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	[Java, ByteCode, Member, Method]	13193	20.216369
1	[Java, ByteCode, Parameter]	13029	19.965062
2	[Java, ByteCode, Bound, ParameterizedType]	7176	10.996184
3	[Java, ByteCode, Bound]	7118	10.907308
4	[Java, ByteCode, Member, Field]	3505	5.370907
5	[Java, ByteCode, Bound, WildcardType]	2908	4.456090
6	[Java, Value, ByteCode, Annotation]	2822	4.324308
7	[Xml, Element]	2144	3.285371
8	[Java, ByteCode, Member, Method, Constructor]	2052	3.144394
9	[Xml, Text]	1436	2.200463
10	[Java, ByteCode, Bound, TypeVariable]	1096	1.679462
11	[Java, ByteCode, Member, Method, Lambda]	942	1.443479
12	[Type, File, Java, ByteCode, ResolvedDuplicate...	899	1.377588
13	[Type, File, Java, ByteCode, Class]	864	1.323955
14	[Type, File, Java, ByteCode, JavaType]	748	1.146202
15	[Java, Value, ByteCode, Primitive]	652	0.999096
16	[Java, ByteCode, GenericDeclaration, Member, M...	569	0.871910
17	[Json, Key]	568	0.870378
18	[Value, Json, Scalar]	551	0.844328
19	[Type, File, Java, ByteCode, ExternalType]	396	0.606813
20	[Value, Array]	267	0.409139
21	[Type, File, Java, ByteCode, Class, GenericDec...	236	0.361636
22	[Value, Property]	202	0.309536
23	[Type, File, Java, ByteCode, Interface]	188	0.288083
24	[Java, Value, ByteCode, Class]	172	0.263565
25	[Maven, Dependency]	163	0.249774
26	[Java, ByteCode, Bound, GenericArrayType]	158	0.242112
27	[Java, Value, ByteCode, Enum]	150	0.229853
28	[Package, File, Directory, Java]	139	0.212997
