

# Open Project Management

from an “open” perspective

## UNIT 4

Instructor: Dr. Bradly Alicea

<http://bradly-alicea.weebly.com>



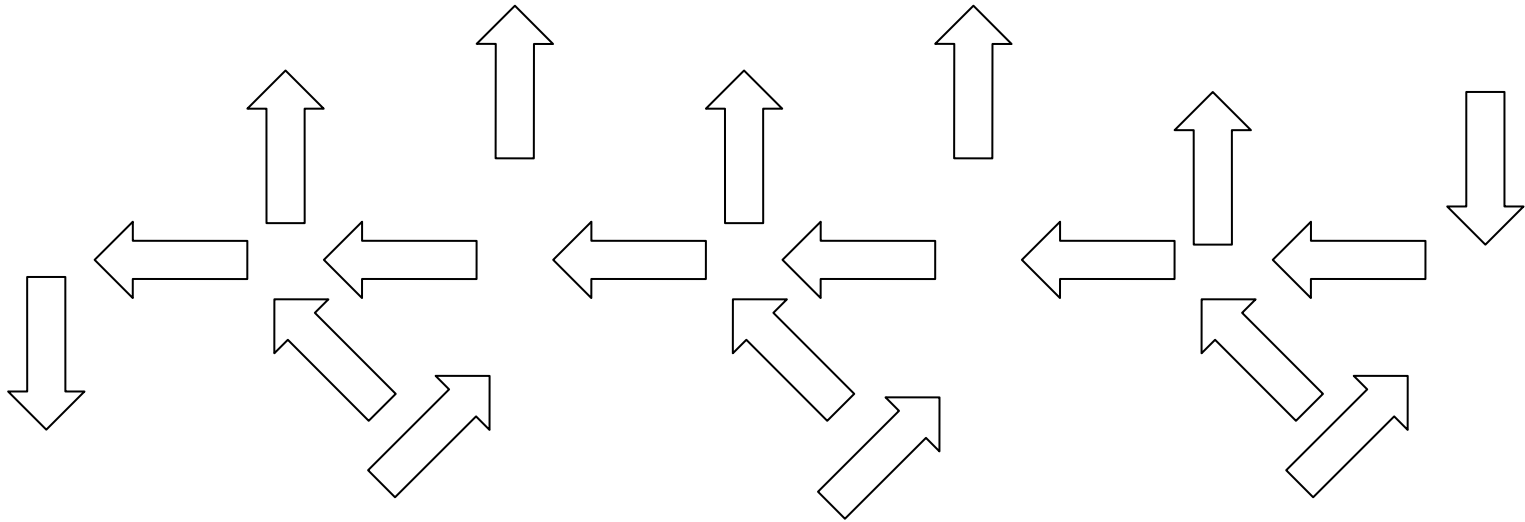
Lecture 17

All content

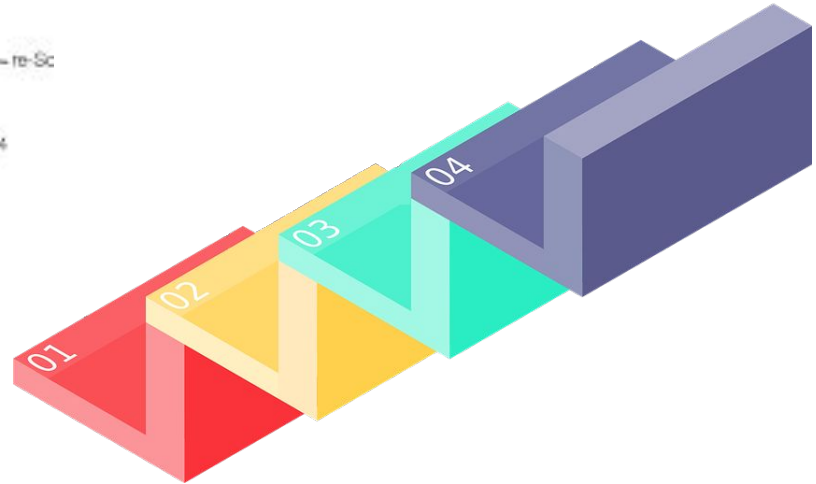


# Open Project Management

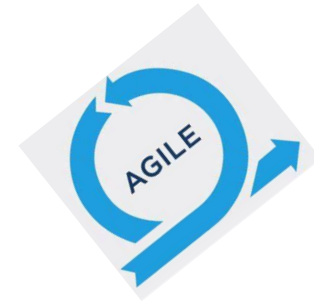
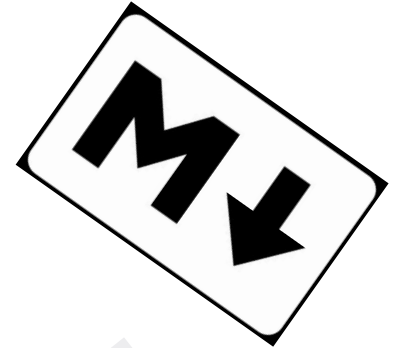
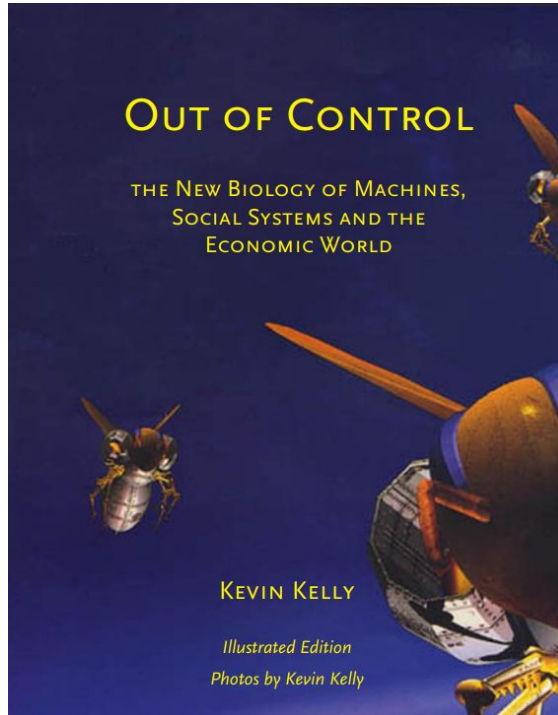
# Welcome Back!



**Can we tame the complexity inherent in technological projects? If so, why?**



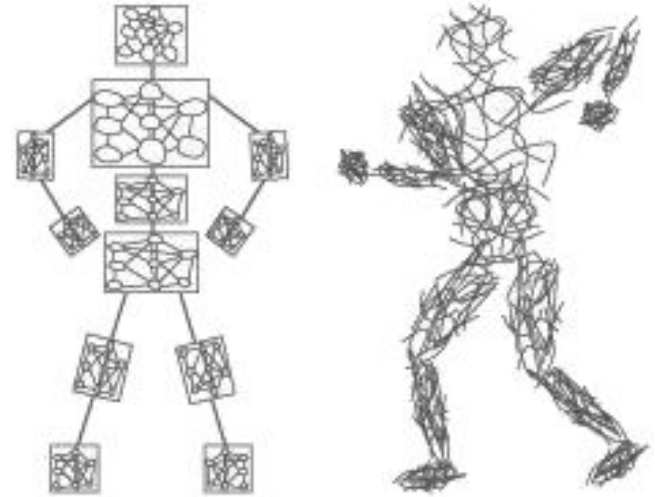
# Open-source Project Management: “keeping things under control”



## Kelly's *Technologies of Adaptation*

Phenomena such as distributed intelligence, niche economics, supervised evolution

- with feedback, these become “lifelike”.
- “wooly” or “scruffy” ideas → 10 years → product design.



### **Neats vs. Scruffies in AI Research**

<https://thedailyomnivore.net/2013/01/23/neats-vs-scruffies/>

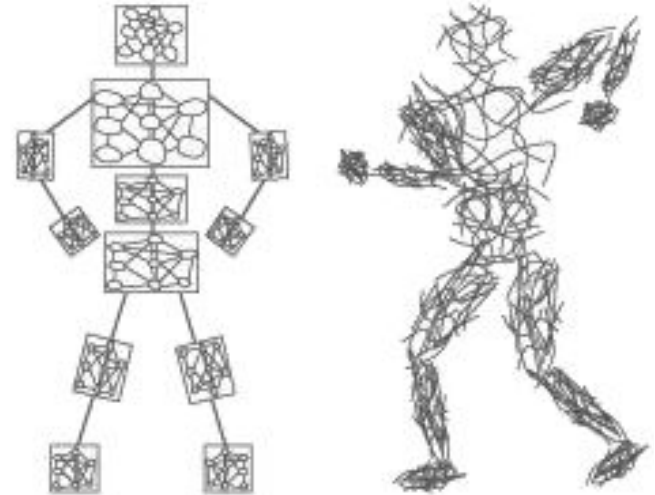
## Kelly's *Technologies of Adaptation*

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How are open-source projects a *technology of adaptation*?

