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]	249234	73.715624
1	[Java, ByteCode, Member, Method]	13200	3.904147
2	[Java, ByteCode, Parameter]	13016	3.849726
3	[Git, Commit]	12225	3.615773
4	[File, Git]	10703	3.165613
5	[Java, ByteCode, ParameterizedType, Bound]	7172	2.121253
6	[Java, ByteCode, Bound]	7113	2.103803
7	[Java, ByteCode, Member, Field]	3503	1.036078
8	[Java, ByteCode, Bound, WildcardType]	2908	0.860095
9	[Java, Value, ByteCode, Annotation]	2822	0.834659
10	[Xml, Element]	2144	0.634128
11	[Java, ByteCode, Member, Constructor, Method]	2043	0.604256
12	[Xml, Text]	1436	0.424724
13	[Java, ByteCode, Bound, TypeVariable]	1096	0.324163
14	[Java, ByteCode, Member, Method, Lambda]	938	0.277431
15	[Type, File, Java, ByteCode, ResolvedDuplicate...	900	0.266192
16	[Type, File, Java, ByteCode, Class]	861	0.254657
17	[Type, File, Java, ByteCode, JavaType]	748	0.221235
18	[Java, Value, ByteCode, Primitive]	650	0.192250
19	[Java, ByteCode, Member, Method, GenericDeclar...	569	0.168292
20	[Json, Key]	560	0.165630
21	[Value, Json, Scalar]	544	0.160898
22	[Type, File, Java, ByteCode, ExternalType]	396	0.117124
23	[Author, Git, Person]	295	0.087252
24	[Value, Array]	267	0.078970
25	[Committer, Git, Person]	250	0.073942
26	[Type, File, Java, ByteCode, Class, GenericDec...	236	0.069801
27	[Value, Property]	202	0.059745
28	[Type, File, Java, ByteCode, Interface]	187	0.055309
29	[Java, Value, ByteCode, Class]	172	0.050872

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)

Legend:
- ['Git', 'Change']
- ['Java', 'ByteCode', 'Member', 'Method']
- ['Java', 'ByteCode', 'Parameter']
- ['Git', 'Commit']
- others
- ['File', 'Git']
- ['Java', 'ByteCode', 'ParameterizedType', 'Bound']
- ['Java', 'ByteCode', 'Bound']
- ['Java', 'ByteCode', 'Member', 'Field']
- ['Java', 'ByteCode', 'Bound', 'WildcardType']
- ['Java', 'Value', 'ByteCode', 'Annotation']
- ['Xml', 'Element']
- ['Java', 'ByteCode', 'Member', 'Constructor', 'Method']

73.72% (249234)
0.60% (2043)
0.63% (2144)
0.83% (2822)
0.86% (2908)
1.04% (3503)
2.10% (7113)
2.12% (7172)
3.17% (10703)
3.55% (12019)
3.62% (12225)
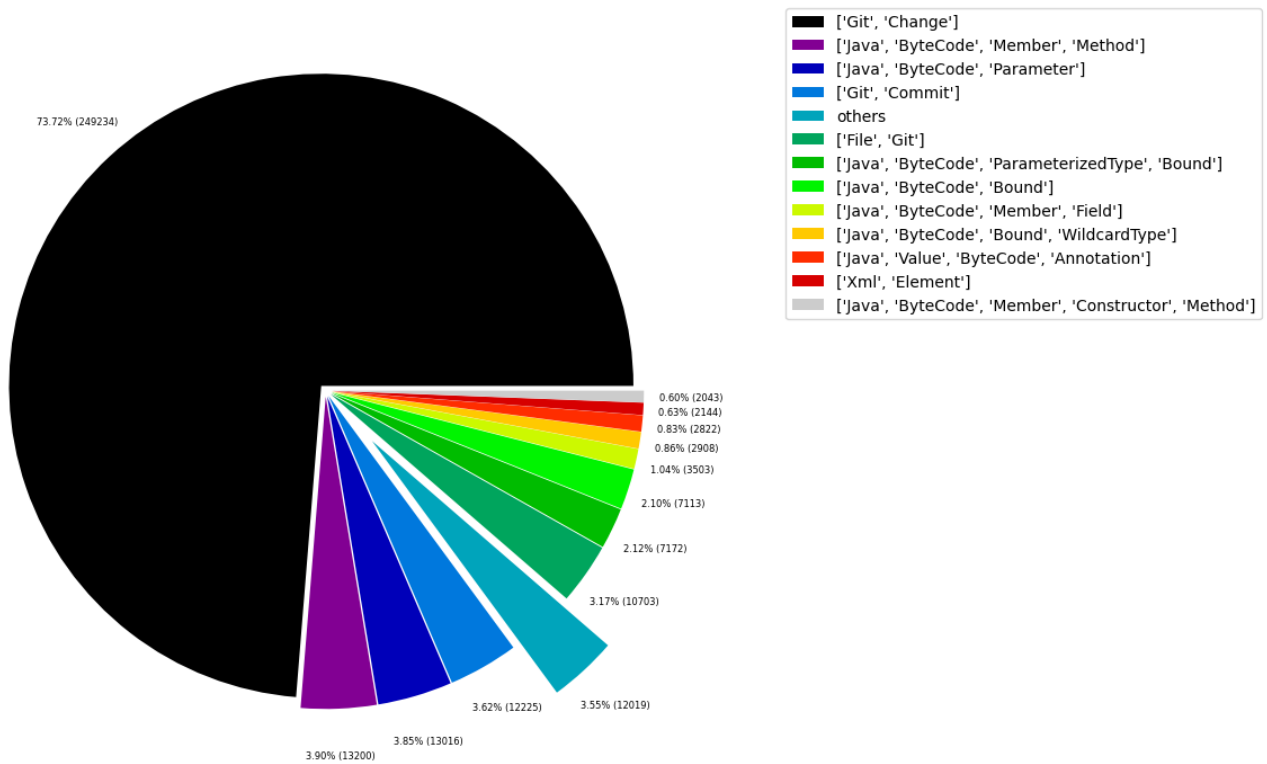3.85% (13016)
3.90% (13200)

