PEACH
FUZZER

Peach Fuzzer
Hosted Trial Guide

Peach Tech v0.0.0

1. Preface

This document supports the user through a trial of using Peach Fuzzer to test several different real-world applications. It shows how Peach Fuzzer should be configured for each application, what monitors are useful for each scenario, and has examples of test runs that show the types of faults that Peach Fuzzer can find and the information it gathers for those faults. This should give the user an overview of the capabilities of Peach Fuzzer and set expectations for what the user will need to do to use Peach Fuzzer to test their own software.

1.1. Goals

After reading this document, you should be able to accomplish the following:

1. Access your trial instance of Peach Fuzzer
2. Run tests against several target applications with Peach Fuzzer
3. View the results of a test run to see the vulnerabilities that were found and the data was gathered
4. Understand how Peach Fuzzer is configured to test various applications based on the nature of the application
5. Understand why the configurations have the specific settings and Monitors that they do and how those settings relate to the specifics of the application they are testing
6. (Optional) Create a new configuration to test one of the existing applications that exist on your trial instance

1.2. Non-Goals

This document is NOT intended to be comprehensive documentation for how to configure Peach Fuzzer or a full demonstration of every feature that Peach Fuzzer offers. It is also not meant to help the user install, configure, or troubleshoot Peach Fuzzer for testing their own applications. Users needing assistance with any of those things should consult the Peach Fuzzer User Guide or contact support for assistance.

1.3. Target Applications

The applications being tested in the trial are all free and open source where possible. In many cases, the source was forked from the original version and contrived security vulnerabilities were intentionally introduced into the code in order to better demonstrate the features of Peach Fuzzer. Therefore, the vulnerabilities found by Peach Fuzzer on the trial instance should not be assumed to be present in the publicly available versions of those applications. In addition, Peach Tech has not done a comprehensive test of those applications so we cannot guarantee that additional vulnerabilities are not present in those applications' original source code.

2. Configurations

Each pit available in the trial has at least one configuration. In some cases there will be two; a basic configuration and an advanced configuration.

In protocols where both a client and server are present and being tested, the client and server are considered separate protocols for purposes of this document. It is therefore possible that both the client and the server will each have a basic and advanced configuration.

2.1. Basic Configuration

This configuration shows how a user would typically set up Peach Fuzzer to test an application that they either can't compile or can't re-compile with additional compiler or linker options. The applications used in these configurations have typically been compiled with debug and no optimizations e.g. `gcc -g main.cpp` or similar. The GDB Monitor is used in most cases to detect faults.

2.2. Advanced Configuration

This configuration shows how a user would typically set up Peach Fuzzer to test an application that they have recompiled with various compiler options such as Address Sanitizer (the advanced configurations used in the trial are all compiled this way unless indicated otherwise) and various optimization levels e. g. `gcc -g -O1 -fsanitize=address main.cpp` or similar.

With ASan in use, the GDB Monitor is generally not advised since ASan will terminate the program without sending a signal (e.g. SIGSEGV, SIGABRT, etc.) that the debugger will detect. The Process Monitor is therefore used instead, as it will recognize that ASan has terminated the process for some reason and can gather information from the ASan output in the report for the fault on that particular iteration.

3. Accessing your trial instance

You should have received the following for your trial instance:

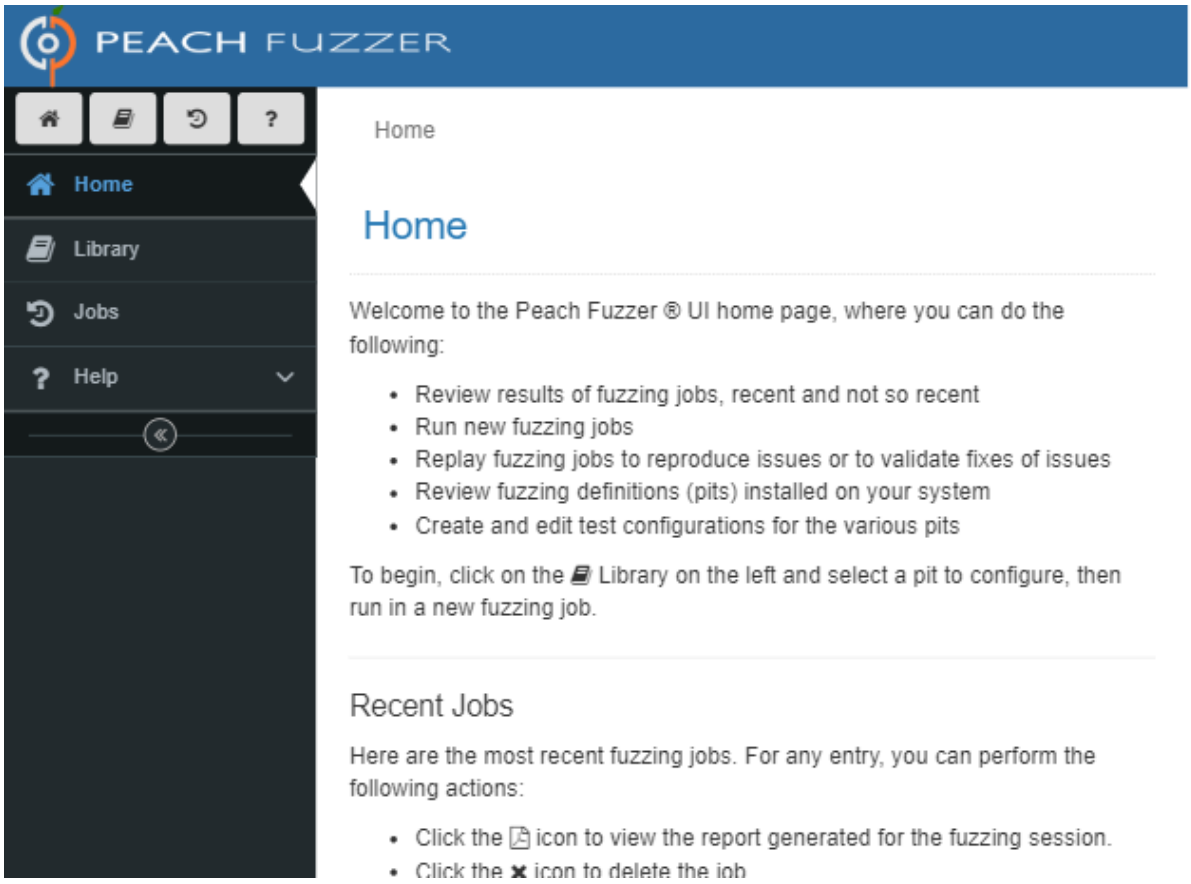
- The URL to access the instance
- The login/password for your trial instance

If you do not have this information, please contact support@peach.tech for assistance.

3.1. Logging in to your trial instance

To log in to your trial instance, follow these steps:

1. Enter the URL into your web browser. It should be something similar to https://mycompany.demo.peach.tech
2. When prompted, enter your credentials.
3. Click "Accept" to accept the license agreement.
4. If prompted a second time for credentials, enter the same credentials you used in step 2.
5. You should now see a screen similar to what is pictured below



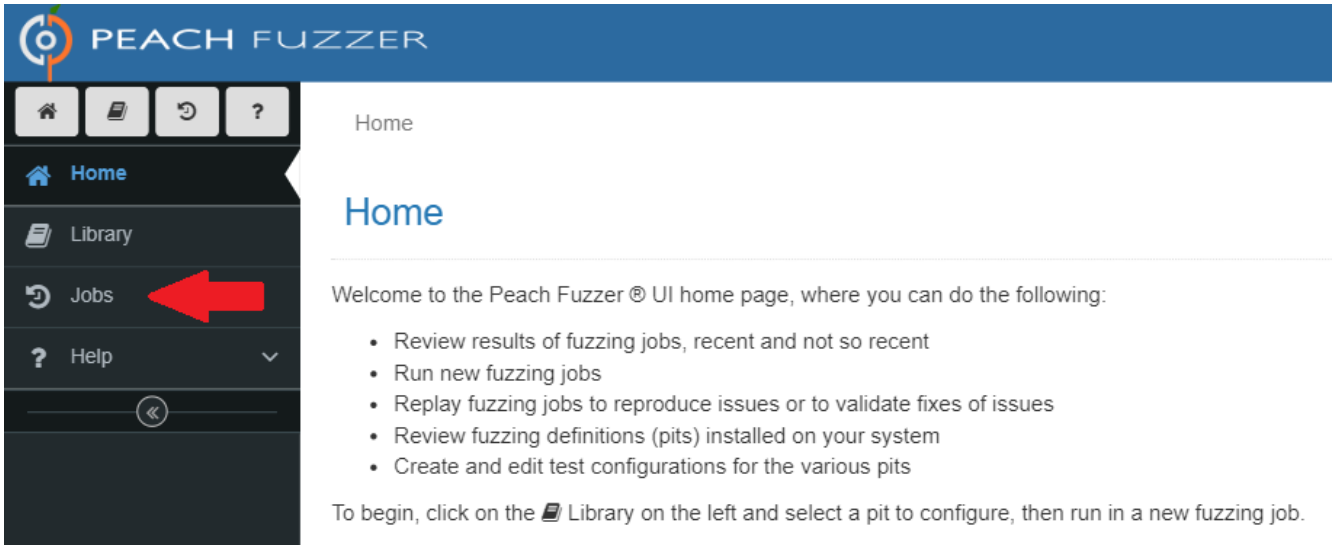
4. Sample Configurations

The following are sample configurations for several different protocols as well as file types that Peach Fuzzer can fuzz. Each sample will already be present and configured on your trial instance. In addition, a test run for each sample is already present on the trial instance so that you can easily view the test results and see the types of faults that Peach Fuzzer can find. You can run the sample configurations with the supplied seed values in this guide. Each section below has instructions for how to set up the sample configuration, including a brief explanation of why Peach Fuzzer has been configured this way for this particular application. It is strongly recommended that you use the supplied values in each section for the **Seed** and **Stop Test Case** (and **Start Test Case** if indicated). These values have been selected to guarantee that you can create a test run that will find faults in the target applications within a few minutes.

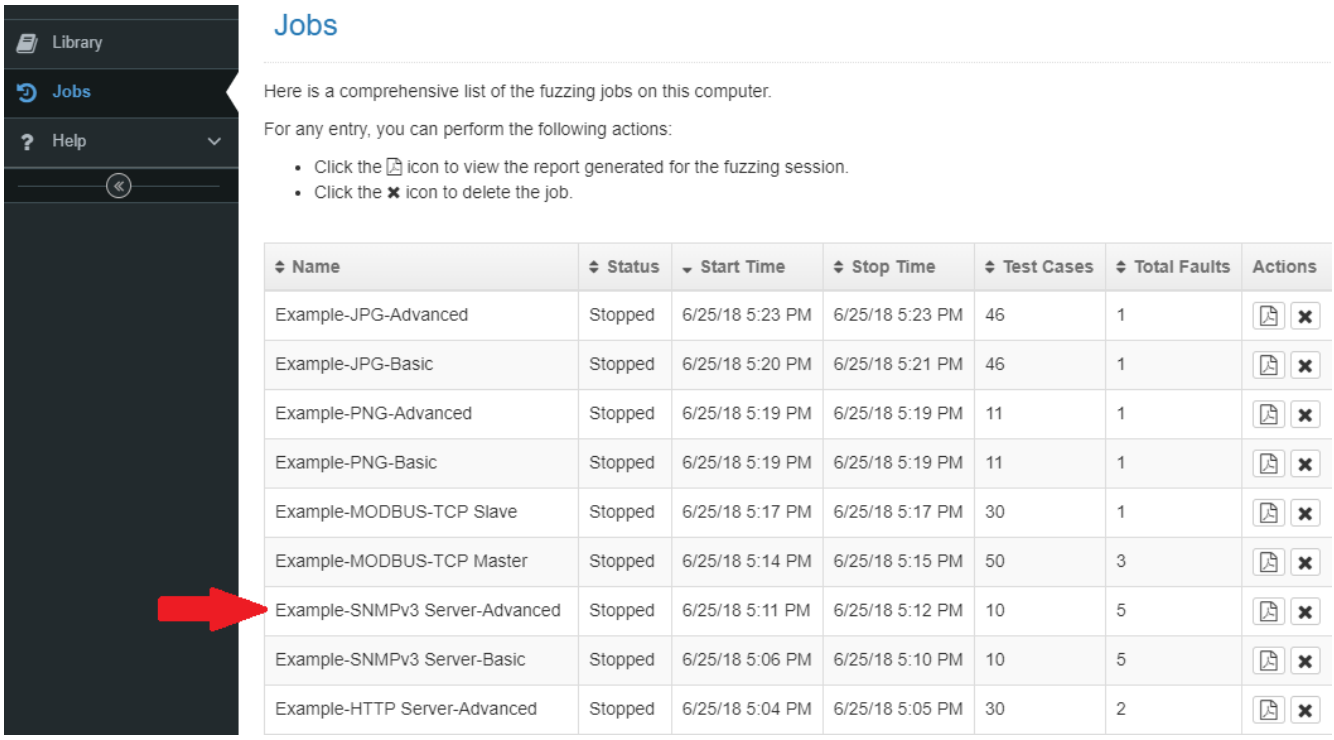
4.1. Viewing the Sample Job Results

Your trial instance already has test runs for each available sample configuration. These can be viewed from the Jobs page. Any additional test runs you perform will be available on the Jobs page. To view the results:

1. From the Home page, click the Jobs tab.



2. Click the job you wish to view from the list of available jobs.

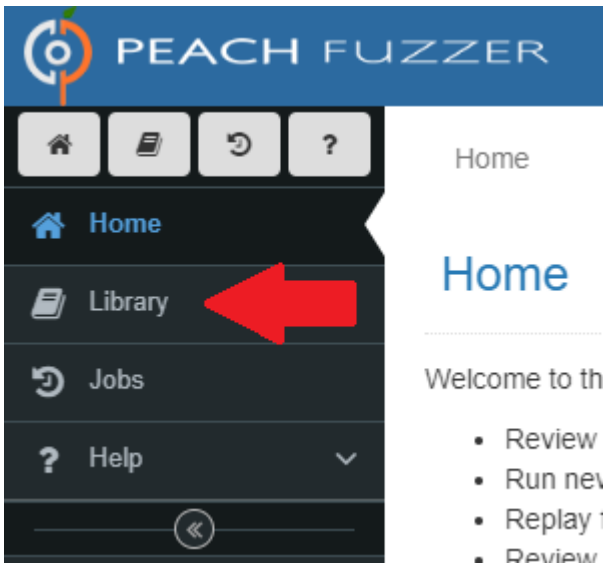


3. The results of the selected job will now be displayed. You can see the overall results which will indicate the parameters with which the job was run and the faults that were found. You can examine the faults individually or download a report that summarizes all of the findings in this job run.

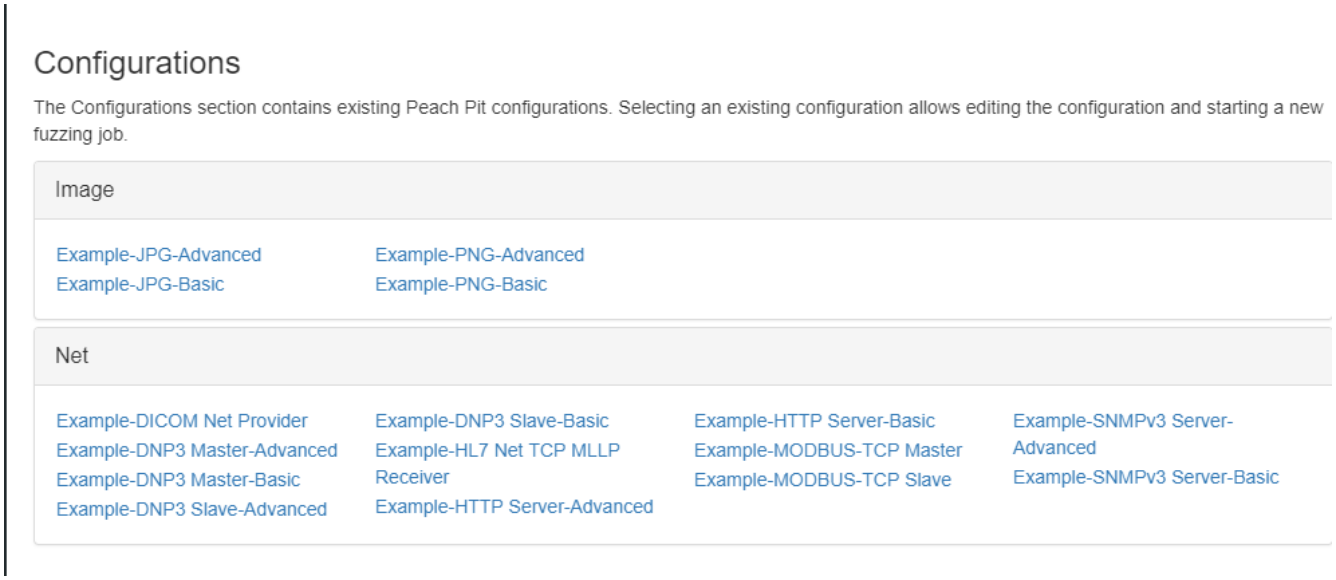
4.2. Running the Samples

To run the pre-configured examples:

1. Click **Library**



2. Under **Configurations**, click the name of the sample configuration that you wish to run



Your trial instance may not have every Configuration pictured here. The exact Configurations available will depend on what Pits are included with your trial license.

3. Enter the appropriate values for **Seed** and **Stop Test Case**.
4. Enter the appropriate value for **Start Test Case** if specified. Otherwise, leave the default of **1**.

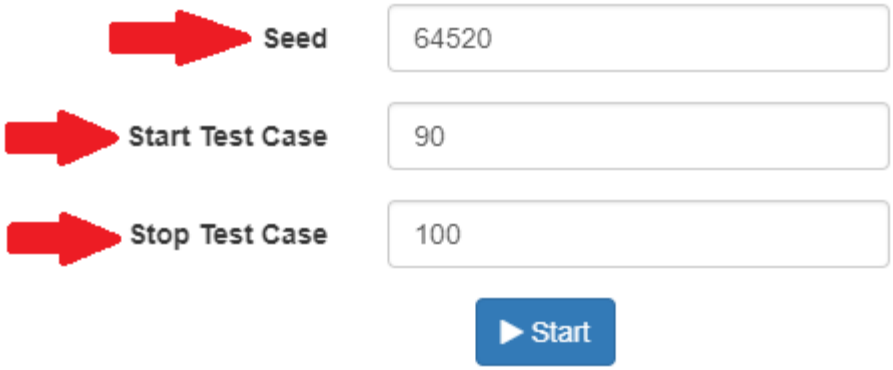
4.3. PNG

This configuration will test an application using PNG. It has two versions, a basic configuration and an advanced configuration. The basic configuration is compiled only with the Debug option. The advanced configuration is compiled with Address Sanitizer, Debug, and Optimization Level 1 options.

4.3.1. Running the test

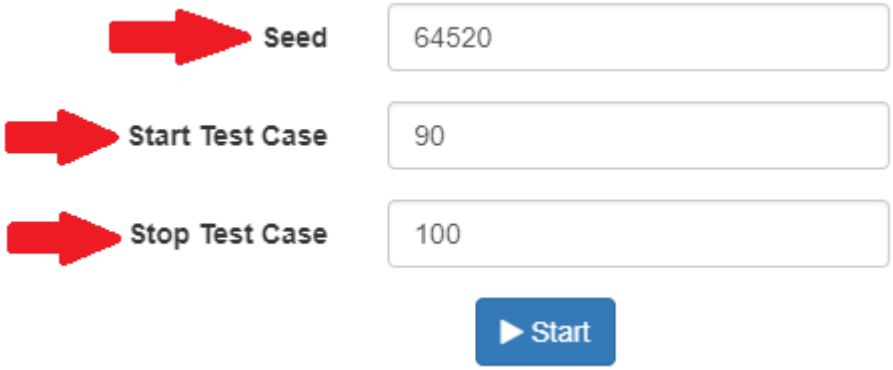
To run the pre-configured basic test:

1. Click **Example-PNG-Basic**.
2. Enter a seed value of **64520**.
3. Enter a Start Test Case value of **90**.
4. Enter a Stop Test Case value of **100**.
5. Click **Start**.



To run the pre-configured advanced test:

1. Click **Example-PNG-Advanced**.
2. Enter a seed value of **64520**.
3. Enter a Start Test Case value of **90**.
4. Enter a Stop Test Case value of **100**
5. Click **Start**.



4.3.2. Configuring the test

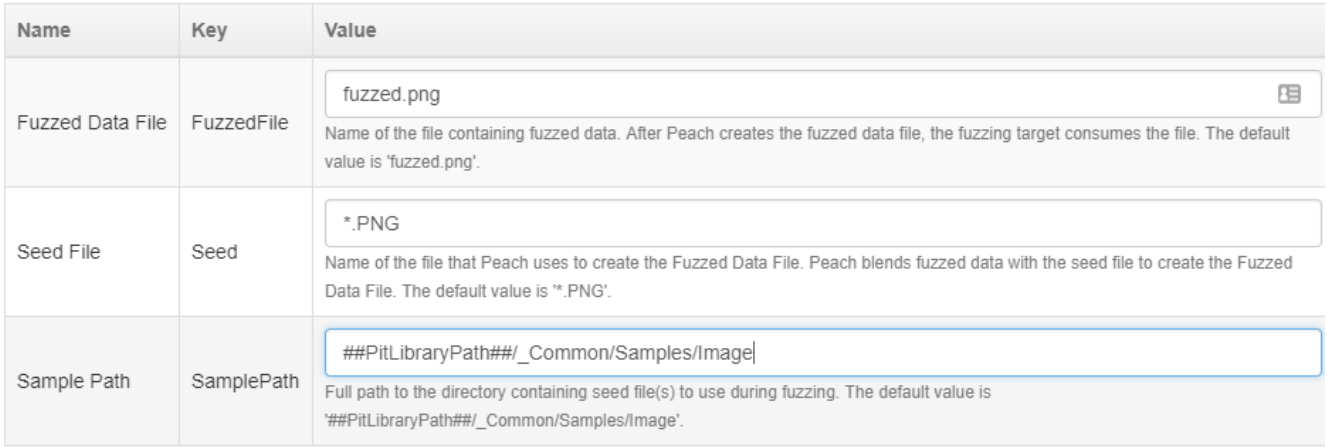
These steps will create the same configuration as is in use in the PNG configuration that is already present on the trial instance. The steps are the same for both the basic and advanced configuration except where indicated. To create the configuration:

1. Click Library and then click **PNG**.
2. Enter a name when prompted and optionally a description, then click **Submit**.

Configuring Variables

The first thing you need to configure are the variables that control how Peach Fuzzer will test the application. Both the Basic and Advanced configuration will use the same variables with the same values. Follow these steps to create a working configuration on your trial instance:

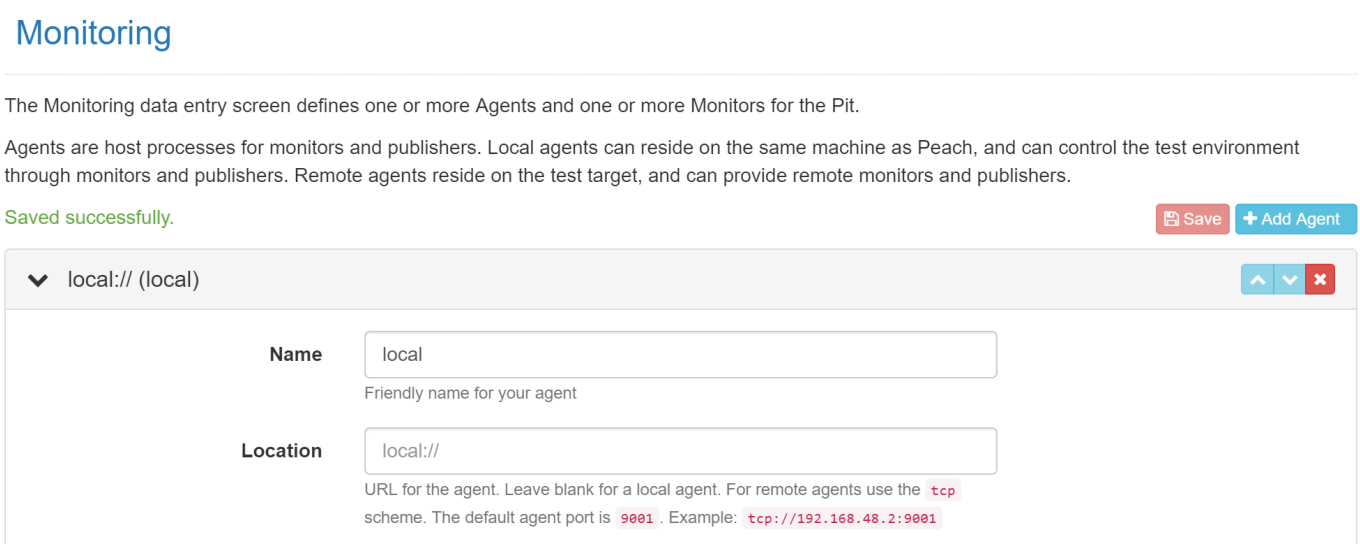
1. Click **Configure Variables**.
2. Configure your variables as appropriate for your application. The following should be used for ImageMagick running on the trial instance:
   a. Fuzzed Data File: leave the default of **fuzzed.png**
   b. Seed File: leave the default of ***.png**
   c. Sample Path: leave the default of **##PitLibraryPath##/_Common/Samples/Image**
   d. Under **Advanced Configuration**, leave all the defaults as they are acceptable for ImageMagick.
   e. Under System Defines, do NOT change any of the values present. These values normally do not require changing.
3. Once all the settings have the desired values, click **Save**.