29	[Value, Json, Object]	135	0.206868

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:
- ['Java', 'ByteCode', 'Member', 'Method']
- ['Java', 'ByteCode', 'Parameter']
- ['Java', 'ByteCode', 'Bound', 'ParameterizedType']
- ['Java', 'ByteCode', 'Bound']
- ['Java', 'ByteCode', 'Member', 'Field']
- ['Java', 'ByteCode', 'Bound', 'WildcardType']
- ['Java', 'Value', 'ByteCode', 'Annotation']
- others
- ['Xml', 'Element']
- ['Java', 'ByteCode', 'Member', 'Method', 'Constructor']
- ['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', 'GenericDeclaration', 'Member', 'Method']
- ['Json', 'Key']
- ['Value', 'Json', 'Scalar']
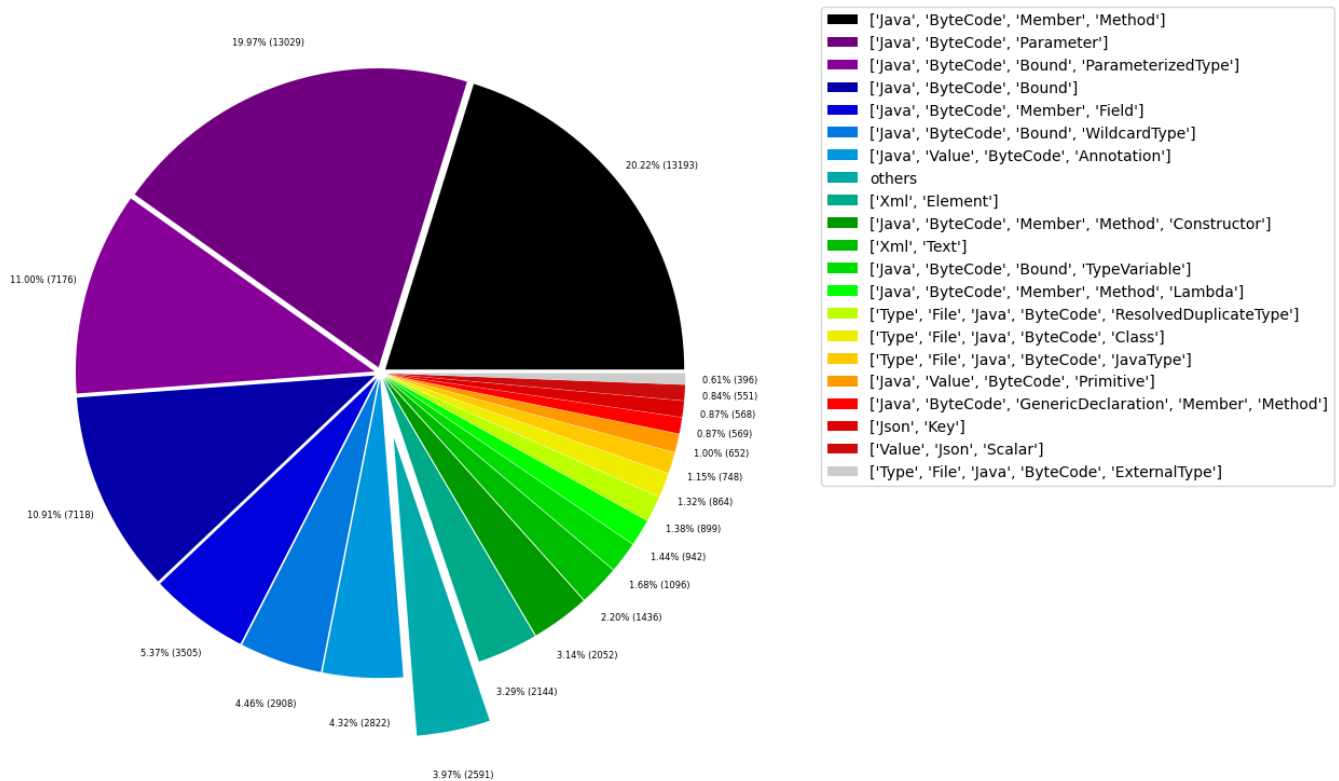- ['Type', 'File', 'Java', 'ByteCode', 'ExternalType']

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	0.001532
1	[File, TS, Scan]	1	0.001532
2	[Package, File, Json, NPM]	1	0.001532
3	[File, Json]	2	0.003065
4	[File]	3	0.004597
5	[Java, ByteCode, GenericDeclaration, Member, M...	4	0.006129
6	[Maven, Exclusion]	5	0.007662
7	[Value, Array, Json]	6	0.009194
8	[Dependency, NPM]	7	0.010726
9	[Type, File, Java, ByteCode, Void]	9	0.013791
10	[File, Maven, Xml, Pom, Document]	9	0.013791
11	[Java, ManifestSection]	9	0.013791
12	[File, Java, Manifest]	9	0.013791
13	[Artifact, File, Jar, Archive, Zip, Java]	9	0.013791
14	[File, Java, ServiceLoader]	10	0.015324
15	[File, Java, Properties]	12	0.018388
16	[Maven, PluginExecution]	16	0.024518
17	[Maven, ExecutionGoal]	16	0.024518
