

Lorem Ipsum Dolor

Scale Free Networks

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The Problem





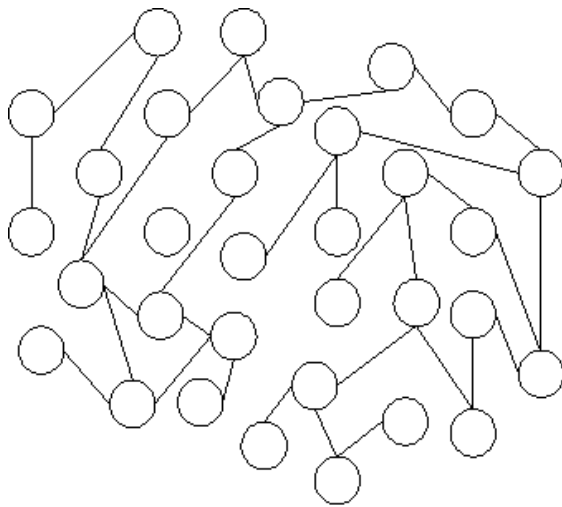
Scaling and Scoping

- Scaling development is in general a bad idea
 - 40% loss in capacity going from 1 team to 2
 - Need to double staff to get back where you started
- Scoping extends the span of communication
 - The same problem as scaling
 - Marketing, HR, management, external plant, security, legal...

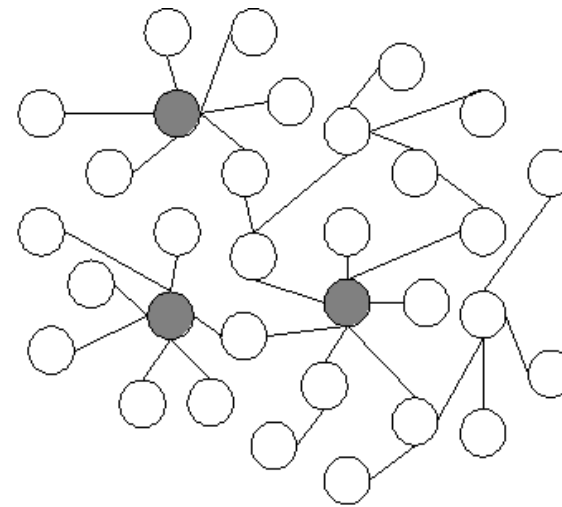
What Are Scale-Free Networks?

- They tend to have a high number of **hubs**
- Long tails in the distribution of node degree, with some nodes an order of magnitude larger than the smaller nodes
- The hubs tie together communities of leaves (and maybe a few other hubs)
- They tend to be flat — so they have low graph diameter (the largest number of hops from any node to any other node) — and the diameter remains constant as the graph grows (scale-free)

Hubs Reduce Graph Diameter



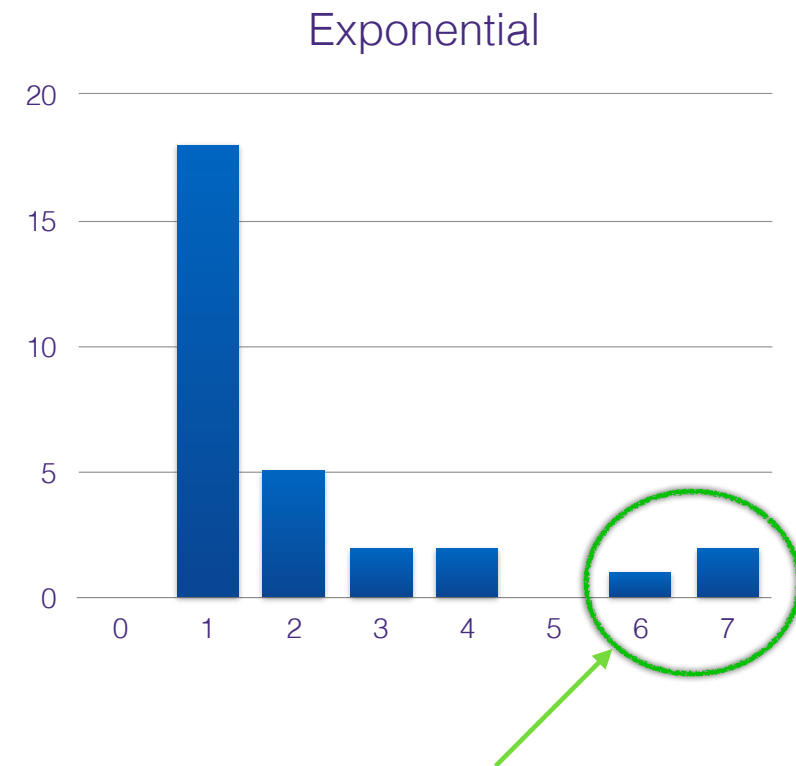
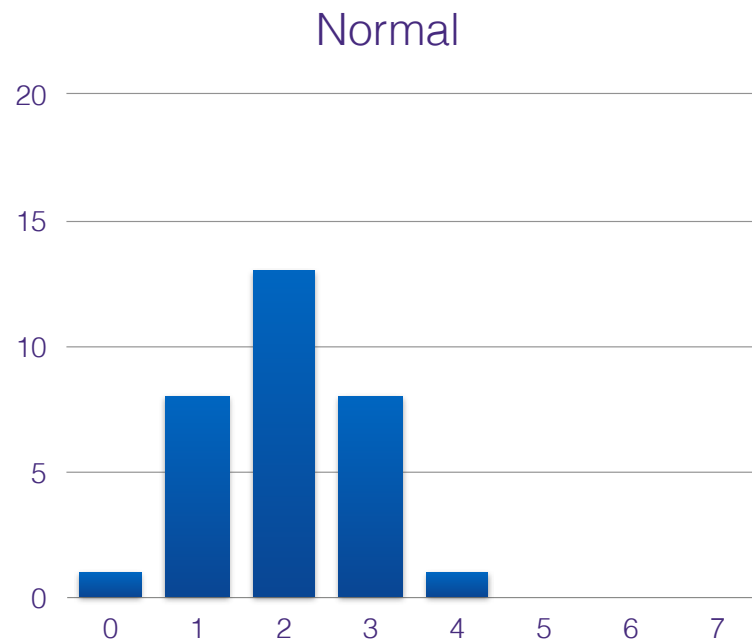
(a) Random network



