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: 319219
```

	nodeLabels	nodesWithThatLabels	nodesWithThatLabelsPercent
0	[Git, Change]	231255	72.443996
1	[Java, ByteCode, Method, Member]	13179	4.128514
2	[Java, ByteCode, Parameter]	12968	4.062415
3	[Git, Commit]	11657	3.651725
4	[File, Git]	10572	3.311833
5	[Java, ByteCode, Bound, ParameterizedType]	7154	2.241095
6	[Java, ByteCode, Bound]	7094	2.222299
7	[Java, ByteCode, Member, Field]	3483	1.091100
8	[Java, ByteCode, Bound, WildcardType]	2902	0.909094
9	[Java, Value, ByteCode, Annotation]	2813	0.881213
10	[Xml, Element]	2144	0.671639
11	[Java, ByteCode, Constructor, Method, Member]	2037	0.638120
12	[Xml, Text]	1436	0.449848
13	[Java, ByteCode, Bound, TypeVariable]	1094	0.342711
14	[Java, ByteCode, Method, Member, Lambda]	931	0.291649
15	[Type, File, Java, ByteCode, ResolvedDuplicate...	899	0.281625
16	[Type, File, Java, ByteCode, Class]	858	0.268781
17	[Type, File, Java, ByteCode, JavaType]	746	0.233695
18	[Java, Value, ByteCode, Primitive]	647	0.202682
19	[Java, ByteCode, Method, Member, GenericDeclar...	567	0.177621
20	[Json, Key]	555	0.173862
21	[Value, Json, Scalar]	539	0.168850
22	[Type, File, Java, ByteCode, ExternalType]	396	0.124053
23	[Author, Git, Person]	288	0.090220
24	[Value, Array]	267	0.083642
25	[Committer, Git, Person]	242	0.075810