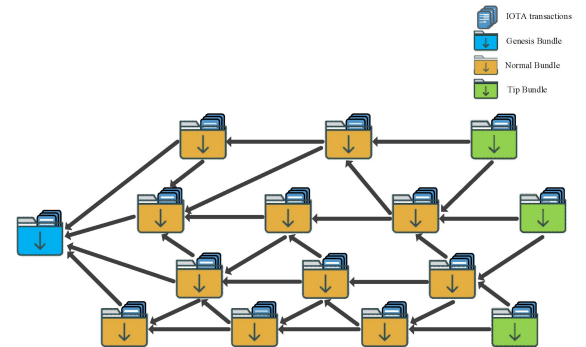
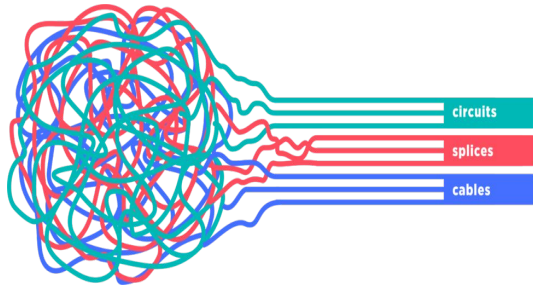
- “neat” vs. “scruffy” research. Using scruffy models for neat expectations.
- creative destruction (disruption) without accounting for effects.



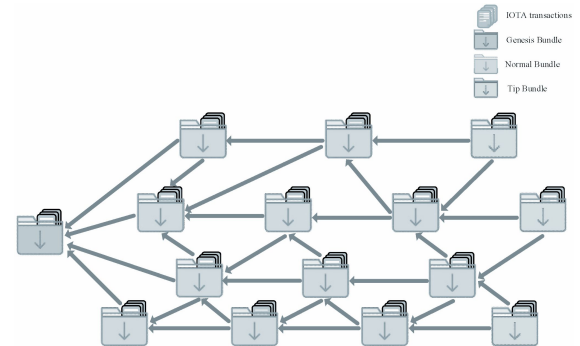
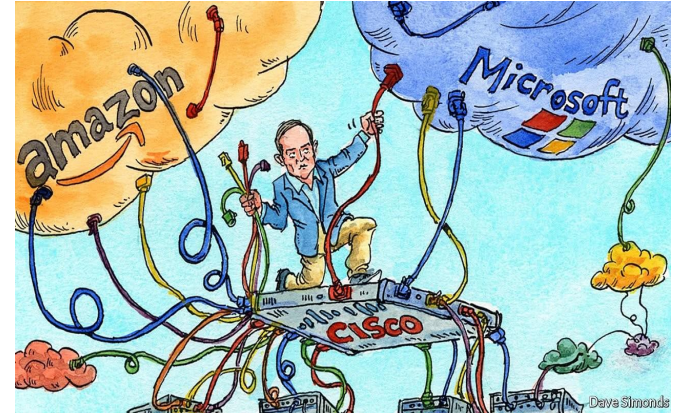
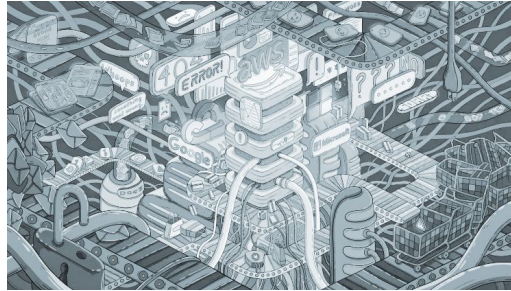
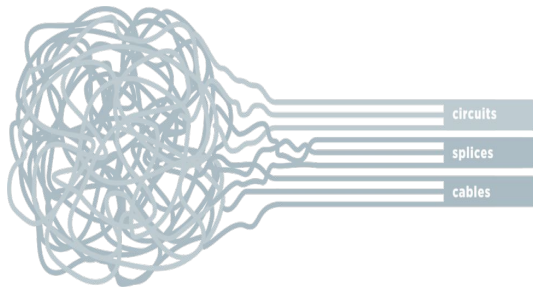
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# Information Technology is Intertwined with Complexity and Difficult, Nonlinear Problems

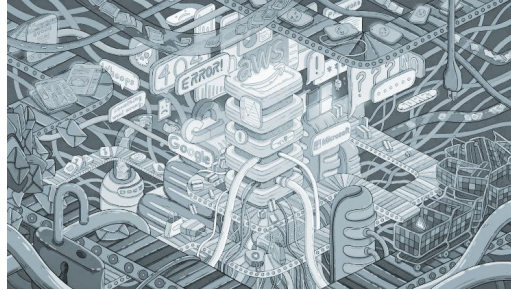
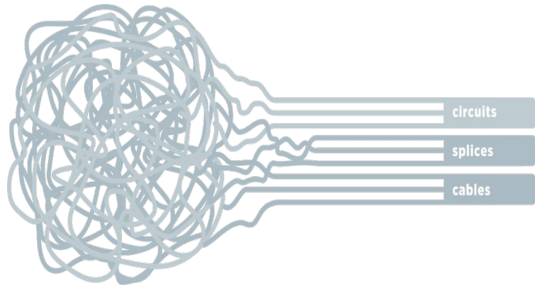


# Information Technology is Intertwined with Complexity and Difficult, Nonlinear Problems

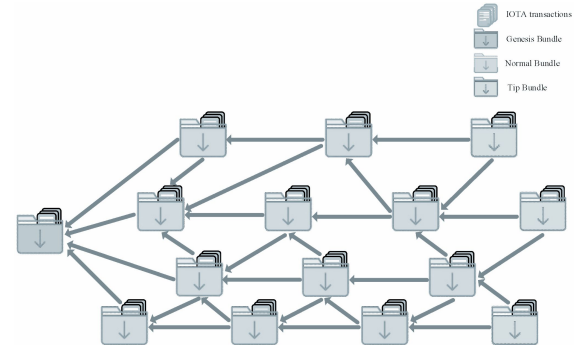




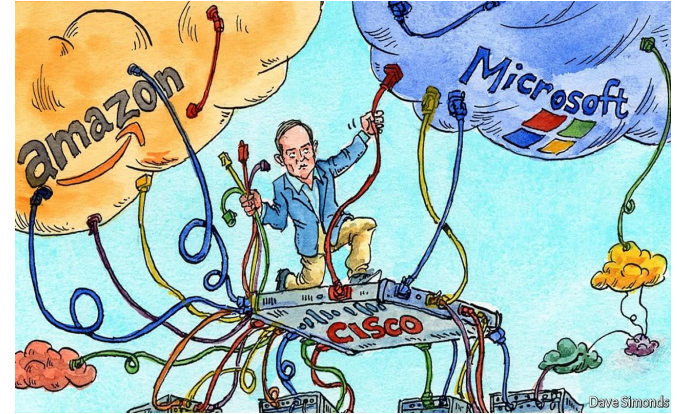
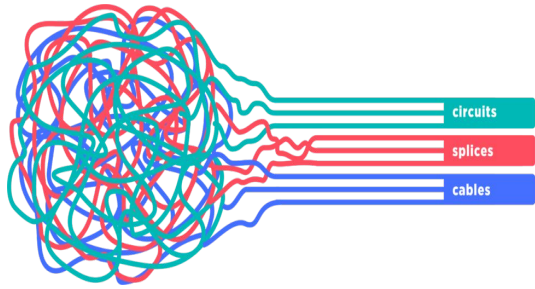
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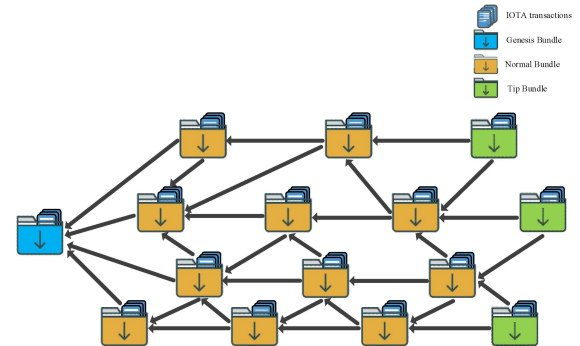
From: The Growing Complexity of Kubernetes



# Information Technology is Intertwined with Complexity and Difficult, Nonlinear Problems



From: The Growing Complexity of Kubernetes



# Sociotechnical Problems are Wicked Problems



# Wicked Problems



Lack clarity in their aims and solutions, challenges of articulation, and internal logic.

