

# NEST Desktop (v2.4.0)

A web-based GUI for NEST Simulator



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CNS Workshop, 18th July 2020



EBRAINS

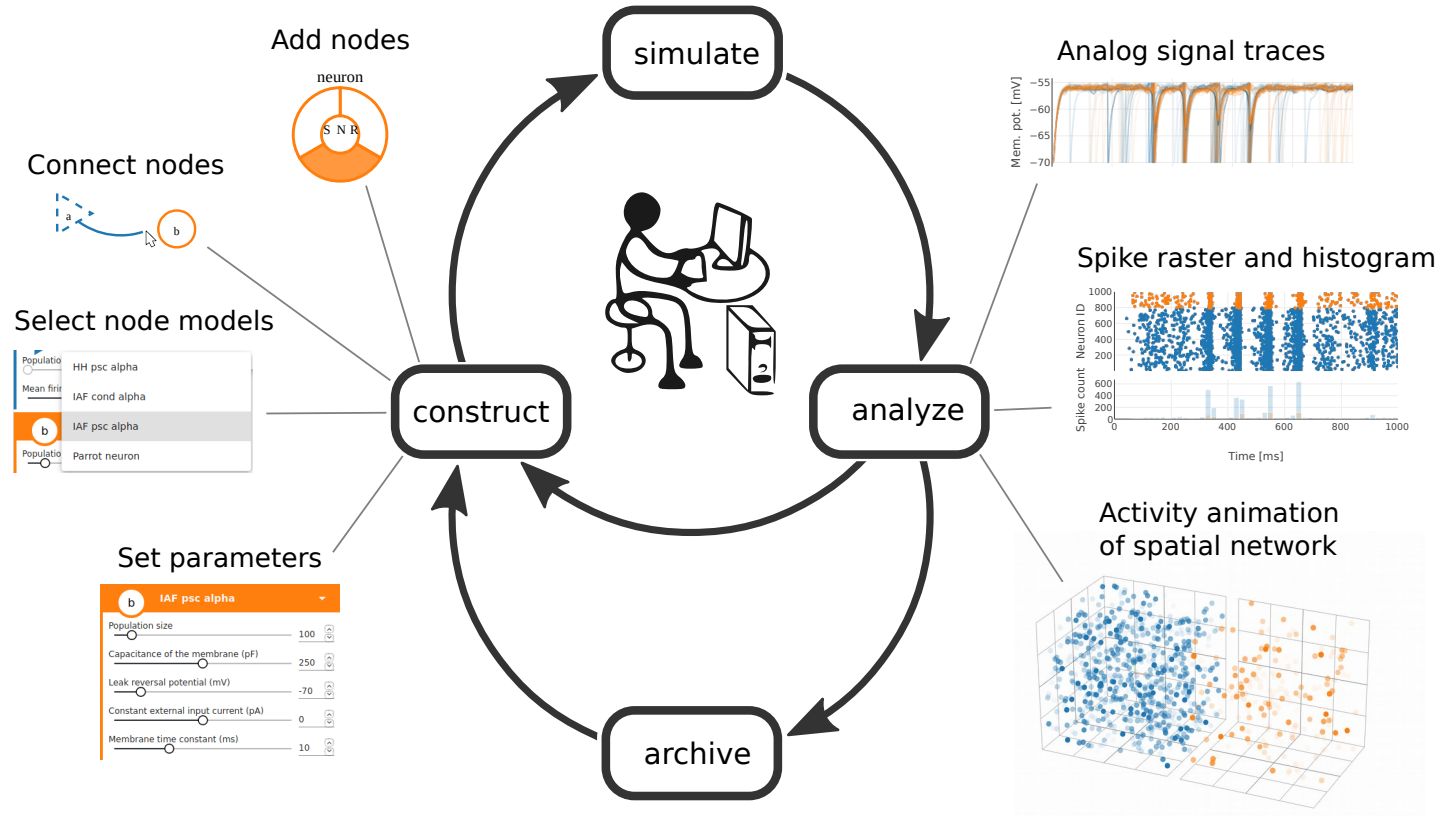


Human Brain Project



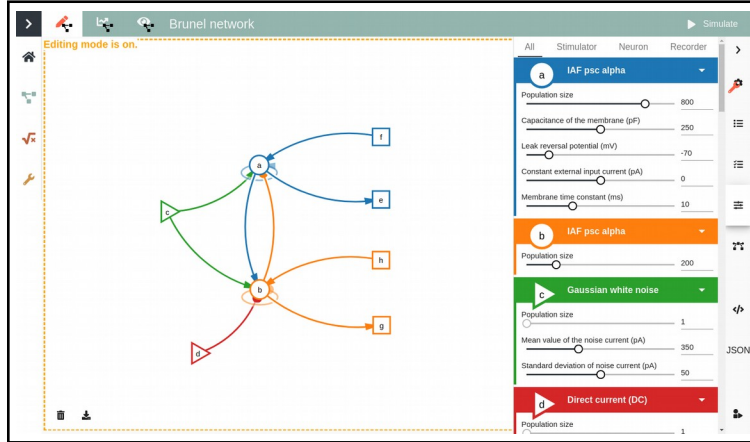
Universität Trier

# Conceptual approach

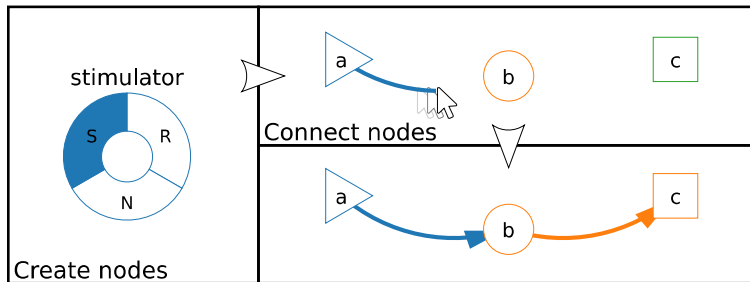


# Network editor

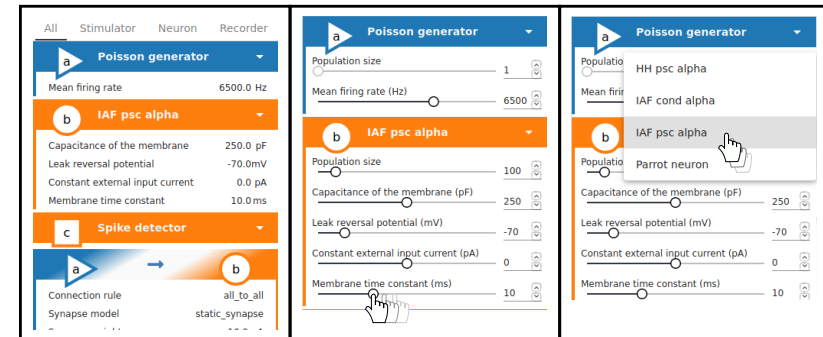
## A Network editor



## B Network sketch



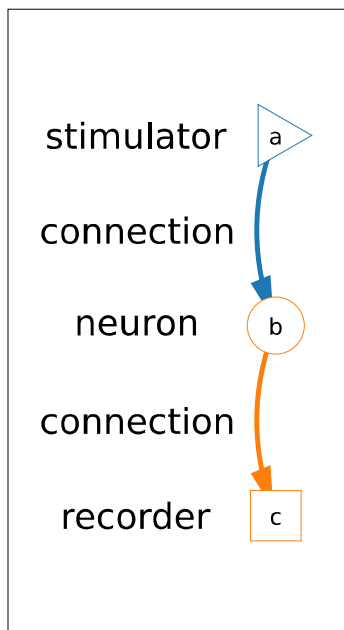
