

# Overview in General

This file contains a general overview of the data in the graph including node labels and relationships types.

## References

- [jqassistant](#)
- [Neo4j Python Driver](#)

## Node Labels

### Table 1a - Highest node count by label combination

Lists the 30 label combinations with the highest number of nodes. The labels with the lowest node count are listed in table 1b. The total list would sum up to the total number of labels (100%).

The whole table can be found in the CSV report `Node_label_combination_count`.

Total number of nodes: 307172

|    | nodeLabels  | nodesWithThatLabels | nodesWithThatLabelsPercent |
|----|---|---------------------|----------------------------|
| 0  | [Git, Change]                                     | 231032              | 75.212584                  |
| 1  | [Git, Commit]                                     | 11619               | 3.782571                   |
| 2  | [Java, ByteCode, Parameter]                       | 11202               | 3.646817                   |
| 3  | [Java, ByteCode, Method, Member]                  | 10666               | 3.472322                   |
| 4  | [File, Git]                                       | 10547               | 3.433581                   |
| 5  | [Java, ByteCode, Bound, ParameterizedType]        | 6542                | 2.129751                   |
| 6  | [Java, ByteCode, Bound]                           | 6316                | 2.056177                   |
| 7  | [Java, ByteCode, Member, Field]                   | 2847                | 0.926842                   |
| 8  | [Java, ByteCode, Bound, WildcardType]             | 2723                | 0.886474                   |
| 9  | [Java, Value, ByteCode, Annotation]               | 2225                | 0.724350                   |
| 10 | [Java, ByteCode, Constructor, Method, Member]     | 1650                | 0.537158                   |
| 11 | [Xml, Element]                                    | 1534                | 0.499394                   |
| 12 | [Xml, Text]                                       | 1016                | 0.330759                   |
| 13 | [Java, ByteCode, Bound, TypeVariable]             | 989                 | 0.321969                   |
| 14 | [Java, ByteCode, Method, Member, Lambda]          | 769                 | 0.250348                   |
| 15 | [Type, File, Java, ByteCode, Class]               | 699                 | 0.227560                   |
| 16 | [Type, File, Java, ByteCode, JavaType]            | 597                 | 0.194354                   |
| 17 | [Type, File, Java, ByteCode, ResolvedDuplicate... | 542                 | 0.176448                   |
| 18 | [Java, ByteCode, Method, Member, GenericDeclar... | 525                 | 0.170914                   |
| 19 | [Java, Value, ByteCode, Primitive]                | 467                 | 0.152032                   |
| 20 | [Author, Git, Person]                             | 288                 | 0.093759                   |
| 21 | [Committer, Git, Person]                          | 242                 | 0.078783                   |
| 22 | [Type, File, Java, ByteCode, Class, GenericDec... | 215                 | 0.069993                   |
| 23 | [Type, File, Java, ByteCode, ExternalType]        | 194                 | 0.063157                   |
| 24 | [Type, File, Java, ByteCode, Interface]           | 167                 | 0.054367                   |
| 25 | [Git, Tag]  | 165                 | 0.053716                   |
| 26 | [Java, ByteCode, Bound, GenericArrayType]         | 145                 | 0.047205                   |
| 27 | [Java, Value, ByteCode, Enum]                     | 142                 | 0.046228                   |
| 28 | [Maven, Dependency]                               | 116                 | 0.037764                   |
| 29 | [Value, Property]                                 | 109                 | 0.035485                   |

## Chart 1a - Highest node count by label combination

Values under 0.5% will be grouped into "others" to get a cleaner plot. The group "others" is then broken down in Chart 1b.

<Figure size 640x480 with 0 Axes>

Nodes per label combination (more than 0.5% overall)

