

PViz

Visualising P2P Multi-Agent Simulations

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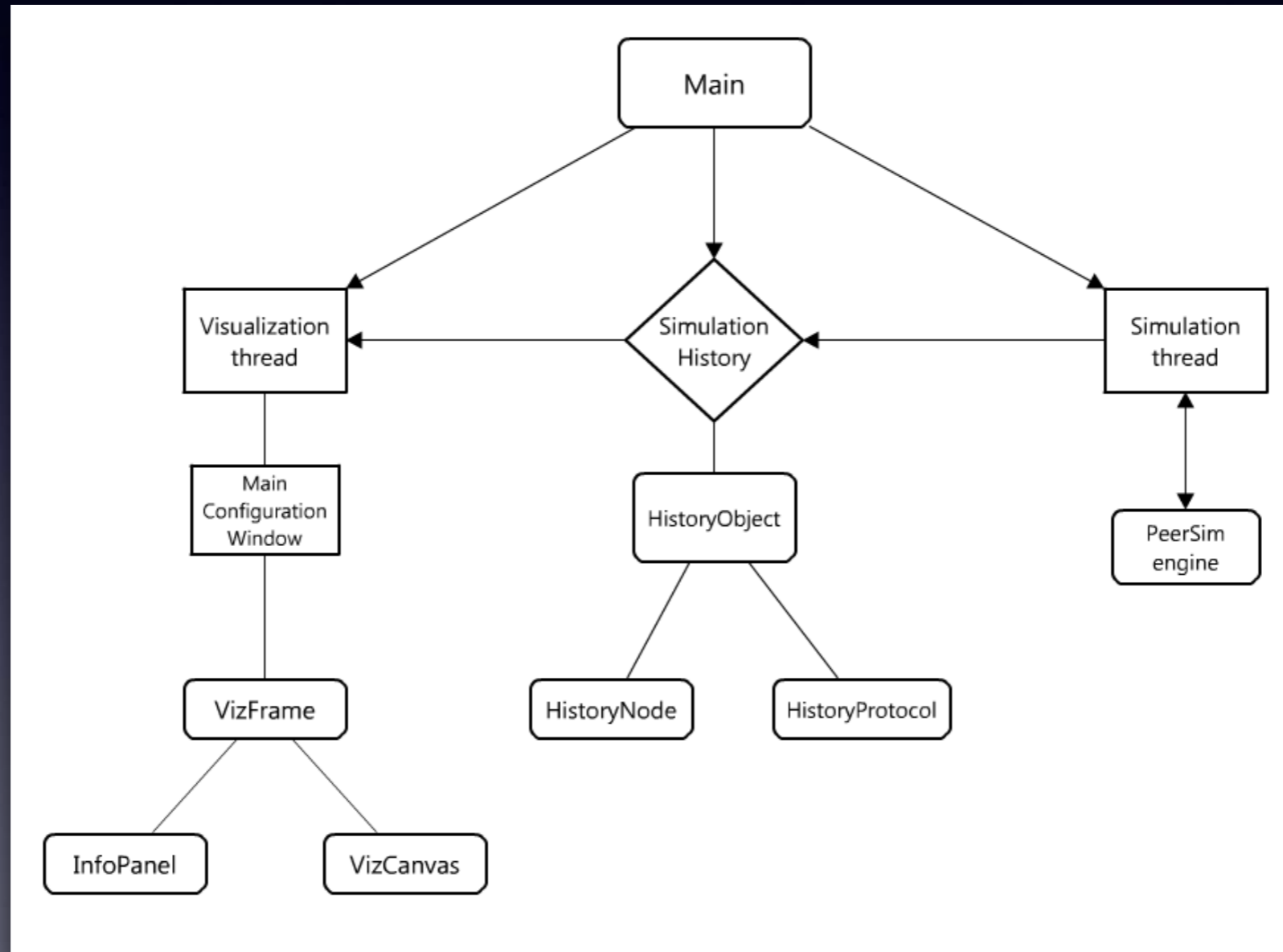
Overview

- PViz is a visualiser for PeerSim simulations.
- Allows the user to visually explore multi-agent, P2P simulations and “replay” their events.
- Effective even for simulations with large number of nodes.
- Fully integrated with PeerSim engine, allows for various user-defined protocols to be visualised
- Chord is used as a test showcase since it is easy to implement and understand.

