

# Reference Documentation for ODGI

## 0.4.1

## Table of Contents

1. odgi (1).....	1
2. odgi build(1).....	6
3. odgi stats(1) .....	8
4. odgi sort(1).....	10
5. odgi view(1).....	14
6. odgi kmers(1).....	15
7. odgi unitig(1).....	17
8. odgi viz(1).....	18
9. odgi paths(1) .....	20
10. odgi prune(1).....	21
11. odgi unchop(1) .....	23
12. odgi normalize(1).....	24
13. odgi subset(1) .....	26
14. odgi bin(1) .....	27
15. odgi matrix(1).....	29
16. odgi chop(1).....	30
17. odgi layout(1) .....	31
18. odgi flatten(1) .....	33
19. odgi break(1).....	34
20. odgi pathindex(1).....	36
21. odgi panpos(1).....	37
22. odgi server(1) .....	38
23. odgi test(1) .....	39

## 1. odgi (1)

### 1.1. NAME

odgi - dynamic succinct variation graph tool

### 1.2. SYNOPSIS

**odgi** **build** -g graph.gfa -o graph.og

**odgi stats** -i graph.og -S

**odgi sort** -i graph.og -o graph.sorted.og -p bSnSnS

**odgi view** -i graph.og -g

**odgi kmers** -i graph.og -c -k 23 -e 34 -D 50

**odgi unitig** -i graph.og -f -t 1324 -l 120

**odgi viz** -i graph.og -o graph.og.png -x 1920 -y 1080 -R -t 28

**odgi paths** -i graph.og -f

**odgi prune** -i graph.og -o graph.pruned.og -c 3 -C 345 -T

**odgi unchop** -i graph.og -o graph.unchopped.og

**odgi normalize** -i graph.og -o graph.normalized.og -I 100 -d

**odgi subset** -i graph.og -o graph.subsetted.og -n 1 -t 28

**odgi bin** -i graph.og -j -w 100 -s -g

**odgi matrix** -i graph.og -e -d

**odgi chop** -i graph.og -o graph.choped.og -c 1000

**odgi layout** -i graph.og -o graph.svg -R 10 -m 100

**odgi break** -i graph.og -o graph.broken.og -s 100 -d

**odgi pathindex** -i graph.og -o graph.xp

**odgi panpos** -i graph.og -p Chr1 -n 4

**odgi server** -i graph.og -p 4000 -ip 192.168.8.9

**odgi test**

## 1.3. DESCRIPTION

**odgi**, the **Optimized Dynamic (genome) Graph Interface**, links a thrifty dynamic in-memory variation graph data model to a set of algorithms designed for scalable sorting, pruning, transformation, and visualization of very large [genome graphs](#). **odgi** includes [python bindings](#) that can be used to [directly interface with its data model](#). This **odgi** manual provides detailed information about its features and subcommands, including examples.

## 1.4. COMMANDS

Each command has its own man page which can be viewed using e.g. **man odgi\_build.1**. Below we have a brief summary of syntax and subcommand description.

**odgi build** [-g, --gfa=FILE] [-o, --out=FILE] [OPTION]...

The `odgi build(1)` command constructs a succinct variation graph from a GFA. Currently, only GFA1 is supported. For details of the format please see <https://github.com/GFA-spec/GFA-spec/blob/master/GFA1.md>.

**odgi stats** [-i, --idx=FILE] [OPTION]...

The `odgi stats(1)` command produces statistics of a variation graph. Among other metrics, it can calculate the #nodes, #edges, #paths and the total nucleotide length of the graph. Various histogram summary options complement the tool. If [-B, --bed-multicov=BED] is set, the metrics will be produced for the intervals specified in the BED.

**odgi sort** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

The `odgi sort(1)` command sorts a succinct variation graph. Odgi sort offers a diverse palette of sorting algorithms to determine the node order:

- A topological sort: A graph can be sorted via [breadth-first search \(BFS\)](#) or [depth-first search \(DFS\)](#). Optionally, a chunk size specifies how much of the graph to grab at once in each topological sorting phase. The sorting algorithm will continue the sort from the next node in the prior graph order that has not been sorted, yet. The cycle breaking algorithm applies a DFS sort until a cycle is found. We break and start a new DFS sort phase from where we stopped.
- A random sort: The graph is randomly sorted. The node order is randomly shuffled from [Mersenne Twister pseudo-random](#) generated numbers.
- A sparse matrix mondriaan sort: We can partition a hypergraph with integer weights and uniform hyperedge costs using the [Mondriaan](#) partitioner.
- A 1D linear SGD sort: Odgi implements a 1D linear, variation graph adjusted, multi-threaded version of the [Graph Drawing by Stochastic Gradient Descent](#) algorithm. The force-directed graph drawing algorithm minimizes the graph's energy function or stress level. It applies stochastic gradient descent (SGD) to move a single pair of nodes at a time.
- An eades algorithmic sort: Use [Peter Eades' heuristic for graph drawing](#).

Sorting the paths in a graph may refine the sorting process. For the users' convenience, it is possible to specify a whole pipeline of sorts within one parameter.

**odgi view** [-i, --idx=FILE] [OPTION]...

The `odgi view(1)` command can convert a graph in odgi format to GFAv1. It can reveal a graph's internal structures for e.g. debugging processes.

**odgi kmers** [-i, --idx=FILE] [-c, --stdout] [OPTION]...

Given a kmer length, the `odgi kmers(1)` command can emit all kmers. The output can be refined by setting the maximum number of furcations at edges or by not considering nodes above a given node degree limit.

**odgi unitig** [-i, --idx=FILE] [OPTION]...

The `odgi unitig(1)` command can print all unitigs of a given odgi graph to standard output in FASTA format. Unitigs can also be emitted in a fixed sequence quality FASTQ format. Various parameters can refine the unitigs to print.

**odgi viz** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

The `odgi viz(1)` command can produce a linear, static visualization of an `odgi` variation graph. It aggregates the pangenome into bins and directly renders a raster image. The binning level depends on the target width of the PNG to emit. Can be used to produce visualizations for gigabase scale pangenomes. For more information about the binning process, please refer to [odgi bin](#). If reverse coloring was selected, only the bins with a reverse rate of at least 0.5 are colored. Currently, there is no parameter to color according to the sequence coverage in bins available.

