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	73.477793
1	[Java, ByteCode, Method, Member]	13200	3.953978
2	[Java, ByteCode, Parameter]	13000	3.894069
3	[Git, Commit]	11996	3.593327
4	[File, Git]	10671	3.196432
5	[Java, ByteCode, Bound, ParameterizedType]	7166	2.146531
6	[Java, ByteCode, Bound]	7112	2.130355
7	[Java, ByteCode, Member, Field]	3494	1.046606
8	[Java, ByteCode, Bound, WildcardType]	2906	0.870474
9	[Java, Value, ByteCode, Annotation]	2821	0.845013
10	[Xml, Element]	2144	0.642222
11	[Java, ByteCode, Constructor, Method, Member]	2038	0.610470
12	[Xml, Text]	1436	0.430145
13	[Java, ByteCode, Bound, TypeVariable]	1096	0.328300
14	[Java, ByteCode, Method, Member, Lambda]	936	0.280373
15	[Type, File, Java, ByteCode, ResolvedDuplicate...	900	0.269589
16	[Type, File, Java, ByteCode, Class]	861	0.257907
17	[Type, File, Java, ByteCode, JavaType]	746	0.223460
18	[Java, Value, ByteCode, Primitive]	650	0.194703
19	[Java, ByteCode, Method, Member, GenericDeclar...	569	0.170440
20	[Json, Key]	555	0.166247
21	[Value, Json, Scalar]	539	0.161454
22	[Type, File, Java, ByteCode, ExternalType]	396	0.118619
23	[Author, Git, Person]	292	0.087467