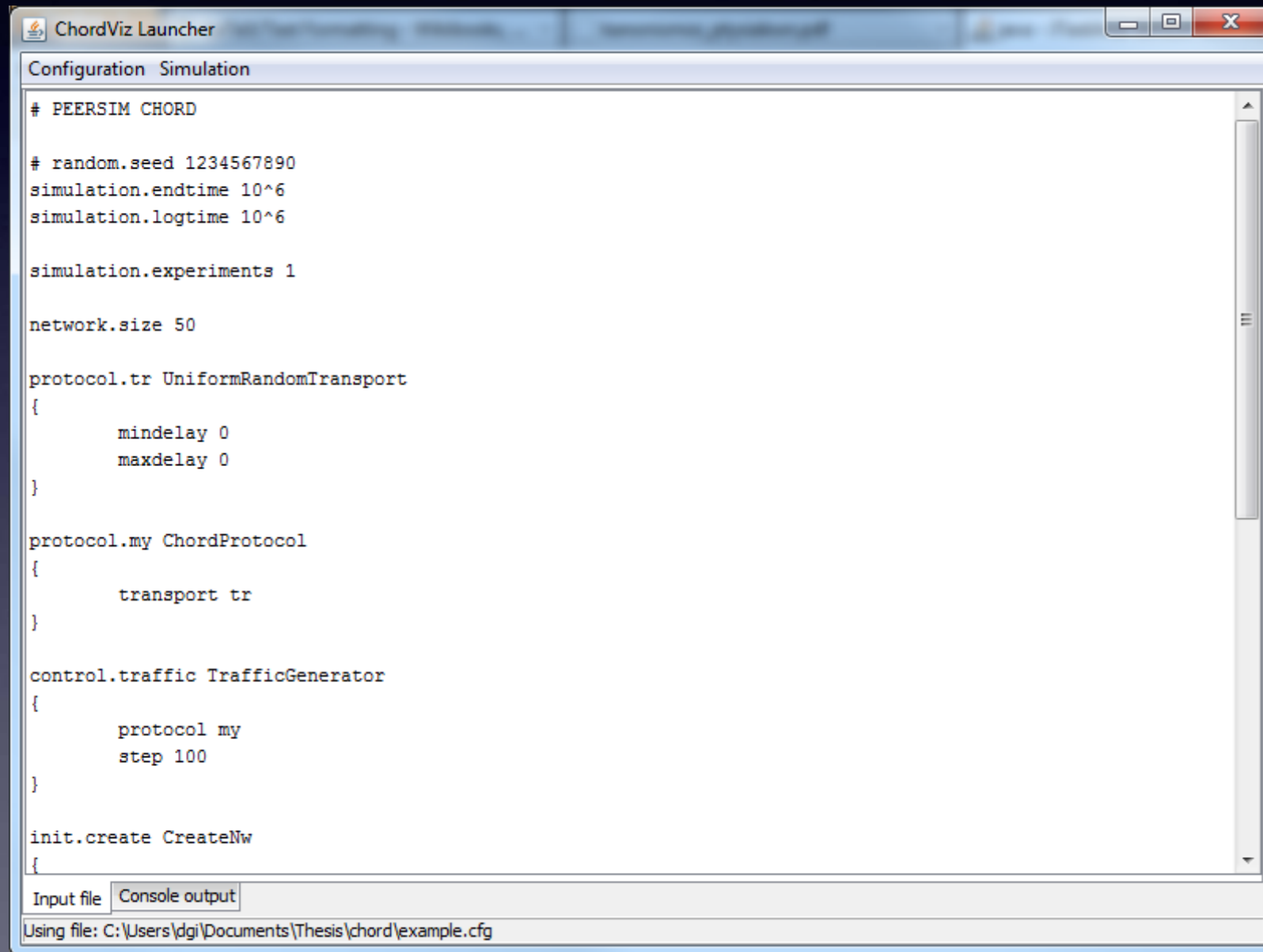
Architecture

- Expands PeerSim, sits on top of simulation engine
- Records all network events and changes (e.g. insert / remove / alter)
- Complete network history is passed to the visualisation engine
- Information presented to the user

Architecture



Step-by-step



The screenshot shows a window titled "ChordViz Launcher" with a "Configuration Simulation" tab. The main area contains a configuration file for a PEERSIM CHORD simulation. The configuration includes parameters for random seed, simulation endtime, logtime, network size, transport protocol, Chord protocol, traffic generator, and initial network creation. At the bottom, there are tabs for "Input file" and "Console output", and a status bar indicating the file path: "Using file: C:\Users\dgi\Documents\Thesis\chord\example.cfg".

```
# PEERSIM CHORD

# random.seed 1234567890
simulation.endtime 10^6
simulation.logtime 10^6

simulation.experiments 1

network.size 50

protocol.tr UniformRandomTransport
{
    mindelay 0
    maxdelay 0
}

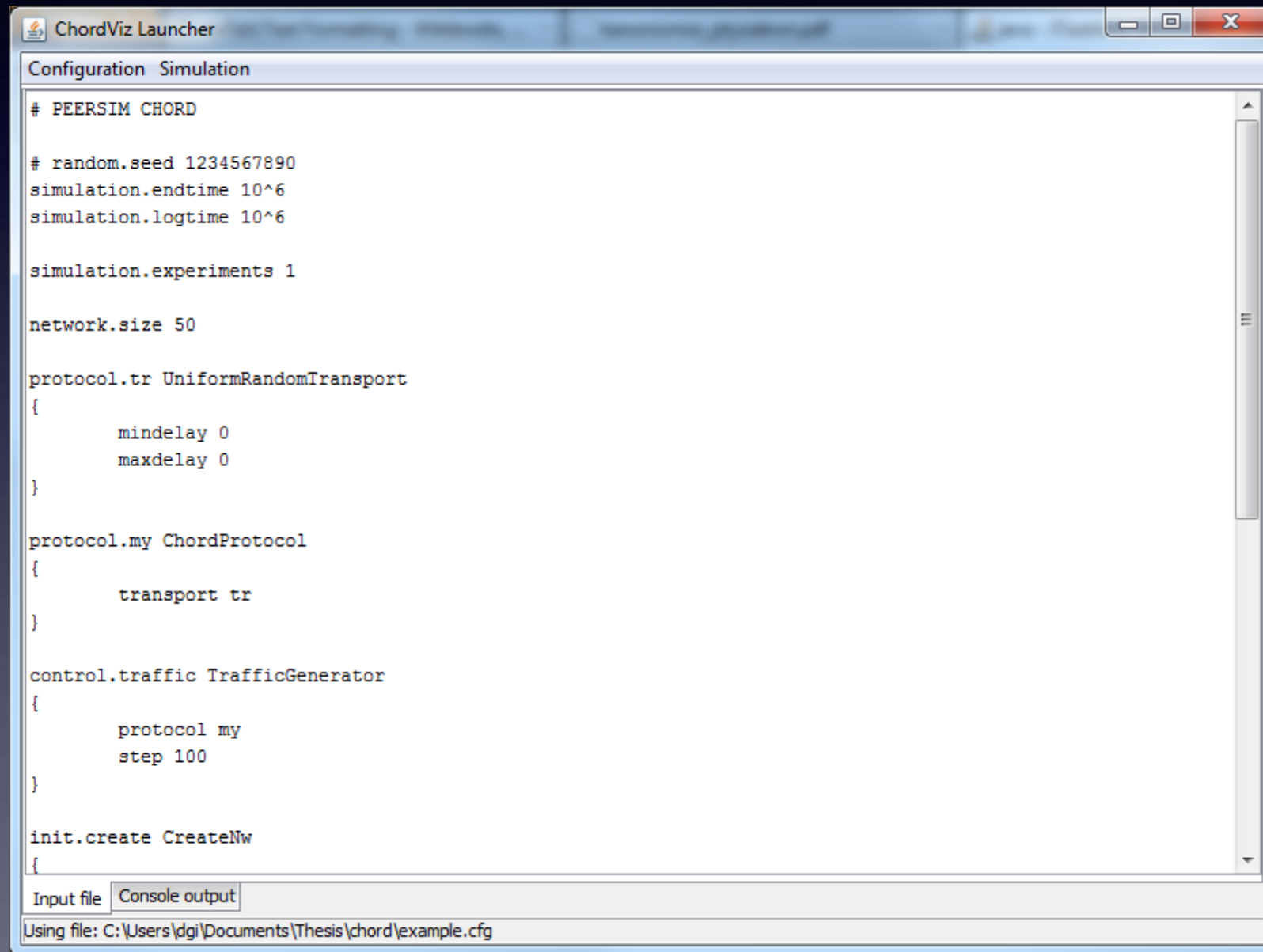
protocol.my ChordProtocol
{
    transport tr
}

control.traffic TrafficGenerator
{
    protocol my
    step 100
}

init.create CreateNw
{
```

