Release Schedule and Future Plans

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Overview

- Introduction

- Release process

- XRootD 5.5.4 patch release

- XRootD 5.6 feature release plans

- XRootD 6.0 major release plans

- Development workflow and project management

- XRootD Documentation

- XRootD Packaging

Quick Self Introduction

▸ Joined IT department at CERN in Feb 2023 to work on XRootD and EOS

▸ Previous experience:

- Oct 2019 – Jan 2023, CERN Staff in EP-SFT Group
  - Geant4 profiling and optimization, R&D on Monte Carlo simulations on GPUs
- Apr 2017 – Sep 2019, CERN Fellow in EP-SFT Group
  - ROOT Data Analysis Framework: parallel I/O, bug fixing, CMake build system
- Nov 2014 – Feb 2017, Postdoc at São Paulo State University (UNESP)
  - Intel® Parallel Computing Center Project in collaboration with CERN and Fermilab
  - Code Modernization of High Energy Physics Simulation Software (Geant4 / GeantV)
  - VecCore SIMD Library (used by VecGeom/GeantV/ROOT)

▸ Education:

- University of Illinois at Urbana-Champaign (Ph.D.) 2014, Aerospace Engineering
- University of Tokyo (M.Sc) 2007, Nuclear Astrophysics (^{7}Be + p elastic/inelastic scattering)
- Universidade de São Paulo (B.S.) 2004, emphasis on physics and computer science

XRootD Release Notation

- ▶ XRootD X.0.0 (Major Release)
  - May break ABI and/or API, likely requires code changes downstream to adjust
  - Every 2 to 4 years
  - XRootD 6.0 expected by the end of this year

- ▶ XRootD X.Y.0 (Minor Release)
  - Feature release, cannot break ABI, but may introduce new APIs
  - About 1 or 2 releases per year

- ▶ XRootD X.Y.Z (Patch Release)
  - Bug fix release, no changes to ABI
  - As often as necessary

Release Work Plan

▶ GitHub Issues used to keep track of bugs/enhancements

▶ Release urgency based on number and severity of bugs fixed

▶ Coordination with downstream projects and users

▶ Work plan is continuous

- Each item (bug or feature) is assessed based on its impact and developer availability

▶ External contributions very welcome

- We do our best to review and integrate them in a timely fashion

▶ When a number of fixes and/or features are ready, a new release is created

Release Process

▸ Gather release notes and create annotated tag in git

- Repeat process for xrootd-ceph repository (can we merge it back?)

▸ Run all tests (based on docker containers) and check that they pass

▸ Run CI pipelines on GitLab (manually) to produce binary packages

▸ Push RPMs to EOS and SLAC (semi-automated)

▸ Push wheel to PyPI

▸ Update website and announce release on mailing lists
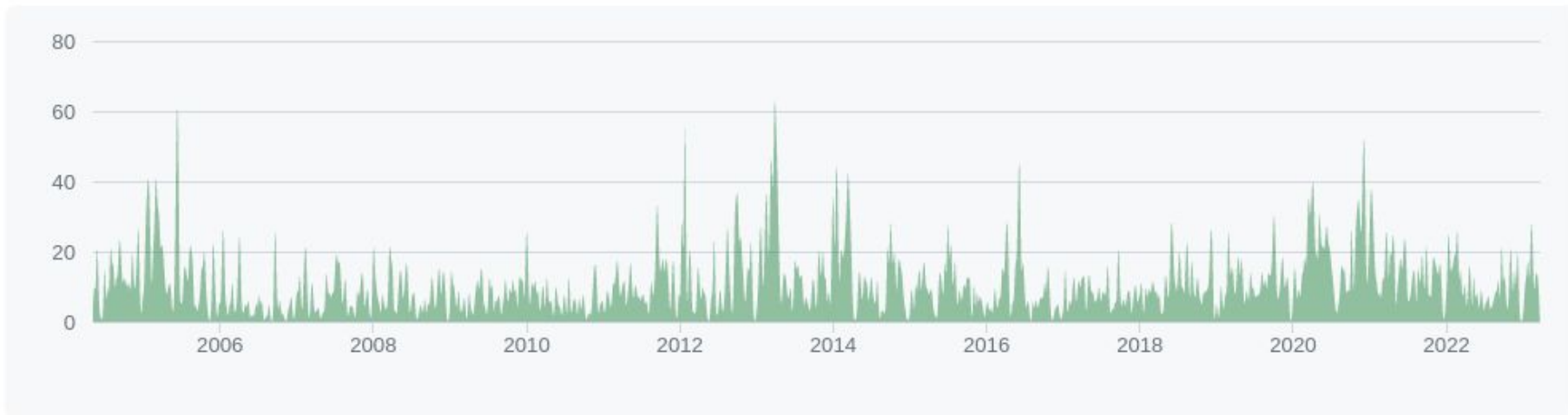
▸ Plans are to automate last remaining steps (scripts/tests we run manually)

