



UNIVERSITY OF
GEORGIA

Directions to a Degree: the Efficient Visualization and Analysis of Curriculum Data using Network Graphs in R



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Contributing Presenter: Andrew Westbrook

Who, What, Why

- VP for Instruction:
 - Student Affairs, Registrar, etc
 - Curriculum Management & Coordination



Dr. Bill Vencill

Associate VP for Instruction, Professor



Who, What, Why

- VP for Instruction:
 - Student Affairs, Registrar, etc
 - Curriculum Management & Coordination
- Curricular Analytics
 - Metrics on Degree Plans using pre-requisite relationships



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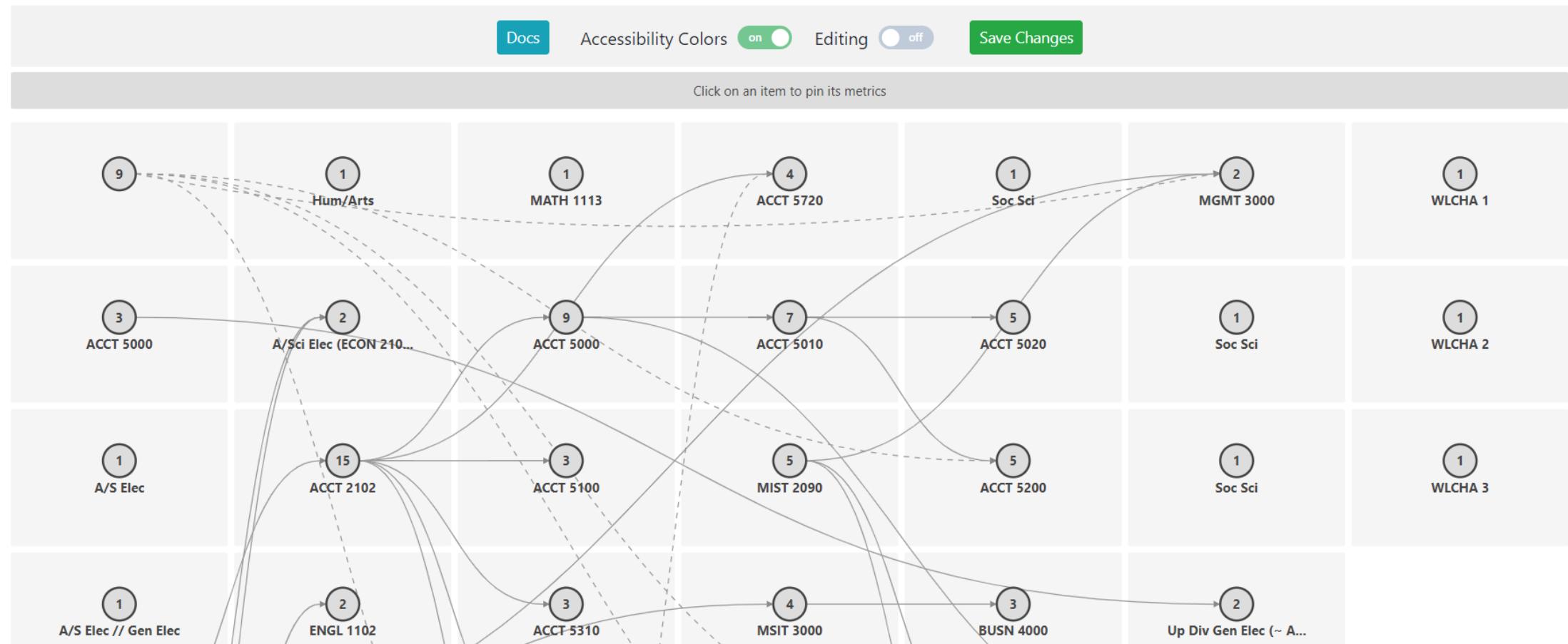


Accounting

Curricular Complexity: 150

Credit Hours: 119

Organization: University of Georgia



Who, What, Why

- VP for Instruction:
 - Student Affairs, Registrar, etc
 - Curriculum Management & Coordination
- Curricular Analytics
 - Metrics on Degree Plans using pre-requisite relationships
- Understand & Improve Curricula
 - Reduce Complexity
 - Manage Different Types of Programs



Dr. Bill Vencill
Associate VP for Instruction, Professor

Part I: Status Quo vs Graphing Networks

Status Quo

The screenshot shows a red header bar with the "UGA BULLETIN" logo and navigation links for "MAJORS", "COURSES", and "UNIVERSITY INFORMATION". Below the header, the page title is "Accounting - B.B.A.". A section titled "DEGREE REQUIREMENTS" contains a link to "Entrance Requirements for the Major". Another section titled "General Education Core Curriculum (Selected with the advice of an academic advisor)" lists "Area I: English", "Area VI", and "Major Requirements". It notes that "College-wide Requirements" must be satisfied and specifies "TOTAL DEGREE HOURS" as 129 hours. A dropdown menu at the bottom left is set to "Basic View". The main content area begins with "I. FOUNDATION COURSES (9 HOURS)" followed by a list of required courses.

Home | Majors
Accounting - B.B.A.
DEGREE REQUIREMENTS
[Entrance Requirements for the Major](#)
**General Education Core Curriculum
(Selected with the advice of an academic advisor)**
Area I: English
Area VI
Major Requirements
College-wide Requirements must be satisfied in order to graduate with this major.
TOTAL DEGREE HOURS 129 hours

Basic View ▾

I. FOUNDATION COURSES (9 HOURS)

[ENGL 1101](#) or [ENGL 1101E](#) or [ENGL 1101S](#)
[ENGL 1102](#) or [ENGL 1102E](#) or [ENGL 1103](#) or [ENGL 1050H](#) or
[ENGL 1060H](#)
[MATH 1101](#) or [MATH 1113](#) or [MATH 1113E](#) or [MATH 2200](#) or
[MATH 2250](#) or [MATH 2250E](#) or [MATH 2300H](#) or [MATH 2400](#) or
[MATH 2400H](#) or [MATH 2410](#) or [MATH 2410H](#) or [STAT 2000](#)
or [STAT 2000E](#)



Status Quo



DEGREE REQUIREMENTS

Entrance Requirements for the Major

General Education Core Curriculum (Selected with the advice of an academic advisor)

Area II: English

Area VI

Major Requirements

College-wide Requirements must be satisfied in order to graduate with this major.

TOTAL DEGREE HOURS 129 hours

Basic View

I. FOUNDATION COURSES (9 HOURS)

ENGL 1101 or ENGL 1101E or ENGL 1101S

ENGL 1102 or ENGL 1102E or ENGL 1103 or ENGL 1050H or
ENGL 1060H

MATH 1101 or MATH 1113 or MATH 1113E or MATH 2200 or
MATH 2250 or MATH 2250E or MATH 2300H or MATH 2400 or
MATH 2400H or MATH 2410 or MATH 2410H or STAT 2000
or STAT 2000E

II. SCIENCES (7-8 HOURS)

At least one of the physical science or life science courses must include a laboratory.

Physical Sciences (3-4 hours)

No preferred courses for this area. See Core Curriculum view.

Life Sciences (3-4 hours)



Status Quo



World Languages and Global Culture (9 hours)

No preferred courses for this area. See Core Curriculum view.

Humanities and the Arts (9 hours)

Preferred Course(s): [COMM 1110](#) or [COMM 1500](#) or [COMM 1500E](#) or [COMM 2150H](#) or [COMM 2500H](#)

■ V. SOCIAL SCIENCES (9 HOURS)

- Students who have not met the Georgia and U.S. Constitution requirement by examination should enroll in [POLS 1101](#) or [POLS 1101E](#) or [POLS 1101H](#).
- A passing grade on an examination on the history of the United States and Georgia is required to satisfy the United States and Georgia History Requirement for all persons receiving a baccalaureate degree from the University, unless exempted by one of the following courses: [HIST 2111](#), [HIST 2111E](#), [HIST 2111H](#), [HIST 2112](#), [HIST 2112E](#), [HIST 2112H](#), [HIST 3080H](#). Examinations are given at University Testing Services. Reexamination is permitted. Contact University Testing Services at (706) 542-3183 for information.

Preferred Course(s): [ECON 2100](#) or [ECON 2100E](#) or [ECON 2200](#) or [ECON 2200E](#) or [ECON 2200H](#)

Area VI

[ACCT 2101](#) or [ACCT 2101H](#) or [ACCT 2101E](#)
[ACCT 2102](#) or [ACCT 2102H](#) or [ACCT 2102E](#)
[ECON 2105](#) or [ECON 2105H](#) or [ECON 2105E](#)



Status Quo

Accounting (BBA) 4-Year Degree Plan

This document is offered as an aid only for planning a Terry College of Business degree plan. Many factors affect a course scheduling sequence. Additional General Elective hours may be needed to meet the UGA 120-hour requirement (not including PEDB credit). An honors equivalent or study abroad coursework may satisfy requirements in the 4-year degree plan. See UGA Bulletin <http://www.bulletin.uga.edu/> for details.

YEAR ONE

Fall Courses	Hours	Spring Courses	Hours
ENGL 1101 (Area I)	3	ENGL 1102 (Area I)	3
MATH 1113 (Area I; <i>Terry entrance requirement</i>)	3	Quantitative Reasoning (Area III)	3
Science (Area II)	3	Lab Science (Area II)	4
World Language/Culture (Area IV)	3	World Language/Culture (Area IV)	3
Social Science (Area V)	3	Social Science (Area V)	3
Total	15	Total	16

YEAR TWO

APPLY TO TERRY MAJOR DURING THIS TERM ↓



Status Quo

YEAR FOUR

Fall Courses	Hours	Spring Courses	Hours
ACCT 5200	3	ACCT 5020	3
ACCT 5100	3	Upper Division General Elective	3
Upper Division General Elective (<i>Terry prefix in residence</i>)	3	Upper Division General Elective	3
Arts and Sciences Elective (<i>ECON 2100 or 2200 preferred</i>)	3	Arts and Sciences Elective	3
Arts and Sciences Elective	3	PEDB (may be added to any semester)	1
Total	15	Total	13

Entrance Requirements to Major

Completion of Core Areas I-VI • good academic standing (2.0 cumulative UGA GPA) • overall GPA of 2.6 • completed MATH 1113 • completed or currently enrolled in BUSN 3000

Terry College and UGA Graduation Requirements

Terry College Residency (30 hours of Terry coursework satisfied through UGA) • Communications requirement (COMM 1100 or COMM 1500 or COMM 3200 or BUSN 4900)
• Terry Economics requirement (ECON 2100 or ECON 2200) • 2.00 Terry College GPA (Terry College prefix courses) • United States and Georgia History • Federal and Georgia Constitution • Environmental Awareness • Cultural Diversity • UGA Residency • Physical Education• Experiential Learning

Accounting and International Business (IB) Comajor

Students considering a Terry IB comajor must either be enrolled in or have completed the third (or higher) level of the same language • earn a minimum grade of "B" (3.0) in each language course • earn a minimum grade of "B" (3.0) in ACCT 2101 • earn an average grade of "B" (3.0) in all ECON courses combined

Fall 2022



UNIVERSITY OF GEORGIA

Status Quo

The screenshot shows the DegreeWorks student planner for Doe, Edward. The top navigation bar includes links for Athena, Portal, FAQ, Help, Print, Exception Management, Template Management, and Log Out. The search bar shows UGA ID: Doe, Edward, Degree: BS_MIBO, Major: Microbiology, Level: UG, Student Class Level: UG 4th Year, Last Audit: Today at 1:28 p.m., and Last Refresh: Today at 1:27 pm.

AB_Core only

Degree: BS - Microbiology
Level: UNDERGRADUATE

Active: Yes
Status: LOCKED
Tracking Status: Not Tracked

2014 - 2015 Academic Year

Not Tracked	Fall 2014, Total Credits: 12.0	Not Tracked	Spring 2015, Total Credits: 3.0
	<u>ENGL 1101</u> 3.0		<u>ENGL 1102</u> 3.0
MATH 1101 or MATH 1113 or MATH 2200 or MATH 2250 or MATH 2300H or MATH 2400 or MATH 2400H or MATH 2410 or MATH 2410H	3.0	(ASTR 1010 and ASTR 1010L) or (ASTR 1020 and ASTR 1020L) or (ASTR 1110 and ASTR 1110L) or (ASTR 1110H and ASTR 1110L) or (ASTR 1120 and ASTR 1120L) or (ASTR 1120H and ASTR 1120L)	3.0
POLS 1101 or POLS 1105H or @ GEN5	3.0	or (CHEM 1110 and CHEM 1110L) or (CHEM 1211 and CHEM 1211L) or (CHEM 1212 and CHEM 1212L) or (CHEM	
@ HUMA	3.0	1212L)	

Last updated by: Duron, Eduardo on 16-Apr-2015

Audit Print

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Status Quo

The screenshot shows the DegreeWorks Student Planner for a student named Doe, Edward. The interface includes a top navigation bar with links for Athena, Portal, FAQ, Help, Print, Exception Management, Template Management, and Log Out. Below the navigation is a search bar for UGA ID and a dropdown for Name, showing 'Doe, Edward'. Other fields include Degree (BS_MIBO), Major (Microbiology), Level (UG), Student Class Level (UG 4th Year), Last Audit (Today at 1:28 p.m.), and Last Refresh (Today at 1:27 pm). The main area displays the Student Planner for Fall 2014, showing a total of 12.0 credits. It lists courses such as ENGL 1101, MATH 1101 or MATH 1113 or MATH 2200 or MATH 2250 or MATH 2300, and POLS 1101 or POLS 1105H. The Spring 2015 section shows a total of 3.0 credits for ENGL 1102. The Fall 2015 section shows a total of 0.0 credits. The Spring 2016 and Fall 2016 sections also show a total of 0.0 credits. The bottom of the screen includes buttons for Create Block, Audit, What-If, Delete, Save As..., and Save.



Issues

Student-level:

- Too much esoteric information or Rote Process
- No Context (Opportunity Costs, Pre-requisites)

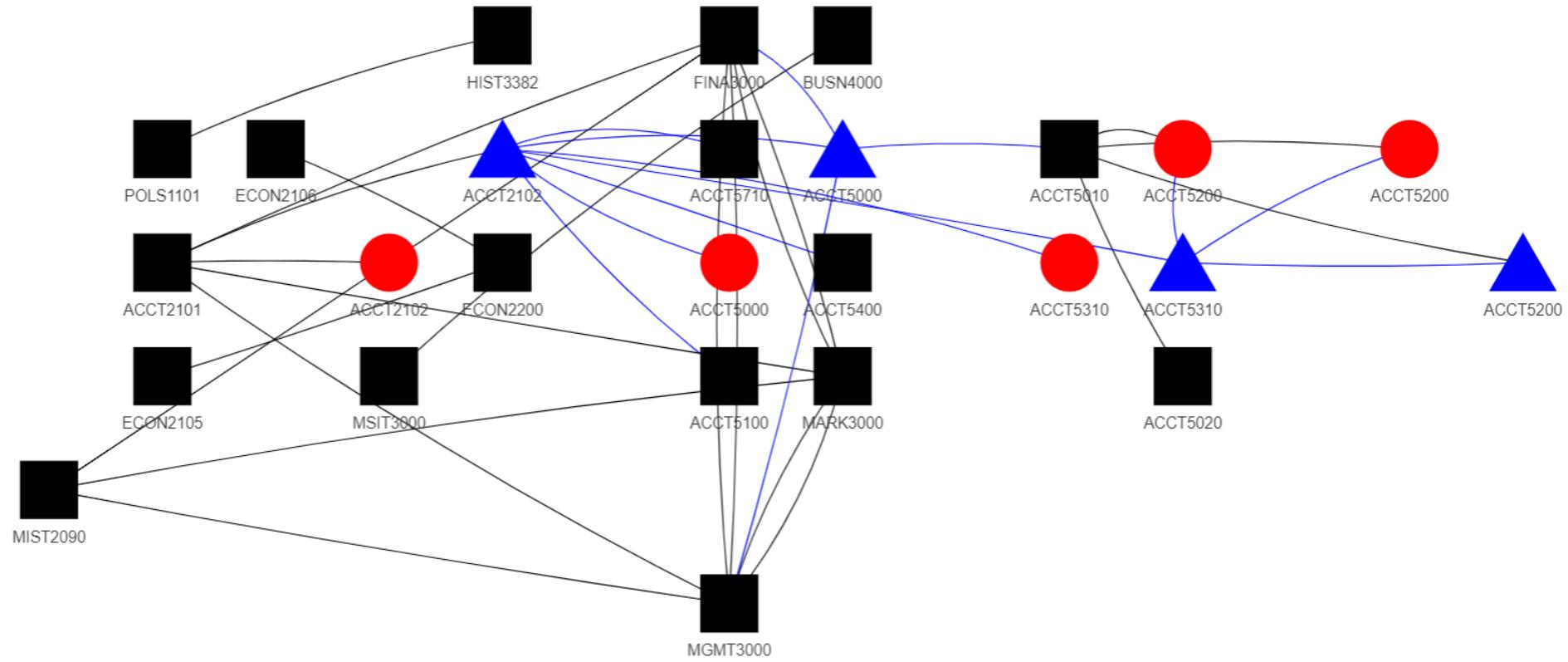
Curriculum-level:

- Too much esoteric information, Unintuitive
- Difficult to analyze



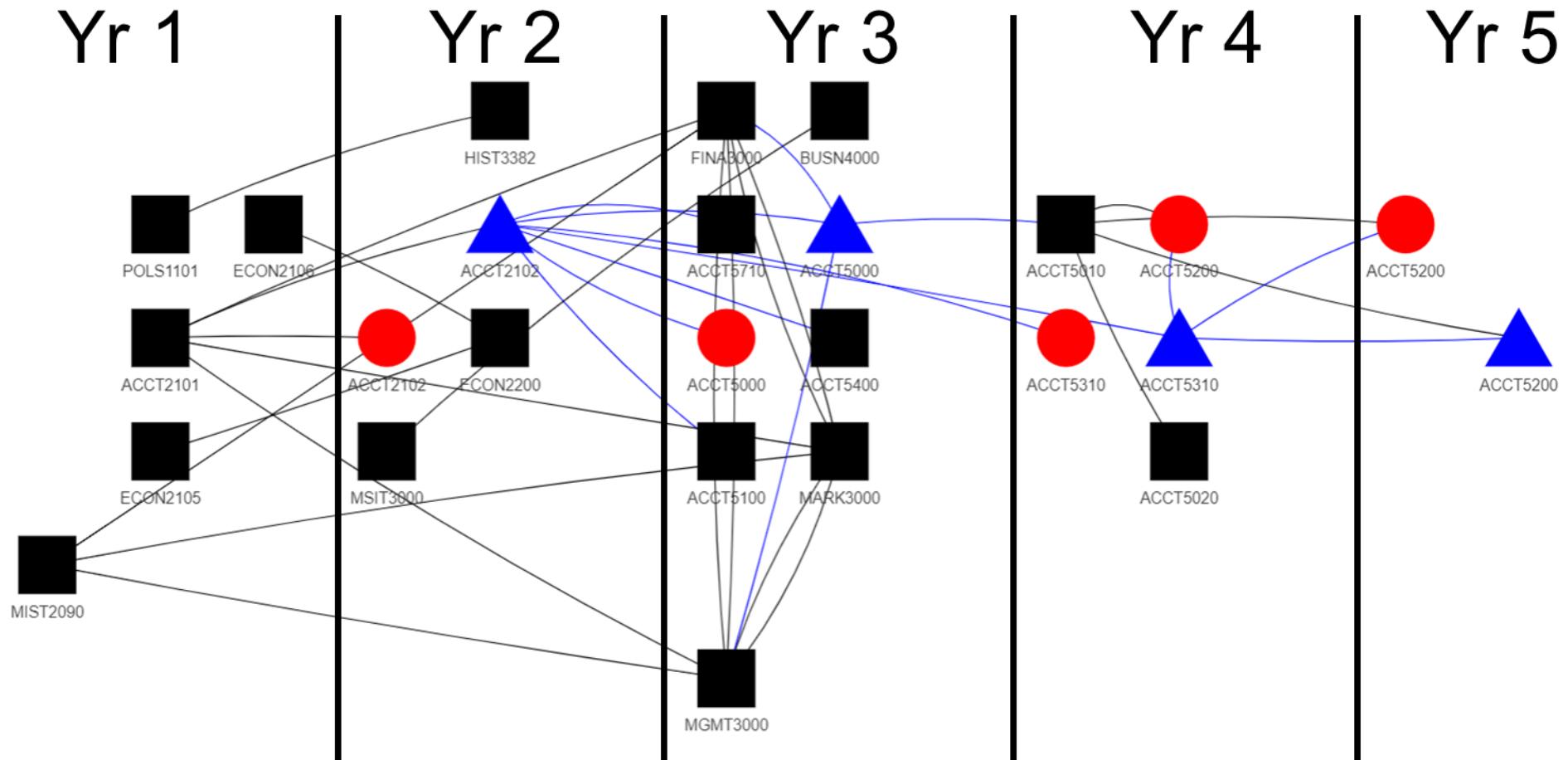
Graphing Networks

The diagram consists of three vertical columns. The first column contains a solid black square icon above the word "pass". The second column contains a solid red circle icon above the word "fail". The third column contains a solid blue triangle icon pointing upwards above the word "repeat".



