

# 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`.

|    | nodeLabels  | nodesWithThatLabels | nodesWithThatLabelsPercent |
|----|---|---------------------|----------------------------|
| 0  | [Git, Change]                                     | 245374              | 73.479129                  |
| 1  | [Java, ByteCode, Method, Member]                  | 13204               | 3.954039                   |
| 2  | [Java, ByteCode, Parameter]                       | 13000               | 3.892950                   |
| 3  | [Git, Commit]                                     | 12007               | 3.595588                   |
| 4  | [File, Git]                                       | 10675               | 3.196711                   |
| 5  | [Java, ByteCode, Bound, ParameterizedType]        | 7166                | 2.145914                   |
| 6  | [Java, ByteCode, Bound]                           | 7112                | 2.129743                   |
| 7  | [Java, ByteCode, Member, Field]                   | 3494                | 1.046305                   |
| 8  | [Java, ByteCode, Bound, WildcardType]             | 2906                | 0.870224                   |
| 9  | [Java, Value, ByteCode, Annotation]               | 2821                | 0.844770                   |
| 10 | [Xml, Element]                                    | 2144                | 0.642037                   |
| 11 | [Java, ByteCode, Constructor, Method, Member]     | 2040                | 0.610894                   |
| 12 | [Xml, Text]                                       | 1436                | 0.430021                   |
| 13 | [Java, ByteCode, Bound, TypeVariable]             | 1096                | 0.328206                   |
| 14 | [Java, ByteCode, Method, Member, Lambda]          | 936                 | 0.280292                   |
| 15 | [Type, File, Java, ByteCode, ResolvedDuplicate... | 900                 | 0.269512                   |
| 16 | [Type, File, Java, ByteCode, Class]               | 861                 | 0.257833                   |
| 17 | [Type, File, Java, ByteCode, JavaType]            | 746                 | 0.223395                   |
| 18 | [Java, Value, ByteCode, Primitive]                | 650                 | 0.194647                   |
| 19 | [Java, ByteCode, Method, Member, GenericDeclar... | 569                 | 0.170391                   |
| 20 | [Json, Key]                                       | 555                 | 0.166199                   |
| 21 | [Value, Json, Scalar]                             | 539                 | 0.161408                   |
| 22 | [Type, File, Java, ByteCode, ExternalType]        | 396                 | 0.118585                   |
| 23 | [Author, Git, Person]                             | 292                 | 0.087442                   |
| 24 | [Value, Array]                                    | 267                 | 0.079955                   |
| 25 | [Committer, Git, Person]                          | 247                 | 0.073966                   |
| 26 | [Type, File, Java, ByteCode, Class, GenericDec... | 236                 | 0.070672                   |
| 27 | [Value, Property]                                 | 202                 | 0.060490                   |
| 28 | [Type, File, Java, ByteCode, Interface]           | 187                 | 0.055999                   |
| 29 | [Java, Value, ByteCode, Class]                    | 172                 | 0.051507                   |

