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Contents:
pygazebo provides python bindings for the Gazebo (http://gazebosim.org) multi-robot simulator.

- GitHub: https://github.com/jpieper/pygazebo
- Free software: Apache 2.0 License

1.1 Features

- Supports publishing and subscribing to any Gazebo topics using a straightforward python API.
- Python versions of all defined Gazebo protobuf messages are included.
- Based on asyncio/trollius for flexible concurrency support.

1.2 Simple Usage

The following example shows how easy it is to publish a message repeatedly to control a single joint in a Gazebo model running on the local machine on the default port.

```python
import trollius
from trollius import From
import pygazebo
import pygazebo.msg.joint_cmd_pb2

@trollius.coroutine
def publish_loop():
    manager = yield From(pygazebo.connect())

    publisher = yield From(
        manager.advertise('/gazebo/default/model/joint_cmd',
        'gazebo.msgs.JointCmd'))

    message = pygazebo.msg.joint_cmd_pb2.JointCmd()
    message.axis = 0
    message.force = 1.0

    while True:
```
yield From(publisher.publish(message))
yield From(trollius.sleep(1.0))

loop = trollius.get_event_loop()
loop.run_until_complete(publish_loop())
Installation

At the command line:

$ easy_install pygazebo

Or, if you have virtualenvwrapper installed:

$ mkvirtualenv pygazebo
$ pip install pygazebo
To use pygazebo in a project, first import, then instantiate a Manager:

```python
from trollius import From
import pygazebo

manager = yield From(pygazebo.connect(('localhost', 11345)))
```

Then, individual topics can be published or subscribed using the `advertise` or `subscribe` methods.

To publish:

```python
publisher = yield From(
    manager.advertise('/gazebo/default/topic',
                       'gazebo.msgs.GzString'))

yield From(publisher.publish(pygazebo.msg.gz_string_pb2.GzString(data='hello')))
```

And to subscribe:

```python
def callback(data):
    message = pygazebo.msg.gz_string_pb2.GzString.FromString(data)
    print('Received message:', message.data)

manager.subscribe('/gazebo/default/topic',
                  'gazebo.msgs.GzString',
                  callback)
```

The library is built with trollius. No external methods are coroutines (they only return Futures) and can thus operate in any application which is already using a trollius or asyncio event loop even if coroutines are not used.
4.1 Report and Fix Bugs

Report or look for bugs to fix at https://github.com/jpieper/pygazebo/issues

4.2 Get Started!

Ready to contribute? Here’s how to set up pygazebo for local development.

1. Fork the pygazebo repo on GitHub.
2. Clone your fork locally:
   ```
   $ git clone git@github.com:your_name_here/pygazebo.git
   ```
3. Install your local copy into a virtualenv. Assuming you have virtualenvwrapper installed, this is how you set up your fork for local development:
   ```
   $ mkvirtualenv pygazebo
   $ cd pygazebo/
   $ python setup.py develop
   ```
4. Create a branch for local development:
   ```
   $ git checkout -b name-of-your-bugfix-or-feature
   ```
   Now you can make your changes locally.
5. When you’re done making changes, check that your changes pass flake8 and the tests, including testing other Python versions with tox:
   ```
   $ flake8 pygazebo tests
   $ python setup.py test
   $ tox
   ```
   To get flake8 and tox, just pip install them into your virtualenv.
6. Commit your changes and push your branch to GitHub:
   ```
   $ git add .
   $ git commit -m "Your detailed description of your changes."
   $ git push origin name-of-your-bugfix-or-feature
7. Submit a pull request through the GitHub website.

4.3 Pull Request Guidelines

Before you submit a pull request, check that it meets these guidelines:

1. The pull request should include tests.

2. If the pull request adds functionality, the docs should be updated. Put your new functionality into a function with a docstring, and update the reference documentation accordingly.

3. The pull request should work for Python 2.7. Check https://travis-ci.org/jpieper/pygazebo/pull_requests and make sure that the tests pass for all supported Python versions.
Credits

- Josh Pieper <jjp@pobox.com>

- Switch from eventlet to trollius/asyncio, for better compatibility with other event loops and future python versions.
- Update to gazebo 3.0.0

6.2 2.2.1-2014.2 (2014-06-04)

- Properly support sending and receiving large messages.

6.3 2.2.1-2014.1 (2014-02-11)

- First release on PyPI.
7.1 Python bindings to the Gazebo multi-robot simulator

This package provides a python API to interact with the Gazebo multi-robot simulator, http://www.gazebosim.org. Gazebo is a multi-robot simulator for outdoor environments. Like Stage, it is capable of simulating a population of robots, sensors and objects, but does so in a three-dimensional world. It generates both realistic sensor feedback and physically plausible interactions between objects (it includes an accurate simulation of rigid-body physics).

pygazebo implements the Gazebo network publish-subscribe protocol, so that python applications can seamlessly interact with Gazebo entities.

pygazebo is based on eventlet for asynchronous network operations.

```python
def pygazebo.connect(address=('127.0.0.1', 11345))
    Create a connection to the Gazebo server.

    Parameters address (a tuple of ('host', port)) – destination TCP server

    Returns a Future indicating when the connection is ready
```

```python
class pygazebo.Publisher
    Publishes data to the Gazebo publish-subscribe bus.

    Variables

    • topic – (string) the topic name this publisher is using

    • msg_type – (string) the Gazebo message type

    publish(msg)
        Publish a new instance of this data.

        Parameters msg (google.protobuf.Message instance) – the message to publish

        Returns a future which completes when the data has been written

    remove()
        Stop advertising this topic.

