

# 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]                                     | 255467              | 74.138016                  |
| 1  | [Java, ByteCode, Member, Method]                  | 13198               | 3.830137                   |
| 2  | [Java, ByteCode, Parameter]                       | 13029               | 3.781092                   |
| 3  | [Git, Commit]                                     | 12364               | 3.588105                   |
| 4  | [File, Git]                                       | 10767               | 3.124646                   |
| 5  | [Java, ByteCode, Bound, ParameterizedType]        | 7176                | 2.082517                   |
| 6  | [Java, ByteCode, Bound]                           | 7118                | 2.065685                   |
| 7  | [Java, ByteCode, Member, Field]                   | 3505                | 1.017171                   |
| 8  | [Java, ByteCode, Bound, WildcardType]             | 2908                | 0.843919                   |
| 9  | [Java, Value, ByteCode, Annotation]               | 2822                | 0.818961                   |
| 10 | [Xml, Element]                                    | 2144                | 0.622201                   |
| 11 | [Java, ByteCode, Member, Method, Constructor]     | 2049                | 0.594632                   |
| 12 | [Xml, Text]                                       | 1436                | 0.416736                   |
| 13 | [Java, ByteCode, Bound, TypeVariable]             | 1096                | 0.318066                   |
| 14 | [Java, ByteCode, Member, Method, Lambda]          | 942                 | 0.273374                   |
| 15 | [Type, File, Java, ByteCode, ResolvedDuplicate... | 899                 | 0.260895                   |
| 16 | [Type, File, Java, ByteCode, Class]               | 864                 | 0.250738                   |
| 17 | [Type, File, Java, ByteCode, JavaType]            | 748                 | 0.217074                   |
| 18 | [Java, Value, ByteCode, Primitive]                | 652                 | 0.189214                   |
| 19 | [Java, ByteCode, GenericDeclaration, Member, M... | 569                 | 0.165127                   |
| 20 | [Json, Key]                                       | 560                 | 0.162515                   |
| 21 | [Value, Json, Scalar]                             | 544                 | 0.157872                   |
| 22 | [Type, File, Java, ByteCode, ExternalType]        | 396                 | 0.114922                   |
| 23 | [Author, Git, Person]                             | 298                 | 0.086481                   |
| 24 | [Value, Array]                                    | 267                 | 0.077485                   |
| 25 | [Committer, Git, Person]                          | 252                 | 0.073132                   |
| 26 | [Type, File, Java, ByteCode, Class, GenericDec... | 236                 | 0.068489                   |
| 27 | [Value, Property]                                 | 202                 | 0.058622                   |
| 28 | [Type, File, Java, ByteCode, Interface]           | 188                 | 0.054559                   |
| 29 | [Java, Value, ByteCode, Class]                    | 172                 | 0.049915                   |