## C Network controller



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# From sketch to code

 sketch



code  
generation

 code

```
import nest

# Create nodes
a = nest.Create('poisson_generator')
b = nest.Create('iaf_psc_alpha')
c = nest.Create('spike_detector')

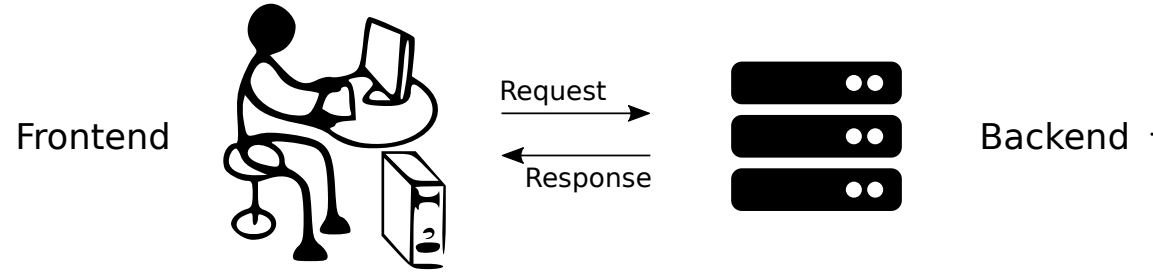
# Connect nodes
nest.Connect(a, b)
nest.Connect(b, c)

# Start simulation
nest.Simulate(1000.0)

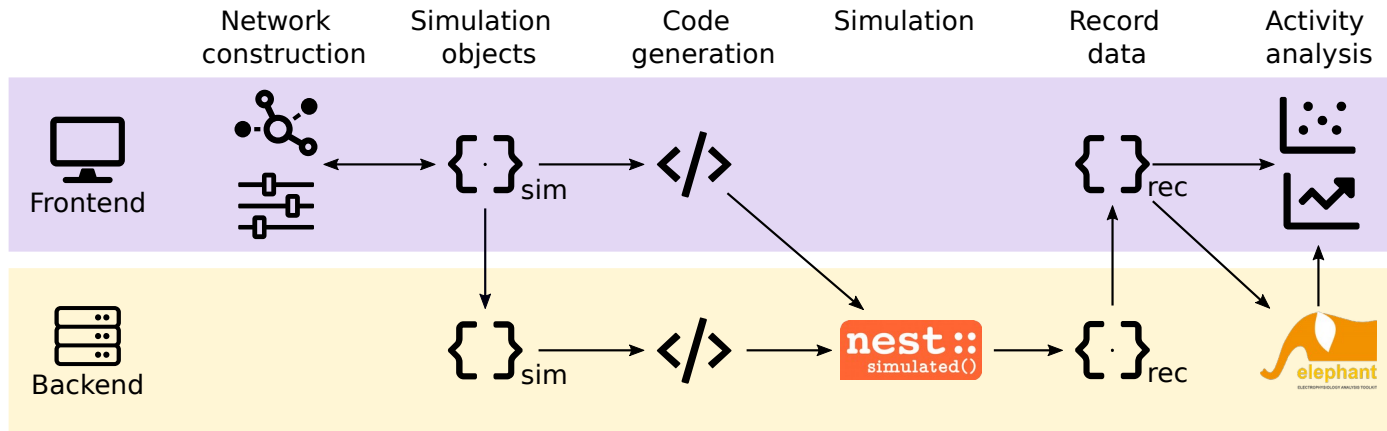
# Get recorded events
c.get('events')
```

