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]	245299	73.479114
1	[Java, ByteCode, Method, Member]	13195	3.952551
2	[Java, ByteCode, Parameter]	13000	3.894139
3	[Git, Commit]	11996	3.593392
4	[File, Git]	10671	3.196489
5	[Java, ByteCode, Bound, ParameterizedType]	7166	2.146569
6	[Java, ByteCode, Bound]	7112	2.130394
7	[Java, ByteCode, Member, Field]	3494	1.046625
8	[Java, ByteCode, Bound, WildcardType]	2906	0.870490
9	[Java, Value, ByteCode, Annotation]	2821	0.845028
10	[Xml, Element]	2144	0.642233
11	[Java, ByteCode, Constructor, Method, Member]	2037	0.610182
12	[Xml, Text]	1436	0.430153
13	[Java, ByteCode, Bound, TypeVariable]	1096	0.328306
14	[Java, ByteCode, Method, Member, Lambda]	936	0.280378
15	[Type, File, Java, ByteCode, ResolvedDuplicate...	900	0.269594
16	[Type, File, Java, ByteCode, Class]	861	0.257912
17	[Type, File, Java, ByteCode, JavaType]	746	0.223464
18	[Java, Value, ByteCode, Primitive]	650	0.194707
19	[Java, ByteCode, Method, Member, GenericDeclar...	569	0.170443
20	[Json, Key]	555	0.166250
21	[Value, Json, Scalar]	539	0.161457
22	[Type, File, Java, ByteCode, ExternalType]	396	0.118621
23	[Author, Git, Person]	292	0.087468
24	[Value, Array]	267	0.079980
