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: 321671
```

	nodeLabels	nodesWithThatLabels	nodesWithThatLabelsPercent
0	[Git, Change]	233534	72.600265
1	[Java, ByteCode, Member, Method]	13225	4.111344
2	[Java, ByteCode, Parameter]	12968	4.031448
3	[Git, Commit]	11748	3.652179
4	[File, Git]	10593	3.293116
5	[Java, ByteCode, ParameterizedType, Bound]	7154	2.224011
6	[Java, ByteCode, Bound]	7094	2.205359
7	[Java, ByteCode, Member, Field]	3485	1.083405
8	[Java, ByteCode, Bound, WildcardType]	2902	0.902164
9	[Java, Value, ByteCode, Annotation]	2813	0.874496
10	[Xml, Element]	2144	0.666520
11	[Java, ByteCode, Member, Constructor, Method]	2047	0.636364
12	[Xml, Text]	1436	0.446419
13	[Java, ByteCode, Bound, TypeVariable]	1094	0.340099
14	[Java, ByteCode, Member, Method, Lambda]	931	0.289426
15	[Type, File, Java, ByteCode, ResolvedDuplicate...	899	0.279478
16	[Type, File, Java, ByteCode, Class]	858	0.266732
17	[Type, File, Java, ByteCode, JavaType]	746	0.231914
18	[Java, Value, ByteCode, Primitive]	647	0.201137
19	[Java, ByteCode, Member, Method, GenericDeclar...	567	0.176267
20	[Json, Key]	555	0.172537
21	[Value, Json, Scalar]	539	0.167563
22	[Type, File, Java, ByteCode, ExternalType]	396	0.123107