Input Configuration

Step-by-step



The screenshot shows a window titled "ChordViz Launcher" with a "Configuration Simulation" tab. The main area contains a text editor with a configuration file. The file is a PEERSIM CHORD configuration with the following content:

```
# PEERSIM CHORD

# random.seed 1234567890
simulation.endtime 10^6
simulation.logtime 10^6

simulation.experiments 1

network.size 50

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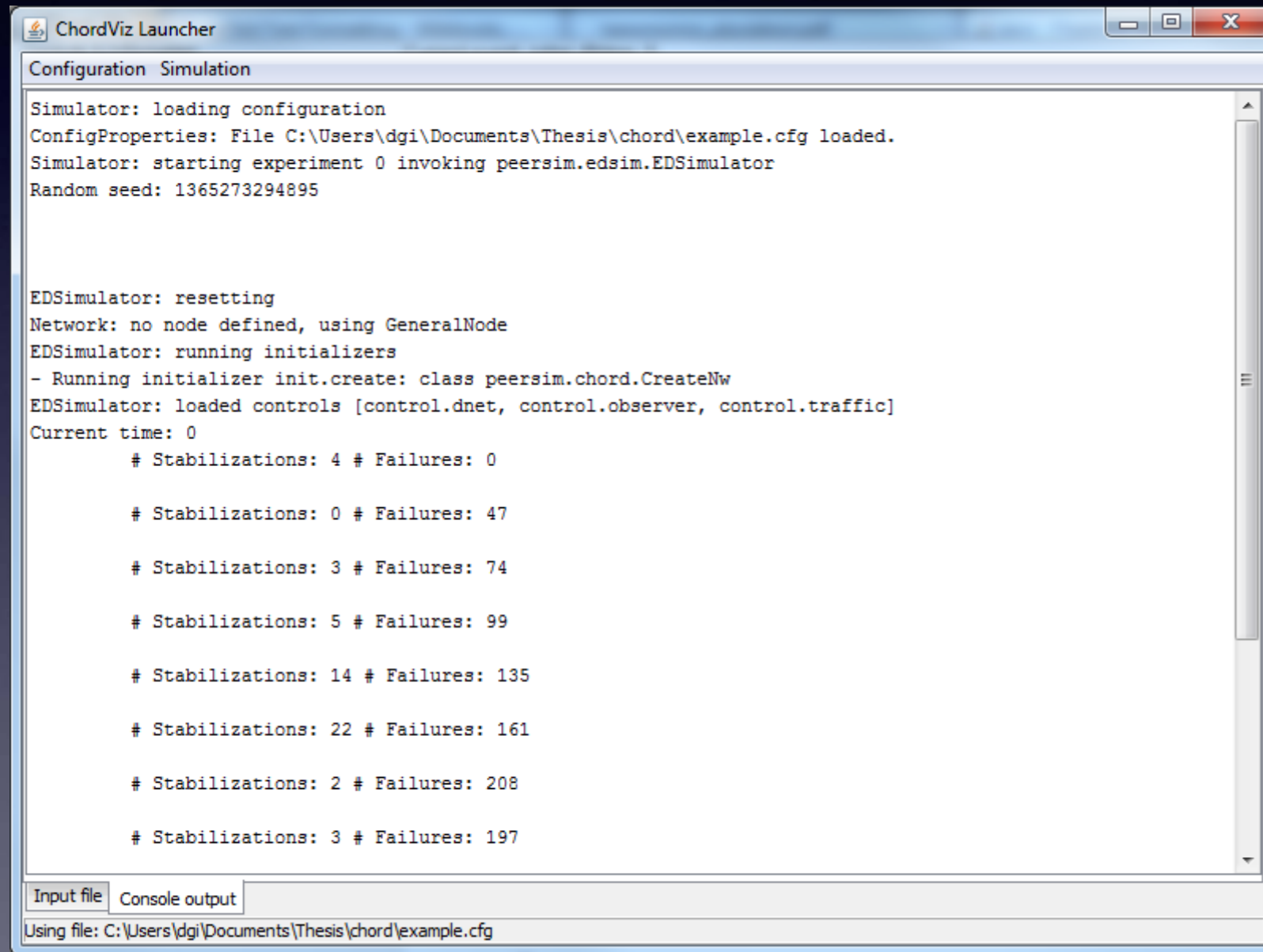
init.create CreateNw
{
```

At the bottom of the window, there are two tabs: "Input file" and "Console output". The "Input file" tab is selected, and the path "Using file: C:\Users\dgi\Documents\Thesis\chord\example.cfg" is displayed below the tabs.

