

# MARVEL

## HERO SOCIAL NETWORK ANALYSIS

The Marvel Universe is an interconnected network in the story verse much like a present-day social network. The heroes have their own stories/groups and collaborate to save the universe as a community, much like people do in real life.

We analyze this network social networks by examining the relationship between different characters to learn more about real world social networks.

# Meet the Team

## and their favorite characters

ABHINANDAN VERMA | IRON MAN

AMANDA WEI | WANDA

CK ANAND PRAKASH | THOR

DEYN LI | BATMAN

KINGSLEY LIU | CAPTAIN AMERICA

URVI VAIDYA | AGENT COULSON





# Our Network Stats



**6421**

Size of Network



**167112**

No of Edges



**20,611,410**

No of Possible Edges



**0.008**

Density of Network



**5**

Network Diameter



**52.05**

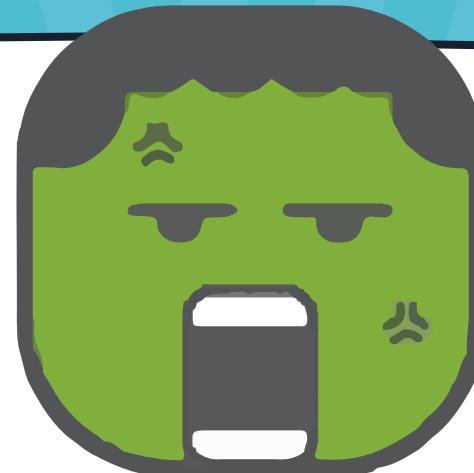
Avg. Degree



**2.635**

Geodesic distance a.k.a  
Avg. Path Length

# SOMETIMES, REVIEWING CONCEPTS IS A GOOD IDEA



## DEGREE

How many ties does a node have.

## CLOSENESS

How quickly can a node interact with all others.

## EIGENVECTOR

Importance of nodes based on its own centrality and that of its connections.

## BETWEENNESS

How much is a node needed to broker an exchange.

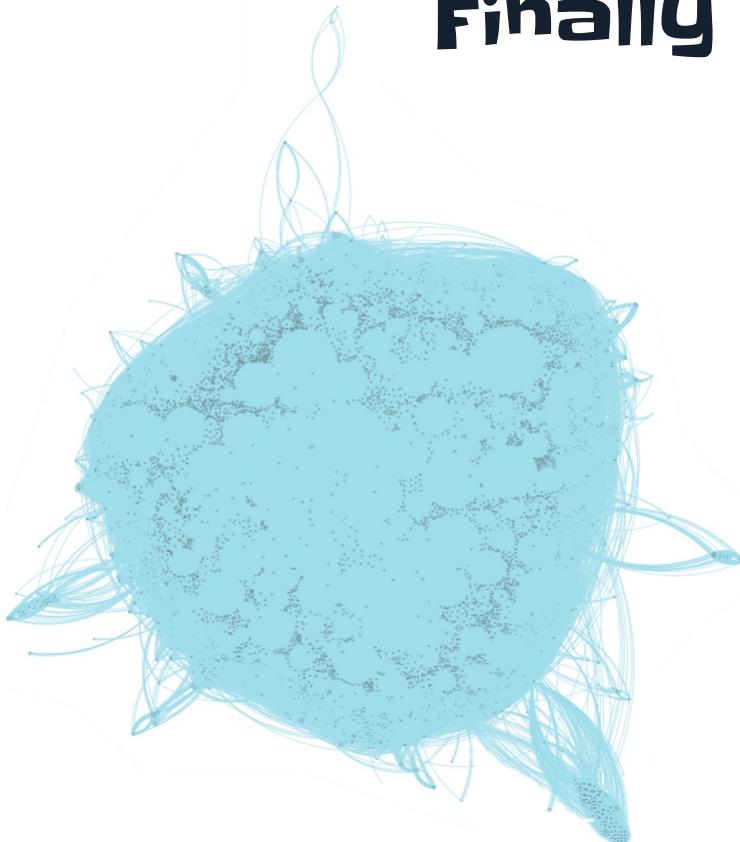
## NO OF TRIANGLES

How many small cliques are formed by this node.

