RWTH Aachen

Process Discovery Using Python (PR)

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User Manual

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Contents

1 Introduction

OPTIS is a standalone Python based web application which aims to minimize time requirements of busines processes. It's customized to work on a single business process (more in section 5.2), for which the user can get custom recommendations. To do that the OPTIS app uses a neural network trained with RL-techniques. The network can recommend the optimal next activity for any active case the user has in their event log. Furthermore OPTIS has the option of generating and exporting an event log from a simulation model based on the previously mentioned business process.

(a) OPTIS Logo

(b) OPTIS Icon

Figure 1: The OPTIS Logo and Icon

2 Quickstart

This quickstart aims to give a short overview about what a user can do while using OPTIS. The general user flow of the web application looks like this:

1. Ensure that you have already installed Docker on your machine and that you have an up-to-date browser. (See Section 3.)
2. Start OPTIS. (See Section 3.)
3. Once you're on the Home Page, click on the "*Optimize now!*" button to get started.
4. Optional: Choose if you want to generate a .xes or .csv file and choose a Start and End Date and Time. Then download the generated event log.
5. Upload your own event log (or the one you generated before).
6. You will see the first 15 rows of your uploaded event log. Check if it's the right one. Go to the next page.
7. Optional: Choose a case using the lower drop-down menu and click the button below to preview the selected case.
8. Choose the case you want to optimize from the upper drop-down menu.
9. Start the optimization by clicking the button.
10. After a few seconds you will get to the results-page and see the optimal solution.
11. Go back to the homepage to optimize another case of another event log.
12. Optional: click "*Info*" in the navigation bar to see some information about OPTIS.
13. At any time you can click on "*Home*" in the navigation bar to go back to the homepage.

3 Installation

Prerequisites

The OPTIS web application can be launched on any computer with an up-to-date modern operating system. In order to launch the OPTIS web application you need to have Docker installed on your computer. For Docker installation please refer to the Docker documentation. You will also need a reasonably up-to-date browser version.

Docker Deployment

To launch the OPTIS app using Docker do the following steps:

1. Clone the source code of the project from GitLab. (GitLab/OPTIS)
2. From the project's root directory run the following command in a terminal of your choice:

```
1        docker image build -t optis_docker .
```

3. Run the following command and the web app will be available on port 5000:

```
1        docker run -p 5000:5000 -d optis_docker
```

4. Open http://localhost:5000/ in a browser of your choice.

Run Locally

To launch the OPTIS app locally do the following steps:

1. Clone the source code of the project from GitLab. (GitLab/OPTIS)
2. From the project's root directory run the following commands in a terminal of your choice:

```
1        cd Frontend
2        python main.py
```

3. Open http://localhost:5000/ in a browser of your choice.

4 Documentation

You can read the documentation of the backend functionalities by cloning the project repository (as described in Section 3) and opening "Backend/docs/_build/html/index.html".

5 Web Application

5.1 Home Page

After launching the web app, you will find yourself at the home page (Figure 2).

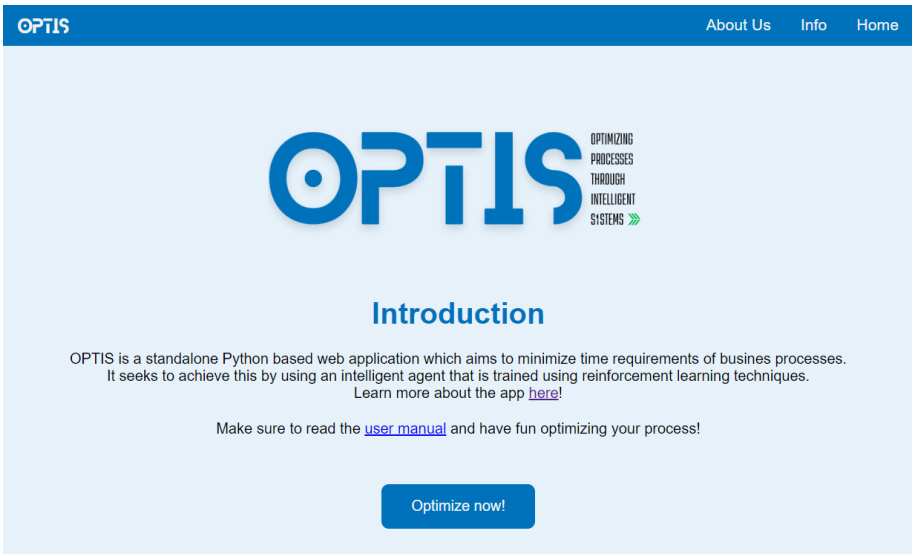


Figure 2: Home Page

There are three different pages that you can access through the navigation bar. These pages are:

- Home page (where you are now)
- About Us page
- Info page (Figure 4)

You can also access this user manual from the hyperlink in the Introduction section of the Home page.

