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]	241394	73.193613
1	[Java, ByteCode, Method, Member]	13202	4.003008
2	[Java, ByteCode, Parameter]	13000	3.941759
3	[Git, Commit]	11883	3.603071
4	[File, Git]	10651	3.229513
5	[Java, ByteCode, Bound, ParameterizedType]	7166	2.172819
6	[Java, ByteCode, Bound]	7112	2.156445
7	[Java, ByteCode, Member, Field]	3495	1.059727
8	[Java, ByteCode, Bound, WildcardType]	2906	0.881135
9	[Java, Value, ByteCode, Annotation]	2821	0.855362
10	[Xml, Element]	2144	0.650087
11	[Java, ByteCode, Constructor, Method, Member]	2038	0.617947
12	[Xml, Text]	1436	0.435413
13	[Java, ByteCode, Bound, TypeVariable]	1096	0.332321
14	[Java, ByteCode, Method, Member, Lambda]	936	0.283807
15	[Type, File, Java, ByteCode, ResolvedDuplicate...	900	0.272891
16	[Type, File, Java, ByteCode, Class]	861	0.261066
17	[Type, File, Java, ByteCode, JavaType]	746	0.226196
18	[Java, Value, ByteCode, Primitive]	650	0.197088
19	[Java, ByteCode, Method, Member, GenericDeclar...	569	0.172528
20	[Json, Key]	555	0.168283
21	[Value, Json, Scalar]	539	0.163431
22	[Type, File, Java, ByteCode, ExternalType]	396	0.120072
23	[Author, Git, Person]	290	0.087932