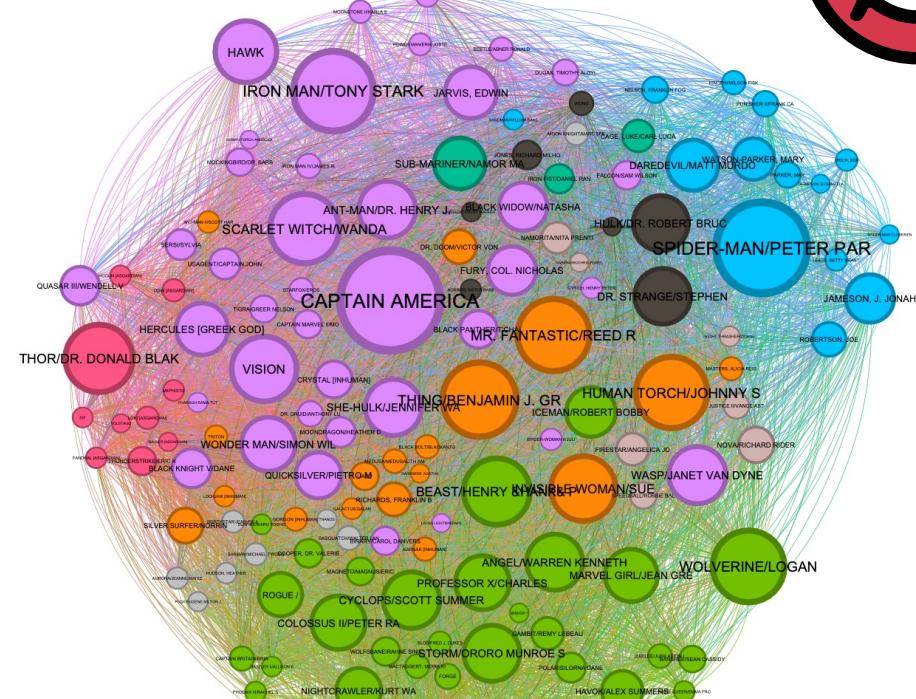
## MODULARITY CLASS

Groups of Nodes that are closely tied to one another

# Finally the Graphs



