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]	235897	72.793562
1	[Java, ByteCode, Member, Method]	13205	4.074825
2	[Java, ByteCode, Parameter]	12968	4.001691
3	[Git, Commit]	11787	3.637256
4	[File, Git]	10598	3.270352
5	[Java, ByteCode, Bound, ParameterizedType]	7154	2.207595
6	[Java, ByteCode, Bound]	7094	2.189081
7	[Java, ByteCode, Member, Field]	3490	1.076951
8	[Java, ByteCode, Bound, WildcardType]	2902	0.895505
9	[Java, Value, ByteCode, Annotation]	2813	0.868041
10	[Xml, Element]	2144	0.661600
11	[Java, ByteCode, Member, Constructor, Method]	2045	0.631050
12	[Xml, Text]	1436	0.443124
13	[Java, ByteCode, Bound, TypeVariable]	1094	0.337589
14	[Java, ByteCode, Member, Method, Lambda]	931	0.287290
15	[Type, File, Java, ByteCode, ResolvedDuplicate...	899	0.277415
16	[Type, File, Java, Class, ByteCode]	858	0.264763
17	[Type, File, Java, ByteCode, JavaType]	746	0.230202
18	[Java, Value, ByteCode, Primitive]	647	0.199653
19	[Java, ByteCode, Member, Method, GenericDeclar...	567	0.174966
20	[Json, Key]	555	0.171263
21	[Value, Json, Scalar]	539	0.166326
22	[Type, File, Java, ByteCode, ExternalType]	396	0.122198
23	[Author, Git, Person]	289	0.089180
24	[Value, Array]	267	0.082391
25	[Committer, Git, Person]	243	0.074985