24	[Value, Array]	267	0.079978
25	[Committer, Git, Person]	247	0.073987
26	[Type, File, Java, ByteCode, Class, GenericDec...	236	0.070692
27	[Value, Property]	202	0.060508
28	[Type, File, Java, ByteCode, Interface]	187	0.056015
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 values: 73.48% (245299), 0.61% (2038), 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% (13200)
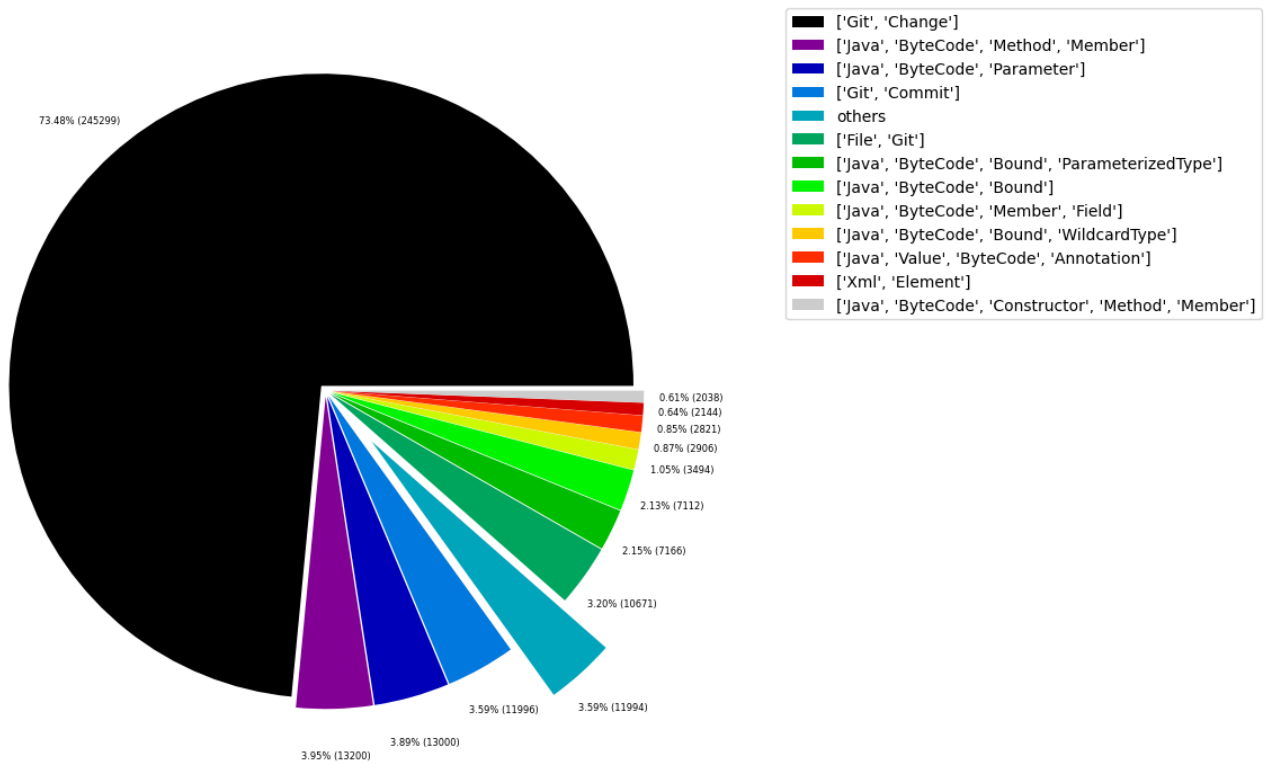
Table 1b - Lowest node count by label combination

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	0.000300
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, Maven, Xml, 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	0.006290
18	[Maven, Configuration]	21	0.006290
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	0.012880
24	[File, Directory]	44	0.013180
25	[Type, File, Java, ByteCode, GenericDeclaratio...	85	0.025461
26	[Artifact, Maven]	92	0.027558
27	[Type, File, Java, ByteCode, ExternalType, Ext...	93	0.027858
28	[Value, ManifestEntry]	120	0.035945
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']
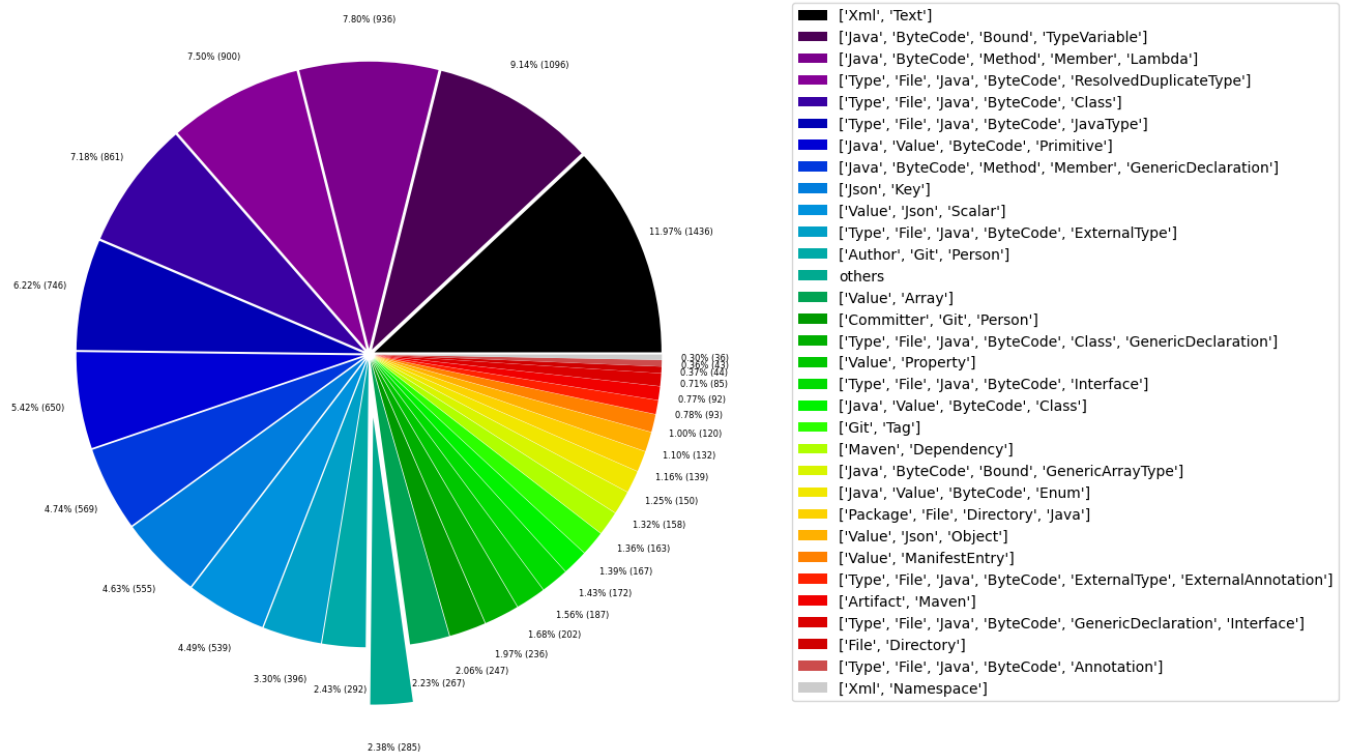- ['Xml', 'Namespace']

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.