25	[Committer, Git, Person]	247	0.073989
26	[Type, File, Java, ByteCode, Class, GenericDec...	236	0.070694
27	[Value, Property]	202	0.060509
28	[Type, File, Java, ByteCode, Interface]	187	0.056016
29	[Java, Value, ByteCode, Class]	172	0.051522

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']
- ['Git', 'Commit']
- others
- ['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 slices:
- 73.48% (245299)
- 0.61% (2037)
- 0.64% (2144)
- 0.85% (2821)
- 0.87% (2906)
- 1.05% (3494)
- 2.13% (7112)
- 2.15% (7166)
- 3.20% (10671)
- 3.59% (11994)
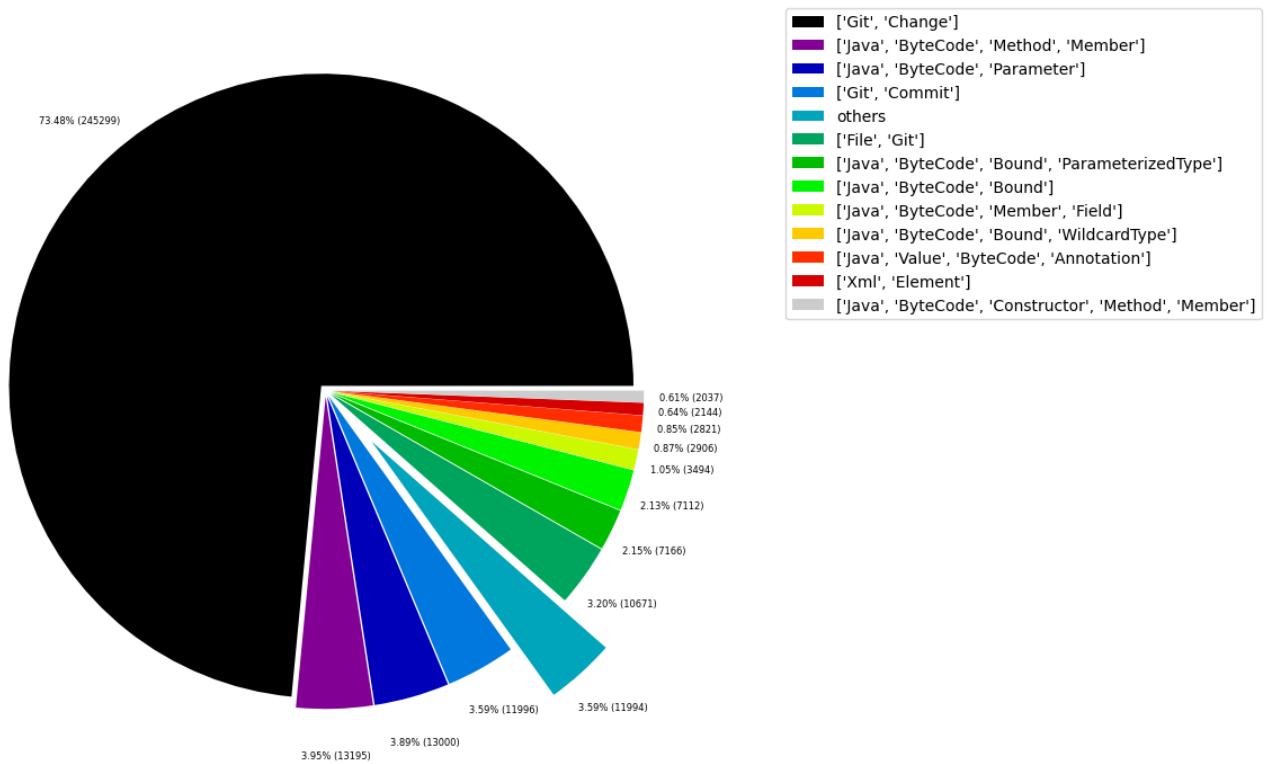- 3.59% (11996)
- 3.89% (13000)
- 3.95% (13195)

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	0.000300
1	[File, Json]	2	0.000599
2	[File]	3	0.000899
3	[Java, ByteCode, Constructor, Method, Member, ...	4	0.001198
4	[Maven, Exclusion]	5	0.001498
5	[Value, Array, Json]	6	0.001797
6	[File, Xml, Maven, Pom, Document]	9	0.002696
7	[Type, File, Java, ByteCode, Void]	9	0.002696
8	[Java, ManifestSection]	9	0.002696
9	[File, Java, Manifest]	9	0.002696
10	[Artifact, File, Jar, Archive, Zip, Java]	9	0.002696
11	[File, Java, ServiceLoader]	10	0.002995
12	[File, Java, Properties]	12	0.003595