26	[Type, File, Java, Class, ByteCode, GenericDec...	236	0.072825
27	[Value, Property]	202	0.062334
28	[Type, File, Java, ByteCode, Interface]	186	0.057396
29	[Java, Value, Class, ByteCode]	170	0.052459

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', 'Bound', 'ParameterizedType']
- ['Java', 'ByteCode', 'Bound']
- ['Java', 'ByteCode', 'Member', 'Field']
- ['Java', 'ByteCode', 'Bound', 'WildcardType']
- ['Java', 'Value', 'ByteCode', 'Annotation']
- ['Xml', 'Element']
- ['Java', 'ByteCode', 'Member', 'Constructor', 'Method']

Pie chart values:
- 72.79% (235897)
- 0.63% (2045)
- 0.66% (2144)
- 0.87% (2813)
- 0.90% (2902)
- 1.08% (3490)
- 2.19% (7094)
- 2.21% (7154)
- 3.27% (10598)
- 3.64% (11787)
- 3.69% (11966)
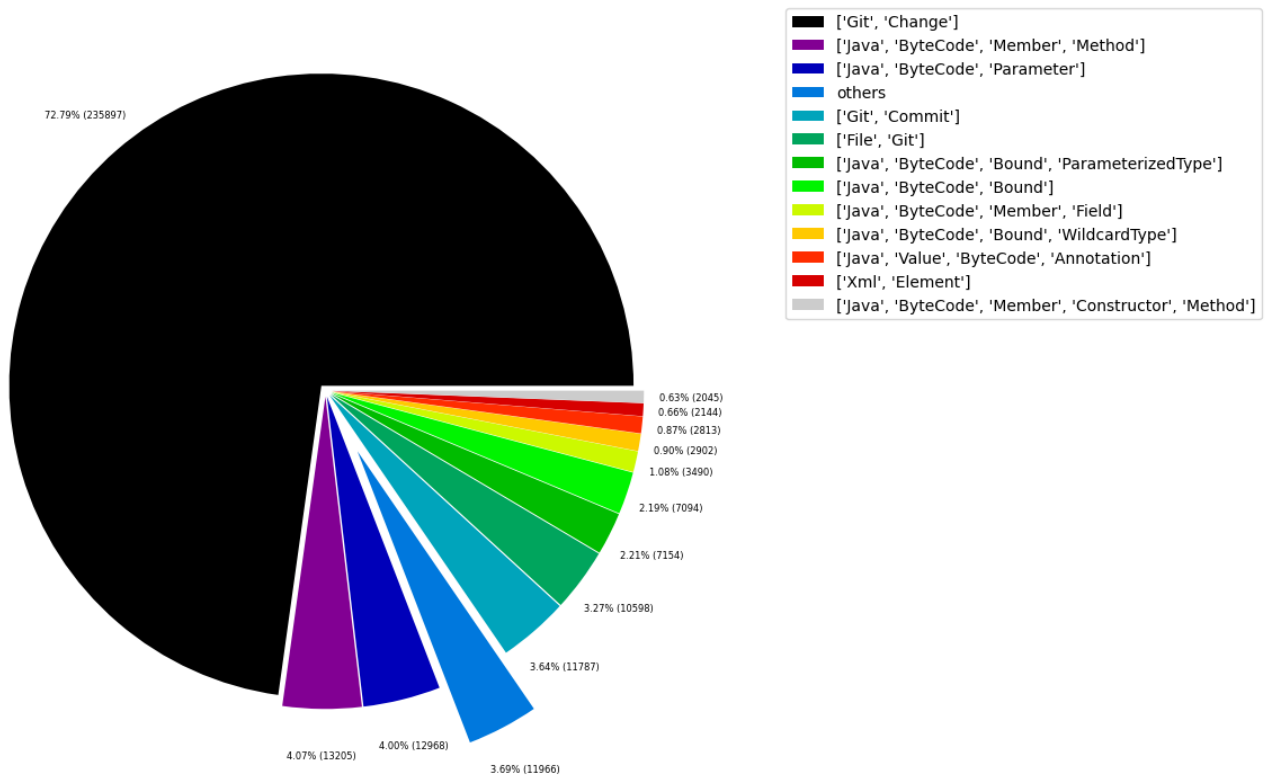- 4.00% (12968)
- 4.07% (13205)

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	0.000309
1	[File, TS, Scan]	1	0.000309
2	[File, Json]	2	0.000617
3	[File]	3	0.000926
4	[Java, ByteCode, Member, Constructor, Method, ...	4	0.001234
5	[Maven, Exclusion]	5	0.001543
6	[Value, Array, Json]	6	0.001851
7	[Type, File, Java, ByteCode, Void]	9	0.002777
8	[File, Maven, Xml, Pom, Document]	9	0.002777
9	[Java, ManifestSection]	9	0.002777
10	[File, Java, Manifest]	9	0.002777
11	[Artifact, File, Jar, Archive, Zip, Java]	9	0.002777