18	[Xml, Attribute]	18	0.027582
19	[jQAssistant, Rule, Concept]	19	0.029115
20	[Maven, Configuration]	21	0.032179
21	[Maven, Plugin]	21	0.032179
22	[Type, File, Java, ByteCode, Enum]	28	0.042906
23	[Type, File, Java, ByteCode, PrimitiveType]	29	0.044438
24	[Xml, Namespace]	36	0.055165
25	[Type, File, Java, ByteCode, Annotation]	43	0.065891
26	[File, Directory]	47	0.072021
27	[Type, File, Java, ByteCode, GenericDeclaratio...	85	0.130250
28	[Artifact, Maven]	92	0.140977
29	[Type, File, Java, ByteCode, ExternalAnnotatio...	93	0.142509

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:
- ['Value', 'Array']
- ['Type', 'File', 'Java', 'ByteCode', 'Class', 'GenericDeclaration']
- ['Value', 'Property']
- ['Type', 'File', 'Java', 'ByteCode', 'Interface']
- ['Java', 'Value', 'ByteCode', 'Class']
- ['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']
- others
- ['Type', 'File', 'Java', 'ByteCode', 'PrimitiveType']
- ['Type', 'File', 'Java', 'ByteCode', 'Enum']
- ['Maven', 'Plugin']
- ['Maven', 'Configuration']
- ['jQAssistant', 'Rule', 'Concept']
- ['Xml', 'Attribute']
- ['Maven', 'PluginExecution']
- ['Maven', 'ExecutionGoal']
- ['File', 'Java', 'Properties']
- ['File', 'Java', 'ServiceLoader']
- ['Type', 'File', 'Java', 'ByteCode', 'Void']
- ['Java', 'ManifestSection']
- ['File', 'Maven', 'Xml', 'Pom', 'Document']
- ['File', 'Java', 'Manifest']
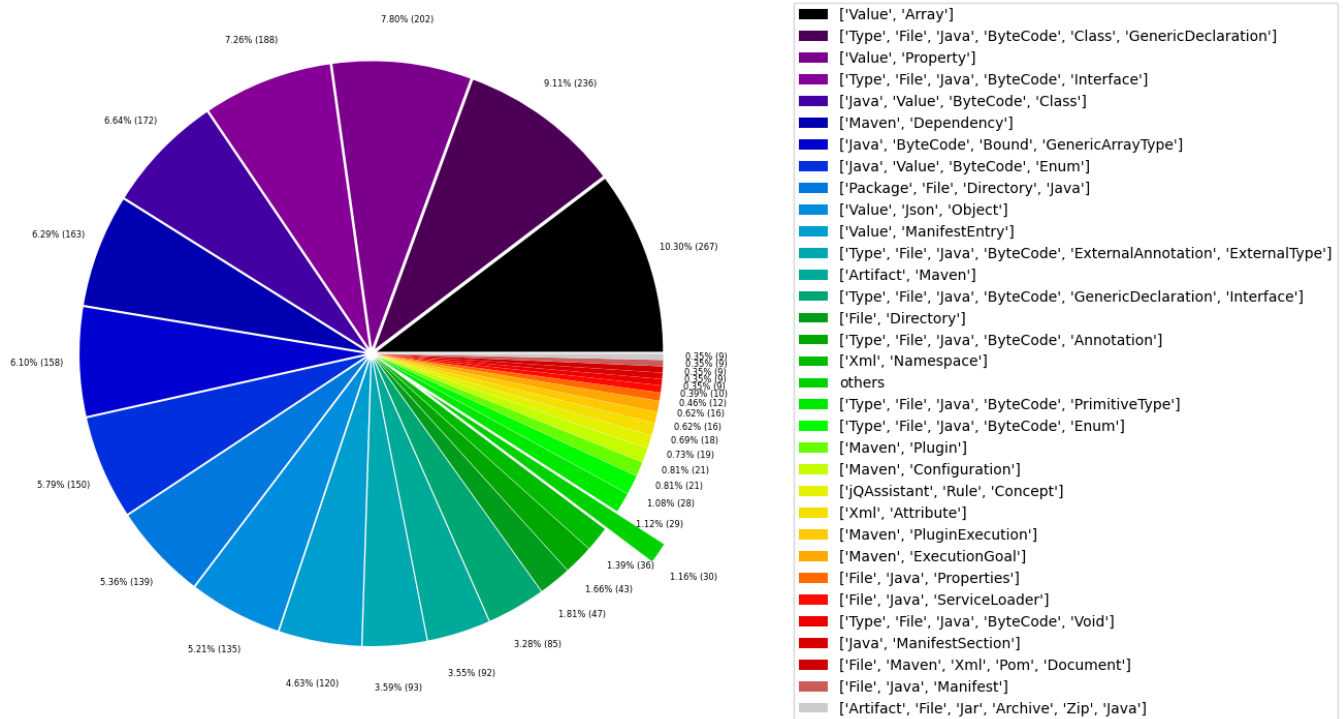- ['Artifact', 'File', 'Jar', 'Archive', 'Zip', 'Java']

