XML format used for roslaunch .launch files

XML(Extensive Make-up Language), 可扩展标记语言，是一种简单的数据存储语言，使用一系列简单的标记描述数据。

Evaluation order

roslaunch evaluates the XML file in a single pass. Includes are processed in depth-first traversal order. Tags are evaluated serially and the last setting wins. Thus, if there are multiple settings of a parameter, the last value specified for the parameter will be used.

substitution args

Roslaunch tag attributes can make use of *substitution args*,

1. $(optenv ENVIRONMENT_VARIABLE default_value)， Substitute the value of an environment variable if it is set. If default_value is provided, it will be used if the environment variable is not set.

例， *<param name="foo" value="$(optenv NUM_CPUS 1)" />*

<param name="foo" value="$(optenv CONFIG_PATH /home/marvin/ros_workspace)" />

2. $(find pkg)， Specifies a *package-relative path*. The file system path to the package directory will be substituted inline.

例，*(find rospy)/manifest.xml.*

3. $(arg foo)， evaluates to the value specified by an <arg> tag. There must be a corresponding <arg> tag *in the same launch file* that declares the arg.

如，*<node name="add_two_ints_client" pkg="beginner_tutorials" type="add_two_ints_client"*

args="$(arg a) $(arg b)" />

在终端输入格式为：

roslaunch beginer_tutorials launch_file.launch a:=1 b:=5

4. $(eval <expression>) , allows to evaluate arbitrary complex python expressions.

例， *<param name="circumference" value="$(eval 2.* 3.1415 * arg('radius'))"/>*

will compute the circumference from the *radius* argument and assign the result to an appropriate parameter.

For your convnience, arguments are also implicitly resolved, i.e. the following two expressions are identical:

"$(eval arg('foo'))"

"$(eval foo)"

if and unless attributes

All tags support if and unless attributes, which include or exclude a tag based on the evaluation of a value. "1" and "true" are considered true values. "0" and "false" are considered false values. Other values will error.

if=value (optional)， If value evaluates to true, include tag and its contents.

unless=value (optional)，Unless value evaluates to true (which means if value evaluates to false), include tag and its contents.

Tag Reference

<launch> tag

The <launch> tag is the root element of any roslaunch file. Its sole purpose is to act as a container for the other elements.

Overview

<node>
Launch a node.
<param>
Set a parameter on the Parameter Server
<remap>
Declare a name remapping.
<machine>
Declare a machine to use for launching.
<rosparam>
Set ROS parameters for the launch using a rosparam file.
<include>
Include other roslaunch files.
<env>
Specify an environment variable for launched nodes.
<test>
Launch a test node (see rostest).
<arg>
Declare an argument.
<group>
Group enclosed elements sharing a namespace or remap.

<node> tag

打开结节

Attributes

pkg="mypackage"，Package of node.

type="nodetype"，Node type. There must be a corresponding executable with the same name.

name="nodename"，Node name. Name cannot contain a namespace. Use the ns attribute instead.

output="log|screen"*(optional)* ，If 'screen', stdout/stderr from the node will be sent to the screen. If 'log', the stdout/stderr output will be sent to a log file in $ROS_HOME/log, and stderr will continue to be sent to screen. The default is 'log'.

args="arg1 arg2 arg3"*(optional)* ，Pass arguments to node.

machine="machine-name"*(optional)* ，Launch node on designated machine.

ns="foo"*(optional)* ，Start the node in the 'foo' namespace.

clear_params="true|false"*(optional)* ，Delete all parameters in the node's private namespace before launch.