(b) Scale-free network

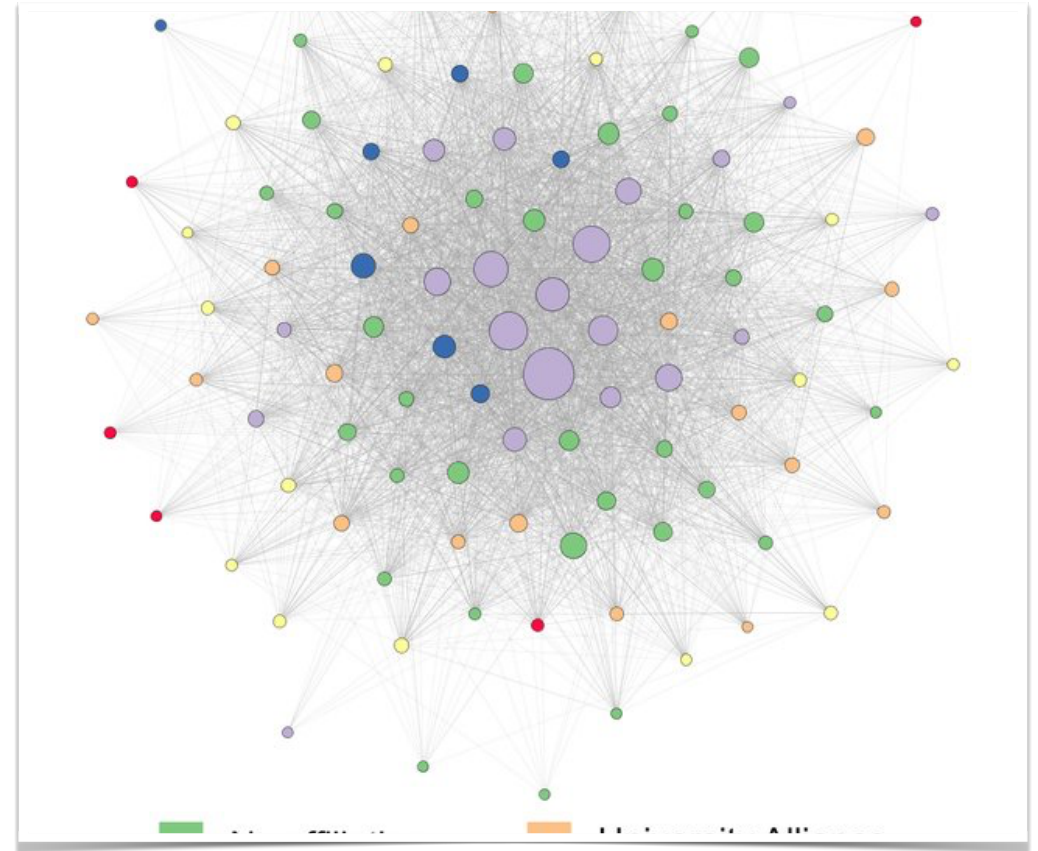
Carlos Castillo: "Effective Web Crawling", PhD Thesis, University of Chile, 2004.