To get started you have to click the "*Optimize now!*" button (Figure 3).

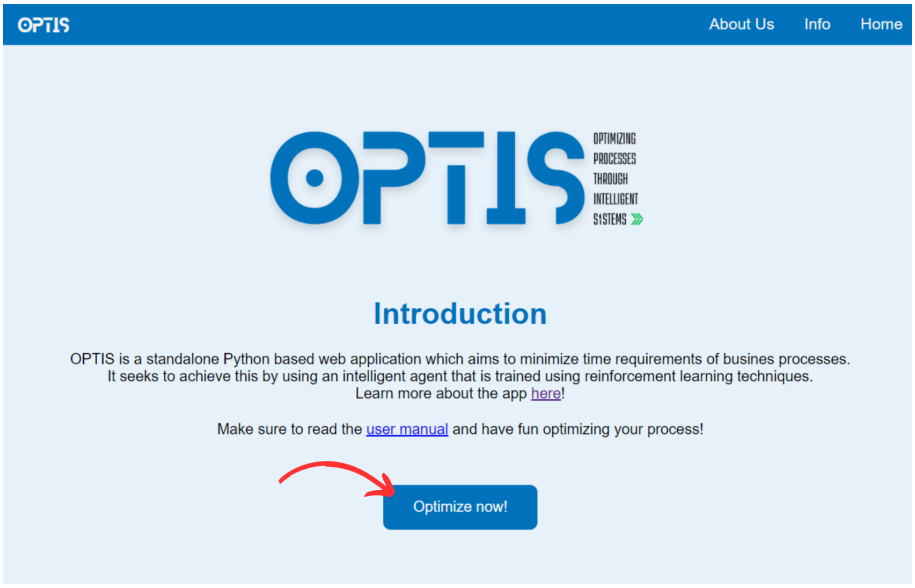


Figure 3: Home Page

5.2 Info Page

We've created an Info page (Figure 4) to help you understand our application better. You can find a brief explanation of what the application does and how it works with some small examples on the Info page. It's always accessible by clicking on the "*Info*" button located on the top right of the Navigation Menu.