## 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)

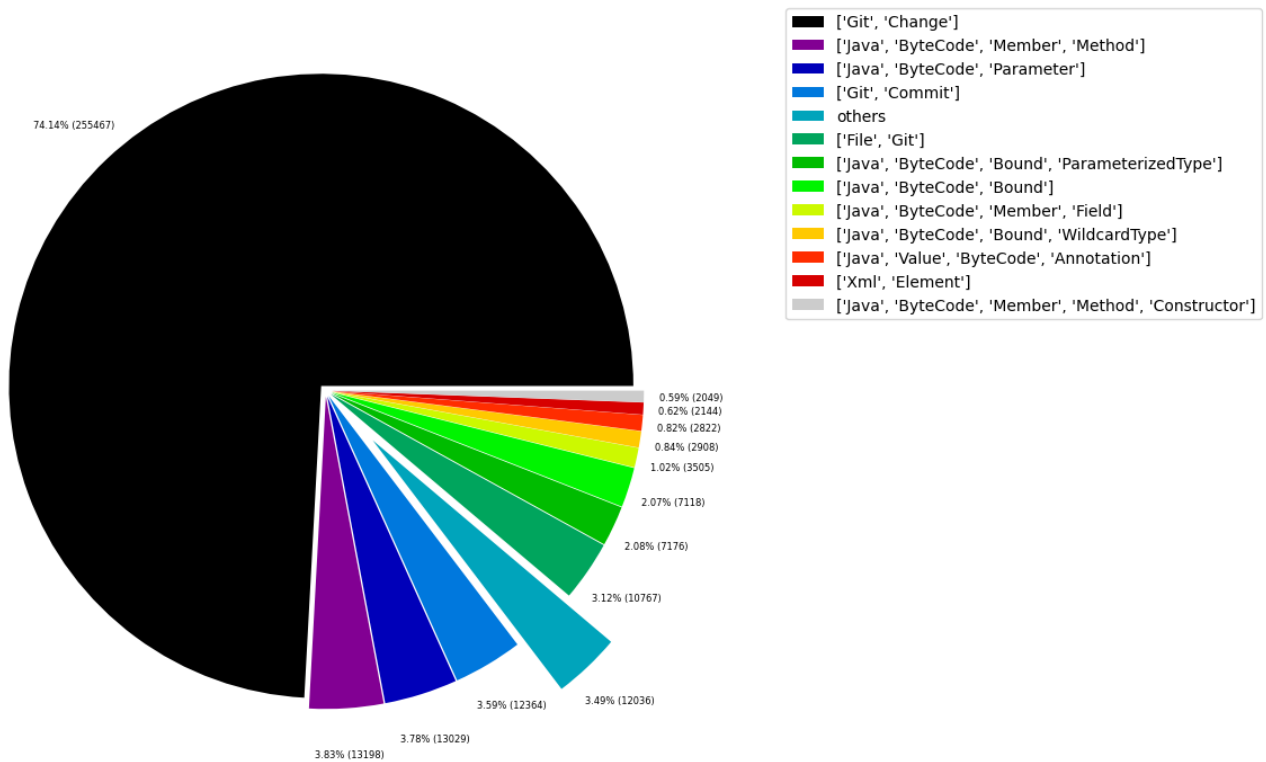


Table 1b - Lowest node count by label combination

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                   | 0.000290                   |
| 1  | [Repository, File, Git]                           | 1                   | 0.000290                   |
| 2  | [File, Json]                                      | 2                   | 0.000580                   |
| 3  | [File]  | 3                   | 0.000871                   |
| 4  | [Java, ByteCode, GenericDeclaration, Member, M... | 4                   | 0.001161                   |
| 5  | [Maven, Exclusion]                                | 5                   | 0.001451                   |
| 6  | [Value, Array, Json]                              | 6                   | 0.001741                   |
| 7  | [Type, File, Java, ByteCode, Void]                | 9                   | 0.002612                   |
| 8  | [File, Maven, Xml, Pom, Document]                 | 9                   | 0.002612                   |
| 9  | [Java, ManifestSection]                           | 9                   | 0.002612                   |
| 10 | [File, Java, Manifest]                            | 9                   | 0.002612                   |
| 11 | [Artifact, File, Jar, Archive, Zip, Java]         | 9                   | 0.002612                   |
| 12 | [File, Java, ServiceLoader]                       | 10                  | 0.002902                   |
| 13 | [File, Java, Properties]                          | 12                  | 0.003482                   |
| 14 | [Maven, ExecutionGoal]                            | 16                  | 0.004643                   |
| 15 | [Maven, PluginExecution]                          | 16                  | 0.004643                   |
| 16 | [Xml, Attribute]                                  | 18                  | 0.005224                   |
| 17 | [jQAssistant, Rule, Concept]                      | 19                  | 0.005514                   |
| 18 | [Maven, Plugin]                                   | 21                  | 0.006094                   |
| 19 | [Maven, Configuration]                            | 21                  | 0.006094                   |
| 20 | [Type, File, Java, ByteCode, Enum]                | 28                  | 0.008126                   |
| 21 | [Type, File, Java, ByteCode, PrimitiveType]       | 29                  | 0.008416                   |
| 22 | [Git, Branch]                                     | 33                  | 0.009577                   |
| 23 | [Xml, Namespace]                                  | 36                  | 0.010447                   |
| 24 | [Type, File, Java, ByteCode, Annotation]          | 43                  | 0.012479                   |
| 25 | [File, Directory]                                 | 44                  | 0.012769                   |
| 26 | [Type, File, Java, ByteCode, GenericDeclaratio... | 85                  | 0.024667                   |
| 27 | [Artifact, Maven]                                 | 92                  | 0.026699                   |
| 28 | [Type, File, Java, ByteCode, ExternalAnnotatio... | 93                  | 0.026989                   |
| 29 | [Value, ManifestEntry]                            | 120                 | 0.034825                   |