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	Java	59352	90.948375
1	ByteCode	59164	90.660292
2	Member	20265	31.053188
3	Bound	18456	28.281157
4	Method	16760	25.682281
5	Parameter	13029	19.965062
6	ParameterizedType	7176	10.996184
7	Value	5077	7.779770
8	File	3860	5.914893
9	Xml	3643	5.582372
10	Type	3618	5.544063
11	Field	3505	5.370907
12	WildcardType	2908	4.456090
13	Annotation	2865	4.390199
14	Element	2144	3.285371
15	Constructor	2056	3.150523
16	Text	1436	2.200463
17	Class	1272	1.949156
18	Json	1263	1.935365
19	TypeVariable	1096	1.679462
20	Lambda	942	1.443479
21	ResolvedDuplicateType	899	1.377588
22	GenericDeclaration	894	1.369926
23	JavaType	748	1.146202
24	Primitive	652	0.999096
25	Key	568	0.870378
26	Scalar	551	0.844328
27	ExternalType	489	0.749322
28	Maven	343	0.525598
29	Array	273	0.418333
30	Interface	273	0.418333
31	Property	202	0.309536
32	Directory	186	0.285018
33	Enum	178	0.272759
34	Dependency	170	0.260500
35	GenericArrayType	158	0.242112
36	Package	140	0.214530
37	Object	135	0.206868
38	ManifestEntry	120	0.183883
39	Artifact	101	0.154768

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
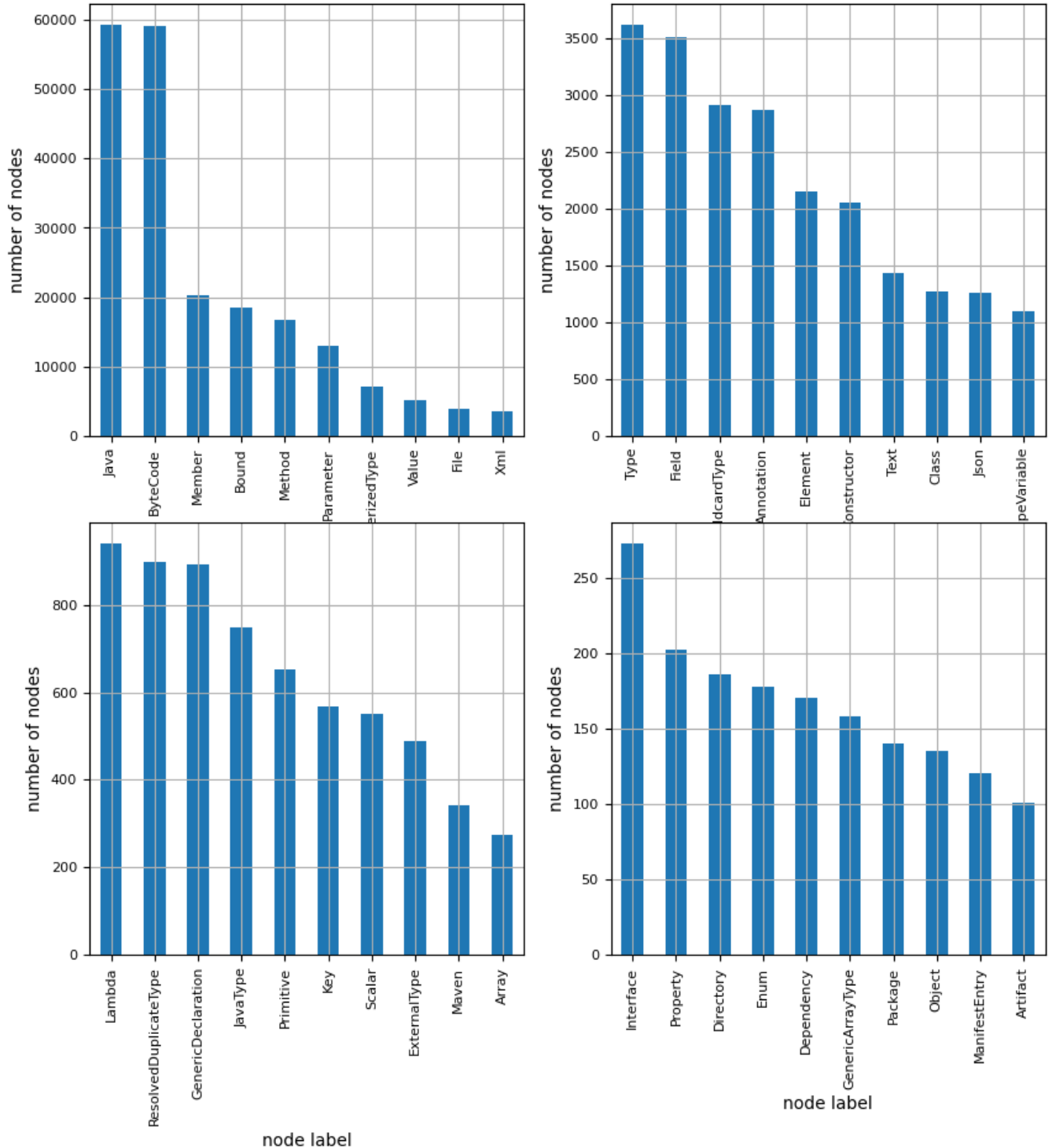
Relationship Types

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: 208910
```

	relationshipType	nodesWithThatRelationshipType	nodesWithThatRelationshipTypePercent
0	INVOKES	35697	17.087262
1	DEPENDS_ON	21931	10.497822
2	OF_TYPE	21394	10.240774
3	DECLARES	20710	9.913360
4	OF_RAW_TYPE	17093	8.181992