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	0.000296
1	[Repository, File, Git]	1	0.000296
2	[File, Json]	2	0.000592
3	[File]	3	0.000887
4	[Java, ByteCode, Member, Constructor, Method, ...	4	0.001183
5	[Maven, Exclusion]	5	0.001479
6	[Value, Json, Array]	6	0.001775
7	[File, Maven, Xml, Pom, Document]	9	0.002662
8	[Type, File, Java, ByteCode, Void]	9	0.002662
9	[Java, ManifestSection]	9	0.002662
10	[File, Java, Manifest]	9	0.002662
11	[Artifact, File, Jar, Archive, Zip, Java]	9	0.002662
12	[File, Java, ServiceLoader]	10	0.002958
13	[File, Java, Properties]	12	0.003549
14	[Maven, ExecutionGoal]	16	0.004732
15	[Maven, PluginExecution]	16	0.004732
16	[Xml, Attribute]	18	0.005324
17	[jQAssistant, Rule, Concept]	19	0.005620
18	[Maven, Plugin]	21	0.006211
19	[Maven, Configuration]	21	0.006211
20	[Type, File, Java, ByteCode, Enum]	28	0.008282
21	[Type, File, Java, ByteCode, PrimitiveType]	29	0.008577
22	[Git, Branch]	30	0.008873
23	[Xml, Namespace]	36	0.010648
24	[Type, File, Java, ByteCode, Annotation]	43	0.012718
25	[File, Directory]	44	0.013014
26	[Type, File, Java, ByteCode, GenericDeclaratio...	85	0.025140
27	[Artifact, Maven]	92	0.027211
28	[Type, File, Java, ByteCode, ExternalAnnotatio...	93	0.027506
29	[Value, ManifestEntry]	120	0.035492

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)