Input Configuration

- Accepts PeerSim files
- Allows customisation

Step-by-step



The screenshot shows a Windows application window titled "ChordViz Launcher". The window contains a text area with the following text:

```
Configuration Simulation
Simulator: loading configuration
ConfigProperties: File C:\Users\dgi\Documents\Thesis\chord\example.cfg loaded.
Simulator: starting experiment 0 invoking peersim.edsim.EDSimulator
Random seed: 1365273294895

EDSimulator: resetting
Network: no node defined, using GeneralNode
EDSimulator: running initializers
- Running initializer init.create: class peersim.chord.CreateNw
EDSimulator: loaded controls [control.dnet, control.observer, control.traffic]
Current time: 0
    # Stabilizations: 4 # Failures: 0

    # Stabilizations: 0 # Failures: 47

    # Stabilizations: 3 # Failures: 74

    # Stabilizations: 5 # Failures: 99

    # Stabilizations: 14 # Failures: 135

    # Stabilizations: 22 # Failures: 161

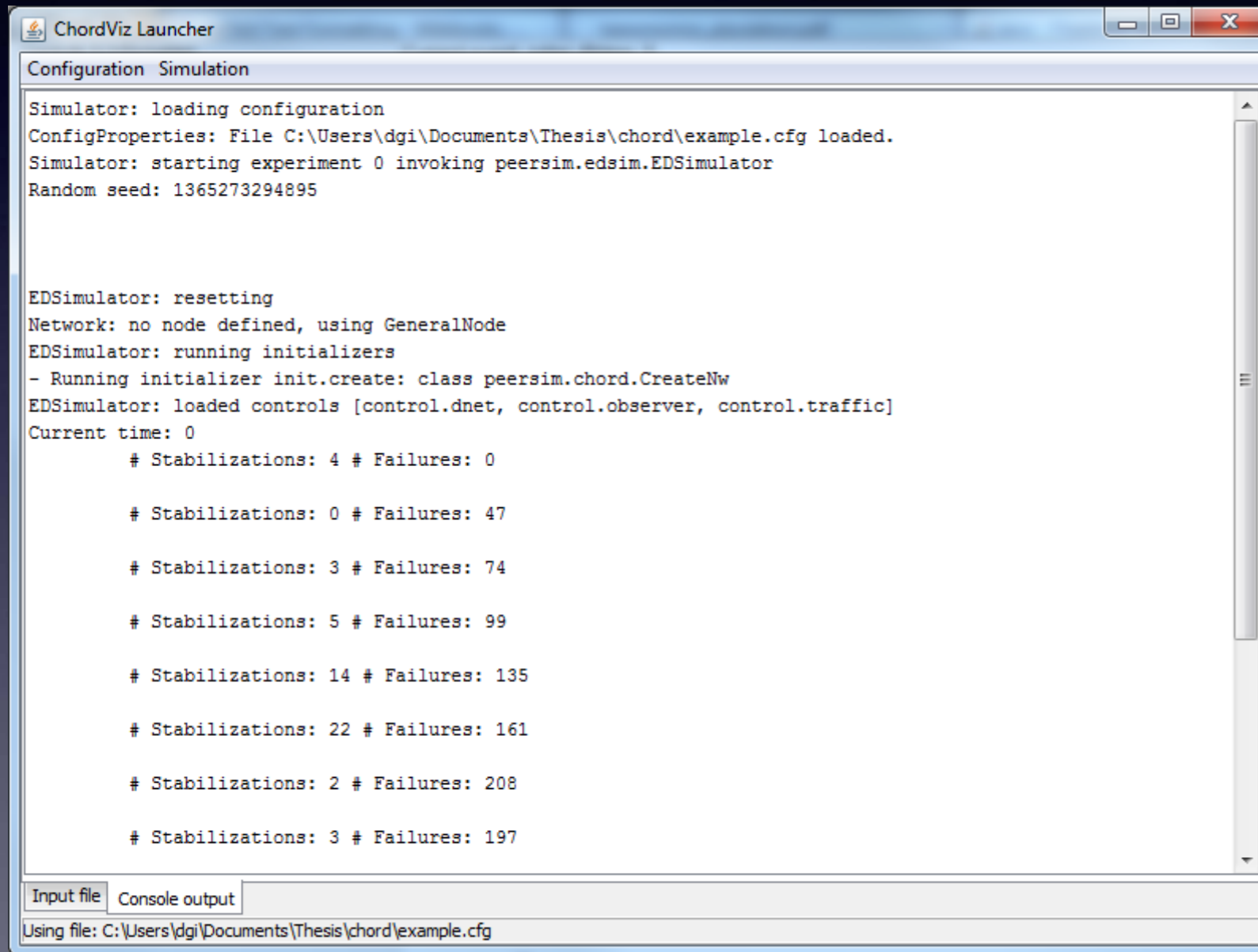
    # Stabilizations: 2 # Failures: 208

    # Stabilizations: 3 # Failures: 197
```

At the bottom of the window, there are two tabs: "Input file" and "Console output". The "Console output" tab is selected. Below the tabs, the text "Using file: C:\Users\dgi\Documents\Thesis\chord\example.cfg" is displayed.

