

# Releasing a new ROS 2 Distribution

Yadunund Vijay - Iron ROS Boss

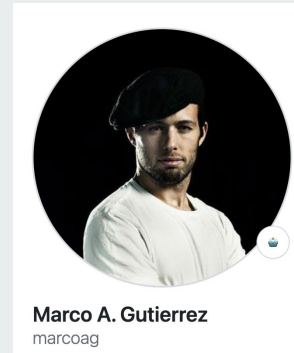
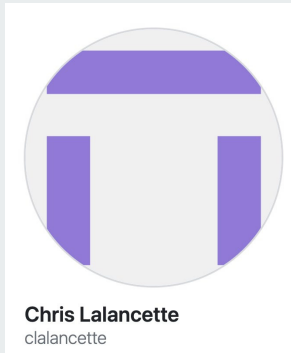
Chris Lalancette - ROS 2 Technical Lead

Marco Gutierrez - Jazzy ROS Boss

October 19, 2023



# Who are we?



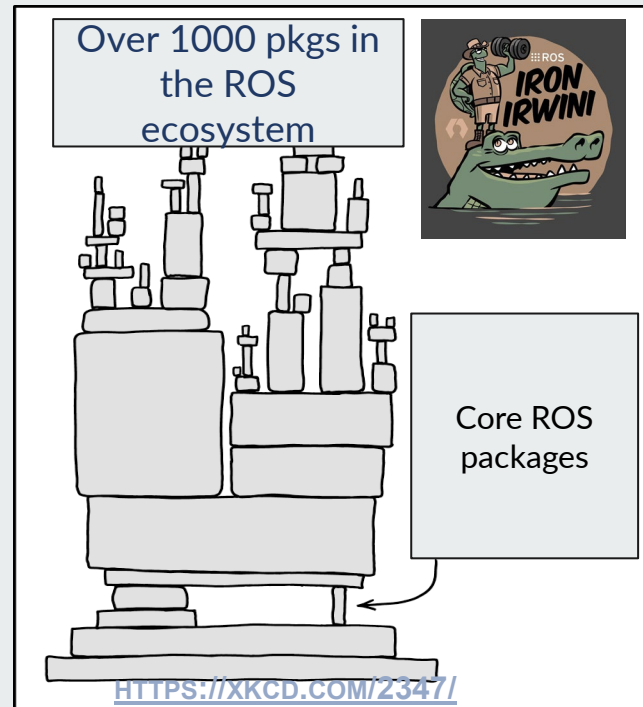
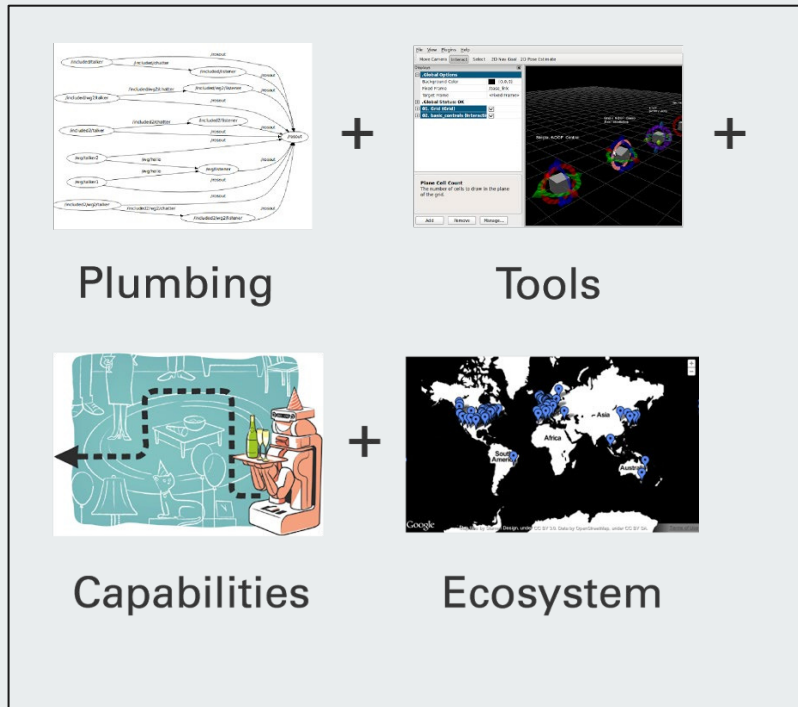
# Outline

- What is ROS?
- What is a ROS distribution?
- Release infrastructure
- Release process