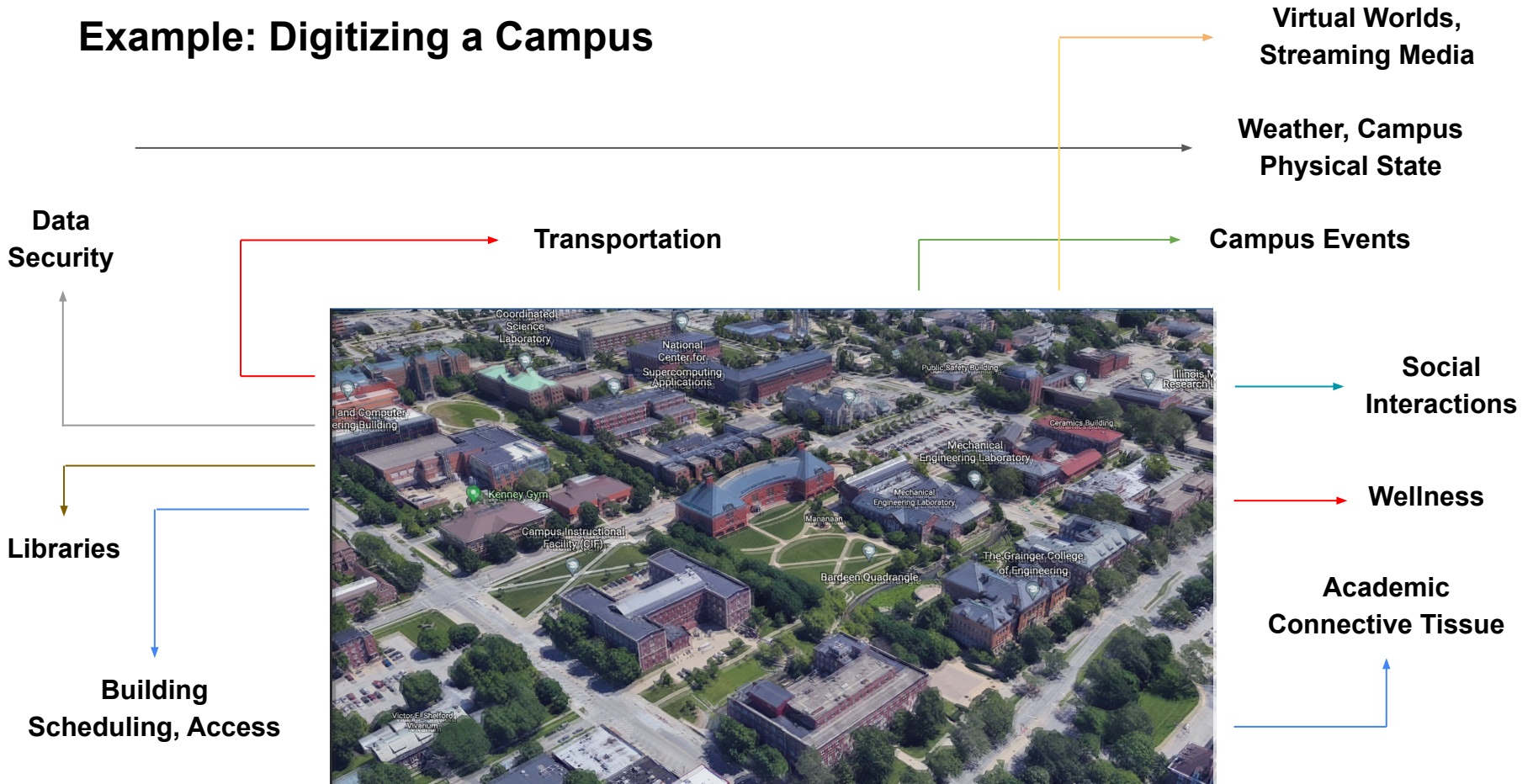
Subject to real-world constraints that prevent quick solutions and replication.

Impossible to solve in a way that is simple, complete, or final.

# Sociotechnical Problems are Path-dependent Problems



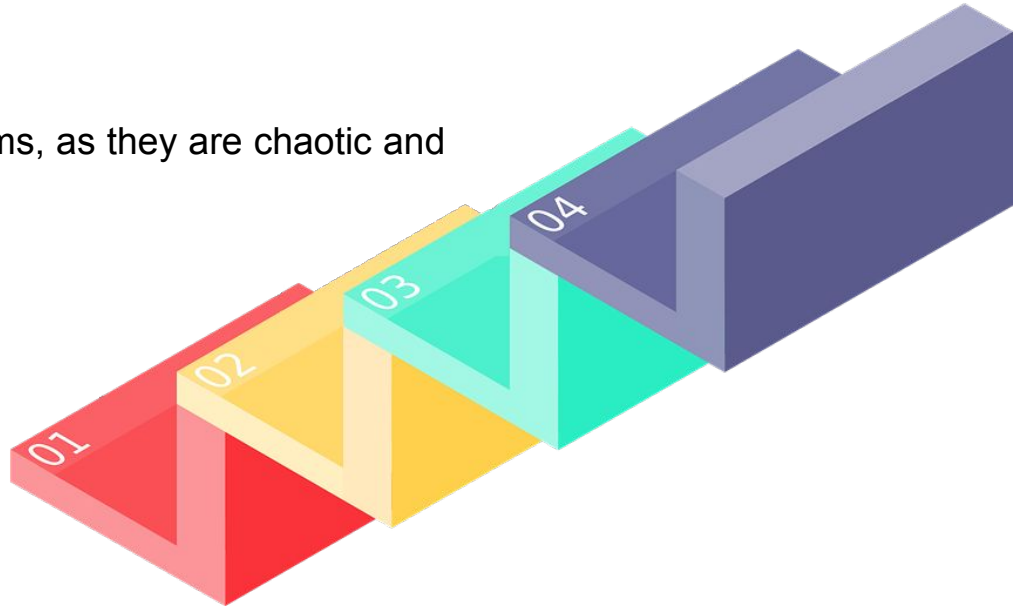
# Example: Digitizing a Campus



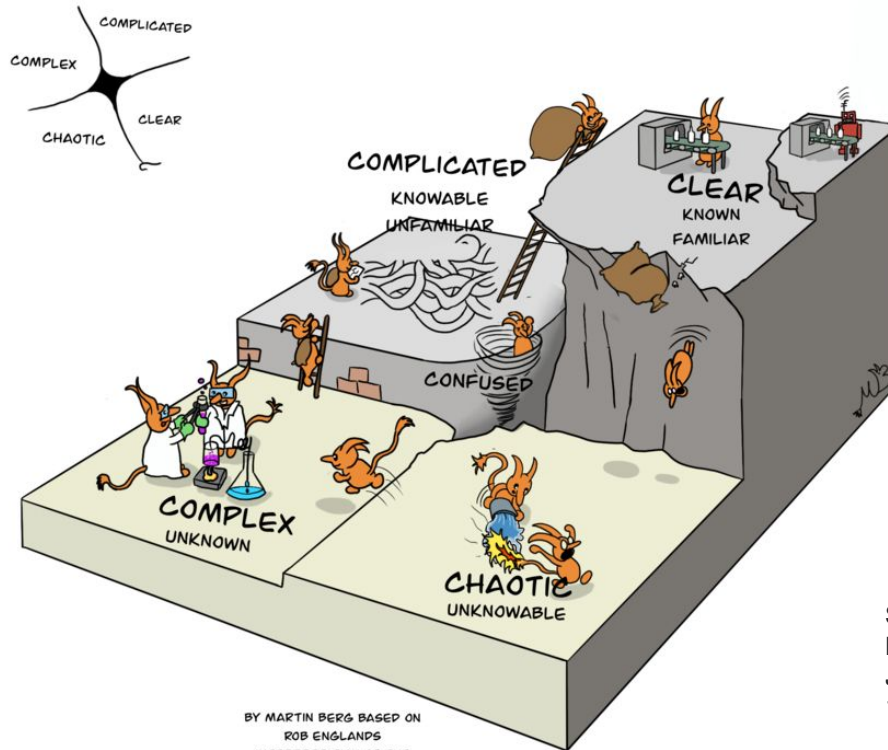
## Is linearizing the problem the answer?

It depends on the problem and who you ask. Linearization is good for systems that has few interacting components (e.g. noisy signals).

This is not the case with wicked problems, as they are chaotic and uncertain.



# Cynefin: Complex to Chaotic Domain

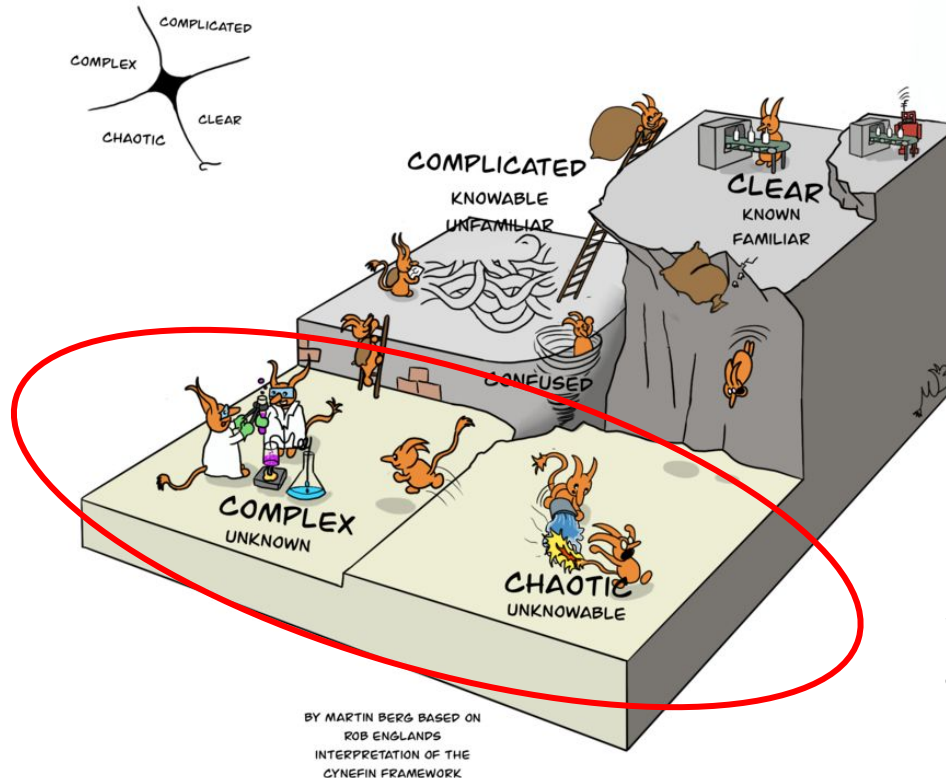


BY MARTIN BERG BASED ON  
ROB ENGLANDS  
INTERPRETATION OF THE  
CYNEFIN FRAMEWORK

Snowden, D. (2002). Complex Acts of Knowing: Paradox and Descriptive Self Awareness. *Journal of Knowledge Management*, 6(2), 100–111.