## 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)

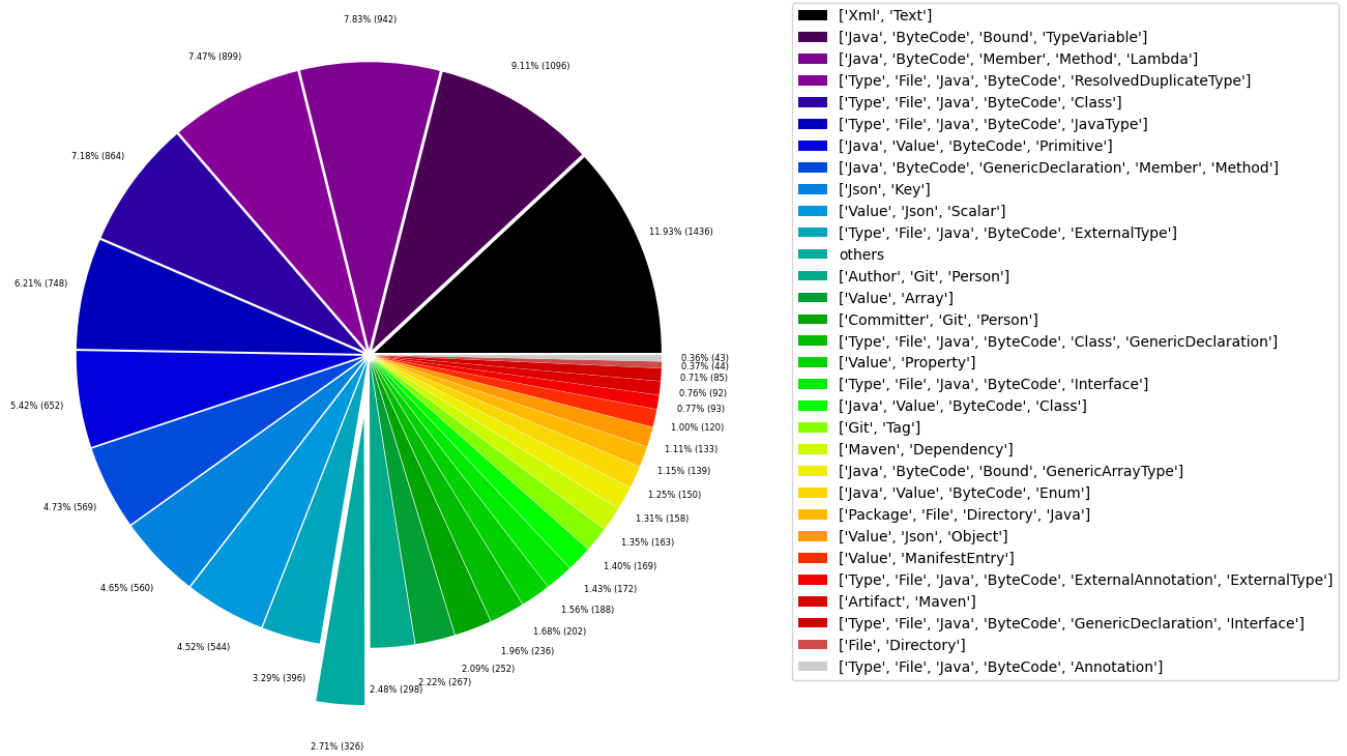


Table 1c - Highest node count by single label

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.