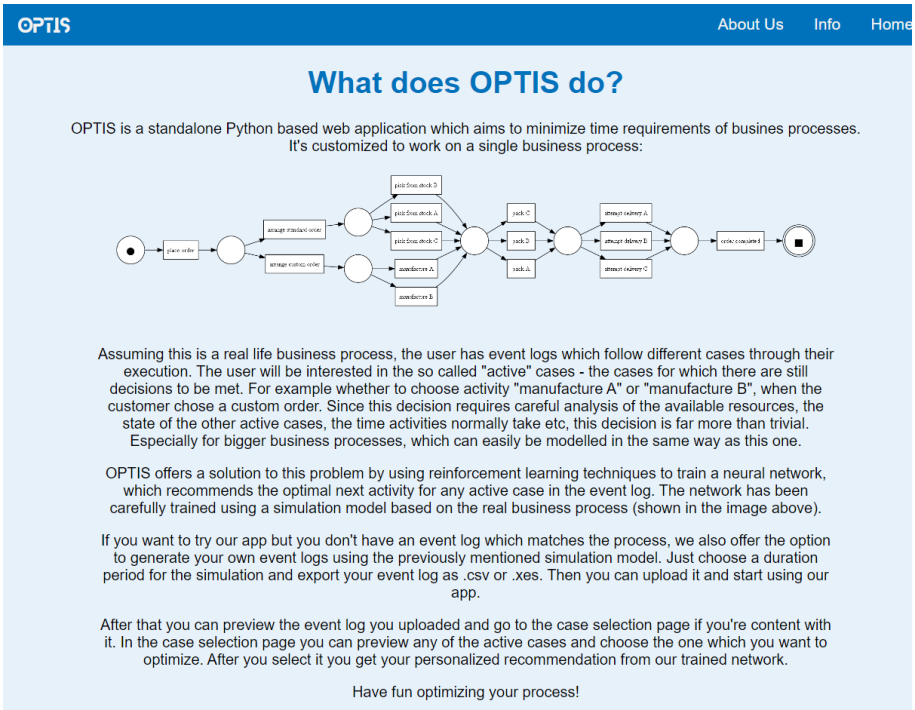


Figure 4: Info Page

5.3 About Us Page

Here you can get some information about the project and our team.

5.4 Start Page

After clicking the "*Optimize now!*" button you will be guided to the Start page (Figure 5). There you have two options: you can either directly start with optimizing a case of your own event log or you can generate a new event log of the given business process. We recommend you to do the second option (generating an event log) first, if you don't have a fitting event log yet.

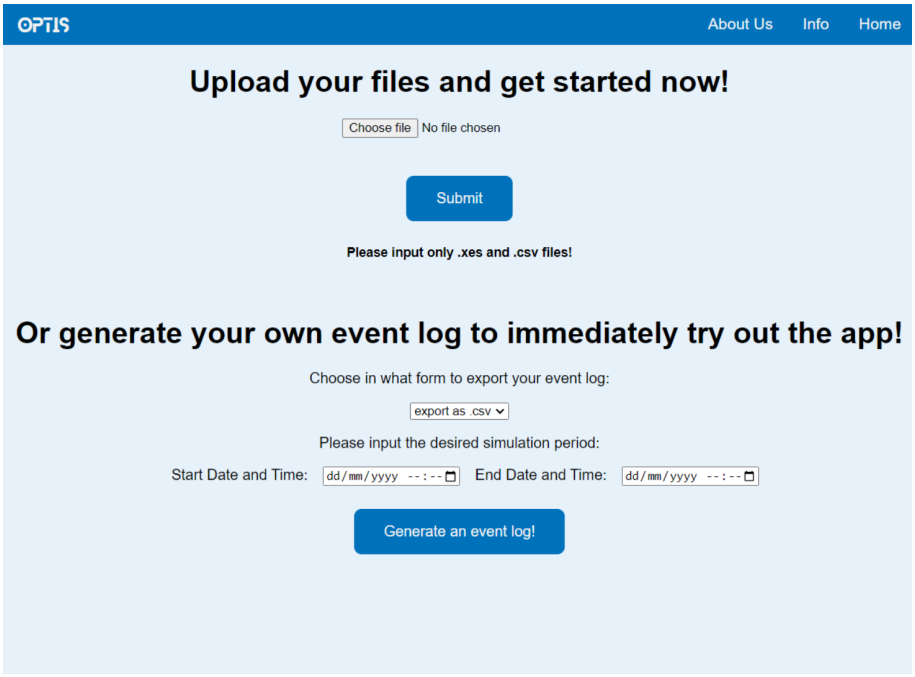


Figure 5: Start Page

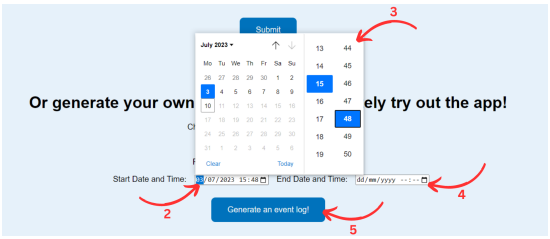
Generate your own eventlog:

To generate your own event log you have to choose the export format (Figure 6a). You have to click on the drop down menu (as shown in 1) to see the options. Then you can either select to export as a .csv-file or as a .xes-file. After that you have to select the time interval for which the simulation should generate the event log (Figure 6b).:

2. First you have to click at the field next to "Start Date and Time".
3. A calendar will pop up. There you can choose a day (on the left side) and a time (on the right side).
4. You have to do the same (step 2 and 3) for the End Date and Time.
5. After you filled everything out you can press the button "*Generate an event log*" and the download will begin. The file will appear in your download-folder.

Note: Don't worry, if you fill in an invalid Start and End Date and Time, a warning will appear.