Node Degree



Examples of Scale-Free Networks

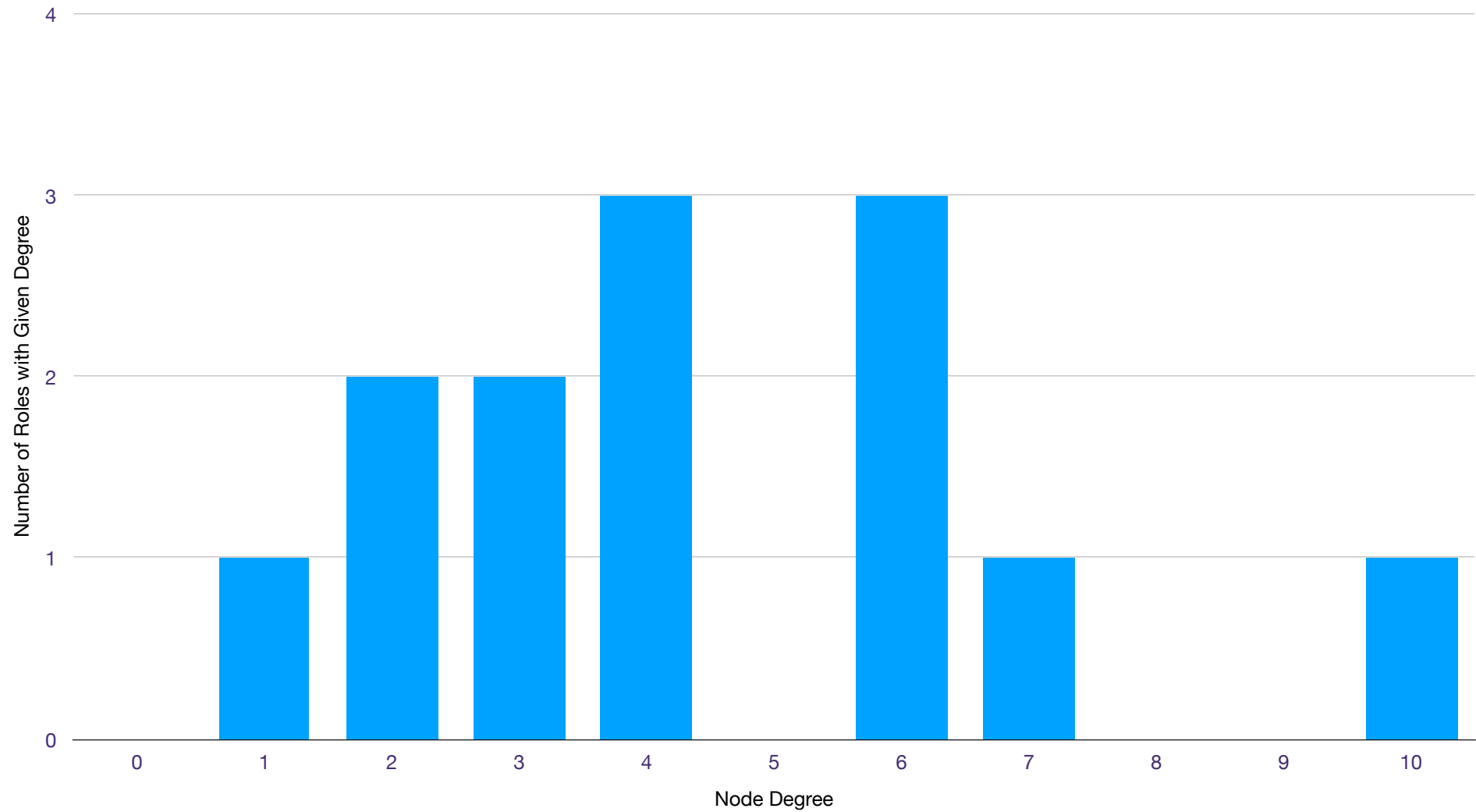
- WWW Page Citations
- Academic Paper Citations



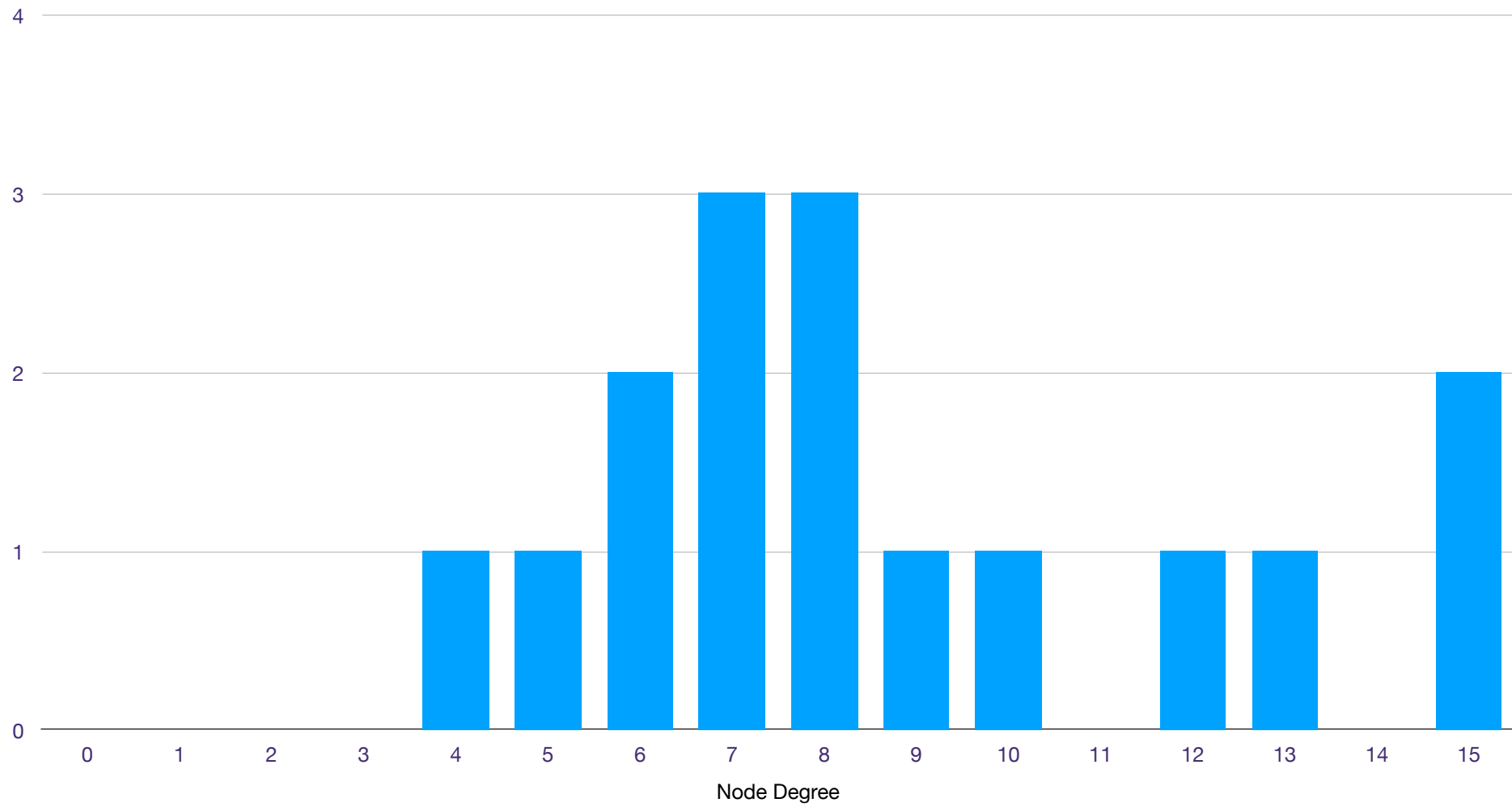
What Are They Good For?

