

Good (or bad) programming practices

I don't say you can apply all of this on your current code....
But it would be great

Make readable code !

- You **already** know
- But **in large** code it is **not so easy**
- Some **optimization** make the code **hard to read**.
- Where is the limit ? **KIS** (Keep It Simple)
- Take care of **variable names** : a, b uv, uvv, uvw
 - I know, as **physicist** you like them...
 - **Some** of them, **ok**, but **not all**
 - Avoid cryptic names (eg **DaVinci**).
- Your **environment** and **methods** will help you to **make good code or not** .

```
#include /*recall-the\ /-good--old-\ /IOCCC-days!\ */<unistd.h>
typedef unsigned/*int*/ short U;U(main) [32768],n,r[8]; __attribute__((
# define R(x) A(r[ 7-(n >>x& 7)], (n>> x>>3 )%8)
#define C(x) (U*) ((/* |IO| -dpd
*/char*) main +(x) )/*| |CC| ll*/
# define A(v, i)(i ?i<2 ?C(v ) :i\
-4?v+=2, C(i- 6?v- 2:v+ *C(v -2)) :C(v -=2) :&v)
/*lian*/ constructor))U( x){for(;;*r+= 2,*r+=!n?_exit( write(2,"Illeg"
"al ins" "truction ;-" "(\n",24)),0: n>>8==001?( signed char

)n*2 :548==n>> 6&&usleep /**/(10
)+n% 64== 4?0* write (r[7 /**/],C(
*C(* r)), *C(* r+2) )+4: /**/ n>>9
==63 &&-r[7-n/ 64%8]?n%+ /**/ 64*-
2:0, n>>6 ==47 ?*R( 0):n>>12==1?
*R(0 )=*R (+6) :n>> 12==+ 14?*
R(0) -=*R(2*3) :0)n=*C(* r);}
```

IOCC 2016 : endoh3

The right tools & technic

- A **religious & troll** slide..
- Can we build an accelerator with **pre-historic tools & technics** ?



Vi / emacs

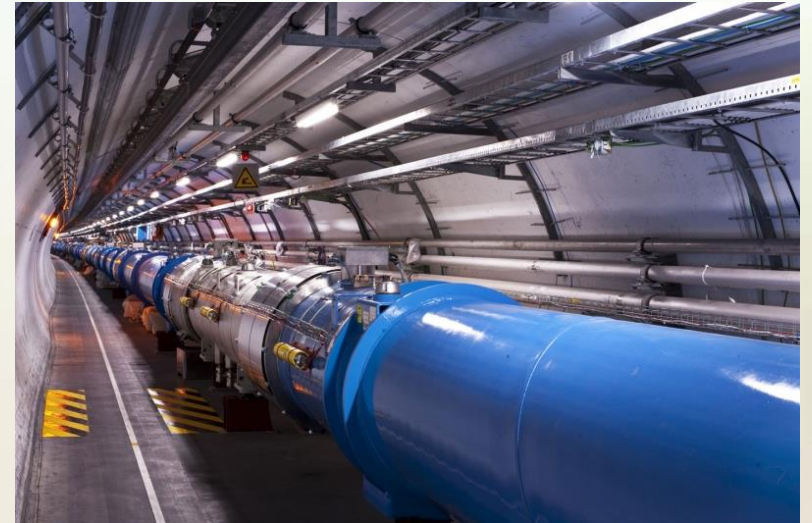


Vi / emacs + config
Kdevelop / XCode

?



Eclipse ?



LHCb million lines of code

Version manager

- ~~Make a daily archive with famous researcher names~~
- Always use a **version manager** to track your changes
- Tools : **Git** or SVN
- Today, prefer git
 - **No** need of a **central server** to host the repository
 - Better use of branches
 - **Ease collaboration** with others
- On CERN, use **CERN gitlab** to host your git



```
#create the repo
git init

#Add all the current files
git add .

#Commit
git commit

#look on the history
git log

#look the history (another tool)
tig
```