12	[File, Java, ServiceLoader]	10	0.003086
13	[File, Java, Properties]	12	0.003703
14	[Maven, ExecutionGoal]	16	0.004937
15	[Maven, PluginExecution]	16	0.004937
16	[Xml, Attribute]	18	0.005554
17	[jQAssistant, Rule, Concept]	19	0.005863
18	[Maven, Plugin]	21	0.006480
19	[Maven, Configuration]	21	0.006480
20	[Git, Branch]	26	0.008023
21	[Type, File, Java, ByteCode, Enum]	28	0.008640
22	[Type, File, Java, ByteCode, PrimitiveType]	29	0.008949
23	[Xml, Namespace]	36	0.011109
24	[Type, File, Java, ByteCode, Annotation]	43	0.013269
25	[File, Directory]	44	0.013578
26	[Type, File, Java, ByteCode, GenericDeclaratio...	85	0.026229
27	[Artifact, Maven]	92	0.028390
28	[Type, File, Java, ByteCode, ExternalAnnotatio...	93	0.028698
29	[Value, ManifestEntry]	120	0.037030

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', 'Class', 'ByteCode']
- ['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', 'Class', 'ByteCode', 'GenericDeclaration']
- ['Value', 'Property']
- ['Type', 'File', 'Java', 'ByteCode', 'Interface']
- ['Java', 'Value', 'Class', 'ByteCode']
- ['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']
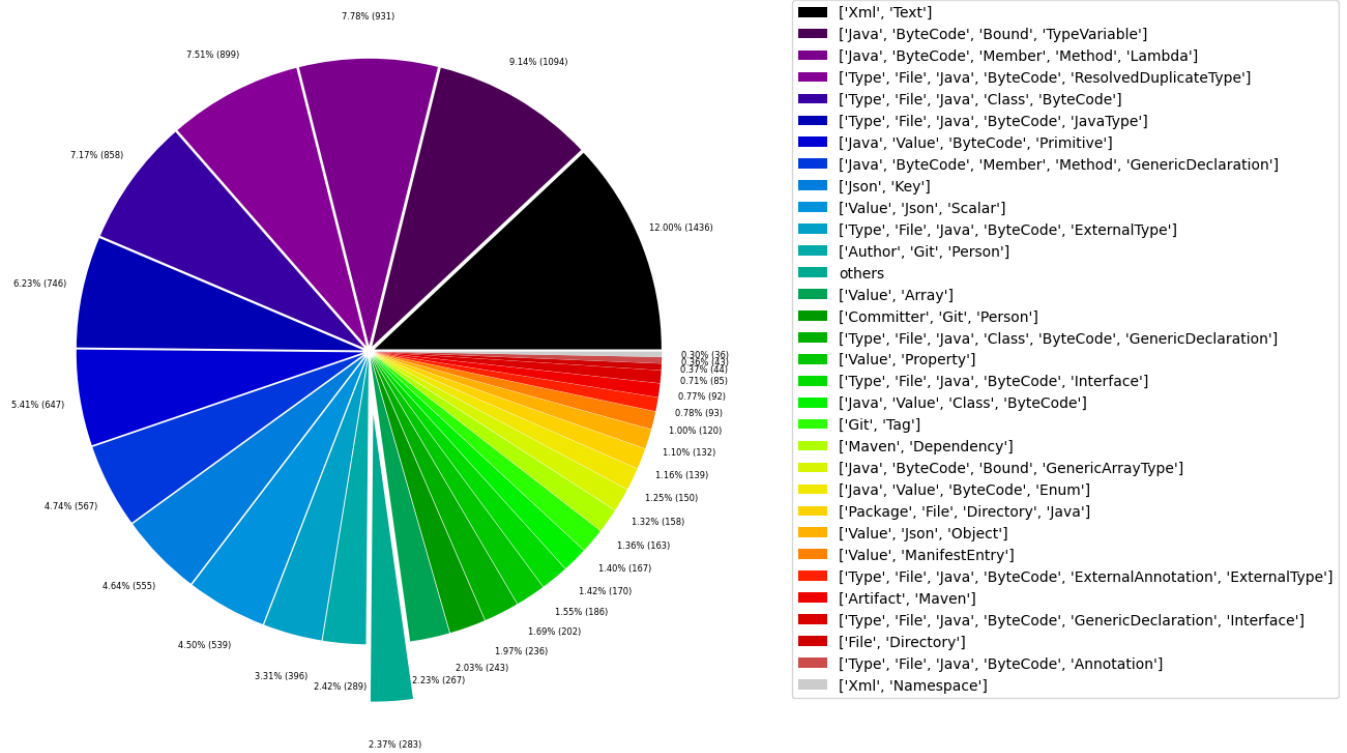- ['Xml', 'Namespace']

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.
