

ROS 2 NDT

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Chapter 1

Namespace Index

1.1 Namespace List

Here is a list of all namespaces with brief descriptions:

ndt_matching	9
--	---

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

ndt_matching::NdtLib	12
Node	
Listener	11

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Listener	11
ndt_matching::NdtLib	12

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

/home/id314/ndt_ws/src/ndt_matching/include/ndt_matching/ ndt_lib.hpp	13
/home/id314/ndt_ws/src/ndt_matching/include/ndt_matching/ visibility_control.h	15
/home/id314/ndt_ws/src/ndt_matching/src/ ndt_lib.cpp	16
/home/id314/ndt_ws/src/ndt_matching/src/ ndt_node.cpp	17

Chapter 5

Namespace Documentation

5.1 ndt_matching Namespace Reference

Classes

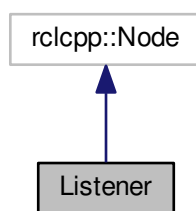
- class [NdtLib](#)

Chapter 6

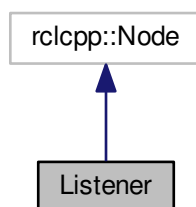
Class Documentation

6.1 Listener Class Reference

Inheritance diagram for Listener:



Collaboration diagram for Listener:



Public Member Functions

- [Listener](#) (const std::string &topic_name, const std::string &topic_name2="map")

6.1.1 Constructor & Destructor Documentation

6.1.1.1 `Listener::Listener (const std::string & topic_name, const std::string & topic_name2 = "map") [inline], [explicit]`

The documentation for this class was generated from the following file:

- `/home/id314/ndt_ws/src/ndt_matching/src/ndt_node.cpp`

6.2 ndt_matching::NdtLib Class Reference

```
#include <ndt_lib.hpp>
```

Public Member Functions

- `NdtLib ()`
- `virtual ~NdtLib ()`
- `int update_map (const sensor_msgs::msg::PointCloud2::SharedPtr msg)`
- `auto align_scan (const sensor_msgs::msg::PointCloud2::SharedPtr msg)`

6.2.1 Constructor & Destructor Documentation

6.2.1.1 `ndt_matching::NdtLib::NdtLib ()`

6.2.1.2 `ndt_matching::NdtLib::~~NdtLib () [virtual]`

6.2.2 Member Function Documentation

6.2.2.1 `auto ndt_matching::NdtLib::align_scan (const sensor_msgs::msg::PointCloud2::SharedPtr msg)`

This function attempts to align an input point cloud with the current reference map.

This function accepts a PointCloud2 sensor message and aligns it with the current reference map using a 3D NDT algorithm.

The PointCloud will be parsed using PCL and Eigen and iterated until the change in estimated pose between iterations is less than .0001 Meters/Radians. For explanation of the algorithm used, see: M. Magnusson, A. Lilienthal, Scan Registration for Autonomous Mining Vehicles Using 3D-NDT, 2007, Wiley Periodicals

6.2.2.2 `int ndt_matching::NdtLib::update_map (const sensor_msgs::msg::PointCloud2::SharedPtr msg)`

This function loads a pcd file and segments the resulting point cloud data to be used as a reference map for the NDT Algorithm.

This function accepts a string containing the absolute path and name of a pcd input file. The contents of the file will be segmented into cubic meter cells and the metadata of each cell calculated and saved into the parent `NdtLib` object Returns an int indicating success (0) or error (1).

The documentation for this class was generated from the following files:

- `/home/id314/ndt_ws/src/ndt_matching/include/ndt_matching/ndt_lib.hpp`
- `/home/id314/ndt_ws/src/ndt_matching/src/ndt_lib.cpp`

Chapter 7

File Documentation

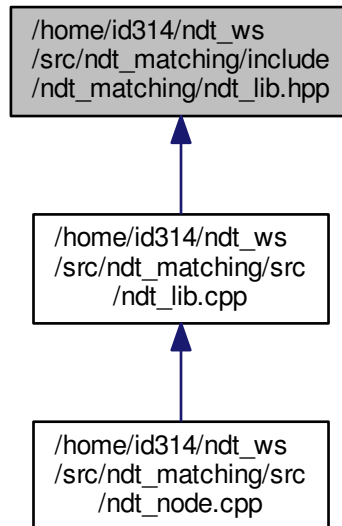
7.1 /home/id314/ndt_ws/src/ndt_matching/include/ndt_matching/ndt_lib.hpp File Reference

```
#include "ndt_matching/visibility_control.h"
#include <ament_index_cpp/get_package_share_directory.hpp>
#include <eigen3/Eigen/Dense>
#include <pcl/io/pcl_io.h>
#include <pcl/point_types.h>
#include <pcl_conversions/pcl_conversions.h>
#include "rclcpp/rclcpp.hpp"
#include "std_msgs/msg/string.hpp"
#include <sensor_msgs/msg/point_cloud2.hpp>
#include <geometry_msgs/msg/pose.hpp>
```