# Workflow

**A**

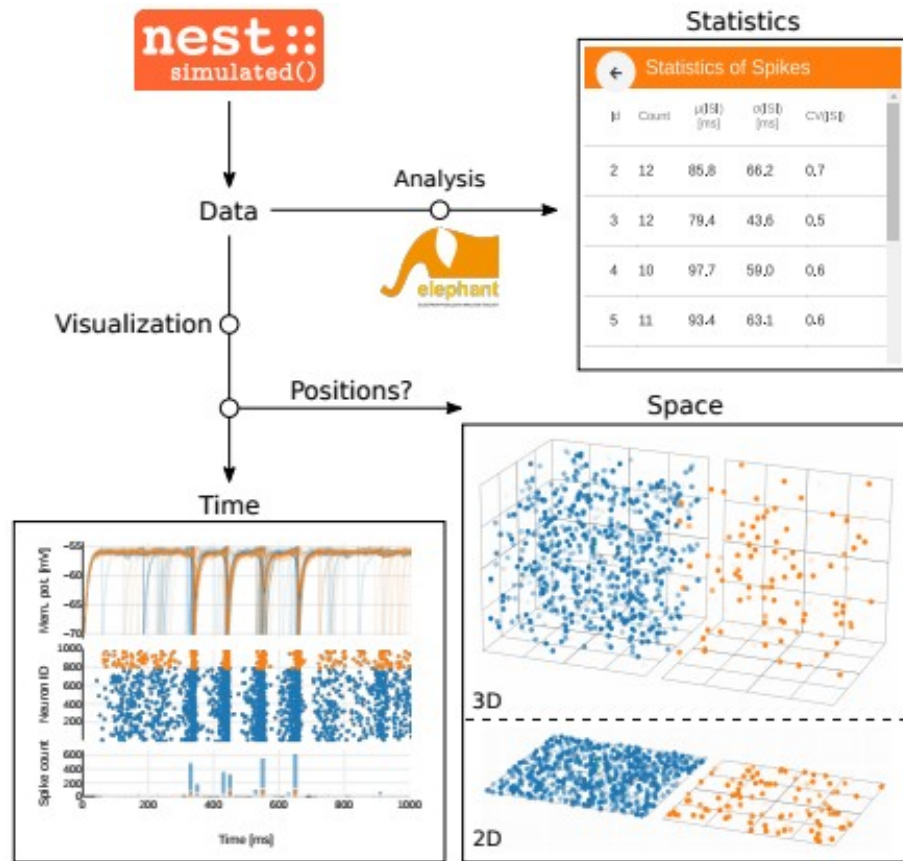


**B**



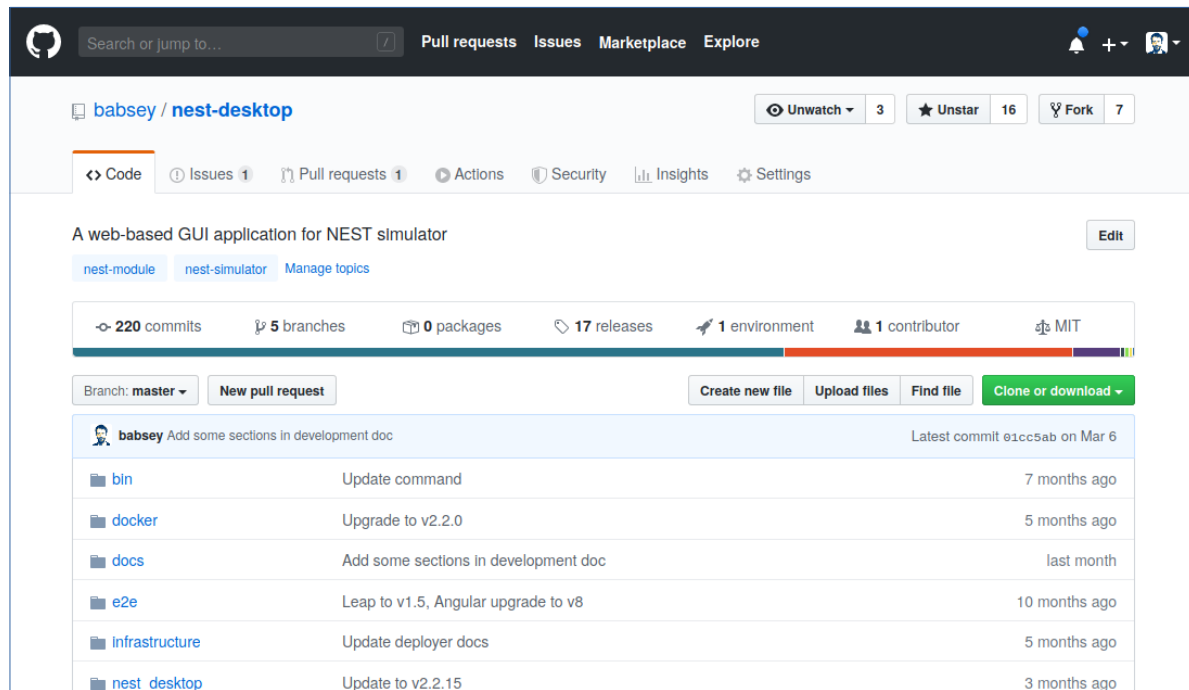