26	[Type, File, Java, ByteCode, Class, GenericDec...	236	0.073930
27	[Value, Property]	202	0.063279
28	[Type, File, Java, ByteCode, Interface]	186	0.058267
29	[Java, Value, ByteCode, Class]	170	0.053255

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

Pie chart values:
- 72.44% (231255)
- 0.64% (2037)
- 0.67% (2144)
- 0.88% (2813)
- 0.91% (2902)
- 1.09% (3483)
- 2.22% (7094)
- 2.24% (7154)
- 3.31% (10572)
- 3.65% (11657)
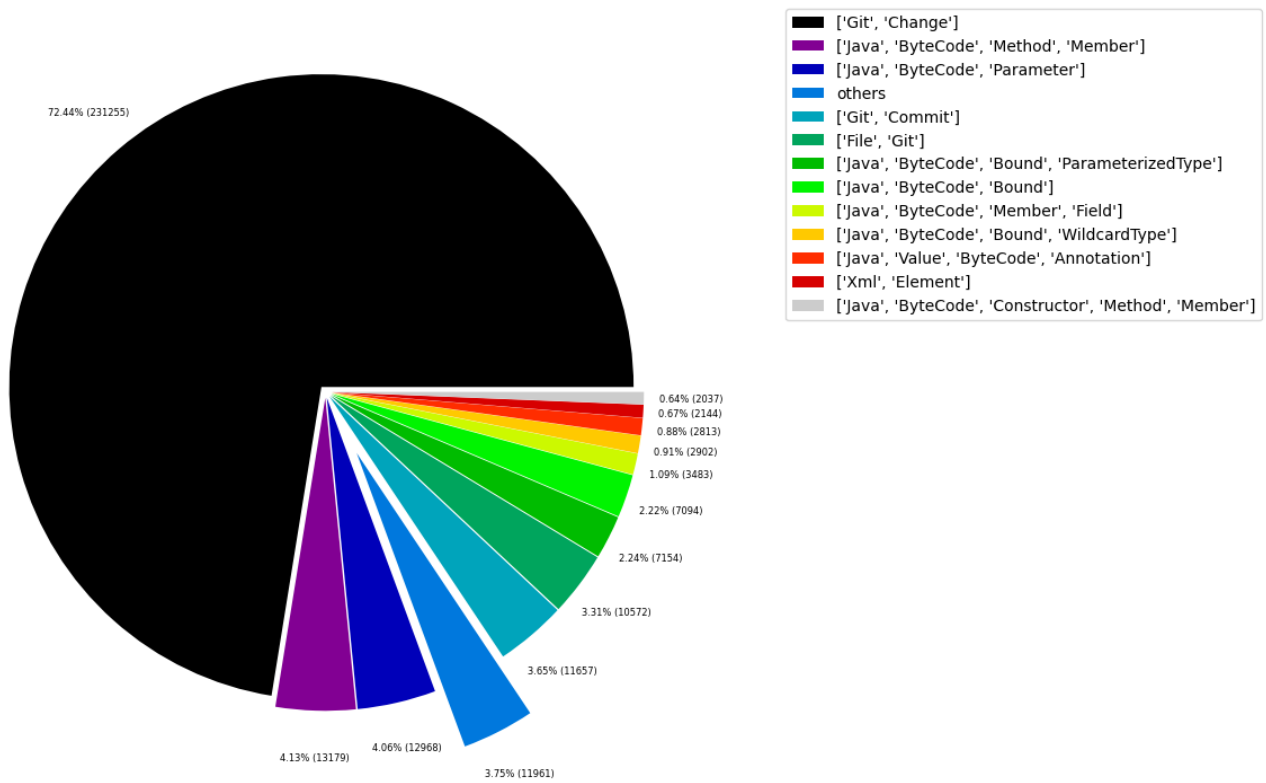- 4.13% (13179)
- 4.06% (12968)
- 3.75% (11961)

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	0.000313
1	[File, TS, Scan]	1	0.000313
2	[File, Json]	2	0.000627
3	[File]	3	0.000940
4	[Java, ByteCode, Constructor, Method, Member, ...	4	0.001253
5	[Maven, Exclusion]	5	0.001566
6	[Value, Array, Json]	6	0.001880
7	[File, Maven, Xml, Pom, Document]	9	0.002819
8	[Type, File, Java, ByteCode, Void]	9	0.002819
9	[Java, ManifestSection]	9	0.002819
10	[File, Java, Manifest]	9	0.002819
11	[Artifact, File, Jar, Archive, Zip, Java]	9	0.002819
12	[File, Java, ServiceLoader]	10	0.003133
13	[File, Java, Properties]	12	0.003759
14	[Maven, ExecutionGoal]	16	0.005012
15	[Maven, PluginExecution]	16	0.005012
16	[Xml, Attribute]	18	0.005639
17	[jQAssistant, Rule, Concept]	19	0.005952
18	[Maven, Plugin]	21	0.006579
19	[Maven, Configuration]	21	0.006579
20	[Git, Branch]	25	0.007832