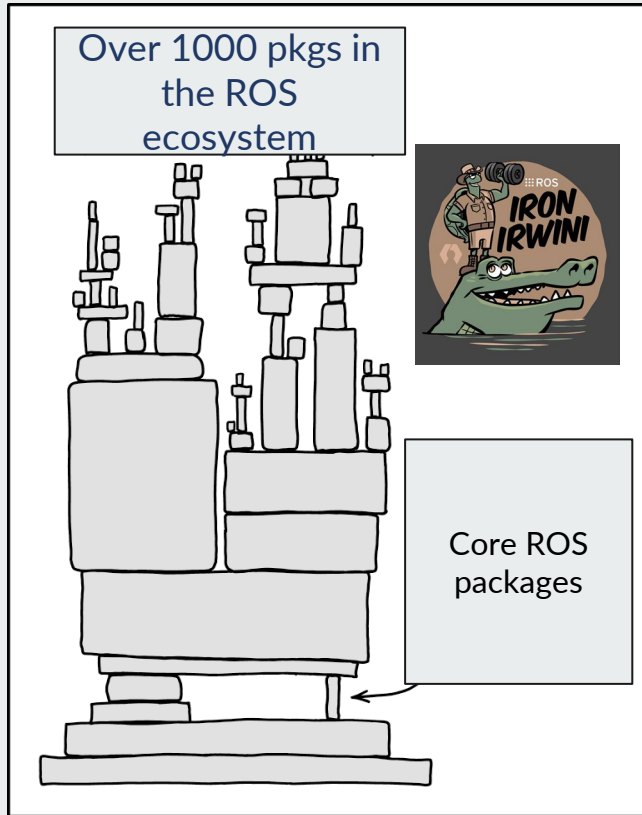


# What is ROS?

# What is ROS?



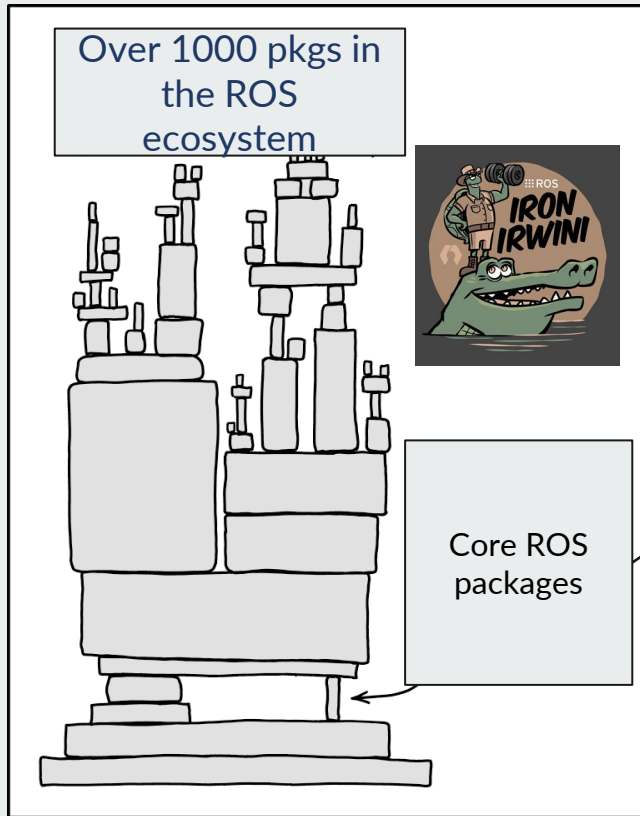
# Variants, Releases, and Target Platforms



## REP 2000:

- Release frequency: 12 months alternating between LTS and non-LTS supports.
- Support durations:
  - LTS: 5 years
  - Non-LTS: 1.5 years
- Support levels:
  - Tier 1: Continuously tested with prioritized bug fixes.
  - Tier 2: Periodically tested.
  - Tier 3: Rely on community for testing and bug fixes.
- Target platforms:
  - Support level for combinations of CPU architectures and Operating systems.

# Variants, Releases, and Target Platforms

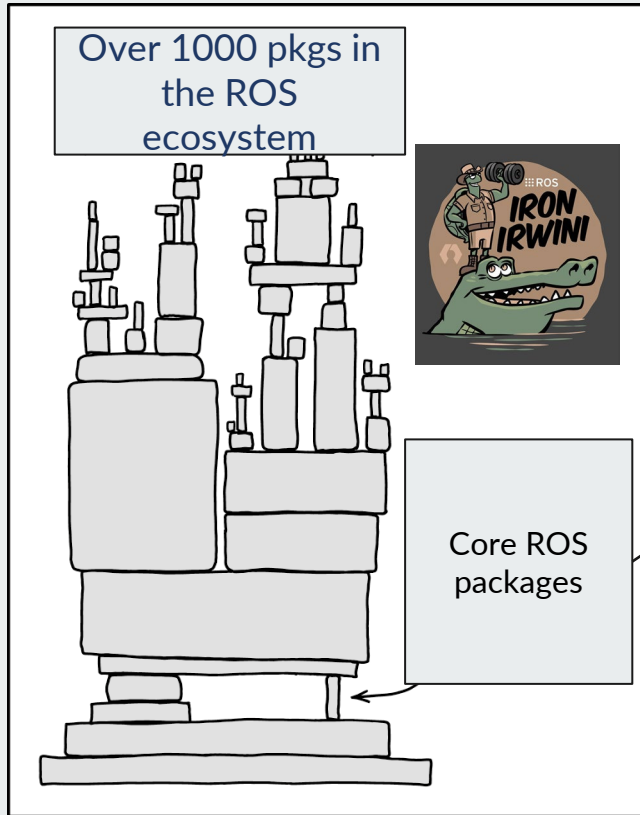


apt install ros-iron-  
desktop-full

REP 2001:

- **core:** ament, launch, rclcpp, rclpy, ros2cli, default rmw implementation
- **base:** core + geometry2, kdl\_parser, robot\_state\_publisher, rosbag2, urdf
- **desktop:** base + rviz, examples, demos
- **perception:** base + image\_common, vision\_opencv, PCL, ...
- **simulation:** base + ros\_gz\_bridge + ros\_gz\_interfaces
- **desktop\_full:** desktop + perception, simulation, ros\_gz\_demos