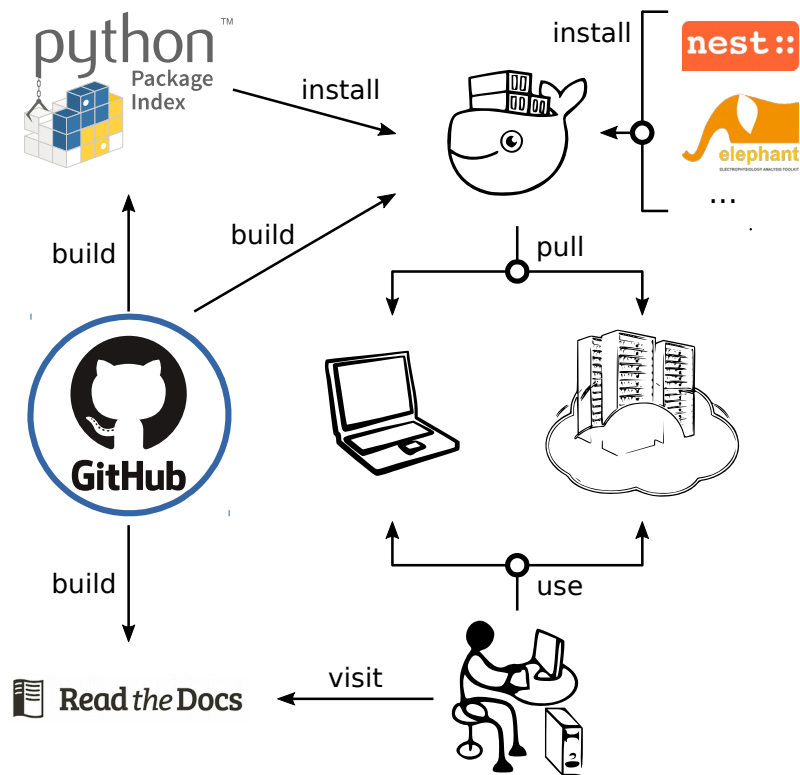
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# Explore activity



