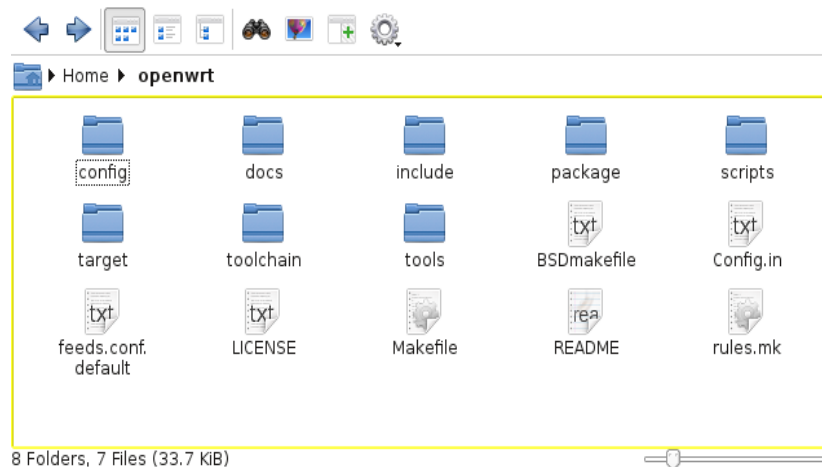
- make package/jméno/compile

Rozložení

- bin – zkompilovaný výsledek

- packages – popis balíčků

- files – překrytí image

- target – profily routerů

Uvnitř

- Kontrola konfigurace & prohlédnutí balíčků

- Překlad toolchainu (správné ld, gcc, …)

- Překlad balíčků

- Instalace balíčků a vytvoření image

Tvorba balíčku

- Makefile v adresáři v packages

- Proměnné popisující vlastnosti

- Definované sekce určující fáze kompilace

- Adresáře:

  - files
  - patches

Balíček

```
include $(TOPDIR)/rules.mk

PKG_NAME:=hello
PKG_VERSION:=1
PKG_SOURCE:=hello.tar.bz2
PKG_SOURCE_URL:=http://example.com/

define Package/hello
        TITLE:=Hello world
        DEPENDS:=+world
endef

define Build/Compile
        $(MAKE_VARS) $(MAKE) -C $(PKG_BUILD_DIR) $(MAKE_FLAGS)
endef

define Package/hello/install
        $(INSTALL_DIR) $(1)/usr/bin $(1)/etc
        $(INSTALL_BIN) $(PKG_BUILD_DIR)/hello $(1)/usr/bin/
        $(INSTALL_DATA) ./files/hello.conf $(1)/etc/
endef

$(eval $(call BuildPackage,hello))
```

Balíček – zařazení do systému

```
include $(TOPDIR)/rules.mk

PKG_NAME:=hello
PKG_VERSION:=1
PKG_SOURCE:=hello.tar.bz2
PKG_SOURCE_URL:=http://example.com/

define Package/hello
        TITLE:=Hello world
        DEPENDS:=+world
endef

define Build/Compile
        $(MAKE_VARS) $(MAKE) -C $(PKG_BUILD_DIR) $(MAKE_FLAGS)
endef

define Package/hello/install
        $(INSTALL_DIR) $(1)/usr/bin $(1)/etc
        $(INSTALL_BIN) $(PKG_BUILD_DIR)/hello $(1)/usr/bin/
        $(INSTALL_DATA) ./files/hello.conf $(1)/etc/
endef

$(eval $(call BuildPackage,hello))
```

Balíček – vlastnosti

```
include $(TOPDIR)/rules.mk

PKG_NAME:=hello
PKG_VERSION:=1
PKG_SOURCE:=hello.tar.bz2
PKG_SOURCE_URL:=http://example.com/

define Package/hello
        TITLE:=Hello world
        DEPENDS:=+world
endef

define Build/Compile
        $(MAKE_VARS) $(MAKE) -C $(PKG_BUILD_DIR) $(MAKE_FLAGS)
endef

define Package/hello/install
        $(INSTALL_DIR) $(1)/usr/bin $(1)/etc
        $(INSTALL_BIN) $(PKG_BUILD_DIR)/hello $(1)/usr/bin/
        $(INSTALL_DATA) ./files/hello.conf $(1)/etc/
endef

$(eval $(call BuildPackage,hello))
```