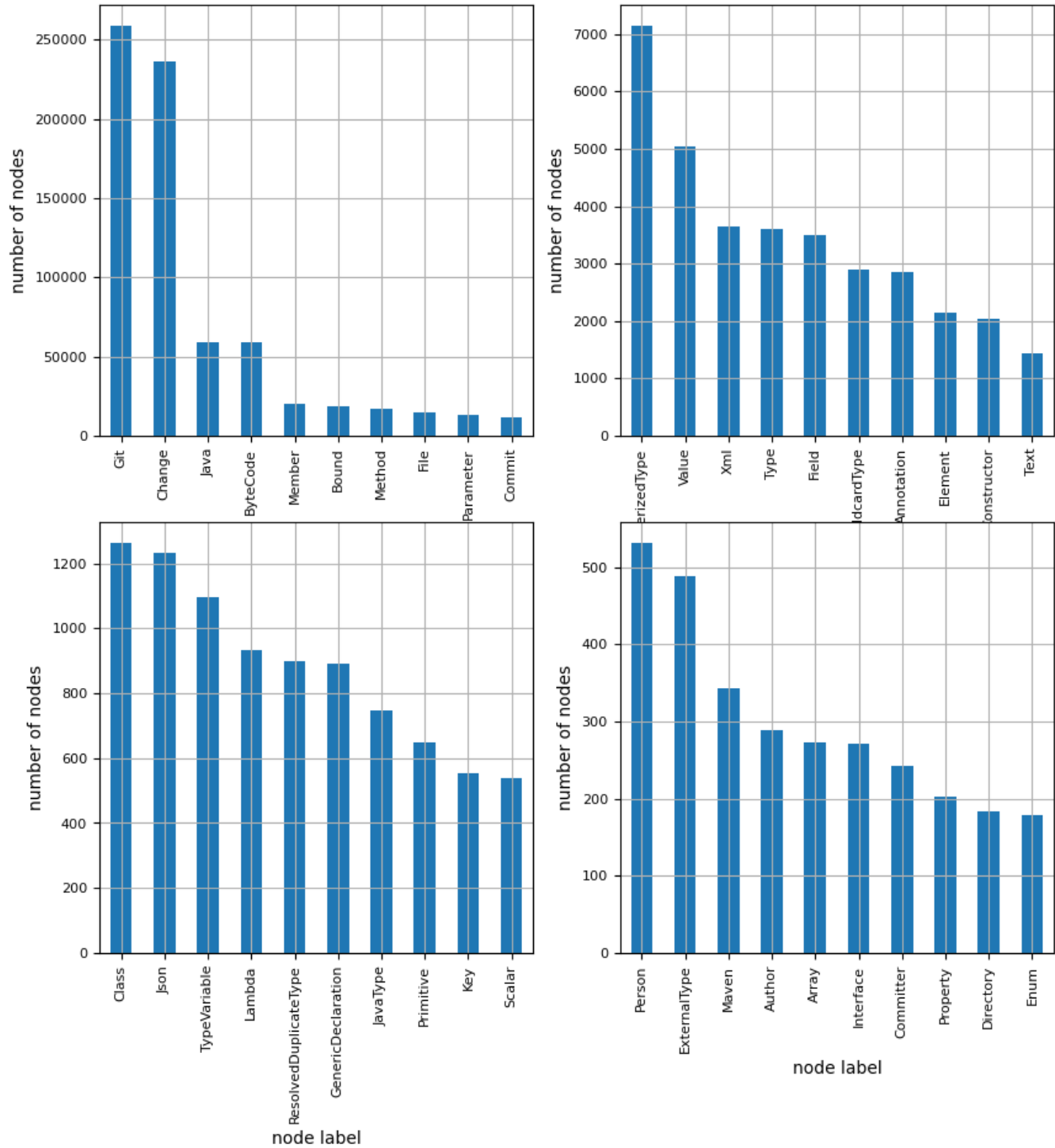
	nodeLabel	nodesWithThatLabel	nodesWithThatLabelPercent
0	Git	259007	79.924891
1	Change	235897	72.793562
2	Java	59188	18.264350
3	ByteCode	59000	18.206336
4	Member	20242	6.246316
5	Bound	18402	5.678525
6	Method	16752	5.169365
7	File	14444	4.457158
8	Parameter	12968	4.001691
9	Commit	11787	3.637256
10	ParameterizedType	7154	2.207595
11	Value	5046	1.557105
12	Xml	3643	1.124164
13	Type	3608	1.113364
14	Field	3490	1.076951
15	WildcardType	2902	0.895505
16	Annotation	2856	0.881310
17	Element	2144	0.661600
18	Constructor	2049	0.632284
19	Text	1436	0.443124
20	Class	1264	0.390048
21	Json	1234	0.380790
22	TypeVariable	1094	0.337589
23	Lambda	931	0.287290
24	ResolvedDuplicateType	899	0.277415
25	GenericDeclaration	892	0.275255
26	JavaType	746	0.230202
27	Primitive	647	0.199653
28	Key	555	0.171263
29	Scalar	539	0.166326