**odgi paths** [-i, --idx=FILE] [OPTION]...

The `odgi paths(1)` command allows the investigation of paths of a given variation graph. It can calculate overlap statistics of groupings of paths.

**odgi prune** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

The `odgi prune(1)` command can remove complex parts of a graph. One can drop paths, nodes by a certain kind of edge coverage, edges and graph tips. Specifying a kmer length and a maximum number of furcations, the graph can be broken at edges not fitting into these conditions.

**odgi unchop** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

The `odgi unchop(1)` command merges each unitig into a single node.

**odgi normalize** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

The `odgi normalize(1)` command [unchops](#) a given variation graph and simplifies redundant furcations.

**odgi subset** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

Extracting a node subset of a variation graph is the task of the `odgi subset(1)` command. Users can specify a node, a list of nodes or a the context of which to generate a subset from.

**odgi matrix** [-i, --idx=FILE] [OPTION]...

The `odgi matrix(1)` command generates a sparse matrix format out of the graph topology of a given variation graph.

**odgi bin** [-i, --idx=FILE] [OPTION]...

The `odgi bin(1)` command bins a given variation graph. The pangenome sequence, the one-time traversal of all nodes from smallest to largest node identifier, can be summed up into bins of a specified size. For each bin, the path metainformation is summarized. This enables a summarized view of gigabase scale graphs. Each step of a path is a bin and connected to its next bin via a link. A link has a start bin identifier and an end bin identifier.

The concept of `odgi bin` is also applied in `odgi viz`. A demonstration of how the `odgi bin` JSON output can be used for an interactive visualization is realized in the [Pantograph](#) project. Per default, `odgi bin` writes the bins to stdout in a tab-delimited format: **path.name**, **path.prefix**, **path.suffix**, **bin** (bin identifier), **mean.cov** (mean coverage of the path in this bin), **mean.inv** (mean inversion rate of this path in this bin), **mean.pos** (mean nucleotide position of this path in this bin), **first.nucl** (first nucleotide position of this path in this bin), **last.nucl** (last nucleotide position of this path in this bin). These nucleotide ranges might span positions that are not present in the bin. Example: A range of 1-100 means that the first nucleotide has position 1 and the last has position 100, but nucleotide 45 could be located in another bin. For an exact positional output, please specify [-j, --json].

**odgi chop** [-i, --idx=FILE] [-o, --out=FILE] [-c, --chop-to=N] [OPTION]...

The `odgi chop(1)` command chops long nodes into short ones while preserving the graph topology.

**odgi layout** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

The **odgi layout**(1) command draws 2D layouts of the graph using stochastic gradient descent (SGD). The input graph must be sorted and id-compacted. The algorithm itself is described in [Graph Drawing by Stochastic Gradient Descent](#). The force-directed graph drawing algorithm minimizes the graph's energy function or stress level. It applies SGD to move a single pair of nodes at a time. The rendered graph is written in SVG format.

**odgi flatten** [-i, --idx=FILE] [OPTION]...

The **odgi flatten**(1) command projects the graph sequence and paths into FASTA and BED.

**odgi break** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

The **odgi break**(1) command finds cycles in a graph via [breadth-first search \(BFS\)](#) and breaks them, also dropping the graph's paths.

**odgi pathindex** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

The **odgi pathindex**(1) command generates a path index of a graph. It uses succinct data structures to encode the index. The path index represents a subset of the features of a fully realized [xg index](#). Having a path index, we can use **odgi panpos** to go from **path:position** → **pangenome:position** which is important when navigating large graphs in an interactive manner like in the [Pantograph](#) project.

**odgi panpos** [-i, --idx=FILE] [-p, --path=STRING] [-n, --nuc-pos=N] [OPTION]...

The **odgi panpos**(1) command give a pangenome position for a given path and nucleotide position. It requires a path index, which can be created with **odgi pathindex**. Going from **path:position** → **pangenome:position** is important when navigating large graphs in an interactive manner like in the [Pantograph](#) project. All input and output positions are 1-based.

**odgi server** [-i, --idx=FILE] [-p, --port=N] [OPTION]...

The **odgi server**(1) command starts an HTTP server with a given path index as input. The idea is that we can go from **path:position** → **pangenome:position** via GET requests to the HTTP server. The server headers do not block cross origin requests. Example GET request: [http://localhost:3000/path\\_name/nucleotide\\_position](http://localhost:3000/path_name/nucleotide_position).

The required path index can be created with **odgi pathindex**. Going from **path:position** → **pangenome:position** is important when navigating large graphs in an interactive manner like in the [Pantograph](#) project. All input and output positions are 1-based. If no IP address is specified, the server will run on localhost.

**odgi test** [<TEST NAME|PATTERN|TAGS> ...] [OPTION]...

The **odgi test**(1) command starts all unit tests that are implemented in **odgi**. For targeted testing, a subset of tests can be selected. **odgi test**(1) depends on [Catch2](#). In the default setting, all results are printed to stdout.

## 1.5. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 1.6. AUTHORS

Erik Garrison from the University of California Santa Cruz wrote the whole **odgi** tool. Despite small code contributions, Simon Heumos from the Quantitative Biology Center Tübingen wrote **odgi pathindex**, **odgi panpos**, **odgi server**, and the documentation.

## 1.7. RESOURCES

**Project web site:** <https://github.com/vgteam/odgi>

**Git source repository on GitHub:** <https://github.com/vgteam/odgi>

**GitHub organization:** <https://github.com/vgteam>

**Discussion list / forum:** <https://github.com/vgteam/odgi/issues>

## 1.8. COPYING

The MIT License (MIT)

Copyright (c) 2019 Erik Garrison

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

## 2. odgi build(1)

### 2.1. NAME

`odgi_build` - construct a dynamic succinct variation graph

### 2.2. SYNOPSIS

**odgi build** [-g, --gfa=FILE] [-o, --out=FILE] [OPTION]...

## 2.3. DESCRIPTION

The `odgi build(1)` command constructs a succinct variation graph from a GFA. Currently, only GFA1 is supported. For details of the format please see <https://github.com/GFA-spec/GFA-spec/blob/master/GFA1.md>.

## 2.4. OPTIONS

### 2.4.1. Graph Files IO

**-g, --gfa=FILE**

GFA1 file containing the nodes, edges and paths to build a dynamic succinct variation graph from.