# Variants, Releases, and Target Platforms



## REP 2001:

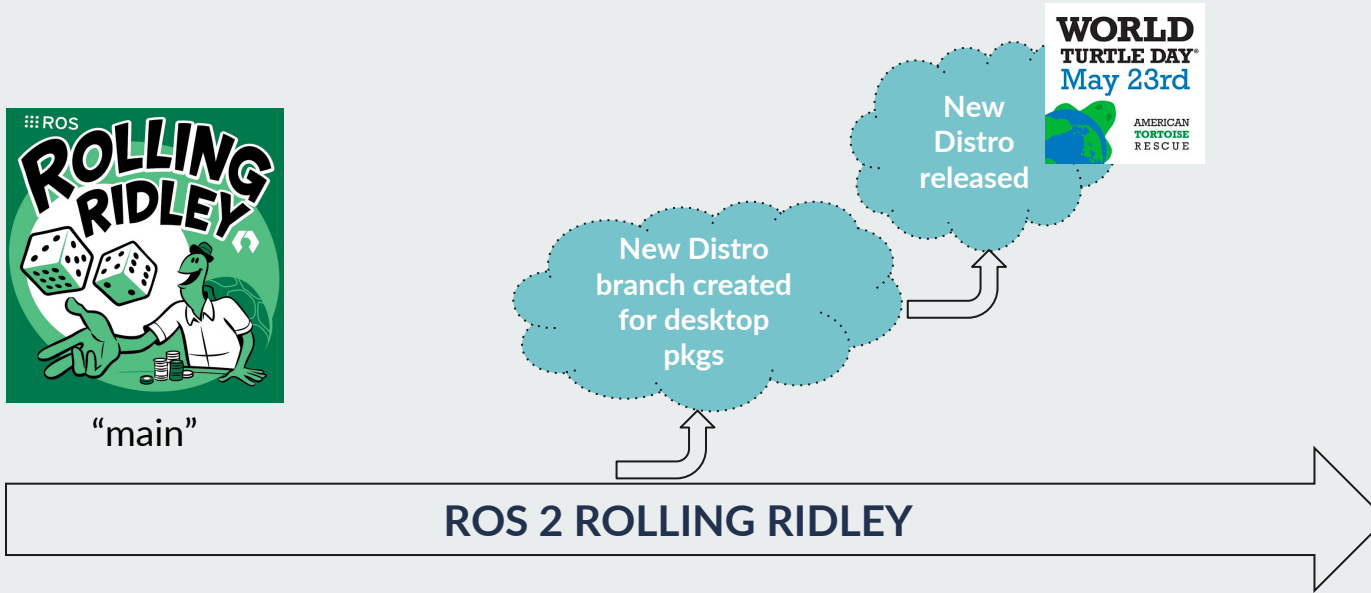
- **core:** ament, launch, rclcpp, rclpy, default rmw implementation
- **base:** core + geometry2, kdl\_parser, robot\_state\_publisher, rosbag2, urdf
- **desktop:** core + rviz + examples + demos + introspection tooling
- **perception:** base + image\_common, vision\_opencv
- **simulation:** bridge + rosbridge
- **ci**

On release day, the desktop variant is available

ception,

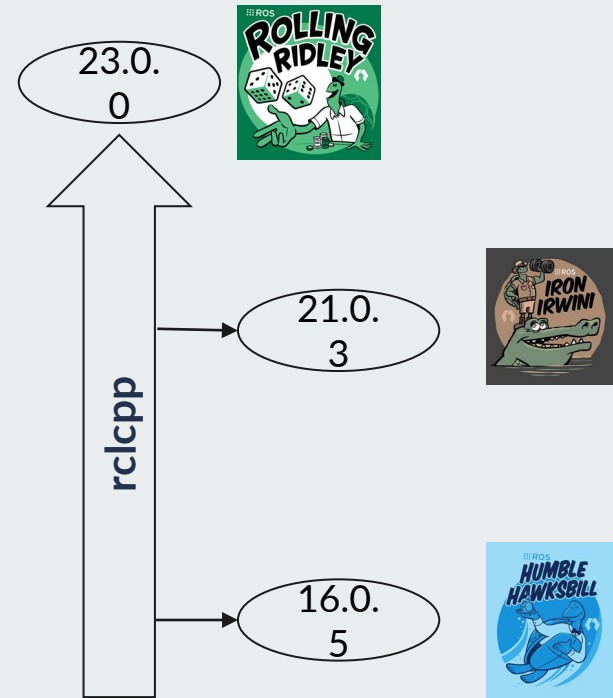


# New distro creation



# But why?

- Once released, the API/ABI for **core** ROS packages will not change throughout the life of the distribution.
  - The Major and Minor version numbers will remain constant while Patch number can be incremented for bug fixes.
- All feature development will target **rolling**.
- New distros give maintainers the opportunity to make improvements that necessitate API/ABI breaks.
- Community maintained packages do not need to follow such guarantees although encouraged.



# Types of release

- Source release
  - Tagged version of the [ros2.repos file](#)
- Binary release
  - Generated by binary jobs on the Buildfarm
    - Debians for Ubuntu
    - RPM for RHEL
- Archive release (pre-built binaries)
  - Generated by “packaging” job on CI
    - For Tier 1 and Tier 2 supported platforms
      - Ubuntu
      - RHEL
      - Windows

5 days ago  
Yadunund  
release-iron-...  
9e88cad

## ROS 2 Iron Irwini - Patch Release 2 Latest

Attached are the binary packages for Iron Irwini - Patch Release 2 (2023-09-12). The release is tagged [release-iron-20230912](#)

For runtime dependencies, see the binary package [installation instructions](#).  
Your system must be up-to-date to be compatible with the downloaded packages.

Additionally, there are

- [Debian packages](#) for Ubuntu 22.04 (Jammy).
- [RPM packages](#) for RHEL 9

Note: Ignore the Source code links because they don't contain the source code for ROS 2 (they're auto-generated by GitHub). Instead, grab the binary package for your platform. If you're interested in building from source, consult the [building from source instructions](#).

