

**МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РФ**  
**Федеральное государственное автономное**  
**образовательное учреждение высшего образования**  
**«МОСКОВСКИЙ ПОЛИТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ»**

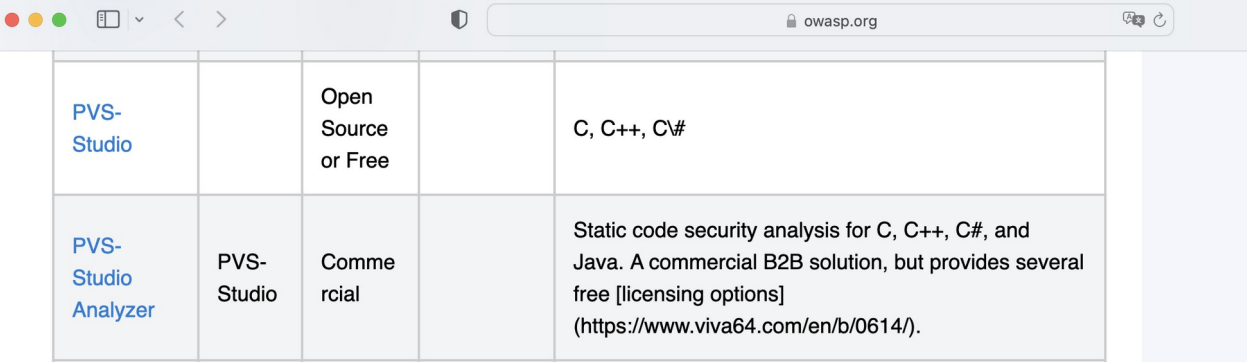
**Лабораторная работа 6**  
**по дисциплине**  
**«Автоматизация процессов жизненного цикла программных средств»**

**Выполнил:**  
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**Проверил:**  
**Красников А. С.**

## План выполнения лабораторной работы

**1. Провести исследования доступных статических анализаторов для выбранного командой стека разработки (большой, но не всеобъемлющий [список]**

**([https://owasp.org/www-community/Source Code Analysis Tools](https://owasp.org/www-community/Source-Code-Analysis-Tools))**



PVS-Studio		Open Source or Free	C, C++, C#
PVS-Studio Analyzer	PVS-Studio	Commercial	Static code security analysis for C, C++, C#, and Java. A commercial B2B solution, but provides several free [licensing options] ( <a href="https://www.viva64.com/en/b/0614/">https://www.viva64.com/en/b/0614/</a> ).

**2. Выбрать минимум два из следующих видов статических анализаторов:**

- анализатор качества кода (пример - Checkstyle)**
- анализатор безопасности кода (Пример - Gosec)**
- средство поиска учетных данных/секретов (Пример - Trufflehog).**

**Анализатор PVS-Studio** выявляет не только опечатки, мёртвый код и другие ошибки, но и потенциальные уязвимости (Static Application Security Testing, SAST). Анализатор отображает предупреждения на Common Weakness Enumeration, SEI CERT Coding Standards, а также поддерживает стандарт MISRA.

3. Добавить в построенном пайплайне TeamCity шаги, на которых код проверяется статическими анализаторами и, в случае обнаружения проблем максимальной критичности для выбранного анализатора (для анализатора безопасности - CRITICAL, для анализатора качества кода - BLOCKER, для средства поиска секретов - любой обнаруженный пароль), билд завершается с ошибкой.

Добавим шаг, в котором будет происходить процесс анализа серверного кода:

Administration / <Root project> / Elya Igor Alex

Run ... Actions Go to build configuration page

☐ Build 1 warning

General Settings

Version Control Settings 1

**Build Steps 4**

Triggers 1

Failure Conditions

Build Features 1

Dependencies

Parameters

Agent Requirements

Suggestions

« Hide unconfigured

Last edited moments ago by admin (view history)

View as code ?

Build step enabled.

**Build Steps**

In this section you can configure the sequence of build steps to be executed. Each build step is represented by a build runner and provides integration with a specific build or test tool. ?

+ Add build step Reorder build steps Auto-detect build steps

Build Step	Parameters Description
1. Analyze and ConvertAnalysisResults	Command Line Custom script: apt install apt-utils -y (and 28 more lines) Execute: If all previous steps finished successfully
2. Docker build	Docker Docker build; Dockerfile location: Dockerfile ; context directory: . Execute: If all previous steps finished successfully
3. Docker push	Docker docker push photolife/medhelper:latest; remove image(s) after push Execute: If all previous steps finished successfully
4. Connect SSH	SSH Exec Target: 192.168.31.4 Port: 22 Commands: cd /home/auto-server docker pull photolife/medhelper docker compose up -d Execute: If all previous steps finished successfully

## Рассмотрим шаг «Analyze and ConvertAnalysisResults»:

**Build Step (1 of 4): Analyze and ConvertAnalysisResults**

Runner type: **Command Line**  
Simple command execution

Step name: **Analyze and ConvertAnalysisResults**  
Optional, specify to distinguish this build step from other steps.