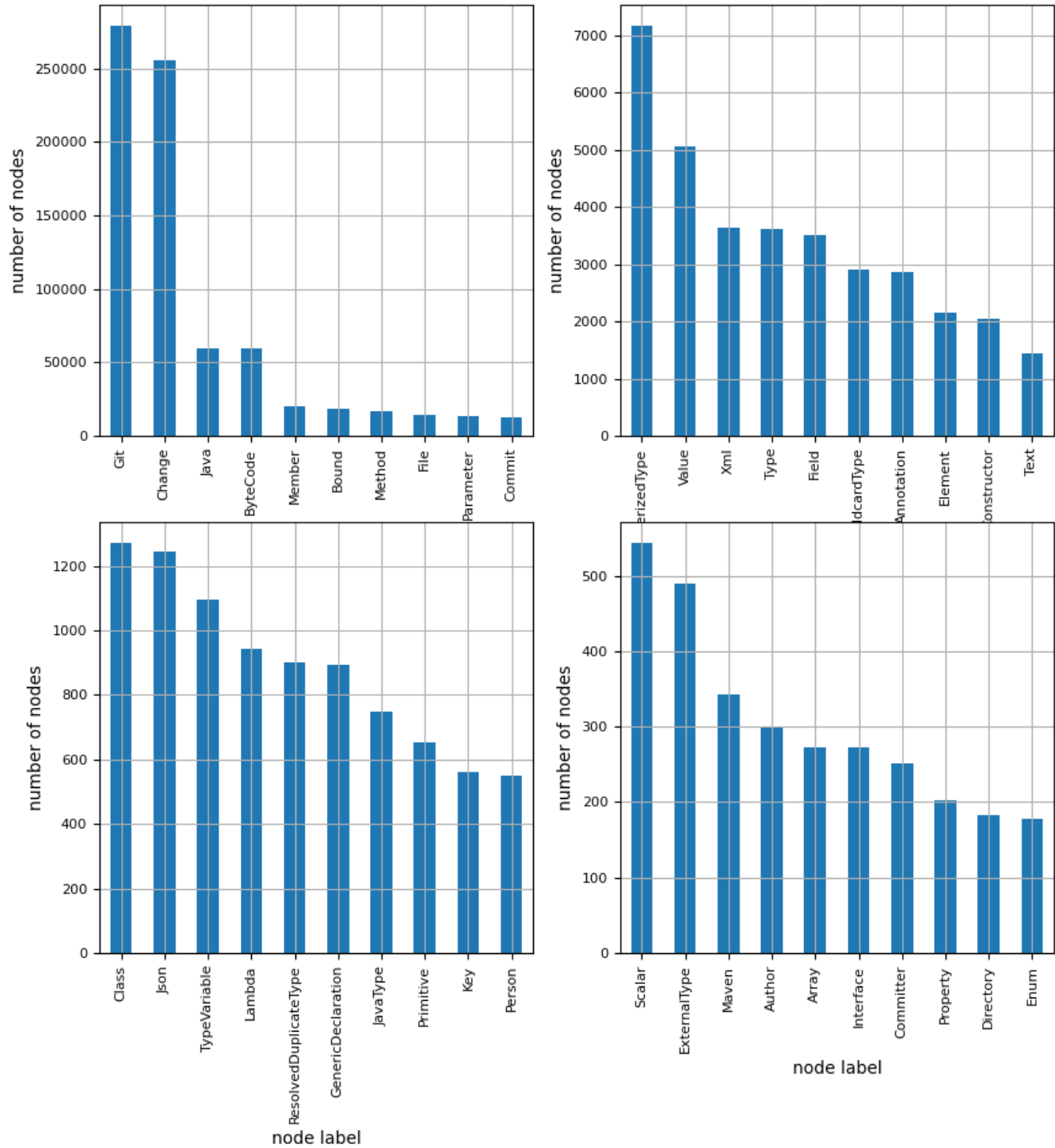
|    | nodeLabel             | nodesWithThatLabel | nodesWithThatLabelPercent |
|----|-----------------------|--------------------|---------------------------|
| 0  | Git                   | 279351             | 81.069292                 |
| 1  | Change                | 255467             | 74.138016                 |
| 2  | Java                  | 59354              | 17.224878                 |
| 3  | ByteCode              | 59166              | 17.170319                 |
| 4  | Member                | 20267              | 5.881602                  |
| 5  | Bound                 | 18456              | 5.356039                  |
| 6  | Method                | 16762              | 4.864430                  |
| 7  | File                  | 14623              | 4.243680                  |
| 8  | Parameter             | 13029              | 3.781092                  |
| 9  | Commit                | 12364              | 3.588105                  |
| 10 | ParameterizedType     | 7176               | 2.082517                  |
| 11 | Value                 | 5068               | 1.470763                  |
| 12 | Xml                   | 3643               | 1.057220                  |
| 13 | Type                  | 3618               | 1.049965                  |
| 14 | Field                 | 3505               | 1.017171                  |
| 15 | WildcardType          | 2908               | 0.843919                  |
| 16 | Annotation            | 2865               | 0.831440                  |
| 17 | Element               | 2144               | 0.622201                  |
| 18 | Constructor           | 2053               | 0.595793                  |
| 19 | Text                  | 1436               | 0.416736                  |
| 20 | Class                 | 1272               | 0.369142                  |
| 21 | Json                  | 1245               | 0.361306                  |
| 22 | TypeVariable          | 1096               | 0.318066                  |
| 23 | Lambda                | 942                | 0.273374                  |
| 24 | ResolvedDuplicateType | 899                | 0.260895                  |
| 25 | GenericDeclaration    | 894                | 0.259444                  |
| 26 | JavaType              | 748                | 0.217074                  |
| 27 | Primitive             | 652                | 0.189214                  |
| 28 | Key                   | 560                | 0.162515                  |
| 29 | Person                | 550                | 0.159613                  |
| 30 | Scalar                | 544                | 0.157872                  |
| 31 | ExternalType          | 489                | 0.141911                  |
| 32 | Maven                 | 343                | 0.099541                  |
| 33 | Author                | 298                | 0.086481                  |
| 34 | Array                 | 273                | 0.079226                  |
| 35 | Interface             | 273                | 0.079226                  |
| 36 | Committer             | 252                | 0.073132                  |
| 37 | Property              | 202                | 0.058622                  |
| 38 | Directory             | 183                | 0.053108                  |
| 39 | Enum                  | 178                | 0.051657                  |

