Queries and Results  
  
MATCH (r:Release)

WITH r, datetime({epochMillis:r.timestamp}) AS releaseDate

RETURN releaseDate.year AS YEAR, releaseDate.month AS MONTH, COUNT(r) AS ReleaseCount

ORDER BY ReleaseCount DESC  
  
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│YEAR│MONTH│ReleaseCount│

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│2024│3 │237371 │

├────┼─────┼────────────┤

│2024│5 │236466 │

├────┼─────┼────────────┤

│2023│3 │230071 │

├────┼─────┼────────────┤

│2024│6 │222219 │

├────┼─────┼────────────┤

│2024│4 │221439 │

├────┼─────┼────────────┤

│2023│11 │217518 │

├────┼─────┼────────────┤

│2022│3 │211965 │

├────┼─────┼────────────┤

│2024│2 │210490 │

├────┼─────┼────────────┤

│2024│7 │209291 │

├────┼─────┼────────────┤

│2022│11 │204684 │

├────┼─────┼────────────┤

│2024│1 │204294 │

├────┼─────┼────────────┤

│2023│5 │203053 │

├────┼─────┼────────────┤

│2023│8 │202825 │

├────┼─────┼────────────┤

│2021│12 │201790 │

├────┼─────┼────────────┤

│2023│6 │201645 │

├────┼─────┼────────────┤

│2023│7 │200994 │

├────┼─────┼────────────┤

│2022│1 │200783 │

├────┼─────┼────────────┤

│2023│4 │197903 │

MATCH (a:Artifact)-[r:relationship\_AR]->(re:Release)

RETURN a.id AS Artifact, COUNT(re) AS ReleaseCount

ORDER BY ReleaseCount DESC LIMIT 200

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│Artifact │ReleaseCount│

╞═══════════════════════════════════════════════════╪════════════╡

│"com.google.apis:google-api-services-adsense" │4639 │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.identity.apps:console" │3614 │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.identity.apps:myaccount" │3568 │

├───────────────────────────────────────────────────┼────────────┤

│"com.google.apis:google-api-services-youtubeAnalyti│3281 │

│cs" │ │

├───────────────────────────────────────────────────┼────────────┤

│"com.google.apis:google-api-services-genomics" │3158 │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:apimgt" │2969 │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:carbon-apimgt" │2969 │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:org.wso2.carbon.apimgt.core│2967 │

│" │ │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:apimgt-feature" │2967 │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:org.wso2.carbon.apimgt.core│2967 │

│.feature" │ │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:org.wso2.carbon.apimgt.rest│2956 │

│.api.publisher.feature" │ │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:org.wso2.carbon.apimgt.rest│2956 │

│.api.store.feature" │ │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:org.wso2.carbon.apimgt.rest│2952 │

│.api.admin.feature" │ │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:org.wso2.carbon.apimgt.thro│2927 │

│ttling.siddhi.extension" │ │

├───────────────────────────────────────────────────┼────────────┤

│"net.openhft:chronicle-bom" │2856 │

├───────────────────────────────────────────────────┼────────────┤

│"org.wso2.carbon.apimgt:org.wso2.carbon.apimgt.keym│2722 │

│gt.client" │ │

├───────────────────────────────────────────────────┼────────────┤

MATCH (a:Artifact)<-[d:dependency]-(re:Release)