## 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)

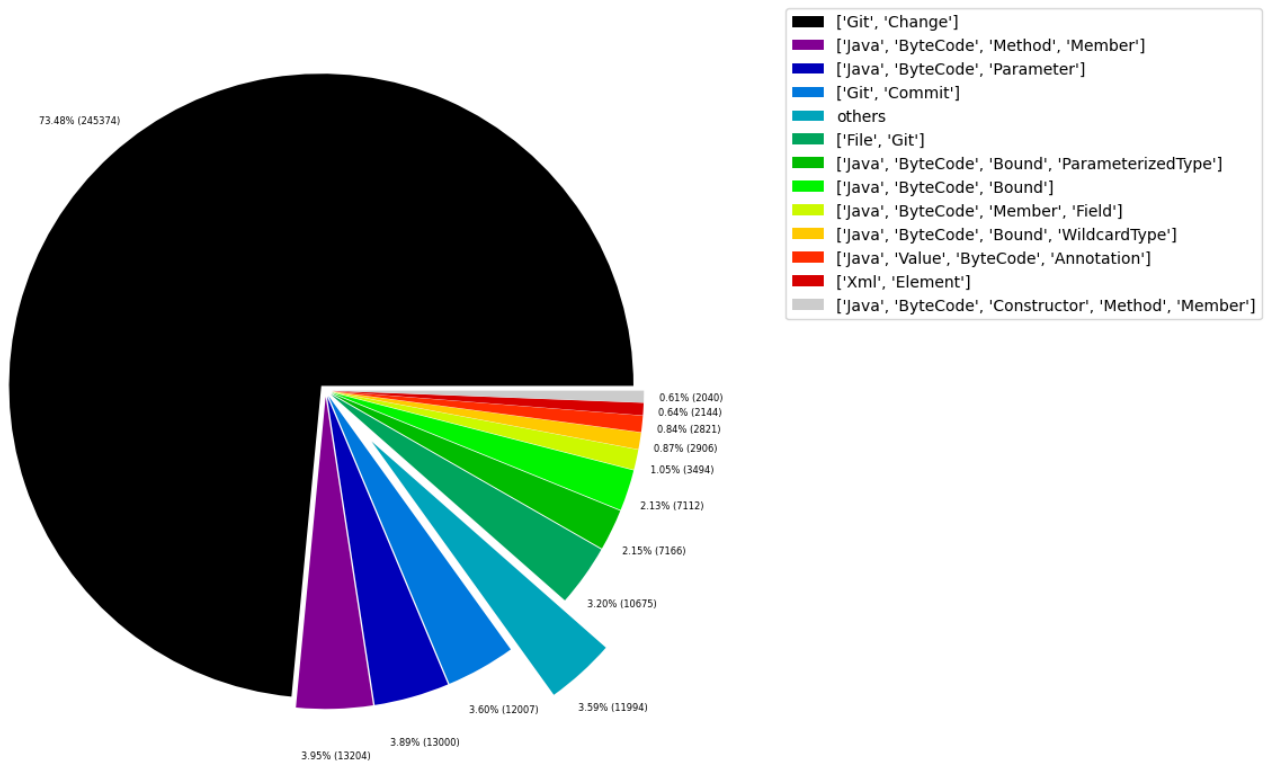


Table 1b - Lowest node count by label combination

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                   | 0.000299                   |
| 1  | [Repository, File, Git]                            | 1                   | 0.000299                   |
| 2  | [File, Json]                                       | 2                   | 0.000599                   |
| 3  | [File]   | 3                   | 0.000898                   |
| 4  | [Java, ByteCode, Constructor, Method, Member, ...] | 4                   | 0.001198                   |
| 5  | [Maven, Exclusion]                                 | 5                   | 0.001497                   |
| 6  | [Value, Array, Json]                               | 6                   | 0.001797                   |
| 7  | [File, Xml, Maven, Pom, Document]                  | 9                   | 0.002695                   |
| 8  | [Type, File, Java, ByteCode, Void]                 | 9                   | 0.002695                   |
| 9  | [Java, ManifestSection]                            | 9                   | 0.002695                   |
| 10 | [File, Java, Manifest]                             | 9                   | 0.002695                   |
| 11 | [Artifact, File, Jar, Archive, Zip, Java]          | 9                   | 0.002695                   |
| 12 | [File, Java, ServiceLoader]                        | 10                  | 0.002995                   |
| 13 | [File, Java, Properties]                           | 12                  | 0.003593                   |
| 14 | [Maven, ExecutionGoal]                             | 16                  | 0.004791                   |
| 15 | [Maven, PluginExecution]                           | 16                  | 0.004791                   |
| 16 | [Xml, Attribute]                                   | 18                  | 0.005390                   |
| 17 | [jQAssistant, Rule, Concept]                       | 19                  | 0.005690                   |
| 18 | [Maven, Plugin]                                    | 21                  | 0.006289                   |
| 19 | [Maven, Configuration]                             | 21                  | 0.006289                   |
| 20 | [Git, Branch]                                      | 28                  | 0.008385                   |
| 21 | [Type, File, Java, ByteCode, Enum]                 | 28                  | 0.008385                   |
| 22 | [Type, File, Java, ByteCode, PrimitiveType]        | 29                  | 0.008684                   |
| 23 | [Xml, Namespace]                                   | 36                  | 0.010780                   |
| 24 | [Type, File, Java, ByteCode, Annotation]           | 43                  | 0.012877                   |
| 25 | [File, Directory]                                  | 44                  | 0.013176                   |
| 26 | [Type, File, Java, ByteCode, GenericDeclaratio...  | 85                  | 0.025454                   |
| 27 | [Artifact, Maven]                                  | 92                  | 0.027550                   |
| 28 | [Type, File, Java, ByteCode, ExternalType, Ext...  | 93                  | 0.027850                   |
| 29 | [Value, ManifestEntry]                             | 120                 | 0.035935                   |