About building tool

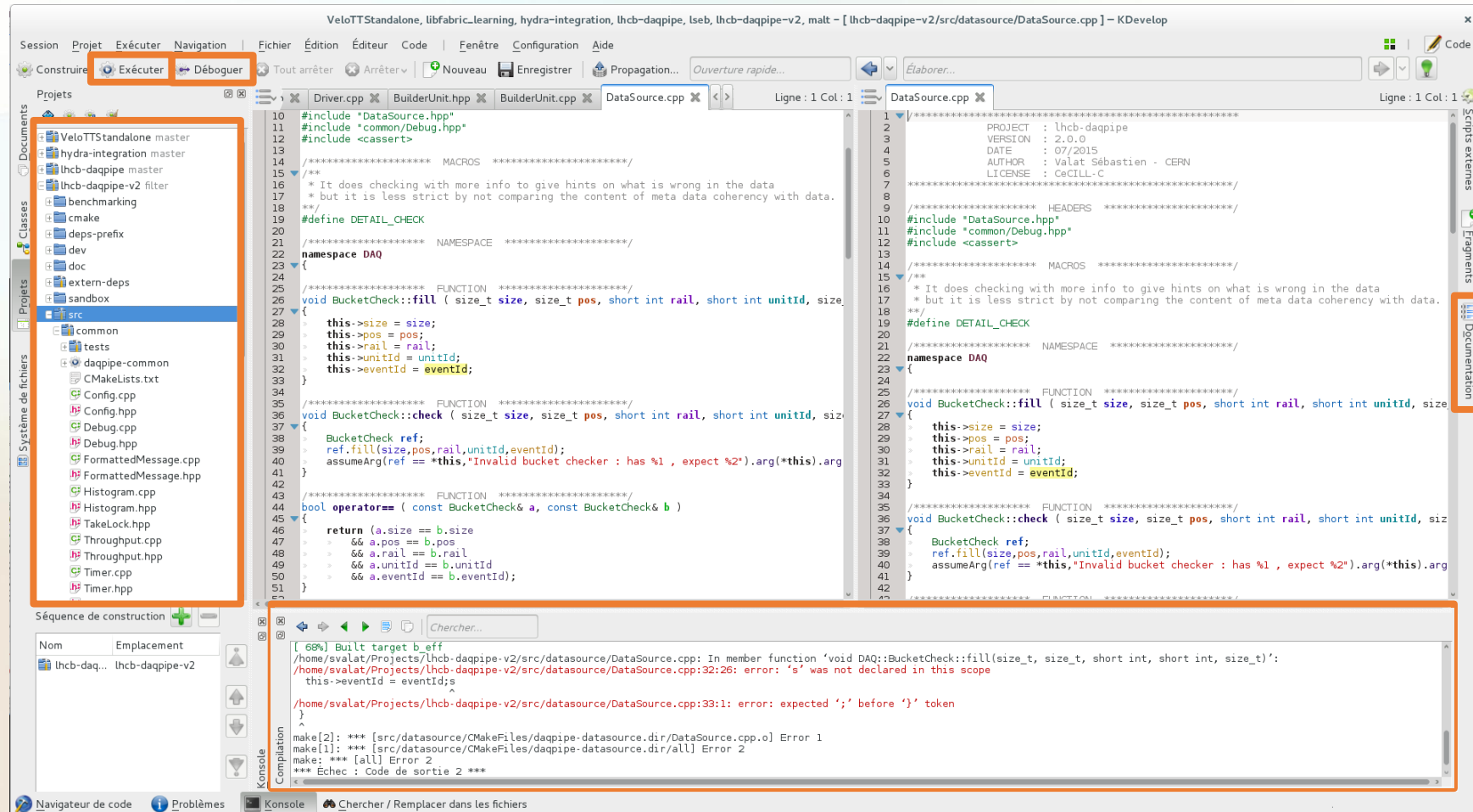


- ~~Write your own script ?~~
- ~~Use Makefile~~
 - Ok for tiny projects
- Use **cmake** / autotools
- Think of the full **workflow of your code**
- Provide a **tutorial to build** your code
- If it is used by others, **think about packaging**.
- The **more you automate** the easier it will be to use **Continuous integration**.
 - But **KIS** & keep it **clear & understandable**
 - If you need 30 (active) minutes to build your project, **you fail**

My way to work

- Limit as most as possible **remote coding** (ssh + vi)
- Prefer to use local **IDE** (**kdevelop**, geany, visual studio, qt creator, atom)
 - It forces my code to **not being linked** to one **particular installation**.
- My **IDE** help me to ease **code refactoring**
 - Usefull to **maintain code quality**
- How to run locally ? (remote data)
- => Use **unit tests**