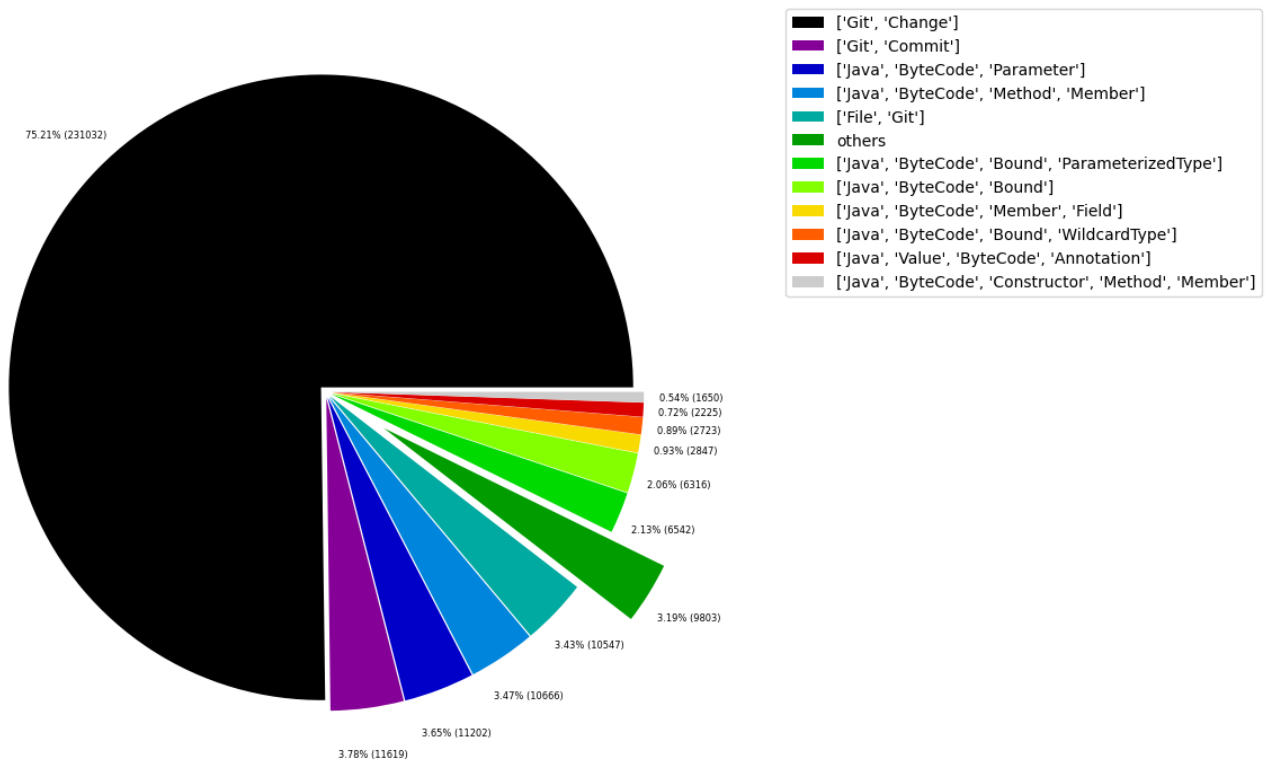


Table 1b - Lowest node count by label combination

Lists the 30 label combinations with the lowest number of nodes until they reach 0.5% of the total node count, which are shown above.

|    | nodeLabels   | nodesWithThatLabels | nodesWithThatLabelsPercent |
|----|--|---------------------|----------------------------|
| 0  | [Analyze, Task, jQAssistant]                       | 1                   | 0.000326                   |
| 1  | [Maven, Exclusion]                                 | 1                   | 0.000326                   |
| 2  | [Repository, File, Git]                            | 1                   | 0.000326                   |
| 3  | [File, TS, Scan]                                   | 1                   | 0.000326                   |
| 4  | [Java, ByteCode, Constructor, Method, Member, ...] | 3                   | 0.000977                   |
| 5  | [File, Maven, Xml, Pom, Document]                  | 6                   | 0.001953                   |
| 6  | [Type, File, Java, ByteCode, Void]                 | 6                   | 0.001953                   |
| 7  | [Java, ManifestSection]                            | 6                   | 0.001953                   |
| 8  | [File, Java, Manifest]                             | 6                   | 0.001953                   |
| 9  | [Artifact, File, Jar, Archive, Zip, Java]          | 6                   | 0.001953                   |
| 10 | [File, Java, Properties]                           | 8                   | 0.002604                   |
| 11 | [File, Java, ServiceLoader]                        | 9                   | 0.002930                   |
| 12 | [Xml, Attribute]                                   | 12                  | 0.003907                   |
| 13 | [Maven, ExecutionGoal]                             | 14                  | 0.004558                   |
| 14 | [Maven, PluginExecution]                           | 14                  | 0.004558                   |
| 15 | [Maven, Plugin]                                    | 16                  | 0.005209                   |
| 16 | [Maven, Configuration]                             | 16                  | 0.005209                   |
| 17 | [jQAssistant, Rule, Concept]                       | 19                  | 0.006185                   |
| 18 | [File]   | 21                  | 0.006837                   |
| 19 | [Type, File, Java, ByteCode, PrimitiveType]        | 21                  | 0.006837                   |
| 20 | [Git, Branch]                                      | 23                  | 0.007488                   |
| 21 | [Xml, Namespace]                                   | 24                  | 0.007813                   |
| 22 | [Type, File, Java, ByteCode, Enum]                 | 25                  | 0.008139                   |
| 23 | [Java, Value, ByteCode, Class]                     | 28                  | 0.009115                   |
| 24 | [File, Directory]                                  | 39                  | 0.012696                   |
| 25 | [Type, File, Java, ByteCode, Annotation]           | 40                  | 0.013022                   |
| 26 | [Type, File, Java, ByteCode, ExternalType, Ext...] | 65                  | 0.021161                   |
| 27 | [Artifact, Maven]                                  | 69                  | 0.022463                   |
| 28 | [Type, File, Java, ByteCode, GenericDeclaratio...] | 80                  | 0.026044                   |
| 29 | [Value, ManifestEntry]                             | 91                  | 0.029625                   |

## Chart 1b - Lowest node count by label combination

Shows the lowest (less than 0.5% overall) node count label combinations. Therefore, this plot breaks down the "others" slice of the pie chart above. Values under 0.01% will be grouped into "others" to get a cleaner plot.