**-o, --out=FILE**

Write the dynamic succinct variation graph to this file. A file ending with `.og` is recommended.

### 2.4.2. Graph Sorting

**-s, --sort**

Apply a general topological sort to the graph and order the node ids accordingly. A bidirected adaptation of Kahn's topological sort (1962) is used, which can handle components with no heads or tails. Here, both heads and tails are taken into account.

### 2.4.3. Processing Information

**-p, --progress**

Print progress updates to stdout.

**-d, --debug**

Verbosely print graph information to stderr. This includes the maximum `node_id`, the minimum `node_id`, the handle to `node_id` mapping, the deleted nodes and the path metadata.

**--trace**

Include backtrace information when reporting errors.

**-v, --verbose**

Verbosely print processing information to stderr, including debug-level log messages.

**-w, --warnings**

Turn on script warnings (applies to executed code).

**-t, --timings**

Print timings report to stderr (time to read, parse, and convert).

## 2.4.4. Program Information

**-h, --help**

Print a help message for **odgi build**.

## 2.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 2.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 2.7. AUTHORS

**odgi build** was written by Erik Garrison.

# 3. odgi stats(1)

## 3.1. NAME

odgi\_stats - metrics describing variation graphs

## 3.2. SYNOPSIS

**odgi stats** [-i, --idx=*FILE*] [*OPTION*]...

## 3.3. DESCRIPTION

The **odgi stats(1)** command produces statistics of a variation graph. Among other metrics, it can calculate the **#nodes**, **#edges**, **#paths** and the total nucleotide length of the graph. Various histogram summary options complement the tool. If **[-B, --bed-multicov=*BED*]** is set, the metrics will be produced for the intervals specified in the BED.

## 3.4. OPTIONS

### 3.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to create statistics from. The file name usually ends



with *.og*.

### 3.4.2. Summary Options

#### **-S, --summarize**

Summarize the graph properties and dimensions. Print to stdout the *#nucleotides*, *#nodes*, *#edges* and *#paths* of the graph.

#### **-b, --base-content**

Describe the base content of the graph. Print to stdout the *#A*, *#C*, *#G* and *#T* of the graph.

#### **-C, --coverage**

Provide a histogram of path coverage over bases in the graph. Print three tab-delimited columns to stdout: **type**, **cov**, **N**. **type** is one of *full* or *uniq* and determines if the histogram corresponds to the full graph or only to a unique paths graph. **cov** implies the *#paths*. **N** implies the *#nucleotides*.

#### **-V, --set-coverage**

Provide a histogram of coverage over unique set of paths. Print two tab-delimited columns to stdout: **cov**, **sets**. **cov** implies *#nucleotides*. **sets** lists the unique set of paths in a comma separated list. Sets with a **cov** of one and no paths in **sets** are listed, too.

#### **-M, --multi-coverage**

Provide a histogram of coverage over unique multiset, the combination with possible repetition of paths. Print two tab-delimited columns to stdout: **cov**, **sets**. **cov** implies *#nucleotides*. **sets** lists the unique multisets of paths in a comma separated list. Multisets with a **cov** of one and no paths in **sets** are listed, too.

### 3.4.3. BED Interval

#### **-B, --bed-multicov=BED**

For each BED entry, provide a table of path coverage over unique multisets of paths in the graph. Each unique multiset of paths overlapping a given BED interval is described in terms of its length relative to the total interval, the number of path traversals and unique paths involved in these traversals.

### 3.4.4. Threading

#### **-t, --threads=N**

Number of threads to use.

### 3.4.5. Program Information

#### **-h, --help**

Print a help message for **odgi stats**.

## 3.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 3.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 3.7. AUTHORS

**odgi stats** was written by Erik Garrison.

# 4. odgi sort(1)

## 4.1. NAME

`odgi_sort` - sort a variation graph

## 4.2. SYNOPSIS

**odgi sort** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

## 4.3. DESCRIPTION

The `odgi sort(1)` command sorts a succinct variation graph. `Odgi sort` offers a diverse palette of sorting algorithms to determine the node order:

- A topological sort: A graph can be sorted via [breadth-first search \(BFS\)](#) or [depth-first search \(DFS\)](#). Optionally, a chunk size specifies how much of the graph to grab at once in each topological sorting phase. The sorting algorithm will continue the sort from the next node in the prior graph order that has not been sorted, yet. The cycle breaking algorithm applies a DFS sort until a cycle is found. We break and start a new DFS sort phase from where we stopped.
- A random sort: The graph is randomly sorted. The node order is randomly shuffled from [Mersenne Twister pseudo-random](#) generated numbers.
- A sparse matrix mondriaan sort: We can partition a hypergraph with integer weights and uniform hyperedge costs using the [Mondriaan](#) partitioner.
- A 1D linear SGD sort: `Odgi` implements a 1D linear, variation graph adjusted, multi-threaded version of the [Graph Drawing by Stochastic Gradient Descent](#) algorithm. The force-directed graph drawing algorithm minimizes the graph's energy function or stress level. It applies stochastic gradient descent (SGD) to move a single pair of nodes at a time.

- An eades algorithmic sort: Use [Peter Eades' heuristic for graph drawing](#).

Sorting the paths in a graph may refine the sorting process. For the users' convenience, it is possible to specify a whole pipeline of sorts within one parameter.

## 4.4. OPTIONS

### 4.4.1. Graph Files IO

**-i, --idx=FILE**

File containing the succinct variation graph to sort. The file name usually ends with *.og*.

**-o, --out=FILE**

Write the sorted dynamic succinct variation graph to this file. A file ending with *.og* is recommended.

**-s, --sort-order=FILE**

File containing the sort order. Each line contains one node identifier.

### 4.4.2. Topological Sorts

**-b, --breadth-first**

Use a (chunked) breadth first topological sort.

**-B, --breadth-first-chunk=N**

Chunk size for breadth first topological sort. Specify how many nucleotides to grasp at once in each BFS phase.

**-z, --depth-first**

Use a (chunked) depth first topological sort.

**-Z, --depth-first-chunk=N**

Chunk size for the depth first topological sort. Specify how many nucleotides to grasp at once in each DFS phase.

**-w, --two-way**

Use a two-way topological algorithm for sorting. It is a maximum of head-first and tail-first topological sort.