21	[Type, File, Java, ByteCode, Enum]	28	0.008771
22	[Type, File, Java, ByteCode, PrimitiveType]	29	0.009085
23	[Xml, Namespace]	36	0.011278
24	[Type, File, Java, ByteCode, Annotation]	43	0.013470
25	[File, Directory]	44	0.013784
26	[Type, File, Java, ByteCode, GenericDeclaratio...	85	0.026627
27	[Artifact, Maven]	92	0.028820
28	[Type, File, Java, ByteCode, ExternalType, Ext...	93	0.029134
29	[Value, ManifestEntry]	120	0.037592

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', 'Method', 'Member', 'Lambda']
- ['Type', 'File', 'Java', 'ByteCode', 'ResolvedDuplicateType']
- ['Type', 'File', 'Java', 'ByteCode', 'Class']
- ['Type', 'File', 'Java', 'ByteCode', 'JavaType']
- ['Java', 'Value', 'ByteCode', 'Primitive']
- ['Java', 'ByteCode', 'Method', 'Member', 'GenericDeclaration']
- ['Json', 'Key']
- ['Value', 'Json', 'Scalar']
- ['Type', 'File', 'Java', 'ByteCode', 'ExternalType']
- ['Author', 'Git', 'Person']
- others
- ['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', 'ExternalType', 'ExternalAnnotation']
- ['Artifact', 'Maven']
- ['Type', 'File', 'Java', 'ByteCode', 'GenericDeclaration', 'Interface']
- ['File', 'Directory']
- ['Type', 'File', 'Java', 'ByteCode', 'Annotation']
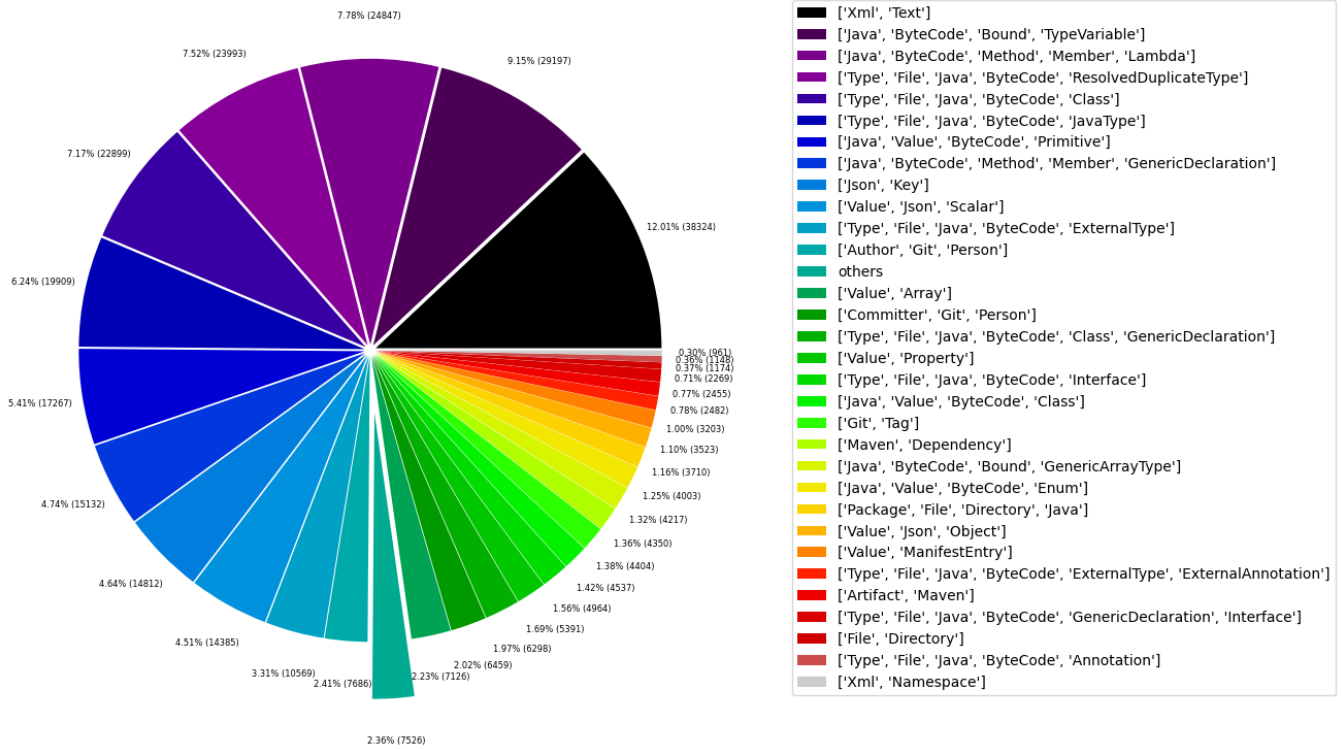- ['Xml', 'Namespace']

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.