## 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: 1069381

|    | relationshipType         | nodesWithThatRelationshipType | nodesWithThatRelationshipTypePercent |
|----|--------------------------|-------------------------------|--------------------------------------|
| 0  | CONTAINS_CHANGE          | 255467                        | 23.889241                            |
| 1  | MODIFIES                 | 255467                        | 23.889241                            |
| 2  | UPDATES                  | 167307                        | 15.645219                            |
| 3  | CREATES                  | 60811                         | 5.686561                             |
| 4  | DELETES                  | 37841                         | 3.538589                             |
| 5  | INVOKES                  | 35684                         | 3.336884                             |
| 6  | COMMITTED                | 24728                         | 2.312366                             |
| 7  | DEPENDS_ON               | 21931                         | 2.050813                             |
| 8  | OF_TYPE                  | 21394                         | 2.000597                             |
| 9  | DECLARES                 | 20712                         | 1.936821                             |
| 10 | OF_RAW_TYPE              | 17093                         | 1.598401                             |
| 11 | HAS_PARENT               | 15025                         | 1.405018                             |
| 12 | HAS                      | 14125                         | 1.320858                             |
| 13 | RETURNS                  | 12578                         | 1.176194                             |
| 14 | HAS_COMMIT               | 12364                         | 1.156183                             |
| 15 | HAS_FILE                 | 10767                         | 1.006844                             |
| 16 | RENAMES                  | 10492                         | 0.981128                             |
| 17 | READS                    | 9164                          | 0.856944                             |
| 18 | HAS_ACTUAL_TYPE_ARGUMENT | 8288                          | 0.775028                             |
| 19 | HAS_NEW_NAME             | 6219                          | 0.581551                             |
| 20 | OF_GENERIC_TYPE          | 5906                          | 0.552282                             |
| 21 | RESOLVES_TO              | 5184                          | 0.484766                             |
| 22 | SIMILAR                  | 3977                          | 0.371897                             |
| 23 | WRITES                   | 3818                          | 0.357029                             |
| 24 | CONTAINS                 | 3814                          | 0.356655                             |
| 25 | RETURNS_GENERIC          | 3545                          | 0.331500                             |
| 26 | ANNOTATED_BY             | 2810                          | 0.262769                             |
| 27 | REQUIRES                 | 2174                          | 0.203295                             |
| 28 | HAS_FIRST_CHILD          | 2144                          | 0.200490                             |
| 29 | HAS_LAST_CHILD           | 2144                          | 0.200490                             |