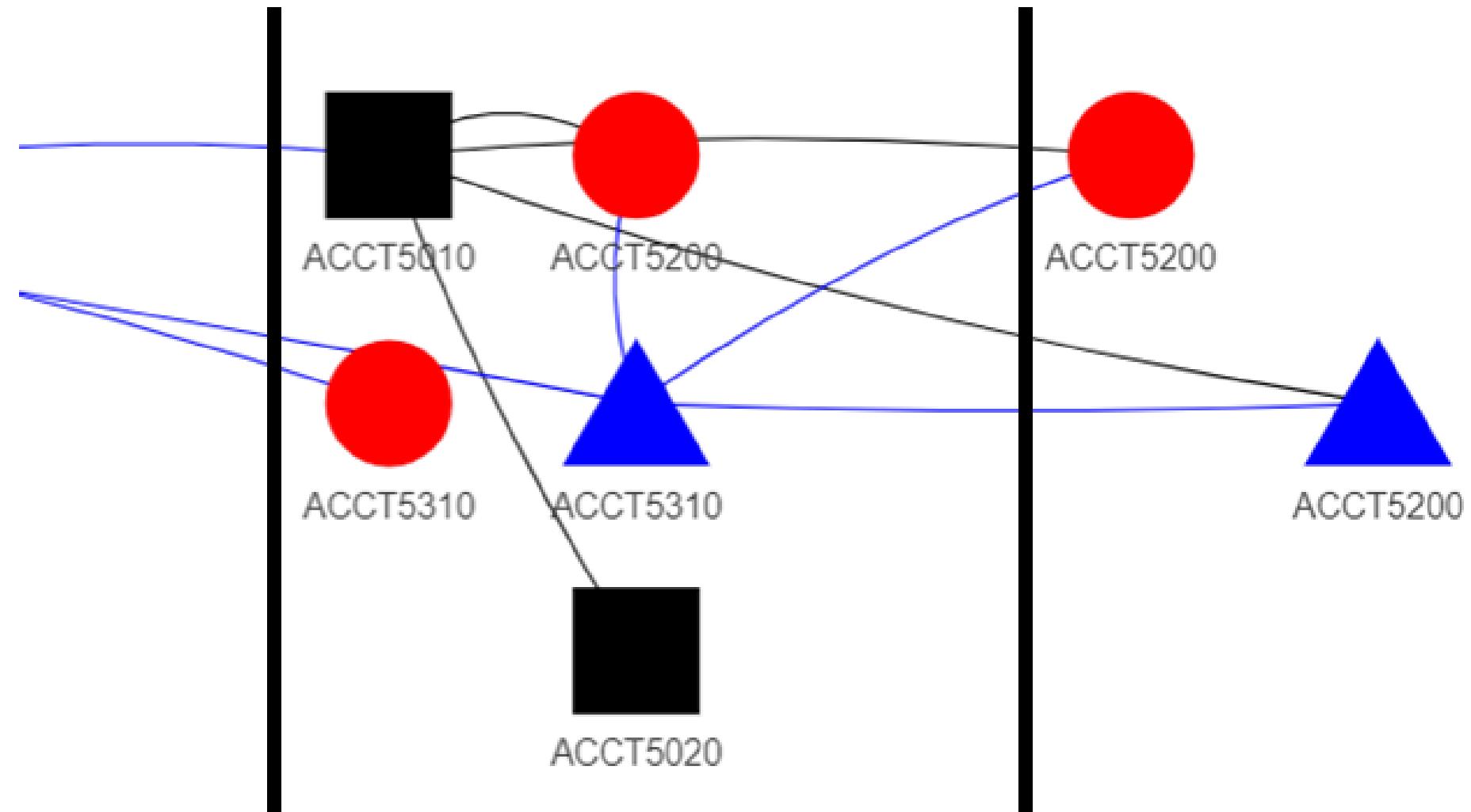
Graphing Networks

- pass
- fail
- ▲ repeat



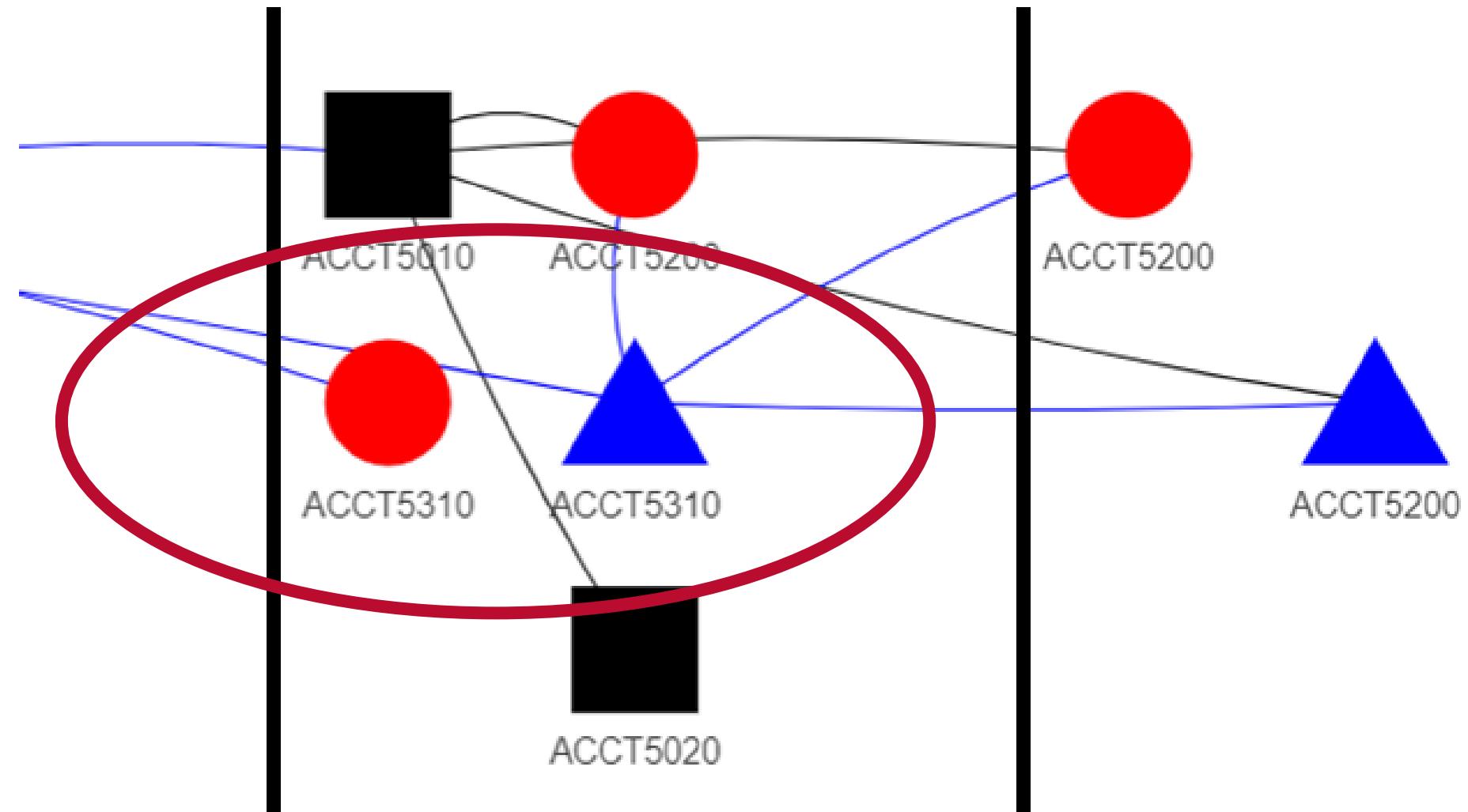
Graphing Networks

- pass
- fail
- ▲ repeat



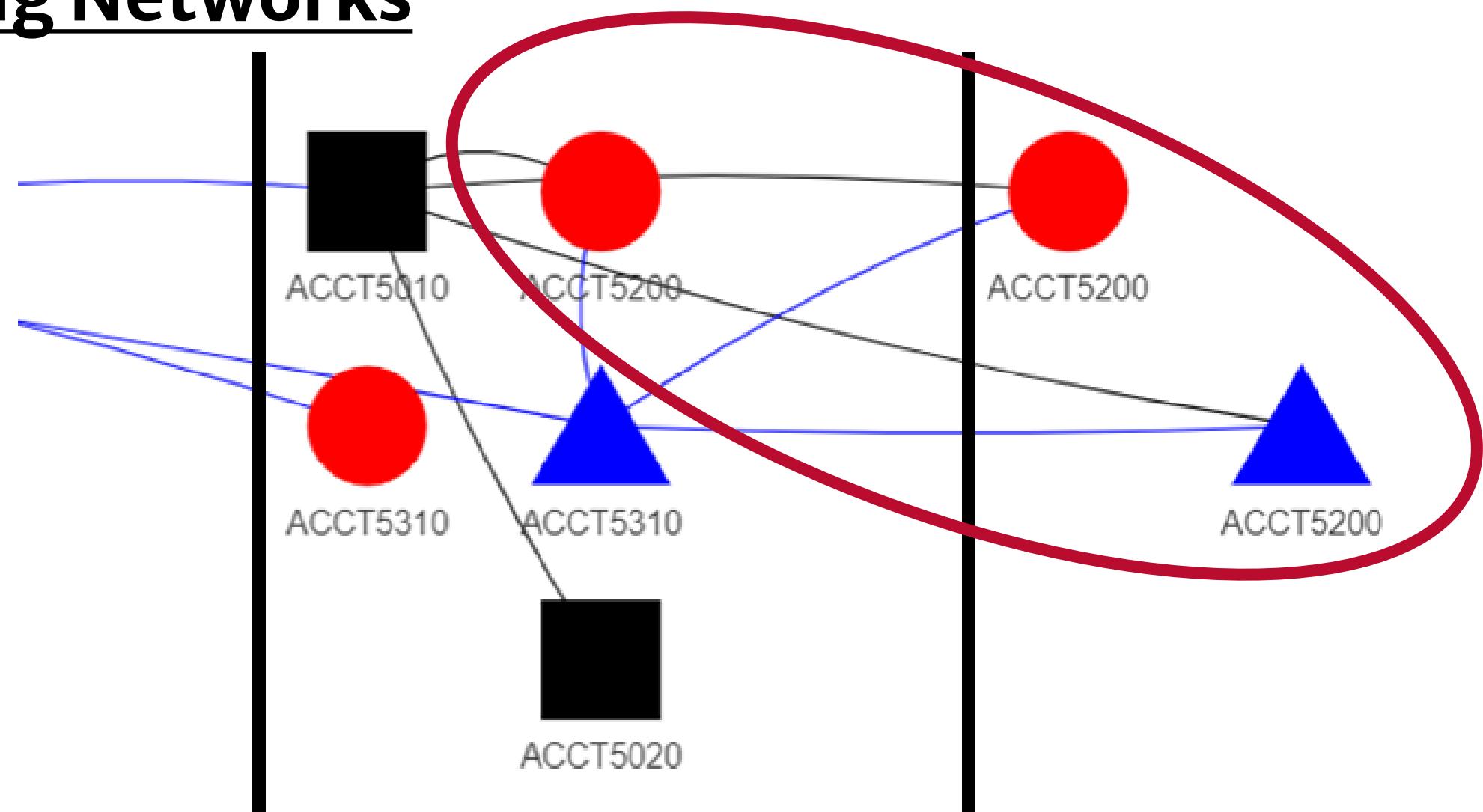
Graphing Networks

- pass
- fail
- ▲ repeat



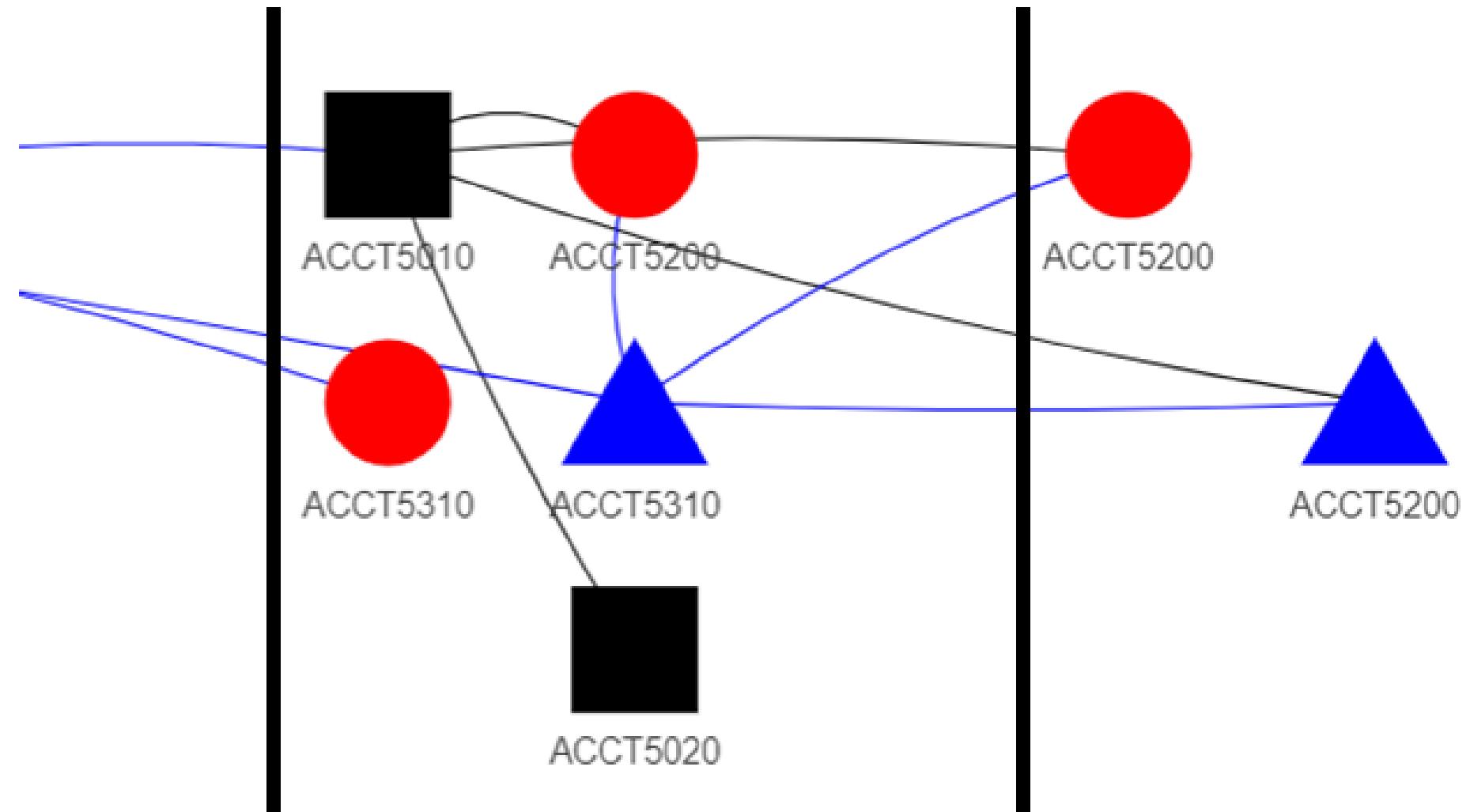
Graphing Networks

- pass
- fail
- ▲ repeat

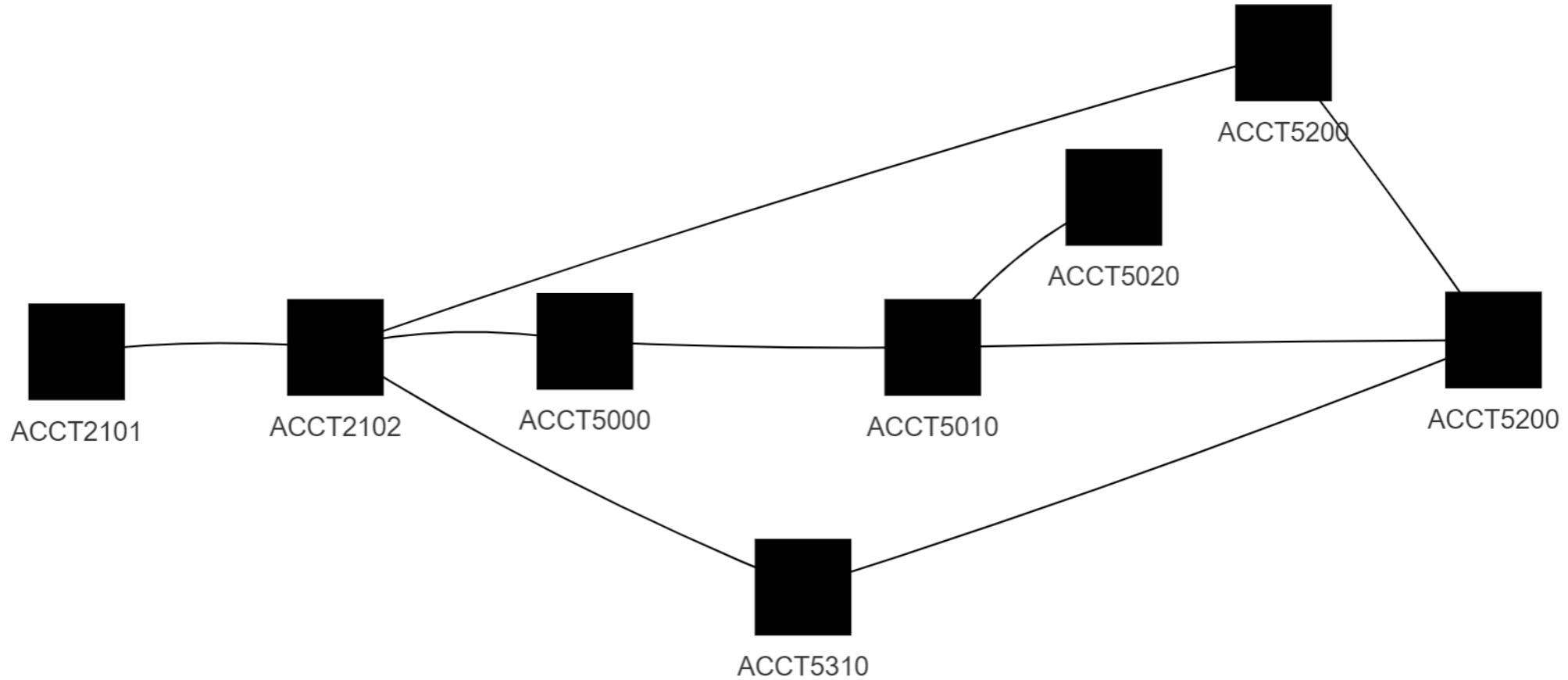


Graphing Networks

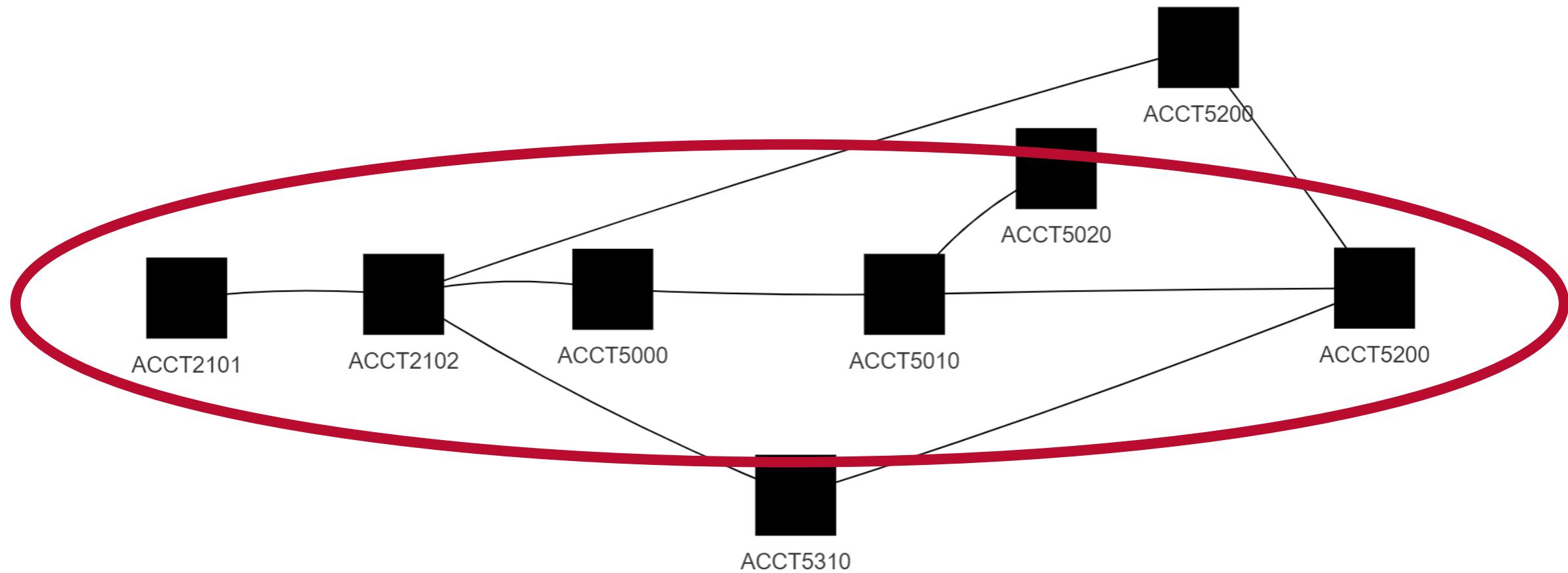
- pass
- fail
- ▲ repeat



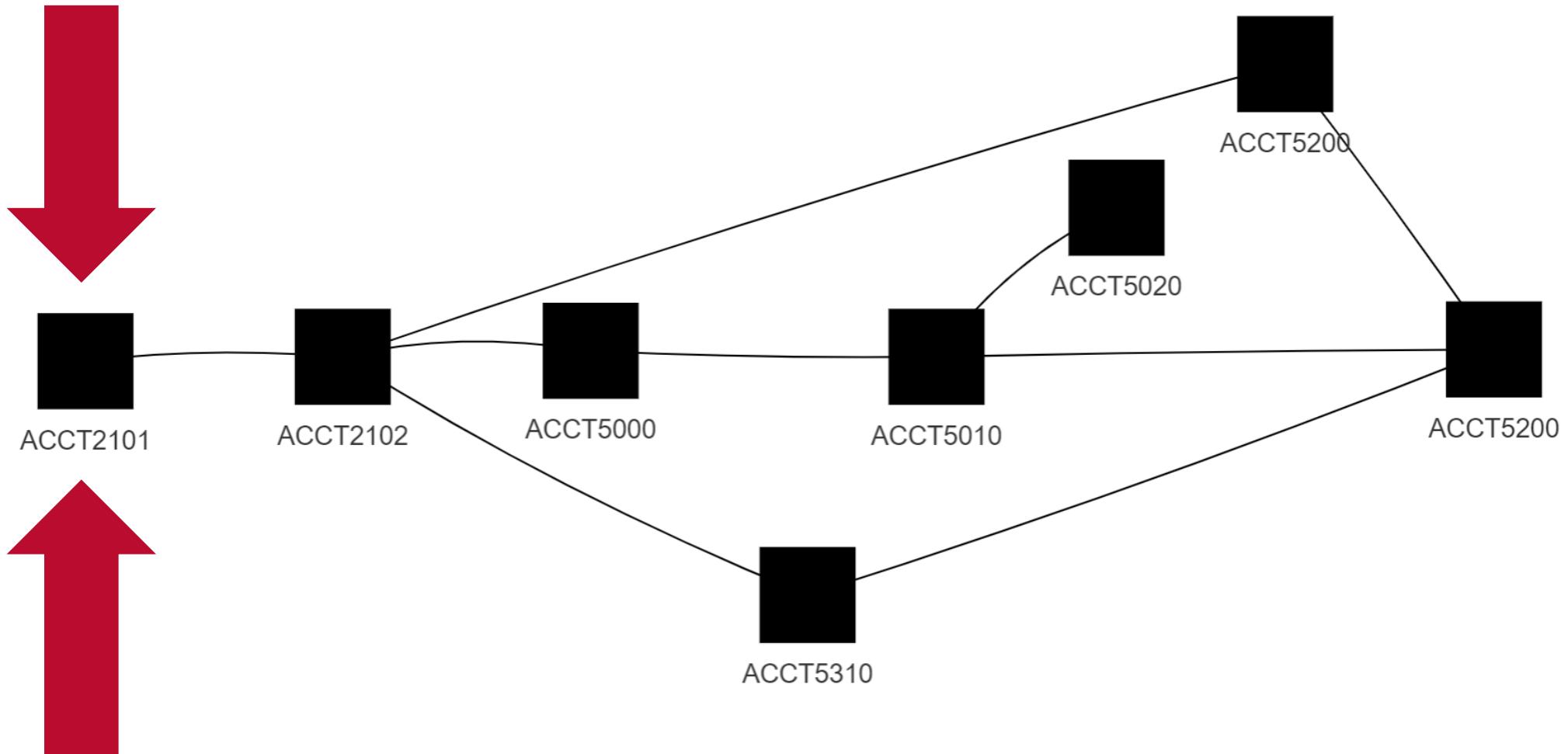
Graphing Networks



Graphing Networks

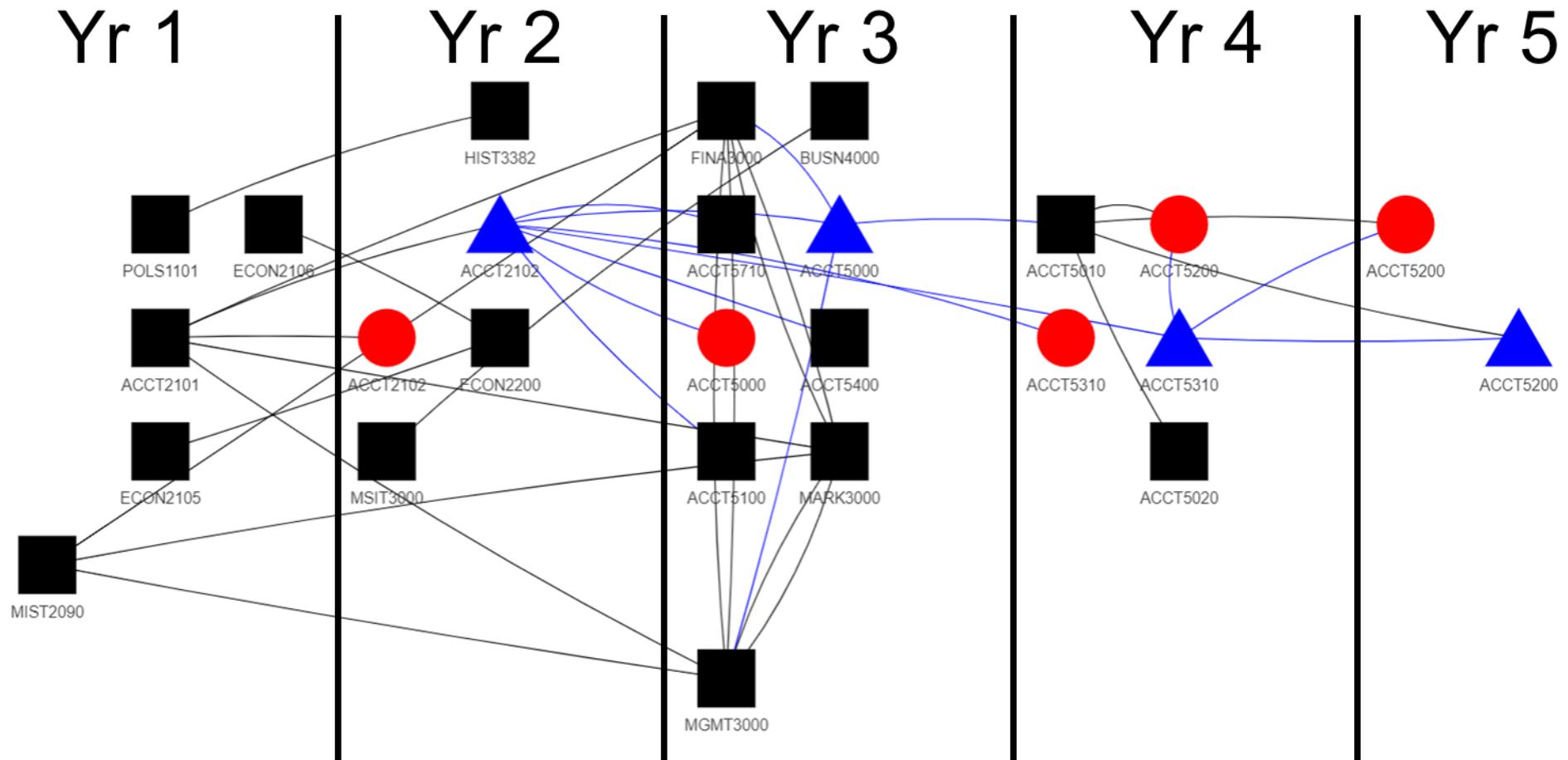


Graphing Networks



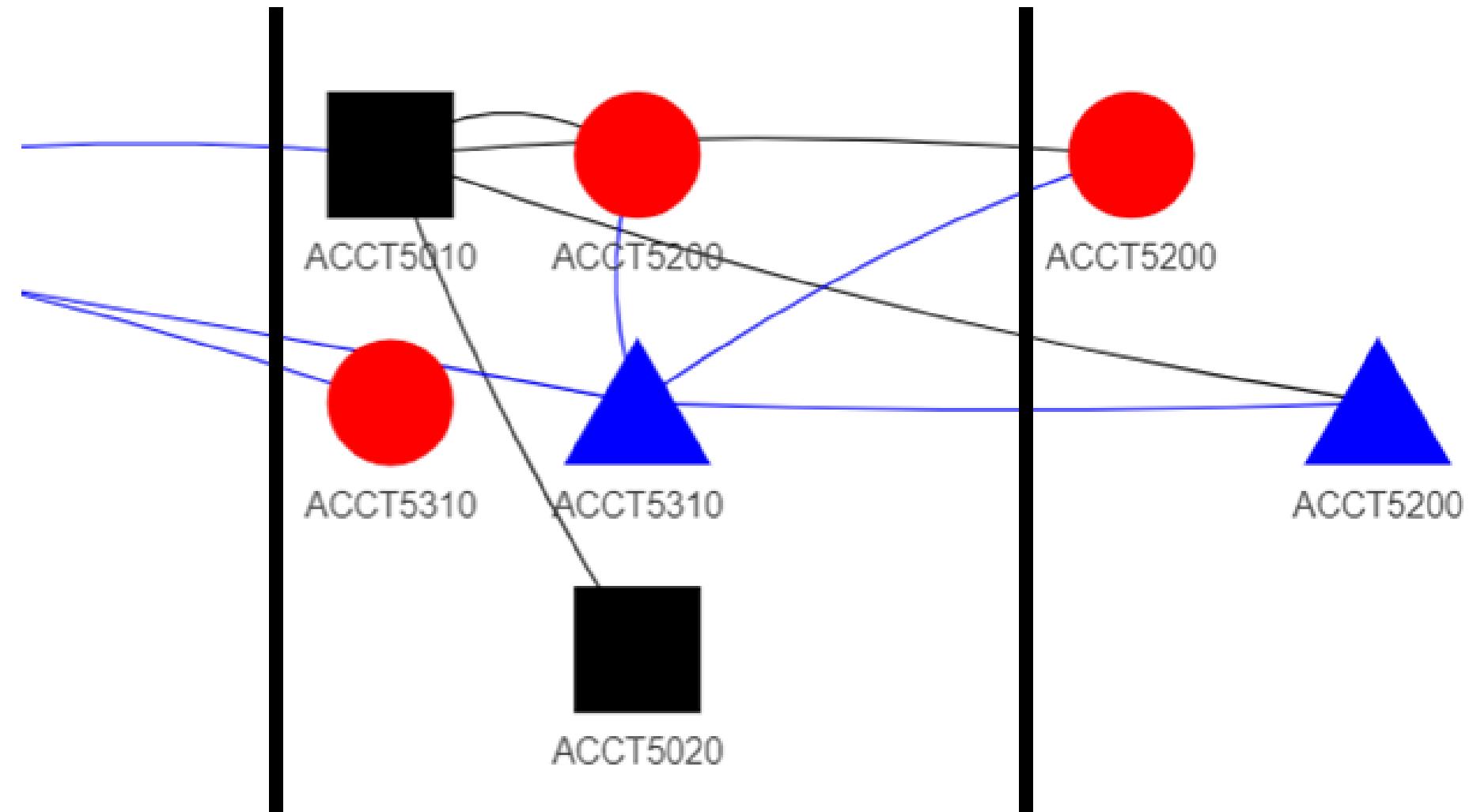
Graphing Networks

- pass
- fail
- ▲ repeat



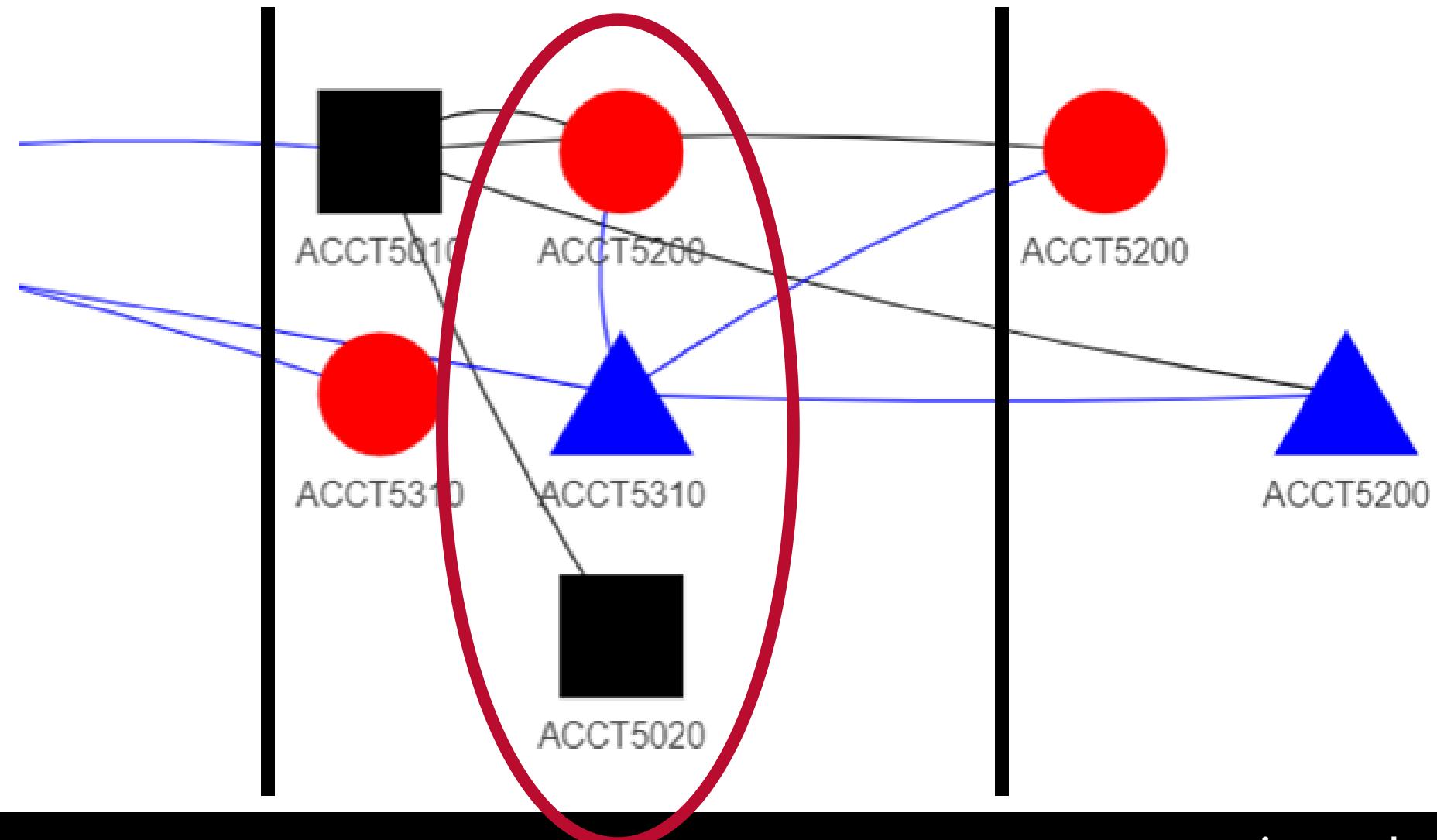
Graphing Networks

- pass
- fail
- ▲ repeat



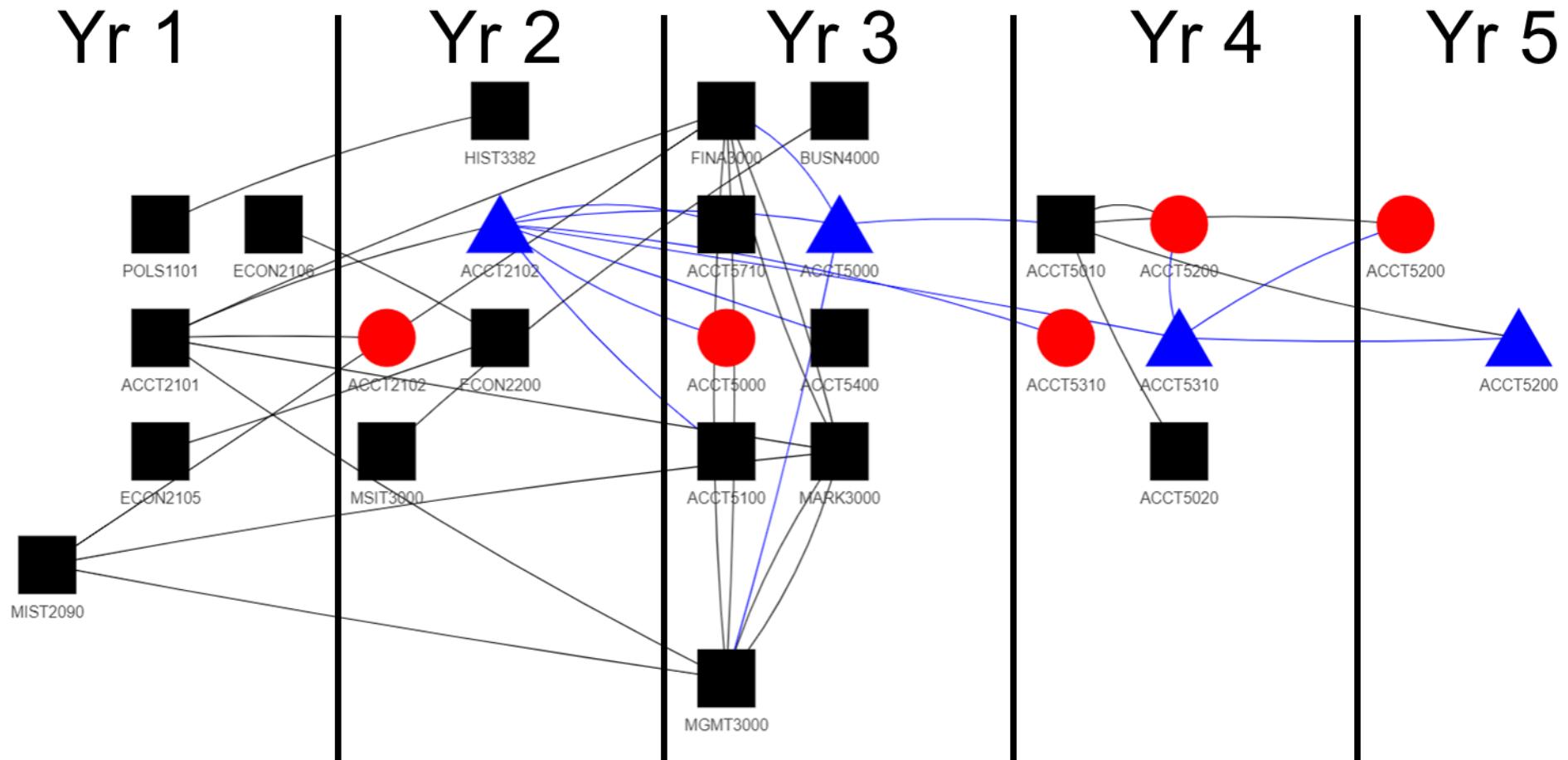
Graphing Networks

- pass
- fail
- ▲ repeat



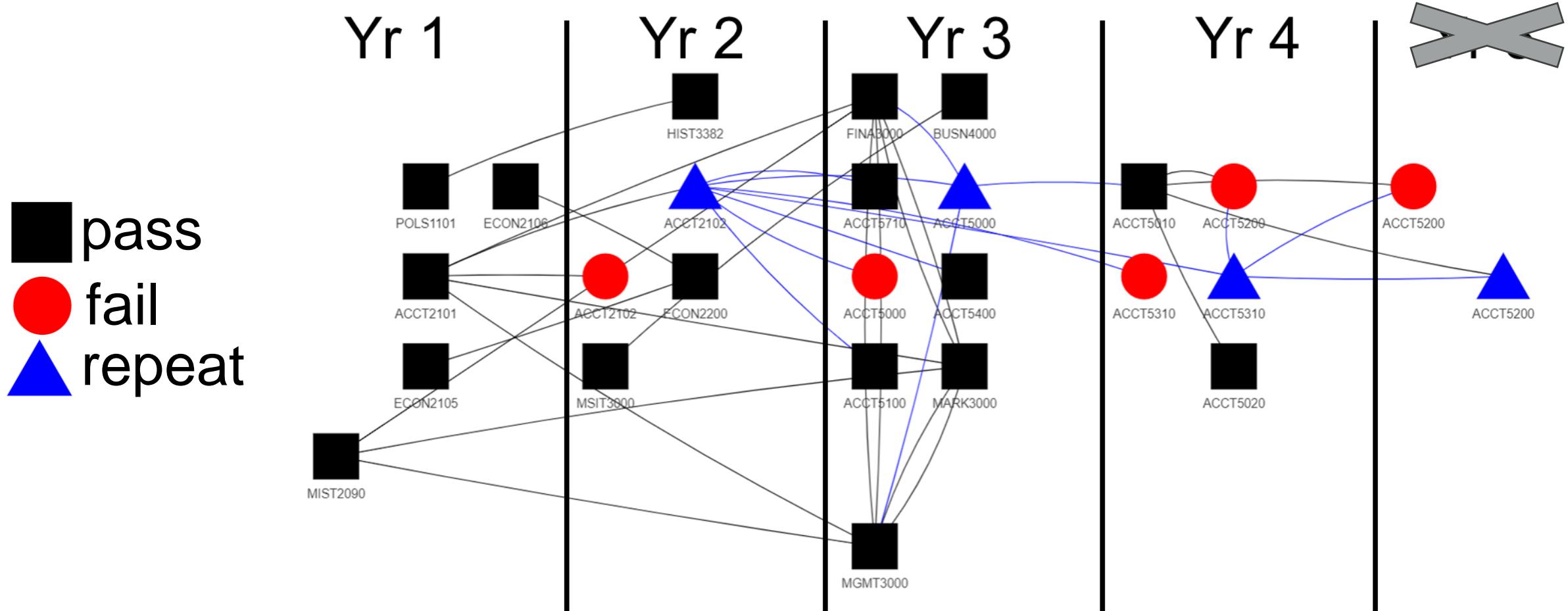
Graphing Networks

- pass
- fail