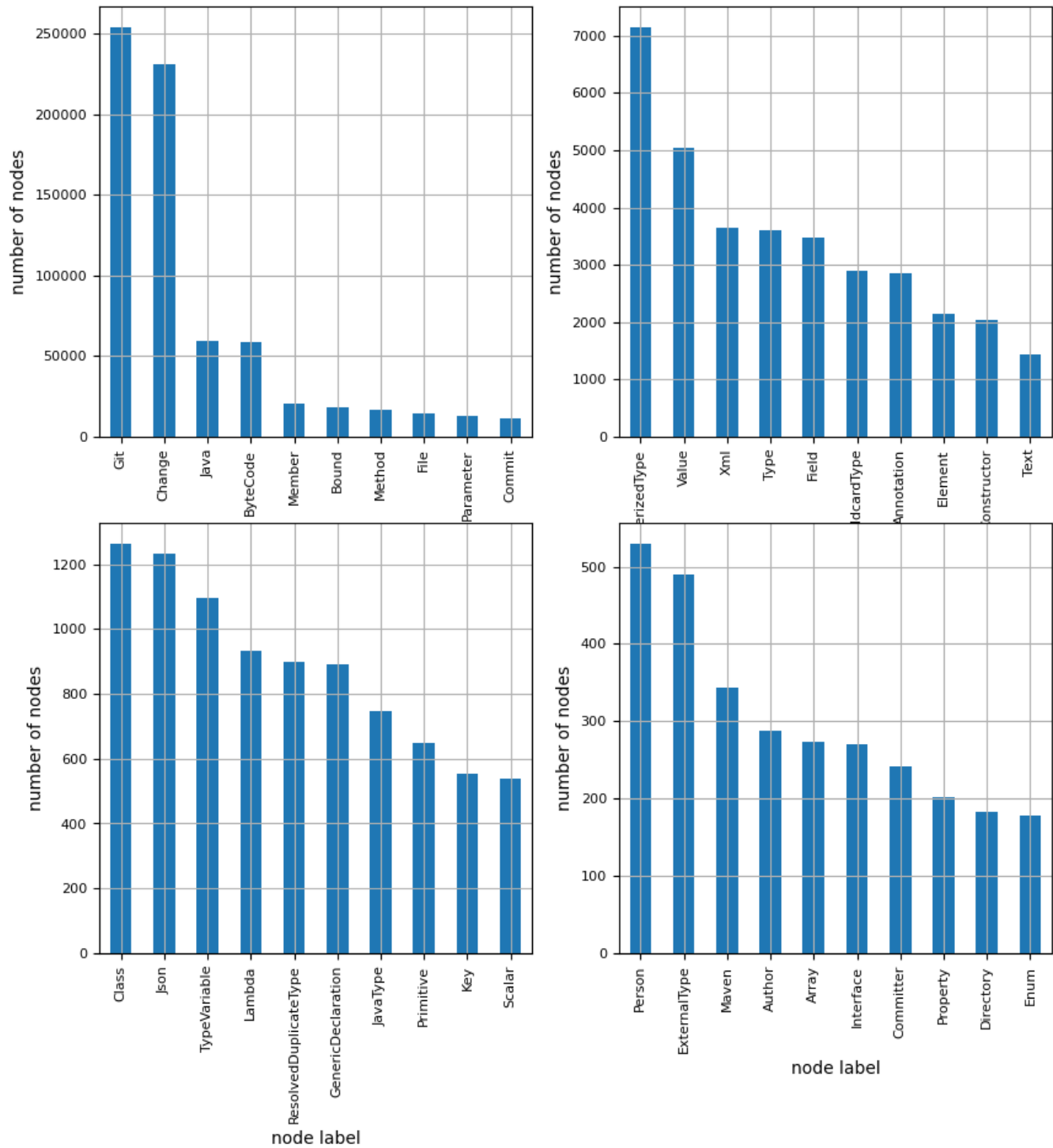
	nodeLabel	nodesWithThatLabel	nodesWithThatLabelPercent
0	Git	254204	79.633105
1	Change	231255	72.443996
2	Java	59147	18.528659
3	ByteCode	58959	18.469765
4	Member	20201	6.328257
5	Bound	18402	5.764694
6	Method	16718	5.237157
7	File	14418	4.516648
8	Parameter	12968	4.062415
9	Commit	11657	3.651725
10	ParameterizedType	7154	2.241095
11	Value	5046	1.580733
12	Xml	3643	1.141223
13	Type	3608	1.130259
14	Field	3483	1.091100
15	WildcardType	2902	0.909094
16	Annotation	2856	0.894684
17	Element	2144	0.671639
18	Constructor	2041	0.639373
19	Text	1436	0.449848
20	Class	1264	0.395966
21	Json	1234	0.386568
22	TypeVariable	1094	0.342711
23	Lambda	931	0.291649
24	ResolvedDuplicateType	899	0.281625
25	GenericDeclaration	892	0.279432
26	JavaType	746	0.233695
27	Primitive	647	0.202682
28	Key	555	0.173862
29	Scalar	539	0.168850
30	Person	530	0.166030
31	ExternalType	489	0.153186
32	Maven	343	0.107450
33	Author	288	0.090220
34	Array	273	0.085521
35	Interface	271	0.084895
36	Committer	242	0.075810
37	Property	202	0.063279
38	Directory	183	0.057327
39	Enum	178	0.055761

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: 967515
```