## 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)

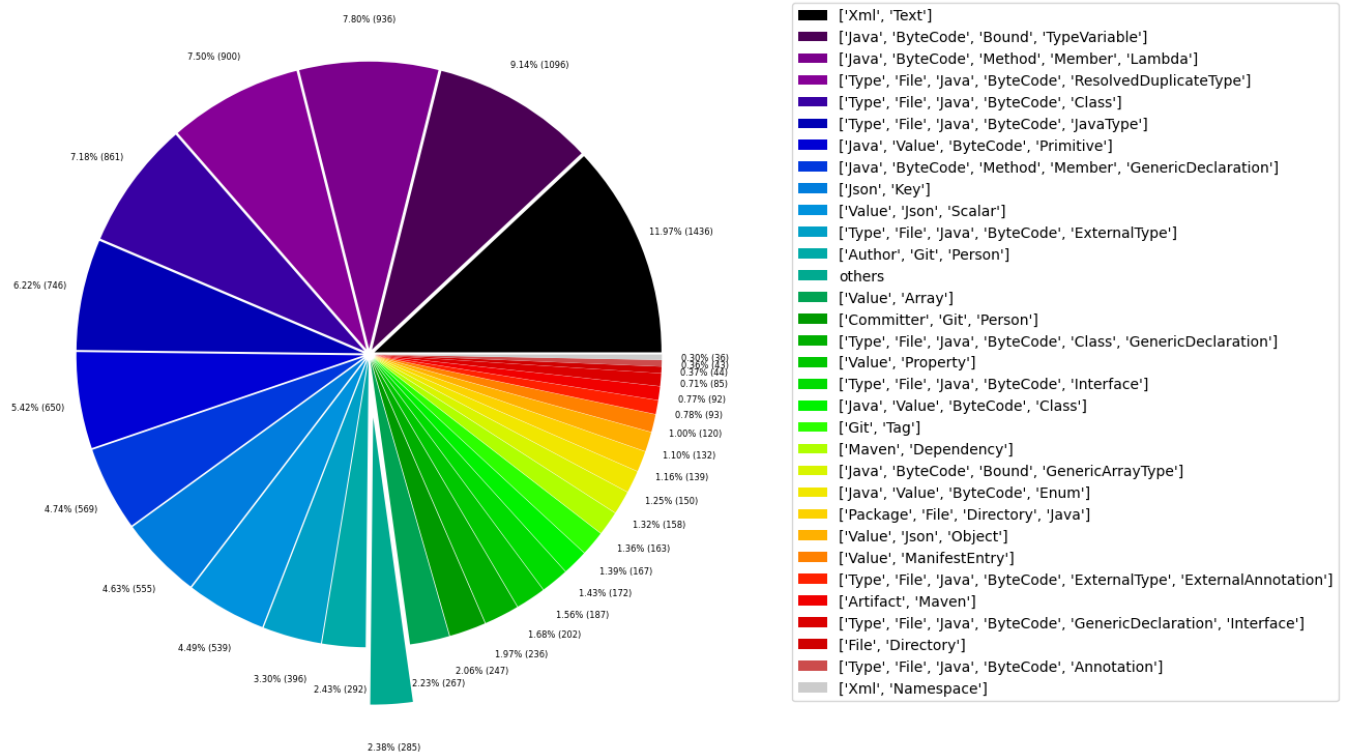


Table 1c - Highest node count by single label

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.

