



Social Networks for Stakeholder Identification and Analysis

Ledri Thaqi, Dingguang Jin

Group 1



Agenda

- Problems and motivation
- Existing stakeholder analysis methods
- Ralic case study
- StakeNet
- Limitations



Problems and motivation

- Overlook stakeholders
- Stakeholders with lack of knowledge
- Most methods treat all stakeholders equally
- Lack of empirical studies
- Systems of systems pose unique problems



Existing stakeholder analysis methods

- Semi-structured
 - Identifies stakeholders by asking context-free questions
 - The largest group of existing practices
 - Return a large number of results which are difficult to prioritize
 - Broad answers and likely to omit stakeholders
- Check-list based approaches
 - Check-list of generic stakeholders
 - Do not provide an exhaustive list of stakeholders
 - Easier to omit stakeholders not on the checklist
 - Map generic stakeholders to project-specific stakeholder roles
 - Consequently stakeholder roles may be overlooked



Existing methods

- Interview
 - Identifies stakeholders and interviews them to identify other stakeholders
 - Requires large amount of time and resources
 - Difficult to scale to systems of systems with large number of stakeholders
 - Highly distributed geographical locations and managerial independence
 - Lacks a way to prioritize stakeholders
- Search
 - Identifies an initial set of stakeholders
 - Considering parties who provide information
 - Parties who process their products
 - Parties who interact with them
 - Generates too much data and return irrelevant parties
 - Also lacks stakeholder prioritization