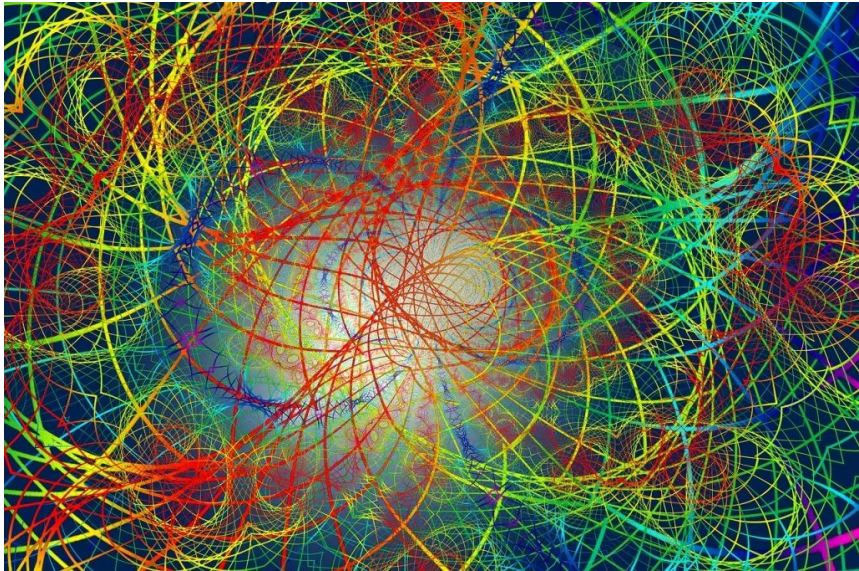
# Cynefin: Complex to Chaotic Domain



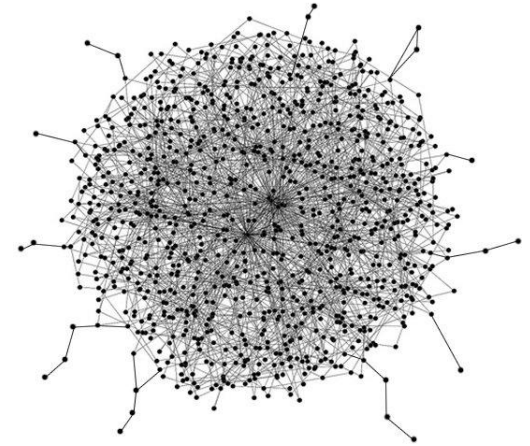
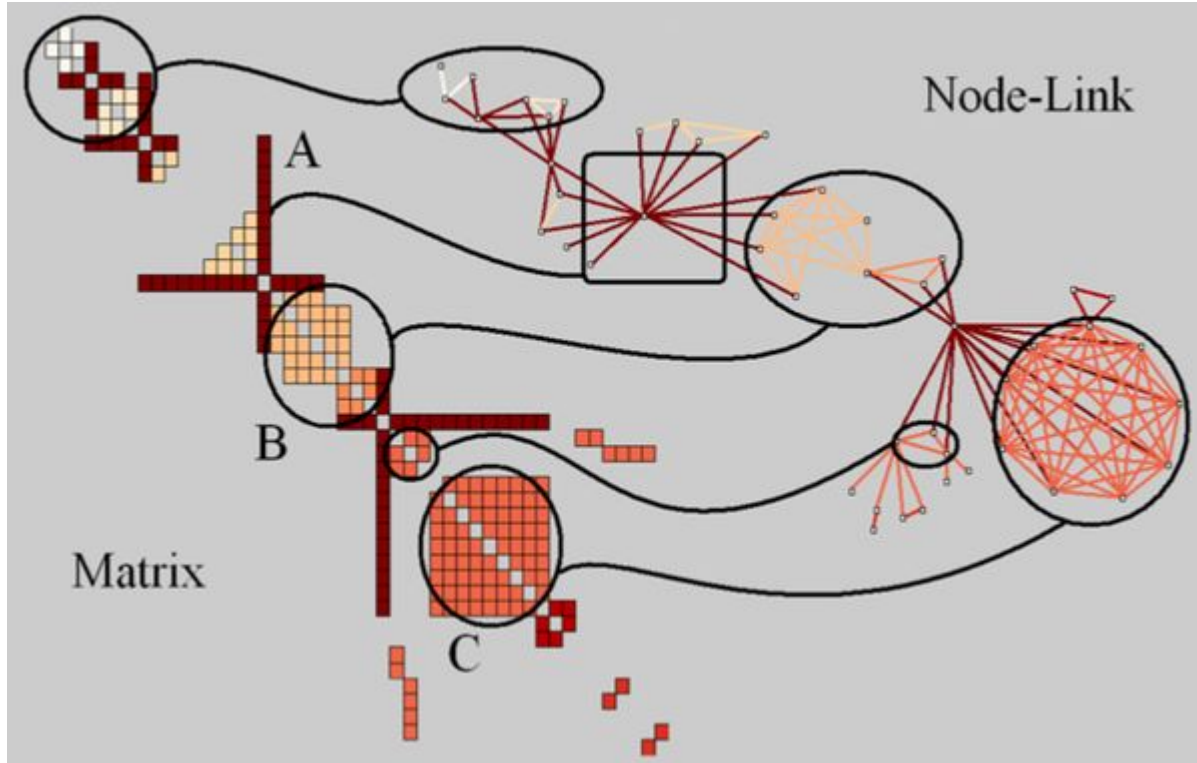
Snowden, D. (2002). Complex Acts of Knowing: Paradox and Descriptive Self Awareness. *Journal of Knowledge Management*, 6(2), 100–111.

**Alternative to the linear: characterize the unknown and unknowable as a strongly interacting and nonlinear system.**

# Chaotic Attractors of a Dynamical System



# Mass Interactions of Adjacent Components

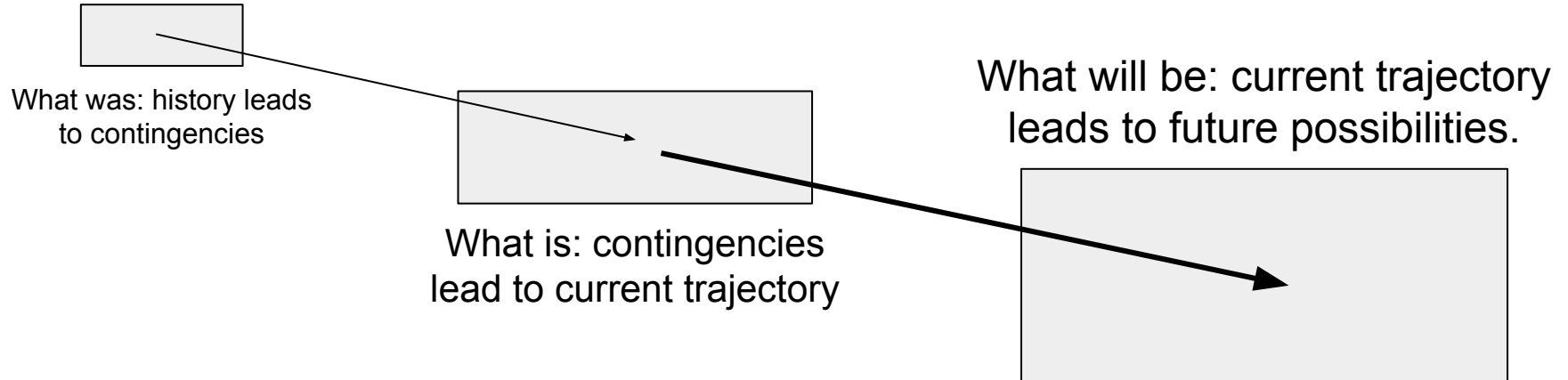


COURTESY: <https://eagereyes.org/techniques/graphs-hairball>

## The “uncertain” has informative components....

Dynamical system: evolution of a system as a trajectory.