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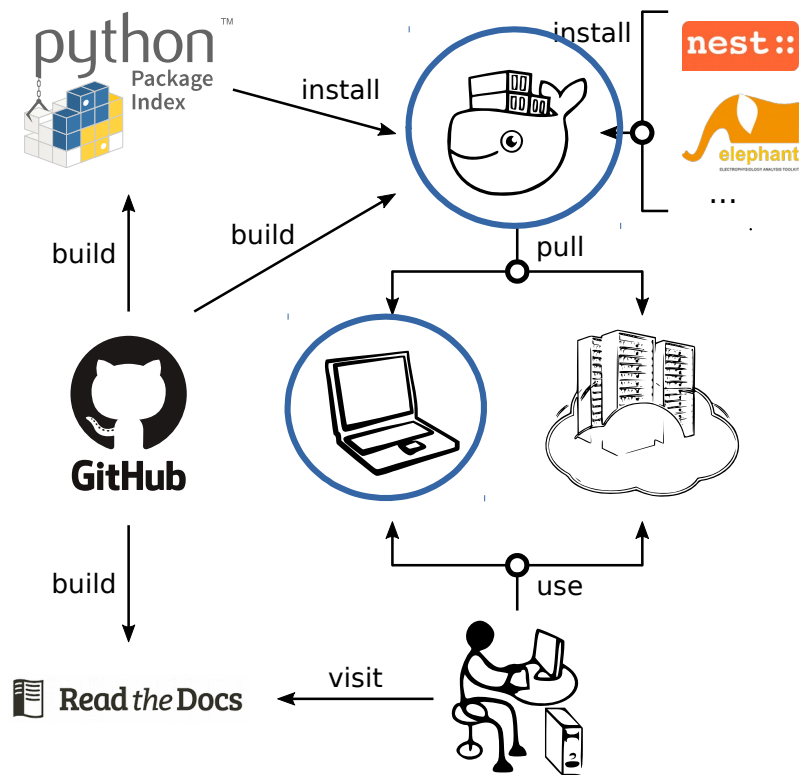
# Open-source code