▸ Move GitLab CI jobs to GitHub Actions

▸ Goal: publish RPMs and other binary artifacts automatically on git tag

XRootD Actively Developed

May 9, 2004 – Mar 28, 2023

Contributions: Commits ▾

Contributions to master, excluding merge commits and bot accounts

XRootD 5.5.4 Release

- ▶ Released 24 Mar 2023
- ▶ 16 Minor bugs fixed
- ▶ ZTN plugin now always enabled

Releases / v5.5.4

v5.5.4 (Latest)

amadio released this 45 minutes ago · 245 commits to master since this release   🏷 v5.5.4   ⚭ 7a490e1 ✓

XRootD 5.5.4 is a bugfix release which includes the following fixes:

- **Minor bug fixes**
  [SSI] Avoid file system+SSI feature interference that caused problems
  [Server] Fix dropped connections when link is reused (issue #1928)
  [Server] Limit max number of sockets in poller (issue #1962)
  [Tests] Fix intermittent failure of SocketTest
  [XrdApps] Fix crashes and deadlocks in xrdreplay tool (issue #1937)
  [XrdCl] Remove interference between sessions in the client (issue #1942)
  [XrdCrypto] Allow ASN1 GeneralizedTime in certificates (issue #1969)
  [XrdCrypto] Fix handling of daylight savings time (issues #985, #1955)
  [XrdHttp] Avoid sending empty headers in the HTTP response
  [XrdHttp] Clear digest header between requests (issue #1956)
  [XrdHttp] Fix for HTTP requests with open-ended byte range
  [XrdHttp] Fix handling of SSL shutdown during cleanup (issue #1967)
  [XrdHttp] Fix parsing of configuration with weighted checksums (issue #1944)
  [XrdHttp] Only call ERR_print_errors() if an error occurred
  [XrdPfc] Fix HTTP request failures with direct read mode enabled
  [XrdTls] Fix intermittent clients disconnections on login (issue #1952)

- **Miscellaneous**
  [XrdHttp] Map authentication failure to HTTP 401 instead of 500
  [XrdSecztn] Enable ZTN plugin by default

Full Changelog: `v5.5.3...v5.5.4`

Next Release: XRootD 5.6 Feature Release

▸ Migration to modern CMake (in progress, some of it already in master)
- Update minimum required version to CMake 3.16 (many new features relative to 3.1)
- Use upstream modules to reduce maintenance burden of build system
- Use newer module FindPython.cmake, with better support for virtual environments, etc
- Replace usage of variables with targets and target properties
- For more information, we recommend the excellent talk Effective CMake, by Daniel Pfeifer

▸ Initial migration of tests from CppUnit to GoogleTest (in progress as well)
- CppUnit is no longer actively developed upstream
- Terse output when tests fail, difficult to know what went wrong
- GoogleTest is actively developed and widely used by C++ developers

▸ Support for distributions based on musl libc (Alpine Linux, Void Linux)

XRootD 6.0 Major Release Plans

▸ Move to C++17 standard as baseline, ensure compilation with C++20

▸ Drop support for Python2.x

▸ File ownership based on uid/gid?

▸ Modernize Python bindings: packaging and implementation

▸ Full migration of testing infrastructure to GoogleTest

- CERN Summer Student project to improve test coverage for authentication, etc

▸ Refactoring of event loop on the client

- Run some event loop tasks on a separate thread pool to improve performance

▸ Planned for release in Q4 of 2023

- Idea is to give time for inclusion of other potentially breaking changes
- Use GitHub milestone to tag features/issues/developments for inclusion into XRootD 6.0
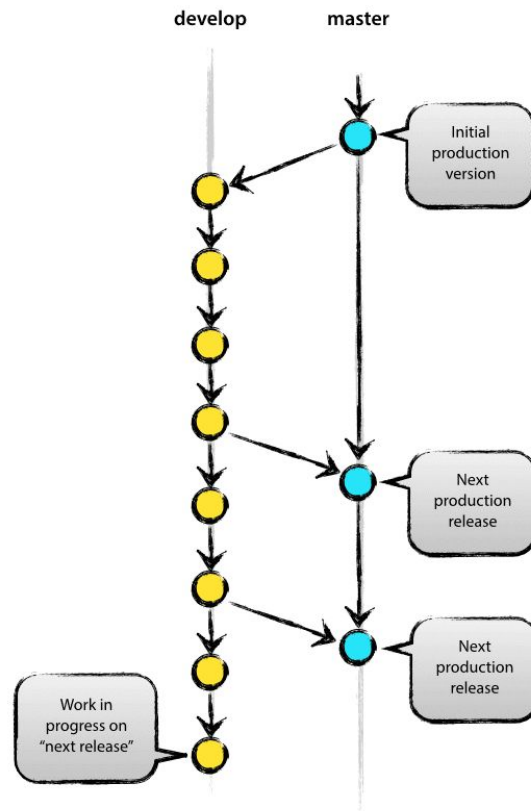
Release Notes