- ▲ repeat



Graphing Networks

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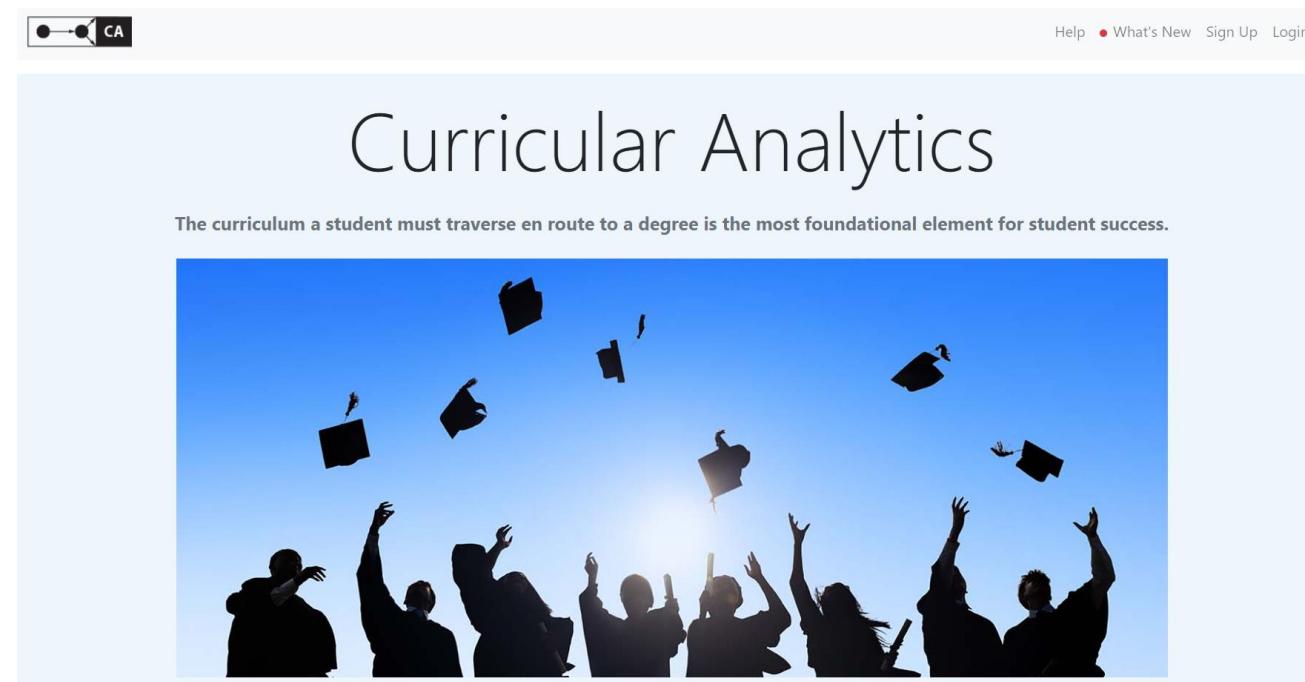


Part II: Pathways & Metrics

Metrics

<https://curricularanalytics.org/>

<https://github.com/CurricularAnalytics/CurricularAnalytics.jl>



Metrics

- Blocking: Measure of Gateway Courses
- Delay: Length of Prerequisite Chain
- Centrality: Interconnectedness
- Complexity: Blocking + Delay

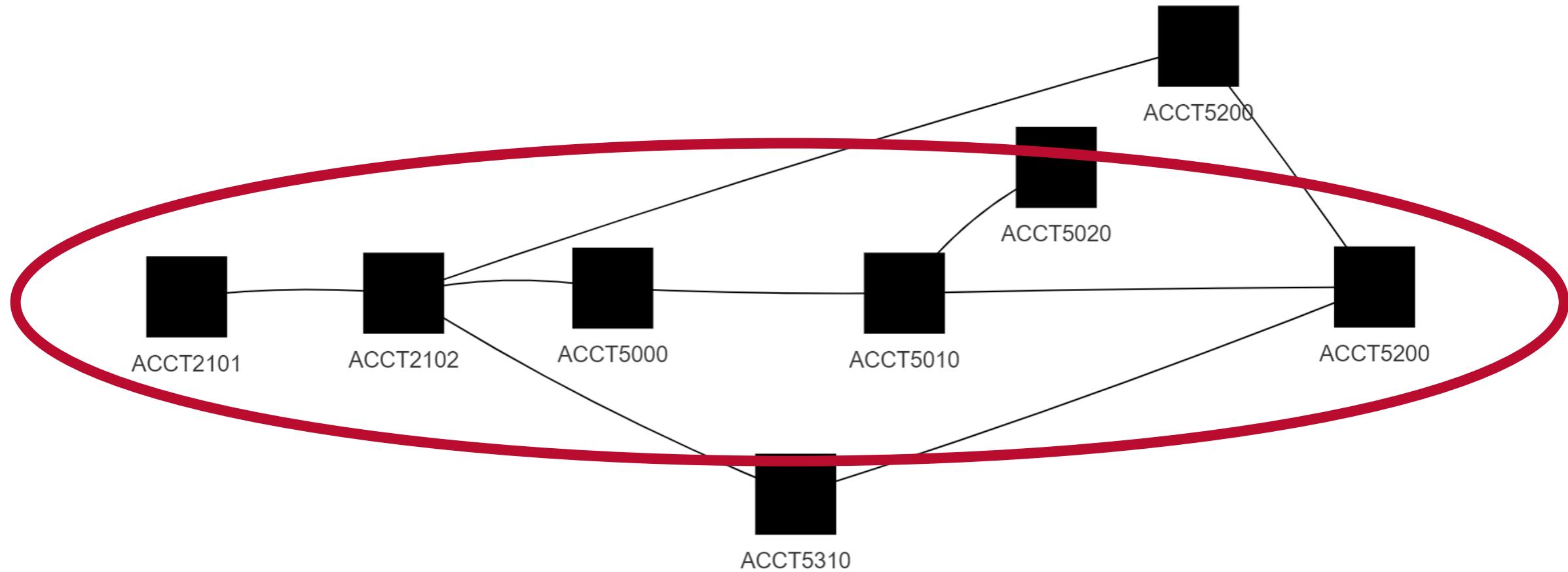


Pathways

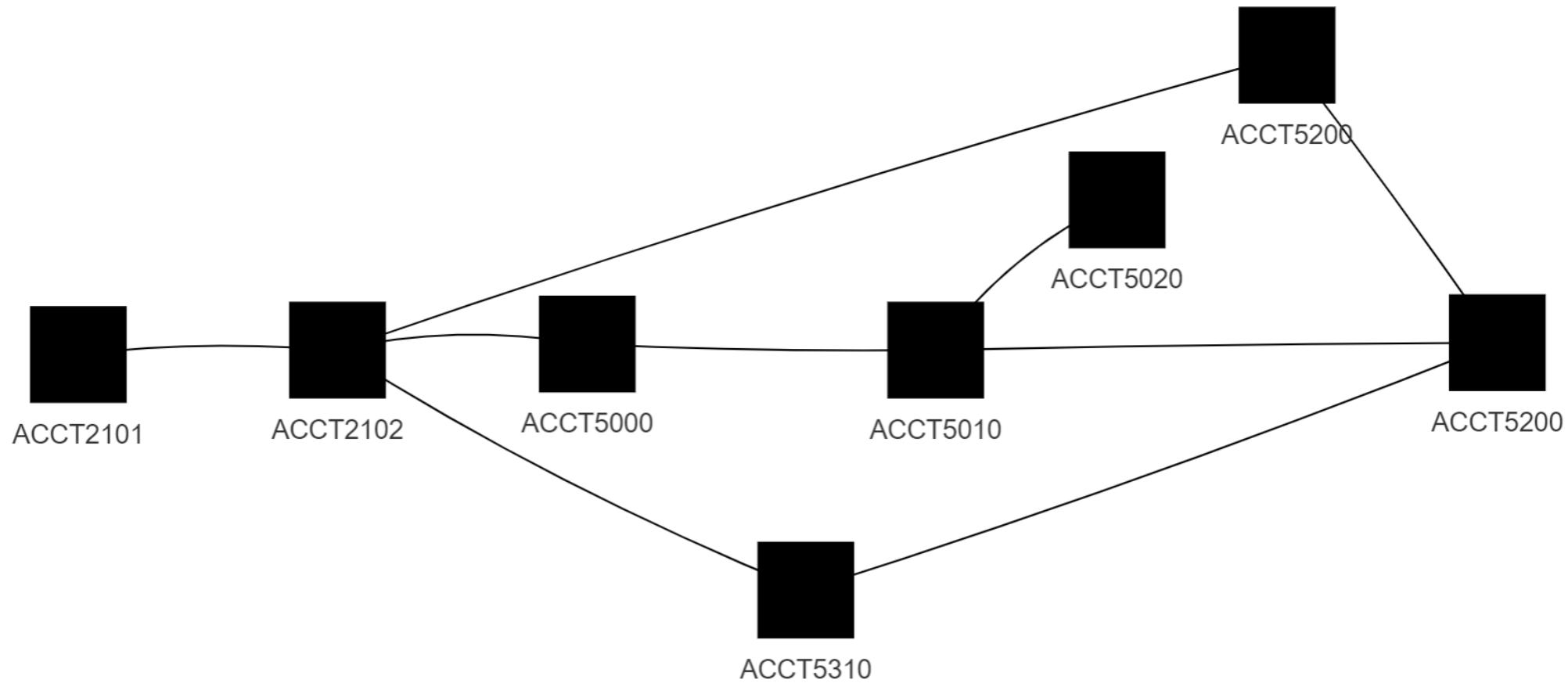


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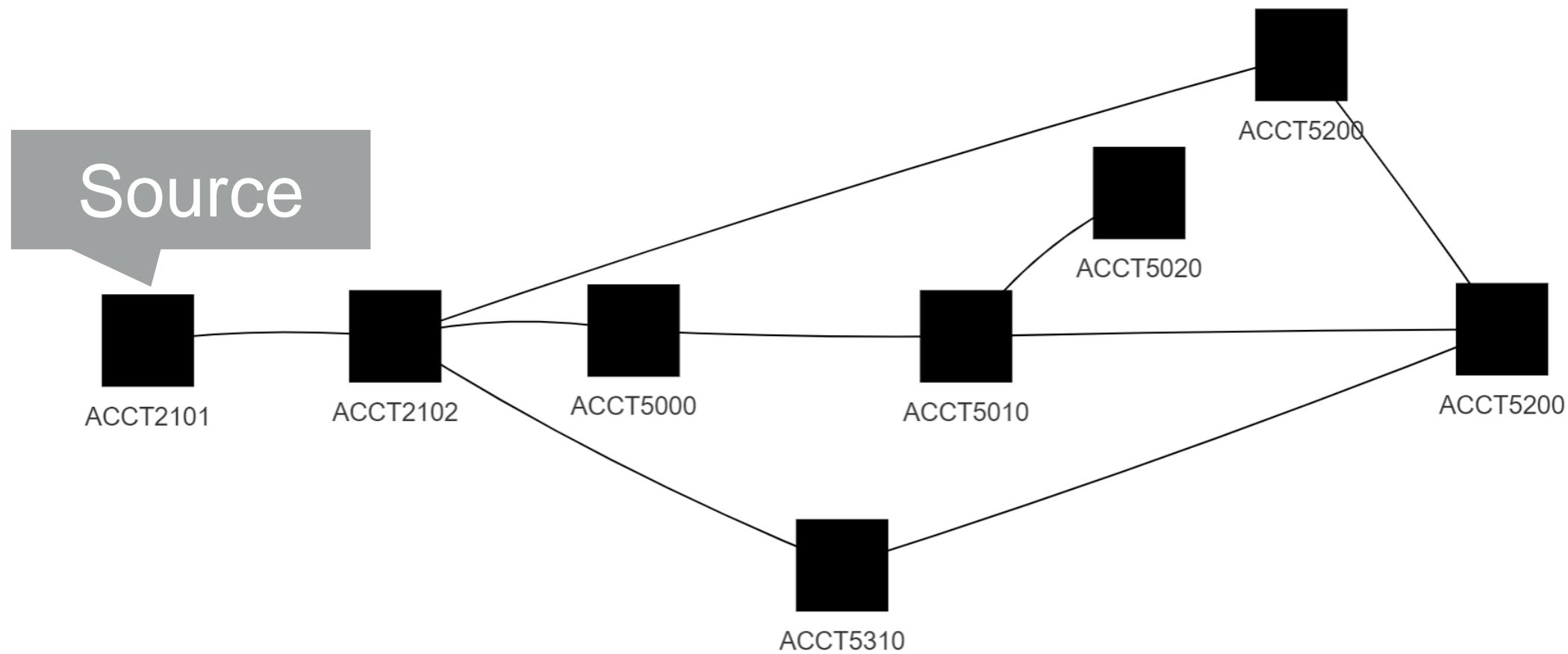
Pathways



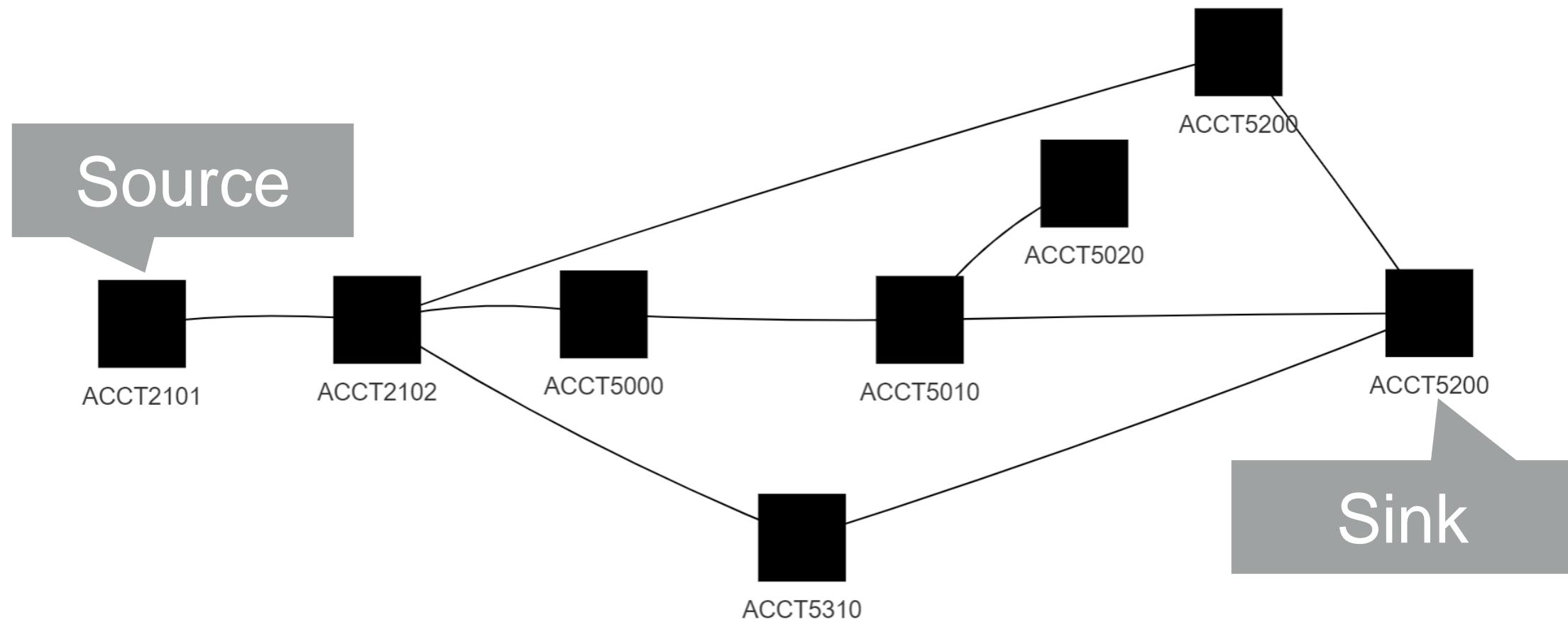
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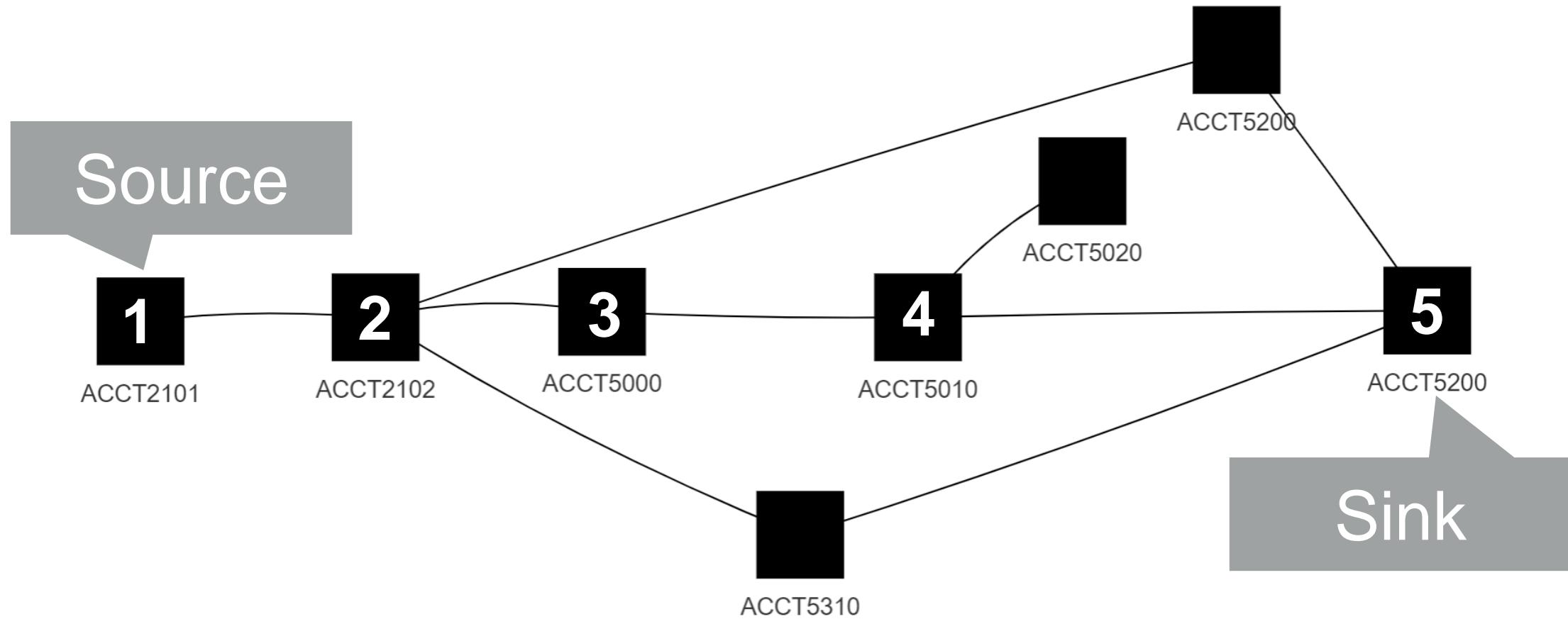
Pathways



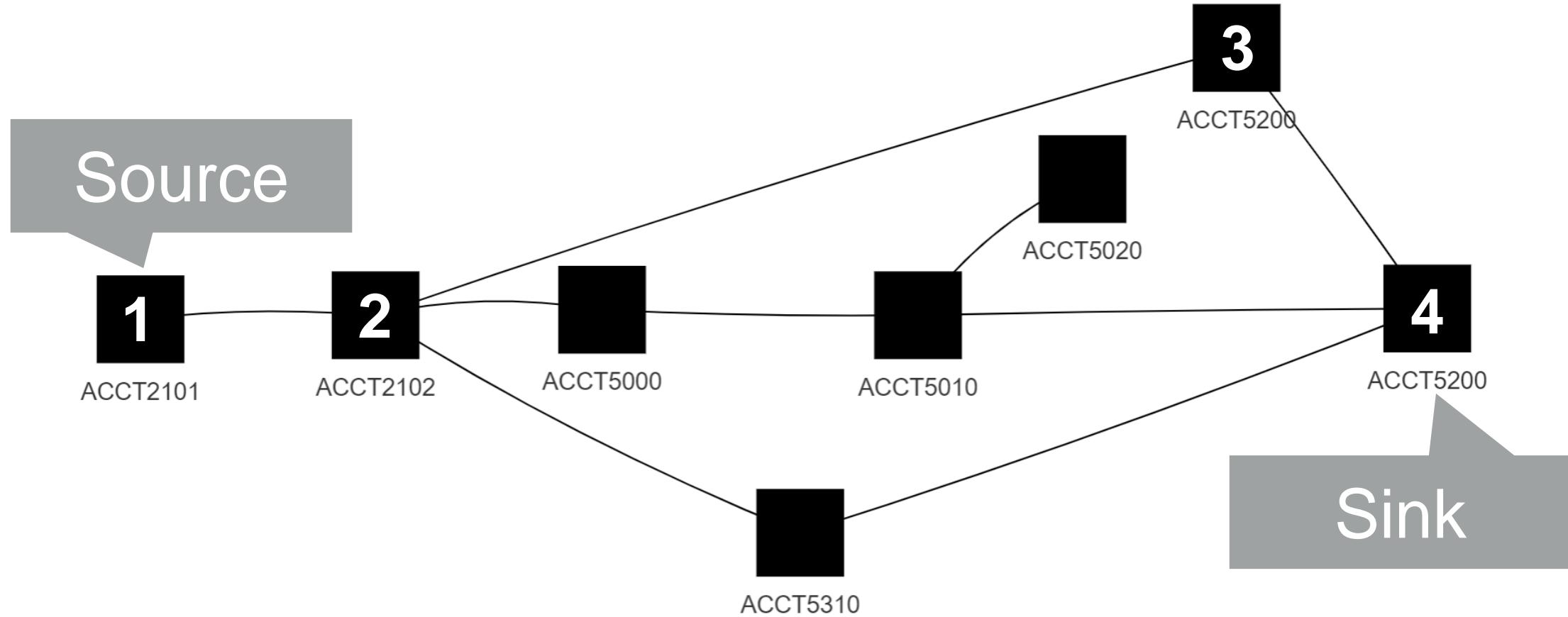
Pathways



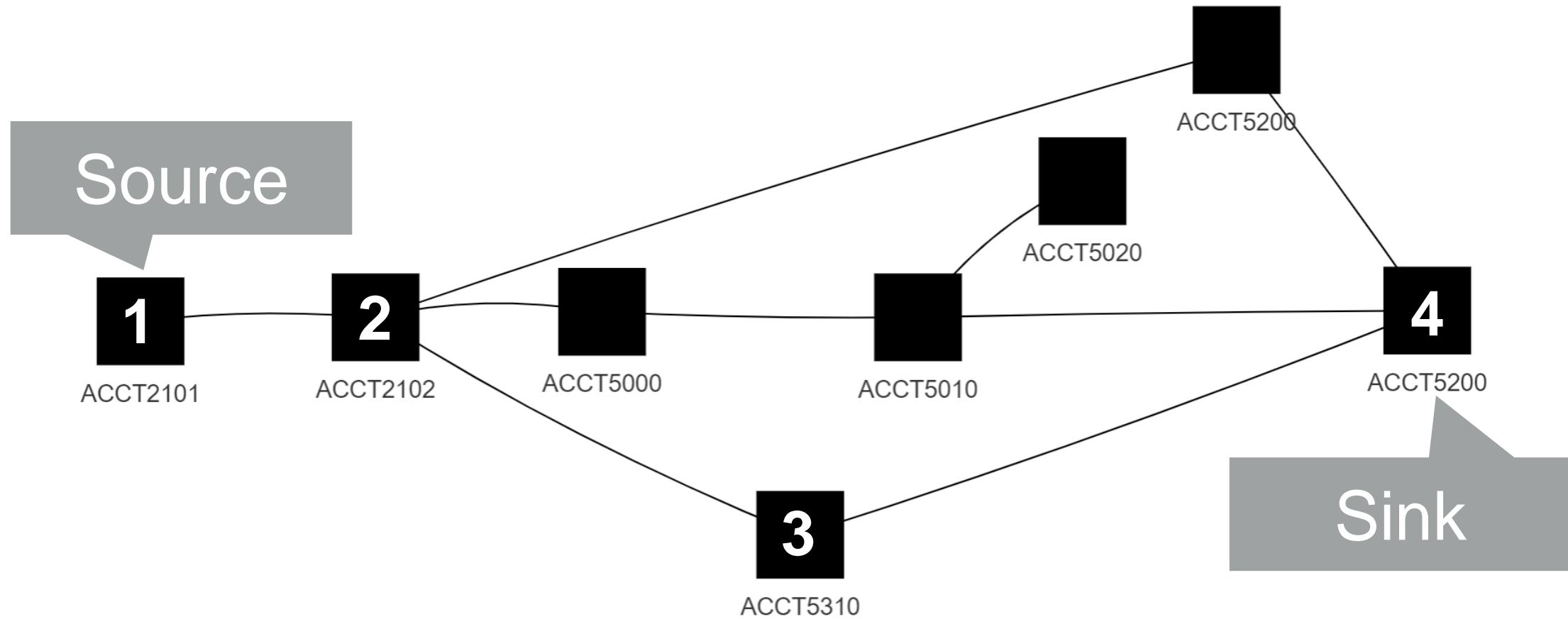
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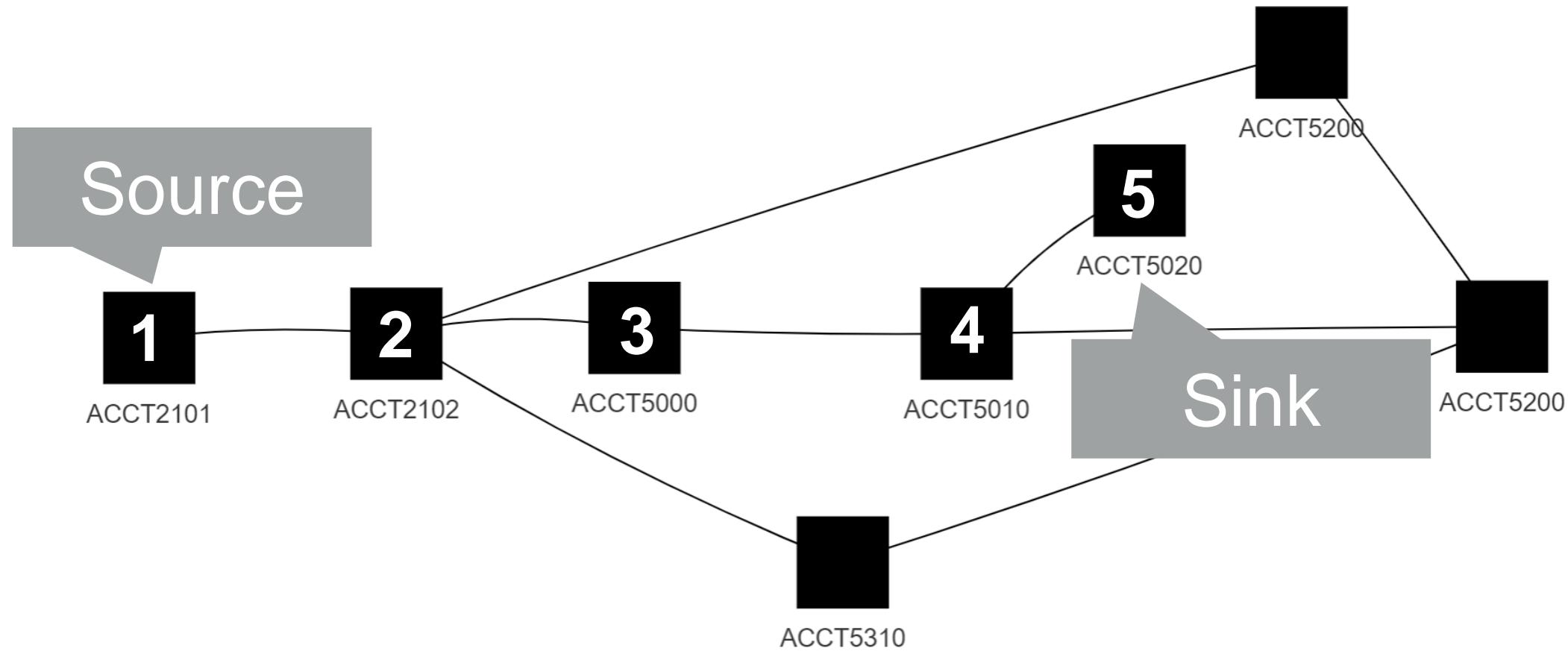
Pathways