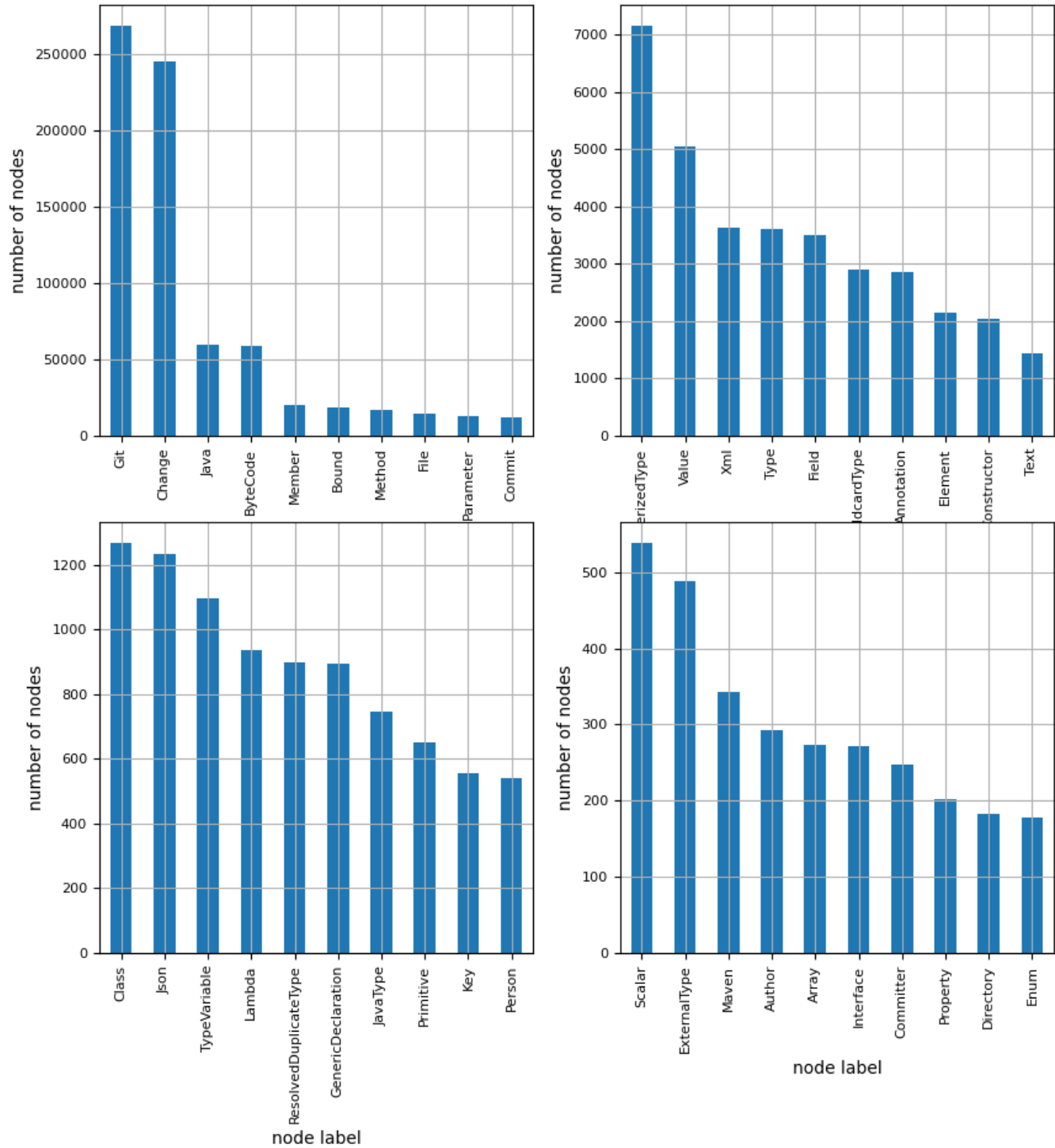
|    | nodeLabel             | nodesWithThatLabel | nodesWithThatLabelPercent |
|----|-----------------------|--------------------|---------------------------|
| 0  | Git                   | 268791             | 80.491530                 |
| 1  | Change                | 245374             | 73.479129                 |
| 2  | Java                  | 59279              | 17.751552                 |
| 3  | ByteCode              | 59091              | 17.695254                 |
| 4  | Member                | 20247              | 6.063120                  |
| 5  | Bound                 | 18438              | 5.521401                  |
| 6  | Method                | 16753              | 5.016815                  |
| 7  | File                  | 14526              | 4.349922                  |
| 8  | Parameter             | 13000              | 3.892950                  |
| 9  | Commit                | 12007              | 3.595588                  |
| 10 | ParameterizedType     | 7166               | 2.145914                  |
| 11 | Value                 | 5059               | 1.514956                  |
| 12 | Xml                   | 3643               | 1.090924                  |
| 13 | Type                  | 3613               | 1.081941                  |
| 14 | Field                 | 3494               | 1.046305                  |
| 15 | WildcardType          | 2906               | 0.870224                  |
| 16 | Annotation            | 2864               | 0.857647                  |
| 17 | Element               | 2144               | 0.642037                  |
| 18 | Constructor           | 2044               | 0.612092                  |
| 19 | Text                  | 1436               | 0.430021                  |
| 20 | Class                 | 1269               | 0.380012                  |
| 21 | Json                  | 1234               | 0.369531                  |
| 22 | TypeVariable          | 1096               | 0.328206                  |
| 23 | Lambda                | 936                | 0.280292                  |
| 24 | ResolvedDuplicateType | 900                | 0.269512                  |
| 25 | GenericDeclaration    | 894                | 0.267715                  |
| 26 | JavaType              | 746                | 0.223395                  |
| 27 | Primitive             | 650                | 0.194647                  |
| 28 | Key                   | 555                | 0.166199                  |
| 29 | Person                | 539                | 0.161408                  |
| 30 | Scalar                | 539                | 0.161408                  |
| 31 | ExternalType          | 489                | 0.146435                  |
| 32 | Maven                 | 343                | 0.102714                  |
| 33 | Author                | 292                | 0.087442                  |
| 34 | Array                 | 273                | 0.081752                  |
| 35 | Interface             | 272                | 0.081452                  |
| 36 | Committer             | 247                | 0.073966                  |
| 37 | Property              | 202                | 0.060490                  |
| 38 | Directory             | 183                | 0.054801                  |
| 39 | Enum                  | 178                | 0.053303                  |