Legend:
- ['Xml', 'Text']
- ['Java', 'ByteCode', 'Bound', 'TypeVariable']
- ['Java', 'ByteCode', 'Member', 'Method', 'Lambda']
- ['Type', 'File', 'Java', 'ByteCode', 'ResolvedDuplicateType']
- ['Type', 'File', 'Java', 'ByteCode', 'Class']
- ['Type', 'File', 'Java', 'ByteCode', 'JavaType']
- ['Java', 'Value', 'ByteCode', 'Primitive']
- ['Java', 'ByteCode', 'Member', 'Method', 'GenericDeclaration']
- ['Json', 'Key']
- ['Value', 'Json', 'Scalar']
- ['Type', 'File', 'Java', 'ByteCode', 'ExternalType']
- others
- ['Author', 'Git', 'Person']
- ['Value', 'Array']
- ['Committer', 'Git', 'Person']
- ['Type', 'File', 'Java', 'ByteCode', 'Class', 'GenericDeclaration']
- ['Value', 'Property']
- ['Type', 'File', 'Java', 'ByteCode', 'Interface']
- ['Java', 'Value', 'ByteCode', 'Class']
- ['Git', 'Tag']
- ['Maven', 'Dependency']
- ['Java', 'ByteCode', 'Bound', 'GenericArrayType']
- ['Java', 'Value', 'ByteCode', 'Enum']
- ['Package', 'File', 'Directory', 'Java']
- ['Value', 'Json', 'Object']
- ['Value', 'ManifestEntry']
- ['Type', 'File', 'Java', 'ByteCode', 'ExternalAnnotation', 'ExternalType']
- ['Artifact', 'Maven']
- ['Type', 'File', 'Java', 'ByteCode', 'GenericDeclaration', 'Interface']
- ['File', 'Directory']
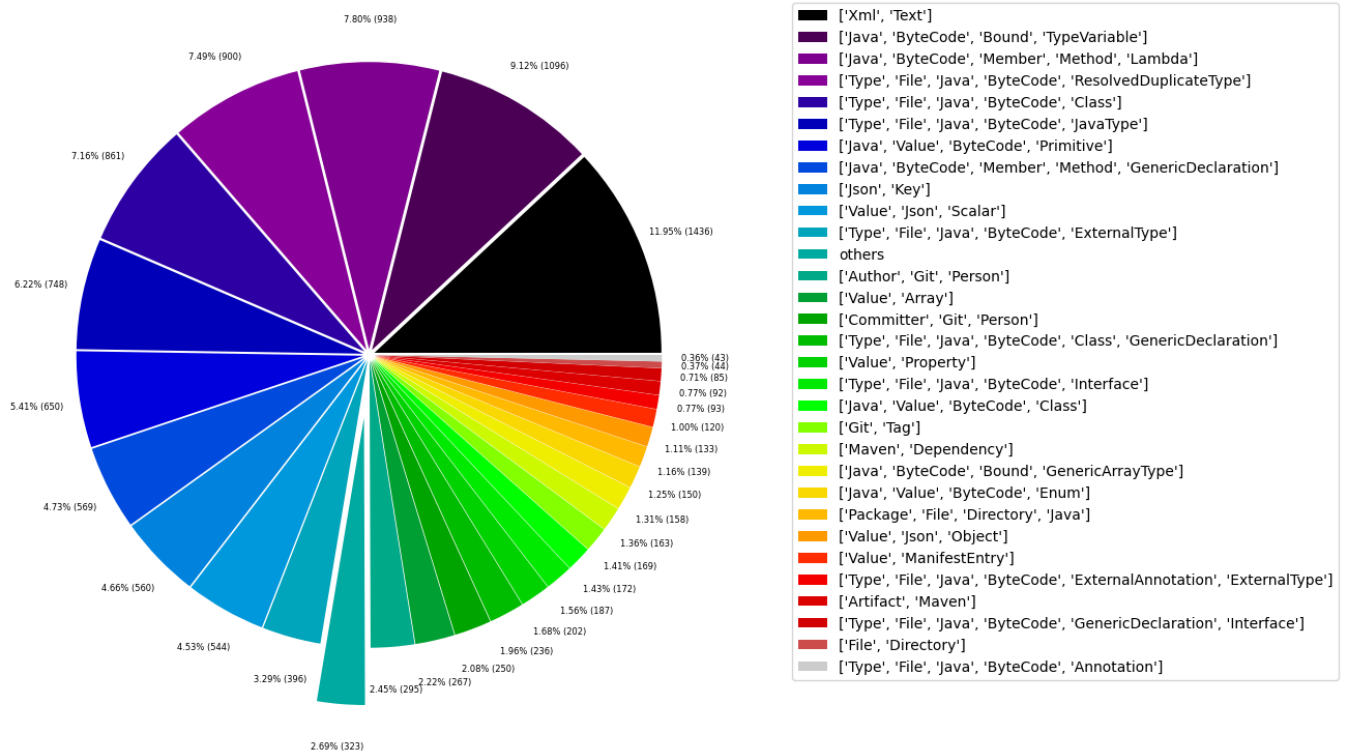- ['Type', 'File', 'Java', 'ByteCode', 'Annotation']