        Note: Once remove() is called, no further methods should be called.

    wait_for_listener()
        Return a Future which is complete when at least one listener is present.
```
class pygazebo.Subscriber(local_host, local_port)

Receives data from the Gazebo publish-subscribe bus.

Variables

- **topic** – (str) The topic name this subscriber is listening for.
- **msg_type** – (str) The Gazebo message type.
- **callback** – (function) The current function to invoke.

**remove**()

Stop listening for this topic.

Note: Once **remove**() is called, the callback will no longer be invoked.
8.1 Axis

class pygazebo.msg.axis_pb2.Axis(**kwargs)

damping
    Magic attribute generated for “damping” proto field.
friction
    Magic attribute generated for “friction” proto field.
limit_effort
    Magic attribute generated for “limit_effort” proto field.
limit_lower
    Magic attribute generated for “limit_lower” proto field.
limit_upper
    Magic attribute generated for “limit_upper” proto field.
limit_velocity
    Magic attribute generated for “limit_velocity” proto field.
xyz
    Magic attribute generated for “xyz” proto field.

8.2 BoxGeom

class pygazebo.msg.boxgeom_pb2.BoxGeom(**kwargs)

size
    Magic attribute generated for “size” proto field.

8.3 CameraCmd

class pygazebo.msg.camera_cmd_pb2.CameraCmd(**kwargs)
follow_model
(Magic attribute generated for “follow_model” proto field.

8.4 CameraSensor

class pygazebo.msg.camerasensor_pb2.CameraSensor(**kwargs)

    far_clip
    (Magic attribute generated for “far_clip” proto field.

    horizontal_fov
    (Magic attribute generated for “horizontal_fov” proto field.

    image_format
    (Magic attribute generated for “image_format” proto field.

    image_size
    (Magic attribute generated for “image_size” proto field.

    near_clip
    (Magic attribute generated for “near_clip” proto field.

    save_enabled
    (Magic attribute generated for “save_enabled” proto field.

    save_path
    (Magic attribute generated for “save_path” proto field.

8.5 Collision

class pygazebo.msg.collision_pb2.Collision(**kwargs)

    geometry
    (Magic attribute generated for “geometry” proto field.

    id
    (Magic attribute generated for “id” proto field.

    laser_retro
    (Magic attribute generated for “laser_retro” proto field.

    max_contacts
    (Magic attribute generated for “max_contacts” proto field.

    name
    (Magic attribute generated for “name” proto field.

    pose
    (Magic attribute generated for “pose” proto field.

    surface
    (Magic attribute generated for “surface” proto field.

    visual
    (Magic attribute generated for “visual” proto field.
8.6 Color

class pygazebo.msg.color_pb2.Color(**kwargs)

    a
    Magic attribute generated for “a” proto field.
    b
    Magic attribute generated for “b” proto field.
    g
    Magic attribute generated for “g” proto field.
    r
    Magic attribute generated for “r” proto field.

8.7 Contact

class pygazebo.msg.contact_pb2.Contact(**kwargs)

    collision1
    Magic attribute generated for “collision1” proto field.
    collision2
    Magic attribute generated for “collision2” proto field.
    depth
    Magic attribute generated for “depth” proto field.
    normal
    Magic attribute generated for “normal” proto field.
    position
    Magic attribute generated for “position” proto field.
    time
    Magic attribute generated for “time” proto field.
    world
    Magic attribute generated for “world” proto field.
    wrench
    Magic attribute generated for “wrench” proto field.

8.8 Contacts

class pygazebo.msg.contacts_pb2.Contacts(**kwargs)

    contact
    Magic attribute generated for “contact” proto field.
    time
    Magic attribute generated for “time” proto field.
8.9 ContactSensor

class pygazebo.msg.contactsensor_pb2.ContactSensor(**kwargs)

    collision_name
    Magic attribute generated for “collision_name” proto field.

8.10 CylinderGeom

class pygazebo.msg.cylindergeom_pb2.CylinderGeom(**kwargs)

    length
    Magic attribute generated for “length” proto field.
    radius
    Magic attribute generated for “radius” proto field.

8.11 Diagnostics

class pygazebo.msg.diagnostics_pb2.Diagnostics(**kwargs)

    real_time
    Magic attribute generated for “real_time” proto field.
    real_time_factor
    Magic attribute generated for “real_time_factor” proto field.
    sim_time
    Magic attribute generated for “sim_time” proto field.
    time
    Magic attribute generated for “time” proto field.

8.12 Factory

class pygazebo.msg.factory_pb2.Factory(**kwargs)

    clone_model_name
    Magic attribute generated for “clone_model_name” proto field.
    edit_name
    Magic attribute generated for “edit_name” proto field.
    pose
    Magic attribute generated for “pose” proto field.
    sdf
    Magic attribute generated for “sdf” proto field.
8.13 Fog

class pygazebo.msg.fog_pb2.Fog(**kwargs)

    color
        Magic attribute generated for “color” proto field.

    density
        Magic attribute generated for “density” proto field.

    end
        Magic attribute generated for “end” proto field.

    start
        Magic attribute generated for “start” proto field.

    type
        Magic attribute generated for “type” proto field.

8.14 Friction

class pygazebo.msg.friction_pb2.Friction(**kwargs)

    fdir1
        Magic attribute generated for “fdir1” proto field.

    mu
        Magic attribute generated for “mu” proto field.

    mu2
        Magic attribute generated for “mu2” proto field.

    slip1
        Magic attribute generated for “slip1” proto field.

    slip2
        Magic attribute generated for “slip2” proto field.

8.15 Geometry

class pygazebo.msg.geometry_pb2.Geometry(**kwargs)

    box
        Magic attribute generated for “box” proto field.

    cylinder
        Magic attribute generated for “cylinder” proto field.
heightmap
    Magic attribute generated for “heightmap” proto field.

image
    Magic attribute generated for “image” proto field.

mesh
    Magic attribute generated for “mesh” proto field.

plane
    Magic attribute generated for “plane” proto field.

points
    Magic attribute generated for “points” proto field.

describe
    Magic attribute generated for “sphere” proto field.

type
    Magic attribute generated for “type” proto field.

8.16 GPS

class pygazebo.msg.gps_pb2.GPS(**kwargs)

    altitude
        Magic attribute generated for “altitude” proto field.

    latitude_deg
        Magic attribute generated for “latitude_deg” proto field.

    link_name
        Magic attribute generated for “link_name” proto field.

    longitude_deg
        Magic attribute generated for “longitude_deg” proto field.

    time
        Magic attribute generated for “time” proto field.

    velocity_east
        Magic attribute generated for “velocity_east” proto field.

    velocity_north
        Magic attribute generated for “velocity_north” proto field.

    velocity_up
        Magic attribute generated for “velocity_up” proto field.

8.17 GUICamera

class pygazebo.msg.gui_camera_pb2.GUICamera(**kwargs)

    name
        Magic attribute generated for “name” proto field.
pose
   Magic attribute generated for “pose” proto field.

track
   Magic attribute generated for “track” proto field.

view_controller
   Magic attribute generated for “view_controller” proto field.

8.18 GUIOverlayConfig

class pygazebo.msg.gui_overlay_config_pb2.GUIOverlayConfig(**kwargs)

layout_filename
   Magic attribute generated for “layout_filename” proto field.

8.19 GUI

class pygazebo.msg.gui_pb2.GUI(**kwargs)

camera
   Magic attribute generated for “camera” proto field.

fullscreen
   Magic attribute generated for “fullscreen” proto field.

8.20 GzString

class pygazebo.msg.gz_string_pb2.GzString(**kwargs)

data
   Magic attribute generated for “data” proto field.

8.21 GzString_V

class pygazebo.msg.gz_string_v_pb2.GzString_V(**kwargs)

data
   Magic attribute generated for “data” proto field.

8.22 Header

class pygazebo.msg.header_pb2.Header(**kwargs)
**index**
Magic attribute generated for “index” proto field.

**stamp**
Magic attribute generated for “stamp” proto field.

**str_id**
Magic attribute generated for “str_id” proto field.

## 8.23 HeightmapGeom