13	[Maven, ExecutionGoal]	16	0.004793
14	[Maven, PluginExecution]	16	0.004793
15	[Xml, Attribute]	18	0.005392
16	[jQAssistant, Rule, Concept]	19	0.005691
17	[Maven, Plugin]	21	0.006291
18	[Maven, Configuration]	21	0.006291
19	[Type, File, Java, ByteCode, Enum]	28	0.008387
20	[Git, Branch]	29	0.008687
21	[Type, File, Java, ByteCode, PrimitiveType]	29	0.008687
22	[Xml, Namespace]	36	0.010784
23	[Type, File, Java, ByteCode, Annotation]	43	0.012881
24	[File, Directory]	44	0.013180
25	[Type, File, Java, ByteCode, GenericDeclaratio...	85	0.025462
26	[Artifact, Maven]	92	0.027559
27	[Type, File, Java, ByteCode, ExternalType, Ext...	93	0.027858
28	[Value, ManifestEntry]	120	0.035946
29	[Value, Json, Object]	132	0.039540

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']
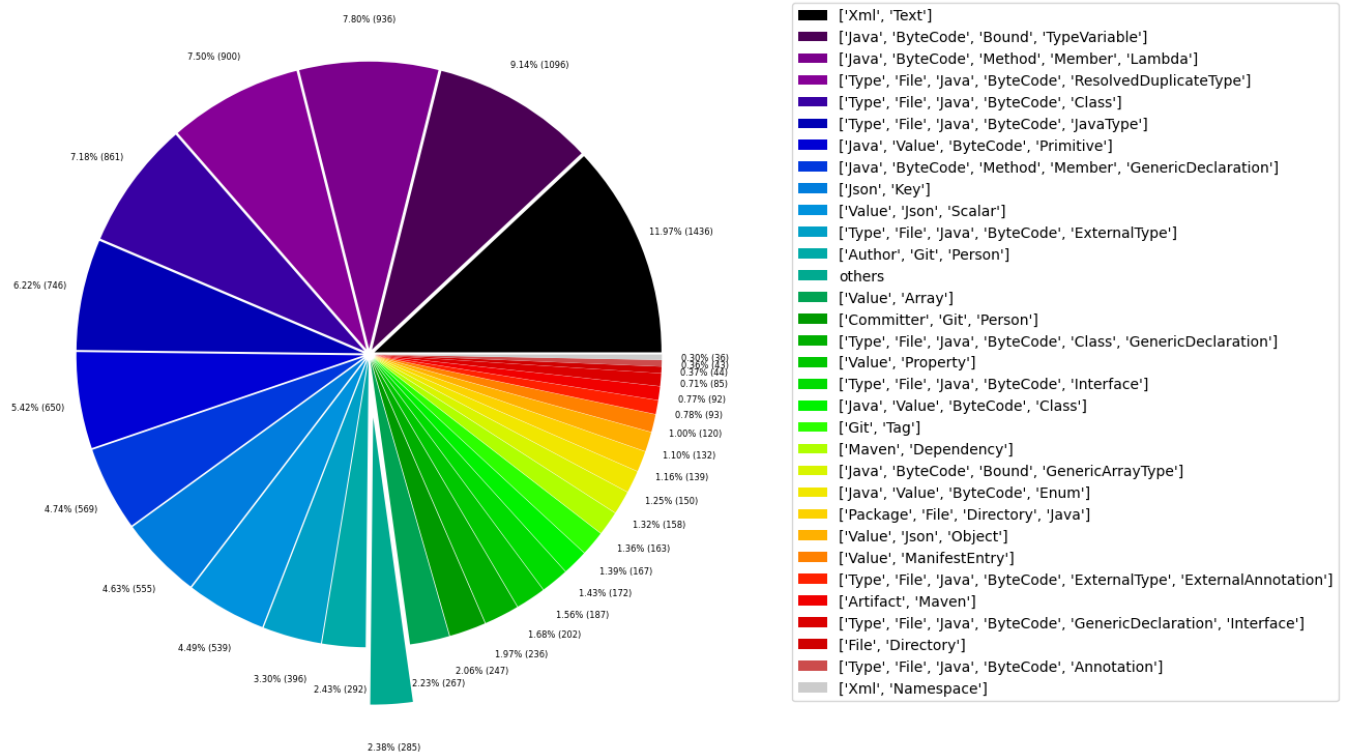- ['Xml', 'Namespace']

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.
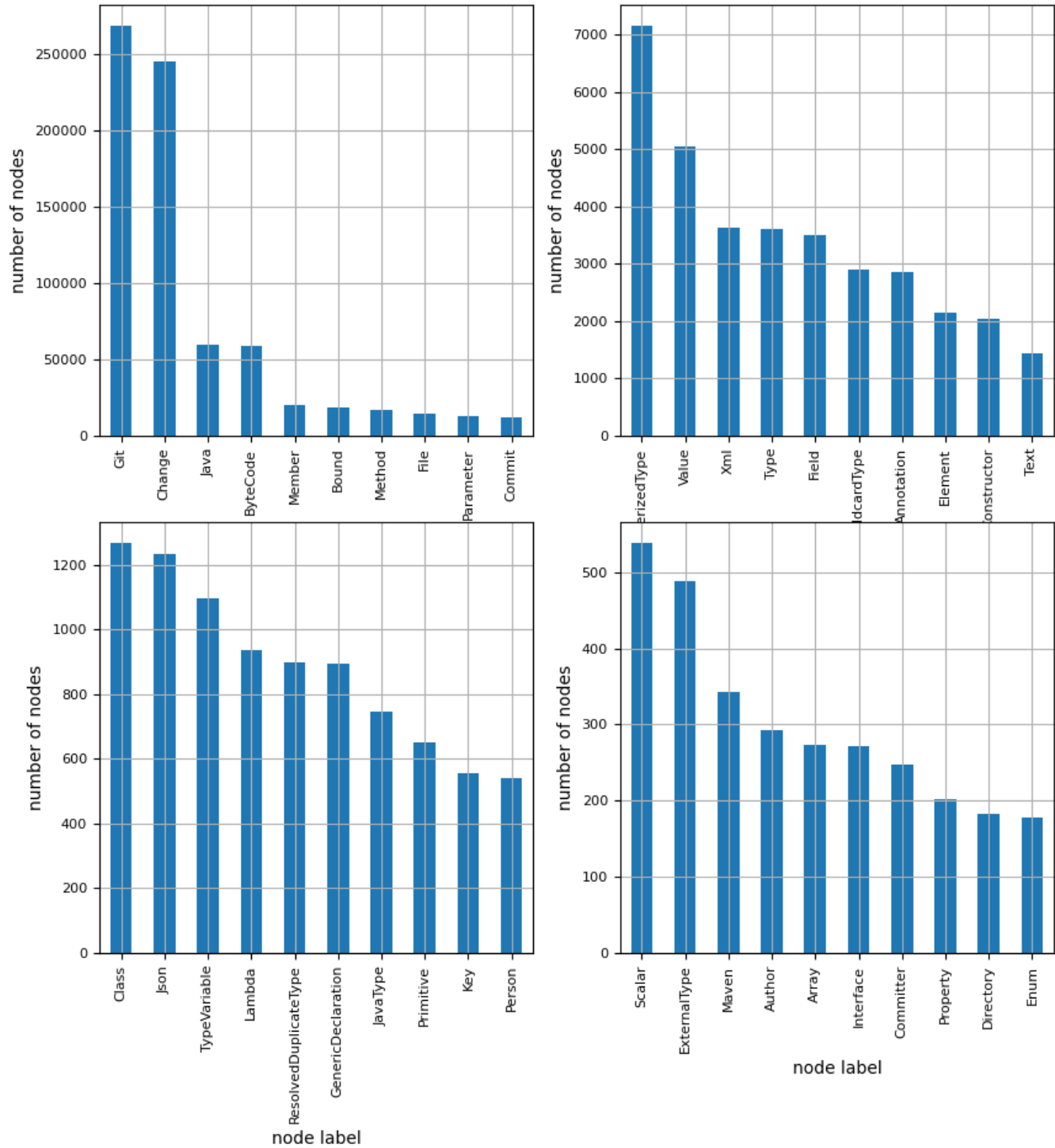
	nodeLabel	nodesWithThatLabel	nodesWithThatLabelPercent
0	Git	268701	80.489164
1	Change	245299	73.479114
2	Java	59267	17.753381
3	ByteCode	59079	17.697066
4	Member	20235	6.061378
5	Bound	18438	5.523088
6	Method	16741	5.014753
7	File	14521	4.349754
8	Parameter	13000	3.894139