Configuring Agents

An Agent runs either in-process of Peach Fuzzer or can be installed and run on a remote machine. For this configuration, only a single local agent is required.

1. Click **Monitoring**.
2. Click **Add Agent**.
3. Enter a name. Leave the **Location** setting to the default **local:**//.
4. Click **Save**.



For more detailed instructions, see Adding an agent.

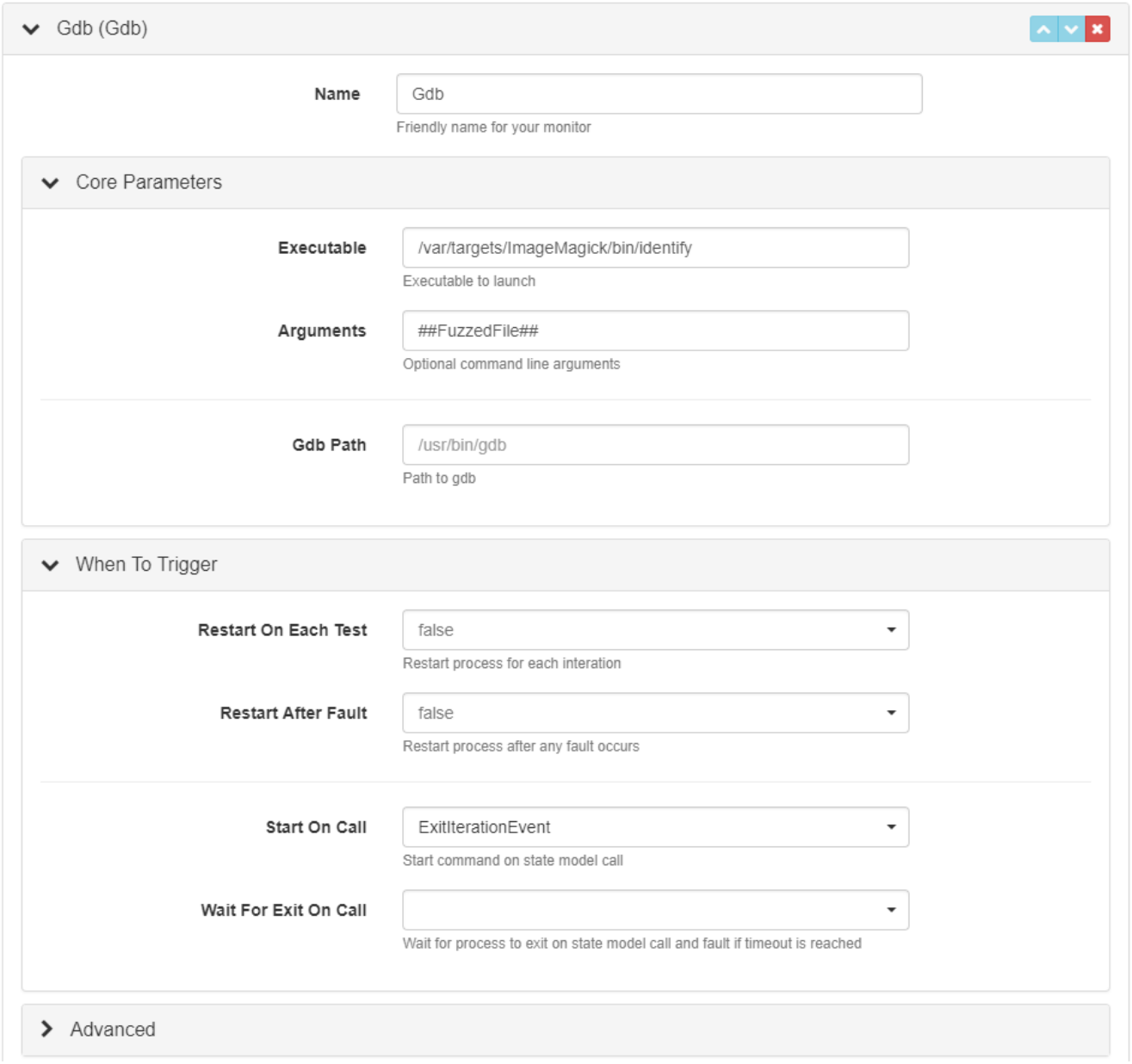
Configuring the monitors for basic

The basic configuration is targeting ImageMagick compiled with Debug enabled. You will therefore want the following monitors:

- **Gdb Monitor**. This will allow Peach Fuzzer to launch ImageMagick from within GDB so that GDB attaches to ImageMagick. Peach Fuzzer will monitor GDB and attempt to analyze any crashes that GDB detects based on receiving signals from the application being tested.

To add and configure the monitors:

1. Click **Add Monitor**. In the pop-up, scroll down and select **Gdb**. Click **Ok**.
2. Under **Executable**, enter **/var/targets/ImageMagick/bin/identify** which is the location of ImageMagick's launcher. This will allow the monitor to launch the application when fuzzing starts. Do not change any of the other settings for this monitor.
3. Under **Arguments**, enter **##FuzzedFile##**.
4. Under **Advanced**, set the value of **Start On Call** to **ExitIterationEvent**. This is important because Peach Fuzzer will normally try to execute the target when the session starts. Because this sample is fuzzing images with an application, the fuzzed image is actually created on each iteration. As a result, the target has to be invoked at the end of the iteration in order to ensure that the fuzzed image has been created and written to a file for the target to process.
5. Click **Save**.



Configuring the monitors for advanced

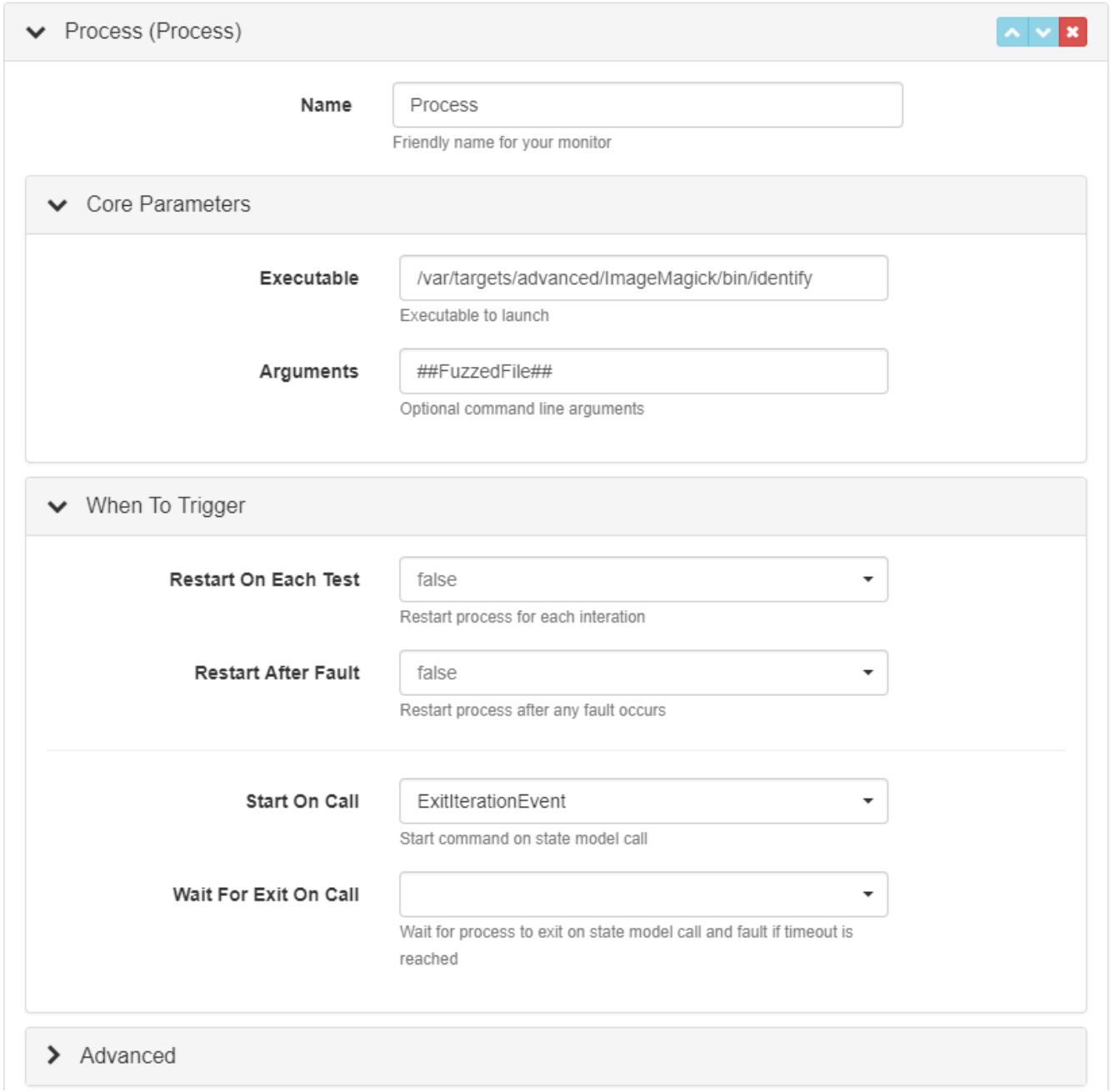
The advanced configuration is targeting ImageMagick compiled with Debug, Address Sanitizer (ASan), and Optimization level 1. You will therefore want the following monitors:

- **Process Monitor**. This will allow Peach Fuzzer to launch ImageMagick. Because ImageMagick is compiled with ASan, the Process Monitor will detect the program exited due to an error and gather the output from ASan about the nature of the crash.

Do not use the GDB Monitor for applications that are compiled with ASan. It is not compatible with ASan.

To add and configure the monitors:

1. Click **Add Monitor**. In the pop-up, scroll down and select **Process**. Click **Ok**.
2. Under **Executable**, enter **/var/targets/advanced/ImageMagick/bin/identify** which is the location of ImageMagick's launcher. This will allow the monitor to launch the application when fuzzing starts.
3. Under **Arguments**, enter **##FuzzedFile##**.
4. Under **Advanced**, set the value of **Start On Call** to **ExitIterationEvent**. This is important because Peach Fuzzer will normally try to execute the target when the session starts. Because this sample is fuzzing images with an application, the fuzzed image is actually created on each iteration. As a result, the target has to be invoked at the end of the iteration in order to ensure that the fuzzed image has been created and written to a file for the target to process.
5. Do not change any of the other settings for this monitor.
6. Click **Save**.



Testing your configuration

You should always test your configuration to ensure that Peach Fuzzer is able to fuzz your application. This will run some control iterations to ensure that your application responds as expected to normal input.

1. Click **Test**
2. Click **Begin Test**
3. Once testing is complete, you will see the results. Correct any errors in your Variables or Monitoring if the test is not successful.
4. Once the test has passed, click **Continue**.

You can now fuzz the application.

Follow the steps under Running the test to start testing the application.

4.4. JPG

This configuration will test an application using JPG. It has two versions, a basic configuration and an advanced configuration. The basic configuration is compiled only with the Debug option. The advanced configuration is compiled with Address Sanitizer, Debug, and Optimization Level 1 options.