24	[Value, Array]	267	0.080958
25	[Committer, Git, Person]	244	0.073984
26	[Type, File, Java, ByteCode, Class, GenericDec...	236	0.071558
27	[Value, Property]	202	0.061249
28	[Type, File, Java, ByteCode, Interface]	187	0.056701
29	[Java, Value, ByteCode, Class]	172	0.052153

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']

Slice labels:
- 73.19% (241394)
- 0.62% (2038)
- 0.65% (2144)
- 0.86% (2821)
- 0.88% (2906)
- 1.06% (3495)
- 2.16% (7112)
- 2.17% (7166)
- 3.23% (10651)
- 3.60% (11883)
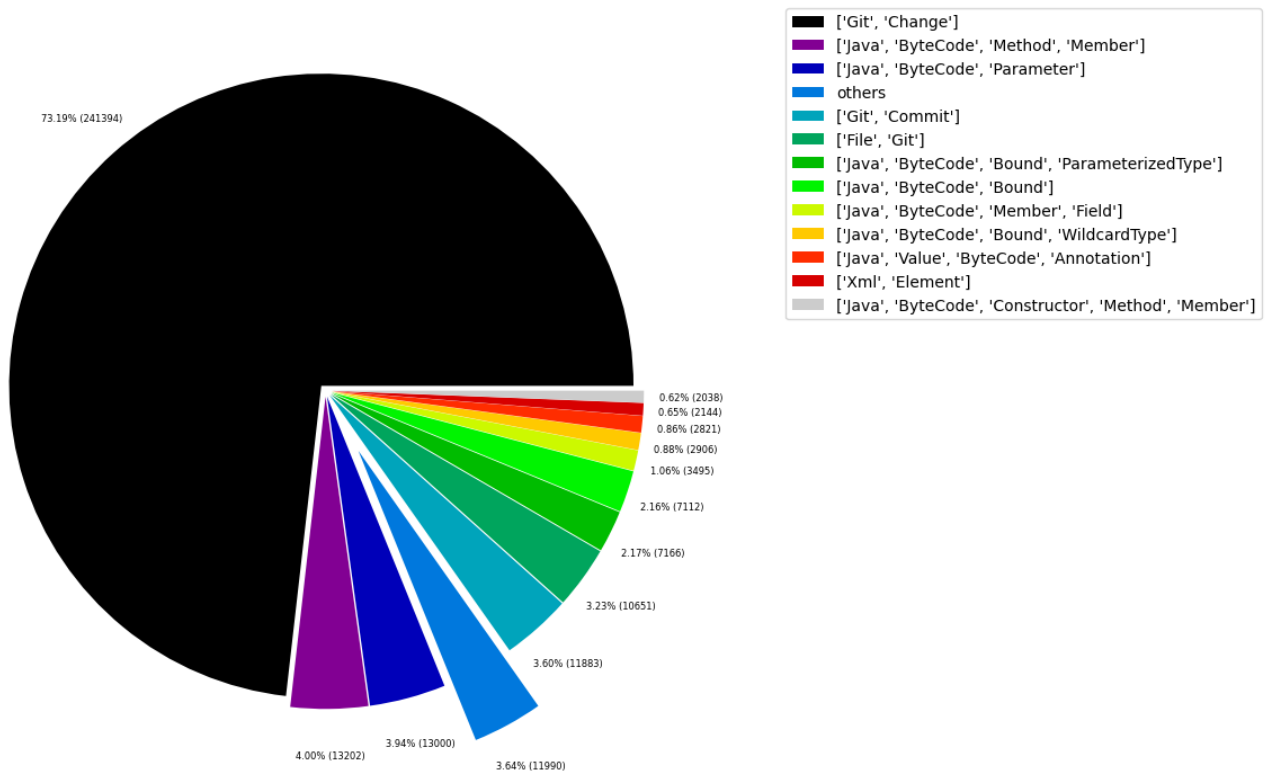- 3.64% (11990)
- 3.94% (13000)
- 4.00% (13202)

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	0.000303
1	[File, TS, Scan]	1	0.000303
2	[File, Json]	2	0.000606
3	[File]	3	0.000910
4	[Java, ByteCode, Constructor, Method, Member, ...	4	0.001213
5	[Maven, Exclusion]	5	0.001516
6	[Value, Array, Json]	6	0.001819
7	[File, Maven, Xml, Pom, Document]	9	0.002729
8	[Type, File, Java, ByteCode, Void]	9	0.002729
9	[Java, ManifestSection]	9	0.002729
10	[File, Java, Manifest]	9	0.002729
11	[Artifact, File, Jar, Archive, Zip, Java]	9	0.002729
12	[File, Java, ServiceLoader]	10	0.003032