- They are robust — they tend to survive random link breakages
- They tend to reduce internode traversal distance
- They have redundancy

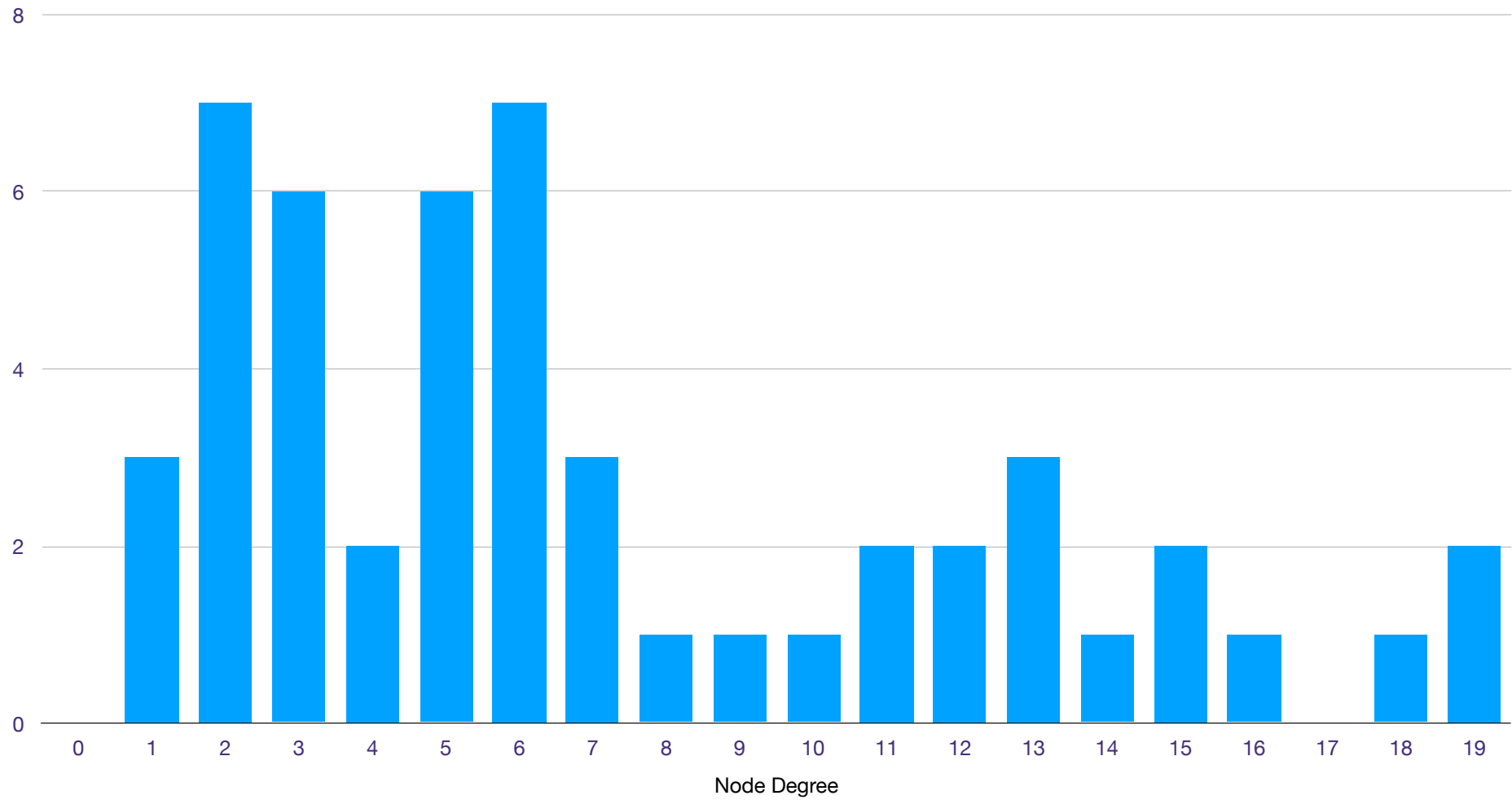
An Enterprise Systems Software Organization