```python
class pygazebo.msg.heightmapgeom_pb2.HeightmapGeom(**kwargs)
```

**blend**
Magic attribute generated for “blend” proto field.

**filename**
Magic attribute generated for “filename” proto field.

**height**
Magic attribute generated for “height” proto field.

**heights**
Magic attribute generated for “heights” proto field.

**image**
Magic attribute generated for “image” proto field.

**origin**
Magic attribute generated for “origin” proto field.

**size**
Magic attribute generated for “size” proto field.

**texture**
Magic attribute generated for “texture” proto field.

**use_terrain_paging**
Magic attribute generated for “use_terrain_paging” proto field.

**width**
Magic attribute generated for “width” proto field.

## 8.24 Image

```python
class pygazebo.msg.image_pb2.Image(**kwargs)
```

**data**
Magic attribute generated for “data” proto field.

**height**
Magic attribute generated for “height” proto field.

**pixel_format**
Magic attribute generated for “pixel_format” proto field.
8.25 ImageStamped

class pygazebo.msg.image_stamped_pb2.ImageStamped(**kwargs)

    image
    Magic attribute generated for “image” proto field.

    time
    Magic attribute generated for “time” proto field.

8.26 ImageGeom

class pygazebo.msg.imagegeom_pb2.ImageGeom(**kwargs)

    granularity
    Magic attribute generated for “granularity” proto field.

    height
    Magic attribute generated for “height” proto field.

    scale
    Magic attribute generated for “scale” proto field.

    threshold
    Magic attribute generated for “threshold” proto field.

    uri
    Magic attribute generated for “uri” proto field.

8.27 ImagesStamped

class pygazebo.msg.images_stamped_pb2.ImagesStamped(**kwargs)

    image
    Magic attribute generated for “image” proto field.

    time
    Magic attribute generated for “time” proto field.

8.28 IMU

class pygazebo.msg.imu_pb2.IMU(**kwargs)
**angular_velocity**
Magic attribute generated for “angular_velocity” proto field.

**entity_name**
Magic attribute generated for “entity_name” proto field.

**linear_acceleration**
Magic attribute generated for “linear_acceleration” proto field.

**orientation**
Magic attribute generated for “orientation” proto field.

**stamp**
Magic attribute generated for “stamp” proto field.

### 8.29 Inertial

class pygazebo.msg.inertial_pb2.Inertial(**kwargs)

**ixx**
Magic attribute generated for “ixx” proto field.

**ixy**
Magic attribute generated for “ixy” proto field.

**ixz**
Magic attribute generated for “ixz” proto field.

**iyy**
Magic attribute generated for “iyy” proto field.

**iyz**
Magic attribute generated for “iyz” proto field.

**izz**
Magic attribute generated for “izz” proto field.

**mass**
Magic attribute generated for “mass” proto field.

**pose**
Magic attribute generated for “pose” proto field.

### 8.30 Int

class pygazebo.msg.int_pb2.Int(**kwargs)

**data**
Magic attribute generated for “data” proto field.

### 8.31 JointAnimation

class pygazebo.msg.joint_animation_pb2.JointAnimation(**kwargs)
joint
    Magic attribute generated for “joint” proto field.
model_name
    Magic attribute generated for “model_name” proto field.
time
    Magic attribute generated for “time” proto field.

8.32 JointCmd

class pygazebo.msg.joint_cmd_pb2.JointCmd(**kwargs)

    axis
        Magic attribute generated for “axis” proto field.
    force
        Magic attribute generated for “force” proto field.
    name
        Magic attribute generated for “name” proto field.
    position
        Magic attribute generated for “position” proto field.
    reset
        Magic attribute generated for “reset” proto field.
    velocity
        Magic attribute generated for “velocity” proto field.

8.33 Joint

class pygazebo.msg.joint_pb2.Joint(**kwargs)

    angle
        Magic attribute generated for “angle” proto field.
    axis1
        Magic attribute generated for “axis1” proto field.
    axis2
        Magic attribute generated for “axis2” proto field.
    bounce
        Magic attribute generated for “bounce” proto field.
    cfm
        Magic attribute generated for “cfm” proto field.
    child
        Magic attribute generated for “child” proto field.
    child_id
        Magic attribute generated for “child_id” proto field.
fudge_factor
    Magic attribute generated for “fudge_factor” proto field.

id
    Magic attribute generated for “id” proto field.

limit_cfm
    Magic attribute generated for “limit_cfm” proto field.

limit_erp
    Magic attribute generated for “limit_erp” proto field.

name
    Magic attribute generated for “name” proto field.

parent
    Magic attribute generated for “parent” proto field.

parent_id
    Magic attribute generated for “parent_id” proto field.

pose
    Magic attribute generated for “pose” proto field.

dsens
    Magic attribute generated for “sensor” proto field.

suspension_cfm
    Magic attribute generated for “suspension_cfm” proto field.

suspension_erp
    Magic attribute generated for “suspension_erp” proto field.

type
    Magic attribute generated for “type” proto field.

velocity
    Magic attribute generated for “velocity” proto field.

8.34 JointWrench

class pygazebo.msg.joint_wrench_pb2.JointWrench(**kwargs)

body_1_id
    Magic attribute generated for “body_1_id” proto field.

body_1_name
    Magic attribute generated for “body_1_name” proto field.

body_1_wrench
    Magic attribute generated for “body_1_wrench” proto field.

body_2_id
    Magic attribute generated for “body_2_id” proto field.

body_2_name
    Magic attribute generated for “body_2_name” proto field.

body_2_wrench
    Magic attribute generated for “body_2_wrench” proto field.
8.35 ForceTorque

class pygazebo.msg.joint_wrench_stamped_pb2.ForceTorque(**kwargs)

    time
    Magic attribute generated for “time” proto field.

    wrench
    Magic attribute generated for “wrench” proto field.

8.36 LaserScan

class pygazebo.msg.laserscan_pb2.LaserScan(**kwargs)

    angle_max
    Magic attribute generated for “angle_max” proto field.

    angle_min
    Magic attribute generated for “angle_min” proto field.

    angle_step
    Magic attribute generated for “angle_step” proto field.

    count
    Magic attribute generated for “count” proto field.

    frame
    Magic attribute generated for “frame” proto field.

    intensities
    Magic attribute generated for “intensities” proto field.

    range_max
    Magic attribute generated for “range_max” proto field.

    range_min
    Magic attribute generated for “range_min” proto field.

    ranges
    Magic attribute generated for “ranges” proto field.

    vertical_angle_max
    Magic attribute generated for “vertical_angle_max” proto field.

    vertical_angle_min
    Magic attribute generated for “vertical_angle_min” proto field.

    vertical_angle_step
    Magic attribute generated for “vertical_angle_step” proto field.

    vertical_count
    Magic attribute generated for “vertical_count” proto field.

    world_pose
    Magic attribute generated for “world_pose” proto field.
8.37 LaserScanStamped

class pygazebo.msg.laserscan_stamped_pb2.LaserScanStamped(**kwargs)

    scan
    Magic attribute generated for “scan” proto field.

    time
    Magic attribute generated for “time” proto field.

8.38 Light

class pygazebo.msg.light_pb2.Light(**kwargs)