例，打开 rospy_tutorials 包中的 listener.py 文件中的 listener1 节点，传递参数--test，如果节点关闭，则重新打开(respawn)

<node name="listener1" pkg="rospy_tutorials" type="listener.py" args="--test" respawn="true" />

其他：

http://blog.csdn.net/github_35160620/article/details/52618271

在独立的窗口运行各 nodes

我们在各自的 terminal 运行 rosrun node_name；但是运行 roslaunch 时，所有的 nodes 共用一个相同的 terminal，这对于那些需要从控制台输入的 nodes 很不方便。可以使用 launch-prefix 属性。

launch-prefix="command-prefix"

Eg：*launch-prefix="xterm -e"*

等价于 *xterm -e rosrun turtlesim turtle_teleop_key*

xterm 命令表示新建一个 terminal；-e 参数告诉 xterm 执行剩下的命令行。

当然，launch-prefix 属性不仅仅限于 xterm。它可用于调试（通过 gdb 或 valgrind），或用于降低进程的执行顺序（通过 nice）.

<param> tag

The <param> tag defines a parameter to be set on the Parameter Server. Instead of value, you can specify a textfile, binfile or command attribute to set the value of a parameter. The <param> tag can be put inside of a <node> tag, in which case the parameter is treated like a private parameter.

Attributes

name="namespace/name" , Parameter name. Namespaces can be included in the parameter name

value="value"*(optional)* , Defines the value of the parameter. If this attribute is omitted, binfile, textfile or command must be specified.

type="str|int|double|bool"*(optional)* , Specifies the type of the parameter. If you don't specify the type, roslaunch will attempt to automatically determine the type.

textfile="$(find pkg-name)/path/file.txt"*(optional)* , The contents of the file will be read and stored as a string. The file must be locally accessible

binfile="$(find pkg-name)/path/file"*(optional)*

command="$(find pkg-name)/exe '$(find pkg-name)/arg.txt'"*(optional)*

例， *<param name="publish_frequency" type="double" value="10.0" />*

<remap> tag

<node>标签下设置重映射参数的标签，格式为：<remap from=”original name” to=”new name”/>

例如想要一个订阅“chatter”话题的节点接收另一个节点发布的”hello”话题的消息，两个话题的类型相同，这时候可以用 remap 命令：

<remap from="chatter" to="hello"/>

<machine> tag

The <machine> tag declares a machine that you can run ROS nodes on. *You do not need this tag if you are launching all the nodes locally.* It is mainly used to declare SSH and ROS environment variable settings for remote machines.

Attributes

name="machine-name" , Name to assign to machine. This corresponds to the name used for the machine attribute for <node> tags.

address="blah.willowgarage.com" , Network address/hostname of machine.

env-loader="/opt/ros/indigo/env.sh" , Specify environment file on remote machine.

default="true|false|never" *(optional)* , Sets this machine as the default to assign nodes to.

user="username" *(optional)* , SSH user name for logging into machine. timeout="10.0" *(optional)* , Number of seconds before a roslaunch on this machine is considered as having failed to launch.

例，在另一台计算机上运行 "footalker" 结点，使用 env-loader 属性加载环境配置文件

<launch>

<machine name="foo" address="foo-address" env-loader="/opt/ros/indigo/env.sh" user="someone"/>

<node machine="foo" name="footalker" pkg="test_ros" type="talker.py" />

</launch>

环境配置文件示例如下：

#!/usr/bin/env bash

source /home/username/workspace/setup.bash

exec "$@"

<rosparam> tag

The <rosparam> tag enables the use of rosparam YAML files for loading and dumping parameters from the ROS Parameter Server. It can also be used to remove parameters. The <rosparam> tag can be put inside of a <node> tag, in which case the parameter is treated like a private name.

[rosparam 命令行：

rosparam set　　set parameter

rosparam get　　get parameter

rosparam load　　load parameters from file

rosparam dump　　dump parameters to file

rosparam delete　delete parameter

rosparam list　　list parameter names

可加参数 /namesapce_name,限定操作在某一命令空间内]

Attributes

command="load|dump|delete" *(optional, default=load)*

file="$(find pkg-name)/path/foo.yaml" *(load or dump commands)*

param="param-name"，Name of parameter.

ns="namespace" *(optional)*，Scope the parameters to the specified namespace.

例，加载 example.yaml 配置文件中的参数

<rosparam command="load" file="$(find rosparam)/example.yaml" />

设置 a_list 参数值为[1,2,3,4] ?