Pathways



Pathways



Pathway Algorithm

https://github.com/zhen-zhang2/SAIR2023_network_graphs

Based on: <https://www.baeldung.com/cs/simple-paths-between-two-vertices>

Algorithm 1: Finding All Simple Paths Between Two Vertices in a Graph

Data: G: The Graph stored in an adjacency list
u: The starting node
v: The ending node
Result: Returns a list of all simple paths from u to v

```
visited ← {false};  
currentPath ← {};  
simplePaths ← {};  
DFS(u, v);  
return simplePaths;
```

Function DFS(u, v):
 if visited[u] = true **then**
 return;
 end
 visited[u] ← true;
 currentPath.addToBack(u);
 if u = v **then**
 simplePaths.add(currentPath);
 visited[u] ← false;
 currentPath.removeFromBack();
 return;
 end
 for next ∈ G[u] **do**
 DFS(next, v);
 end
 currentPath.removeFromBack();
 visited[u] ← false;
end



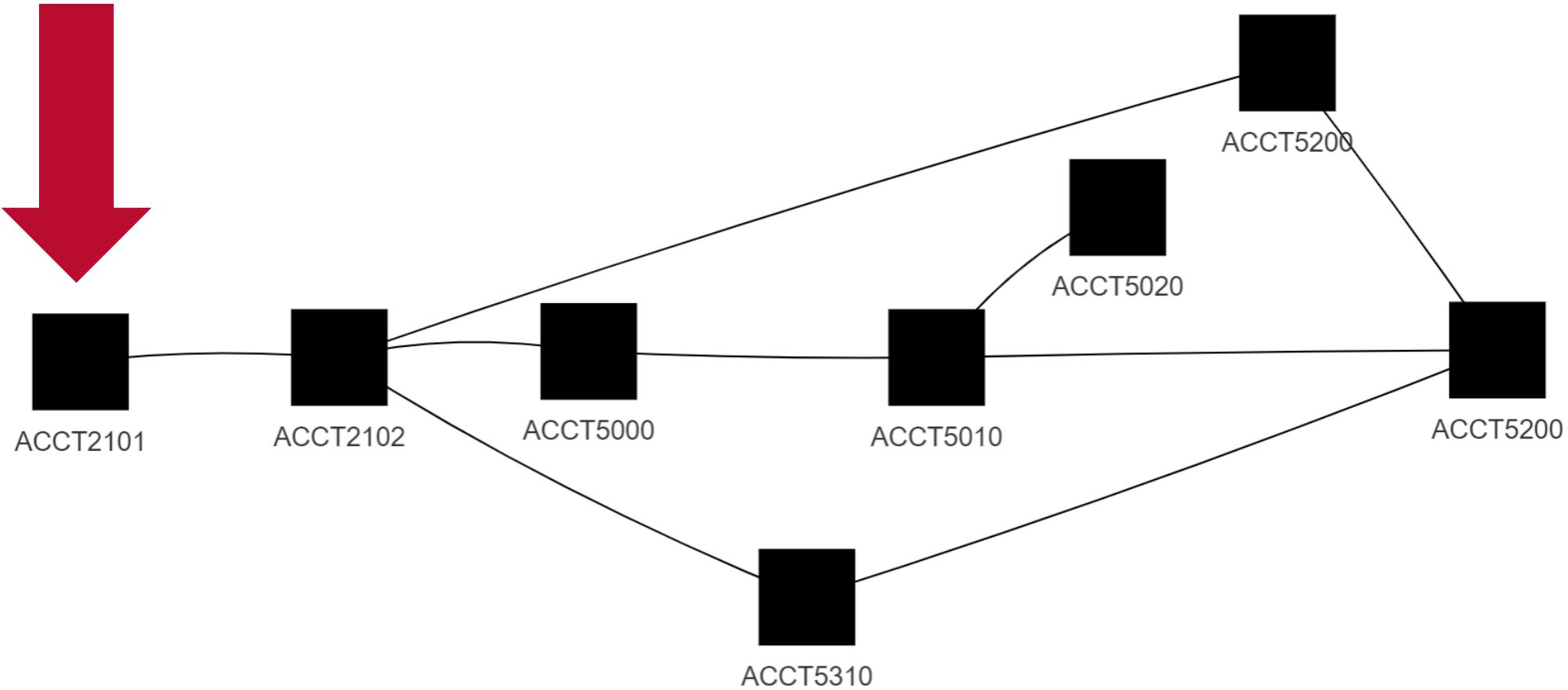
Metrics: Pathway Definitions, Pseudocode

Pathway: Sequence of edges that joins a source to a sink

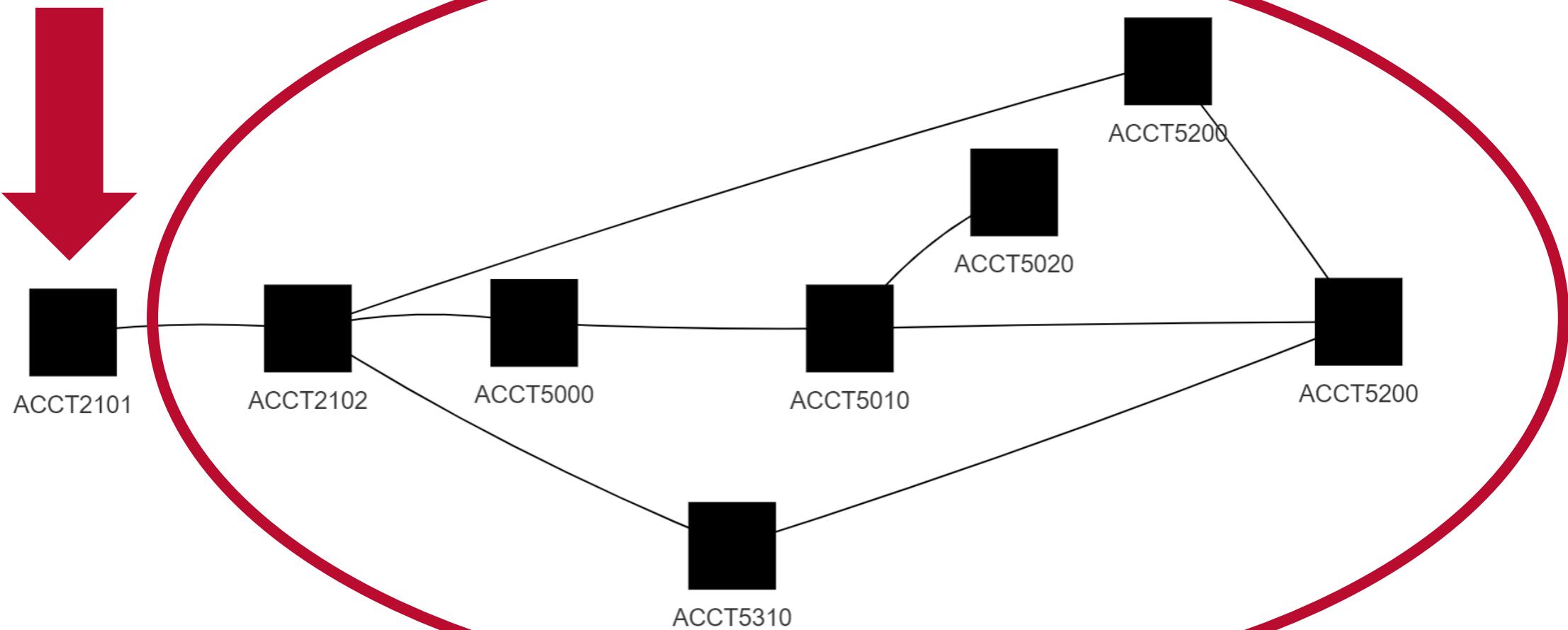
- Blocking: (1) Find all paths with node (2) count all unique nodes after it
- Delay: (1) Find all paths with node (2) length of longest path
- Centrality: (1) If source or sink, 0 (2) Find all paths with node (3) count number of nodes
- Complexity: Blocking + Delay