23	[Author, Git, Person]	289	0.089843
24	[Value, Array]	267	0.083004
25	[Committer, Git, Person]	243	0.075543
26	[Type, File, Java, ByteCode, Class, GenericDec...	236	0.073367
27	[Value, Property]	202	0.062797
28	[Type, File, Java, ByteCode, Interface]	186	0.057823
29	[Java, Value, ByteCode, Class]	170	0.052849

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']
- others
- ['Git', 'Commit']
- ['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']

Pie slice labels:
- 72.60% (233534)
- 0.64% (2047)
- 0.67% (2144)
- 0.87% (2813)
- 0.90% (2902)
- 1.08% (3485)
- 2.21% (7094)
- 2.22% (7154)
- 3.29% (10593)
- 3.65% (11748)
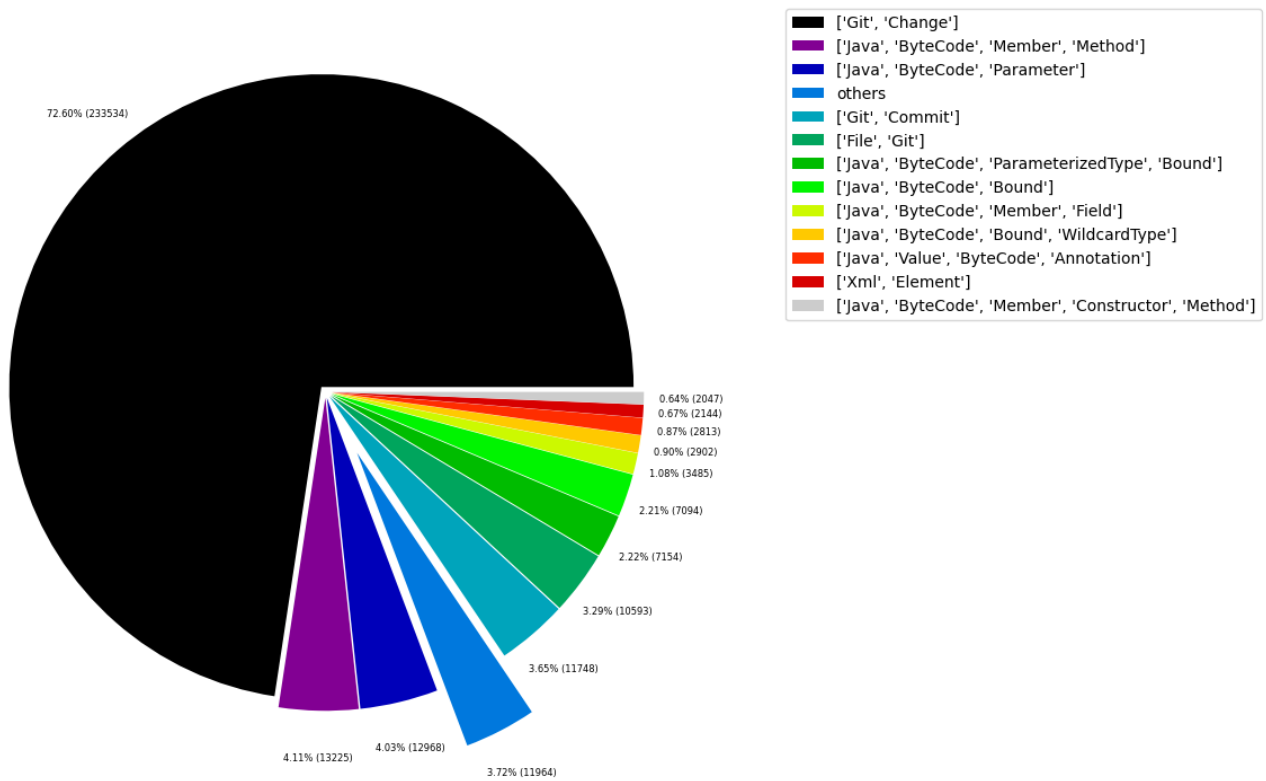- 3.72% (11964)
- 4.03% (12968)
- 4.11% (13225)

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	0.000311
1	[File, TS, Scan]	1	0.000311
2	[File, Json]	2	0.000622
3	[File]	3	0.000933
4	[Java, ByteCode, Member, Constructor, Method, ...	4	0.001244
5	[Maven, Exclusion]	5	0.001554
6	[Value, Json, Array]	6	0.001865
7	[File, Maven, Xml, Pom, Document]	9	0.002798
8	[Type, File, Java, ByteCode, Void]	9	0.002798
9	[Java, ManifestSection]	9	0.002798
10	[File, Java, Manifest]	9	0.002798
11	[Artifact, File, Jar, Archive, Zip, Java]	9	0.002798