<Figure size 640x480 with 0 Axes>

Nodes per label combination (less than 0.5% overall)

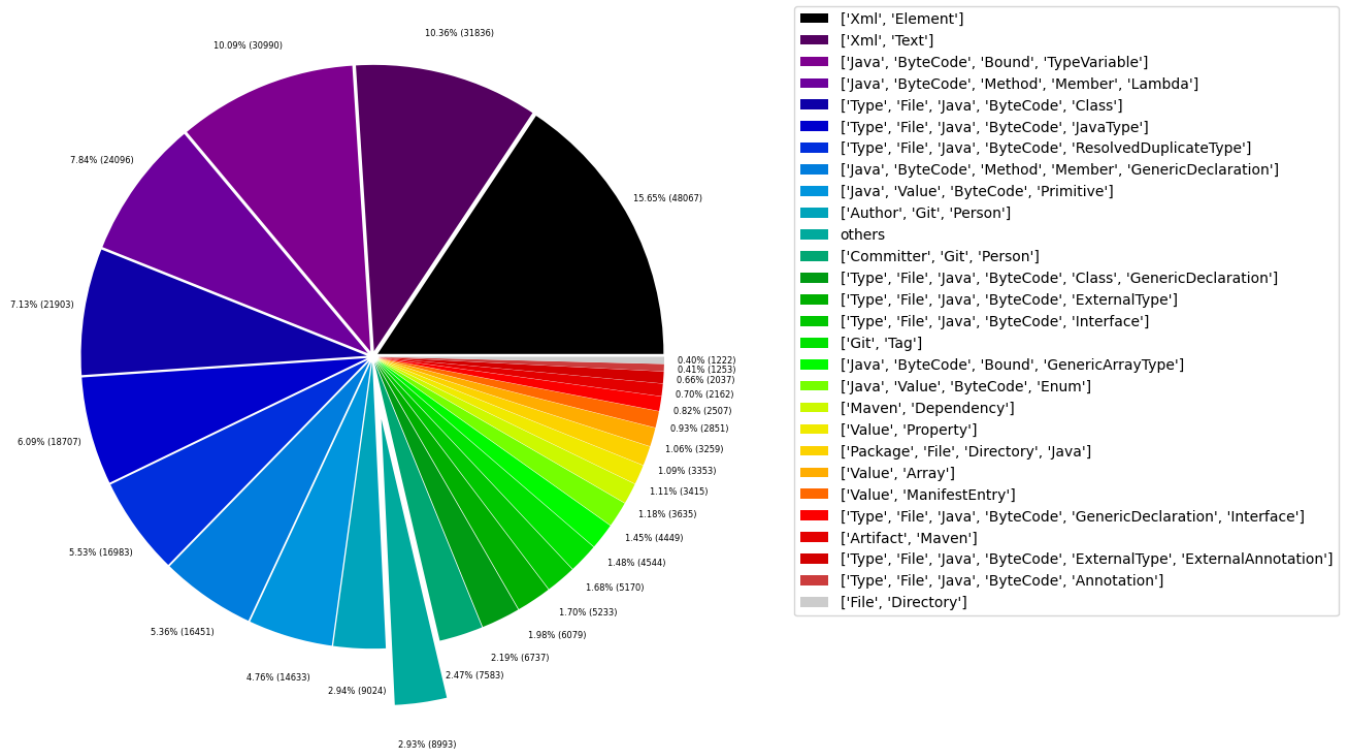


Table 1c - Highest node count by single label

Lists the 40 labels with the highest number of nodes. Doesn't sum up to the total number of nodes or 100% because one node can have multiple labels. Helps to identify commonly used labels.