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.
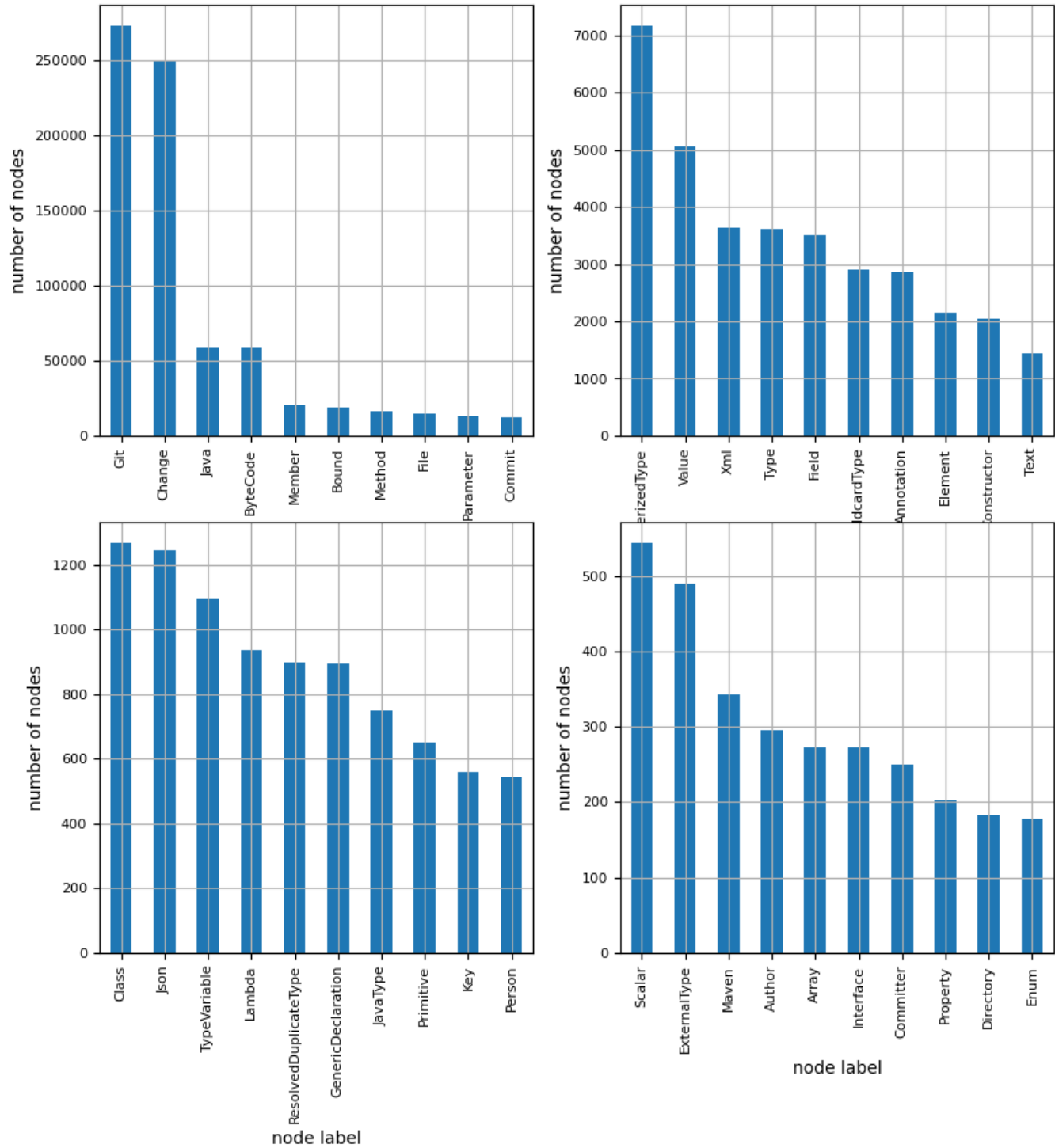
	nodeLabel	nodesWithThatLabel	nodesWithThatLabelPercent
0	Git	272907	80.717357
1	Change	249234	73.715624
2	Java	59317	17.544114
3	ByteCode	59129	17.488509
4	Member	20257	5.991387
5	Bound	18447	5.456046
6	Method	16754	4.955309
7	File	14556	4.305210
8	Parameter	13016	3.849726
9	Commit	12225	3.615773
10	ParameterizedType	7172	2.121253
11	Value	5066	1.498364
12	Xml	3643	1.077485
13	Type	3615	1.069204
14	Field	3503	1.036078
15	WildcardType	2908	0.860095
16	Annotation	2865	0.847377
17	Element	2144	0.634128
18	Constructor	2047	0.605439
19	Text	1436	0.424724
20	Class	1269	0.375331
21	Json	1245	0.368232
22	TypeVariable	1096	0.324163
23	Lambda	938	0.277431
24	ResolvedDuplicateType	900	0.266192
25	GenericDeclaration	894	0.264417
26	JavaType	748	0.221235
27	Primitive	650	0.192250
28	Key	560	0.165630
29	Person	545	0.161194
30	Scalar	544	0.160898
31	ExternalType	489	0.144631
32	Maven	343	0.101449
33	Author	295	0.087252
34	Array	273	0.080745
35	Interface	272	0.080449
36	Committer	250	0.073942
37	Property	202	0.059745
38	Directory	183	0.054126
39	Enum	178	0.052647