30	Person	532	0.164166
31	ExternalType	489	0.150897
32	Maven	343	0.105844
33	Author	289	0.089180
34	Array	273	0.084243
35	Interface	271	0.083626
36	Committer	243	0.074985
37	Property	202	0.062334
38	Directory	183	0.056471
39	Enum	178	0.054928

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: 982348
```

	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	CONTAINS_CHANGE	235897	24.013588
1	MODIFIES	235897	24.013588
2	UPDATES	151660	15.438521
3	CREATES	58219	5.926515
4	DELETES	35985	3.663162
5	INVOKES	35528	3.616641
6	COMMITTED	23574	2.399761
7	DEPENDS_ON	21820	2.221209
8	OF_TYPE	21292	2.167460
9	DECLARES	20681	2.105262
10	OF_RAW_TYPE	17041	1.734721
11	HAS_PARENT	14327	1.458444
12	HAS	14057	1.430959
13	RETURNS	12524	1.274905
14	RENAMES	9967	1.014610
15	READS	9069	0.923196
16	HAS_ACTUAL_TYPE_ARGUMENT	8261	0.840944
17	HAS_NEW_NAME	6165	0.627578
18	OF_GENERIC_TYPE	5892	0.599787
19	RESOLVES_TO	5237	0.533110
20	SIMILAR	3955	0.402607
21	CONTAINS	3797	0.386523
22	WRITES	3796	0.386421
23	RETURNS_GENERIC	3538	0.360158
24	ANNOTATED_BY	2801	0.285133
25	REQUIRES	2172	0.221103
26	HAS_FIRST_CHILD	2144	0.218253
27	HAS_LAST_CHILD	2144	0.218253
28	HAS_ELEMENT	2126	0.216420
29	HAS_UPPER_BOUND	1519	0.154630

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

Pie chart values:
- 24.01% (235897)
- 24.01% (235897)
- 15.44% (151660)
- 5.93% (58219)
- 4.00% (39255)
- 3.66% (35985)
- 3.62% (35528)
- 2.40% (23574)
- 2.22% (21820)
- 2.17% (21292)
- 2.11% (20681)
- 1.73% (17041)
- 1.46% (14327)
- 1.43% (14057)
- 1.27% (12524)
- 1.01% (9967)
- 0.92% (9069)
- 0.84% (8261)
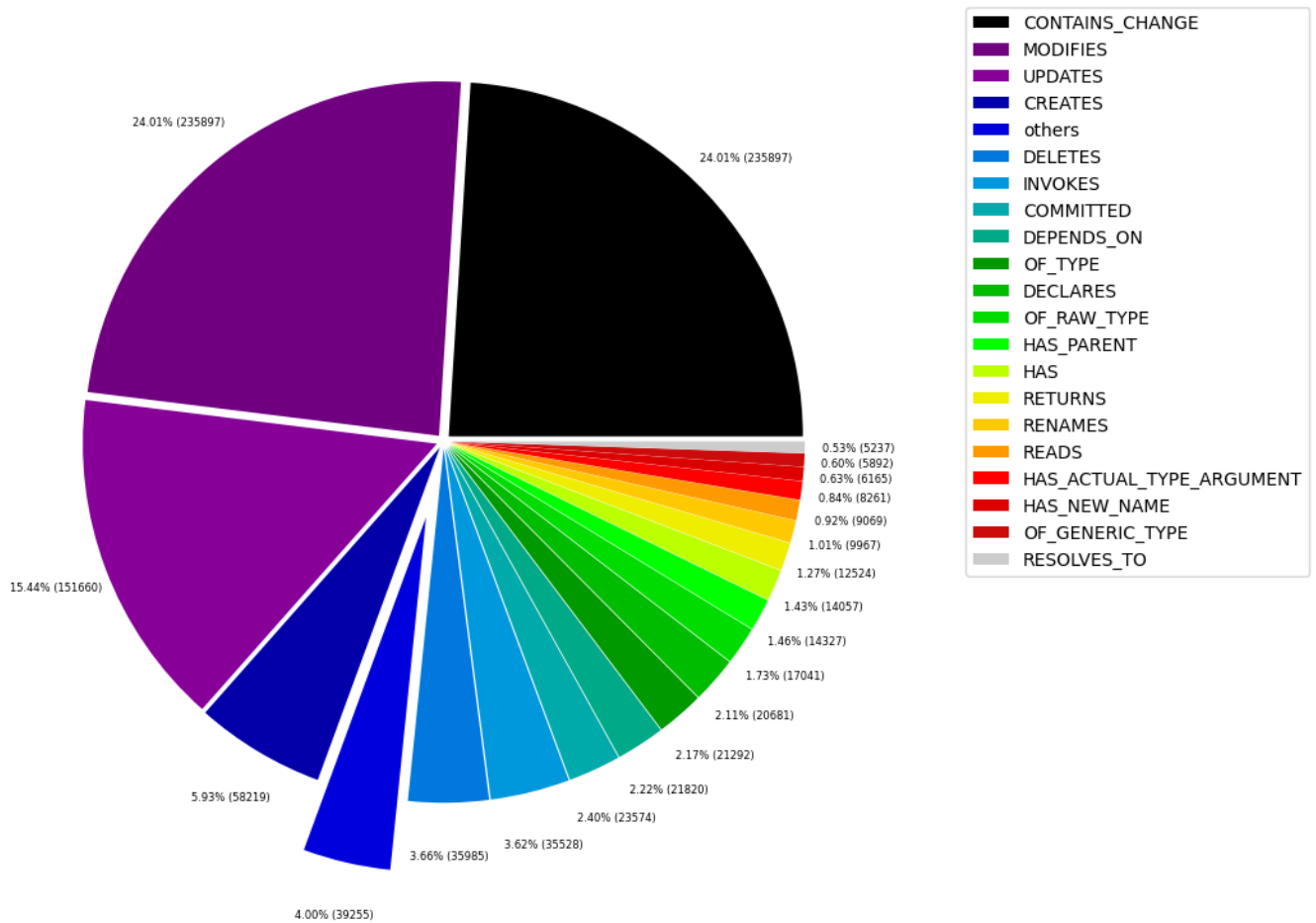- 0.63% (6165)
- 0.60% (5892)
- 0.53% (5237)

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.
