# Insite

## A Generalized Pipeline for In-transit Visualization and Analysis

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# What's Insite?

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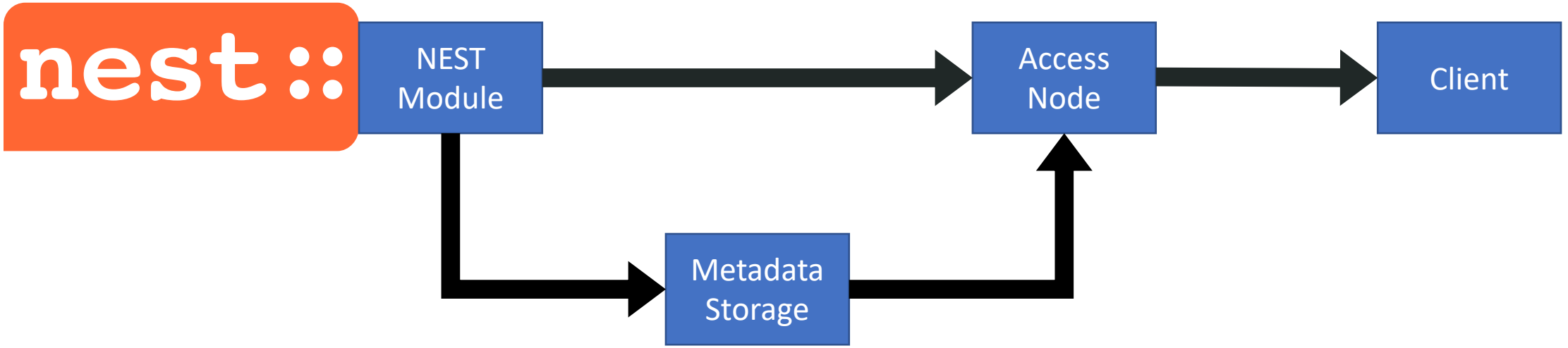

# API

- Closely developed for visualization needs with focus on ease of use

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Features

- Query simulation time

```
GET /simulation_time_info

  {
    ”start”:      1000.0,
    “end”:        2000.0,
    “time_step”:     0.1,
    “current”:    1140.1
  }
```

# API

- Closely developed for visualization needs with focus on ease of use

Features

- Query simulation time
- Query neuron IDs

```
GET /gids

  [ 0, 1, …, 10000 ]
```

# API

- Closely developed for visualization needs with focus on ease of use

Features

- Query simulation time
- Query neuron IDs
- Query populations

```
GET /populations

  [ 0, 1, 2, 3 ]


GET /population/0/gids

  [ 0, 1, …, 2499, 2500]
```

# API

- Closely developed for visualization needs with focus on ease of use

Features

- Query simulation time
- Query neuron IDs
- Query populations
- Query positions

```
GET /neuron_properties?gids=1,2

  [
    {
      ”position”: [0.12, 0.57, 0.13]
    },
    {
      ”position”: [0.22, 0.57, 0.13]
    }
  ]
```