	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	CONTAINS_CHANGE	231255	23.901955
1	MODIFIES	231255	23.901955
2	UPDATES	148162	15.313664
3	CREATES	57605	5.953913
4	INVOKES	35719	3.691829
5	DELETES	35346	3.653277
6	COMMITTED	23314	2.409678
7	DEPENDS_ON	21459	2.217950
8	OF_TYPE	21292	2.200689
9	DECLARES	20640	2.133300
10	OF_RAW_TYPE	17041	1.761316
11	HAS_PARENT	14171	1.464680
12	HAS	14057	1.452897
13	RETURNS	12524	1.294450
14	RENAMES	9858	1.018899
15	READS	9068	0.937246
16	HAS_ACTUAL_TYPE_ARGUMENT	8261	0.853837
17	HAS_NEW_NAME	6161	0.636786
18	OF_GENERIC_TYPE	5892	0.608983
19	RESOLVES_TO	5225	0.540043
20	SIMILAR	3915	0.404645
21	CONTAINS	3797	0.392449
22	WRITES	3796	0.392345
23	RETURNS_GENERIC	3538	0.365679
24	ANNOTATED_BY	2801	0.289505
25	REQUIRES	2172	0.224493
26	HAS_FIRST_CHILD	2144	0.221599
27	HAS_LAST_CHILD	2144	0.221599
28	HAS_ELEMENT	2126	0.219738
29	HAS_UPPER_BOUND	1519	0.157000

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>
```
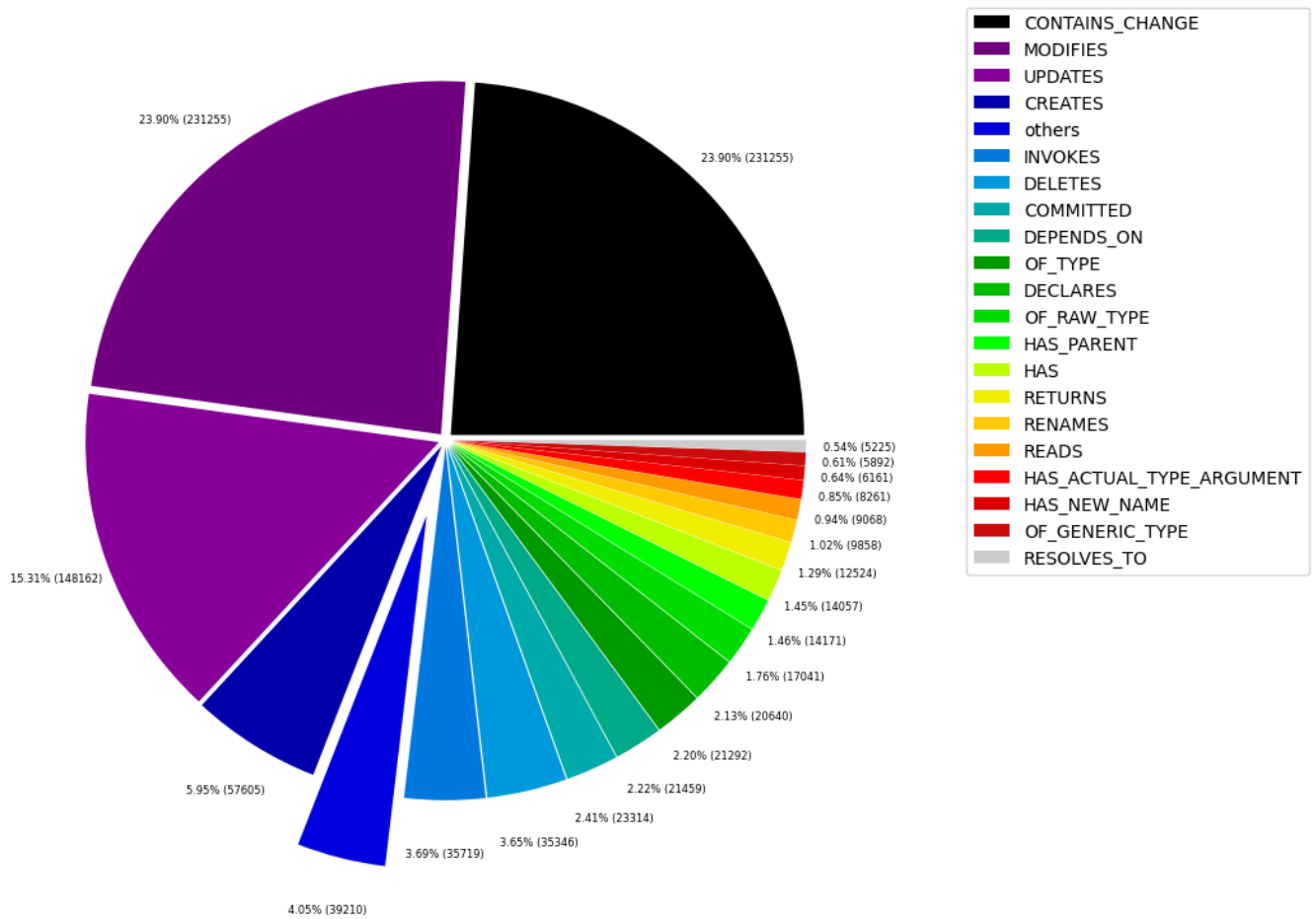
Relationship types (more than 0.5% overall)

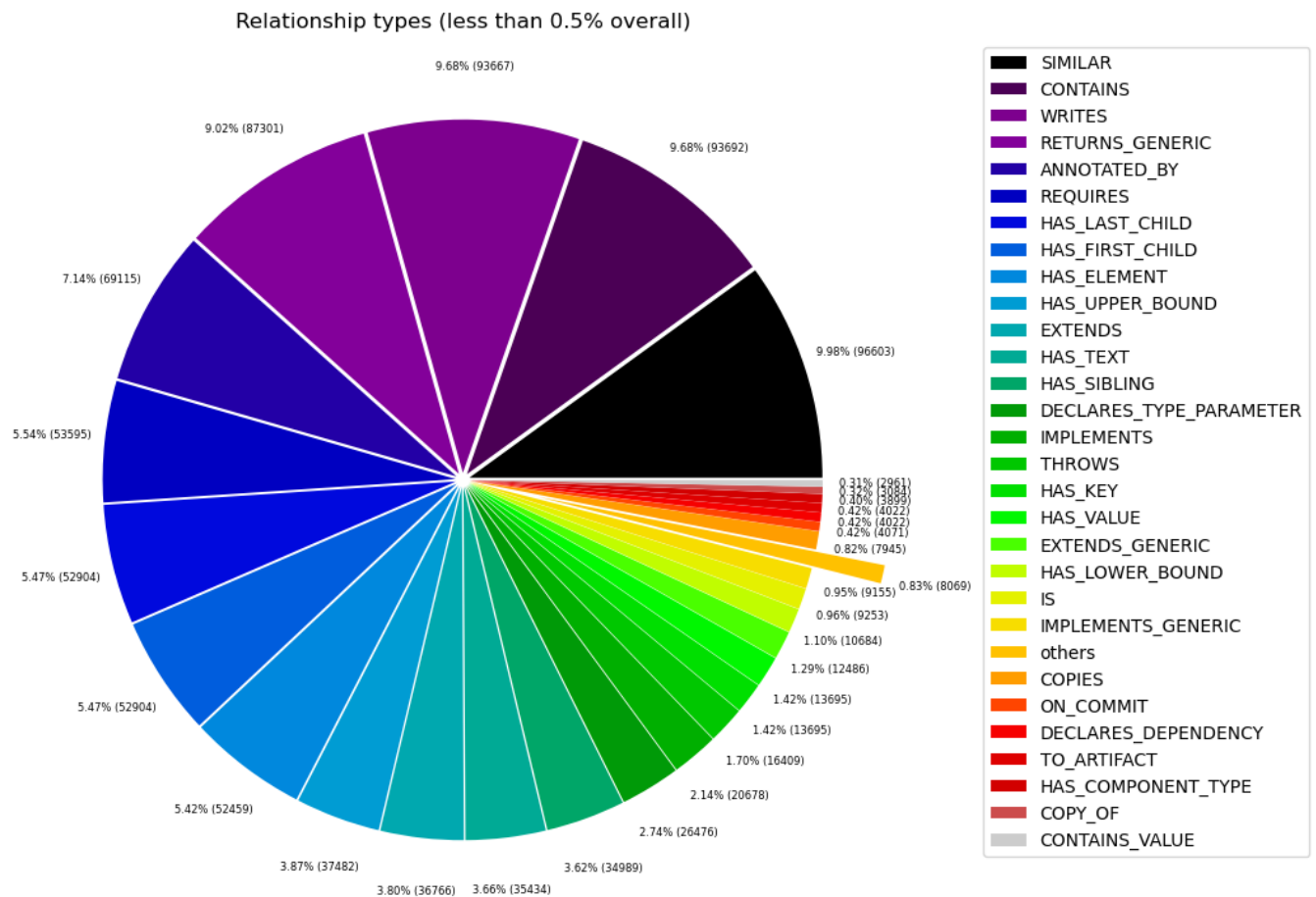|	
■	CONTAINS_CHANGE
■	MODIFIES
■	UPDATES
■	CREATES
■	others
■	INVOKES
■	DELETES
■	COMMITTED
■	DEPENDS_ON
■	OF_TYPE
■	DECLARES
■	OF_RAW_TYPE
■	HAS_PARENT
■	HAS