12	[File, Java, ServiceLoader]	10	0.003109
13	[File, Java, Properties]	12	0.003731
14	[Maven, ExecutionGoal]	16	0.004974
15	[Maven, PluginExecution]	16	0.004974
16	[Xml, Attribute]	18	0.005596
17	[jQAssistant, Rule, Concept]	19	0.005907
18	[Maven, Plugin]	21	0.006528
19	[Maven, Configuration]	21	0.006528
20	[Git, Branch]	26	0.008083
21	[Type, File, Java, ByteCode, Enum]	28	0.008705
22	[Type, File, Java, ByteCode, PrimitiveType]	29	0.009015
23	[Xml, Namespace]	36	0.011192
24	[Type, File, Java, ByteCode, Annotation]	43	0.013368
25	[File, Directory]	44	0.013679
26	[Type, File, Java, ByteCode, GenericDeclaratio...	85	0.026425
27	[Artifact, Maven]	92	0.028601
28	[Type, File, Java, ByteCode, ExternalAnnotatio...	93	0.028912
29	[Value, ManifestEntry]	120	0.037305

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']
- ['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', 'ExternalAnnotation', 'ExternalType']
- ['Artifact', 'Maven']
- ['Type', 'File', 'Java', 'ByteCode', 'GenericDeclaration', 'Interface']
- ['File', 'Directory']
- ['Type', 'File', 'Java', 'ByteCode', 'Annotation']
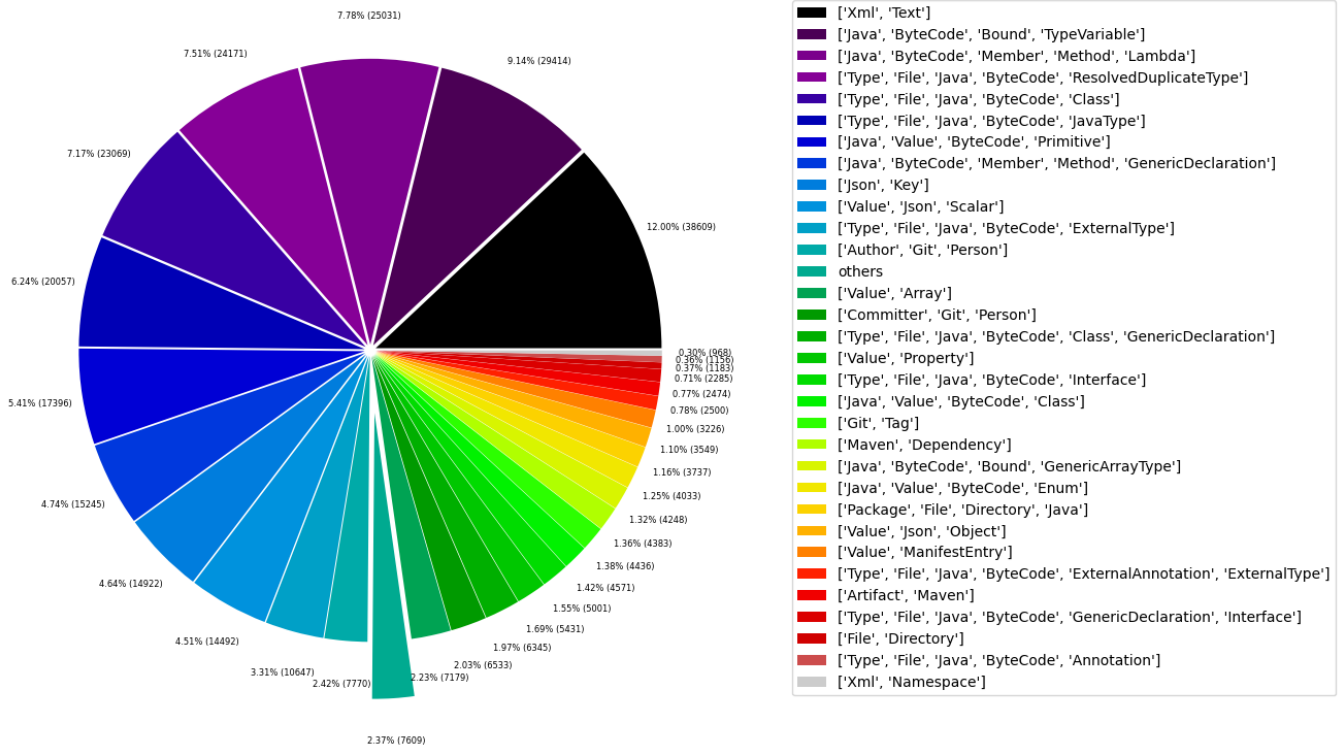- ['Xml', 'Namespace']

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.