# API

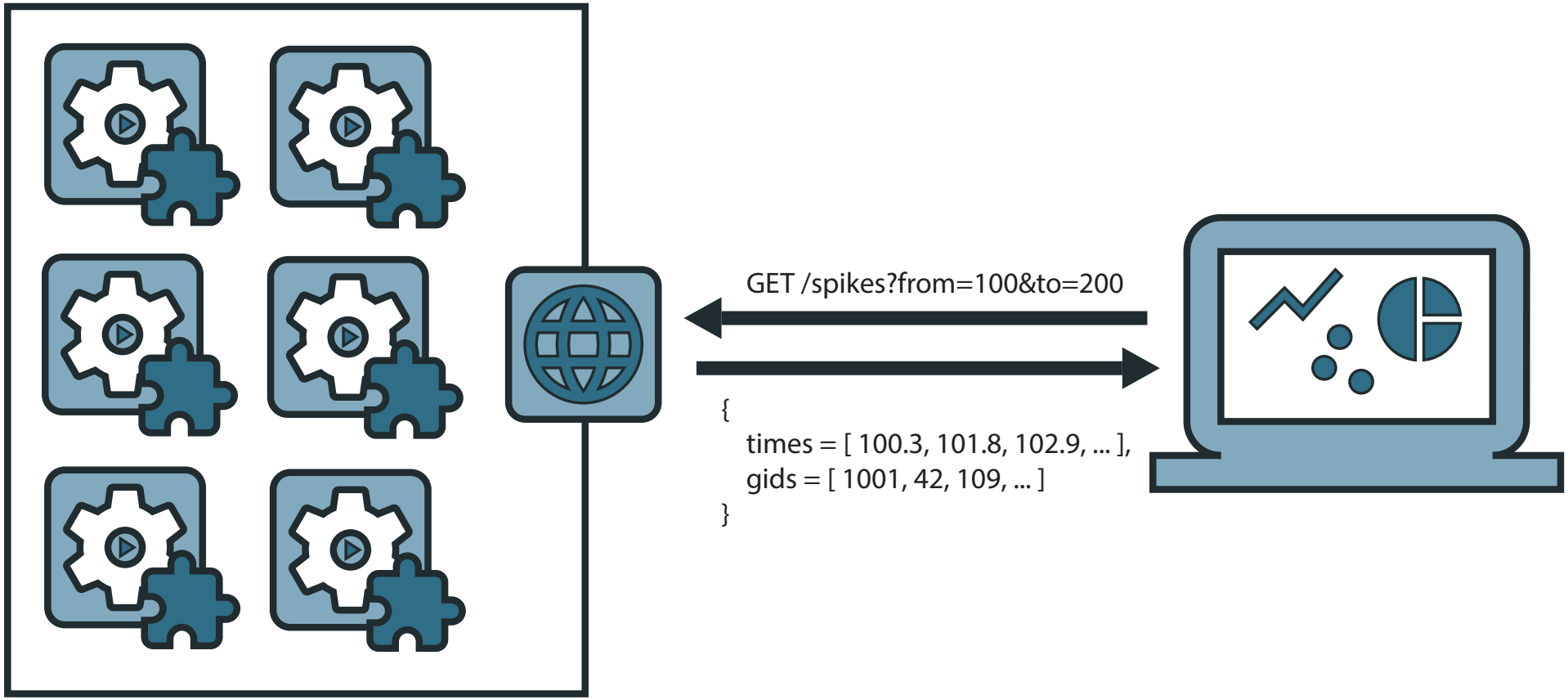
- Closely developed for visualization needs with focus on ease of use

Features

- Query simulation time
- Query neuron IDs
- Query populations
- Query positions
- Query spikes

```
GET /spikes?from=1050&to=1070&gids=1,2,3

  {
    “times”: [ 1050.4, 1055.8, 1061.8 ]
    ”gids”:  [      1,      3,      1 ]
  }


GET /population/0/spikes


  …
```

# Large Scale Simulations



# Simulation Integration

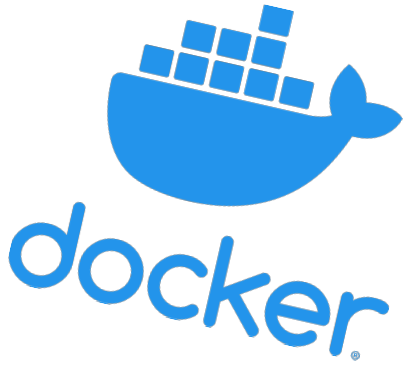
```
nest.Install("insitemodule")

spike_detector = nest.Create("spike_detector")
nest.SetStatus(
     spike_detector,
     [{"record_to": "insite"}])
```

# Module Installation

Option 1: Build it yourself

- Somewhat cumbersome

**Option 2: Use docker-compose**




- Clone https://github.com/VRGroupRWTH/insite
- Run “`docker-compose run …`”
- The simulation data is accessible via http://localhost:8080
- Workflow can be optimized using NEST Server (PR 1415)

...ite — fish /Users/simon/Code/insite — -fish ...osforge.xquartz:0 HOME=/Users/simon

```
simon@Simons-MacBook-Pro ~/C/insite>
```

Problem loading page

localhost:8080/simulation_time 300%

# Unable to connect

Firefox can’t establish a connection to the server at localhost:8080.