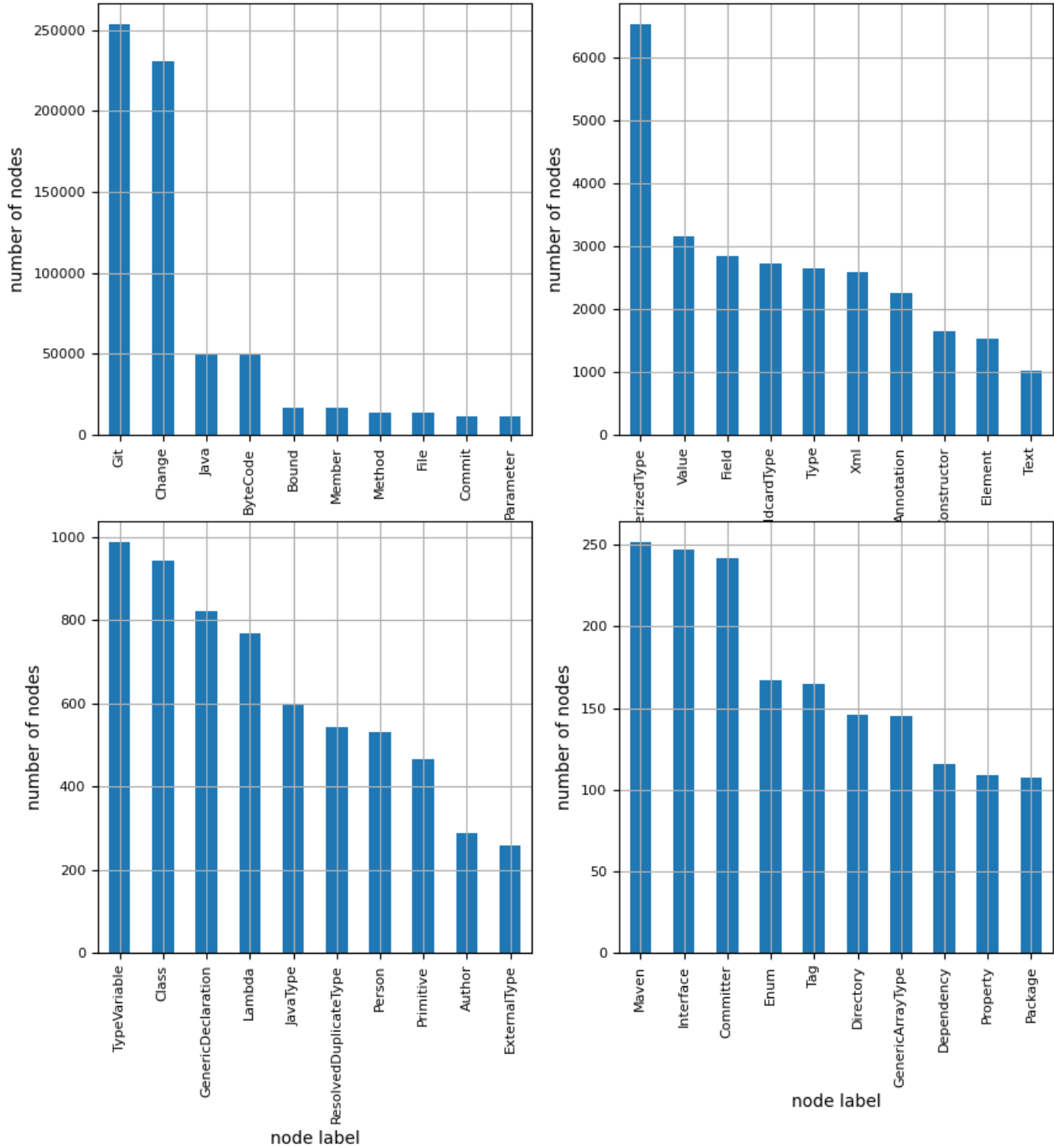
|    | nodeLabel             | nodesWithThatLabel | nodesWithThatLabelPercent |
|----|-----------------------|--------------------|---------------------------|
| 0  | Git                   | 253917             | 82.662808                 |
| 1  | Change                | 231032             | 75.212584                 |
| 2  | Java                  | 50032              | 16.287943                 |
| 3  | ByteCode              | 49890              | 16.241715                 |
| 4  | Bound                 | 16715              | 5.441577                  |
| 5  | Member                | 16460              | 5.358561                  |
| 6  | Method                | 13613              | 4.431719                  |
| 7  | File                  | 13402              | 4.363028                  |
| 8  | Commit                | 11619              | 3.782571                  |
| 9  | Parameter             | 11202              | 3.646817                  |
| 10 | ParameterizedType     | 6542               | 2.129751                  |
| 11 | Value                 | 3166               | 1.030693                  |
| 12 | Field                 | 2847               | 0.926842                  |
| 13 | WildcardType          | 2723               | 0.886474                  |
| 14 | Type                  | 2651               | 0.863034                  |
| 15 | Xml                   | 2592               | 0.843827                  |
| 16 | Annotation            | 2265               | 0.737372                  |
| 17 | Constructor           | 1653               | 0.538135                  |
| 18 | Element               | 1534               | 0.499394                  |
| 19 | Text                  | 1016               | 0.330759                  |
| 20 | TypeVariable          | 989                | 0.321969                  |
| 21 | Class                 | 942                | 0.306669                  |
| 22 | GenericDeclaration    | 823                | 0.267928                  |
| 23 | Lambda                | 769                | 0.250348                  |
| 24 | JavaType              | 597                | 0.194354                  |
| 25 | ResolvedDuplicateType | 542                | 0.176448                  |
| 26 | Person                | 530                | 0.172542                  |
| 27 | Primitive             | 467                | 0.152032                  |
| 28 | Author                | 288                | 0.093759                  |
| 29 | ExternalType          | 259                | 0.084318                  |
| 30 | Maven                 | 252                | 0.082039                  |
| 31 | Interface             | 247                | 0.080411                  |
| 32 | Committer             | 242                | 0.078783                  |
| 33 | Enum                  | 167                | 0.054367                  |
| 34 | Tag                   | 165                | 0.053716                  |
| 35 | Directory             | 146                | 0.047530                  |
| 36 | GenericArrayType      | 145                | 0.047205                  |
| 37 | Dependency            | 116                | 0.037764                  |
| 38 | Property              | 109                | 0.035485                  |
| 39 | Package               | 107                | 0.034834                  |

## Chart 1c - Highest node count by label

Shows the 40 labels with the highest number of nodes.