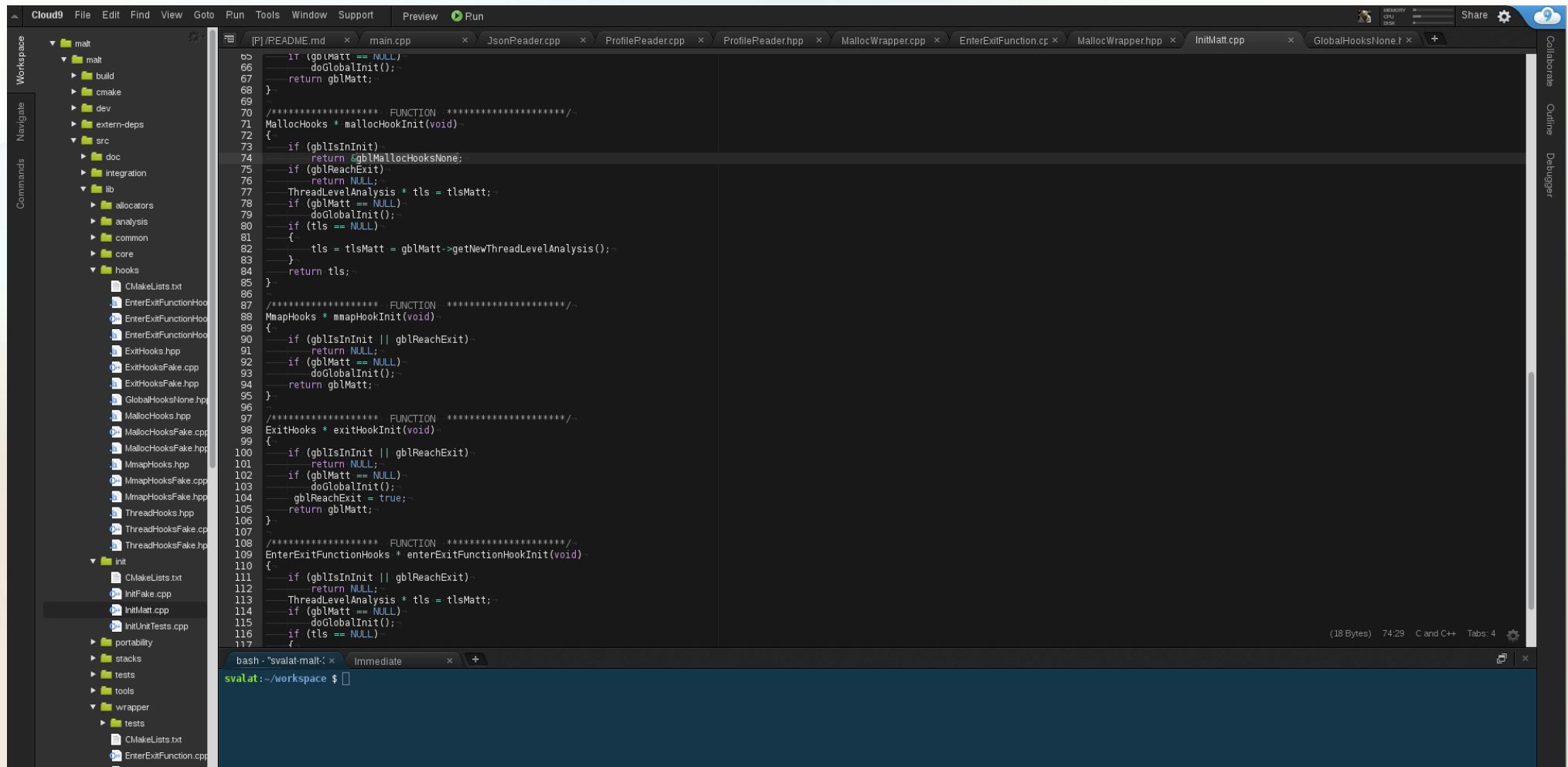
Why an IDE can help ?



My dream, a web IDE

- Launch a **server** on the **remote machine** (via ssh)
- **Forward** the SSH port locally (through the ssh connection)
- Connect with your **browser**
- You get a **nice GUI + remote compilation / completion**
- Can do **share working** on the **same session** for debugging.

The technic is there... but not open Cloud9



The screenshot displays the Cloud9 IDE interface. On the left, a sidebar shows a project workspace with a file tree. The main editor area contains a C++ source file with the following code:

```
65 if (gblMatt == NULL)
66     doGlobalInit();
67     return gblMatt;
68 }
69
70 /***** FUNCTION *****/
71 MallocHooks * mallocHookInit(void)
72 {
73     if (gblIsInInit)
74         return &gblMallocHooksNone;
75     if (gblReachExit)
76         return NULL;
77     ThreadLevelAnalysis * tls = tlsMatt;
78     if (gblMatt == NULL)
79         doGlobalInit();
80     if (tls == NULL)
81     {
82         tls = tlsMatt = gblMatt->getNewThreadLevelAnalysis();
83     }
84     return tls;
85 }
86
87 /***** FUNCTION *****/
88 MmapHooks * mmapHookInit(void)
89 {
90     if (gblIsInInit || gblReachExit)
91         return NULL;
92     if (gblMatt == NULL)
93         doGlobalInit();
94     return gblMatt;
95 }
96
97 /***** FUNCTION *****/
98 ExitHooks * exitHookInit(void)
99 {
100     if (gblIsInInit || gblReachExit)
101         return NULL;
102     if (gblMatt == NULL)
103         doGlobalInit();
104     gblReachExit = true;
105     return gblMatt;
106 }
107
108 /***** FUNCTION *****/
109 EnterExitFunctionHooks * enterExitFunctionHookInit(void)
110 {
111     if (gblIsInInit || gblReachExit)
112         return NULL;
113     ThreadLevelAnalysis * tls = tlsMatt;
114     if (gblMatt == NULL)
115         doGlobalInit();
116     if (tls == NULL)
117     {
```

At the bottom of the IDE, a terminal window is open with the prompt `svalat:~/workspace $`.