**-n, --no-seeds**

Don't use heads or tails to seed topological sort.

**-c, --cycle-breaking**

Use a cycle breaking sort.

### 4.4.3. Random Sort

**-r, --random**

Randomly sort the graph.

### 4.4.4. Mondriaan Sort

**-m, --mondriaan**

Use the sparse matrix diagonalization to sort the graph.

**-N, --mondriaan-n-parts=*N***

Number of partitions for the mondriaan sort.

**-E, --mondriaan-epsilon=*N***

Set the epsilon parameter for the mondriaan sort.

**-W, --mondriaan-path-weight**

Weight the mondriaan input matrix by the path coverage of edges.

### 4.4.5. 1D Linear SGD Sort

**-S, --linear-sgd**

Apply 1D linear SGD algorithm to sort the graph.

**-O, --sgd-bandwidth=*sgd-bandwidth***

Bandwidth of linear SGD model. The default value is *1000*.

**-Q, --sgd-sampling-rate=*sgd-sampling-rate***

Sample pairs of nodes with probability distance between them divided by the sampling rate. The default value is *20*.

**-K, --sgd-use-paths**

Use the paths to structure the distances between nodes in SGD.

**-T, --sgd-iter-max=*sgd\_iter-max***

The maximum number of iterations for the linear SGD model. The default value is *30*.

**-V, --sgd-eps=*sgd-eps***

The final learning rate for the linear SGD model. The default value is *0.01*.

**-C, --sgd-delta=*sgd-delta***

The threshold of the maximum node displacement, approximately in base pairs, at which to stop SGD.

### 4.4.6. Eades Sort

**-e, --eades**

Use eades algorithm.

#### 4.4.7. Path Sorting Options

**-L, --paths-min**

Sort paths by their lowest contained node identifier.

**-M, --paths-max**

Sort paths by their highest contained node identifier.

**-A, --paths-avg**

Sort paths by their average contained node identifier.

**-R, --paths-avg-rev**

Sort paths in reverse by their average contained node identifier.

**-D, --path-delim=*path-delim***

Sort paths in bins by their prefix up to this delimiter.

#### 4.4.8. Pipeline Sorting

**-p, --pipeline=*STRING***

Apply a series of sorts, based on single character command line arguments given to this command. The default sort is *s*. The reverse sort would be specified via *f*.

#### 4.4.9. Additional Parameters

**-d, --dagify-sort**

Sort on the basis of a DAGified graph.

**-O, --Optimize**

Use the MutableHandleGraph::optimize method to compact the node identifier space.

#### 4.4.10. Threading

**-t, --threads=*N***

Number of threads to use for parallel sorting in SGD. Only specify this argument in combination with **-S, --linear-sgd**. No multi-threading support for any other sorting algorithm.

#### 4.4.11. Processing Information

**-P, --progress**

Print sort progress to stdout.

#### 4.4.12. Program Information

**-h, --help**

Print a help message for **odgi sort**.

## 4.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 4.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 4.7. AUTHORS

**odgi sort** was written by Erik Garrison.

# 5. odgi view(1)

## 5.1. NAME

`odgi_view` - projection of graphs into other formats

## 5.2. SYNOPSIS

**odgi view** [-i, --idx=*FILE*] [*OPTION*]...

## 5.3. DESCRIPTION

The `odgi view(1)` command can convert a graph in `odgi` format to GFAv1. It can reveal a graph's internal structures for e.g. debugging processes.

## 5.4. OPTIONS

### 5.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to convert from. The file name usually ends with `.og`.

**-g, --to-gfa**

Write the graph in GFAv1 format to standard output.

### 5.4.2. Summary Options

### **-d, --display**

Show the internal structures of a graph. Print to stdout the maximum node identifier, the minimum node identifier, the nodes vector, the delete nodes bit vector and the path metadata, each in a separate line.

### **5.4.3. Program Information**

### **-h, --help**

Print a help message for **odgi view**.

## **5.5. EXIT STATUS**

**0**

Success.

**1**

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## **5.6. BUGS**

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## **5.7. AUTHORS**

**odgi view** was written by Erik Garrison.

# **6. odgi kmers(1)**

## **6.1. NAME**

**odgi\_kmers** - show and characterize the kmer space of the graph

## **6.2. SYNOPSIS**

**odgi kmers** [-i, --idx=*FILE*] [-c, --stdout] [*OPTION*]...

## **6.3. DESCRIPTION**

Given a kmer length, the **odgi kmers(1)** command can emit all kmers. The output can be refined by setting the maximum number of furcations at edges or by not considering nodes above a given node degree limit.

## 6.4. OPTIONS

### 6.4.1. Graph Files IO

**-i, --idx=FILE**

File containing the succinct variation graph to convert from. The file name usually ends with *.og*.

**-c, --stdout=**

Write the kmers to standard output. Kmers are line-separated.

### 6.4.2. Kmer Options

**-k, --kmer-length=N**

The kmer length to generate kmers from.

**-e, --max-furcations=N**

Break at edges that would induce this many furcations when generating a kmer.

**-D, --max-degree=N**

Don't take nodes into account that have a degree greater than *N*.

### 6.4.3. Threading

**-t, --threads=N**

Number of threads to use.

### 6.4.4. Program Information

**-h, --help**

Print a help message for **odgi kmers**.

## 6.5. EXIT STATUS

**0**

Success.

**1**

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 6.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 6.7. AUTHORS

**odgi kmers** was written by Erik Garrison.



# 7. odgi unitig(1)

## 7.1. NAME

odgi\_unitig - output unitigs of the graph

## 7.2. SYNOPSIS

**odgi unitig** [-i, --idx=*FILE*] [*OPTION*]...

## 7.3. DESCRIPTION

The odgi unitig(1) command can print all [unitigs](#) of a given odgi graph to standard output in FASTA format. Unitigs can also be emitted in a fixed sequence quality FASTQ format. Various parameters can refine the unitigs to print.

## 7.4. OPTIONS

### 7.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to convert from. The file name usually ends with *.og*.

### 7.4.2. FASTQ Options

**-f, --fake-fastq**

Write the unitigs in FASTQ format to stdout with a fixed quality value of *I*.

### 7.4.3. Unitig Options

**-t, --sample-to=*N***

Continue unitigs with a random walk in the graph so that they have at least the given *N* length.

