Connection to robair

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Outline

1. Connecting to the RobAIR: wireless connection;

2. ROS on robair: how it works;

3. Tests of connection to robair.

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Robot handling rules

1. When picking up the robot, always place your hands under the lower chassis plate. The upper plate where the laser scanner and raspberry pi are located is fragile.

2. While using the robot, check the red battery voltage display on top of the robot regularly. If the voltage gets close to 22 (e.g. 22.5), switch the robot off using the blue/yellow button on top of the robot.
PLEASE DO NOT LET IT GO BELOW 22V (it will damage the battery).

3. When using autonomous control (action node) you should always have one person on the laptop, and one person close to the robot. To stop robot movement:
   - Press ctrl + c in the terminal which is running the action node (robot will stop after one second);
   - If very urgent: push the RED safety switch on top of the robot. This will stop the motors immediately. Once it is safe, motors can be re-enabled by twisting/rotating the switch so it pops up again.

4. At the end of each lab session, bring the robot back to the storage area, and switch the robot off with the blue/yellow button, and check that all lights / LEDs are OFF.

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Wireless hotspot connection

1. Turn on the robot with the blue/yellow button (takes ~ 2 mins to boot).

2. On your laptop, click on the wifi / network icon in the top-right corner of the screen.

3. Select the RobAIR_hotspot_ that matches the end of the MAC address of your robot (written on top of the robot with a label).

4. **Example ssid:** `RobAIR_hotspot_0cb6d2f1`**ff17**

5. **Password:** `robairRobair42`

6. Open a terminal (ctrl + alt + t) and check if you can ping the robot by typing the command:

   `ping 10.0.0.42`

7. When you finish using the robot: **disconnect** from the hotspot!
   If you do not disconnect, you will have problems when other groups start using the robot, or when you try to play rosbags.
   Switch off the robot (blue/yellow button) if another group doesn't take it.

Outline
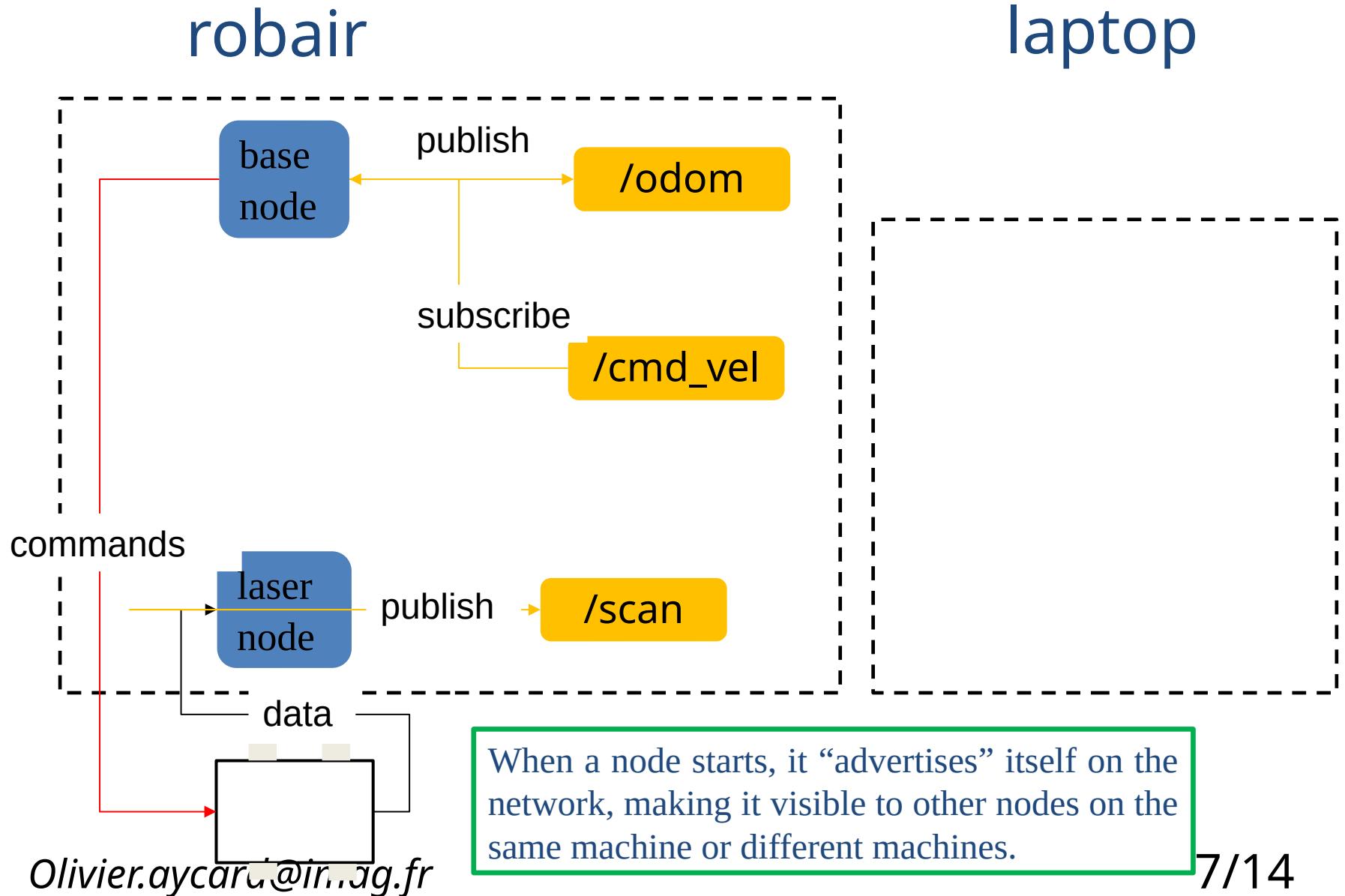
1. Connecting to the RobAIR: wireless connection;