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: 1048693
```

	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	CONTAINS_CHANGE	249234	23.766155
1	MODIFIES	249234	23.766155
2	UPDATES	162498	15.495288
3	CREATES	59791	5.701478
4	DELETES	37236	3.550705
5	INVOKES	35678	3.402140
6	COMMITTED	24450	2.331474
7	DEPENDS_ON	21887	2.087074
8	OF_TYPE	21373	2.038061
9	DECLARES	20698	1.973695
10	OF_RAW_TYPE	17084	1.629075
11	HAS_PARENT	14856	1.416620
12	HAS	14110	1.345484
13	RETURNS	12562	1.197872
14	HAS_COMMIT	12225	1.165737
15	HAS_FILE	10703	1.020604
16	RENAMES	10291	0.981317
17	READS	9097	0.867461
18	HAS_ACTUAL_TYPE_ARGUMENT	8284	0.789936
19	HAS_NEW_NAME	6200	0.591212
20	OF_GENERIC_TYPE	5903	0.562891
21	RESOLVES_TO	5204	0.496237
22	SIMILAR	3968	0.378376
23	WRITES	3812	0.363500
24	CONTAINS	3806	0.362928
25	RETURNS_GENERIC	3543	0.337849
26	ANNOTATED_BY	2810	0.267953
27	REQUIRES	2175	0.207401
28	HAS_FIRST_CHILD	2144	0.204445
29	HAS_LAST_CHILD	2144	0.204445

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>
```

Legend:
- CONTAINS_CHANGE
- MODIFIES
- UPDATES
- CREATES
- others
- DELETES
- INVOKES
- COMMITTED
- DEPENDS_ON
- OF_TYPE
- DECLARES
- OF_RAW_TYPE
- HAS_PARENT
- HAS
- RETURNS
- HAS_COMMIT
- HAS_FILE
- RENAMES
- READS
- HAS_ACTUAL_TYPE_ARGUMENT
- HAS_NEW_NAME
- OF_GENERIC_TYPE