▼ Assets 7

|  |         |            |
|--|---------|------------|
| <a href="#">ros2-iron-20230912-linux-jammy-amd64.tar.bz2</a> | 671 MB  | 5 days ago |
| <a href="#">ros2-iron-20230912-linux-jammy-arm64.tar.bz2</a> | 651 MB  | 5 days ago |
| <a href="#">ros2-iron-20230912-linux-rhel9-amd64.tar.bz2</a> | 722 MB  | 5 days ago |
| <a href="#">ros2-iron-20230912-windows-debug-amd64.zip</a>   | 1.08 GB | 5 days ago |
| <a href="#">ros2-iron-20230912-windows-release-amd64.zip</a> | 648 MB  | 5 days ago |
| <a href="#">Source code (zip)</a>                            |         | 5 days ago |
| <a href="#">Source code (tar.gz)</a>                         |         | 5 days ago |

<https://github.com/ros2/ros2/releases>

# Release infrastructure

For detailed talk on how packaging works, watch [“The ROS build farm and you: How ROS packages you release become binary packages”](#)



# Release infrastructure- ros2.repos

- **<distro>/ros2.repos:** A repos file that clones in all **desktop** variant packages for a given ROS distro with the correct “source” branch for each repo
  - 106 repos for iron
    - 358 packages
- **<distro>-release/ros2.repos:** Clones in latest release version of each repository
- **release-<distro>-YYYYMMDD/ros2.repos:** Tagged ros2.repos file with package versions at specified date. Corresponds to a patch release.

```
raw.githubusercontent.com/ros2/iron/ros2.repos

repositories:
ament/ament_cmake:
  type: git
  url: https://github.com/ament/ament_cmake.git
  version: iron
ament/ament_index:
  type: git
  url: https://github.com/ament/ament_index.git
  version: iron
ament/ament_lint:
  type: git
  url: https://github.com/ament/ament_lint.git
  version: iron
ament/ament_package:
  type: git
  url: https://github.com/ament/ament_package.git
  version: iron
ament/google_benchmark_vendor:
  type: git
  url: https://github.com/ament/google_benchmark_vendor.git
  version: iron
ament/googletest:
  type: git
  url: https://github.com/ament/googletest.git
  version: iron
ament/uncrustify_vendor:
  type: git
  url: https://github.com/ament/uncrustify_vendor.git
  version: iron
```

```
raw.githubusercontent.com/ros2/iron-release/ros2.repos

repositories:
ament/ament_cmake:
  type: git
  url: https://github.com/ament/ament_cmake.git
  version: 2.0.3
ament/ament_index:
  type: git
  url: https://github.com/ament/ament_index.git
  version: 1.5.2
ament/ament_lint:
  type: git
  url: https://github.com/ament/ament_lint.git
  version: 0.14.2
ament/ament_package:
  type: git
  url: https://github.com/ament/ament_package.git
  version: 0.15.3
ament/google_benchmark_vendor:
  type: git
  url: https://github.com/ament/google_benchmark_vendor.git
  version: 0.3.0
ament/googletest:
  type: git
  url: https://github.com/ament/googletest.git
  version: 1.10.9005
ament/uncrustify_vendor:
  type: git
  url: https://github.com/ament/uncrustify_vendor.git
  version: 2.1.2
```



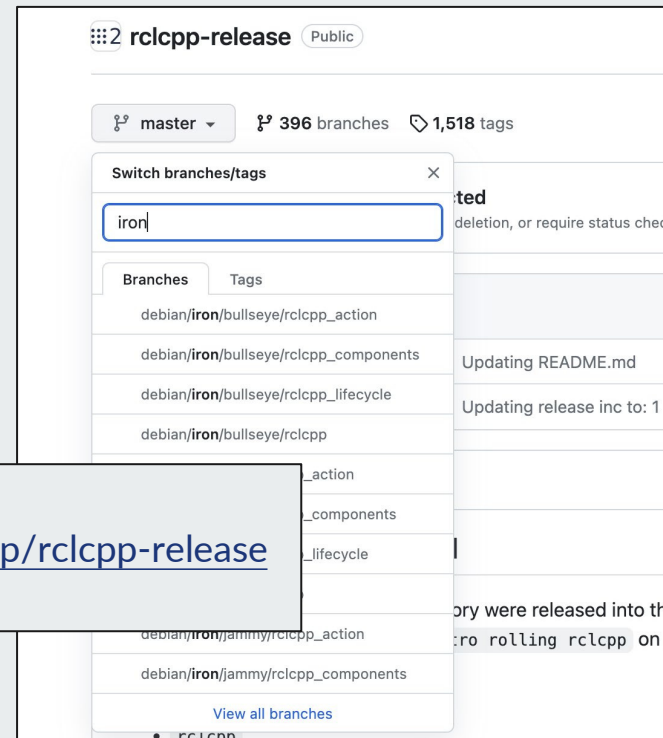
# Release infrastructure- bloom

- A python tool to automate release branching and the generation of platform specific source packages, like debian's src-debs.
- The buildfarm pulls source code from each target branch and builds each package independently.

[ros2/rclcpp](#)

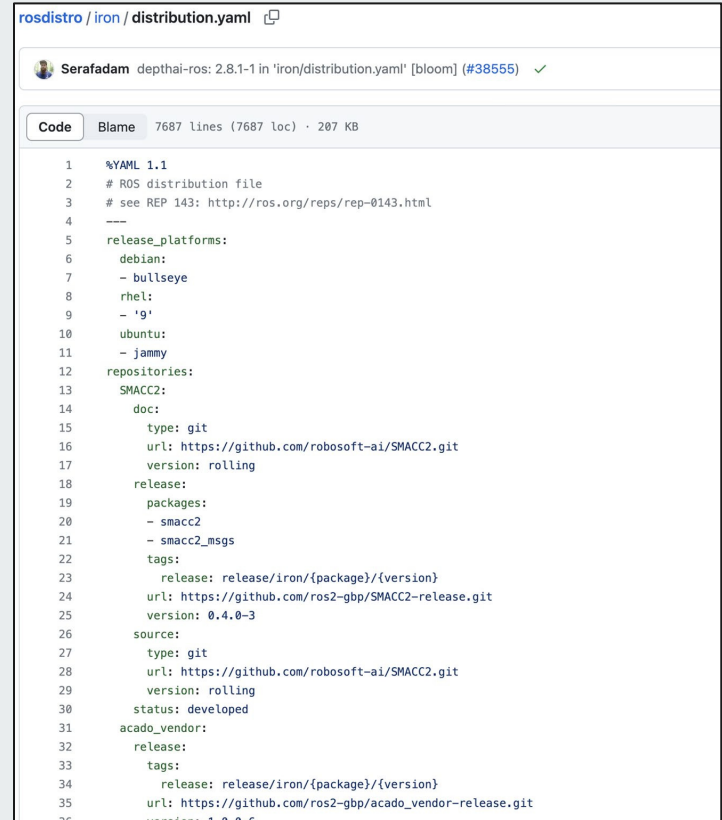


[ros2-gbp/rclcpp-release](#)