RETURN a.id AS Artifact, COUNT(re) AS DependencyCount

ORDER BY DependencyCount DESC LIMIT 200

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│Artifact │DependencyCount│

╞══════════════════════════════════╪════════════╡

│"junit:junit" │2776154 │

├──────────────────────────────────┼────────────┤

│"org.slf4j:slf4j-api" │1966436 │

├──────────────────────────────────┼────────────┤

│"org.mockito:mockito-core" │1716315 │

├──────────────────────────────────┼────────────┤

│"org.scala-lang:scala-library" │1578793 │

├──────────────────────────────────┼────────────┤

│"org.assertj:assertj-core" │1098582 │

├──────────────────────────────────┼────────────┤

│"ch.qos.logback:logback-classic" │888641 │

├──────────────────────────────────┼────────────┤

│"com.google.guava:guava" │870311 │

├──────────────────────────────────┼────────────┤

│"com.fasterxml.jackson.core:jackso│860581 │

│n-databind" │ │

├──────────────────────────────────┼────────────┤

│"org.hamcrest:hamcrest-all" │701635 │

├──────────────────────────────────┼────────────┤

│"org.projectlombok:lombok" │667283 │

├──────────────────────────────────┼────────────┤

│"org.apache.commons:commons-lang3"│652146 │

├──────────────────────────────────┼────────────┤

│"commons-io:commons-io" │640219 │

├──────────────────────────────────┼────────────┤

│"org.jetbrains.kotlin:kotlin-stdli│575644 │

│b" │ │

├──────────────────────────────────┼────────────┤

│"org.apache.logging.log4j:log4j-co│522401 │

│re" │ │

├──────────────────────────────────┼────────────┤

│"org.junit.jupiter:junit-jupiter-a│465480 │

│pi" │ │

├──────────────────────────────────┼────────────┤

│"org.jetbrains.kotlin:kotlin-stdli│460984 │

│b-common" │ │

├──────────────────────────────────┼────────────┤

│"org.testng:testng" │459926 │

├──────────────────────────────────┼────────────┤

│"org.apache.logging.log4j:log4j-sl│448592 │

// Step 1: Match the Artifact and its Release relationships, collecting distinct releases early

MATCH (a:Artifact)<-[d:dependency]-(r:Release)

WITH a, COUNT(DISTINCT r) AS DependencyCount, COLLECT(r) AS releases

// Step 2: Match dependent artifacts on the release using the collected releases

UNWIND releases AS r

MATCH (r)<-[ra:relationship\_AR]-(ar:Artifact)

// Step 3: Return the Artifact ID, DependencyCount, and the number of dependent artifacts

RETURN a.id AS Artifact, DependencyCount, COUNT(DISTINCT ar) AS DependentArtifacts

|  |  |  |
| --- | --- | --- |
| Artifact | DependencyCount | DependentArtifacts |
| junit:junit | 2775545 | 152993 |
| org.slf4j:slf4j-api | 1965315 | 86288 |
| org.mockito:mockito-core | 1716125 | 49097 |
| org.scala-lang:scala-library | 1578767 | 81074 |
| org.assertj:assertj-core | 1098573 | 26342 |
| ch.qos.logback:logback-classic | 887369 | 39166 |
| com.google.guava:guava | 870262 | 36024 |
| com.fasterxml.jackson.core:jackson-databind | 860468 | 28885 |
| org.hamcrest:hamcrest-all | 701635 | 12040 |
| org.projectlombok:lombok | 667283 | 42359 |
| org.apache.commons:commons-lang3 | 652141 | 28482 |
| commons-io:commons-io | 640217 | 25740 |
| org.jetbrains.kotlin:kotlin-stdlib | 575644 | 47077 |
| org.apache.logging.log4j:log4j-core | 521214 | 14471 |
| org.junit.jupiter:junit-jupiter-api | 465476 | 24175 |
| org.jetbrains.kotlin:kotlin-stdlib-common | 460984 | 36541 |

MATCH (x:AddedValue)<-[ad]-(r)<-[ra]-(z:Artifact)

WHERE x.value CONTAINS 'CRITICAL\\'

WITH z, split(x.value, '},') AS rows

UNWIND rows AS row

WITH z, row, split(row, ']') AS parts

UNWIND parts AS part

WITH z, part, split(part, ',') AS subparts

WITH z, part, subparts[1] AS severity, subparts[2] AS name

WHERE severity CONTAINS 'CRITICAL\\'

WITH DISTINCT split(name, '"')[3] AS CVE, z.id AS artifactId

MATCH (re:Release)-[d]->(a:Artifact)-[ra]->(r:Release)