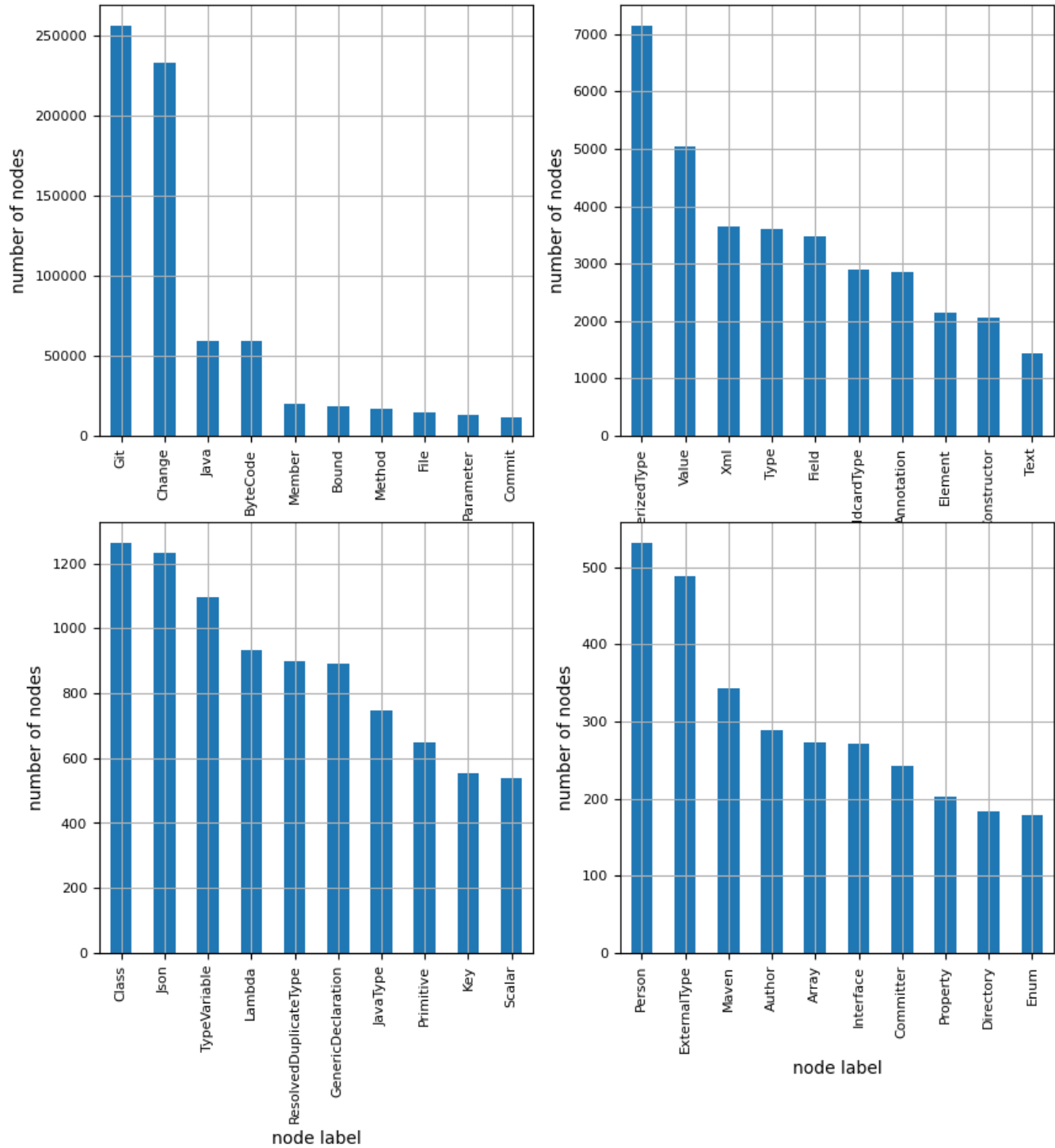
	nodeLabel	nodesWithThatLabel	nodesWithThatLabelPercent
0	Git	256598	79.770324
1	Change	233534	72.600265
2	Java	59205	18.405452
3	ByteCode	59017	18.347007
4	Member	20259	6.298050
5	Bound	18402	5.720752
6	Method	16774	5.214645
7	File	14439	4.488748
8	Parameter	12968	4.031448
9	Commit	11748	3.652179
10	ParameterizedType	7154	2.224011
11	Value	5046	1.568684
12	Xml	3643	1.132524
13	Type	3608	1.121643
14	Field	3485	1.083405
15	WildcardType	2902	0.902164
16	Annotation	2856	0.887864
17	Element	2144	0.666520
18	Constructor	2051	0.637608
19	Text	1436	0.446419
20	Class	1264	0.392948
21	Json	1234	0.383622
22	TypeVariable	1094	0.340099
23	Lambda	931	0.289426
24	ResolvedDuplicateType	899	0.279478
25	GenericDeclaration	892	0.277302
26	JavaType	746	0.231914
27	Primitive	647	0.201137
28	Key	555	0.172537
29	Scalar	539	0.167563
30	Person	532	0.165386
31	ExternalType	489	0.152019
32	Maven	343	0.106631
33	Author	289	0.089843
34	Array	273	0.084869
35	Interface	271	0.084248
36	Committer	243	0.075543
37	Property	202	0.062797
38	Directory	183	0.056890
39	Enum	178	0.055336

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: 975139
```

	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	CONTAINS_CHANGE	233534	23.948791
1	MODIFIES	233534	23.948791
2	UPDATES	149869	15.368988