Ralic stakeholder analysis

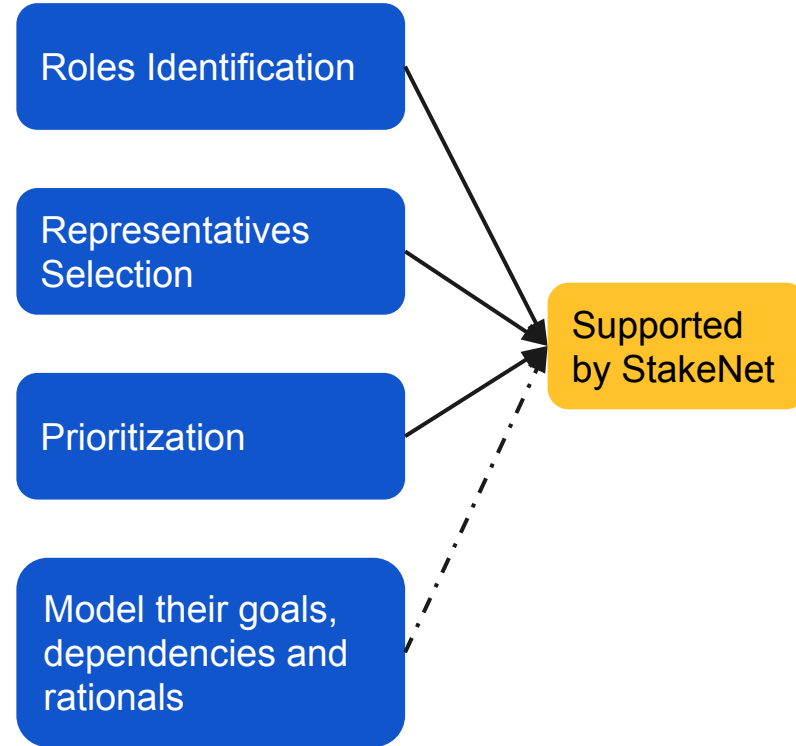
What happens when there are

- more than 60 stakeholder groups
- Approximately 30,000 system users

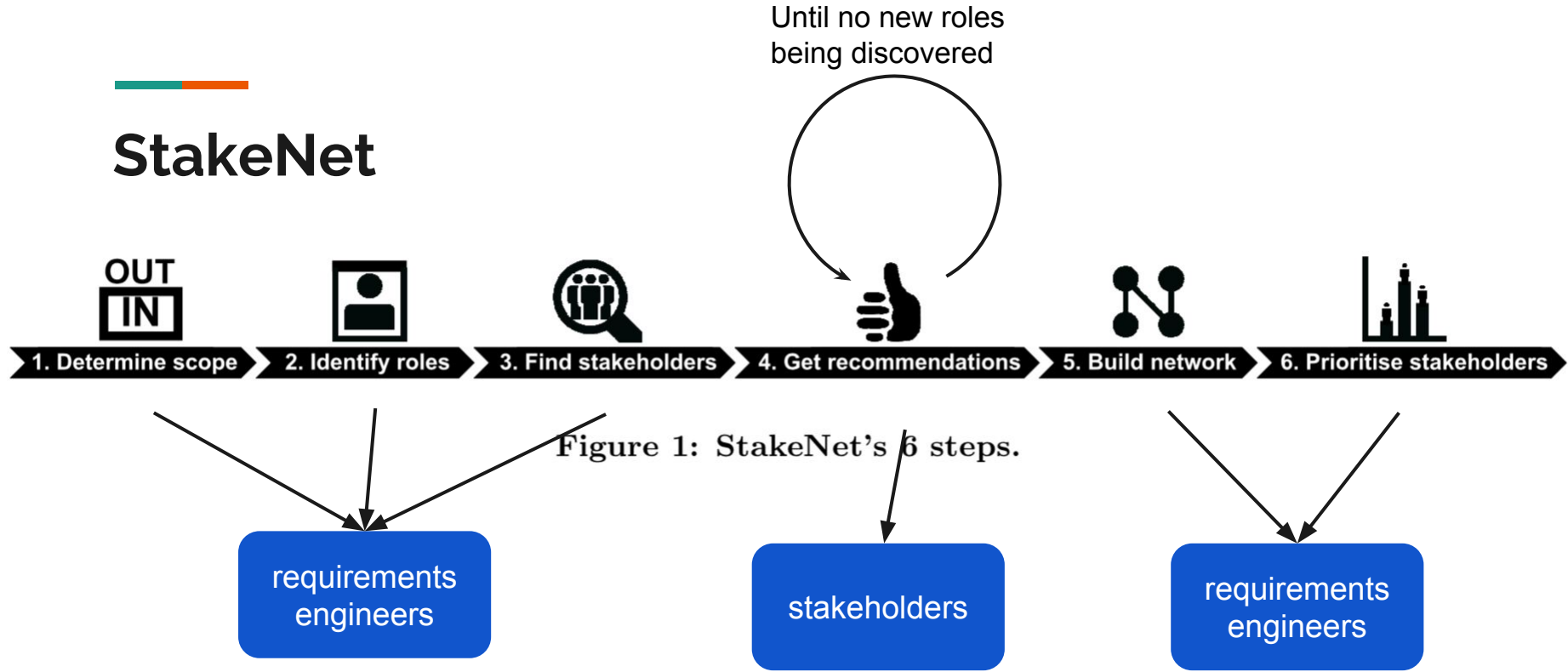
As in RALIC project(Replacement Access, Library and ID Card)

(From RE I)The guideline is to perform stakeholder analysis, steps are:

But how can a few requirements engineers do that efficiently yet accurately? ----Using a collaborative approach in which all stakeholders have a say.



StakeNet





StakeNet



6. Prioritise stakeholders

Applying ideas from network analysis:

- Between centrality
- Closeness centrality
- PageRank
- Degree Centrality
- in-degree and out-degree

An interesting perspective



StakeNet Results in RALIC project

compared to ground truth

Results may be too ideal, because:

Table 4: Identifying Stakeholder Roles

Method	Precision	Recall
Existing method	0.893	0.403
StakeNet	0.903	0.903

- The project is already finished 4 years ago, so people involved may have a clear vision of the project
- In step 4, recommendation, actually, the requirements engineers also talk with each stakeholder for about one hour. It's almost like interviewing, from which we can already expect a good result.



StakeNet Results in RALIC project

Table 5: Prioritising Stakeholder Roles

Measure	Accuracy
Betweenness	0.785
Closeness	0.628
PageRank	0.716
Degree	0.686
In-degree	0.653
Out-degree	0.625

The results are actually not very impressive. We can dive further into it:

- Although StakeNet models the recommendation as network, it needs not necessarily to be one. A recommends B can be a very weak connection. It may be too weak to be considered as a link. This can limit the accuracy from reaching 100% even in optimal cases.
- The model treats all recommendations equally. But actually, the confidence and accuracy varies vastly.

Table 6: Identifying and Prioritising Stakeholders

Method/Measure	Recall	Accuracy
Existing method	0.465	N/A
Betweenness	0.920	0.517
Closeness	0.907	0.564
PageRank	0.867	0.778
Degree	0.907	0.649
In-degree	0.907	0.659
Out-degree	0.907	0.565



StakeNet Limitations

- There is not a terminology for roles. And a person can also be addressed differently.
- The prioritization method is heuristic. It doesn't base on the attributes of stakeholders that we might be interested in, e.g, funding, development, usage, power...
- RALIC is a project implemented in a university. Students and faculties are happy to cooperate, which may not be the case in real companies. ---- a major issue when Stakenet being applied to system of systems project



system of systems project

1. System of systems is a class of complex systems whose constituents are themselves complex
2. May involve thousands or even hundreds of thousands stakeholders
3. Pose unique problems for stakeholder analysis due to their
 - evolutionary nature
 - emergent behavior
 - operational independence
 - managerial independence
 - geographical distribution



StakeSource

an online tool based on StakeNet

This time, is provided. Stakeholders can even comment on others' recommendations.

Problems:

1. This time, real companies. Stakeholders are bound to have conflict of interests
 - > unwilling to share information with stakeholders from other system, or even, with requirements engineers
2. Requirements engineers expect stakeholders to help. But this questionnaire to them may just considered to be extra and unnecessary work.
 - > not surprisingly, in some projects, the responses collected by StakeSource were insufficient to add value
3. Development in system of systems is evolutionary. So how to ensure the information we get from StakeSource is up to date?

Model their goals,
dependencies and
rationals

Helps in

This may be discovered by
analysis of the gathered
information



Previous Experience in Social Computing

- E-mail and various mobile chat applications
- Workshops
- Collaborative social tools
- Limitation on resources



Thank you for your attention

Welcome questions and insights for problems encountered

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