Making safer code : assert

- Use **assertions**
- An assertion is a **test** which is executed **only in debug mode** (suppressed by **-DNDEBUG**)

```
#include <assert.h> //or <cassert> in C++

UnitType Transport::getUnitType ( int rank, int unitId )
{
    //errors
    assert(unitId >=0 && unitId < DAQ_MAX_NODE_PER_PROCESS);
    assert(rank >= 0 && rank < this->getWorldSize());

    //action
    return unitTypes[rank * DAQ_MAX_NODE_PER_PROCESS + unitId];
}
```

- I also define **assume** in my codes :

```
#include "Debug.hpp"

UnitType Transport::getUnitType ( int rank, int unitId )
{
    //errors
    assume(rank >= 0, "Rank must be positive !");
    ...
}
```

To be safer => unit test

- Take a **small part (function, class)** of the code to be tested
- It **must not** depend on **100 objects**
- A **good code** is **testable**
- It force you to make **better code**
- It force you to **think about your API**
- It **help** you to **refactor** (you are sure to see what you break)

Example using GTest

- It also gives **example of usage**
- Ease debugging
- I'm using **GTest** for C++
- Similar pattern in all languages
- Do **not** try to **implement all cases**
- Add tests **when you encounter bugs**

```
TEST(DummyDataSource, isEventAvailable)
{
    Config config;
    config.dataSizeRandomRatio = 0;
    DummyDataSource datasource(&config);
    datasource.setId(0);

    EXPECT_TRUE(datasource.IsEventAvailable(0));
    EXPECT_FALSE(datasource.IsEventAvailable(100000));
}
```

```
Running main() from gmock_main.cc
[=====] Running 8 tests from 1 test case.
[-----] Global test environment set-up.
[-----] 8 tests from DummyDataSource
[ RUN    ] DummyDataSource.getTotalSize
[        OK ] DummyDataSource.getTotalSize (142 ms)
[ RUN    ] DummyDataSource.isEventAvailable
/home/svalat/Projects/lhcb-daqpipeline-
v2/src/datasource/tests/TestDummyDataSource.cpp:97: Failure
Value of: datasource.IsEventAvailable(100000)
Actual: false
Expected: true
[ FAILED ] DummyDataSource.isEventAvailable (138 ms)
[ RUN    ] DummyDataSource.operatorStream
[        OK ] DummyDataSource.operatorStream (0 ms)
[-----] 8 tests from DummyDataSource (1050 ms total)

[-----] Global test environment tear-down
```

Unit test / integration test

- If you need to instantiate **all your classes** => **integration test**
- You need some
- But **hard to maintain** if you do **only this**
- You can **mock** to **break dependencies**

Unit test & mocking

```
#include "gmock/gmock.h" // Brings in Google Mock.

class MockTurtle : public Turtle {
public:
    ...
    MOCK_METHOD0(PenUp, void());
    MOCK_METHOD0(PenDown, void());
    MOCK_METHOD1(Forward, void(int distance));
    MOCK_METHOD1(Turn, void(int degrees));
    MOCK_METHOD2(GoTo, void(int x, int y));
    MOCK_CONST_METHOD0(GetX, int());
    MOCK_CONST_METHOD0(GetY, int());
};
```

```
TEST(PainterTest, CanDrawSomething) {
    MockTurtle turtle;
    EXPECT_CALL(turtle, PenDown())
        .Times(AtLeast(1));

    Painter painter(&turtle);

    EXPECT_TRUE(painter.DrawCircle(0, 0, 10));
}
```


From unit test to continuous integration

build passing

- If you have unit test you can move to **continuous integration**
- Your **integration platform** will perform **test for each commit**
- You can be **notified by mail** in case of failure
- **Useful** for example if you support **multiple OS / use cases**
- Tools : **Gitlab-CI, Travis-CI or Jenkins**

Example : Travis-CI

Travis CI

BlogStatusHelp

Sébastien Valat

Search all repositories

My Repositories +

✓ svalat/mpc_allocator_cpp # 9

⌚ Duration: 1 min 8 sec

📅 Finished: 2 months ago

✓ svalat/htopml # 11

⌚ Duration: 1 min 37 sec

📅 Finished: 3 months ago

✓ svalat/fork-sharing-checker # 25

⌚ Duration: 1 min 20 sec

📅 Finished: 3 months ago

✓ svalat/svUnitTest # 19

⌚ Duration: 44 sec

📅 Finished: 3 months ago

✗ svalat/CMR # 2

⌚ Duration: 1 min 47 sec

📅 Finished: 7 months ago

svalat / CMR

build failing

CurrentBranchesBuild HistoryPull Requests

More options

✗ master * Add trvis icon

📄 Commit 949e0e0

📄 Compare aad2833..949e0e0

👤 Sebastien Valat authored and committed

🔗 #2 failed

⌚ Elapsed time 1 min 47 sec

⌚ Total time 3 min 3 sec

📅 7 months ago

Build Jobs


✗ # 2.1	👤 </> Compiler: clang	📄 no environment variables set	⌚ 1 min 23 sec
✗ # 2.2	👤 </> Compiler: gcc	📄 no environment variables set	⌚ 1 min 40 sec