## 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)

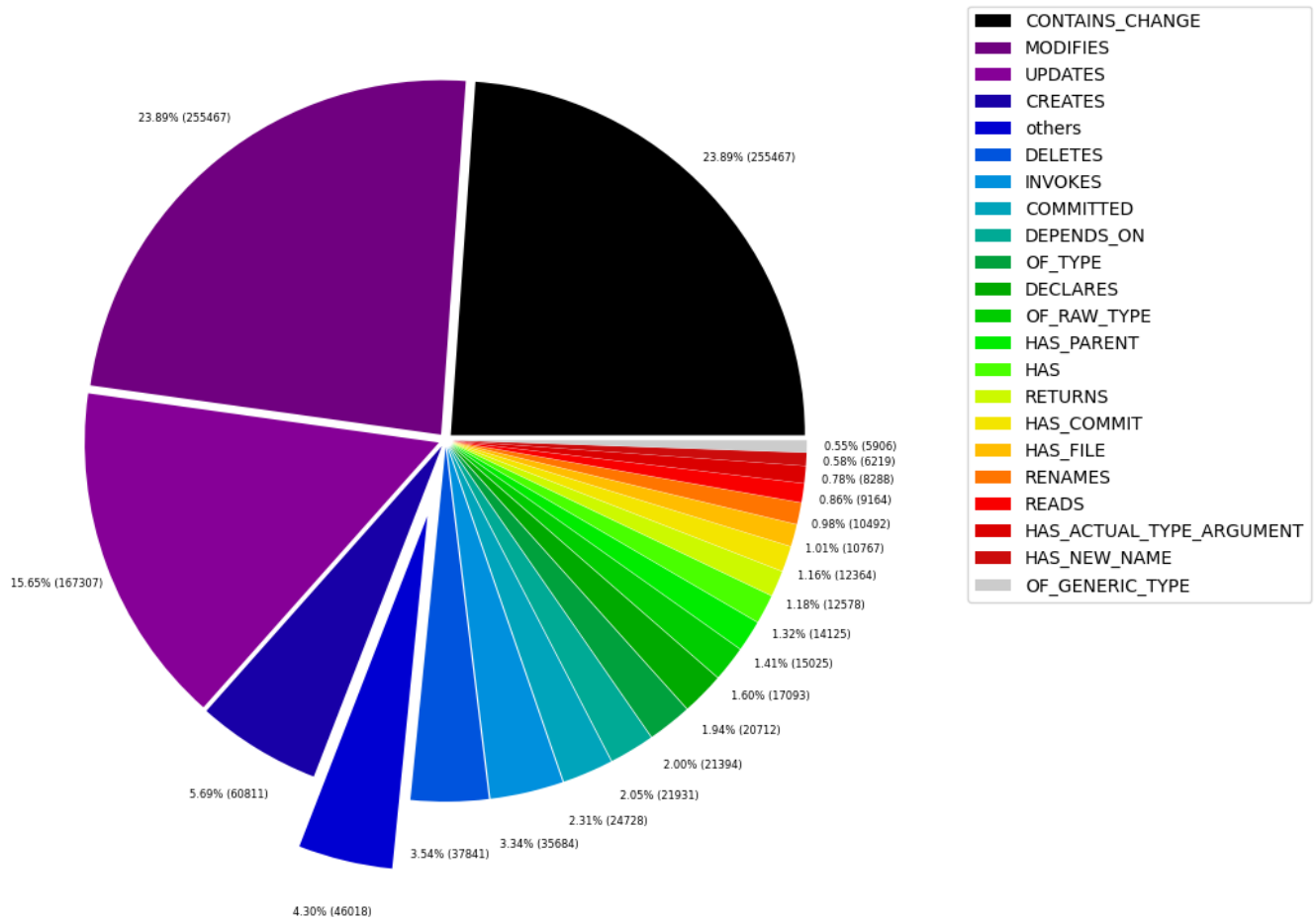


Table 2b - Lowest relationship count by type

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.