<Figure size 640x480 with 0 Axes>

## Node count by label



## Relationship Types

Table 2a - Highest relationship count by type

Lists the 30 relationship types with the highest number of occurrences. The whole table can be found in the CSV report `Relationship_type_count` .

Total number of relationships: 953601

|    | relationshipType         | nodesWithThatRelationshipType | nodesWithThatRelationshipTypePercent |
|----|--------------------------|-------------------------------|--------------------------------------|
| 0  | CONTAINS_CHANGE          | 231032                        | 24.227324                            |
| 1  | MODIFIES                 | 231032                        | 24.227324                            |
| 2  | UPDATES                  | 148008                        | 15.520957                            |
| 3  | CREATES                  | 57541                         | 6.034075                             |
| 4  | DELETES                  | 35338                         | 3.705743                             |
| 5  | INVOKES                  | 29734                         | 3.118076                             |
| 6  | COMMITTED                | 23238                         | 2.436868                             |
| 7  | OF_TYPE                  | 17636                         | 1.849411                             |
| 8  | DEPENDS_ON               | 17445                         | 1.829381                             |
| 9  | DECLARES                 | 16822                         | 1.764050                             |
| 10 | OF_RAW_TYPE              | 15200                         | 1.593958                             |
| 11 | HAS_PARENT               | 14124                         | 1.481123                             |
| 12 | HAS                      | 11902                         | 1.248111                             |
| 13 | HAS_COMMIT               | 11619                         | 1.218434                             |
| 14 | RETURNS                  | 10643                         | 1.116085                             |
| 15 | HAS_FILE                 | 10547                         | 1.106018                             |
| 16 | RENAMES                  | 9855                          | 1.033451                             |
| 17 | READS                    | 7695                          | 0.806941                             |
| 18 | HAS_ACTUAL_TYPE_ARGUMENT | 7501                          | 0.786597                             |
| 19 | HAS_NEW_NAME             | 6159                          | 0.645868                             |
| 20 | OF_GENERIC_TYPE          | 5349                          | 0.560926                             |
| 21 | RESOLVES_TO              | 3802                          | 0.398699                             |
| 22 | SIMILAR                  | 3419                          | 0.358536                             |
| 23 | RETURNS_GENERIC          | 3253                          | 0.341128                             |
| 24 | CONTAINS                 | 3084                          | 0.323406                             |
| 25 | WRITES                   | 3066                          | 0.321518                             |
| 26 | ANNOTATED_BY             | 2213                          | 0.232068                             |
| 27 | HAS_FIRST_CHILD          | 1534                          | 0.160864                             |
| 28 | HAS_LAST_CHILD           | 1534                          | 0.160864                             |
| 29 | HAS_ELEMENT              | 1522                          | 0.159606                             |

## Chart 2a - Highest relationship count by type

Values under 0.5% will be grouped into "others" to get a cleaner plot. The group "others" is then broken down in the second chart.

<Figure size 640x480 with 0 Axes>



Relationship types (more than 0.5% overall)

