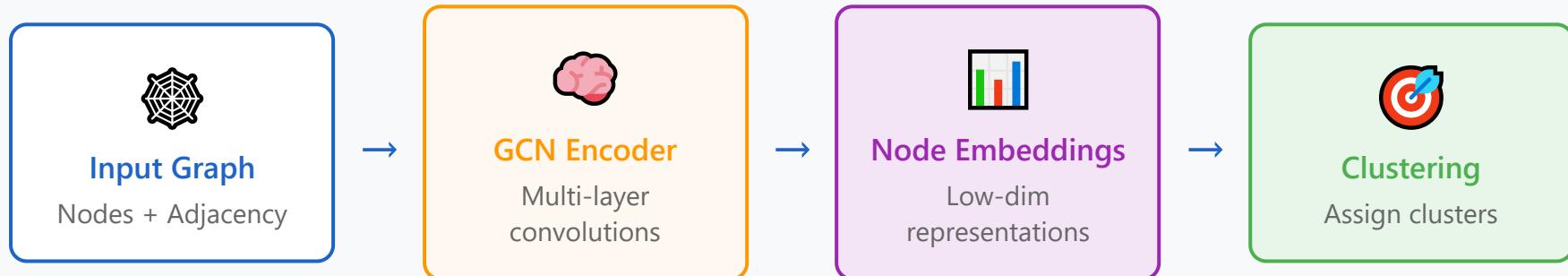


Clustering with Graph Convolutional Networks (GCN)

End-to-End Trainable Graph Clustering

GCN-based Clustering Architecture



Reconstruction Loss



Preserve graph structure

$$L_{\text{recon}} = ||A - \hat{A}||^2$$

Clustering Loss



Optimize cluster assignment

$$L_{\text{cluster}} = KL(P || Q)$$

End-to-End Trainable: $L_{\text{total}} = L_{\text{recon}} + \lambda \cdot L_{\text{cluster}}$



Key Features

- ✓ Supervised or unsupervised learning
- ✓ Captures local & global structure



Advantages

- ✓ Outperforms spectral methods
- ✓ Better on benchmarks

✓ Joint optimization of encoder & clustering

✓ Learns rich node representations