Output pane

Step-by-step



The screenshot shows a Windows application window titled "ChordViz Launcher". The window contains a text area with the following text:

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Configuration Simulation
Simulator: loading configuration
ConfigProperties: File C:\Users\dgi\Documents\Thesis\chord\example.cfg loaded.
Simulator: starting experiment 0 invoking peersim.edsim.EDSimulator
Random seed: 1365273294895

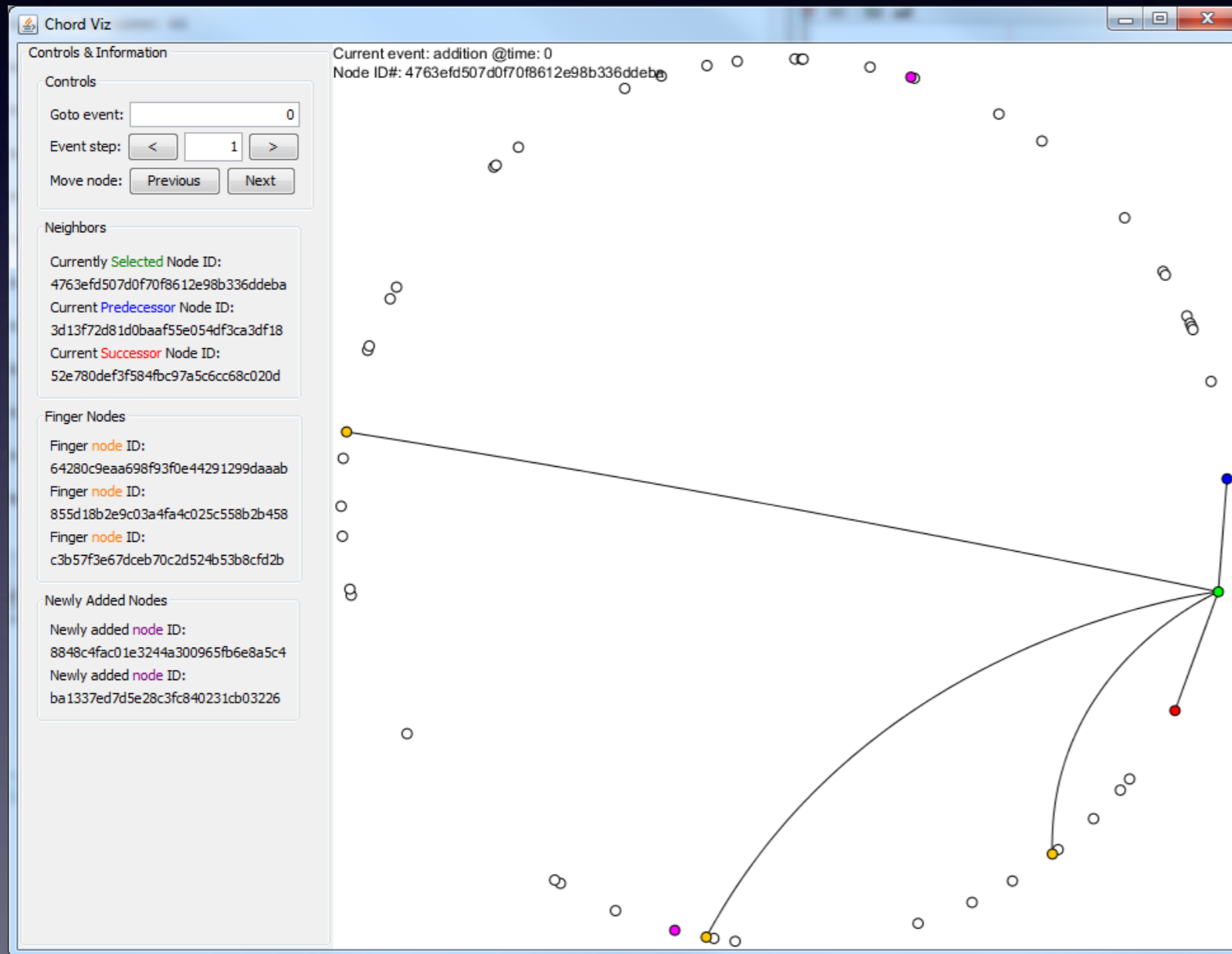
EDSimulator: resetting
Network: no node defined, using GeneralNode
EDSimulator: running initializers
- Running initializer init.create: class peersim.chord.CreateNw
EDSimulator: loaded controls [control.dnet, control.observer, control.traffic]
Current time: 0