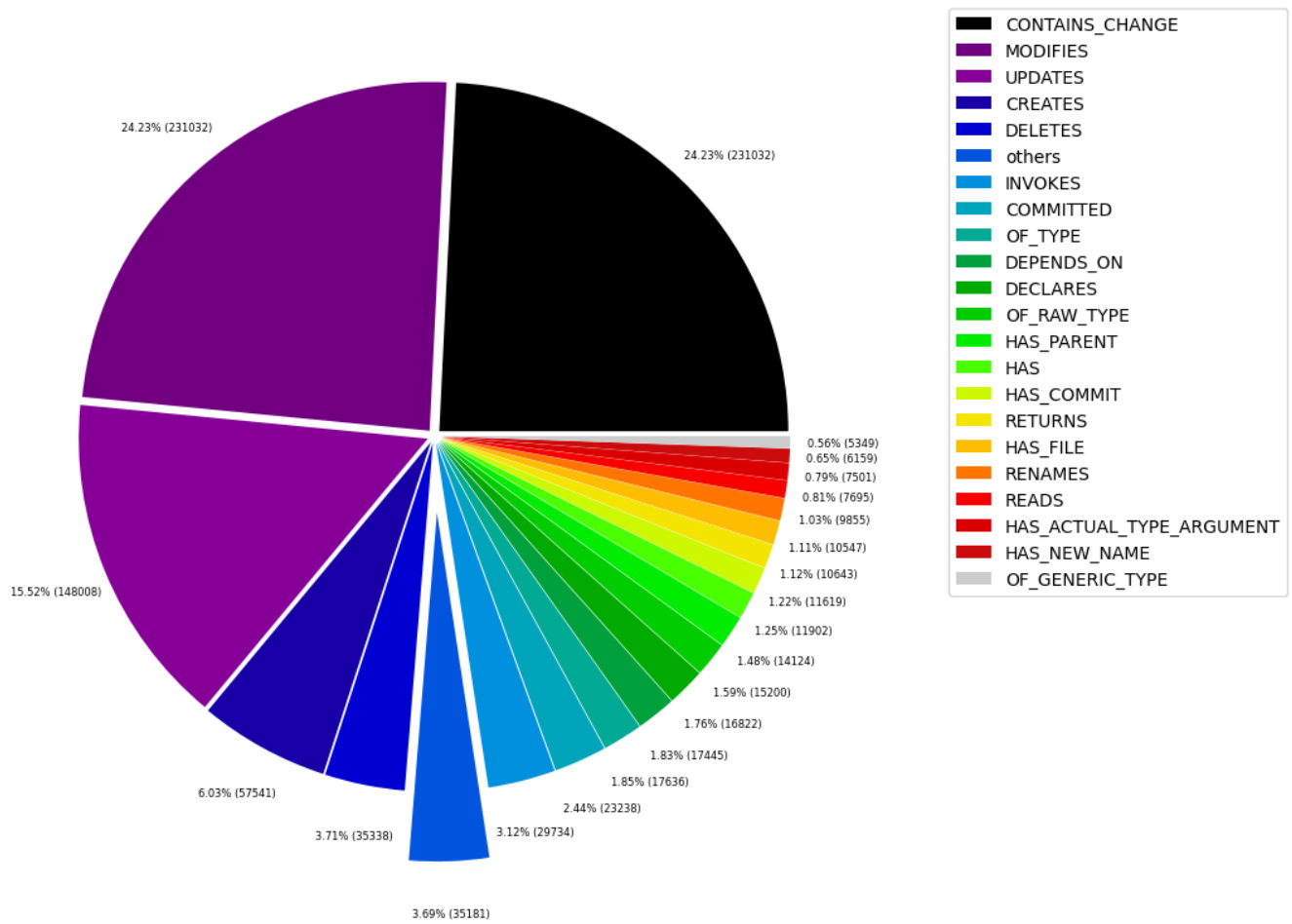


Table 2b - Lowest relationship count by type

Lists the 30 relationships type with the lowest number of occurrences up to 0.5% of the total node count. This is essentially breaking down the "others" slice from the chart above.