9	Commit	11996	3.593392
10	ParameterizedType	7166	2.146569
11	Value	5059	1.515419
12	Xml	3643	1.091258
13	Type	3613	1.082271
14	Field	3494	1.046625
15	WildcardType	2906	0.870490
16	Annotation	2864	0.857909
17	Element	2144	0.642233
18	Constructor	2041	0.611380
19	Text	1436	0.430153
20	Class	1269	0.380128
21	Json	1234	0.369644
22	TypeVariable	1096	0.328306
23	Lambda	936	0.280378
24	ResolvedDuplicateType	900	0.269594
25	GenericDeclaration	894	0.267797
26	JavaType	746	0.223464
27	Primitive	650	0.194707
28	Key	555	0.166250
29	Person	539	0.161457
30	Scalar	539	0.161457
31	ExternalType	489	0.146480
32	Maven	343	0.102745
33	Author	292	0.087468
34	Array	273	0.081777
35	Interface	272	0.081477
36	Committer	247	0.073989
37	Property	202	0.060509
38	Directory	183	0.054817
39	Enum	178	0.053320

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: 1012230
```

	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	CONTAINS_CHANGE	245299	24.233524
1	MODIFIES	245299	24.233524
2	UPDATES	158722	15.680428
3	CREATES	59675	5.895399
4	DELETES	37191	3.674165
5	INVOKES	35568	3.513826
6	COMMITTED	23992	2.370212
7	DEPENDS_ON	21873	2.160873
8	OF_TYPE	21347	2.108908
9	DECLARES	20676	2.042619