Pie chart values:
- 23.77% (249234)
- 23.77% (249234)
- 15.50% (162498)
- 5.70% (59791)
- 4.32% (45299)
- 3.55% (37236)
- 3.40% (35678)
- 2.33% (24450)
- 2.09% (21887)
- 2.04% (21373)
- 1.97% (20698)
- 1.63% (17084)
- 1.42% (14856)
- 1.35% (14110)
- 1.20% (12562)
- 1.17% (12225)
- 1.02% (10703)
- 0.98% (10291)
- 0.87% (9097)
- 0.79% (8284)
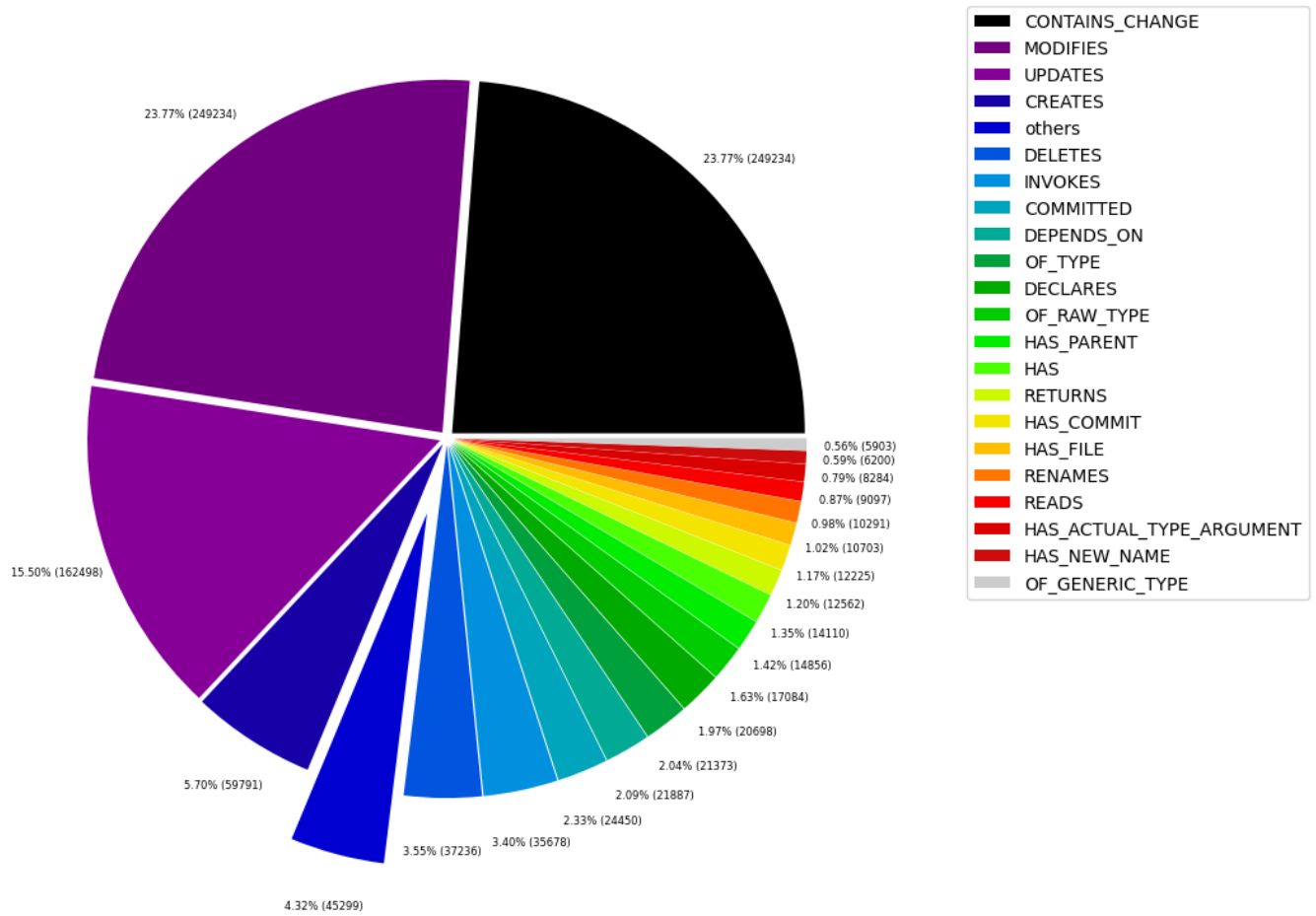- 0.59% (6200)
- 0.56% (5903)

