CONTINUOUS INTEGRATION & DEPLOYMENT

Improve project deployment by letting your team focus on code quality.
What is **git**?

- A version control system (VCS)
- It is distributed:
  - *Local & Remote (optional) directory*
- Letting developers contribute together:
  - *Keep track of changes*
  - *Ability to rollback to previous versions*
  - *Sync code between fellow developers*
  - *Develop features independently*
git workflow
Continuous Integration (CI)

- Integrates very well with \( \text{\textregistered} \) git
- Enables automated builds:
  - Detect errors quickly and easily
  - Lets developers focus on code quality
  - Spend more time on adding features
- Continuous deployment (CD)
  - Releasing every good build to end-users
  - Release software at a higher pace
- Define your stages:
  - *Are executed in given order*
- Define your jobs:
  - *Multiple jobs per stage*
  - *Parallel execution within stage*
- Specified as CI job
- Deploy project to website:
  - Display project results
  - Possibility to use generator
  - Give user insight on CI/CD process
- Host for free on GitLab
MOD-MTASK: Validating metabolic models

Requirements:
- *Test a metabolic computer model*
- Automated testing
- Accessible model performance information
- Iterative model updates
MOD-MTASK: Validating metabolic models

- Model performance per test:

```plaintext
<table>
<thead>
<tr>
<th>Commit</th>
<th>Created</th>
<th>Passed</th>
<th>Failed</th>
<th>Skipped</th>
<th>Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>9d99083799b2bec6e90792f7e8603431ab4f4e602</td>
<td>04/25/2017 15:51:52</td>
<td>15</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>6622966b033720979e8d4bcb963c9ff501a8a638</td>
<td>04/25/2017 15:43:29</td>
<td>10</td>
<td>5</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>c2500b31d688853093c3e5b6ed6427d6e461bc2</td>
<td>04/25/2017 15:35:13</td>
<td>13</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>e3006909d117815f823363248d1f1ec1ea8d40a82</td>
<td>04/25/2017 14:28:20</td>
<td>11</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>dc32cb3ff652ae11360c1e622d5133e5b37b6f</td>
<td>04/25/2017 14:27:44</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
```
MOD-MTASK: Validating metabolic models

- Test was marked to fail and failed as expected.
- Test was skipped, while it was not specified in the comma separated values (CSV) tasks file.
- Test passed.

The following reactions in compartment e are tagged to do not contain metabolites from that compartment: FE3HOXUtex.
MOD-MTASK: Validating metabolic models

Future:
- Biologists and mathematicians to implement tests that are biologically relevant for the stated focus of the metabolic model
- Models to test the test suite with like for example canonical salmon metabolism model