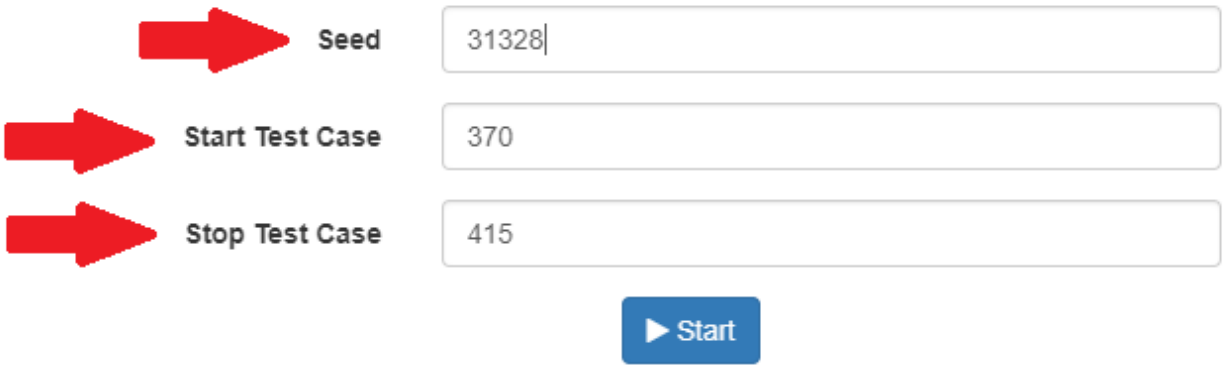
4.4.1. Running the test

To run the pre-configured basic test:

1. Click **Example-JPG-Basic**.
2. Enter a seed value of **31328**.
3. Enter a Start Test Case value of **370**.
4. Enter a Stop Test Case value of **415**.
5. Click **Start**.

To run the pre-configured advanced test:

1. Click **Example-JPG-Advanced**.
2. Enter a seed value of **31328**.
3. Enter a Start Test Case value of **370**.
4. Enter a Stop Test Case value of **415**
5. Click **Start**.



4.4.2. Configuring the test

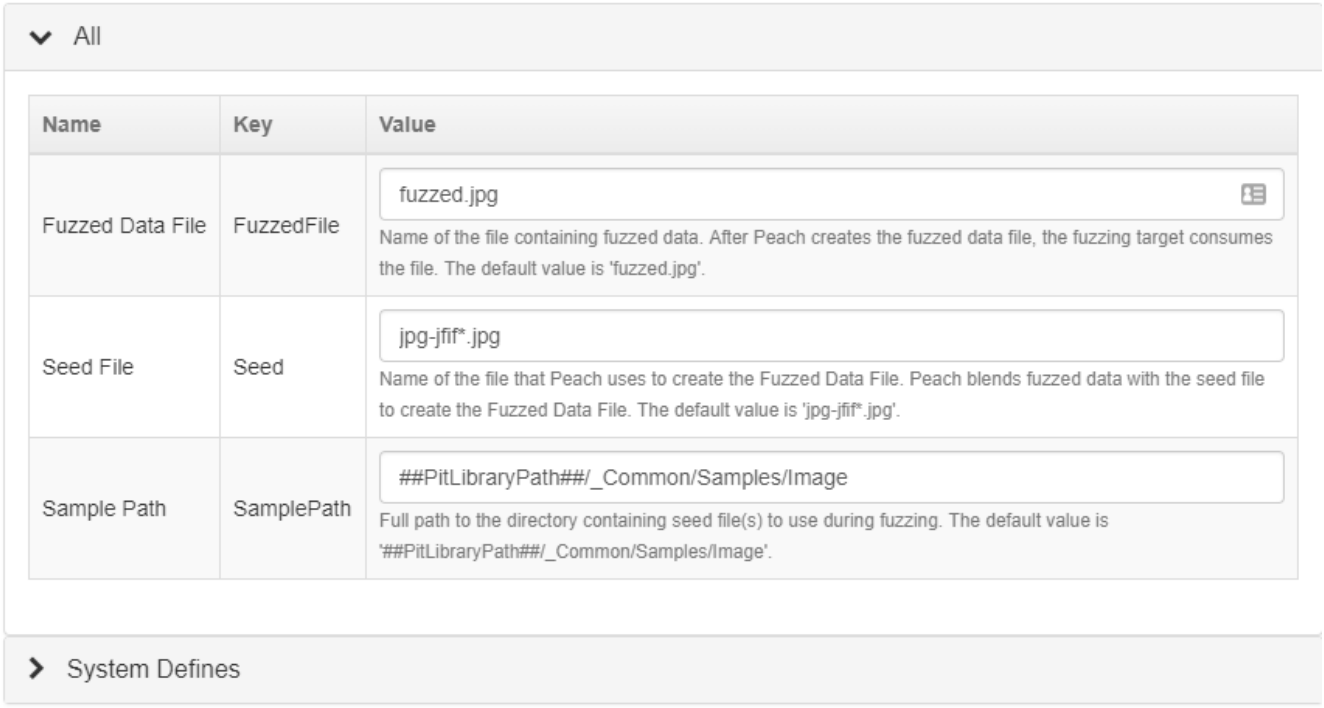
These steps will create the same configuration as is in use in the JPG configuration that is already present on the trial instance. The steps are the same for both the basic and advanced configuration except where indicated. To create the configuration:

1. Click Library and then click **JPG**.
2. Enter a name when prompted and optionally a description, then click **Submit**.

Configuring Variables

The first thing you need to configure are the variables that control how Peach Fuzzer will test the application. Both the Basic and Advanced configuration will use the same variables with the same values. Follow these steps to create a working configuration on your trial instance:

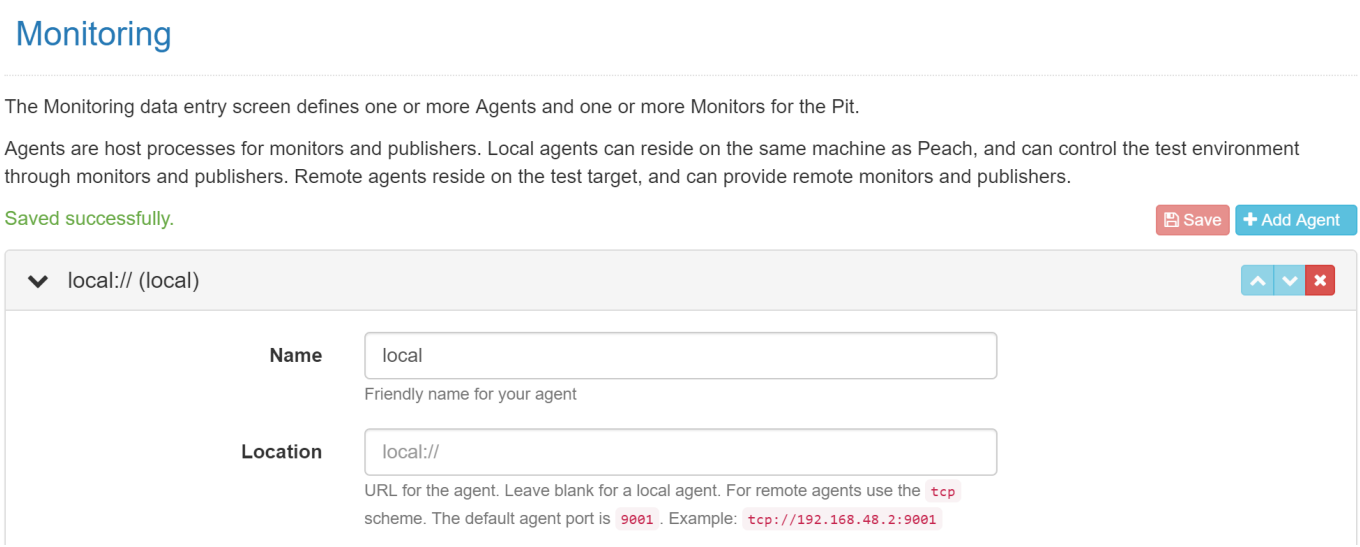
1. Click **Configure Variables**.
2. Configure your variables as appropriate for your application. The following should be used for ImageMagick running on the trial instance:
    a. Fuzzed Data File: leave the default of **fuzzed.png**
    b. Seed File: leave the default of ***.png**
    c. Sample Path: leave the default of **##PitLibraryPath##/_Common/Samples/Image**
    d. Under **Advanced Configuration**, leave all the defaults as they are acceptable for ImageMagick.
    e. Under System Defines, do NOT change any of the values present. These values normally do not require changing.
3. Once all the settings have the desired values, click **Save**.



Configuring Agents

An Agent runs either in-process of Peach Fuzzer or can be installed and run on a remote machine. For this configuration, only a single local agent is required.

1. Click **Monitoring**.
2. Click **Add Agent**.
3. Enter a name. Leave the **Location** setting to the default **local:**//.
4. Click **Save**.



For more detailed instructions, see Adding an agent.

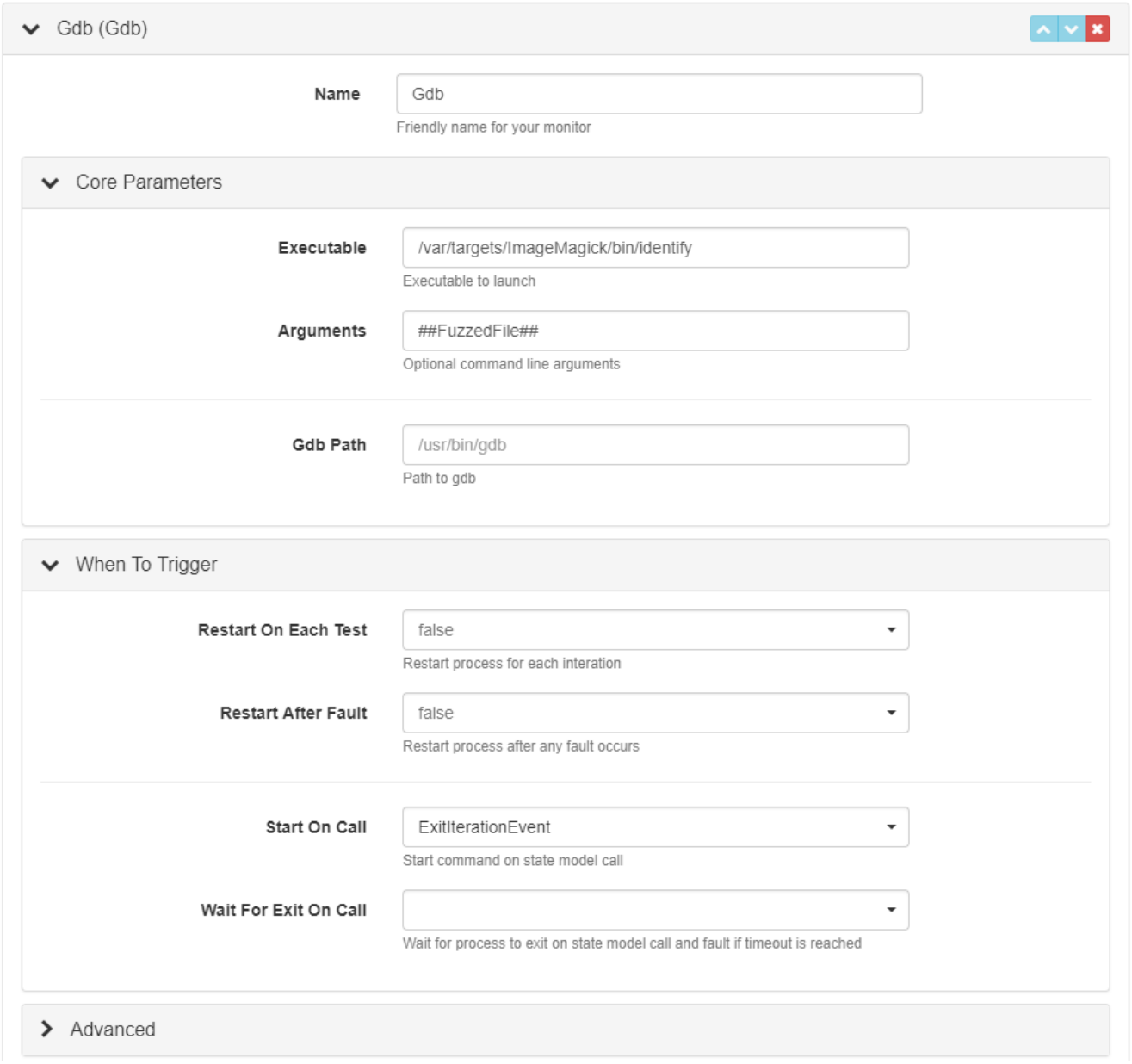
Configuring the monitors for basic

The basic configuration is targeting ImageMagick compiled with Debug enabled. You will therefore want the following monitors:

- **Gdb Monitor**. This will allow Peach Fuzzer to launch ImageMagick from within GDB so that GDB attaches to ImageMagick. Peach Fuzzer will monitor GDB and attempt to analyze any crashes that GDB detects based on receiving signals from the application being tested.