5	HAS	14125	6.761285
6	RETURNS	12578	6.020774
7	READS	9164	4.386578
8	HAS_ACTUAL_TYPE_ARGUMENT	8288	3.967259
9	OF_GENERIC_TYPE	5906	2.827055
10	SIMILAR	3977	1.903691
11	CONTAINS	3823	1.829975
12	WRITES	3818	1.827581
13	RETURNS_GENERIC	3545	1.696903
14	ANNOTATED_BY	2810	1.345077
15	RESOLVES_TO	2560	1.225408
16	REQUIRES	2174	1.040640
17	HAS_FIRST_CHILD	2144	1.026279
18	HAS_LAST_CHILD	2144	1.026279
19	HAS_ELEMENT	2126	1.017663
20	HAS_UPPER_BOUND	1523	0.729022
21	EXTENDS	1498	0.717055
22	HAS_TEXT	1436	0.687377
23	HAS_SIBLING	1418	0.678761
24	THROWS	1357	0.649562
25	DECLARES_TYPE_PARAMETER	1075	0.514576
26	IMPLEMENTS	843	0.403523
27	HAS_KEY	568	0.271887
28	HAS_VALUE	568	0.271887
29	EXTENDS_GENERIC	508	0.243167

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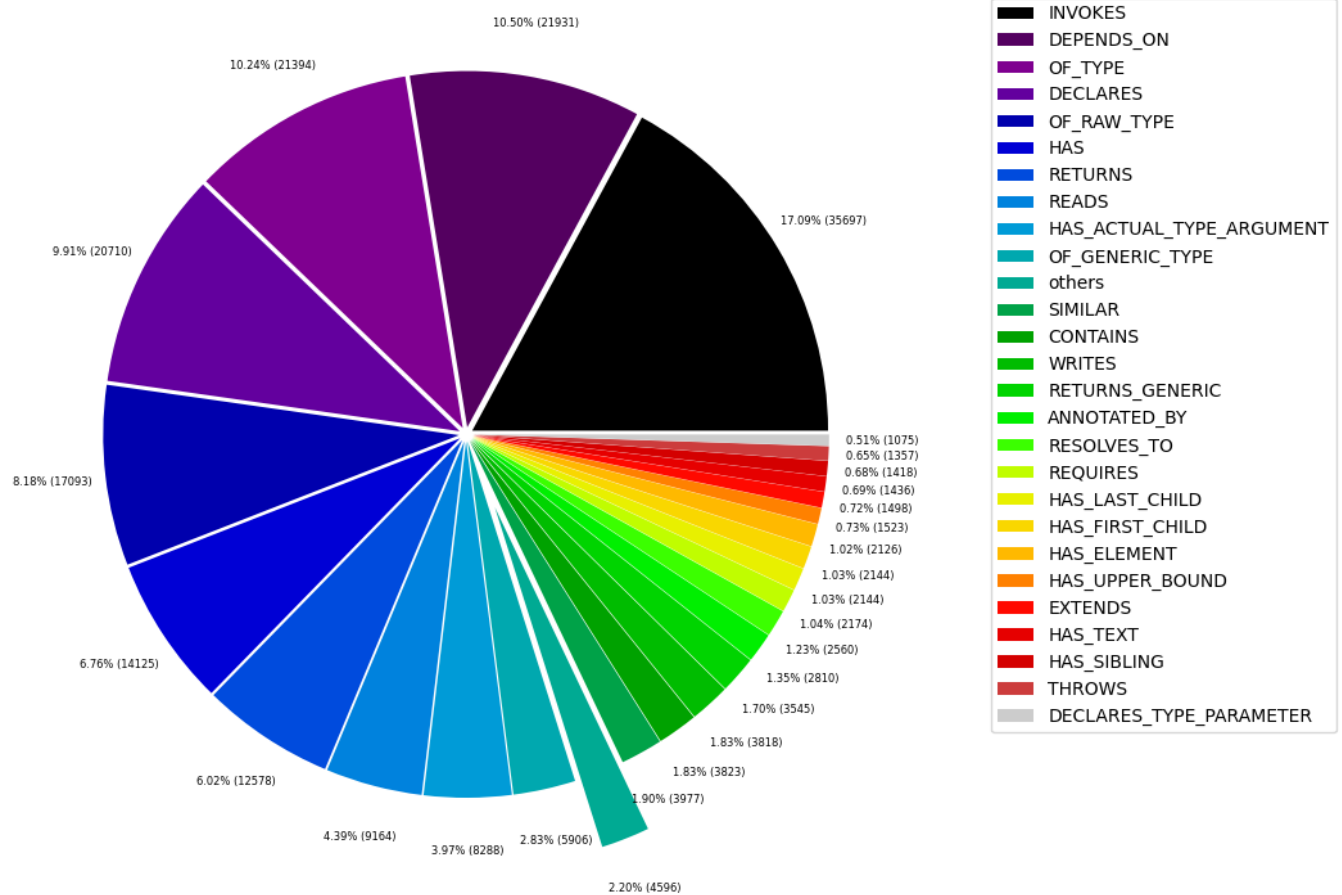
Relationship types (more than 0.5% overall)

10.50% (21931)
10.24% (21394)
9.91% (20710)
8.18% (17093)
6.76% (14125)
6.02% (12578)
4.39% (9164)
3.97% (8288)
2.83% (5906)
2.20% (4596)
1.90% (3977)
1.83% (3823)
1.83% (3818)
1.70% (3545)
1.35% (2810)
1.23% (2560)
1.04% (2174)
1.03% (2144)
1.03% (2144)
1.02% (2126)
0.73% (1523)
0.72% (1498)
0.69% (1436)
0.68% (1418)
0.65% (1357)
0.51% (1075)
17.09% (35697)

Legend:
- INVOKES
- DEPENDS_ON
- OF_TYPE
- DECLARES
- OF_RAW_TYPE
- HAS
- RETURNS
- READS
- HAS_ACTUAL_TYPE_ARGUMENT
- OF_GENERIC_TYPE
- others
- SIMILAR
- CONTAINS
- WRITES
- RETURNS_GENERIC
- ANNOTATED_BY
- RESOLVES_TO
- REQUIRES
- HAS_LAST_CHILD