# Release infrastructure- rosdistro

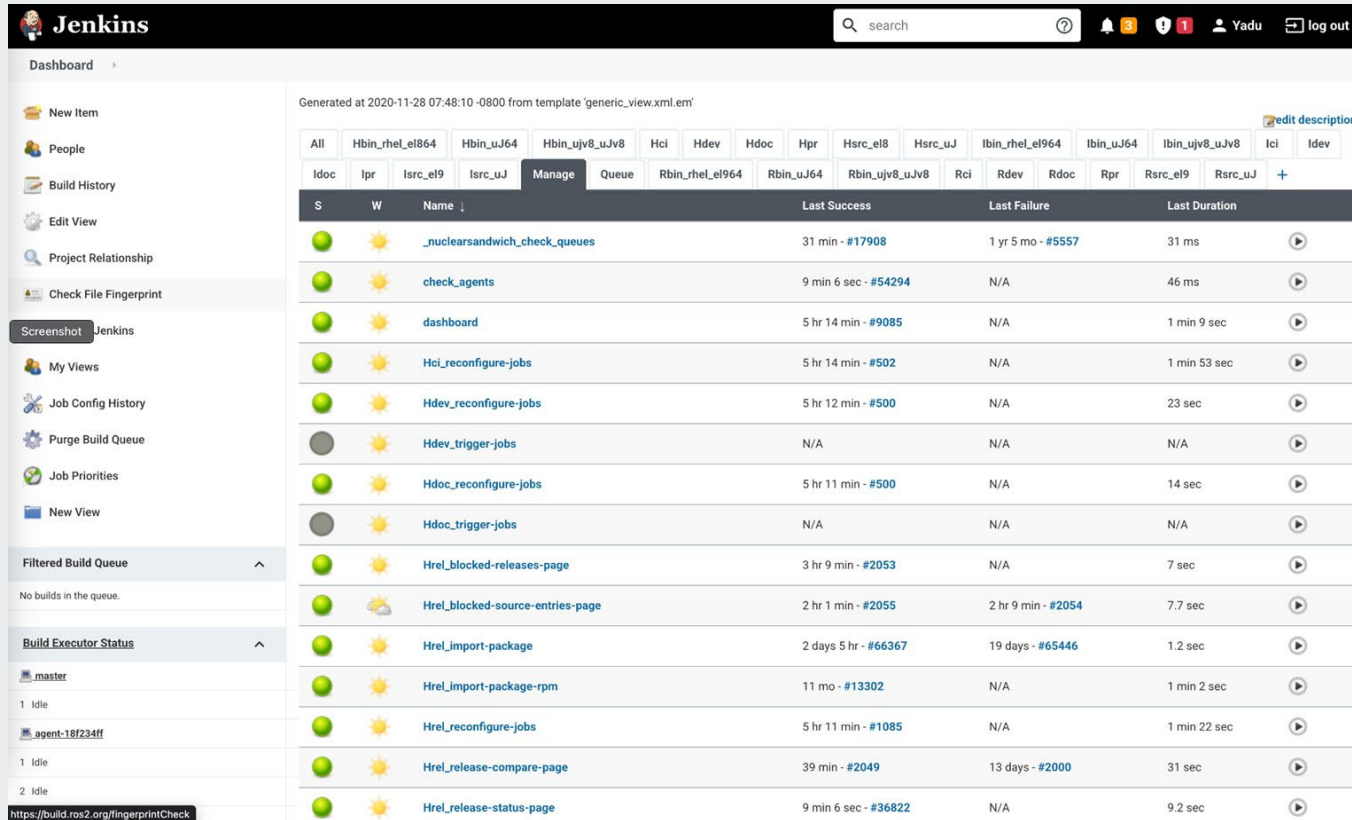
- Each distro has a [distribution.yaml](#) file with entities for each repository released via the ROS Buildfarm (core and community maintained).
  - Source of truth / database
- Specifies
  - Packages released from this repository
  - Source branch for document generation
  - Latest version of package released via the Buildfarm
  - URL of release repository
  - URL of source repository and branch
- Updated via PRs opened automatically when the maintainer blooms a new release.
- Changes to the distribution.yaml are automatically polled to trigger binary jobs on the Buildfarm.



The screenshot shows a GitHub repository page for 'rosdistro / iron / distribution.yaml'. The file content is as follows:

```
1  %YAML 1.1
2  # ROS distribution file
3  # see REP 143: http://ros.org/reps/rep-0143.html
4  ---
5  release_platforms:
6  debian:
7  - bullseye
8  rhel:
9  - '9'
10 ubuntu:
11 - jammy
12 repositories:
13 SMACC2:
14 doc:
15   type: git
16   url: https://github.com/robosoft-ai/SMACC2.git
17   version: rolling
18   release:
19     packages:
20     - smacc2
21     - smacc2_msgs
22     tags:
23       release: release/iron/{package}/{version}
24       url: https://github.com/ros2-gbp/SMACC2-release.git
25       version: 0.4.0-3
26   source:
27     type: git
28     url: https://github.com/robosoft-ai/SMACC2.git
29     version: rolling
30   status: developed
31   acado_vendor:
32     release:
33       tags:
34         release: release/iron/{package}/{version}
35       url: https://github.com/ros2-gbp/acado_vendor-release.git
36       version: 1.0.0-6
```