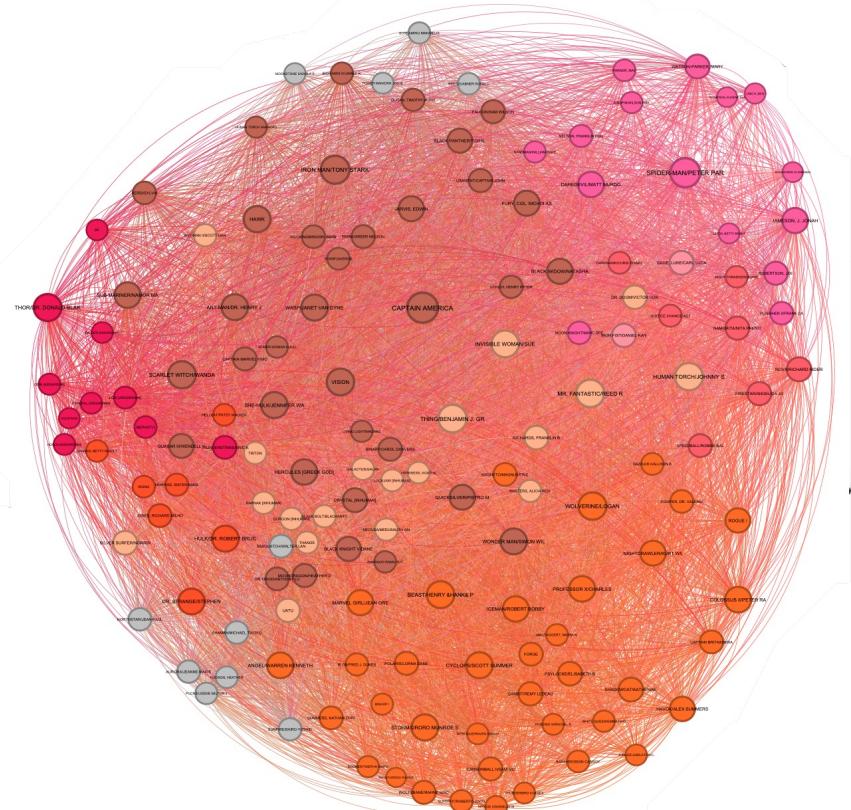
Our Network in Entirety



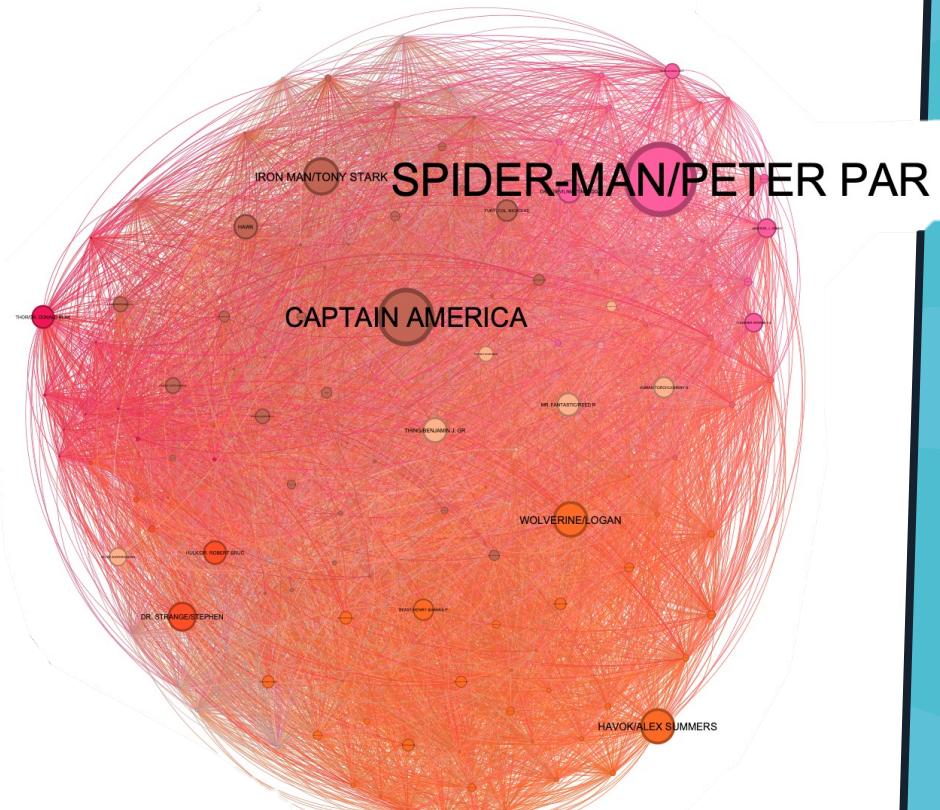
Filtered Network with Degree & Modularity