■	RETURNS
■	RENAMES
■	READS
■	HAS_ACTUAL_TYPE_ARGUMENT
■	HAS_NEW_NAME
■	OF_GENERIC_TYPE
■	RESOLVES_TO

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	0.000103
1	THROWS_GENERIC	5	0.000517
2	EXCLUDES	5	0.000517
3	DESCRIBES	9	0.000930
4	HAS_ROOT_ELEMENT	11	0.001137
5	HAS_GOAL	16	0.001654
6	HAS_EXECUTION	16	0.001654
7	OF_NAMESPACE	18	0.001860
8	HAS_ATTRIBUTE	18	0.001860
9	INCLUDES_CONCEPT	19	0.001964
10	USES_PLUGIN	21	0.002171
11	REQUIRES_TYPE_PARAMETER	21	0.002171
12	IS_ARTIFACT	21	0.002171
13	HAS_CONFIGURATION	21	0.002171
14	HAS_HEAD	25	0.002584
15	REQUIRES_CONCEPT	28	0.002894
16	DECLARES_NAMESPACE	36	0.003721
17	HAS_DEFAULT	36	0.003721
18	CONTAINS_VALUE	120	0.012403
19	COPY_OF	125	0.012920
20	HAS_COMPONENT_TYPE	158	0.016330
21	TO_ARTIFACT	163	0.016847
22	DECLARES_DEPENDENCY	163	0.016847
23	ON_COMMIT	165	0.017054
24	COPIES	322	0.033281
25	IMPLEMENTS_GENERIC	371	0.038346
26	IS	375	0.038759
27	HAS_LOWER_BOUND	433	0.044754
28	EXTENDS_GENERIC	506	0.052299
29	HAS_VALUE	555	0.057363

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

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]	231255	11657	
1	[Git, Change]	MODIFIES	[File, Git]	231255	231255	
2	[Git, Change]	UPDATES	[File, Git]	148162	231255	