(a) Export Format Selection Menu



(b) Date and Time Selection Menu

Figure 6: Event Log Generator

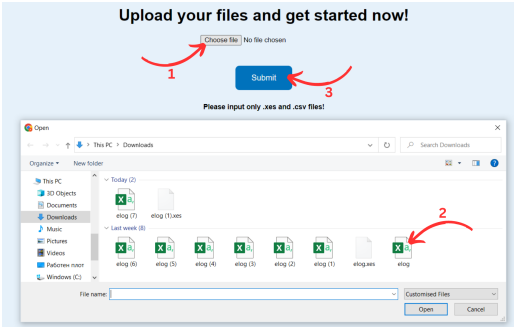
Start to optimize:

First you have to upload an event log (you can use the one you generated before for example), which is visualized in Figure 7.

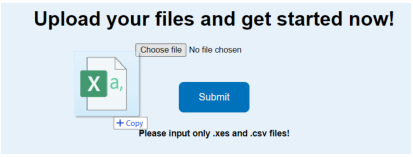
To upload from your File System (Figure 7a), you have to click *"Choose file"* (as shown in 1). Your own file system will pop up and you have to navigate to the file you want to upload. Choose it and click on *"open"* (2). Then the name of your file will appear next to *"Choose file"* instead of "No file chosen". To start the optimization press the button *"Submit"* (3).

You can also upload through Drag and Drop (Figure 7b). For that just drag the file you want to upload and drop it above the *"choose file"* button. After that you can click at *"Submit"* to start the optimization.

Note: Don't worry, if you upload an empty file or a file of a different format, a warning will appear.



(a) Upload from the User's File System

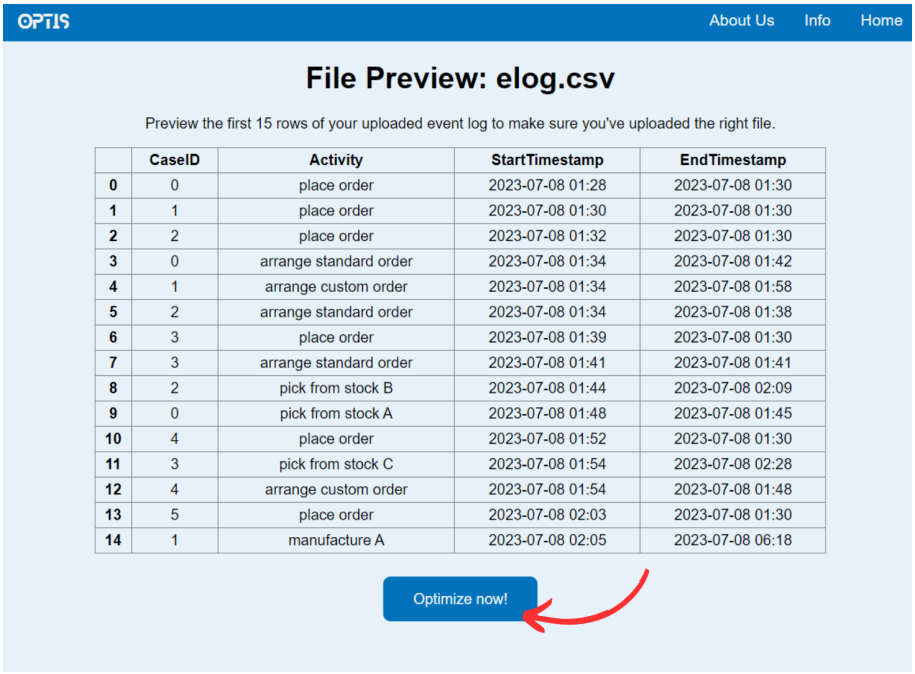


(b) Upload through Drag and Drop

Figure 7: Upload Functionality

5.5 File Preview Page

This page previews the first 15 row of the event log file you have uploaded. If you've made sure that you've uploaded the correct file, you can immediately click on *"Optimize now!"* to optimize your event log (See Figure: 8). If you want to upload another event log, you can return to the home page to upload a new event log.