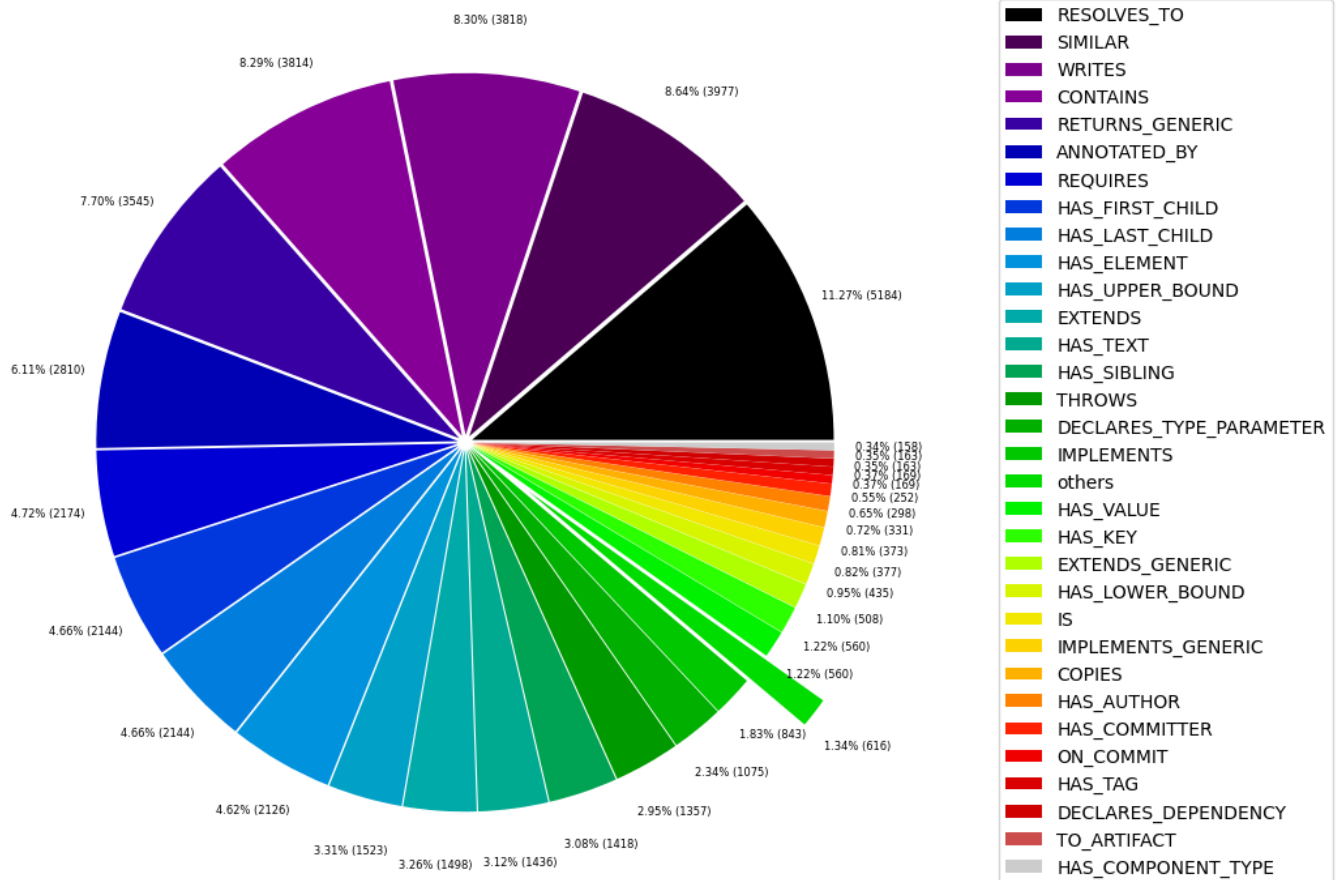
|    | relationshipType        | nodesWithThatRelationshipType | nodesWithThatRelationshipTypePercent |
|----|-------------------------|-------------------------------|--------------------------------------|
| 0  | HAS_PROPERTY            | 1                             | 0.000094                             |
| 1  | THROWS_GENERIC          | 5                             | 0.000468                             |
| 2  | EXCLUDES                | 5                             | 0.000468                             |
| 3  | DESCRIBES               | 9                             | 0.000842                             |
| 4  | HAS_ROOT_ELEMENT        | 11                            | 0.001029                             |
| 5  | HAS_GOAL                | 16                            | 0.001496                             |
| 6  | HAS_EXECUTION           | 16                            | 0.001496                             |
| 7  | OF_NAMESPACE            | 18                            | 0.001683                             |
| 8  | HAS_ATTRIBUTE           | 18                            | 0.001683                             |
| 9  | INCLUDES_CONCEPT        | 19                            | 0.001777                             |
| 10 | USES_PLUGIN             | 21                            | 0.001964                             |
| 11 | REQUIRES_TYPE_PARAMETER | 21                            | 0.001964                             |
| 12 | IS_ARTIFACT             | 21                            | 0.001964                             |
| 13 | HAS_CONFIGURATION       | 21                            | 0.001964                             |
| 14 | REQUIRES_CONCEPT        | 28                            | 0.002618                             |
| 15 | HAS_BRANCH              | 33                            | 0.003086                             |
| 16 | HAS_HEAD                | 34                            | 0.003179                             |
| 17 | DECLARES_NAMESPACE      | 36                            | 0.003366                             |
| 18 | HAS_DEFAULT             | 36                            | 0.003366                             |
| 19 | CONTAINS_VALUE          | 121                           | 0.011315                             |
| 20 | COPY_OF                 | 126                           | 0.011783                             |
| 21 | HAS_COMPONENT_TYPE      | 158                           | 0.014775                             |
| 22 | TO_ARTIFACT             | 163                           | 0.015242                             |
| 23 | DECLARES_DEPENDENCY     | 163                           | 0.015242                             |
| 24 | ON_COMMIT               | 169                           | 0.015804                             |
| 25 | HAS_TAG                 | 169                           | 0.015804                             |
| 26 | HAS_COMMITTER           | 252                           | 0.023565                             |
| 27 | HAS_AUTHOR              | 298                           | 0.027867                             |
| 28 | COPIES                  | 331                           | 0.030952                             |
| 29 | IMPLEMENTS_GENERIC      | 373                           | 0.034880                             |