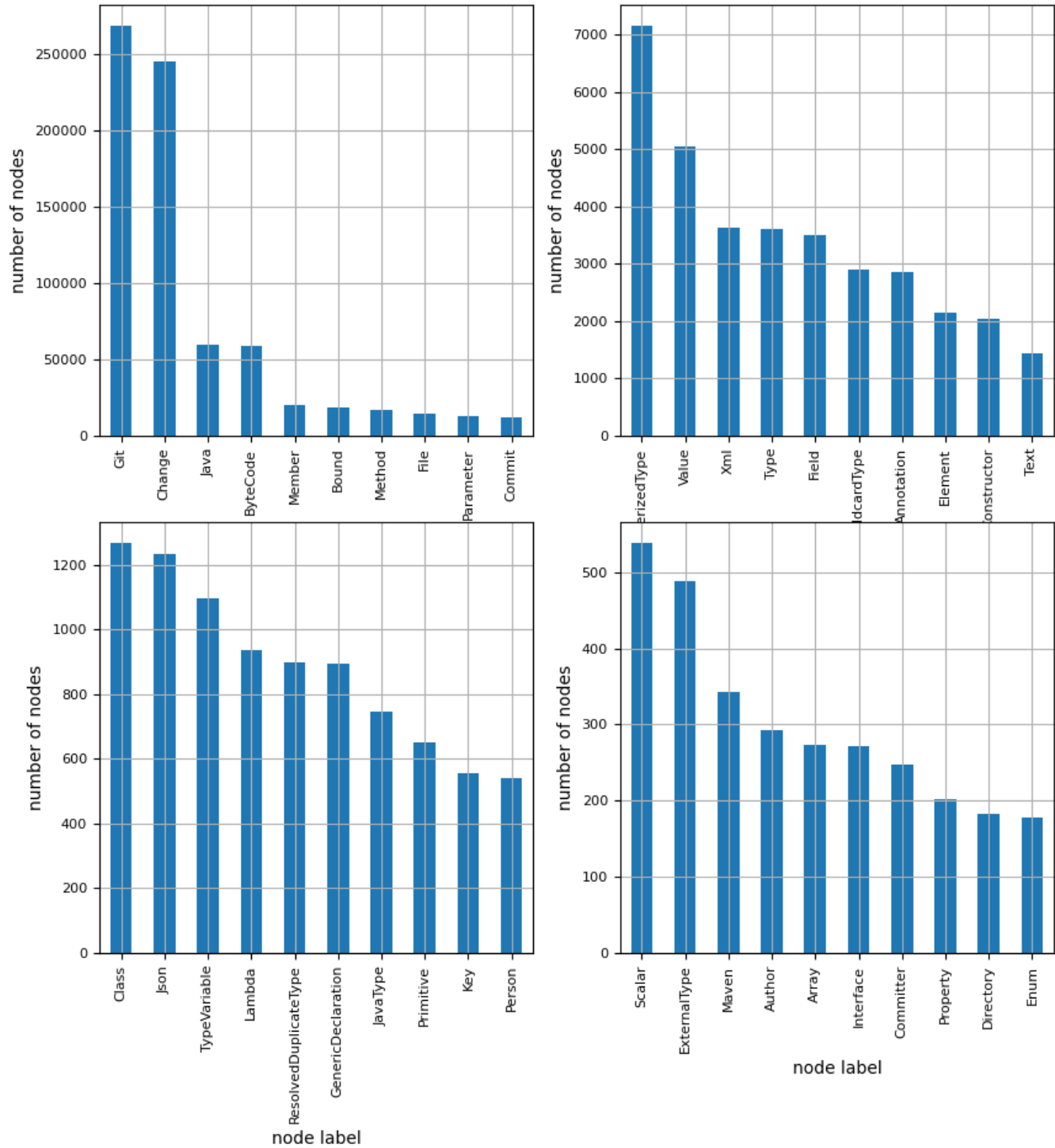
	nodeLabel	nodesWithThatLabel	nodesWithThatLabelPercent
0	Git	268701	80.487717
1	Change	245299	73.477793
2	Java	59273	17.754859
3	ByteCode	59085	17.698545
4	Member	20241	6.063066
5	Bound	18438	5.522988
6	Method	16747	5.016460
7	File	14521	4.349675
8	Parameter	13000	3.894069
9	Commit	11996	3.593327
10	ParameterizedType	7166	2.146531
11	Value	5059	1.515392
12	Xml	3643	1.091238
13	Type	3613	1.082252
14	Field	3494	1.046606
15	WildcardType	2906	0.870474
16	Annotation	2864	0.857893
17	Element	2144	0.642222
18	Constructor	2042	0.611668
19	Text	1436	0.430145
20	Class	1269	0.380121
21	Json	1234	0.369637
22	TypeVariable	1096	0.328300
23	Lambda	936	0.280373
24	ResolvedDuplicateType	900	0.269589
25	GenericDeclaration	894	0.267792
26	JavaType	746	0.223460
27	Primitive	650	0.194703
28	Key	555	0.166247
29	Person	539	0.161454
30	Scalar	539	0.161454
31	ExternalType	489	0.146477
32	Maven	343	0.102744
33	Author	292	0.087467
34	Array	273	0.081775
35	Interface	272	0.081476
36	Committer	247	0.073987
37	Property	202	0.060508
38	Directory	183	0.054817
39	Enum	178	0.053319