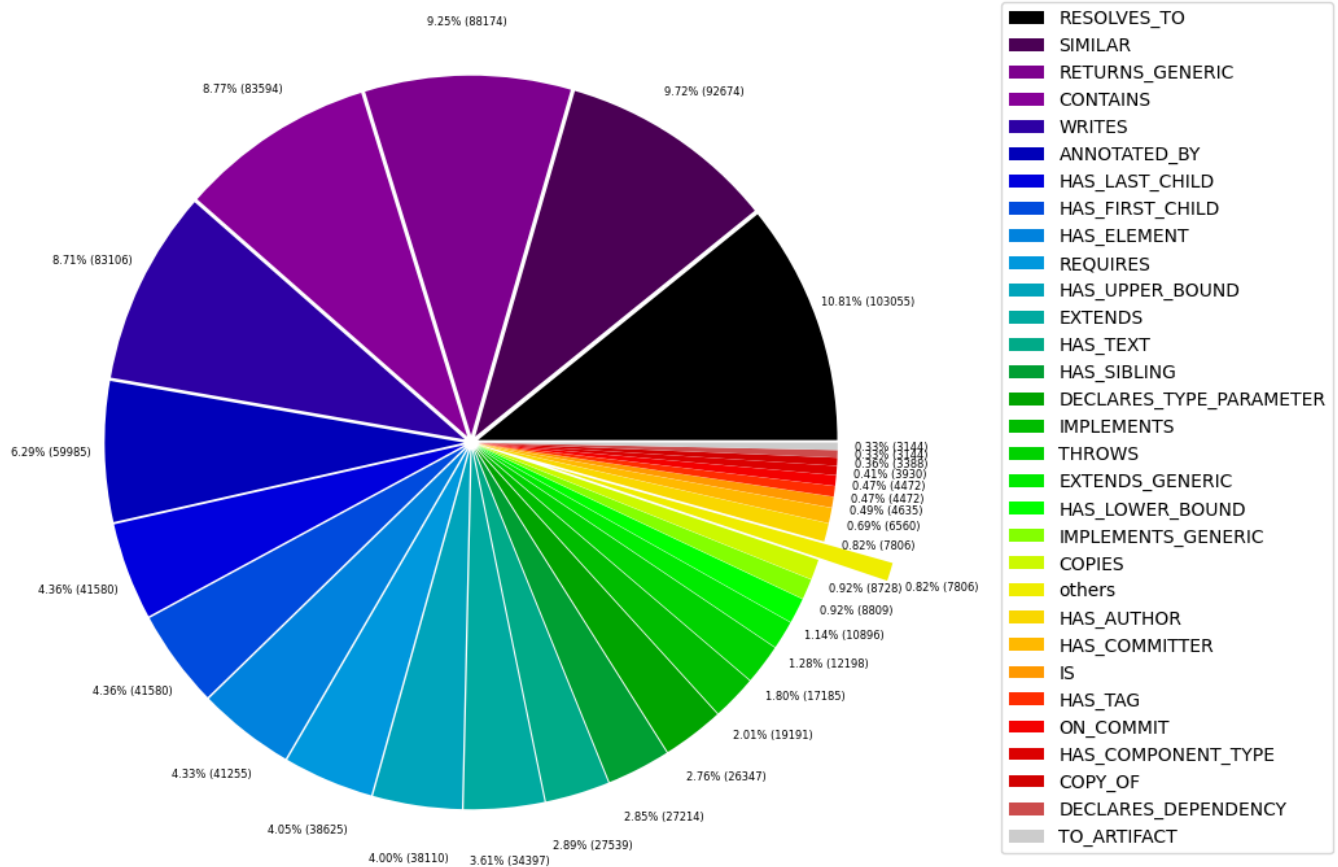
|    | relationshipType        | nodesWithThatRelationshipType | nodesWithThatRelationshipTypePercent |
|----|-------------------------|-------------------------------|--------------------------------------|
| 0  | EXCLUDES                | 1                             | 0.000105                             |
| 1  | THROWS_GENERIC          | 5                             | 0.000524                             |
| 2  | DESCRIBES               | 6                             | 0.000629                             |
| 3  | HAS_ROOT_ELEMENT        | 7                             | 0.000734                             |
| 4  | OF_NAMESPACE            | 12                            | 0.001258                             |
| 5  | HAS_ATTRIBUTE           | 12                            | 0.001258                             |
| 6  | HAS_GOAL                | 14                            | 0.001468                             |
| 7  | HAS_EXECUTION           | 14                            | 0.001468                             |
| 8  | USES_PLUGIN             | 16                            | 0.001678                             |
| 9  | IS_ARTIFACT             | 16                            | 0.001678                             |
| 10 | HAS_CONFIGURATION       | 16                            | 0.001678                             |
| 11 | REQUIRES_TYPE_PARAMETER | 17                            | 0.001783                             |
| 12 | INCLUDES_CONCEPT        | 19                            | 0.001992                             |
| 13 | HAS_BRANCH              | 23                            | 0.002412                             |
| 14 | HAS_HEAD                | 24                            | 0.002517                             |
| 15 | DECLARES_NAMESPACE      | 24                            | 0.002517                             |
| 16 | REQUIRES_CONCEPT        | 28                            | 0.002936                             |
| 17 | HAS_DEFAULT             | 34                            | 0.003565                             |
| 18 | DECLARES_DEPENDENCY     | 116                           | 0.012164                             |
| 19 | TO_ARTIFACT             | 116                           | 0.012164                             |
| 20 | COPY_OF                 | 125                           | 0.013108                             |
| 21 | HAS_COMPONENT_TYPE      | 145                           | 0.015206                             |
| 22 | ON_COMMIT               | 165                           | 0.017303                             |
| 23 | HAS_TAG                 | 165                           | 0.017303                             |
| 24 | IS                      | 171                           | 0.017932                             |
| 25 | HAS_COMMITTER           | 242                           | 0.025377                             |
| 26 | HAS_AUTHOR              | 288                           | 0.030201                             |
| 27 | COPIES                  | 322                           | 0.033767                             |
| 28 | IMPLEMENTS_GENERIC      | 325                           | 0.034081                             |
| 29 | HAS_LOWER_BOUND         | 402                           | 0.042156                             |

## Chart 2b - Lowest relationship count by type

Shows the lowest (less than 0.5% overall) relationship types. This plot breaks down the "others" slice of the pie chart above. Values under 0.01% will be grouped into "others" to get a cleaner plot.

