

Prodoscore's Organization and Employee Collaboration Score



Research conducted and validated by third-party Data Science team, in partnership with the Prodoscore Research Council

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Organization Score

Network density and network transitivity are two of the most important factors in running a successful company - they allow the company to have better communication and coordination between employees, laying the groundwork for more efficient and effective operations.

NETWORK DENSITY:

The number of connections within a network

NETWORK TRANSITIVITY:

A measurement of the likelihood that two connected nodes will also be connected



Benefits of High Network Density and Transitivity

Increased creativity and innovation

- When people are closely connected, they are able to share ideas and build on each other's work more effectively

Greater knowledge sharing and learning

- Closely connected networks allow for more effective knowledge sharing and learning, as people can easily access information and expertise from others

More effective communication and coordination

- High network density and transitivity make communication and coordination more effective since there are more pathways for information to flow

Greater team effectiveness

- Closely connected teams are able to work more effectively together, as they can easily coordinate and share information

Increased organizational efficiency

- High network density and transitivity can lead to increased organizational efficiency because there are more pathways for information and resources to flow

Enhanced competitive advantage

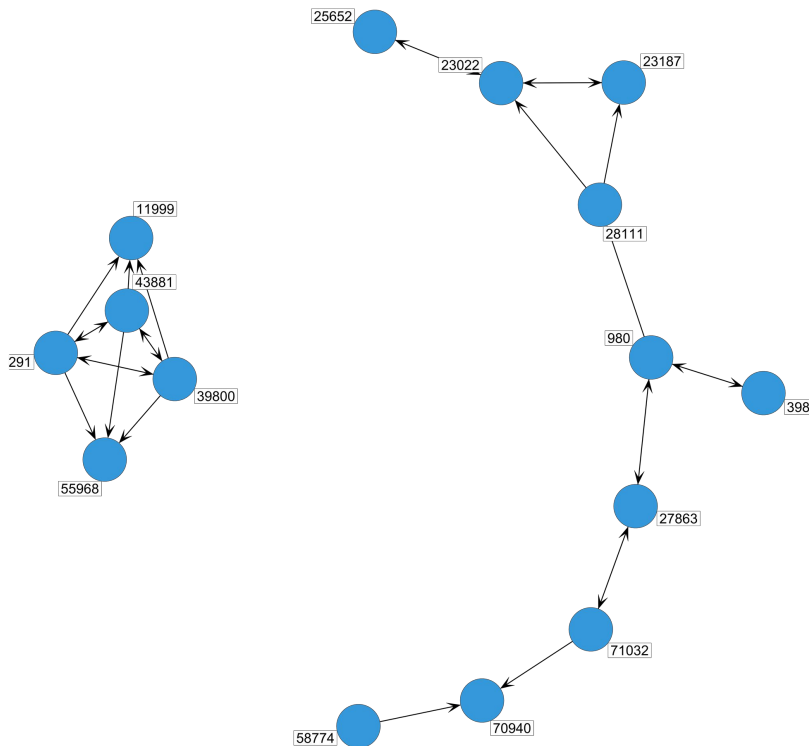
- Companies with high network density and transitivity have a competitive advantage and are better able to innovate and respond to market changes