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: 1012244
```

	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	CONTAINS_CHANGE	245299	24.233189
1	MODIFIES	245299	24.233189
2	UPDATES	158722	15.680211
3	CREATES	59675	5.895318
4	DELETES	37191	3.674114
5	INVOKES	35573	3.514271
6	COMMITTED	23992	2.370180
7	DEPENDS_ON	21873	2.160843
8	OF_TYPE	21347	2.108879
9	DECLARES	20682	2.043183
10	OF_RAW_TYPE	17077	1.687044
11	HAS_PARENT	14588	1.441155
12	HAS	14094	1.392352
13	RETURNS	12547	1.239523
14	RENAMES	10289	1.016455
15	READS	9076	0.896622
16	HAS_ACTUAL_TYPE_ARGUMENT	8276	0.817589
17	HAS_NEW_NAME	6198	0.612303
18	OF_GENERIC_TYPE	5902	0.583061
19	RESOLVES_TO	5223	0.515982
20	SIMILAR	3968	0.392000
21	CONTAINS	3805	0.375898
22	WRITES	3803	0.375700
23	RETURNS_GENERIC	3543	0.350014
24	ANNOTATED_BY	2809	0.277502
25	REQUIRES	2173	0.214672
26	HAS_FIRST_CHILD	2144	0.211807
27	HAS_LAST_CHILD	2144	0.211807
28	HAS_ELEMENT	2126	0.210028
29	HAS_UPPER_BOUND	1521	0.150260

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

Slice values:
- 24.23% (245299)
- 24.23% (245299)
- 15.68% (158722)
- 5.90% (59675)
- 3.88% (39321)