## 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: 1035913

|    | relationshipType         | nodesWithThatRelationshipType | nodesWithThatRelationshipTypePercent |
|----|--------------------------|-------------------------------|--------------------------------------|
| 0  | CONTAINS_CHANGE          | 245374                        | 23.686738                            |
| 1  | MODIFIES                 | 245374                        | 23.686738                            |
| 2  | UPDATES                  | 158754                        | 15.325032                            |
| 3  | CREATES                  | 59716                         | 5.764577                             |
| 4  | DELETES                  | 37193                         | 3.590359                             |
| 5  | INVOKES                  | 35574                         | 3.434072                             |
| 6  | COMMITTED                | 24014                         | 2.318148                             |
| 7  | DEPENDS_ON               | 21873                         | 2.111471                             |
| 8  | OF_TYPE                  | 21347                         | 2.060694                             |
| 9  | DECLARES                 | 20688                         | 1.997079                             |
| 10 | OF_RAW_TYPE              | 17077                         | 1.648498                             |
| 11 | HAS_PARENT               | 14602                         | 1.409578                             |
| 12 | HAS                      | 14094                         | 1.360539                             |
| 13 | RETURNS                  | 12547                         | 1.211202                             |
| 14 | HAS_COMMIT               | 12007                         | 1.159074                             |
| 15 | HAS_FILE                 | 10675                         | 1.030492                             |
| 16 | RENAMES                  | 10289                         | 0.993230                             |
| 17 | READS                    | 9076                          | 0.876135                             |
| 18 | HAS_ACTUAL_TYPE_ARGUMENT | 8276                          | 0.798909                             |
| 19 | HAS_NEW_NAME             | 6198                          | 0.598313                             |
| 20 | OF_GENERIC_TYPE          | 5902                          | 0.569739                             |
| 21 | RESOLVES_TO              | 5207                          | 0.502648                             |
| 22 | SIMILAR                  | 3968                          | 0.383044                             |
| 23 | CONTAINS                 | 3806                          | 0.367405                             |
| 24 | WRITES                   | 3803                          | 0.367116                             |
| 25 | RETURNS_GENERIC          | 3543                          | 0.342017                             |
| 26 | ANNOTATED_BY             | 2809                          | 0.271162                             |
| 27 | REQUIRES                 | 2173                          | 0.209767                             |
| 28 | HAS_FIRST_CHILD          | 2144                          | 0.206967                             |
| 29 | HAS_LAST_CHILD           | 2144                          | 0.206967                             |