# Release infrastructure- Buildfarm



The screenshot shows the Jenkins dashboard interface. At the top, there's a search bar and user information (Yadu, log out). The left sidebar contains navigation options like 'New Item', 'People', 'Build History', 'Edit View', 'Project Relationship', 'Check File Fingerprint', 'Screenshots', 'My Views', 'Job Config History', 'Purge Build Queue', 'Job Priorities', and 'New View'. The main area displays a table of build jobs. The table has columns for status (S), weather icon (W), Name, Last Success, Last Failure, and Last Duration. The jobs listed include various configuration and release tasks.

| S | W  | Name ↓   | Last Success         | Last Failure       | Last Duration |
|---|----|--|----------------------|--------------------|---------------|
| 🟢 | ☀️ | <a href="#">_nuclearsandwich_check_queues</a>    | 31 min - #17908      | 1 yr 5 mo - #5557  | 31 ms         |
| 🟢 | ☀️ | <a href="#">check_agents</a>                     | 9 min 6 sec - #54294 | N/A                | 46 ms         |
| 🟢 | ☀️ | <a href="#">dashboard</a>                        | 5 hr 14 min - #9085  | N/A                | 1 min 9 sec   |
| 🟢 | ☀️ | <a href="#">Hci_reconfigure-jobs</a>             | 5 hr 14 min - #502   | N/A                | 1 min 53 sec  |
| 🟢 | ☀️ | <a href="#">Hdev_reconfigure-jobs</a>            | 5 hr 12 min - #500   | N/A                | 23 sec        |
| 🟡 | ☀️ | <a href="#">Hdev_trigger-jobs</a>                | N/A                  | N/A                | N/A           |
| 🟢 | ☀️ | <a href="#">Hdoc_reconfigure-jobs</a>            | 5 hr 11 min - #500   | N/A                | 14 sec        |
| 🟡 | ☀️ | <a href="#">Hdoc_trigger-jobs</a>                | N/A                  | N/A                | N/A           |
| 🟢 | ☀️ | <a href="#">Hrel_blocked-releases-page</a>       | 3 hr 9 min - #2053   | N/A                | 7 sec         |
| 🟢 | ☁️ | <a href="#">Hrel_blocked-source-entries-page</a> | 2 hr 1 min - #2055   | 2 hr 9 min - #2054 | 7.7 sec       |
| 🟢 | ☀️ | <a href="#">Hrel_import-package</a>              | 2 days 5 hr - #66367 | 19 days - #65446   | 1.2 sec       |
| 🟢 | ☀️ | <a href="#">Hrel_import-package-rpm</a>          | 11 mo - #13302       | N/A                | 1 min 2 sec   |
| 🟢 | ☀️ | <a href="#">Hrel_reconfigure-jobs</a>            | 5 hr 11 min - #1085  | N/A                | 1 min 22 sec  |
| 🟢 | ☀️ | <a href="#">Hrel_release-compare-page</a>        | 39 min - #2049       | 13 days - #2000    | 31 sec        |
| 🟢 | ☀️ | <a href="#">Hrel_release-status-page</a>         | 9 min 6 sec - #36822 | N/A                | 9.2 sec       |



# Release infrastructure- Communication



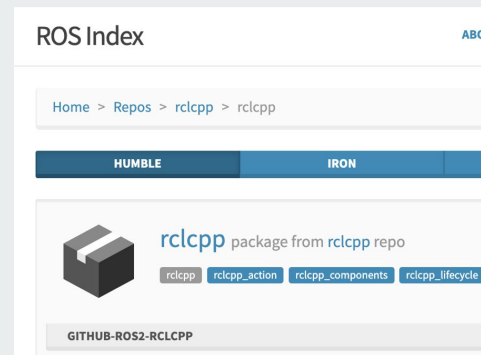
[discourse.ros.org](https://discourse.ros.org)

Announcements to the community before, during and after release

Release timeline, changelogs, setup instructions, tutorials, guides and more



[docs.ros.org](https://docs.ros.org)



[index.ros.org](https://index.ros.org)

Distro specific information on package versions, documentation



# The release process

# Release Process Board

The screenshot shows a GitHub project board for the 'Jazzy Jalisco Release Process'. The board is in 'Timeline' view and displays a sequence of tasks from March 25 to April 28, 2024. The tasks are listed on the left and visualized as cards on the timeline. The task 'Announce RMW freeze + upcoming overall freeze #26' is highlighted with a blue box. The board includes a search bar, filter options, and navigation controls.

| Task ID | Task Description   | Start Date | End Date   |
|---------|--|------------|------------|
| 25      | Create detailed release plan #25                                 | 2024-03-25 | 2024-03-25 |
| 26      | Announce RMW freeze + upcoming overall freeze #26                | 2024-03-26 | 2024-03-26 |
| 27      | Release packages into Rolling #27                                | 2024-03-27 | 2024-03-27 |
| 28      | Announce overall freeze, upcoming branch, and tutorial party #28 | 2024-03-28 | 2024-03-28 |
| 29      | Add distro source branches for core repos #31                    | 2024-03-29 | 2024-03-29 |
| 30      | Build interim tarballs for testing #32                           | 2024-03-30 | 2024-03-30 |
| 31      | Add distro to CI #30   | 2024-03-31 | 2024-03-31 |
| 32      | Branch rosdistro off Rolling #39                                 | 2024-04-01 | 2024-04-01 |
| 33      | Other buildfarm configs #29                                      | 2024-04-02 | 2024-04-02 |
| 34      | Announce branch, Beta, and tutorial party #33                    | 2024-04-03 | 2024-04-03 |
| 35      | Tutorial party #40   | 2024-04-04 | 2024-04-04 |
| 36      | Announce T-shirt campaign #34                                    | 2024-04-05 | 2024-04-05 |

# Rough release steps


1. Prepare
2. Freeze
3. Update Rolling core package binaries
4. Branch
5. Test
6. Release!
7. Post-release!

# Prepare: Name release

- Starts in April of previous year
- Follows alphabet order in the form of “<adjective> <turtle species>”
  - e.g. Iron Irwini, Jazzy Jalisco, K-turtle
- Ideas are gathered from the community through a thread on discourse
- List of names are compiled by the ROS Boss
- Names are eliminated:
  - Anything copyrighted (no Ninja Turtles)
  - Offensive
  - Unsuitable
  - Too long (generally longer than 8 characters)
- ROS 2 core team votes on the names
- ROS Boss makes the final selection
- Name is announced on the previous release announcement post on discourse.