Network Density

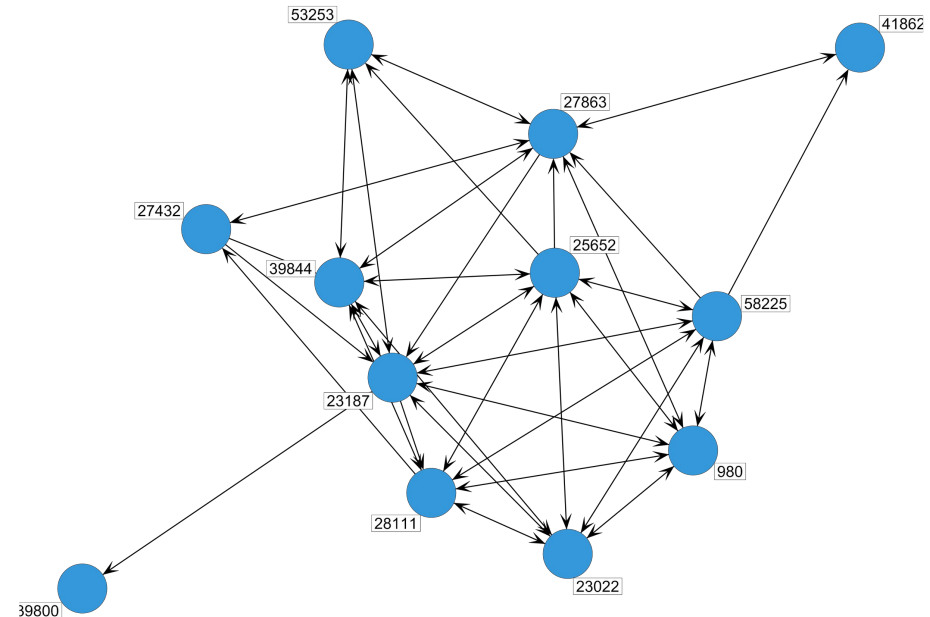
Collaborative Quantity Metric

- Network density refers to the number of ties or connections in a network relative to the maximum number of possible connections in that network
- The more connections that exist among employees, the denser the network