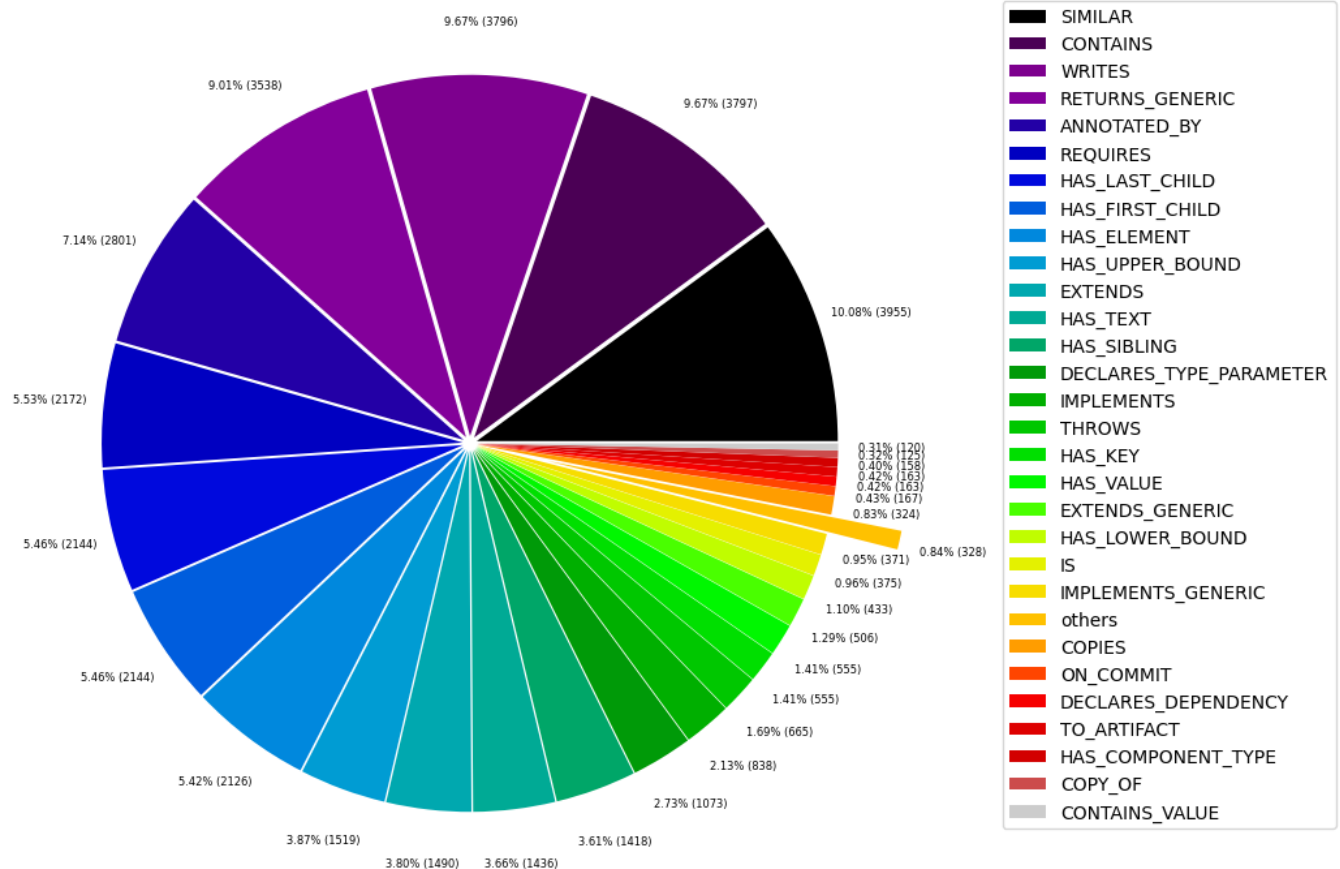
	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	HAS_PROPERTY	1	0.000102
1	THROWS_GENERIC	5	0.000509
2	EXCLUDES	5	0.000509
3	DESCRIBES	9	0.000916
4	HAS_ROOT_ELEMENT	11	0.001120
5	HAS_GOAL	16	0.001629
6	HAS_EXECUTION	16	0.001629
7	OF_NAMESPACE	18	0.001832
8	HAS_ATTRIBUTE	18	0.001832
9	INCLUDES_CONCEPT	19	0.001934
10	USES_PLUGIN	21	0.002138
11	REQUIRES_TYPE_PARAMETER	21	0.002138
12	IS_ARTIFACT	21	0.002138
13	HAS_CONFIGURATION	21	0.002138
14	HAS_HEAD	26	0.002647
15	REQUIRES_CONCEPT	28	0.002850
16	DECLARES_NAMESPACE	36	0.003665
17	HAS_DEFAULT	36	0.003665
18	CONTAINS_VALUE	120	0.012216
19	COPY_OF	125	0.012725
20	HAS_COMPONENT_TYPE	158	0.016084
21	TO_ARTIFACT	163	0.016593
22	DECLARES_DEPENDENCY	163	0.016593
23	ON_COMMIT	167	0.017000
24	COPIES	324	0.032982
25	IMPLEMENTS_GENERIC	371	0.037767
26	IS	375	0.038174
27	HAS_LOWER_BOUND	433	0.044078
28	EXTENDS_GENERIC	506	0.051509
29	HAS_VALUE	555	0.056497

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% (3796)
9.01% (3538)
9.67% (3797)
7.14% (2801)
10.08% (3955)
5.53% (2172)
5.46% (2144)
0.31% (120)
0.32% (125)
0.40% (158)
0.42% (163)
0.42% (163)
0.43% (167)
0.83% (324)
5.46% (2144)
0.84% (328)
0.95% (371)
0.96% (375)
5.42% (2126)
1.10% (433)
1.29% (506)
1.41% (555)
1.41% (555)
3.87% (1519)
1.69% (665)
3.80% (1490)
3.66% (1436)
2.13% (838)
3.61% (1418)
2.73% (1073)

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]	235897	11787	
1	[Git, Change]	MODIFIES	[File, Git]	235897	235897	
2	[Git, Change]	UPDATES	[File, Git]	151660	235897	
3	[Git, Change]	CREATES	[File, Git]	58219	235897	
4	[Git, Change]	DELETES	[File, Git]	35985	235897	