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ROS on robair (1/5)
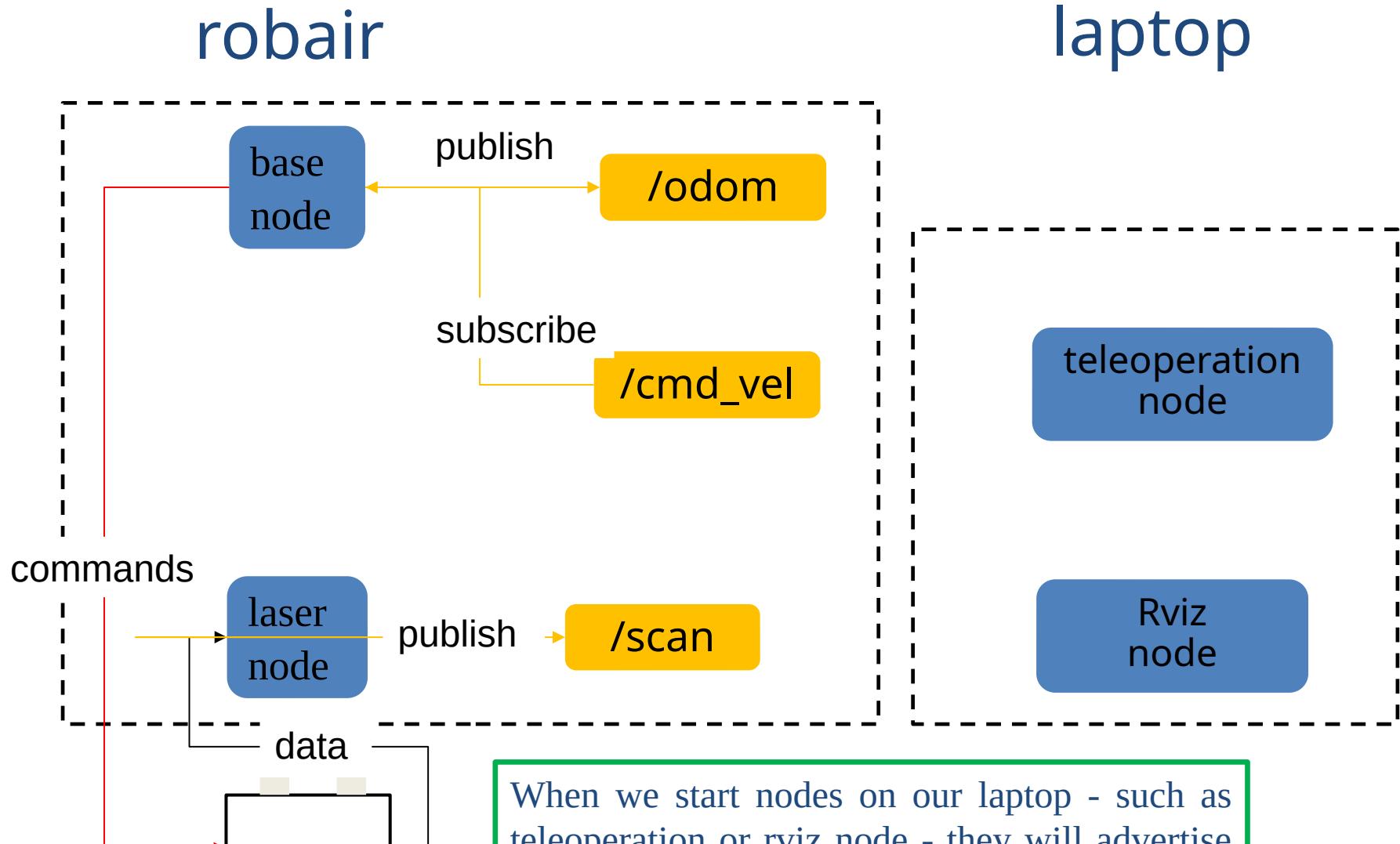
- Each robair publishes:
  - ➤ /scan (laserscanner data);
  - ➤ /odom (odometry).