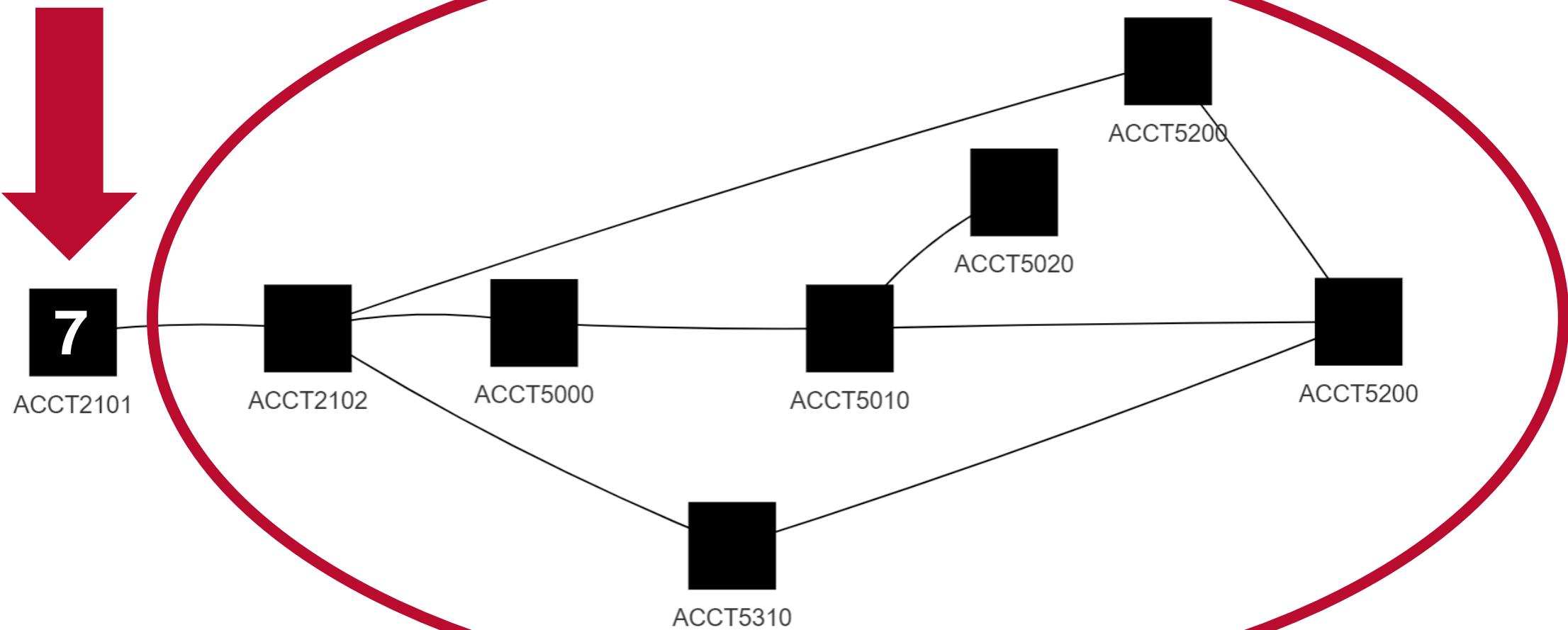
Metrics: Blocking



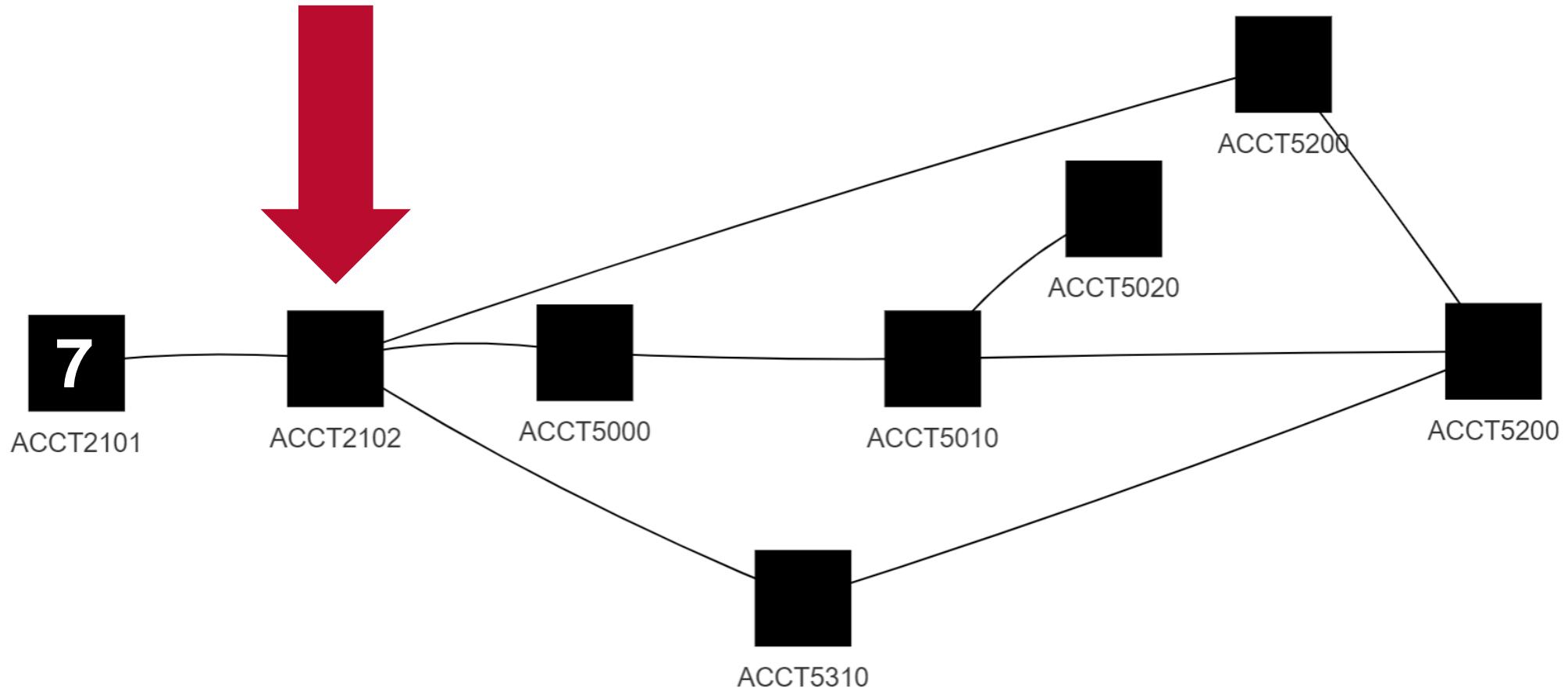
Metrics: Blocking



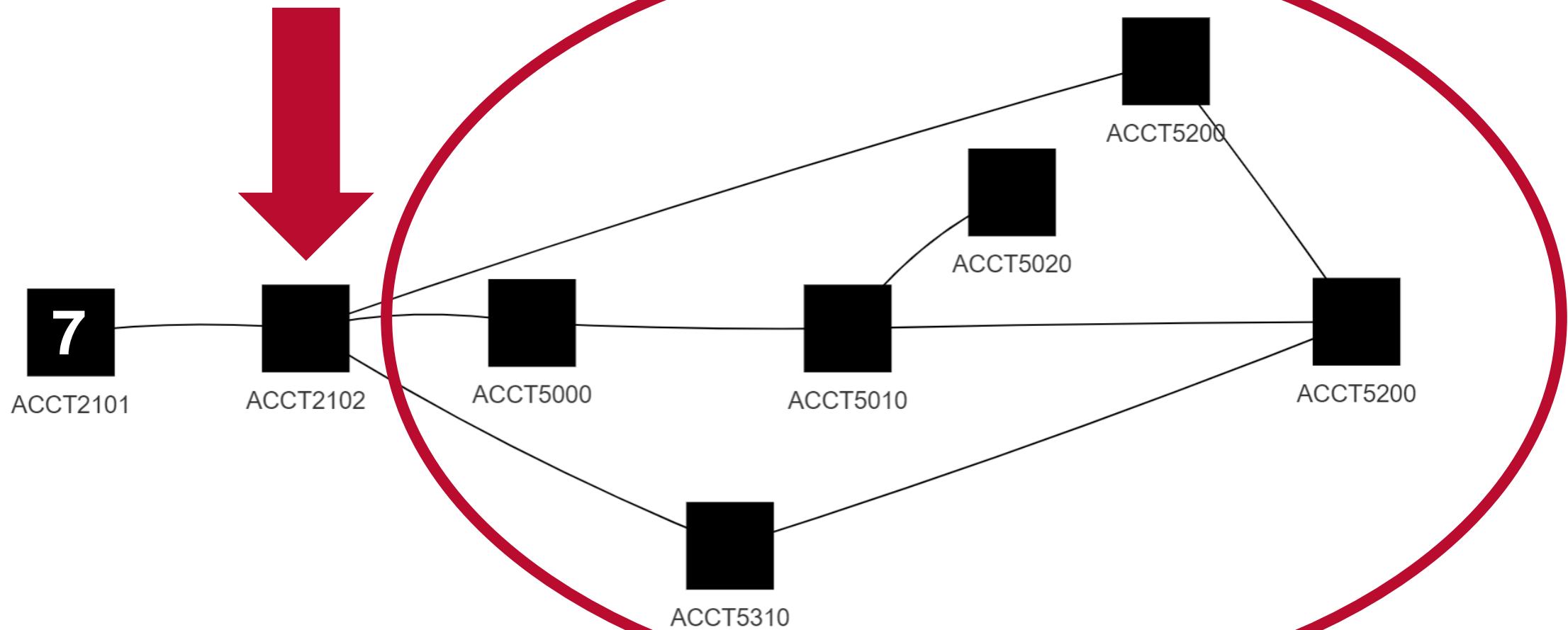
Metrics: Blocking



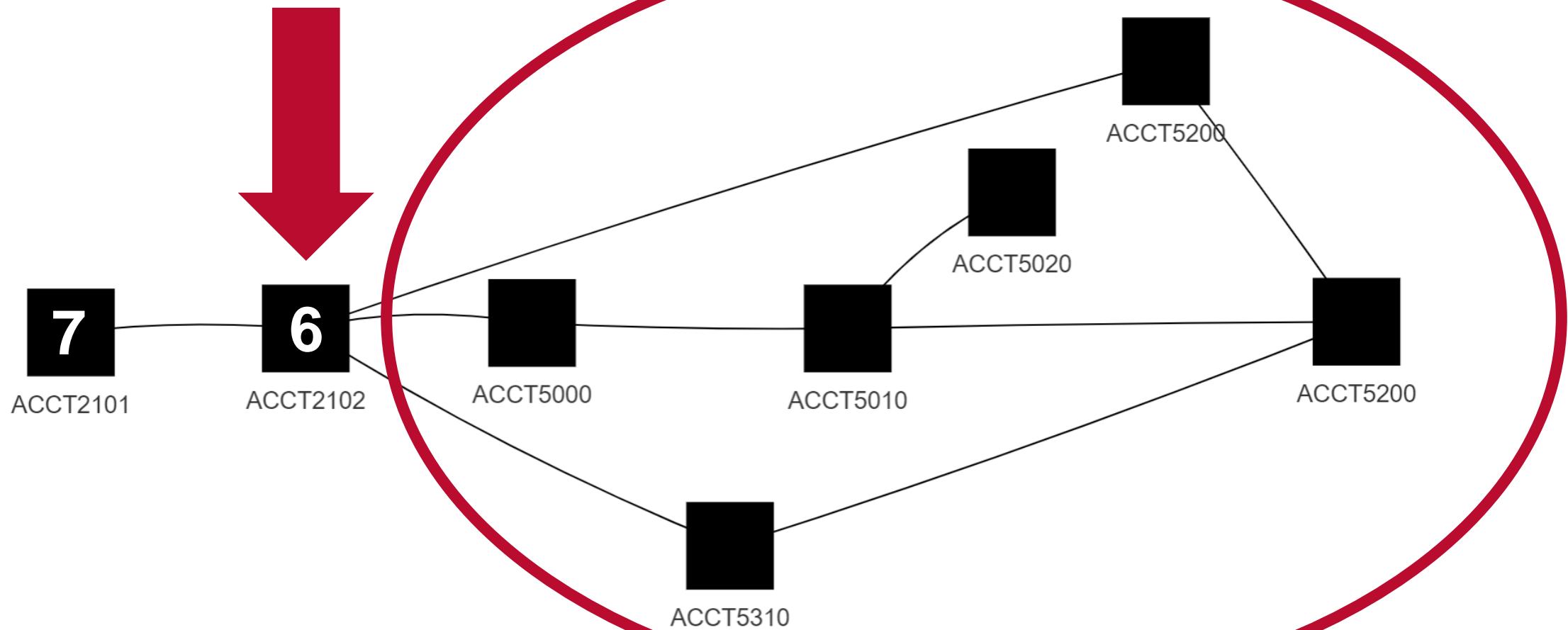
Metrics: Blocking



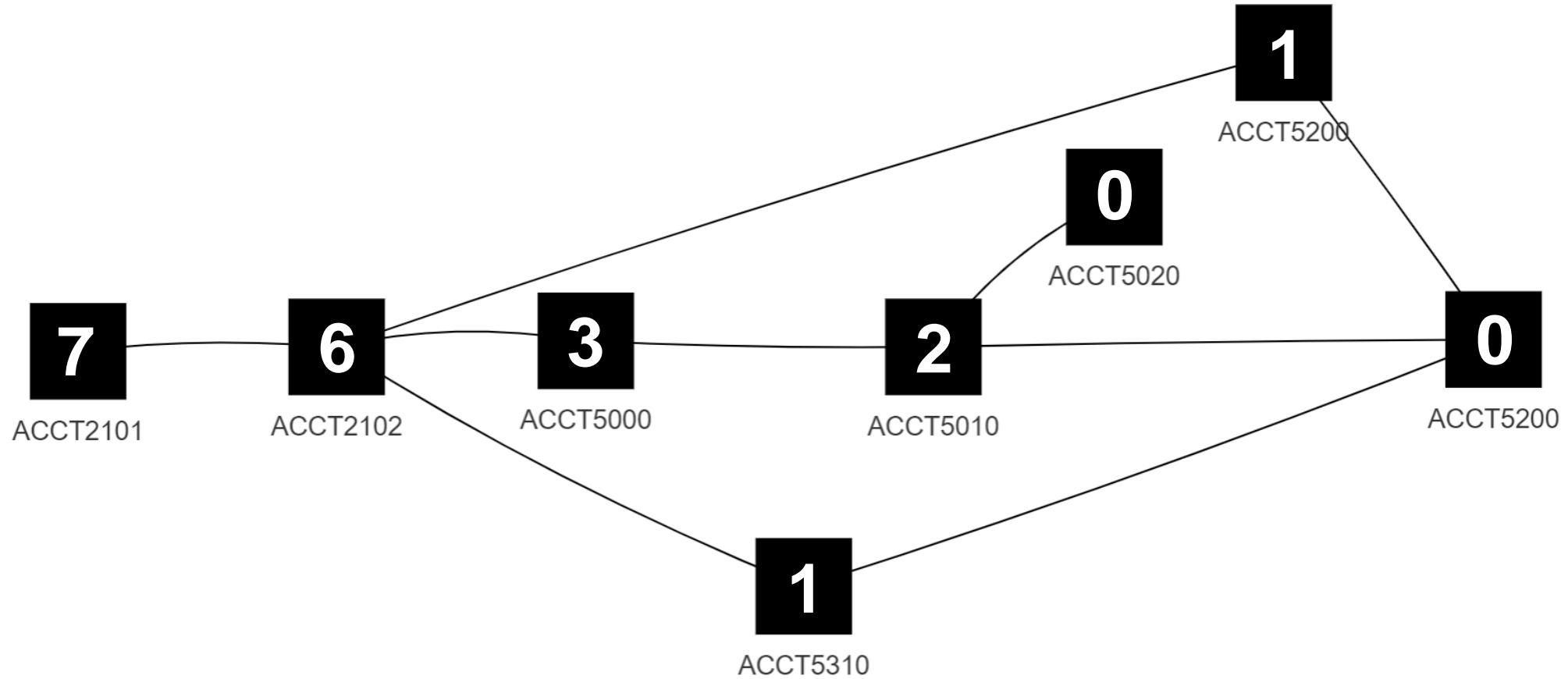
Metrics: Blocking



Metrics: Blocking



Metrics: Blocking



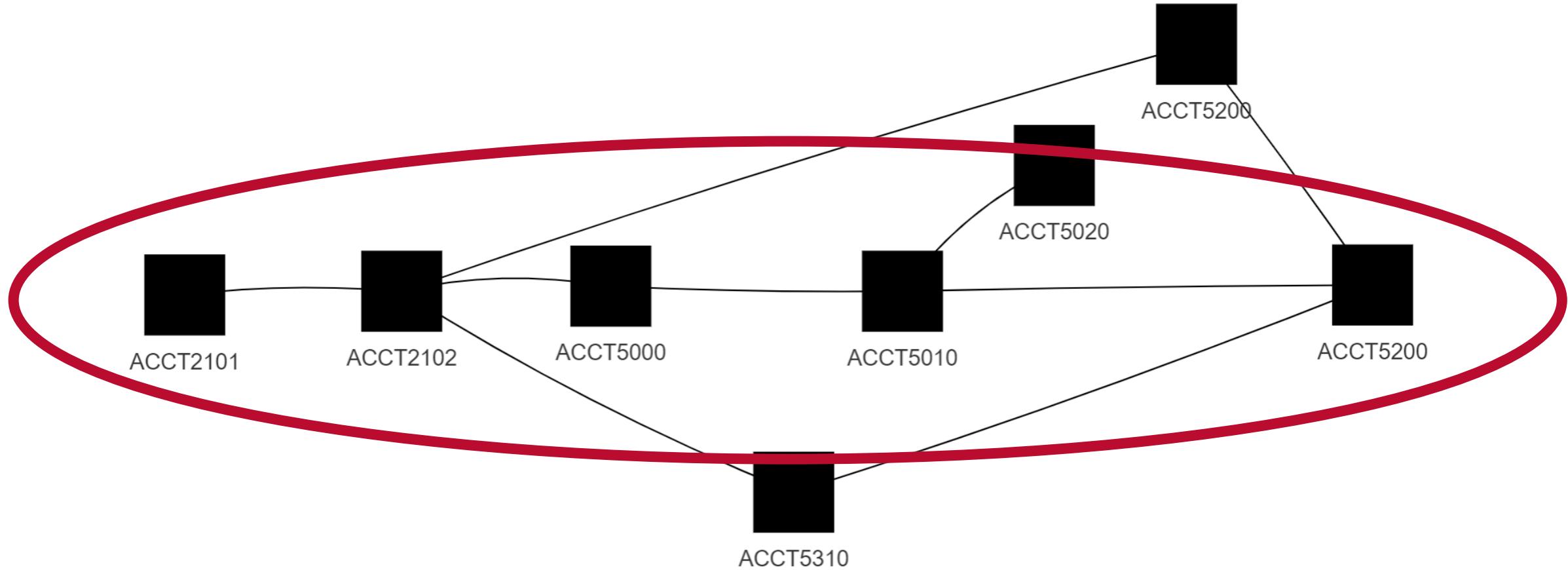
Metrics: Delay



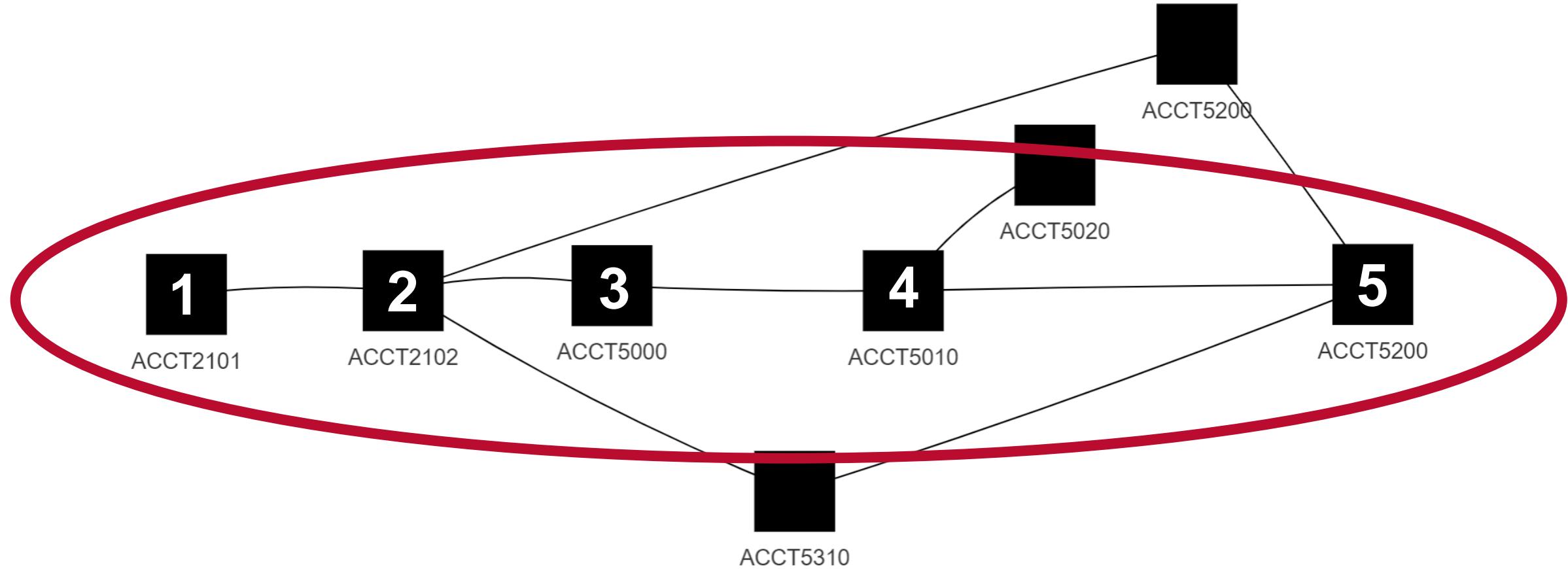
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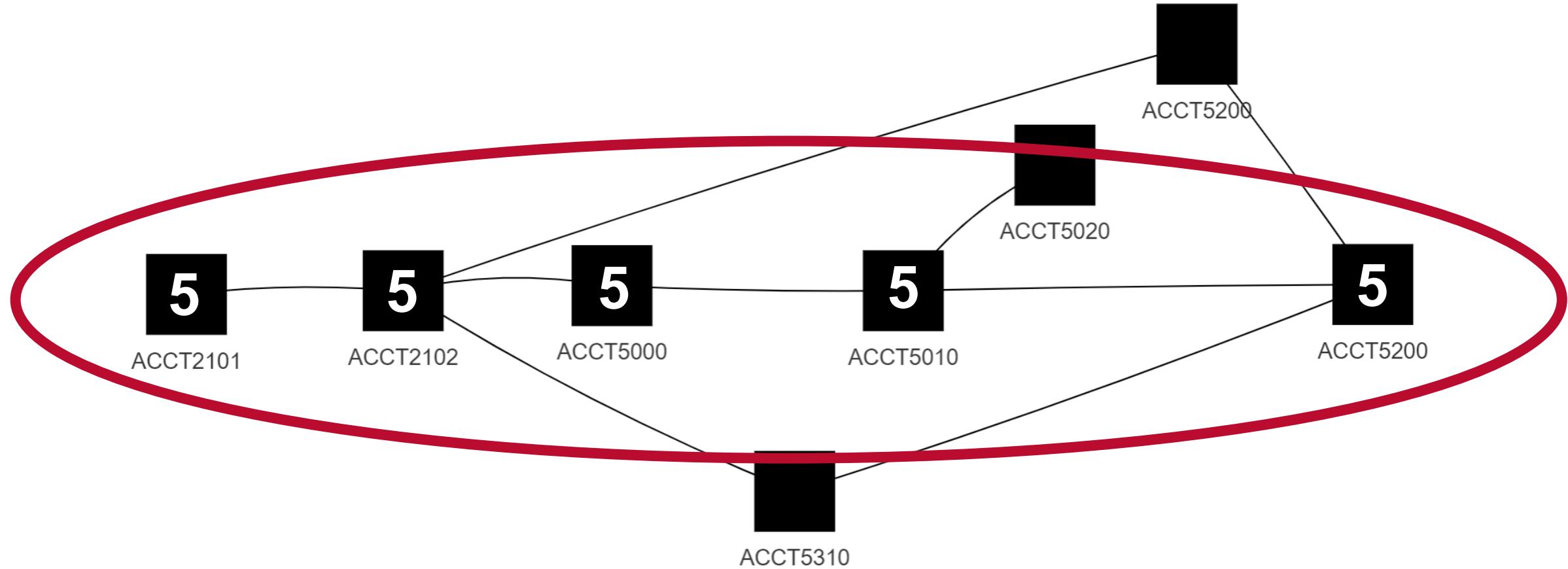
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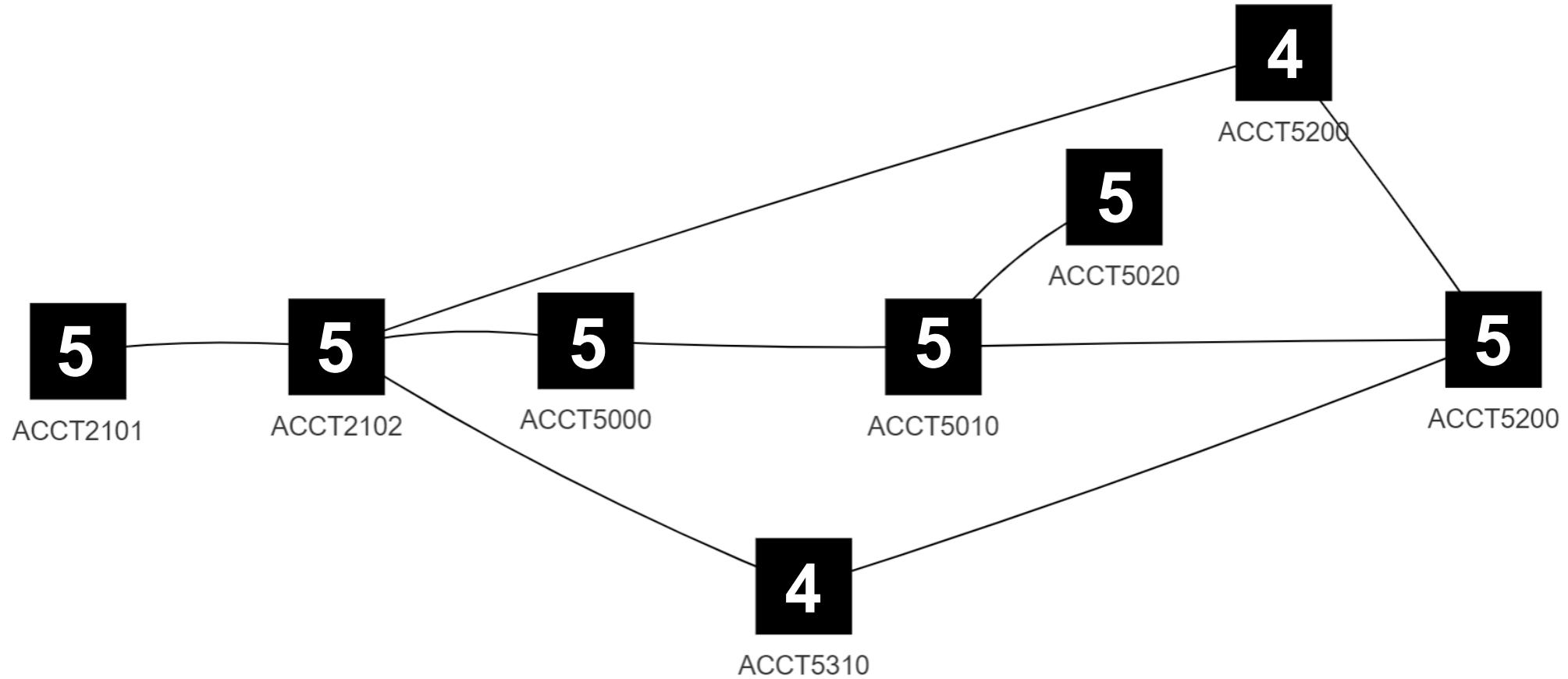
Metrics: Delay



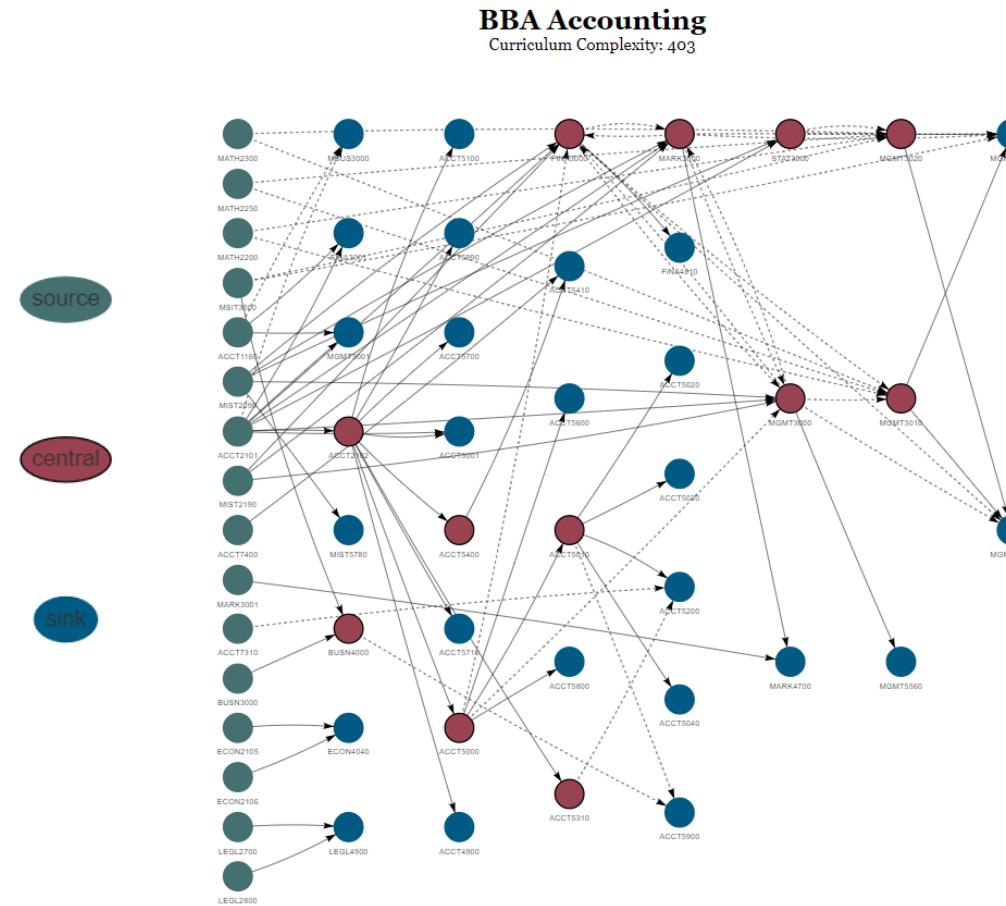
Metrics: Delay



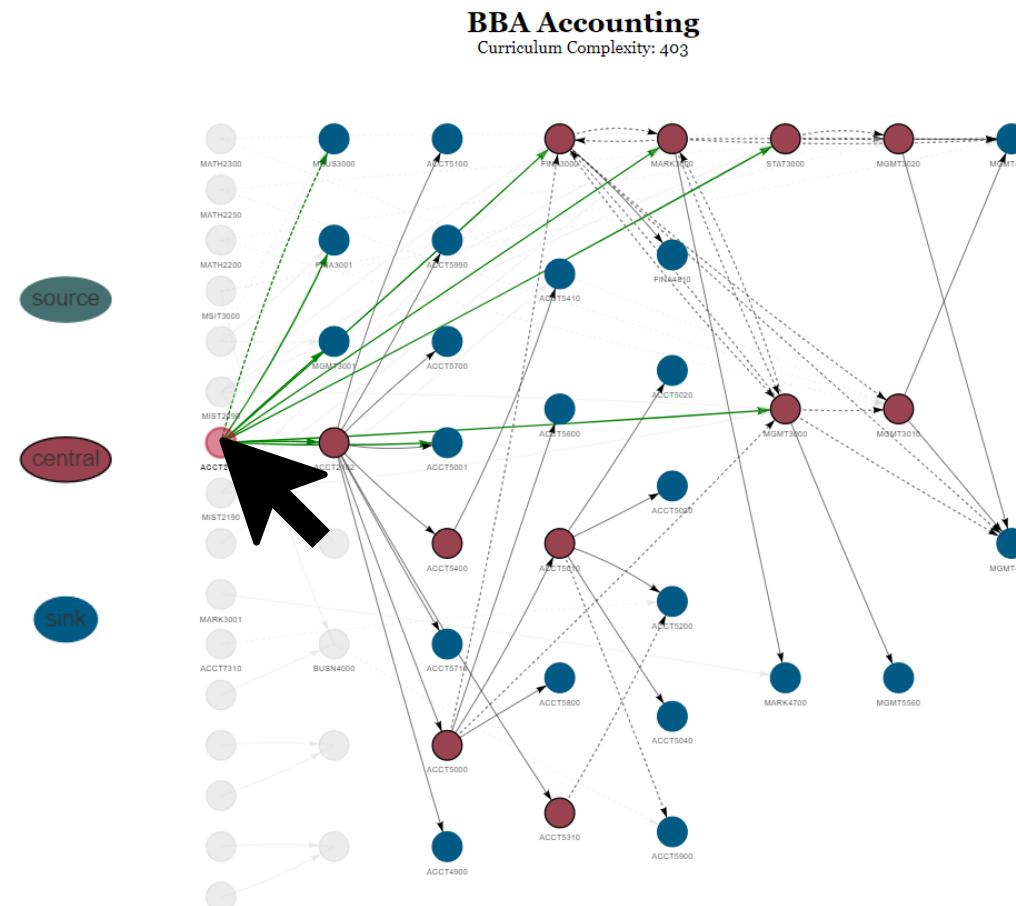
Metrics: Delay



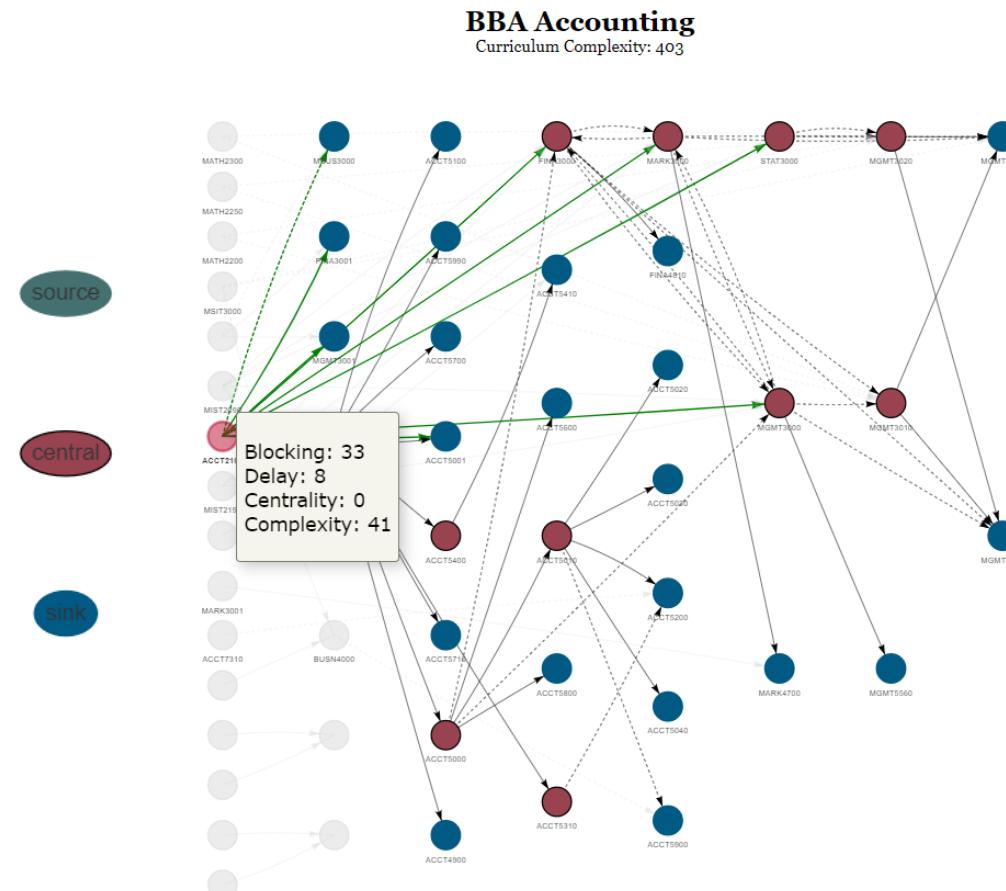
Graphing Networks



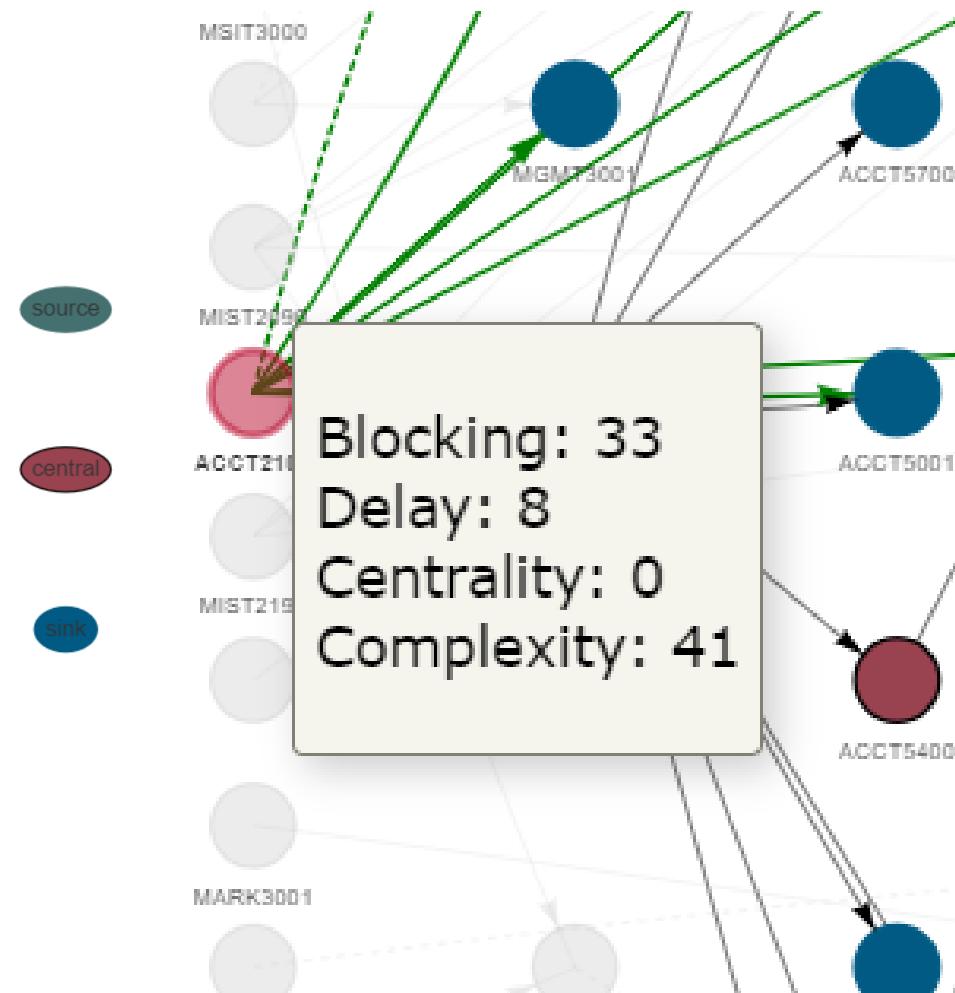
Graphing Networks



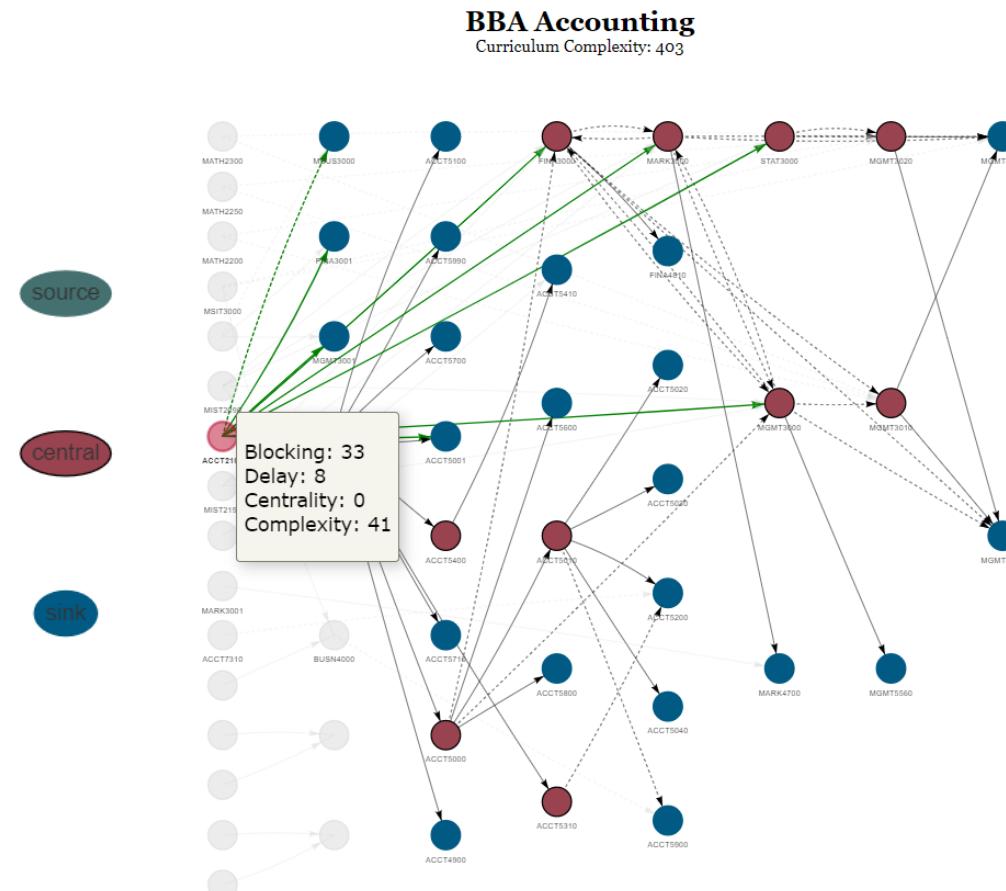
Graphing Networks



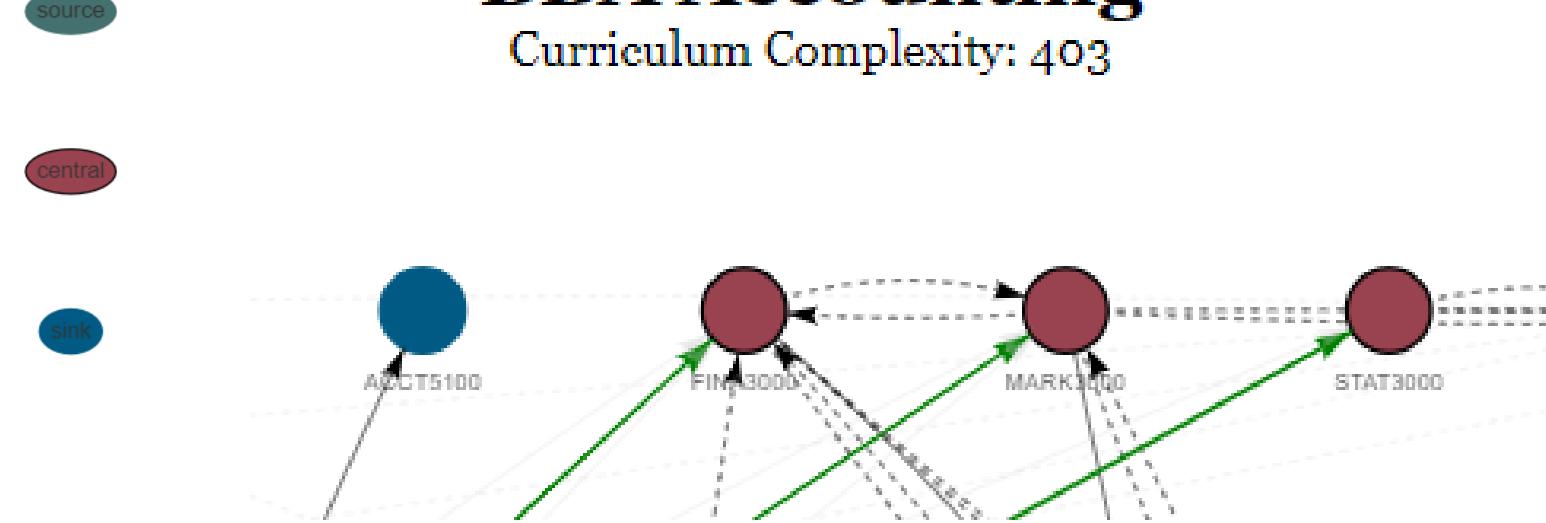
Graphing Networks



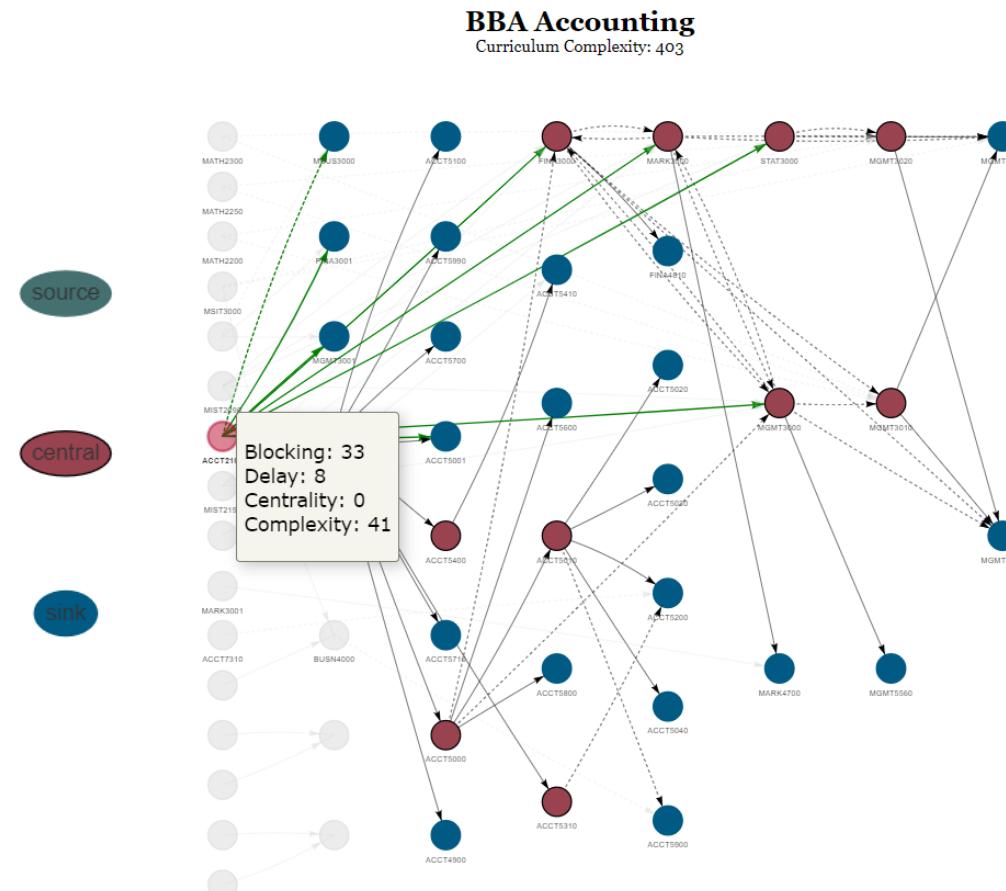
Graphing Networks



Graphing Networks

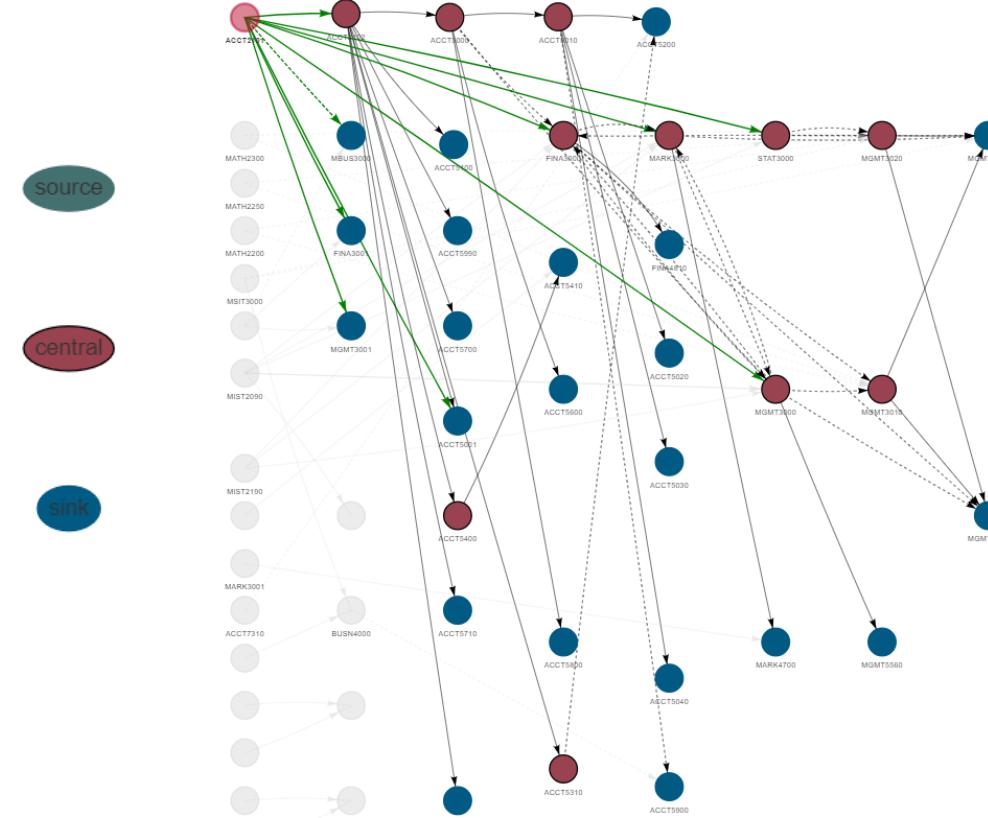


Graphing Networks



Graphing Networks

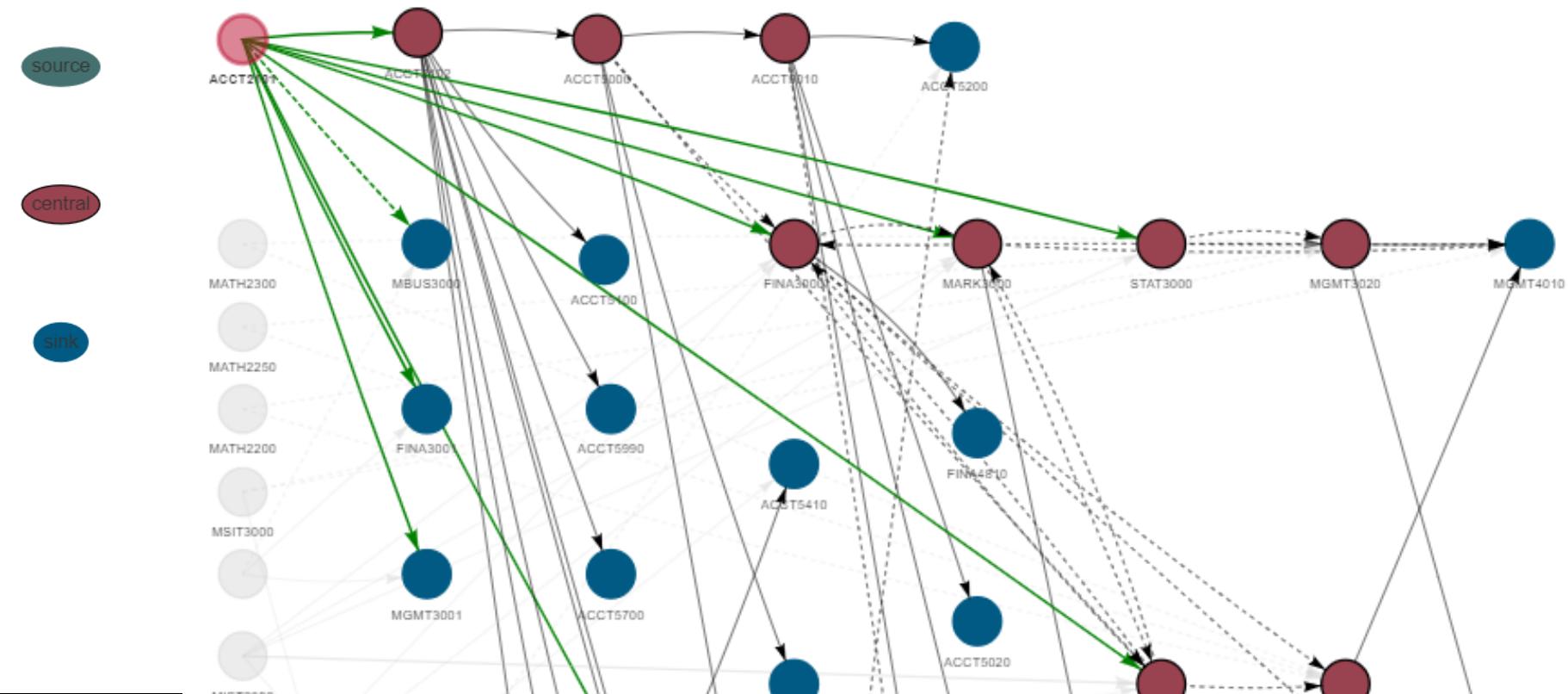
BBA Accounting
Curriculum Complexity: 403