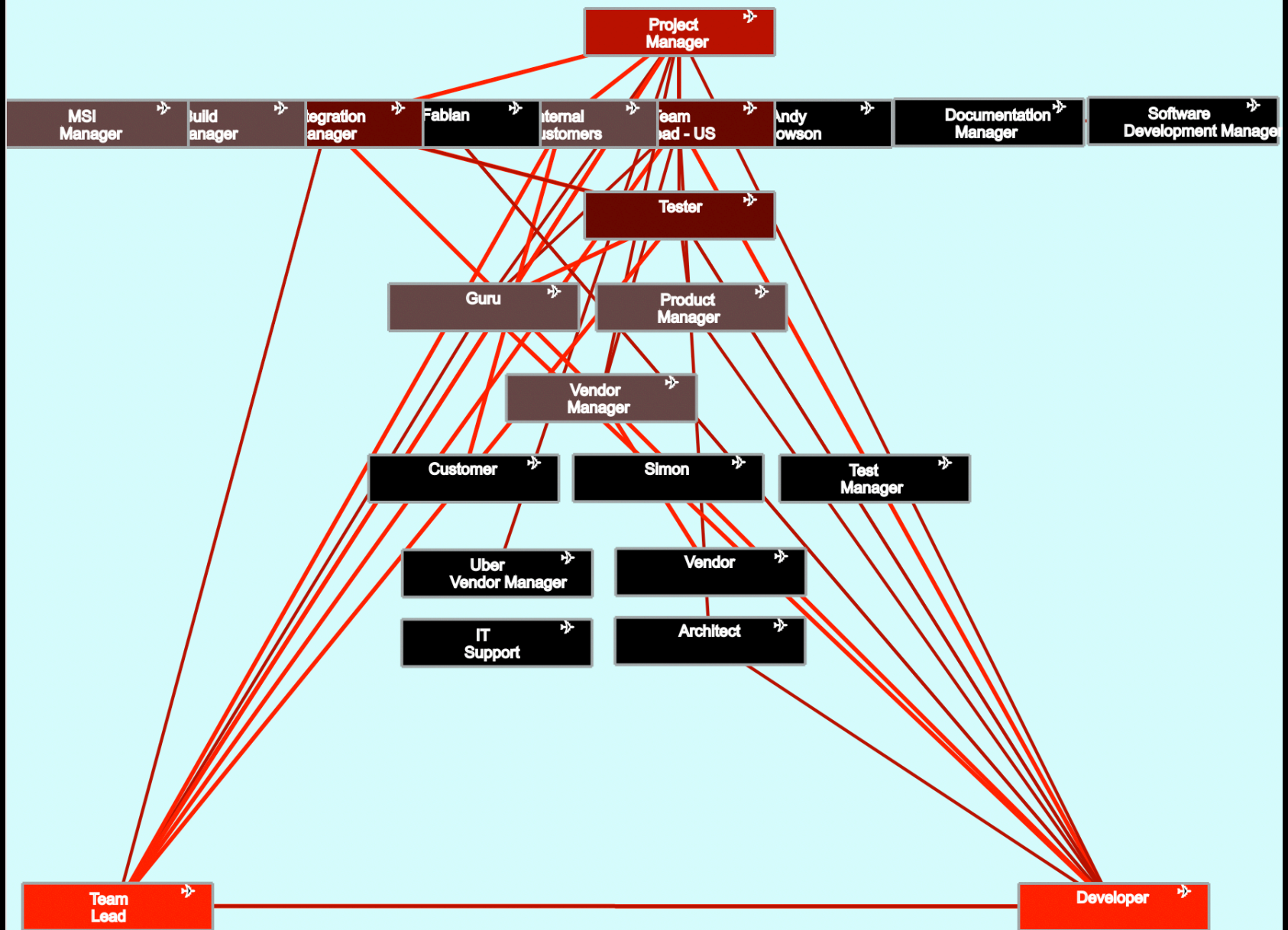


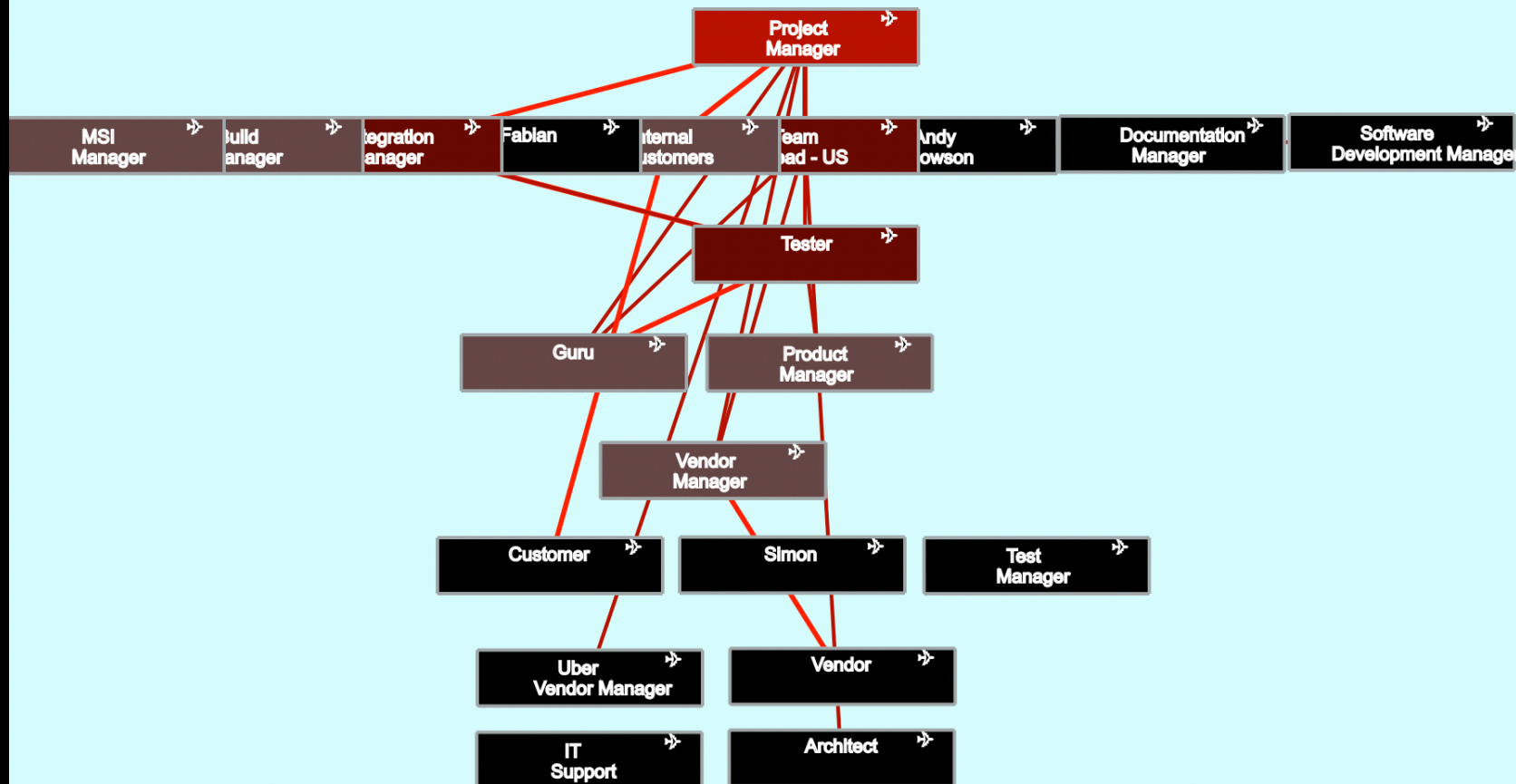
Borland QPW



A Documentation Organization in Danish Manufacturing



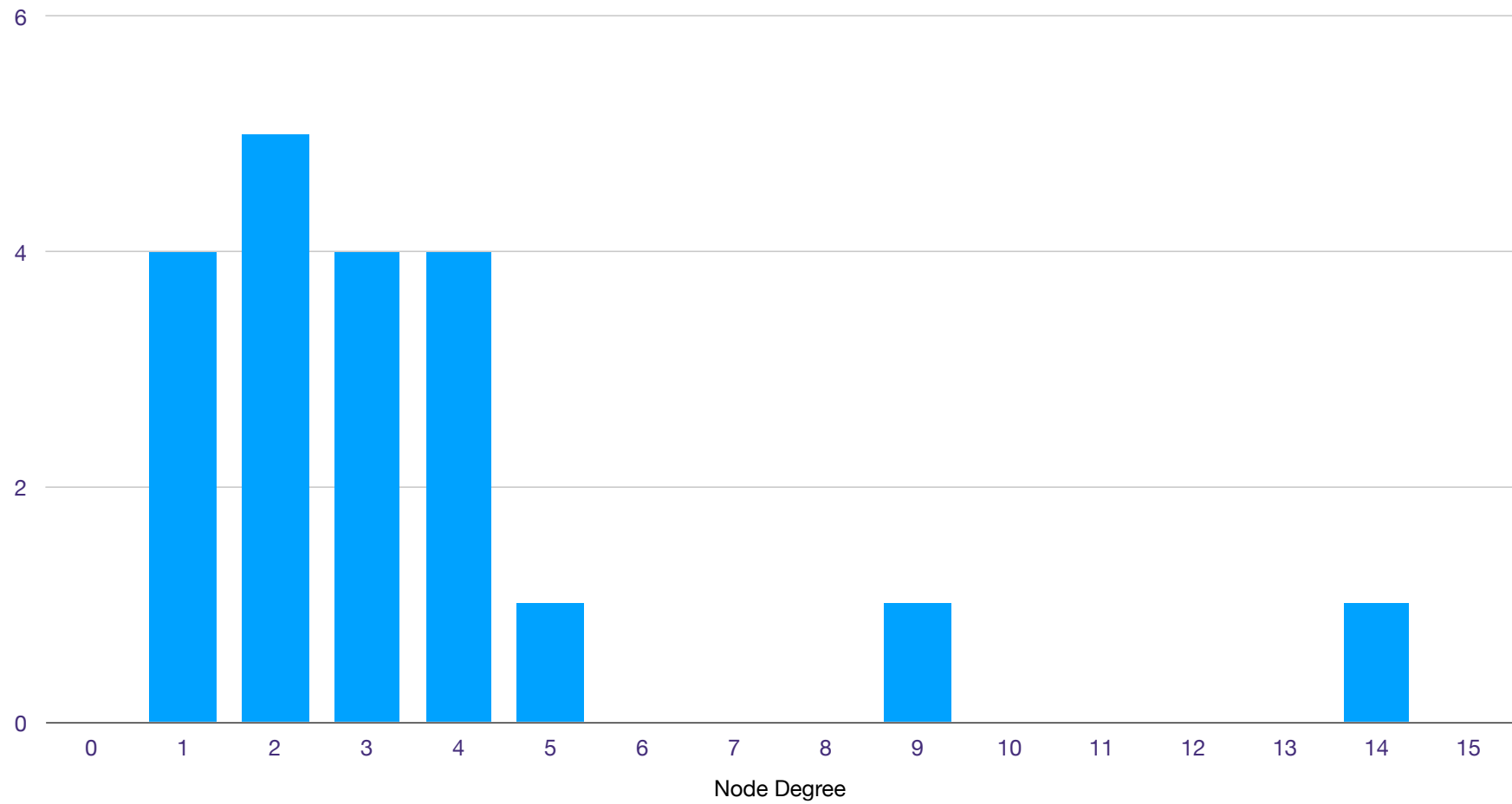


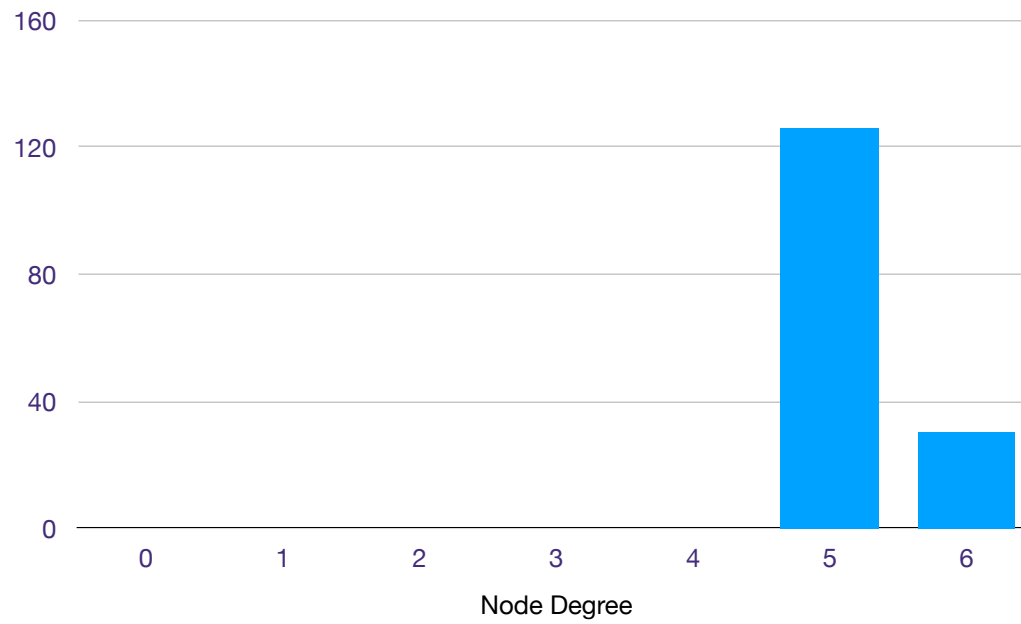


Team Lead

Developer

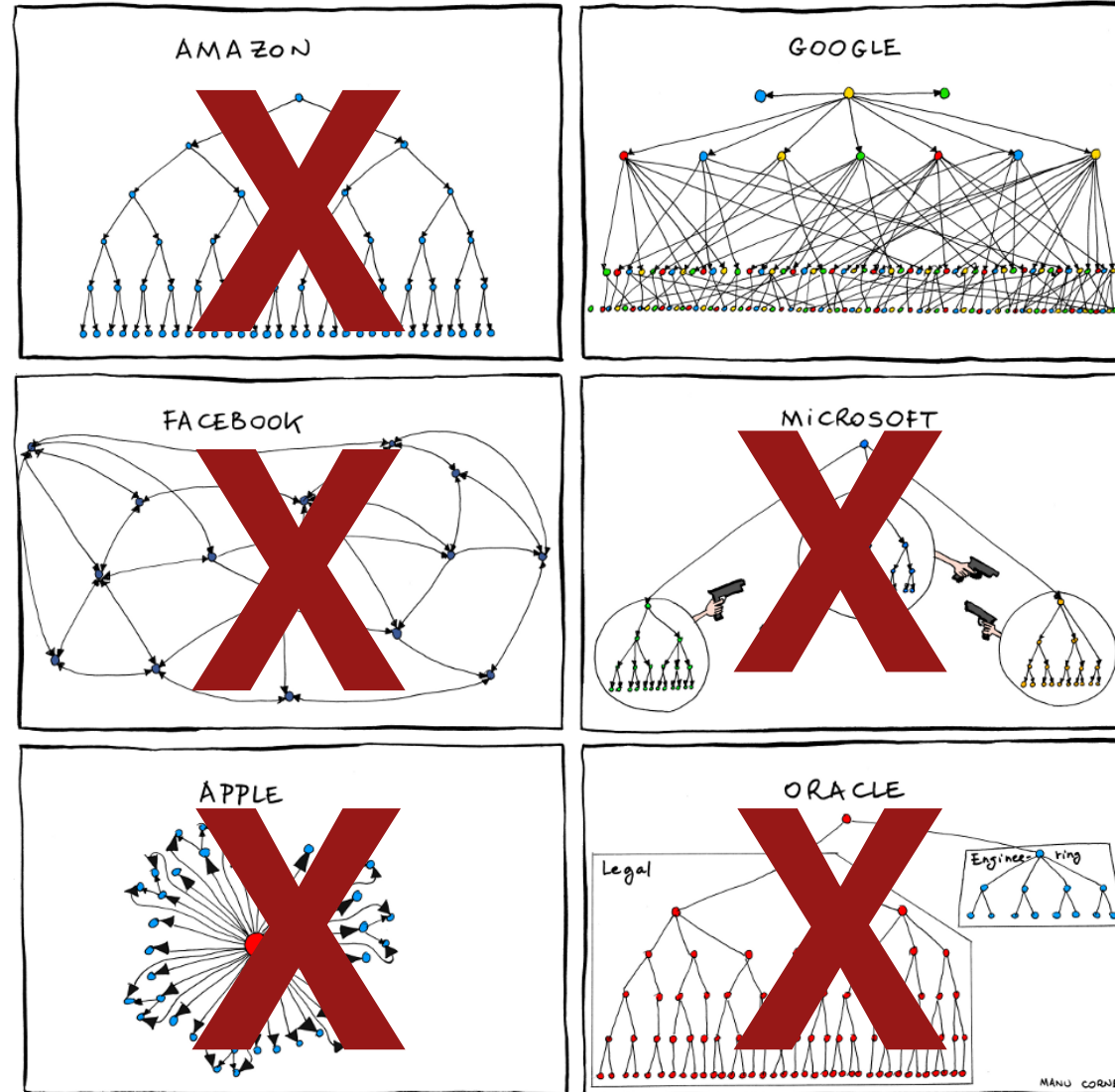