WHERE a.id = artifactId

RETURN CVE, artifactId, COUNT(DISTINCT re) AS NoOfDependents, COUNT(DISTINCT r) AS NoOfReleases

|  |  |  |  |
| --- | --- | --- | --- |
| CVE | artifactId | NoOfDependents | NoOfReleases |
| "CVE-2022-36944\" | "org.scala-lang:scala-library" | 1578767 | 210 |
| "CVE-2017-5929\" | "ch.qos.logback:logback-classic" | 887369 | 136 |
| "CVE-2018-19362\" | "com.fasterxml.jackson.core:jackson-databind" | 860468 | 199 |
| "CVE-2018-14720\" | "com.fasterxml.jackson.core:jackson-databind" | 860468 | 199 |
| "CVE-2017-7525\" | "com.fasterxml.jackson.core:jackson-databind" | 860468 | 199 |
| "CVE-2021-45046\" | "org.apache.logging.log4j:log4j-core" | 521214 | 65 |
| "CVE-2021-44228\" | "org.apache.logging.log4j:log4j-core" | 521214 | 65 |
| "CVE-2017-5645\" | "org.apache.logging.log4j:log4j-core" | 521214 | 65 |
| "CVE-2019-17571\" | "log4j:log4j" | 419791 | 14 |
| "CVE-2022-23305\" | "log4j:log4j" | 419791 | 14 |
| "CVE-2022-23307\" | "log4j:log4j" | 419791 | 14 |
| "CVE-2017-5929\" | "ch.qos.logback:logback-core" | 302015 | 136 |
| "CVE-2022-23221\" | "com.h2database:h2" | 278520 | 139 |
| "CVE-2021-42392\" | "com.h2database:h2" | 278520 | 139 |
| "CVE-2013-4366\" | "org.apache.httpcomponents:httpclient" | 278029 | 55 |
| "CVE-2022-22965\" | "org.springframework.boot:spring-boot-starter-web" | 241964 | 227 |
| "CVE-2016-1000027\" | "org.springframework:spring-web" | 225645 | 284 |
| "CVE-2018-1270\" | "org.springframework:spring-core" | 198851 | 284 |
| "CVE-2022-22965\" | "org.springframework:spring-beans" | 198033 | 277 |

// Step 1: Start with an artifact and find all its releases

MATCH (startArtifact:Artifact {id: "org.apache.logging.log4j:log4j-core"})-[:relationship\_AR]->(release1:Release)

// Step 2: Find distinct artifacts on which these releases depend, considering the targetVersion and excluding scope = 'test'

WITH startArtifact, release1

MATCH (release1)-[d1:dependency]->(dependentArtifact1:Artifact)

WHERE d1.scope <> 'test' // Exclude dependencies with scope = 'test'

WITH startArtifact, release1, d1.targetVersion AS targetVersion1, dependentArtifact1

WITH startArtifact, release1, COLLECT(DISTINCT {id: dependentArtifact1.id, targetVersion: targetVersion1}) AS artiList

// Step 3: For each artifact in artiList, find their releases and the artifacts they depend on

UNWIND artiList AS artifactInfo

MATCH (dependentArtifact1:Artifact {id: artifactInfo.id})-[:relationship\_AR]->(release2:Release)

WHERE release2.version = artifactInfo.targetVersion

MATCH (release2)-[d2:dependency]->(dependentArtifact2:Artifact)

WHERE d2.scope <> 'test' // Exclude dependencies with scope = 'test'

WITH startArtifact, release1, artifactInfo, release2, d2.targetVersion AS targetVersion2, dependentArtifact2, artiList

// Step 4: Check if any artifact from the second layer of dependencies (dependentArtifact2) is in artiList

WITH startArtifact, release1.id AS startingReleaseId, artifactInfo.id AS firstLayerArtifactId, artifactInfo.targetVersion AS firstLayerTargetVersion,release2.id AS firstLayerReleaseId, COLLECT(DISTINCT {id: dependentArtifact2.id, targetVersion: targetVersion2}) AS secondLayerArtifacts, artiList

// Step 5: Use UNWIND to compare IDs from artiList for duplicate dependencies

UNWIND artiList AS aId

WITH startArtifact, startingReleaseId, firstLayerArtifactId, firstLayerTargetVersion, firstLayerReleaseId, secondLayerArtifacts, aId