**-p, --sample-plus=*N***

Continue unitigs with a random walk in the graph by *N* past their natural end.

**-l, --min-begin-node-length=*N***

Only begin unitigs collection from nodes which have at least length *N*.

### 7.4.4. Program Information

**-h, --help**

Print a help message for **odgi unitig**.

## 7.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 7.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 7.7. AUTHORS

**odgi unitig** was written by Erik Garrison.

# 8. odgi viz(1)

## 8.1. NAME

odgi\_viz - variation graph visualizations

## 8.2. SYNOPSIS

**odgi viz** [-i, --idx=FILE] [-o, --out=FILE] [OPTION]...

## 8.3. DESCRIPTION

The **odgi viz(1)** command can produce a linear, static visualization of an **odgi** variation graph. It aggregates the pangenome into bins and directly renders a raster image. The binning level depends on the target width of the PNG to emit. Can be used to produce visualizations for gigabase scale pangenomes. For more information about the binning process, please refer to [odgi bin](#). If reverse coloring was selected, only the bins with a reverse rate of at least 0.5 are colored. Currently, there is no parameter to color according to the sequence coverage in bins available.

## 8.4. OPTIONS

### 8.4.1. Graph Files IO

**-i, --idx=FILE**

File containing the succinct variation graph to convert from. The file name usually ends with **.og**.

**-o, --out=FILE**

Write the visualization in PNG format to this file.

### 8.4.2. Visualization Options

**-x, --width=*N***

Set the width in pixels of the output image.

**-y, --height=*N***

Set the height in pixels of the output image.

**-P, --path-height=*N***

The height in pixels for a path.

**-X, --path-x-padding=*N***

The padding in pixels on the x-axis for a path.

**-R, --path-per-row**

Display a single path per row rather than packing them.

**-L, --link-path-pieces=*FLOAT***

Show thin links of this relative width to connect path pieces.

**-A, --alignment-prefix=*STRING***

Apply alignment related visual motifs to paths which have this name prefix.

**-S, --show-strand**

Use red and blue coloring to display forward and reverse alignments. This parameter should only be set in combination with [-A, --alignment-prefix=*STRING*].

### 8.4.3. Threading

**-t, --threads=*N***

Number of threads to use.

### 8.4.4. Program Information

**-h, --help**

Print a help message for **odgi viz**.

## 8.5. EXIT STATUS

**0**

Success.

**1**

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 8.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 8.7. AUTHORS

**odgi viz** was written by Erik Garrison.

# 9. odgi paths(1)

## 9.1. NAME

odgi\_paths - embedded path interrogation

## 9.2. SYNOPSIS

**odgi paths** [-i, --idx=*FILE*] [*OPTION*]...

## 9.3. DESCRIPTION

The **odgi paths(1)** command allows the investigation of paths of a given variation graph. It can calculate overlap statistics of groupings of paths.

## 9.4. OPTIONS

### 9.4.1. Graph Files IO

**-i, --idx=FILE**

File containing the succinct variation graph to investigate the paths from. The file name usually ends with *.og*.

**-O, --overlaps=FILE**

Read in the path grouping file to generate the overlap statistics from. The file must be tab-delimited. The first column lists a grouping and the second the path itself. Each line has one path entry. For each group the pairwise overlap statistics for each pairing will be calculated and printed to stdout.

### 9.4.2. Investigation Options

**-L, --list-paths**

Print the paths in the graph to stdout. Each path is printed in its own line.

**-H, --haplotypes**

Print to stdout the paths in an approximate binary haplotype matrix based on the graph's sort order. The output is tab-delimited: **path.name**, **path.length**, **node.count**, **node.1**, **node.2**,

**node.n**. Each path entry is printed in its own line.

**-D, --delim=CHAR**

The part of each path name before this delimiter is a group identifier. This parameter should only be set in combination with **[-H, --haplotypes]**. Prints an additional, first column **group.name** to stdout.

**-d, --distance**

Provides a sparse distance matrix for paths. If **[-D, --delim]** is set, it will be path groups distances.

**-f, --fasta**

Print paths in FASTA format to stdout.

### 9.4.3. Threading

**-t, --threads=N**

Number of threads to use.

### 9.4.4. Program Information

**-h, --help**

Print a help message for **odgi paths**.

## 9.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 9.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 9.7. AUTHORS

**odgi paths** was written by Erik Garrison.

# 10. odgi prune(1)

## 10.1. NAME

**odgi\_prune** - remove complex parts of the graph

## 10.2. SYNOPSIS

**odgi prune** [-i, --idx=*FILE*] [-o, --out=*FILE*] [*OPTION*]...

## 10.3. DESCRIPTION

The `odgi prune(1)` command can remove complex parts of a graph. One can drop paths, nodes by a certain kind of edge coverage, edges and graph tips. Specifying a kmer length and a maximum number of furcations, the graph can be broken at edges not fitting into these conditions.

## 10.4. OPTIONS

### 10.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to load in. The file name usually ends with *.og*.

**-o, --out=*FILE***

Write the pruned graph to *FILE*. The file name should end with *.og*.

### 10.4.2. Kmer Options

**-k, --kmer-length=*N***

The length of the kmers to consider.

**-e, --max-furcations=*N***

Break at edges that would induce *N* many furcations in a kmer.

### 10.4.3. Node Options

**-d, --max-degree=*N***

Remove nodes that have a higher node degree than *N*.

**-c, --min-coverage=*N***

Remove nodes covered by fewer than *N* number of path steps.

**-C, --max-coverage=*N***

Remove nodes covered by more than *N* number of path steps.

**-T, --cut-tips=*N***

Remove nodes which are graph tips.

### 10.4.4. Edge Options

**-E, --edge-coverage**

Remove edges outside of the minimum and maximum coverage rather than nodes. Only set this

argument in combination with [-c, --min-coverage=*N*] and [-C, --max-coverage=*N*].

**-b, --best-edges=*N***

Only keep the *N* most covered inbound and output edges of each node.

### 10.4.5. Path Options

**-D, --drop-paths**

Remove the paths from the graph.

### 10.4.6. Threading

**-t, --threads=*N***

Number of threads to use.

### 10.4.7. Program Information

**-h, --help**

Print a help message for **odgi prune**.

