Continuous Integration for ROS in Commercial Environments

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What is CI?

• Automated build
  • Build everything in clean environment, ensures dependencies are fully specified.

• Automated test
  • Run package tests after a commit.

• Automated deployment
  • Debian releases: from git-buildpackage repositories created by bloom-release tool.
The ros.org buildfarm

- **Jenkins**
  - Builds .deb packages
  - Builds documentation
  - Runs “devel” jobs
Common Issues

- Private repositories
- Turn around time
- Unsupported architectures
- Complex configuration, but highly scalable
• Goals

  • Easy configuration (using only python + rosdistro), good documentation

  • Support deb, doc, and devel jobs

  • Support private repositories, even private rosdistros
• Implementation

  • Built on buildbot (Python/Twisted) + cowbuilder + reprepro + python-rosdistro

  • Configuration is requires setting up a rosdistro and pointing the Python configuration at that rosdistro

  • Default configuration is ~120 lines of Python (for a single machine)
• Why would my team want a buildbot-ros?

• You are a coder, not an IT specialist

• Faster turnaround - know you’ve broke the tests in 5-10 minutes rather than hours

• Can also build generic git-buildpackage repos (useful when Ubuntu EOLs your distro)
Build builder ubr1_apps_indigo_trusty_amd64_debbuild Build #41

Results:
Build successful

SourceStamp:
<table>
<thead>
<tr>
<th>Branch</th>
<th>Revision</th>
<th>Got Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>master</td>
<td>46223ed13e5f89326a727c645707753a780d8ae</td>
<td>8aece8b2330c6894a689a562947e541e37d1198c</td>
</tr>
</tbody>
</table>

BuildSlave:
ubr1

Reason:
The triggerable scheduler named ubr1_apps_indigo-trusty-amd64-debtrigger triggered this build

Steps and Logfiles:
1. git update
   - 1 stde
2. ubr1_navigator-buildsource sourcedeb ubr1_navigator
   - 1 stde
3. ubr1_navigator-stampedchangelog 0.4.1.0-20140727-0224-0700 (6 secs)
   - 1 stde
4. ubr1_navigator-buildbinary binarystdeb ubr1_navigator
   - 48 secs
5. ubr1_navigator-infoindex debindex in api ubr1_navigator
   - 6 secs
6. ubr1_move-buildsource sourcedeb ubr1_move
   - 1 stde
7. ubr1_move-stampedchangelog 0.4.1.0-20140727-0226-0700 (0 secs)
   - 1 stde
8. ubr1_move-buildbinary binarystdeb ubr1_move
   - 2 mins, 19 secs
9. ubr1_move-buildsource debindex in api ubr1_move
   - 6 secs
10. ubr1_grasping-buildsource sourcedeb ubr1_grasping
    - 1 stde
11. ubr1_grasping-stampedchangelog 0.4.1.0-20140727-0228-0700 (0 secs)
    - 1 stde

Build Properties:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>branch</td>
<td>ubr1_apps_indigo_trusty_amd64_debbuild</td>
</tr>
<tr>
<td>builder</td>
<td>ubr1_apps_indigo_trusty_amd64_debbuild</td>
</tr>
<tr>
<td>buildnumber</td>
<td>41</td>
</tr>
<tr>
<td>codebase</td>
<td>20140727-0226-0700</td>
</tr>
<tr>
<td>got_revision</td>
<td>8aece8b2330c6894a689a562947e541e37d1198c</td>
</tr>
<tr>
<td>project</td>
<td>ubr1_apps_indigo_trusty_amd64_debbuild</td>
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<tr>
<td>release_version</td>
<td>0.4.1.0</td>
</tr>
<tr>
<td>revision</td>
<td>46223ed13e5f89326a727c645707753a780d8ae</td>
</tr>
<tr>
<td>scheduler</td>
<td>ubr1_apps-indigo-trusty-amd64-debtrigger</td>
</tr>
<tr>
<td>stasename</td>
<td>ubr1_apps_indigo_trusty_amd64_debbuild</td>
</tr>
<tr>
<td>workdir</td>
<td>/root/piggy1/ubr1_apps_indigo_trusty_amd64_debbuild</td>
</tr>
</tbody>
</table>

Forced Build Properties:

| Name | Value |

Responsible Users:
no responsible users

Timing:
- Start: Sun Jul 27 02:24:31 2014
- End: Sun Jul 27 03:38:46 2014
- Elapsed: 9 mins, 17 secs
• Limitations

• 1000 unique jobs (there is a monkey patch around this)

• Does not automatically reconfigure to changes in rosdistro (future work)
• Recommendations

• SSDs improve cowbuilder performance (2-3x speedup over 7200rpm drive).

• One buildbot-ros instance per architecture if building all of ROS (~1000pkgs).

• Use a cron job to restart farm periodically to register updates from rosdistro.
• Can be used to deploy buildbot-ros. Example dockerfiles are in the documentation folder of buildbot-ros repo.
Future work

- Github pull request builder
- Use dockers instead of cowbuilders
- Better visualization