- 3.67% (37191)
- 3.51% (35573)
- 2.37% (23992)
- 2.16% (21873)
- 2.11% (21347)
- 2.04% (20682)
- 1.69% (17077)
- 1.44% (14588)
- 1.39% (14094)
- 1.24% (12547)
- 1.02% (10289)
- 0.90% (9076)
- 0.82% (8276)
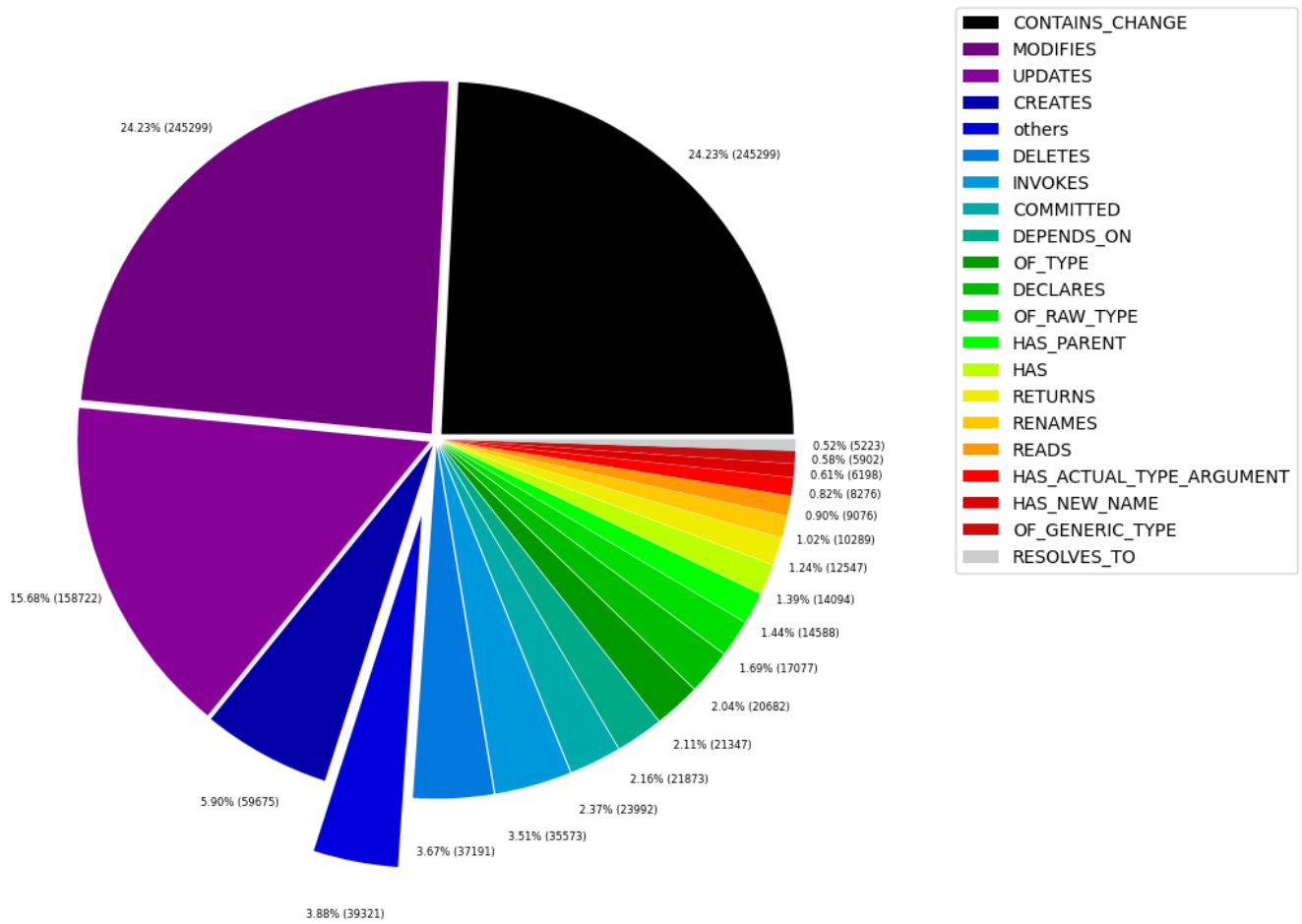- 0.61% (6198)
- 0.58% (5902)
- 0.52% (5223)

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.
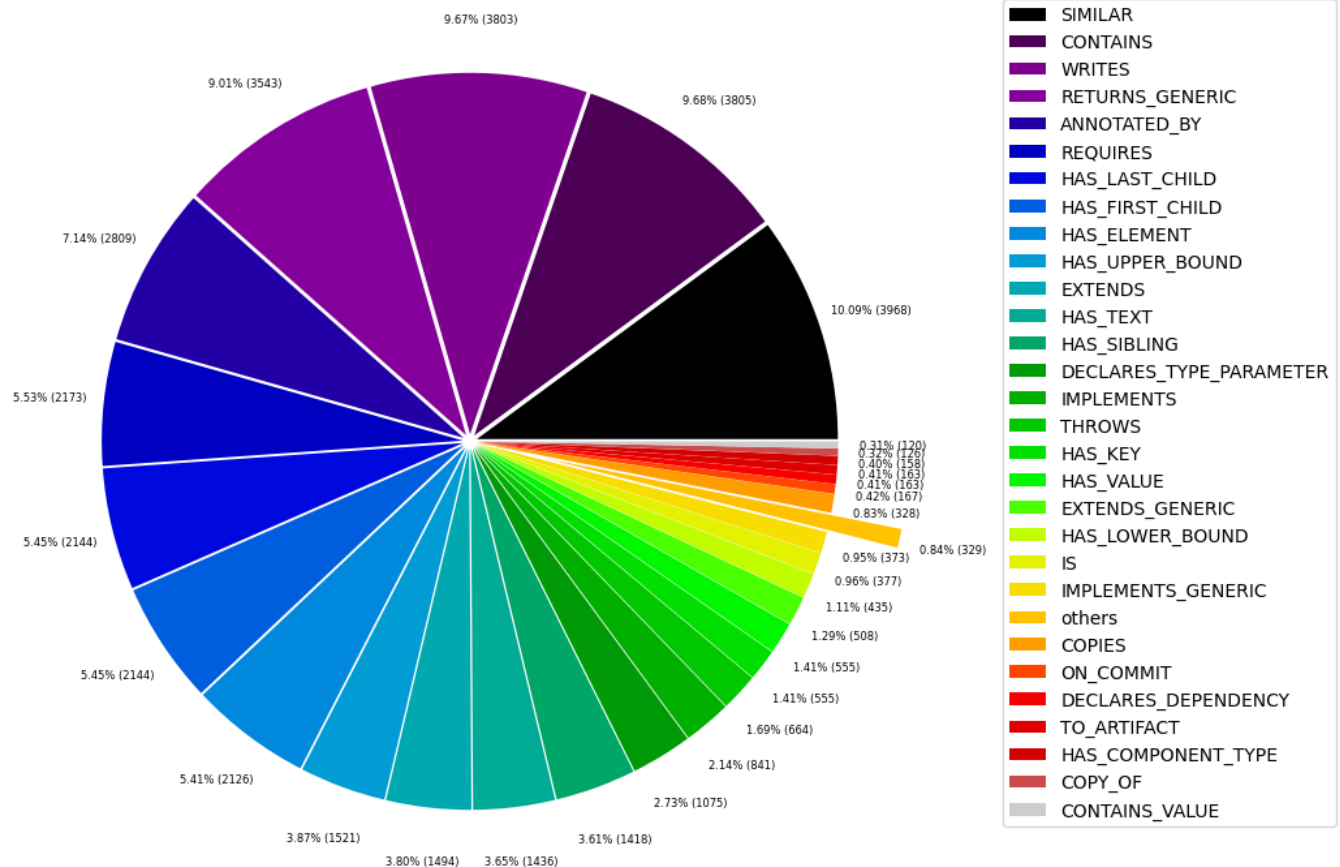
	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	HAS_PROPERTY	1	0.000099
1	THROWS_GENERIC	5	0.000494
2	EXCLUDES	5	0.000494
3	HAS_ROOT_ELEMENT	9	0.000889
4	DESCRIBES	9	0.000889
5	HAS_GOAL	16	0.001581
6	HAS_EXECUTION	16	0.001581
7	OF_NAMESPACE	18	0.001778
8	HAS_ATTRIBUTE	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	0.003556
17	HAS_DEFAULT	36	0.003556
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	0.032403
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)

9.67% (3803)
9.68% (3805)
9.01% (3543)
10.09% (3968)
7.14% (2809)
5.53% (2173)
5.45% (2144)
5.45% (2144)
5.41% (2126)
3.87% (1521)
3.80% (1494)
3.65% (1436)
3.61% (1418)
2.73% (1075)
2.14% (841)
1.69% (664)
1.41% (555)
1.41% (555)
1.29% (508)
1.11% (435)
0.96% (377)
0.95% (373)
0.84% (329)
0.83% (328)
0.42% (167)
0.41% (163)
0.41% (163)
0.40% (158)
0.32% (126)
0.31% (120)

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]	21529	13077	
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	13077	
11	[Java, ByteCode, Method, Member]	READS	[Java, ByteCode, Member, Field]	8101	13077	
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	2038	
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	2038	
23	[Java, ByteCode, Method, Member]	RETURNS	[Type, File, Java, ByteCode, JavaType]	2088	13077	
24	[Java, ByteCode, Constructor, Method, Member]	HAS	[Java, ByteCode, Parameter]	2023	2038	
25	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, Bound]	2023	13000	
26	[Java, ByteCode, Method, Member]	INVOKES	[Java, ByteCode, Constructor, Method, Member]	2008	13077	
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	2038	

Graph Density

```
total_number_of_nodes (vertices): 333841
total_number_of_relationships (edges): 1012244
-> total directed graph density: 9.08253681476325e-06
-> total directed graph density in percent: 0.0009082536814763251
```