## 10.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 10.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 10.7. AUTHORS

**odgi prune** was written by Erik Garrison.

# 11. odgi unchop(1)

## 11.1. NAME

odgi\_unchop - merge unitigs into single nodes

## 11.2. SYNOPSIS

**odgi unchop** [-i, --idx=*FILE*] [-o, --out=*FILE*] [*OPTION*]...

## 11.3. DESCRIPTION

The `odgi unchop(1)` command merges each unitig into a single node.

## 11.4. OPTIONS

### 11.4.1. Graph Files IO

**-i, --idx=FILE**

File containing the succinct variation graph to unchop. The file name usually ends with `.og`.

**-o, --out=FILE**

Write the unchopped dynamic succinct variation graph to this file. A file ending with `.og` is recommended.

### 11.4.2. Program Information

**-h, --help**

Print a help message for **odgi unchop**.

## 11.5. EXIT STATUS

**0**

Success.

**1**

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 11.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 11.7. AUTHORS

**odgi unchop** was written by Erik Garrison.

# 12. odgi normalize(1)

## 12.1. NAME

`odgi_normalize` - compact unitigs and simplify redundant furcations



## 12.2. SYNOPSIS

**odgi normalize** [-i, --idx=*FILE*] [-o, --out=*FILE*] [*OPTION*]...

## 12.3. DESCRIPTION

The `odgi normalize(1)` command [unchops](#) a given variation graph and simplifies redundant furcations.

## 12.4. OPTIONS

### 12.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to normalize. The file name usually ends with *.og*.

**-o, --out=*FILE***

Write the normalized dynamic succinct variation graph to this file. A file ending with *.og* is recommended.

**-I, --max-iterations=*N***

Iterate the normalization up to *N* many times. The default is *10*.

### 12.4.2. Program Debugging

**-d, --debug**

Print information about the normalization process to stdout.

### 12.4.3. Program Information

**-h, --help**

Print a help message for **odgi normalize**.

## 12.5. EXIT STATUS

**0**

Success.

**1**

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 12.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 12.7. AUTHORS

**odgi normalize** was written by Erik Garrison.

## 13. odgi subset(1)

### 13.1. NAME

**odgi\_subset** - extract subsets of the graph as defined by query criteria

### 13.2. SYNOPSIS

**odgi subset** [-i, --idx=*FILE*] [-o, --out=*FILE*] [*OPTION*]...

### 13.3. DESCRIPTION

Extracting a node subset of a variation graph is the task of the **odgi subset(1)** command. Users can specify a node, a list of nodes or a context of which to generate a subset from.

### 13.4. OPTIONS

#### 13.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to subset. The file name usually ends with *.og*.

**-o, --out=*FILE***

Write the subset to this file.

#### 13.4.2. Traversal Options

**-l, --node-list=*FILE***

A file with one node identifier per line. All nodes specified here will be extract as a subset.

**-n, --node=*N***

Specify the node identifier from which our traversal should begin.

**-c, --context=*N***

The number of steps away from which to begin our traversal.

#### 13.4.3. Threading

**-t, --threads=*N***

Number of threads to use.

### 13.4.4. Program Information

**-h, --help**

Print a help message for **odgi subset**.

## 13.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 13.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 13.7. AUTHORS

**odgi subset** was written by Erik Garrison.

# 14. odgi bin(1)

## 14.1. NAME

**odgi\_bin** - binning of pangenome sequence and path information in the graph

## 14.2. SYNOPSIS

**odgi bin** [-i, --idx=FILE] [OPTION]...

## 14.3. DESCRIPTION

The **odgi bin(1)** command bins a given variation graph. The pangenome sequence, the one-time traversal of all nodes from smallest to largest node identifier, can be summed up into bins of a specified size. For each bin, the path meta-information is summarized. This enables a summarized view of gigabase scale graphs. Each step of a path is a bin and connected to its next bin via a link. A link has a start bin identifier and an end bin identifier.

The concept of **odgi bin** is also applied in **odgi viz**. A demonstration of how the **odgi bin** JSON output can be used for an interactive visualization is realized in the [Pantograph](#) project. Per default, **odgi bin** writes the bins to stdout in a tab-delimited format: **path.name**, **path.prefix**, **path.suffix**, **bin** (bin identifier), **mean.cov** (mean coverage of the path in this bin), **mean.inv** (mean inversion rate of this path in this bin), **mean.pos** (mean nucleotide position of this path in this bin), **first.nucl** (first nucleotide position of this path in this bin), **last.nucl** (last nucleotide position of this path in this bin). These nucleotide ranges might span positions that are not present in the bin. Example: A

range of 1-100 means that the first nucleotide has position 1 and the last has position 100, but nucleotide 45 could be located in another bin. For an exact positional output, please specify [-j, --json].

## 14.4. OPTIONS

### 14.4.1. Graph Files IO

**-i, --idx=FILE**

File containing the succinct variation graph to investigate the bin from. The file name usually ends with *.og*.

### 14.4.2. FASTA Options

**-f, --fasta=FILE**

Write the pangenome sequence to *FILE* in FASTA format.

### 14.4.3. Bin Options

**-n, --number-bins=N**

The number of bins the pangenome sequence should be chopped up to.

**-w, --bin-width=N**

The bin width specifies the size of each bin.

**-D, --path-delim=STRING**

Annotate rows by prefix and suffix of this delimiter.

**-a, --aggregate-delim**

Aggregate on path prefix delimiter. Argument depends on [-D, --path-delim=STRING].

**-j, --json**

Print bins and links to stdout in pseudo JSON format. Each line is a valid JSON object, but the whole file is not a valid JSON! First, each bin including its pangenome sequence is printed to stdout per line. Second, for each path in the graph, its traversed bins including meta-information: **bin** (bin identifier), **mean.cov** (mean coverage of the path in this bin), **mean.inv** (mean inversion rate of this path in this bin), **mean.pos** (mean nucleotide position of this path in this bin), and an array of ranges determining the nucleotide position of the path in this bin. Switching first and last nucleotide in a range represents a complement reverse orientation of that particular sequence.

**-s, --no-seqs**

If [-j, --json] is set, no nucleotide sequences will be printed to stdout in order to save disk space.

**-g, --no-gap-links**

Links connecting a path from left to right may not be relevant to understand a path's traversal through the bins. They can be left out saving disk space.