# Centralities

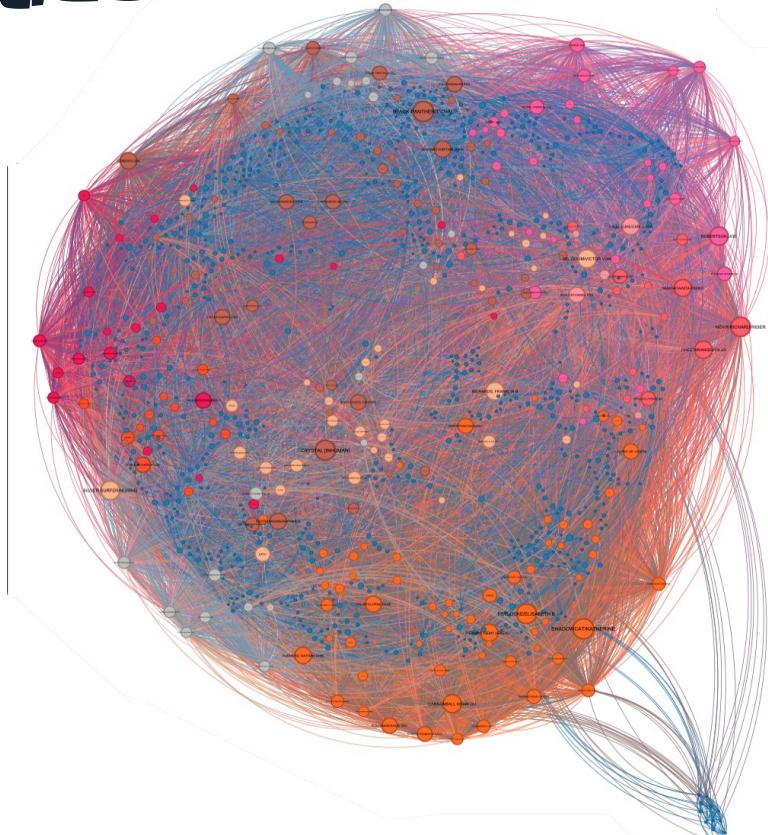
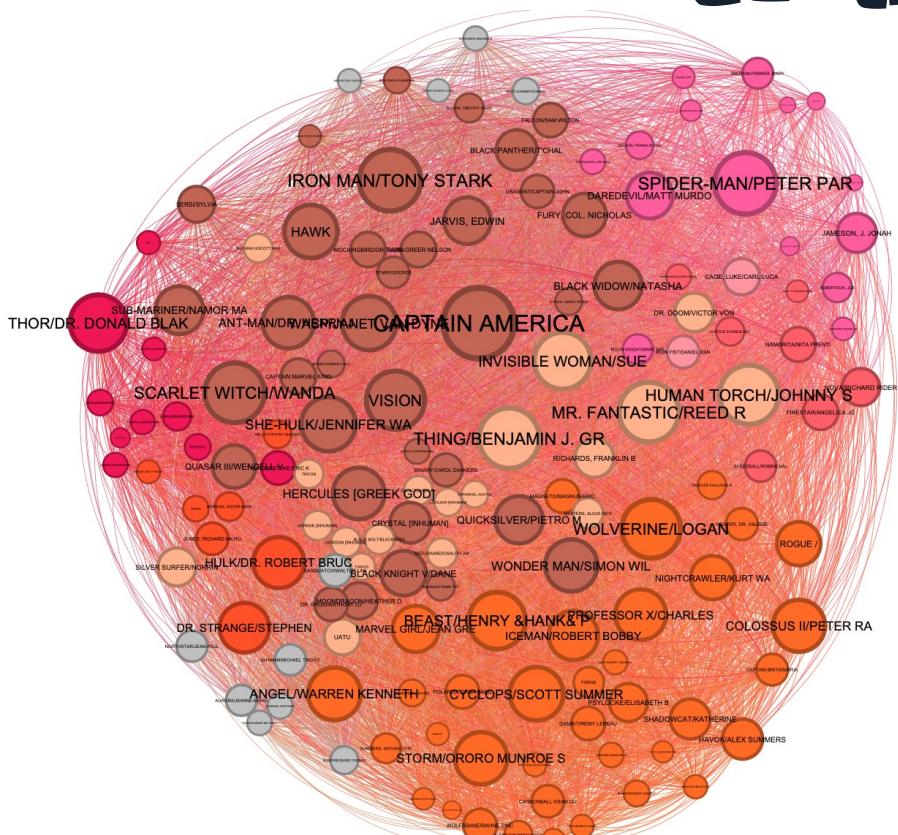