Low Density = Sparse Network



High Density = Dense Network

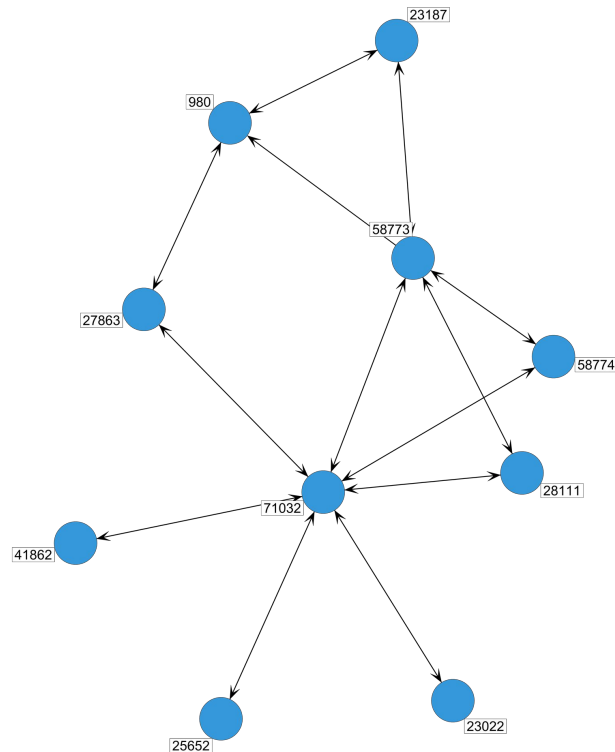


Network Transitivity

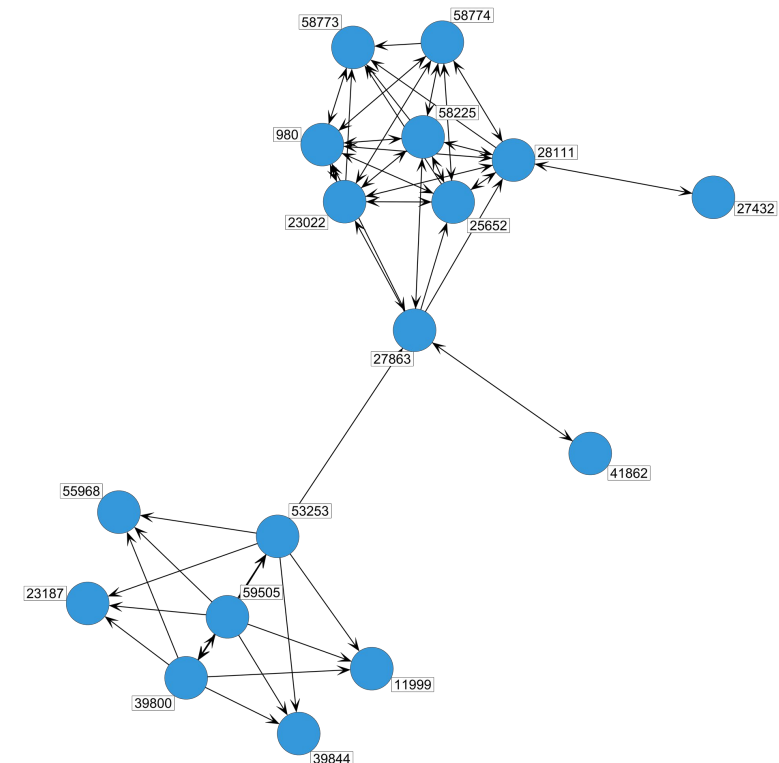
Collaborative Quality Metric

- Network transitivity, also known as clustering coefficient, is a measure of the likelihood that two friends of a person are also friends with each other (i.e. Employee X communicates with Employee Y and Employee Z)
- This network characteristic implies that employees are operating as a clique; that is, everyone in the clique communicate with one another - a strong indicator of group collaboration

Low Transitivity = Loose Network



High Transitivity = Tightly Knit Network or Community



Comparing Network Density & Transitivity

High Density and High Transitivity

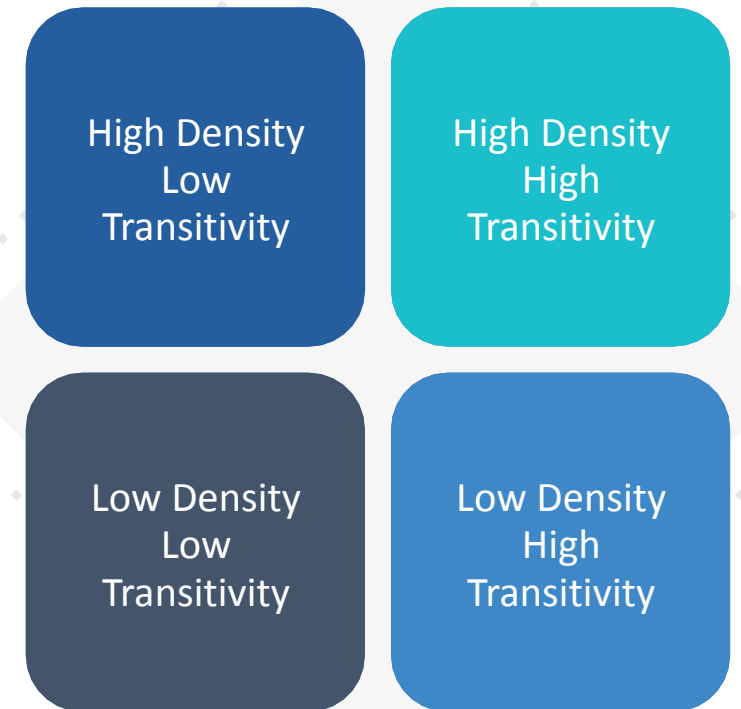
- Characterized by a high number of connections between employees and a high degree of communication and collaboration between employees
- This type of environment is often found in companies that are highly innovative and that place a high value on creativity and knowledge sharing

High Density and Low Transitivity

- Characterized by a high number of connections between employees but a low degree of communication and collaboration between employees
- This type of environment is often found in companies that are large and bureaucratic, where there is a lot of red tape and where employees are siloed
- Characterized by a low number of connections between employees but a high degree of communication and collaboration between employees
- This type of environment is often found in small companies or startups, where there is a close-knit team and where employees are highly engaged with each other