10	OF_RAW_TYPE	17077	1.687067
11	HAS_PARENT	14588	1.441174
12	HAS	14094	1.392371
13	RETURNS	12547	1.239540
14	RENAMES	10289	1.016469
15	READS	9076	0.896634
16	HAS_ACTUAL_TYPE_ARGUMENT	8276	0.817601
17	HAS_NEW_NAME	6198	0.612311
18	OF_GENERIC_TYPE	5902	0.583069
19	RESOLVES_TO	5220	0.515693
20	SIMILAR	3968	0.392006
21	CONTAINS	3805	0.375903
22	WRITES	3803	0.375705
23	RETURNS_GENERIC	3543	0.350019
24	ANNOTATED_BY	2809	0.277506
25	REQUIRES	2173	0.214675
26	HAS_FIRST_CHILD	2144	0.211810
27	HAS_LAST_CHILD	2144	0.211810
28	HAS_ELEMENT	2126	0.210031
29	HAS_UPPER_BOUND	1521	0.150262

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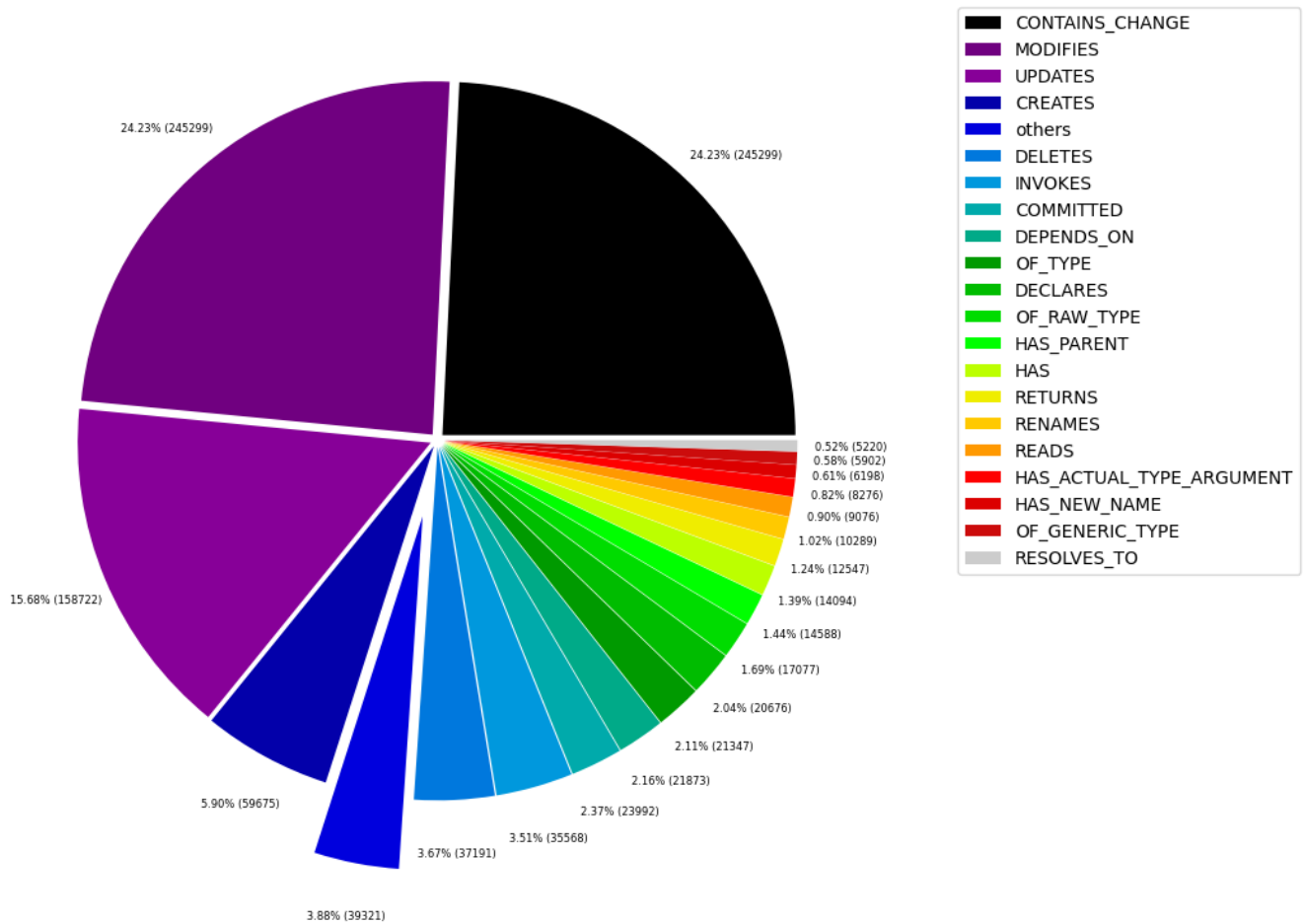
Relationship types (more than 0.5% overall)

Legend:
- 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

Values shown on chart:
- 24.23% (245299)
- 24.23% (245299)
- 15.68% (158722)
- 5.90% (59675)
- 3.88% (39321)
- 3.67% (37191)
- 3.51% (35568)
- 2.37% (23992)
- 2.16% (21873)
- 2.11% (21347)
- 2.04% (20676)
- 1.69% (17077)
- 1.44% (14588)
- 1.39% (14094)
- 1.24% (12547)
- 1.02% (10289)
- 0.90% (9076)
- 0.82% (8276)
- 0.61% (6198)
- 0.58% (5902)
- 0.52% (5220)

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.