To add and configure the monitors:

1. Click **Add Monitor**. In the pop-up, scroll down and select **Gdb**. Click **Ok**.
2. Under **Executable**, enter **/var/targets/ImageMagick/bin/identify** which is the location of ImageMagick's launcher. This will allow the monitor to launch the application when fuzzing starts. Do not change any of the other settings for this monitor.
3. Under **Arguments**, enter **##FuzzedFile##**.
4. Under **Advanced**, set the value of **Start On Call** to **ExitIterationEvent**. This is important because Peach Fuzzer will normally try to execute the target when the session starts. Because this sample is fuzzing images with an application, the fuzzed image is actually created on each iteration. As a result, the target has to be invoked at the end of the iteration in order to ensure that the fuzzed image has been created and written to a file for the target to process.
5. Click **Save**.



Configuring the monitors for advanced

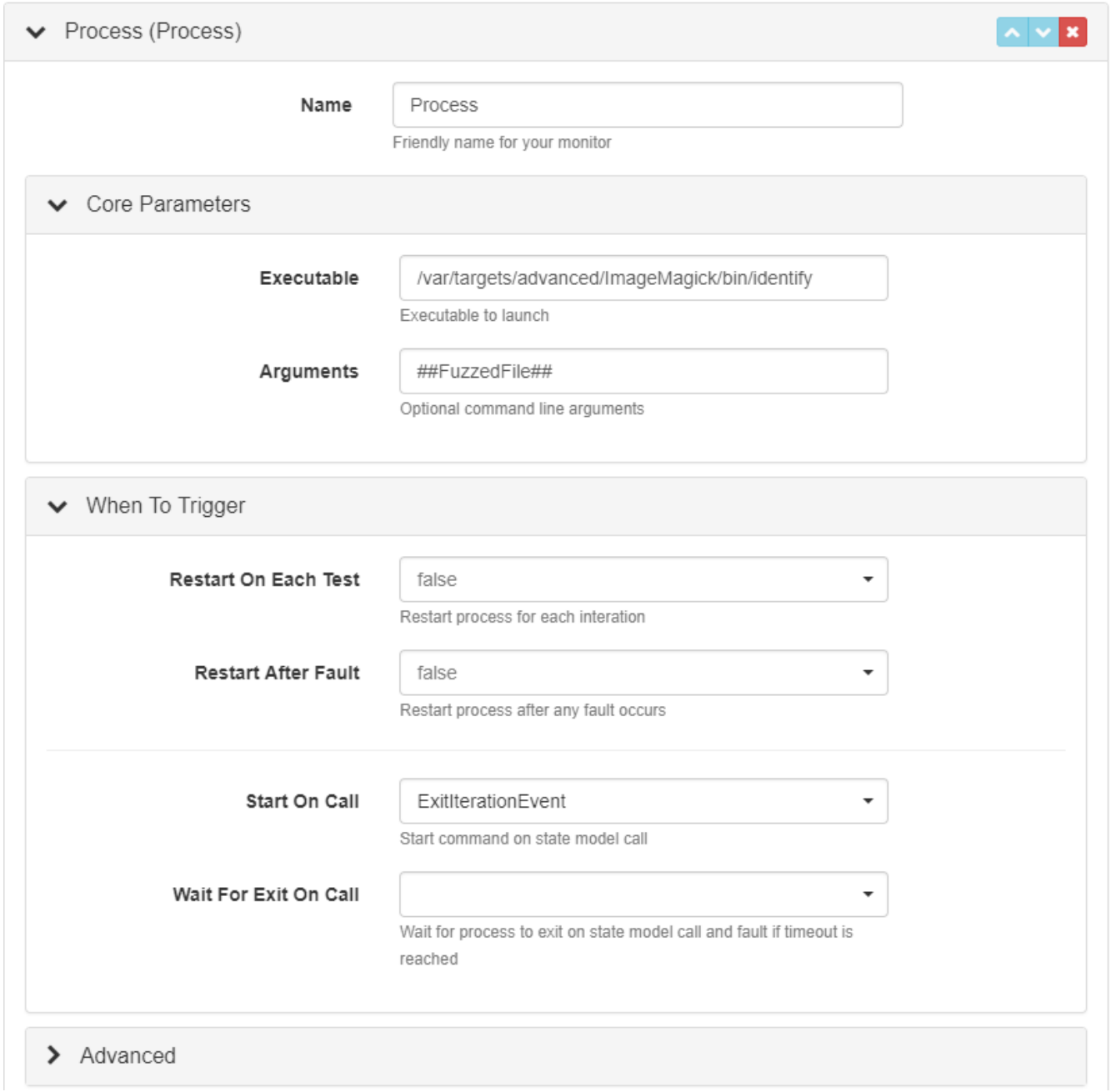
The advanced configuration is targeting ImageMagick compiled with Debug, Address Sanitizer (ASan), and Optimization level 1. You will therefore want the following monitors:

- **Process Monitor**. This will allow Peach Fuzzer to launch ImageMagick. Because ImageMagick is compiled with ASan, the Process Monitor will detect the program exited due to an error and gather the output from ASan about the nature of the crash.

Do not use the GDB Monitor for applications that are compiled with ASan. It is not compatible with ASan.

To add and configure the monitors:

1. Click **Add Monitor**. In the pop-up, scroll down and select **Process**. Click **Ok**.
2. Under **Executable**, enter **/var/targets/advanced/ImageMagick/bin/identify** which is the location of ImageMagick's launcher. This will allow the monitor to launch the application when fuzzing starts.
3. Under **Arguments**, enter **##FuzzedFile##**.
4. Under **Advanced**, set the value of **Start On Call** to **ExitIterationEvent**. This is important because Peach Fuzzer will normally try to execute the target when the session starts. Because this sample is fuzzing images with an application, the fuzzed image is actually created on each iteration. As a result, the target has to be invoked at the end of the iteration in order to ensure that the fuzzed image has been created and written to a file for the target to process.
5. Do not change any of the other settings for this monitor.
6. Click **Save**.



Testing your configuration

You should always test your configuration to ensure that Peach Fuzzer is able to fuzz your application. This will run some control iterations to ensure that your application responds as expected to normal input.

1. Click **Test**
2. Click **Begin Test**
3. Once testing is complete, you will see the results. Correct any errors in your Variables or Monitoring if the test is not successful.
4. Once the test has passed, click **Continue**.

You can now fuzz the application.

Follow the steps under Running the test to start testing the application.

Appendix A: Common Tasks

This section includes more detailed instructions on how to perform the more frequent tasks in this document.

A.1. Adding an agent

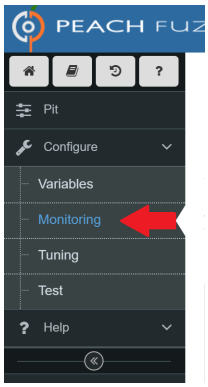
An Agent runs either in-process of Peach Fuzzer or can be installed and run on a remote machine.

It is typically not necessary to configure multiple agents for the same machine. A single agent is capable of running multiple different monitors.

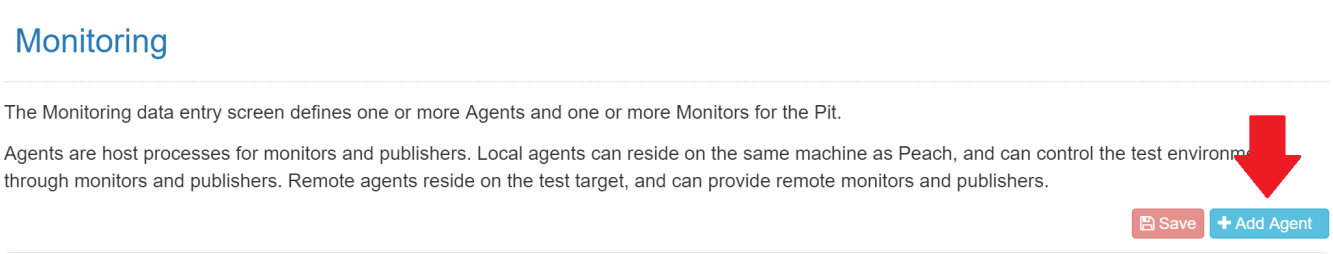
A.1.1. Add a local agent

To add a local agent, follow these steps:

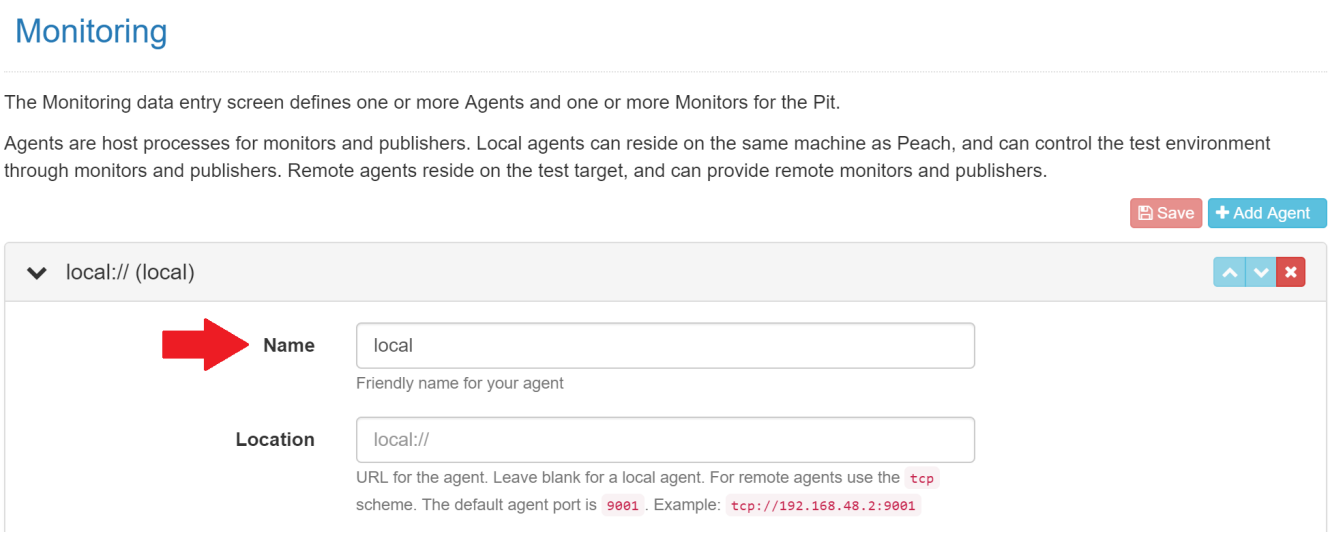
1. Click Monitoring



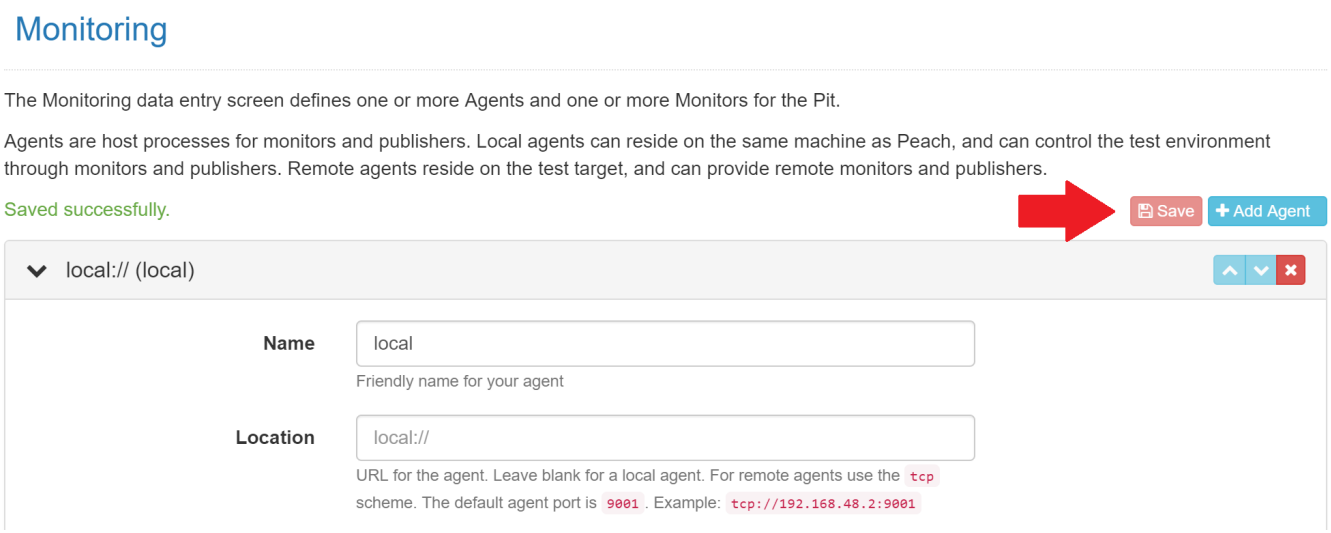
2. Click Add Agent



3. Enter a name for the agent e.g. `Local`. Leave the default value of `local://` for the agent's location.



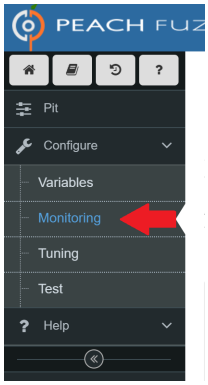
4. Click Save



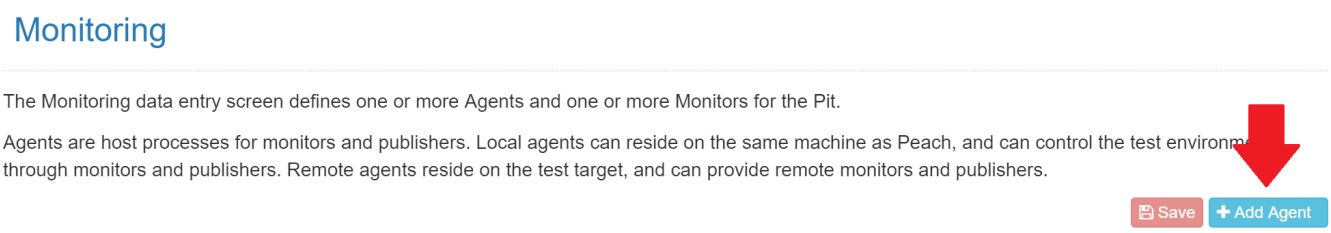
A.1.2. Add a remote agent

Assume you have peachagent running on a host with the IP address 192.168.17.145. To add a remote agent to this host, follow these steps:

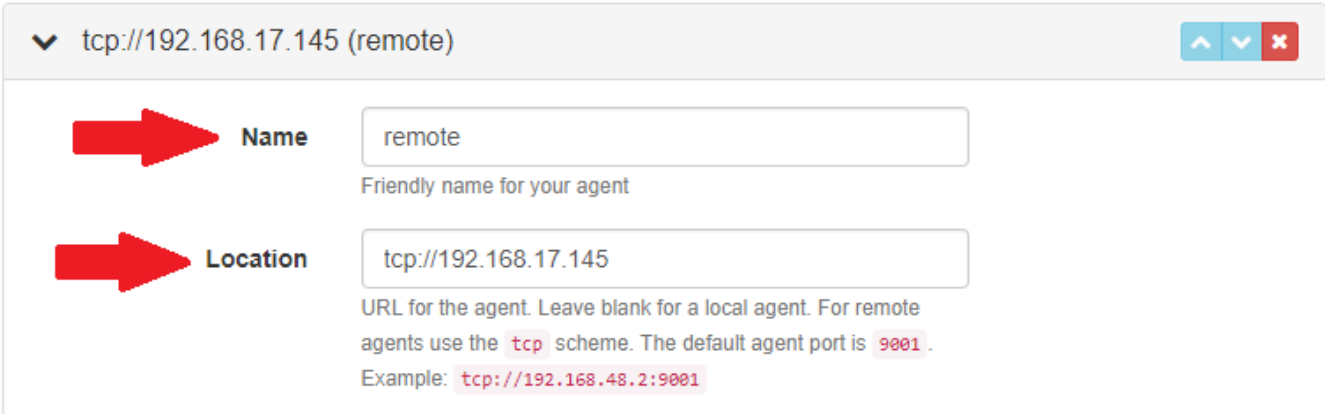
1. Click Monitoring



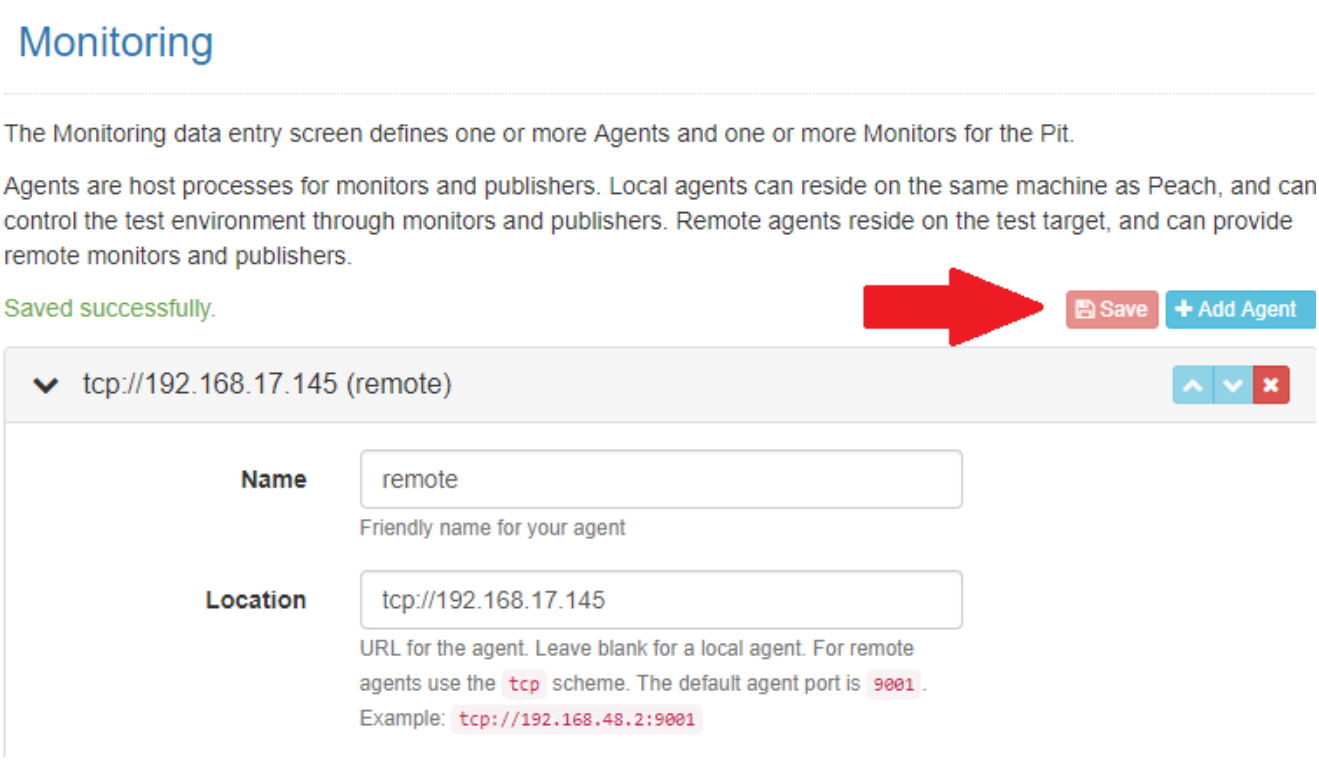
2. Click Add Agent



3. Enter a name for the agent e.g. `Remote`. Use `tcp://192.168.17.145` to indicate the agent is running on the remote host.



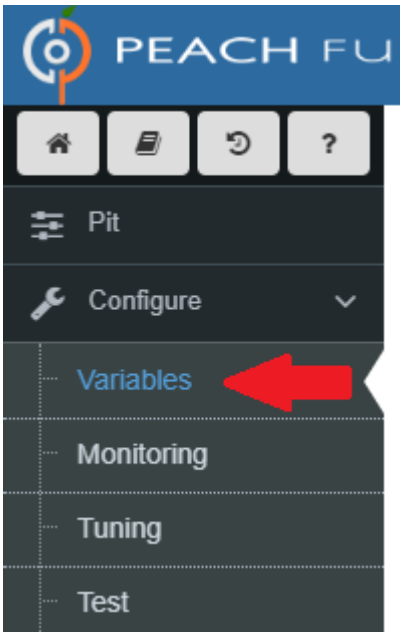
4. Click Save



A.2. Using variables

Peach Fuzzer supports using variables for things such as parameters for monitors and values for other variables. All variables are surrounded by double hash marks e.g. ##. It is generally recommended to use variables whenever possible.

Variables are defined under the **Variables** section of a configuration.



A variable is referred to by its **Key** value in this section. For example, this shows a variable called `TargetPort` that has a value of **20000**.

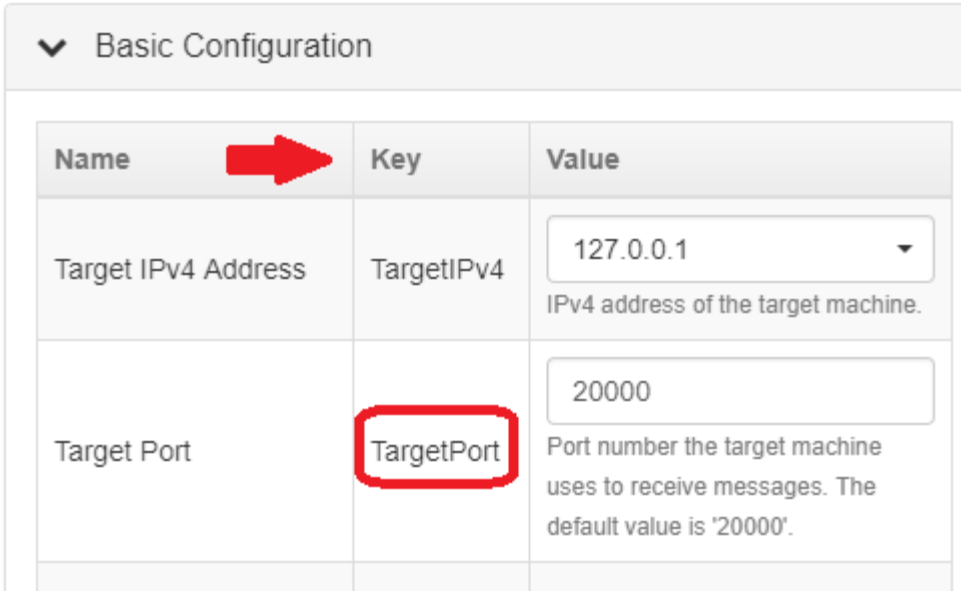


Figure 1. The TargetPort variable is shown here.

This variable could be used anywhere the Target Port is needed, such as an argument passed to the command of a process monitor or a PCAP expression on a Network Capture Monitor. To use the `TargetPort` variable elsewhere in the configuration, reference it as **##TargetPort##**.