# Prepare: Develop Release timeline

ROS 2 Documentation: Rolling



Search docs

- Installation
- Distributions
  - Iron Irwini (iron)
  - Screenshot** wksbill (humble)
  - Rolling Ridley (rolling)
- Development Distribution
  - Jazzy Jalisco (jazzy)
- End-of-Life Distributions
  - Development process for a release
- Tutorials
- How-to Guides
- Concepts
- Contact
- The ROS 2 Project
- API Documentation
- Related Projects
- Glossary
- Citations

Other Versions v: rolling

## Release Timeline

### November, 2023 - Platform decisions

REP 2000 is updated with the target platforms and major dependency versions.

### By January, 2024 - Rolling platform shift

Build farm is updated with the new platform versions and dependency versions for Jazzy Jalisco.

### Mon. April 8, 2024 - Alpha + RMW freeze

Preliminary testing and stabilization of ROS Base <sup>1</sup> packages, and API and feature freeze for RMW provider packages.

### Mon. April 15, 2024 - Freeze

API and feature freeze for ROS Base <sup>1</sup> packages in Rolling Ridley. Only bug fix releases should be made after this point. New packages can be released independently.

### Mon. April 22, 2024 - Branch

Branch from Rolling Ridley. `rosdistro` is reopened for Rolling PRs for ROS Base <sup>1</sup> packages. Jazzy development shifts from `ros-rolling*` packages to `ros-jazzy*` packages.

### Mon. April 29, 2024 - Beta

Updated releases of ROS Desktop <sup>2</sup> packages available. Call for general testing.

### Wed, May 1, 2024 - Kick off of Tutorial Party

Tutorials hosted at [https://github.com/osrf/ros2\\_test\\_cases](https://github.com/osrf/ros2_test_cases) are open for community testing.

### Mon. May 13, 2024 - Release Candidate

Release Candidate packages are built. Updated releases of ROS Desktop <sup>2</sup> packages available.

### Mon. May 20, 2024 - Distro Freeze

Freeze `rosdistro`. No PRs for Jazzy on the `rosdistro` repo will be merged (reopens after the release announcement).

### Thu. May 23, 2024 - General Availability

Release announcement. `rosdistro` is reopened for Jazzy PRs.

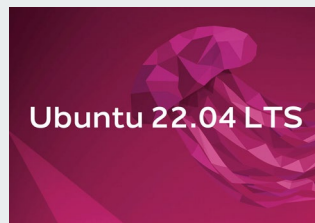
[1] (1,2,3): The `ros_base` variant is described in REP 2001 (ros-base).

<https://docs.ros.org/en/rolling/Releases/Release-Jazzy-Jalisco.html#release-timeline>



# Prepare: Migrate Rolling onto next Ubuntu

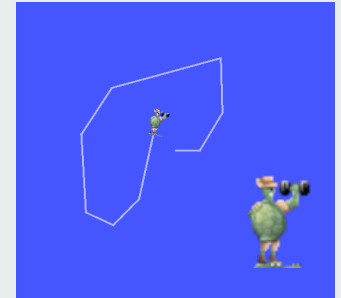
- In even years, migrate to the next Ubuntu (e.g. for 2024, migrate to Ubuntu 24.04)
- When Ubuntu 24.04 alpha packages are available, do the migration (~December/January)
- Now Rolling binary packages will be available targeting next Ubuntu
- CI (<https://ci.ros2.org>) also targets next Ubuntu



Ubuntu  
24.04

# Prepare: Commission logo/turtle icon

- ~January
- Contact the artist ([Joshua Ellingson](#))
- Give artist the release name and some ideas for logo
- Artist comes up with a few sketches
- ROS 2 core team votes on options
- Artist does final artwork
- Adapt artwork to turtlesim icon





- Announced on discourse
- Typically happens one week before overall freeze (Jazzy: April 8, 2024)
- After RMW freeze, no new features or APIs to the rmw layer or below
  - Includes the DDS implementations (e.g. Fast-DDS, CycloneDDS, etc)
  - Includes the rmw implementations (e.g. `rmw_fastrtps`, `rmw_cyclonedds`, etc)
  - Includes the rmw API

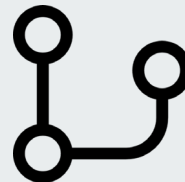
- 6 weeks before release (Jazzy: April 15, 2024)
- After freeze, no more API changes or features in core packages
- Bug fixes are still allowed

# Update Rolling core package binaries

- Release all changes that made it into Rolling before the freezes
  - Bump and tag source version on rolling
  - Bloom changes
- Ensures all binary packages are up-to-date with the sources

# Branch: sources for core repositories

- Branch core sources off of Rolling
  - each core repository (eg. rclcpp) will now have a <distro> branch
- This opens Rolling back up for API/ABI breaking changes
- But keeps <distro> stable for testing and release
- Create a new <distro> ros2.repos file
  - Sources reference the branches created above
  - CI jobs will now use this ros2.repos file