	CaseID	Activity	StartTimestamp	EndTimestamp
0	0	place order	2023-07-08 01:28	2023-07-08 01:30
1	1	place order	2023-07-08 01:30	2023-07-08 01:30
2	2	place order	2023-07-08 01:32	2023-07-08 01:30
3	0	arrange standard order	2023-07-08 01:34	2023-07-08 01:42
4	1	arrange custom order	2023-07-08 01:34	2023-07-08 01:58
5	2	arrange standard order	2023-07-08 01:34	2023-07-08 01:38
6	3	place order	2023-07-08 01:39	2023-07-08 01:30
7	3	arrange standard order	2023-07-08 01:41	2023-07-08 01:41
8	2	pick from stock B	2023-07-08 01:44	2023-07-08 02:09
9	0	pick from stock A	2023-07-08 01:48	2023-07-08 01:45
10	4	place order	2023-07-08 01:52	2023-07-08 01:30
11	3	pick from stock C	2023-07-08 01:54	2023-07-08 02:28
12	4	arrange custom order	2023-07-08 01:54	2023-07-08 01:48
13	5	place order	2023-07-08 02:03	2023-07-08 01:30
14	1	manufacture A	2023-07-08 02:05	2023-07-08 06:18

Figure 8: File Preview Page

Case Selection and Case Preview Page

After you've uploaded your file now you are ready to start optimizing your event log.

On the Case page (Figure 9) you will find two drop-down menus which contain the case-IDs of all active cases found in the event log.

You can preview a case before optimizing it by utilizing the lower drop-down menu (1). Pick the case-ID of the case which you want to preview, then click on "*Preview this case*"(2). It will show you a preview of the selected case. (See Figure 10). The preview contains:

A: a table containing all events which happened in this case.

B: a petri-net representation of the process, where the trace of the case is colored in blue.

You can also directly optimize your case (See Figure 11):

1. Click on the drop-down menu.
2. Pick the case-ID of the case you want to optimize.
3. Click on "*Optimize Now!*"

For the optimal user experience we recommend you to follow the sequence of steps shown in Figure 9.

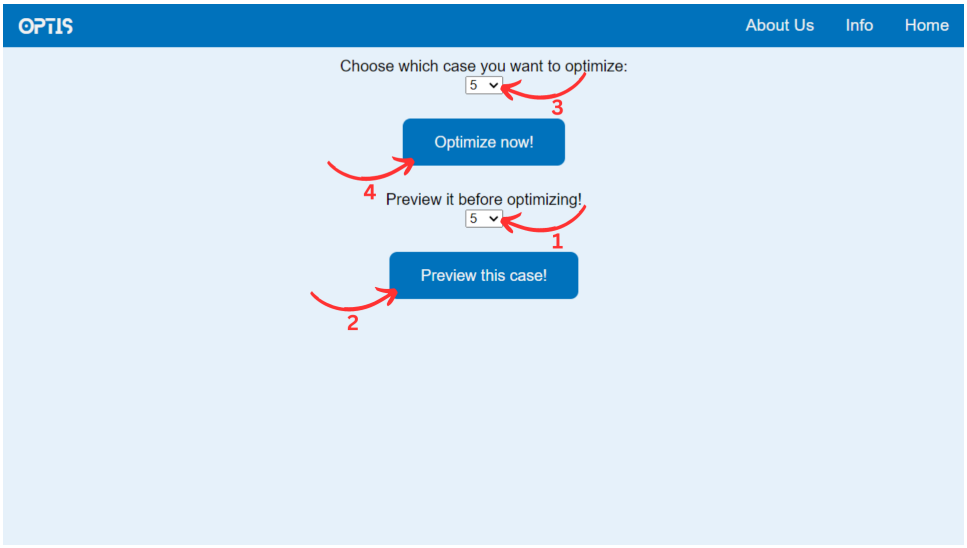
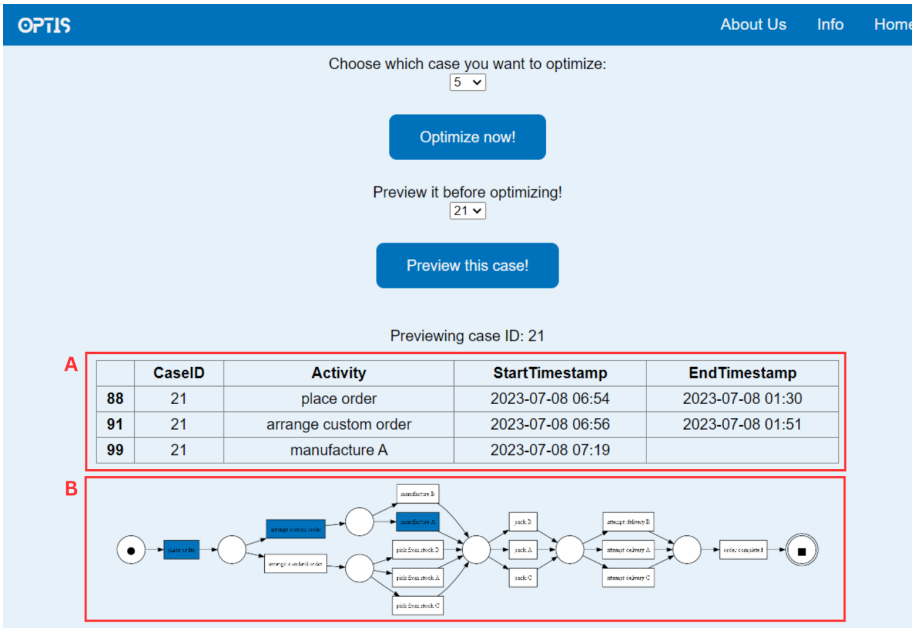