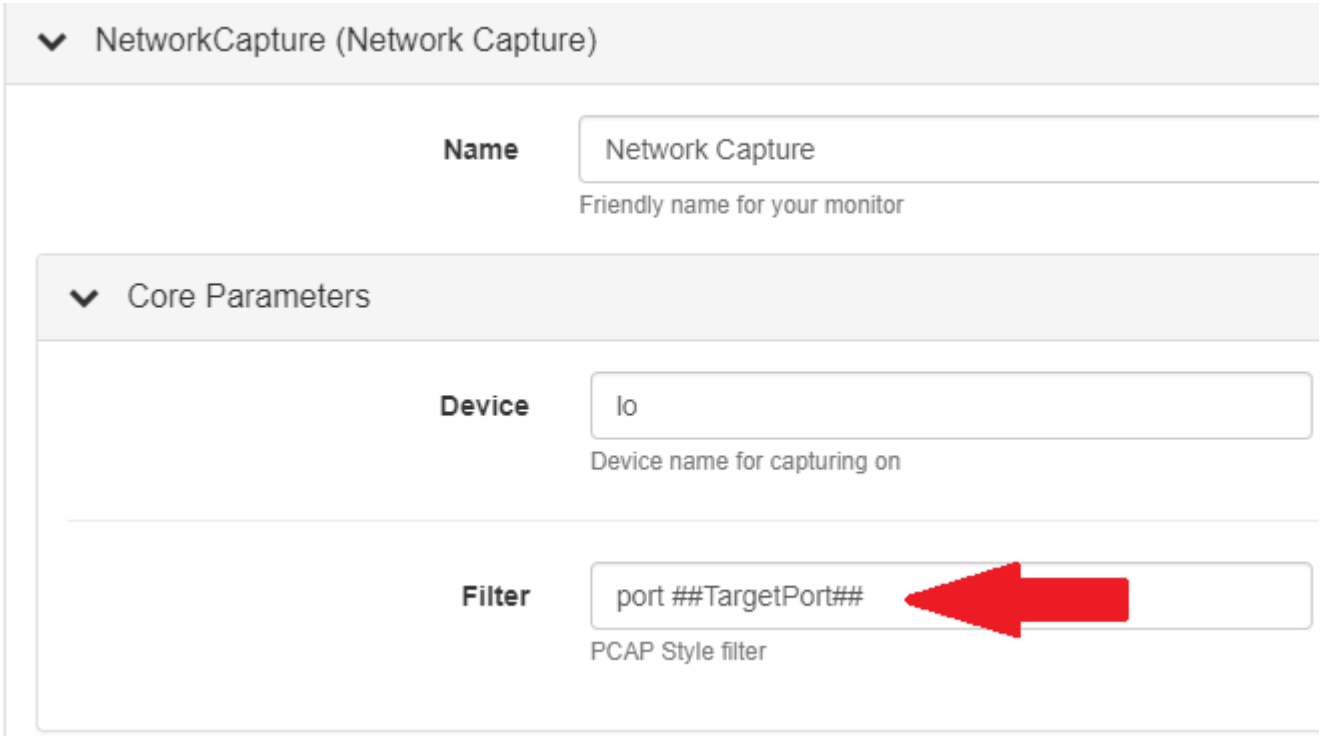


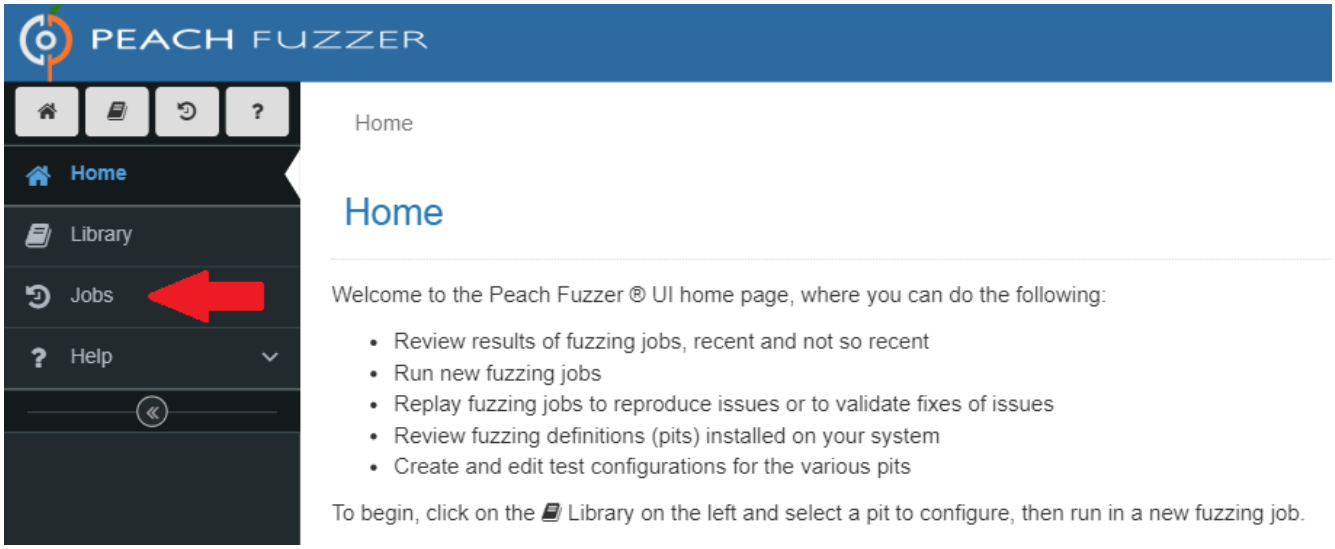
Figure 2. The TargetPort variable is used here to set a Network Capture Monitor to capture all traffic for this configuration. In this example, traffic to and from port 20000 will be captured.

If the vale of a variable changes, it will automatically be applied everywhere the next time the configuration is run.

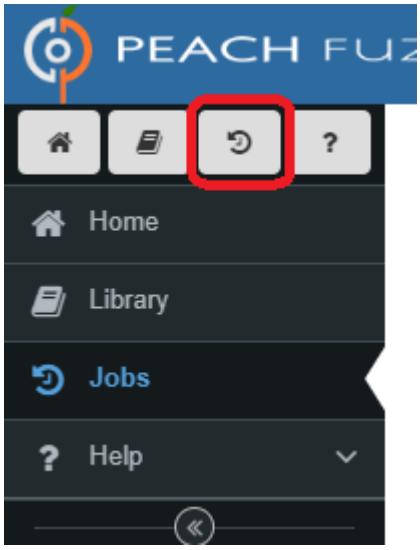
A.3. Examining faults

Each job represents a single test run using a specific configuration. A job will show information on the duration of the job, the settings used to run that job, and the faults that were found. When you run a test on a configuration, a new job is created and you will see all the relevant information for that job. If you wish to view the information on a previous job, you can select a specific job from the Jobs page.

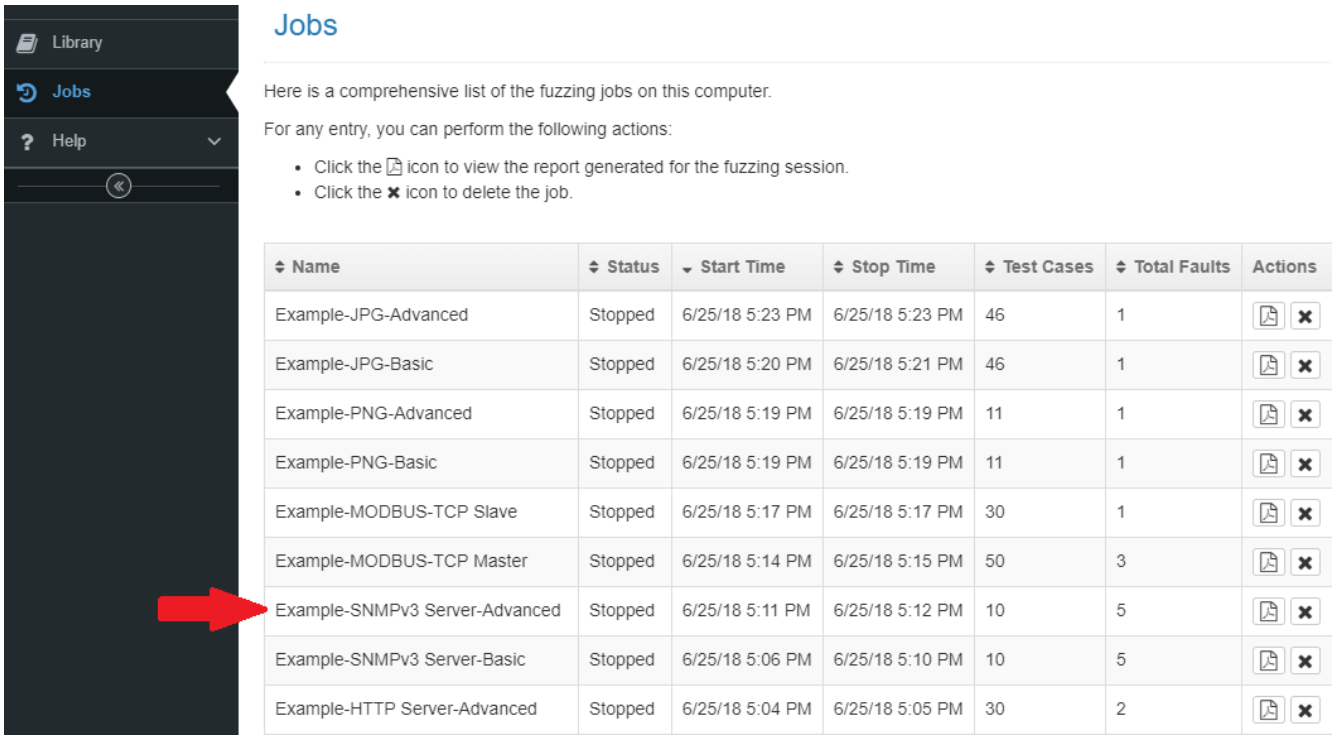
1. First, navigate to the Jobs page by clicking on the Jobs tab