Low Density and High Transitivity

- Characterized by a low number of connections between employees and a low degree of communication and collaboration between employees
- This type of environment is often found in companies that are isolated or that have a very hierarchical structure

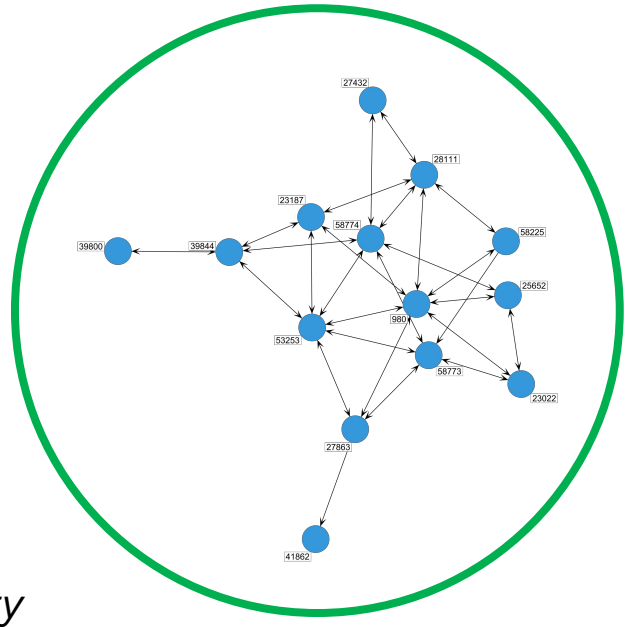


Visualizing Network Comparison

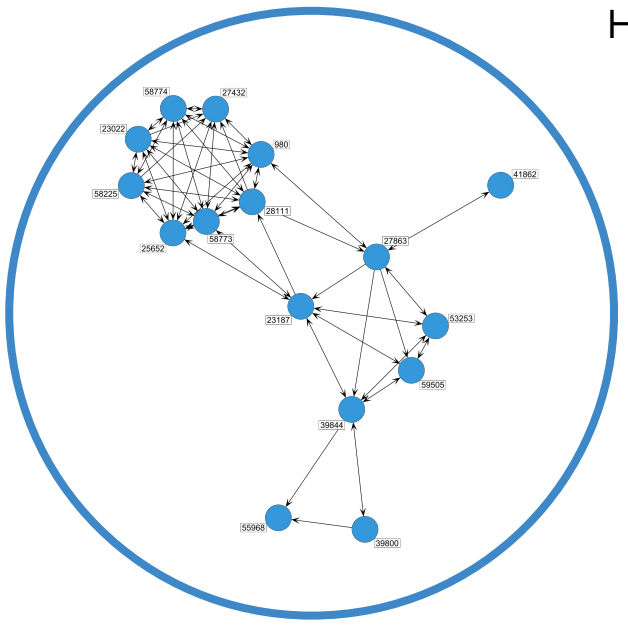
Highly Collaborative
 Collaborative
 Low Collaboration

Days where communication networks are **highly dense** and **highly transitive** are highly collaborative

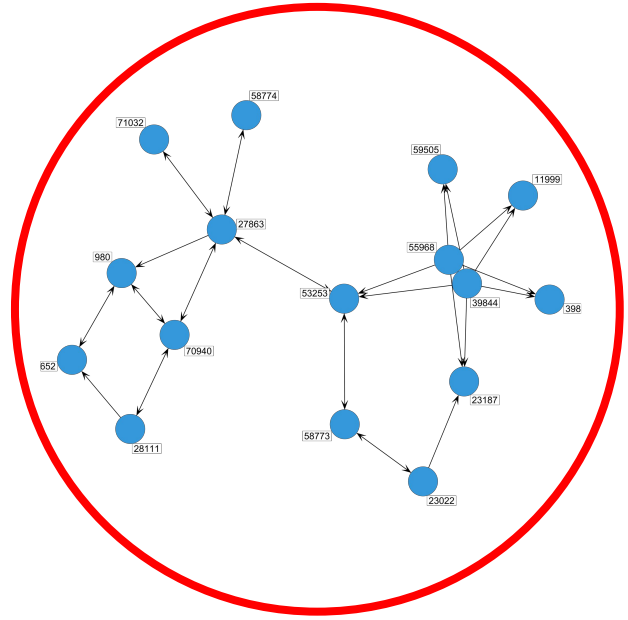
These companies benefit from a large number of connections between employees, increasing productivity and efficiency, as employees are able to quickly and easily communicate with each other to solve problems more quickly and effectively than a company with a low degree of connectivity.