Quick error report

```
552      Start 29: TestMarkNoTransf
553 29/34 Test #29: TestMarkNoTransf ..... Passed    0.00 sec
554      Start 30: TestReplace
555 30/34 Test #30: TestReplace ..... Passed    0.00 sec
556      Start 31: TestImplicitMul
557 31/34 Test #31: TestImplicitMul ..... Passed    0.00 sec
558      Start 32: TestExtractLoops
559 32/34 Test #32: TestExtractLoops ..... Passed    0.00 sec
560      Start 33: TestReplaceAlias
561 33/34 Test #33: TestReplaceAlias .....***Failed    0.01 sec
562      Start 34: TestCodeTemplate
563 34/34 Test #34: TestCodeTemplate ..... Passed    0.00 sec
564
565 97% tests passed, 1 tests failed out of 34
566
567 Total Test time (real) =  0.15 sec
568
569 The following tests FAILED:
570      33 - TestReplaceAlias (Failed)
571 Errors while running CTest
572 make: *** [test] Error 8
573
574 The command "mkdir -p build && cd build && ../configure --enable-debug && make && make test"
    exited with 2.
575
576 Done. Your build exited with 1.
```

Top ▲

Similar with Gitlab-CI

 GitLab

Go to dashboard

Project

Activity

Files

Commits

Builds 0

Graphs

Milestones

Issues 20

Merge Requests 0

Members

Labels

Wiki

Forks

Settings

Sebastien Valat / lhcb-daqppe-v2 ▾ · Builds

Build #19743 for commit 0d8d72b3 from rapidio

✕ tcp

✕ local

✕ mpi

✕ libfabric

✕ failed

 5 seconds

a day ago

```
gitlab-ci-multi-runner 1.0.3 (6c6458e)
Using Shell executor...
Running on pclhcb126.cern.ch...
Fetching changes...
Removing build/
Removing deps-prefix/
HEAD is now at 0d8d72b Merge remote-tracking branch 'origin/master' into rapidio
Checking out 0d8d72b3 as rapidio...
HEAD is now at 0d8d72b... Merge remote-tracking branch 'origin/master' into rapidio
$ ./dev/install-local-deps-for-jenkins.sh
+ set -e
+ SUBDIR=deps-prefix
+ PREFIX=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr
+ export PATH=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/bin:/home/gitlab-runner/scripts:/usr/sue/bin:/usr/lib64/qt-3.3/bin:/home/gitlab-runner/perl5/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/home/gitlab-runner/.local/bin:/home/gitlab-runner/bin
+ PATH=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/bin:/home/gitlab-runner/scripts:/usr/sue/bin:/usr/lib64/qt-3.3/bin:/home/gitlab-runner/perl5/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/home/gitlab-runner/.local/bin:/home/gitlab-runner/bin
+ export LD_LIBRARY_PATH=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/lib:
+ LD_LIBRARY_PATH=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/lib:
+ '[' -d /opt/lhcb-daqppe-deps ']'
+ echo 'Used /opt/lhcb-daqppe-deps'
Used /opt/lhcb-daqppe-deps
+ mkdir -p deps-prefix
+ ln -sf /opt/lhcb-daqppe-deps /home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr
+ exit 0
$ ./dev/run-into-jenkins.sh TCP
+ SOURCE_DIR=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2
+ DEP_PREFIX=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr
+ export PATH=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/bin:/home/gitlab-runner/scripts:/usr/sue/bin:/usr/lib64/qt-3.3/bin:/home/gitlab-runner/perl5/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/home/gitlab-runner/.local/bin:/home/gitlab-runner/bin
+ PATH=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/bin:/home/gitlab-runner/scripts:/usr/sue/bin:/usr/lib64/qt-3.3/bin:/home/gitlab-runner/perl5/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/home/gitlab-runner/.local/bin:/home/gitlab-runner/bin
+ export LD_LIBRARY_PATH=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/lib64:/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/lib:
+ LD_LIBRARY_PATH=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/lib64:/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr/lib:
+ '[' -z TCP ']'
+ case $MODE in
+ BUILD_OPTIONS='--with-transport=TCP --with-libfabric=/home/gitlab-runner/builds/42acdb93/0/svalat/lhcb-daqppe-v2/deps-prefix/usr --wit
```

Build #19743

Retry

Erse

Duration: 5 seconds

Created: a day ago

Finished: a day ago

Runner: #7

Commit 0d8d72b3

Branch: rapidio

Author: Sima Baymani

Message: Merge remote-tracking branch 'origin/master' into rapidio Conflicts: src/units/Command.cpp src/units/Command.hpp