#### 14.4.4. Program Information

**-h, --help**

Print a help message for **odgi bin**.

### 14.5. EXIT STATUS

**0**

Success.

**1**

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

### 14.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

### 14.7. AUTHORS

**odgi bin** was written by Erik Garrison.

## 15. odgi matrix(1)

### 15.1. NAME

**odgi\_matrix** - write the graph topology in sparse matrix formats

### 15.2. SYNOPSIS

**odgi matrix** [-i, --idx=*FILE*] [*OPTION*]...

### 15.3. DESCRIPTION

The **odgi matrix(1)** command generates a sparse matrix format out of the graph topology of a given variation graph.

### 15.4. OPTIONS

#### 15.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to create the sparse matrix from. The file name usually ends with *.og*.

## 15.4.2. Matrix Options

### **-e, --edge-depth-weight**

Weigh edges by their path depth.

### **-d, --delta-weight**

Weigh edges by their inverse id delta.

## 15.4.3. Program Information

### **-h, --help**

Print a help message for **odgi matrix**.

## 15.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 15.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 15.7. AUTHORS

**odgi matrix** was written by Erik Garrison.

# 16. odgi chop(1)

## 16.1. NAME

**odgi\_chop** - divide nodes into smaller pieces

## 16.2. SYNOPSIS

**odgi chop** [-i, --idx=FILE] [-o, --out=FILE] [-c, --chop-to=N] [OPTION]...

## 16.3. DESCRIPTION

The **odgi chop(1)** command chops long nodes into short ones while preserving the graph topology.

## 16.4. OPTIONS

### 16.4.1. Graph Files IO

**-i, --idx=FILE**

File containing the succinct variation graph to chop. The file name usually ends with *.og*.

**-o, --out=FILE**

Write the chopped succinct variation graph to *FILE*. The file name usually ends with *.og*.

### 16.4.2. Chop Options

**-c, --chop-to=N**

Divide nodes that are shorter than *N*.

### 16.4.3. Processing Information

**-d, --debug**

Print information about the components to stdout.

### 16.4.4. Program Information

**-h, --help**

Print a help message for **odgi chop**.

## 16.5. EXIT STATUS

**0**

Success.

**1**

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 16.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 16.7. AUTHORS

**odgi chop** was written by Erik Garrison.

## 17. odgi layout(1)

## 17.1. NAME

odgi\_layout - use SGD to make 2D layouts of the graph

## 17.2. SYNOPSIS

**odgi layout** [-i, --idx=*FILE*] [-o, --out=*FILE*] [*OPTION*]...

## 17.3. DESCRIPTION

The odgi layout(1) command draws 2D layouts of the graph using stochastic gradient descent (SGD). The input graph must be sorted and id-compacted. The algorithm itself is described in [Graph Drawing by Stochastic Gradient Descent](#). The force-directed graph drawing algorithm minimizes the graph's energy function or stress level. It applies SGD to move a single pair of nodes at a time. The rendered graph is written in SVG format.

## 17.4. OPTIONS

### 17.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to layout. The file name usually ends with *.og*.

**-o, --out=*FILE***

Write the rendered layout in SVG format to *FILE*.

### 17.4.2. SGD Options

**-m, --iter-max=*N***

The maximum number of iterations to run the layout. Default is 30.

**-p, --n-pivots=*N***

The number of pivots for sparse layout. Default is 0 leading to a non-sparse layout.

**-e, --eps=*N***

The learning rate for SGD layout. Default is 0.01.

### 17.4.3. SVG Options

**-x, --x-padding=*N***

The padding between the connected component layouts. Default is 10.0.

**-R, --render-scale=*N***

SVG scaling Default is 5.0.



#### 17.4.4. Processing Information

**-d, --debug**

Print information about the components to stdout.

#### 17.4.5. Program Information

**-h, --help**

Print a help message for **odgi layout**.

### 17.5. EXIT STATUS

**0**

Success.

**1**

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

### 17.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

### 17.7. AUTHORS

**odgi layout** was written by Erik Garrison.

## 18. odgi flatten(1)

### 18.1. NAME

**odgi\_flatten** - generate linearization of the graph

### 18.2. SYNOPSIS

**odgi flatten** [-i, --idx=FILE] [OPTION]...

### 18.3. DESCRIPTION

The **odgi flatten(1)** command projects the graph sequence and paths into FASTA and BED.

### 18.4. OPTIONS

### 18.4.1. Graph Files IO

**-i, --idx=FILE**

File containing the succinct variation graph to flatten. The file name usually ends with *.og*.

### 18.4.2. Output Options

**-f, --fasta=FILE**

Write the concatenated node sequences in FASTA format to *FILE*.

**-n, --name-seq=STRING**

The name to use for the concatenated graph sequence. Default is the name of the input file which was specified via **[-i, --idx=FILE]**.

**-b, --bed=FILE**

Write the mapping between graph paths and the linearized FASTA sequence in BED format to *FILE*.

### 18.4.3. Program Information

**-h, --help**

Print a help message for **odgi flatten**.

## 18.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 18.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 18.7. AUTHORS

**odgi flatten** was written by Erik Garrison.

# 19. odgi break(1)

## 19.1. NAME

**odgi\_break** - break cycles in the graph and drop its paths

## 19.2. SYNOPSIS

**odgi break** [-i, --idx=*FILE*] [-o, --out=*FILE*] [*OPTION*]...

## 19.3. DESCRIPTION

The `odgi break(1)` command finds cycles in a graph via [breadth-first search \(BFS\)](#) and breaks them, also dropping the graph's paths.

## 19.4. OPTIONS

### 19.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to break. The file name usually ends with *.og*.

**-o, --out=*FILE***

Write the broken graph to *FILE*.

### 19.4.2. Cycle Options

**-c, --cycle-max-bp=*N***

The maximum cycle length at which to break.

**-s, --max-search-bp=*N***

The maximum search space of each BFS given in number of base pairs.

**-u, --repeat-up-to=*N***

Iterate cycle breaking up to *N* times or stop if no new edges are removed.

**-d, --show**

Print the edges we would remove to stdout.

### 19.4.3. Program Information

**-h, --help**

Print a help message for **odgi break**.

## 19.5. EXIT STATUS

**0**

Success.