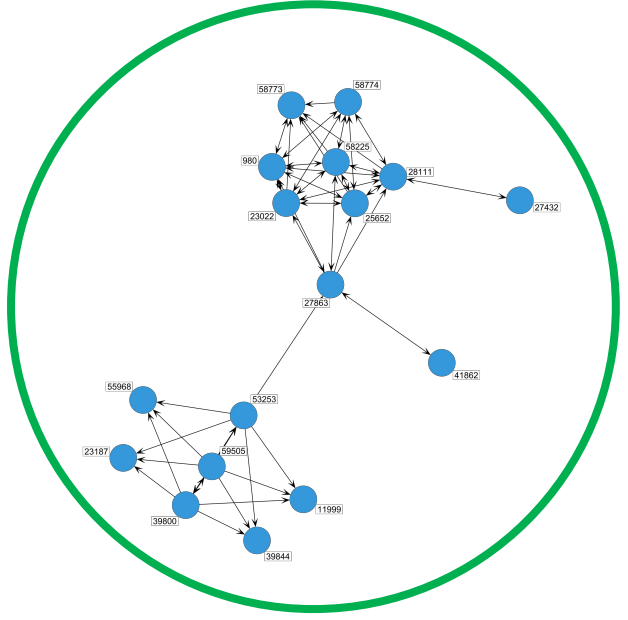
Density



High



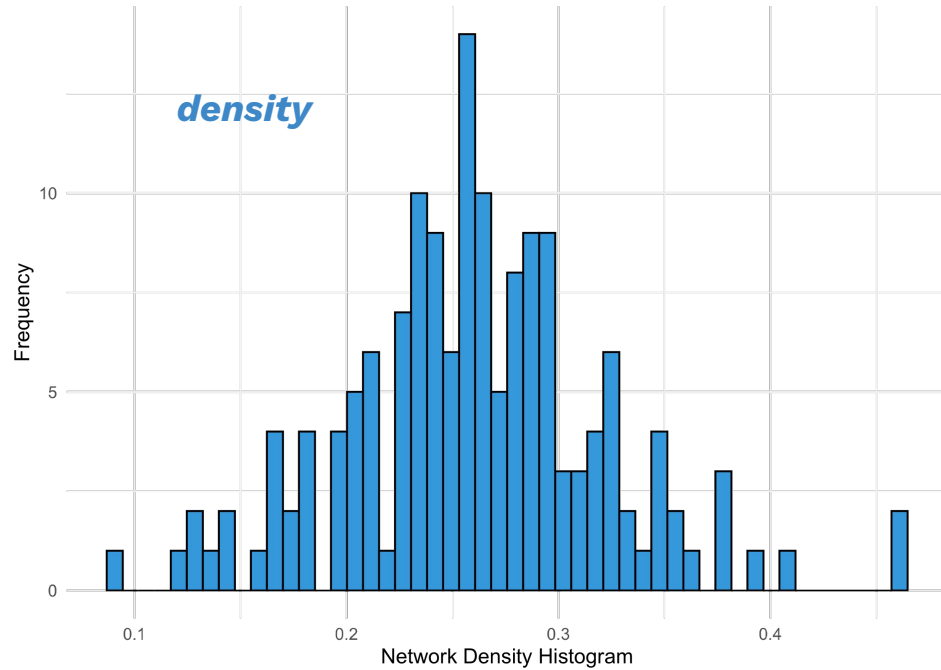
Low



Transitivity

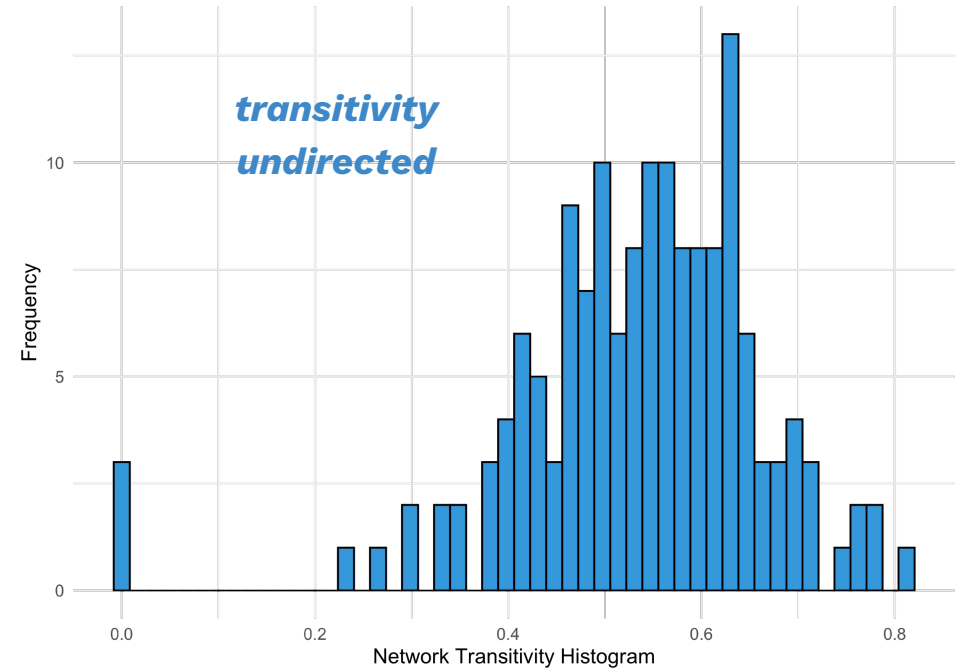
All metric calculations are available as functions in the 'igraph' package using an adjacency matrix in python

Network Density



Frequency
Distribution
(across 154 days)

Network Transitivity



Proposed Scoring Formula

As the distributions of the two-network metrics are correlated, independent phenomenon that do not necessarily interact with one another, mimic a normal distribution, and the range from 0 – 1, an additive linear scoring model is ideal.

Organizational Collaboration = normalized (Network Density + Network Transitivity)

Normalization can be either a min-max normalization or we can divide all values by the maximum value, then take it to the power of a positive shape value that best satisfies our desired transformation.