Balíček – fáze výroby

```
include $(TOPDIR)/rules.mk

PKG_NAME:=hello
PKG_VERSION:=1
PKG_SOURCE:=hello.tar.bz2
PKG_SOURCE_URL:=http://example.com/

define Package/hello
        TITLE:=Hello world
        DEPENDS:=+world
endef

define Build/Compile
        $(MAKE_VARS) $(MAKE) -C $(PKG_BUILD_DIR) $(MAKE_FLAGS)
endef

define Package/hello/install
        $(INSTALL_DIR) $(1)/usr/bin $(1)/etc
        $(INSTALL_BIN) $(PKG_BUILD_DIR)/hello $(1)/usr/bin/
        $(INSTALL_DATA) ./files/hello.conf $(1)/etc/
endef

$(eval $(call BuildPackage,hello))
```

Složitější balíčky

```
...

define Package/hello/conffiles
/etc/hello.conf
endef

define Package/hello/postinst
#!/bin/sh
[ -n "$$IPKG_INSTROOT" ] || /usr/bin/hello
endef

define Package/hello-translations
        TITLE:=Hello world
        DEPENDS:=+hello
endef

define Package/hello-translations/install
        $(INSTALL_DIR) $(1)/usr/share/hello
        $(INSTALL_DATA) $(PKG_BUILDDIR)/translations.txt $(1)/usr/share/hello/
endef

$(eval $(call BuildPackage,hello))
$(eval $(call BuildPackage,hello-translations))
```

Složitější balíčky – konfiguráky

```
...

define Package/hello/conffiles
/etc/hello.conf
endef

define Package/hello/postinst
#!/bin/sh
[ -n "$$IPKG_INSTROOT" ] || /usr/bin/hello
endef

define Package/hello-translations
        TITLE:=Hello world
        DEPENDS:=+hello
endef

define Package/hello-translations/install
        $(INSTALL_DIR) $(1)/usr/share/hello
        $(INSTALL_DATA) $(PKG_BUILDDIR)/translations.txt $(1)/usr/share/hello/
endef

$(eval $(call BuildPackage,hello))
$(eval $(call BuildPackage,hello-translations))
```

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Složitější balíčky – instalace

```
...

define Package/hello/conffiles
/etc/hello.conf
endef

define Package/hello/postinst
#!/bin/sh
[ -n "$$IPKG_INSTROOT" ] || /usr/bin/hello
endefl

define Package/hello-translations
        TITLE:=Hello world
        DEPENDS:=+hello
endef

define Package/hello-translations/install
        $(INSTALL_DIR) $(1)/usr/share/hello
        $(INSTALL_DATA) $(PKG_BUILDDIR)/translations.txt $(1)/usr/share/hello/
endef

$(eval $(call BuildPackage,hello))
$(eval $(call BuildPackage,hello-translations))
```

Více balíčků

```
...

define Package/hello/conffiles
/etc/hello.conf
endef

define Package/hello/postinst
#!/bin/sh
[ -n "$$IPKG_INSTROOT" ] || /usr/bin/hello
endef

define Package/hello-translations
        TITLE:=Hello world
        DEPENDS:=+hello
endef

define Package/hello-translations/install
        $(INSTALL_DIR) $(1)/usr/share/hello
        $(INSTALL_DATA) $(PKG_BUILDDIR)/translations.txt $(1)/usr/share/hello/
endef

$(eval $(call BuildPackage,hello))
$(eval $(call BuildPackage,hello-translations))
```
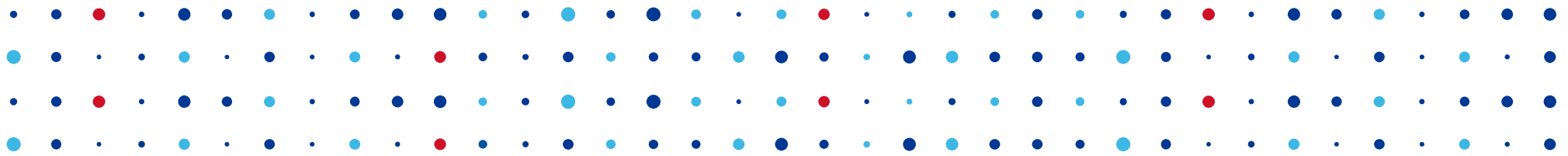
Děkuji za pozornost

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