    attenuation_constant
    Magic attribute generated for “attenuation_constant” proto field.

    attenuation_linear
    Magic attribute generated for “attenuation_linear” proto field.

    attenuation_quadratic
    Magic attribute generated for “attenuation_quadratic” proto field.

    cast_shadows
    Magic attribute generated for “cast_shadows” proto field.

    diffuse
    Magic attribute generated for “diffuse” proto field.

    direction
    Magic attribute generated for “direction” proto field.

    name
    Magic attribute generated for “name” proto field.

    pose
    Magic attribute generated for “pose” proto field.

    range
    Magic attribute generated for “range” proto field.

    specular
    Magic attribute generated for “specular” proto field.

    spot_falloff
    Magic attribute generated for “spot_falloff” proto field.

    spot_inner_angle
    Magic attribute generated for “spot_inner_angle” proto field.

    spot_outer_angle
    Magic attribute generated for “spot_outer_angle” proto field.

    type
    Magic attribute generated for “type” proto field.
8.39 LinkData

class pygazebo.msg.link_data_pb2.LinkData(**kwargs)

    angular_velocity
    Magic attribute generated for “angular_velocity” proto field.

    linear_velocity
    Magic attribute generated for “linear_velocity” proto field.

    name
    Magic attribute generated for “name” proto field.

    time
    Magic attribute generated for “time” proto field.

8.40 Link

class pygazebo.msg.link_pb2.Link(**kwargs)

    canonical
    Magic attribute generated for “canonical” proto field.

    collision
    Magic attribute generated for “collision” proto field.

    enabled
    Magic attribute generated for “enabled” proto field.

    gravity
    Magic attribute generated for “gravity” proto field.

    id
    Magic attribute generated for “id” proto field.

    inertial
    Magic attribute generated for “inertial” proto field.

    kinematic
    Magic attribute generated for “kinematic” proto field.

    name
    Magic attribute generated for “name” proto field.

    pose
    Magic attribute generated for “pose” proto field.

    projector
    Magic attribute generated for “projector” proto field.

    self_collide
    Magic attribute generated for “self_collide” proto field.

    sensor
    Magic attribute generated for “sensor” proto field.

    visual
    Magic attribute generated for “visual” proto field.
8.41 LogControl

class pygazebo.msg.log_control_pb2.LogControl(**kwargs)

    base_path
        Magic attribute generated for “base_path” proto field.

    encoding
        Magic attribute generated for “encoding” proto field.

    paused
        Magic attribute generated for “paused” proto field.

    start
        Magic attribute generated for “start” proto field.

    stop
        Magic attribute generated for “stop” proto field.

8.42 LogStatus

class pygazebo.msg.log_status_pb2.LogStatus(**kwargs)

    log_file
        Magic attribute generated for “log_file” proto field.

    sim_time
        Magic attribute generated for “sim_time” proto field.

8.43 Material

class pygazebo.msg.material_pb2.Material(**kwargs)

    ambient
        Magic attribute generated for “ambient” proto field.

    diffuse
        Magic attribute generated for “diffuse” proto field.

    emissive
        Magic attribute generated for “emissive” proto field.

    lighting
        Magic attribute generated for “lighting” proto field.

    normal_map
        Magic attribute generated for “normal_map” proto field.

    script
        Magic attribute generated for “script” proto field.

    shader_type
        Magic attribute generated for “shader_type” proto field.
specular
    Magic attribute generated for “specular” proto field.

8.44 MeshGeom

class pygazebo.msg.meshgeom_pb2.MeshGeom(**kwargs)

    center_submesh
        Magic attribute generated for “center_submesh” proto field.
    filename
        Magic attribute generated for “filename” proto field.
    scale
        Magic attribute generated for “scale” proto field.
    submesh
        Magic attribute generated for “submesh” proto field.

8.45 ModelConfiguration

class pygazebo.msg.model_configuration_pb2.ModelConfiguration(**kwargs)

    joint_names
        Magic attribute generated for “joint_names” proto field.
    joint_positions
        Magic attribute generated for “joint_positions” proto field.
    link_name
        Magic attribute generated for “link_name” proto field.
    pose
        Magic attribute generated for “pose” proto field.
    time
        Magic attribute generated for “time” proto field.

8.46 Model

class pygazebo.msg.model_pb2.Model(**kwargs)

    deleted
        Magic attribute generated for “deleted” proto field.
    id
        Magic attribute generated for “id” proto field.
    is_static
        Magic attribute generated for “is_static” proto field.
joint
Magic attribute generated for “joint” proto field.

link
Magic attribute generated for “link” proto field.

name
Magic attribute generated for “name” proto field.

pose
Magic attribute generated for “pose” proto field.

scale
Magic attribute generated for “scale” proto field.

visual
Magic attribute generated for “visual” proto field.

8.47 Model_V

class pygazebo.msg.model_v_pb2.Model_V(**kwargs)

models
Magic attribute generated for “models” proto field.

8.48 Packet

class pygazebo.msg.packet_pb2.Packet(**kwargs)

serialized_data
Magic attribute generated for “serialized_data” proto field.

stamp
Magic attribute generated for “stamp” proto field.

type
Magic attribute generated for “type” proto field.

8.49 Physics

class pygazebo.msg.physics_pb2.Physics(**kwargs)

cfm
Magic attribute generated for “cfm” proto field.

contact_max_correcting_vel
Magic attribute generated for “contact_max_correcting_vel” proto field.

contact_surface_layer
Magic attribute generated for “contact_surface_layer” proto field.
**enable_physics**
Magic attribute generated for “enable_physics” proto field.

**erp**
Magic attribute generated for “erp” proto field.

**gravity**
Magic attribute generated for “gravity” proto field.

**iters**
Magic attribute generated for “iters” proto field.

**max_step_size**
Magic attribute generated for “max_step_size” proto field.

**min_step_size**
Magic attribute generated for “min_step_size” proto field.

**precon_iters**
Magic attribute generated for “precon_iters” proto field.

**real_time_factor**
Magic attribute generated for “real_time_factor” proto field.

**real_time_update_rate**
Magic attribute generated for “real_time_update_rate” proto field.

**solver_type**
Magic attribute generated for “solver_type” proto field.

**sor**
Magic attribute generated for “sor” proto field.

**type**
Magic attribute generated for “type” proto field.

### 8.50 PID

class **pygazebo.msg.pid_pb2.PID(**kwargs)

**d_gain**
Magic attribute generated for “d_gain” proto field.

**i_gain**
Magic attribute generated for “i_gain” proto field.

**i_max**
Magic attribute generated for “i_max” proto field.

**i_min**
Magic attribute generated for “i_min” proto field.

**limit**
Magic attribute generated for “limit” proto field.

**p_gain**
Magic attribute generated for “p_gain” proto field.

**target**
Magic attribute generated for “target” proto field.
8.51 PlaneGeom