Network Density

Network Transitivity

Collaboration Category Validation

To better sample the possible distributions of transitivity scores given a certain number of connections within the network, 10,000 randomized samples were simulated for each of the 154 days present within the dataset.

1,540,000 simulated observations were used as a comparison null group. Collaboration categories are determined by the average standardized deviation from these observations deeming above average and below average scores significant.

The simulated expected scores for each category are as follows.

Above Average

Transitivity - .58
Density - .59

Average

Transitivity - .46
Density - .48

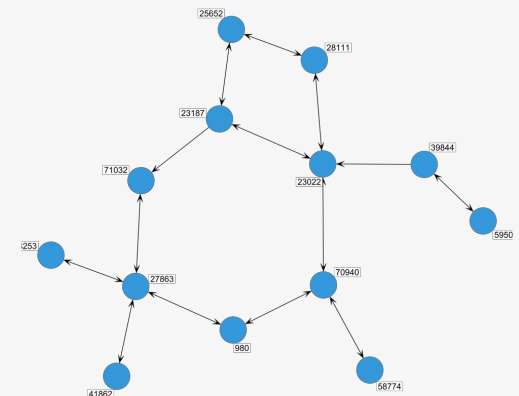
Below Average

Transitivity - .31
Density - .33

Network Exploration

The following network would be classified as having below average collaboration as very few connections emerge among employees.