<rosparam param="a_list">[1, 2, 3, 4]</rosparam>

When to use param and rosparam on launch file?

I believe that the main difference is that <param> may be used to set a single command on the ROS parameter server, while <rosparam> can be used to evaluate groups of parameters.

The value set by the <param> tag may only be a string, int, bool, or double, which may be set through the xml attribute value, or by reading in from a text file, bin file, or the output of a command line command.

The value set by the <rosparam> tag is most commonly a batch of related parameters, read in from a YAML file (or from the output of rosparam dump). You can think of it as a programmatic way to access the functionality of rosparam from a launch file. A good example of this in practice is the move_base related nodes, where there are many, many parameters to be set, it's less cumbersome to just use the YAML format.

Ros Navigation: concepts and tutorial

As to move base, it bases its path planning techniques on the current location and the nav goal. In the node launcher code, we have the usual syntax to launch a node, followed by a list of seven parameters, five of which are rosparams. The params are two: base global planner and controller frequency. The rosparam, in turn, are files that contain more parameters for the move base, and which are done this way to keep the files organized and easy to read.

<include> tag

The <include> tag enables you to import another roslaunch XML file into the current file.

Attributes

file="$(find pkg-name)/path/filename.xml"， Name of file to include.

ns="foo" *(optional)*， Import the file relative to the 'foo' namespace.

<test> tag

The <test> tag is syntactically similar to the <node> tag. They both specify a ROS node to run, but the <test> tag indicates that the node is actually a *test node* to run.

例，*<test test-name="test_1_2" pkg="mypkg" type="test_1_2.py" time-limit="10.0" args="--test1 --test2" />*

Launches the "test_1_2" node using the test_1_2.py executable from the mypkg package with the command-line argument --test1 --test2. The test will be terminated as a failure if it takes longer than 10 seconds.

<arg> tag

The <arg> tag allows you to create more re-usable and configurable launch files by specifying values that are passed via the command-line, passing in via an <include>, or declared for higher-level files.

用法

<arg name="foo" /> Declares the existence of foo. foo must be passed in either as a command-line argument (if top-level) or via <include> passing (if included).

<arg name="foo" default="1" /> ， Declares foo with a default value.

<arg name="foo" value="bar" /> ， Declares foo with constant value. The value for foo cannot be overridden.

<group> tag

The <group> tag makes it easier to apply settings to a group of nodes. It has an ns attribute that lets you push the group of nodes into a separate namespace.

Attributes

ns="namespace" *(optional)* , Assign the group of nodes to the specified namespace.

clear_params="true|false" *(optional)* , Delete all parameters in the group's namespace before launch. This feature is very dangerous and should be used with caution. ns must be specified.

The <group> tag is equivalent to the top-level <launch> tag and simply acts as a container for the tags within. This means that you can use any tag as you would normally use it within a <launch> tag.

例 urdf_show.launch:

```
<launch>
        <arg name="model" />   //申明变量“model”
        <arg name="gui" default="False" />  //申明变量“gui”，默认值是 “False”
        <param name="robot_description" textfile="$(arg model)" />
  //robot_description 的值来来自文本变量 model（joint_state_publisher 中的参数，为所描述机器人 urdf 文件的内容）
        <param name="use_gui" value="$(arg gui)"/>
//use_gui 的值由变量 gui 传递（joint_state_publisher 中的参数），规定是否使用调节关节角度的 gui
        <node name="joint_state_publisher" pkg="joint_state_publisher" type="joint_state_publisher" />
        <node name="robot_state_publisher" pkg="robot_state_publisher" type="state_publisher" />
```

//打开两个节点，对应的两个功能包并没有专门加入，猜想是在安装 rviz 的时候一起默认安装的

```
    <node name="rviz" pkg="rviz" type="rviz" args="-d $(find teleop)/urdf.rviz" required="true" />
</launch>
```

在 telep 包 urdf 文件夹下建立 06-flexible.urdf 后在终端输入：

roslaunch teleop urdf_show.launch model:='$(find teleop)/urdf/06-flexible.urdf' gui:=true