3	CREATES	57908	5.938435
4	DELETES	35673	3.658248
5	INVOKES	35599	3.650659
6	COMMITTED	23496	2.409503
7	DEPENDS_ON	21820	2.237630
8	OF_TYPE	21292	2.183484
9	DECLARES	20698	2.122569
10	OF_RAW_TYPE	17041	1.747546
11	HAS_PARENT	14276	1.463996
12	HAS	14057	1.441538
13	RETURNS	12524	1.284330
14	RENAMES	9916	1.016881
15	READS	9069	0.930021
16	HAS_ACTUAL_TYPE_ARGUMENT	8261	0.847161
17	HAS_NEW_NAME	6165	0.632218
18	OF_GENERIC_TYPE	5892	0.604222
19	RESOLVES_TO	5262	0.539615
20	SIMILAR	3955	0.405583
21	CONTAINS	3797	0.389380
22	WRITES	3796	0.389278
23	RETURNS_GENERIC	3538	0.362820
24	ANNOTATED_BY	2801	0.287241
25	REQUIRES	2172	0.222737
26	HAS_FIRST_CHILD	2144	0.219866
27	HAS_LAST_CHILD	2144	0.219866
28	HAS_ELEMENT	2126	0.218020
29	HAS_UPPER_BOUND	1519	0.155773

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)

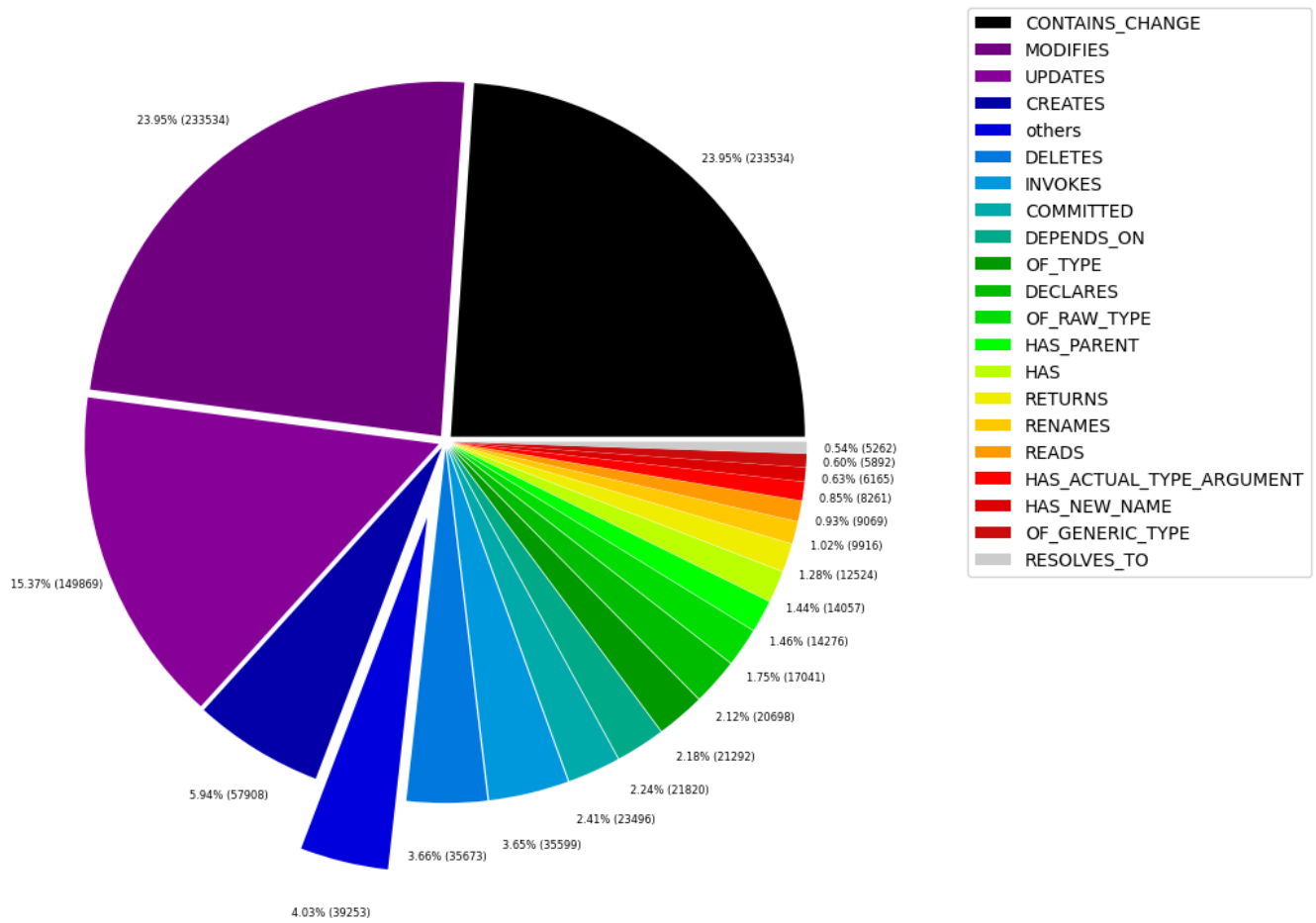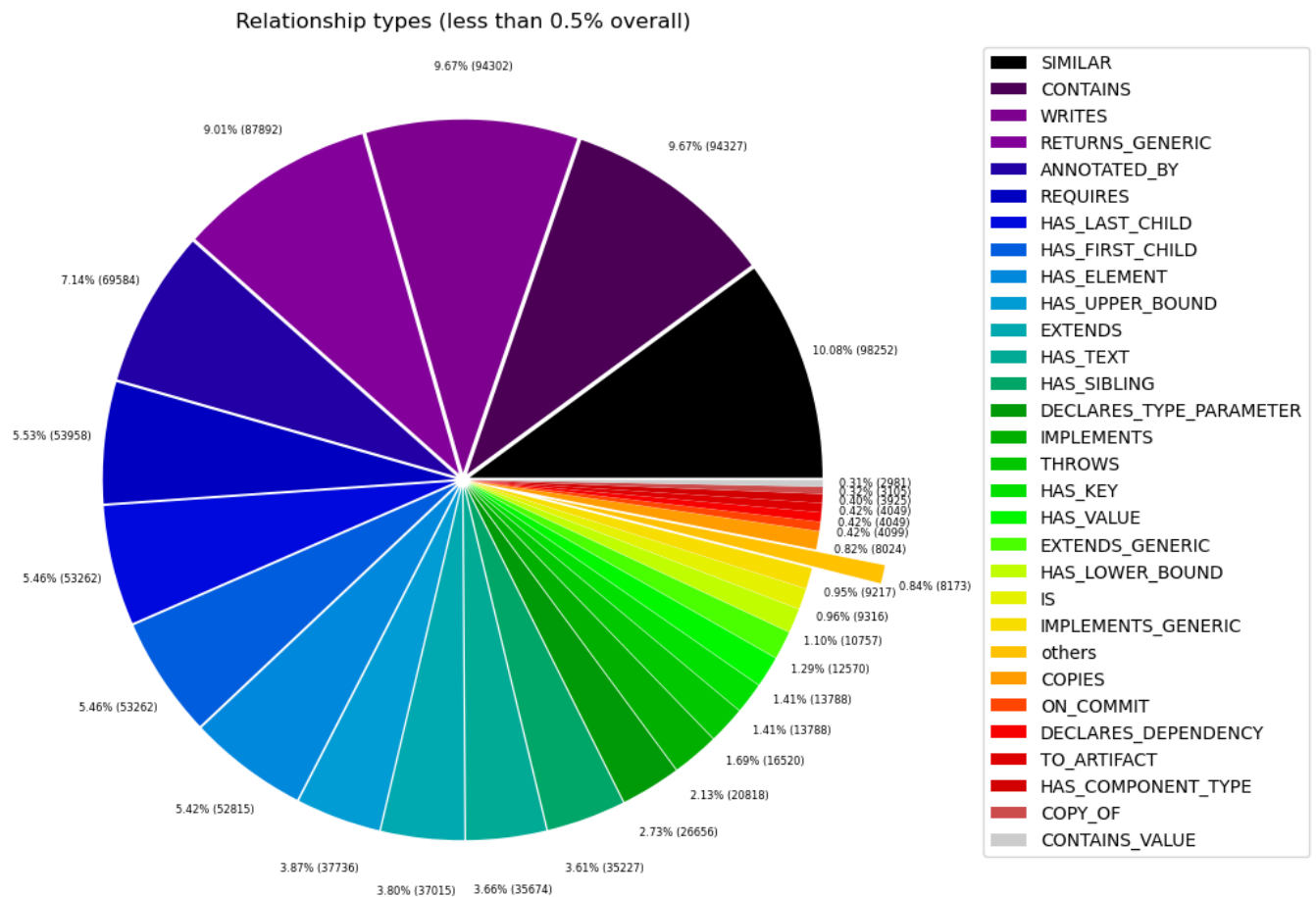|	
■	CONTAINS_CHANGE
■	MODIFIES
■	UPDATES
■	CREATES
■	others
■	DELETES
■	INVOKES
■	COMMITTED
■	DEPENDS_ON
■	OF_TYPE
■	DECLARES
■	OF_RAW_TYPE
■	HAS_PARENT
■	HAS
■	RETURNS
■	RENAMES
■	READS
■	HAS_ACTUAL_TYPE_ARGUMENT
■	HAS_NEW_NAME
■	OF_GENERIC_TYPE
■	RESOLVES_TO

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	0.000513
2	EXCLUDES	5	0.000513
3	DESCRIBES	9	0.000923
4	HAS_ROOT_ELEMENT	12	0.001231
5	HAS_GOAL	16	0.001641