Execute step: **If all previous steps finished successfully** Add condition

Working directory: **.**  
Optional, set if differs from the checkout directory.

Run: **Custom script**

Custom script: Enter build script content:

```
1 apt install apt-utils -y
2 apt-get update -y
3 apt-get install qt5-qmake -y
4 apt-get install cmake -y
5 apt-get install qt5-default -y
6 apt-get install qtbase5-dev -y
7 apt-get install build-essential -y
8 apt-get install wget -y
9 wget -q -O - https://cdn.pvs-studio.com/etc/pubkey.txt | apt-key add - -y
10 wget -O /etc/apt/sources.list.d/viva64.list https://cdn.pvs-studio.com/etc/viva64.list
11 apt-get update -y
12 apt-get install pvs-studio -y
13 pvs-studio-analyzer credentials 817601@mail.ru 5DMG-77B4-25N1-2WGF
14 cd ./untitled9
15 rm -f compile_commands.json
16 rm -f moc*
17 rm -f Makefile
18 rm -f *.o
```

A platform-specific script, which will be executed as a .cmd file on Windows or as a shell script in Unix-like environments.

Format stderr output as: **error**  
Specify how error output is processed.

Docker Settings

Run step within Docker container: **.**  
E.g. ruby:2.4. TeamCity will start a container from the specified image and will try to run this build step within this container.

## Разберем подробнее custom script:

*#Установим apt-utils и обновим индекс пакетов:*

`apt install apt-utils -y`

`apt-get update -y`

*#Установим Qt и компиляторы*

`apt-get install qt5-qmake -y`

`apt-get install cmake -y`

`apt-get install qt5-default -y`

`apt-get install qtbase5-dev -y`

`apt-get install build-essential -y`

`apt-get install wget -y`

*#Установим непосредственно pvs-studio*

`wget -q -O - https://cdn.pvs-studio.com/etc/pubkey.txt | apt-key add - -y`

`wget -O /etc/apt/sources.list.d/viva64.list https://cdn.pvs-studio.com/etc/viva64.list`

`apt-get update -y`

`apt-get install pvs-studio -y`

*#Добавим лицензию pvs-studio*

pvs-studio-analyzer credentials 817601@mail.ru 5DMG-77B4-25N1-2WGF

*#Перейдем в папку сервера:*

cd ./untitled9

*#Удалим старые сборки и старые версии файлов:*

rm -f compile\_commands.json

rm -f moc\*

rm -f Makefile

rm -f \*.o

rm -f untitled9.pro

rm -f strace\_out

rm -f pvs.log

rm -f pvs\*.tasks

*#Проведем трассировку компиляции (соберем проект):*

qmake -o Makefile untitled.pro

make clean

pvs-studio-analyzer trace -- make

rm -f moc\*

*#Удалим старую директорию для сохранения отчета и создадим новую:*

rm -R ./report

mkdir ./report

*#Запустим анализ нашего сервера:*

pvs-studio-analyzer analyze -l /root/.config/PVS-Studio/PVS-Studio.lic -o pvs.log  
--disableLicenseExpirationCheck

*#Сохраним отчет в формате .html в созданной папке:*

plog-converter -a GA:1,2 --renderTypes fullhtml -t tasklist -o ./report/ pvs.log

*#Заменяем «фальшивые» err просто на 1, чтобы корректно найти критические ошибки:*

sed "s|pvs-studio.com/en/docs/warnings/ 1 err Help: The documentation  
for all analyzer warnings is available here:

<https://pvs-studio.com/en/docs/warnings/>.|1|" ./report/pvs.tasks >  
./report/pvs1.tasks

sed "s|err Renew|1|" ./report/pvs1.tasks > ./report/pvs2.tasks

#Найдем err в отчете (если err будет найден, то код – 0, иначе – 1):

```
grep -r 'err' ./report/pvs2.tasks
```

#Выведем в случае обнаружения err в отчете код 1 (если ошибок нет, то 0):

```
if [ $? -eq 0 ]
```

```
then
```