Mass interactions: adjacency of strong and weak interactions.



**Trajectories are the key to understanding extracting potential orderings from a chaotic, dynamical technological system.**

## **Examples**

Long-term open-source projects with a lot of forks and contributors (Linux).

Technological innovation in a given area of technology (Apple Macs).

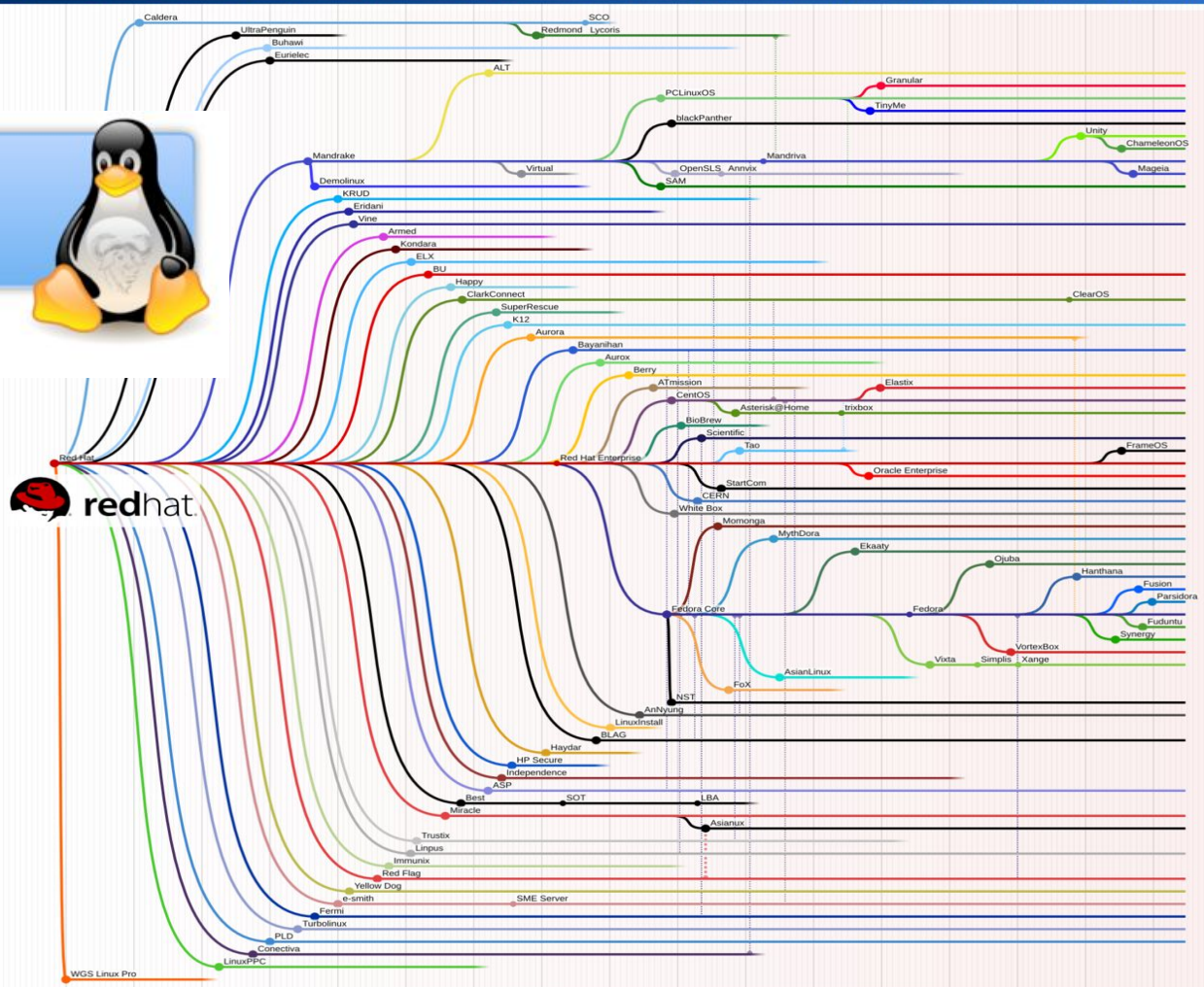
# Red Hat Family Tree

based on GLDT version 11.6

A. Lundqvist, D. Rodic - futurist.se/gldt  
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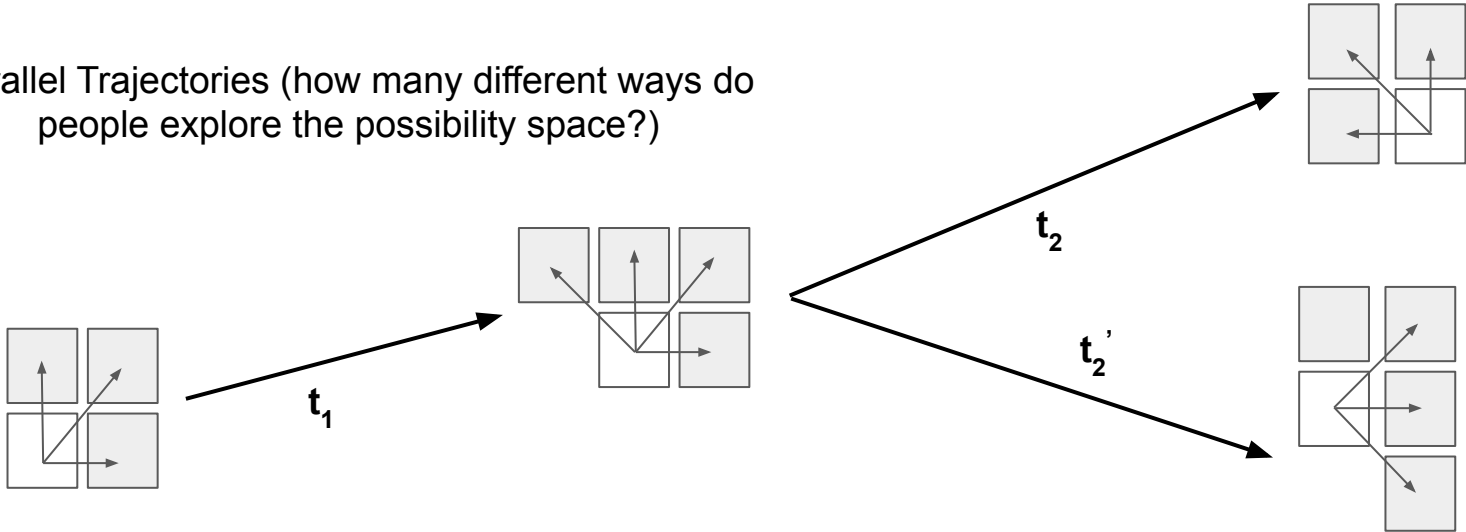


- Influence, developer switching
- ..... Rebasing, substantial code flow, project overtaking
- ..... Developer & code sharing, project merging



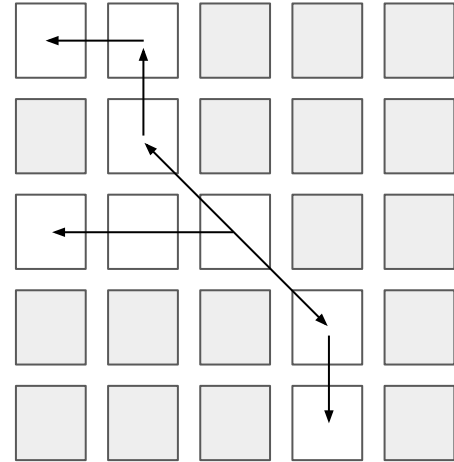
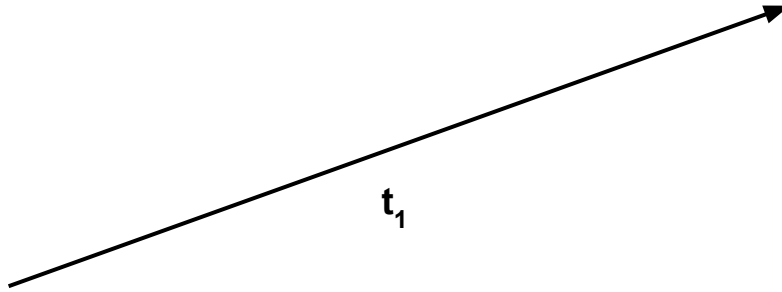
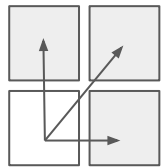
# Technical Innovation as the Adjacent Possible

Parallel Trajectories (how many different ways do people explore the possibility space?)





