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SASO in Socio-Technical Systems

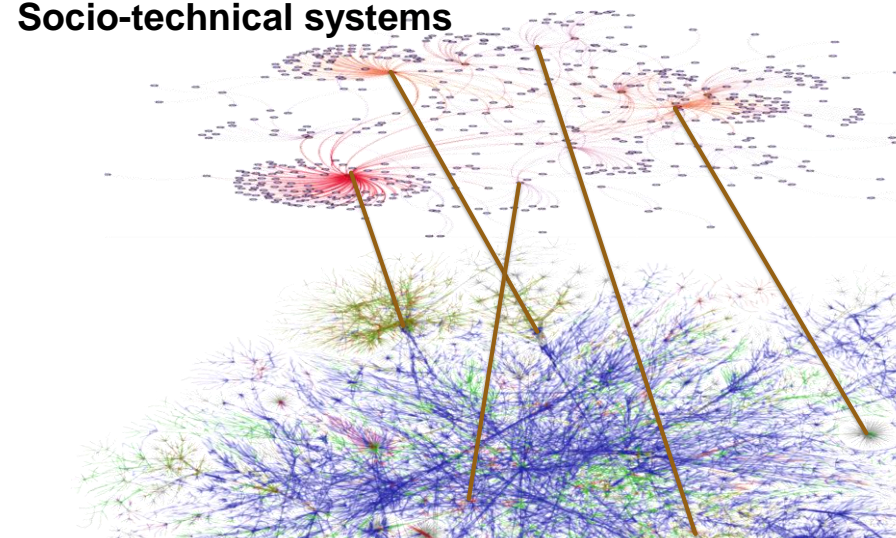
A tale of two layers ...

Ingo Scholtes
Chair of Systems Design
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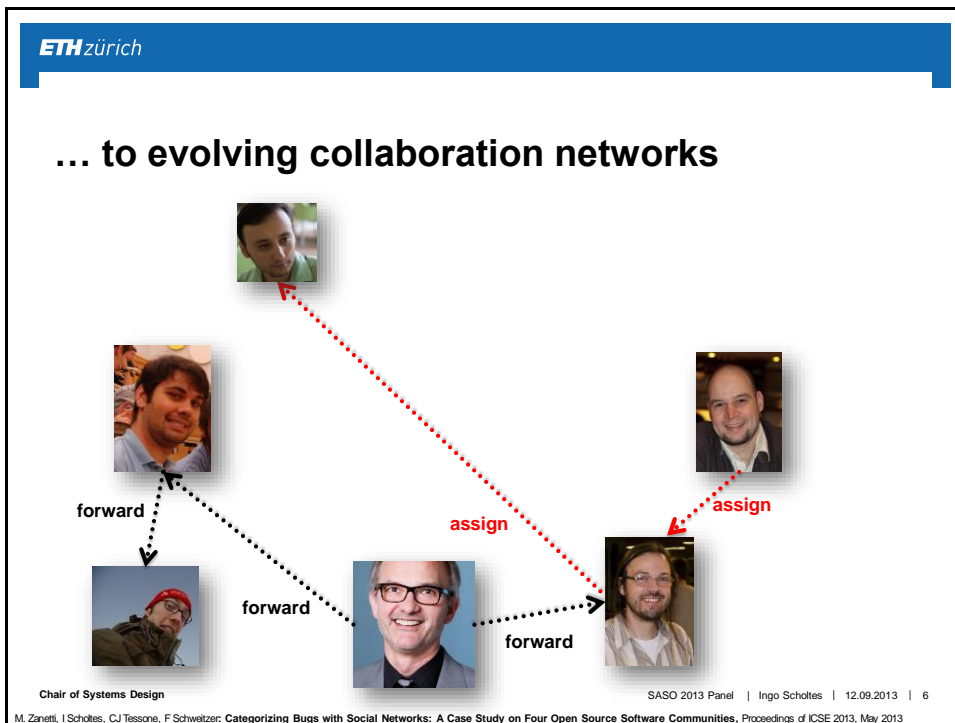
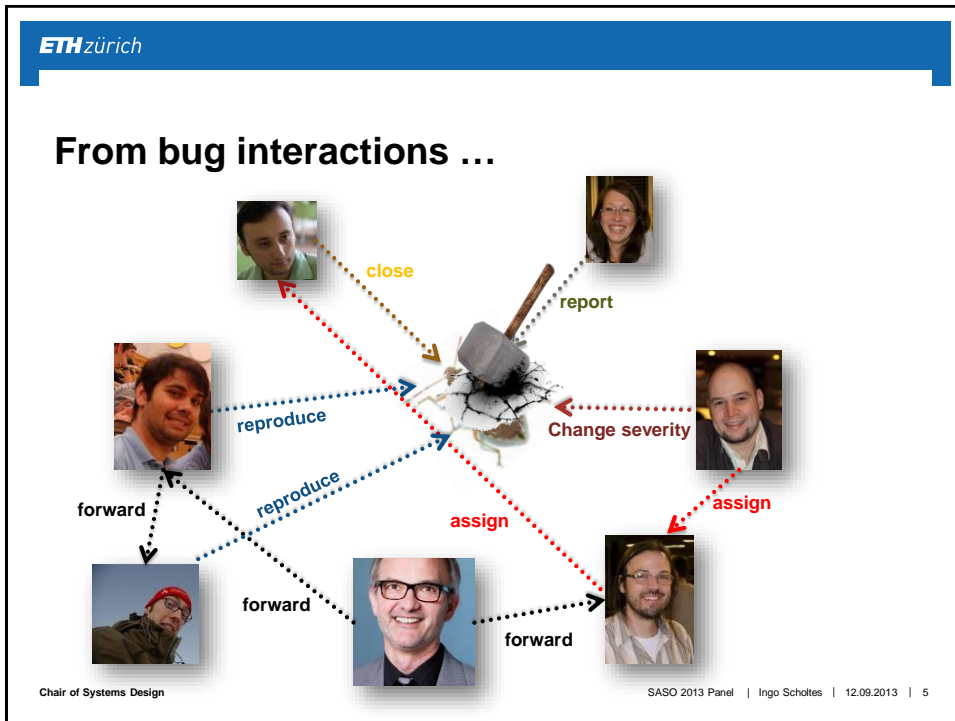
Socio-technical systems