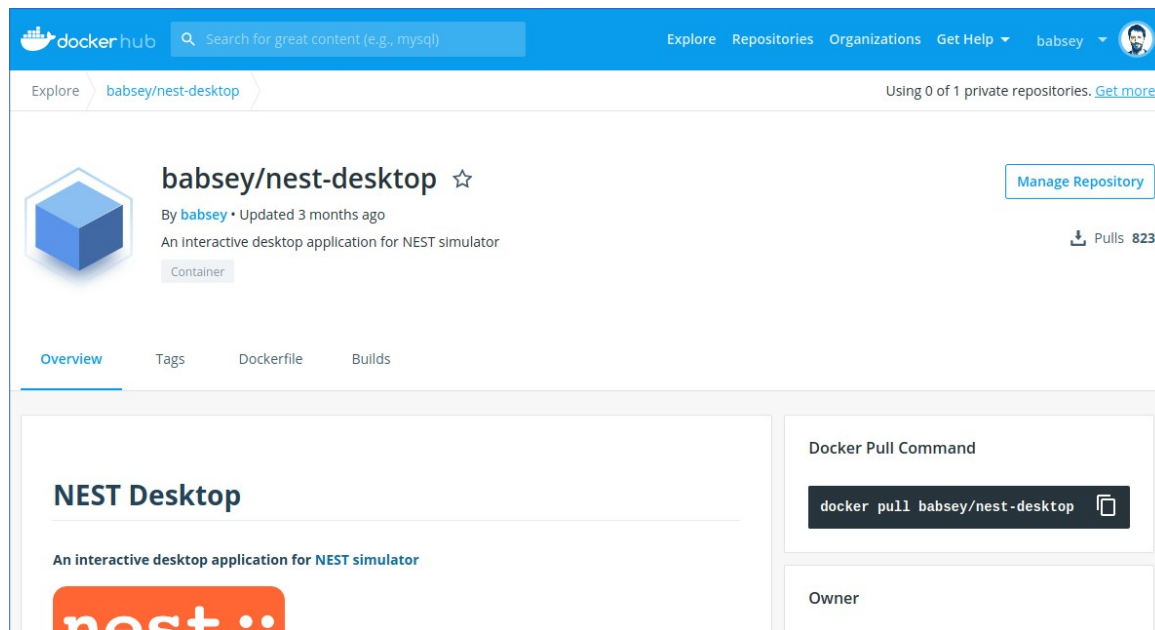
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<https://github.com/babsey/nest-desktop>