```python
class pygazebo.msg.planegeom_pb2.PlaneGeom(**kwargs)
```

- `d`  
  Magic attribute generated for “d” proto field.

- `normal`  
  Magic attribute generated for “normal” proto field.

- `size`  
  Magic attribute generated for “size” proto field.

8.52 Plugin

```python
class pygazebo.msg.plugin_pb2.Plugin(**kwargs)
```

- `filename`  
  Magic attribute generated for “filename” proto field.

- `innerxml`  
  Magic attribute generated for “innerxml” proto field.

- `name`  
  Magic attribute generated for “name” proto field.

8.53 PointCloud

```python
class pygazebo.msg.pointcloud_pb2.PointCloud(**kwargs)
```

- `points`  
  Magic attribute generated for “points” proto field.

8.54 PoseAnimation

```python
class pygazebo.msg.pose_animation_pb2.PoseAnimation(**kwargs)
```

- `model_id`  
  Magic attribute generated for “model_id” proto field.

- `model_name`  
  Magic attribute generated for “model_name” proto field.

- `pose`  
  Magic attribute generated for “pose” proto field.

- `time`  
  Magic attribute generated for “time” proto field.
8.55 Pose

class pygazebo.msg.pose_pb2.Pose(**kwargs)

    id
    Magic attribute generated for “id” proto field.

    name
    Magic attribute generated for “name” proto field.

    orientation
    Magic attribute generated for “orientation” proto field.

    position
    Magic attribute generated for “position” proto field.

8.56 PoseStamped

class pygazebo.msg.pose_stamped_pb2.PoseStamped(**kwargs)

    pose
    Magic attribute generated for “pose” proto field.

    time
    Magic attribute generated for “time” proto field.

8.57 PoseTrajectory

class pygazebo.msg.pose_trajectory_pb2.PoseTrajectory(**kwargs)

    id
    Magic attribute generated for “id” proto field.

    name
    Magic attribute generated for “name” proto field.

    pose_stamped
    Magic attribute generated for “pose_stamped” proto field.

8.58 Pose_V

class pygazebo.msg.pose_v_pb2.Pose_V(**kwargs)

    pose
    Magic attribute generated for “pose” proto field.
8.59 PosesStamped

```python
class pygazebo.msg.poses_stamped_pb2.PosesStamped(**kwargs)

    pose
        Magic attribute generated for “pose” proto field.
    time
        Magic attribute generated for “time” proto field.
```

8.60 Projector

```python
class pygazebo.msg.projector_pb2.Projector(**kwargs)

    enabled
        Magic attribute generated for “enabled” proto field.
    far_clip
        Magic attribute generated for “far_clip” proto field.
    fov
        Magic attribute generated for “fov” proto field.
    name
        Magic attribute generated for “name” proto field.
    near_clip
        Magic attribute generated for “near_clip” proto field.
    pose
        Magic attribute generated for “pose” proto field.
    texture
        Magic attribute generated for “texture” proto field.
```

8.61 PropagationGrid

```python
class pygazebo.msg.propagation_grid_pb2.PropagationGrid(**kwargs)

    particle
        Magic attribute generated for “particle” proto field.
```

8.62 PropagationParticle

```python
class pygazebo.msg.propagation_particle_pb2.PropagationParticle(**kwargs)