3	[Git, Change]	CREATES	[File, Git]	57605	231255	
4	[Git, Change]	DELETES	[File, Git]	35346	231255	
5	[Java, ByteCode, Method, Member]	INVOKES	[Java, ByteCode, Method, Member]	21818	13063	
6	[Git, Commit]	HAS_PARENT	[Git, Commit]	14162	11657	
7	[Author, Git, Person]	COMMITTED	[Git, Commit]	11657	288	
8	[Committer, Git, Person]	COMMITTED	[Git, Commit]	11657	242	
9	[Git, Change]	RENAMES	[File, Git]	9858	231255	
10	[Java, ByteCode, Method, Member]	HAS	[Java, ByteCode, Parameter]	8289	13063	
11	[Java, ByteCode, Method, Member]	READS	[Java, ByteCode, Member, Field]	8128	13063	
12	[Java, ByteCode, Parameter]	OF_TYPE	[Type, File, Java, ByteCode, JavaType]	6335	12968	
13	[File, Git]	HAS_NEW_NAME	[File, Git]	6161	10572	
14	[Java, ByteCode, Bound]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3554	7094	
15	[Java, ByteCode, Bound, ParameterizedType]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3034	7154	
16	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, WildcardType]	2902	7154	
17	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, Bound, ParameterizedType]	2650	12968	
18	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, TypeVariable]	2453	7154	