6	HAS_EXECUTION	16	0.001641
7	OF_NAMESPACE	18	0.001846
8	HAS_ATTRIBUTE	18	0.001846
9	INCLUDES_CONCEPT	19	0.001948
10	USES_PLUGIN	21	0.002154
11	REQUIRES_TYPE_PARAMETER	21	0.002154
12	IS_ARTIFACT	21	0.002154
13	HAS_CONFIGURATION	21	0.002154
14	HAS_HEAD	26	0.002666
15	REQUIRES_CONCEPT	28	0.002871
16	DECLARES_NAMESPACE	36	0.003692
17	HAS_DEFAULT	36	0.003692
18	CONTAINS_VALUE	120	0.012306
19	COPY_OF	125	0.012819
20	HAS_COMPONENT_TYPE	158	0.016203
21	TO_ARTIFACT	163	0.016716
22	DECLARES_DEPENDENCY	163	0.016716
23	ON_COMMIT	165	0.016921
24	COPIES	323	0.033123
25	IMPLEMENTS_GENERIC	371	0.038046
26	IS	375	0.038456
27	HAS_LOWER_BOUND	433	0.044404
28	EXTENDS_GENERIC	506	0.051890
29	HAS_VALUE	555	0.056915

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

Pie chart values: 9.67% (94302), 9.01% (87892), 7.14% (69584), 5.53% (53958), 5.46% (53262), 5.46% (53262), 5.42% (52815), 3.87% (37736), 3.80% (37015), 3.66% (35674), 3.61% (35227), 2.73% (26656), 2.13% (20818), 1.69% (16520), 1.41% (13788), 1.41% (13788), 1.29% (12570), 1.10% (10757), 0.96% (9316), 0.95% (9217), 0.84% (8173), 0.82% (8024), 0.42% (4099), 0.42% (4049), 0.42% (4049), 0.40% (3625), 0.32% (3105), 0.31% (2981), 9.67% (94327), 10.08% (98252)

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]	233534	11748	
