Mixed-Membership Stochastic Block-Models for Transactional Data

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1) Transactional network
   Part of the Enron dataset

<table>
<thead>
<tr>
<th>Sender</th>
<th>Recipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kevin</td>
<td>Darrell</td>
</tr>
<tr>
<td>Kevin</td>
<td>Steven</td>
</tr>
<tr>
<td>Mark</td>
<td>Steven, Tracy, Kimberly, Teb, Rod</td>
</tr>
<tr>
<td>Tracy</td>
<td>Steven, Michelle, Kimberly, Rod</td>
</tr>
<tr>
<td>Tracy</td>
<td>Steven, Rod, Kimberly</td>
</tr>
<tr>
<td>Tracy</td>
<td>Rod</td>
</tr>
</tbody>
</table>

2) Model
   Mixed Membership for Nodes
   - Groups
   - Nodes
   - Blocks

3) Generative process
   For each new message:
   - Each node chooses its membership
   - Sender node is picked
   - Every node is a potential recipient

Differences from Social Network Data
   - Transactional relations, not binary
   - One-to-many relations

True and Recovered Adjacency Matrices
   - True adjacency matrix
   - Recovered adjacency matrix

Generalization of Airoldi et al. (2008)
   Mixed Membership Stochastic Blockmodels