- The site could be temporarily unavailable or too busy. Try again in a few moments.
- If you are unable to load any pages, check your computer’s network connection.

...ite — fish /Users/simon/Code/insite — -fish ...osforge.xquartz:0 HOME=/Users/simon

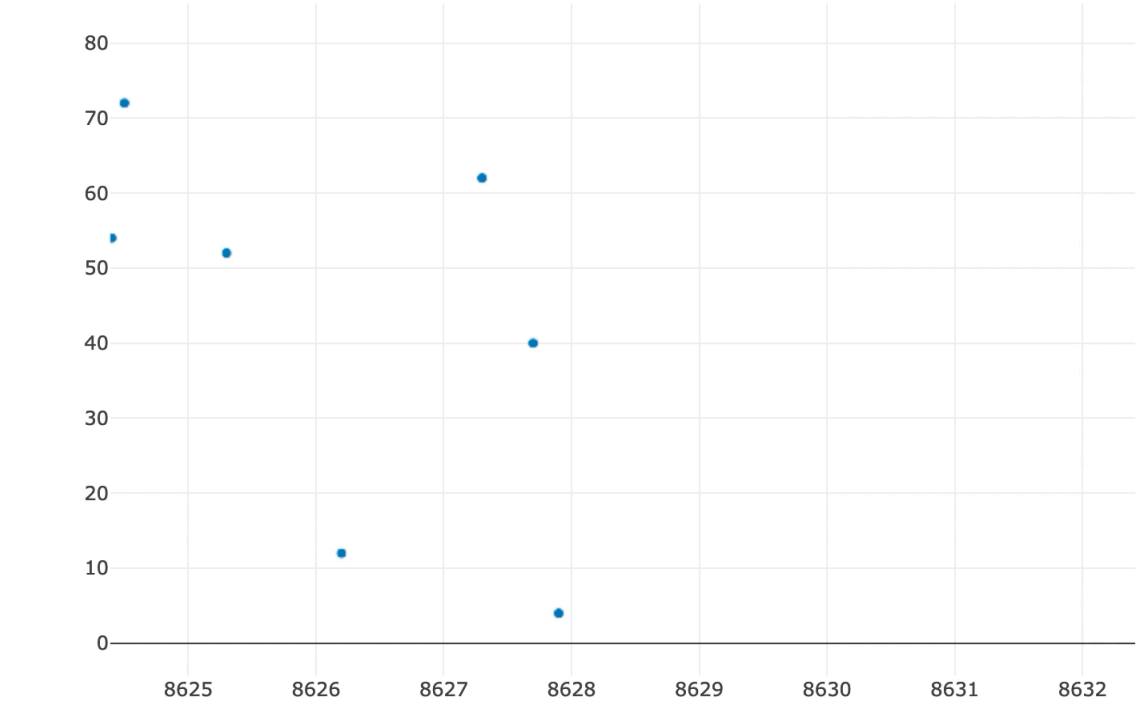
```
simon@Simons-MacBook-Pro ~/C/insite> docker-compose up
```