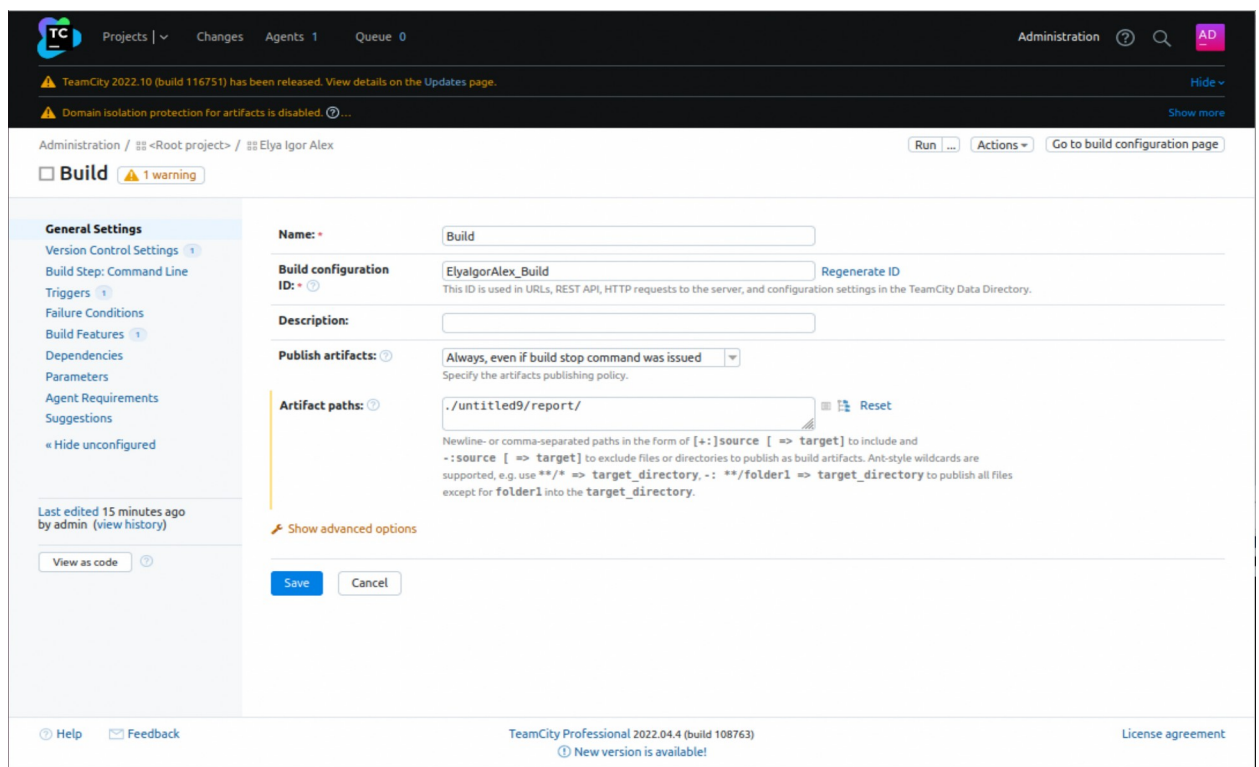
```
    exit 1
```

```
else
```

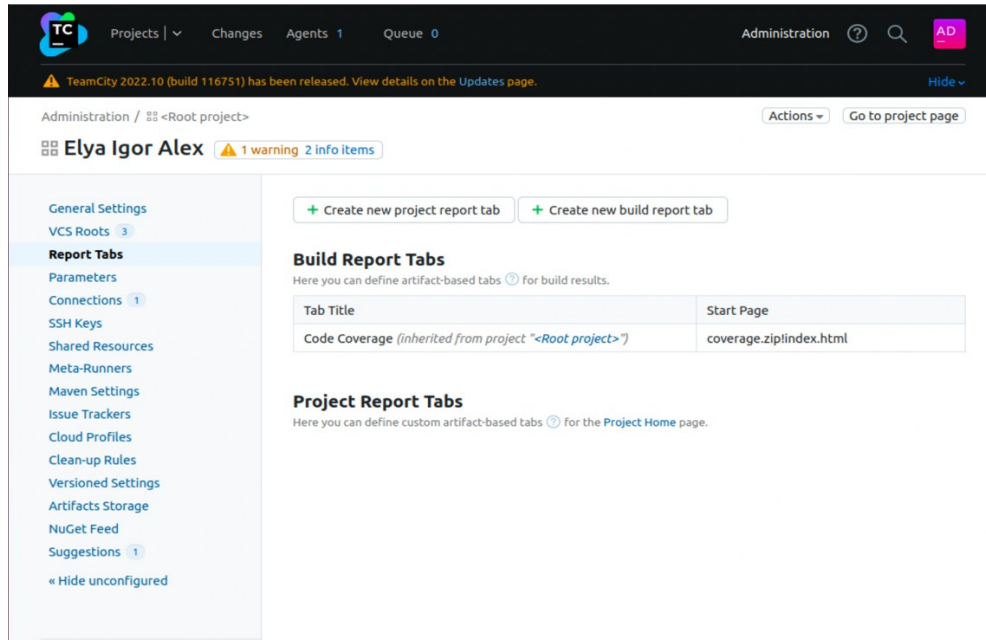
```
    exit 0
```

```
fi
```

После создания шага настроим пути Artifact, то есть пропишем в них путь созданной папки report, чтобы после успешного выполнения сборки отчёт анализатора будет доступен в артефактах:



Также можно сделать так, чтобы отчёт анализатора отображался на специальной вкладке отчёта о сеансе сборки. Для этого необходимо перейти в настройки проекта, открыть 'Report Tabs' и добавить новую вкладку отчёта сборки ('Create new build report tab').



В окне добавления вкладки в поле 'Start page' необходимо указать путь к файлу 'index.html' относительно корневой папки артефактов:

The 'Edit Report Tab Settings' dialog box is shown. It contains the following fields and options:

- Tab Title:** Pvs-Studio-REPORT
- Get artifacts from:** Elya Igor Alex / Build (dropdown menu). Below it, a description: 'Build configuration that produces artifact with the report'.
- Latest finished build:** (dropdown menu)
- Build branch filter:** +: \* (text input). Below it, a description: 'Newline-delimited set of rules in the form of +|-:logical branch name (with an optional \* placeholder).'
- Start page:** pvs.fullhtml/index.html (text input). Below it, a description: 'Relative path from the root of build's artifacts to a start page of the generated report. To reference a file from an archive, use the [path-to-archive]![relative-path] syntax.'

At the bottom, there are 'Save' and 'Cancel' buttons.

[Projects](#)
[Changes](#)
[Agents 1](#)
[Queue 0](#)

[Administration](#)

TeamCity 2022.10 (build 116751) has been released. [View details on the Updates page.](#)
[Hide](#)

Domain isolation protection for artifacts is disabled. [?](#)...
 [Show more](#)

Administration / [«Root project»](#)

**Elya Igor Alex**

1 warning