- Release note items are currently added by hand by developers
  - Commit hashes added in separate commits in pre-release notes
  - Can lead to merge/rebase conflicts on the (pre-)release notes documents in master

- Suggestion: write commit messages such that they can be added as items to release notes more or less verbatim. Do not add items by hand, let release note items be handled by release manager when preparing each release. No longer use pre-release notes file. Release notes commit added onto stable branch and merged to master afterwards (as done for 5.5.3 and 5.5.4).

Development Workflow

▸ Goal: make tagged releases appear linearly in git history

▸ Current development workflow
- Commits are applied directly to the master branch
- Branches named `stable-X.Y` are used for patch releases, with commits cherry picked from master
- Cherry-picking many changes is error-prone
- Many commits appear multiple times in git history (i.e. on master and branches where it was cherry-picked

▸ Suggested development workflow
- Use a `develop` or similarly named branch where all commits are applied
- Release manager takes care of picking up commits, merging to master branch, and tagging releases

develop   master

Initial production version

Next production release

Next production release

Work in progress on "next release"

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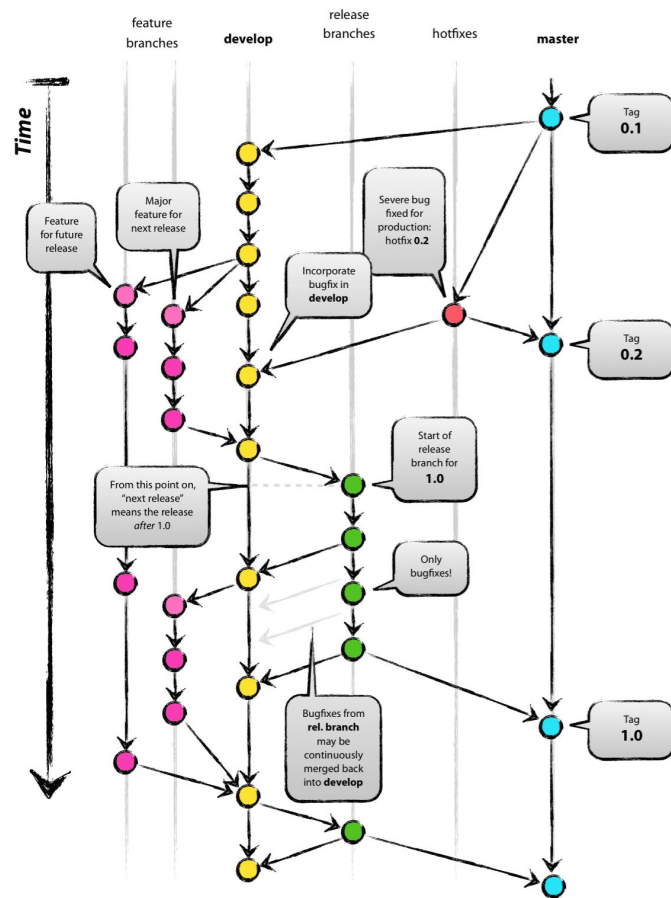
XRootD Python Bindings

▸ Drop Python 2 from next major release (issue 1588 and 1711)

▸ Rework packaging which currently uses deprecated tools (issue 1844)

- Always compiled in debug mode (issue 1807)

- CXXFLAGS not propagated from CMake (issue 1807)

- Install target does not work with DESTDIR (issue 1768)

▸ Should we provide binary wheels on PyPI? (issue 1833)

▸ Address inconsistencies with environment (issues 1657, 1696, 1713, 1839)

▸ Documentation

XRootD Documentation

▶ Current documentation is based on MS Word documents

▶ Difficult to manage contributions, risks becoming outdated

▶ Some build issues with doxygen documentation when building RPMs

▶ Can we find a better format to evolve XRootD's documentation?

▶ Ideally

- Easy to contribute to (i.e. a textual format like Markdown)
- Suitable format to keep under version control in a git repository
- Capable of generating equivalent documentation to what already exists
- Capable of generating links, graphics, and complex tables and data structures

XRootD Packaging and Distribution

▶ RPM and DEB packaging defined within repository

▶ XRootD is available via official channels in most distributions already

- Alma, Arch, CentOS, Debian, Fedora, Gentoo, Manjaro, Raspbian, Rocky, Ubuntu, etc

▶ XRootD is also available on repositories that work across other OSs

- Homebrew, macPorts, Nix, Spack, etc
- Plan is to contribute new versions to Homebrew to cover macOS "semi-officially"