# Branch: create new distro binaries

- Run a script which “migrates” Rolling to the new distribution
  - Creates a new rosdistro/distribution.yaml file
  - Creates new release track in the ros2-gbp repositories
  - Creates binaries for the new distribution
- This is why all releases in Rolling must use <https://github.com/ros2-gbp> for release repository; easiest way to ensure we have permissions to do this branching

# Test: interim tarballs

- Tarballs are built at <https://ci.ros2.org/view/packaging/>
- Can be downloaded and run without installing anything additional
- Available for all Tier-1 and Tier-2 platforms:
  - Ubuntu Linux amd64
  - Ubuntu Linux arm64
  - RHEL Linux amd64
  - Windows amd64

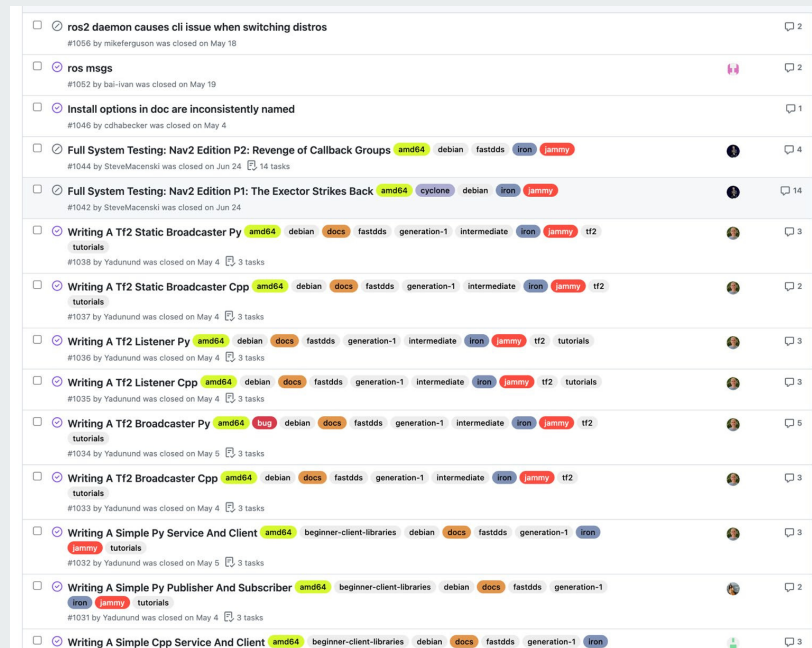
# Test: announce branch and beta

- Announced on discourse
- Also call for testing during the tutorial party



# Build & test: tutorial party

- Core devs and community test out the code
- List of test cases is generated at [https://github.com/osrf/ros2\\_test\\_cases/](https://github.com/osrf/ros2_test_cases/)
- Make fixes to the core based on testing
  - Bump patch versions and bloom releases



The screenshot displays a list of 14 issues from the ROS2 repository, sorted by most recent. Each issue entry includes a title, a status icon (open, closed, or merged), a user icon, a date, a task count, and a list of assignees. The issues are:

- ros2 daemon causes cli issue when switching distros (closed, May 18, 2 tasks)
- ros msgs (closed, May 19, 2 tasks)
- Install options in doc are inconsistently named (closed, May 4, 1 task)
- Full System Testing: Nav2 Edition P2: Revange of Callback Groups (amd64, debian, fastdds, iron, jammy) (closed, Jun 24, 14 tasks)
- Full System Testing: Nav2 Edition P1: The Exector Strikes Back (amd64, cyclone, debian, iron, jammy) (closed, Jun 24, 14 tasks)
- Writing A Tf2 Static Broadcaster Py (amd64, debian, docs, fastdds, generation-1, intermediate, iron, jammy, tf2, tutorials) (closed, May 4, 3 tasks)
- Writing A Tf2 Static Broadcaster Cpp (amd64, debian, docs, fastdds, generation-1, intermediate, iron, jammy, tf2, tutorials) (closed, May 4, 3 tasks)
- Writing A Tf2 Listener Py (amd64, debian, docs, fastdds, generation-1, intermediate, iron, jammy, tf2, tutorials) (closed, May 4, 3 tasks)
- Writing A Tf2 Listener Cpp (amd64, debian, docs, fastdds, generation-1, intermediate, iron, jammy, tf2, tutorials) (closed, May 4, 3 tasks)
- Writing A Tf2 Broadcaster Py (amd64, bug, debian, docs, fastdds, generation-1, intermediate, iron, jammy, tf2, tutorials) (closed, May 5, 5 tasks)
- Writing A Tf2 Broadcaster Cpp (amd64, debian, docs, fastdds, generation-1, intermediate, iron, jammy, tf2, tutorials) (closed, May 4, 3 tasks)
- Writing A Simple Py Service And Client (amd64, beginner-client-libraries, debian, docs, fastdds, generation-1, iron, jammy, tutorials) (closed, May 5, 3 tasks)
- Writing A Simple Py Publisher And Subscriber (amd64, beginner-client-libraries, debian, docs, fastdds, generation-1, iron, jammy, tutorials) (closed, May 4, 3 tasks)
- Writing A Simple Cpp Service And Client (amd64, beginner-client-libraries, debian, docs, fastdds, generation-1, iron) (closed, 3 tasks)



# Release!

- Mark distribution as active on
  - [roscdistro](#)
  - [index.ros.org](#)
  - [ros.org](#)
  - [docs.ros.org](#)
- Run “sync” job on buildfarm to move packages from ros2-testing into main.
- Create tagged source release on [ros2/ros2](#) and upload tarballs.
- Make the announcement post on [discourse](#)

# Post release!

- Reflect on release with ROS 2 working group team and garner feedback.
- Ensure docker image is available for new distribution.
- Prepare for Patch release 1 if any fixes are needed right after release.
- Periodically sync packages and fix bugs that may arise along the lifetime of the release.

# Conclusion