Additionally, few employees speak with more than one other person, stifling the cross-pollination of ideas.

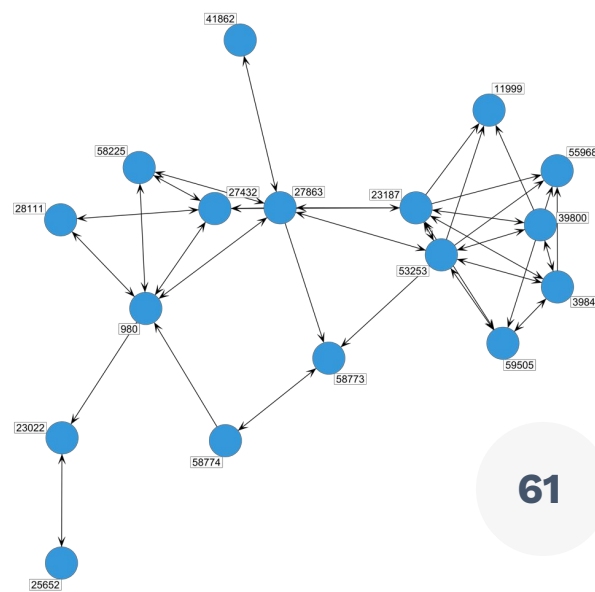


Scoring Samples

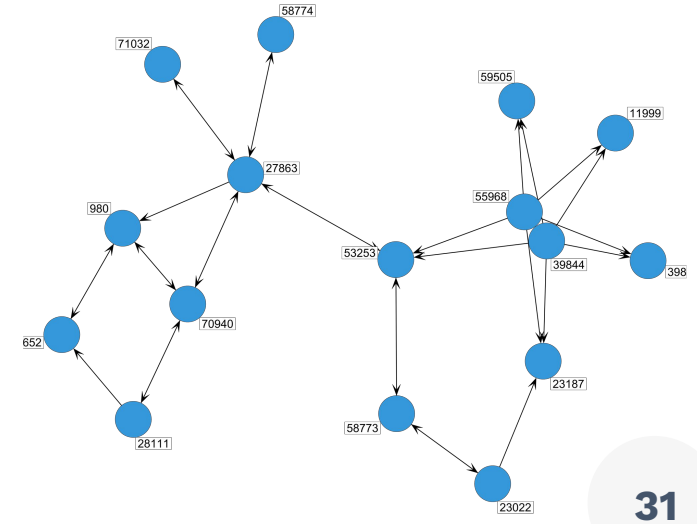
Highly Collaborative



Collaborative



Low Collaboration



Category	Organization Collaboration Score
Highly Collaborative	> 80
Collaborative	80 - 50
Low Collaboration	< 50

Based on the simulation results and results from the proposed scoring formula, we should expect organization-level collaboration scores to be:

Average 73.4% of workdays

Above Average 14.2% of workdays

Below Average 12.3% of workdays



Highlights

1. Increased productivity through better communication and collaboration between employees
2. Increased efficiency as employees can quickly find and connect with the right people and resources
3. Improved innovation through exposure to a greater variety of ideas and perspectives
4. Greater employee engagement and satisfaction by feeling more connected to work and colleagues
5. Reduced costs as employees are able to share resources and knowledge more effectively
6. Increased competitiveness by quickly adapting and responding to changes in the market
7. Better decision making as employees are able to tap into the collective intelligence of the network
8. Greater resilience in the face of adversity as the network is able to quickly adapt and find new solutions