    # Stabilizations: 4 # Failures: 0
    # Stabilizations: 0 # Failures: 47
    # Stabilizations: 3 # Failures: 74
    # Stabilizations: 5 # Failures: 99
    # Stabilizations: 14 # Failures: 135
    # Stabilizations: 22 # Failures: 161
    # Stabilizations: 2 # Failures: 208
    # Stabilizations: 3 # Failures: 197
```

At the bottom of the window, there are two tabs: "Input file" and "Console output". The "Console output" tab is selected. Below the tabs, it says "Using file: C:\Users\dgi\Documents\Thesis\chord\example.cfg".

Output pane

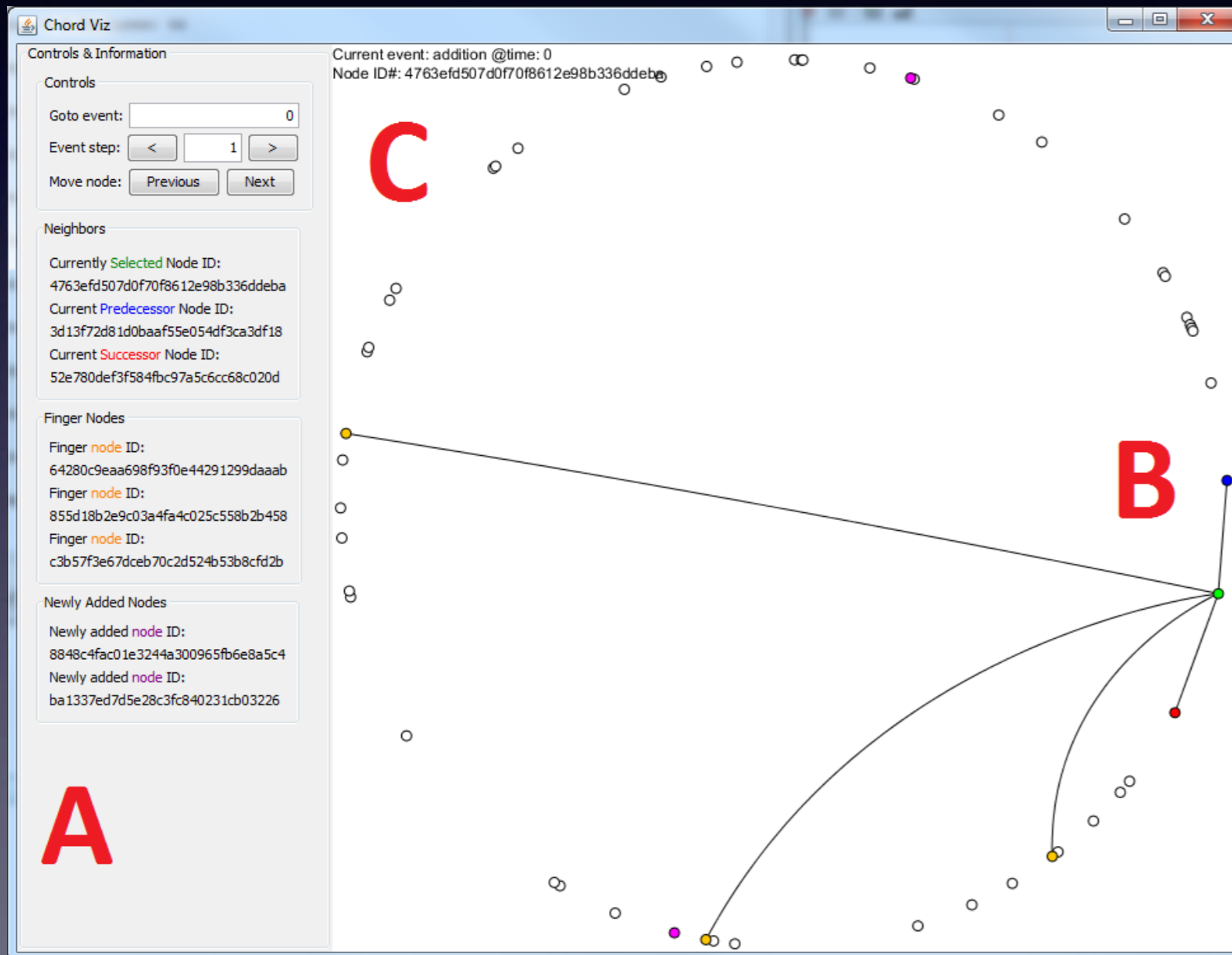
- PeerSim output log
- Provides additional information

Step-by-step



Visualization Window

Step-by-step



Visualization Window

A. Information Panel