- HAS_FIRST_CHILD
- HAS_ELEMENT
- HAS_UPPER_BOUND
- EXTENDS
- HAS_TEXT
- HAS_SIBLING
- THROWS
- DECLARES_TYPE_PARAMETER

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	0.000479
1	THROWS_GENERIC	5	0.002393
2	EXCLUDES	5	0.002393
3	DECLARES_DEV_DEPENDENCY	7	0.003351
4	HAS_PARENT	9	0.004308
5	DESCRIBES	9	0.004308
6	HAS_ROOT_ELEMENT	12	0.005744
7	HAS_GOAL	16	0.007659
8	HAS_EXECUTION	16	0.007659
9	OF_NAMESPACE	18	0.008616
10	HAS_ATTRIBUTE	18	0.008616
11	INCLUDES_CONCEPT	19	0.009095
12	HAS_CONFIGURATION	21	0.010052
13	USES_PLUGIN	21	0.010052
14	REQUIRES_TYPE_PARAMETER	21	0.010052
15	IS_ARTIFACT	21	0.010052
16	REQUIRES_CONCEPT	28	0.013403
17	HAS_DEFAULT	36	0.017232
18	DECLARES_NAMESPACE	36	0.017232
19	CONTAINS_VALUE	121	0.057920
20	HAS_COMPONENT_TYPE	158	0.075631
21	TO_ARTIFACT	163	0.078024
22	DECLARES_DEPENDENCY	163	0.078024
23	IMPLEMENTS_GENERIC	373	0.178546
24	IS	377	0.180460
25	HAS_LOWER_BOUND	435	0.208224
26	EXTENDS_GENERIC	508	0.243167
27	HAS_VALUE	568	0.271887
28	HAS_KEY	568	0.271887
29	IMPLEMENTS	843	0.403523

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>
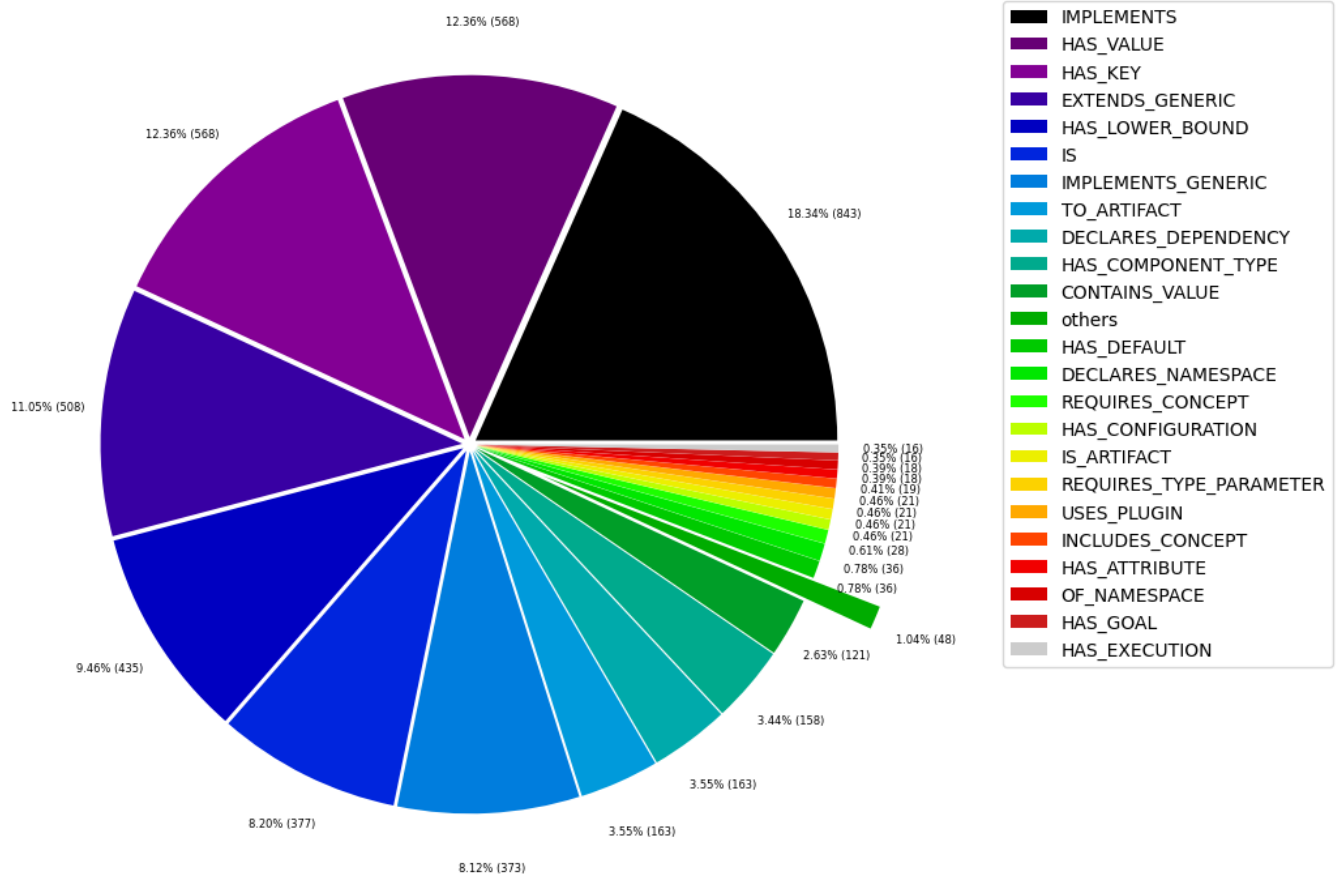
Node labels with their relationships

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	[Java, ByteCode, Member, Method]	INVOKES	[Java, ByteCode, Member, Method]	21797	13099	
1	[Java, ByteCode, Member, Method]	HAS	[Java, ByteCode, Parameter]	8362	13099	
2	[Java, ByteCode, Member, Method]	READS	[Java, ByteCode, Member, Field]	8218	13099	