Figure 9: Case Selection and Case Preview Page



	CaseID	Activity	StartTimestamp	EndTimestamp
88	21	place order	2023-07-08 06:54	2023-07-08 01:30
91	21	arrange custom order	2023-07-08 06:56	2023-07-08 01:51
99	21	manufacture A	2023-07-08 07:19	

Figure 10: Case Preview

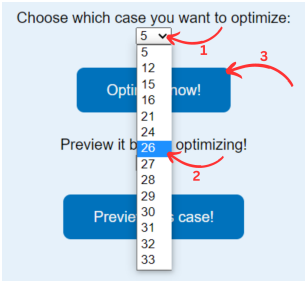


Figure 11: Case Selection Dropdown Menu

5.6 Result Page

After selecting the case you want to optimize, you will be directed to the Result page (See Figure 12). We have kept the Result page simple yet informative. On the Result page, you will see your recommendation in two ways.
First, you will be able to see a Petri-net where the activities are highlighted in blue and green (mark A).
The blue activities are those which have already been done and the green one is the one we recommend you to do (mark B).
The second way to see your recommendation is in the written text above the Petri-net (mark C).
Finally, if you wish to optimize another case, you can click on the button labeled *Optimize your next case NOW!*.

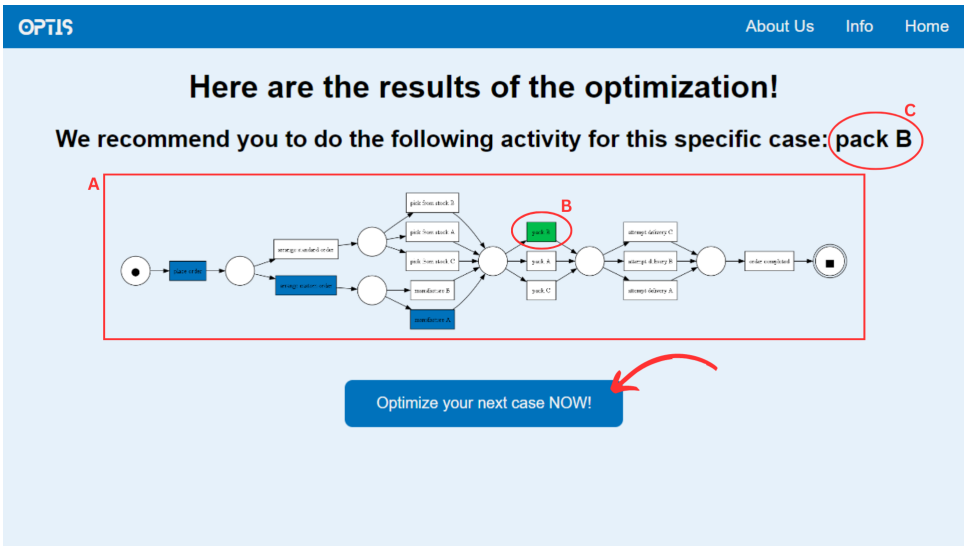


Figure 12: Result Page

We hope you will have fun using OPTIS!