19	[Java, ByteCode, Constructor, Method, Member]	WRITES	[Java, ByteCode, Member, Field]	2423	2037	
20	[Java, Value, ByteCode, Annotation]	OF_TYPE	[Type, File, Java, ByteCode, ExternalType, Ext...	2336	2813	
21	[Xml, Element]	HAS_ELEMENT	[Xml, Element]	2126	2144	
22	[Java, ByteCode, Constructor, Method, Member]	INVOKES	[Java, ByteCode, Constructor, Method, Member]	2103	2037	
23	[Java, ByteCode, Method, Member]	RETURNS	[Type, File, Java, ByteCode, JavaType]	2089	13063	
24	[Java, ByteCode, Method, Member]	INVOKES	[Java, ByteCode, Constructor, Method, Member]	2034	13063	
25	[Java, ByteCode, Constructor, Method, Member]	HAS	[Java, ByteCode, Parameter]	2021	2037	
26	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, Bound]	2020	12968	
27	[Java, ByteCode, Method, Member, Lambda]	INVOKES	[Java, ByteCode, Method, Member]	1859	931	
28	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound]	1792	7154	
29	[Java, ByteCode, Constructor, Method, Member]	INVOKES	[Java, ByteCode, Method, Member]	1791	2037	

Graph Density

```
total_number_of_nodes (vertices): 319219
total_number_of_relationships (edges): 967515
-> total directed graph density: 9.49470775600036e-06
-> total directed graph density in percent: 0.000949470775600036
```