3 other builds for 0d8d72b3:

✕	libfabric	failed
✕	mpi	failed
✕	local	failed

5/26/2016

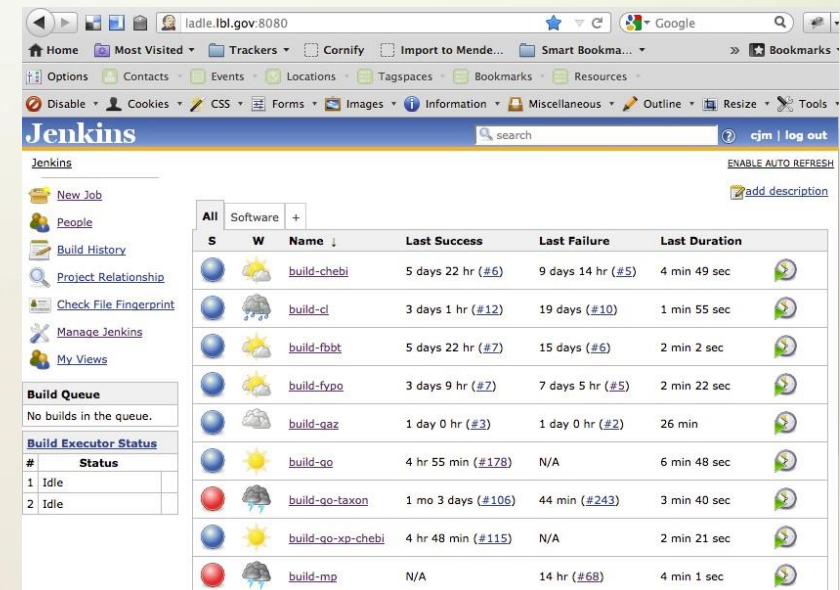
Sébastien Valat

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More details with Jenkins



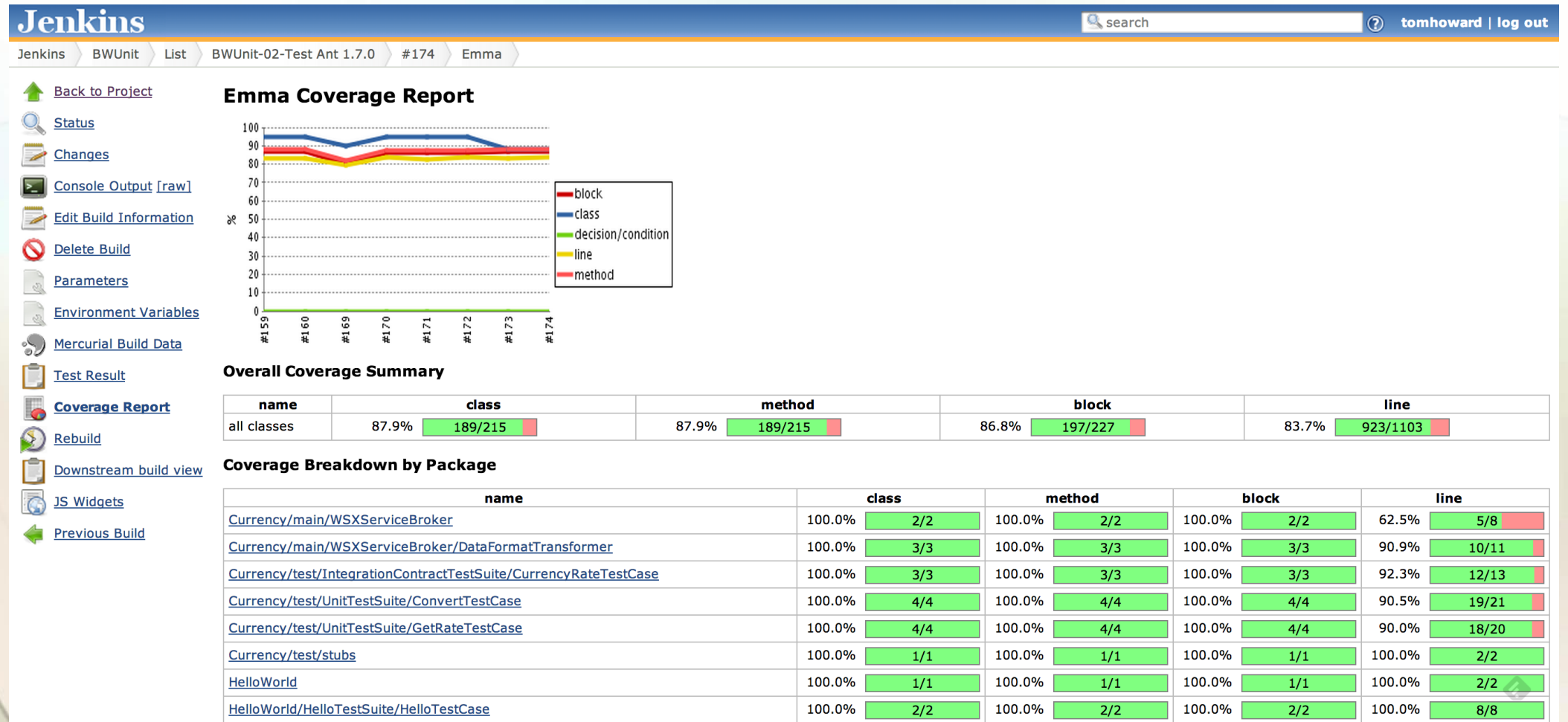
- Jenkins is a more advanced integration platform
- It provide detailed **per test error report**
- Build **reports** from static / dynamic **code analysis tools** :
 - Valgrind
 - CppCheck
 - Rats
- You can use the **CERNFORGE** service to create an instance
- Can produce your **RPM**
- Manage **inter-project dependencies**



