

# **GPU exercise introduction**

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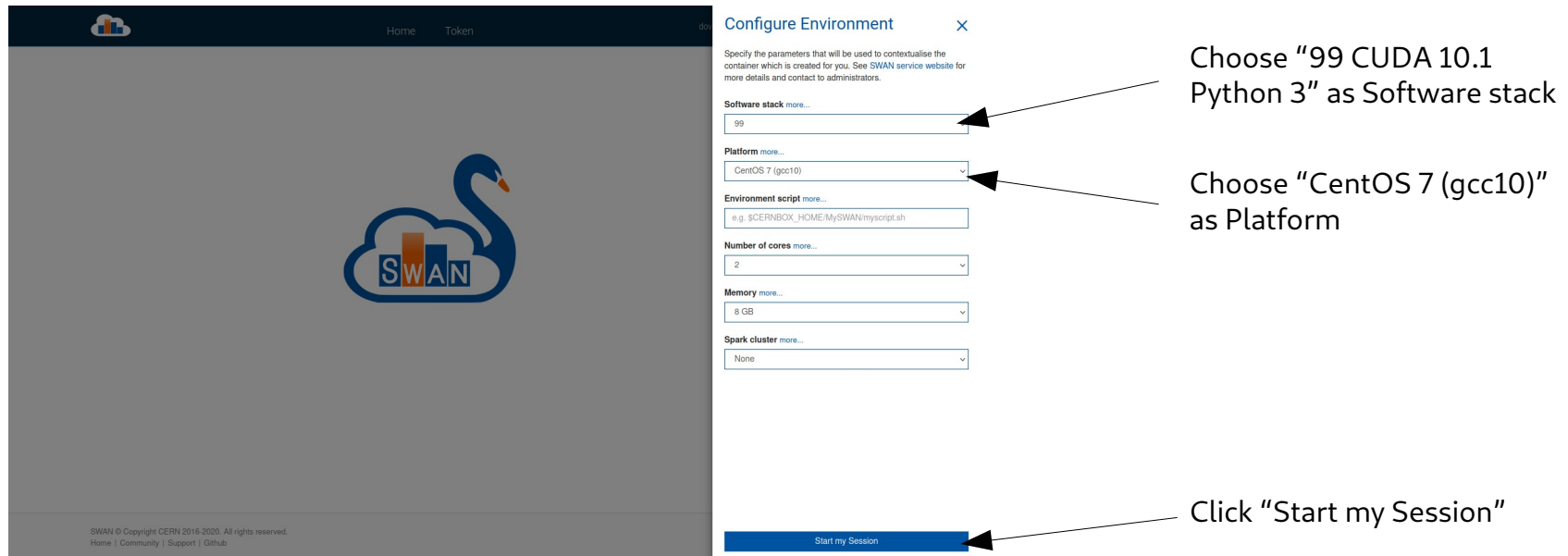
# CERN's SWAN service to access GPUs

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- Will use CERN's SWAN service to access GPUs and run exercises via a web browser
- Have around 20 GPUs available for the afternoon → Always two students will share a GPU
- Therefore, authenticate with cscXX account, which is always shared by two students (see [here](#))
- For this, create a private / anonymous tab in your browser, such that you do not use your normal CERN account for the authentication
- The student personal accounts do not have access to the GPUs
- Login to SWAN with the cscXX account: <https://swan-k8s.cern.ch>
- Important: first do this authentication with your assigned account, only then follow the instructions on the next slide

# Access to exercise repository via SWAN

- Follow this link to open the SWAN service and to clone the repository containing the exercises:  
<https://swan-k8s.cern.ch/user-redirect/download?projurl=https://gitlab.cern.ch/dcampora/gpulab-tcsc-2021-spring.git>
- The first of two students sharing an account will be asked to configure the session



The screenshot shows the SWAN 'Configure Environment' form. The form is titled 'Configure Environment' and includes a 'Start my Session' button at the bottom. The form fields are as follows:

- Software stack more...:** A text input field containing '99'. An arrow points to this field with the annotation: "Choose '99 CUDA 10.1 Python 3' as Software stack".
- Platform more...:** A dropdown menu showing 'CentOS 7 (gcc10)'. An arrow points to this dropdown with the annotation: "Choose 'CentOS 7 (gcc10)' as Platform".
- Environment script more...:** A text input field containing 'e.g. \$CERINBOX\_HOME/MySWAN/myscript.sh'.
- Number of cores more...:** A dropdown menu showing '2'.
- Memory more...:** A dropdown menu showing '8 GB'.
- Spark cluster more...:** A dropdown menu showing 'None'.

An arrow points to the 'Start my Session' button with the annotation: "Click 'Start my Session'".

# Two copies of repository

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- Every time one clicks on the swan link, a new copy of the repository is cloned
- By clicking on the link, you will end up directly in “your” copy
- If you were the first to have cloned the repository, yours will have the name “gpulab-tcsc-2021-spring”
- If you were the second, it will have the name “gpulab-tcsc-2021-spring1”
- Make sure you only modify files inside “your” repository

I was first:

SWAN > My Projects > gpulab-tcsc-2021-spring

gpulab-tcsc-2021-spring ↑

I was second:

SWAN > My Projects > gpulab-tcsc-2021-spring1

gpulab-tcsc-2021-spring1 ↑

# Start exercise

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- Inside the repository you find a jupyter notebook **exercises.ipynb** that will guide you through the exercises
- Click on it to open it in a new browser tab
- Then follow the instructions in the notebook
- The exercises do not require any previous knowledge about GPUs and GPU programming
- If you already have some experience with GPUs and know the first steps, feel free to move on quickly to the later exercises
- We cover the following:
  - Tools to query the status and specs of GPUs
  - Hello world
  - Vector addition
  - Matrix multiplication (see how far you can get)
  - Kalman filter for tracks from LHCb's Velo detector (optional)
- Have fun!