 [2 info items](#)

[Actions](#)
[Go to project page](#)

[General Settings](#)
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[Report Tabs](#)
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[Shared Resources](#)
[Meta-Runners](#)
[Maven Settings](#)
[Issue Trackers](#)
[Cloud Profiles](#)
[Clean-up Rules](#)
[Versioned Settings](#)
[Artifacts Storage](#)
[NuGet Feed](#)
[Suggestions 1](#)
[« Hide unconfigured](#)

Report tab updated

[+ Create new project report tab](#)
[+ Create new build report tab](#)

**Build Report Tabs**

Here you can define artifact-based tabs [?](#) for build results.

Tab Title	Start Page
Code Coverage <i>(inherited from project "&lt;Root project&gt;")</i>	coverage.ziplindex.html

**Project Report Tabs**

Here you can define custom artifact-based tabs [?](#) for the [Project Home](#) page.

Tab Title	Get Artifacts From	Start Page	
Pvs-Studio-REPORT	... Build (Latest finished build, branch filter: +:*)	pvs.fullhtml/index.html	<a href="#">Edit</a> <a href="#">Delete</a>

Last edited 4 days ago by admin

[View history](#)

Зафиксируем успешную сборку из feature1:

[Projects](#)
[Changes](#)
[Agents 1](#)
[Queue 0](#)

[Administration](#)

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[Hide](#)

Domain isolation protection for artifacts is disabled. [?](#)...
 [Show more](#)

Elya Igor Alex / [Build](#)

Run ...

Actions

Edit Configuration Settings

**#101 (13 Nov 22 21:57)**

[Overview](#)
[Changes](#)
[Build Log](#)
[Parameters](#)
[Artifacts](#)
[PerfMon](#)

[«](#)
[»](#)
[#100](#)
[All history](#)
[Last recorded build](#)

Result:	Success	Agent:	ip_172.17.0.1
Time:	13 Nov 22 21:57:34 - 21:58:32 (58s)	Triggered by:	you on 13 Nov 22 21:57
Branch:	<a href="#">feature1</a>		

This build is in your favorites

[? Help](#)
[Feedback](#)

TeamCity Professional 2022.04.4 (build 108763)

New version is available!