13	[File, Java, Properties]	12	0.003639
14	[Maven, ExecutionGoal]	16	0.004851
15	[Maven, PluginExecution]	16	0.004851
16	[Xml, Attribute]	18	0.005458
17	[jQAssistant, Rule, Concept]	19	0.005761
18	[Maven, Plugin]	21	0.006367
19	[Maven, Configuration]	21	0.006367
20	[Type, File, Java, ByteCode, Enum]	28	0.008490
21	[Git, Branch]	29	0.008793
22	[Type, File, Java, ByteCode, PrimitiveType]	29	0.008793
23	[Xml, Namespace]	36	0.010916
24	[Type, File, Java, ByteCode, Annotation]	43	0.013038
25	[File, Directory]	44	0.013341
26	[Type, File, Java, ByteCode, GenericDeclaratio...	85	0.025773
27	[Artifact, Maven]	92	0.027896
28	[Type, File, Java, ByteCode, ExternalType, Ext...	93	0.028199
29	[Value, ManifestEntry]	120	0.036385

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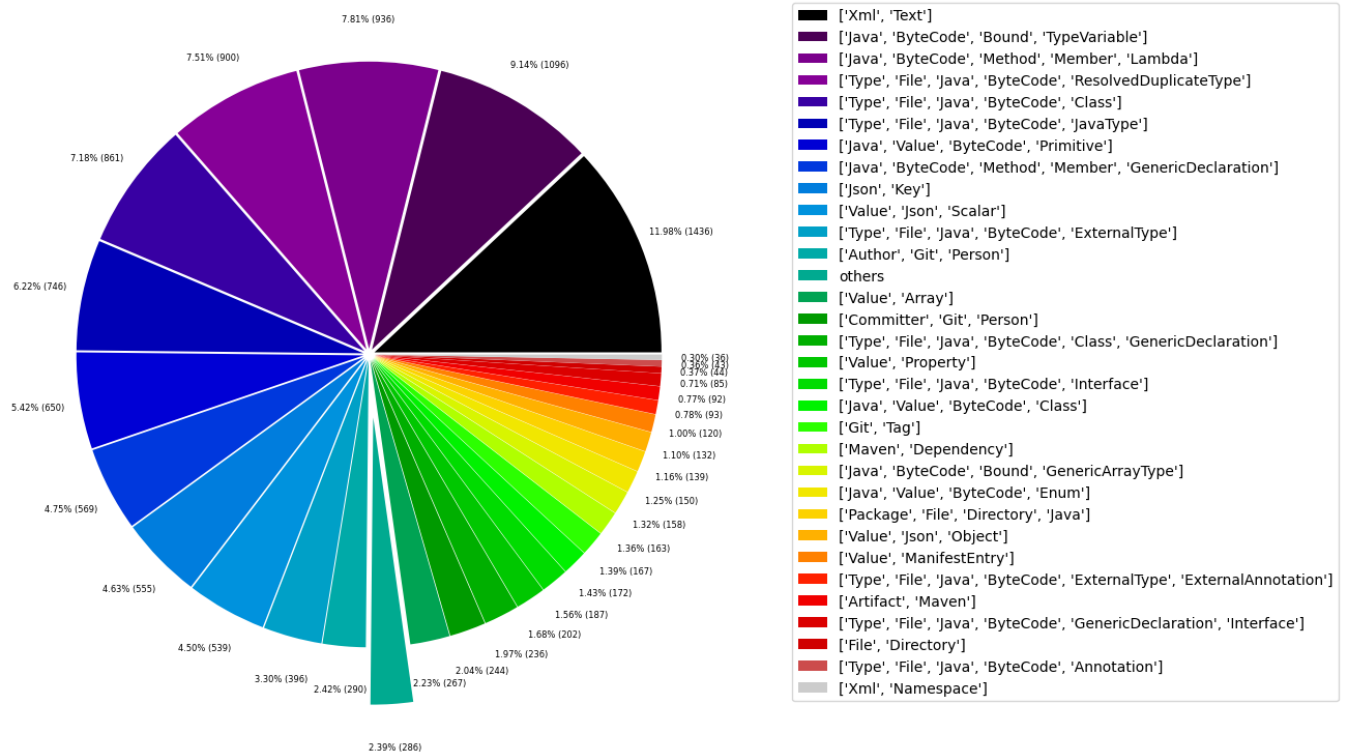- ['Xml', 'Namespace']

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.
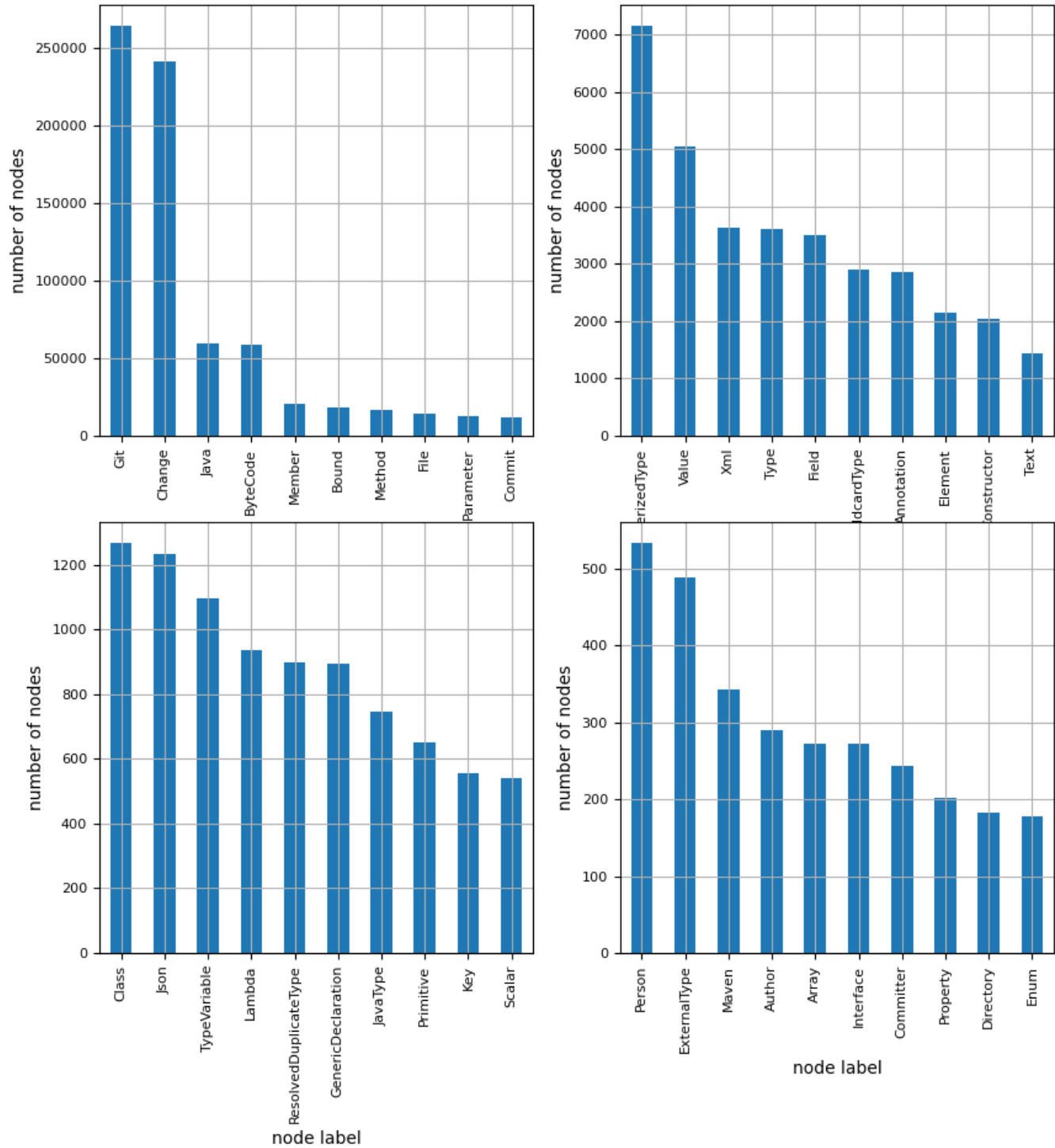
	nodeLabel	nodesWithThatLabel	nodesWithThatLabelPercent
0	Git	264658	80.247542
1	Change	241394	73.193613
2	Java	59276	17.973208
3	ByteCode	59088	17.916204
4	Member	20244	6.138228
5	Bound	18438	5.590627
6	Method	16749	5.078502