5	[Java, ByteCode, Member, Method]	INVOKES	[Java, ByteCode, Member, Method]	21581	13095	
6	[Git, Commit]	HAS_PARENT	[Git, Commit]	14318	11787	
7	[Author, Git, Person]	COMMITTED	[Git, Commit]	11787	289	
8	[Committer, Git, Person]	COMMITTED	[Git, Commit]	11787	243	
9	[Git, Change]	RENAMES	[File, Git]	9967	235897	
10	[Java, ByteCode, Member, Method]	HAS	[Java, ByteCode, Parameter]	8297	13095	
11	[Java, ByteCode, Member, Method]	READS	[Java, ByteCode, Member, Field]	8140	13095	
12	[Java, ByteCode, Parameter]	OF_TYPE	[Type, File, Java, ByteCode, JavaType]	6335	12968	
13	[File, Git]	HAS_NEW_NAME	[File, Git]	6165	10598	
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, Member, Constructor, Method]	WRITES	[Java, ByteCode, Member, Field]	2423	2045	
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]	2109	2045	
23	[Java, ByteCode, Member, Method]	RETURNS	[Type, File, Java, ByteCode, JavaType]	2087	13095	
24	[Java, ByteCode, Member, Method]	INVOKES	[Java, ByteCode, Member, Constructor, Method]	2032	13095	
25	[Java, ByteCode, Member, Constructor, Method]	HAS	[Java, ByteCode, Parameter]	2021	2045	
26	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, Bound]	2020	12968	
27	[Java, ByteCode, Member, Method, Lambda]	INVOKES	[Java, ByteCode, Member, Method]	1866	931	
28	[Java, ByteCode, Member, Constructor, Method]	INVOKES	[Java, ByteCode, Member, Method]	1795	2045	
29	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound]	1792	7154	

Graph Density

```
total_number_of_nodes (vertices): 324063
total_number_of_relationships (edges): 982348
-> total directed graph density: 9.354224940484566e-06
-> total directed graph density in percent: 0.0009354224940484566
```