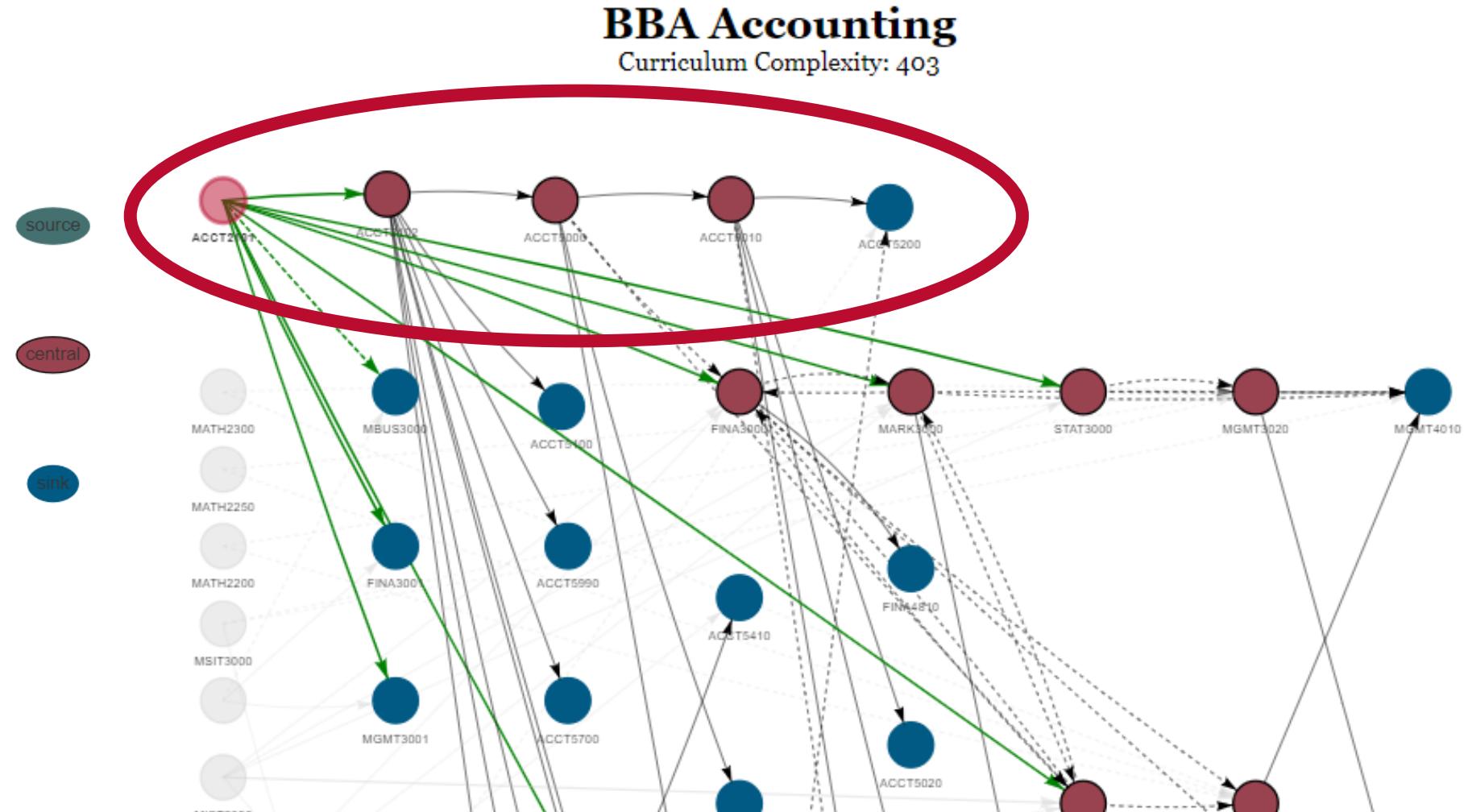
Graphing Networks

BBA Accounting

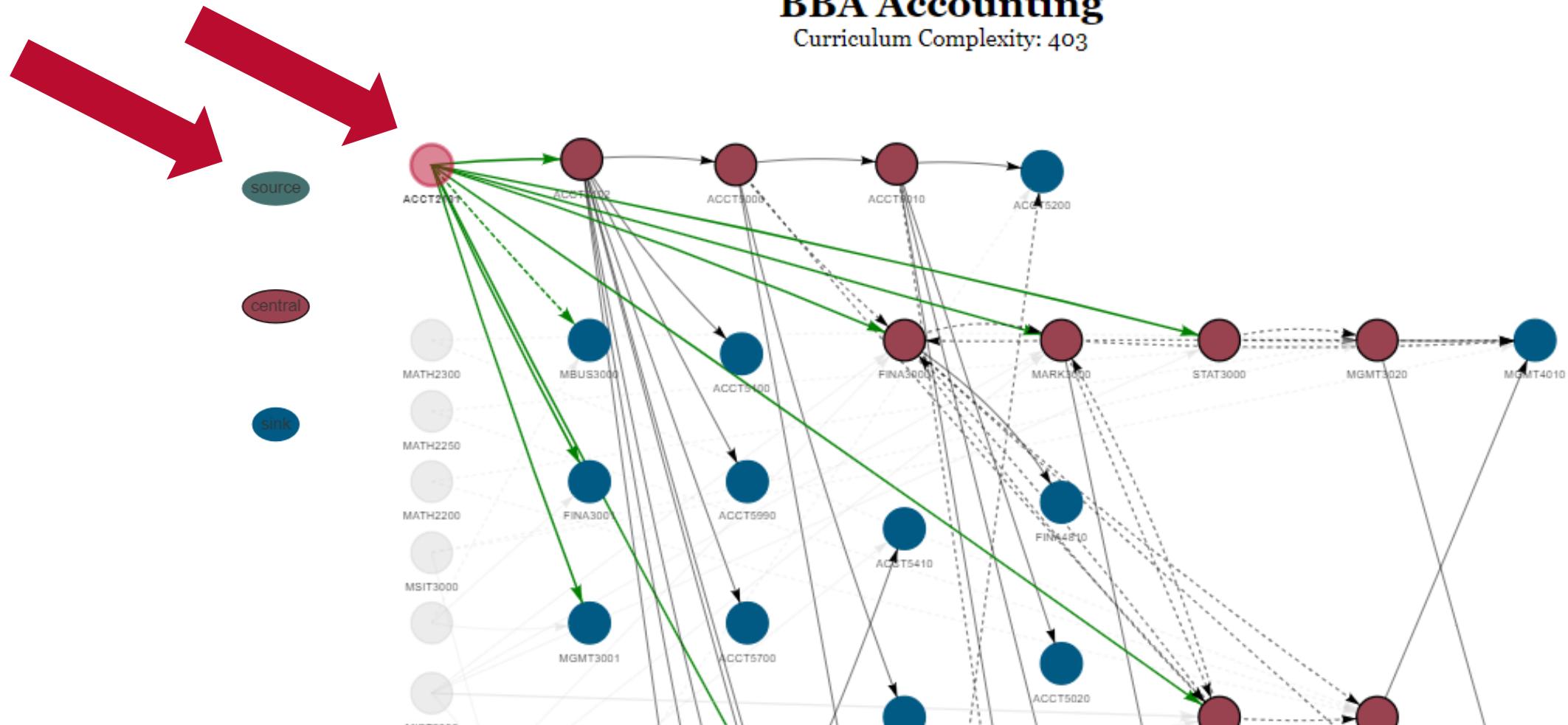
Curriculum Complexity: 403



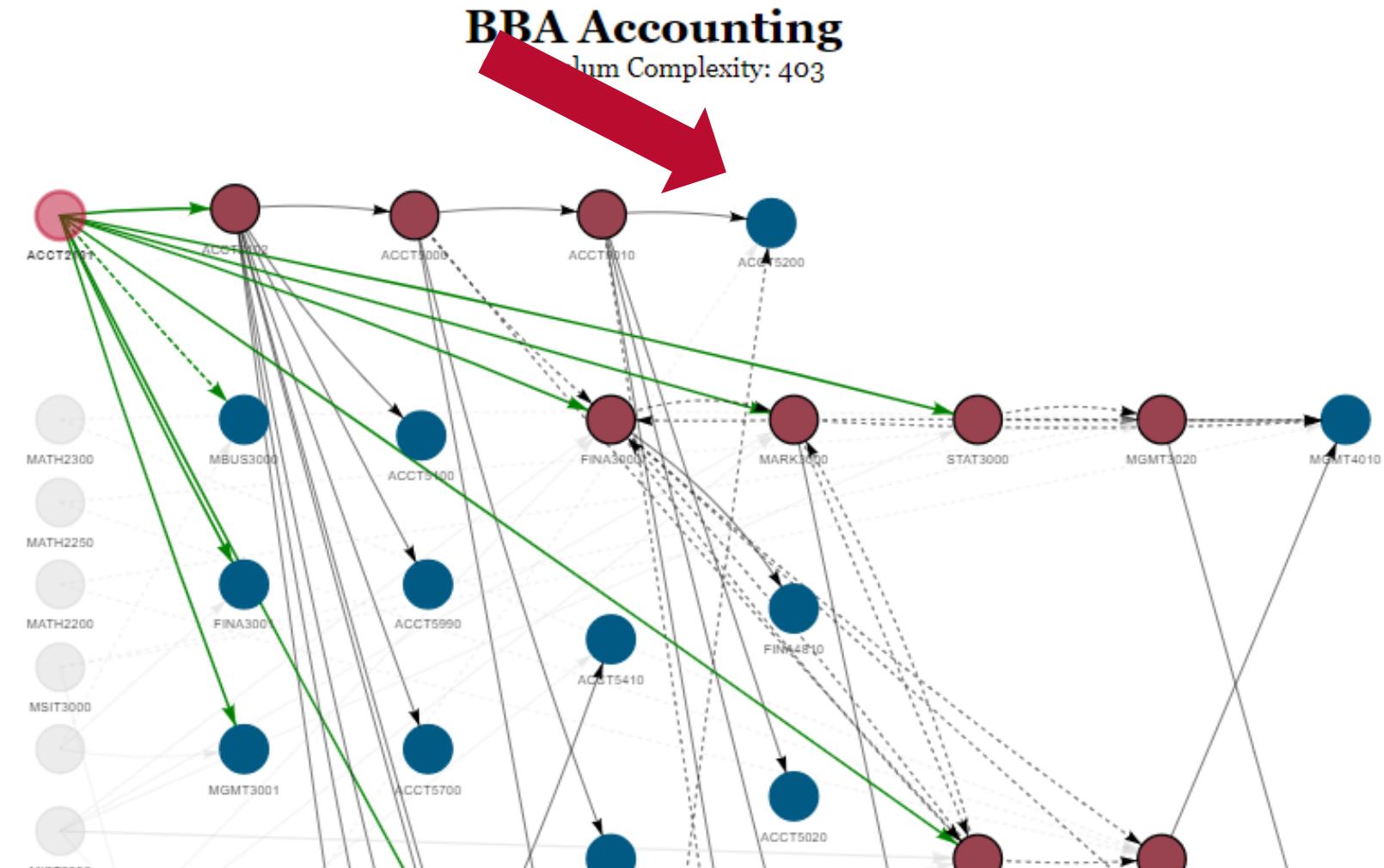
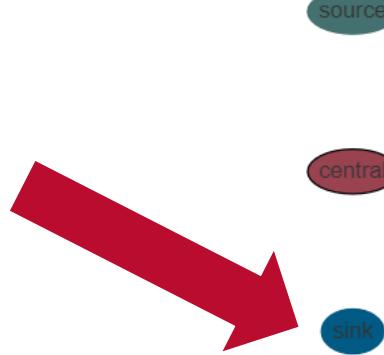
Graphing Networks



Graphing Networks



Graphing Networks



Part III: The Workflow

visNetwork Inputs, Data Pulls & Full Workflow

Inputs

<https://cran.r-project.org/web/packages/visNetwork/vignettes/Introduction-to-visNetwork.html>

Introduction to visNetwork

B. Thieurmel - DataStorm

2022-09-29

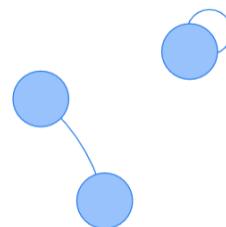
visNetwork is a R package for network visualization, using vis.js javascript library (<https://visjs.org>). All the remarks and bugs returns are welcome on github : <https://github.com/datastorm-open/visNetwork>.

Minimal example

visNetwork needs at least two informations :

- o a nodes data.frame, with *id* column
- o a edges data.frame, with *from* and *to* columns

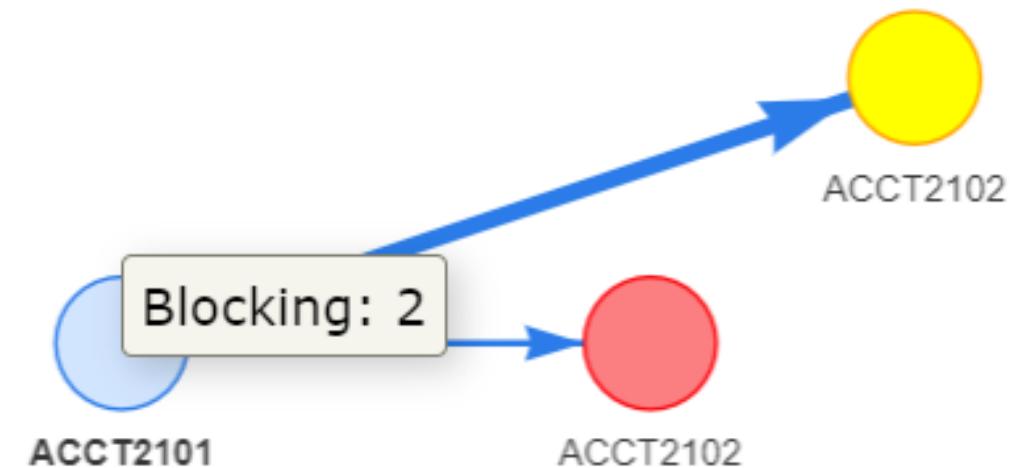
```
require(visNetwork, quietly = TRUE)
# minimal example
nodes <- data.frame(id = 1:3)
edges <- data.frame(from = c(1,2), to = c(1,3))
visNetwork(nodes, edges, width = "100%")
```



Inputs

Nodes

Edges



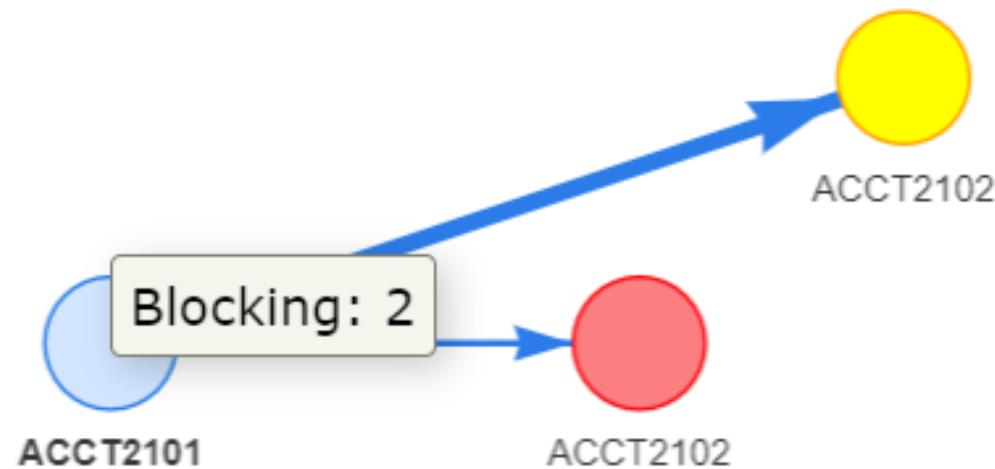
Inputs

Nodes

Edges



Inputs: Nodes



id

group/color

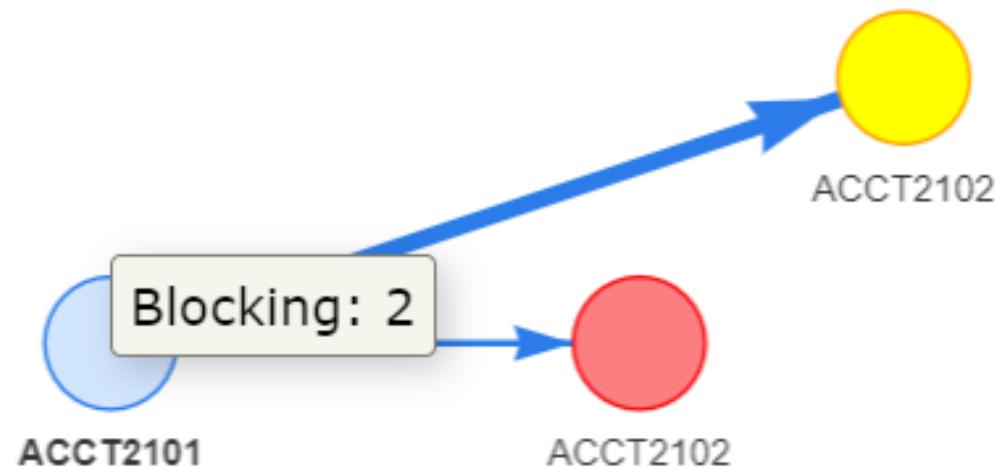
title in html

label
(name)

(x,y)
coordinates



Inputs: Nodes



id

group/color

title in html

label
(name)

(x,y)
coordinates



Inputs: Nodes



id

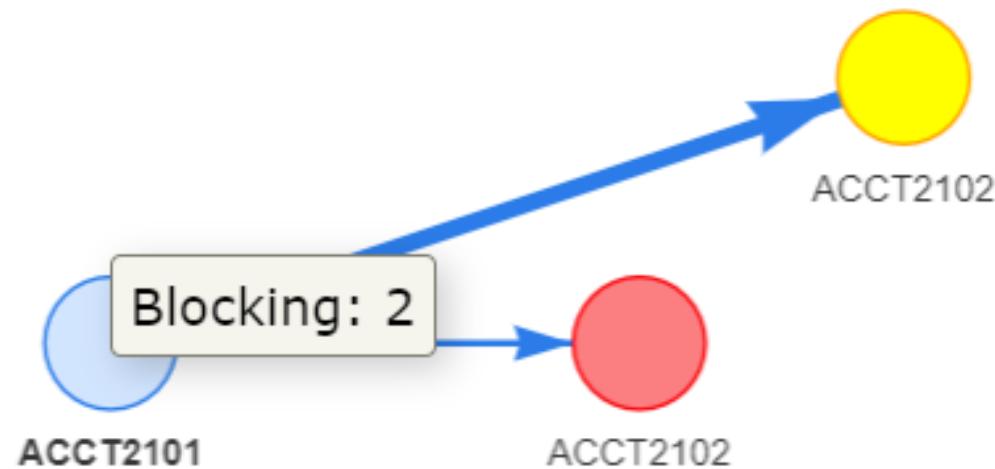
group/color

title in html

label
(name)

(x,y)
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Inputs: Nodes



id

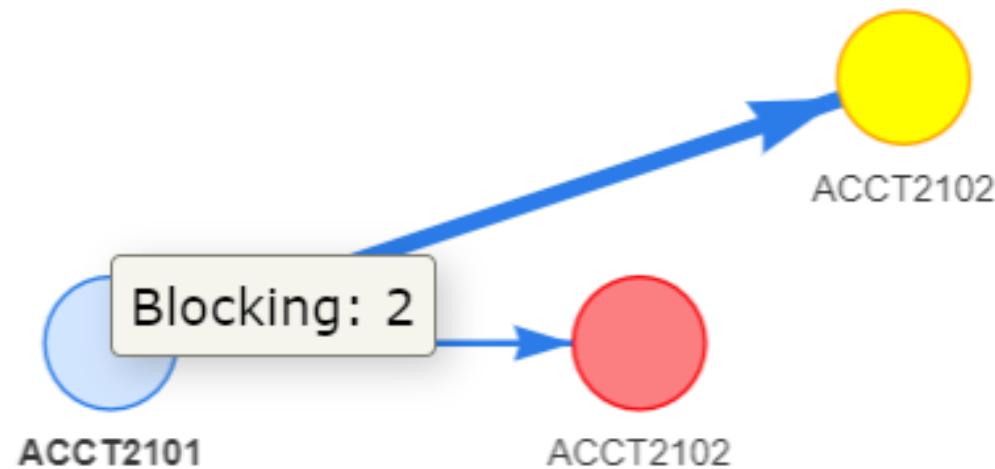
group/color

title in html

label
(name)

(x,y)
coordinates

Inputs: Nodes



id

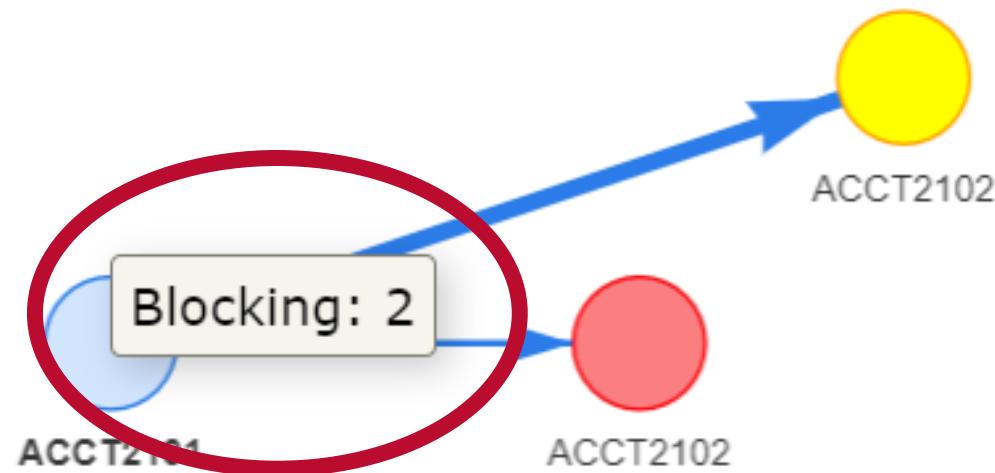
group/color

title in html

label
(name)

(x,y)
coordinates

Inputs: Nodes



`id`

`label
(name)`

`group/color`

`(x,y)
coordinates`

`title in html`



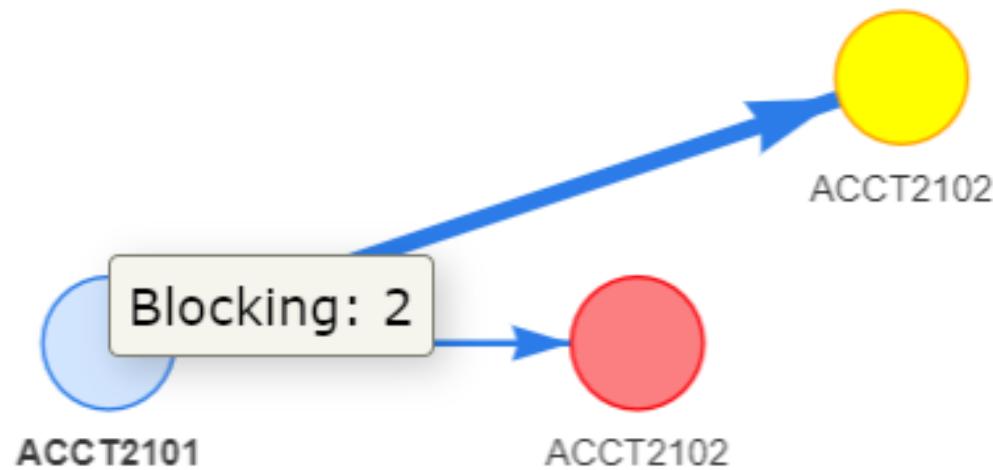
Inputs

Nodes

Edges



Inputs: Edges



from/to
(id)

arrow

width



Inputs: Edges



from/to
(id)

arrow

width



Inputs: Edges



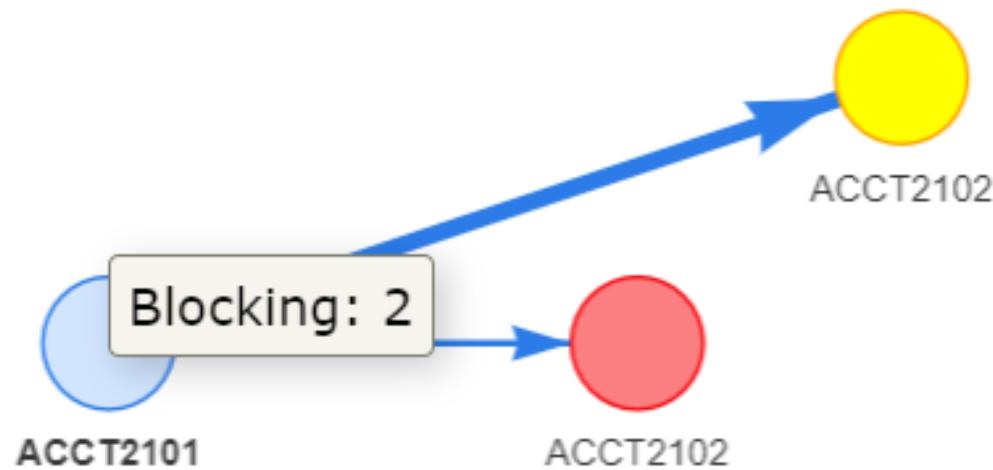
from/to
(id)

arrow

width



Inputs: Edges



from/to
(id)

arrow

width



Data Pulls (The Real Work)



Data Pulls: UGA Overview

- Elucian Banner & DegreeWorks School: Oracle SQL Server
- OIR Data Warehouse: Microsoft SQL Server



Data Pulls: Sources

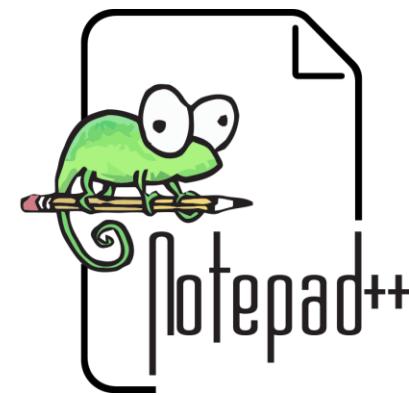
- Web Scraping (UGA Bulletin)
- Student Information System (Banner): No Curriculum Data
- Special SIS (Scribe/Degreeworks): Curriculum Data



Data Pulls: Web Scraping



or



Data Pulls: Web Scraping

DEGREE REQUIREMENTS

Entrance Requirements for the Major

General Education Core Curriculum (Selected with the advice of an academic advisor)

Area II: History

Area VI

Major Requirements

College-wide Requirements must be satisfied in order to graduate with this major.

TOTAL DEGREE HOURS

129 hours

Basic View ▾

I. FOUNDATION COURSES (9 HOURS)

[ENGL 1101](#) or [ENGL 1101E](#) or [ENGL 1101S](#)

[ENGL 1102](#) or [ENGL 1102E](#) or [ENGL 1103](#) or [ENGL 1050H](#) or
[ENGL 1060H](#)

[MATH 1101](#) or [MATH 1113](#) or [MATH 1113E](#) or [MATH 2200](#) or
[MATH 2250](#) or [MATH 2250E](#) or [MATH 2300H](#) or [MATH 2400](#) or
[MATH 2400H](#) or [MATH 2410](#) or [MATH 2410H](#) or [STAT 2000](#)
or [STAT 2000E](#)

II. SCIENCES (7-8 HOURS)

At least one of the physical science or life science courses must include a laboratory.

Physical Sciences (3-4 hours)

No preferred courses for this area. See Core Curriculum view.

Life Sciences (3-4 hours)

Nodes

Edges



Data Pulls: Web Scraping

The screenshot shows the UGA Bulletin's Courses page. At the top, there is a red header bar with the UGA logo and the text "UGA BULLETIN". Below the header, there are three tabs: "MAJORS", "COURSES" (which is currently selected), and "UNI". The main content area has a breadcrumb navigation "Home / Courses". Below this, there is a section titled "FIND A COURSE" with a red arrow icon. It includes a note: "Use the menus below to help you find a course." There are two input fields: "PREFIX: acct" and "NUMBER: 2102", followed by a "Go" button. Below these are two dropdown menus: "By Prefix: ACCT - Accounting" and "ACCT 2102". At the bottom of the page, there is a dropdown menu labeled "Basic View with Syllabus". A horizontal line separates this from the footer information. The footer contains "Course ID: ACCT 2102. 3 hours." and "Course Title: Principles of Accounting II".

