Rockchip

ROS Instruction

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Preface

Overview

This document mainly introduces how to use ROS of Rockchip Linux SDK.

Chipset model

Chip Name	Kernel Version
RK3XXX	4.40

Applicable object

This document is mainly suitable for the following engineers:

- Field application engineers
- Software development engineers

Revision history

Revision Date	Version No.	Author	Revision Description
2018-12	V1.00	Zain Wang	Ros has been porting into buildroot, removing the original compilation method and switching to new method.

Chapter 1. Overview

Rockchip Linux SDK integrates with ROS which provides a range of libraries and tools to help software developers create robotic applications.

ROS version which Rockchip integrated are Indigo and kinetic

Chapter 2. Compile

There are two default configurations of ros_indigo.config and ros_kinetic.config under buildroot/configs/rockchip directory. Before compiling rootfs, add ros_xxx.config to the config corresponding to rootfs.

Take RK3308 Linux SDK as an example. Other methods are similar, modify buildroot/configs/rockchip_rk3308_release_defconfig

```
diff --git a/configs/rockchip_rk3308_release_defconfig b/configs/rockchip_rk3308_release_defconfig
index f905f16..a2afac1 100644
--- a/configs/rockchip_rk3308_release_defconfig
+++ b/configs/rockchip_rk3308_release_defconfig
@@ -135,3 +135,4 @@ BR2_TARGET_ROOTFS_SQUASHFS=y
 # BR2_TARGET_ROOTFS_TAR is not set
 BR2_PACKAGE_HOST_MKE2IMG=y
 BR2_PACKAGE_HOST_VBOOT_UTILS=y
+#include "ros_indigo.config"
```

Then run `./build.sh`，

Or first select the rockchip_rk3308_release corresponding to source envsetup.sh, then run make

The compilation for the first time will take a few hours. After the compilation is complete, buildroot/output/rockchip_rk3308_release/images/rootfs.squashfs which is the rootfs firmware will be generated.

Chapter 3. Add the new ros code

Provide the ros_sample: https://github.com/DZain/ROS_Sample.git
Synchronize the project to external
Then add the following files and modifications in buildroot
1) vi buildroot/package/rockchip/ros/beginner_tutorials/Config.in
Add the following items:

```
config BR2_PACKAGE_BEGINNER_TUTORIALS
    bool "beginner tutorials"
    select BR2_PACKAGE_ROSCPP
    select BR2_PACKAGE_ROSPY
    select BR2_PACKAGE_STD_MSGS
    select BR2_PACKAGE_GENMSG
    help
    beginner tutorials
```

The select option in the Config depends on the dependencies in the project

2) vi buildroot/package/rockchip/ros/beginner_tutorials/beginner_tutorials.mk

```
BEGINNER_TUTORIALS_VERSION = 1.0.0 # valid parameters must start with BEGINNER_TUTORIALS
BEGINNER_TUTORIALS_SITE_METHOD = local # local code
BEGINNER_TUTORIALS_SITE = $(TOPDIR)/../external/beginner_tutorials #code location

ROSPACK_DEPENDENCIES = roscpp rospy std_msgs genmsg # dependencies, corresponding to Config.in

${eval ${catkin-package}} # in fact it is compiled by Cmake, and the package content is pkg-catkin.mk
```

3) Add beginner_tutorials to buildroot

```
@@ -46,6 +46,7 @@ source "package/rockchip/ros/cmake_modules/Config.in"
 source "package/rockchip/ros/rospack/Config.in"
 source "package/rockchip/ros/orocos_kinematics_dynamics/Config.in"
 source "package/rockchip/ros/image-common/Config.in"
+source "package/rockchip/ros/beginner_tutorials/Config.in"
```

4) Compile

The source envsetup.sh in the SDK root directory, select rockchip_rk3308_release (If you have already ran, don't have to run again).

Configure make menuconfig, use or enter search, search BEGINNER_TUTORIALS (step 1, defined in Config.in), and select.

Save the configuration.

Compile with make.

(Or use make beginner_tutorials directly. Recompile using make beginner_tutorials-dirclean && make beginner_tutorials)

Chapter 4. Flashing

Please refer to the release documentations of Rockchip Linux SDK for instructions on how to flash firmware. It won't go into details here. Just compile ROS generated Rootfs.img download to the corresponding rootfs partition.

Chapter 5. Run

The steps to run ROS are as follows:

1, Configure environment variables

```
source /opt/ros/indigo/setup.sh
```

2, Run roscore

```
roscore &
```

3, Run the code

Take the above beginner_tutorials as an example:

```
rosrun beginner_tutorials talker
```

Running result:

```
  [ INFO] [1501923947.458788791]: hello world 0
  [ INFO] [1501923947.558904332]: hello world 1
  [ INFO] [1501923947.658774958]: hello world 2
  [ INFO] [1501923947.758644458]: hello world 3
  [ INFO] [1501923947.858779666]: hello world 4
  [ INFO] [1501923947.958779291]: hello world 5
```

(The beginner_tutorials code is a pair of programs, the talker is sending and the listener is listener, open talker alone, calculation will always accumulate. There is no phenomenon when opening listener alone, but when talker is opened at the same time, the two programs calculate and simultaneously print)