## 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)

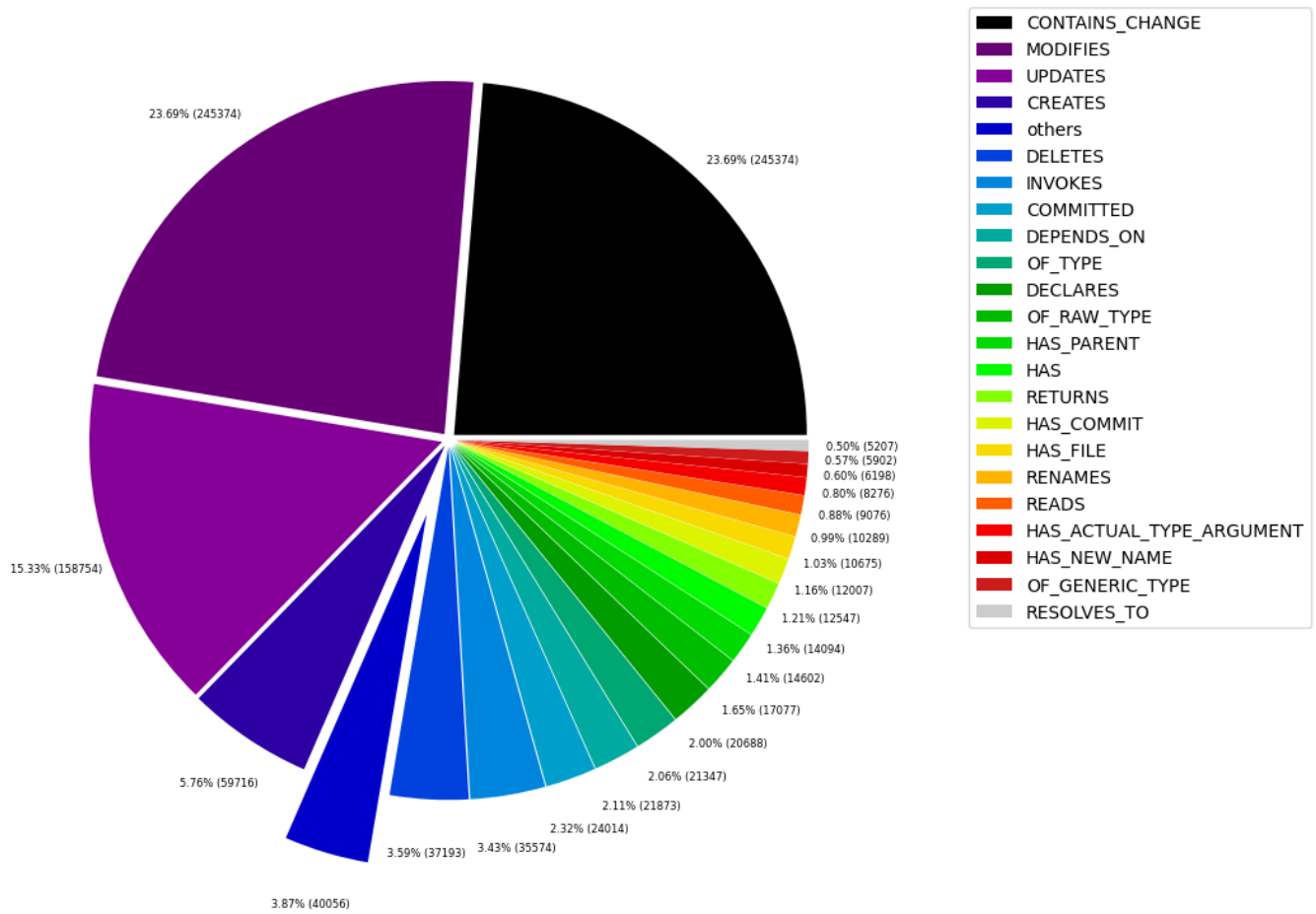


Table 2b - Lowest relationship count by type

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.