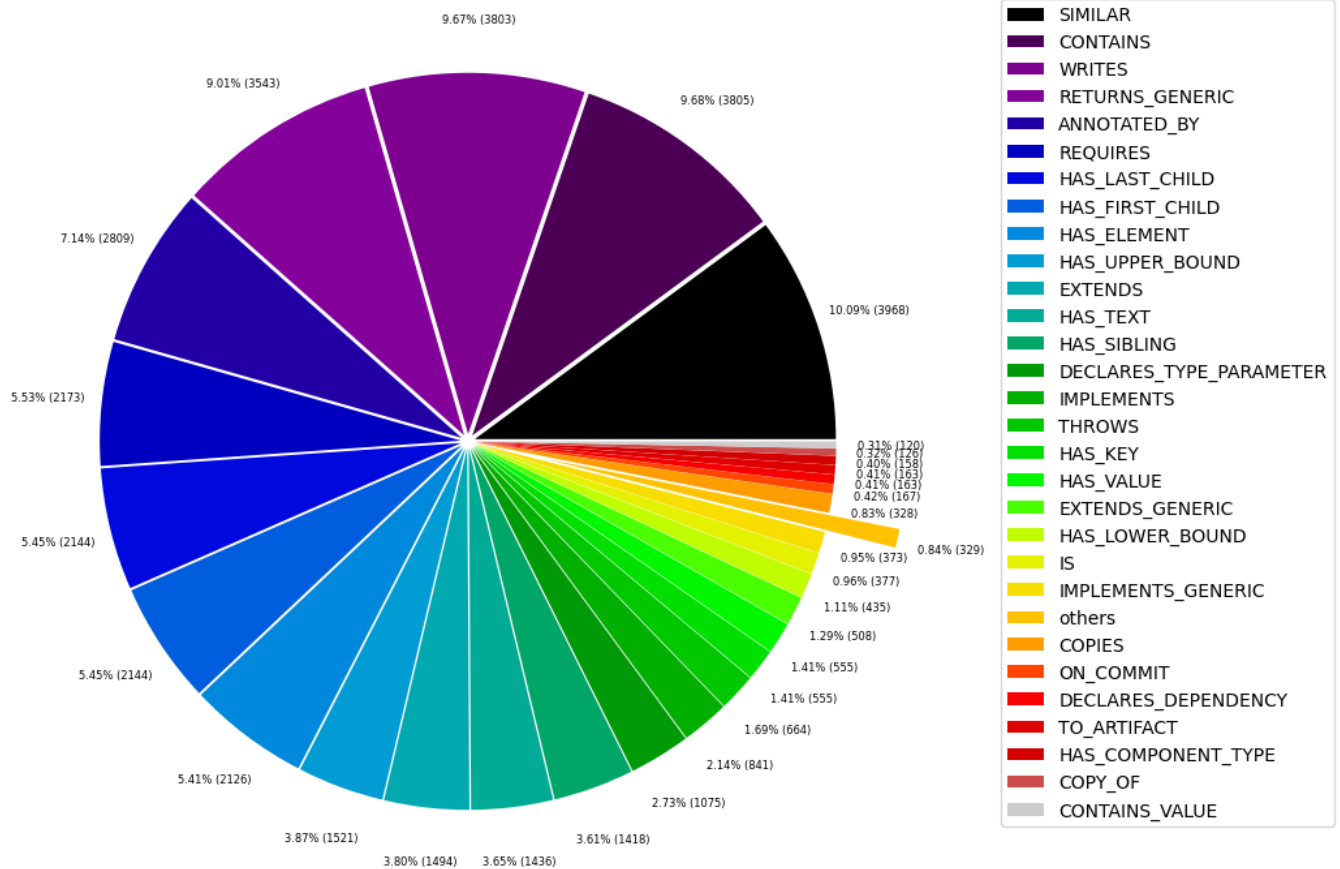
	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	HAS_PROPERTY	1	0.000099
1	THROWS_GENERIC	5	0.000494
2	EXCLUDES	5	0.000494
3	HAS_ROOT_ELEMENT	9	0.000889
4	DESCRIBES	9	0.000889
5	HAS_GOAL	16	0.001581
6	HAS_EXECUTION	16	0.001581
7	OF_NAMESPACE	18	0.001778
8	HAS_ATTRIBUTE	18	0.001778
9	INCLUDES_CONCEPT	19	0.001877
10	USES_PLUGIN	21	0.002075
11	REQUIRES_TYPE_PARAMETER	21	0.002075
12	IS_ARTIFACT	21	0.002075
13	HAS_CONFIGURATION	21	0.002075
14	REQUIRES_CONCEPT	28	0.002766
15	HAS_HEAD	29	0.002865
16	DECLARES_NAMESPACE	36	0.003557
17	HAS_DEFAULT	36	0.003557
18	CONTAINS_VALUE	120	0.011855
19	COPY_OF	126	0.012448
20	HAS_COMPONENT_TYPE	158	0.015609
21	TO_ARTIFACT	163	0.016103
22	DECLARES_DEPENDENCY	163	0.016103
23	ON_COMMIT	167	0.016498
24	COPIES	328	0.032404
25	IMPLEMENTS_GENERIC	373	0.036849
26	IS	377	0.037244
27	HAS_LOWER_BOUND	435	0.042974
28	EXTENDS_GENERIC	508	0.050186
29	HAS_VALUE	555	0.054829

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]	245299	11996	
1	[Git, Change]	MODIFIES	[File, Git]	245299	245299	
2	[Git, Change]	UPDATES	[File, Git]	158722	245299	
3	[Git, Change]	CREATES	[File, Git]	59675	245299	
4	[Git, Change]	DELETES	[File, Git]	37191	245299	
5	[Java, ByteCode, Method, Member]	INVOKES	[Java, ByteCode, Method, Member]	21524	13072	
6	[Git, Commit]	HAS_PARENT	[Git, Commit]	14579	11996	
7	[Author, Git, Person]	COMMITTED	[Git, Commit]	11996	292	
8	[Committer, Git, Person]	COMMITTED	[Git, Commit]	11996	247	
9	[Git, Change]	RENAMES	[File, Git]	10289	245299	
10	[Java, ByteCode, Method, Member]	HAS	[Java, ByteCode, Parameter]	8300	13072	
11	[Java, ByteCode, Method, Member]	READS	[Java, ByteCode, Member, Field]	8101	13072	
12	[Java, ByteCode, Parameter]	OF_TYPE	[Type, File, Java, ByteCode, JavaType]	6360	13000	