Include dependency graph for ndt_lib.hpp:



This graph shows which files directly or indirectly include this file:



Classes

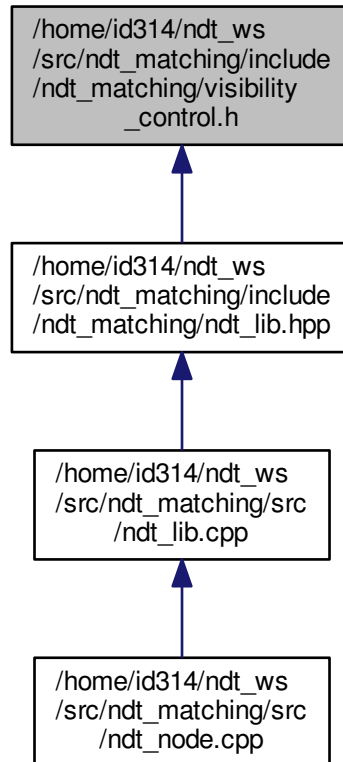
- class [ndt_matching::NdtLib](#)

Namespaces

- [ndt_matching](#)

7.2 /home/id314/ndt_ws/src/ndt_matching/include/ndt_matching/visibility_control.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- `#define NDT_MATCHING_EXPORT __attribute__((visibility("default")))`
- `#define NDT_MATCHING_IMPORT`
- `#define NDT_MATCHING_PUBLIC`
- `#define NDT_MATCHING_LOCAL`
- `#define NDT_MATCHING_PUBLIC_TYPE`

7.2.1 Macro Definition Documentation

7.2.1.1 `#define NDT_MATCHING_EXPORT __attribute__((visibility("default")))`

7.2.1.2 `#define NDT_MATCHING_IMPORT`

7.2.1.3 #define NDT_MATCHING_LOCAL

7.2.1.4 #define NDT_MATCHING_PUBLIC

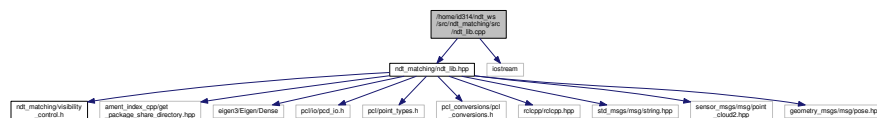
7.2.1.5 #define NDT_MATCHING_PUBLIC_TYPE

7.3 /home/id314/ndt_ws/src/ndt_matching/src/ndt_lib.cpp File Reference

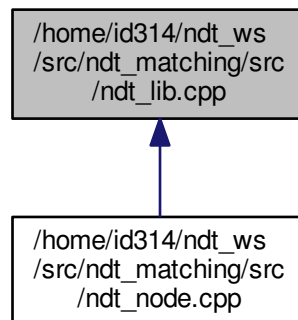
```
#include "ndt_matching/ndt_lib.hpp"
```

```
#include <iostream>
```

Include dependency graph for ndt_lib.cpp:



This graph shows which files directly or indirectly include this file:

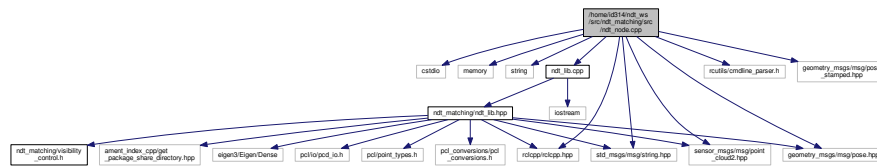


Namespaces

- [ndt_matching](#)

7.4 /home/id314/ndt_ws/src/ndt_matching/src/ndt_node.cpp File Reference

```
#include <stdio>
#include <memory>
#include <string>
#include "ndt_lib.cpp"
#include "rclcpp/rclcpp.hpp"
#include "rcutils/cmdline_parser.h"
#include "std_msgs/msg/string.hpp"
#include <sensor_msgs/msg/point_cloud2.hpp>
#include <geometry_msgs/msg/pose.hpp>
#include <geometry_msgs/msg/pose_stamped.hpp>
Include dependency graph for ndt_node.cpp:
```



Classes

- class [Listener](#)

Functions

- void [print_usage](#) ()
- int [main](#) (int argc, char *argv[])

7.4.1 Function Documentation

7.4.1.1 int [main](#) (int *argc*, char * *argv*[])

7.4.1.2 void [print_usage](#) ()

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