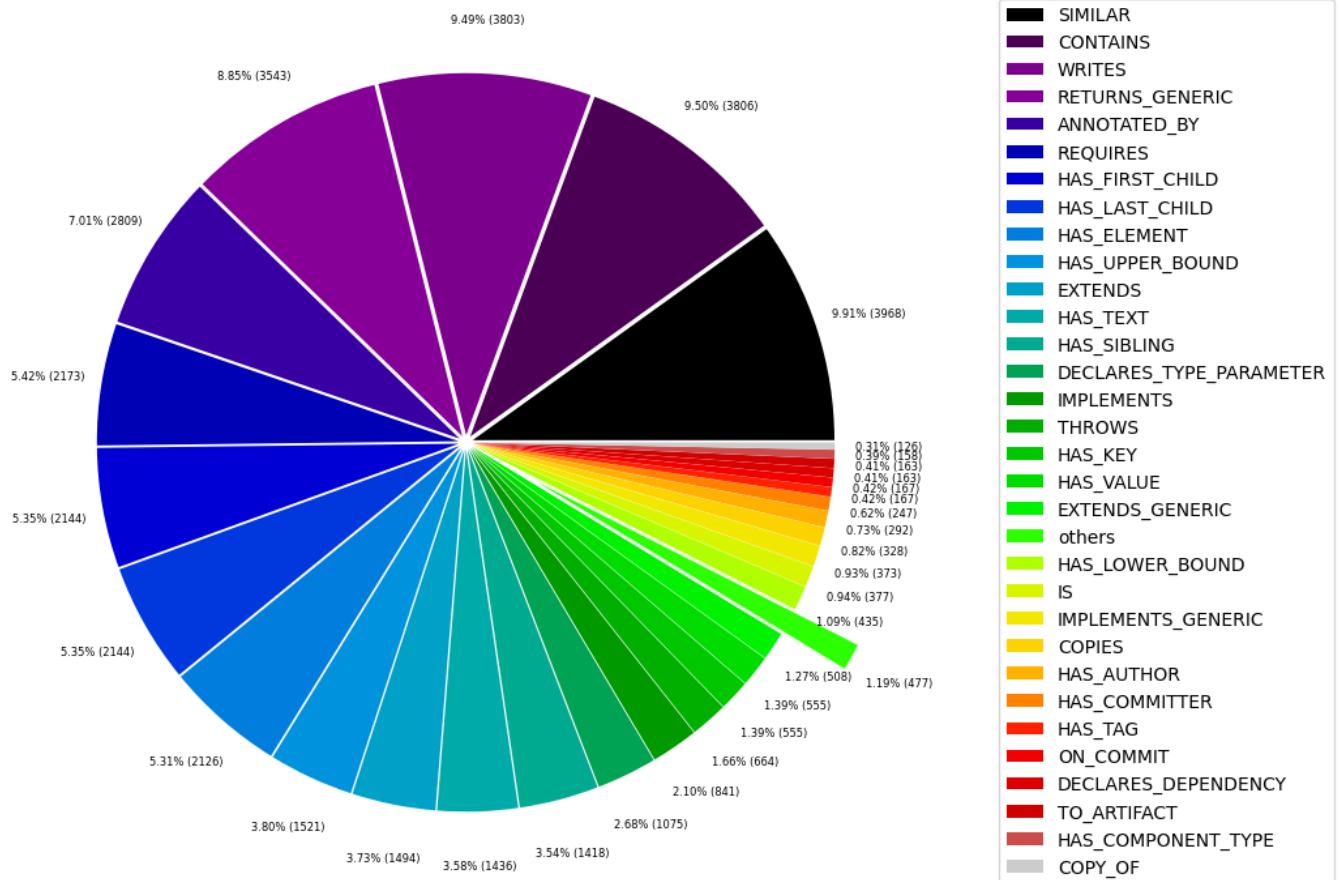
|    | relationshipType        | nodesWithThatRelationshipType | nodesWithThatRelationshipTypePercent |
|----|-------------------------|-------------------------------|--------------------------------------|
| 0  | HAS_PROPERTY            | 1                             | 0.000097                             |
| 1  | THROWS_GENERIC          | 5                             | 0.000483                             |
| 2  | EXCLUDES                | 5                             | 0.000483                             |
| 3  | HAS_ROOT_ELEMENT        | 9                             | 0.000869                             |
| 4  | DESCRIBES               | 9                             | 0.000869                             |
| 5  | HAS_GOAL                | 16                            | 0.001545                             |
| 6  | HAS_EXECUTION           | 16                            | 0.001545                             |
| 7  | OF_NAMESPACE            | 18                            | 0.001738                             |
| 8  | HAS_ATTRIBUTE           | 18                            | 0.001738                             |
| 9  | INCLUDES_CONCEPT        | 19                            | 0.001834                             |
| 10 | USES_PLUGIN             | 21                            | 0.002027                             |
| 11 | REQUIRES_TYPE_PARAMETER | 21                            | 0.002027                             |
| 12 | IS_ARTIFACT             | 21                            | 0.002027                             |
| 13 | HAS_CONFIGURATION       | 21                            | 0.002027                             |
| 14 | REQUIRES_CONCEPT        | 28                            | 0.002703                             |
| 15 | HAS_BRANCH              | 28                            | 0.002703                             |
| 16 | HAS_HEAD                | 29                            | 0.002799                             |
| 17 | DECLARES_NAMESPACE      | 36                            | 0.003475                             |
| 18 | HAS_DEFAULT             | 36                            | 0.003475                             |
| 19 | CONTAINS_VALUE          | 120                           | 0.011584                             |
| 20 | COPY_OF                 | 126                           | 0.012163                             |
| 21 | HAS_COMPONENT_TYPE      | 158                           | 0.015252                             |
| 22 | TO_ARTIFACT             | 163                           | 0.015735                             |
| 23 | DECLARES_DEPENDENCY     | 163                           | 0.015735                             |
| 24 | ON_COMMIT               | 167                           | 0.016121                             |
| 25 | HAS_TAG                 | 167                           | 0.016121                             |
| 26 | HAS_COMMITTER           | 247                           | 0.023844                             |
| 27 | HAS_AUTHOR              | 292                           | 0.028188                             |
| 28 | COPIES                  | 328                           | 0.031663                             |
| 29 | IMPLEMENTS_GENERIC      | 373                           | 0.036007                             |