3	[Java, ByteCode, Parameter]	OF_TYPE	[Type, File, Java, ByteCode, JavaType]	6371	13029	
4	[Type, File, Java, ByteCode, Class]	DECLARES	[Java, ByteCode, Member, Method]	5103	814	
5	[Type, File, Java, ByteCode, Class]	DEPENDS_ON	[Type, File, Java, ByteCode, JavaType]	4480	814	
6	[Java, ByteCode, Bound]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3570	7118	
7	[Java, ByteCode, Bound, ParameterizedType]	OF_RAW_TYPE	[Type, File, Java, ByteCode, JavaType]	3053	7176	
8	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, WildcardType]	2908	7176	
9	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, Bound, ParameterizedType]	2657	13029	
10	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound, TypeVariable]	2454	7176	
11	[Java, ByteCode, Member, Method, Constructor]	WRITES	[Java, ByteCode, Member, Field]	2438	2052	
12	[Java, Value, ByteCode, Annotation]	OF_TYPE	[Type, File, Java, ByteCode, ExternalAnnotatio...]	2341	2822	
13	[Type, File, Java, ByteCode, Class]	DECLARES	[Java, ByteCode, Member, Field]	2203	814	
14	[Xml, Element]	HAS_ELEMENT	[Xml, Element]	2126	2144	
15	[Java, ByteCode, Member, Method, Constructor]	INVOKES	[Java, ByteCode, Member, Method, Constructor]	2123	2052	
16	[Type, File, Java, ByteCode, Class, GenericDec...]	DECLARES	[Java, ByteCode, Member, Method]	2116	231	
17	[Java, ByteCode, Member, Method]	RETURNS	[Type, File, Java, ByteCode, JavaType]	2091	13099	