Closeness with Modularity

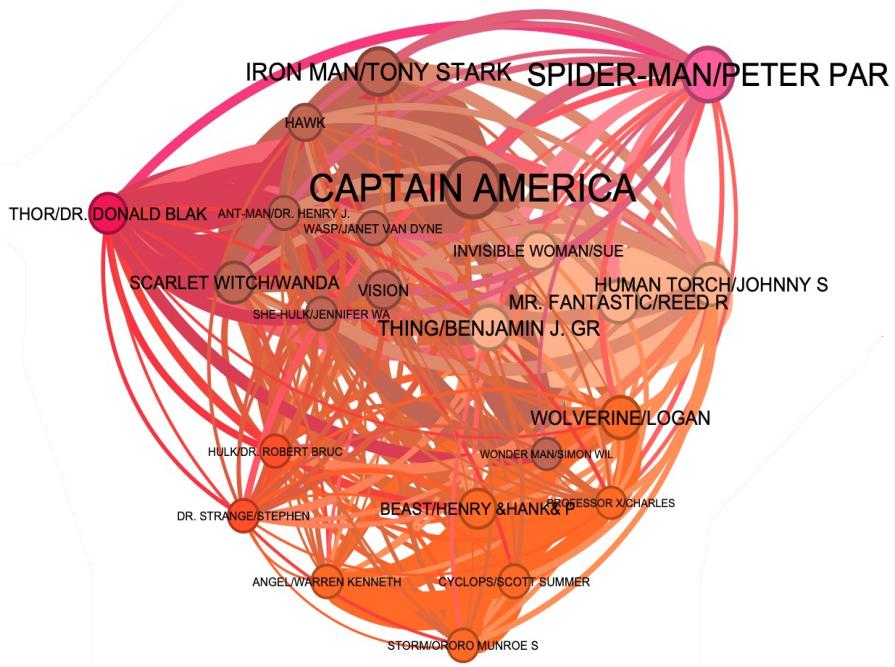


Betweenness with Modularity

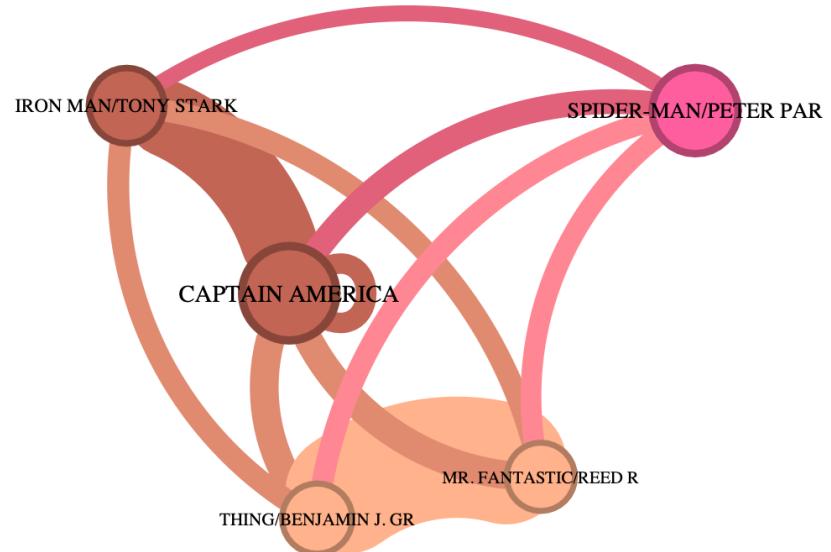
# Centralities



# Network of Popular Characters



Network of the Top 25 Characters



Network of the top 5 characters



# Lets talk Numbers

	DEGREE	BETWEENNESS	CLOSENESS	EIGENVECTOR	CLUSTERING COEFFICIENT	NO OF TRIANGLES
CAPTAIN AMERICA	1905	1173071.86	0.5852	1.0	0.0490	88849
SPIDERMAN	1737	1516223.61	0.5757	0.8711	0.0488	73690
IRON MAN	1521	767294.35	0.5630	0.8718	0.0620	71764
THING	1416	524521.76	0.5594	0.8541	0.0691	69252

# Meet our Influencers / Hubs



## CAPTAIN AMERICA

a.k.a.

Steven Rogers

- ④ Highest Degree, Eigenvector & No of Triangles
- ④ Originally Introduced in 1941
- ④ Member of the Avengers, Secret Avengers, All-Winners Squad, Redeemers, Invaders



## SPIDERMAN a.k.a.

Peter Parker

- ④ Highest Betweenness
- ④ Originally Introduced in 1962
- ④ Member of Avengers and allies with Ironman, Captain America, Doctor Strange & Star Lord,



## IRON MAN a.k.a.

Tony Stark

- ④ Second Highest Eigenvector
- ④ Originally Introduced in 1963
- ④ Member of the Avengers, Initiative, Hellfire Club, S.H.I.E.L.D, Illuminati, Thunderbolts, Force Works & Queen's Vengeance

# CONCLUSION

**It's a small world out there** - With an avg. clustering coefficient of 0.781, network diameter of 5 and avg. path length of 2.638, its just a few links to get from one node to another.

**With great power comes great responsibility** - A few nodes have the most links and there is a long tail of nodes with very few links. Our top 4 heroes are the centers of 4 large hubs, so, if danger comes calling and the world is facing impending doom you can save a lot of time and energy by contacting these 4 people first. Assembling the Avengers has never been easier.

Network analysis can help identify essential characters, inform plot development, and inform marketing strategies in the MCU. It can also be applied to analyze audience engagement and identify key influencers for marketing and business strategies related to the franchise.

# THANKS