Nodes

Edges



Data Pulls: Web Scraping

FIND A COURSE

Use the menus below to help you find a course.

By Prefix and Number: PREFIX: NUMBER: Go

By Prefix:

Course ID:	ACCT 2102. 3 hours.
Course Title:	Principles of Accounting II
Course Description:	Basic managerial accounting systems, concepts, and p interpretation, and reporting of cost data for manager needs. Cost-volume-profit analysis, budgeting, and pe discussed as they relate to other business disciplines.
Athena Title:	Principles of Accounting II
Equivalent Courses:	Not open to students with credit in ACCT 2102H, ACCT
Prerequisite:	ACCT 2101H or ACCT 2101 or ACCT 2101E
Semester Course Offered:	Offered every year.
Grading System:	A-F (Traditional)



Nodes

Edges



Data Pulls: Web Scraping

- Find consistent formatting
 - Tables: Extract the relevant columns
 - Links: Extract the link names
 - Keywords: Save all text in a row after a keyword
- Repeat for all websites
 - Find Menu items for list of all URL's
 - Find URL formatting



Data Pulls: SIS

- Student-level
 - Student Enrollments table
- Curriculum-level: No perfect source
 - All distinct courses taken by graduates
 - All distinct courses in a Subject Code

Nodes

Edges



Data Pulls: SIS

SMRACAA or equivalent

Nodes

Edges



Data Pulls: Special SIS

- Curriculum-level
 - Scribe: Requirements “scribing” language
- Student-level
 - DegreeWorks Degree Audits:
“Classes Applied” towards degree &
“Classes Needed” for requirement

Nodes

Edges



Data Pulls: Special SIS: Scribe Tips

DISCLAIMER: General Tips Only, Ask your Team

- Formatting can vary *a lot*
- Row by Row
- Rows having “Class”/ “Credits”
- Subject Code + numbers separated by commas
- @ is wildcard for class numbers
- “Hide” or “hide” can mean don’t include

Nodes

Edges



Data Pulls: Special SIS: DegreeWorks Tips

DISCLAIMER: General Tips Only, Ask your Team

- Requirements → Blocks → Rules → Classes
- Individual Degree Audits generated & saved to specific table
- “Audit Type” = “AA”
- “Result Type” = “Label”, “ClassApplied”, “ClassNeeded”
- Value1 = Subject Code, Value2 = Course Number

Nodes

Edges



Data Sources: Special SIS

SMRACAA or equivalent

Nodes

Edges



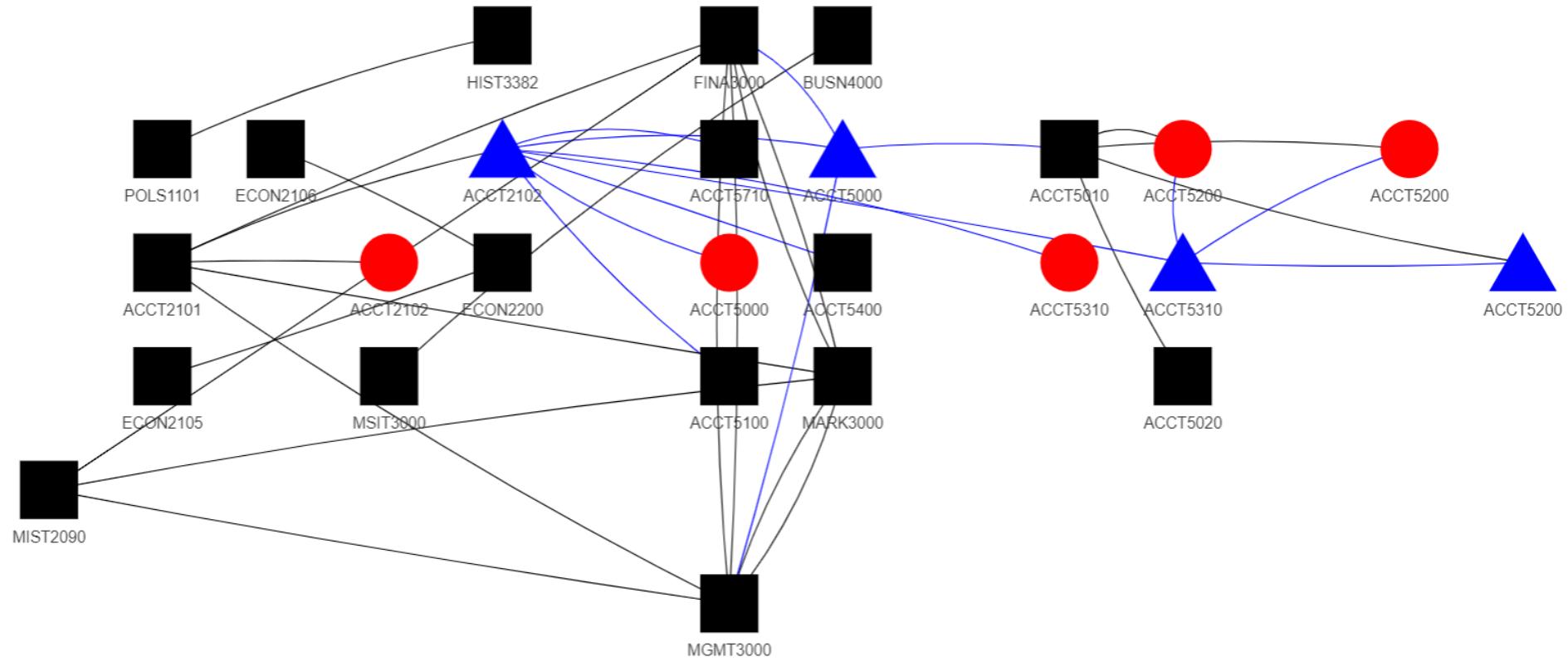
Workflow

- 1. Pre-load all unique courses and pre-requisites**
 - a) Encode/Decode functions (course names → integer ids) for speed**
- 2. Import node list from data sources with any special tags**
- 3. Run metric calculation functions**
- 4. Prep node & edge lists for visNetwork**
- 5. Run visNetwork function**
- 6. Export (visSave function) to HTML or View**



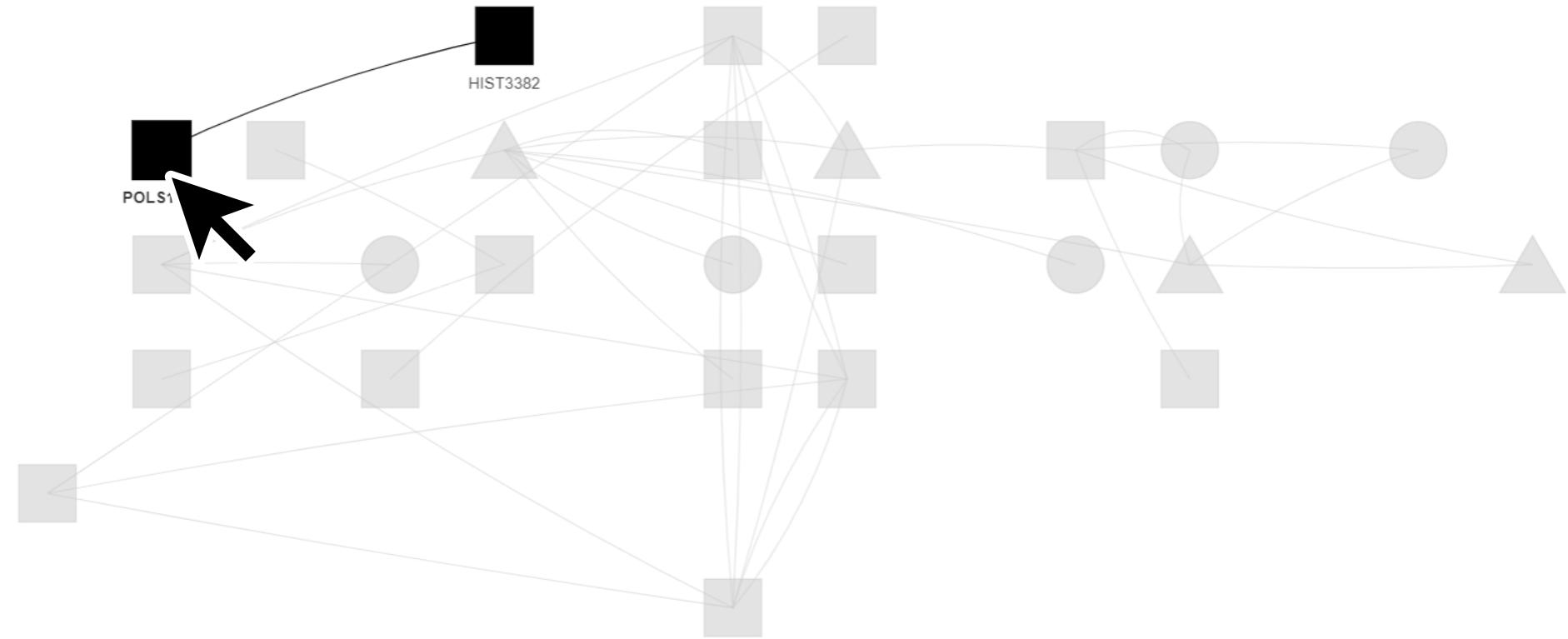
Graphing Networks

The diagram consists of three vertical columns. The first column contains a solid black square icon above the word "pass". The second column contains a solid red circle icon above the word "fail". The third column contains a solid blue triangle icon pointing upwards above the word "repeat".



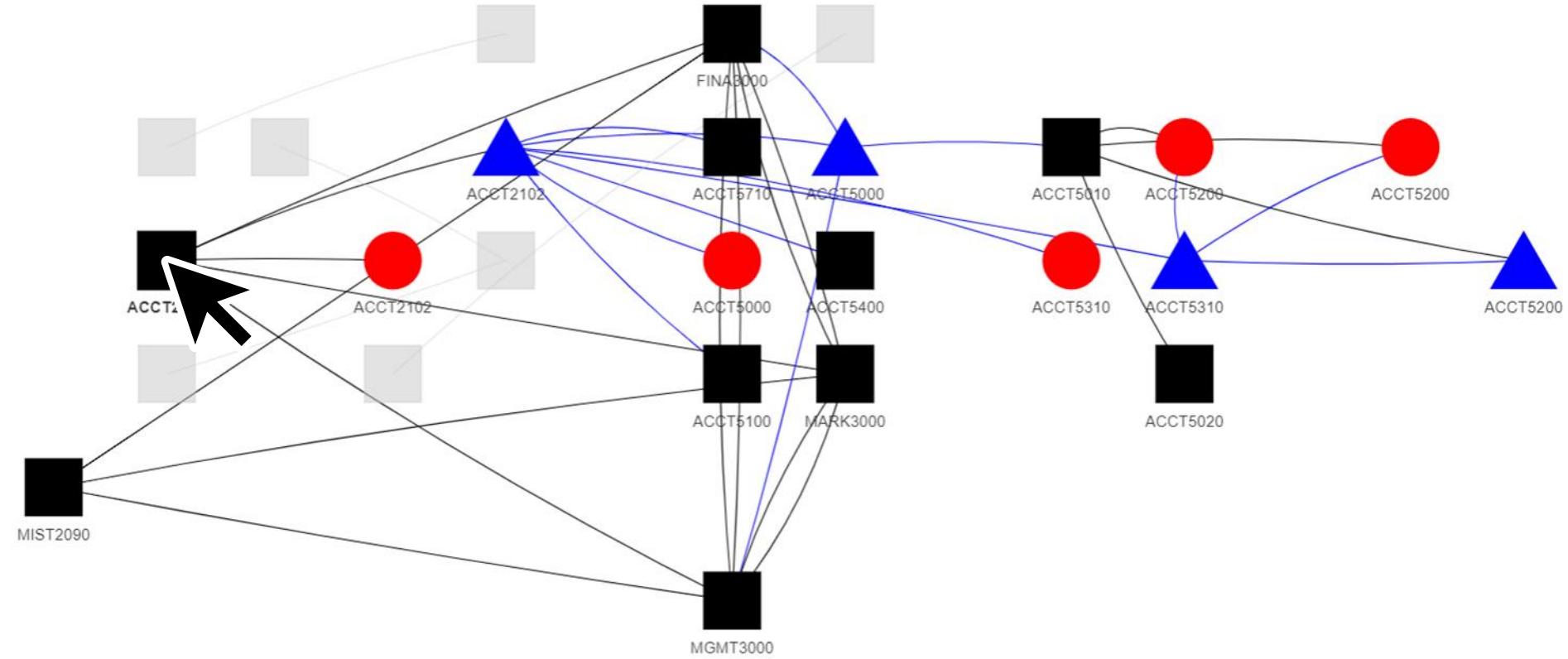
Graphing Networks

- pass
- fail
- ▲ repeat



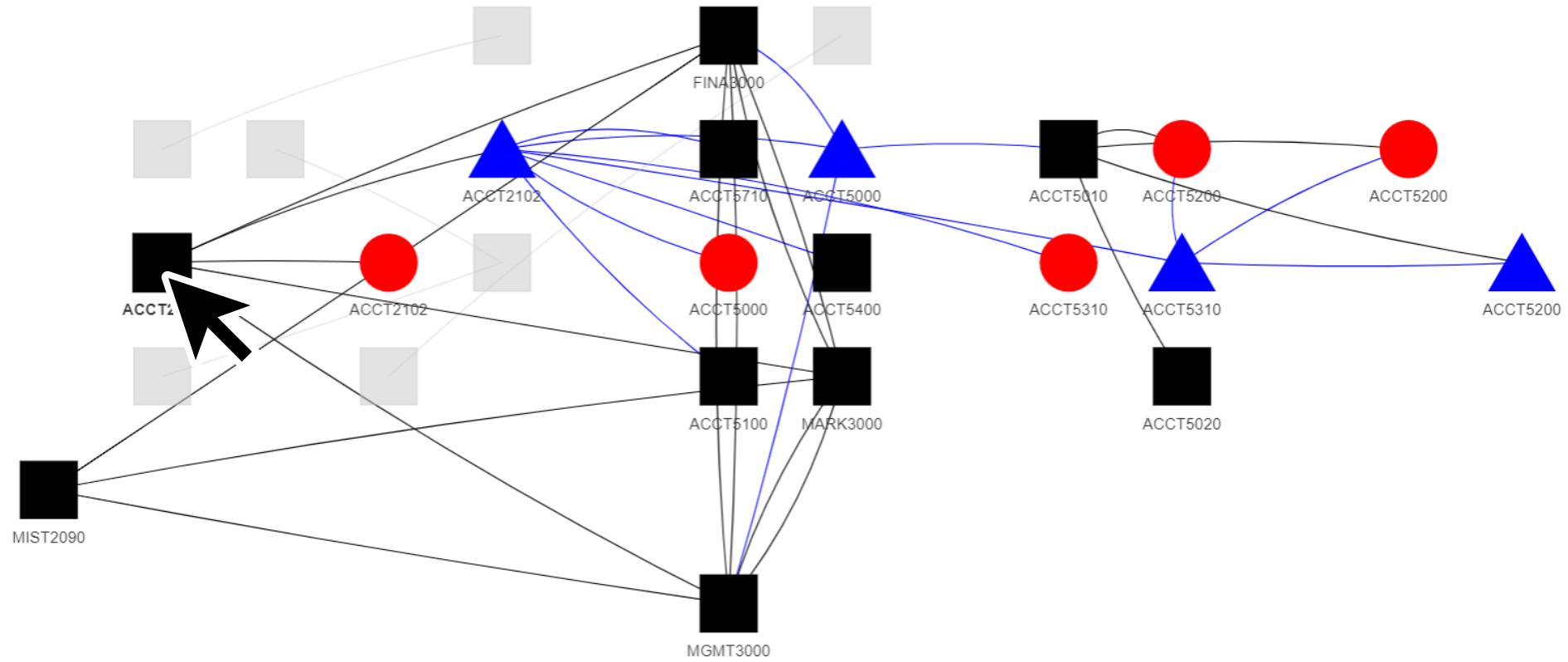
Graphing Networks

- pass
- fail
- ▲ repeat



Graphing Networks

- pass
- fail
- ▲ repeat

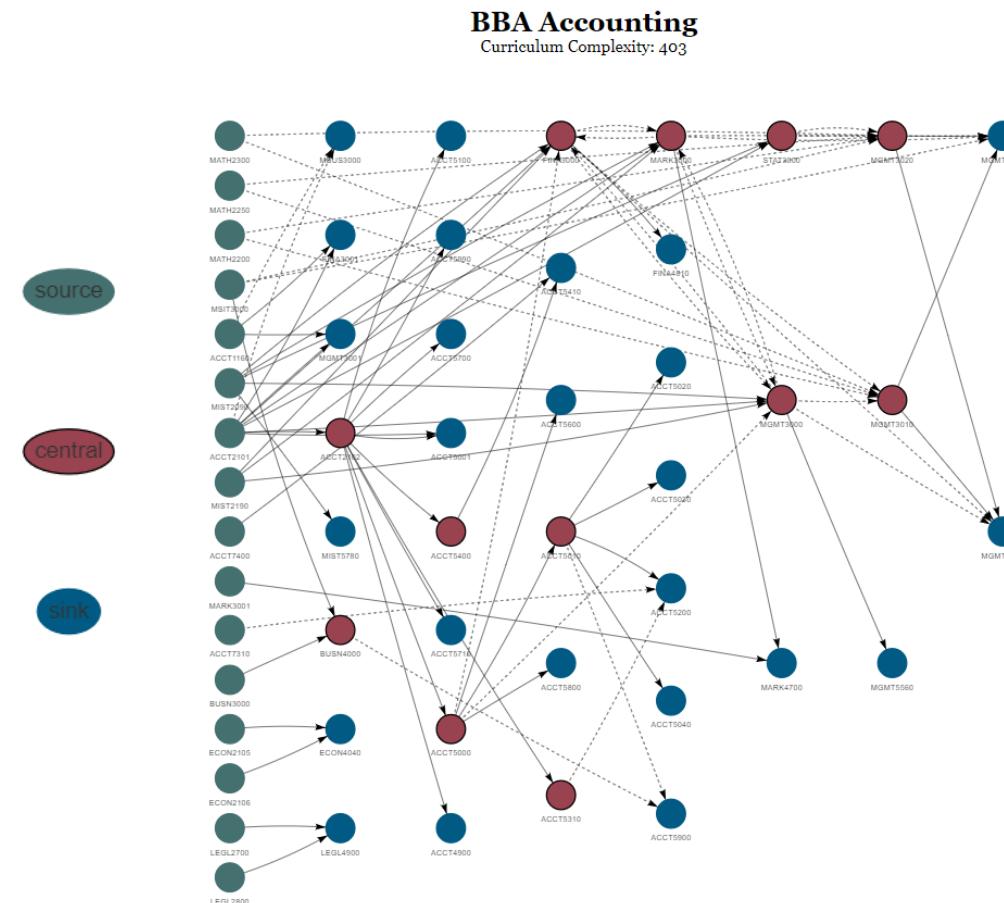


Part IV: Extension Examples

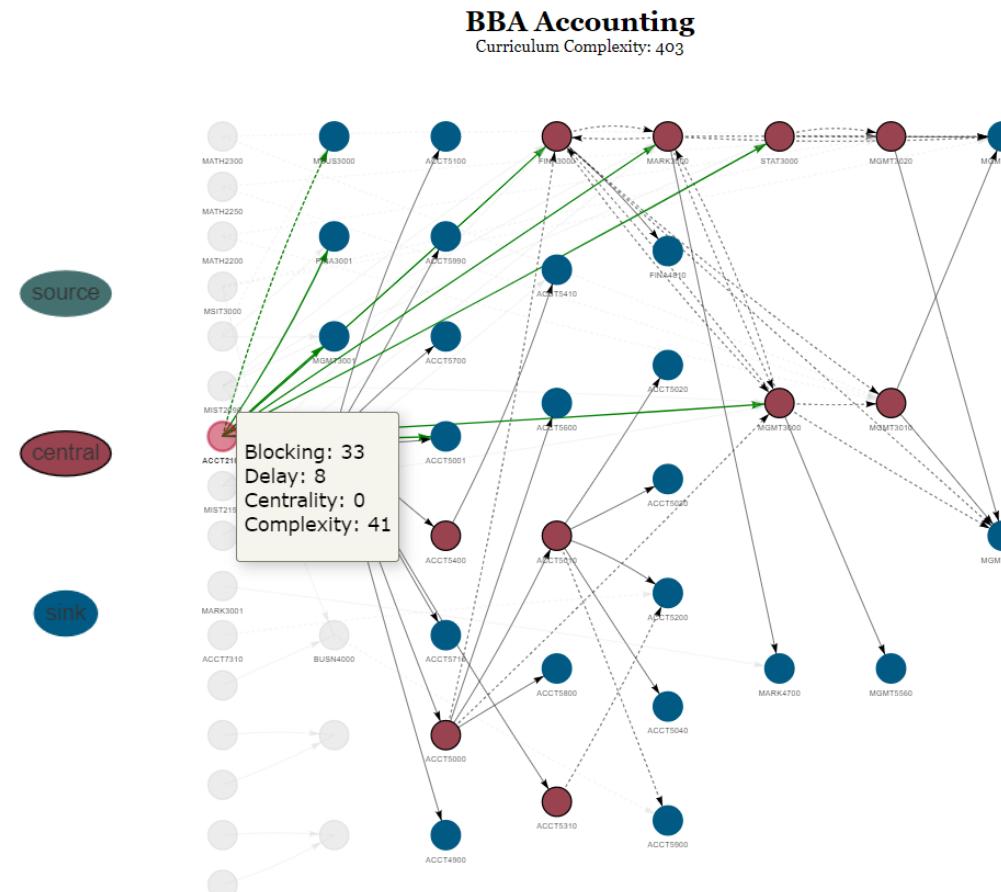
Task: Find Theoretical & Actual Gateway Courses



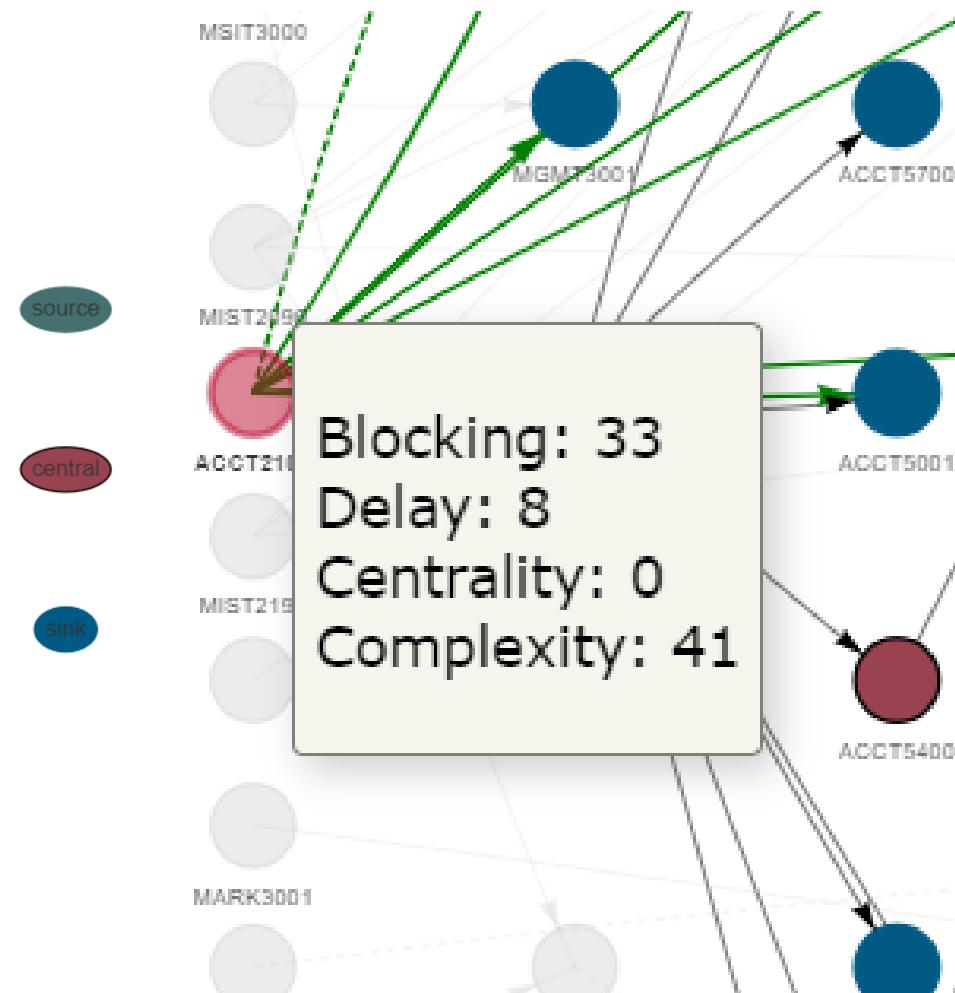
Graphing Networks



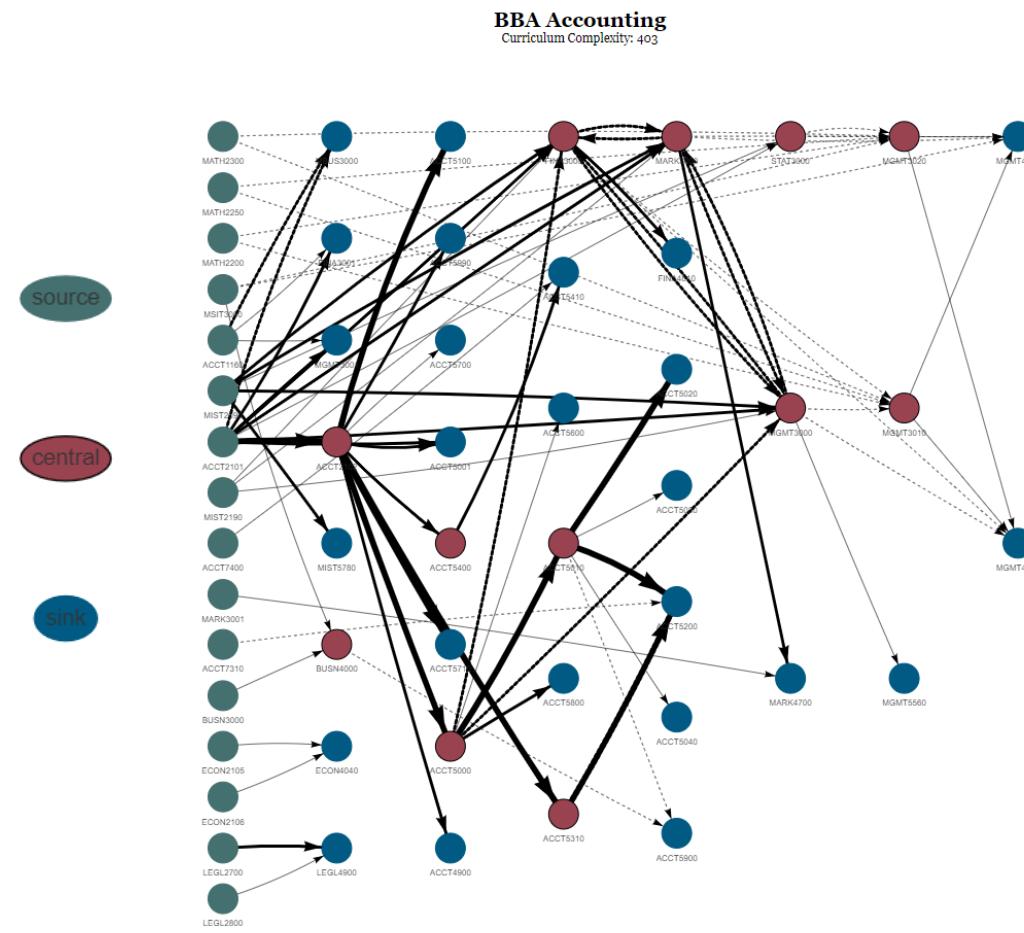
Graphing Networks



Graphing Networks



Graphing Networks



Metrics: Actual Gateway Courses Pseudocode

1. Identify all pathways (for a major)
2. Calculate metrics for pathways
3. Gather student enrollments for graduates of majors
4. Count number of times paths are travelled
5. Weigh paths by proportion of graduates travelled
6. Weigh courses by path weight