# Technical Innovation as the Adjacent Possible



Constrained  
Trajectories

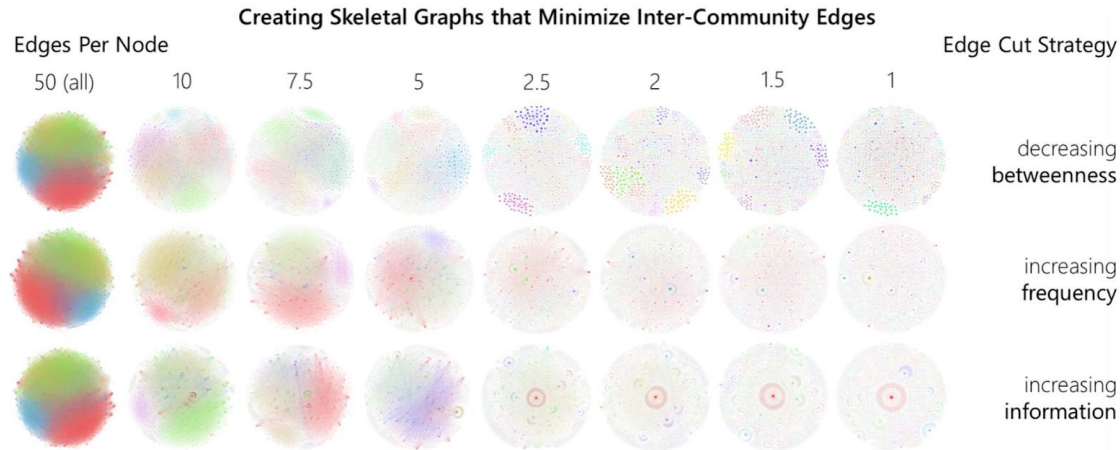
Linearization is not the goal in and of itself, and can often lead to misunderstandings and poor systems integration.

## **Examples**

Hairballs: massively interacting systems with explorable order.

Intentionality suboptimal design to account for technological effects (social, psychological, future interactions).

# Nonspecific Interactions = Hairballs



COURTESY: Mathieu Jacomy: <https://reticular.hypotheses.org/1809>

# Hairballs + Analysis = Specific Patterns, Motifs, and Pizza

Simplifying the Systems Hairball – With a Pizza Analogy

<https://www.suuchi.com/simplifying-the-systems-hairball-with-a-pizza-analogy/>

Grooming the hairball - how to tidy up network visualizations?

*Proceedings IEEE VIS 2013*

[https://www.researchgate.net/publication/281050201\\_Grooming\\_the\\_hair\\_ball\\_-\\_how\\_to\\_tidy\\_up\\_network\\_visualizations](https://www.researchgate.net/publication/281050201_Grooming_the_hair_ball_-_how_to_tidy_up_network_visualizations)

What do we see when we look at networks: Visual network analysis, relational ambiguity, and force-directed layouts. *Big Data and Society*, 8(1).

<https://journals.sagepub.com/doi/10.1177/20539517211018488>

Motif Simplification: Improving Network Visualization Readability with Fan, Connector, and Clique Glyphs.

*Proceedings IEEE SIGCHI 2013*

<https://hcil.umd.edu/pub-perm-link/?number=2012-29>

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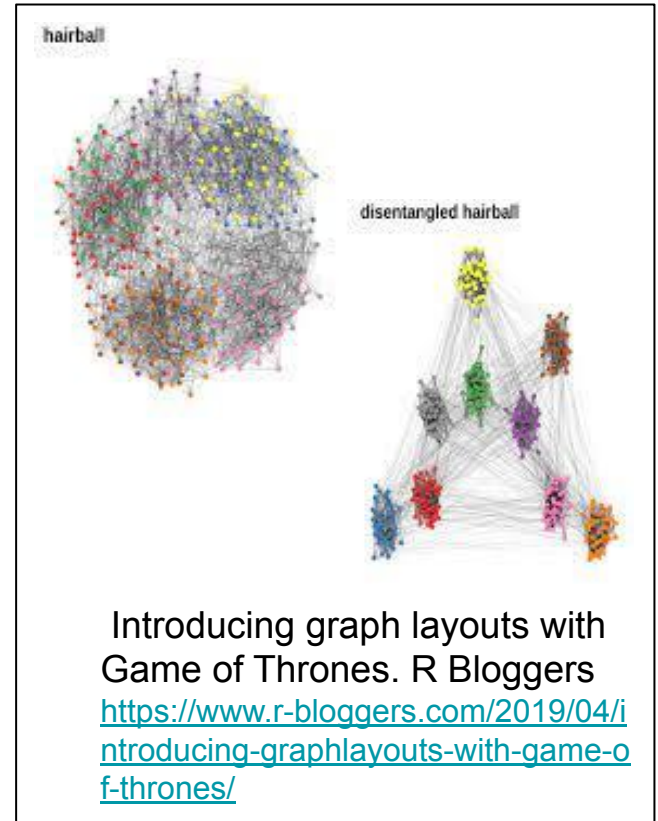
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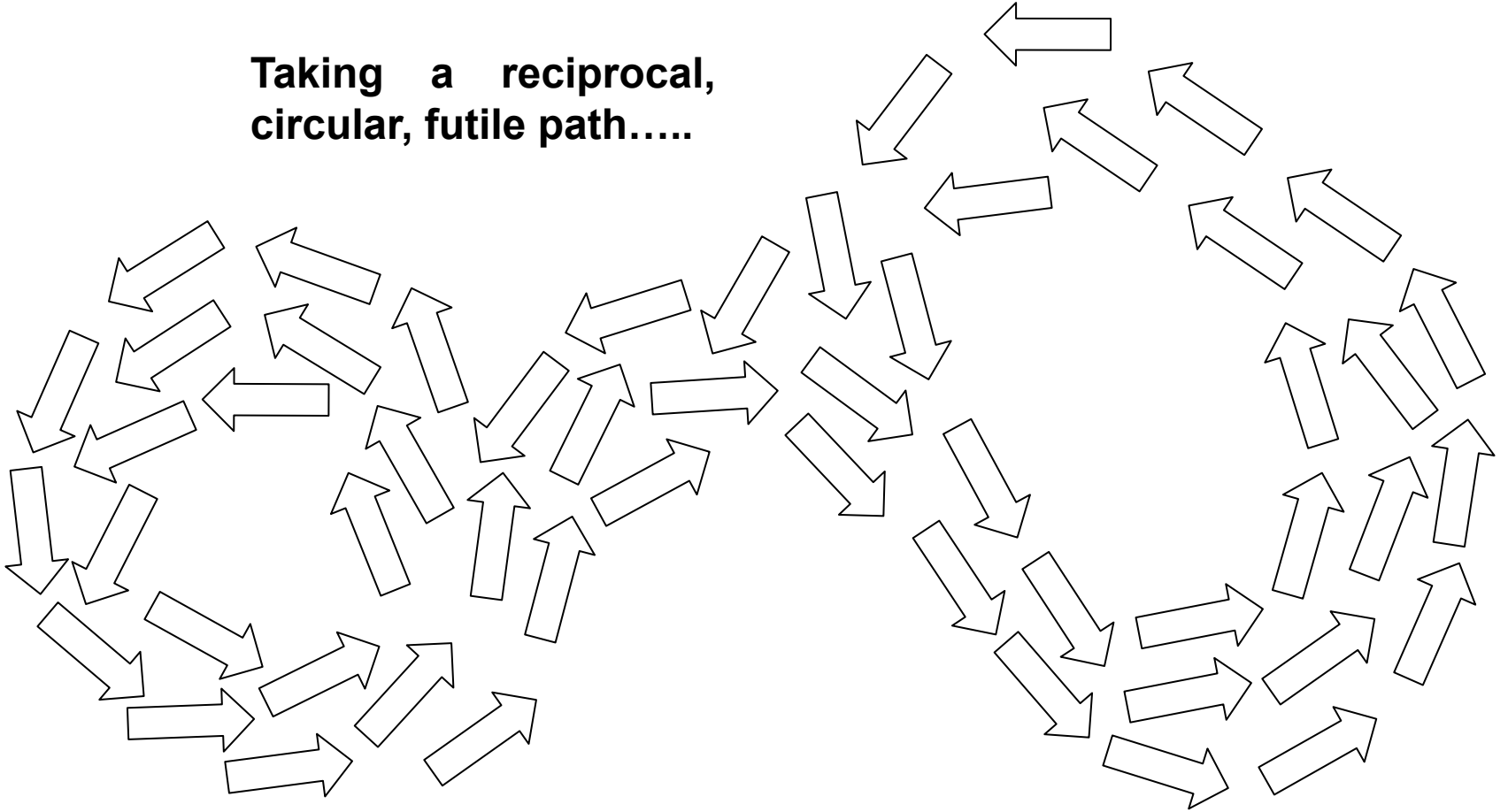
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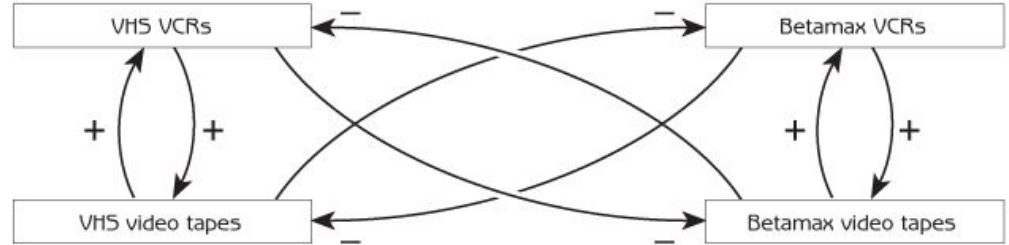
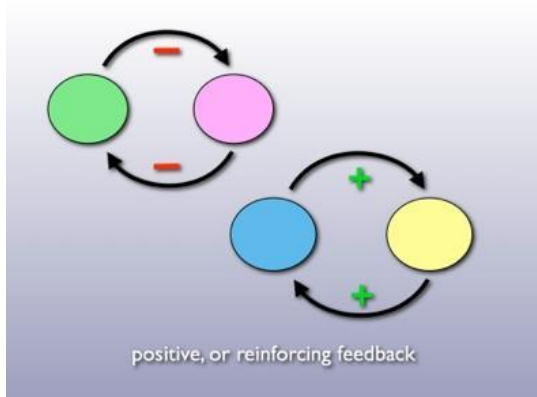
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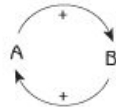