The screenshot shows the Jenkins web interface in a browser. The main content area displays a table of builds. The table has columns for status (S), weather icon (W), name, last success, last failure, and last duration. The builds listed are: build-chebi, build-cl, build-fbdt, build-fypo, build-gaz, build-go, build-go-taxon, build-go-xp-chebi, and build-mp.

S	W	Name	Last Success	Last Failure	Last Duration
Blue	Sunny	build-chebi	5 days 22 hr (#6)	9 days 14 hr (#5)	4 min 49 sec
Blue	Cloudy	build-cl	3 days 1 hr (#12)	19 days (#10)	1 min 55 sec
Blue	Sunny	build-fbdt	5 days 22 hr (#7)	15 days (#6)	2 min 2 sec
Blue	Sunny	build-fypo	3 days 9 hr (#7)	7 days 5 hr (#5)	2 min 22 sec
Blue	Cloudy	build-gaz	1 day 0 hr (#3)	1 day 0 hr (#2)	26 min
Blue	Sunny	build-go	4 hr 55 min (#178)	N/A	6 min 48 sec
Red	Cloudy	build-go-taxon	1 mo 3 days (#106)	44 min (#243)	3 min 40 sec
Blue	Sunny	build-go-xp-chebi	4 hr 48 min (#115)	N/A	2 min 21 sec
Red	Cloudy	build-mp	N/A	14 hr (#68)	4 min 1 sec

Jenkins – code coverage



Jenkins – code coverage & valgrind

Jenkins test #39

[BACK to project](#)

[Status](#)

[Changes](#)

[Console Output](#)

[Edit Build Information](#)

[Delete Build](#)

[Git Build Data](#)

[No Tags](#)

[Coverage Report](#)

[Previous Build](#)

Code Coverage

[Cobertura Coverage Report](#) > [kcov_cobertura](#) >

lhome/simkag/private/kcov/src/main.cc

Trend

Classes	100%
Conditionals	100%
Lines	17%

File Coverage summary

Name	Classes	Conditionals	Lines
lhome/simkag/private/kcov/src/main.cc	100% 1/1	100% 0/0	17% 5/29

Coverage Breakdown by Class

Name	Conditionals	Lines
main.cc	N/A	17% 5/29

Source

```
lhome/simkag/private/kcov/src/main.cc
1 #include <configuration.hh>
2 #include <engine.hh>
3 #include <reporter.hh>
4 #include <writer.hh>
5 #include <collector.hh>
6 #include <output-handler.hh>
7 #include <elf.hh>
8
9 #include <string.h>
10 #include <signal.h>
11
12 #include "html-writer.hh"
13 #include "cobertura-writer.hh"
14
15 using namespace kcov;
16
17 static IOutputHandler *g_output;
18
19 static void ctrlc(int sig)
20 {
21     g_output->stop();
22     IEngine::getInstance().kill();
23     exit(0);
24 }
25
26
27 int main(int argc, const char *argv[])
28 {
29     IConfiguration &conf = IConfiguration::getInstance();
30
31     if (!conf.parse(argc, argv))
32         return 1;
33 }
```

Valgrind Error Details

Executable	main
Text	4 bytes in 1 blocks are definitely lost in loss record 1 of 1

Stacktrace

Object	/usr/lib/valgrind/vgpreload_memcheck-amd64-linux.so
Function	operator new(unsigned long)
File/Line	/build/buildd/valgrind-3.6.0~svn20100724/coregrind/m_replacemalloc/vg_replace_malloc.c:261
Code	Source code not available

Object	/home/hudson/hudson/workspace/valgrind-test-project/main
Function	leak()
File/Line	/home/hudson/hudson/workspace/valgrind-test-project/main.cpp:6
Code	<pre>03 void leak() 04 { 05 std::cout << "leak" << std::endl; 06 int* i = new int(42); 07 } 08 09 int invalidread(int x)</pre>