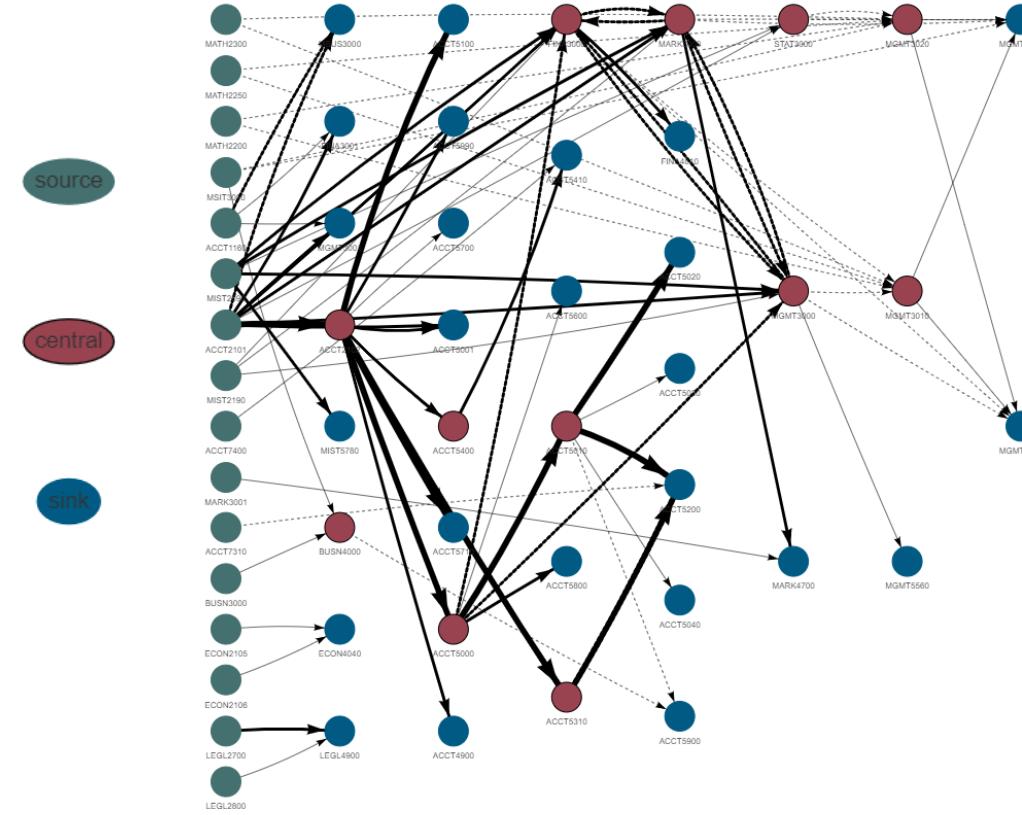


Task: Majors by Unique Pathways Travelled by Graduates

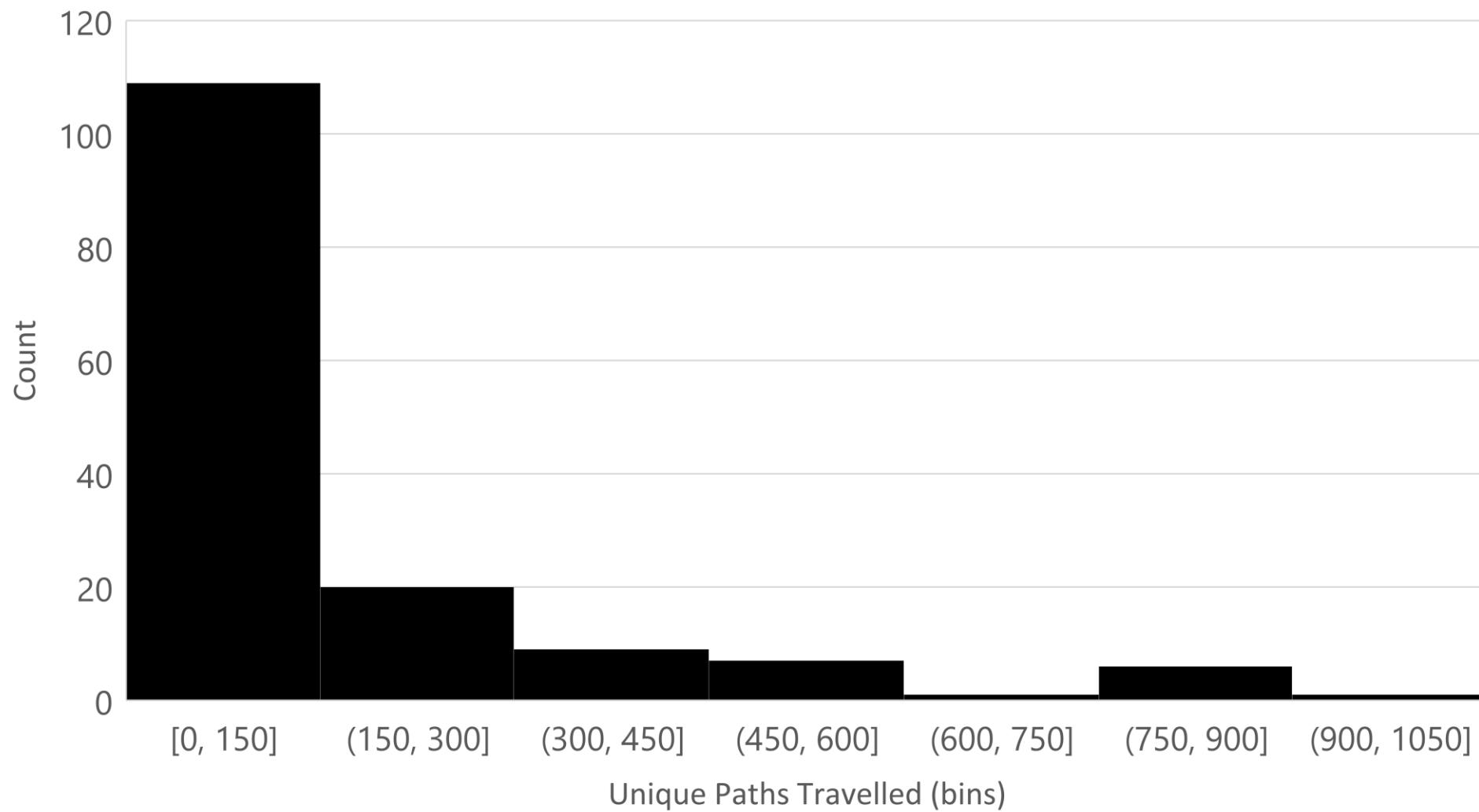


Graphing Networks

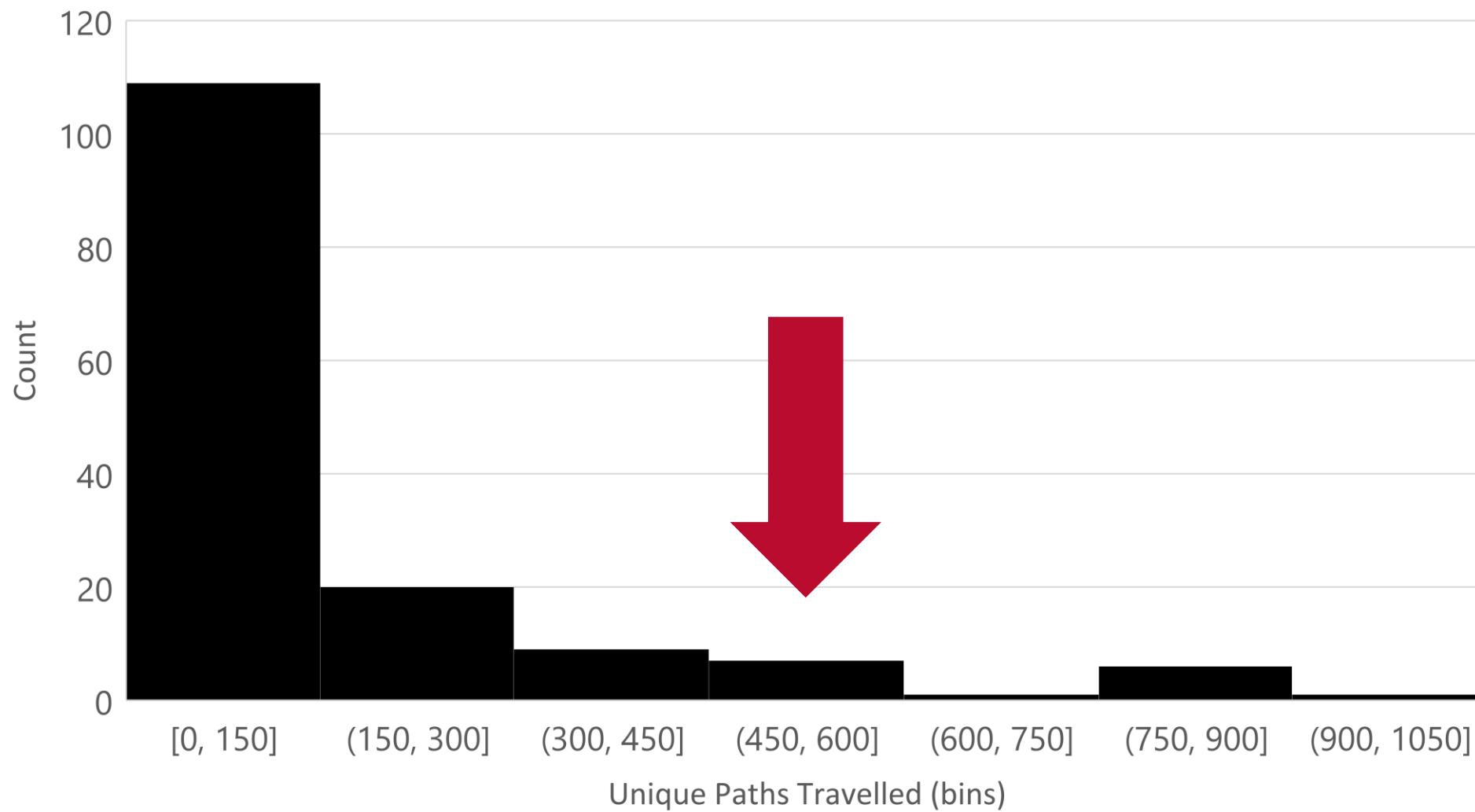
BBA Accounting
Curriculum Complexity: 403



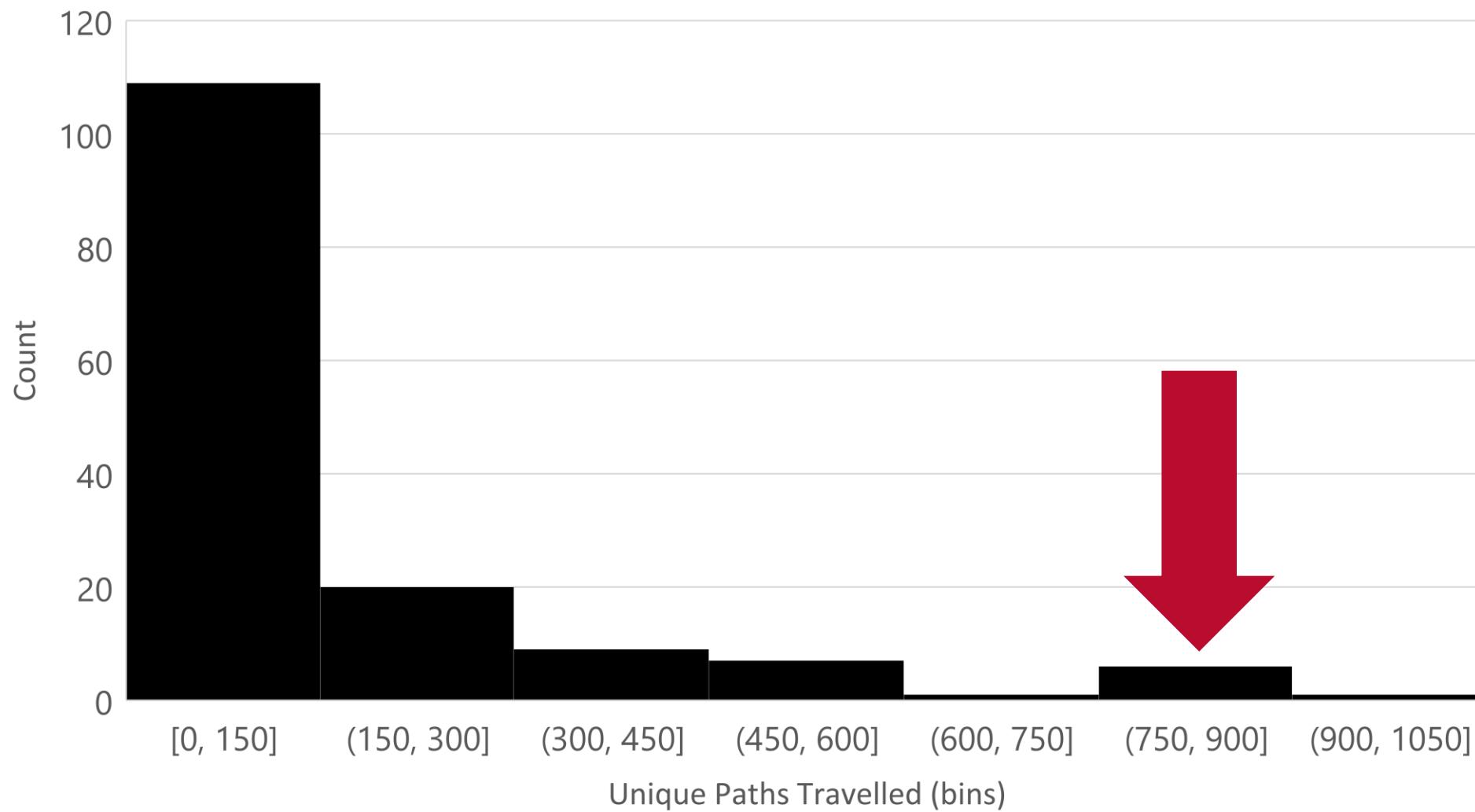
Histogram of Unique Paths Travelled by Graduates from a Degree



Histogram of Unique Paths Travelled by Graduates from a Degree



Histogram of Unique Paths Travelled by Graduates from a Degree



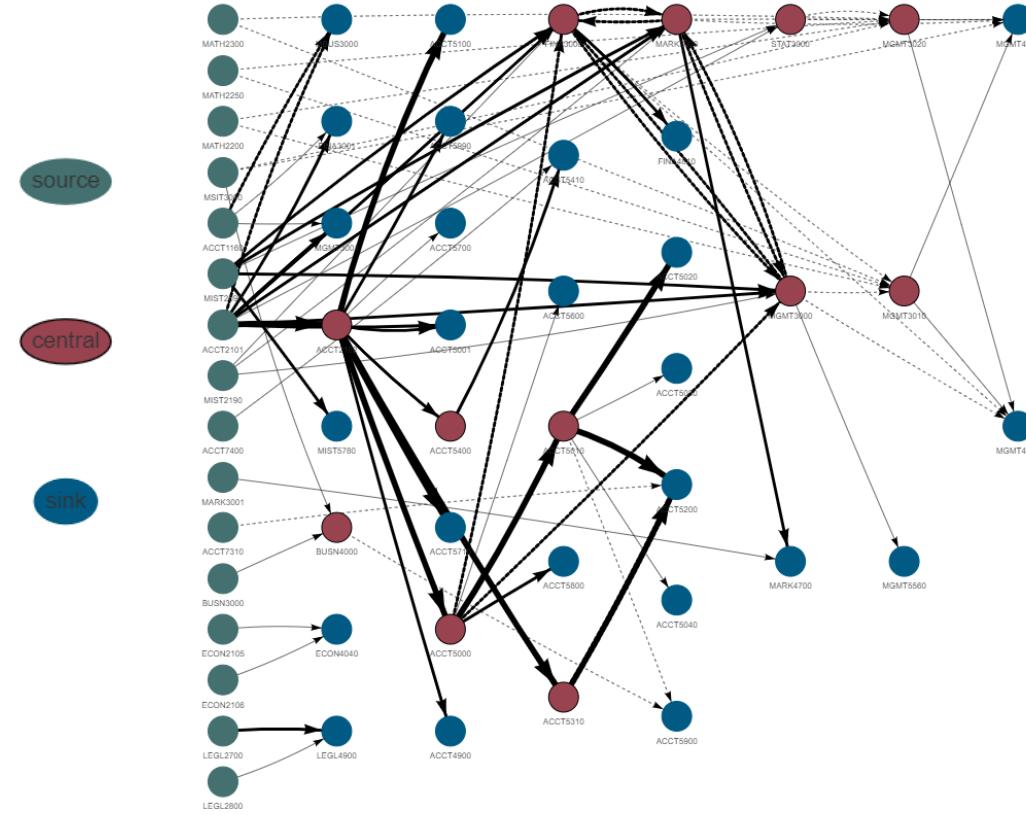
Metrics: Flexibility Pseudocode

1. Identify all pathways (for a major)
2. Calculate metrics for pathways
3. Gather student enrollments for graduates of majors
4. Count number of times paths are travelled
5. Calculate Proportions

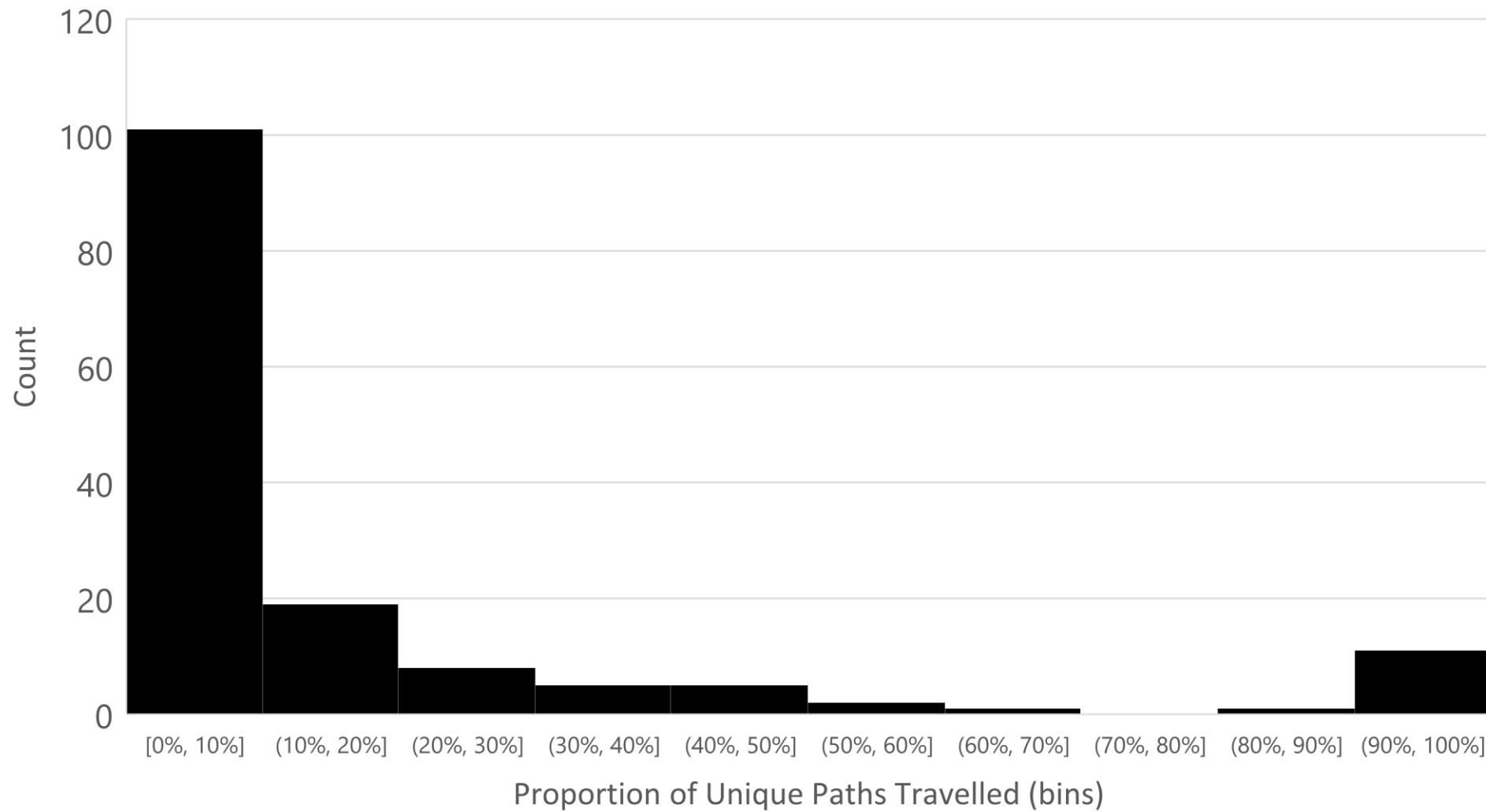


Graphing Networks

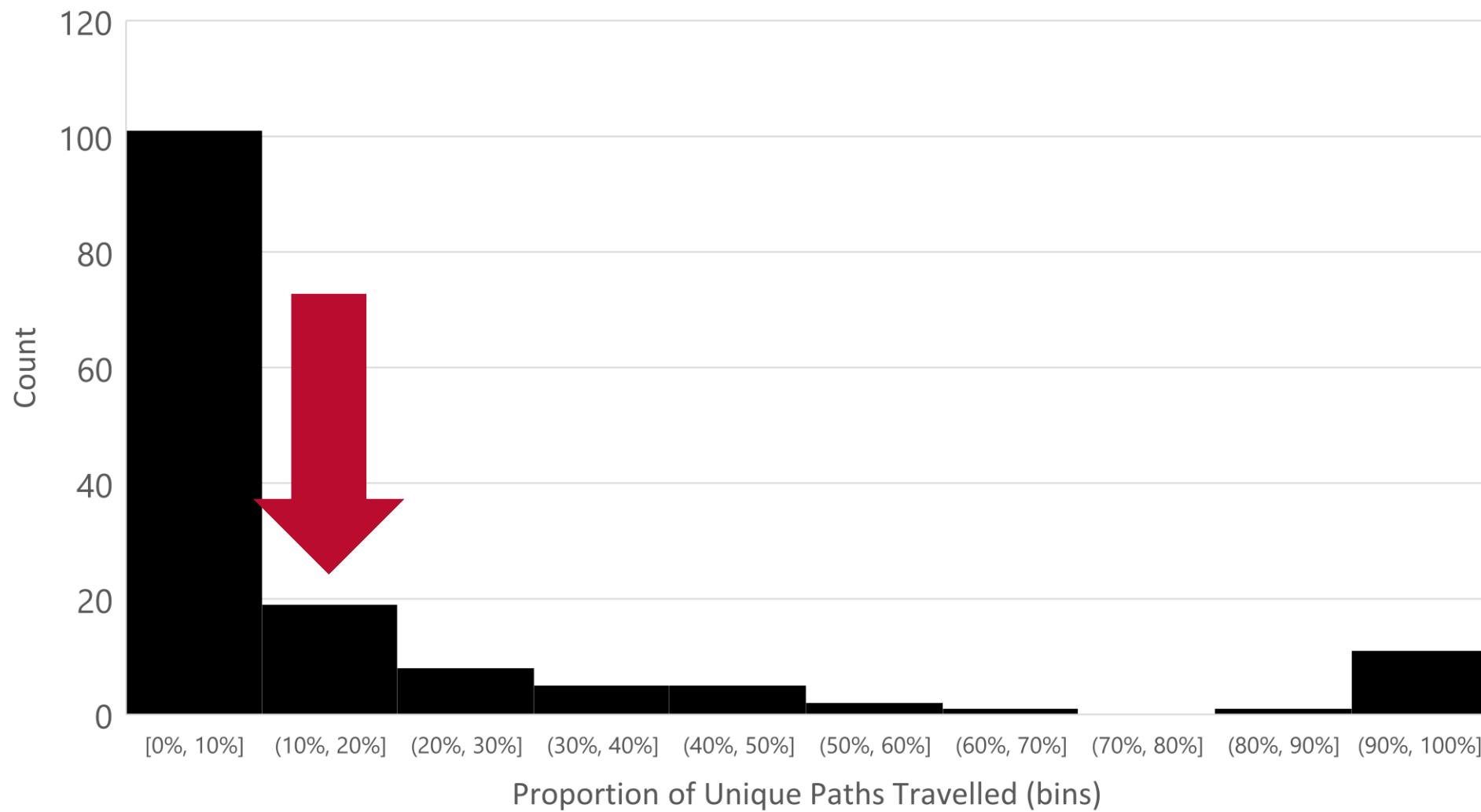
BBA Accounting
Curriculum Complexity: 403



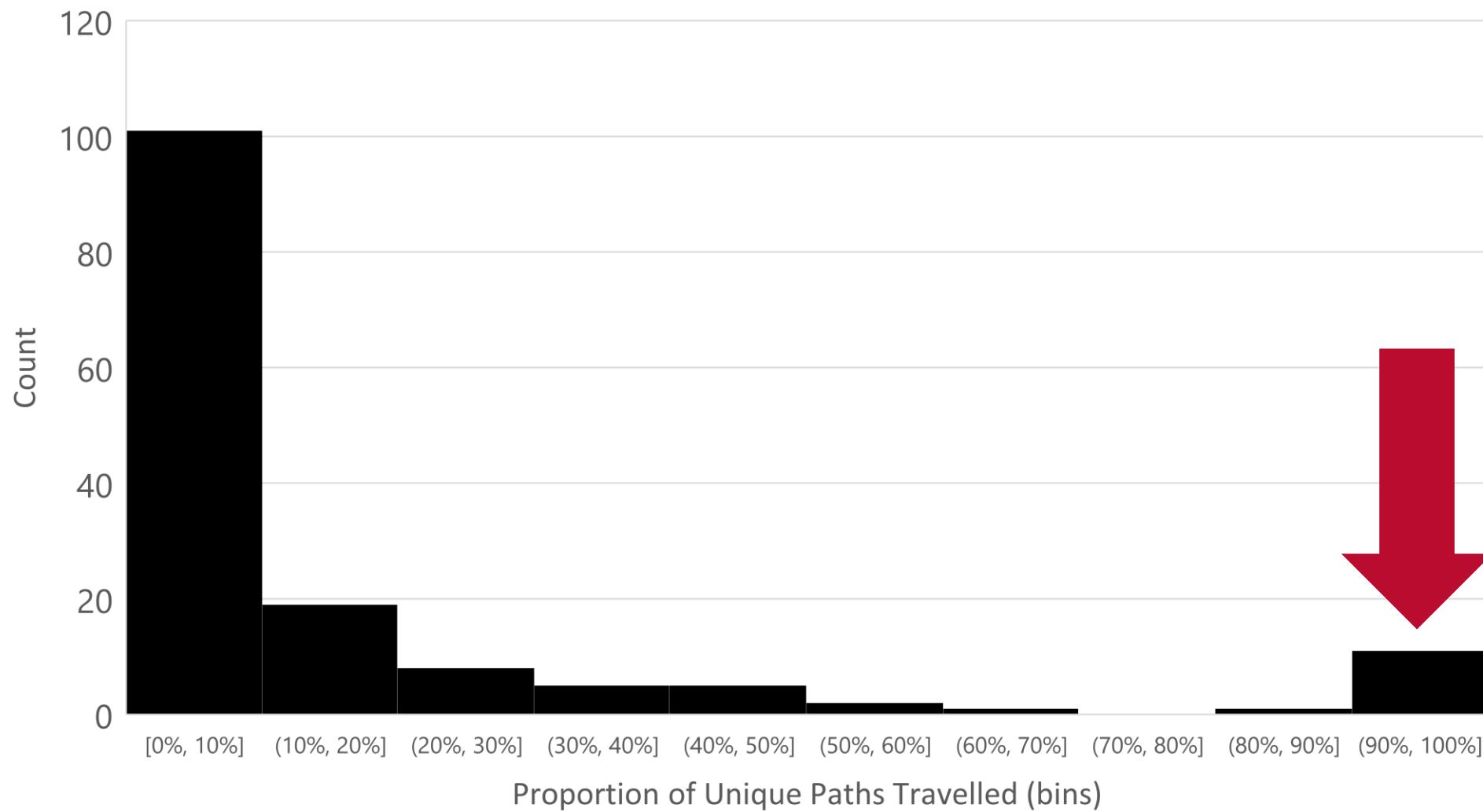
Histogram of Proportion of Paths Travelled by 80%+ of Graduates Degree



Histogram of Proportion of Paths Travelled by 80%+ of Graduates Degree



Histogram of Proportion of Paths Travelled by 80%+ of Graduates Degree



Task: Majors with Shared Pathways



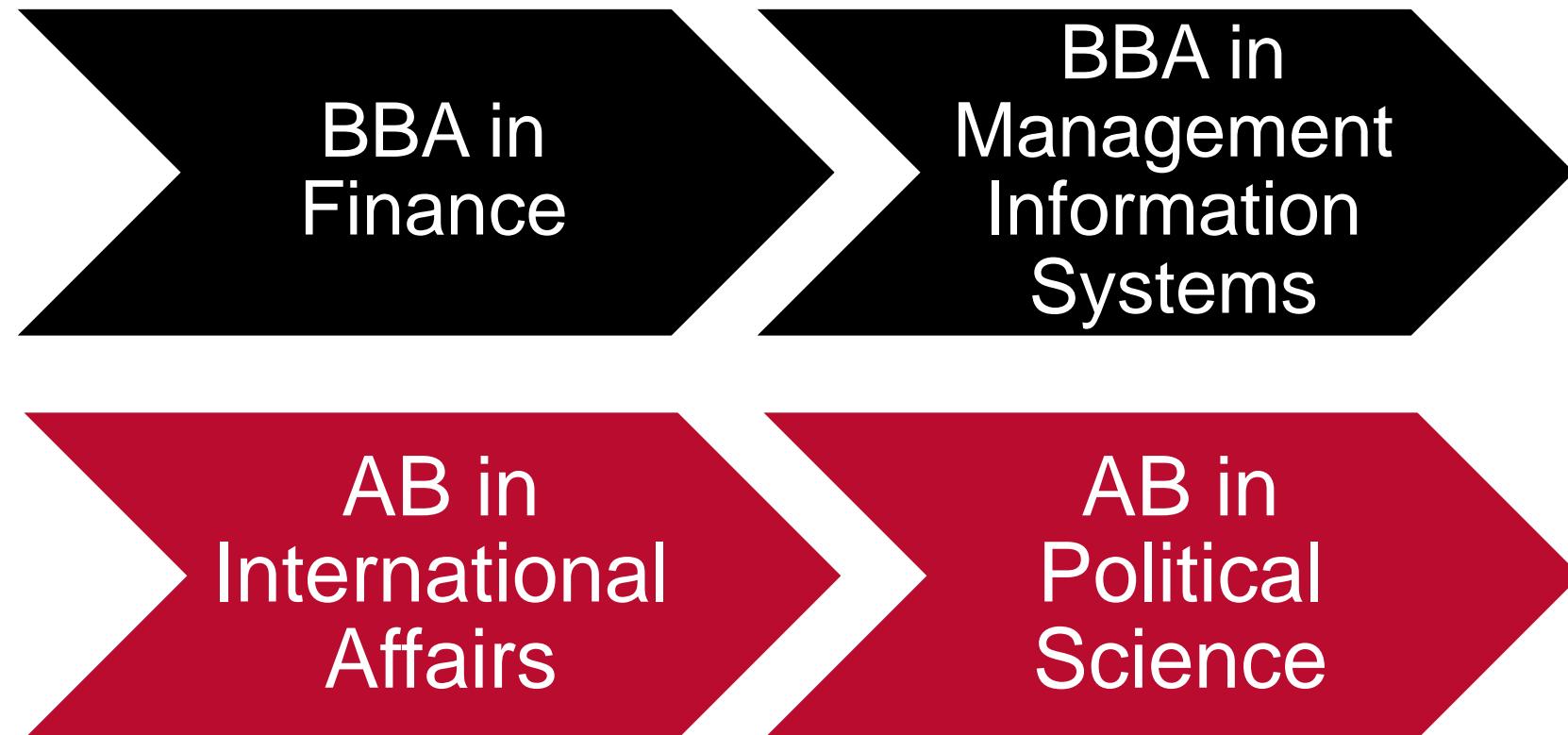
UNIVERSITY OF GEORGIA

Metrics: Shared Pathways Pseudocode

1. Identify all pathways (for a major)
2. Gather student enrollments for graduates of majors
3. Count number of times paths are travelled for each major
4. For every pair of majors, find the length of the intersection of the unique pathways



Metrics: Shared Pathways



Part V: The Future

The Future (with complete Curriculum Data)

- Pathway-based “Meta Majors”
- Analysis on the Requirement Level
- Course Enrollment Projections
- Theoretical & Actual Impact of Repeats, High DFW courses
- Rshiny apps: Contextual Degree Planner
- Predicting next steps: Generative Degree Planner



Thank You

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https://github.com/zhen-zhang2/SAIR2023_network_graphs



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