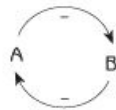
**Taking a reciprocal,  
circular, futile path.....**



# Feedback is a fundamental aspect of technology development



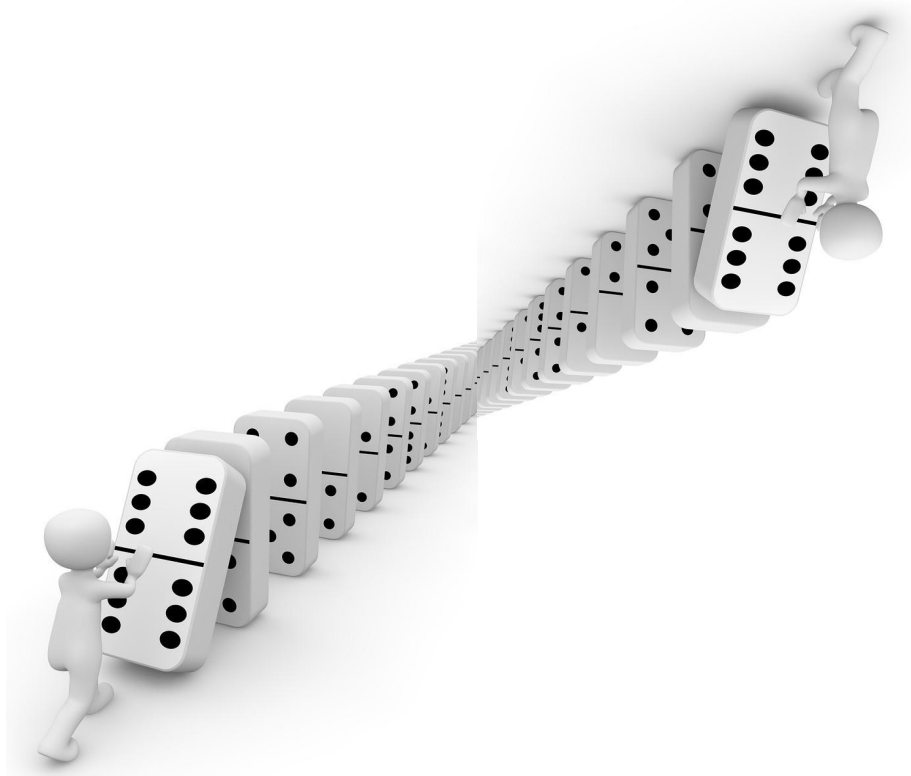
Feedback loops of the form  are positive because  $[+][+] = [+]$

Feedback loops of the form  are also positive because  $[-][-] = [+]$

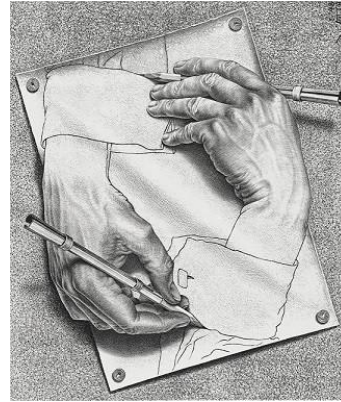
A change in A causes an opposite change in B, and a change in B causes an opposite change in A. The effect around the loop is therefore to increase change

COURTESY: <http://gerrymarten.com/human-ecology/>

# Reciprocal Causation

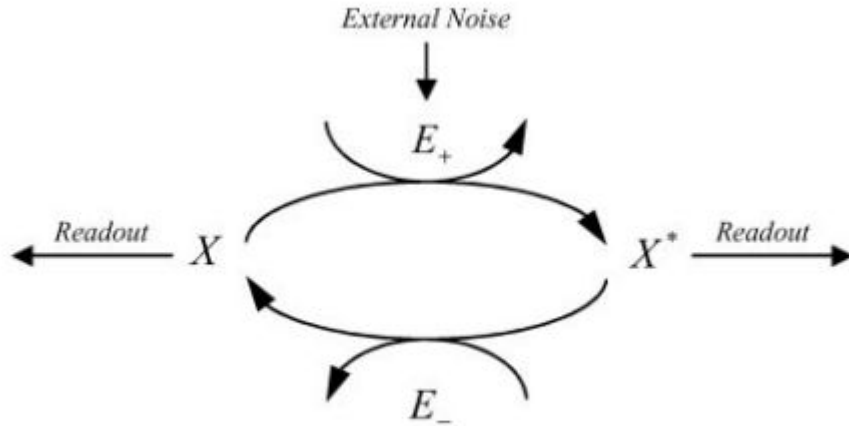


Feedback and circularity as countervailing processes and recursivity.



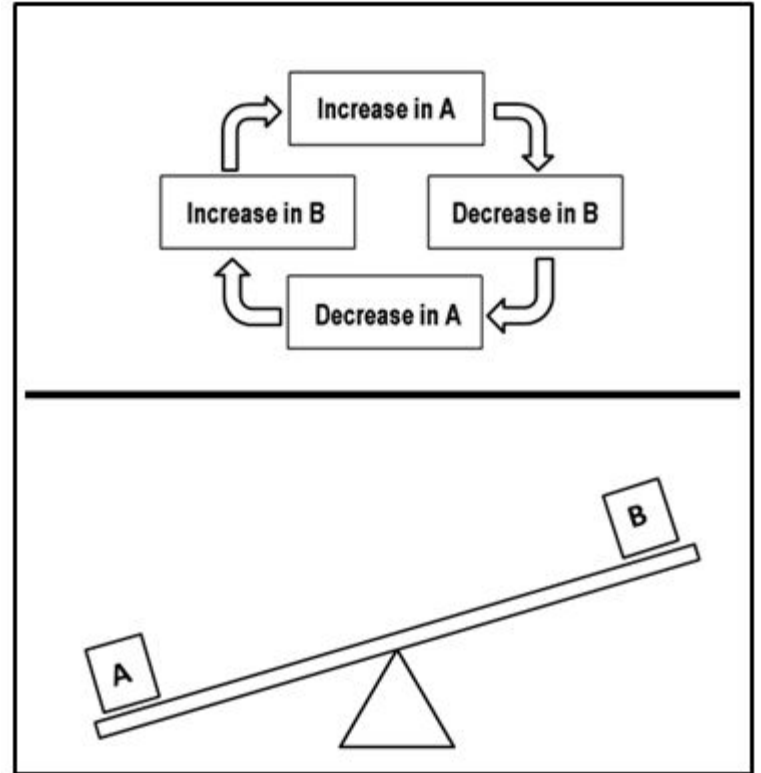


# Futile Cycles

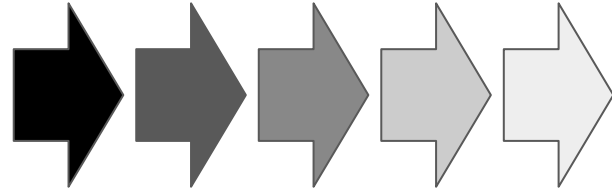


Futile cycle as an enzymatic reaction.

# Futile Cycles



**Going forward.....**



Path-dependence leads to salient technical issues.

Diverse effects on a system are features to work with rather than around.

Nonlinear processes are often a feature of actionable outcomes.

# Tech Toolbox: between chaos and rigidity

(Stack Overflow blog)

<https://stackoverflow.blog/2023/03/23/your-tech-toolbox-the-middle-ground-between-tech-chaos-and-rigidity/?cb=1>



Essays, opinions, and advice on the act of computer programming from Stack Overflow.



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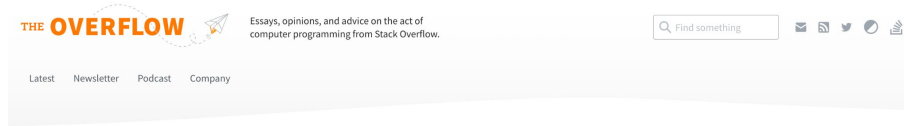
## Your tech toolbox: The middle ground between tech chaos and rigidity

Do you solve new problems the same way because it's already done? Or do you go with a new approach that offers more benefits?



Daniel Orner





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Daniel Orner



Two approaches: taking a balanced view (golden mean)?