# Run NEST Desktop locally



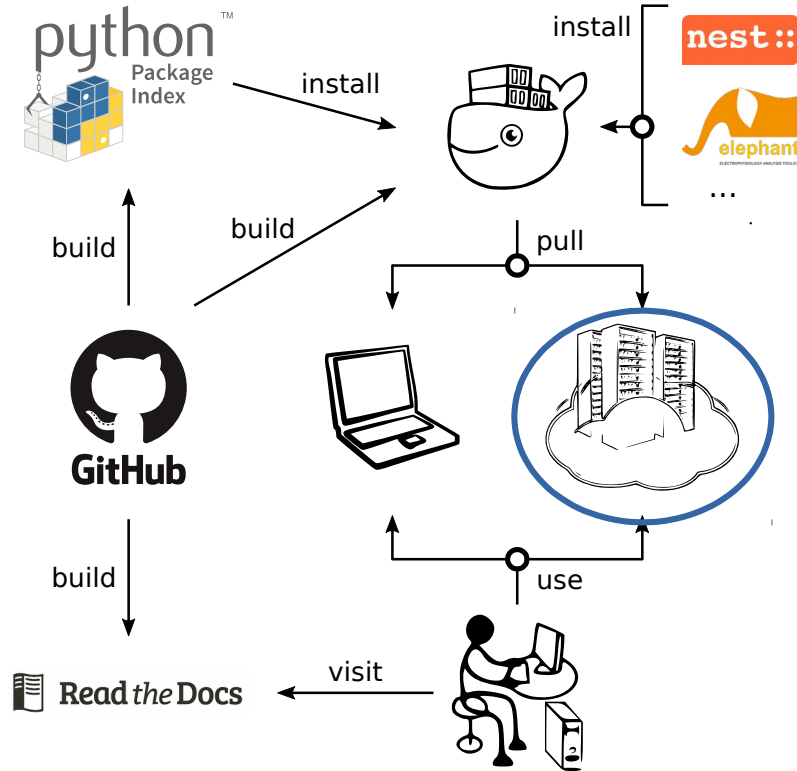
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```
# Start nest-desktop in bash
docker run -it -p 5000:5000 -p 8000:8000 babsey/nest-desktop
```



# Online accessible



The screenshot shows the NEST Desktop web application interface. At the top, there is a laptop icon with the text 'nest::simulated()' on its screen. Below this, the title 'NEST Desktop' is displayed, followed by the subtitle 'An educational GUI for neuroscience'. The interface includes a sidebar with icons for home, settings, and a search bar. The main content area contains a description of NEST Desktop as a web-based GUI application for NEST Simulator, an advanced simulation tool for computational neuroscience. It also mentions that the application enables the rapid construction, parametrization, and instrumentation of neuronal network models. The interface includes links for Documentation, Source Code, License, Current Version, and Contact. The footer features logos for the Human Brain Project, EBRANS, and the European Union.

NEST Desktop  
An educational GUI for neuroscience

NEST Desktop is a web-based GUI application for NEST Simulator, an advanced simulation tool for computational neuroscience.

The application enables the rapid construction, parametrization, and instrumentation of neuronal network models. The primary objective is to provide an accessible classroom tool that allows users to rapidly explore neuroscience concepts without the need to learn a simulator control language at the same time.