## 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]                                     | 245374                |                                     | 12007              |
| 1  | [Git, Change]                                 | MODIFIES                 | [File, Git]                                       | 245374                |                                     | 245374             |
| 2  | [Git, Change]                                 | UPDATES                  | [File, Git]                                       | 158754                |                                     | 245374             |
| 3  | [Git, Change]                                 | CREATES                  | [File, Git]                                       | 59716                 |                                     | 245374             |
| 4  | [Git, Change]                                 | DELETES                  | [File, Git]                                       | 37193                 |                                     | 245374             |
| 5  | [Java, ByteCode, Method, Member]              | INVOKES                  | [Java, ByteCode, Method, Member]                  | 21521                 |                                     | 13080              |
| 6  | [Git, Commit]                                 | HAS_PARENT               | [Git, Commit]                                     | 14593                 |                                     | 12007              |
| 7  | [Repository, File, Git]                       | HAS_COMMIT               | [Git, Commit]                                     | 12007                 |                                     | 1                  |
| 8  | [Author, Git, Person]                         | COMMITTED                | [Git, Commit]                                     | 12007                 |                                     | 292                |
| 9  | [Committer, Git, Person]                      | COMMITTED                | [Git, Commit]                                     | 12007                 |                                     | 247                |
| 10 | [Repository, File, Git]                       | HAS_FILE                 | [File, Git]                                       | 10675                 |                                     | 1                  |
| 11 | [Git, Change]                                 | RENAMES                  | [File, Git]                                       | 10289                 |                                     | 245374             |
| 12 | [Java, ByteCode, Method, Member]              | HAS                      | [Java, ByteCode, Parameter]                       | 8297                  |                                     | 13080              |
| 13 | [Java, ByteCode, Method, Member]              | READS                    | [Java, ByteCode, Member, Field]                   | 8100                  |                                     | 13080              |
| 14 | [Java, ByteCode, Parameter]                   | OF_TYPE                  | [Type, File, Java, ByteCode, JavaType]            | 6360                  |                                     | 13000              |
| 15 | [File, Git]                                   | HAS_NEW_NAME             | [File, Git]                                       | 6198                  |                                     | 10675              |
| 16 | [Java, ByteCode, Bound]                       | OF_RAW_TYPE              | [Type, File, Java, ByteCode, JavaType]            | 3569                  |                                     | 7112               |
| 17 | [Java, ByteCode, Bound, ParameterizedType]    | OF_RAW_TYPE              | [Type, File, Java, ByteCode, JavaType]            | 3043                  |                                     | 7166               |
| 18 | [Java, ByteCode, Bound, ParameterizedType]    | HAS_ACTUAL_TYPE_ARGUMENT | [Java, ByteCode, Bound, WildcardType]             | 2906                  |                                     | 7166               |
| 19 | [Java, ByteCode, Parameter]                   | OF_GENERIC_TYPE          | [Java, ByteCode, Bound, ParameterizedType]        | 2655                  |                                     | 13000              |
| 20 | [Java, ByteCode, Bound, ParameterizedType]    | HAS_ACTUAL_TYPE_ARGUMENT | [Java, ByteCode, Bound, TypeVariable]             | 2454                  |                                     | 7166               |
| 21 | [Java, ByteCode, Constructor, Method, Member] | WRITES                   | [Java, ByteCode, Member, Field]                   | 2426                  |                                     | 2040               |
| 22 | [Java, Value, ByteCode, Annotation]           | OF_TYPE                  | [Type, File, Java, ByteCode, ExternalType, Ext... | 2340                  |                                     | 2821               |
| 23 | [Xml, Element]                                | HAS_ELEMENT              | [Xml, Element]                                    | 2126                  |                                     | 2144               |
| 24 | [Java, ByteCode, Constructor, Method, Member] | INVOKES                  | [Java, ByteCode, Constructor, Method, Member]     | 2111                  |                                     | 2040               |
| 25 | [Java, ByteCode, Method, Member]              | RETURNS                  | [Type, File, Java, ByteCode, JavaType]            | 2088                  |                                     | 13080              |
| 26 | [Java, ByteCode, Constructor, Method, Member] | HAS                      | [Java, ByteCode, Parameter]                       | 2023                  |                                     | 2040               |
| 27 | [Java, ByteCode, Parameter]                   | OF_GENERIC_TYPE          | [Java, ByteCode, Bound]                           | 2023                  |                                     | 13000              |
| 28 | [Java, ByteCode, Method, Member]              | INVOKES                  | [Java, ByteCode, Constructor, Method, Member]     | 2007                  |                                     | 13080              |
| 29 | [Java, ByteCode, Method, Member, Lambda]      | INVOKES                  | [Java, ByteCode, Method, Member]                  | 1883                  |                                     | 936                |

## Graph Density

```
total_number_of_nodes (vertices): 333937
total_number_of_relationships (edges): 1035913
-> total directed graph density: 9.289567637998241e-06
-> total directed graph density in percent: 0.0009289567637998242
```