13	[File, Git]	HAS_NEW_NAME	[File, Git]	6198	10671	
14	[Java, ByteCode, Bound]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3569	7112	
15	[Java, ByteCode, Bound, ParameterizedType]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3043	7166	
16	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, WildcardType]	2906	7166	
17	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, Bound, ParameterizedType]	2655	13000	
18	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, TypeVariable]	2454	7166	
19	[Java, ByteCode, Constructor, Method, Member]	WRITES	[Java, ByteCode, Member, Field]	2426	2037	
20	[Java, Value, ByteCode, Annotation]	OF_TYPE	[Type, File, Java, ByteCode, ExternalType, Ext...	2340	2821	
21	[Xml, Element]	HAS_ELEMENT	[Xml, Element]	2126	2144	
22	[Java, ByteCode, Constructor, Method, Member]	INVOKES	[Java, ByteCode, Constructor, Method, Member]	2111	2037	
23	[Java, ByteCode, Method, Member]	RETURNS	[Type, File, Java, ByteCode, JavaType]	2088	13072	
24	[Java, ByteCode, Constructor, Method, Member]	HAS	[Java, ByteCode, Parameter]	2023	2037	
25	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, Bound]	2023	13000	
26	[Java, ByteCode, Method, Member]	INVOKES	[Java, ByteCode, Constructor, Method, Member]	2008	13072	
27	[Java, ByteCode, Method, Member, Lambda]	INVOKES	[Java, ByteCode, Method, Member]	1882	936	
28	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound]	1802	7166	
29	[Java, ByteCode, Constructor, Method, Member]	INVOKES	[Java, ByteCode, Method, Member]	1796	2037	

Graph Density

```
total_number_of_nodes (vertices): 333835
total_number_of_relationships (edges): 1012230
-> total directed graph density: 9.082737676188357e-06
-> total directed graph density in percent: 0.0009082737676188357
```