<Figure size 640x480 with 0 Axes>

Relationship types (less than 0.5% overall)



## Node labels with their relationships

Table 3a - Highest relationship count by node labels and relationship type

Lists the 30 node labels and their relationship types with the highest number of occurrences.

|    | sourceLabels                                  | relationType             | targetLabels                                      | numberOfRelationships | numberOfNodesWithSameLabelsAsSource | numberOfNodesWithS |
|----|---|--------------------------|---|-----------------------|-------------------------------------|--------------------|
| 0  | [Git, Commit]                                 | CONTAINS_CHANGE          | [Git, Change]                                     | 231032                | 11619                               |                    |
| 1  | [Git, Change]                                 | MODIFIES                 | [File, Git]                                       | 231032                | 231032                              |                    |
| 2  | [Git, Change]                                 | UPDATES                  | [File, Git]                                       | 148008                | 231032                              |                    |
| 3  | [Git, Change]                                 | CREATES                  | [File, Git]                                       | 57541                 | 231032                              |                    |
| 4  | [Git, Change]                                 | DELETES                  | [File, Git]                                       | 35338                 | 231032                              |                    |
| 5  | [Java, ByteCode, Method, Member]              | INVOKES                  | [Java, ByteCode, Method, Member]                  | 18206                 | 10579                               |                    |
| 6  | [Git, Commit]                                 | HAS_PARENT               | [Git, Commit]                                     | 14118                 | 11619                               |                    |
| 7  | [Repository, File, Git]                       | HAS_COMMIT               | [Git, Commit]                                     | 11619                 | 1                                   |                    |
| 8  | [Author, Git, Person]                         | COMMITTED                | [Git, Commit]                                     | 11619                 | 288                                 |                    |
| 9  | [Committer, Git, Person]                      | COMMITTED                | [Git, Commit]                                     | 11619                 | 242                                 |                    |
| 10 | [Repository, File, Git]                       | HAS_FILE                 | [File, Git]                                       | 10547                 | 1                                   |                    |
| 11 | [Git, Change]                                 | RENAMES                  | [File, Git]                                       | 9855                  | 231032                              |                    |
| 12 | [Java, ByteCode, Method, Member]              | HAS                      | [Java, ByteCode, Parameter]                       | 7306                  | 10579                               |                    |
| 13 | [Java, ByteCode, Method, Member]              | READS                    | [Java, ByteCode, Member, Field]                   | 6917                  | 10579                               |                    |
| 14 | [File, Git]                                   | HAS_NEW_NAME             | [File, Git]                                       | 6159                  | 10547                               |                    |
| 15 | [Java, ByteCode, Parameter]                   | OF_TYPE                  | [Type, File, Java, ByteCode, JavaType]            | 5730                  | 11202                               |                    |
| 16 | [Java, ByteCode, Bound]                       | OF_RAW_TYPE              | [Type, File, Java, ByteCode, JavaType]            | 3218                  | 6316                                |                    |
| 17 | [Java, ByteCode, Bound, ParameterizedType]    | OF_RAW_TYPE              | [Type, File, Java, ByteCode, JavaType]            | 2779                  | 6542                                |                    |
| 18 | [Java, ByteCode, Bound, ParameterizedType]    | HAS_ACTUAL_TYPE_ARGUMENT | [Java, ByteCode, Bound, WildcardType]             | 2723                  | 6542                                |                    |
| 19 | [Java, ByteCode, Parameter]                   | OF_GENERIC_TYPE          | [Java, ByteCode, Bound, ParameterizedType]        | 2435                  | 11202                               |                    |
| 20 | [Java, ByteCode, Bound, ParameterizedType]    | HAS_ACTUAL_TYPE_ARGUMENT | [Java, ByteCode, Bound, TypeVariable]             | 2230                  | 6542                                |                    |
| 21 | [Java, ByteCode, Constructor, Method, Member] | WRITES                   | [Java, ByteCode, Member, Field]                   | 1971                  | 1650                                |                    |
| 22 | [Java, ByteCode, Method, Member]              | RETURNS                  | [Type, File, Java, ByteCode, JavaType]            | 1892                  | 10579                               |                    |
| 23 | [Java, Value, ByteCode, Annotation]           | OF_TYPE                  | [Type, File, Java, ByteCode, ExternalType, Ext... | 1842                  | 2225                                |                    |
| 24 | [Java, ByteCode, Parameter]                   | OF_GENERIC_TYPE          | [Java, ByteCode, Bound]                           | 1819                  | 11202                               |                    |
| 25 | [Java, ByteCode, Constructor, Method, Member] | INVOKES                  | [Java, ByteCode, Constructor, Method, Member]     | 1745                  | 1650                                |                    |
| 26 | [Java, ByteCode, Constructor, Method, Member] | HAS                      | [Java, ByteCode, Parameter]                       | 1710                  | 1650                                |                    |
| 27 | [Java, ByteCode, Method, Member]              | INVOKES                  | [Java, ByteCode, Constructor, Method, Member]     | 1703                  | 10579                               |                    |
| 28 | [Java, ByteCode, Parameter]                   | ANNOTATED_BY             | [Java, Value, ByteCode, Annotation]               | 1594                  | 11202                               |                    |
| 29 | [Java, ByteCode, Constructor, Method, Member] | INVOKES                  | [Java, ByteCode, Method, Member]                  | 1539                  | 1650                                |                    |

## Graph Density

```
total_number_of_nodes (vertices): 307172
total_number_of_relationships (edges): 953601
-> total directed graph density: 1.0106594957921728e-05
-> total directed graph density in percent: 0.0010106594957921728
```