WITH startArtifact, startingReleaseId, firstLayerArtifactId, firstLayerTargetVersion, firstLayerReleaseId,[artifact IN secondLayerArtifacts WHERE artifact.id = aId.id] AS duplicateDependencies

// Step 6: Return artifacts with circular dependencies along with their release IDs and targetVersions

RETURN startArtifact.id AS StartingArtifact, startingReleaseId, firstLayerArtifactId AS FirstLayerArtifact,

firstLayerReleaseId, firstLayerTargetVersion, duplicateDependencies

|  |  |  |
| --- | --- | --- |
| startingReleaseId | firstLayerReleaseId | duplicateDependencies |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "com.fasterxml.jackson.dataformat:jackson-dataformat-xml:2.13.4" | [{id: "com.fasterxml.jackson.core:jackson-core", targetVersion: "2.13.4"}] |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "com.fasterxml.jackson.dataformat:jackson-dataformat-xml:2.13.4" | [{id: "com.fasterxml.woodstox:woodstox-core", targetVersion: "6.3.1"}] |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "com.fasterxml.jackson.dataformat:jackson-dataformat-xml:2.13.4" | [{id: "com.fasterxml.jackson.core:jackson-databind", targetVersion: "2.13.4"}] |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "org.apache.logging.log4j:log4j-api:2.19.0" | [{id: "org.osgi:org.osgi.core", targetVersion: "6.0.0"}] |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "com.conversantmedia:disruptor:1.2.15" | [{id: "org.slf4j:slf4j-api", targetVersion: "1.7.13"}] |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "com.fasterxml.jackson.dataformat:jackson-dataformat-yaml:2.13.4" | [{id: "com.fasterxml.jackson.core:jackson-core", targetVersion: "2.13.4"}] |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "com.fasterxml.jackson.dataformat:jackson-dataformat-yaml:2.13.4" | [{id: "com.fasterxml.jackson.core:jackson-databind", targetVersion: "2.13.4"}] |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "org.apache.commons:commons-compress:1.21" | [{id: "org.osgi:org.osgi.core", targetVersion: "6.0.0"}] |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "org.apache.kafka:kafka-clients:1.1.1" | [{id: "org.slf4j:slf4j-api", targetVersion: "1.7.25"}] |
| "org.apache.logging.log4j:log4j-core:2.19.0" | "com.fasterxml.jackson.core:jackson-databind:2.13.4" | [{id: "com.fasterxml.jackson.core:jackson-core", targetVersion: "2.13.4"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "com.conversantmedia:disruptor:1.2.15" | [{id: "org.slf4j:slf4j-api", targetVersion: "1.7.13"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "org.apache.kafka:kafka-clients:3.6.1" | [{id: "org.slf4j:slf4j-api", targetVersion: "1.7.36"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "biz.aQute.bnd:biz.aQute.bnd.annotation:7.0.0" | [{id: "org.osgi:osgi.annotation", targetVersion: "8.1.0"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "org.jctools:jctools-core:4.0.3" | [{id: "org.osgi:osgi.annotation", targetVersion: "8.0.0"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "com.fasterxml.jackson.dataformat:jackson-dataformat-xml:2.16.1" | [{id: "com.fasterxml.jackson.core:jackson-databind", targetVersion: "2.16.1"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "com.fasterxml.jackson.dataformat:jackson-dataformat-xml:2.16.1" | [{id: "com.fasterxml.jackson.core:jackson-core", targetVersion: "2.16.1"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "com.fasterxml.jackson.dataformat:jackson-dataformat-yaml:2.16.1" | [{id: "com.fasterxml.jackson.core:jackson-databind", targetVersion: "2.16.1"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "com.fasterxml.jackson.dataformat:jackson-dataformat-yaml:2.16.1" | [{id: "com.fasterxml.jackson.core:jackson-core", targetVersion: "2.16.1"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "com.fasterxml.jackson.core:jackson-databind:2.16.1" | [{id: "com.fasterxml.jackson.core:jackson-core", targetVersion: "2.16.1"}] |
| "org.apache.logging.log4j:log4j-core:2.23.0" | "org.apache.commons:commons-compress:1.25.0" | [{id: "org.osgi:org.osgi.core", targetVersion: "6.0.0"}] |