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.
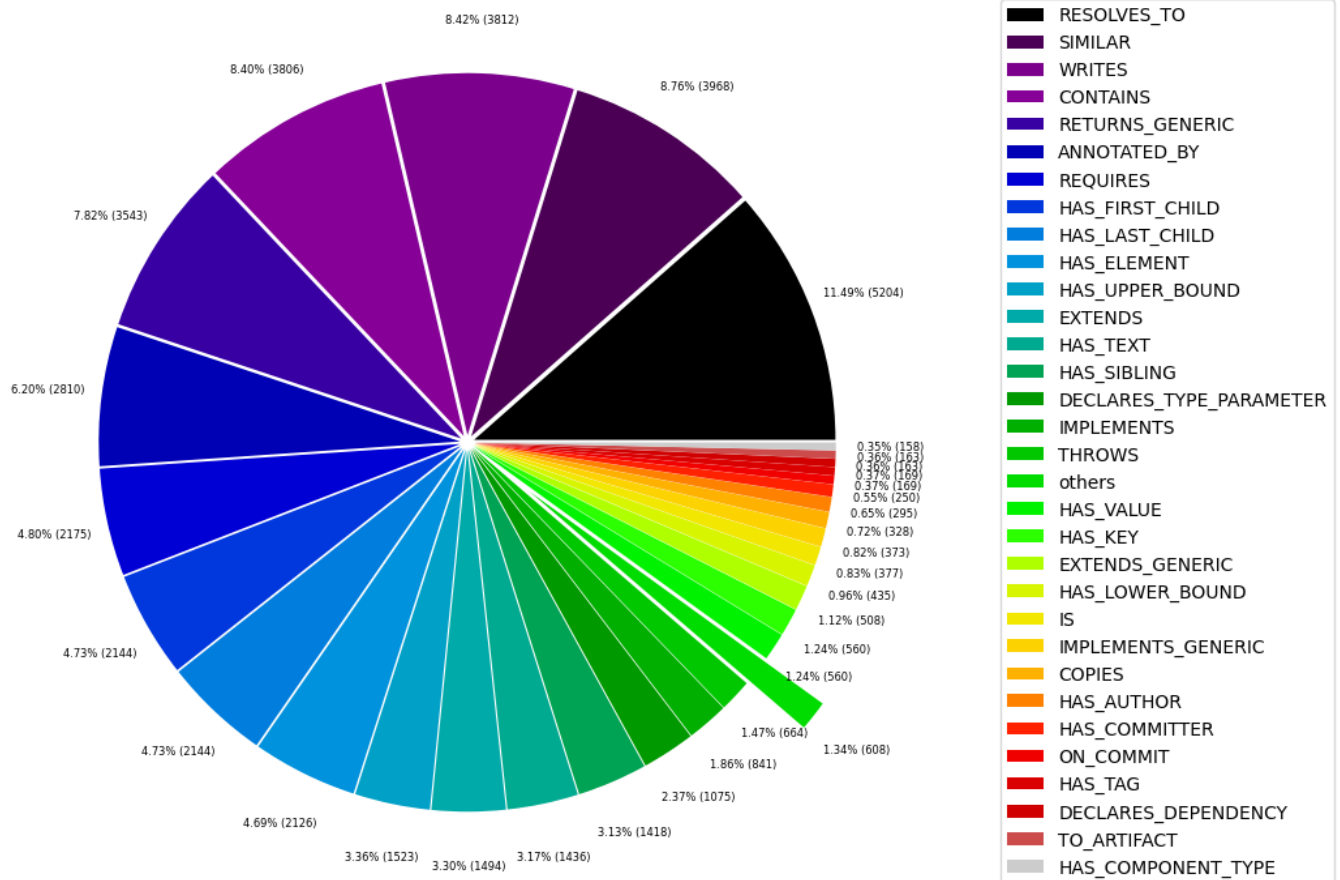
	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	HAS_PROPERTY	1	0.000095
1	THROWS_GENERIC	5	0.000477
2	EXCLUDES	5	0.000477
3	HAS_ROOT_ELEMENT	9	0.000858
4	DESCRIBES	9	0.000858
5	HAS_GOAL	16	0.001526
6	HAS_EXECUTION	16	0.001526
7	OF_NAMESPACE	18	0.001716
8	HAS_ATTRIBUTE	18	0.001716
9	INCLUDES_CONCEPT	19	0.001812
10	USES_PLUGIN	21	0.002002
11	REQUIRES_TYPE_PARAMETER	21	0.002002
12	IS_ARTIFACT	21	0.002002
13	HAS_CONFIGURATION	21	0.002002
14	REQUIRES_CONCEPT	28	0.002670
15	HAS_BRANCH	30	0.002861
16	HAS_HEAD	31	0.002956
17	DECLARES_NAMESPACE	36	0.003433
18	HAS_DEFAULT	36	0.003433
19	CONTAINS_VALUE	121	0.011538
20	COPY_OF	126	0.012015
21	HAS_COMPONENT_TYPE	158	0.015066
22	TO_ARTIFACT	163	0.015543
23	DECLARES_DEPENDENCY	163	0.015543
24	ON_COMMIT	169	0.016115
25	HAS_TAG	169	0.016115
26	HAS_COMMITTER	250	0.023839
27	HAS_AUTHOR	295	0.028130
28	COPIES	328	0.031277
29	IMPLEMENTS_GENERIC	373	0.035568

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)