1	[Git, Change]	MODIFIES	[File, Git]	233534	233534	
2	[Git, Change]	UPDATES	[File, Git]	149869	233534	
3	[Git, Change]	CREATES	[File, Git]	57908	233534	
4	[Git, Change]	DELETES	[File, Git]	35673	233534	
5	[Java, ByteCode, Member, Method]	INVOKES	[Java, ByteCode, Member, Method]	21652	13105	
6	[Git, Commit]	HAS_PARENT	[Git, Commit]	14267	11748	
7	[Author, Git, Person]	COMMITTED	[Git, Commit]	11748	289	
8	[Committer, Git, Person]	COMMITTED	[Git, Commit]	11748	243	
9	[Git, Change]	RENAMES	[File, Git]	9916	233534	
10	[Java, ByteCode, Member, Method]	HAS	[Java, ByteCode, Parameter]	8294	13105	
11	[Java, ByteCode, Member, Method]	READS	[Java, ByteCode, Member, Field]	8122	13105	
12	[Java, ByteCode, Parameter]	OF_TYPE	[Type, File, Java, ByteCode, JavaType]	6335	12968	
13	[File, Git]	HAS_NEW_NAME	[File, Git]	6165	10593	
14	[Java, ByteCode, Bound]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3554	7094	
15	[Java, ByteCode, ParameterizedType, Bound]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3034	7154	
16	[Java, ByteCode, ParameterizedType, Bound]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, WildcardType]	2902	7154	
17	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, ParameterizedType, Bound]	2650	12968	
18	[Java, ByteCode, ParameterizedType, Bound]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, TypeVariable]	2453	7154	