An XP Commerical Network Project





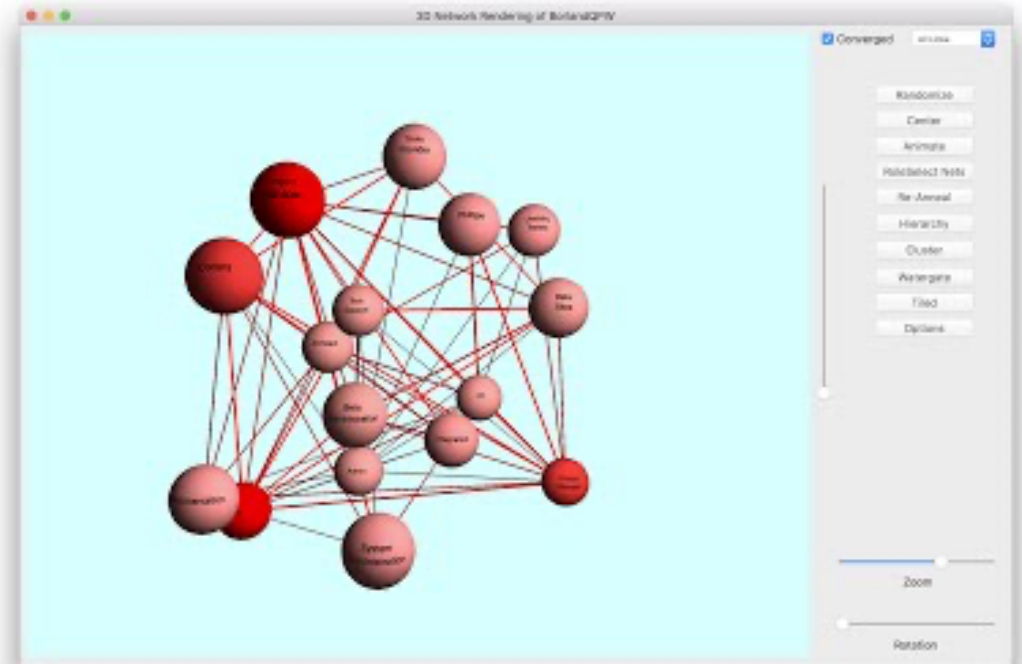
... We Already Know Some Examples

- (Dynamic) Scrum of Scrums
- Birds of a Feather
- Feature Owner and Component Owner (Cockburn)



Do It At Home

- ❖ The PasteurNet social network tool suite now has hub analysis
- ❖ Available at the Apple Store for MacBooks
- ❖ See: <https://www.pasteurnet3.com/>



Conclusion

- Most scaling frameworks are not scale-free
- At best, they are hierarchical organizations that just run interrupt-driven
- Small Scrum works because everyone is connected
- Scale-freeness supports enterprise agility
- Scrum has some facilities now, but more formalized “hubs” could make it even better

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The background is a solid blue color. On the right side, there is a series of white, wavy, vertical lines that curve slightly to the right, creating a sense of motion or a stylized 'S' shape. The lines are thin and closely spaced.