Legend:
- RESOLVES_TO
- SIMILAR
- WRITES
- CONTAINS
- RETURNS_GENERIC
- ANNOTATED_BY
- REQUIRES
- HAS_FIRST_CHILD
- HAS_LAST_CHILD
- HAS_ELEMENT
- HAS_UPPER_BOUND
- EXTENDS
- HAS_TEXT
- HAS_SIBLING
- DECLARES_TYPE_PARAMETER
- IMPLEMENTS
- THROWS
- others
- HAS_VALUE
- HAS_KEY
- EXTENDS_GENERIC
- HAS_LOWER_BOUND
- IS
- IMPLEMENTS_GENERIC
- COPIES
- HAS_AUTHOR
- HAS_COMMITTER
- ON_COMMIT
- HAS_TAG
- DECLARES_DEPENDENCY
- TO_ARTIFACT
- HAS_COMPONENT_TYPE

Pie chart values:
- 8.42% (3812)
- 8.40% (3806)
- 8.76% (3968)
- 7.82% (3543)
- 11.49% (5204)
- 6.20% (2810)
- 0.35% (158)
- 0.36% (163)
- 0.36% (163)
- 0.37% (169)
- 0.37% (169)
- 0.55% (250)
- 0.65% (295)
- 4.80% (2175)
- 0.72% (328)
- 0.82% (373)
- 0.83% (377)
- 4.73% (2144)
- 0.96% (435)
- 1.12% (508)
- 1.24% (560)
- 1.24% (560)
- 4.73% (2144)
- 1.47% (664)
- 1.34% (608)
- 4.69% (2126)
- 1.86% (841)
- 3.36% (1523)
- 2.37% (1075)
- 3.30% (1494)
- 3.17% (1436)
- 3.13% (1418)

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]	249234	12225	
1	[Git, Change]	MODIFIES	[File, Git]	249234	249234	
2	[Git, Change]	UPDATES	[File, Git]	162498	249234	
3	[Git, Change]	CREATES	[File, Git]	59791	249234	
4	[Git, Change]	DELETES	[File, Git]	37236	249234	
5	[Java, ByteCode, Member, Method]	INVOKES	[Java, ByteCode, Member, Method]	21616	13099	
6	[Git, Commit]	HAS_PARENT	[Git, Commit]	14847	12225	
7	[Repository, File, Git]	HAS_COMMIT	[Git, Commit]	12225	1	
8	[Author, Git, Person]	COMMITTED	[Git, Commit]	12225	295	
9	[Committer, Git, Person]	COMMITTED	[Git, Commit]	12225	250	
10	[Repository, File, Git]	HAS_FILE	[File, Git]	10703	1	
11	[Git, Change]	RENAMES	[File, Git]	10291	249234	
12	[Java, ByteCode, Member, Method]	HAS	[Java, ByteCode, Parameter]	8348	13099	
13	[Java, ByteCode, Member, Method]	READS	[Java, ByteCode, Member, Field]	8124	13099	
14	[Java, ByteCode, Parameter]	OF_TYPE	[Type, File, Java, ByteCode, JavaType]	6368	13016	
15	[File, Git]	HAS_NEW_NAME	[File, Git]	6200	10703	
16	[Type, File, Java, ByteCode, Class]	DECLARES	[Java, ByteCode, Member, Method]	5065	813	
17	[Type, File, Java, ByteCode, Class]	DEPENDS_ON	[Type, File, Java, ByteCode, JavaType]	4475	813	
18	[Java, ByteCode, Bound]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3570	7113	
19	[Java, ByteCode, ParameterizedType, Bound]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3049	7172	
20	[Java, ByteCode, ParameterizedType, Bound]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, WildcardType]	2908	7172	
21	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, ParameterizedType, Bound]	2655	13016	
22	[Java, ByteCode, ParameterizedType, Bound]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, TypeVariable]	2454	7172	
23	[Java, ByteCode, Member, Constructor, Method]	WRITES	[Java, ByteCode, Member, Field]	2432	2043	
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]	2177	813	
26	[Xml, Element]	HAS_ELEMENT	[Xml, Element]	2126	2144	
27	[Java, ByteCode, Member, Constructor, Method]	INVOKES	[Java, ByteCode, Member, Constructor, Method]	2113	2043	
28	[Type, File, Java, ByteCode, Class, GenericDec...]	DECLARES	[Java, ByteCode, Member, Method]	2099	228	
29	[Java, ByteCode, Member, Method]	RETURNS	[Type, File, Java, ByteCode, JavaType]	2088	13099	

Graph Density

```
total_number_of_nodes (vertices): 338102
total_number_of_relationships (edges): 1048693
-> total directed graph density: 9.17390363840726e-06
-> total directed graph density in percent: 0.000917390363840726
```