    signal_level
        Magic attribute generated for “signal_level” proto field.
```
8.63 Publish

class pygazebo.msg.publish_pb2.Publish(**kwargs)

    host
    Magic attribute generated for “host” proto field.

    msg_type
    Magic attribute generated for “msg_type” proto field.

    port
    Magic attribute generated for “port” proto field.

    topic
    Magic attribute generated for “topic” proto field.

8.64 Publishers

class pygazebo.msg.publishers_pb2.Publishers(**kwargs)

    publisher
    Magic attribute generated for “publisher” proto field.

8.65 Quaternion

class pygazebo.msg.quaternion_pb2.Quaternion(**kwargs)

    w
    Magic attribute generated for “w” proto field.

    x
    Magic attribute generated for “x” proto field.

    y
    Magic attribute generated for “y” proto field.

    z
    Magic attribute generated for “z” proto field.

8.66 RaySensor

class pygazebo.msg.raysensor_pb2.RaySensor(**kwargs)
display_scan
    Magic attribute generated for “display_scan” proto field.

horizontal_max_angle
    Magic attribute generated for “horizontal_max_angle” proto field.

horizontal_min_angle
    Magic attribute generated for “horizontal_min_angle” proto field.

horizontal_resolution
    Magic attribute generated for “horizontal_resolution” proto field.

horizontal_samples
    Magic attribute generated for “horizontal_samples” proto field.

range_max
    Magic attribute generated for “range_max” proto field.

range_min
    Magic attribute generated for “range_min” proto field.

range_resolution
    Magic attribute generated for “range_resolution” proto field.

vertical_max_angle
    Magic attribute generated for “vertical_max_angle” proto field.

vertical_min_angle
    Magic attribute generated for “vertical_min_angle” proto field.

vertical_resolution
    Magic attribute generated for “vertical_resolution” proto field.

vertical_samples
    Magic attribute generated for “vertical_samples” proto field.

8.67 Request

class pygazebo.msg.request_pb2.Request(**kwargs)

    data
        Magic attribute generated for “data” proto field.

    dbl_data
        Magic attribute generated for “dbl_data” proto field.

    id
        Magic attribute generated for “id” proto field.

    request
        Magic attribute generated for “request” proto field.

8.68 Response

class pygazebo.msg.response_pb2.Response(**kwargs)
id
  Magic attribute generated for “id” proto field.

request
  Magic attribute generated for “request” proto field.

response
  Magic attribute generated for “response” proto field.

serialized_data
  Magic attribute generated for “serialized_data” proto field.

type
  Magic attribute generated for “type” proto field.

8.69 Road

class pygazebo.msg.road_pb2.Road(**kwargs)

  name
    Magic attribute generated for “name” proto field.

  point
    Magic attribute generated for “point” proto field.

  width
    Magic attribute generated for “width” proto field.

8.70 Scene

class pygazebo.msg.scene_pb2.Scene(**kwargs)

  ambient
    Magic attribute generated for “ambient” proto field.

  background
    Magic attribute generated for “background” proto field.

  fog
    Magic attribute generated for “fog” proto field.

  grid
    Magic attribute generated for “grid” proto field.

  joint
    Magic attribute generated for “joint” proto field.

  light
    Magic attribute generated for “light” proto field.

  model
    Magic attribute generated for “model” proto field.

  name
    Magic attribute generated for “name” proto field.
8.71 Selection

class pygazebo.msg.selection_pb2.Selection(**kwargs)

    id
    Magic attribute generated for “id” proto field.

    name
    Magic attribute generated for “name” proto field.

    selected
    Magic attribute generated for “selected” proto field.

8.72 Sensor

class pygazebo.msg.sensor_pb2.Sensor(**kwargs)

    always_on
    Magic attribute generated for “always_on” proto field.

    camera
    Magic attribute generated for “camera” proto field.

    contact
    Magic attribute generated for “contact” proto field.

    id
    Magic attribute generated for “id” proto field.

    name
    Magic attribute generated for “name” proto field.

    parent
    Magic attribute generated for “parent” proto field.

    parent_id
    Magic attribute generated for “parent_id” proto field.

    pose
    Magic attribute generated for “pose” proto field.

    ray
    Magic attribute generated for “ray” proto field.

    topic
    Magic attribute generated for “topic” proto field.

    type
    Magic attribute generated for “type” proto field.
update_rate
    Magic attribute generated for “update_rate” proto field.

visualize
    Magic attribute generated for “visualize” proto field.

8.73 ServerControl

class pygazebo.msg.server_control_pb2.ServerControl(**kwargs)

    new_world
        Magic attribute generated for “new_world” proto field.

    open_filename
        Magic attribute generated for “open_filename” proto field.

    save_filename
        Magic attribute generated for “save_filename” proto field.

    save_world_name
        Magic attribute generated for “save_world_name” proto field.

    stop