## 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]                                     | 255467                |                                     | 12364              |
| 1  | [Git, Change]                                     | MODIFIES                 | [File, Git]                                       | 255467                |                                     | 255467             |
| 2  | [Git, Change]                                     | UPDATES                  | [File, Git]                                       | 167307                |                                     | 255467             |
| 3  | [Git, Change]                                     | CREATES                  | [File, Git]                                       | 60811                 |                                     | 255467             |
| 4  | [Git, Change]                                     | DELETES                  | [File, Git]                                       | 37841                 |                                     | 255467             |
| 5  | [Java, ByteCode, Member, Method]                  | INVOKES                  | [Java, ByteCode, Member, Method]                  | 21758                 |                                     | 13104              |
| 6  | [Git, Commit]                                     | HAS_PARENT               | [Git, Commit]                                     | 15016                 |                                     | 12364              |
| 7  | [Repository, File, Git]                           | HAS_COMMIT               | [Git, Commit]                                     | 12364                 |                                     | 1                  |
| 8  | [Author, Git, Person]                             | COMMITTED                | [Git, Commit]                                     | 12364                 |                                     | 298                |
| 9  | [Committer, Git, Person]                          | COMMITTED                | [Git, Commit]                                     | 12364                 |                                     | 252                |
| 10 | [Repository, File, Git]                           | HAS_FILE                 | [File, Git]                                       | 10767                 |                                     | 1                  |
| 11 | [Git, Change]                                     | RENAMES                  | [File, Git]                                       | 10492                 |                                     | 255467             |
| 12 | [Java, ByteCode, Member, Method]                  | HAS                      | [Java, ByteCode, Parameter]                       | 8361                  |                                     | 13104              |
| 13 | [Java, ByteCode, Member, Method]                  | READS                    | [Java, ByteCode, Member, Field]                   | 8218                  |                                     | 13104              |
| 14 | [Java, ByteCode, Parameter]                       | OF_TYPE                  | [Type, File, Java, ByteCode, JavaType]            | 6371                  |                                     | 13029              |
| 15 | [File, Git]                                       | HAS_NEW_NAME             | [File, Git]                                       | 6219                  |                                     | 10767              |
| 16 | [Type, File, Java, ByteCode, Class]               | DECLARES                 | [Java, ByteCode, Member, Method]                  | 5103                  |                                     | 814                |
| 17 | [Type, File, Java, ByteCode, Class]               | DEPENDS_ON               | [Type, File, Java, ByteCode, JavaType]            | 4480                  |                                     | 814                |
| 18 | [Java, ByteCode, Bound]                           | OF_RAW_TYPE              | [Type, File, Java, ByteCode, JavaType]            | 3570                  |                                     | 7118               |
| 19 | [Java, ByteCode, Bound, ParameterizedType]        | OF_RAW_TYPE              | [Type, File, Java, ByteCode, JavaType]            | 3053                  |                                     | 7176               |
| 20 | [Java, ByteCode, Bound, ParameterizedType]        | HAS_ACTUAL_TYPE_ARGUMENT | [Java, ByteCode, Bound, WildcardType]             | 2908                  |                                     | 7176               |
| 21 | [Java, ByteCode, Parameter]                       | OF_GENERIC_TYPE          | [Java, ByteCode, Bound, ParameterizedType]        | 2657                  |                                     | 13029              |
| 22 | [Java, ByteCode, Bound, ParameterizedType]        | HAS_ACTUAL_TYPE_ARGUMENT | [Java, ByteCode, Bound, TypeVariable]             | 2454                  |                                     | 7176               |
| 23 | [Java, ByteCode, Member, Method, Constructor]     | WRITES                   | [Java, ByteCode, Member, Field]                   | 2438                  |                                     | 2049               |
| 24 | [Java, Value, ByteCode, Annotation]               | OF_TYPE                  | [Type, File, Java, ByteCode, ExternalAnnotatio... | 2341                  |                                     | 2822               |
| 25 | [Type, File, Java, ByteCode, Class]               | DECLARES                 | [Java, ByteCode, Member, Field]                   | 2203                  |                                     | 814                |
| 26 | [Xml, Element]                                    | HAS_ELEMENT              | [Xml, Element]                                    | 2126                  |                                     | 2144               |
| 27 | [Java, ByteCode, Member, Method, Constructor]     | INVOKES                  | [Java, ByteCode, Member, Method, Constructor]     | 2117                  |                                     | 2049               |
| 28 | [Type, File, Java, ByteCode, Class, GenericDec... | DECLARES                 | [Java, ByteCode, Member, Method]                  | 2114                  |                                     | 231                |
| 29 | [Java, ByteCode, Member, Method]                  | RETURNS                  | [Type, File, Java, ByteCode, JavaType]            | 2092                  |                                     | 13104              |

## Graph Density

```
total_number_of_nodes (vertices): 344583
total_number_of_relationships (edges): 1069381
-> total directed graph density: 9.006292104576975e-06
-> total directed graph density in percent: 0.0009006292104576975
```