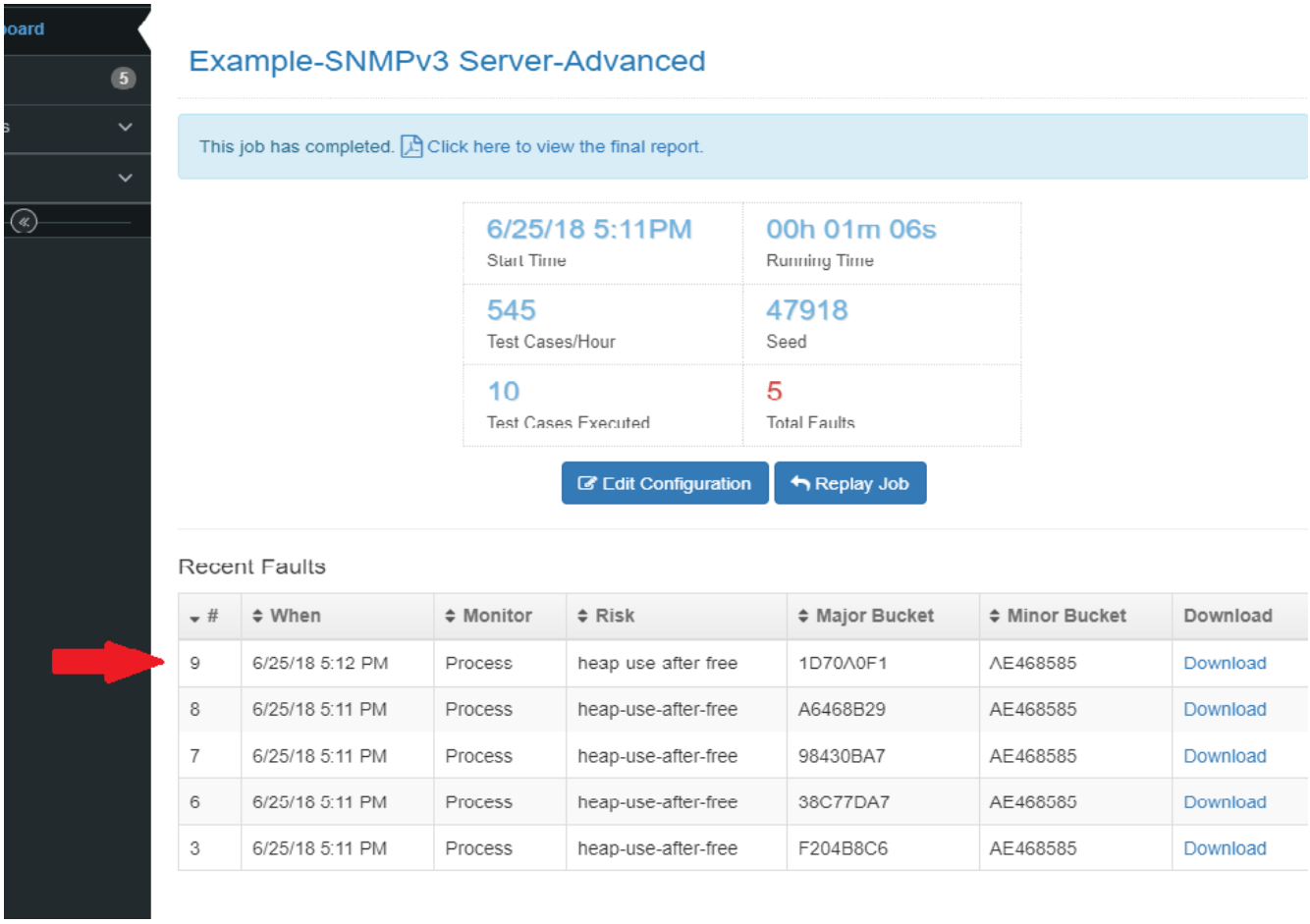
   or by clicking on the Jobs icon



2. Next, select the job you wish to view.

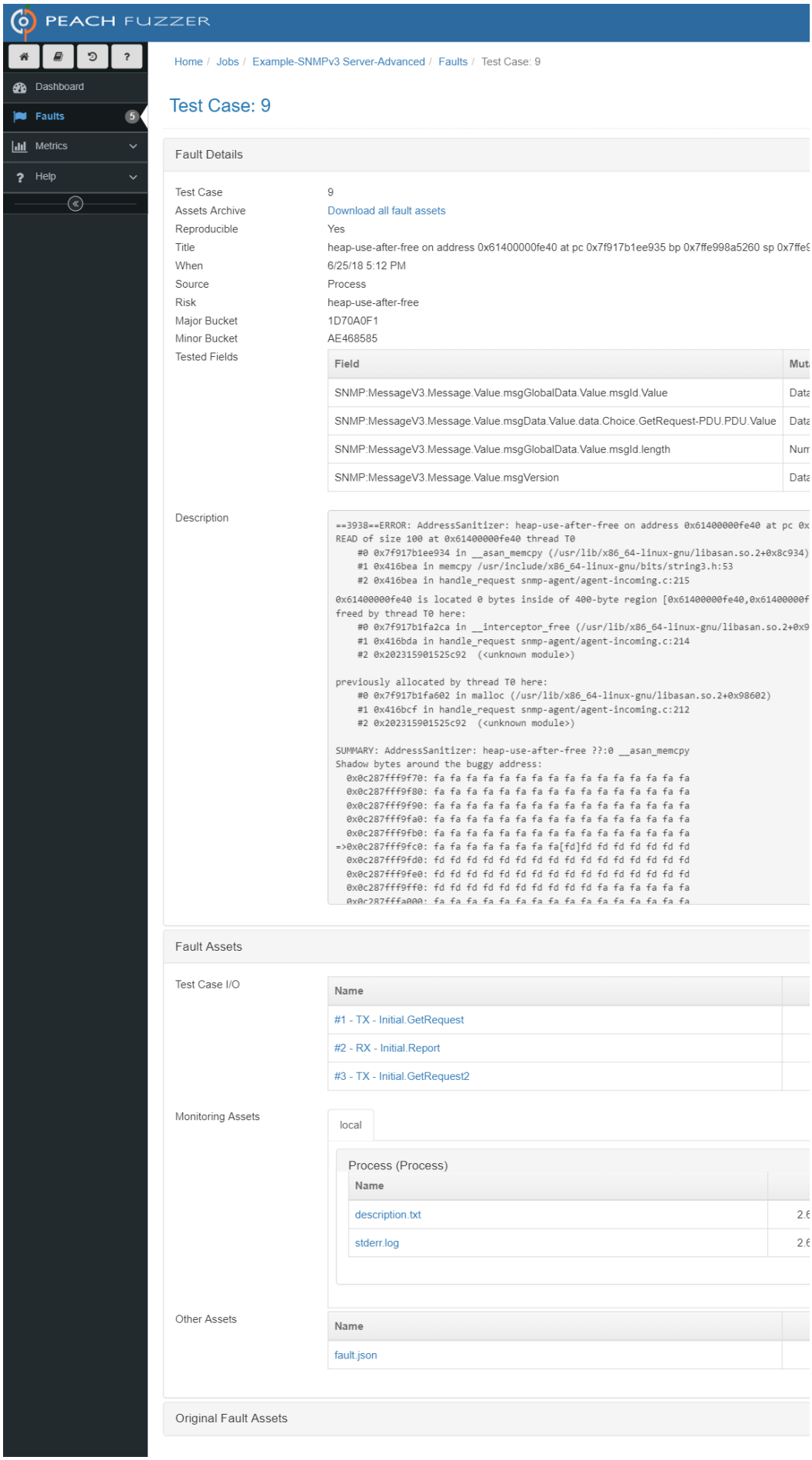


3. The job you selected will now be displayed. Select a fault to view more information.

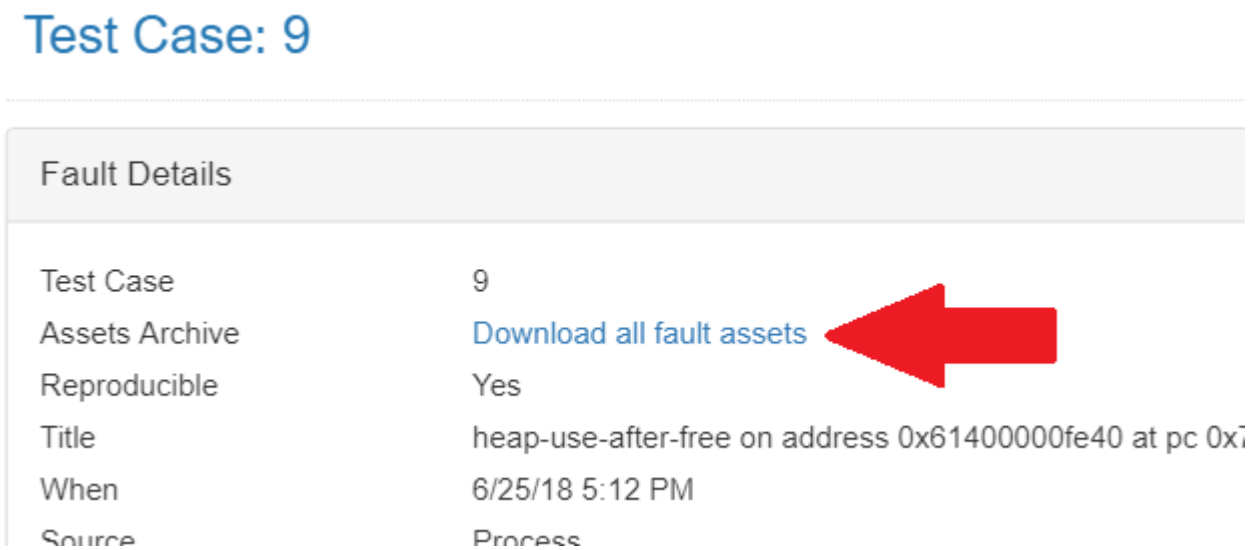


4. The selected fault will contain detailed information about the type of fault, how it was discovered, and the information collected from the various Monitors that were running when the fault

occurred.


PEACH FUZZER
Dashboard
Faults 5
Metrics
Help
Home / Jobs / Example-SNMPv3 Server-Advanced / Faults / Test Case: 9
Test Case: 9
Fault Details
Test Case 9
Assets Archive Download all fault assets
Reproducible Yes
Title heap-use-after-free on address 0x61400000fe40 at pc 0x7f917b1ee935 bp 0x7ffe998a5260 sp 0x7ffe9
When 6/25/18 5:12 PM
Source Process
Risk heap-use-after-free
Major Bucket 1D70A0F1
Minor Bucket AE468585
Tested Fields
Field
SNMP:MessageV3.Message.Value.msgGlobalData.Value.msgId.Value
SNMP:MessageV3.Message.Value.msgData.Value.data.Choice.GetRequest-PDU.PDU.Value
SNMP:MessageV3.Message.Value.msgGlobalData.Value.msgId.length
SNMP:MessageV3.Message.Value.msgVersion
Description
==3938==ERROR: AddressSanitizer: heap-use-after-free on address 0x61400000fe40 at pc 0x
READ of size 100 at 0x61400000fe40 thread T0
#0 0x7f917b1ee934 in __asan_memcpy (/usr/lib/x86_64-linux-gnu/libasan.so.2+0x8c934)
#1 0x416bea in memcpy /usr/include/x86_64-linux-gnu/bits/string3.h:53
#2 0x416bea in handle_request snmp-agent/agent-incoming.c:215
0x61400000fe40 is located 0 bytes inside of 400-byte region [0x61400000fe40,0x61400000f
freed by thread T0 here:
#0 0x7f917b1fa2ca in __interceptor_free (/usr/lib/x86_64-linux-gnu/libasan.so.2+0x9
#1 0x416bda in handle_request snmp-agent/agent-incoming.c:214
#2 0x202315901525c92 (<unknown module>)
previously allocated by thread T0 here:
#0 0x7f917b1fa602 in malloc (/usr/lib/x86_64-linux-gnu/libasan.so.2+0x98602)
#1 0x416bcf in handle_request snmp-agent/agent-incoming.c:212
#2 0x202315901525c92 (<unknown module>)
SUMMARY: AddressSanitizer: heap-use-after-free ??:0 __asan_memcpy
Shadow bytes around the buggy address:
0x0c287fff9f70: fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa
0x0c287fff9f80: fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa
0x0c287fff9f90: fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa
0x0c287fff9fa0: fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa
0x0c287fff9fb0: fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa fa
=>0x0c287fff9fc0: fa fa fa fa fa fa fa fa[fd]fd fd fd fd fd fd
0x0c287fff9fd0: fd fd fd fd fd fd fd fd fd fd fd fd fd fd fd fd
0x0c287fff9fe0: fd fd fd fd fd fd fd fd fd fd fd fd fd fd fd fd
0x0c287fff9ff0: fd fd fd fd fd fd fd fd fd fd fa fa fa fa fa fa
Fault Assets
Test Case I/O
Name
#1 - TX - Initial.GetRequest
#2 - RX - Initial.Report
#3 - TX - Initial.GetRequest2
Monitoring Assets
local
Process (Process)
Name
description.txt
stderr.log
Other Assets
Name
fault.json
Original Fault Assets

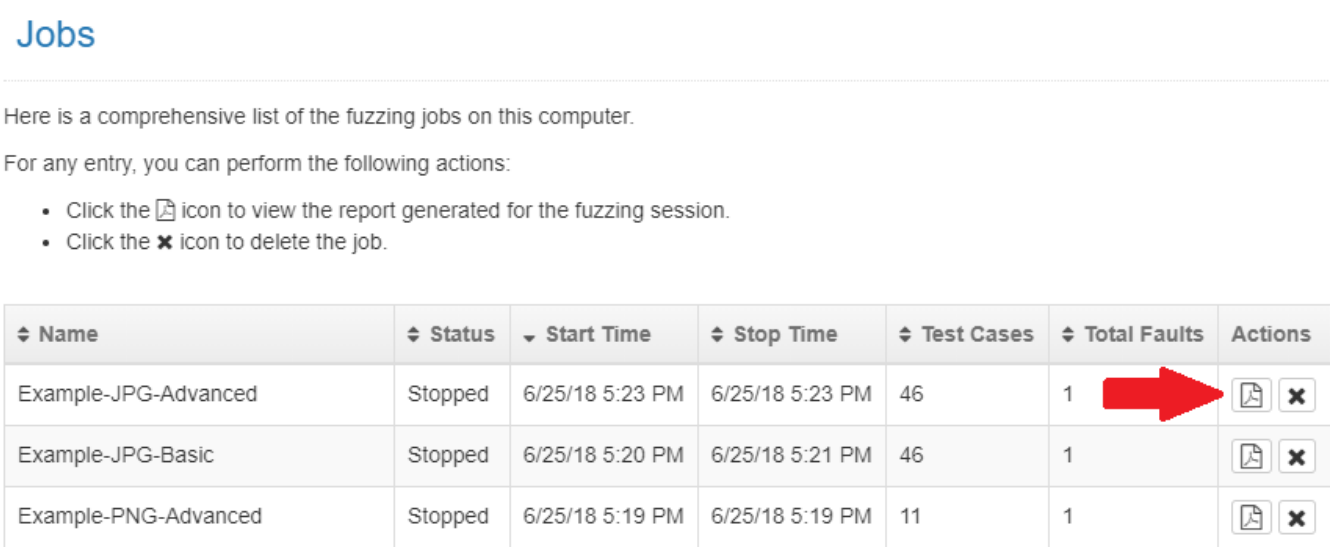
5. You can download all the captured data by clicking **Download all fault assets**.



A.4. Downloading the final report

Each job contains a final report detailing an overview of all the findings from that job. You can access this report several different ways:

- From the Jobs page, click the **Report** icon for any job in the list to download the report for that job



- If you are already viewing a job, click the link at the top of the page

Example-SNMPv3 Server-Advanced

This job has completed. Click here to view the final report.

6/25/18 5:11PM Start Time	00h 01m 06s Running Time
545 Test Cases/Hour	47918 Seed
10 Test Cases Executed	5 Total Faults

Edit Configuration | Replay Job

Recent Faults

#	When	Monitor	Risk	Major Bucket	Minor Bucket	Download
9	6/25/18 5:12 PM	Process	heap-use-after-free	1D70A0F1	AE468585	Download