7	File	14502	4.397184
8	Parameter	13000	3.941759
9	Commit	11883	3.603071
10	ParameterizedType	7166	2.172819
11	Value	5059	1.533951
12	Xml	3643	1.104602
13	Type	3613	1.095506
14	Field	3495	1.059727
15	WildcardType	2906	0.881135
16	Annotation	2864	0.868400
17	Element	2144	0.650087
18	Constructor	2042	0.619159
19	Text	1436	0.435413
20	Class	1269	0.384776
21	Json	1234	0.374164
22	TypeVariable	1096	0.332321
23	Lambda	936	0.283807
24	ResolvedDuplicateType	900	0.272891
25	GenericDeclaration	894	0.271072
26	JavaType	746	0.226196
27	Primitive	650	0.197088
28	Key	555	0.168283
29	Scalar	539	0.163431
30	Person	534	0.161915
31	ExternalType	489	0.148271
32	Maven	343	0.104002
33	Author	290	0.087932
34	Array	273	0.082777
35	Interface	272	0.082474
36	Committer	244	0.073984
37	Property	202	0.061249
38	Directory	183	0.055488
39	Enum	178	0.053972

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: 999912
```

	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	CONTAINS_CHANGE	241394	24.141524
1	MODIFIES	241394	24.141524
2	UPDATES	155836	15.584971
3	CREATES	58984	5.898919
4	DELETES	36739	3.674223
5	INVOKES	35573	3.557613
6	COMMITTED	23766	2.376809