Object	/home/hudson/hudson/workspace/valgrind-test-project/main
Function	main
File/Line	/home/hudson/hudson/workspace/valgrind-test-project/main.cpp:17
Code	<pre>14 15 int main(int argc, char** argv) 16 { 17 leak(); 18 19 std::cout << "invalid read: " << invalidread(42) << std::endl; 20 }</pre>

Refactoring

- Your needs **evolve** (especially in research field)
- If your **code become inadequate => refactor**
- It is easier to do **using tools**
- Having **unit tests is certainly safer**
- **Without unit test**, this is a **risky challenge**

Ticket system

- If you are **many on the project**
- But if you are rigorous : **also alone.**
- It **save you** when you come back after a **couple of month**
- Make you **think in advance** on what **need to be done.**
- Use a ticket system (**Gitlab** or Jira)

The screenshot displays a GitLab issue tracker interface. At the top, there are tabs for 'Open' (20), 'Closed' (45), and 'All' (65). A search bar with the placeholder 'Filter by name ...' and a '+ New Issue' button are on the right. Below the tabs, there are filter dropdowns for 'Author', 'Assignee', 'Milestone', 'Label', and 'Weight', along with a 'Last created' dropdown. The main list of issues includes:

- Add filter unit** (#65) - opened 13 days ago by Sebastien Valat. Filter Unit. updated 13 days ago.
- Track memory leak** (#64) - opened 3 months ago by Sebastien Valat. Improve current version MPI and libfabric. **bugfix**. updated 3 months ago.
- Enabling multiple sockets between peers** (#63) - opened 4 months ago by Balazs Voneki. Add TCP support. **improvement**. updated 4 months ago.
- htopml, update the switch proxy to go from one process to another** (#57) - opened 5 months ago by Sebastien Valat. Htopml integration. **new feature**. updated 5 months ago.
- htopml, print topology in use** (#56) - opened 5 months ago by Sebastien Valat. Htopml integration. **new feature**. updated 5 months ago.
- Htopml, print current config** (#55) - opened 5 months ago by Sebastien Valat. Htopml integration. **new feature**. updated 5 months ago.

Documentation

- **Doxygen** : yes but it is **not enough**
- I like to also have a **wiki** with a **global view** on **how the code is working**
 - On **release** I make a **snapshot** of the wiki in the **source code**
- Provide some usage **examples** (unit tests) ?
- The **knowledge** must **not be** only in your **code**

5/26/2016

Sébastien Valat

The screenshot shows a GitLab Wiki page for 'Sebastien Valat / lhcb-daqppe-v2'. The page title is 'Data layout', last edited by Sebastien Valat 14 days ago. The page content includes a title 'Data layout', a subtitle 'Data transfers between ReadoutUnit and BuilerUnit', and a paragraph explaining the purpose of the page. Below the text is a diagram illustrating data layout and transfers between ReadoutUnit and BuilerUnit. The diagram shows two ReadoutUnits (RU-0 and RU-1) connected to a BuilerUnit. Data is transferred from the ReadoutUnits to the BuilerUnit via 50 Gb/s connections. The diagram shows data buffers (Data 1, Data 2) and meta buffers (Meta 1, Meta 2) with event ranges [40-59], [60-79], [20-39], and [40-59]. A legend indicates that [00-19] is a bucket of events. A note mentions a 'Trick in driver to map start at end to avoid 2 fragments on limits'. The diagram also shows a 'Credit storage' section with a 'Meta' buffer and a '1MB' buffer. The page number 24 is visible at the bottom right.

Documentation

- **For who ?** Me ? You ?
- I use documentation for **me**.
- If you **cannot explain** what you have done.... **rework it**
- It let you the **time to think** what you are doing
- It is **not up-to-date** ? Ok, still better than having just the code.

5/26/2016

Sébastien Valat

Sebastien Valat / lhcb-daqppe-v2 · Wiki

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Data_layout · last edited by Sebastien Valat 14 days ago

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Data layout

This page aims to help understanding the data layout and transfers which append inside DAQPIPE.

Data transfers between ReadoutUnit and BuilerUnit

This picture can help to understand how the datas are exchanged between ReadoutUnit and BuilerUnit by taking care of the interaction with the incoming PCIe40 board.

50 Gb/s 50 Gb/s

Legend
[00-19]
Bucket of events

ReadoutUnit 0

Trick in driver to map start at end to avoid 2 fragments on limits

ReadoutUnit 1

~1MB

25

Final message

Think about your **development strategy**, **always improve** and **use the right tools....**

If you want an example search **lhcb-daqpipeline-v2** in cern gitlab

Project management

- **Out of the scope** of this presentation
- But if you are a **team**, look on **agile methods** :
 - **Scrum**
- Using **agile methods** requires all the **previous stuff** !
- Agile method **is not having no method....**