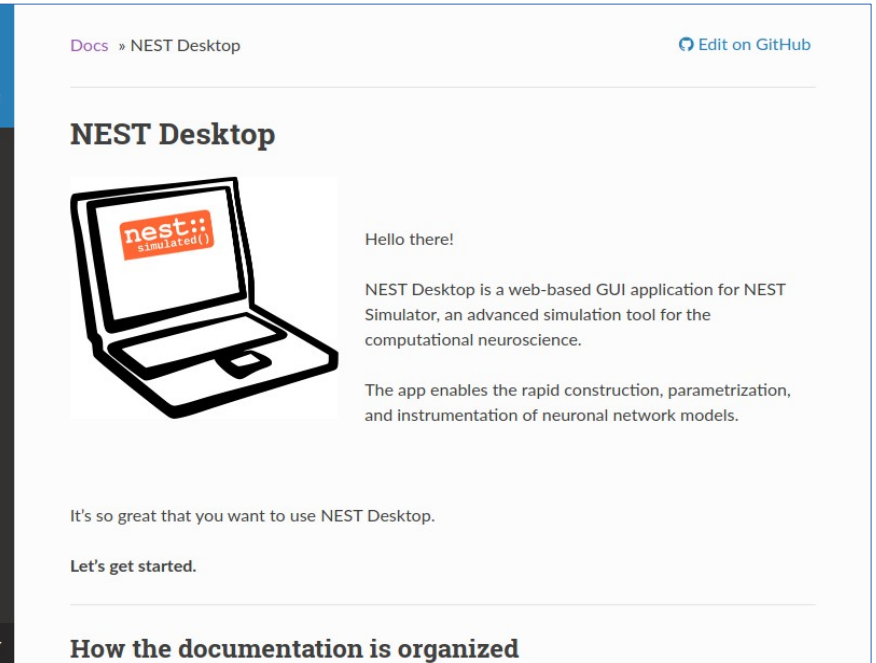
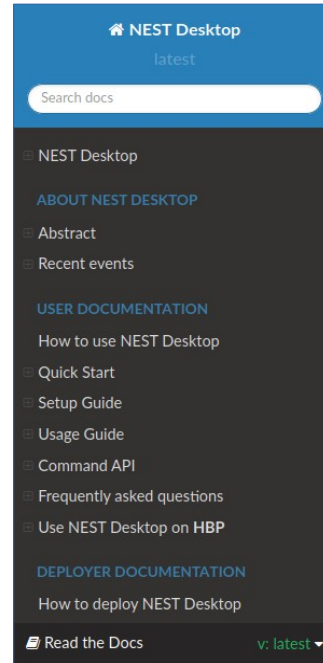
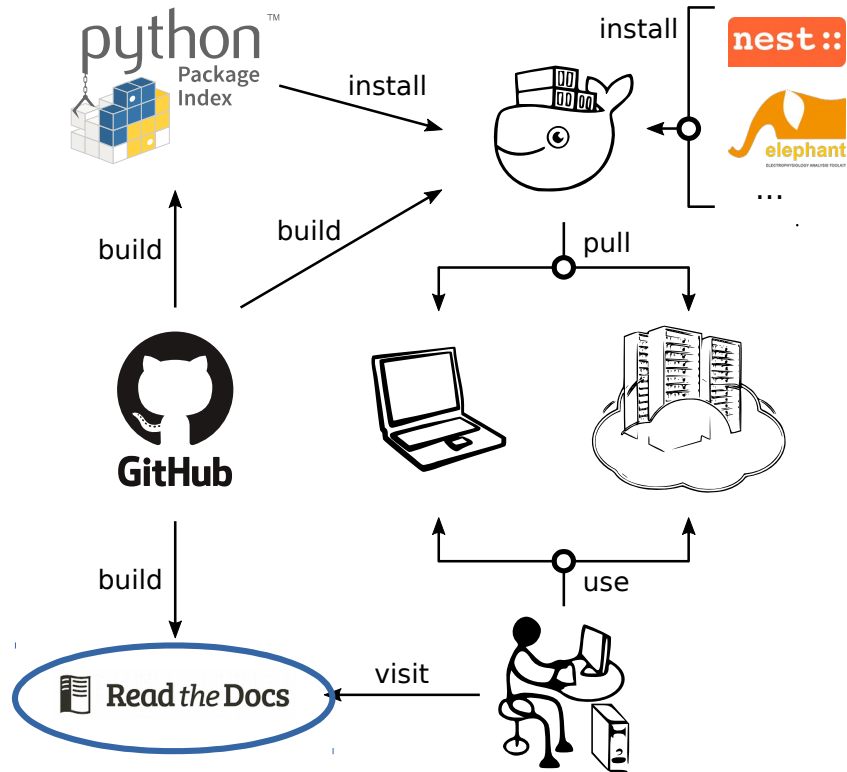
Documentation	Source Code	License	Current Version	Contact
<a href="https://nest-desktop.readthedocs.io">https://nest-desktop.readthedocs.io</a>	<a href="https://github.com/babsey/nest-desktop">https://github.com/babsey/nest-desktop</a>	MIT License	2.2.15	Sebastian Spreizer

nest::simulated() Human Brain Project EBRANS Co funded by the European Union

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<https://nest-desktop.apps.hbp.eu>

# Documentation



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<https://nest-desktop.readthedocs.io>

# Future perspectives




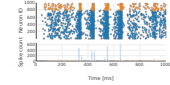





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Feature	Projects
Custom neuron / synapse models	NESTML
Live simulation	Insite
Advance analysis	Elephant

Thank you.

# Technical challenges

C

Problem	Solution	Example
Interactive network sketch	 D3.js	
Interactive chart for recording data	 plotly	
Animation of spatially resolved data	 three.js	
Advance analysis of simulation results	 elephant BIOMEDICAL ANALYSIS TOOLKIT	
Simulation engine	 nest::API	nest.Simulate()
Custom neuron and synapse models	 nest::ml	$C_m * \frac{dV_m(t)}{dt} = -g_L * V_m(t) + I(t)$

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