7	DEPENDS_ON	21873	2.187492
8	OF_TYPE	21347	2.134888
9	DECLARES	20685	2.068682
10	OF_RAW_TYPE	17077	1.707850
11	HAS_PARENT	14449	1.445027
12	HAS	14094	1.409524
13	RETURNS	12547	1.254810
14	RENAMES	10165	1.016589
15	READS	9078	0.907880
16	HAS_ACTUAL_TYPE_ARGUMENT	8276	0.827673
17	HAS_NEW_NAME	6190	0.619054
18	OF_GENERIC_TYPE	5902	0.590252
19	RESOLVES_TO	5225	0.522546
20	SIMILAR	3968	0.396835
21	CONTAINS	3805	0.380533
22	WRITES	3803	0.380333
23	RETURNS_GENERIC	3543	0.354331
24	ANNOTATED_BY	2809	0.280925
25	REQUIRES	2173	0.217319
26	HAS_FIRST_CHILD	2144	0.214419
27	HAS_LAST_CHILD	2144	0.214419
28	HAS_ELEMENT	2126	0.212619
29	HAS_UPPER_BOUND	1521	0.152113

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:
- 24.14% (241394)
- 24.14% (241394)
- 15.58% (155836)
- 5.90% (58984)
- 3.93% (39318)
- 3.67% (36739)
- 3.56% (35573)
- 2.38% (23766)
- 2.19% (21873)
- 2.13% (21347)
- 2.07% (20685)
- 1.71% (17077)
- 1.45% (14449)
- 1.41% (14094)
- 1.25% (12547)
- 1.02% (10165)
- 0.91% (9078)
- 0.83% (8276)
- 0.62% (6190)
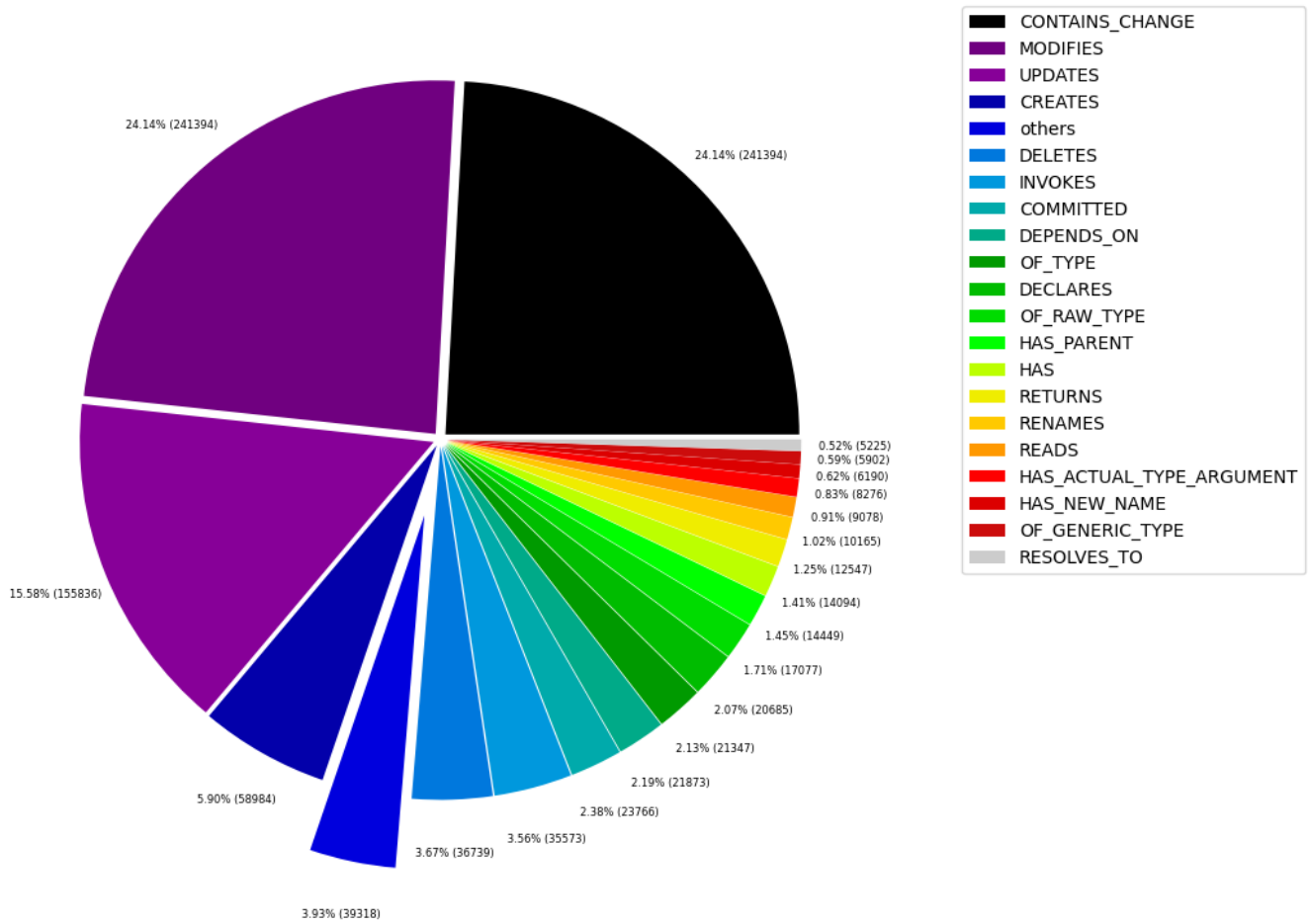- 0.59% (5902)
- 0.52% (5225)

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.