- 1) Wild West Approach: full autonomy, absolute change.
  - risk of issue and technological sprawl, hard to reuse tools and past solutions.
- 2) Lock it Down Approach: no autonomy, a single solution from the start.
  - easy to reuse tools and past solutions leads to increasingly hacky and costly kludges.

## Mapping this to an Agile Framework (or something similar)

Networked Kanban (Jurgen Appelo): <https://kanbantool.com/kanban-library/case-studies/networked-kanban>

Kanban in a Nonlinear Flow:

<https://hunskaar.com/2011/11/03/kanban-in-a-non-linear-flow/>

What complexity wrought: non-sequential project stages, ill-defined issues and project states, and technical expertise that is non-contiguous over time.

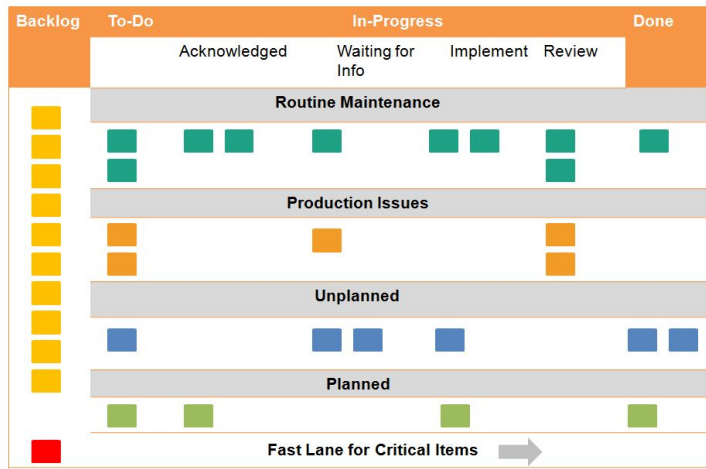
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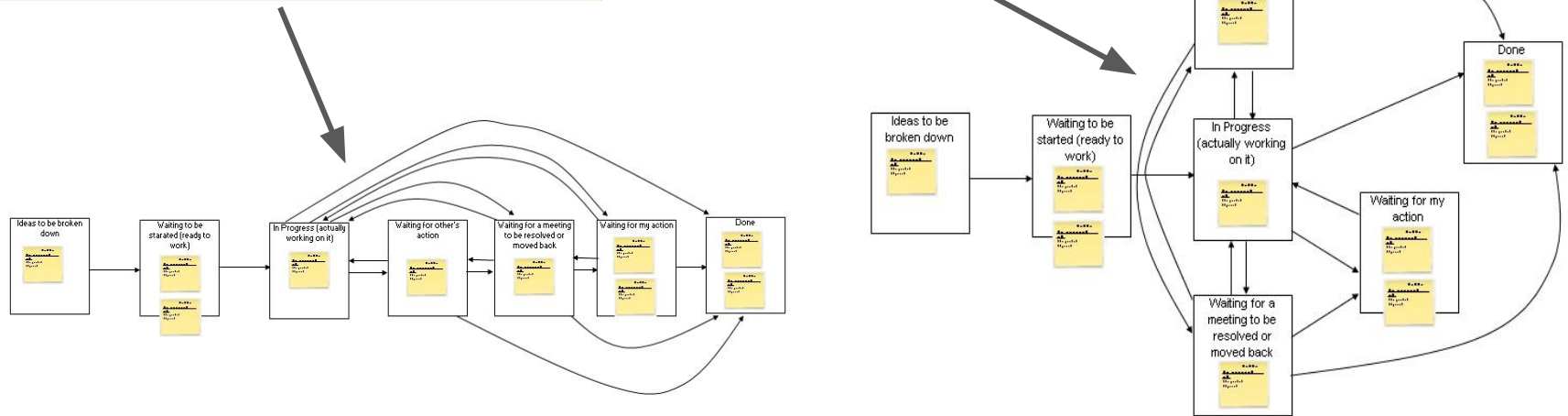
Resulting project management techniques:

- 1) multiple entry and exit points for each issue (local and global flow are distinct).
- 2) different types of representation within the same project (linear, web-like, circular visualizations).
- 3) decentralized access to the entire project (only a few people have access to the entirety of the project).



# The Optimum way to use Kanban Boards to streamline your IT Operations

<https://digite.medium.com/the-optimum-way-to-use-kanban-boards-to-streamline-your-it-operations-a04e9eec5d22>

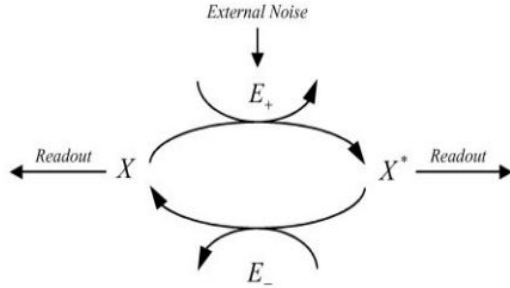


## Kanban in a Networked Process

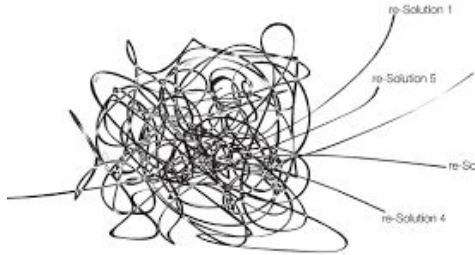
<https://softwaredevelopmenttoday.com/2011/11/kanban-in-a-networked-process-visualise-the-network/>



## Open-ended Approaches to Open Source

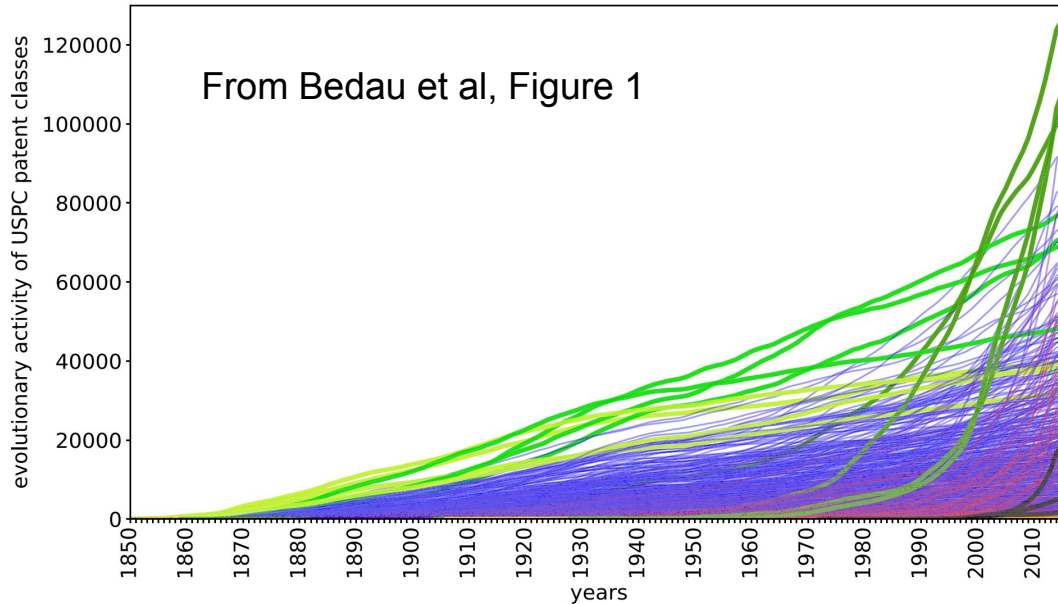


Consider a system with both a prerequisite and outcome. An objective that optimizes this process is not relevant.



Open-ended is the potential for change given this system's complexity and its ability to transition to new trajectories.

# Patent Space as an Open-ended Evolutionary System



A model incorporating US Patent data over 165 years (ongoing patent data):

- new forms of technology emerge over time.
- unanticipated innovations emerge over time

Both of these tend to transcend previous categorical systems.

Bedau et.al (2019). Open-Ended Technological Innovation, *Artificial Life*, 25(1), 33-49.

# How to bring created issues onto the project board

The screenshot shows a GitHub Project Board for a project named "Quiz #2". The board is organized into columns representing different stages of work: "Todo", "On Hold", "In Progress", "Urgent", and "Future".

- Todo (1):** Issues that have been proposed but not started (could have). It contains one item: "Project-Management #55 Test Issue".
- On Hold (0):** Issues that require a dependency (could have).
- In Progress (0):** Issues that are actively being worked on.
- Urgent (0):** Issue that requires immediate attention (must have).
- Future (0):** Issue that can be addressed in the future (nice to have).

A dropdown menu is open over the "Todo" column, listing several issues:

- Develop list of Champaign apartments #57
- Wee\_Ethan.md #56
- Project Board Issue #54
- Project Board Screenshot #53
- Test Item #51
- Test Item #52
- Test item #49
- Test Item #50
- Create new issue
- Add items from OREL-group/Project-Management

A red arrow points from the "Add items from OREL-group/Project-Management" option in the dropdown menu towards the "Urgent" column, indicating the action of moving items to that column.

At the bottom, a search bar contains the text: "repo:Project-Management Search issues and pull requests, create a new issue, or add multiple items".