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Elya Igor Alex /

Build

✓

#101 (13 Nov 22 21:57)

Overview

Changes

Build Log

Parameters

Artifacts

PerfMon

★ This build is in your favorites

▼

pvs.fullhtml

> images

> sources

index.html

1.98 KB

jquery-3.5.1.min.js

87.37 KB

script.js

4.58 KB

style.css

1.51 KB

pvs.tasks

265 B


Show hidden artifacts

Total size: 131.76 KB

**Elya Igor Alex**

Overview Change Log Statistics Current Problems Investigations Muted Problems Flaky Tests 0 Pvs-Studio-REPORT

Data was taken from Elya Igor Alex / Build, build 101 | started at 13 Nov 22 21:57





## PVS-Studio Analysis Results


Date:	Sun Nov 13 21:58:31 2022
PVS-Studio Version:	7.21.64848.262
Command Line:	plog-converter -a GA\1.2 --renderTypes fullhtml -t tasklist -o ./untitled9/report/ pvs.log
Fails!Info:	1

Group	Location	Level	Code	Message
1			<a href="#">Renew</a>	Your license will expire in 5 days. Click 'Renew' to learn more or contact us at support@viva64.com.

Теперь зафиксируем сборку с ошибками из ветки feature4:

 Projects | Changes Agents 1 Queue 0 Administration ? Search AD



 TeamCity 2022.10 (build 116751) has been released. View details on the Updates page. [Hide](#)

 Domain isolation protection for artifacts is disabled. ? ... [Show more](#)


Elya Igor Alex / Build Run ... Actions Edit Configuration Settings


**#164 (17 Nov 22 17:47)**

Overview Changes Build Log Parameters Artifacts PerfMon « #163 | All history | Last recorded build

Result:	 Exit code 1 (Step: Analyze and ConvertAnalysisResults (Command Line)) (new)	Agent:	 ip_172.17.0.1
Time:	17 Nov 22 17:47:47 - 17:48:38 (51s)	Triggered by:	you on 17 Nov 22 17:47
Branch:	feature4		

★ This build is in your favorites

 **Build problems: 1 (1 new)**

 [Process exited with code 1 \(Step: Analyze and ConvertAnalysisResults \(Command Line\)\)](#) | ▾

Help Feedback TeamCity Professional 2022.04.4 (build 108763) License agreement


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Elya Igor Alex / Build Run ... Actions Edit Configuration Settings

**#164 (17 Nov 22 17:47)** | ▾


Overview Changes Build Log Parameters Artifacts PerfMon « #163 | All history | Last recorded build

★ This build is in your favorites


 pvs.fullhtml

 images

 sources

 index.html 3.62 KB

 jquery-3.5.1.min.js 87.37 KB

 script.js 4.58 KB

 style.css 1.51 KB

 pvs.tasks 967 B

 pvs1.tasks 819 B

 pvs2.tasks 811 B

[Download all \(.zip\)](#)

Show hidden artifacts

Total size: 146.89 KB

TC

Projects

Changes

Agents 1

Queue 0

Administration

?

Q

AD

TeamCity 2022.10 (build 116751) has been released. View details on the Updates page.

Hide

Domain isolation protection for artifacts is disabled. ?...

Show more

Elya Igor Alex

Overview

Change Log

Statistics

Current Problems


Investigations

Muted Problems

Flaky Tests 0

Pvs-Studio-REPORT

Data was taken from Elya Igor Alex / Build, build 164 | started at 17 Nov 22 17:47



# PVS-Studio Analysis Results

Date:

Thu Nov 17 17:48:37 2022

PVS-Studio Version:

7.21.64848.262

Command Line:

plog-converter -a GA:1.2 --renderTypes fullhtml -t tasklist -o ./report/ pvs.log

Total Warnings (GA):

3

Fails/Info:

1

Group	Location	Level	Code	Message
1			<a href="#">Renew</a>	Your license will expire in 6 days. Click 'Renew' to learn more or contact us at support@viva64.com.
General Analysis	<a href="#">functions.cpp:21</a>	Medium	<a href="#">V640</a>	The code's operational logic does not correspond with its formatting. The statement is indented to the right, but it is always executed. It is possible that curly brackets are missing.
General Analysis	<a href="#">mytcpserver.cpp:25</a>	High	<a href="#">V611</a>	The memory was allocated using 'new T' operator but was released using the 'delete []' operator. Consider inspecting this code. It's probably better to use 'delete server;'.
General Analysis	<a href="#">mytcpserver.cpp:24</a>	Medium	<a href="#">V799</a>	The 'server' variable is not used after memory has been allocated for it. Consider checking the use of this variable.