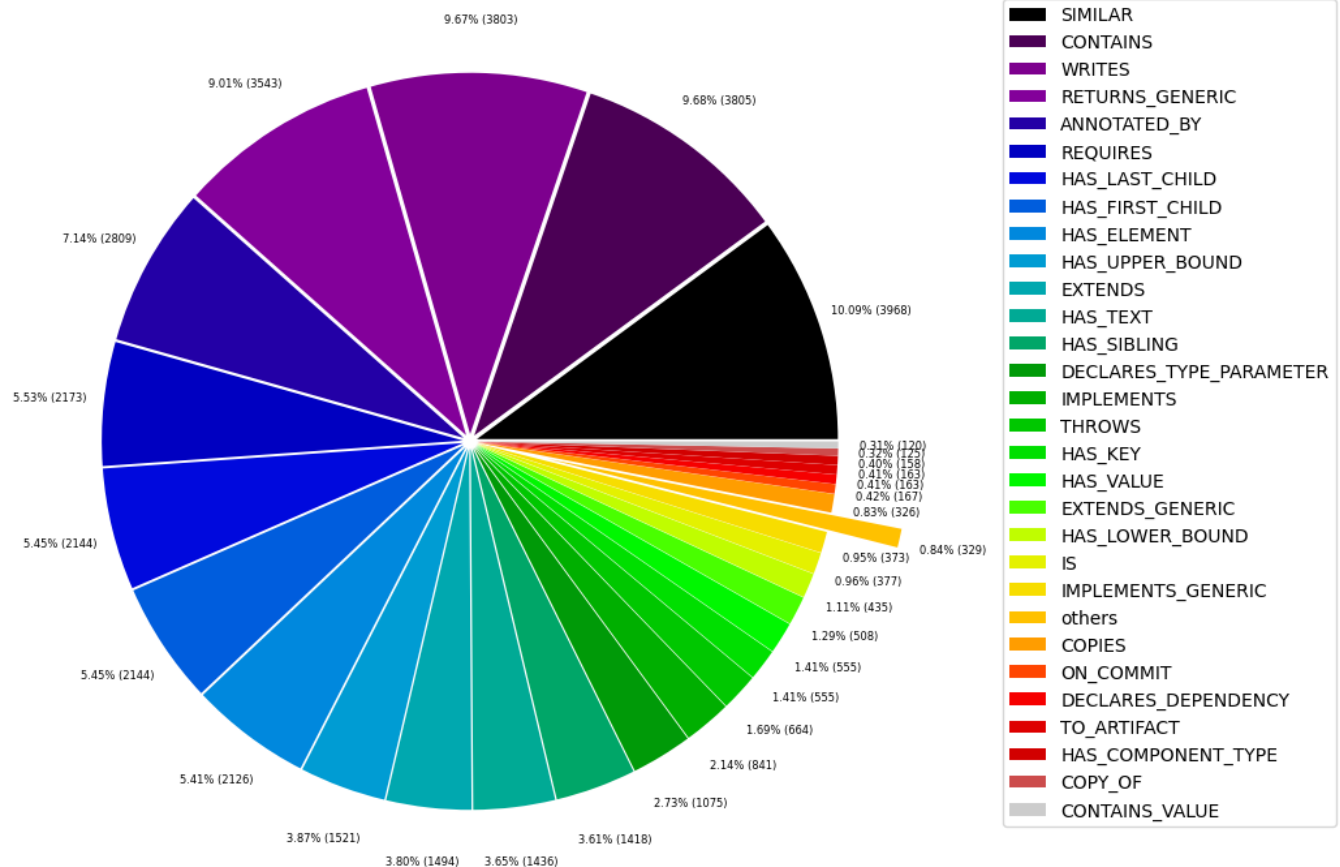
	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	HAS_PROPERTY	1	0.000100
1	THROWS_GENERIC	5	0.000500
2	EXCLUDES	5	0.000500
3	HAS_ROOT_ELEMENT	9	0.000900
4	DESCRIBES	9	0.000900
5	HAS_GOAL	16	0.001600
6	HAS_EXECUTION	16	0.001600
7	OF_NAMESPACE	18	0.001800
8	HAS_ATTRIBUTE	18	0.001800
9	INCLUDES_CONCEPT	19	0.001900
10	USES_PLUGIN	21	0.002100
11	REQUIRES_TYPE_PARAMETER	21	0.002100
12	IS_ARTIFACT	21	0.002100
13	HAS_CONFIGURATION	21	0.002100
14	REQUIRES_CONCEPT	28	0.002800
15	HAS_HEAD	29	0.002900
16	DECLARES_NAMESPACE	36	0.003600
17	HAS_DEFAULT	36	0.003600
18	CONTAINS_VALUE	120	0.012001
19	COPY_OF	125	0.012501
20	HAS_COMPONENT_TYPE	158	0.015801
21	TO_ARTIFACT	163	0.016301
22	DECLARES_DEPENDENCY	163	0.016301
23	ON_COMMIT	167	0.016701
24	COPIES	326	0.032603
25	IMPLEMENTS_GENERIC	373	0.037303
26	IS	377	0.037703
27	HAS_LOWER_BOUND	435	0.043504
28	EXTENDS_GENERIC	508	0.050804
29	HAS_VALUE	555	0.055505

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>

9.67% (3803)

9.01% (3543)

9.68% (3805)

7.14% (2809)

10.09% (3968)

5.53% (2173)

0.31% (120)
0.32% (125)
0.40% (158)
0.41% (163)
0.41% (163)
0.42% (167)
0.83% (326)

5.45% (2144)

0.84% (329)

0.95% (373)

5.45% (2144)

0.96% (377)

1.11% (435)

1.29% (508)

5.41% (2126)

1.41% (555)

1.41% (555)

3.87% (1521)