- Each robair subscribes to:
  - ➤ /cmd_vel to command robair in translation and/or rotation.

robair

laptop

base node

publish

/odom

subscribe

/cmd_vel

commands

laser node

publish

/scan

data

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When a node starts, it "advertises" itself on the network, making it visible to other nodes on the same machine or different machines.

robair

laptop

base node

publish

/odom

subscribe

/cmd_vel

teleoperation node

commands

laser node

publish

/scan

Rviz node

data
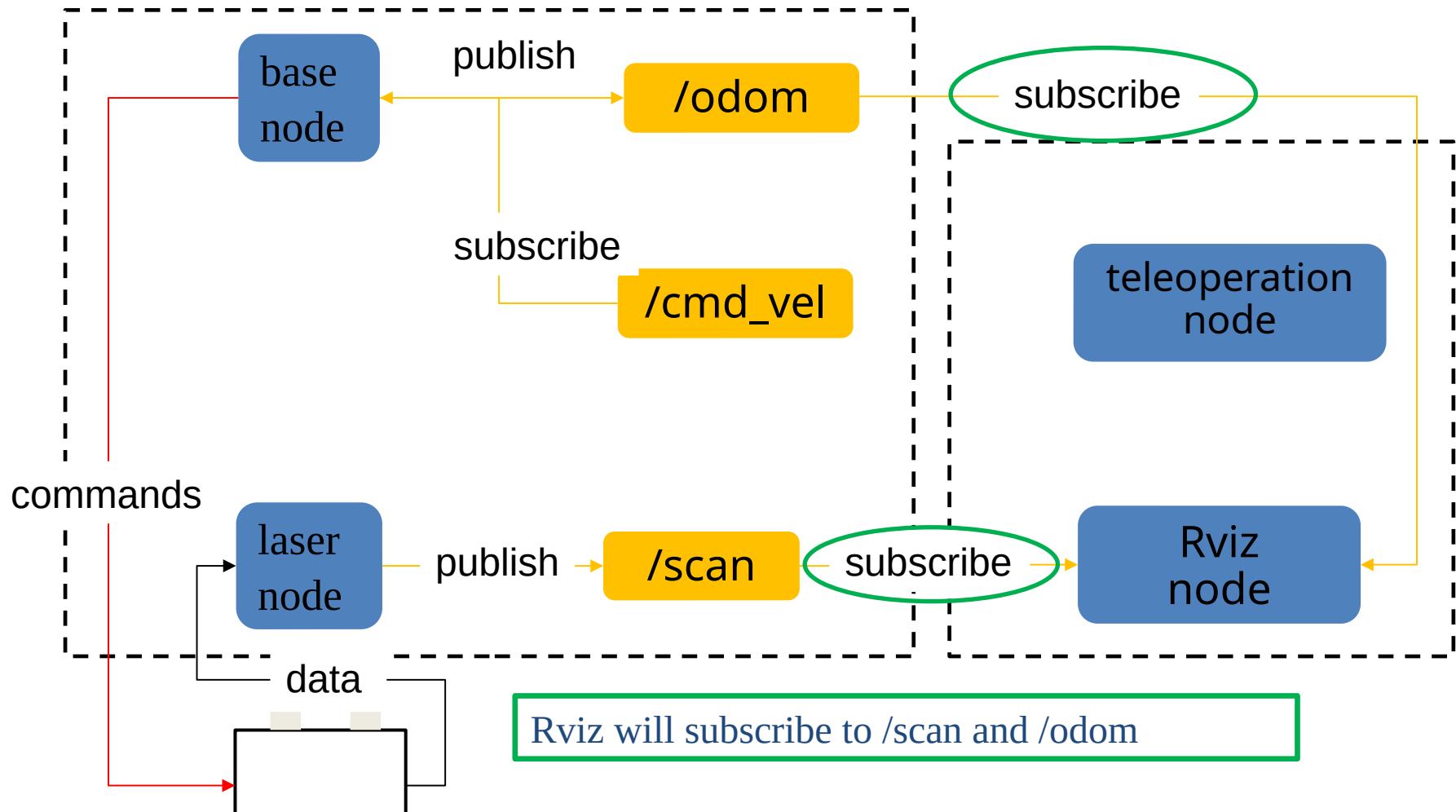
When we start nodes on our laptop - such as teleoperation or rviz node - they will advertise themselves, and see the nodes and topics running on RobAIR.