        Magic attribute generated for “stop” proto field.

8.74 Shadows

class pygazebo.msg.shadows_pb2.Shadows(**kwargs)

    color
        Magic attribute generated for “color” proto field.

    type
        Magic attribute generated for “type” proto field.

8.75 Sky

class pygazebo.msg.sky_pb2.Sky(**kwargs)

    cloud_ambient
        Magic attribute generated for “cloud_ambient” proto field.

    humidity
        Magic attribute generated for “humidity” proto field.

    mean_cloud_size
        Magic attribute generated for “mean_cloud_size” proto field.

    sunrise
        Magic attribute generated for “sunrise” proto field.
sunset
Magic attribute generated for “sunset” proto field.

time
Magic attribute generated for “time” proto field.

wind_direction
Magic attribute generated for “wind_direction” proto field.

wind_speed
Magic attribute generated for “wind_speed” proto field.

8.76 Sonar

class pygazebo.msg.sonar_pb2.Sonar(**kwargs)

contact
Magic attribute generated for “contact” proto field.

frame
Magic attribute generated for “frame” proto field.

radius
Magic attribute generated for “radius” proto field.

range
Magic attribute generated for “range” proto field.

range_max
Magic attribute generated for “range_max” proto field.

range_min
Magic attribute generated for “range_min” proto field.

world_pose
Magic attribute generated for “world_pose” proto field.

8.77 SonarStamped

class pygazebo.msg.sonar_stamped_pb2.SonarStamped(**kwargs)

sonar
Magic attribute generated for “sonar” proto field.

time
Magic attribute generated for “time” proto field.

8.78 SphereGeom

class pygazebo.msg.spheregeom_pb2.SphereGeom(**kwargs)
radius
   Magic attribute generated for “radius” proto field.

8.79 SphericalCoordinates

class pygazebo.msg.spherical_coordinates_pb2.SphericalCoordinates(**kwargs)

   elevation
      Magic attribute generated for “elevation” proto field.
   heading_deg
      Magic attribute generated for “heading_deg” proto field.
   latitude_deg
      Magic attribute generated for “latitude_deg” proto field.
   longitude_deg
      Magic attribute generated for “longitude_deg” proto field.
   surface_model
      Magic attribute generated for “surface_model” proto field.

8.80 Subscribe

class pygazebo.msg.subscribe_pb2.Subscribe(**kwargs)

   host
      Magic attribute generated for “host” proto field.
   latching
      Magic attribute generated for “latching” proto field.
   msg_type
      Magic attribute generated for “msg_type” proto field.
   port
      Magic attribute generated for “port” proto field.
   topic
      Magic attribute generated for “topic” proto field.

8.81 Surface

class pygazebo.msg.surface_pb2.Surface(**kwargs)

   bounce_threshold
      Magic attribute generated for “bounce_threshold” proto field.
   collide_without_contact
      Magic attribute generated for “collide_without_contact” proto field.
collide_without_contact_bitmask
    Magic attribute generated for “collide_without_contact_bitmask” proto field.

friction
    Magic attribute generated for “friction” proto field.

kd
    Magic attribute generated for “kd” proto field.

kp
    Magic attribute generated for “kp” proto field.

max_vel
    Magic attribute generated for “max_vel” proto field.

min_depth
    Magic attribute generated for “min_depth” proto field.

restitution_coefficient
    Magic attribute generated for “restitution_coefficient” proto field.

soft_cfm
    Magic attribute generated for “soft_cfm” proto field.

soft_erp
    Magic attribute generated for “soft_erp” proto field.

8.82 Tactile

class pygazebo.msg.tactile_pb2.Tactile(**kwargs)

    collision_id
        Magic attribute generated for “collision_id” proto field.

    collision_name
        Magic attribute generated for “collision_name” proto field.

    pressure
        Magic attribute generated for “pressure” proto field.

    time
        Magic attribute generated for “time” proto field.

8.83 Test

class pygazebo.msg.test_pb2.Test(**kwargs)

    header
        Magic attribute generated for “header” proto field.

8.84 Time

class pygazebo.msg.time_pb2.Time(**kwargs)
nsec
    Magic attribute generated for “nsec” proto field.
sec
    Magic attribute generated for “sec” proto field.

8.85 TopicInfo

class pygazebo.msg.topic_info_pb2.TopicInfo(**kwargs):

    msg_type
        Magic attribute generated for “msg_type” proto field.
    publisher
        Magic attribute generated for “publisher” proto field.
    subscriber
        Magic attribute generated for “subscriber” proto field.

8.86 TrackVisual

class pygazebo.msg.track_visual_pb2.TrackVisual(**kwargs):

    id
        Magic attribute generated for “id” proto field.
    inherit_orientation
        Magic attribute generated for “inherit_orientation” proto field.
    max_dist
        Magic attribute generated for “max_dist” proto field.
    min_dist
        Magic attribute generated for “min_dist” proto field.
    name
        Magic attribute generated for “name” proto field.

8.87 Vector2d

class pygazebo.msg.vector2d_pb2.Vector2d(**kwargs):

    x
        Magic attribute generated for “x” proto field.
    y
        Magic attribute generated for “y” proto field.
8.88 Vector3d