InsiteNestPlot

localhost:4200

Update

Follow




url

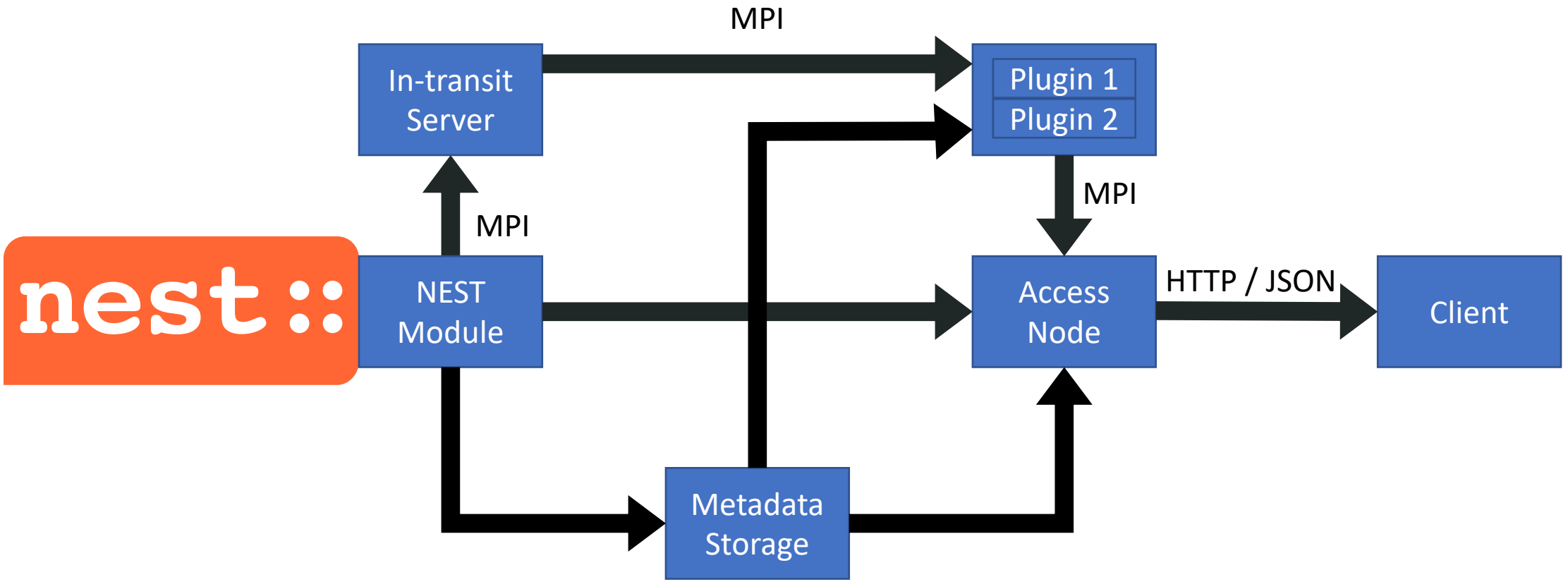
http://localhost

Http failure response for http://localhost:8080/spikes: 0 Unknown Error

Current simulation time: 1000 ms

Sebastian Spreizer

# In-transit Analysis



# Analysis API (WIP)

Features

- Query plugin list

```
GET /analysis

  [
    {
      “id”: “mfr”,
      “short_desc”: “Calculates the
                     mean firing rate
                     for all neurons.”
    },
    …
  ]
```

# Analysis API (WIP)

Features

- Query plugin list
- Query plugin details

```
GET /analysis/mfr

  {
    “name”: “Mean Firing Rate”,
    “short_desc”: “Calculates the …”,
    “long_desc”: “…”
    “parameters”: [
      {
        “name”: “window_size”,
        “type”: “float”
      },
      …
    ]
  }
```

# Analysis API (WIP)

Features

- Query plugin list
- Query plugin details
- (De-)Activate plugins

```
GET /analysis/mfr/activate

  {
    “is_active”: false
  }


PUT /analysis/mfr/active?is_active=true
```

# Analysis API (WIP)

Features

- Query plugin list
- Query plugin details
- (De-)Activate plugins
- Set/get parameters

```
GET /analysis/mfr/params

  {
    “window_size”: 2
  }


PUT /analysis/mfr/params?window_size=3
```

# Analysis API (WIP)

Features

- Query plugin list
- Query plugin details
- (De-)Activate plugins
- Set/get parameters
- Query data

```
GET /analysis/mfr/data

  {
    “0”: [12.3, 10.1, 10.3],
    “1”: [4.0, 1.0, 0.1],
    …
  }
```

# What's Next?

- Documentation
- Improved data formats
  - E.g., Google FlatBuffers
- Steering
  - `POST /pause`
  - `POST /resume`
  - …

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# Thank you for your attention!

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