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robot

laptop

base
node

publish

/odom

subscribe

subscribe

/cmd_vel

teleoperation
node

commands

laser
node

publish

/scan

subscribe

Rviz
node

data

Rviz will subscribe to /scan and /odom
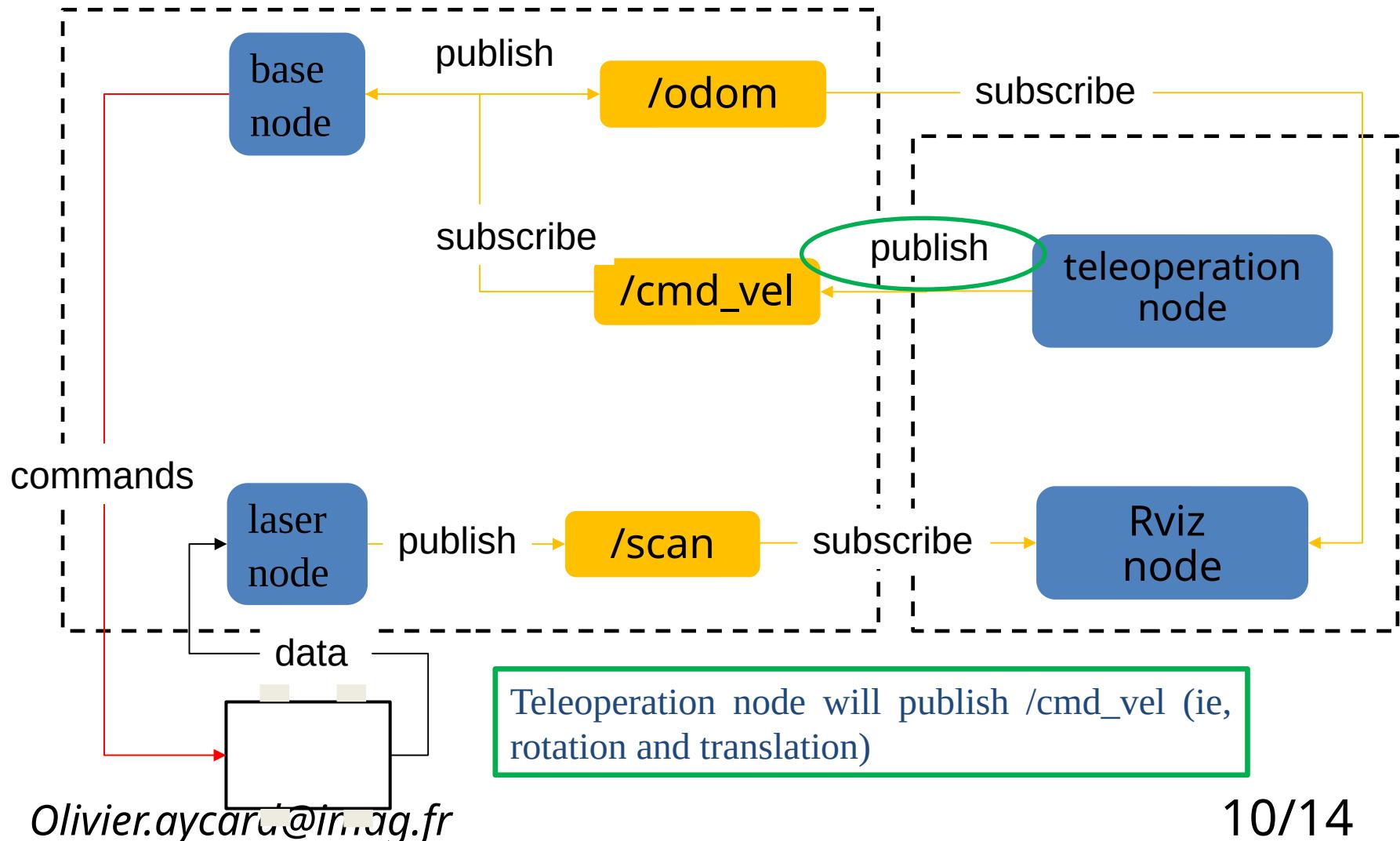
ROS on robair (5/5)

robot

laptop

base node — publish → /odom — subscribe → (to laptop)

/odom — subscribe

subscribe

/cmd_vel — publish ← teleoperation node

commands

laser node — publish → /scan — subscribe → Rviz node

data

Teleoperation node will publish /cmd_vel (ie, rotation and translation)

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Outline

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Tests of connection on robair

- We will check if you are able to receive the laser data (/scan topic) and send motion commands to robair (/cmd_vel topic)

- In general, to run a ros2 node, you must do the following:
    - Open a terminal (ctrl + alt + t), and run: `cd ~/ros2_ws`
    - Then, run: `source install/local_setup.bash`
    - Then, run the command for your node
      `ros2 run <package name> <node name>`

1. View Laser data in Rviz:

    - Start rviz: `ros2 run rviz2 rviz2 -d src/follow_me/config/laser_only.rviz`
    - You should see the data of the laser scanner

2. Send motion commands:
    - Run the *node* called `smooth_teleop_node`, which is part of the *package* `smooth teleop` (using instructions above).
    - Use the keyboard to move robair. Press "k" to immediately stop.
    - You should see robair moving

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