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| | FIREFOX | THUNDERBIRD | ECLIPSE | NETBEANS | Total |
|--------------------------------|---------------|---------------|----------------|---------------|----------------|
| Start date | April 2002 | January 2000 | October 2001 | January 1999 | - |
| Total bug reports | 112,968 | 35,388 | 356,415 | 210,921 | 715,692 |
| Change events | 1,068,070 | 313,957 | 2,594,385 | 1,875,878 | 5,852,290 |
| Changes / report | 9.45 | 8.87 | 7.28 | 8.89 | 8.18 |
| Resolved bugs (resolved/total) | 64,088 (0.57) | 21,644 (0.61) | 158,957 (0.45) | 42,851 (0.19) | 287,540 (0.40) |
| FIX (FIX / resolved) | 10,856 (0.17) | 4,508 (0.21) | 103,453 (0.65) | 21,442 (0.50) | 140,259 (0.49) |
| DUP (DUP / resolved) | 24,263 (0.38) | 10,336 (0.48) | 28,227 (0.18) | 9,328 (0.22) | 72,154 (0.25) |
| INV (INV / resolved) | 11,785 (0.18) | 2,829 (0.13) | 12,601 (0.08) | 4,082 (0.10) | 31,297 (0.11) |
| WOF (WOF / resolved) | 2,708 (0.04) | 581 (0.03) | 14,676 (0.09) | 5,515 (0.13) | 23,480 (0.08) |
| INC (INC / resolved) | 14,476 (0.23) | 3,390 (0.16) | - | 2484 (0.06) | 20,350 (0.07) |

Most bug reports are not helpful!



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... to evolving collaboration networks

one month period

Time

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M. Zanetti, I. Scholtes, C.J. Tessone, F. Schweitzer: Categorizing Bugs with Social Networks: A Case Study on Four Open Source Software Communities, Proceedings of ICSE 2013, May 2013

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Detecting helpful bug reports

1. in largest connected component?
2. eigenvector centrality
3. closeness centrality
4. betweenness centrality
5. k-coreness
6. total degree
7. in-degree
8. out-degree
9. local clustering coefficient

valid bug report?

training set

**Precision of prediction: 78 – 90 %
Higher than competing method**

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Information

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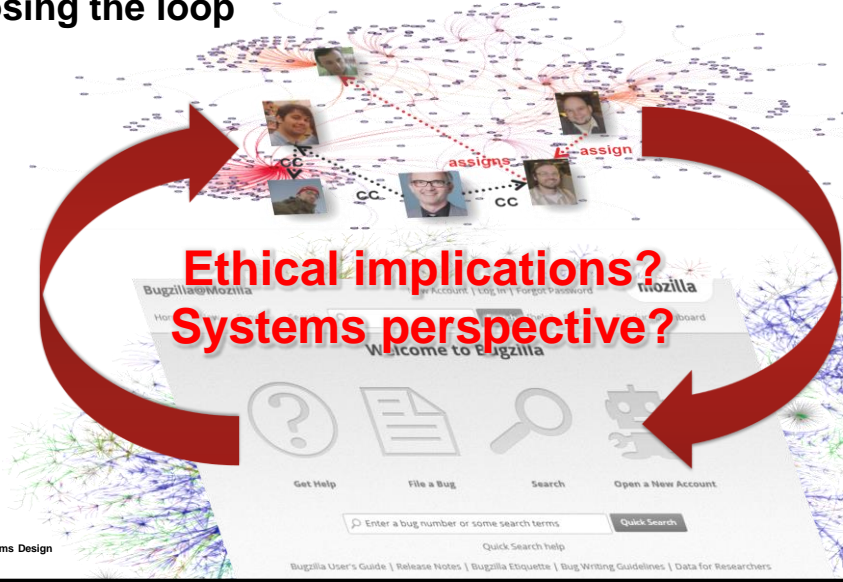
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Closing the loop



Ethical implications?
Systems perspective?