18	[Java, ByteCode, Member, Method]	INVOKES	[Java, ByteCode, Member, Method, Constructor]	2032	13099	
19	[Java, ByteCode, Member, Method, Constructor]	HAS	[Java, ByteCode, Parameter]	2027	2052	
20	[Java, ByteCode, Parameter]	OF_GENERIC_TYPE	[Java, ByteCode, Bound]	2022	13029	
21	[Java, ByteCode, Member, Method, Lambda]	INVOKES	[Java, ByteCode, Member, Method]	1877	942	
22	[Java, ByteCode, Bound, ParameterizedType]	HAS_ACTUAL_TYPE_ARGUMENT	[Java, ByteCode, Bound]	1807	7176	
23	[Java, ByteCode, Member, Method, Constructor]	INVOKES	[Java, ByteCode, Member, Method]	1800	2052	
24	[Java, ByteCode, Member, Method]	RETURNS	[Type, File, Java, ByteCode, Void]	1787	13099	
25	[Java, ByteCode, Parameter]	ANNOTATED_BY	[Java, Value, ByteCode, Annotation]	1731	13029	
26	[Java, ByteCode, GenericDeclaration, Member, M...]	INVOKES	[Java, ByteCode, Member, Method]	1723	555	
27	[Type, File, Java, ByteCode, Class]	SIMILAR	[Type, File, Java, ByteCode, Class]	1578	814	
28	[Type, File, Java, ByteCode, Class, GenericDec...]	DEPENDS_ON	[Type, File, Java, ByteCode, JavaType]	1555	231	

	sourceLabels	relationType	targetLabels	numberOfRelationships	numberOfNodesWithSameLabelsAsSource	numberOfNodesWithS
29	[Type, File, Java, ByteCode, JavaType]	DECLARES	[Java, ByteCode, Member, Method]	1541	748	

Graph Density

```
total_number_of_nodes (vertices): 65259
total_number_of_relationships (edges): 208910
-> total directed graph density: 4.9055200478418084e-05
-> total directed graph density in percent: 0.004905520047841809
```