```python
class pygazebo.msg.vector3d_pb2.Vector3d(**kwargs)
```

- `x`  
  Magic attribute generated for “x” proto field.

- `y`  
  Magic attribute generated for “y” proto field.

- `z`  
  Magic attribute generated for “z” proto field.

8.89 Visual

```python
class pygazebo.msg.visual_pb2.Visual(**kwargs)
```

- `cast_shadows`  
  Magic attribute generated for “cast_shadows” proto field.

- `delete_me`  
  Magic attribute generated for “delete_me” proto field.

- `geometry`  
  Magic attribute generated for “geometry” proto field.

- `id`  
  Magic attribute generated for “id” proto field.

- `is_static`  
  Magic attribute generated for “is_static” proto field.

- `laser_retro`  
  Magic attribute generated for “laser_retro” proto field.

- `material`  
  Magic attribute generated for “material” proto field.

- `name`  
  Magic attribute generated for “name” proto field.

- `parent_id`  
  Magic attribute generated for “parent_id” proto field.

- `parent_name`  
  Magic attribute generated for “parent_name” proto field.

- `plugin`  
  Magic attribute generated for “plugin” proto field.

- `pose`  
  Magic attribute generated for “pose” proto field.

- `scale`  
  Magic attribute generated for “scale” proto field.

- `transparency`  
  Magic attribute generated for “transparency” proto field.
visible
    Magic attribute generated for “visible” proto field.

8.90 WirelessNode

class pygazebo.msg.wireless_node_pb2.WirelessNode(**kwargs)

    essid
        Magic attribute generated for “essid” proto field.
    frequency
        Magic attribute generated for “frequency” proto field.
    signal_level
        Magic attribute generated for “signal_level” proto field.

8.91 WirelessNodes

class pygazebo.msg.wireless_nodes_pb2.WirelessNodes(**kwargs)

    node
        Magic attribute generated for “node” proto field.

8.92 WorldControl

class pygazebo.msg.world_control_pb2.WorldControl(**kwargs)

    multi_step
        Magic attribute generated for “multi_step” proto field.
    pause
        Magic attribute generated for “pause” proto field.
    reset
        Magic attribute generated for “reset” proto field.
    seed
        Magic attribute generated for “seed” proto field.
    step
        Magic attribute generated for “step” proto field.

8.93 WorldModify

class pygazebo.msg.world_modify_pb2.WorldModify(**kwargs)

    create
        Magic attribute generated for “create” proto field.
8.94 WorldReset

class pygazebo.msg.world_reset_pb2.WorldReset(**kwargs)

    all
    Magic attribute generated for “all” proto field.

    model_only
    Magic attribute generated for “model_only” proto field.

    time_only
    Magic attribute generated for “time_only” proto field.

8.95 WorldStatistics

class pygazebo.msg.world_stats_pb2.WorldStatistics(**kwargs)

    iterations
    Magic attribute generated for “iterations” proto field.

    model_count
    Magic attribute generated for “model_count” proto field.

    pause_time
    Magic attribute generated for “pause_time” proto field.

    paused
    Magic attribute generated for “paused” proto field.

    real_time
    Magic attribute generated for “real_time” proto field.

    sim_time
    Magic attribute generated for “sim_time” proto field.

8.96 Wrench

class pygazebo.msg.wrench_pb2.Wrench(**kwargs)

    force
    Magic attribute generated for “force” proto field.

    torque
    Magic attribute generated for “torque” proto field.
8.97 WrenchStamped

class pygazebo.msg.wrench_stamped_pb2.WrenchStamped(**kwargs)

    time
    Magic attribute generated for “time” proto field.

    wrench
    Magic attribute generated for “wrench” proto field.
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