1.69% (664)

3.80% (1494)   3.65% (1436)

2.14% (841)

3.61% (1418)

2.73% (1075)

- 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]	241394	11883	
1	[Git, Change]	MODIFIES	[File, Git]	241394	241394	
2	[Git, Change]	UPDATES	[File, Git]	155836	241394	
3	[Git, Change]	CREATES	[File, Git]	58984	241394	
4	[Git, Change]	DELETES	[File, Git]	36739	241394	
5	[Java, ByteCode, Method, Member]	INVOKES	[Java, ByteCode, Method, Member]	21529	13079	
6	[Git, Commit]	HAS_PARENT	[Git, Commit]	14440	11883	
7	[Author, Git, Person]	COMMITTED	[Git, Commit]	11883	290	
8	[Committer, Git, Person]	COMMITTED	[Git, Commit]	11883	244	
9	[Git, Change]	RENAMES	[File, Git]	10165	241394	
10	[Java, ByteCode, Method, Member]	HAS	[Java, ByteCode, Parameter]	8300	13079	
11	[Java, ByteCode, Method, Member]	READS	[Java, ByteCode, Member, Field]	8101	13079	
12	[Java, ByteCode, Parameter]	OF_TYPE	[Type, File, Java, ByteCode, JavaType]	6360	13000	
13	[File, Git]	HAS_NEW_NAME	[File, Git]	6190	10651	
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	13079	
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	13079	
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): 329802
total_number_of_relationships (edges): 999912
-> total directed graph density: 9.192984487380321e-06
-> total directed graph density in percent: 0.0009192984487380321
```