19	[Java, ByteCode, Member, Constructor, Method]	WRITES	[Java, ByteCode, Member, Field]	2423	2047	
20	[Java, Value, ByteCode, Annotation]	OF_TYPE	[Type, File, Java, ByteCode, ExternalAnnotatio...]	2336	2813	
21	[Xml, Element]	HAS_ELEMENT	[Xml, Element]	2126	2144	
22	[Java, ByteCode, Member, Constructor, Method]	INVOKES	[Java, ByteCode, Member, Constructor, Method]	2107	2047	
23	[Java, ByteCode, Member, Method]	RETURNS	[Type, File, Java, ByteCode, JavaType]	2084	13105	
24	[Java, ByteCode, Member, Method]	INVOKES	[Java, ByteCode, Member, Constructor, Method]	2037	13105	
25	[Java, ByteCode, Member, Constructor, Method]	HAS	[Java, ByteCode, Parameter]	2021	2047	
26	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, Bound]	2020	12968	
27	[Java, ByteCode, Member, Method, Lambda]	INVOKES	[Java, ByteCode, Member, Method]	1881	931	
28	[Java, ByteCode, Member, Constructor, Method]	INVOKES	[Java, ByteCode, Member, Method]	1798	2047	
29	[Java, ByteCode, ParameterizedType, Bound]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound]	1792	7154	

Graph Density

```
total_number_of_nodes (vertices): 321671
total_number_of_relationships (edges): 975139
-> total directed graph density: 9.424190532756295e-06
-> total directed graph density in percent: 0.0009424190532756295
```