B. Interactive Visualisation

C. Details on current event

Step-by-step

Controls & Information

Controls

Goto event:

Event step:

Move node:

Neighbors

Currently **Selected** Node ID:
425b58bcc8d8cec4d0773044b97556ab

Current **Predecessor** Node ID:
3f612c76a17220eed5b30338e3f9431a

Current **Successor** Node ID:
5978efecc0cfb3b6899247a38bd00523

Finger Nodes

Finger **node** ID:
5b6ddc13e0f0330c83f3da8c2df0408d

Finger **node** ID:
7d709948a9adc3827512e5826473ac84

Finger **node** ID:
c24a415e9a5168c5081bc5ab46287a8f

Newly Added Nodes

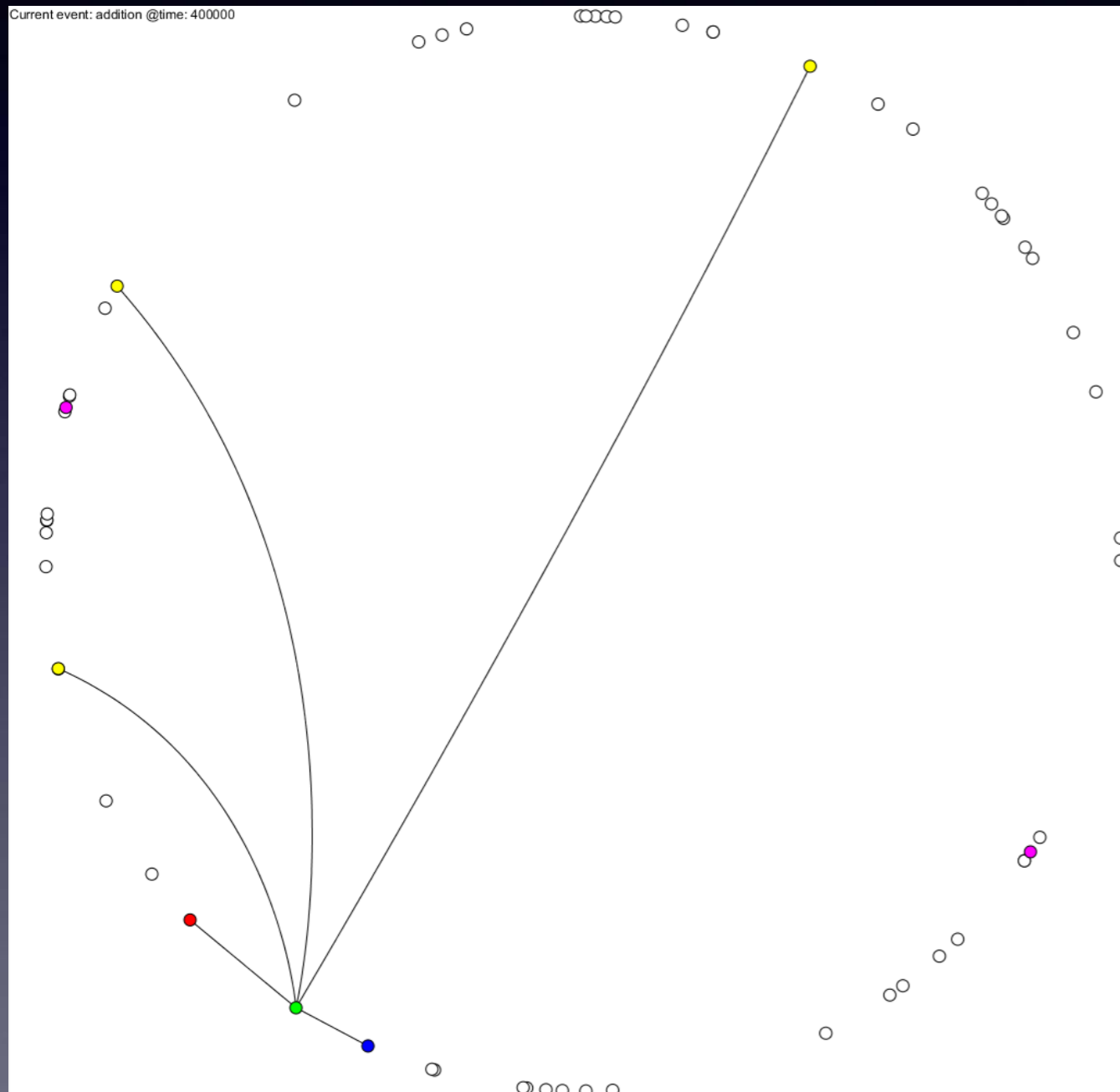
Newly added **node** ID:
73226101dc20c61c4269b55be848b09b

Newly added **node** ID:
67c4c107ea8c97882525a123dd8b4ac0

A) Information Panel

- Controls for event, simulation stepping, selected node.