**1**

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 19.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 19.7. AUTHORS

**odgi break** was written by Erik Garrison.

# 20. odgi pathindex(1)

## 20.1. NAME

`odgi_pathindex` - create a path index for a given path

## 20.2. SYNOPSIS

**odgi pathindex** [-i, --idx=*FILE*] [-o, --out=*FILE*] [*OPTION*]...

## 20.3. DESCRIPTION

The `odgi pathindex(1)` command generates a path index of a graph. It uses succinct data structures to encode the index. The path index represents a subset of the features of a fully realized [xg index](#). Having a path index, we can use `odgi panpos` to go from **path:position** → **pangenome:position** which is important when navigating large graphs in an interactive manner like in the [Pantograph](#) project.

## 20.4. OPTIONS

### 20.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph to generate a path index from. The file name usually ends with *.og*.

**-o, --out=*FILE***

Write the path index to *FILE*.

### 20.4.2. Program Information

**-h, --help**

Print a help message for **odgi pathindex**.

## 20.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 20.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 20.7. AUTHORS

**odgi pathindex** was written by Simon Heumos.

# 21. odgi panpos(1)

## 21.1. NAME

**odgi\_panpos** - get the pangenome position of a given path and nucleotide position (1-based)

## 21.2. SYNOPSIS

**odgi panpos** [-i, --idx=*FILE*] [-p, --path=*STRING*] [-n, --nuc-pos=*N*] [*OPTION*]...

## 21.3. DESCRIPTION

The **odgi panpos(1)** command give a pangenome position for a given path and nucleotide position. It requires a path index, which can be created with **odgi pathindex**. Going from **path:position** → **pangenome:position** is important when navigating large graphs in an interactive manner like in the **Pantograph** project. All input and output positions are 1-based.

## 21.4. OPTIONS

### 21.4.1. Graph Files IO

**-i, --idx=*FILE***

File containing the succinct variation graph index to find the pangenome position in. The file name usually ends with *.xp*.

### 21.4.2. Position Options

**-p, --path=STRING**

The path name of the query.

**-n, --nuc-pos=STRING**

The nucleotide sequence of the query.

### 21.4.3. Program Information

**-h, --help**

Print a help message for **odgi panpos**.

## 21.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 21.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 21.7. AUTHORS

**odgi panpos** was written by Simon Heumos.

# 22. odgi server(1)

## 22.1. NAME

**odgi\_server** - start a HTTP server with a given index file to query a pangenome position

## 22.2. SYNOPSIS

**odgi server** [-i, --idx=FILE] [-p, --port=N] [OPTION]...

## 22.3. DESCRIPTION

The **odgi server(1)** command starts an HTTP server with a given path index as input. The idea is that we can go from **path:position** → **pangenome:position** via GET requests to the HTTP server. The server headers do not block cross origin requests. Example GET request: [http://localhost:3000/path\\_name/nucleotide\\_position](http://localhost:3000/path_name/nucleotide_position).

The required path index can be created with **odgi pathindex**. Going from **path:position** → **pangenome:position** is important when navigating large graphs in an interactive manner like in

the [Pantograph](#) project. All input and output positions are 1-based. If no IP address is specified, the server will run on localhost.

## 22.4. OPTIONS

### 22.4.1. Graph Files IO

**-i, --idx=FILE**

File containing the succinct variation graph index to host in a HTTP server. The file name usually ends with *.xp*.

### 22.4.2. HTTP Options

**-p, --port=N**

Run the server under this port.

**-a, --ip=IP**

Run the server under this IP address. If not specified, *IP* will be *localhost*.

### 22.4.3. Program Information

**-h, --help**

Print a help message for **odgi server**.

## 22.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 22.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 22.7. AUTHORS

**odgi server** was written by Simon Heumos.

# 23. odgi test(1)

## 23.1. NAME

odgi\_test - run odgi unit tests

## 23.2. SYNOPSIS

**odgi test** [<TEST NAME | PATTERN | TAGS> ...] [*OPTION*]...

## 23.3. DESCRIPTION

The `odgi test(1)` command starts all unit tests that are implemented in `odgi`. For targeted testing, a subset of tests can be selected. `odgi test(1)` depends on [Catch2](#). In the default setting, all results are printed to `stdout`.

## 23.4. OPTIONS

### 23.4.1. Testing Options

**-l, --list-tests**

List all test cases. If a pattern was specified, all matching test cases are listed.

**-t, --list-tags**

List all tags. If a pattern was specified, all matching tags are listed.

**-s, --success**

Include successful tests in output.

**-b, --break**

Break into debugger mode upon failed test.

**-e, --nothrow**

Skip exception tests.

**-i, --invisibles**

Show invisibles like tabs or newlines.

**-o, --out=FILE**

Write all output to *FILE*.

**-r, --reporter=STRING**

Reporter to use. Default is console.

**-n, --name=STRING**

Suite name.

**-a, --abort**

Abort at first failure.

**-x, --abortx=N**

Abort after *N* failures.



**-w, --warn=STRING**

Enable warnings.

**-d, --durations=yes|no**

Show test durations. Default is *no*.

**-f, --input-file=FILE**

Load test names from a file.

**-#, --filenames-as-tags**

Adds a tag for the file name.

**-c, --section=STRING**

Specify the section to run the tests on.

**-v, --verbosity=quiet|normal|high**

Set output verbosity. Default is *normal*.

**--list-test-names-only**

List all test cases names only. If a pattern was specified, all matching test cases are listed.

**--list-reporters**

List all reporters.

**--order=decl|lex|rand**

Test case order. Default is *decl*.

**--rng-seed=time|number**

Set a specific seed for random numbers.

**--use-color=yes|no**

Should the output be colorized? Default is *yes*.

**--libidentify**

Report name and version according to libidentify.

**--wait-for-keypress=start|exit|both**

Waits for a keypress before *start|exit|both*.

**--benchmark-resolution-multiple**

Multiple of clock resolution to run benchmarks.

## 23.4.2. Program Information

**-, -h, --help**

Print a help message for **odgi test**.

## 23.5. EXIT STATUS

0

Success.

1

Failure (syntax or usage error; parameter error; file processing failure; unexpected error).

## 23.6. BUGS

Refer to the **odgi** issue tracker at <https://github.com/vgteam/odgi/issues>.

## 23.7. AUTHORS

**odgi test** was written by Erik Garrison and Simon Heumos.