- Lists neighbours and fingers of selected node
- Lists details of nodes added on the current event

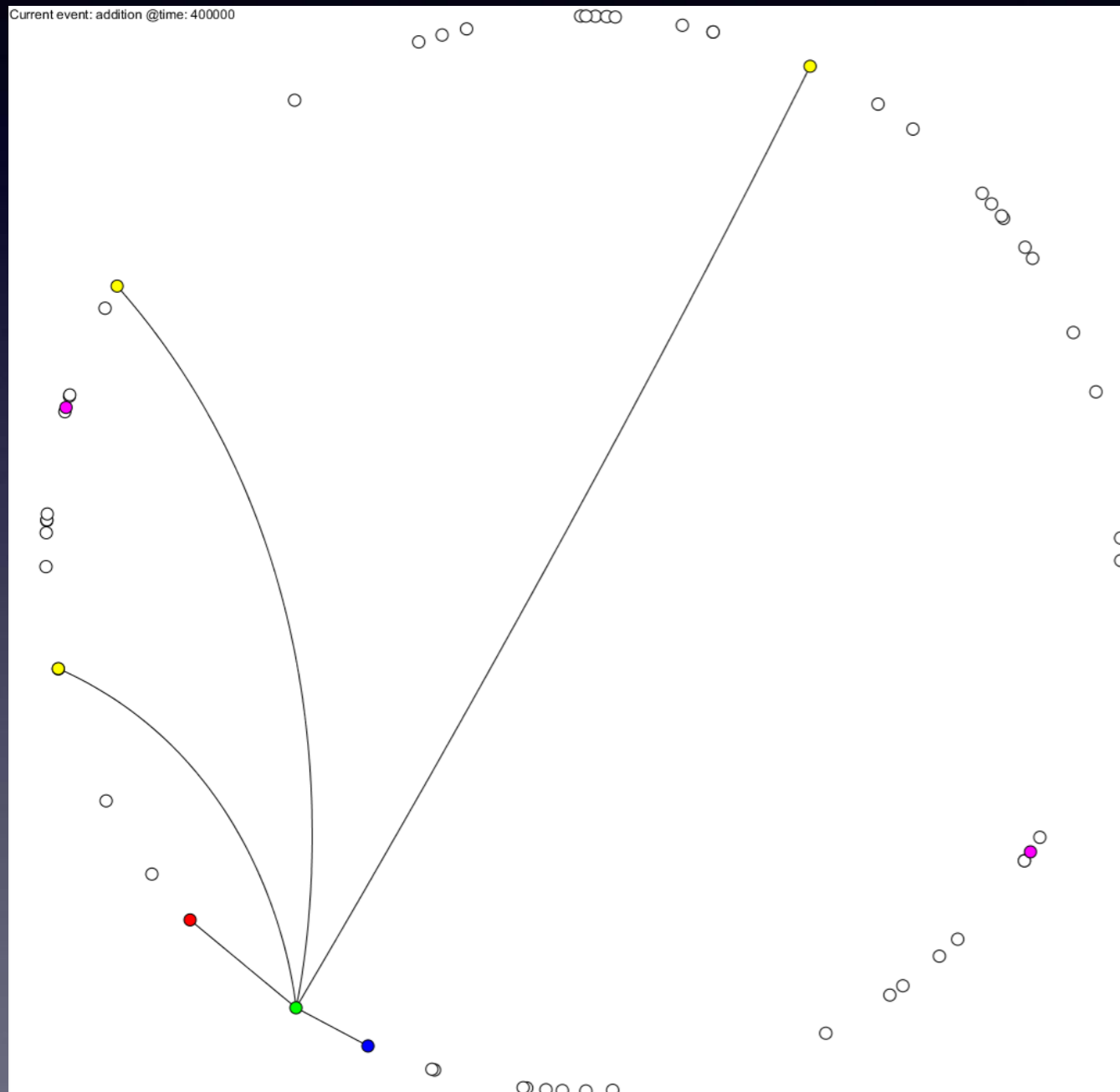
Step-by-step



B) Main Visualization

- Node selection reveals successor, predecessor, fingers
 - Successor: red
 - Predecessor: blue
 - Fingers: yellow

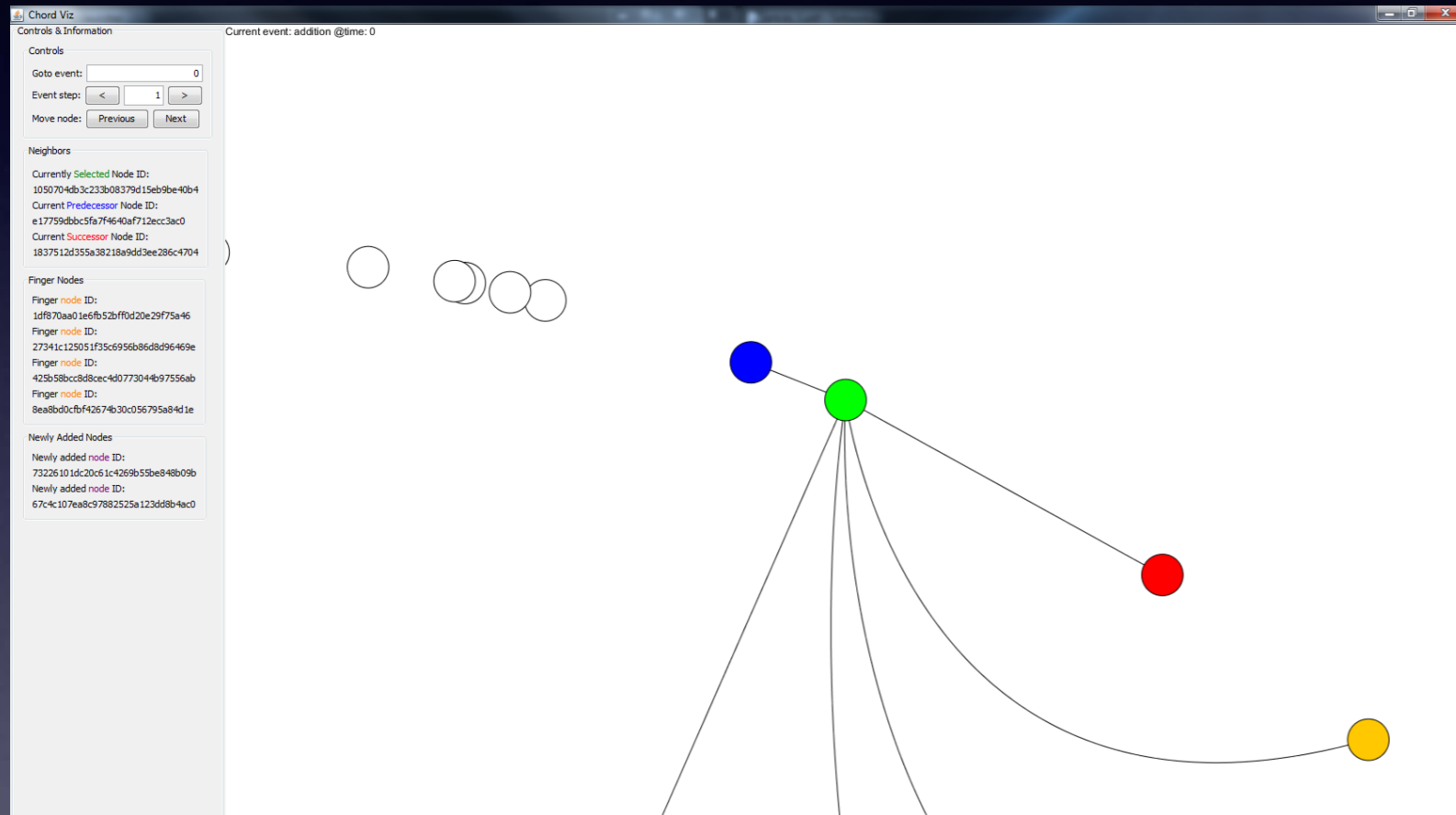
Step-by-step



B) Main Visualization

- Event details shown on top-left corner
- On event change, new nodes are highlighted
 - New nodes: magenta

Step-by-step



Interaction

- Visualization allows zoom in or zoom out
 - Explore dense networks
 - See overview of network
- Selected node can be changed via keyboard
 - Useful when network is dense

Questions

- Any questions?

PViz

Thank you!